GW - 28

MONITORING REPORTS

DATE:
1977 - 1994

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

December 9, 1994

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-185

Mr. Darrell Moore
Environmental Specialist
Navajo Refining Company
P.O. Box 159
Artesia, New Mexico 88211-0159

RE: ADDITIONAL GROUND WATER MONITOR WELLS
NAVAJO ARTESIA REFINERY
EDDY COUNTY, NEW MEXICO

Dear Mr. Moore:

The New Mexico Oil Conservation Division (OCD) has completed a review of Navajo Refining Company's September 22, 1994 "WORKPLAN TO SATISFY GW-28 MODIFICATION CONDITIONS". This document contains Navajo's proposal install additional ground water monitor wells in response to the OCD's July 25, 1994 conditional approval of the modification of discharge plan GW-28.

The above referenced work plan **is approved under the conditions contained in the enclosed attachment.**

Please be advised that OCD approval does not relieve Navajo of liability should the ground water investigation fail to completely define the extent of contamination related to Navajo's activities. In addition, OCD approval does not relieve Navajo of responsibility for compliance with any other federal, state or local laws and/or regulations.

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

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: OCD Artesia District Office
Richard D. Mayer, EPA Region VI

APPROVAL CONDITIONS
GROUND WATER MONITOR WELL INSTALLATION WORK PLAN
NAVAJO REFINING COMPANY
ARTESIA REFINERY

(December 9, 1994)

1. Additional Monitor Wells

In addition to the monitor well locations proposed, Navajo will install two (2) additional monitor wells in the locations illustrated on the attached figure.

2. Monitor Well Construction

All monitor wells will be constructed with a minimum of 15 feet of well screen. At least 5 feet of well screen will be located above the water table and 10 feet of well screen below the water table

3. Product and Waste Disposal:

All wastes generated during the investigation activities will be recycled and/or disposed of at an OCD approved facility.

4. Ground Water Sampling And Analysis

Ground water from all monitor wells will initially be sampled and analyzed for aromatic and halogenated volatile organics, polynuclear aromatic hydrocarbons (PAH's), heavy metals and major cations and anions. All water quality sampling will be conducted according to EPA approved sampling and analysis methods.

5. Investigation Report:

An investigation report will be submitted to the OCD by April 1, 1995. The investigation report will contain:

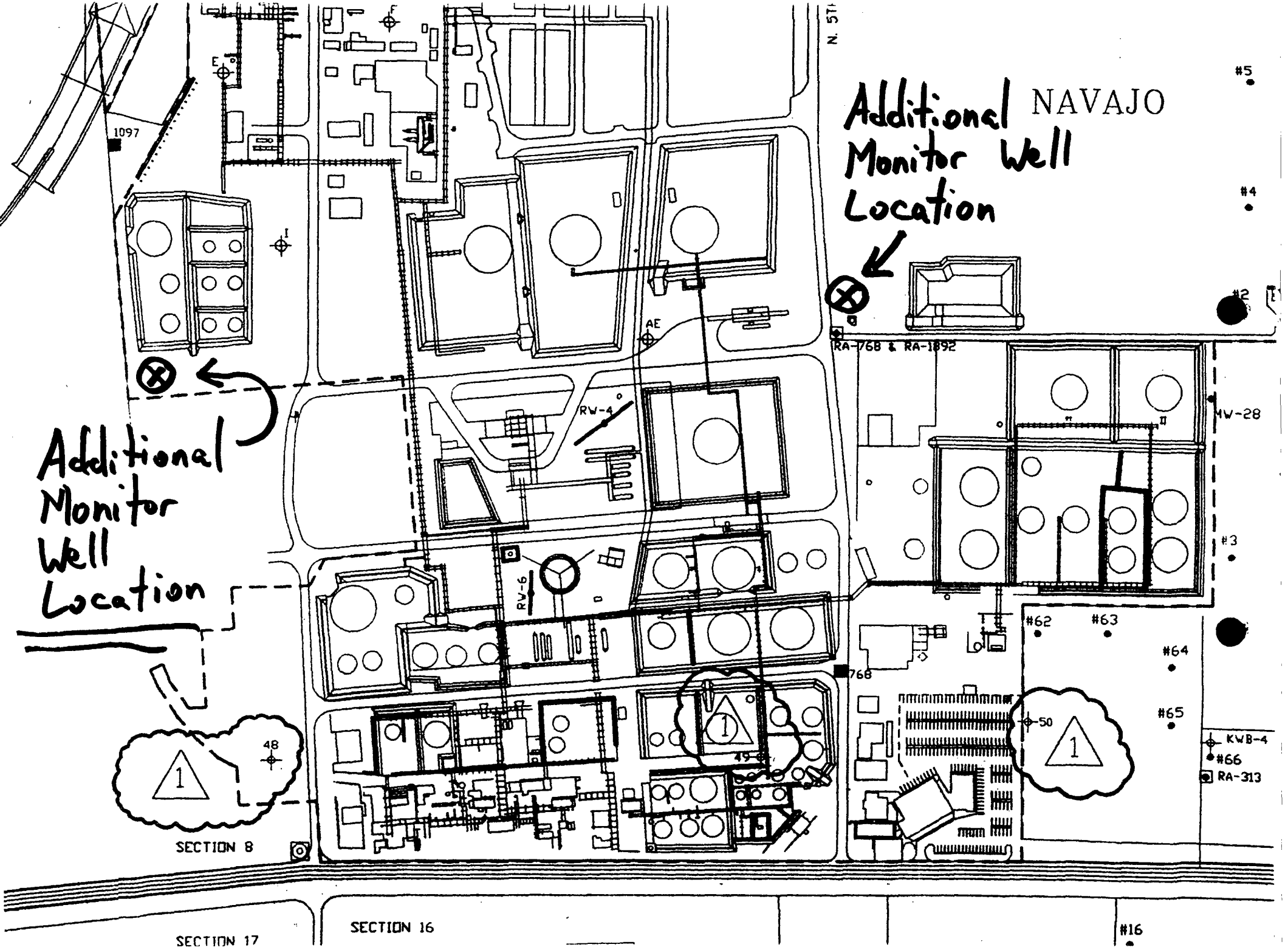
a. A map showing the location of all monitoring wells.

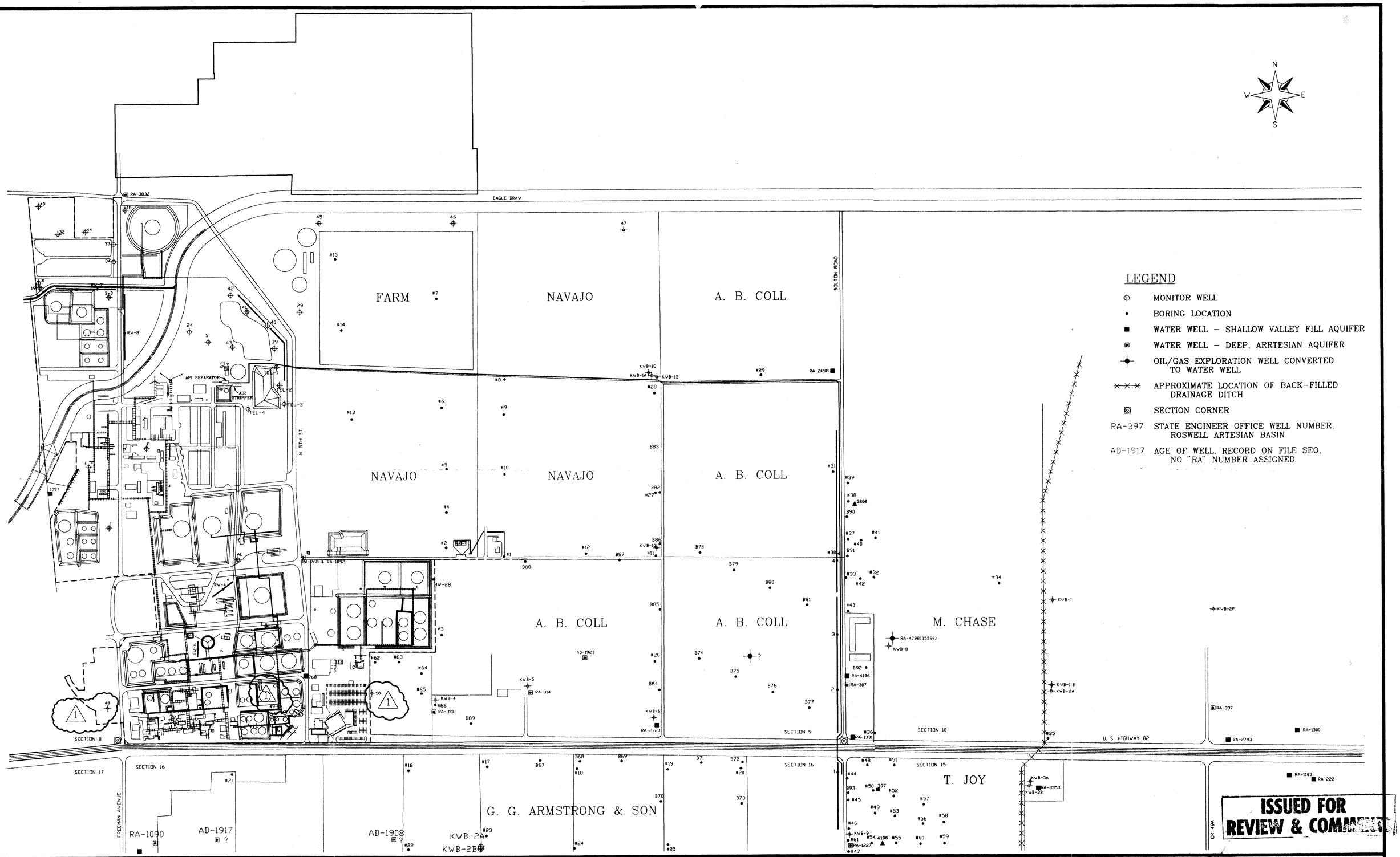
b. Well logs for each well, including monitor well construction diagrams.

c. A summary of the field measurements and the laboratory analytic results of water quality sampling of the monitor wells.

d. A water table elevation map using the water table elevation of the ground water in all refinery monitor wells (excluding monitor wells around the refinery's disposal ponds).

e. A product thickness map based on the thickness of free phase product on ground water in all refinery monitor wells.


Additional NAVAJO Monitor Well Location
Additional Monitor Well Location
N. 5TH
1097
AE
RW-4
RV-6
RA-768 & RA-1892
MW-28
#5
#4
#2
#3
#62
#63
#64
#65
#66
768
50
49
48
KWB-4
RA-313
SECTION 8
SECTION 17
SECTION 16
#16



LEGEND

- ⊕ MONITOR WELL
- • BORING LOCATION
- ■ WATER WELL – SHALLOW VALLEY FILL AQUIFER
- ▣ WATER WELL – DEEP, ARRTESIAN AQUIFER
- ✦ OIL/GAS EXPLORATION WELL CONVERTED TO WATER WELL
- ×–×–× APPROXIMATE LOCATION OF BACK-FILLED DRAINAGE DITCH
- ⊡ SECTION CORNER
- RA-397 STATE ENGINEER OFFICE WELL NUMBER, ROSWELL ARTESIAN BASIN
- AD-1917 AGE OF WELL, RECORD ON FILE SEO, NO "RA" NUMBER ASSIGNED

ISSUED FOR REVIEW & COMMENT

NOTES

REFERENCE DRAWINGS

NO.	REVISIONS	BY	CHK.	DATE	APPR.	APPR.

NO.	REVISIONS	BY	CHK.	DATE	APPR.	APPR.
1	PROPOSED LOC. OF NEW MONITOR WELLS (3)	DLW	DGJ	8/94		

DRAWING TITLE

WELLS & BORING LOCATIONS IN & AROUND NAVAJO REFINING

NAVAJO REFINING CO.
ENGINEERING DEPARTMENT
P.O. DRAWER 159
ARTESIA, NEW MEXICO

DRAWN BY	CHK'D BY	SCALE	
PETE	DGM	1" = 300'	
DATE	APPR BY	DRAWING NUMBER	REV.
8-11-94		90-42-D	1

DISTRICT I
P.O.Box 1980, Hobbs, NM 88241-1980

DISTRICT II
P.O. Drawer DD, Artesia, NM 88211-0719

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 2 COPIES TO APPROPRIATE DISTRICT OFFICE IN ACCORDANCE WITH RULE 116 PRINTED ON BACK SIDE OF FORM

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

OPERATOR: Navajo Refining Company						ADDRESS: 501 E. Main, Artesia, NM			TELEPHONE #: 748-3311
REPORT OF	FIRE	BREAK	SPILL	LEAK: X		BLOWOUT	OTHER*		
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTRY	PIPE LINE	GASO PLNT	OIL RFY: X	OTHER*		

FACILITY NAME: Navajo Refining Company - Tank 106

LOCATION OF FACILITY Qtr/Qtr Sec. or Footage	SEC.	TWP.	RGE.	COUNTY
501 E. Main St., Artesia, NM	9	17.S	26. E	Eddy

DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK

DATE AND HOUR OF OCCURRENCE: 11/22/94 7:00 AM				DATE AND HOUR OF DISCOVERY: 11/22/94 7:00 AM	
WAS IMMEDIATE NOTICE GIVEN?	YES: X	NO	NOT REQUIRED	IF YES, TO WHOM: Mark Ashley	
BY WHOM: David Griffin				DATE AND HOUR: 11/22/94 10:45 AM	
TYPE OF FLUID LOST: Gasoline				QUANTITY OF LOSS: 1000 Bbls	VOLUME RECOVERED: 0
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO: X	QUANTITY		

IF YES, DESCRIBE FULLY**

NOV 28.'94

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

Gauging and meter calculations done during the blending and pipeline shipment of a batch of 87 octane Unleaded Gasoline which was passing through Tank 106 revealed a loss. A check performed 2 hours later confirmed losses occuring in Tank 106. Visual inspection around the tank also confirmed staining from a leak. Immediately water was introduced into the tank to float the gasoline off the floor of the tank. Blending was halted into the tank

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

while the pipeline continued to suck the gasoline out. Tank was gasoline free at 7:00 PM same day. Opening and inspection of tank will follow. There was no free hydrocarbon to recover but Navajo is beginning an investigation to determine if the existing recovery well network will intercept this product.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER*			
				X Heavy Industrial			
SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY	ROCKY	WET	DRY	SNOW
			X		X		

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Cold and damp from a front passing through, some showers but no appreciable precipitation. Light to moderate winds from the NNW.

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

SIGNED: David G. Griffin PRINTED NAME AND TITLE: David G. Griffin Supt. EA & QC DATE: 11/23/94

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

INCIDENT SUMMARY

LOCATION: Artesia New Mexico

DATE OF INCIDENT: December 5, 1994 **TIME:** 11:45 P.M.

DATE OF SUMMARY: December 7, 1994

BACKGROUND

At Hickson Kerley's Artesia New Mexico plant, H_2S gas is received from Navajo Refinery. This gas is absorbed into hydroxide solutions and any unabsorbed gas is returned to the refinery. If the Hickson Kerley process is shutdown, the refinery gas is flared.

SYNOPSIS OF EVENTS

ENVIRONMENTAL RELEASE

At approximately 11:45 p.m. on Dec. 5, approximately 1,900 gallons of ammonium sulfide was spilled, because of a piping mechanical failure. Fumes from the spill were contained by water fog spray from the fire monitors.

The area containment capacity is approximately 3,000 gallons; but, due to addition of the water and overspray of water from the fire monitors, a small amount of liquid spilled to a storm drainage area. The spill did not leave refinery property. The drain area channels storm water to the Pecos river approximately 4 miles distant.

INJURIES

Two employees received injuries. Operator Gary Smith received a silver dollar size second degree chemical burn on his right arm and a half dollar size first degree chemical burn above his right ankle. He was treated and released.

Operator Reggie Turner was climbing the tower ladder with an SCBA. He could not advance in the ladder cage and momentarily removed his face mask. He became dizzy from fumes but on receiving fresh air recovered fully.

DETAILS LEADING TO RELEASE

Gary Smith was having pressure problems in the plant. He had called Navajo Refinery several times and had decided to have the refinery shut down the sour water gas flow. The unit was steamed through the vent line and the pressure dropped at approximately 11:30 P.M. Shortly, Gary noticed that the ammonia eductor piping was leaking and climbed up to tighten the connection. In the process of tightening, the line broke behind the connection at the pipe threads. He was sprayed in the face and body and climbed down and used the safety shower. The plant was isolated and shutdown.

COMMUNITY COMPLAINTS

There were none reported.

REGULATORY CONTACTS

Statutory authorities were contacted between 4:45 A.M. and 6:00 A.M. by plant manager Jim Cooper.

National Response Center
State Emergency Response
State Police (the state police contacted the LEPC)

The State Police dispatched a HAZMAT officer to the site shortly after 6:00 A.M. to file a report.

The plant was contacted at 9:00 A.M. by Frank Sanchez of New Mexico Emergency Response who wanted to know control action being taken. He was later contacted (9:15 A.M.) and the remediation plan was discussed with him.

MEDIA CONTACTS

Ken Gagon prepared release statement with contact/guidance from Steve Young at Leeds.

Statements were made with Daniel Russel from the *Artesia Daily Press* at 10:45 A.M. and Nicola Giacchetti from the *Carlsbad Current Argus* at 11:40 A.M. by Ken Gagon following referral from the plantsite.

Copies of the news reports of December 7 are attached.

CLEANUP STATUS

The liquid contained in the bermed area was recovered by vacuum truck. The majority of liquid which left the berm was contained in a concrete lined portion of the drainage system and was also recovered. In the areas which were not concrete, the soil is being placed in a lined containment area for oxidation to a nonhazardous material by local contractor and will likely be completed December 8.

CAUSE OF FAILURE

Carbon steel "swedge" reducer (threaded on one end, welded on one end) failed due to erosion/corrosion. There was not an isolation valve to prevent drainage of the tower contents so that the leak was plugged manually.

CORRECTIVE ACTIONS:

The piping "swedge" was replaced with welded stainless steel.

Isolation valving will be installed.

Use of proper protective equipment will be reinforced.

Plants will be reviewed for similar piping hazards and appropriate measures taken.

REMEDIATION PLAN

1. RECOVERY

   A. Utilize vacuum trucks to pick up all pooled areas of ammonium sulfide/water and to clean up small stream of material in Eagle Draw (concrete lined). Discharge vacuum truck contents to storage tanks for reuse in plant.

   B. Construct a contaminated dirt containment area approximately 1 1/2' deep X 12' X 24' at the south end of plant, away from spill area. Line the area with heavy duty 6 mil plastic to prevent further soil contamination.

   C. Utilize bobcat, wheel barrel, shovels and five HAZMAT trained personnel to pickup remaining contaminated soil and place in containment area treating the soil with dilute hydrogen peroxide (5-7%) during this clean up.

2. TREATMENT

   A. Contaminated soil will exhibit two hazard waste characteristics, reactive sulfides and a corrosive pH (9-10). The treatment with dilute hydrogen peroxide will oxidize any remaining reactive sulfides to sulfates. This same reaction reduces the pH to near neutral (7-7.5). The end result of this treatment is a mixture of dirt and ammonium sulfate, a recognized commercial fertilizer.

   B. Once chemical lab analysis has verified the sulfides are gone, we propose to spread the resulting fertilizer soil on the organic landfarm maintained by Navajo Refining Company. This will not present a transportation problem as our facility is already located on Navajo Refining property. The addition of a fertilizer to their landfarm should actually enhance their organic treatment process.

DISTRICT I
P.O.Box 1980, Hobbs, NM 88241-1980

DISTRICT II
P.O. Drawer DD, Artesia, NM 88211-0719

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 2 COPIES TO APPROPRIATE DISTRICT OFFICE IN ACCORDANCE WITH RULE 116 PRINTED ON BACK SIDE OF FORM

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

OPERATOR: Navajo Refining Company						ADDRESS: 501 E. Main, Artesia, NM		TELEPHONE #: 748-3311
REPORT OF	FIRE	BREAK	SPILL	LEAK: X		BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTRY	PIPE LINE	GASO PLNT	OIL RFY: X	OTHER*	

FACILITY NAME: Navajo Refining Company - Tank 106

LOCATION OF FACILITY Qtr/Qtr Sec. or Footage	SEC.	TWP.	RGE.	COUNTY
501 E. Main St., Artesia, NM	9	17.S	26. E	Eddy

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BY WHOM: David Griffin				DATE AND HOUR: 11/22/94 10:45 AM	
TYPE OF FLUID LOST: Gasoline				QUANTITY OF LOSS: 1000 Bbls	VOLUME RECOVERED: 0
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO: X	QUANTITY		

IF YES, DESCRIBE FULLY**

NOV 28 '94

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

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DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER*: X Heavy Industrial

SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY: X	ROCKY	WET: X	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Cold and damp from a front passing through, some showers but no appreciable precipitation. Light to moderate winds from the NNW.

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SIGNED: David G. Griffin PRINTED NAME AND TITLE: David G. Griffin, Supt. EA & QC DATE: 11/23/94

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

12/07/94

INCIDENT SUMMARY

LOCATION: Artesia New Mexico

DATE OF INCIDENT: December 5, 1994 **TIME:** 11:45 P.M.

DATE OF SUMMARY: December 7, 1994

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NEW MEXICO OIL CONSERVATION COMMISSION
NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS AND BLOWOUTS

NAME OF OPERATOR GPM Gas Corporation					ADDRESS 4044 Penbrook Odessa, Texas 79762		
REPORT OF:	FIRE	BREAK	SPILL X	LEAK	BLOWOUT	OTHER*	
TYPE OF FACILITY:	DRLG WELL	PROD WELL	TANK BTTY	PIPELINE	GASO PLNT	OIL RFY	OTHER* Booster Station
NAME OF FACILITY GPM Gas Corporation Burton Flats Booster							
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTIO NW/NW					SEC 1	TWP 21	RGE 27 COUNTY Eddy
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK Approximately 3 1/2 miles North of Carlsbad city limits.							
DATE AND HOUR OF OCCURENCE 11-24-94, approximately 3:00 a.m.					DATE AND HOUR OF DISCOVERY 11-24-94, approximately 3:30 a.m.		
WAS IMMEDIATE NOTICE GIVEN?	YES	NO X	NOT REQ'D N/A	IF YES, TO WHOM? N/A			
BY WHOM? N/A					DATE AND HOUR N/A		
TYPE OF FLUID LOST Oil and Produced Water					QUANTITY OF LOSS 125 bbls P/W, 5 bbls oil	VOLUME RECOVERED 120 bbls	
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO X	QUANTITY				

IF YES, DESCRIBE FULLY:**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN:**

PROBLEM CAUSE: Producer's Oil Well Equipment Malfunction

REMEDIAL ACTION: Producer called gang to the site and repaired the equipment.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN:**

AREA: Slop Tank Containment

CLEAN UP: Vacuum truck recovered 120 bbls.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER*
		X		

SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY	ROCKY	WET	DRY	SNOW
	X					X	

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

34 degrees F, wind N..W. @ 20 mph, 0 precipitation

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

SIGNED Rhonda Ashley TITLE Agency Compliance Assistant DATE 12-02-94

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

DISTRICT I
P.O.Box 1980, Hobbs, NM 88241-1980

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P.O. Box 2088
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NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

OPERATOR: Navajo Refining Co.						ADDRESS: 501 E. Main	TELEPHONE #
REPORT OF	FIRE	BREAK	SPILL ✓	LEAK		BLOWOUT	OTHER*
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTRY	PIPE LINE	GASO PLNT	OIL RFY	OTHER* Sump overflow
FACILITY NAME: Beeson Pump Station							
LOCATION OF FACILITY Qtr/Qtr Sec. or Footage: NE 1/4 of NW 1/4						SEC. 3	TWP. 18S
RGE. 30E	COUNTY Eddy						
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK: 2 1/4 mi. S.E. of Loco Hills							
DATE AND HOUR OF OCCURRENCE: Approx. 11 Am 12-4-94						DATE AND HOUR OF DISCOVERY: 8:30 pm. 12-4-94	
WAS IMMEDIATE NOTICE GIVEN?	YES ✓	NO	NOT REQUIRED			IF YES, TO WHOM: NM. OCD	
BY WHOM: Albert Reyes						DATE AND HOUR: 9:30 pm 12-4-94	
TYPE OF FLUID LOST: Crude oil						QUANTITY OF LOSS: 185 bbl.	VOLUME RECOVERED: 170 bbl.
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO ✓	QUANTITY: N/A				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN** Sump was overrun on account of valve being left partially open. Sump valve was closed and sump was pumped out. Oil was recovered by using a vacuum truck.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN** Sand dunes - all liquid was picked up by vacuum truck and soil was excavated and set upon plastic to prevent further migration of oil.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Sand Hills			
SURFACE CONDITIONS	SANDY	SANDY LOAM ✓	CLAY	ROCKY	WET	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)** Approx 40° - slight breeze - clear skies - no moisture.

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

SIGNED Albert Reyes PRINTED NAME AND TITLE Albert Reyes Crude Systems Supervisor DATE 12-9-94

*SPECIFY Copy SGT. File

**ATTACH ADDITIONAL SHEETS IF NECESSARY

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 1050	Date 9/17/94

Originating Party	Other Parties
Darrell Moore - Navajo Refining	Bill Olson - Envir Bureau

Subject

Spill at Navajo Artesia Refinery

Discussion

Spill of 100 bbls of crude oil from Tank 437
Tank drain left open
Fluid overflowed drain sump and spilled onto ground
Fluid contained within dike
@ Approx. 85 bbls recovered
Placed absorbent on ground surface to recover additional fluid
Will excavate contaminated soil. I requested final confirmation samples of final excavated area.
Will ship offsite to Hazardous Disposal Facility

Conclusions or Agreements

He will take final confirmation samples for TPH, BTEX and submit to OCD for approval
He will submit written incident report to OCD within one week

Distribution

File
RCA

Signed Bill Olson

ENCINAL DIVISION
ENCINAL
ENCINAL 87430

TELEPHONE
(505) 748-3311

REFINING COMPANY

501 EAST MAIN STREET ◦ P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

EASYLINK
62905278
FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

June 23, 1994

Mr. Bill Olson, Hydrogeologist
Oil Conservation Division
Environmental Bureau
Land Office Bldg.
P.O. Box 2088
Santa Fe, NM 87501

Dear Bill,

Enclosed is the map of our facility showing all monitor wells, discharge points, air stripper, recovery well locations along Bolton Rd., and other recovery well locations inside the plant that we would also like to put through the stripper. As I said in previous letters, the piping from and along Bolton Rd. is below ground and was tested after installation.

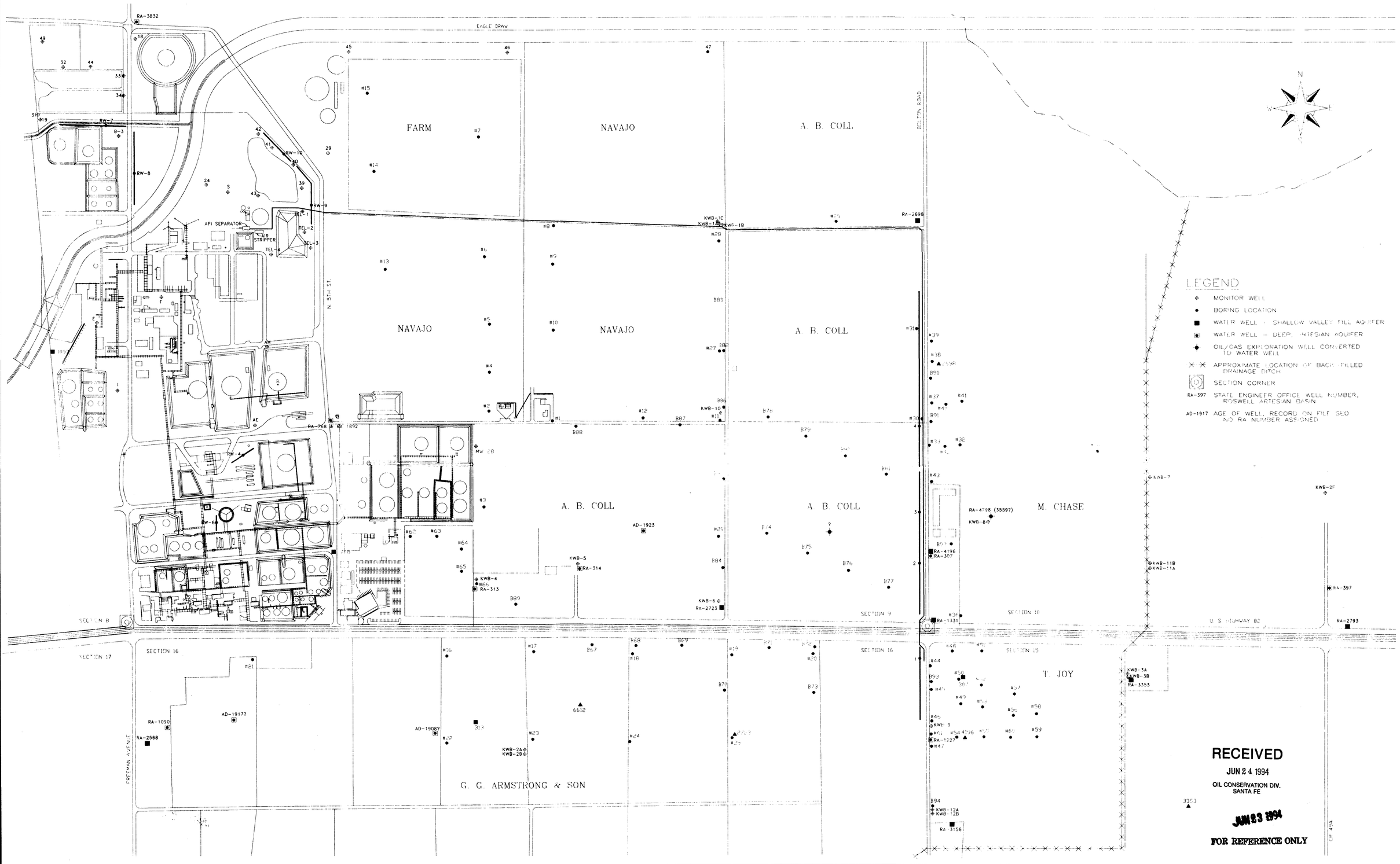
Hopefully, this map will satisfy OCD's requests for information concerning this modification to our discharge plan. If you have any questions concerning this matter, please call me at 505-748-3311.

Sincerely,

Darrell Moore

Darrell Moore
Environmental Specialist

Encl.



LEGEND

- ⊕ MONITOR WELL
- ● BORING LOCATION
- ■ WATER WELL – SHALLOW VALLEY FILL AQUIFER
- ◉ WATER WELL – DEEP, ARTESIAN AQUIFER
- ◆ OIL/GAS EXPLORATION WELL CONVERTED TO WATER WELL
- ✕–✕ APPROXIMATE LOCATION OF BACK FILLED DRAINAGE DITCH
- ⊡ SECTION CORNER
- RA-397 STATE ENGINEER OFFICE WELL NUMBER, ROSWELL ARTESIAN BASIN
- AD-1917 AGE OF WELL, RECORD ON FILE S.E.O. NO RA NUMBER ASSIGNED

NOTES
- ○ NO HYDROCARBON
- ◐ TRACY INDICATIONS
- ● HYDROCARBON BOX
- ▲ IRRIGATION WELLS-VALLEY FILL AQUIFER
- ■ IRRIGATION WELLS-DEEP ARTESIAN AQUIFER
- ⊡ M.W. LOCATION

REFERENCE DRAWINGS

NO	REVISIONS	BY	CHK	DATE	APPR

NO	REVISIONS	BY	CHK	DATE	APPR

DRAWN TITLE

WELLS & BORING LOCATIONS IN & AROUND NAVAJO REFINING

NAVAJO REFINING CO.
ENGINEERING DEPARTMENT
P.O. DRAWER 159
ARTESIA, NEW MEXICO

DRAWN BY	CHK'D BY	SCALE	
		1" = 275'	
DATE	APPR BY	DRAWING NUMBER	REV
		90-42-D	

DISTRICT I
P.O.Box 1980, Hobbs, NM 88241-1980

DISTRICT II
P.O. Drawer DD, Artesia, NM 88211-0719

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 2 COPIES TO APPROPRIATE DISTRICT OFFICE IN ACCORDANCE WITH RULE 116 PRINTED ON BACK SIDE OF FORM

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

OPERATOR						ADDRESS	TELEPHONE #
Navajo Refining Company						501 E. Main, Artesia, NM	748-3311

REPORT OF	FIRE	BREAK	SPILL	LEAK	BLOWOUT	OTHER*
				X		

TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTRY	PIPE LINE	GASO PLNT	OIL RFY	OTHER*
						X	

FACILITY NAME: Navajo Refining Company - Tank 106

LOCATION OF FACILITY Qtr/Qtr Sec. or Footage	SEC.	TWP.	RGE.	COUNTY
501 E. Main St., Artesia, NM	9	17.S	26. E	Eddy

DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK

DATE AND HOUR OF OCCURRENCE	DATE AND HOUR OF DISCOVERY
11/22/94 7:00 AM	11/22/94 7:00 AM

WAS IMMEDIATE NOTICE GIVEN?	YES	NO	NOT REQUIRED	IF YES, TO WHOM
	X			Mark Ashley

BY WHOM	DATE AND HOUR
David Griffin	11/22/94 10:45 AM

TYPE OF FLUID LOST	QUANTITY OF LOSS	VOLUME RECOVERED
Gasoline	1000 Bbls	0

DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO	QUANTITY
		X	

IF YES, DESCRIBE FULLY**

NOV 28 '94
O. C. D.
ARTESIA, OFFICE

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

Gauging and meter calculations done during the blending and pipeline shipment of a batch of 87 octane Unleaded Gasoline which was passing through Tank 106 revealed a loss. A check performed 2 hours later confirmed losses occuring in Tank 106. Visual inspection around the tank also confirmed staining from a leak. Immediately water was introduced into the tank to float the gasoline off the floor of the tank. Blending was halted into the tank

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

while the pipeline continued to suck the gasoline out. Tank was gasoline free at 7:00 PM same day. Opening and inspection of tank will follow. There was no free hydrocarbon to recover but Navajo is beginning an investigation to determine if the existing recovery well network will intercept this product.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER*
				X Heavy Industrial

SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY	ROCKY	WET	DRY	SNOW
			X		X		

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Cold and damp from a front passing through, some showers but no appreciable precipitation. Light to moderate winds from the NNW.

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

SIGNED David G. Griffin PRINTED NAME AND TITLE David G. Griffin Supt. EA & QC DATE 11/23/94

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

N DIVISION
REFINING COMPANY
'94 SEP 26 AM 8 52
501 EAST MAIN STREET ◦ P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

TELEPHONE
(505) 748-3311

EASYLINK
62905278
FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

September 22, 1994

Mr. Bill Olson
Oil Conservation Division
Environmental Bureau
Land Office Bldg.
P.O. Box 2088
Santa Fe, NM 87504

RE: Workplan to Satisfy GW-28 Modification Conditions

INTRODUCTION:

Navajo Refinery, located in Artesia, New Mexico, is working under a discharge plan (GW-28) that is regulated by the Oil Conservation Division. As a condition of permitting the underground injection of water into wells RW-4 and RW-6, the OCD has requested a workplan be submitted for the installation and sampling of additional monitor wells. These wells, which will help monitor the hydraulic gradient in the area of injection, will be placed in areas of the refinery where there is a lack of ground water monitoring points.

Enclosed is a map of the Artesia refinery with all monitor wells located. The location of three proposed new wells is also shown on this map in the "clouded" areas and designated as monitor wells number 48, 49, and 50. These points were selected based on accessibility for the drilling rig, lack of underground lines, and hydrogeologic value based on the problem at hand.

MONITOR WELL INSTALLATION PROCEDURES

Once injection begins, the objective of the additional monitor wells will be to determine the effect, if any, the injected water has on the natural hydraulic gradient and to supplement the existing monitoring well network.

Drilling will be conducted using a CME 75 truck-mounted rig (or equivalent) with 12 inch hollow-stem augers. Visual observations of discoloration, odors, and hydrocarbons will be noted and logged. Prior to drilling, each site will be inspected and cleared as necessary to allow access by the drilling rig and crews. Public utilities will be advised of the drilling operations and locations beforehand so that those entities affected can do a site inspection to locate their particular lines.

A geologist will be present at each location to log samples, monitor drilling operations, record depth to water table and other ground water data, prepare borehole logs and well construction diagrams, and record

well installation procedures. All soil cuttings produced during the installation of monitoring wells will be collected and placed in the appropriate containers for disposal by refinery personnel.

Monitor wells will be designed to:

allow sufficient ground water flow for well sampling;
minimize the passage of formation materials (turbidity); and
provide sufficient structural integrity to prevent the collapse of the intake structure.

After drilling, well casing, screen, filter pack, bentonite seal, and grout are placed within the borehole, and the wellhead is completed with a cement seal and locking surface casing. A typical installation is shown in the enclosed diagram.

Monitoring wells will be completed with 2 inch (ID) stainless steel or schedule 40 PVC casing with 0.01 inch machine slotted screen using 12 inch (OD) augers. Casing sections will be flush threaded with screw joints. The screened interval will range from 5-10 ft and intercept the water table (allowing for seasonal fluctuations). A 6 inch sediment sump will be included below the screen. A sand pack consisting of 20/40 silica sand and extending from the base of the boring to 2 ft. above the top of the screen will be placed directly in the annular space between the casing and borehole and added at a rate to prevent bridging. A tremie pipe may be used to insure complete filling of the annular space. The volume of filter material needed to fill the annular space will be calculated and the thickness of emplaced sand will be monitored using a weighted probe. A bentonite seal with a minimum thickness of 2 ft will be placed in the annular space above the sand pack using a tremie pipe and allowed to set-up for at least 30 minutes prior to grouting. The well will then be grouted from the top of the bentonite seal to within 3 ft of the ground surface using a tremie pipe. The grout mixture will be a 10:1 ratio of Portland cement to bentonite powder (by weight) and will contain only enough water for a lump free pumpable mix. At least 24 hours will then be allowed before surface completion.

Monitoring wells will be completed at the surface with the well casing extending approximately 3 ft above grade. A steel protective cover with locking cap will be placed over the riser and extend 2 ft below grade. The well head will be surrounded by a 4 ft x 4 ft x 4 in cement pad which slopes away from the center. The wells will be developed using a combination of bailing, surging, and pumping.

To prevent the possibility of cross-contamination, all drilling equipment will be thoroughly steam-cleaned between boreholes and prior to use at each monitor well. All steam cleaning will be performed at the refinery steam rack and all run-off will enter the refinery wastewater system.

The elevation and location of all well installations will be determined by a land surveyor at the close of fieldwork. The elevation at the top of each new well casing will be determined to 0.01 ft and be traceable to, and previously established from, a survey marker. Both the elevation of the ground surface and the elevation of the top of the well casing will be measured. All surveyed points will be recorded on both site-specific and project maps, as will the locations of benchmarks and permanent markers.

MEASUREMENTS AND SAMPLING

The depth to groundwater is important in determining changes in horizontal and vertical flow gradients. Depth to groundwater will be measured by the use of a Keck oil/water interface meter. Measurements of both depth to product and depth to water will be taken to the nearest 0.01 ft and will be made from a clearly marked reference point on the top of each well casing. In addition, total depth of the well will be taken to determine total casing water volume.

Prior to sampling a well, a minimum of three well casing volumes will be removed to ensure that the sample will be representative of groundwater conditions. The pH, conductivity, and temperature of the groundwater will be monitored during purging. A sample will be collected when these parameters have stabilized. All fluids produced during purging for sample collection will be placed in barrels and disposed of in the refinery wastewater system.

Immediately after purging of the well is complete, a groundwater sample will be taken. A disposable Teflon bailer and nylon twine will be used to collect samples which will be poured directly from the bailer into appropriate sample containers. Samples will then be placed in a cooler with ice. Latex gloves will be worn to prevent cross-contamination between wells.

Each sample will be recorded on a chain of custody record. An identifying code will be assigned to each sample and this code will be used on the chain of custody. A brief description of the sampling point will also be placed on the chain of custody form. A copy of this form will be retained at the refinery in a secure area. The sample will then be shipped via Fed-X to an approved lab.

The three new monitor wells will be sampled on an annual basis for PAH's, cations/anions, and heavy metals. They will also be incorporated into the quarterly water table elevation map and product thickness map that is being added to Navajo's reporting schedule per OCD's July 25, 1994 letter.

This workplan will be approved and implemented before commencing injection into monitor wells RW-4 and RW -6. At the present time, Navajo is sending all water from recovery wells to the API separator which eventually ends up in the ponds. As you know, we are currently working on a project to get a customized air stripper at this location to treat the water prior to injecting it or putting it on one of our farms for agricultural use. I hope this work plan will meet your needs as we try to reach our larger goal of discontinuing use of the evaporation ponds. If you have any questions or comments, please call me at 505-748-3311. Thank you for your time in this matter.

Regards,

Darrell Moore

Darrell Moore
Environmental Specialist

Samp. Meth.	Samp. Log	PID (ppm)	Depth (Feet)
RB			2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36

Geologic Description

0–11.5' SILTY GRAVELS, sand and silt are tan, dry, gravel is well rounded.

11.5–19' SANDY CLAY, reddish/brown, moist, plastic, clay content increasing with depth.

19–25' CLAY, brown, moist, plastic.

25–29' SANDY CLAY, brown, saturated.

29–34' SILTY SAND, brown, saturated, fine grained.

TD = 34.0'

Sample Method Symbols

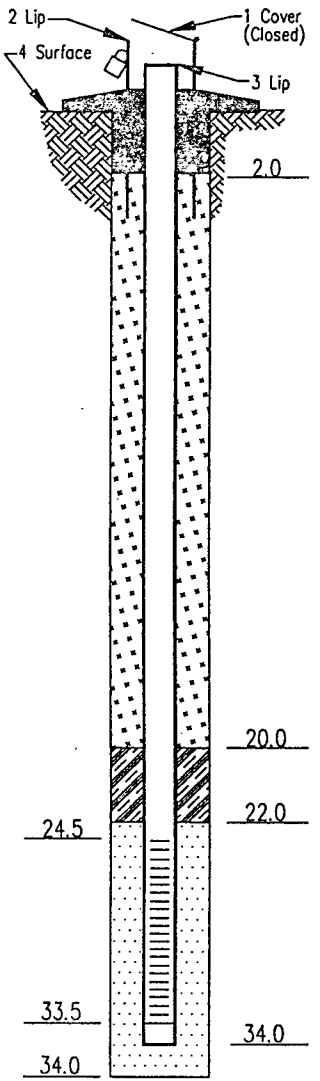
☒ RB=Recovery Barrel ☒ 5' ☐ ____

ST=Shelby Tube | SS=Split Spoon | C=Cutting

Monitoring Well ☐

Piezometer ☐

Protective Casing ☐



Depths in Feet from Ground Surface (Not to Scale)

LOG-1

Design Specifications

Elevations: (feet MSL) 1 _____ 2 _____ 3 _____ 4 _____

Coordinates: X _____ Y _____

Bore Hole Diameter: _____

Type of Casing: ☐ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ _____

Casing Diameter: ☒ 2" ☐ 4" ☐ 6" ☐ _____

Screen Slot: ☐ 0.008 ☒ 0.010 ☐ _____

Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ _____

Sand Pack: C.S.S.I. 20/40

Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ _____

Grout Type: Portland/Bentonite Weight: _____

Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ _____

Drilled By: _____ Lic. #: _____

Logged By: _____

Completion Date: _____

Depth First Encountered Water: _____

Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC
2/10/93	18.58				

Comments: Example of single cased monitoring well/piezometer.

Navajo

Project: 622093001-115 (EC-P4)
Location: Artesia, New Mexico

TELEPHONE
(505) 748-3311

EASYLINK
62905278

REFINING COMPANY

501 EAST MAIN STREET ° P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

October 12, 1994

Mr. Bill Olson, Hydrogeologist
Oil Conservation Division
Environmental Bureau
Land Office Bldg.
P.O. Box 2088
Santa Fe, NM 87501

Dear Bill,

Recently we had a spill at our tank 437 and we made notification both by phone and in writing. Subsequently, the spill has been cleaned up and hauled off. Enclosed are some supporting documents to detail where the contaminated soil was sent and the TPH levels in the cleaned area.

Please find copies of two manifests for contaminated soil shipped to USPCI's Lone Mountain landfill. This is the material that was dug up in the area of the spill. Secondly, I have enclosed the lab analysis of the soil in the area after the clean-up was completed. This was a composite sample taken by filling a five gallon bucket with soil from several different areas and mixing them together.

I hope this will finalize this particular spill. If you have any questions regarding this matter, please call me at 505-748-3311. Thank you for your time in this matter.

Regards,

Darrell Moore

Darrell Moore
Environmental Specialist

Encl.

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore

October 04, 1994
Receiving Date: 09/27/94
Sample Type: Soil
Project No: NA
Project Location: NA

501 E. Main
Artesia, NM 88210

Analysis Date: 09/28/94
Sampling Date: 09/26/94
Sample Condition: Intact & Cool
Sample Received by: JW
Project Name: NA

TA#	Field Code	TRPHC (ppm)	BENZENE (ppm)	TOLUENE (ppm)	ETHYL-BENZENE (ppm)	M,P,O XYLENE (ppm)	TOTAL BTEX (ppm)
T26411	Spill TK 437	17.985	0.118	1.308	1.278	2.091	4.795
QC	Quality Control	1.000	0.216	0.231	0.240	0.602	
Detection Limit		0.010	0.001	0.001	0.001	0.001	
% Precision		---	99	98	100	100	
% Extraction Accuracy		---	106	100	68	46	
% Instrument Accuracy		---	108	115	120	100	

METHODS: EPA SW 846-8020; Modified 8015.
BTEX SPIKE AND QC: Sample and Blank Spiked with 0.200 ppm EACH VOLATILE ORGANICS.
TRPHC SPIKE AND QC: Sample spiked with 327.760 ppm TRPCH and Blank spiked with 163.880 ppm TRPHC.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

10-14-94
Date

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NMD048918817	Manifest Document No. 00056	2. Page 1 of 1	Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: Navajo Refining Co. P.O. Drawer 159 Artesia, NM 88211

A. State Manifest Document Number:

B. State Generator's ID:

4. Generator's Phone: (505) 748 3311

5. Transporter 1 Company Name: Triad Transport

6. US EPA ID Number: OKD981588774

C. State Transporter's ID: 3405

D. Transporter's Phone: 918-492-4234

7. Transporter 2 Company Name: LEA NO

8. US EPA ID Number:

E. State Transporter's ID:

F. Transporter's Phone:

9. Designated Facility Name and Site Address: USPCI Lone Mountain RR 2 Box 170 Weyhoka, OK 73860

10. US EPA ID Number: OKD065438376

G. State Facility's ID: SD 47002

H. Facility's Phone: 405-477-2500

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Non Hazardous Waste, solid, contaminated soils and special waste n.o.s.		001	CM	07680	T	
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above: Confirmation # 72824 Stream # 0994295

K. Handling Codes for Wastes Listed Above:

15. Special Handling Instructions and Additional Information: 24 hr. Phone # 505 748 3311

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
Darrell Moore	Darrell Moore	10	13	94

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Larry Roberts	Larry Roberts	10	13	94

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

Style F15 REV-6 Labelmaster, An American Labelmark Co., Chicago, IL 60646 (800)621-5808

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

PRINTED ON RECYCLED PAPER USING SOYBEAN INK — PRINTED WITH SOY INK

GENERATOR COPY

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law.
NMD 0 9 8 9 1 8 8 7 1	100053		

GENERATOR

3. Generator's Name and Mailing Address: Navajo Refining Co. P.O. Drawer 159 Artesia, NM 88210

4. Generator's Phone (505) 748 3311

A. State Manifest Document Number:

B. State Generator's ID:

5. Transporter 1 Company Name: Ward Transport

6. US EPA ID Number: OKD 9 8 9 5 8 8 7 9 1

C. State Transporter's ID: 3405

D. Transporter's Phone: 918-926-1251

7. Transporter 2 Company Name:

8. US EPA ID Number:

E. State Transporter's ID:

F. Transporter's Phone:

9. Designated Facility Name and Site Address: USPCI Lyon MT Rt. 2 Box 110 Wayneka, OK 73860

10. US EPA ID Number: OKD 0 6 5 1 3 8 3 7 6

G. State Facility's ID: SD 4002

H. Facility's Phone: 405 691-3580

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	HM	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Non Hazardous Waste, Solid, contaminated soils and special waste n.o.s.		001	CM	24320	P	
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above: Formation # 71186 Steam # LMTH 0295

K. Handling Codes for Wastes Listed Above:

15. Special Handling Instructions and Additional Information: 24 hr. Phone # 505-748 3311

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; **OR**, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
Darrell Moore	Darrell Moore	1	0	1 1 94

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Larry Roberts	Larry Roberts	1	9	1 1 94

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19:

Printed/Typed Name	Signature	Month	Day	Year

TELEPHONE
(505) 748-3311

EASYLINK
62905278

DIVISION
REFINING COMPANY

FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

501 EAST MAIN STREET ◦ P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

'94 OCT 14 AM 8 52

October 12, 1994

Mr. Bill Olson, Hydrogeologist
Oil Conservation Division
Environmental Bureau
Land Office Bldg.
P.O. Box 2088
Santa Fe, NM 87501

RE: Third Quarter Sampling Results, Offsite Plume, Navajo Refining, Eddy County, NM

Dear Bill:

Enclosed are the results from our quarterly sampling of the offsite plume along with the other bi-weekly samples that you have not received. As you can see, KWB-7 has 3 ppb MTBE and 2 ppb benzene. RA-1227 came up clean on this sampling event, but KWB-9, which is about 20 ft. northwest of RA-1227, shows to have 3 ppb benzene.

As per your letter of October 8, 1992, we also checked the product thickness in monitor wells KWB-5 and KWB-8. Again, KWB-5 had no product that could be measured with our instrument. It is accurate down to 1/8 inch. KWB-8 had a product thickness of 1.1'.

The samples labeled RA-5000 are not actually wells. They are Navajo's samples sent to double check the lab's results. We fill two VOA's with deionized water and carry them around during sampling.

Thank you for your time in this matter. If you have any questions, call me at 748-3311.

Regards,

Darrell Moore

Darrell Moore
Environmental Specialist

encl.

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

July 25, 1994
Receiving Date: 07/20/94
Sample Type: Water
Project No: NA
Project Location: NA

Analysis Date: 07/22/94
Sampling Date: 07/19/94
Sample Condition: Intact & Cool
Sample Received by: MS
Project Name: NA

TA#	Field Cod	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T23727	RA 2723 (Offsite)	<1	<1	<1	<1	<1	<1
QC	Quality Control	199	207	200	196	553	
Detection Limit		1	1	1	1	1	
% Precision		98	101	102	101	101	
% Extraction Accuracy		113	108	104	101	100	
% Instrument Accuracy		100	104	100	98	92	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

7/25/94
Date

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

August 3, 1994
Receiving Date: 08/01/94
Sample Type: Water
Project No: NA
Project Location: NA

Analysis Date: 08/01/94
Sampling Date: 07/29/94
Sample Condition: Intact & Cool
Sample Received by: BL
Project Name: NA

TA#	Field Cod	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T24163	RA-1331	<1	<1	<1	<1	<1	<1
T24164	RA-307	<1	<1	<1	<1	<1	<1
T24165	RA-4196	<1	<1	<1	<1	<1	<1
T24166	RA-2723	<1	<1	<1	<1	<1	<1
T24167	RA-4798	<1	<1	<1	<1	<1	<1
T24168	RA-313	<1	5	<1	<1	<1	5
T24170	RA-1227	3	<1	<1	<1	<1	<1
T24171	RA-314	<1	<1	<1	<1	<1	<1
T24172	RA-5000	<1	<1	<1	<1	<1	<1
QC	Quality Control	228	206	208	210	630	
Detection Limit		1	1	1	1	1	
% Precision		99	100	100	100	100	
% Extraction Accuracy		116	108	107	105	105	
% Instrument Accuracy		114	103	104	105	105	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

8-3-94
Date

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

August 15, 1994
Receiving Date: 08/12/94
Sample Type: Water
Project No: NA
Project Location: NA

Analysis Date: 08/14/94
Sampling Date: 08/11/94
Sample Condition: Intact & Cool
Sample Received by: BL
Project Name: NA

TA#	Field Cod	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T24504	RA-2723	<1	<1	<1	<1	<1	<1
QC	Quality Control	236	211	211	205	620	
Detection Limit		1	1	1	1	1	
% Precision		94	100	100	100	100	
% Extraction Accuracy		111	107	109	108	106	
% Instrument Accuracy		118	106	106	103	103	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

8/15/94
Date

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

September 02, 1994
Receiving Date: 08/31/94
Sample Type: Water
Project No: NA
Project Location: NA

Analysis Date: 09/01/94
Sampling Date: 08/30/94
Sample Condition: Intact & Cool
Sample Received by: YL
Project Name: NA

TA#	Field Cod	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T25264	RA-2723	<1	<1	<1	<1	<1	<1
T25265	RA-4798	<1	<1	<1	<1	<1	<1
T25266	RA-313	<1	<1	<1	<1	<1	<1
T25267	RA-314	<1	<1	<1	<1	<1	<1
T25268	RA-1331	<1	<1	<1	<1	<1	<1
T25269	RA-307	<1	<1	<1	<1	<1	<1
T25270	RA-1227	<1	<1	<1	<1	<1	<1
T25271	RA-5000	<1	<1	<1	<1	<1	<1
QC	Quality Control	232	214	216	210	629	
Detection Limit		1	1	1	1	1	
% Precision		100	100	100	100	100	
% Extraction Accuracy		106	110	109	104	103	
% Instrument Accuracy		116	107	108	105	105	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

BL 9-6-94

Director, Dr. Blair Leftwich — Date
Director, Dr. Bruce McDonell

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

September 12, 1994
Receiving Date: 09/10/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 09/10/94
Sampling Date: 09/09/94
Sample Condition: Intact & Cool
Sample Received by: McD
Project Name: NA

TA#	Field Cod	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T25717	RA-2723	<1	<1	<1	<1	<1	<1
QC	Quality Control	211	198	205	208	623	
Detection Limit		1	1	1	1	1	
% Precision		99	100	100	100	101	
% Extraction Accuracy		131	104	107	105	106	
% Instrument Accuracy		106	99	103	104	104	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

9-12-94
Date

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

October 04, 1994
Receiving Date: 09/27/94
Sample Type: Water
Project No: NA
Project Location: NA

Analysis Date: 09/29/94
Sampling Date: 09/26/94
Sample Condition: Intact & Cool
Sample Received by: JW
Project Name: NA

TA#	Field Code	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T26395	RA-5000	<1	<1	<1	<1	<1	<1
T26396	RA-2723	<1	<1	<1	<1	<1	<1
T26397	RA-1227	<1	<1	<1	<1	<1	<1
T26398	KWB - 9	<1	3	<1	<1	<1	3
T26399	RA-3156	<1	<1	<1	<1	<1	<1
T26400	RA-1331	<1	<1	<1	<1	<1	<1
T26401	RA-307	<1	<1	<1	<1	<1	<1
T26402	RA-4196	<1	<1	<1	<1	<1	<1
T26403	RA-4798	<1	<1	<1	<1	<1	<1
T26404	KWB - 3A	<1	<1	<1	<1	<1	<1
T26405	RA-3353	<1	<1	<1	<1	<1	<1
QC	Quality Control	241	213	215	204	612	
Detection Limit		1	1	1	1	1	
% Precision		98	100	100	97	99	
% Extraction Accuracy		117	111	109	100	101	
% Instrument Accuracy		120	107	108	102	102	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

BF

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

10-10-94
Date

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

October 04, 1994
Receiving Date: 09/27/94
Sample Type: Water
Project No: NA
Project Location: NA

Analysis Date: 09/29/94
Sampling Date: 09/26/94
Sample Condition: Intact & Cool
Sample Received by: JW
Project Name: NA

TA#	Field Code	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T26406	KWB - 7	3	2	<1	<1	<1	2
T26407	KWB - 2A	<1	<1	<1	<1	<1	<1
T26408	RA - 313	<1	<1	<1	<1	<1	<1
T26409	RA - 314	<1	<1	<1	<1	<1	<1
QC	Quality Control	241	213	215	204	612	
Detection Limit		1	1	1	1	1	
% Precision		98	100	100	97	99	
% Extraction Accuracy		117	111	109	100	101	
% Instrument Accuracy		120	107	108	102	102	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

10-10-94
Date

NAVAJO REFINING COMPANY

501 EAST MAIN STREET ◦ P.O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

TELEPHONE
(505) 748-3311

EASYLINK
62905278
FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

August 8, 1994

Mr. Bill Olson, Hydrogeologist
Oil Conservation Division
Environmental Bureau
Land Office Bldg.
P.O. Box 2088
Santa Fe, NM 87501

RE: Quarterly Sampling Results Offsite Plume, Navajo Refining, Eddy County, NM

Dear Bill:

Enclosed are the results from our quarterly sampling of the offsite plume along with the other bi-weekly samples that you have not received. In the future, we will hold the bi-weekly samples and send the complete quarter's samples at one time. As you can see, KWB-7 has 3 ppb MTBE and we are still seeing small amounts of MTBE in RA-1227.

As per your letter of October 8, 1992, we also checked the product thickness in monitor wells KWB-5 and KWB-8. Again, KWB-5 had no product that could be measured with our instrument. It is accurate down to 1/8 inch. KWB-8 had a product thickness of 1.2".

Thank you for your time in this matter. If you have any questions, call me at 748-3311.

Regards,

Darrell Moore

Darrell Moore
Environmental Specialist

encl.

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

July 05, 1994
Receiving Date: 06/30/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 07/01/94
Sampling Date: 06/29/94
Sample Condition: Intact & Cool
Sample Received by: McD
Project Name: NA

TA#	Field Cod	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T23025	RA-3156	<1	<1	<1	<1	<1	<1
T23026	RA-3353	<1	<1	<1	<1	<1	<1
T23027	KWB-2A	<1	<1	<1	<1	<1	<1
T23028	KWB-3A	<1	<1	<1	<1	<1	<1
T23029	RA-313	<1	<1	<1	<1	<1	<1
T23030	RA-314	<1	<1	<1	<1	<1	<1
T23031	RA-1331	<1	<1	<1	<1	<1	<1
T23032	RA-307	<1	<1	<1	<1	<1	<1
T23033	KWB-7	3	<1	<1	<1	<1	<1
T23034	KWB-9	<1	<1	<1	<1	<1	<1
T23035	RA-1227	1	<1	<1	<1	<1	<1
QC	Quality Control	210	209	202	199	599	
Detection Limit		1	1	1	1	1	
% Precision		97	99	98	97	98	
% Extraction Accuracy		102	102	98	95	96	
% Instrument Accuracy		105	105	101	100	100	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

7-5-94
Date

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

June 13, 1994
Receiving Date: 06/10/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 06/12/94
Sampling Date: 06/09/94
Sample Condition: Intact & Cool
Sample Received by: MS
Project Name: NA

TA#	Field Cod	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T22221	RA-2723	<1	<1	<1	<1	<1	<1
QC	Quality Control	196	191	190	187	554	
Detection Limit		1	1	1	1	1	
% Precision		98	100	99	99	99	
% Extraction Accuracy		97	92	95	91	91	
% Instrument Accuracy		98	95	95	93	92	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

BS

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

6-14-94
Date

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

May 19, 1994
Receiving Date: 05/17/94
Sample Type: Water
Project No: NA
Project Location: NA

Analysis Date: 05/18/94
Sampling Date: 05/16/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: Stripper & Recovery Wells

TA#	FIELD CODE	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T21444	RA - 2723	<1	<1	<1	<1	<1	<1
T21445	RA - 1227	2	<1	<1	<1	<1	<1
T21446	RA - 1331	<1	<1	<1	<1	<1	<1
T21447	RA - 307	<1	<1	<1	<1	<1	<1
T21448	RA - 4196	<1	<1	<1	<1	<1	<1
T21449	RA - 4798	<1	<1	<1	<1	<1	<1
T21450	RA - 313	<1	<1	<1	<1	<1	<1
T21451	RA - 314	<1	<1	<1	<1	<1	<1
T21452	Trip Blank	<1	<1	<1	<1	<1	<1
QC	Quality Control	209	206	202	207	620	
Detection Limit		1	1	1	1	1	
% Precision		114	106	107	107	107	
% Extraction Accuracy		104	102	103	103	103	
% Instrument Accuracy		105	103	104	104	103	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

BF
Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

5-19-94
Date

TraceAnalysis, Inc.

6701 Aberdeen Avenue Lubbock, Texas 79424
Tel (806) 794 1296 Fax (806) 794 1298

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Fernando Col. to Rachu

Project Manager: Darrell Moore

Phone #:

FAX #:

Company Name & Address: Navajo

Project #:

Project Name :

Project Location:

Sampler Signature:

ANALYSIS REQUEST

SPECIAL HANDLING

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	BTEX, MTBE	TPH	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI	Same as RO Project unless CNTY mirrors	Turn around # of days	Fax ASAP	Report TWC direct	Hold
	Lea RO Project	9		X							X			4/28/94	14:00					X	X		X	X				
	BDAT w/Lime	2			X						X			4/25/94	7:00			X		[redacted]								
	BDAT without Lime	2			X						X			" "	"			X		[redacted]								
	RA 3156	2		X							X			4/29/94	8:00	X												
	RA 3353	2		X							X			" "	8:30	X												
	KWB-2A	2		X							X			" "	9:00	X												
	KWB-3H	2		X							X			" "	9:15	X												
	RA 313	2		X							X			" "	9:30	X												
	RA 314	2		X							X			" "	9:45	X												
	RA 1331	2		X							X			" "	10:00	X												
	RA 307	2		X							X			" "	10:30	X												

Relinquished by:	Date:	Times:	Received by:
Relinquished by:	Date:	Times:	Received by:
Relinquished by:	Date:	Times:	Received by Laboratory:

REMARKS

BDAT w/Lime TCLP Metals, Volatiles, Semi-Volatiles and RCI

RO Project Lea was kept on ice.

TraceAnalysis, Inc.

6701 Aberdeen Avenue Lubbock, Texas 79424
Tel (806) 794 1296 Fax (806) 794 1298

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: | **Phone #:** | **FAX #:**

Company Name & Address:

Project #: | **Project Name :**

Project Location: | **Sampler Signature:**

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX					PRESERVATIVE METHOD					SAMPLING		ANALYSIS REQUEST										SPECIAL HANDLING				
				WATER	SOIL	AIR	SLUDGE	OTHER	HCL	HNO3	ICE	NONE	OTHER	DATE	TIME	BTEX, MTBE	TPH	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI					Turn around # of days	Fax ASAP	Report TWC direct	Hold	
	KWB-7	2		X							X			4/29/94	13:30	X														
	KWB-9	2		X							X			4/29/94	14:00	X														
	RA-1227	2		X							X			" "	14:10	X														
	Alky Cooling Twr. Inlet	3		X							X			" "	14:45			See List												
	" " " Outlet	3		X							X			" "	15:00			See List												
	RO Reject Bi Wkly	2		X							X			" "	14:30			See List												

Relinquished by:	Date:	Times:	Received by:
Relinquished by:	Date:	Times:	Received by:
Relinquished by:	Date:	Times:	Received by Laboratory:

REMARKS

TELEPHONE
(505) 748-3311

OIL CONSERVATION DIV
RECEIVED
'94 JUL 25 AM 8 50

REFINING COMPANY
501 EAST MAIN STREET • P. O. DRAWER 159
ARTESIA, NEW MEXICO 88210

EASYLINK
62905278
FAX
(505) 746-6410

July 21, 1994

Mr. Roger Anderson, Chief
Environmental Bureau
N. M. Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87501

RE: EMERGENCY PIT - FIRE TRAINING GROUNDS

Dear Roger:

Navajo Refining is requesting your approval for use of an "Emergency Pit" to hold overflow water generated six (6) times per year, during fire training exercises at Navajo's Artesia Refinery.

The emergency pit will be constructed on the North side of the Fire Training Center, where the oil/water separators are located. These separators are designed to keep the fuels used during training within the confines of the training facility, while allowing excess water to drain away to the pit. The water collected in this pit will be removed within 24 hours of each training session.

An analysis of the fire training water collected during our June 22, 1994 training event is enclosed for your review. Navajo appreciates your attendance during that exercise and anxiously awaits your approval of this facility so that future exercises can be planned. If you have any questions please call me at 505-748-3311.

Sincerely,

David G. Griffin
Supt. Environmental
Affairs/Quality Control

DGG/pb

enclosure

6701 Aberdeen Avenue
Lubbock, Texas 79424
806•794•1296
FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

July 19, 1994
Receiving Date: 06/23/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 07/18/94
Sampling Date: 06/22/94
Sample Condition: I & C
Sample Received by: BL
Project Name: NA

EPA 8240 Compounds (ppb)	T22833 Fire Training Pond	Detection Limit	QC	%P	%EA	%IA
Dichlorodifluoromethane	ND	10	43			86
Chloromethane	ND	10	51			102
Vinyl chloride	ND	20	59			118
Bromomethane	ND	10	59			118
Chloroethane	ND	10	74			148
Trichlorofluoromethane	ND	10	44			88
1,1-Dichloroethene	ND	20	52	97	116	104
Iodomethane	ND	10	51			102
Carbon disulfide	ND	10	50			100
Methylene chloride	ND	10	47			94
trans-1,2-Dichloroethene	ND	10	42			84
1,1-Dichloroethane	ND	10	44			88
Vinyl acetate	ND	10	51			102
2-Butanone	ND	200	55			110
Chloroform	ND	10	41			82
1,1,1-Trichloroethane	ND	10	52			104
1,2-Dichloroethane	ND	20	47			94
Benzene	820	2	69	98	180	138
Carbon Tetrachloride	ND	20	46			92
1,2-Dichloropropane	ND	20	47			94
Trichloroethene	ND	20	47	105	112	94
Bromodichloromethane	ND	10	54			108
cis-1,3-Dichloropropene	ND	20	43			86
4-Methyl-2-pentanone	ND	100	58			116
trans-1,3-Dichloropropene	ND	20	46	95	88	92
Toluene	610	5	52			104
1,1,2-Trichloroethane	ND	10	48			96
2-Hexanone	ND	100	53			106

NAVAJO REFINING COMPANY
Project Location: Artesia, NM

EPA 8240 Compounds (ppb)	T22833 Fire Training Pond	Detection Limit	QC	%P	%EA	%IA
Dibromochloromethane	ND	10	47			94
Tetrachloroethene	ND	20	58			116
Chlorobenzene	ND	10	51	100	112	102
Ethylbenzene	110	5	53			106
m & p-Xylene	320	5	108			108
Bromoform	ND	10	35			70
Styrene	ND	5	48			96
o-Xylene	170	5	57			114
1,1,2,2-Tetrachloroethane	ND	10	48			96
1,4-Dichloro-2-butene	ND	50	48			96
1,4-Dichlorobenzene	ND	20	51			102
1,3-Dichlorobenzene	ND	20	49			98
1,2-Dichlorobenzene	ND	20	48			96
Acentonitrile	ND	300				
Acetone	ND	100				
3-Chloropropionitrile	ND	100				
Ethanol	ND	500				
Acrylonitrile	ND	300				
Allyl chloride	ND	50				
Methyl tert-Butyl Ether	ND	100				
Propionitrile	ND	50				
Allyl alcohol	ND	500				
Propargyl alcohol	ND	300				
Methacrylonitrile	ND	100				
1,2-Dichloroethene	ND	100				
2,2-Dichloropropane	ND	100				
Isobutyl alcohol	ND	500				
1,1-Dichloropropene	ND	100				
2-Hydroxypropionitrile	ND	200				
Acrolein	ND	300				
2-Chloroethyl vinyl ether	ND	100				
Dibromomethane	ND	1				
1,4-Dioxane	ND	10				
Methyl methacrylate	ND	100				
2-Chloroethanol	ND	500				
Epichlohydrin	ND	100				
Pyridine	ND	300				

NAVAJO REFINING COMPANY
Project Location: Artesia, NM

EPA 8240 Compounds (ppb)	T22833 Fire Training Pond	Detection Limit	QC	%P	%EA	%IA
1,3-Dichloropropane	ND	100				
Ethyl methacrylate	ND	100				
1,2,3,5-Diepoxybutane	ND	200				
1,2-Dibromoethane	ND	1				
2-Picoline	ND	10				
1,1,1,2-Tetrachloroethane	ND	10				
1,2,3-Trichloropropane	ND	10				
Isopropylbenzene	ND	10				
Bromobenzene	ND	10				
n-Propylbenzene	ND	10				
2-Chlorotoluene	ND	10				
4-Chlorotoluene	ND	10				
1,3,5-Trimethylbenzene	200	10				
Pentachloroethane	ND	1				
1,2,4-Trimethylbenzene	220	10				
tert-Butylbenzene	ND	10				
Benzyl chloride	ND	50				
sec-Butylbenzene	20	10				
Isopropyl toluene	20	10				
n-Butylbenzene	ND	10				
1,3-Dichloro-2-propanol	ND	50				
1,2-Dibromo-3-chloropropane	ND	50				
1,2,3-trichlorobenzene	ND	100				
Naphthalene	90	10				
1,2,4-trichlorobenzene	ND	100				
Hexachlorobutadiene	ND	100				

	% RECOVERY
1,2-Dichloroethane-d4 SURR	94
Toluene-d8 SURR	108
4-Bromofluorobenzene SURR	96

***ND = Not Detected**
METHODS: EPA SW 846-8240.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

7/19/94
DATE

TELEPHONE
(505) 748-3311

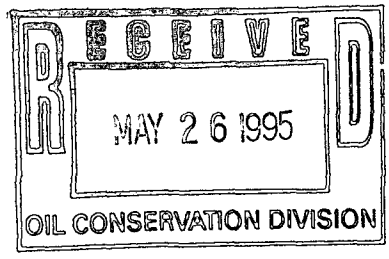
EASYLINK
62905278

Navajo REFINING COMPANY

501 EAST MAIN STREET ◦ P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

May 23, 1995



Mark Ashley
Geologist
Environmental Bureau
Oil Conservation Division
2040 S. Pacheco St.
Santa Fe, NM 87505-5472

RE: HYDROTEST WATER FROM TK 106, NAVAJO REFINING CO., ARTESIA, NM

Dear Mark,

We are currently in the process of hydrotesting our Tank 106. This tank was in gasoline service. The floor was patched; a new roof, man-way, and primary and secondary seals were added. After repairs, this tank was filled with fresh water on May 8-9, 1995. It was then sampled on May 10, 1995 and those results are enclosed. A total of 56,800 barrels of water were needed to fill this tank. We are requesting to be allowed to discharge this water to our farm.

As you can see, we had no busts on any WQCC ground water parameters. If there are any questions, please call me at 505-748-3311. As usual in these instances, we are in a rush to return this tank to service. Thank you for your time and attention to this matter. We truly appreciate it.

Sincerely,

NAVAJO REFINING CO.

Darrell Moore

Darrell Moore
Environmental Specialist

Encl.

TRACEANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

May 19, 1995
Receiving Date: 05/11/95
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 05/12/95
Sampling Date: 05/10/95
Sample Condition: Intact & Cool
Sample Received by: McD
Project Name: NA

TA#	FIELD CODE	pH (s.u.)	TOTAL PCB's (mg/L)	PHENOL (mg/L)	NO3-NO2 (mg/L)	FLUORIDE (mg/L)	TDS (mg/L)
T35790	TK 106	7.4	<0.0001	<0.01	<0.01	1.3	890
QC	Quality Control	7.0	0.006	0.79	103	1.04	---
% Precision		100	100	100	101	100	100
% Extraction Accuracy		---	90	112	108	99	---
% Instrument Accuracy		100	121	100	103	101	---
REPORTING LIMIT		---	0.0001	0.01	0.01	0.1	1

TA#	FIELD CODE	CHLORIDE (mg/L)	SULFATE (mg/L)	CYANIDE (mg/L)
T35790	TK 106	18	603	<0.02
QC	Quality Control	499	12.6	0.035
% Precision		100	101	98
% Extraction Accuracy		97	126	98
% Instrument Accuracy		100	113	96
REPORTING LIMIT		1	1	0.02

METHODS: EPA SW 846-3510, 8080; EPA 150.1, 420.2, 353.3, 340.2, 160.1, SM 4500 Cl-B, 335.2, 375.4.
PCB SPIKE AND QC: Sample spiked with 0.005 mg/L PCB and Blank spiked with 0.005 mg/L PCB.
PHENOLS SPIKE AND QC: Sample and Blank spiked with 0.8 mg/L PHENOLS.
NO3-NO2 SPIKE AND QC: Sample spiked with 1.33 mg/L NO3-NO2 and Blank spiked with 1.0 mg/L NO3-NO2.
FLUORIDE SPIKE AND QC: Sample and Blank spiked with 1.0 mg/L FLUORIDE.
CHLORIDE SPIKE AND QC: Sample and Blank spiked with 500 mg/L CHLORIDE.
CYANIDE SPIKE AND QC: Sample and Blank spiked with 0.04 mg/L CYANIDE.
SULFATE SPIKE AND QC: Sample and Blank spiked with 10.0 mg/L SULFATE.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

5-19-95
Date

6701 Aberdeen Avenue
Lubbock, Texas 79424
806•794•1296
FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

May 19, 1995
Receiving Date: 05/11/95
Sample Type: Water
Sample Condition: Intact & Cool
Sample Received by: McD
Project Location: Artesia, NM
Analysis Date: 05/15/95

PAH's	Reporting	T35790				
EPA 8270 (ppm)	Limit	TK 106	QC	%P	%EA	%IA
Naphthalene	0.0004	0.0011	49.9			100
Acenaphthylene	0.0004	ND	48.7			97
Acenaphthene	0.0004	ND	49.7	94	76	99
Fluorene	0.0004	ND	49.5			99
Phenanthrene	0.0004	ND	45.4			91
Anthracene	0.0004	ND	49.6			99
Fluoranthene	0.0004	ND	49.3			99
Pyrene	0.0004	ND	50.6	88	113	101
Benz[a]anthracene	0.0004	ND	49.6			99
Chyrsene	0.0004	ND	49.8			100
Benzo[b]fluoranthene	0.0004	ND	51.9			104
Benzo[k]fluoranthene	0.0004	ND	48.9			98
Benzo[a]pyrene	0.0004	ND	50.0			100
Indeno[1,2,3-cd]pyrene	0.0004	ND	51.9			104
Dibenz[a,h]anthracene	0.0004	ND	50.8			102
Benzo[g,h,i]perylene	0.0004	ND	51.4			103

*ND = Not Detected

	% RECOVERY
2-Fluorophenol SURR	55
Phenol-d6 SURR	32
Nitrobenzene-d5 SURR	75
2-Fluorobiphenyl SURR	74
2,4,6-Tribromophenol SURR	69
Terphenyl-d14 SURR	100

METHODS: EPA 8270.

Director, Dr. Blair Leftwich

5-19-95
DATE

Director, Dr. Bruce McDonell

TRACE ANALYSIS, INC.
A Laboratory for Advanced Environmental Research and Analysis

6701 Aberdeen Avenue
Lubbock, Texas 79424
806•794•1296
FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

May 19, 1995
Receiving Date: 05/11/95
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 05/11/95
Sampling Date: 05/10/95
Sample Condition: Intact & Cool
Sample Received by: McD
Project Name: NA

EPA 8240 Compounds (ppb)	T35790 TK 106	Reporting Limit
Dichlorodifluoromethane	ND	2
Chloromethane	ND	2
Vinyl chloride	ND	2
Bromomethane	ND	10
Chloroethane	ND	2
Trichlorofluoromethane	ND	2
1,1-Dichloroethene	ND	2
Iodomethane	ND	20
Carbon disulfide	ND	2
Methylene chloride	ND	25
trans-1,2-Dichloroethene	ND	2
1,1-Dichloroethane	ND	2
Vinyl acetate	ND	2
2-Butanone	ND	100
Chloroform	ND	2
1,1,1-Trichloroethane	ND	2
1,2-Dichloroethane	ND	2
Benzene	ND	2
Carbon Tetrachloride	ND	2
1,2-Dichloropropane	ND	2
Trichloroethene	ND	2
Bromodichloromethane	ND	2
cis-1,3-Dichloropropene	ND	2
4-Methyl-2-pentanone	ND	100
trans-1,3-Dichloropropene	ND	2
Toluene	ND	2
1,1,2-Trichloroethane	ND	2
2-Hexanone	ND	100

NAVAJO REFINING
Project Location: Artesia, NM

EPA 8240 Compounds (ppb)	T35790 TK 106	Reporting Limit
Dibromochloromethane	ND	2
Tetrachloroethene	ND	2
Chlorobenzene	ND	2
Ethylbenzene	ND	2
m & p-Xylene	ND	2
Bromoform	ND	2
Styrene	ND	2
o-Xylene	ND	2
1,1,2,2-Tetrachloroethane	ND	2
trans 1,4-Dichloro-2-butene	ND	10
cis 1,4-Dichloro-2-butene	ND	10
1,4-Dichlorobenzene	ND	4
1,3-Dichlorobenzene	ND	4
1,2-Dichlorobenzene	ND	4

SURROGATES	% RECOVERY
Dibromofluoromethane	102
Toluene-d8	100
4-Bromofluorobenzene	99

*ND = Not Detected

METHODS: EPA 8240.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

5-19-95
Date

TRACEANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

May 19, 1995
Receiving Date: 05/11/95
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 05/11/95
Sampling Date: 05/10/95
Sample Condition: Intact & Cool
Sample Received by: McD
Project Name: NA

TOTAL METALS

TA#	FIELD CODE	As (mg/L)	Mo (mg/L)	Cr (mg/L)	Zn (mg/L)	Cd (mg/L)	Ni (mg/L)	Fe (mg/L)	Co (mg/L)	Mn (mg/L)
T35790	TK 106	0.1	<0.05	0.05	<0.01	0.02	<0.05	0.08	<0.05	<0.05
QC	Quality Control	4.62	4.41	4.43	4.89	4.42	4.86	4.86	4.79	4.82
REPORTING LIMIT		0.1	0.05	0.01	0.01	0.01	0.05	0.05	0.05	0.05
% Precision		107	101	106	97	105	98	97	97	96
% Extraction Accuracy		102	76	86	79	85	76	74	77	72
% Instrument Accuracy		92	88	89	98	88	97	97	96	96

TA#	FIELD CODE	Cu (mg/L)	Al (mg/L)	B (mg/L)	Ba (mg/L)	U (mg/L)	Hg (mg/L)	Se (mg/L)	Pb (mg/L)	Ag (mg/L)
T35790	TK 106	<0.05	0.11	<0.05	<0.05	<0.5	<0.0010	0.001	0.001	<0.01
QC	Quality Control	4.85	4.66	4.73	4.32	9.63	0.0052	0.023	0.024	4.33
REPORTING LIMIT		0.05	0.05	0.05	0.05	0.5	0.0010	0.001	0.001	0.01
% Precision		97	98	98	103	102	100	100	100	100
% Extraction Accuracy		84	82	86	82	93	124	92	92	86
% Instrument Accuracy		97	93	95	86	98	104	92	96	87

METHODS: EPA 200.7, 239.2, 270.2, 272.2.
QC: Blank Spiked with 0.025 mg/L Se, Pb; 9.8 mg/L U; 0.0050 mg/L Hg; 5.0 mg/L As, Cr, Cd, Ba, Ag, Al, B, Mo, Zn, Ni, Fe, Co, Mn, Cu.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

5-19-95
DATE

Navajo REFINING COMPANY

TELEPHONE
(505) 748-3311

501 EAST MAIN STREET ◦ P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

EASYLINK
62905278
FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

June 15, 1994

Mr. Roger Anderson, Chief
Environmental Bureau
N. M. Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87501

RE: WATER SAMPLING AT FIRE TRAINING EXERCISE

Dear Roger:

Per our discussion during your last visit to Artesia, Navajo Refining is scheduling a Fire Training Exercise for 2:00 p.m., June 22, 1994. During this exercise, Navajo will collect samples of any run-off resulting from the training. These samples will be analyzed, using EPA Methods 8010 & 8020, for haloginated volatile organics and aromatic volatile organics.

It is Navajo's understanding that the results of this sampling event will help you in determining adequate secondary containment requirements for this fire training run-off. When reviewing this data and reaching a decision on containment requirements, keep in mind that the NMED Air Permit for this facility requires Navajo to remove **all** fluids from the site within 24 hours of a training event. In addition, Navajo can hold no more than 6 training sessions a year, such that the secondary containment basin will only be active for a very few days each year.

We are looking forward to your attendance at this training exercise. You should see a spectacular demonstration of the types of fires the petroleum industry must deal with, along with the specialized techniques necessary to extinguish them.

Sincerely,

David G. Griffin
Supt. Environmental
Affairs/Quality Control

DGG/pb

NAVAJO REFINING COMPANY
501 EAST MAIN STREET ◦ P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

TELEPHONE
(505) 748-3311

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62905278
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(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

June 2, 1994

Verbal approval 6/16/94

Mr. Bobby Myers
Oil Conservation Division
Environmental Bureau
Land Office Bldg.
P.O. Box 2088
Santa Fe, NM 87501

RE: Hydrotesting of Tank 110, Navajo Refining Co., Eddy County, New Mexico

Dear Bobby,

Navajo Refining is in the process of working over our Tank 110 which is in asphalt service. This includes cleaning the coils and inside of the tank by sandblasting, removing the old floor, and replacing the floor with new materials. This tank will be returned to asphalt service.

We will hydrotest this tank by filling it with approximately 54000 bbls. of well water. We would like to dispose of the water by discharging it to our adjacent farm. The water will be pumped to the farm through above ground fas-line. Since the tank has been cleaned and was in asphalt service, which is a very heavy hydrocarbon, Navajo feels that no additional testing will need to be done on this water. We know by process knowledge that no volatiles or semi-volatiles will be present. Also, because of analysis that has been done on our asphalt (included) we know that no metals will leach out of the asphalt in quantities that will trip the TCLP limits. Therefore, by process knowledge and analysis, this water will pass WQCC and RCRA standards.

Your prompt attention to this matter will be greatly appreciated. If you have any questions, please call me at 748-3311. Thank you for your time.

Regards,

Darrell Moore

Darrell Moore
Environmental Specialist

Encl.

Sample Description: Asphalt DAF
Sample Date: 1/28/93

Laboratory ID: D0129510

TCLP EXTRACT (SW846/1311)

TEST	Value	Units	Spike % Recovery	Detection Limits	EPA Method
Arsenic	< 0.20	mg/L	97.0	0.20	6010
Barium	0.68	mg/L	112	0.50	6010
Cadmium	< 0.05	mg/L	100	0.05	6010
Chromium	< 0.20	mg/L	100	0.20	6010
Lead	< 0.20	mg/L	103	0.20	6010
Mercury	< 0.0002	mg/L	106	0.0002	7470
Selenium	< 0.20	mg/L	113	0.05	6010
Silver	< 0.05	mg/L	110	0.05	6010

detection limit ≥ standard (WDC)

BETZ Analytical Services

Sample Description: Asphalt DAF
Sample Date: 1/28/93
Analyst: RW

Laboratory ID: D0129510
Date Analyzed: 2/15/93 22:32
Dilution: 1:5

VOLATILE ORGANICS (TCLP 8240)

Compound	Value-ug/L*	Spike % Recovery
Benzene	< 25	91.0
Methyl ethyl keytone	< 500 [500]	80.0
Carbon Tetrachloride	< 25	101
Chlorobenzene	< 25	93.0
Chloroform	< 25	100
1,2-Dichloroethane	< 25	105
1,1-Dichloroethene	< 25	107
Tetrachloroethylene	< 25	105
Trichloroethylene	< 25	99.0
Vinyl chloride	< 50 [50]	102

*Limit of Practical Quantitation is 25 ug/L, unless otherwise noted in brackets.

DL ≥ WQCC

Surrogate Recovery:		Recovery Limits
1,2-Dichloroethane-d4	103 %	76-114 %
Toluene-d8	101 %	88-110 %
Bromofluorobenzene	99 %	86-115 %

BETZ Analytical Services

Sample Description: Asphalt DAF
Sample Date: 1/28/93
Analyst: RW

Laboratory ID: D0129510
Date Analyzed: 2/15/93 22:32
Dilution: 1:5

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Compound Name	Retention Time (min.)	Est. Concentration ug/L
Ethylbenzene		ND
Toluene		ND
Xylenes		ND
Carbon Disulfide		ND

detection limit

Sample Description: Asphalt DAF
Date Sampled: 1/28/93
Date Analyzed: 3/2/93 00:59
Dilution: 1:4

Laboratory ID: D0129510
Date Extracted: 2/16/93
Analyst: MA

TCLP ACID EXTRACTABLE ORGANICS (EPA 8270)

Compound	Value-ug/L*	Spike % Recovery
o-Cresol	< 40	83.0
m,p-Cresol	< 40	83.0
Pentachlorophenol	< 200 [200]	100
2,4,5-Trichlorophenol	< 40	104
2,4,6-Trichlorophenol	< 40	100

*Limit of Practical Quantitation is 40 ug/L, unless otherwise noted.

Surrogate Recovery:		Limits:
2-Fluorophenol	75 %	10 - 94 %
Phenol-d5	70 %	25 - 121 %
2,4,6-Tribromophenol	84 %	10 - 123 %

TCLP BASE/NEUTRAL EXTRACTABLE ORGANICS (EPA 8270)

Compound	Value-ug/L*	Spike % Recovery
1,4-Dichlorobenzene	< 40	81.0
2,4-Dinitrotoluene	< 40	93.0
Hexachlorobenzene	< 40	146
Hexachlorobutadiene	< 40	83.0
Hexachloroethane	< 40	79.0
Nitrobenzene	< 40	81.0
Pyridine	< 40	52.0

*Limit of Practical Quantitation is 40 ug/L, unless otherwise noted.

Surrogate Recovery:		Recovery Limits
Nitrobenzene-d5	78 %	35 - 114 %
2-Fluorobiphenyl	86 %	43 - 116 %
Terphenyl-d14	92 %	33 - 141 %

Sample Description: Asphalt DAF
Date Sampled: 1/28/93
Date Analyzed: 3/2/93 00:59
Dilution: 1:4

Laboratory ID: D0129510
Date Extracted: 2/16/93
Analyst: MA

SEMI-VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Compound Name	Retention Time (min.)	Est. Concentration ug/L
Anthracene		ND
Benzo(a)anthracene		ND
Benzo(a)pyrene		ND
Bis(2-ethylhexyl)phthalate		ND
Chrysene		ND
Di-n-butyl phthalate		ND
Fluorene		ND
Naphthalene		ND
Phenanthrene		ND
Phenol		ND
Pyrene		ND
2,4-Dimethyl phenol		ND

detection limit

BETZ ANALYTICAL SERVICES

Chain of Custody

P.O. Box 4300 • 9669 Grogans Mill Road • The Woodlands, TX 77380 • 713-367-6201 • Fax 713-367-3189

Client Name/Address: Navajo Refining
501 E. Main St. Artesia NM 88210

Send Report to: Darrell Moore

P.O. Number:

Invoice to: — SAME —

Samplers (Signature): Randy Bruce

Project Number: —

Sta No.	Date	Time	Comp.	Grab	Station Location	Number of Containers	VOA-Benzene only	TCLP					Remarks
1	1/28/93	10:20		X	DAF Effluent	2	✓						7 day turnaround
2	1/28/93	10:00		X	Asphalt DAF	1		✓					Metals, volatiles, & semi volatiles only

Relinquished by (Signature)	Date / Time	Received by (Signature)	Relinquished by (Signature)	Date / Time	Received by (Signature)
Randy Bruce	1/28/93 11:15				
Relinquished by (Signature)	Date / Time	Received by (Signature)	Relinquished by (Signature)	Date / Time	Received by (Signature)
Relinquished by (Signature)	Date / Time	Received for Laboratory by (Sig.)	Date / Time	Sample condition upon receipt:	
		Glenda Fortner	1-29-93 10:00		

Method of Shipment: Fed X

Cooler temperature upon receipt ambient

LAB 170 9206 (3 part)

ENRON REFINING COMPANY

TELEPHONE
(505) 748-3311

501 EAST MAIN STREET ◦ P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

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(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

May 4, 1994

Mr. William Olson, Hydrogeologist
Environmental Bureau
Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504

Dear Bill,

Enclosed are the remainder of the test results we talked about on the phone on May 3, 1994. These are in reference to our modification of our discharge plan GW-28 which has requested permission to inject the trench water into RW-4 and/or RW-6 or to put the water on our adjacent farm.

Currently, the water is being routed to our waste water API. As of today the rate to the API is about 45 gpm or 65000 gallons per day. This could conceivably increase once the irrigation water has a chance to migrate down into our recovery trenches.

Thank you for your time in this matter. If I can be of any help in processing this modification, please call me at 505-748-3311.

Sincerely,

Darrell Moore

Darrell Moore
Environmental Specialist

encl.

6701 Aberdeen Avenue
Lubbock, Texas 79424
806•794•1296
FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

May 03, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 05/02/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	FIELD CODE	PHENOLICS (mg/L)
T20473	RW - 4	0.35
QC	Quality Control	0.80
DETECTION LIMIT		0.05
% Precision		95
% Extraction Accuracy		90
% Instrument Accuracy		99

METHODS: EPA 420.2.

BS 5-3-94

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

DATE

6701 Aberdeen Avenue
Lubbock, Texas 79424
806•794•1296
FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

May 03, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 05/02/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	FIELD CODE	PHENOLICS (mg/L)
T20474	RW - 6	0.50
QC	Quality Control	0.80
DETECTION LIMIT		0.05
% Precision		95
% Extraction Accuracy		90
% Instrument Accuracy		99

METHODS: EPA 420.2.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

5-3-94
DATE

TRACEANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING

April 27, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

Analysis Date: 04/21/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	Field Code	CHLORIDE (mg/L)	FLUORIDE (mg/L)	SULFATE (mg/L)	ALKALINITY (as CaCO3) HCO3 (mg/L)	ALKALINITY (as CaCO3) CO3 (mg/L)	CN- (mg/L)
T20473	RW - 4	28	0.67	35.4	941	0	<0.01
QC	Quality Control	505	2.03	19.9	---	---	0.031
% Precision		100	97	96	100	100	100
% Extraction Accuracy		99	99	90	---	---	93
% Instrument Accuracy		101	103	98	---	---	98
DETECTION LIMIT		1	0.1	1	10	---	0.01

METHODS: EPA 375.4, 310.1, 340.2, 335.2; 4500 Cl-B.
QC: Blank Spiked with 500 mg/L CHLORIDE; 2.0 mg/L FLUORIDE; 20.0 mg/L SULFATE.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

4-28-94
Date

TRACEANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING

April 27, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

Analysis Date: 04/21/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	Field Code	CHLORIDE (mg/L)	FLUORIDE (mg/L)	SULFATE (mg/L)	~~TOTAL~~ ALKALINITY (mg/L as CaCO3) ~~(mg/L)~~ HCO_3	CO_3	CN- (mg/L)
T20474	EW - 6	33	0.65	29.6	994	0	<0.01
QC	Quality Control	505	2.03	19.9	---	—	0.031
% Precision		100	97	96	100	100	100
% Extraction Accuracy		99	99	90	---	—	93
% Instrument Accuracy		101	103	98	---	—	98
DETECTION LIMIT		1	0.1	1	10	—	0.01

METHODS: EPA 375.4, 310.1, 340.2, 335.2; 4500 Cl-B.
QC: Blank Spiked with 500 mg/L CHLORIDE; 2.0 mg/L FLUORIDE; 20.0 mg/L SULFATE.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

4-29-94
Date

6701 Aberdeen Avenue
Lubbock, Texas 79424
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FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

May 03, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 05/02/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	FIELD CODE	PHENOLICS (mg/L)
T20475	Influent Air Stripper	0.74
QC	Quality Control	0.80
DETECTION LIMIT		0.05
% Precision		95
% Extraction Accuracy		90
% Instrument Accuracy		99

METHODS: EPA 420.2.

BS 5-3-94

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell
DATE

6701 Aberdeen Avenue
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FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

May 03, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 05/02/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	FIELD CODE	PHENOLICS (mg/L)
T20476	Effluent Air Stripper	<0.1
QC	Quality Control	0.80
DETECTION LIMIT		0.1
% Precision		95
% Extraction Accuracy		90
% Instrument Accuracy		99

METHODS: EPA 420.2.

BF

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

5-3-94
DATE

TRACEANALYSIS, INC.
A Laboratory for Advanced Environmental Research and Analysis

TRACE ANALYSIS, INC.

6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

April 27, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 04/21/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	Field Code	CHLORIDE (mg/L)	FLUORIDE (mg/L)	SULFATE (mg/L)	ALKALINITY (mg/L as CaCO3) HCO3	CO3	CN- (mg/L)
T20476	Effluent Air Stripper	201	1.47	429	655	0	<0.01
QC	Quality Control	505	2.04	19.9	---	---	0.031
% Precision		100	100	96	100	100	100
% Extraction Accuracy		98	106	90	---	---	93
% Instrument Accuracy		101	107	98	---	---	98
DETECTION LIMIT		1	0.1	1	10	---	0.01

METHODS: EPA 375.4, 310.1, 340.2, 335.2; 4500 Cl-B.
QC: Blank Spiked with 500 mg/L CHLORIDE; 2.0 mg/L FLUORIDE; 20.0 mg/L SULFATE.

BB

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

4-28-94

Date

TRACEANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING

April 27, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

Analysis Date: 04/21/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	Field Code	CHLORIDE (mg/L)	FLUORIDE (mg/L)	SULFATE (mg/L)	ALKALINITY (mg/L as CaCO3) HCO3	ALKALINITY (mg/L as CaCO3) CO3	CN- (mg/L)
T20475	Influent Air Stripper	206	1.68	388	803	0	<0.01
QC	Quality Control	505	2.04	19.9	---	---	0.031
% Precision		100	100	96	100	100	100
% Extraction Accuracy		98	106	90	---	---	93
% Instrument Accuracy		101	107	98	---	---	98
DETECTION LIMIT		1	0.1	1	10	---	0.01

METHODS: EPA 375.4, 310.1, 340.2, 335.2; 4500 Cl-B.
QC: Blank Spiked with 500 mg/L CHLORIDE; 2.0 mg/L FLUORIDE; 20.0 mg/L SULFATE.

BS

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

4-28-94
Date

REFINING COMPANY

TELEPHONE
(505) 748-3311

501 EAST MAIN STREET ○ P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

EASYLINK
62905278
FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

April 29, 1994

Mr. Bill Olson, Hydrogeologist
Oil Conservation Division
Environmental Bureau
Land Office Bldg.
P.O. Box 2088
Santa Fe, NM 87501

Dear Bill:

Enclosed please find the analysis from RW-4 and RW-6 and the influent and effluent to and from the air stripper. To refresh your memory, Navajo has applied for a modification to our discharge plan GW-28. In a letter dated February 10, 1994, OCD asked for information and analysis to further this request. Previously, we submitted all requests except the analysis that is included today.

Also, in our original letter, we had included RW-5 as a possible point of re-injection. After further study and analysis, we have decided that this well should be kept as a recovery well and we would like to withdraw it from consideration as an injection point.

Presently, we are discharging the effluent from the air stripper to our waste water API and it eventually ends up in the evaporation ponds. We would like to open up the options of re-injection or discharging to the farm as soon as possible. If you have any questions or further needs, please call me at 748-3311.

Regards,

Darrell Moore

Darrell Moore
Environmental Specialist

encl.

TRACEANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

April 21, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 04/20/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	FIELD CODE	MTBE (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	M,P,O XYLENE (ppb)	TOTAL BTEX (ppb)
T20473	RW - 4	82,071	16,337	5,774	984	2,162	25,257
T20474	RW - 6	95,561	19,028	6,745	1,391	3,447	30,611
T20475	Influent Air Stripper	1,855	6,358	2,188	1,766	2,658	12,970
T20476	Effluent Air Stripper	<1	<1	<1	<1	<1	<1
QC	Quality Control	196	201	197	196	588	
Detection Limit		1	1	1	1	1	
% Precision		99	100	100	100	100	
% Extraction Accuracy		102	102	101	99	99	
% Instrument Accuracy		98	100	99	98	98	

METHODS: EPA SW 846-8020.
BTEX SPIKE AND QC: Sample and Blank Spiked with 200 ppb EACH VOLATILE ORGANICS.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

4-27-94
Date

TRACEANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJC REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

April 27, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 04/21/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	Field Code	pH (s.u.)	TDS (mg/L)	(NO2-NO3)-N (mg/L)	SPECIFIC CONDUCTIVITY (uMHOs/cm)
T20473	RW - 4	7.76	1,487	<0.01	2,201
QC	Quality Control	7.01	---	1.02	---
% Precision		100	---	100	99
% Extraction Accuracy		---	---	98	---
% Instrument Accuracy		---	---	101	100

METHODS: EPA 150.1; 353.3; 120.1; 160.1.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

4-27-94
Date

TRACEANALYSIS, INC.
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ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

April 27, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 04/21/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	Field Code	pH (s.u.)	TDS (mg/L)	(NO2-NO3)-N (mg/L)	SPECIFIC CONDUCTIVITY (uMHOs/cm)
T20474	RW - 6	7.71	1,496	<0.01	2,226
QC	Quality Control	7.01	---	1.02	---
% Precision		100	---	100	99
% Extraction Accuracy		---	---	98	---
% Instrument Accuracy		---	---	101	100

METHODS: EPA 150.1; 353.3; 120.1; 160.1.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

4-27-94
Date

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ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

April 27, 1994
Receiving Date: 04/19/94
Sample Type: Water
Sample Condition: Intact & Cool
Sample Received by: JC
Analysis Date: 04/26/94

T20473

EPA 8270 (ppm)	DL	RW-4	QC	%P	%EA	%IA
Naphthalene	0.001	0.067	0.555	NR	NR	111
Acenaphthylene	0.001	ND	0.499	NR	NR	99
Acenaphthene	0.001	ND	0.488	100	90	97
Fluorene	0.001	0.002	0.492	NR	NR	98
Phenanthrene	0.001	0.003	0.507	NR	NR	101
Anthracene	0.001	ND	0.495	NR	NR	99
Fluoranthene	0.001	ND	0.475	NR	NR	95
Pyrene	0.001	ND	0.543	100	104	108
Benz[a]anthracene	0.001	ND	0.518	NR	NR	103
Chyrsene	0.001	ND	0.520	NR	NR	104
Benzo[b]fluoranthene	0.001	ND	0.535	NR	NR	107
Benzo[k]fluoranthene	0.001	ND	0.575	NR	NR	115
Benzo[a]pyrene	0.001	ND	0.568	NR	NR	113
Indeno[1,2,3-cd]pyrene	0.001	ND	0.448	NR	NR	89
Dibenz[a,h]anthracene	0.001	ND	0.372	NR	NR	74
Benzo[g,h,i]perylene	0.001	ND	0.451	NR	NR	90

*ND = Not Detected

	% RECOVERY
2-Fluorophenol SURR	76
Phenol-d5 SURR	118
Nitrobenzene-d5 SURR	124
2-Fluorobiphenyl SURR	120
2,4,6-Tribromophenol SURR	101
Terphenyl-d14 SURR	121

METHODS: EPA SW 846-8270.

4-27-94

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

DATE

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Lubbock, Texas 79424
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ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

April 27, 1994
Receiving Date: 04/19/94
Sample Type: Water
Sample Condition: Intact & Cool
Sample Received by: JC
Analysis Date: 04/26/94

T20474

EPA 8270 (ppm)	DL	RW-6	QC	%P	%EA	%IA
Naphthalene	0.001	0.008	0.555	NR	NR	111
Acenaphthylene	0.001	ND	0.499	NR	NR	99
Acenaphthene	0.001	0.002	0.488	100	90	97
Fluorene	0.001	0.002	0.492	NR	NR	98
Phenanthrene	0.001	0.005	0.507	NR	NR	101
Anthracene	0.001	ND	0.495	NR	NR	99
Fluoranthene	0.001	ND	0.475	NR	NR	95
Pyrene	0.001	ND	0.543	100	104	108
Benz[a]anthracene	0.001	ND	0.518	NR	NR	103
Chyrsene	0.001	ND	0.520	NR	NR	104
Benzo[b]fluoranthene	0.001	ND	0.535	NR	NR	107
Benzo[k]fluoranthene	0.001	ND	0.575	NR	NR	115
Benzo[a]pyrene	0.001	ND	0.568	NR	NR	113
Indeno[1,2,3-cd]pyrene	0.001	ND	0.448	NR	NR	89
Dibenz[a,h]anthracene	0.001	ND	0.372	NR	NR	74
Benzo[g,h,i]perylene	0.001	ND	0.451	NR	NR	90

*ND = Not Detected

	% RECOVERY
2-Fluorophenol SURR	126
Phenol-d5 SURR	123
Nitrobenzene-d5 SURR	127
2-Fluorobiphenyl SURR	125
2,4,6-Tribromophenol SURR	101
Terphenyl-d14 SURR	120

METHODS: EPA SW 846-8270.

4-27-94

Director, Dr. Blair Leftwich — DATE

Director, Dr. Bruce McDonell

6701 Aberdeen Avenue
Lubbock, Texas 79424
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ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

April 27, 1994
Receiving Date: 04/19/94
Sample Type: Water
Sample Condition: Intact & Cool
Sample Received by: JC
Analysis Date: 04/26/94

T2047 5
Influent Air

EPA 8270 (ppm)	DL	Stripper	QC	%P	%EA	%IA
Naphthalene	0.001	0.007	0.555	NR	NR	111
Acenaphthylene	0.001	ND	0.499	NR	NR	99
Acenaphthene	0.001	ND	0.488	100	90	97
Fluorene	0.001	ND	0.492	NR	NR	98
Phenanthrene	0.001	ND	0.507	NR	NR	101
Anthracene	0.001	ND	0.495	NR	NR	99
Fluoranthene	0.001	ND	0.475	NR	NR	95
Pyrene	0.001	ND	0.543	100	104	108
Benz[a]anthracene	0.001	ND	0.518	NR	NR	103
Chyrsene	0.001	ND	0.520	NR	NR	104
Benzo[b]fluoranthene	0.001	ND	0.535	NR	NR	107
Benzo[k]fluoranthene	0.001	ND	0.575	NR	NR	115
Benzo[a]pyrene	0.001	ND	0.568	NR	NR	113
Indeno[1,2,3-cd]pyrene	0.001	ND	0.448	NR	NR	89
Dibenz[a,h]anthracene	0.001	ND	0.372	NR	NR	74
Benzo[g,h,i]perylene	0.001	ND	0.451	NR	NR	90

*ND = Not Detected

	% RECOVERY
2-Fluorophenol SURR	89
Phenol-d5 SURR	100
Nitrobenzene-d5 SURR	107
2-Fluorobiphenyl SURR	124
2,4,6-Tribromophenol SURR	89
Terphenyl-d14 SURR	128

METHODS: EPA SW 846-8270.

4-27-94

Director, Dr. Blair Leftwich — DATE

Director, Dr. Bruce McDonell

6701 Aberdeen Avenue
Lubbock, Texas 79424
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ANALYTICAL RESULTS FOR
[redacted]JO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

[redacted]ril 27, 1994
Receiving Date: 04/19/94
Sample Type: Water
Sample Condition: Intact & Cool
Sample Received by: JC
Analysis Date: 04/26/94

T20476
Effluent Air

EPA 8270 (ppm)	DL	Stripper	QC	%P	%EA	%IA
Naphthalene	0.001	ND	0.555	NR	NR	111
Acenaphthylene	0.001	ND	0.499	NR	NR	99
Acenaphthene	0.001	ND	0.488	100	90	97
Fluorene	0.001	ND	0.492	NR	NR	98
Phenanthrene	0.001	ND	0.507	NR	NR	101
Anthracene	0.001	ND	0.495	NR	NR	99
Fluoranthene	0.001	ND	0.475	NR	NR	95
Pyrene	0.001	ND	0.543	100	104	108
Benz[a]anthracene	0.001	ND	0.518	NR	NR	103
Chyrsene	0.001	ND	0.520	NR	NR	104
Benzo[b]fluoranthene	0.001	ND	0.535	NR	NR	107
Benzo[k]fluoranthene	0.001	ND	0.575	NR	NR	115
Benzo[a]pyrene	0.001	ND	0.568	NR	NR	113
Indeno[1,2,3-cd]pyrene	0.001	ND	0.448	NR	NR	89
Dibenz[a,h]anthracene	0.001	ND	0.372	NR	NR	74
Benzo[g,h,i]perylene	0.001	ND	0.451	NR	NR	90

*ND = Not Detected

	% RECOVERY
2-Fluorophenol SURR	97
Phenol-d5 SURR	99
Nitrobenzene-d5 SURR	108
2-Fluorobiphenyl SURR	127
2,4,6-Tribromophenol SURR	84
Terphenyl-d14 SURR	95

METHODS: EPA SW 846-8270.

Director, Dr. Blair Leftwich

4-27-94
DATE

Director, Dr. Bruce McDonell

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING

April 28, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

Analysis Date: 04/27/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TA#	Field Code	POTASSIUM (mg/L)	MAGNESIUM (mg/L)	CALCIUM (mg/L)	SODIUM (mg/L)
T20473	RW - 4	2.4	145	134	200
T20474	RW - 6	2.5	144	112	184
T20475	Influent Air Stripper	2.1	138	227	147
T20476	Effluent Air Stripper	2.2	128	170	140
QC	Quality Control	102.4	19.4	20.2	20.0
Detection Limit		0.1	0.1	0.05	0.1
% Precision		96	103	98	95
% Extraction Accuracy		107	104	99	92
% Instrument Accuracy		102	97	101	100

METHODS: EPA 200.7.
QC: Blank Spiked with 100.0 mg/L POTASSIUM; 20.0 mg/L MAGNESIUM, CALCIUM, SODIUM.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

4-28-94
Date

TRACEANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

April 28, 1994
Receiving Date: 04/19/94
Sample Type: Water
Project No: NA
Project Location: Artesia, NM

Analysis Date: 04/26/94
Sampling Date: 04/18/94
Sample Condition: Intact & Cool
Sample Received by: JC
Project Name: NA

TOTAL METALS

TA#	FIELD CODE	Pb (ppm)	As (ppm)	Ba (ppm)	Cd (ppm)	Cr (ppm)	Se (ppm)	Ag (ppm)	Ni (ppm)	Be (ppm)	V (ppm)	B (ppm)
T20473	RW - 4	<0.1	0.3	2.91	<0.01	<0.01	<0.2	<0.01	<0.05	<0.05	<0.05	0.40
T20474	RW - 6	<0.1	0.3	2.80	<0.01	<0.01	<0.2	<0.01	<0.05	<0.05	<0.05	0.35
T20475	Influent Air Stripper	<0.1	<0.1	0.22	<0.01	<0.01	<0.2	<0.01	<0.05	<0.05	<0.05	0.54
T20476	Effluent Air Stripper	<0.1	<0.1	0.14	<0.01	<0.01	<0.2	<0.01	<0.05	<0.05	<0.05	0.52
QC	Quality Control	4.88	5.1	100.6	5.02	4.81	5.2	5.18	5.06	4.86	4.87	10.56
DETECTION LIMIT		0.1	0.1	0.05	0.01	0.01	0.2	0.01	0.05	0.05	0.05	0.05
% Precision		100	100	100	100	100	100	100	100	100	100	100
% Extraction Accuracy		97	99	98	102	103	95	104	98	94	101	100
% Instrument Accuracy		98	102	101	100	96	103	102	101	97	97	106

TA#	FIELD CODE	Cu (ppm)	Fe (ppm)	Zn (ppm)	Al (ppm)	Co (ppm)	Mn (ppm)	Mo (ppm)	U (ppm)	Hg (ppm)
T20473	RW - 4	<0.05	<0.05	<0.01	<0.1	<0.05	0.05	<0.05	<0.5	<0.001
T20474	RW - 6	<0.05	<0.05	<0.01	<0.1	<0.05	<0.05	<0.05	<0.5	<0.001
T20475	Influent Air Stripper	<0.05	0.08	<0.01	<0.1	<0.05	0.77	<0.05	<0.5	<0.001
T20476	Effluent Air Stripper	<0.05	<0.05	<0.01	<0.1	<0.05	0.34	<0.05	<0.5	<0.001
QC	Quality Control	4.82	4.71	4.97	9.96	4.92	5.21	5.25	9.7	0.020
DETECTION LIMIT		0.05	0.05	0.01	0.1	0.05	0.05	0.05	0.5	0.001
% Precision		100	100	100	100	100	100	100	92	100
% Extraction Accuracy		98	96	94	101	96	103	101	96	101
% Instrument Accuracy		96	94	99	100	98	104	105	99	100

METHODS: EPA 200.7, 245.1.
QC: Blank Spiked with 5.0 ppm As, Se, Mo, Cr, Zn, Cd, Pb, Ni, Be, Fe, Co, Mn, V, Cu, Ag; 100.0 ppm Ba; 10.0 ppm Al, B; 9.7 ppm U; 0.020 ppm Hg.

BS
Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

4-28-94
DATE

NAVAJO REFINING COMPANY

501 EAST MAIN STREET ° P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

TELEPHONE
(505) 748-3311

EASYLINK
62905278
FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

April 5, 1994

Mr. William Olson, Hydrogeologist
Environmental Bureau
Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504

RE: SAMPLING SCHEDULE - OFFSITE PLUME 2ND QUARTER 1994 NAVAJO REFINING

Dear Bill:

Below is the sampling schedule for the offsite plume for the 2nd quarter of 1994:

April 6, 1994	RA-2723
April 20, 1994	RA-2723 RA-4196 RA-4798 RA-313 RA-314 RA-1331 RA-307 RA-1227
May 6, 1994	RA-2723
May 18, 1994	RA-2723 RA-4196 RA-4798 RA-313 RA-314 RA-1331 RA-307 RA-1227
June 8,1994	RA-2723
June 22, 1994	Quarterly Sampling

This letter will satisfy our requirement to provide 2 weeks notice to OCD, in case you would like to split samples with us. If you have any questions please call me at 748-3311.

Regards,

Darrell Moore

Darrell Moore
Environmental Specialist

REFINING COMPANY

TELEPHONE
(505) 748-3311

501 EAST MAIN STREET ◦ P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

EASYLINK
62905278
FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

March 10, 1994

Mr. William Olson, Hydrogeologist
Environmental Bureau
Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504

Re: Modification To Discharge Plan GW-28, Navajo Refinery, Eddy County, New Mexico

Dear Mr. Olson:

Enclosed, please find a map showing the location of all piping and proposed discharge points where treated water will be routed. These points include RW-4, RW-5, RW-6 and the Farm. The piping from Bolton Rd. to the plant is below grade and was pressure tested after installation. Also enclosed is a drawing of a typical recovery well in the trenches along Bolton Rd. Finally, we are in the process of analyzing the water from RW-4, RW-5 and RW-6. Those results will be forwarded to you as soon as they are received. Once the air stripper is operational, Navajo will sample the effluent weekly for VOC's and PAH's. We will also initially test for WQCC heavy metals and major cations and anions and annually thereafter.

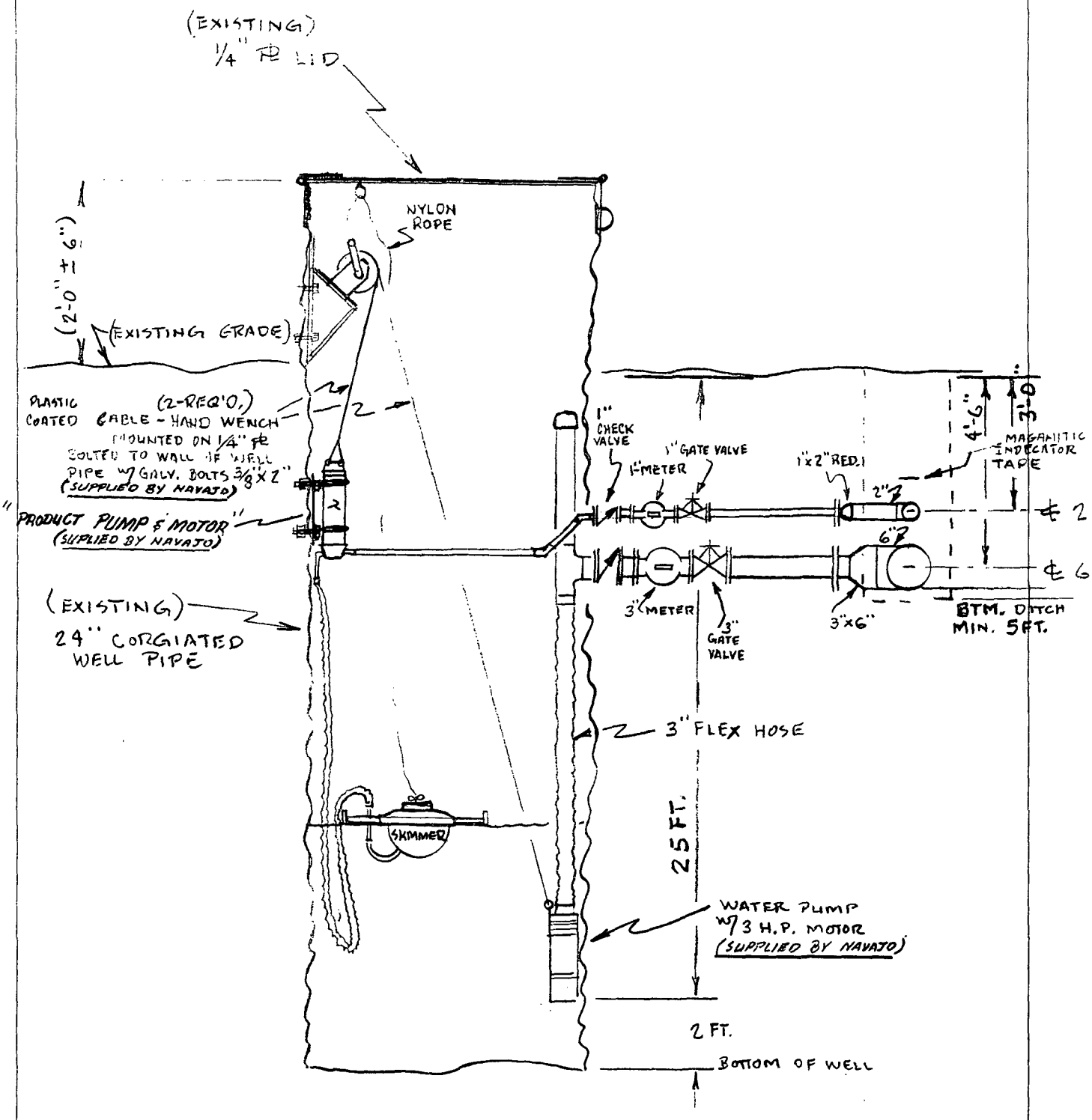
Navajo would also like to add another modification to GW-28. On the enclosed map, we have identified **RW-7, RW-8, RW-9,** and **RW-10.** Currently, water from these recovery wells is discharged into the API separators and eventually ends up at the ponds. We would like to have the option of also putting the recovered water from these wells through the air stripper and then discharging it to the farm or re injecting it into RW-4, RW-5, RW-6 and/or any new trenches that would be constructed especially for this purpose. This water at no time would be discharged to Eagle Draw. In addition, all of the options listed above would be affecting the same aquifer that the water is being pumped from in the recovery trenches.

Thank you for your prompt attention to this matter. If you have any questions, please call me at 748-3311.

Regards,

Darrell Moore
Environmental Specialist

encl.



"WET WELL" STAND PIPE (TYPICAL) OF (FOUR)

BOLTON RD. COLLECTION SYSTEM FOR WELL #1, 2, 3 & 4
SKETCH-01
NO SCALE 8-12-93

TOTAL HWY BORE = 100 L/F.
TOTAL DITCH = 7500 L/F.
TOTAL PIPE = 7600 L/F.

RA-3832

EAGLE DRAW

NAVAJO FARM

NAVAJO

A. B. COLL

BOLTON ROAD

RW-7

RW-8

RW-10

API Separator

CUT PAVEMENT & RESURFACE

RW-9

Stripper

KWB-1C

KWB-1A

KWB-1B

RA-2698

45°

N. 5TH ST.

NAVAJO

NAVAJO

A. B. COLL

0.5

2.5

3.5

1.5

KWB-10

WELL NO.4

RA-76 & RA-1892

RW-4

RW-5

RW-6

A. B. Coll

AD-1923 ?

COLL ?

KWB-5

RA-314

KWB-4

RA-313

RA-4798 (3559?)

WELL NO.3

KWB-8

SHT. 3

SHT. 2

RA-4196

WELL NO.2

RA-307

KWB-6

RA-2723

1675 FT.

665'

333'

371'

270'

135'

KWB-7

KWB-2P

KWB-11B

KWB-11A

RA-397

RA-2793

RA-1300

SECTION 8

SECTION 9

RA-1331

SECTION 10

SHT. 2

SHT. 1

U. S. HIGHWAY 82

SECTION 17

SECTION 16

SECTION 16

WELL NO.1

SECTION 15

KWB-3A

KWB-3B

RA-3353

T. Joy

RA-1183

RA-222

RA-2749

AD-1917 ?

RA-1090

RA-2568

AD-1908 ?

KWB-2A

KWB-2B

FREEMAN AVENUE

G. G. Armstrong & son

KWB-9

RA-1227

KWB-12A

KWB-12B

RA-3156

AD-1908 ?

RA-1044

RA-2050 & 2871

RA-1503

CR 45A

800 0 800 2400 FEET

EXPLANATION

- KWB-7 ⊕ Monitor well
- • Boring location
- ■ Water well – shallow valley fill aquifer
- ◉ Water well – deep, artesian aquifer
- o Open casing – no information
- ✦ Oil/gas exploration well converted to water well
- ? Location in 1/4 1/4 section unknown
- ×××× Approximate location of back-filled drainage ditch
- ⓒ Section corner
- 0.5 Apparent product thickness contour
- RA-397 State Engineer Office well number, Roswell Artesian Basin
- AD-1917 Age of well, record on file SEO, no RA number assigned
- ✱ NAVAJO RECOVERY WELL (W/ PUMP & SKIMMER)

Boring and water well locations approximate based on field observations and existing records. Monitor well locations surveyed 3/92.

N W E S

NOTE: Map compiled from Navajo Refinery and NM State Highway Department Aerial Mapping.
LOCATION: T17S, R26E, NMPM, Eddy County, New Mexico

RECEIVED
MAR 14 1994
OIL CONSERVATION DIV. SANTA FE

BOLTON RD. COLLECTION SYSTEM

PROJECT:	
LOCATION: ARTESIA, NEW MEXICO	
APPR:	DATE: 8-6-93
DRAWN BY: NRL	SCALE: AS SHOWN
DATE:	FIGURE:

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

February 10, 1994

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-241-902

Mr. Darrell Moore
Environmental Specialist
Navajo Refining Company
P.O. Box 159
Artesia, New Mexico 88211-0159

RE: MODIFICATION TO DISCHARGE PLAN GW-28
NAVAJO REFINERY
EDDY COUNTY, NEW MEXICO

Dear Mr. Moore:

The New Mexico Oil Conservation Division (OCD) is in the process of reviewing Navajo Refining Company's January 31, 1994 "MODIFICATION TO NAVAJO REFINING COMPANY'S DISCHARGE PLAN GW-28". This document proposes to modify Navajo's previously approved discharge plan for the Navajo Refinery to include the discharge of treated ground water from the remediation of contaminated ground water at the facility.

The OCD has the following comments and requests for information regarding the above referenced discharge plan modification request:

1. Please provide a map showing the exact location of all proposed discharge points including the farmland where treated ground water would be used for irrigation purposes.

2. Please provide the results of the most recent analysis of ground water from recovery wells RW-4, RW-5 and RW-6.

3. The request does not indicate whether the piping between the air stripper system and the pumping well system will be installed above ground or below grade. Please provide this information and a map showing the proposed location of all piping including piping to the discharge points. Please be aware that the OCD requires that all below grade piping

carrying fluids which exceed New Mexico Water Quality Control Commission (WQCC) ground water standards be pressure tested to three (3) psi above operating pressure prior to operation.

4. In addition to the proposed air stripper effluent water quality sampling, the OCD requires that the effluent also be sampled initially for WQCC heavy metals and major cations and anions and annually thereafter. Please provide a commitment to perform these analyses.

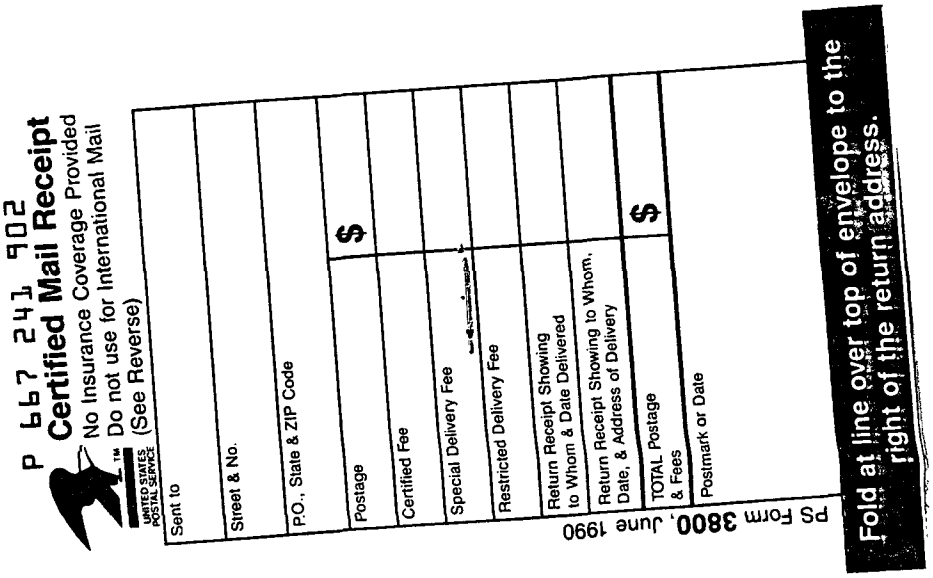
Receipt of the above information will allow the OCD to complete a review to this discharge plan modification.

If you have any questions, please contact me at (505) 827-5885.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Ray Smith, OCD Artesia District Office
Richard D. Mayer, EPA Region VI



STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

February 10, 1994

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-241-902

Mr. Darrell Moore
Environmental Specialist
Navajo Refining Company
P.O. Box 159
Artesia, New Mexico 88211-0159

RE: MODIFICATION TO DISCHARGE PLAN GW-28
NAVAJO REFINERY
EDDY COUNTY, NEW MEXICO

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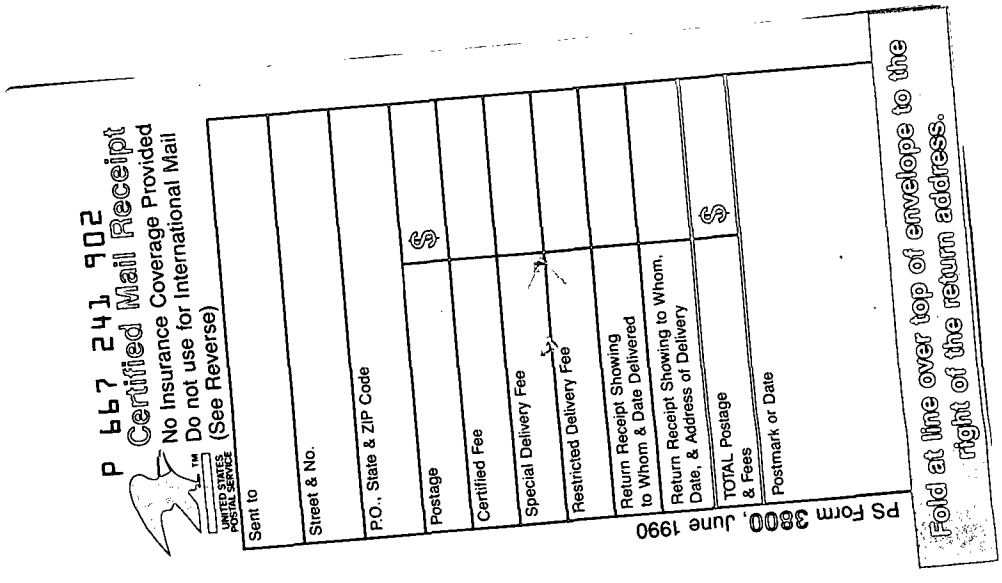
Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Ray Smith, OCD Artesia District Office
Richard D. Mayer, EPA Region VI



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 1430 | Date 2/8/94

Originating Party	Other Parties
Dave Griffin - Navajo Refining	Bill Olson - Envir. Bureau

Subject

Navajo Refinery UST

Discussion

Navajo previously purchased property on North side of Refinery. Recently discovered UST when excavating in area. Contacted UST and inspector witnessed tank pull. Took soil samples from excavation. Told him UST Bureau Chief (Bearzi) referred case to OCD because of OCD's ongoing remedial work at refinery.

Conclusions or Agreements

Navajo will submit report on UST to OCD

Distribution

Signed Bill Olson

INITIAL INCIDENT REPORT FORM

CONTACT INFORMATION District # 4 Field Office Roswell

Caller: Ter. McMullan Phone: 624-6123

Facility Name: Navajo Welding & Pipefitter Shop County Eddy

Address East 5th Artesia NM 88210

They are handling site.

(PUT CHECK MARK IN FRONT OF PRINCIPLE CONTACT IF ONE IS DESIGNATED)

X Facility Owner J N Hightower Phone

Address 908 South 8th Artesia NM 88210

Contact # 748-3311 David Griffin

X Facility Operator Navajo Refining Co Phone 748-3311

Address P.O. Box 159 Artesia NM 88210

DISCHARGE INFORMATION

(check one) Suspected Release ____ Confirmed release X

Cause of Discharge hole in tank

Date/Time of discharge unk Duration unk Volume lost unk

Circle one: ? Unleaded gasoline Regular gasoline
Diesel Waste Oil Other ____

Has further discharge been prevented? If so, describe yes Tank Removed
Have fire authorities been notified? If so, give name/phone no

Has P/I inspector informed RP of immediate responsibilities? yes
Are highly contaminated soils present? Describe Removal no

NNU - 340 ppm at ~ 5-6 ft.

HYDROGEOLOGIC INFORMATION

Depth to water 18' Direction of GW flow ____

Surface water endangered NO Soil types clay

POSSIBLE IMPACTS FROM DISCHARGE

Well locations, depths, types ____
Utility Corridors ____
Vapors in Homes, buildings ____

Other ____

Call received by BRZ Date 2/4/94

****

Assignment OCD Referral Date ____

Phone # ____ ____

Revised 1/9/92

NAVAJO REFINING COMPANY

501 EAST MAIN STREET ◦ P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159

TELEPHONE
(505) 748-3311

EASYLINK
62905278
FAX
(505) 746-6410 ACCTG
(505) 746-6155 EXEC
(505) 748-9077 ENGR
(505) 746-4438 P / L

January 31, 1994

Mr. Bill Olson, Hydrogeologist
Oil Conservation Division
Environmental Bureau
Land Office Bldg.
P.O.Box 2088
Santa Fe, NM 87501

RE: Modification to Navajo Refining Company's Discharge Plan GW-28

Dear Bill:

This letter is sent to make application for release of 140,000 gpd of treated water from our recovery trenches on Bolton Road. The water will be air stripped and then polished through carbon to achieve State groundwater standards. This used carbon will be disposed of as hazardous waste by Navajo Refining. The stripping unit itself will be placed on the south side of the water treatment plant beside the wastewater API.

This treated water will then be disposed of in one of the following ways:

(1) Used as irrigation water on our adjacent farm.

(2) Injected into one of several recovery wells inside the refinery. The most likely well would be RW-5 but we would like to keep RW-4 and RW-6 and possibly others as options. These wells are no longer pumping product.

(3) Injected into a new trench or well that would be constructed especially for this purpose.

This water at no time would be put into Eagle Draw. Also, all these options would be affecting the same aquifer that the water is being pumped out of in the recovery trenches.

Navajo will monitor the water that is being disposed of by testing it weekly for VOC's and PAH's. This would ensure that the constituents that are present in the untreated water are being removed. The stripping unit itself will be monitored by refinery personnel on a regular basis to insure that it is working correctly.

Your prompt attention to this matter will be greatly appreciated. Please feel free to contact me at 505-748-3311 if you have any questions.

Regards,

Darrell Moore

Darrell Moore
Environmental Specialist

water treating?
no puddling
trench design (depth?)

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 0900 | Date 12/20/93

Originating Party	Other Parties
Cheryl Moore - Navajo Refining	Bill Olson - OCD

Subject

Artesia Refinery

Discussion

- Navajo will be sampling pond effluent and Mr's ground pond beginning today
- currently skimming product from off-site wells
- Navajo will be doing quarterly sampling at offsite wells in early January
- OCD would like to get split samples on offsite wells

Conclusions or Agreements

I will get back with him on date for offsite wells

Distribution

Signed Bill Olson

Verbal PO # 38492

Submit 5 copies to Appropriate District Office

DISTRICT I
P.O.Box 1980, Hobbs, NM 88241-1980

DISTRICT II
P.O. Drawer DD, Artesia, NM 88211-0719

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

Form C-117 A
Revised 4-1-91

PERMIT NO. A-7163

TANK CLEANING, SEDIMENT OIL REMOVAL, TRANSPORTATION OF MISCELLANEOUS HYDROCARBONS AND DISPOSAL PERMIT

Operator or Owner EDDY POTASH INC. Address P.O. Box 31, Carlsbad, N.M. 882

Lease or Facility Name _____ Location 31 North off Hobbs Hwy.
U.L. - Sec. - Twp. - Rge.

OPERATION TO BE PERFORMED:

☐ Tank Cleaning ☐ Sediment Oil Removal ☒ Transportation of Miscellaneous Hydrocarbons

Operator or Owner Representative authorizing work Mr. Connie Day, Company Man

Date Work to be Performed 10/28/93

TANK CLEANING DATA Tank Number _____ Volume _____

Tank Type _____ Volume Below Load Line _____

SEDIMENT OIL OR MISCELLANEOUS HYDROCARBON DATA

Sediment Oil from: ☐ Pit ☐ Cellar ☐ Other

MISCELLANEOUS OIL

Tank Bottoms From: ☐ Pipeline Station ☐ Crude Terminal ☒ Refinery ☐ Other*

Catchings From: ☐ Gasoline Plant ☐ Gathering Lines ☐ Salt Water Disposal System ☐ Other*

Pipeline Break Oil or Spill ☐

*Other (Explain) Slurry Oil from Navajo Refinery in Artesia

VOLUME AND DESTINATION: Estimated Volume 120 Bbls. Field test volume of good oil _____ Bbls.
(Not required prior to Division approval)

Destination (Name and Location of treating plant or other facility) Eddy Potash Mine Site

DESTRUCTION OF SEDIMENT OIL BY: ☐ Burning ☐ Pit Disposal ☐ Use on Roads or firewalls ☐ Other

(Explain) _____

Location of Destruction _____

Justification of Destruction _____

CERTIFICATION: (APPLICATION MAY BE MADE BY EITHER OF THE FOLLOWING)

I hereby certify that the infomation above is true and complete to the best of my knowledge and belief.

Owner _____ Transporter I & W INC.

By _____ Address P.O. Box 98

Title _____ Signature Kevin Wilson

Date _____ Title Pusher Date 10/28/93

OIL CONSERVATION DIVISION

Approved By Betty Rollins Title Tech Date OCT 29 1993

A COPY OF THIS FORM MUST BE ON LOCATION DURING TANK CLEANING, REMOVAL OF SEDIMENT OIL OR MISCELLANEOUS HYDROCARBONS, AND MUST BE PRESENTED WITH TANK BOTTOMS, SEDIMENT OIL OR MISCELLANEOUS HYDROCARBONS AT THE TREATING PLANT TO WHICH IT IS DELIVERED.

DISTRIBUTION BY OCD	
✓	Santa Fe
	File
	Operator
	Transporter (2)

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 1915 hrs. | Date 9/18/93

Originating Party	Other Parties
Dave Crotton - Navajo Refining 365-8365 (cellular)	Bill Olson - Envir. Bureau

Subject

Discharge of hydrotest water from crude tank #437

Discussion

Faxed test results for benzene & metals
Test results, below TC limits. No solvents used in cleaning was steam cleaned.
Want to discharge to farm plot used for RO discharge water
Volume of discharge = 100,000 bbls
Hydrotest water from A. plant feed water (fresh water)

Conclusions or Agreements

Based upon test results and Navajo statement of process knowledge
OK I gave O/C to discharge to RO discharge fields with condition that there be no discharge to "waters of US."

Distribution file

Signed Bill Olson

NAVAJO REFINING COMPANY
P.O. DRAWER 159
501 EAST MAIN STREET
ARTESIA, NEW MEXICO 88210
PHONE: (505) 748-3311

ENGINEERING DEPARTMENT
FAX: (505) 748-9077

SENDING TO: NAME Bill Olsen
ORGANIZATION/FIRM Oil Conservation Division
TELECOPY # 827-5741

SENDING FROM: NAME David Griffin
DATE 9/18/93 NUMBER OF PAGES, INCLUDING THIS COVER PAGE 2

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL TRISH AT EXT. 270, OR PATTI AT EXT. 202

MESSAGE: Bill,

!!-- are the analyses of the hydrotest water in Tank 437. As you can see we meet all applicable discharge standards. Navajo's Chemist Charlie Ebarb and I did the analysis here at Navajo's Laboratory. The Benzene was run using EPA's purge and trap GC method and the Metals were run by Atomic Adsorption. We await your authorization to discharge - Navajo can wait until approximately 8 PM this evening and still make the necessary deadlines. Thanks for your help.

David Griffin

NAVAJO REFINING CO
LABORATORY ANALYSIS

SAMPLE: TANK 437 HYDROTEST WATER
SAMPLE DATE: 9-17-93
ANALYSIS STARTED: 9-17-93
ANALYSIS COMPLETE: 9-18-93

BENZENE,ppb	4.0
ARSENIC,ppm	ND
BARIUM,ppm	0.02
CADMIUM,ppm	ND
CHROMIUM,ppm	ND
LEAD,ppm	0.01

Note: Detection Limits for Metals Analysis = 0.01 ppm
Detection Limit for Benzene Analysis = 2 ppb

NAVAJO REFINING COMPANY
P.O. DRAWER 159
501 EAST MAIN STREET
ARTESIA, NEW MEXICO 88210
PHONE: (505) 748-3311

ENGINEERING DEPARTMENT
FAX: (505) 748-9077

SENDING TO:
NAME Kathy Brown
ORGANIZATION/FIRM OCD
TELECOPY # 1-827-5741

SENDING FROM:
NAME Darrell Moore
DATE 8/2/93 NUMBER OF PAGES, INCLUDING THIS COVER PAGE 4

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL TRISH AT EXT. 270, OR PATTI AT EXT. 202

MESSAGE:
This analysis is from Tk 437 after the bottoms have been centrifuged.

Darrell

BETZ Analytical Services

Sample Description: Centrifuge 437 TK Laboratory ID: D0604512
Sample Date: 6/3/93

TCLP EXTRACT (SW846/1311)

TEST	Value	Units	Spike % Recovery	Detection Limits	EPA Method
Arsenic	< 0.20	mg/L	99	0.20	6010
Barium	< 0.50	mg/L	109	0.50	6010
Cadmium	< 0.05	mg/L	89	0.05	6010
Chromium	< 0.20	mg/L	91	0.20	6010
Lead	< 0.20	mg/L	88	0.20	6010
Mercury	< 0.0002	mg/L	114	0.0002	7470
Selenium	< 0.20	mg/L	83	0.20	6010
Silver	< 0.05	mg/L	96	0.05	6010

BETZ Analytical Services

Sample Description: Centrifuge
Date Sampled: 6/2/93
Date Analyzed: 6/21/93 8:59pm
Dilution: 1:4

Laboratory ID: D0604512
Date Extracted: 6/16/93
Analyst: WK

TCLP ACID EXTRACTABLE ORGANICS (EPA 8270)

Compound	Value-ug/L*	Spike % Recovery
o-Cresol	< 40	84
m,p-Cresol	< 40	88
Pentachlorophenol	< 200 [200]	76
2,4,5-Trichlorophenol	< 40	96
2,4,6-Trichlorophenol	< 40	81

*Limit of Practical Quantitation is 40 ug/L, unless otherwise noted.

Surrogate Recovery:		Limits:
2-Fluorophenol	77 %	10 - 94 %
Phenol-d5	86 %	21 - 100 %
2,4,6-Tribromophenol	97 %	10 - 123 %

TCLP BASE/NEUTRAL EXTRACTABLE ORGANICS (EPA 8270)

Compound	Value-ug/L*	Spike % Recovery
1,4-Dichlorobenzene	< 40	67
2,4-Dinitrotoluene	< 40	88
Hexachlorobenzene	< 40	100
Hexachlorobutadiene	< 40	71
Hexachloroethane	< 40	72
Nitrobenzene	< 40	76
Pyridine	< 40	91

*Limit of Practical Quantitation is 40 ug/L, unless otherwise noted.

Surrogate Recovery:		Recovery Limits
Nitrobenzene-d5	80 %	35 - 114 %
2-Fluorobiphenyl	75 %	43 - 116 %
Terphenyl-d14	84 %	33 - 141 %

BETZ Analytical Services

Sample Description: Centrifuge 437 TK
Date Sampled: 6/2/93
Analyst: RW

Laboratory ID: D0604512
Date Analyzed: 6/21/93 15:33
Dilution: 1:5

VOLATILE ORGANICS (TCLP 8240)

Compound	Value-ug/L*	Spike % Recovery
Benzene	< 25	99
Methyl ethyl keytone	< 500 [500]	100
Carbon Tetrachloride	< 25	105
Chlorobenzene	< 25	100
Chloroform	< 25	104
1,2-Dichloroethane	< 25	93
1,1-Dichloroethene	< 25	88
Tetrachloroethylene	< 25	107
Trichloroethylene	< 25	107
Vinyl chloride	< 50 [50]	83

*Limit of Practical Quantitation is 25 ug/L, unless otherwise noted in brackets.

Surrogate Recovery:		Recovery Limits
1,2-Dichloroethane-d4	91 %	84-113 %
Toluene-d8	88 %	82-113 %
Bromofluorobenzene	97 %	91-109 %

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 1500 hrs	Date 3/1/93
Originating Party	**Other Parties**	
Darrell Moore - Navajo Refining	Bill Olson - Environmental Bureau	

Subject

Navajo Refinery Remediation trench

Discussion

Expect to begin construction of trenches on Thursday 3/4
Will take approximately 3 weeks

Conclusions or Agreements

Distribution

f/e
NMOCD Artesia

Signed Bill Olson

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

DRUG FREE

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

February 22, 1993

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-320

Mr. Darrell Moore
Environmental Specialist
Navajo Refining Company
P.O. Drawer 159
Artesia, New Mexico 88210

RE: OFFSITE GROUND WATER REMEDIATION
NAVAJO REFINERY
EDDY COUNTY, NEW MEXICO

Dear Mr. Moore:

The New Mexico Oil Conservation Division (OCD) has reviewed Navajo Refining Company's proposal to control and remediate the leading edge of petroleum contaminated ground water downgradient of Navajo's Refinery in Artesia, New Mexico. This proposal is contained in Navajo's January 21, 1993 and February 17, 1993 correspondence with OCD.

The above referenced remediation proposal is hereby approved with the following conditions:

1. Saturated contaminated soils removed from the ground during excavation of the recovery trenches will not be placed directly on or drained onto the ground surface.

2. Contaminated ground water produced from trenches during excavation will either remain within the excavations or placed in tanks for proper disposal.

3. Navajo will design the underground piping which conveys contaminated ground water to the refinery such that it can be pressure tested to a minimum of three (3) psi above operating pressure. All underground piping will subsequently be pressure tested prior to operation with the results of the tests submitted to OCD.

4. Navajo will provide the following items to OCD within 30 days of completion of the recovery trenches.

   A. A completion report containing:

      i. A map showing the actual locations of the completed trenches and all underground piping.

      ii. The volume and disposition of all fluids and soils generated during the trench installations.

      iii. Any deviations from the proposed construction design.

   B. A proposed monitoring schedule for the remediation system.

5. Navajo will notify OCD of the date of initiation of the trench construction such that OCD may have the opportunity to witness the activities.

Please be advised that OCD approval does not limit Navajo to the work proposed should the trench system fail to effectively contain and remediate petroleum contaminated ground water emanating from the refinery. In addition, OCD approval does not relieve Navajo of responsibility for compliance with any other federal, state, or local laws and/or regulations.

If you have any questions, please contact me at (505) 827-5885.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Mike Williams, OCD Artesia District Supervisor
David G. Boyer, K.W. Brown Environmental Services
Richard D. Mayer, EPA Region VI

P 667 242 320

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TELEPHONE
(505) 748-3311

EASYLINK
62905278

FAX
(505) 746-6410

Navajo REFINING COMPANY

501 EAST MAIN STREET • P. O. DRAWER 159
ARTESIA, NEW MEXICO 88210

February 22, 1993

Mr. William Olson, Hydrogeologist
Environmental Bureau
Oil Conservation Division
P.O. Box 2088
Santa Fe, N.M. 87504

Re: OFFSITE GROUNDWATER CONTAMINATION, NAVAJO REFINERY, EDDY COUNTY, NEW MEXICO.

Dear Bill:

Last week I talked to you about the possibility of our having to move our interceptor trench out of the pecan orchard. The Chase family, which owns the orchard, does not want the trench on their land. Therefore, this letter is to inform you that we are moving the trench to a location along the west right-of-way of Bolton Road. This is directly across the road from the pecan orchard. We have already acquired all necessary permits from the county and tentative construction of the trench is set to start on March 1, 1993.

If you have any questions, please call me at 748-3311, extension 281. Thank you for your time.

Regards,

Darrell Moore

Darrell Moore
Environmental Specialist

DGM/te

TELEPHONE
(505) 748-3311

Navajo REFINING COMPANY

501 EAST MAIN STREET • P. O. DRAWER 159
ARTESIA, NEW MEXICO 88210

EASYLINK
62905278

FAX
(505) 746-6410

OIL CONSERVATION DIVISION
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'93 FEB 22 AM 9 42

February 17, 1993

Fax recieved 2/17/93
MD

Mr. Bill Olson, Hydrogeologist
Environmental Bureau
Oil Conservation Division
P.O. Box 2088
Santa Fe, NM. 87504

Re: Offsite Groundwater Contamination, Navajo Refinery, Eddy County, New Mexico.

Dear Bill:

In our telephone conversation on February 15, 1993, you brought up several items that you needed clarified on our recovery trench. Following is an item by item response:

1. Disposition of Soils - Topsoil (top 18 to 24 inches) will be placed in a segregated area to be put back as topsoil on the trench.

   Backfill Soil - (24 inches to top of vapor contamination) will be placed in a separate area to be used as backfill in the trench.

   Contaminated Soil - will be placed in dump trucks and brought back to the refinery to be placed on the Truck By Pass Landfarm. Whatever precautions necessary to keep the truck from leaking will be taken. No leaking trucks will be on the roads.

2. Fluids Handling - all fluids will be piped straight back to the refinery. Water will be put through our wastewater system and hydrocarbons will be reprocessed.

3. Diagram of Piping - for several reasons, the recovery trenches are being constructed in two phases. The first phase is the actual digging and construction of the trenches and the second phase is the piping, electricity, pumps, etc. For that reason, our drafting and engineering departments have not yet done the piping diagrams. Generally, piping will cross under U.S. 82 and go north along Bolton Road to approximately where our effluent line crosses Bolton Road. From there the piping will turn west and go straight to our north API separator at the wastewater plant. When drafting gets us actual diagrams of the piping we will get those to you.

4. **Plastic on top of gravel** - there will be a layer of 8 mil polypropylene plastic overlying the gravel along the entire length of the trench. I hope this answers your questions.

Finally, due to recalcitrant landowners, the trench may have to be put on the west right-of-way of Bolton Road. The Chases are not very receptive to the trench. If we cannot convince them, we'll have to move it. The county has been very open to us putting the trench along Bolton Road in county right-of-ways.

If you have any questions concerning this matter, please call me at 748-3311, extension 281. Thank you for your time.

Darrell Moore

Darrell Moore
Environmental Specialist

DGM/te

KWBES

K. W. Brown Environmental Services
A Division of AMEC Environmental Services, Inc.
500 Graham Road, College Station, TX 77845
Telephone: (409) 690-9280, Fax: (409) 690-7310

January 21, 1993

Mr. William C. Olson, Hydrogeologist
Environmental Bureau
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

RE: Offsite Groundwater Contamination Investigation,
Navajo Refinery, Artesia, New Mexico

Dear ~~Mr. Olson~~ Bill:

As you know, K. W. Brown Environmental Services (KWBES) continues to perform work for Navajo Refining Company in the matter of their offsite hydrocarbon contamination investigation. At their request and in response to your October 8, 1992, letter, we are providing you with information and copies of analytical data generated as a result of this work. The information is organized in the same format as your letter, but only those numbered items to which we are responding are shown.

Recommendations for Immediate Action

2. Water analyses for these wells are included in the package. Please note that well RA-3156 is also called the "Gurley well" and RA-3353 is the "Truman Joy well". Product thicknesses for all wells are presented in the table below:

Well #	Measurement Date				
	3/10/92	5/22/92	8/5/92	9/29/92	11/20/92
KWB-4	2.11 ft.	1.25 ft.	1.24 ft.	1.61 ft.	0.99 ft.
KWB-5	LT 1/16 inch	LT 1/16 inch	Sheen	Sheen	Sheen
KWB-6	3.28 ft.	0.67 ft.	0.80 ft.	0.83 ft.	3.55 ft.
KWB-8	LT 1/16 inch	LT 1/16 inch	LT 1/8 inch	Sheen	Sheen

LT — Less than.

6. The preliminary design for the recovery trench has been completed and is submitted with this package. The final design will be provided after consultation with Navajo and affected landowners and after comments are received from OCD. We are hoping to begin trench installation within the next several weeks, therefore review of the design at your earliest convenience would be appreciated.

Recommendations for Long-term Actions

1. The required analyses are enclosed. Please note that low level detections of 1,2-dichloroethane (EDC) were seen in several monitor wells, but only one detection (KWB-

9) was confirmed using the mass spectrophotometer. These wells will be checked again for this compound at the next regular sampling. Also, heavy metal analyses were performed only for selected metals, mainly for comparison by Navajo of the results seen in the RCRA analyses performed in the evaporation pond area. Please notify us if further metals analyses are required.

2. Wells RA-4922, RA-6550 and RA-7180 are located in the NW 1/4 of Section 10 and were not field-located as part of this study. However, RA-6550 was located and sampled as part of the Navajo RCRA study last month and the results will be provided to you in the next several weeks when they are received. Similarly, wells RA-4684 and RA-4765 were not field-located for the initial study because they are in the SE 1/4 of the NW 1/4 of Section 15 and away from the current area of concern. The latter two wells will be field-located and sampled if future information indicates a threat to water quality from the offsite contamination.

3. A revised Table 3 is included with this package.

4. A copy of the KWBES workplan for additional plume definition is included with this package. The workplan includes the information on proposed well locations and well construction methods requested in your letter. As originally presented to Navajo, the plan proposed additional work elements that have not yet been authorized by them. Accordingly, the package submitted to OCD includes only the approved work. At Navajo's request, KWBES proceeded with additional plume definition work that began prior to the receipt of the your October 8 letter. Accordingly, we are including information on additional monitor well locations and the results of the water quality sampling conducted on these new wells.

As mentioned elsewhere in this letter, Navajo is being required by EPA to conduct an extensive soil and groundwater investigation of the Three-Mile Ditch area and the area of the evaporation ponds. Accordingly, the evaporation pond monitor wells required to be sampled as a condition of the WQCC Discharge Plan approval were sampled during that investigation, and the results will be provided to you when analyses are complete, sometime in the next few days. All required analyses will be submitted to you by February 1.

If you have any questions regarding the information provided in or with this letter, please do not hesitate to contact me, at (409) 690-9280.

Sincerely,

David G. Boyer
Project Manager

DGB/jc
Enclosure
File: 622092003-236
cc: David Griffin
VIA Federal Express

Table 3. Boring and monitoring well product thickness at the Navajo Refinery.

Boring no.	HC thickness (ft)	Taken by	Date	Comments
1	sheen	Navajo-Z.R.S.	10/3/91	HC product thickness too thin to measure, field notes
2	sheen	Navajo-Z.R.S.	10/3/91	HC product thickness too thin to measure, field notes
3	~0.25"	Navajo-Z.R.S.	10/4/91	Field notes
4	sheen	Navajo-Z.R.S.	10/4/91	HC product thickness too thin to measure, field notes
5	sheen	Navajo-Z.R.S.	10/4/91	HC product thickness too thin to measure, field notes
6	sheen	Navajo-Z.R.S.	10/4/91	HC product thickness too thin to measure, field notes
7	none	Navajo-Z.R.S.	10/4/91	Field notes
8	none	Navajo-Z.R.S.	10/4/91	Field notes
9	sheen	Navajo-Z.R.S.	10/4/91	HC product thickness too thin to measure, field notes
10	sheen	Navajo-Z.R.S.	10/4/91	HC product thickness too thin to measure, field notes
11	~2.0	Navajo-Z.R.S.	10/7/91	Field notes
12	~0.25"	Navajo-Z.R.S.	10/7/91	Field notes
13	~0.25"	Navajo-Z.R.S.	10/11/91	Field notes
14	~0.25"	Navajo-Z.R.S.	10/11/91	Field notes
15	none	Navajo-Z.R.S.	10/11/91	Field notes
16	none	Navajo-Z.R.S.	10/11/91	Field notes
17	sheen	Navajo-Z.R.S.	10/11/91	HC product thickness too thin to measure, field notes
18	sheen	Navajo-Z.R.S.	10/11/91	HC product thickness too thin to measure, field notes
19	~2.0	Navajo-Z.R.S.	10/11/91	Field notes
20	sheen	Navajo-Z.R.S.	10/11/91	HC product thickness too thin to measure, field notes
21	none	Navajo-Z.R.S.	10/11/91	Field notes
22	none	Navajo-Z.R.S.	10/11/91	Field notes
23	none	Navajo-Z.R.S.	10/11/91	Field notes
24	none	Navajo-Z.R.S.	10/11/91	Field notes
25	none	Navajo-Z.R.S.	10/11/91	Field notes
26	~0.25"	Navajo-Z.R.S.	10/11/91	Field notes
27	sheen	Navajo-Z.R.S.	10/9/91 [a]	NFMR [b]
28	none	Navajo-Z.R.S.	10/11/91 [a]	NFMR [b]
29	none	Navajo-Z.R.S.	10/11/91 [a]	NFMR [b]
30	>1.0"	Navajo-Z.R.S.	10/11/91 [a]	NFMR [b]
31	none	Navajo-Z.R.S.	10/11/91 [a]	NFMR [b]
32	none	Navajo-Z.R.S.	10/15/91 [a]	NFMR [b]
33	>1.0"	Navajo-Z.R.S.	10/15/91 [a]	NFMR [b]

Table 3. Continued.

Boring no.	HC thickness (ft)	Taken by	Date	Comments
34	none	Navajo-Z.R.S.	10/15/91 [a]	NFMR [b]
35	none	Navajo-Z.R.S.	10/15/91 [a]	NFMR [b]
36	none	Navajo-Z.R.S.	10/15/91 [a]	NFMR [b]
37	sheen	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
38	sheen	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
39	none	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
40	sheen	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
41	none	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
42	none, slight HC odor	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
43	sheen	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
44	sheen	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
45	none, slight HC odor	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
46	sheen	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
47	none	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
48	none	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
49	sheen	Navajo-Z.R.S.	10/16/91 [a]	NFMR [b]
50	none, slight HC odor	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
51	none	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
52	none	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
53	sheen	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
54	none	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
55	none	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
56	sheen	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
57	none	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
58	none	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
59	none	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
60	none	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
61	none	Navajo-Z.R.S.	10/22/91 [a]	NFMR [b]
62	see comment	Navajo-Z.R.S.	11/8/91	Depth to HC fluid 10 ft, no product thickness
63	0.75	Navajo-Z.R.S.	11/8/91	
64	sheen	Navajo-Z.R.S.	11/8/91	
65	0.17	Navajo-Z.R.S.	11/8/91	
66	~0.25"	Navajo-Z.R.S.	11/8/91	

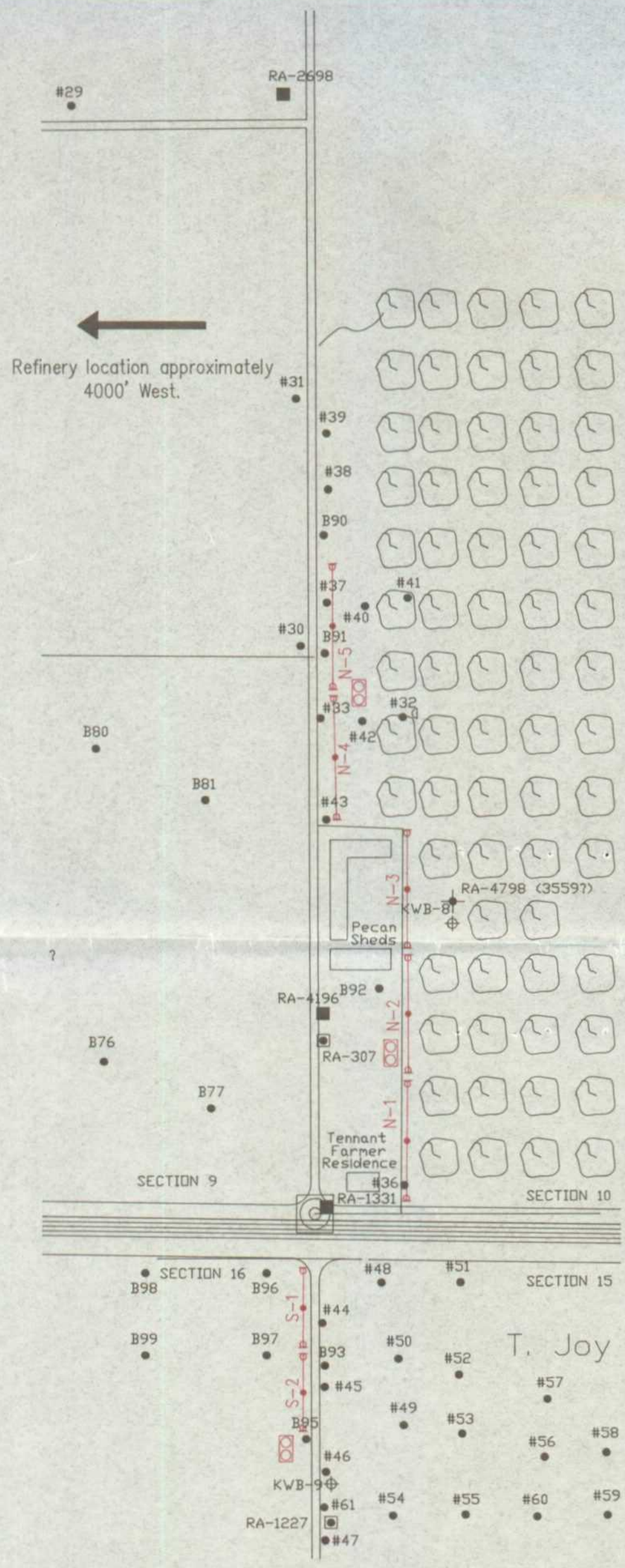
Table 3. Continued.

Boring no.	HC thickness (ft)	Taken by	Date	Comments
67	sheen	KWBES	3/4/92	
68	sheen	KWBES	3/4/92	
69	0.56	KWBES	3/4/92	
70	0.04	KWBES	3/4/92	
71	2.22	KWBES	3/4/92	
72	0.02	KWBES	3/4/92	
73	sheen	KWBES	3/4/92	
74	2.91	KWBES	3/5/92	
75	0.21	KWBES	3/5/92	
76	0.01	KWBES	3/5/92	
77	sheen	KWBES	3/5/92	
78	4.64	KWBES	3/6/92	
79	2.47	KWBES	3/6/92	
80	2.56	KWBES	3/6/92	
81	2.35	KWBES	3/6/92	
82	sheen	KWBES	3/6/92	
83	none	KWBES	3/6/92	
84	2.93	KWBES	3/7/92	
85	3.77	KWBES	3/7/92	
86	2.49	KWBES	3/7/92	
87	4.56	KWBES	3/7/92	
88	2.58	KWBES	3/8/92	
89	0.03	KWBES	3/8/92	
90	none	KWBES	3/8/92	
91	1.04	KWBES	3/8/92	
92	0.78	KWBES	3/10/92	
93	0.5	KWBES	3/10/92	
94	none	KWBES	3/10/92	
KWB-28	>1.0"	Navajo-Z.R.S.	?	NFMR [b]
KWB-1A	none	KWBES	2/19/92	
KWB-1B	none	KWBES	2/19/92	
KWB-2A	none	KWBES	2/19/92	
KWB-2B	none	KWBES	2/19/92	
KWB-3A	none	KWBES	2/19/92	

Table 3. Continued

Boring no.	HC thickness (ft)	Taken by	Date	Comments
KWB-3B	none	KWBES	2/19/92	
KWB-4	none	KWBES	2/19/92	
KWB-5	none	KWBES	2/19/92	
KWB-6	3.25	KWBES	2/19/92	
KWB-7	none	KWBES	2/19/92	
KWB-8	none	KWBES	2/19/92	
KWB-9	none	KWBES	2/19/92	
KWB-1A	none	KWBES	3/10/92	
KWB-1B	none	KWBES	3/10/92	
KWB-2A	none	KWBES	3/10/92	
KWB-2B	none	KWBES	3/10/92	
KWB-3A	none	KWBES	3/10/92	
KWB-3B	none	KWBES	3/10/92	
KWB-4	2.11	KWBES	3/10/92	
KWB-5	< 0.06"	KWBES	3/10/92	
KWB-6	3.28	KWBES	3/10/92	
KWB-7	none	KWBES	3/10/92	
KWB-8	< 0.06"	KWBES	3/10/92	
KWB-9	none	KWBES	3/10/92	

a — Date given is the date of boring completion rather than date of measurement.
b — NFMR - No field measurement recorded.



EXPLANATION

KWB-7 ⊕	Monitor well
•	B – borings performed by KWBES # – borings performed by Navajo
■	Water well – shallow valley fill aquifer
▣	Water well – deep, artesian aquifer
○	Open casing – no information
✦	Oil/gas exploration well converted to water well
?	Location in 1/4 1/4 section unknown
◎	Section corner
RA-397	State Engineer Office well number, Roswell Artesian Basin
AD-1917	Age of well, record on file SEO, no RA number assigned
	Pecan trees
	Limits of interceptor trench segment.
N-3	Designation of interceptor trench segment.
	Central "wet well" with recovery pumps.
	Piezometers at ends of trench.
	Concrete pad with tanks for temporary storage of collected product/groundwater.

Notes:

1. Boring and water well locations approximate based on field observations and existing records. Monitor well locations surveyed 3/92.
2. See figures 2 and 3 for details of interceptor trench.

Preliminary — Subject To Review

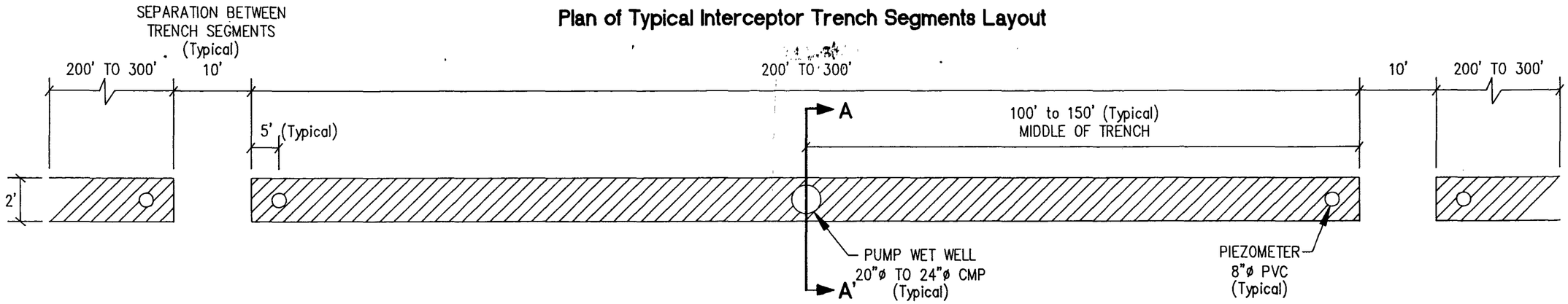
KWBES

prepared for: Navajo

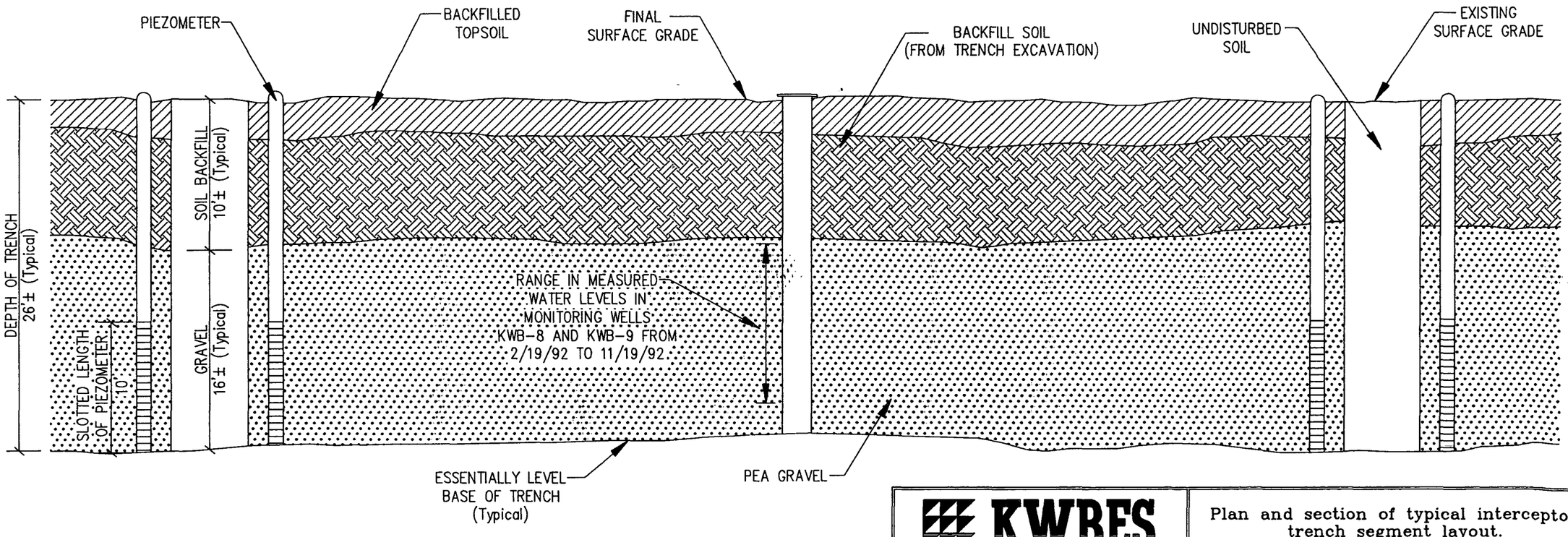
Offsite interceptor trench.

PROJECT: 622092003-262 (BASE2)	
LOCATION: ARTESIA, NEW MEXICO	
APPR:	DATE: 1-21-93
DRAWN BY: JW	SCALE: AS SHOWN
DATE: 1-21-93	FIGURE: 1

Plan of Typical Interceptor Trench Segments Layout



Section of Typical Interceptor Trench Segments Layout



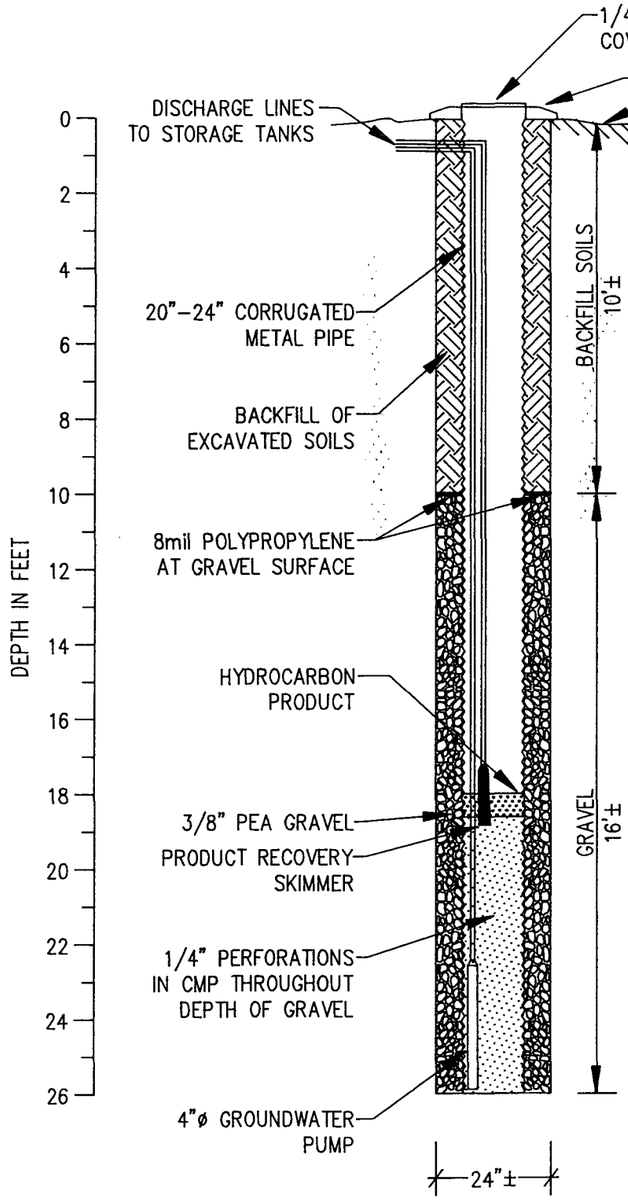
Preliminary —
Subject To Review

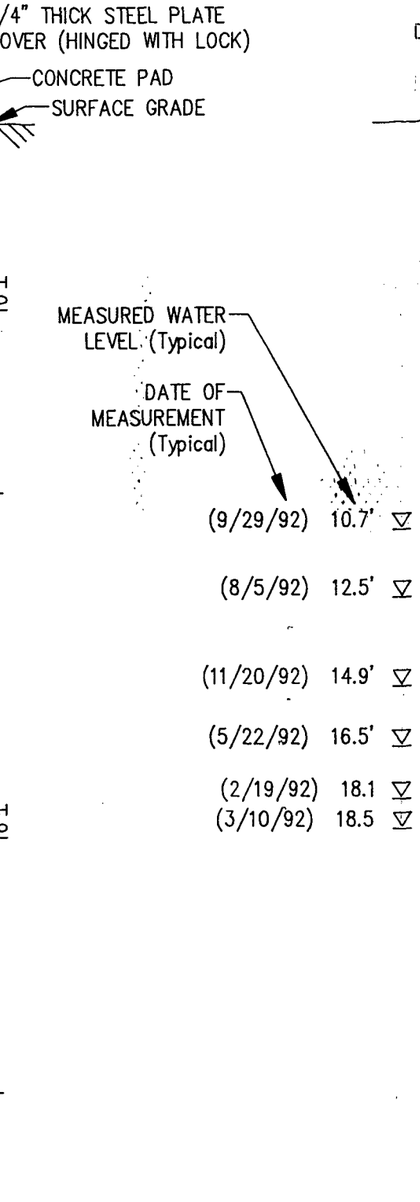
KWBES

prepared for: Navajo

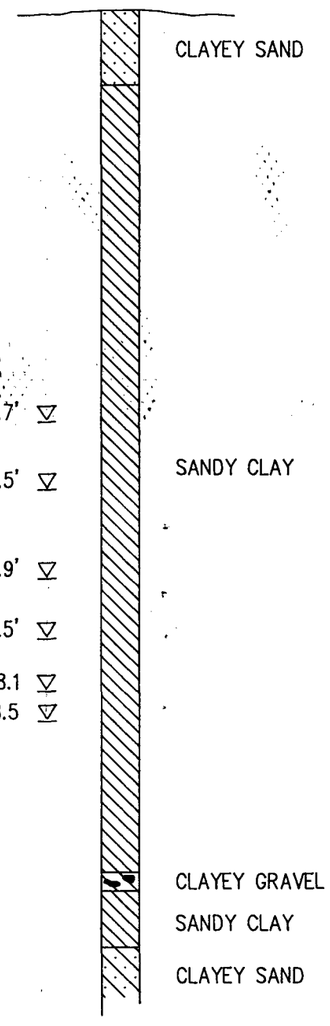
Plan and section of typical interceptor trench segment layout.

PROJECT: 622092003-262 (TRENCH2)	
LOCATION: ARTESIA, NEW MEXICO	
APPR:	DATE: 01/21/93
DRAWN BY: RMO	SCALE: NONE
DATE: 01/13/93	FIGURE: 2

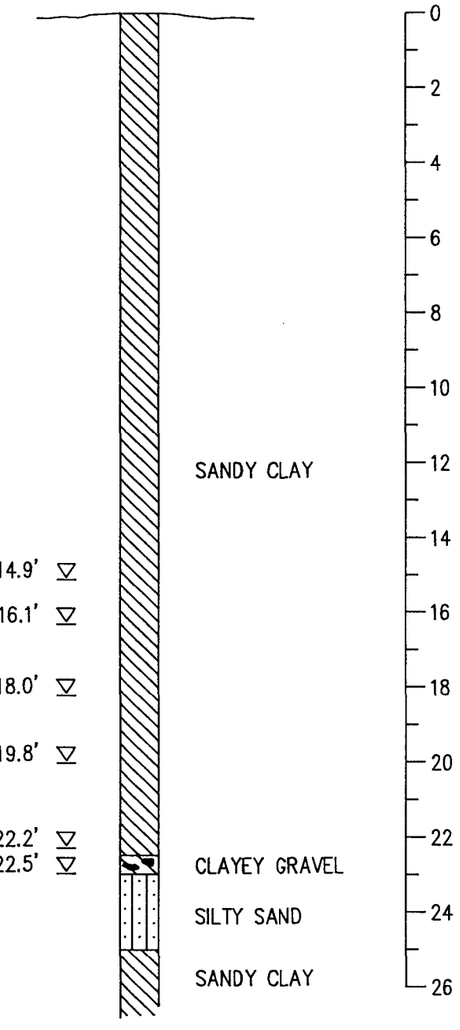




DRILLING LOG
KWB–8



DRILLING LOG
KWB–9



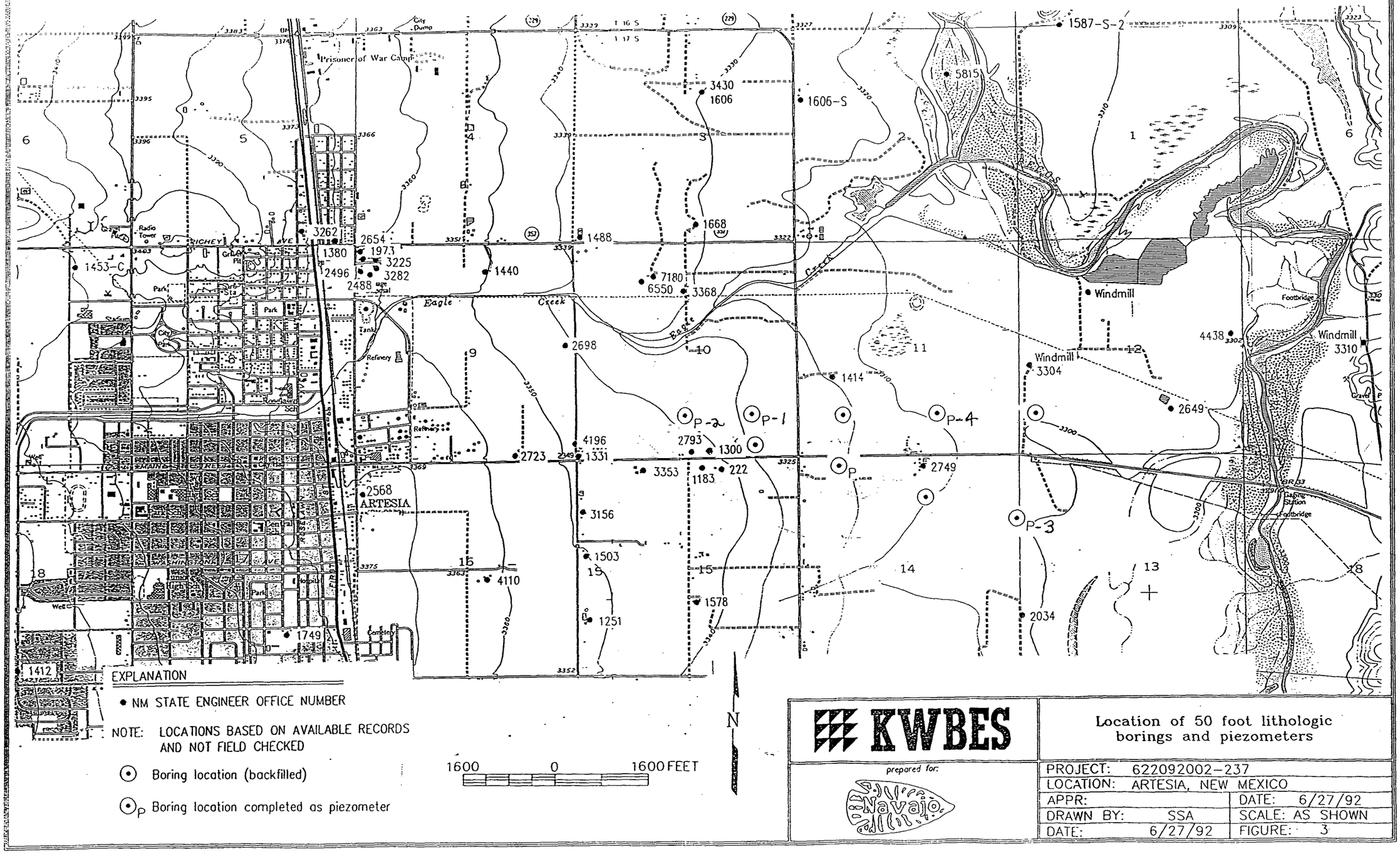
Preliminary — Subject To Review

KWBES

prepared for: Navajo Refining

Section A–A'
Offsite interceptor trench

PROJECT: 622092003–262 (TRENCH)	
LOCATION: ARTESIA, NEW MEXICO	
APPR:	DATE: 01/21/93
DRAWN BY: RMO	SCALE: AS SHOWN
DATE: 01/13/93	FIGURE: 3



EXPLANATION

- • NM STATE ENGINEER OFFICE NUMBER

NOTE: LOCATIONS BASED ON AVAILABLE RECORDS AND NOT FIELD CHECKED

- ⊙ Boring location (backfilled)
- $⊙_P$ Boring location completed as piezometer

KWBES

prepared for: Navajo Refining

Location of 50 foot lithologic borings and piezometers

PROJECT:	622092002-237		
LOCATION:	ARTESIA, NEW MEXICO		
APPR:		DATE:	6/27/92
DRAWN BY:	SSA	SCALE:	AS SHOWN
DATE:	6/27/92	FIGURE:	3

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

Mr. David Boyer
K. W. Brown Environmental Services
500 Graham Road
College Station, TX 77845

January 8, 1993

Dear David,

On November 21, 1992, one soil sample and thirteen water samples were received by Inter-Mountain Laboratories - College Station. The samples were received cool and intact. Two trip blanks accompanied the samples. The samples were identified by Project Name "Navajo". Analyses for Volatiles (Methods 8020/ 8010), Semivolatiles (Method 8100), Dissolved Metals by ICP, Total Metals, pH, EC and Oil and Grease were performed according to the accompanying chain of custody forms and per Lisa Mayfield's phone conversation with you on November 23, 1992.

It is the policy of this laboratory to employ, whenever possible, preparatory and analytical methods which have been approved by regulatory agencies. The methods used in the analysis of samples reported herein are found in "Test Methods for Evaluating Solid Waste", SW-846, USEPA, 1986. All reports in this package reference methods utilized. Quality control within the laboratory includes analyse of method blanks, duplicates and spikes with each analytical batch.

Methods used for each analysis are listed on the reports. All detection limits are practical quantification limits (PQLs). PQLs have been corrected for the dry weight of the sample, dilutions, weight or volume of the sample analyzed, and the final volume of the extract analyzed.

Methyl tert-butyl Ether was requested December 9, 1992. MTBE was reported based on the original run if possible, since holding time had been exceeded. Hits were confirmed by GC/MS, Method 8240. If the hit exceeded the calibration range, an estimated concentration was reported based on the 8240 confirmation. On January 6, 1992 you requested we confirm the 1,2-Dichloroethane hits. KWB-9 confirmed at 7ug/L. KWB-11, KWB-11B, KWB-7 and KWB-12B did not confirm. KWB-7 and KWB-12B had headspace in the vials. Normal detection limit for GC/MS is 5ug/L.

Quality Control reports have been included for your information and use. These reports appear at the end of the analytical package and may be identified by title. If you have any questions regarding the information in this package, please feel free to call at your convenience.

Sincerely,

Ulonda M. Rogers
Lab Manager

encl.

KWBE2428

Inter- Mountain Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
Navajo / Artesia NM	Artesia, NM

Sampler: (Signature)	Chain of Custody Tape No.
Mike Stevens	

Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers	Volatiles 8010, 8020	Semivolatiles	Total ICP Metals	Dissolved ICP Metals	Remarks
KWB-1C	11/19/92	1725	C922428	Water	5	X	X	X	X	Check w/DWE
KWB-4	11/20/92	1320	C922429		5	X	X	X	X	Boyer for Semivol.
KWB-5	11/20/92	1235	C922430		5	X	X	X	X	method
KWB-6	11/20/92	1420	C922431		5	X	X	X	X	
KWB-8	11/20/92	1135	C922432		5	X	X	X	X	
KWB-9	11/19/92	1555	C922433		5	X	X	X	X	
KWB-10	11/20/92	0955	C922434		5	X	X	X	X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Mike Stevens	9/20/92	1625	Wendy M Logan	11/21/92 ~~11/24/92~~	1430
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by laboratory: (Signature)	Date	Time

Inter-Mountain Laboratories, Inc.

☐ 1633 Terra Avenue, Sheridan, Wyoming 82801, Telephone (307) 672-8945
☐ 1714 Phillips Circle, Gillette, Wyoming 82716, Telephone (307) 682-8945
☐ 2506 West Main Street, Farmington, NM 87401, Telephone (505) 326-4737
☐ 910 Technology Blvd. Suite B, Bozeman, Montana 59715, Telephone (406) 586-8450
☐ Route 3, Box 256, College Station, TX 77845, Telephone (409) 776-8945
☒ 3304 Longmire Drive, College Station, TX 77845, Telephone (409) 774-4999

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imi
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Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
Navajo Refinery	Artesia, NM

Sampler: (Signature)	Chain of Custody Tape No.
M. Adams	

Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers	Volatiles 8010, 8020	Semivolatiles	Total ICP Metals	Dissolved ICP Metals	Remarks
KWB - 11B dup	11/19/92	0915	C922436	Water	2	X				VOA duplicate preserved
KWB - 11B	11/19/92	0915	C922437	Water	6	X	X	X	X	with Mercuric Chloride
KWB - 11A	11/19/92	1025	C922438	Water	6	X	X	X	X	
KWB - 7	11/19/92	1200	C922439	Water	6	X	X	X	X	
KWB - 12B	11/19/92	1430	C922440	Water	5	X	X	X	X	Check w/ Dave
KWB - 12A	11/19/92	1445	C922441	Water	5	X	X	X	X	Boyer for
										Semivolatile method.
EC-SD-002	11/20/92	1200	C922442	Soil	1					Soil Analysis For
										Total Cr, Pb,
										O&G, pH, EC

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
M. Adams	11/20/92	0900	W.T. Boyer	11/20/92	0900
W.T. Boyer	11/20/92	1500	Wendi Mclay	11/21/92	1430
Relinquished by: (Signature)	Date	Time	Received by laboratory: (Signature)	Date	Time

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Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	NA
Sample ID:	Travel Blank	Date Received:	11/21/92
Sample Number:	C922443	Date Analyzed:	12/04/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	41.9 B	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

B - Analyte detected in blank

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	NA
Sample ID:	Travel Blank	Date Received:	11/21/92
Sample Number:	C922443	Date Analyzed:	12/04/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	102%	75-125%
Bromochloromethane	97%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	NA
Sample ID:	Travel Blank	Date Received:	11/21/92
Sample Number:	C922435	Date Analyzed:	12/03/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	17.2 B	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.
B - Analyte detected in blank

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	NA
Sample ID:	Travel Blank	Date Received:	11/21/92
Sample Number:	C922435	Date Analyzed:	12/03/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	1-Chloro-2-Fluorobenzene	117%	75-125%
	Bromochloromethane	114%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - MATRIX SPIKE
METHOD 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: C922432 Spike
Sample Matrix: Water
Preservative: Cool, HCl
Condition: Intact, pH=2

Date Sampled: 11/20/92
Date Received: 11/21/92
Date Analyzed: 12/01/92

Analyte	Spike Added (ug/L)	Sample Result (ug/L)	Spike Result (ug/L)	Percent Recovery	Acceptance Limit
Benzene	200	429	589	80%	39-150%
Bromodichloromethane	200	ND	209	105%	42-172%
Bromoform	200	ND	195	98%	13-159%
Bromomethane	NA	ND	NA	NA	D-144%
Carbon tetrachloride	200	ND	218	109%	43-143%
Chlorobenzene	400	ND	433	108%	38-150%
Chloroethane	NA	ND	NA	NA	46-137%
2-Chloroethylvinylether	200	ND	150	75%	14-186%
Chloroform	200	ND	206	103%	49-133%
Chloromethane	NA	ND	NA	NA	D-193%
Dibromochloromethane	200	ND	216	108%	24-191%
1,2-Dichlorobenzene	400	ND	460	115%	D-208%
1,3-Dichlorobenzene	400	ND	453	113%	7-187%
1,4-Dichlorobenzene	400	ND	474	119%	42-143%
Dichlorodifluoromethane	NA	ND	NA	NA	47-132%
1,1-Dichloroethane	200	ND	204	102%	51-147%
1,2-Dichloroethane	200	ND	230	115%	28-167%
1,1-Dichloroethene	200	ND	333	167%	38-155%
trans-1,2-Dichloroethene	200	ND	204	102%	44-156%
1,2-Dichloropropane	200	ND	214	107%	22-178%
trans-1,3-Dichloropropene	200	ND	224	112%	22-178%
Ethylbenzene	200	286	473	94%	32-160%
Methylene Chloride	200	250 B	136 B	57%	25-162%
1,1,2,2-Tetrachloroethane	200	ND	220	110%	8-184%
Tetrachloroethene	200	ND	238	119%	26-162%
Toluene	200	120	325	103%	46-148%
1,1,1-Trichloroethane	200	36.5	213	88%	41-138%
1,1,2-Trichloroethane	200	ND	229	115%	39-136%
Trichloroethene	200	ND	211	106%	35-146%
Trichlorofluoromethane	NA	ND	NA	NA	21-156%
Vinyl chloride	NA	ND	NA	NA	28-163%
p, m - Xylene	400	107	529	106%	50-150%
o - Xylene	200	45.4	268	111%	50-150%

ND - Analyte not detected at stated detection limit.
B - Analyte detected in blank

Inter·Mountain Laboratories, Inc.

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College Station, Texas 77845

QUALITY CONTROL REPORT - MATRIX SPIKE
METHOD 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number:	C922432 Spike	Date Sampled:	11/20/92
Sample Matrix:	Water	Date Received:	11/21/92
Preservative:	Cool, HCl	Date Analyzed:	12/01/92
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	99%	75-125%
Bromochloromethane	102%	75-125%

Reference:

Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

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QUALITY CONTROL REPORT - MATRIX SPIKE DUPLICATE
METHOD 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: C922432 Spike Duplicate
Sample Matrix: Water
Preservative: Cool, HCl
Condition: Intact, pH=2

Date Sampled: 11/20/92
Date Received: 11/21/92
Date Analyzed: 12/01/92

Analyte	Spike (%)	Spike Dup (%)	Percent Difference
Benzene	80%	84%	4.3%
Bromodichloromethane	105%	114%	8.2%
Bromoform	98%	106%	7.4%
Bromomethane	NA	NA	NA
Carbon tetrachloride	109%	109%	0.0%
Chlorobenzene	108%	110%	1.4%
Chloroethane	NA	NA	NA
2-Chloroethylvinylether	75%	79%	4.6%
Chloroform	103%	107%	3.8%
Chloromethane	NA	NA	NA
Dibromochloromethane	108%	111%	2.7%
1,2-Dichlorobenzene	115%	116%	1.1%
1,3-Dichlorobenzene	113%	114%	1.1%
1,4-Dichlorobenzene	119%	119%	0.2%
Dichlorodifluoromethane	NA	NA	NA
1,1-Dichloroethane	102%	107%	4.8%
1,2-Dichloroethane	115%	116%	0.9%
1,1-Dichloroethene	167%	198%	17.0%
trans-1,2-Dichloroethene	120%	106%	12.4%
1,2-Dichloropropane	107%	107%	0.5%
trans-1,3-Dichloropropene	112%	113%	0.9%
Ethylbenzene	94%	97%	3.1%
Methylene Chloride	57%	52%	10.1%
1,1,2,2-Tetrachloroethane	110%	117%	5.7%
Tetrachloroethene	119%	118%	1.3%
Toluene	103%	105%	1.4%
1,1,1-Trichloroethane	88%	91%	3.1%
1,1,2-Trichloroethane	115%	113%	1.8%
Trichloroethene	106%	108%	1.4%
Trichlorofluoromethane	NA	NA	NA
Vinyl chloride	NA	NA	NA
p, m - Xylene	106%	107%	0.9%
o - Xylene	111%	113%	1.6%

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QUALITY CONTROL REPORT - MATRIX SPIKE DUPLICATE
METHOD 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number:	C922432 Spike Duplicate	Date Sampled:	11/20/92
Sample Matrix:	Water	Date Received:	11/21/92
Preservative:	Cool, HCl	Date Analyzed:	12/01/92
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	100%	75-125%
Bromochloromethane	102%	75-125%

Reference:

Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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College Station, Texas 77845

QUALITY CONTROL REPORT - MATRIX SPIKE
METHOD 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: C922438 Spike
Sample Matrix: Water
Preservative: Cool, HCl
Condition: Intact, pH=2

Date Sampled: 11/19/92
Date Received: 11/21/92
Date Analyzed: 12/02/92

Analyte	Spike Added (ug/L)	Sample Result (ug/L)	Spike Result (ug/L)	Percent Recovery	Acceptance Limit
Benzene	20.0	ND	20.0	100%	39-150%
Bromodichloromethane	20.0	ND	19.6	98%	42-172%
Bromoform	20.0	ND	19.7	99%	13-159%
Bromomethane	NA	ND	NA	NA	D-144%
Carbon tetrachloride	20.0	ND	23.4	117%	43-143%
Chlorobenzene	40.0	ND	41.1	103%	38-150%
Chloroethane	NA	ND	NA	NA	46-137%
2-Chloroethylvinylether	20.0	ND	4.5	23%	14-186%
Chloroform	20.0	ND	23.4	117%	49-133%
Chloromethane	NA	ND	NA	NA	D-193%
Dibromochloromethane	20.0	ND	18.8	94%	24-191%
1,2-Dichlorobenzene	40.0	ND	40.4	101%	D-208%
1,3-Dichlorobenzene	40.0	ND	41.1	103%	7-187%
1,4-Dichlorobenzene	40.0	ND	41.0	103%	42-143%
Dichlorodifluoromethane	NA	ND	NA	NA	47-132%
1,1-Dichloroethane	20.0	ND	24.2	121%	51-147%
1,2-Dichloroethane	20.0	2.9	21.9	95%	28-167%
1,1-Dichloroethene	20.0	ND	25.1	126%	38-155%
trans-1,2-Dichloroethene	20.0	ND	23.0	115%	44-156%
1,2-Dichloropropane	20.0	ND	19.7	99%	22-178%
trans-1,3-Dichloropropene	20.0	ND	19.4	97%	22-178%
Ethylbenzene	20.0	ND	20.6	103%	32-160%
Methylene Chloride	20.0	4.7 B	20.4 B	79%	25-162%
1,1,2,2-Tetrachloroethane	20.0	ND	20.3	102%	8-184%
Tetrachloroethene	20.0	ND	19.3	97%	26-162%
Toluene	20.0	ND	20.5	103%	46-148%
1,1,1-Trichloroethane	20.0	ND	23.3	117%	41-138%
1,1,2-Trichloroethane	20.0	ND	19.9	100%	39-136%
Trichloroethene	20.0	ND	20.4	102%	35-146%
Trichlorofluoromethane	NA	ND	NA	NA	21-156%
Vinyl chloride	NA	ND	NA	NA	28-163%
p, m - Xylene	40.0	ND	41.3	103%	50-150%
o - Xylene	20.0	ND	20.6	103%	50-150%

ND - Analyte not detected at stated detection limit.
B - Analyte detected in blank

Inter-Mountain Laboratories, Inc.

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College Station, Texas 77845

QUALITY CONTROL REPORT - MATRIX SPIKE
METHOD 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2

Sample Number:	C922438 Spike	Date Sampled:	11/19/92
Sample Matrix:	Water	Date Received:	11/21/92
Preservative:	Cool, HCl	Date Analyzed:	12/02/92
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	107%	75-125%
Bromochloromethane	116%	75-125%

Reference:

Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - METHOD BLANK
METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: MB1129V1
Sample Matrix: Water

Date Sampled: NA
Date Received: NA
Date Analyzed: 11/29/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	1.5	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Not detected at stated detection limit

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QUALITY CONTROL REPORT - METHOD BLANK
METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: MB1129V1 Date Analyzed: 11/29/92
Sample Matrix: Water

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	98%	75-125%
Bromochloromethane	92%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

Inter-Mountain Laboratories, Inc.

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QUALITY CONTROL REPORT - METHOD BLANK
METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: MB1201V1
Sample Matrix: Water

Date Sampled: NA
Date Received: NA
Date Analyzed: 12/01/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	3.9	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Not detected at stated detection limit

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QUALITY CONTROL REPORT - METHOD BLANK
METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2

Sample Number: MB1201V1 Date Analyzed: 12/01/92
Sample Matrix: Water

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	102%	75-125%
Bromochloromethane	107%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

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QUALITY CONTROL REPORT - METHOD BLANK
METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: MB1202V1
Sample Matrix: Water

Date Sampled: NA
Date Received: NA
Date Analyzed: 12/02/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	9.3	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Not detected at stated detection limit

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QUALITY CONTROL REPORT - METHOD BLANK
METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: MB1202V1
Sample Matrix: Water

Date Analyzed: 12/02/92

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	104%	75-125%
Bromochloromethane	100%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

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QUALITY CONTROL REPORT - METHOD BLANK
METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: MB1204V1
Sample Matrix: Water

Date Sampled: NA
Date Received: NA
Date Analyzed: 12/04/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	2.5	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Not detected at stated detection limit

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QUALITY CONTROL REPORT - METHOD BLANK
METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: MB1204V1 Date Analyzed: 12/04/92
Sample Matrix: Water

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	101%	75-125%
Bromochloromethane	98%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

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QUALITY CONTROL REPORT - METHOD BLANK
Method 8100 - POLYNUCLEAR AROMATIC HYDROCARBONS

Client: **K.W. Brown Environmental Services, Inc.**
Project Name: Navajo Refinery
Sample I.D.: Method Blank
Sample Number: MB794
Sample Matrix: Water

Date Extracted: 11/26/92
Date Analyzed: 12/17/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	ND	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Dibenz(a,j)acridine	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

ND - Analyte not detected at stated detection limit

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, Volume IB, September 1986.

Mary Higginbotham
Analyst

Review

Inter-Mountain Laboratories, Inc.

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QUALITY CONTROL REPORT - METHOD BLANK
Method 8100 - POLYNUCLEAR AROMATIC HYDROCARBONS

Client: **K.W. Brown Environmental Services, Inc.**
Project Name: Navajo Refinery
Sample I.D.: Method Blank
Sample Number: MB797
Sample Matrix: Water

Date Extracted: 11/27/92
Date Analyzed: 12/18/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	ND	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Dibenz(a,j)acridine	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

ND - Analyte not detected at stated detection limit

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, Volume IB, September 1986.

Mary Wigginbotham
Analyst

Review

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QUALITY CONTROL REPORT - MATRIX SPIKE
Polynuclear Aromatic Hydrocarbons

Sample I.D.: Matrix Spike
Sample Number: DI 869
Sample Matrix: Water

Date Extracted: 12/28/92
Date Analyzed: 01/05/93

Analyte	Spike Added (ug/L)	Sample Result (ug/L)	Spike Result (ug/L)	Percent Recovery	Acceptance Limit (%)
Naphthalene	100	ND	61.0	61%	D-122
Acenaphthylene	100	ND	68.0	68%	D-139
Acenaphthene	100	ND	68.9	69%	D-124
Fluorene	100	ND	66.9	67%	D-142
Indeno(1,2,3)pyrene	100	ND	69.7	70%	D-116

ND - Analyte not detected at stated detection limit
D - Detection

Reference: Method 8100 - Polynuclear Aromatic Hydrocarbons
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Mary Higginbotham
Analyst

Review

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WATER QUALITY REPORT
TRACE METALS
QUALITY CONTROL REPORT-MATRIX SPIKE ANALYSIS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-12B	**Report Date:**	12/30/92
Laboratory Number:	C922440/15742	**Date Sampled:**	11/19/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Unspiked Sample Concentration (mg/L)	Spiked Sample Concentration (mg/L)	Spike Amount (mg/L)	Percent Recovery	Detection Limit (mg/L)	Method Reference
Dissolved Arsenic	ND	0.012	0.010	120	0.005	7061
Dissolved Chromium	ND	0.06	0.05	120	0.02	7191
Dissolved Lead	ND	0.04	0.05	80	0.02	7421
Dissolved Nickel	0.07	0.51	0.50	89	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

Reviewed by:

Mitch Swan
Supervisor--Water Operations

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3050 DIGESTION
TRACE METAL CONCENTRATIONS
QUALITY CONTROL REPORT - METHOD BLANK

CLIENT: KW BROWN ENVIRONMENTAL SERVICES
PROJECT: Navajo
JOB NUMBER: 622092005

Laboratory Number:	MB120792	**Report Date:**	12/31/92
Sample Matrix:	WATER	**Date Extracted:**	12/07/92

Analyte	Concentration (mg/L)	Detection Limit (mg/L)	Method Reference
Arsenic	NR	0.005	7061
Barium	NR	0.5	7080
Cadmium	NR	0.005	7131
Chromium	ND	0.02	7190
Lead	ND	0.01	7421
Nickel	NR	0.01	7520
Selenium	NR	0.002	7741
Silver	NR	0.01	7760

ND - Parameter Not Detected at stated detection level.
NR - Parameter Not Requested for analysis.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", United States Environmental Protection Agency, November, 1986.

Reviewed by:

David N. Poelstra
Laboratory Manager

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3050 DIGESTION
TRACE METAL CONCENTRATIONS
QUALITY CONTROL REPORT - METHOD BLANK

CLIENT: KW BROWN ENVIRONMENTAL SERVICES
PROJECT: Navajo
JOB NUMBER: 622092005

Laboratory Number:	MB123092	**Report Date:**	12/31/92
Sample Matrix:	WATER	**Date Extracted:**	12/30/92

Analyte	Concentration (mg/L)	Detection Limit (mg/L)	Method Reference
Arsenic	NR	0.005	7061
Barium	NR	0.5	7080
Cadmium	NR	0.005	7131
Chromium	ND	0.02	7190
Lead	ND	0.01	7421
Nickel	NR	0.01	7520
Selenium	NR	0.002	7741
Silver	NR	0.01	7760

ND - Parameter Not Detected at stated detection level.
NR - Parameter Not Requested for analysis.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", United States Environmental Protection Agency, November, 1986.

Reviewed by:

David N. Poelstra
Laboratory Manager

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WATER QUALITY REPORT

QUALITY CONTROL REPORT-REFERENCE STANDARD ANALYSIS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Analyte	Found Concentration (mg/L)	Known Concentration (mg/L)	Standard Reference ID	Method Reference
Arsenic	0.0101	0.0100	SPEX	SW-846 7061
Chromium	0.049	0.050	ERA 9947	SW-846 7190
Lead	0.039	0.040	SPEX	SW-846 7421
Nickel	0.25	0.25	ERA 9947	SW-846 7520

REFERENCE: SW-846 - "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

Reviewed by:

Mitch Swan
Supervisor--Water Operations

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CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:		KWB-1B	KWB-2A	KWB-3A	METHOD REFERENCE
Laboratory Number:		C922030/15211	C922031/15212	C922032/15213	
Date Sampled:		09/26/92	09/28/92	09/28/92	
Dissolved Aluminum	mg/L	6.2	12.3	2.2	6010
Dissolved Arsenic	mg/L	0.005	0.005	<0.005	7061
Dissolved Barium	mg/L	<0.2	<0.2	<0.2	6010
Dissolved Boron	mg/L	0.72	0.31	0.15	6010
Dissolved Cadmium	mg/L	<0.005	0.013	<0.005	6010
Dissolved Chromium	mg/L	<0.02	<0.02	<0.02	6010
Dissolved Cobalt	mg/L	<0.02	<0.02	<0.02	6010
Dissolved Copper	mg/L	<0.01	<0.01	<0.01	6010
Dissolved Iron	mg/L	6.05	6.46	1.93	6010
Dissolved Manganese	mg/L	0.16	0.20	0.04	6010
Dissolved Molybdenum	mg/L	<0.05	<0.05	<0.05	6010
Dissolved Lead	mg/L	<0.01	<0.01	<0.01	7421
Total Mercury	mg/L	0.002	<0.002	<0.002	7470
Dissolved Nickel	mg/L	<0.05	<0.05	<0.05	6010
Dissolved Selenium	mg/L	0.006	0.011	0.023	7741
Dissolved Silver	mg/L	<0.01	<0.01	<0.01	6010
Dissolved Zinc	mg/L	0.09	0.05	0.05	6010
Fluoride	mg/L	1.2	0.8	0.4	EPA 340.2

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

EPA - "Methods for Chemical Analysis of Water and Wastes," US EPA, EPA 600/4-79-020, Revised March 1983.

Reviewed by:

Mitch Swan
Supervisor--Water Operations

Inter-Mountain Laboratories, Inc.

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	09/26/92
Sample ID:	KWB - 1B	Date Received:	10/08/92
Sample Number:	C922030	Date Analyzed:	10/08/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 6		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	1.5	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	98%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

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College Station, Texas 77845

BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. Brown Environmental Services**
Project Name: Navajo - Artesia
Project Number: 622092003
Login Number: 9210003
Sample ID: KWB - 1 Deep (IC) QAPB
Sample Number: C922040
Sample Matrix: Water
Preservative: Cool, pH < 2
Condition: Intact

Report Date: 10/14/92
Date Sampled: 10/01/92
Date Received: 10/08/92
Date Analyzed: 10/13/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	6.4	0.5
Toluene	12.2	0.5
Ethylbenzene	6.1	0.5
p,m-Xylene	11.5	0.5
o-Xylene	4.7	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	91%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 1C	Date Received:	11/21/92
Sample Number:	C922428	Date Analyzed:	11/29/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	26.2	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	1.3 B	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	0.9	0.5
o - Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

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B - Analyte detected in blank

METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 1C	Date Received:	11/21/92
Sample Number:	C922428	Date Analyzed:	11/29/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	1-Chloro-2-Fluorobenzene	94%	75-125%
	Bromochloromethane	88%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

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EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client: **K.W. Brown Environmental Services, Inc.**
Project Name: Navajo Refinery
Sample ID: KWB-1C
Sample Number: C922428
Sample Matrix: Water
Preservative: Cool
Condition: Intact

Report Date: 12/18/92
Date Sampled: 11/19/92
Date Received: 11/21/92
Date Extracted: 11/26/92
Date Analyzed: 12/18/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	ND	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Benzo(j)fluoranthene	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j,)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Mary Higginbotham
Analyst

B. Vinson Taylor
Review

Inter·Mountain Laboratories, Inc.

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. Brown Environmental Services**
Project Name: Navajo - Artesia
Project Number: 622092003
Login Number: 9210003
Sample ID: KWB - 2A
Sample Number: C922031
Sample Matrix: Water
Preservative: Cool, pH < 4
Condition: Intact

Report Date: 10/14/92
Date Sampled: 09/28/92
Date Received: 10/08/92
Date Analyzed: 10/08/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	111%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	09/28/92
Sample ID:	KWB - 3A	Date Received:	10/08/92
Sample Number:	C922032	Date Analyzed:	10/09/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 4		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	97%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. Brown Environmental Services**
Project Name: Navajo - Artesia
Project Number: 622092003
Login Number: 9210003
Sample ID: KWB - 4
Sample Number: C922033
Sample Matrix: Water
Preservative: Cool, pH < 4
Condition: Intact

Report Date: 10/14/92
Date Sampled: 09/29/92
Date Received: 10/08/92
Date Analyzed: 10/09/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	2500
Benzene	10900	250
Toluene	6690	250
Ethylbenzene	913	250
p,m-Xylene	1690	250
o-Xylene	585	250

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	99%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/20/92
Sample ID:	KWB - 4	Date Received:	11/21/92
Sample Number:	C922429	Date Analyzed:	11/29/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	52500	1250
Bromodichloromethane	ND	500
Bromoform	ND	500
Bromomethane	ND	2500
Carbon tetrachloride	ND	500
Chlorobenzene	ND	500
Chloroethane	ND	2500
2-Chloroethylvinylether	ND	2500
Chloroform	ND	500
Chloromethane	ND	2500
Dibromochloromethane	ND	500
1,2-Dichlorobenzene	ND	500
1,3-Dichlorobenzene	ND	500
1,4-Dichlorobenzene	ND	500
Dichlorodifluoromethane	ND	2500
1,1-Dichloroethane	ND	500
1,2-Dichloroethane	ND	500
1,1-Dichloroethene	ND	500
trans-1,2-Dichloroethene	ND	500
1,2-Dichloropropane	ND	500
trans-1,3-Dichloropropene	ND	500
Ethylbenzene	4590	250
Methylene Chloride	629 B	500
tert-Butyl methyl ether *	2740 J	250
1,1,2,2-Tetrachloroethane	ND	500
Tetrachloroethene	ND	500
Toluene	41400	1250
1,1,1-Trichloroethane	ND	500
1,1,2-Trichloroethane	ND	500
Trichloroethene	ND	500
Trichlorofluoromethane	ND	2500
Vinyl chloride	ND	2500
p, m - Xylene	9210	250
o - Xylene	3990	250

ND - Analyte not detected at stated detection limit.
B - Analyte detected in blank
J - Estimated concentration

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QUALITY CONTROL REPORT - METHOD BLANK
METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: MB1203V1
Sample Matrix: Water

Date Sampled: NA
Date Received: NA
Date Analyzed: 12/03/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	7.8	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Not detected at stated detection limit

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QUALITY CONTROL REPORT - METHOD BLANK
METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number: MB1203V1 Date Analyzed: 12/03/92
Sample Matrix: Water

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	117%	75-125%
Bromochloromethane	85%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

Inter-Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/20/92
Sample ID:	KWB - 4	Date Received:	11/21/92
Sample Number:	C922429	Date Analyzed:	11/29/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	94%	75-125%
Bromochloromethane	101%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.
* MTBE analyzed outside of holding time by Method 8240 GC/MS

Analyst

Review

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EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client: **K.W. Brown Environmental Services, Inc.**
Project Name: Navajo Refinery
Sample ID: KWB-4
Sample Number: C922429
Sample Matrix: Water
Preservative: Cool
Condition: Intact

Report Date: 12/29/92
Date Sampled: 11/20/92
Date Received: 11/21/92
Date Extracted: 11/27/92
Date Analyzed: 12/23/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	613.8	25.0
Acenaphthylene	ND	25.0
Acenaphthene	ND	25.0
Fluorene	ND	25.0
Phenanthrene	ND	25.0
Anthracene	ND	25.0
Fluoranthene	ND	25.0
Pyrene	ND	25.0
Benzo(a)anthracene	ND	25.0
Chrysene	ND	25.0
Benzo(b)fluoranthene	ND	25.0
Benzo(k)fluoranthene	ND	25.0
Benzo(a)pyrene	ND	25.0
Dibenzo(a,h)anthracene	ND	25.0
Ideno(1,2,3-cd)pyrene	ND	25.0
Benzo(ghi)perylene	ND	25.0
Benzo(j)fluoranthene	ND	25.0
3-Methylcholanthene	ND	25.0
Dibenz(a,h)acridine	ND	25.0
Dibenz(a,j,)acridine	ND	25.0
7H-Dibenz(c,g)carbazole	ND	25.0
Dibenzo(a,e)pyrene	ND	25.0
Dibenzo(a,i)pyrene	ND	25.0
Dibenzo(a,h)pyrene	ND	25.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Comments: Increased detection limit is due to dilution of the sample needed for analysis.

Mary Higginbotham
Analyst

Review

Inter-Mountain Laboratories, Inc.

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College Station, Texas 77845

BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	09/30/92
Sample ID:	KWB - 5	Date Received:	10/08/92
Sample Number:	C922034	Date Analyzed:	10/08/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 2		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	2500
Benzene	19600	500
Toluene	9200	250
Ethylbenzene	2960	250
p,m-Xylene	5310	250
o-Xylene	2050	250

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	101%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. Brown Environmental Services**
Project Name: Navajo - Artesia
Project Number: 622092003
Login Number: 9210003
Sample ID: KWB - Dup (KWB-5)
Sample Number: C922039 KWB
Sample Matrix: Water
Preservative: Cool, pH < 6
Condition: Intact

Report Date: 10/14/92
Date Sampled: 09/29/92
Date Received: 10/08/92
Date Analyzed: 10/09/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	2500
Benzene	13900	500
Toluene	5380	250
Ethylbenzene	2520	250
p,m-Xylene	4170	250
o-Xylene	1540	250

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	95%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/20/92
Sample ID:	KWB - 5	Date Received:	11/21/92
Sample Number:	C922430	Date Analyzed:	11/29/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	11800	250
Bromodichloromethane	ND	50
Bromoform	ND	50
Bromomethane	ND	250
Carbon tetrachloride	ND	50
Chlorobenzene	ND	50
Chloroethane	ND	250
2-Chloroethylvinylether	ND	250
Chloroform	ND	50
Chloromethane	ND	250
Dibromochloromethane	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	250
1,1-Dichloroethane	ND	50
1,2-Dichloroethane	ND	50
1,1-Dichloroethene	ND	50
trans-1,2-Dichloroethene	ND	50
1,2-Dichloropropane	ND	50
trans-1,3-Dichloropropene	ND	50
Ethylbenzene	2510	250
Methylene Chloride	66.9 B	50
tert-Butyl methyl ether *	867 J	100
1,1,2,2-Tetrachloroethane	ND	50
Tetrachloroethene	ND	50
Toluene	1390	25
1,1,1-Trichloroethane	ND	50
1,1,2-Trichloroethane	ND	50
Trichloroethene	ND	50
Trichlorofluoromethane	ND	250
Vinyl chloride	ND	250
p, m - Xylene	922	25
o - Xylene	310	25

ND - Analyte not detected at stated detection limit.
B - Analyte detected in blank
J- Estimated concentration

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/20/92
Sample ID:	KWB - 5	Date Received:	11/21/92
Sample Number:	C922430	Date Analyzed:	11/29/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	97%	75-125%
Bromochloromethane	100%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.
*MTBE analyzed outside of holding time by Method 8240 GC/MS

Analyst

Review

Inter-Mountain Laboratories, Inc.

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EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	**K.W. Brown Environmental Services, Inc.**		
Project Name:	Navajo Refinery	Report Date:	12/29/92
Sample ID:	KWB-5	Date Sampled:	11/20/92
Sample Number:	C922430	Date Received:	11/21/92
Sample Matrix:	Water	Date Extracted:	11/27/92
Preservative:	Cool	Date Analyzed:	12/24/92
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	677.3	25.0
Acenaphthylene	ND	25.0
Acenaphthene	ND	25.0
Fluorene	ND	25.0
Phenanthrene	ND	25.0
Anthracene	ND	25.0
Fluoranthene	ND	25.0
Pyrene	ND	25.0
Benzo(a)anthracene	ND	25.0
Chrysene	ND	25.0
Benzo(b)fluoranthene	ND	25.0
Benzo(k)fluoranthene	ND	25.0
Benzo(a)pyrene	ND	25.0
Dibenzo(a,h)anthracene	ND	25.0
Ideno(1,2,3-cd)pyrene	ND	25.0
Benzo(ghi)perylene	ND	25.0
Benzo(j)fluoranthene	ND	25.0
3-Methylcholanthene	ND	25.0
Dibenz(a,h)acridine	ND	25.0
Dibenz(a,j,)acridine	ND	25.0
7H-Dibenz(c,g)carbazole	ND	25.0
Dibenzo(a,e)pyrene	ND	25.0
Dibenzo(a,i)pyrene	ND	25.0
Dibenzo(a,h)pyrene	ND	25.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Comments: Increased detection limit is due dilution of the sample needed for analysis.

Mary Higginbotham
Analyst

Review

Inter·Mountain Laboratories, Inc.

3304 Longmire
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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. Brown Environmental Services**
Project Name: Navajo - Artesia
Project Number: 622092003
Login Number: 9210003
Sample ID: KWB - 6
Sample Number: C922035
Sample Matrix: Water
Preservative: Cool, pH < 5
Condition: Intact

Report Date: 10/14/92
Date Sampled: 09/29/92
Date Received: 10/08/92
Date Analyzed: 10/12/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	2500
Benzene	12300	250
Toluene	4450	250
Ethylbenzene	1810	250
p,m-Xylene	2830	250
o-Xylene	1000	250

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	102%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/20/92
Sample ID:	KWB - 6	Date Received:	11/21/92
Sample Number:	C922431	Date Analyzed:	11/30/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	11500	250
Bromodichloromethane	ND	200
Bromoform	ND	200
Bromomethane	ND	1000
Carbon tetrachloride	ND	200
Chlorobenzene	ND	200
Chloroethane	ND	1000
2-Chloroethylvinylether	ND	1000
Chloroform	ND	200
Chloromethane	ND	1000
Dibromochloromethane	ND	200
1,2-Dichlorobenzene	ND	200
1,3-Dichlorobenzene	ND	200
1,4-Dichlorobenzene	ND	200
Dichlorodifluoromethane	ND	1000
1,1-Dichloroethane	ND	200
1,2-Dichloroethane	ND	200
1,1-Dichloroethene	ND	200
trans-1,2-Dichloroethene	ND	200
1,2-Dichloropropane	ND	200
trans-1,3-Dichloropropene	ND	200
Ethylbenzene	2030	100
Methylene Chloride	3708	200
tert-Butyl methyl ether *	ND	250
1,1,2,2-Tetrachloroethane	ND	200
Tetrachloroethene	ND	200
Toluene	2770	100
1,1,1-Trichloroethane	ND	200
1,1,2-Trichloroethane	ND	200
Trichloroethene	ND	200
Trichlorofluoromethane	ND	1000
Vinyl chloride	ND	1000
p, m - Xylene	2920	100
o - Xylene	1010	100

ND - Analyte not detected at stated detection limit.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/20/92
Sample ID:	KWB - 6	Date Received:	11/21/92
Sample Number:	C922431	Date Analyzed:	11/30/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	106%	75-125%
Bromochloromethane	108%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.
*MTBE analyzed outside of holding time by Method 8240 GC/MS

Analyst

Review

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EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	**K.W. Brown Environmental Services, Inc.**		
Project Name:	Navajo Refinery	Report Date:	12/29/92
Sample ID:	KWB-6	Date Sampled:	11/20/92
Sample Number:	C922431	Date Received:	11/21/92
Sample Matrix:	Water	Date Extracted:	11/27/92
Preservative:	Cool	Date Analyzed:	12/24/92
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	393.9	25.0
Acenaphthylene	ND	25.0
Acenaphthene	ND	25.0
Fluorene	ND	25.0
Phenanthrene	ND	25.0
Anthracene	ND	25.0
Fluoranthene	ND	25.0
Pyrene	ND	25.0
Benzo(a)anthracene	ND	25.0
Chrysene	ND	25.0
Benzo(b)fluoranthene	ND	25.0
Benzo(k)fluoranthene	ND	25.0
Benzo(a)pyrene	ND	25.0
Dibenzo(a,h)anthracene	ND	25.0
Ideno(1,2,3-cd)pyrene	ND	25.0
Benzo(ghi)perylene	ND	25.0
Benzo(j)fluoranthene	ND	25.0
3-Methylcholanthene	ND	25.0
Dibenz(a,h)acridine	ND	25.0
Dibenz(a,j,)acridine	ND	25.0
7H-Dibenz(c,g)carbazole	ND	25.0
Dibenzo(a,e)pyrene	ND	25.0
Dibenzo(a,i)pyrene	ND	25.0
Dibenzo(a,h)pyrene	ND	25.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Comments: Increased detection limit is due to dilution of the sample needed for analysis.

Mary Higginbotham
Analyst

Review

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	09/26/92
Sample ID:	KWB - 7	Date Received:	10/08/92
Sample Number:	C922036	Date Analyzed:	10/09/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 3		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	99%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 7	Date Received:	11/21/92
Sample Number:	C922439	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	5.4	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	2.9 B	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

B - Analyte detected in blank

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 7	Date Received:	11/21/92
Sample Number:	C922439	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	105%	75-125%
Bromochloromethane	96%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

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QUALITY CONTROL REPORT - MATRIX DUPLICATE
METHOD 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number:	C922439 Duplicate	Date Sampled:	11/19/92
Sample Matrix:	Water	Date Received:	11/21/92
Preservative:	Cool, HCl	Date Analyzed:	12/02/92
Condition:	Intact, pH=2		

Analyte	Sample Result (ug/L)	Duplicate Result (ug/L)	Percent Difference
Benzene	ND	ND	NA
Bromodichloromethane	ND	ND	NA
Bromoform	ND	ND	NA
Bromomethane	ND	ND	NA
Carbon tetrachloride	ND	ND	NA
Chlorobenzene	ND	ND	NA
Chloroethane	ND	ND	NA
2-Chloroethylvinylether	ND	ND	NA
Chloroform	ND	ND	NA
Chloromethane	ND	ND	NA
Dibromochloromethane	ND	ND	NA
1,2-Dichlorobenzene	ND	ND	NA
1,3-Dichlorobenzene	ND	ND	NA
1,4-Dichlorobenzene	ND	ND	NA
Dichlorodifluoromethane	ND	ND	NA
1,1-Dichloroethane	ND	ND	NA
1,2-Dichloroethane	5.4	5.4	0.0%
1,1-Dichloroethene	ND	ND	NA
trans-1,2-Dichloroethene	ND	ND	NA
1,2-Dichloropropane	ND	ND	NA
trans-1,3-Dichloropropene	ND	ND	NA
Ethylbenzene	ND	ND	NA
Methylene Chloride	2.9 B	3.8 B	6.7%
1,1,2,2-Tetrachloroethane	ND	ND	NA
Tetrachloroethene	ND	ND	NA
Toluene	ND	ND	NA
1,1,1-Trichloroethane	ND	ND	NA
1,1,2-Trichloroethane	ND	ND	NA
Trichloroethene	ND	ND	NA
Trichlorofluoromethane	ND	ND	NA
Vinyl chloride	ND	ND	NA
p, m - Xylene	ND	ND	NA
o - Xylene	ND	ND	NA

ND - Analyte not detected at stated detection limit
NA - Value not applicable or calculated
B - Analyte detected in blank

Inter-Mountain Laboratories, Inc.

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QUALITY CONTROL REPORT - MATRIX DUPLICATE
METHOD 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Sample Number:	C922439 Duplicate	Date Sampled:	11/19/92
Sample Matrix:	Water	Date Received:	11/21/92
Preservative:	Cool, HCl	Date Analyzed:	12/02/92
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	106%	75-125%
Bromochloromethane	96%	75-125%

Reference:

Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	**K.W. Brown Environmental Services, Inc.**		
Project Name:	Navajo Refinery	Report Date:	12/18/92
Sample ID:	KWB-7	Date Sampled:	11/19/92
Sample Number:	C922439	Date Received:	11/21/92
Sample Matrix:	Water	Date Extracted:	11/26/92
Preservative:	Cool	Date Analyzed:	12/18/92
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	ND	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Benzo(j)fluoranthene	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j,)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Mary Higginbotham
Analyst

Review

Inter-Mountain Laboratories, Inc.

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	09/29/92
Sample ID:	KWB - 8	Date Received:	10/08/92
Sample Number:	C922037	Date Analyzed:	10/12/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 5		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	250
Benzene	1160	25.0
Toluene	393	25.0
Ethylbenzene	697	25.0
p,m-Xylene	306	25.0
o-Xylene	120	25.0

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	106%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/20/92
Sample ID:	KWB - 8	Date Received:	11/21/92
Sample Number:	C922432	Date Analyzed:	12/01/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	429	10
Bromodichloromethane	ND	20
Bromoform	ND	20
Bromomethane	ND	100
Carbon tetrachloride	ND	20
Chlorobenzene	ND	20
Chloroethane	ND	100
2-Chloroethylvinylether	ND	100
Chloroform	ND	20
Chloromethane	ND	100
Dibromochloromethane	ND	20
1,2-Dichlorobenzene	ND	20
1,3-Dichlorobenzene	ND	20
1,4-Dichlorobenzene	ND	20
Dichlorodifluoromethane	ND	100
1,1-Dichloroethane	ND	20
1,2-Dichloroethane	ND	20
1,1-Dichloroethene	ND	20
trans-1,2-Dichloroethene	ND	20
1,2-Dichloropropane	ND	20
trans-1,3-Dichloropropene	ND	20
Ethylbenzene	286	10
Methylene Chloride	250 B	20
tert-Butyl methyl ether *	ND	5
1,1,2,2-Tetrachloroethane	ND	20
Tetrachloroethene	ND	20
Toluene	120	10
1,1,1-Trichloroethane	36.5	20
1,1,2-Trichloroethane	ND	20
Trichloroethene	ND	20
Trichlorofluoromethane	ND	100
Vinyl chloride	ND	100
p, m - Xylene	107	10
o - Xylene	45.4	10

ND - Analyte not detected at stated detection limit.
B - Analyte detected in blank

Inter-Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/20/92
Sample ID:	KWB - 8	Date Received:	11/21/92
Sample Number:	C922432	Date Analyzed:	12/01/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	99%	75-125%
Bromochloromethane	95%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.
*MTBE analyzed outside of holding time by Method 8240 GC/MS

Analyst

Review

Inter·Mountain Laboratories, Inc.

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EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	**K.W. Brown Environmental Services, Inc.**		
Project Name:	Navajo Refinery	Report Date:	12/29/92
Sample ID:	KWB-8	Date Sampled:	11/20/92
Sample Number:	C922432	Date Received:	11/21/92
Sample Matrix:	Water	Date Extracted:	11/27/92
Preservative:	Cool	Date Analyzed:	12/24/92
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	29.1	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Benzo(j)fluoranthene	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j,)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Mary Higginbotham
Analyst

B. Van Slyke
Review

Inter·Mountain Laboratories, Inc.

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. Brown Environmental Services**
Project Name: Navajo - Artesia
Project Number: 622092003
Login Number: 9210003
Sample ID: KWB - 9
Sample Number: C922038
Sample Matrix: Water
Preservative: Cool, pH < 5
Condition: Intact

Report Date: 10/14/92
Date Sampled: 09/28/92
Date Received: 10/08/92
Date Analyzed: 10/09/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	100%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 9	Date Received:	11/21/92
Sample Number:	C922433	Date Analyzed:	12/01/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	9.4	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	2.0 B	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.
B - Analyte detected in blank

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 9	Date Received:	11/21/92
Sample Number:	C922433	Date Analyzed:	12/01/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	105%	75-125%
Bromochloromethane	113%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	**K.W. Brown Environmental Services, Inc.**		
Project Name:	Navajo Refinery	Report Date:	12/18/92
Sample ID:	KWB-9	Date Sampled:	11/19/92
Sample Number:	C922433	Date Received:	11/21/92
Sample Matrix:	Water	Date Extracted:	11/26/92
Preservative:	Cool	Date Analyzed:	12/18/92
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	ND	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Benzo(j)fluoranthene	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j,)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Mary Higginbotham
Analyst

B. Ron Shyler
Review

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	10/05/92
Sample ID:	Coll Deep (KWB-10)	Date Received:	10/08/92
Sample Number:	C922041	Date Analyzed:	10/14/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 2		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	34.0	5.0
Benzene	64.5	2.5
Toluene	97.0	2.5
Ethylbenzene	51.5	2.5
p,m-Xylene	86.7	2.5
o-Xylene	35.8	2.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	94%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/20/92
Sample ID:	KWB - 10	Date Received:	11/21/92
Sample Number:	C922434	Date Analyzed:	12/01/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	4.1	2.5
Bromodichloromethane	ND	5.0
Bromoform	ND	5.0
Bromomethane	ND	25.0
Carbon tetrachloride	ND	5.0
Chlorobenzene	ND	5.0
Chloroethane	ND	25.0
2-Chloroethylvinylether	ND	25.0
Chloroform	ND	5.0
Chloromethane	ND	25.0
Dibromochloromethane	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
Dichlorodifluoromethane	ND	25.0
1,1-Dichloroethane	ND	5.0
1,2-Dichloroethane	ND	5.0
1,1-Dichloroethene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
1,2-Dichloropropane	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
Ethylbenzene	12.3	2.5
Methylene Chloride	16.8 B	5.0
tert-Butyl methyl ether *	4400 J	250
1,1,2,2-Tetrachloroethane	ND	5.0
Tetrachloroethene	ND	5.0
Toluene	5.4	2.5
1,1,1-Trichloroethane	ND	5.0
1,1,2-Trichloroethane	ND	5.0
Trichloroethene	ND	5.0
Trichlorofluoromethane	ND	25.0
Vinyl chloride	ND	25.0
p, m - Xylene	11.3	2.5
o - Xylene	ND	2.5

ND - Analyte not detected at stated detection limit.
B - Analyte detected in blank
J - Estimated concentration

Inter·Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/10/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/20/92
Sample ID:	KWB - 10	Date Received:	11/21/92
Sample Number:	C922434	Date Analyzed:	12/01/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	90%	75-125%
Bromochloromethane	111%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.
*MTBE analyzed outside of holding time by Method 8240 GC/MS

Analyst

Review

Inter·Mountain Laboratories, Inc.

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EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	**K.W. Brown Environmental Services, Inc.**		
Project Name:	Navajo Refinery	Report Date:	12/18/92
Sample ID:	KWB-10	Date Sampled:	11/20/92
Sample Number:	C922434	Date Received:	11/21/92
Sample Matrix:	Water	Date Extracted:	11/26/92
Preservative:	Cool	Date Analyzed:	12/17/92
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	ND	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Benzo(j)fluoranthene	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j,)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Mary Higginbotham
Analyst

Review

Inter-Mountain Laboratories, Inc

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College Station, Texas 77845

BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	10/01/92
Sample ID:	Pecan Shallow (KWB-11A)	Date Received:	10/08/92
Sample Number:	C922042	Date Analyzed:	10/08/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 4		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	3.0	0.5
Toluene	2.3	0.5
Ethylbenzene	0.8	0.5
p,m-Xylene	1.7	0.5
o-Xylene	0.9	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	109%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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College Station, Texas 77845

METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 11 A	Date Received:	11/21/92
Sample Number:	C922438	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	2.9	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	4.7 B	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

B - Analyte detected in blank

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 11 A	Date Received:	11/21/92
Sample Number:	C922438	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	1-Chloro-2-Fluorobenzene	104%	75-125%
	Bromochloromethane	86%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

Inter·Mountain Laboratories, Inc.

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College Station, Texas 77845

EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client: **K.W. Brown Environmental Services, Inc.**
Project Name: Navajo Refinery
Sample ID: KWB-11A
Sample Number: C922438
Sample Matrix: Water
Preservative: Cool
Condition: Intact

Report Date: 12/18/92
Date Sampled: 11/19/92
Date Received: 11/21/92
Date Extracted: 11/26/92
Date Analyzed: 12/18/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	ND	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Benzo(j)fluoranthene	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j,)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Mary Higginbotham
Analyst

B. Kim Taylor
Review

Inter·Mountain Laboratories, Inc.

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College Station, Texas 77845

BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. Brown Environmental Services**
Project Name: Navajo - Artesia
Project Number: 622092003
Login Number: 9210003
Sample ID: Pecan Deep (KWB-11 B)
Sample Number: C922043
Sample Matrix: Water
Preservative: Cool, pH < 2
Condition: Intact

Report Date: 10/14/92
Date Sampled: 10/06/92
Date Received: 10/08/92
Date Analyzed: 10/08/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	2.5	0.5
Toluene	7.1	0.5
Ethylbenzene	3.3	0.5
p,m-Xylene	6.2	0.5
o-Xylene	2.6	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	102%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. BROWN ENVIRONMENTAL SERVICES**		
Project Name:	Navajo Refinery - Artesia, NM		
Project Number:	622092003	Report Date:	11/06/92
Login Number:	9210009	Date Sampled:	10/29/92
Sample ID:	KWB - 11B	Date Received:	10/30/92
Sample Number:	C922170	Date Analyzed:	11/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH<2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Toluene	0.8	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	0.6	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	89%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 11 B	Date Received:	11/21/92
Sample Number:	C922437	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	1.1	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	13.1 B	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

B - Analyte detected in blank

Inter-Mountain Laboratories, Inc.

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 11 B	Date Received:	11/21/92
Sample Number:	C922437	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	104%	75-125%
Bromochloromethane	112%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 11 B Dup	Date Received:	11/21/92
Sample Number:	C922436	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, Mercuric Chloride		
Condition:	Intact, pH=6		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	1.0	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	7.3 B	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

B - Analyte detected in blank

Inter·Mountain Laboratories, Inc.

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College Station, Texas 77845

METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 11 B Dup	Date Received:	11/21/92
Sample Number:	C922436	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, Mercuric Chloride		
Condition:	Intact, pH=6		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	103%	75-125%
Bromochloromethane	100%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client: **K.W. Brown Environmental Services, Inc.**
Project Name: Navajo Refinery
Sample ID: KWB-11B
Sample Number: C922437
Sample Matrix: Water
Preservative: Cool
Condition: Intact

Report Date: 12/18/92
Date Sampled: 11/19/92
Date Received: 11/21/92
Date Extracted: 11/26/92
Date Analyzed: 12/18/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	ND	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Benzo(j)fluoranthene	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j,)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Mary Higginbotham
Analyst

B. [illegible]
Review

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QUALITY CONTROL REPORT - MATRIX DUPLICATE
Polynuclear Aromatic Hydrocarbons

Client:	**K.W. Brown Environmental Services, Inc.**		
Project Name:	Navajo Refinery	Report Date:	12/18/92
Sample ID:	KWB-11B	Date Sampled:	11/19/92
Laboratory ID:	C922437DUP	Date Received:	11/21/92
Sample Matrix:	Water	Date Extracted:	11/26/92
Preservative:	Cool	Date Analyzed:	12/18/92
Condition:	Intact		

Analyte	Duplicate Result (ug/L)	Original Result (ug/L)	Percent Difference
Naphthalene	ND	ND	NA
Acenaphthylene	ND	ND	NA
Acenaphthene	ND	ND	NA
Fluorene	ND	ND	NA
Phenanthrene	ND	ND	NA
Anthracene	ND	ND	NA
Fluoranthene	ND	ND	NA
Pyrene	ND	ND	NA
Benzo(a)anthracene	ND	ND	NA
Chrysene	ND	ND	NA
Benzo(b)fluoranthene	ND	ND	NA
Benzo(k)fluoranthene	ND	ND	NA
Benzo(a)pyrene	ND	ND	NA
Dibenzo(a,h)anthracene	ND	ND	NA
Ideno(1,2,3-cd)pyrene	ND	ND	NA
Benzo(ghi)perylene	ND	ND	NA
Benzo(j)fluoranthene	ND	ND	NA
3-Methylcholanthene	ND	ND	NA
Dibenz(a,h)acridine	ND	ND	NA
Dibenz(a,j)acridine	ND	ND	NA
7H-Dibenz(c,g)carbazole	ND	ND	NA
Dibenzo(a,e)pyrene	ND	ND	NA
Dibenzo(a,i)pyrene	ND	ND	NA
Dibenzo(a,h)pyrene	ND	ND	NA

ND - Analyte not detected at established detection limit
NA-Value not applicable

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-486, United States Environmental Protection Agency, Volume IB, September 1986.

Mary Higginbotham
Analyst

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	10/05/92
Sample ID:	Gurley Shallow (KWB-12A)	Date Received:	10/08/92
Sample Number:	C922044	Date Analyzed:	10/13/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 3		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	99%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 12 A	Date Received:	11/21/92
Sample Number:	C922441	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	8.4 B	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

B - Analyte detected in blank

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 12 A	Date Received:	11/21/92
Sample Number:	C922441	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	96%	75-125%
Bromochloromethane	102%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

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EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	**K.W. Brown Environmental Services, Inc.**		
Project Name:	Navajo Refinery	Report Date:	12/18/92
Sample ID:	KWB-12A	Date Sampled:	11/19/92
Sample Number:	C922441	Date Received:	11/21/92
Sample Matrix:	Water	Date Extracted:	11/26/92
Preservative:	Cool	Date Analyzed:	12/18/92
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	ND	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Benzo(j)fluoranthene	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j,)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Mary Higginbotham
Analyst

B. Ken Taylor
Review

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	10/05/92
Sample ID:	Gurley Deep (KWB-123)	Date Received:	10/08/92
Sample Number:	C922045	Date Analyzed:	10/14/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 2		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	3.5	0.5
Toluene	5.2	0.5
Ethylbenzene	1.9	0.5
p,m-Xylene	3.7	0.5
o-Xylene	1.4	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	101%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. BROWN ENVIRONMENTAL SERVICES**
Project Name: Navajo Refinery - Artesia, NM
Project Number: 622092003
Login Number: 9210009
Sample ID: KWB - 12B
Sample Number: C922171
Sample Matrix: Water
Preservative: Cool, HCl
Condition: Intact, pH<2

Report Date: 11/06/92
Date Sampled: 10/29/92
Date Received: 10/30/92
Date Analyzed: 11/02/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Toluene	0.7	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	88%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

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Review

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 12 B	Date Received:	11/21/92
Sample Number:	C922440	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Bromodichloromethane	ND	1.0
Bromoform	ND	1.0
Bromomethane	ND	5.0
Carbon tetrachloride	ND	1.0
Chlorobenzene	ND	1.0
Chloroethane	ND	5.0
2-Chloroethylvinylether	ND	5.0
Chloroform	ND	1.0
Chloromethane	ND	5.0
Dibromochloromethane	ND	1.0
1,2-Dichlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
Dichlorodifluoromethane	ND	5.0
1,1-Dichloroethane	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Ethylbenzene	ND	0.5
Methylene Chloride	6.1 B	1.0
tert-Butyl methyl ether	ND	5.0
1,1,2,2-Tetrachloroethane	ND	1.0
Tetrachloroethene	ND	1.0
Toluene	ND	0.5
1,1,1-Trichloroethane	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Trichloroethene	ND	1.0
Trichlorofluoromethane	ND	5.0
Vinyl chloride	ND	5.0
p, m - Xylene	ND	0.5
o - Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.
B - Analyte detected in blank

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METHODS 8010/8020
HALOGENATED/AROMATIC VOLATILE ORGANICS
Page 2 - Quality Control

Client:	**K W. Brown Environmental Services**		
Project Name:	Navajo - Artesia, New Mexico	Report Date:	12/14/92
Project Location:	Artesia, New Mexico	Date Sampled:	11/19/92
Sample ID:	KWB - 12 B	Date Received:	11/21/92
Sample Number:	C922440	Date Analyzed:	12/02/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=2		

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	114%	75-125%
Bromochloromethane	87%	75-125%

Reference: Method 5030, Purge and Trap
Method 8010, Halogenated Volatile Organics
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments: Methylene Chloride is a common laboratory contaminant. Analytical results should not be considered reliable unless the sample result exceeds five times the reporting limit or ten times the blank concentration.

Analyst

Review

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EPA Method 8100
POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	**K.W. Brown Environmental Services, Inc.**		
Project Name:	Navajo Refinery	Report Date:	12/18/92
Sample ID:	KWB-12B	Date Sampled:	11/19/92
Sample Number:	C922440	Date Received:	11/21/92
Sample Matrix:	Water	Date Extracted:	11/26/92
Preservative:	Cool	Date Analyzed:	12/18/92
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Naphthalene	ND	5.0
Acenaphthylene	ND	5.0
Acenaphthene	ND	5.0
Fluorene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Fluoranthene	ND	5.0
Pyrene	ND	5.0
Benzo(a)anthracene	ND	5.0
Chrysene	ND	5.0
Benzo(b)fluoranthene	ND	5.0
Benzo(k)fluoranthene	ND	5.0
Benzo(a)pyrene	ND	5.0
Dibenzo(a,h)anthracene	ND	5.0
Ideno(1,2,3-cd)pyrene	ND	5.0
Benzo(ghi)perylene	ND	5.0
Benzo(j)fluoranthene	ND	5.0
3-Methylcholanthene	ND	5.0
Dibenz(a,h)acridine	ND	5.0
Dibenz(a,j,)acridine	ND	5.0
7H-Dibenz(c,g)carbazole	ND	5.0
Dibenzo(a,e)pyrene	ND	5.0
Dibenzo(a,i)pyrene	ND	5.0
Dibenzo(a,h)pyrene	ND	5.0

References: Method 8100: Polynuclear Aromatic Hydrocarbons
Test Methods for Evaluating Solid Waste, SW-846, United States Environmental Protection Agency, September 1986.

Mary Higginbotham
Analyst

B. Vann Sykes
Review

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	09/30/92
Sample ID:	Water Well at KWB - 6 (RA-2723)	Date Received:	10/08/92
Sample Number:	C922050	Date Analyzed:	10/12/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 2		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	107%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. Brown Environmental Services**
Project Name: Navajo - Artesia
Project Number: 622092003
Login Number: 9210003
Sample ID: Water Well at KWB - 8 (RA- 4798)
Sample Number: C922051
Sample Matrix: Water
Preservative: Cool, pH < 3
Condition: Intact

Report Date: 10/14/92
Date Sampled: 09/30/92
Date Received: 10/08/92
Date Analyzed: 10/12/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	107%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	09/30/92
Sample ID:	Gurley House Well (RA-3156)	Date Received:	10/08/92
Sample Number:	C922052	Date Analyzed:	10/12/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 2		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	107%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	09/30/92
Sample ID:	Joy House Well (RA-3353)	Date Received:	10/08/92
Sample Number:	C922053	Date Analyzed:	10/12/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 2		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	103%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. BROWN ENVIRONMENTAL SERVICES**		
Project Name:	Navajo Refinery - Artesia, NM		
Project Number:	622092003	Report Date:	11/06/92
Login Number:	9210009	Date Sampled:	10/28/92
Sample ID:	KWB - 1P (KWB - P-1)	Date Received:	10/30/92
Sample Number:	C922166	Date Analyzed:	10/30/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=3		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	98%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. Brown Environmental Services**
Project Name: Navajo - Artesia
Project Number: 622092003
Login Number: 9210003
Sample ID: P - 2
Sample Number: C922046
Sample Matrix: Water
Preservative: Cool, pH < 2
Condition: Intact

Report Date: 10/14/92
Date Sampled: 10/07/92
Date Received: 10/08/92
Date Analyzed: 10/08/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	103%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	10/06/92
Sample ID:	P - 3	Date Received:	10/08/92
Sample Number:	C922047	Date Analyzed:	10/08/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 2		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	13.1	0.5
Toluene	21.0	0.5
Ethylbenzene	3.7	0.5
p,m-Xylene	12.4	0.5
o-Xylene	6.4	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	102%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

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College Station, Texas 77845

BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. BROWN ENVIRONMENTAL SERVICES**		
Project Name:	Navajo Refinery - Artesia, NM		
Project Number:	622092003	Report Date:	11/06/92
Login Number:	9210009	Date Sampled:	10/29/92
Sample ID:	KWB - 3P (KWB P-3)	Date Received:	10/30/92
Sample Number:	C922167	Date Analyzed:	10/30/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=6		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	1-Chloro-2-Fluorobenzene	98%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client: **K. W. Brown Environmental Services**
Project Name: Navajo - Artesia
Project Number: 622092003
Login Number: 9210003
Sample ID: P - 4
Sample Number: C922048
Sample Matrix: Water
Preservative: Cool, pH < 3
Condition: Intact

Report Date: 10/14/92
Date Sampled: 10/07/92
Date Received: 10/08/92
Date Analyzed: 10/08/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	1.1	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	1.6	0.5
o-Xylene	1.5	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	101%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. BROWN ENVIRONMENTAL SERVICES**		
Project Name:	Navajo Refinery - Artesia, NM		
Project Number:	622092003	Report Date:	11/06/92
Login Number:	9210009	Date Sampled:	10/29/92
Sample ID:	KWB - 4P (KWB P-4)	Date Received:	10/30/92
Sample Number:	C922168	Date Analyzed:	10/30/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH=6		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	98%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	K. W. BROWN ENVIRONMENTAL SERVICES		
Project Name:	Navajo Refinery - Artesia, NM		
Project Number:	622092003	Report Date:	11/06/92
Login Number:	9210009	Date Sampled:	10/29/92
Sample ID:	~~KWB-5P~~ Equip. Blank at KWB-11B location	Date Received:	10/30/92
Sample Number:	C922169	Date Analyzed:	10/30/92
Sample Matrix:	Water		
Preservative:	Cool, HCl		
Condition:	Intact, pH<2		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Toluene	0.5	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	97%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

iml

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Client: K. W. BROWN ENVIRONMENTAL SERVICES

500 GRAHAM ROAD

COLLEGE STATION, TEXAS 77845

10/29/92

P.O. #43562

PROJECT: NAVAJO-ARTESIA - #622092003

IML Lab No.		C922040/15220	C922041/15221	C922042/15222	C922043/15223
Sample ID.		KWB-1 Deep	Coll Deep	Pecan Shallow	Pecan Deep
Date Sampled		10/1/92	10/5/92	10/1/92	10/6/92
Date Received		10/9/92	10/9/92	10/9/92	10/9/92
pH	s.u	7.9	11.7	7.3	7.8
Conductivity	umhos/cm	1360.	2620.	3710.	1550.
Calcium	mg/L	182.	265.	386.	172.
Magnesium	mg/L	59.	0.6	164.	69.
Potassium	mg/L	1.3	139.	26.	15.
Sodium	mg/L	19.	78.	158.	38.
Total Alkalinity	mg/L	193.	280.	469.	68.
Chloride	mg/L	21.	35.	305.	72.
Sulfate	mg/L	484.	681.	1120.	602.
Total Dissolved Solids	mg/L	948.	1400.	2690.	1140.
Total Arsenic	mg/L	<0.005	<0.005	<0.005	<0.005
Total Chromium	mg/L	<0.02		<0.02	
Total Lead	mg/L	<0.02	<0.02	<0.02	

KWB-1C KWB-10 KWB-11D KWB-11B

Reviewed by:

Mitch Swan

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Supervisor–Water Operations

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10/29/92

P.O. #43562

PROJECT: NAVAJO-ARTESIA - #622092003

IML Lab No.		C922044/15224	C922045/15225	C922046/15226	C922047/15227
Sample ID.		Gurley Shallow	Gurley Deep	P-2	P-3
Date Sampled		10/5/92	10/5/92	10/7/92	10/6/92
Date Received		10/9/92	10/9/92	10/9/92	10/9/92
pH	s.u	7.2	7.7	7.4	7.3
Conductivity	umhos/cm	4940.	3270.	5650.	8660.
Calcium	mg/L	576.	348.	553.	546.
Magnesium	mg/L	242.	140.	321.	606.
Potassium	mg/L	2.6	36.	3.0	5.1
Sodium	mg/L	248.	148.	240.	620.
Total Alkalinity	mg/L	320.	151.	228.	282.
Chloride	mg/L	125.	77.	602.	782.
Sulfate	mg/L	2480.	1540.	2130.	3870.
Total Dissolved Solids	mg/L	4220.	2610.	4590.	7440.
Total Arsenic	mg/L	<0.005	<0.005	<0.005	0.005
Total Chromium	mg/L	<0.02		<0.02	<0.02
Total Lead	mg/L	<0.02		<0.02	<0.02

KWB-12A KWB-12B

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P.O. #43562

PROJECT: NAVAJO-ARTESIA - #622092003

IML Lab No.		C922048/15228	C922043/15230		
Sample ID.		P-4	Pecan Deep Dup		
Date Sampled		10/7/92	10/6/92		
Date Received		10/9/92	10/9/92		
pH	s.u	7.6	7.7		
Conductivity	umhos/cm	9170.	1550.		
Calcium	mg/L	605.	176.		
Magnesium	mg/L	554.	71.		
Potassium	mg/L	5.4	15.		
Sodium	mg/L	620.	36.		
Total Alkalinity	mg/L	326.	74.		
Chloride	mg/L	1120.	72.		
Sulfate	mg/L	3210.	606.		
Total Dissolved Solids	mg/L	7450.	1160.		
Total Arsenic	mg/L	0.005	<0.005		
Total Chromium	mg/L	<0.02			
Total Lead	mg/L	<0.02			

KWB-11B

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10/29/92

P.O. #43562

PROJECT: NAVAJO-ARTESIA - #622092003

IML Lab No.		C922030/15211	C922031/15212	C922032/15213	C922033/15214
Sample ID.		KWB-1B	KWB-2A	KWB-3A	KWB-4
Date Sampled		9/26/92	9/28/92	9/28/92	9/29/92
Date Received		10/5/92	10/5/92	10/5/92	10/5/92
Total Arsenic	mg/L	0.005	0.009	<0.005	
Total Chromium	mg/L	<0.02			
Total Lead	mg/L	<0.02			<0.02

IML Lab No.		C922034/15215	C922035/15216	C922036/15217	C922038/15218
Sample ID.		KWB-5	KWB-6	KWB-7	KWB-9
Date Sampled		9/30/92	9/29/92	9/26/92	9/28/92
Date Received		10/5/92	10/5/92	10/5/92	10/5/92
Total Arsenic	mg/L			<0.005	<0.005
Total Chromium	mg/L				
Total Lead	mg/L	0.04	<0.02		

IML Lab No.		C922039/15219	C922030/15229
Sample ID.		KWB-Dup	KWB-1B (Dup)
Date Sampled		9/29/92	9/26/92
Date Received		10/5/92	10/5/92
Total Arsenic	mg/L		0.006
Total Chromium	mg/L		<0.02
Total Lead	mg/L	0.03	<0.02

KWB-5

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WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-1C	**Report Date:**	12/30/92
Laboratory Number:	C922428/15732	**Date Sampled:**	11/19/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	ND	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.07	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

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WATER QUALITY REPORT
TRACE METALS
QUALITY CONTROL REPORT-MATRIX SPIKE ANALYSIS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-1C	**Report Date:**	12/30/92
Laboratory Number:	C922428/15732	**Date Sampled:**	11/19/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Unspiked Sample Concentration (mg/L)	Spiked Sample Concentration (mg/L)	Spike Amount (mg/L)	Percent Recovery	Detection Limit (mg/L)	Method Reference
Dissolved Arsenic	ND	0.011	0.010	110	0.005	7061
Dissolved Chromium	ND	0.06	0.05	120	0.02	7191
Dissolved Lead	ND	0.05	0.05	100	0.02	7421
Dissolved Nickel	0.07	0.51	0.50	89	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

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WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-4	**Report Date:**	12/30/92
Laboratory Number:	C922429/15733	**Date Sampled:**	11/20/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	0.007	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.06	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

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WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-5	**Report Date:**	12/30/92
Laboratory Number:	C922430/15734	**Date Sampled:**	11/20/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	ND	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.05	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

Reviewed by:

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WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-6	**Report Date:**	12/30/92
Laboratory Number:	C922431/15735	**Date Sampled:**	11/20/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	0.007	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.05	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

Reviewed by:

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WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-7	**Report Date:**	12/30/92
Laboratory Number:	C922439/15741	**Date Sampled:**	11/19/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	ND	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.07	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

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WATER QUALITY REPORT
TRACE METALS
QUALITY CONTROL REPORT-DUPLICATE ANALYSIS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-7	**Report Date:**	12/30/92
Laboratory Number:	C922439/15744	**Date Sampled:**	11/19/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Original Concentration (mg/L)	Duplicate Concentration (mg/L)	Relative Percent Difference	Reporting Limit (mg/L)	Method Reference
Dissolved Arsenic	ND	ND	NC	0.005	7061
Dissolved Chromium	ND	ND	NC	0.02	7191
Dissolved Lead	ND	ND	NC	0.02	7421
Dissolved Nickel	0.07	0.07	0.0	0.01	7520

NC - Noncalculable RPD due to value(s) less than RL.
ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

Reviewed by:

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WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-8	**Report Date:**	12/30/92
Laboratory Number:	C922432/15736	**Date Sampled:**	11/20/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	0.016	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.07	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

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WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-9	**Report Date:**	12/30/92
Laboratory Number:	C922433/15737	**Date Sampled:**	11/19/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	ND	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.06	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

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WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-10	**Report Date:**	12/30/92
Laboratory Number:	C922434/15738	**Date Sampled:**	11/20/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	0.113	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.06	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

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WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-11A	**Report Date:**	12/30/92
Laboratory Number:	C922438/15740	**Date Sampled:**	11/19/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	ND	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.06	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

Reviewed by:

Mitch Swan
Supervisor--Water Operations

imL Inter-Mountain Laboratories, Inc.
Phone (409) 776-8945 FAX (409) 774-4705 11183 SH 30 College Station, Texas 77845

WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-11B	**Report Date:**	12/30/92
Laboratory Number:	C922437/15739	**Date Sampled:**	11/19/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	ND	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.06	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

Reviewed by:

Mitch Swan
Supervisor--Water Operations

jml
Inter-Mountain Laboratories, Inc.
Phone (409) 776-8945 FAX (409) 774-4705
11183 SH 30 College Station, Texas 77845

WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-12A	**Report Date:**	12/30/92
Laboratory Number:	C922441/15743	**Date Sampled:**	11/19/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	ND	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.08	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

Reviewed by:

Mitch Swan
Supervisor--Water Operations

imL Inter-Mountain Laboratories, Inc.
Phone (409) 776-8945 FAX (409) 774-4705
11183 SH 30 College Station, Texas 77845

WATER QUALITY REPORT
TRACE METALS

CLIENT: K.W. BROWN ENVIRONMENTAL SERVICES
PROJECT: NAVAJO - #622092005

Sample ID:	KWB-12B	**Report Date:**	12/30/92
Laboratory Number:	C922440/15742	**Date Sampled:**	11/19/92
Sample Matrix:	WATER	**Date Received:**	11/23/92
Preservative:	HNO3, COOL	**Date Extracted:**	11/30/92
Condition:	INTACT		

Analyte	Concentration	Units	Detection Limit	Method Reference
Dissolved Arsenic	ND	mg/L	0.005	7061
Dissolved Chromium	ND	mg/L	0.02	7191
Dissolved Lead	ND	mg/L	0.02	7421
Dissolved Nickel	0.07	mg/L	0.01	7520

ND - Parameter not detected at stated detection limit.
Detection limits are derived from practical quantitation levels.

REFERENCE: Analysis performed according to SW-846 "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," United States Environmental Protection Agency, November, 1986.

Reviewed by:

Mitch Swan
Supervisor--Water Operations

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 0945	Date 1/26/93

Originating Party	Other Parties
Darrel Moore - Navajo Refining	Bill Olson

Subject

Navajo Refinery Tank Hydrotest Discharge & Ground Water Remediation

Discussion

Want to discharge hydrotest water from used, reconstructed diesel tank to adjacent farm land.
I told him OCD will need analysis for appropriate TC and WQCC constituents (ie BTEX, PAH's, metals, general chemistry)

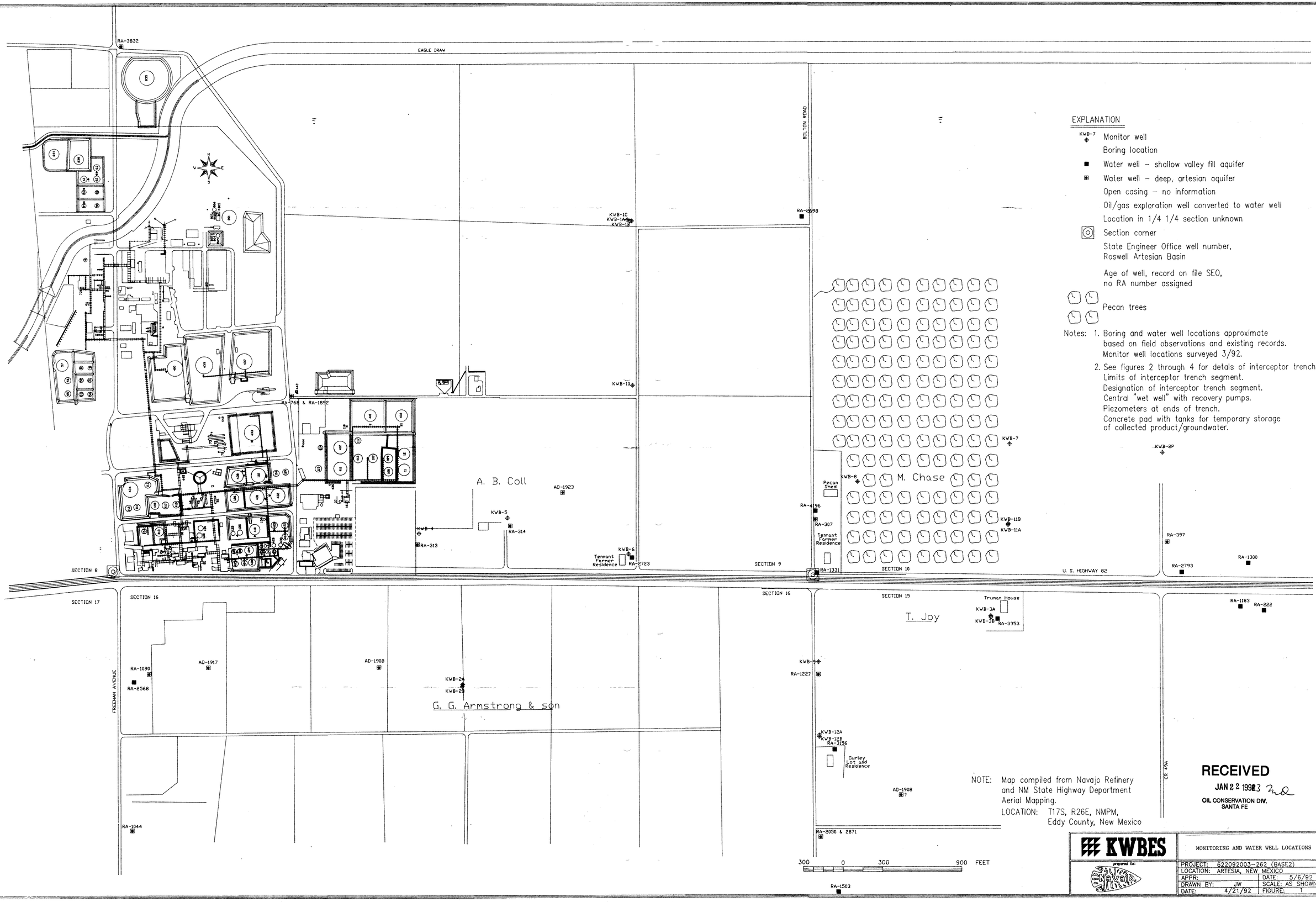
Navajo wants to put in air stripper and reinject treated offsite GW on upgradient side of refinery by early Feb.
I told him OCD will need work plan

Conclusions or Agreements

He will submit hydrotest analysis to B. Myers for approval when recieve results
He will submit workplan for air stripper & reinjection by next Wed.

Distribution file

Signed Bill Olson



EXPLANATION

- KWB-7 ⊕ Monitor well
- Boring location
- ■ Water well – shallow valley fill aquifer
- ◙ Water well – deep, artesian aquifer
- Open casing – no information
- Oil/gas exploration well converted to water well
- Location in 1/4 1/4 section unknown
- ◎ Section corner
- State Engineer Office well number, Roswell Artesian Basin
- Age of well, record on file SEO, no RA number assigned
- Pecan trees

Notes:
1. Boring and water well locations approximate based on field observations and existing records. Monitor well locations surveyed 3/92.
2. See figures 2 through 4 for detals of interceptor trench.
   - Limits of interceptor trench segment.
   - Designation of interceptor trench segment.
   - Central "wet well" with recovery pumps.
   - Piezometers at ends of trench.
   - Concrete pad with tanks for temporary storage of collected product/groundwater.

NOTE: Map compiled from Navajo Refinery and NM State Highway Department Aerial Mapping.

LOCATION: T17S, R26E, NMPM, Eddy County, New Mexico

KWBES

prepared for: Navajo Refining Co.

MONITORING AND WATER WELL LOCATIONS

PROJECT: 622092003-262 (BASE2)	
LOCATION: ARTESIA, NEW MEXICO	
APPR:	DATE: 5/6/92
DRAWN BY: JW	SCALE: AS SHOWN
DATE: 4/21/92	FIGURE: 1

TELEPHONE
(505) 748-3311

Navajo REFINING COMPANY
501 EAST MAIN STREET • P. O. DRAWER 159
ARTESIA, NEW MEXICO 88210

EASYLINK
62905278
FAX
(505) 746-6410

January 21, 1993

Mr. William Olson, Hydrogeologist
Environmental Bureau
Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504

RE: OFFSITE GROUNDWATER CONTAMINATION, NAVAJO REFINERY, EDDY COUNTY, NEW MEXICO

Dear Bill:

Navajo received OCD's letter of January 7, 1993 regarding our failure to submit required information on our plume east of the refinery. Due to lack of communication and misunderstandings on my part, this was not taken care of. I would like to apologize for the lack of attention to this matter.

In your letter of October 8, 1992 you gave Navajo some conditions of approval on the remediation of the plume. Several steps have been taken, but I would like to go through each condition and let you know where we are at this time.

Immediate Actions:

1. Private wells, RA-2723, RA-4196 and RA-4798 are the domestic wells to be sampled for BTEX. As I mentioned in our phone conversation of November 9, 1992, Navajo looked into the possibility of providing these users with city water thereby alleviating the necessity for frequent testing. However, after looking into the feasibility of this it was decided that this probably wasn't a good option, for several reasons. First of all, the City would put certain stipulations on the landowners that they would not accept. Secondly, RA-4196 has no residential use and RA-4798, which is an abandoned oil and gas well, is double cased making it highly unlikely that this water could get contaminated. Therefore, Navajo would like to re-propose that RA-4196 and RA-4798 be sampled monthly, with RA-2723 on a twice monthly schedule. Since we are already behind in sampling, Navajo will sample these wells immediately and get the results to OCD as soon as possible, while awaiting your decision on our proposal.

2. Dave Boyer with K. W. Brown has agreed to send the sample analysis for wells RA-3156, RA-3353, KWB-2A, KWB-3A, KWB-7 and KWB-9 to the OCD. These wells were sampled in November, 1992 as per your additional requirements. However the lab (Inter Mountain Labs) has had some trouble getting results to us due to the large number of Navajo's RCRA samples being processed simultaneously.

3. Irrigation wells; RA-313, RA-314, RA-1331, RA-307 and RA-1227 will be sampled monthly for BTEX once the irrigation season begins in the spring.

4. Navajo and K.W. Brown are in the process of designing a recovery trench for the area along Bolton Road to stop the front of the plume. Several options are being considered for the other areas, including modeling to check radius of influence to give us a better idea on how to proceed.

5. All recovered fluids will be piped back to the refinery. Water will be put through our waste water system and hydrocarbons will be re-processed.

6. As mentioned above in #4, the preliminary design of the recovery trench along Bolton Road has been completed. This will be submitted to OCD by Dave Boyer. Other systems will be submitted shortly thereafter. Navajo and K. W. Brown are working on stopping the leading edge of the plume first, then recovering the product where it is concentrated back to the east.

7. Dave Boyer notified OCD of our November sampling. Unfortunately, that is the only sampling that has been done. Our next quarterly sampling is due April 1, 1993. As for the biweekly and monthly sampling we will be glad to give OCD notice.

8. The quarterly sampling that was done in November should be to your office by the time you receive this letter. It will be forwarded by Dave Boyer. I realize it is late but the lab seems to have gotten overloaded.

9. Obviously, some of this has been missed. Again I apologize.

Long Term Actions:

1. Dave Boyer discussed this condition with you over the phone, and as a result of that conversation selected wells were sampled. It is my understanding that after these results are analyzed, we will have a better idea of how to proceed. These results will be in a packet you receive from Dave on or before the January 22, 1993 deadline.

2. I could find nothing in the State Engineer's files that shows these wells ever existed. I also found no evidence of them in the field.

3. Information from borings 62 - 66 will be sent by Dave Boyer.

4. A work plan for additional plume definition with detailed information on monitor wells, monitor well construction, sampling procedures, and analytical methods has been completed and will be forwarded by Dave Boyer. The work plan for long term remediation hasn't been approved yet by Navajo. However, when finished it will be forwarded.

Hopefully this letter will ease some of the concerns you have about this project. Again, I'm truthfully sorry about the confusion surrounding this. I can assure you that Navajo regards this situation with the seriousness that it deserves and I will be more diligent in implementing the procedures to insure it's success. If you have any questions please contact me at 748-3311, extension 281.

Sincerely,

Darrell Moore

Darrell Moore
Environmental Specialist

DGM/pb

cc: Dave Boyer
K. W. Brown Engineering Services
500 Graham Road
College Station, TX 77845

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 1530	Date 1/15/93
Originating Party	**Other Parties**	
Bill Olson - Envir. Bureau	Durrell Moore - Navajo Refining 748-3311	

Subject

Off-site Remediation Trench

Discussion

OCD has the following questions that must be answered prior to approval:

1.) Disposition of soils removed (contaminated & non contaminated)?
2.) How will saturated soils be handled? (ie during excavation to keep off grade)
3.) " " fluids from excavation be handled?
4.) How will they keep irrigation fluids out?
5.) Where will piping for recovery fluids to refinery be located?
6.) Need committment to test piping prior to operation & annually thereafter.
7.) Is there a barrier (ie plastic, etc.) in recovery trench at top of gravel?

Conclusions or Agreements

He will get response ASAP

Distribution

Signed Bill Olson

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

January 7, 1993

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-317

Mr. David G. Griffin
Superintendent of Environmental Affairs and Quality Control
Navajo Refining Company
P.O. Drawer 159
Artesia, New Mexico 88210

RE: OFFSITE GROUND WATER CONTAMINATION
NAVAJO REFINERY
EDDY COUNTY, NEW MEXICO

Dear Mr. Griffin:

On October 8, 1992, the New Mexico Oil Conservation Division (OCD) sent Navajo Refining Co. a letter of review of Navajo Refinery's May 1992 "INVESTIGATION OF THE SUBSURFACE HYDROCARBON PLUME AT THE NAVAJO REFINERY, ARTESIA, NEW MEXICO". In this letter, OCD approved Navajo's "Recommendations For Immediate Action" which were to be implemented by November 8, 1992. The OCD also required that Navajo submit a work plan for additional plume definition, a work plan for long term remediation of contaminated ground water and further information on water quality by December 8, 1992. To date, the OCD has not received any of the required information nor has OCD been notified of implementation of required immediate actions.

You are hereby notified that Navajo Refinery will be found to be out of compliance with New Mexico Water Quality Control Commission (WQCC) Regulation 1-203 unless Navajo provides OCD with information on implementation of the required "Immediate Actions" and submits all other information required in OCD's October 8, 1992 correspondence by January 22, 1992.

If you have any questions, please contact me at (505) 827-5812.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

xc: Mike Williams, OCD Artesia District Supervisor
David G. Boyer, K.W. Brown Environmental Services
Richard D. Mayer, EPA Region VI

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

Mr. David Boyer
K.W. Brown Environmental Services
500 Graham Road
College Station, Texas 77845

November 6, 1992

Dear David,

On October 30, 1992, six water samples were received by Inter-Mountain Laboratories - College Station. The samples were received cool, intact and in good condition. The samples was identified by Project Name "Navajo Refinery". Analyses for Benzene-Toluene-Ethylbenzene-Xylenes (BTEX) was performed according to the accompanying chain of custody form. RUSH

It is the policy of this laboratory to employ, whenever possible, preparatory and analytical methods which have been approved by regulatory agencies. The methods used in the analysis of samples reported herein are found in 40 CFR Part 261, Appendix II, USEPA, July 1, 1990, and "Test Methods for Evaluating Solid Waste", SW-846, USEPA, 1986. All reports in this package reference methods utilized.

Low level hits were found in three of the samples: KWB-5P, KWB-11B, and KWB-12B. Quality Control reports have been included for your information and use. These reports appear at the end of the analytical package and may be identified by title. If you have any questions regarding the information in this package, please feel free to call at your convenience.

Sincerely,

Ulonda M. Rogers

Ulonda M. Rogers
Manager

KWB2166

imi
Inter- Mountain
Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location	ANALYSES / PARAMETERS
Navajo Refinery	Artesia, New Mexico	
Sampler: (Signature) Todd Ullom (409) 690-9280	**Chain of Custody Tape No.** Login # 9210009	

Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers	BTEX					Remarks
KWB-1P	10/28/92	1540	C922166	Water	2	X					TA C922172
KWB-3P	10/29/92	950	C922167			X					
KWB-4P	10/29/92	840	C922168			X					
KWB-5P	10/29/92	1300	C922169			X					
KWB-11B	10/29/92	1235	C922170			X					
KWB-12B	10/29/92	1045	C922171			X					

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Todd Ullom	10/29/92	1600	Mary L. Shelton	10/30/92	0900
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by laboratory: (Signature)	Date	Time

Inter-Mountain Laboratories, Inc.

☐ 1633 Terra Avenue, Sheridan, Wyoming 82801, Telephone (307) 672-8945
☐ 1714 Phillips Circle, Gillette, Wyoming 82716, Telephone (307) 682-8945
☐ 2506 West Main Street, Farmington, NM 87401, Telephone (505) 326-4737
☐ 910 Technology Blvd. Suite B, Bozeman, Montana 59715, Telephone (406) 586-8450
☐ Route 3, Box 256, College Station, TX 77845, Telephone (409) 776-8945
☒ 3304 Longmire Drive, College Station, TX 77845, Telephone (409) 774-4999

11710

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - MATRIX SPIKE
AROMATIC AND HALOGENATED VOLATILE ORGANICS

Sample Number:	C922169 Spike	Report Date:	11/06/92
Sample Matrix:	Water	Date Sampled:	10/29/92
Preservative:	Cool, HCl	Date Received:	10/30/92
Condition:	Intact, pH<2	Date Analyzed:	11/02/92

Analyte	Spike Added (ug/L)	Sample Result (ug/L)	Spike Result (ug/L)	Percent Recovery	Acceptance Limit
Benzene	10.0	ND	10.8	108%	39-150%
Toluene	10.0	0.5	11.2	107%	46-148%
Ethylbenzene	10.0	ND	11.1	111%	32-160%
p,m-Xylenes	20.0	ND	22.0	110%	50-150%
o-Xylenes	10.0	ND	10.9	109%	50-150%

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	83%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - MATRIX DUPLICATE
AROMATIC AND HALOGENATED VOLATILE ORGANICS

Sample Number:	C922170 Duplicate	Date Sampled:	10/29/92
Sample Matrix:	Water	Date Received:	10/30/92
Preservative:	Cool, HCl	Date Analyzed:	11/02/92
Condition:	Intact, pH<2		

Analyte	Sample Result (ug/L)	Duplicate Result (ug/L)	Percent Difference
Benzene	ND	ND	NA
Toluene	0.8	0.8	0.9%
Ethylbenzene	ND	ND	NA
p,m-Xylenes	0.6	0.5	15.6%
o-Xylenes	ND	ND	NA

ND - Analyte not detected at stated detection limit.

Quality Control: Duplicate acceptance limit set at 20% difference.

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	89%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - METHOD BLANK
VOLATILE AROMATIC HYDROCARBONS

Sample Number: MB1102V2
Sample Matrix: Water

Date Analyzed: 11/02/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	90%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, November 1986.

Comments:

Analyst

Review

imil

Inter-Mountain Laboratories, Inc.

Phone (409) 776-8945 FAX (409) 774-4705

11183 SH 30 College Station, Texas 77845

Client: K. W. BROWN ENVIRONMENTAL SERVICES

500 GRAHAM ROAD

COLLEGE STATION, TEXAS 77845

10/29/92

P.O. #43562

PROJECT: NAVAJO-ARTESIA - #622092003

QUALITY ASSURANCE/QUALITY CONTROL

	EPA I.D.	FOUND	KNOWN
Arsenic	SPEX	0.0112	0.0100
Chromium	ICP 19	0.10	0.10
Lead	ICP 19	0.10	0.10

Reviewed by:

Mitch Swan

Supervisor--Water Operations

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

Mr. David Boyer
K.W. Brown Environmental Services
500 Graham Road
College Station, Texas 77845

October 30, 1992

Dear David,

On October 8, 1992, twenty-four water samples were received by Inter-Mountain Laboratories - College Station. The samples were received cool and in good condition. The samples were identified by Project Name "Navajo - Artesia". Analyses for Benzene - Toluene - Ethylbenzene - Xylenes (BTEX), tert-Butyl methyl ether (MTBE) and inorganics were performed according to the accompanying chain of custody form. A trip blank also accompanied the shipment.

Analysis for MTBE was requested on four samples only, however MTBE has been reported on all sample reports. The reason being is that MTBE is a routine calibration compound and is included in our BTEX analysis, if requested, at no extra charge. If the MTBE results are not desired on all the reports please let us know and corrected copies will be sent.

It is the policy of this laboratory to employ, whenever possible, preparatory and analytical methods which have been approved by regulatory agencies. The methods used in the analysis of samples reported herein are found in 40 CFR 136, Part 261, Appendix II, USEPA, July 1, 1990, and "Test Methods for Evaluating Solid Waste", SW-846, USEPA, 1986. All reports in this package reference methods utilized.

Quality Control reports have been included for your information and use. These reports appear at the end of the analytical package and may be identified by title. If you have any questions regarding the information in this package, please feel free to call at your convenience. Thank you for using Inter-Mountain Laboratories.

Sincerely,

Kevin Woodruff

Kevin Woodruff
Project Manager

KWB2030

CHAIN OF CUSTODY RECORD

Project No. 622092003	Project Name Navajo - Artesia	P.M. DGB	Login No. 9210003	P.O. No. 43562

Sample Identification	Date	Time	Sample Container (Size/Material)	Sample Type (Liquid, Soil, etc.)	Preservative	Analyses Requested A	B	C	D	E	F	Comments
KWB-1B	9/26	1145	2x 40 mL VOA 1x 250 mL plastic	Water	HCl Nitric	X		X	X	X		C922030
KWB-2A	9/28	1545	"			X			X			C922031
KWB-3A	9/28	1105	"			X			X			C922032
KWB-4	9/29	1550	"			X	X	X				C922033
KWB-5	9/30	1415	"			X	X	X				C922034
KWB-6	9/29	1755	"			X	X	X				C922035
KWB-7	9/26	1700	"			X			X			C922036
KWB-8	9/29	1135	"			X						C922037
KWB-9	9/28	1220	"			X			X			C922038
KWB-Dup	9/29	1650	"			X	X	X				C922039
KWB-1 Deep	10/1	1550	2x 40 mL VOA 1x 250mL Plastic 1x 1L Plastic			X		X	X	X	X	C922040
Coll Deep	10/5	1555	"			X		X	X		X	C922041
Pecan Shallow	10/1	1655	"			X		X	X	X	X	C922042
Pecan Deep	10/6	1300	"	√	√	X			X		X	C922043

Relinquished By (Signature)	Date	Time	Received By (Signature)
Mike Stevens	10/9/92	0915	Mary K. Shattuck

Analyses:
- A BTEX
- B BTEX + MTBE
- C Pb
- D As
- E Cr
- F GWC

CHAIN OF CUSTODY RECORD

Project No. 622092003	Project Name Navajo - Artesia	P.M. DGB	Login No. 9210003	P.O. No. 43562

Sample Identification	Date	Time	Sample Container (Size/Material)	Sample Type (Liquid, Soil, etc.)	Preservative	Analyses Requested A	B	C	D	E	F	Comments
Gurley Shallow	10/5	1910	2x40 mL VOA 1x250 mL Plastic 1x1L Plastic	Water	HCl Nitric	X		X	X	X	X	C922044
Gurley Deep	10/5	1820	"			X			X		X	C922045
~~P-1~~	~~10/7~~	~~1525~~										
P-2	10/7	1525	"			X		X	X	X	X	C922046
P-3	10/6	1650	"			X		X	X	X	X	C922047
P-4	10/7	1135	"			X		X	X	X	X	C922048
Field Blank	10/6	1650	2x40 mL VOA		HCl	X						C922049
Water well at KWB-6	9/30	1020	"			X						C922050
Water well at KWB-8	9/30	0955	"			X						C922051
Gurley House well	9/30	1630	"			X						C922052
Joy House well	9/30	1000	"			X						C922053 / TB# C922054

Relinquished By (Signature)	Date	Time	Received By (Signature)
10/9/92	10/9/92	0915	Mary L. Stadtlander

Analyses:
A BTEX
B MTBE
C Pb
D As
E Cr
F GWC

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	10/06/92
Sample ID:	Field Blank	Date Received:	10/08/92
Sample Number:	C922049	Date Analyzed:	10/14/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 2		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	97%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

BTEX
VOLATILE AROMATIC HYDROCARBONS

Client:	**K. W. Brown Environmental Services**		
Project Name:	Navajo - Artesia		
Project Number:	622092003	Report Date:	10/14/92
Login Number:	9210003	Date Sampled:	NA
Sample ID:	Trip Blank	Date Received:	10/08/92
Sample Number:	C922054	Date Analyzed:	10/14/92
Sample Matrix:	Water		
Preservative:	Cool, pH < 2		
Condition:	Intact		

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	101%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

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College Station, Texas 77845

QUALITY CONTROL REPORTS

* ***Method Blank Analyses***

* ***Matrix Spike Analyses***

* ***Duplicate Analyses***

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - MATRIX DUPLICATE
VOLATILE AROMATIC HYDROCARBONS

Sample Number:	C922040 Duplicate	Date Sampled:	10/01/92
Sample Matrix:	Water	Date Received:	10/08/92
Preservative:	Cool, pH < 2	Date Analyzed:	10/13/92
Condition:	Intact		

Analyte	Sample Result (ug/L)	Duplicate Result (ug/L)	Percent Difference
tert-Butyl methyl ether	ND	ND	NA
Benzene	6.4	6.7	4.1%
Toluene	12.2	13.6	11.2%
Ethylbenzene	6.1	6.8	11.0%
p,m-Xylene	11.5	12.8	11.3%
o-Xylene	4.7	5.2	11.9%

ND - Analyte not detected at stated detection limit.

Quality Control: Duplicate acceptance limit set at 20% difference.

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	98%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - MATRIX DUPLICATE
VOLATILE AROMATIC HYDROCARBONS

Sample Number:	C922047 Duplicate	Date Sampled:	10/06/92
Sample Matrix:	Water	Date Received:	10/08/92
Preservative:	Cool, pH < 2	Date Analyzed:	10/08/92
Condition:	Intact		

Analyte	Sample Result (ug/L)	Duplicate Result (ug/L)	Percent Difference
tert-Butyl methyl ether	ND	ND	NA
Benzene	13.1	12.9	1.1%
Toluene	21.0	19.5	7.6%
Ethylbenzene	3.7	3.3	10.6%
p,m-Xylene	12.4	11.1	11.6%
o-Xylene	6.4	5.7	12.5%

ND - Analyte not detected at stated detection limit.

Quality Control: Duplicate acceptance limit set at 20% difference.

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	97%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - MATRIX SPIKE
VOLATILE AROMATIC HYDROCARBONS

Sample Number:	C922040 Spike	Report Date:	10/14/92
Sample Matrix:	Water	Date Sampled:	10/01/92
Preservative:	Cool, pH < 2	Date Received:	10/08/92
Condition:	Intact	Date Analyzed:	10/13/92

Analyte	Spike Added (ug/L)	Sample Result (ug/L)	Spike Result (ug/L)	Percent Recovery	Acceptance Limit
tert-Butyl methyl ether	100	ND	82.1	82.1%	50-150%
Benzene	10	6.402	15.5	91.3%	39-150%
Toluene	10	12.159	20.5	83.6%	46-148%
Ethylbenzene	10	6.066	14.7	86.0%	32-160%
p,m-Xylenes	20	11.464	27.3	79.0%	50-150%
o-Xylene	10	4.66	13.2	85.6%	50-150%

ND - Analyte not detected at stated detection limit.

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	1-Chloro-2-Fluorobenzene	97%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - MATRIX SPIKE
VOLATILE AROMATIC HYDROCARBONS

Sample Number:	C922042 Spike	Report Date:	10/14/92
Sample Matrix:	Water	Date Sampled:	10/01/92
Preservative:	Cool, pH ≤ 4	Date Received:	10/08/92
Condition:	Intact	Date Analyzed:	10/09/92

Analyte	Spike Added (ug/L)	Sample Result (ug/L)	Spike Result (ug/L)	Percent Recovery	Acceptance Limit
tert-Butyl methyl ether	NA	NA	NA	NA	50-150%
Benzene	10	3.0	14.0	110%	39-150%
Toluene	10	2.3	12.0	96.6%	46-148%
Ethylbenzene	10	0.8	10.5	97.3%	32-160%
p,m-Xylenes	20	1.7	21.1	97.0%	50-150%
o-Xylene	10	0.9	10.2	93.4%	50-150%

ND - Analyte not detected at stated detection limit.

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	1-Chloro-2-Fluorobenzene	100%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - METHOD BLANK
VOLATILE AROMATIC HYDROCARBONS

Sample Number: MB1008V1 Date Analyzed: 10/08/92
Sample Matrix: Water

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	102%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, November 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - METHOD BLANK
VOLATILE AROMATIC HYDROCARBONS

Sample Number: MB1009V1 Date Analyzed: 10/09/92
Sample Matrix: Water

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	96%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, November 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - METHOD BLANK
VOLATILE AROMATIC HYDROCARBONS

Sample Number: MB1012V1 Date Analyzed: 10/12/92
Sample Matrix: Water

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	102%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, November 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - METHOD BLANK
VOLATILE AROMATIC HYDROCARBONS

Sample Number: MB1013V1
Sample Matrix: Water

Date Analyzed: 10/13/92

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	101%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, November 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

3304 Longmire
College Station, Texas 77845

QUALITY CONTROL REPORT - METHOD BLANK
VOLATILE AROMATIC HYDROCARBONS

Sample Number: MB1014V1 Date Analyzed: 10/14/92
Sample Matrix: Water

Analyte	Concentration (ug/L)	Detection Limit (ug/L)
tert-Butyl methyl ether	ND	5.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
p,m-Xylene	ND	0.5
o-Xylene	ND	0.5

ND - Analyte not detected at stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
1-Chloro-2-Fluorobenzene	94%	75-125%

Reference: Method 5030, Purge and Trap
Method 8020, Aromatic Volatile Organics
SW-846, Test Methods for Evaluating Solid Wastes, United States Environmental Protection Agency, November 1986.

Comments:

Analyst

Review

1. Name and address of the person making the discharge:

Navajo Refining Company

PO Drawer 159

Artesia, N.M. 88211-0159

Telephone: (505) 748-3311

2. Location of the discharge (in Township, Range and Section, ¼,¼,¼, if available).

32° 50' 51" North Latitude 104° 23' 42" West Longitude

3. The means of discharge (To a lagoon, Flowing Stream, Water Course, Arroyo, Septic Tank-Leach field, Other - Specify.

Arroyo - Eagle Draw feeding the Pecos River

4. The estimated concentration of contaminants in the discharge. Ca-604.9 Mg/L,

Mg - 146.1 Mg/L, Na - 382.3 Mg/L, CO3 - .3 Mg/L, HCO3 - 621.3 Mg/L, SO4 - 2002.0 Mg/L

Cl - 256.1 Mg/L, SiO2 - 39.5 Mg/L, TDS - 3747.0, CO2 - 36.7

5. The type of operation from which the discharge is derived.

Reverse osmosis treatment unit/demineralizer.

6. The estimated flow to be discharged per day. 600,000 gpd.

7. The estimated depth to ground water (if available). 20 ft.

Signed: Virgil R. Stanfield Date: 9-15-92

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0175

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (the area to the left of the label space lists the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK "X" YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	MARK "X" YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge to waters of the U.S.**? (FORM 2A)	X			B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge to waters of the U.S.**? (FORM 2B)			X
C. Is this a facility which currently results in **discharges to waters of the U.S.** other than those described in A or B above? (FORM 2C)	X			D. Is this a proposed facility *(other than those described in A or B above)* which will result in a **discharge to waters of the U.S.**? (FORM 2D)			X
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	X			F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)			X
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	X			H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)			X
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	X			J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5)			X

III. NAME OF FACILITY

1 | SKIP | Navajo Refining Company

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2 Griffin, David Supt. of Environmental Affairs & Q.C.	505 748 3311

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 P.O. Drawer 159

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 Artesia	NM	88211-0159

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 501 E. Main Street

B. COUNTY NAME

Eddy

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6 Artesia	NM	88210	

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST	B. SECOND
7 2911 (specify) Petroleum Refinery	7 (specify)
C. THIRD	**D. FOURTH**
7 (specify)	7 (specify)

VIII. OPERATOR INFORMATION

A. NAME

8 Navajo Refining Company

B. Is the name listed in Item VIII-A also the owner? [X] YES [ ] NO (66)

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)

F = FEDERAL; M = PUBLIC (other than federal or state); S = STATE; O = OTHER (specify); P = PRIVATE

P (specify)

D. PHONE (area code & no.)

A 505 748 3311

E. STREET OR P.O. BOX

P.O. Drawer 159

F. CITY OR TOWN	G. STATE	H. ZIP CODE
8 Artesia	NM	88211

IX. INDIAN LAND

Is the facility located on Indian lands? [ ] YES [X] NO (52)

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)	
9 NI	9 P	
B. UIC (Underground Injection of Fluids)	**E. OTHER (specify)**	
9 UI	9 195-M-4	(specify) State Air Permit
C. RCRA (Hazardous Wastes)	**E. OTHER (specify)**	
9 RI NMD048918817	9 GW-28	(specify) State Ground Water Permit

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

Petroleum Refinery - Producing hydrocarbon products i.e., Gasoline, Jetfuels, Diesels, LPG, Asphalt.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
Virgil R. Lankford Vice Pres. Refining	Virgil R. Lankford	9-15-92

COMMENTS FOR OFFICIAL USE ONLY

C

Please type or print using unshaded areas only

OMB No. 2040-0086
Approval expires 3-31-88

Form 2D NPDES

EPA

New Sources and New Dischargers
Application for Permit to Discharge Process Wastewater

I. Outfall Location

For each outfall, list the latitude and longitude, and the name of the receiving water

Outfall Number (list)	Latitude Deg.	Min.	Sec.	Longitude Deg.	Min.	Sec.	Receiving Water (name)
01	32	50	51	104	23	42	Pecos River via Eagle Draw

II. Discharge Date (When do you expect to begin discharging?)

April 1, 1993

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and stormwater runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

Outfall Number	1. Operations Contributing Flow (list)	2. Average Flow (include units)	3. Treatment (Description or List Codes from Table 2D-1)
01	Reverse Osmosis Water Demineralization	600,000 gpd	None

B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in Item III-A be intermittent or seasonal?

☐ Yes *(complete the following table)* ☒ No *(go to Item IV)*

Outfall Number	1. Frequency		2. Flow		
	a. Days Per Week *(specify average)*	b. Months Per Year *(specify average)*	a. Maximum Daily Flow Rate *(in mgd)*	b. Maximum Total Volume *(specify with units)*	c. Duration *(in days)*

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet)

Year	a. Quantity Per Day	b. Units of Measure	c. Operation, Product, Material, etc *(specify)*
N/A	N/A	N/A	N/A

CONTINUED FROM THE FRONT	EPA ID Number *(copy from Item 1 of Form 1)*	Outfall Number 01

V. Effluent Characteristics

A. and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3 Average Daily Value *(include units)*	4. Source *(see instructions)*
Biochemical O2 Demand	None	None	
Chemical O2 Demand	None	None	
Total Organic Carbon	None	None	
Total Suspended Solids	None	None	
Flow	600,000	600,000	
Ammonia	None	None	
Temperature - Winter	25° C	25° C	
Temperature - Summer	25° C	25° C	
pH	7.4	7.4	
Sulfate (SO4)	4,546.5 Kg.	4,546.5 Kg.	
Magnesium (Mg)	331.8 Kg.	331.8 Kg.	

CONTINUED FROM THE FRONT | EPA ID Number (copy from Item 1 of Form 1)

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1 Pollutant	2 Reason for Discharge
None	

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☒ Report Available ☐ No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge, resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location

VII. Other Information (Option

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

The permit being requested is for a fresh water reverse osmosis demineralization unit. Potable well water will be processed to reduce TDS for plant feed water while the residue water which contains material mineral concentrate will be disposed of in an interstate stream system.

The performance projection information based on Navajo's water quality is enclosed for your information.

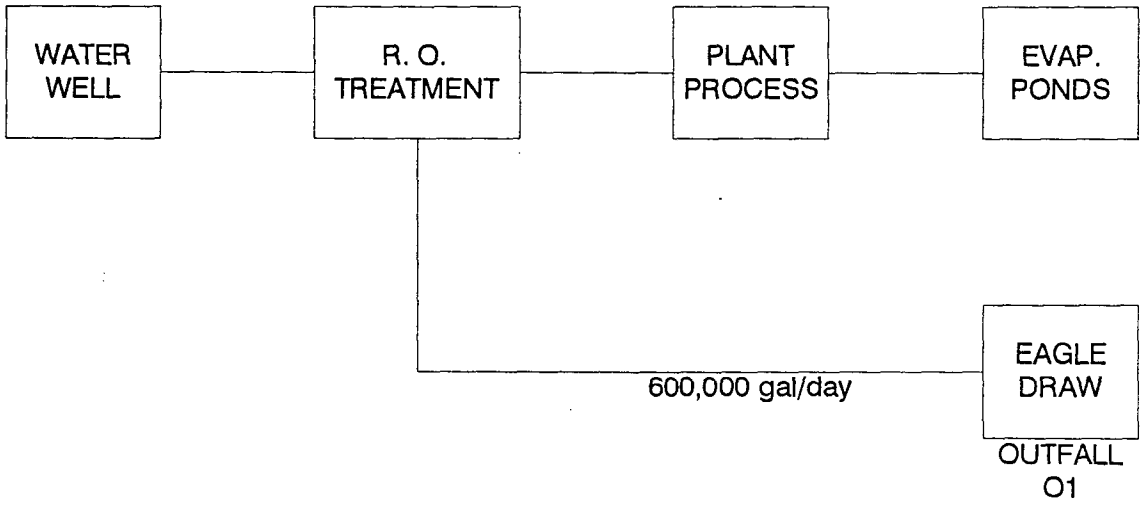
VIII. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name and Official Title (type or print)	B. Phone No
Virgil R. Lankford Vice Pres. Refining	(505) 748-3311
C. Signature	D. Date Signed
Virgil R. Lankford	9-15-92

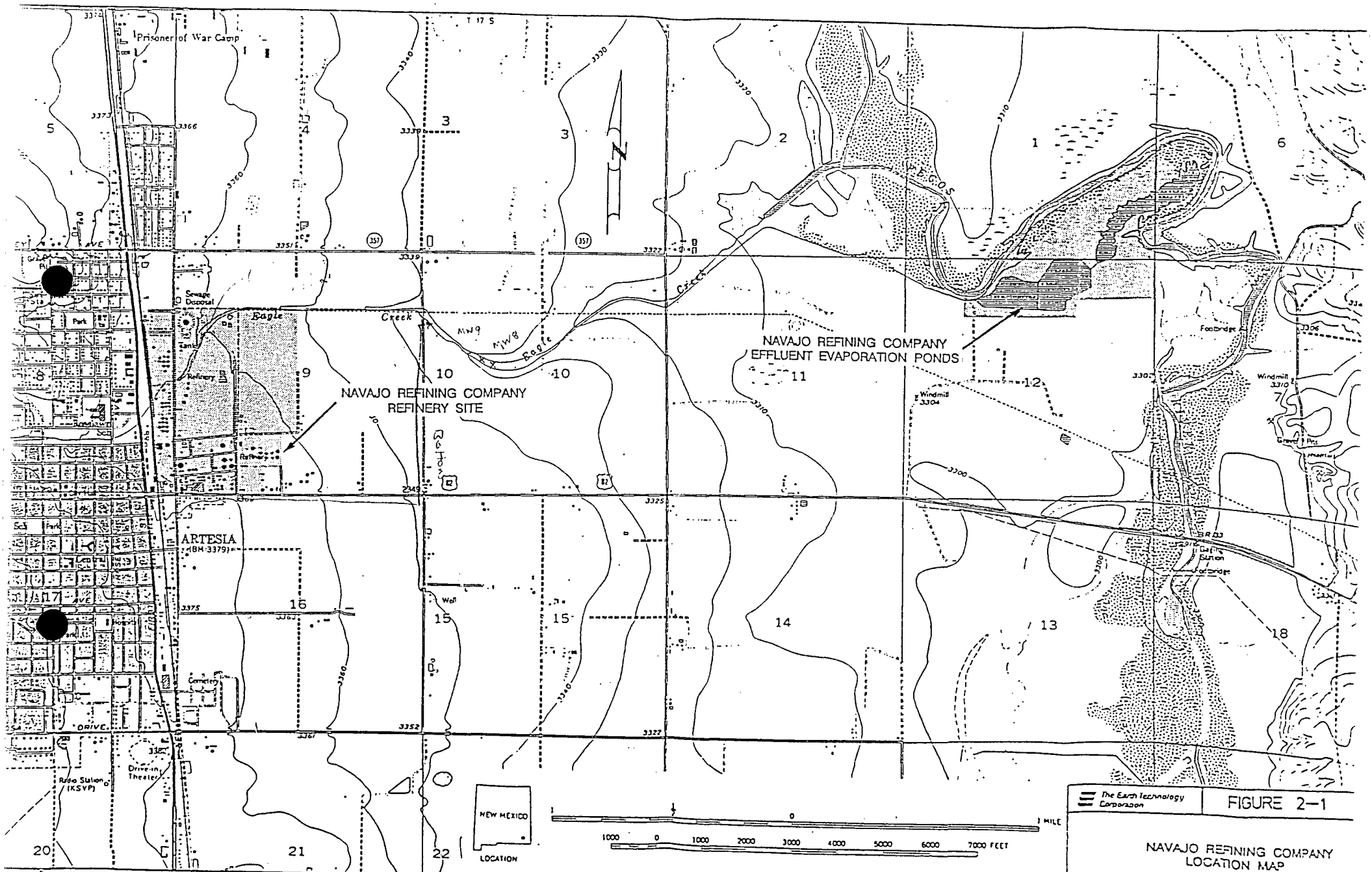
NAVAJO REFINING COMPANY
P.O. DRAWER 159
ARTESIA, NM 88211-0159

WATER DEMINERALIZATION SYSTEM



Note: The only permit required at this time is for the Reverse Osmosis process concentrate. Engineering studies are in progress to revise the plant process wastewater system.

WATER.WK1


NAVAJO REFINING COMPANY
REFINERY SITE
NAVAJO REFINING COMPANY
EFFLUENT EVAPORATION PONDS
ARTESIA
(BM 3379)
Prisoner of War Camp
Eagle Creek
MW9
MW8
PECOS
Sewage Disposal
Park
Refinery
Cemetery
Radio Station (KSVP)
Drive-in Theater
Windmill 3304
Windmill 3310
Well
T 17 S
NEW MEXICO
LOCATION
1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
The Earth Technology Corporation
FIGURE 2-1
NAVAJO REFINING COMPANY
LOCATION MAP

RO UNIT PERFORMANCE PROJECTION
using "ROPRO" (C) v 5.0MG (Feb [redacted] 1992)
Provided to SALTECH
by Fluid Systems Corporation

Project: NAVAJO Date: June 25, 1992
The unit has 54 Model TFCL 8829LP Elements Age = 3 yrs.
Tube Array = 6 / 3 Elements per Tube = 6
Permeate Flow = 325000. gpd (225.7 gpm) Recovery = 65.0%
Water Temp. = 25.0 C Avg. Annual Water Temp. = 25.0 C
Feed Press. = 201.4 psi Brine Press. = 149.5 psi
Feed Osmotic Press. = 7.7 psi Brine Osmotic Press. = 21.5 psi
This unit would require 107. pounds per day of 100% H2SO4.

BANK	FEED		CONCENTRATE		--AVGE. ELEMENT--		TUBE	FINAL
	TOTAL gpm	TUBE gpm	TOTAL gpm	TUBE gpm	FLOW gpd	FLUX gfd	DELTA P psi	ELEMENT BETA
1	347.2	57.9	187.6	31.3	6384.	18.2	23.2	1.084
2	187.6	62.5	121.7	40.6	5276.	15.1	28.7	1.052
SYSTEM					6019.	17.2	51.9	

The ratio of brine molar concentration product to Ksp (brine) for CaSO4 is .98
Brine conc. to saturation conc. ratio for reactive SiO2 is .31
The Stiff-Davis saturation index of the concentrate stream is plus 1.2

	RAW FEED mg/l	PRETREATED FEED mg/l	CONCENTRATE mg/l	PERMEATE mg/l
Ca	214.4	214.4	604.9	3.8
Mg	51.8	51.8	146.1	.9
Na	138.0	138.0	382.3	6.2
K	.0	.0	.0	.0
NH4	.0	.0	.0	.0
CO3	.0	.1	.3	.0
HCO3	258.6	226.5	621.3	13.6
SO4	683.0	708.2	2002.0	10.3
Cl	92.0	92.0	256.1	3.5
NO3	.0	.0	.0	.0
F	.0	.0	.0	.0
SiO2	14.1	14.1	39.5	.4
SUM	1451.9	1445.1	4052.6	38.7
TDS	1324.7	1333.7	3747.0	32.0
CO2	13.6	36.7	36.7	36.7
pH	7.5	7.0	7.4	5.8
pHs		6.9	6.3	

This projection is the anticipated performance and is based on nominal properties of the elements. No allowance was made for fouling or for pressure losses in the manifolds.
This computer printout should not be considered a guarantee of system performance unless accompanied by a statement to that effect.

By DON CLINE

TELEPHONE
(505) 748-3311

Navajo REFINING COMPANY

501 EAST MAIN STREET ● P. O. DRAWER 159
ARTESIA, NEW MEXICO 88210

EASYLINK
62905278

FAX
(505) 748-6410

November 6, 1991

Mr. Roger C. Anderson
Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504-2088

RE: TANK 419 UNDERGROUND LINE LEAK

Dear Mr. Anderson:

Enclosed is a spill report to follow up our conversation of Friday, November 1, 1991. As we discussed, Navajo is optimistic that the product lost will be recovered by an adjacent oil recovery well.

Should you need any additional information please give me a call at 748-3311, extension 223.

Sincerely,

David G. Griffin
Supt. Environmental Affairs
& Quality Control

DGG/pb

enclosure

SF

NEW MEXICO OIL CONSERVATION COMMISSION

RECEIVED

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

JAN 11 '89

O. C. D. ARTESIA, OFFICE

NAME OF OPERATOR	Navajo Refining Company				ADDRESS	501 East Main, Artesia, NM	
REPORT OF	FIRE	BREAK	SPILL X	LEAK	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*
NAME OF FACILITY	Navajo Refinery						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)	501 East Main				SEC.	TWP.	RGE. / COUNTY
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	Artesia, NM						
DATE AND HOUR OF OCCURENCE	1/5/89 5:00 p.m.				DATE AND HOUR OF DISCOVERY	Same	
WAS IMMEDIATE NOTICE GIVEN?	YES	NO X	NOT REQUIRED		IF YES, TO WHOM	Betty Rollins - OCD, Artesia, NM	
BY WHOM	David Griffin				DATE AND HOUR	1/6/89 1:00 p.m.	
TYPE OF FLUID LOST	-1° API Carbon Black Oil				QUANTITY OF LOSS	28 Bbls	VOLUME RECOVERED 10 Bbls
DID ANY FLUIDS REACH A WATERCOURSE?	YES X	NO	QUANTITY	3 Bbls			

IF YES, DESCRIBE FULLY**

A small portion of the spill escaped the containment at the loading rack. Recent high winds had blown trash into the containment drains - backing up the spill enough for about 3 Bbls to escape into a drainage arroyo on the North end of the rack.

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

Rail cars were being loaded with Carbon Black Oil (CBO). One car was overflilled due to operator error.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

The spill affected Navajo's rail loading facility and about 10 to 15 feet of a storm drainage arroyo at the North end of the rack. All free oil was vacuumed up. The oil stained soil was removed to Navajo's landfarm. Fresh dirt replaced and additional dikage built to prevent future occurances.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER*			
SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY-LOAM X	ROCKY	WET	DRY X	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Typical dry winter conditions of sunny days (45 - 65°F) and cold nights (20 - 40°F).

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

SIGNED David L. Griffin TITLE Supt. of Environmental Affairs & Quality Control DATE 1/9/89

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

1-13-89 OK M.S.

RECEIVED
JAN 18 1989
OIL CONSERVATION DIVISION
SANTA FE

TELEPHONE
(505) 748-3311

TELETYPE
(910) 986-0990

Navajo REFINING COMPANY
501 EAST MAIN STREET • P. O. DRAWER 159
ARTESIA, NEW MEXICO 88210

January 14, 1986

Mr. David G. Boyer
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Re: 1981 Pipeline Leak East of Artesia

Dear Dave:

Pipeline maintenance personnel remembers a 1981 leak in a new crude line that had just been installed in the area indicated by the representative from Transwestern. The leak amounted to an estimated loss of 5 barrels of crude oil and was confined to the south side of the highway.

Additional discussions with our pipeline division personnel, revealed that there was an old crude oil line that ran on the north side of the highway in the area of the USGS boring. The line was owned by Continental Oil Company (Conoco) and was abandoned from service in the early 1960's. All of our current pipelines in the area in question remain on the south side of the highway for approximately a half mile west of Transwestern's highway crossing point before they cross under the highway.

If you have any further questions, please give me a call.

Sincerely,

David G. Griffin

DGGr/sg

RECEIVED

OCT 09 '85

O. C. D.
ARTESIA, OFFICE

NEW MEXICO OIL CONSERVATION DIVISION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Transportation Navajo Refining-& Supply Div.				ADDRESS	P.O. Box 159-Artesia, N.M. 88210	
REPORT OF	FIRE	BREAK	SPILL	LEAK X	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE X	GASO PLNT	OIL RFY	OTHER*
NAME OF FACILITY	Red Lake Suction Line						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)	SW ¼				SEC. 20	TWP. 17	RGE. 28 COUNTY Eddy
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	12 miles east of Artesia						
DATE AND HOUR OF OCCURENCE	N/A				DATE AND HOUR OF DISCOVERY	9:00 A.M. 9/24/85	
WAS IMMEDIATE NOTICE GIVEN?	YES	NO	NOT REQUIRED		IF YES, TO WHOM		
BY WHOM					DATE AND HOUR		
TYPE OF FLUID LOST	Crude Oil				QUANTITY OF LOSS	Approximately 100 Bbls.	VOLUME RECOVERED 75 Bbls.
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO X	QUANTITY				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

Hole in pipe/Replace pipe

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

Pick up oil and covered leak area with dry dirt.

DESCRIPTION OF AREA	FARMING	GRAZING X	URBAN	OTHER*			
SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY X	ROCKY	WET X	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Rained
Wet & mud

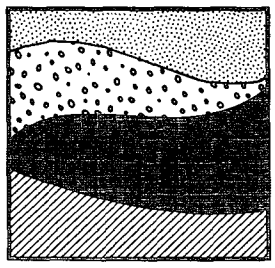
I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED John Clayton TITLE Foreman DATE 10/8/85

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

OK GR
10-15-85

Geoscience
Consultants, Ltd.



February 25, 1985

Mr. Richard Stamets
NMOCD
P.O. Box 2088
Santa Fe, New Mexico 87501

Re: Effluent Flow and Chemical Characteristics of Waste Streams Regulated by Discharge Plan

Dear Mr. Stamets:

Navajo Refining Company, Inc. and Geoscience Consultants, Ltd. are pleased to submit our report on effluent characteristics. Our previous submission described the process at the Artesia Refinery and presented chemical data on many individual waste streams. Section 1.0-6.0 of the Discharge Plan also presented chemical analyses of the evaporation pond fluids which represent the best composite sample of the effluent streams.

In the initial meeting of September 17, 1984 it was decided that all waste streams which are disposed of in the evaporation ponds would be governed by this Discharge Plan. These streams are:

- Effluent from the oil/water separator
- Effluent from the water softener
- Boiler blow down
- Effluent from the oil recovery system
- Liquid effluent from the heat exchanger bundle cleaning area
- Other liquid effluent which may be periodically discharged into the conveyance ditch

The chemical data on these waste streams were presented in Sections 1.0-6.0 of the Discharge Plan and are presented with this submission. Note that samples from the evaporation ponds were analised for benzene, toluene, xylene and ethylbenzene. Analyses of individual waste streams were included for information only. Regulatory decisions should consider the quality of the final effluent as characterized by analyses of the effluent flowing to the evaporation ponds.

The flow data is shown in the Table. At the present time no data are available for flow rates at the downstream end of the ditch.

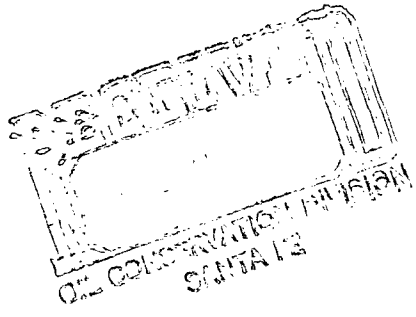
500 Copper Avenue N.W. Suite 220, Albuquerque, New Mexico 87102 (505) 842-0001

If you or your technical staff have any questions about this submission please contact me at our Albuquerque office.

Sincerely,
GEOSCIENCE CONSULTANTS, LTD.
Randy J. Hicks RJ
Randall T. Hicks
Vice President

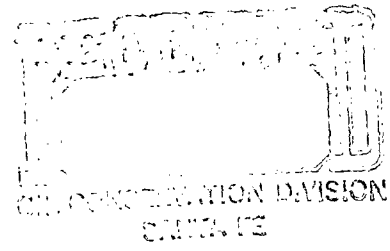
RTH/mg

cc: Mr. Dave Griffin, Navajo
Mr. Joel Carson, Losee, Carson, Dickerson
M. David Boyer, NMOCD (2 copies)



EFFLUENT FLOW DATA

DATE	GPD	PH
6-6-84	342,720	12.0
6-7-84	361,440	12.5
6-8-84	361,440	11.0
6-9-84	361,440	13.0
6-11-84	361,440	12.0
6-12-84	Cleaning ditch north of the FCC	13.5
6-13-84	303,384	11.0
6-14-84	342,720	13.0
6-15-84	342,720	13.5
6-18-84	342,720	9.5
6-20-83	361,440	9.0
6-21-84	342,720	9.0
6-22-84	342,720	10.0
6-23-84	381,440	9.5
6-25-84	361,440	8.5
6-26-84	342,720	9.0
6-27-84	419,040	9.5
6-28-84	380,160	10.5
6-29-84	361,440	11.0
6-30-84	380,160	11.5
7-2-84	342,720	12.5
7-3-84	342,720	10.0
7-5-84	342,720	9.5
7-6-84	380,160	9.5



EFFLUENT FLOW DATA CONT.

DATE	GPD	PH
7-8-84	361,440	9.5
7-10-84	361,440	9.0
7-11-84	342,720	10.0
7-12-84	303,840	10.5
7-15-84	342,720	8.5
7-19-84	380,160	7.5
7-20-84	380,160	9.5
7-23-84	380,160	12.5
7-24-84	361,440	11.0
7-25-84	380,160	12.5
7-27-81	380,160	11.0
7-30-84	361,440	9.0
8-2-84	342,720	9.0
8-3-84	380,160	9.0
8-6-84	342,720	9.0
8-7-84	342,270	10.0
8-8-84	361,440	11.0
8-9-84	361,440	9.0
8-14-84	380,160	8.0
8-15-84	380,160	8.5
8-16-84	419,040	8.0
8-17-84	380,160	8.0
8-20-84	380,160	7.5
8-21-84	380,160	7.5
8-22-84	380,160	8.0

EFFLUENT FLOW DATA CONT.

DATE	GPD	PH
8-23-84	380,160	10.0
8-24-84	361,440	9.0
8-27-84	361,440	9.5
8-28-84	380,160	8.5
8-29-84	361,440	10.0
8-30-84	380,160	8.0
8-31-84	380,160	7.5
9-5-84	380,160	7.0
9-6-84	380,160	8.0
9-7-84	380,160	8.0
9-10-84	380,160	8.5
9-11-84	361,440	9.5
9-12-84	380,160	11.0
9-13-84	380,160	9.5
9-14-84	361,440	11.0
9-17-84	342,720	11.5
9-18-84	361,440	9.0
9-19-84	380,160	7.0
9-20-84	361,440	9.0
9-21-84	342,720	9.0
9-24-84	342,720	8.5
9-25-84	361,440	8.5
9-26-84	342,720	10.5
9-27-84	342,720	11.0
10-1-84	361,440	10.0
10-2-84	342,720	9.5

EFFLUENF FLOW DATA CONT.

DATE	GPD	PH
10-3-84	361,440	10.5
10-4-84	342,720	11.0
10-5-84	342,720	10.0
10-8-84	361,440	8.0
10-9-84	342,720	9.5
10-11-84	342,720	10.5
10-12-84	342,720	10.0
10-15-84	361,440	11.5
10-16-84	419,040	7.5
10-17-84	398,880	8.5
10-18-84	398,880	7.5
10-19-84	419,040	7.5
10-22-84	398,880	10.5
10-23-84	419,040	8.5
10-24-84	419,040	7.0
10-25-84	398,880	9.0
10-26-84	398,880	11.0
10-29-84	419,040	8.0
10-30-84	398,880	9.5
10-31-84	398,880	9.0
11-1-84	398,880	6.0
11-2-84	342,720	8.0
11-5-84	380,160	5.5
11-6-84	303,384	4.0
11-7-84	303,384	7.5

EFFLUENT FLOW DATA CONT.

DATE	GPD	PH
11-8-84	380,160	8.5
11-9-84	380,160	7.0
11-10-84	342,720	8.0
11-11-84	342,720	9.5
11-12-84	380,160	9.0
11-13-84	342,720	8.5
11-14-84	303,840	8.5
11-20-84	380,160	7.0
11-21-84	380,160	9.0
11-22-84	342,720	10.0
11-23-84	342,720	9.0
11-26-84	380,160	8.5
11-27-84	398,880	10.0
11-28-84	419,040	10.5
11-29-84	419,040	8.0
11-30-84	380,160	10.0
12-3-84	398,880	11.5
12-4-84	398,880	10.5
12-5-84	380,160	13.0
12-6-84	419,040	9.0
12-7-84	398,880	8.0
12-10-84	380,160	6.5
12-11-84	419,040	11.5
12-12-84	398,880	9.0
12-13-84	419,040	9.0

EFFLUENT FLOW DATA CONT.

DATE	GPD	PH
12-14-84	398,880	9.5
12-17-84	380,160	6.0
12-18-84	342,720	7.5
12-19-84	419,040	8.0
12-20-84	380,160	11.5
12-21-84	380,160	10.0
12-26-84	342,720	9.0
12-27-84	342,720	11.0
1-2-85	380,160	9.5
1-3-85	361,440	6.0
1-4-85	361,440	8.8
1-7-85	342,720	9.5
1-8-85	303,384	10.5
1-9-85	342,720	10.0
1-10-85	342,720	12.0
1-11-85	303,384	9.0
1-14-85	342,720	10.0
1-15-85	303,384	8.5
1-16-85	380,160	6.5
1-17-85	342,720	7.5
1-18-85	361,440	8.5
1-21-85	361,440	7.0
1-22-85	342,720	7.0
1-23-85	342,720	8.0
1-24-85	419,040	6.5

EFFLUENT FLOW DATA CONT.

DATE	GPD	PH
1-25-85	361,440	7.5
1-28-85	380,160	7.0
1-29-85	380,160	7.0
1-30-85	361,440	6.0
1-31-85	342,720	7.5
2-1-85	361,440	8.5
2-4-85	342,720	7.0
2-5-85	242,720	9.0
2-6-85	361,440	9.5

TABLE 5-2
CHEMICAL ANALYSES OF SELECTED WASTE
STREAMS AT NAVAJO REFINERY (AFTER BRANVOLD, 1984)
(VALUES IN MG/L EXCEPT WHERE NOTED)

	WQCC 3-103 STANDARDS	CRUDE UNIT PROCESS (#4, #11, #13)	CAT. CRACKER PROCESS BEFORE SOUR WATER STRIPPER	SOUR WATER STRIPPER EFFLUENT (#17)	ALKY. NEUTRALIZING SEWER (#6)	ND & SD DESALTERS (#3, #9)
As						
Ba						
Cd						
Cr						
CN		<0.1	<0.1	<0.1	7.8	
		<0.1	<0.1	<0.1	<0.1	
F		1.3	0.5	0.4	10.8	<1.0
Pb						
Hg						
NO_3						
Se						
Ag						
U						
Cl						
Cu						
Fe		<0.1	3.9	17.0	7.8	
Mn						
SO^4						
TDS		805	2160	560	2872	2524
Zn		<0.1	<0.1	0.12	18.8	
pH		6.3	9.0	9.5	3.6	
Al						
B						
Co						
Mo						
Ni						
Phenols		9.9	710	250	0.26	
TSS						
Cond.						
COD		1202	8379	1702	8870	600
NH_4		78	2320	256	<1	5.0
S		64	180	7.7	1.4	<1.0

Table 5-2 (continued)

BOILERS

WQCC 3-103	S.D.	N.D.	N.D.
PARAMETERS	BOILER BLOWDOWN (#2)	HIGH PRESSURE BOILER (#18)	LOW PRESSURE BOILER (#12)
As	.004	.005	.003
Ba	<.1	<.1	<.1
Cd	<.01	<.01	<.01
Cr	<.05	<.05	<.05
CN			
F	3.1	2.2	1.5
Pb	.18	.14	.05
Hg			
NO_3	.2	.1	.05
Se			
Ag	<.05	<.05	<.05
U	<.05	<.05	<.05
Cl	127	73	44
Cu	<.03	<.03	<.03
Fe	1.9	0.65	0.25
Mn	.07	<.03	<.03
SO	1549	1242	693
TDS	4220	2873	1807
Zn	.06	<.01	<.01
pH	11.6	11.6	11.2
Al	<1.0	<1.0	<1.0
B			
Co	<.01	.02	.01
Mo	<.5	<.5	<.5
Ni	<.05	<.05	<.05
Phenols			
TSS	20	0	0
Cond.	6000	5000	2890
COD	116	0	0
NH_4			
S			

Table 5-2 (continued)

COOLING TOWERS

	WQCC 3-103 STANDARDS	N.D. COOLING TOWER BLOWDOWN (#10)	S.D. ALKY COOLING TOWER BLOWDOWN (#1)	S.D. TCC COOLING TOWER BLOWDOWN	N.D. FCC COOLING TOWER BLOWDOWN (#16)
As		.004	<.001	.011	.001
Ba		<.1	<.1	<.1	<.1
Cd		<.01	<.01	<.01	<.01
Cr		.06	1.05	<.05	0.22
CN					
F		1.6	4.4	2.2	1.6
Pb		.05	.05	<.05	.05
Hg					
NO_3		.5	.75	.2	.3
Se					
Ag		<.05	<.05	<.05	<.05
U		<.05	<.05	<.05	<.05
Cl		48	53	44	47
Cu		<.03	<.03	<.03	<.03
Fe		.05	.5	<.05	<.05
Mn		<.03	.07	<.03	<.03
SO		1077	1461	1236	1067
TDS*		1906	2732	1694	1973
Zn		.48	28	<.01	.17
pH		7.6	6.9	7.7	8.0
Al		<1.0	<1.0	1.0	<1.0
B					
Co		<.01	.01	.02	.01
Mo		<.5	<.5	<.5	<.5
Ni		<.05	<.07	<.05	<.05
Phenols					
TSS		13	0	67	0
Cond.		0	0	108	1800
COD		1850			15
NH_4		0			

QUALITY OF WATER IN EVAPORATION PONDS

ASSAIGAI

ANALYTICAL LABORATORIES, INC.

TO: Geo Science
500 Copper Ave. N.W.
Albuquerque, NM

DATE: 8 November 1984
1080, 1040

ANALYTE	SAMPLE ID/ANALYTICAL RESULTS		
	11184 1330 Well 28	103184 1432 Well 45	103184 1240 Well 46
Benzene	<0.005 mg/l	<0.005 mg/l	<0.005 mg/l
Toluene	<0.005 mg/l	<0.005 mg/l	<0.005 mg/l
Ethylbenzene	<0.005 mg/l	<0.005 mg/l	<0.005 mg/l
Xylenes	<0.005 mg/l	<0.005 mg/l	<0.005 mg/l
	103184 1520 Well 47	103184 1550 Fire Pond	
Benzene	<0.005 mg/l	<0.005 mg/l	
Toluene	<0.005 mg/l	<0.005 mg/l	
Ethylbenzene	<0.005 mg/l	<0.005 mg/l	
Xylenes	<0.005 mg/l	<0.005 mg/l	
	Well 3	Well 5	Well 12
NO_3 as N	<0.01 mg/l	<0.01 mg/l	<0.01 mg/l
NH_4	1.16 mg/l	2.5 mg/l	0.25 mg/l
CN	<0.01 mg/l	<0.01 mg/l	<0.01 mg/l
Benzene	<0.005 mg/l	<0.005 mg/l	<0.005 mg/l
Toluene	<0.005 mg/l	<0.005 mg/l	<0.005 mg/l
Xylenes	<0.005 mg/l	<0.005 mg/l	<0.005 mg/l
Ethylbenzene	<0.005 mg/l	<0.005 mg/l	<0.005 mg/l
	Well 13	Pond 1	Pond 3
NO_3 as N	<0.01 mg/l	<0.01 mg/l	<0.01 mg/l
NH_4	5.6 mg/l	10.6 mg/l	13.87 mg/l
CN	0.09 mg/l	0.4 mg/l	0.2 mg/l
Benzene	0.254 mg/l	0.711 mg/l	0.027 mg/l
Toluene	0.345 mg/l	0.588 mg/l	<0.005 mg/l
Xylenes	0.389 mg/l	0.591 mg/l	<0.005 mg/l
Ethylbenzene	<0.100 mg/l	0.240 mg/l	<0.005 mg/l

TO: Geo Science
500 Copper Ave. N.W.
Albuquerque, NM

DATE: 8 November 1984
1080, 1040

ANALYTE	SAMPLE ID/ANALYTICAL RESULTS Pond #1 floating film	NOMINAL DETECTION LIMIT
NO_3 as N		0.01 mg/l
NH_4		0.1 mg/l
CN		0.01 mg/l
Benzene	0.617 mg/l	0.005 mg/l
Toluene	0.467 mg/l	0.005 mg/l
Xylenes	0.463 mg/l	0.005 mg/l
Ethylbenzene	0.201 mg/l	0.005 mg/l

REFERENCE: "Standard Methods for the Examination of Water and Wastewater", 15th Edition, APHA, N.Y. ,1980.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerely,

Jennifer V. Smith

Jennifer V. Smith, Ph.D.
Laboratory Director

CUSTOMER Navajo Refining Co. ny
ADDRESS Drawer 159
CITY Artesia, NM 88210
ATTENTION Ed Kinney
INVOICE NO 104223

REPORT OF ANALYSIS

SAMPLES RECEIVED 4/24/81	CUSTOMER ORDER NUMBER P.O. # 20030

TYPE OF ANALYSIS Water

Sample Identification	Type of Analysis		mg/liter
Navajo West Pond	Acidity		13
	Alkalinity, "P" (as $CaCO_3$)	<	1
	Barium		0.2
	Biochemical Oxygen Demand		116
	Cadmium		0.003
	Chemical Oxygen Demand		102
	Chloride		918
	Chromium		0.04
	Chromium 6+	<	0.01
	Copper	<	0.001
	Fluoride		6.6
	Hardness (as $CaCO_3$)		760
	Iron		0.06
	Lead		0.002
	Magnesium		60
	Nickel		0.01
	pH Units		7.7
	Phenols		0.04
	Alkalinity, "M"		173
	Solids, Total Dissolved		2930
	Sulfate		885
	Sulfide		25.1
	Zinc	<	0.1

10d

Sample Analysis by: BP

Date and Time of Analysis: BOD_5: 4/24/81 @ 1600 hrs.

pH: 4/30/81 @ 1400 hrs.

Method of Analysis: BOD_5 - 5 day incubation

pH:electrode

C-E-C

Controls for Environmental Pollution, Inc.

APPROVED BY

Elmer D. Martinez, Director of Quality Assurance

CUSTOMER Navajo Refining Co[illegible]y
ADDRESS Drawer 159
CITY Artesia, NM 88210
ATTENTION: Ed Kinney
INVOICE NO 104223

REPORT OF ANALYSIS

SAMPLES RECEIVED 4/24/81 | CUSTOMER ORDER NUMBER P.O. # 20030

TYPE OF ANALYSIS Water

Sample Identification	Type of Analysis		mg/liter
Navajo Middle Pond	Acidity		29
	Alkalinity, "P" (as $CaCO_3$)	<	1
	Barium	<	0.1
	Biochemical Oxygen Demand		116
	Cadmium		0.002
	Chemical Oxygen Demand		363
	Chloride		1468
	Chromium		0.1
	Chromium 6+	<	0.01
	Copper	<	0.001
	Fluoride		7.4
	Hardness (as $CaCO_3$)		1060
	Iron		0.06
	Lead	<	0.001
	Magnesium		96
	Nickel	<	0.01
	pH Units		7.4
	Phenols		0.027
	Alkalinity, "M"		349
	Solids, Total Dissolved		4020
	Sulfate		1050
	Sulfide		13.4
	Zinc	<	0.1

Sample Analysis by: BP
Date and Time of Analysis: BOD_5: 4/24/81 @ 1600 hrs.
pH: 4/30/81 @ 1400 hrs.
Method of Analysis: BOD_5 - 5 day incubation
pH:electrode

CEC

APPROVED BY
Elmer D. Martinez, Director of Quality Assurance
4/30/81

CUSTOMER Navajo Refining Co y
ADDRESS Drawer 159
CITY Artesia, NM 88210
ATTENTION Ed Kinney
INVOICE NO 104223

SAMPLES RECEIVED 4/24/81	CUSTOMER ORDER NUMBER P.O. # 20030

TYPE OF ANALYSIS Water

Sample Identification	Type of Analysis	mg/liter
Navajo East Pond	Acidity	10
	Alkalinity, "P" (as $CaCO_3$)	< 1
	Barium	< 0.1
	Biochemical Oxygen Demand	72
	Cadmium	0.002
	Chemical Oxygen Demand	225
	Chloride	1632
	Chromium	0.1
	Chromium 6+	< 0.01
	Copper	0.002
	Fluoride	5.8
	Hardness (as $CaCO_3$)	1160
	Iron	0.1
	Lead	< 0.001
	Magnesium	110
	Nickel	< 0.01
	pH Units	7.2
	Phenols	< 0.001
	Alkalinity, "M"	214
	Solids, Total Dissolved	4920
	Sulfate	1520
	Sulfide	0.36
	Zinc	< 0.1

1 of 4

Sample Analysis by: BP

Date and Time of Analysis: BOD_5: 4/24/81 @ 1600 hrs.

pH: 4/30/81 @ 1400 hrs.

Method of Analysis: BOD_5 - 5 day incubation

pH:electrode

APPROVED BY
Elmer D. Martinez, Director of Quality Assurance
4/30/81

REPORT ON WATER DISPOSAL NAVAJO REFINING COMPANY

The Navajo Refining Company operates an oil refinery in Artesia, New Mexico. Fresh water is used in the refining process; part of the water is used to de-salt the incoming crude oil. This saline water and other waste water is delivered via ditch three miles east of the plant to evaporation ponds adjacent to the Pecos River.

The reach of the Pecos River between Acme (16 miles northeast of Roswell) and Artesia is a section of river in which the mineral content of the water increases considerably - especially the chloride and sulfate content. The flow in the river consists of three parts: a.) the base flow. b.) the release of storage water from the reservoirs near Ft. Sumner, N. M.; and c.) runoff from precipitation. Inasmuch as b and c are relatively transitory in time, the measurement of water quality in the river is given by analysis of the base flow (a).

Table #1 shows the chloride and flouride content at Acme and Artesia as well as the chromium, sulfate, and solids at Artesia as analyzed by the United States Geological Survey (USGS) monthly for the water years 1979 and 1980, ending in September, 1980. The data for 1980 is labeled provisional until published. Chart #1 shows the chloride content at the Artesia bridge sampling point. The great variation is due to time of sampling and the mix of a, b, and c, The average chloride content for the two year period is 1846 parts per million (ppm). The water in the Pecos River is not potable; it is brackish and marginal for agriculture.

Report not dated when prepared or received by OCD
It was said by Hydro Science to be dated Aug. 10, 1981. DFB

This is not the same report appearing in the Updated DP dated

Table #1a is a list of minor constituents in the Pecos River water that were analyzed by the USGS.

The Pecos River water quality deteriorates between Acme and Artesia by leaching of the soil on the west by return irrigation water and precipitation runoff and on the east side by precipitation runoff through highly mineralized beds of the Permian (Chalk Bluff Formation).

The valley fill aquifer (30 - 32 feet thick) lies along the river in a narrow belt. The aquifer is composed of fine grained sediments (sand and clay) deposited by the river. The permeability of the formation is low and consequently the transmissibility of water is also low. The aquifer has about 20 feet of saturated zone; the top of which is cut by the river. Water seeps into the river at low flow and outward from the river at high water level. The water in the valley fill is saline like the water in the river. The well #1 is a test of the aquifer water updip 1560 feet northwest of the ponds. This well water tests 8313 ppm chloride, 4920 ppm sulfate, and 19,700 ppm dissolved solids. This is the same irrigation return and precipitation runoff that is found in the river.

In the general area of the ponds, the valley fill water has recharge from the effluent of the City of Artesia's sewage plant. Part of the effluent is used to irrigate pasture located in the S½NW¼ Section 12, just southwest of the evaporation ponds. When not used for irrigating, the effluent is discharged into Eagle Draw wherein it ponds adjacent to the river at a distance of ½ mile northwest of well #1.

The Navajo Refining Company has three ponds containing 85

acres located in Sections 1 & 12, T17S, R26E, Eddy County, N. M. Observation wells have been dug around the perimeter of the ponds in order to observe the effects, if any, on the ground water in the valley fill aquifer. Wells 1, 3, and 5, were placed on the north or updip side of the ponds. As previously mentioned well #1 is 1560 feet northwest of the ponds and 200 feet from the river. This well measures the water in the valley fill without chance of being effected by the water in the ponds. Wells 7, 9, 12, and 13 were placed to measure the water moving east to the river or south along the water level slope. These wells have slotted casing which allows aquifer water to move through the well bore. Wells 16 and 17 were drilled to test the bottom of the aquifer. In sampling these, the water was drawn from the bottom of the well.

The evaporation ponds have been at this location for several decades. The water in the observation wells has been tested over a period of 4 years. The latest sampling was on April 16, 1981, by the undersigned witnessed by N. Raymond Lamb. The samples were sent by the undersigned to the Controls for Environmental Pollution, Inc., Santa Fe, New Mexico, for analysis. Table #2 is a compilation of the results.

The water levels in observation wells 1, 3, and 5 indicate a flow to the river and to the south. The level is slightly above low flow water level in the river. Well #7 appears to have an anomalous water level some 7 feet above low flow in the river and 4 feet above the wells to the south. This may be due to a perched water table in an old meander of the river.

The water in the river and the valley fill is saline with high levels of chloride, sulfate, and dissolved solids. The possible industrial contaminants of barium, cadmium, hexavalent chromium, lead and flouride are all low and within the values for potable water much less for saline water.

There is no evidence that the water in the evaporation ponds is contaminating the water in the aquifer. Just south of the west end of the ponds is a water well used by the rancher for watering of his stock. This well is pumped by windmill. This water analyzes to be saline as found in the general aquifer. In view of the long time operation of these ponds, if they were contributing industrial pollutants to the aquifer the water being pumped regularly should show a poor analysis.

The ponds have a surface area of 85 acres. Of this amount 70 acres has strong evaporation. The Soil Conservation Service has a map titled Gross Annual Lake Evaporation, New Mexico with contour lines denoting inches of evaporation. To convert these data to Pond Evaporation data a factor of 1.21 is applied to the Lake Surface data. This factor is used because ponds are smaller and dry winds do not saturate in blowing across them as they do over large lake bodies. The contour for Artesia is 80+ inches per year. Using 80 times 1.21 less average rainfall at 12.8 inches per year (the last 5 years) gives a net evaporation rate of 84 inches per year. The average precipitation at Roswell for 1944-67 was 9.66 inches per year. The 7 feet of net evaporation per year from the 70 acres is a total of 490 acre feet per year. The refinery is discharging an average 449457 gallons per day or 503 acre feet per year. There is apparently

a 5% loss in transmission over the three miles; therefore, the net discharge into the evaporation ponds is 478 acre feet per year.

The calculated 100 year flood peak discharge of the Pecos River has been determined in connection with the Brantley Dam project and is 93,200 cubic feet per second (cfs). The flood at the site of the ponds would be 2 miles wide and have a crest of 14 feet above river bottom - 3313 feet above msl according to flood profiles by the US Corps of Engineers - chart #2. The flood profile shows a river bottom of 3299 feet; however, our measurements of low flow water level by registered surveyors is 3297 for an average with the river bottom a bit less. The bank of the river just north of the ponds is 90% covered by thick salt cedar growth. This growth will very materially lessen the floods washing effect against the pond dikes. The peak elevation of 3311 or 3313 may cause water to flow into the ponds. The pond storage is equivalent to 80 seconds of peak flood flow.

Respectfully submitted,

Edward E. Kinney

Edward E. Kinney, PE&LS #1144

NO. 3170. DATA SHEET, ONE MONTH BY DAYS.

CODEX BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS.
PRINTED IN U.S.A.

Table #1

UNITED STATES GEOLOGICAL SURVEY (USGS) PECOS RIVER WATER QUALITY DATA

	Date	CHLORIDE Acme	CHLORIDE Artesia	FLOURINE Acme	FLOURINE Artesia	CHROMIUM	CHROMIUM Artesia	SULFATE Artesia	SOLIDS Res @ 180°C		
1	Oct. 78	420	2700	.8	.8			1800	7700		1
2	Nov	130	1500	.6	.7			1400	3900		2
3	Dec	740	1500	.5	.7		0	1300	4860		3
4	Jan 79	520	1200	.5	.7			1200	3820		4
5	Feb	740	1500	.6	.7			1500	4690		5
6	Mar	1000	3500	.6	.9		.02	2500	9290		6
7	Apr	950	3400	.7	.8			2300	9380		7
8	May	990	3700	.8	.8			2700	10800		8
9	Jun	130	110	.6	.5		.03	590	1210		9
10	Jul		2300		.6			1600	6170		10
11	Aug	47	1700	.5	.6		.03	1700	5220		11
12	Sep	350	2600	.6	.6			2000	7090		12
13	Oct *	97	3700	.4	.8			3200	9990		13
14	Nov		770		.5			1100	3200		14
15	Dec	410	860	.4	.8		.01	2600	5770		15
16	Jan 80	450	2100	.5	.9			1800	6210		16
17	Feb	460	2100	.4	.6			1800	6070		17
18	Mar	630	4200	.5	.9		.02	2600	10700		18
19	Apr		150		.6		.03	970	1810		19
20	May	330	1900	.3	.5			1600	5920		20
21	Jun	490	480	.2	.9		.05	1500	3090		21
22	Jul	89	74	.8	.7			470	945		22
23	Aug	120	1600	.4	.5			1300	4730		23
24	Sep	340	650	.6	.6			720	2430		24
25											25
26											26
27											27
28											28
29											29
30	* Provisonal for water year 1980 - not yet published										30
31											31

Table 1a

WATER ANALYSIS BY U S GEOLOGICAL SURVEY for water years 1979 & 1980*
Sampled at Artesia Bridge on the Pecos River. Mg./L (ppm)

Date	Iron	Barium	Cadmium	Lead	Zinc
Oct 78	.01				
Nov	.02				
Dec	.03	.1	0	.005	.04
Jan 79	.04				
Feb	.01				
Mar	.05	0	0	.006	.04
Apr	.06				
May	.04				
Jun	.01	.6	0	0	.09
Jul	.02				
Aug	.06	0	.001	0	.01
Sep	.02				
Oct	.05				
Nov	.02				
Dec	.06	.4	0	.006	.004
Jan 80	.03				
Feb	.07				
Mar	.05	.2	.001	.001	.08
Apr	.11	.8	.001	.055	.15
May	.05				
Jun	.16	1.0	0	.057	.23
Jul	.05				
Aug	.05				
Sep	.84				

*1980 water year data provisional until published

Chart #1

PECOS RIVER * Chloride Content at Artesia bridge

Water years 1979 and 1980

USGS - data

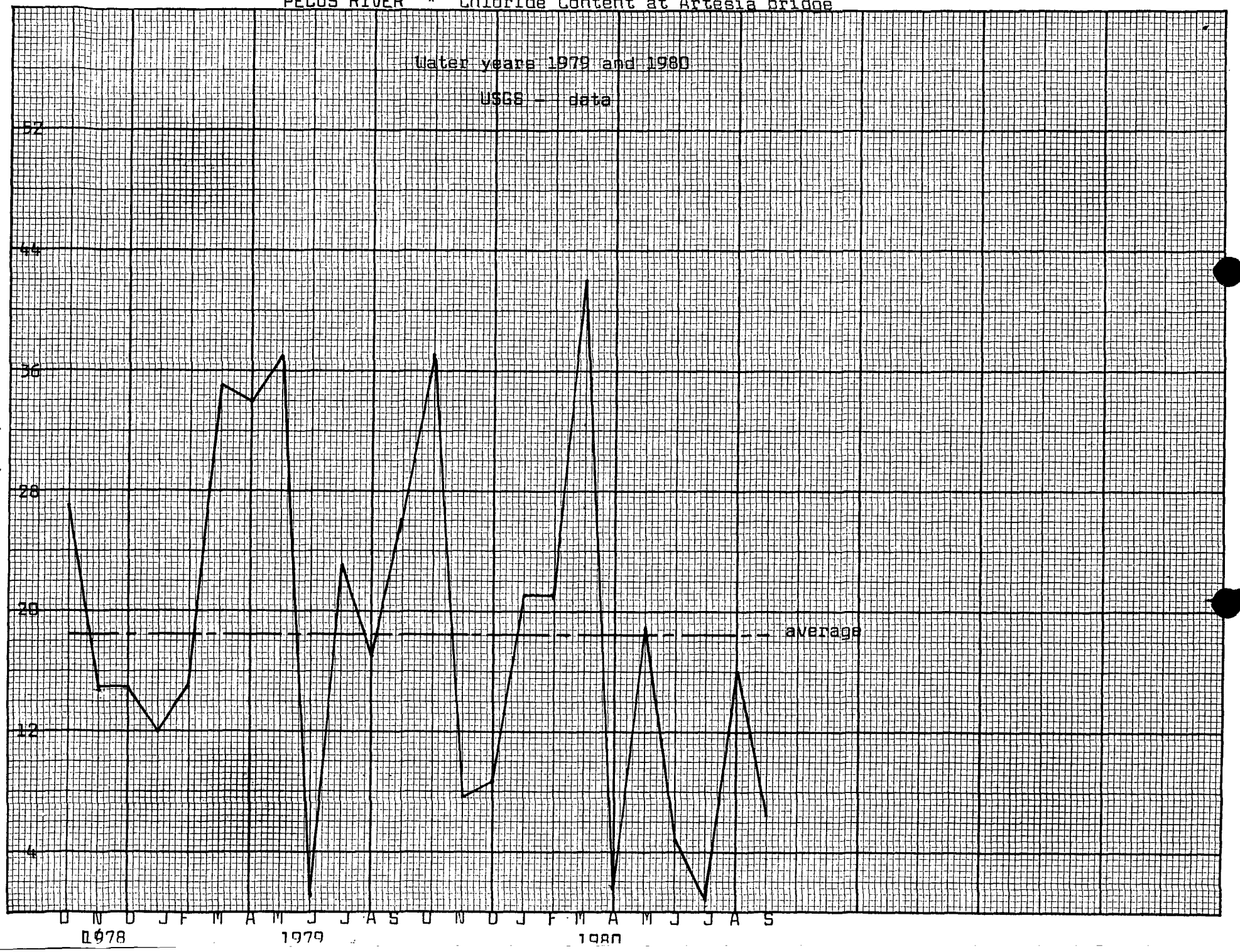


Table #2

N A V A J O R E F I N I N G C O M P A N Y

R E P O R T O F W A T E R A N A L Y S I S

Sampled 4/16/81 by Edward E. Kinney and N. Raymond Lamb

Type of Analysis	Well #1	Well #3	Well #5	Well #7	Well #9	Well #12	Well #13	Well #16	Well #17	W. Pond	Md Pond	E. Pond	Ranch Well	Type Analysis
Acidity	179	32	36	36	36	55	11	13	17	13	29	10	13	Acidity
Alka. "P" as CACO3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	Alka. "P"
Barium	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	0.1	0.2	< 0.1	< 0.1	< 0.1	Barium
BOD	44	40	24	38	36	38	22	44	42	116	116	72	38	BOD
Cadmium	0.05	0.009	0.05	0.04	0.01	0.07	0.002	0.002	0.03	0.003	0.002	0.002	0.002	Cadmium
COD	145	73	176	136	88	256	48	152	88	102	116	225	88	COD
Chloride	8313	2652	7089	3570	2703	8058	357	1173	4692	918	1468	1632	1632	Chloride
Chromium	0.002	< 0.001	0.002	0.002	0.002	0.002	0.002	< 0.001	0.002	0.04	0.1	0.1	0.002	Chromium
Chromium 6+	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	Chromium 6+
Copper	0.001	< 0.001	0.001	0.004	0.006	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	0.004	Copper
Flouride	0.9	1.6	0.44	0.3	0.7	0.9	1.2	0.44	0.3	6.6	7.4	5.8	0.25	Flouride
Hardness (CaCO3)	5760	2760	4660	3160	3120	8920	1570	1610	4470	760	1060	1160	2400	Hardness
Iron	0.05	0.01	0.04	0.05	0.01	0.04	0.02	< 0.01	0.03	0.06	0.06	0.1	0.06	Iron
Lead	0.006	< 0.001	0.007	0.001	0.001	0.007	0.003	0.002	0.005	0.002	< 0.001	< 0.001	0.005	Lead
Magnesium	850	250	650	370	370	1330	79	140	470	60	96	110	310	Magnesium
Nickel	0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	0.01	0.01	< 0.01	< 0.01	< 0.01	Nickel
pH Units	7.8	7.4	7.7	8.0	7.7	7.6	7.4	7.7	7.7	7.7	7.4	7.2	7.8	pH
Phenols	0.015	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.016	< 0.001	0.04	0.027	< 0.001	0.022	Phenols
Alka. "M"	700	356	506	596	322	545	146	425	198	173	349	214	205	Alka. "M"
Solids, Total Dis.	19,700	7,730	16,800	14,200	10,400	28,900	3,200	4,770	11,200	2,930	4,020	4,920	6,860	Solids
Sulfate	4,920	2,720	4,290	5,600	4,160	11,500	1,810	1,890	2,930	885	1,050	1,520	2,830	Sulfate
Sulfide	0.21	0.10	0.13	0.05	0.03	0.05	0.04	0.10	0.03	25.1	13.4	0.36	0.03	Sulfide
Zinc	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0.1	< 0.1	< 0.1	< 0.1	0.2	

Analysis made by: Controls for Environmental Pollution, Inc., Box 5351, Santa Fe, New Mexico 87501

BOD_5 analysis - 5 day incubation

pH : electrode

All measurements mg/liter (ppm)

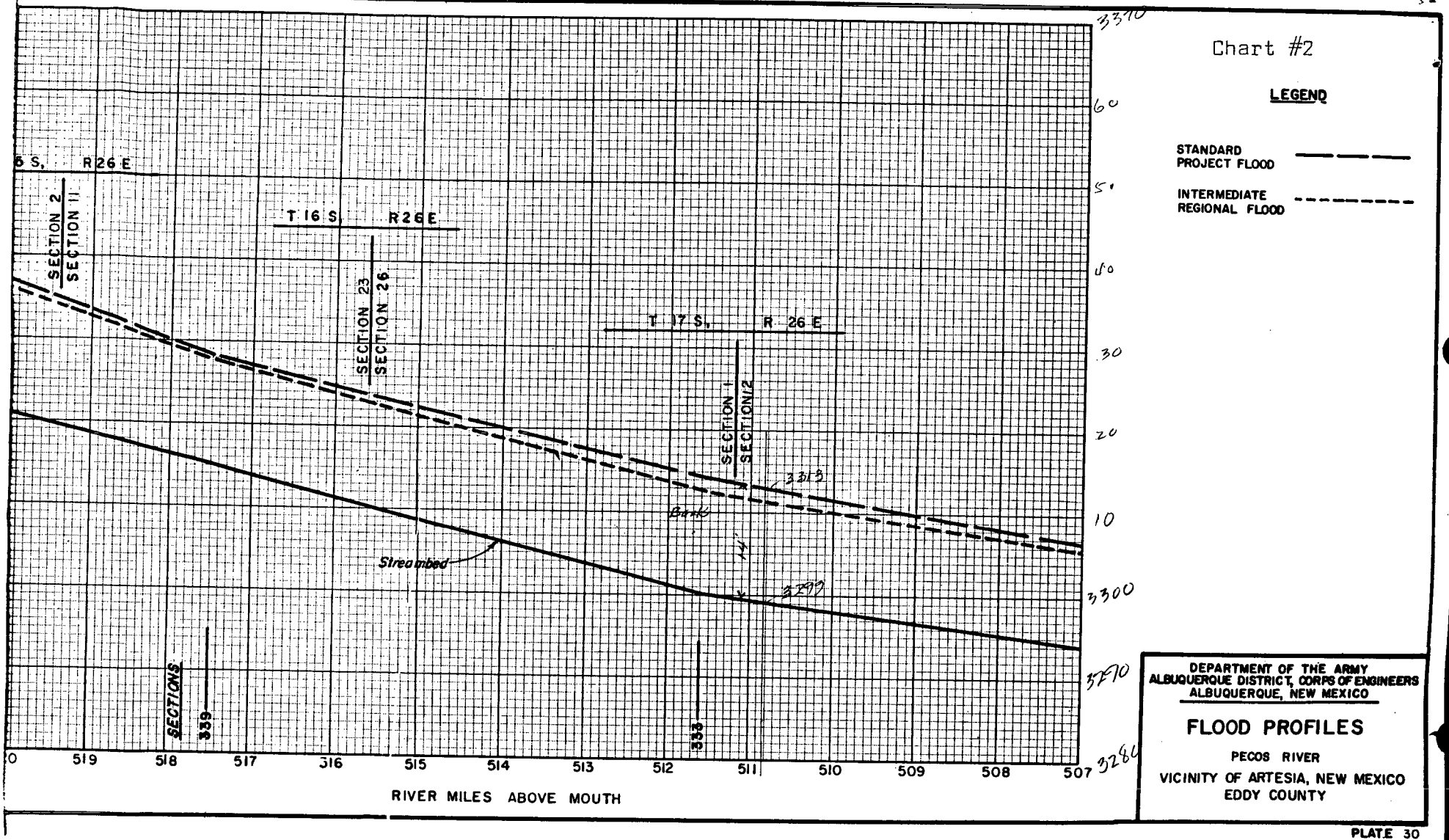


Chart #2
LEGEND
STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
T 15 S, R 26 E
T 16 S, R 26 E
T 17 S, R 26 E
SECTION 2
SECTION 11
SECTION 23
SECTION 26
SECTION 1
SECTION 12
SECTIONS
339
333
Streambed
Bank
3313
3299
3310
3300
3290
3280
60
50
40
30
20
10
0
519
518
517
516
515
514
513
512
511
510
509
508
507
RIVER MILES ABOVE MOUTH
DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
ALBUQUERQUE, NEW MEXICO
FLOOD PROFILES
PECOS RIVER
VICINITY OF ARTESIA, NEW MEXICO
EDDY COUNTY
PLATE 30

TELEPHONE
A. C. (505) 746-9851

Navajo REFINING COMPANY
501 EAST MAIN STREET ○ P. O. DRAWER 159
ARTESIA, NEW MEXICO · 88210

TELETYPE
910-986-0990

November 20, 1980

Mr. Joe D. Ramey
Director, Oil Conservation Division
Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

Enclosed you will find Navajo Refining Company's reply to your request for a discharge plan under Water Quality Control Commission regulation 3-106.

It is our intention to show with the enclosed information that Navajo does not discharge wastewater to either the shallow aquifer below the evaporation ponds or the Pecos River.

It is my understanding that Mr. Thomas Parkhill of your Division will be reviewing the information provided. If any questions arise during the review, please have Mr. Parkhill contact me.

Sincerely yours,

David G. Griffin
Environmental Coordinator

DGG/jh

Enclosures:

Discharge Report
Attachments 1 - 5

Report Separate in File

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

MEMORANDUM

TO: R. L. Stamets

FROM: Thomas A. Parkhill

SUBJECT: Tour of Navajo's Artesia Refinery

On June 5, 1980, M. Williams and I represented the O.C.D. on a tour and meetings at the Navajo's Artesia Refinery. The total number of people in attendance was fifteen (15) and included people representing Navajo Refinery, EPA, U. S. Fish and Wildlife Service, EID, and USDI. The area toured included the three (3) waste water ponds, the full length of the ditch and the landform, all located within the refinery property boundaries.

The refinery has an operating capacity of 30,000 barrels/day. This process produces about three-quarters of a ton of solid sediment per day. About 40 to 60% of the waste water is cooling tower water. Navajo Refinery people estimate that depending on PH of oil, 30 to 400 ppm (1/2 to 5 barrels/day) of oil escapes to waste water ponds. Navajo owns the old Artesia sewage plant and may be able to use it to remove oil and solids from waste water before it is drained to the ponds.

The waste water ditch has been a problem to Navajo Refinery because of very flat grade present along one of its sections and the difficulty of maintaining ditch during periods of wet ground during winter months when heavy equipment cannot be moved in for repairs. This problem has been compounded in

this area by the City of Artesia's sewage plant which has frequently dumped raw sewage into a ditch which intersects Navajo's ditch, keeping the ground soft. Navajo did file an oral complaint about this problem to E.I.D personnel. They (E.I.D.) need to do a better surveillance job on Artesia's sewage treatment plant. I believe that Navajo could use a large diameter pipe to move waste water to the ponds if they remove sediments and oil from waste water and construct a pipe using a good grade. A pipe would not be effected by flood waters.

The waste water ponds apparently do not affect the quality of the ground water or the Pecos River water. The water in the Pecos, which varies seasonally, is a poorer quality than the ponds. The six (6) monitor wells, drilled 15 ft. to water table, around the ponds indicate a wide variation in ground water quality and a lack of phenols. This may be due to a simple change in geological formations which outcrop out near surface in this area. The pond bottoms may have a naturally impermeable bottom due to the addition of fine sediments from the oil and the waste waters sodium plus magnesium tend to disperse soil colloids with resultant loss of good tilth and permeability. Navajo personnel have a valid concern about taking ponds of service because of the accumulation of heavy metals at the site, and lack of a New Mexico toxic waste damp to dispose them at. With Navajo's modernizing effot, it may be possible to cut the amount of waste water to about a range of 199,000 to 200,000 gal/day. Building new pits and lining them would cost about 10 1/2 million dollars.

During the tour Jim D. Millsap (EPA) took water samples from the ditch and the waste water ponds. The personnel from the U. S. Fish and Wildlife Service and the U.S.D.I. found three (3) dead birds that had been oiled, and took one (1) for Navajo to run tests to determine cause of death. In addition one (1) dead turtle, covered with oil, was found.

Navajo tried to make the Yates Bolton #1, Sec. 9, Township 17 South, Range 26 East, 660 FNL - 2180 FEL into an injection well, but failed. They perforated the Morrow formation with four holes per feet, acidize and frac. the section. Other data on well was 9 BPME at 3500 lb., I.S.I.P. - 700 lbs. It is questionable how long formation would accept fluid and it would not be satisfactory for 100,000 gal/day to 200,000 gal/day for the modified refinery operations.

We did visit Navajo's landform, located on the west side of the North Plant. In this area oil sludge is mixed with soil and allowed to decompose. Oil studge is estimated to decompose in about two (2) to three (3) months depending on moisture, load, temp, and etc. About 80 barrels of studge and solids are added to soil month to increase fertility of soil. The landform is located on Navajo land and is surrounded by a two (2) ft. high dike. I don't think this comes under any O.C.D. rules at this time.

I did talk to David G. Griffin, Navajo Environmental Coordinator about our request for a discharge plan. He stated expansion plans have put a large strain on Navajo's finances because of heavy borrowing. The refinery expansion is taking all the Navajos engineers time and they are currently required to work a six (6) day work week. If refinery not brought on line on schedule Sept. 1, 1980, the company could fold up, causing the loss of 250 jobs in the Artesia area. EPA's new regulations are not complete and final at this time which makes it impossible to justify the expense to come up with a discharge plan which conforms to new regulations. The company will probably ask for an extension of time near the end of the 120 day period. I would recommend that the O.C.D. grant an extension of time, if

Navajo requests it, for another 120 day period with the provision that a progress report must be submitted at the end of the first 60 days.

I believe that Navajo Refinery should work on their three (3) biggest problems which are the removal of oil and solids from the waste water, and constructing a limited access chain link fense around ponds. They then could use a large diameter pipe to transport water to the ponds.

June 20, 1980

og

Joel Carson	Losee, Carson & Dickerson	Artesia, NM
Edward E. Kinney	Consultant	Artesia, NM
Patrick G. Juarez	Refinery Chemist	Artesia, NM
David G. Griffin	Navajo Environmental Coordinator	Artesia, NM
Jim D. Millsap	EPA	Ada, OK
Hans Stuart	U. S. Fish & Wildlife Service	Albuquerque, NM
Wayne McDonald	U. S. Fish & Wildlife Service	Albuquerque, NM
Jack Ellvinger	NM EID	Santa Fe, NM
Trent G. Thomas	NM EID	Santa Fe, NM
Thomas A. Parkhill	NM OCD	Santa Fe, NM
Mike Williams	NM OCD	Artesia, NM
Charlie Sanchez, Jr.	U. S. Fish & Wildlife Service	Albuquerque, NM
W. C. Chamberlain	Navajo Technical Service	Artesia, NM
John C. Robinson	U. S. Fish & Wildlife Service	El Paso, Texas
V. Lee Grover	USDI	Carlsbad, NM

June 5 1980 meeting list at Navajo's Artesia Refinery

from

PATRICK G. JUAREZ May 30, 1980

TO DGGr

Subject: Water Samples From Test Holes near Ponds

Sample	pH	ppm F^-	ppm Phenol	TDS
#3.	7.050	4.825 ppm	0 ppm	4,256 ppm
#5	7.045	1.525 ppm	0 ppm	12,242 ppm
#7	7.599	1.820 ppm	0 ppm	8,532 ppm
#9	7.313	3.070 ppm	0 ppm	8,477 ppm
#12	7.424	3.050 ppm	0 ppm	15,824 ppm
#13	7.184	4.150 ppm	0 ppm	2,511 ppm

Patrick G. Juarez

from

JAMES L. BROWN 1-9, 1980

To BCB-DBBr Sampled 1-7-80

	P alk	M alk	Acidity	pH	Hardness	Chloride	F^-	$S^=$	Phenol
Pecos River above ponds	0	162	0	8.276	2300	1840	1.42	0	0
Pecos River at bridge	0	162	0	8.234	2330	1860	1.46	0	0
Water Well	not available								
West Pond	0	54	0	7.388	680	810	50.5	0	25+
Middle Pond	0	196	0	7.483	690	950	35.0	0	25
East Pond	0	222	0	7.442	840	1160	44.0	0	4
Total Effluent	10	238	0	8.473	1940	1780	34.8	205	20
API Separator	16	312	0	8.671	680	80	40.0	230	24
N.D. Trap	0	192	0	8.185	850	1400	1.98	230	1
S.D. Trap	0	158	0	7.264	10400	13200	1.90	170	0
City Water	0	184	0	7.178	716	28	1.95	0	0

Jim Brown

from

JAMES L. BROWN 1-7, 1980

To Results in ppm - by AA

	Iron	Copper	Nickel	Zinc	Lead	Chromium	Arsenic	
Pecos River above ponds	.065	.028	.076	.000	.071	.000	—	
Pecos River at bridge	.049	.047	.076	.000	.071	.062		
Water Well								
West Pond	.098	.000	.030	.0079	.071	.000	—	
Middle Pond	.065	.009	.030	.000	.071	.000	—	
East Pond	.147	.009	.030	.000	.071	.000	—	
Total Effluent	.065	.000	.106	.000	.142	.000	—	
API Separator	.033	.000	.015	.000	.000	.000	—	
N. D. Trap	.033	.000	.030	.000	.000	.000	—	
S. D. Trap	.180	.028	.287	.1597	.356	.000	—	
City Water	.000	.009	.000	.3968	.071	.000	—	

from

JAMES L. BROWN 2-12, 19 80

To BCB, - S. Br. Sampled 2-11-80

	P Alk.	M Alk.	Acidity	pH	Hardness	Chlorides	Fluorides	Sulfide	Phenol
Pecos River above Ponds	0	166	0	8.159	2310	1830	1.80	0	0
Pecos River at Bridge	0	166	0	8.162	2280	1850	1.70	0	0
Water Well (Windmill)	not available								
West Pond	0	12	0	7.575	820	1040	82	0	50
Middle Pond	0	90	0	6.785	710	960	92	0	20
East Pond	0	144	0	7.053	770	1090	74	0	2
Total Effluent	0	42	0	5.921	3200	360	87	0	1.6
API Separator	0	0	80	3.417	11200	380	150	3.2	2
N. Div. Trap	0	180	0	8.404	550	120	4.20	32	6
S. Div Trap	0	178	0	7.728	930	260	3.85	0	0
City Water	0	174	0	7.023	668	32	2.45	0	0

from

PATRICK G. JUAREZ 2-12, 1980

TO BCA - D.GGr Sampled 2-11-80

ppm	Fe	Cu	Ni	Cd	Zn	Pb	Cr
Pecos River above Ponds	0.07	0.06	0.00	0.02	0.01	0.22	0.00
Pecos River At Bridge	0.03	0.07	0.25	0.03	0.04	0.11	0.00
water well (windmill)		NOT AVAILABLE					
west Pond	9.51	0.06	0.33	0.01	0.36	0.22	0.14
Middle Pond	0.44	0.06	0.25	0.12	0.05	0.00	0.07
East Pond	0.12	0.06	0.00	0.02	0.03	0.22	0.07
Total Effluent	0.71	0.07	0.17	0.02	0.01	0.00	0.55
API Separator	1.20	0.06	0.00	0.01	0.15	0.00	0.51
N. D. TRAP	0.24	0.07	0.17	0.01	0.01	0.11	0.07
S. Div. TRAP	0.17	0.07	0.08	0.01	0.01	0.11	0.17
City Water	0.22	0.08	0.25	0.00	0.42	0.11	0.17

from

JAMES L. BROWN 3-12, 1980

To B & B. Sampled 3-11-80

	P Alk.	M. Alk.	Acidity	pH	Hardness	Chloride	Chloride	Sulfide	Phenol
Pecos River above Ponds	0	138	0	8.034	3520	2600	0.74	0	0
Pecos River at Bridge	0	140	0	7.993	3550	2590	0.69	0	0
Water Well									
West Pond	0	100	0	7.485	1230	1170	46	0	12+
Middle Pond	0	104	0	7.044	1100	1150	39	0	7
East Pond	0	80	0	7.135	1150	1210	33	0	0
Total Effluent	1760	3230	0	11.331	180	350	300	806	0
API Separator	102	482	0	9.064	640	230	70	138	12+
N. W. Trap	44	236	0	8.867	1650	1690	1.10	22	6
S.W. Trap	0	154	0	8.121	1970	900	2.18	0	0
City Water	0	176	0	7.173	686	26	0.69	0	0

Jim Brown

from

PATRICK G. JUAREZ 3-12, 1980

TO B C G. Sampled 3-11-80

ELEMENTS IN PPM	Cu	Fe	Ni	Pb	Zn	Cd	Cr		
Pecos River Above Ponds	0.010	0.215	0.045	0.200	0.00	0.030	0.037		
Pecos River At Bridge	0.010	0.200	0.061	0.200	0.000	0.022	0.037		
N.D TRAPS	0.000	0.092	0.045	0.066	0.003	0.011	0.000		
West Pond	0.000	0.308	0.045	0.066	0.021	0.019	0.037		
Middle Pond	0.000	0.446	0.045	0.066	0.026	0.034	0.074		
East Pond	0.000	0.231	0.015	0.066	0.036	0.007	0.037		
Total Effluent	0.010	0.092	0.061	0.066	0.094	0.007	0.037		
API Separator	0.000	0.108	0.028	0.000	0.023	0.007	6.103		
S D TRAPS	0.000	0.092	0.030	0.066	0.049	0.015	0.000		
City Water	0.010	0.123	0.061	0.066	0.473	0.000	0.000		

Patrick G. Juarez

from

JAMES L. BROWN April 2, 1980

To Water Samples. Sampled 4-1-80

	P Alk	M Alk	Acidity	pH	Hardness	Chlorides	F	S	Phenol
Pecos River above Ponds	0	118	0	8.125	2940	3530	0.3	0	0
Pecos River at Bridge	0	122	0	8.125	2880	2820	0.4	0	0
Water Well	not available								
West Pond	0	141	0	7.350	700	1240	83	0	12+
Middle Pond	0	102	0	6.981	870	1200	81	0	1
East Pond	0	86	0	7.024	950	1410	79	0	0
Total Effluent	108	514	0	9.030	400	500	80	160	12+
API Separator	0	352	0	8.328	680	430	83	128	12+
N. D. Tray	0	234	0	8.248	510	300	1	54	10
S. D. Tray	0	178	0	7.782	420	510	0.8	0	0
City Water	0	180	0	7.044	630	28	0.4	0	0

Jim B.

from

PATRICK G. JUAREZ April 2, 1980

TO Water Samples Sampled 4-1-80

	Fe	Cu	Ni	Zn	Pb	Cr	Cd
PECOS RIVER ABOVE PONDS	0.08	0.04	0.07	0.19	0.25	0.00	0.03
PECOS RIVER AT BRIDGE	0.12	0.05	0.10	0.05	0.40	0.00	0.03
WEST POND	0.23	0.02	0.04	0.04	0.19	0.15	0.007
MIDDLE POND	0.23	0.02	0.04	0.05	0.25	0.13	0.005
EAST POND	0.23	0.04	0.07	0.19	0.16	0.05	0.001
TOTAL EFFLUENT	0.06	0.02	0.05	0.04	0.06	0.06	0.01
A.P.I. SEPARATOR	0.01	0.003	0.04	0.04	0.04	0.14	0.007
NORTH DIVISION TRAP	0.07	0.02	0.06	0.04	0.31	0.33	0.001
SOUTH DIVISION TRAP	0.03	0.005	0.005	0.04	0.30	0.18	0.000
CITY WATER	0.03	0.01	0.01	0.53	0.00	0.01	0.000

Water well — not available

Patrick G. Juarez

from

PATRICK G JUAREZ May 14, 1980

TO B.C. Gregoren (OGR.) - Metals in Waste Waters & Effluents for May, 1980

	Fe	Cu	Ni	Zn	Pb	Cr	Cd
PECOS RIVER ABOVE PONDS	0.048	0.000	0.055	0.011	0.000	0.000	0.006
PECOS RIVER AT BRIDGE	0.053	0.000	0.055	0.000	0.000	0.000	0.024
WEST POND	0.154	0.000	0.000	0.018	0.000	0.102	0.018
MIDDLE POND	0.150	0.002	0.018	0.028	0.000	0.121	0.016
EAST POND	0.505	0.000	0.036	0.044	0.000	0.000	0.032
TOTAL EFFLUENT	0.000	0.000	0.040	0.015	0.000	0.000	0.024
A.P.I. SEPARATOR	0.040	0.000	0.000	0.020	0.000	0.000	0.000
NORTH DIVISION TRAP	0.000	0.000	0.036	0.000	0.000	0.041	0.011
SOUTH DIVISION TRAP	0.335	0.002	0.000	0.016	0.000	0.045	0.017
CITY WATER	0.000	0.002	0.000	0.402	0.000	0.045	0.005

Sampled May 12, 1980, 10 days after Shutdown.

Water Well (Windmill) Not Available.

from

JAMES L. BROWN 5-12, 1980

To BCB. Sampled 5-12-80

	P Alk.	M Alk	Acidity	pH	Hardness	Chloride	Fluoride	Sulfide	Phenol
Pecos River above Ponds	6	66	0	8.708	1730	1110	0.68	0	0
Pecos River at Bridge	8	68	0	8.716	1720	1130	0.68	0	0
Water Well (Wind mill)	not available								
West Pond	84	352	0	9.641	440	1050	68	0	12
Middle Pond	0	94	0	7.308	890	1250	38	0	0.5
East Pond	0	58	0	7.326	1230	1730	27	0	0.3
Total Effluent	12	76	0	10.127	380	330	27	16.0	2
API Separator	14	50	0	9.474	500	50	17	tr	0.5
N.D. Trap	36	184	0	9.381	530	130	1.78	19.2	3
S.D. Trap	534	662	0	12.359	40	110	440	0	0.5
City Water	0	170	0	7.168	620	24	1.25	0	0

Further samples of Pecos River water caught alongside of the game refuge matched the samples from above ponds and bridge. This is related to letter David Griffin received from the environmental people.

17S 26E

Section 2

Navaho Disposal Ponds
Oil & Brine Filled Ditch
Soil Contamination
Ground Water Pollution
Bird Deaths

Sighted a juvenile Whooping Crane - Feeding with large Flocks of Sandhill Cranes - here - 2-24-80

4-21-80 - Dead Birds

1	Snowy Egret
4	Ducks
1	Crane
1	Grackle
1	Coot
1	unidentified

Took egret & 2 ducks

Also noted many live snowy egrets & bl. crowned night herons, a few spotted sand pipers & meadow larks

Livestock well to west appears polluted - test

Section 10
Navaho Refining Company
Oil + Brine Filled Ditch
Soil Contamination
Ground Water Pollution
Bird Deaths

Noted a Mallard + a
Marsh Hawk - dead here -
2-24-79

Section 11

Navajo Refining Company

3 large Disposal Ponds
Brine & oil Filled Ditch -
Ground Water Pollution
Pecos River Pollution
Soil Contamination
Bird Deaths
Livestock Deaths

* Note:
Endangered Species
Sightings:

2-24-79
Whooping Crane - Sec. 2

12-1-79
Peregrine Falcon - Sec. 14

2-24-79 Bird Deaths
Snow Geese
Avocet
Pectoral Sandpiper
6 Ruddy Ducks
also noted cattle Bones

3-21-79 Bird Deaths
4 Lesser Scaup
1 Green Heron
1 Lesser Yellowlegs
1 Unidentified Sparrow

12-1-79 Wildlife Deaths
1 Eared Grebe
1 Hispid Cotton Rat

5-13-80

1 Crane (Unidentified)
1 Snowy Egret
1 Pied-billed Grebe
5 unidentified ducks

RECEIVED

AUG 27 1979

O. C. C.
ARTESIA, OFFICE

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Navajo Pipeline				ADDRESS	Artesia, New Mexico	
REPORT OF	FIRE	BREAK	SPILL	LEAK xx	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE xx	GASO PLNT	OIL RFY	OTHER*
NAME OF FACILITY	North Artesia						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)	Se/4 Se/4				SEC. 4	TWP. 18S	RGE. 28E / COUNTY Eddy
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	1 mile east of American Petrofina office						
DATE AND HOUR OF OCCURENCE					DATE AND HOUR OF DISCOVERY	8/9/79 7:00 A.M.	
WAS IMMEDIATE NOTICE GIVEN?	YES	NO X	NOT REQUIRED		IF YES, TO WHOM		
BY WHOM					DATE AND HOUR		
TYPE OF FLUID LOST	crude				QUANTITY OF LOSS	100 barrels	VOLUME RECOVERED
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO x	QUANTITY				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

2" hose broke, new hose put on

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

Grassy and sand.
Oil picked up and area covered up.

DESCRIPTION OF AREA	FARMING	GRAZING xx	URBAN	OTHER*		
SURFACE CONDITIONS	SANDY xx	SANDY LOAM	CLAY	ROCKY	WET	DRY xx	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

80° and dry

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

SIGNED Jay Alcorn Jay Alcorn TITLE Gauger DATE 8/9/79

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

DISCHARGE REPORT

3-106.C.1

Quantity = 720,000 gallons per day average

Quality = See Attachment 1, which is monthly analyses for the past 2 years. More monthly data is available upon request if needed.

Flow Characteristics

Flow is generally steady state, but there are daily fluctuations and seasonal fluctuations which can amount up to an estimated ± 50% of the average flow. The daily fluctuations are usually brought on by maintenance, clean up, and other increased activity during normal business hours (7:00 AM to 4:00 PM). The season fluctuations are the result of increased cooling loads in the summer and increased steam heating needs in the winter. Since a large part of the waste water generated in the refinery comes from cooling tower blowdown, changes in cooling needs have a significant impact on wastewater volumes. Also, to a lesser extent, blowdown from boilers causes fluctuations in wastewater volumes depending on the amount of steam required.

The other significant factor in wastewater volume is the amount of crude being refined. Refining requires between 20 to 40 gallons of water per barrel (42 gallons) of crude processed, depending on the season and products being made from the crude.

3-106.C.2

See attachment 2, U.S. Geological Survey 7½ Minute Topographical Maps, Navajo Refining Company Blueprints 55-56-24B and 55-6-24B.

3-106.C.3

Attachment 3 covers the depth to the ground water and includes data from July 1977 through January 1979 on a monthly basis. Attachment 4 consists of analytical data on samples taken from monitor wells surrounding the ponds. This will give the TDS concentration.

no information along ditch

3-106.C.4

Elevations of the Pecos River, the evaporation ponds, and the dikes surrounding the ponds are given on the attached drawing no. 55-56-24B. As can be seen on this drawing, the river would have to rise approximately 10 feet before there would be danger of the river breeching the dikes surrounding the ponds.

3-106.C.5

The locations of the monitor wells are given on drawing no. 55-56-24B, and the location of a "V" notch weir from which the flow could be calculated is shown on drawing no. 55-6-24B.

3-106.C.6

No specific information is available on the rock strata below the evaporation ponds, but included as Attachment 5 is a drawing of cross sections. This drawing gives an idea of the types of formations in the area of the evaporation ponds.

Attachment 1
Waste Water Report (ppm)

Date 10-7-80
Date Sampled 10-24-80

	P alk.	M alk.	Acidity	pH	Hardness	Chloride	F^-	$S^=$	Phos	Fe	Cu	Ni	Zn	Pb	Cr	Cd	? Ba	
Pecos River below Ponds	0	152	0	8.124	3490	2180	.65	0	0	.06	.000	.030	.007	.000	.012	.02		
Pecos River at Bridge	0	152	0	8.121	3470	2200	.59	0	0	.045	.036	.030	.012	.02	.000	.02		
Water Well	0	178	0	7.587	3310	1500	.61	0	0	.024	.048	.08	.012	.020	.000	.03		
West Pond	0	214	0	8.380	1230	950	50	16	>60	.062	.04	.036	.018	.012	.000 ?	.014		
Middle Pond	0	204	0	7.825	1030	870	46	0	24	.324	.008	.042	.016	.002	.018 ?	.012		
East Pond	0	180	0	7.554	1280	980	28	0	0	.18	.023	.038	.03	.07	.000	.014		
Total Effluent of w hot & where John	694	1034	0	10.45	430	260	85	96	60	.44	.03	.040	.014	.012	.42	.019		
S.P.S. Separator where	0	0	560	4.182	370	280	7100	48	>60	.520	.016	.02	.022	.02	.000	.002		
N. Trap	104	468	0	8.853	1010	180	17.5	112	0	.042	.34	.038	.014	.012	.14	.02		
N. Trap where	30	204	0	8.691	840	160	2	0	0	.021	.09	.024	.016	.000	.15	.016		
City Water	0	184	0	7.298	718	26	0.94	0	0	.024	.004	.002	.428	.000	.000	.15		

Waste Water Report

Transfer

Date 10-2-80
Date Sampled 9-25-80

	P Alk. ppm	M Alk. ppm	Acidity ppm	pH	Hardness ppm	Chloride ppm	F⁻ ppm	S⁼ ppm	Phos ppm	Fe ppm	Cu ppm	Ni ppm	Zn ppm	Pb ppm	Cr ppm	Cd ppm	Ba ppm
Pecos River above Ponds (How far)	0	74	0	8.135	1930	1120	.92	0	0	0.200	0.28	1.00	.02	.02	.44	.08	2.6
Pecos River at Bridge	0	68	0	8.387	1920	1120	.85	0	0	0.21	0.21	1.20	.03	.03	.000	.09	.000
Water Well	0	176	0	7.480	2860	1450	1.12	0	0	0.32	0.23	2.00	.25	.01	.001	.10	.010
West Pond	0	210	0	8.161	840	640	25.4	0	30	0.35	0.50	2.18	.04	.01	.03	.10	.03
Middle Pond	0	232	0	7.530	860	730	20.0	0	0	0.56	0.74	2.18	.04	.012	.02	.12	.06
East Pond	0	200	0	7.397	1220	1080	18.7	0	0	0.67	0.77	2.60	.04	.01	.02	.13	.08
Total Effluent (where of west)	0	0	200	2.571	440	650	77	0	50	2.72	0.78	3.28	.12	.000	.20	.14	.09
A.P.S. Separator	0	0	140	3.040	130	210	400	19.2	>120	>500	0.84	2.80	.24	.01	.23	.20	1.00
N.E. Trap	38	170	0	9.341	1080	400	3.0	3.2	2	0.75	0.85	3.00	.04	.000	.06	.20	3.50
S.E. Trap	0	196	0	8.093	1660	1620	1.8	0	0	0.82	1.40	2.80	.07	.007	.09	.22	5.40
City Water	0	186	0	7.116	804	28	1.22	0	0	0.67	1.10	3.24	0.24	.000	.03	0.20	3.60

Jim Brown

from

JAMES L. BROWN 8-13, 1980

To BCS - Brownsville Sampled 8-11-80

	P alk	M. alk	Acidity	pH	Hardness	Chlorides	F^-	$S^=$	Phenols
Recirculation Aeration Ponds	0	96	0	7.922	2080	1100	0.31	0	0
Recirculation at Bridge	0	98	0	7.930	2110	1070	0.24	0	0
Water Well	0	164	0	7.611	3730	1650	0.10	0	0
West Pond	32	234	0	9.076	1710	610	4.0	115	10
Middle Pond	0	220	0	7.343	1370	1200	5.4	0	1
East Pond	0	174	0	5.821	2110	1980	3.3	0	0.5
Total Effluent	0	30	0	5.723	6600	4480	0.82	59	24
API Separator	0	420	0	7.985	400	120	25.0	226	15
N. D. Traps	0	130	0	6.927	930	290	0.24	29	3
S. D. Traps	0	200	0	8.070	350	200	0.49	0	0
City Water	0	188	0	6.975	640	28	0.15	0	0

from

PATRICK G. JUAREZ

August 13, 1980

TO BCG - DGGT

WATERS SAMPLED 8/11/80

	Fe	Cu	Ni	Zn	Pb	Cr	Cd	Ba
PECOS RIVER ABOVE PONDS	0.011	0.000	0.028	0.009	0.038	0.000	0.012	0.375
PECOS RIVER AT BRIDGE	0.028	0.000	0.029	0.003	0.077	0.000	0.012	0.437
WEST POND	0.072	0.000	0.021	0.018	0.000	0.000	0.008	0.000
MIDDLE POND	0.078	0.007	0.035	0.018	0.000	0.000	0.012	0.187
EAST POND	0.178	0.015	0.047	0.020	0.000	0.000	0.023	0.187
TOTAL EFFLUENT	0.689	0.015	0.151	0.020	0.000	0.868	0.044	0.062
A.P.I. SEPARATOR	0.111	0.000	0.000	0.020	0.000	0.769	0.008	0.000
NORTH DIVISION TRAP	0.111	0.000	0.038	0.003	0.000	0.165	0.015	0.000
SOUTH DIVISION TRAP	0.089	0.000	0.000	0.017	0.000	1.066	0.009	0.020
CITY WATER	0.022	0.000	0.042	0.282	0.000	0.000	0.016	0.000
Water well	0.022	0.000	0.042	0.182	0.000	0.000	0.029	0.188

Patrick G. Juarez

from

PATRICK G. JUAREZ July 9, 1980

TO B.C. Clayton - Waste Waters & Effluents — July 8, 1980

	Fe	Cu	Ni	Zn	Pb	Cr	Cd	Ba
PECOS RIVER ABOVE PONDS	0.027	0.000	0.028	0.034	0.000	0.000	0.000	0.199
PECOS RIVER AT BRIDGE	0.027	0.000	0.000	0.021	0.000	0.000	0.000	0.199
WEST POND	0.090	0.000	0.035	0.043	0.000	0.000	0.000	0.000
MIDDLE POND	0.090	0.016	0.270	0.046	0.000	0.000	0.008	0.000
EAST POND	0.289	0.016	0.000	0.046	0.000	0.000	0.024	0.199
TOTAL EFFLUENT	0.280	0.000	0.000	0.030	0.000	0.080	0.008	0.000
A.P.I. SEPARATOR	0.588	0.000	0.000	0.038	0.000	0.139	0.005	0.000
NORTH DIVISION TRAP	0.045	0.000	0.000	0.010	0.000	0.000	0.012	0.000
SOUTH DIVISION TRAP	0.027	0.016	0.000	0.122	0.000	1.194	0.000	0.000
CITY WATER	0.651	0.064	0.000	0.477	0.000	0.000	0.004	0.000
Detection Limit, ppm	0.027 ppm	0.016 ppm	0.021 ppm	0.002 ppm	0.124 ppm	0.040 ppm	0.004 ppm	0.199 ppm

Water Well not Available

Samples Filtered through #42 Filter paper

Copies BCG - DGGr - File ✓

Patrick G. Juarez

from

JAMES L. BROWN 7-16, 1980

To Sampled 7-9-80

	P. alk	M alk	Acidity	pH	Hardness	Chlorides	F	S	Phos
Pecos River above Ponds	0	78	0	8.242	1670	160	0.52	0	0
Pecos River at Bridge	0	78	0	8.245	1680	160	0.47	0	0
Water Well	not available								
West Pond	0	166	0	8.051	1150	930	16.0	0	7
Middle Pond	0	188	0	7.367	1610	1570	24.5	0	1
East Pond	0	126	0	6.941	2590	2760	20.8	0	0
Total Effluent	0	54	0	8.147	1090	490	15.8	0	30
A.P.I. Separator	0	98	0	7.003	660	60	30.0	0	40
N.D. Trap	50	176	0	9.394	1370	1430	1.32	0	12
S.D. Trap	0	124	0	8.198	2360	920	2.75	0	0
City Water	0	188	0	7.255	704	30	0.67	0	0

Jim

from

JAMES L. BROWN 6-10, 1980

To

Sampled 6-9-80

	P. Alk.	M. Alk	Acidity	pH	Hardness	Chlorides	F	S	Phos.
Pecos River above Ponds	0	98	0	8.342	4220	3590	0.82	0	0
Pecos River at Bridge	0	106	0	8.181	4230	3550	0.77	0	0
Water Well									
West Pond	44	200	0	9.183	970	990	31.5	0	60+
Middle Pond	0	64	0	7.255	1360	1400	31.8	0	0.3
East Pond	0	30	0	6.958	2250	2320	22.8	0	0
Total Effluent	0	0	10	2.687	640	680	89	16.0	50
API Separator	0	108	0	6.665	360	140	69	64.0	50
N.D. Trap	0	140	0	8.345	970	260	1.52	41.6	3
S.D. Trap	0	58	0	6.560	1630	240	4.58	0	0
City Water	0	168	0	7.198	664	30	0.90	0	0

Jim Brown

from

PATRICK G. JUAREZ

June 11, 1980

TO Metals in Waste Waters and effluents — June 9, 1980

	Fe	Cu	Ni	Zn	Pb	Cr	Cd	Ba
PECOS RIVER ABOVE PONDS	0.118	0.041	0.116	0.019	0.346	0.000	0.041	0.271
PECOS RIVER AT BRIDGE	0.106	0.035	0.072	0.000	0.173	0.000	0.005	0.244
WEST POND	0.230	0.000	0.048	0.018	0.000	0.164	0.021	0.136
MIDDLE POND	0.274	0.021	0.058	0.022	0.115	0.096	0.015	0.136
EAST POND	1.183	0.021	0.094	0.018	0.087	0.000	0.021	0.136
TOTAL EFFLUENT	0.294	0.000	0.000	0.221	0.000	0.842	0.005	0.054
A.P.I. SEPARATOR	0.442	0.000	0.000	0.025	0.000	0.137	0.007	0.000
NORTH DIVISION TRAP	0.053	0.000	0.000	0.112	0.017	0.128	0.006	0.000
SOUTH DIVISION TRAP	1.631	0.000	0.029	0.286	0.087	2.27	0.003	0.000
CITY WATER	0.088	0.021	0.051	0.442	0.000	0.000	0.002	0.000

Patrick G. Juarez

from

JAMES L. BROWN 5-12, 19 50

To BCB. Sampled 5-12-50

	P alk.	M alk	Acidity	pH	Hardness	Chloride	Fluoride	Sulfide	Phenol
Pecos River above ponds	6	66	0	8.708	1730	1110	0.68	0	0
Pecos River at Bridge	8	68	0	8.716	1720	1130	0.68	0	0
Water Well (Wind Mill)	not available								
West Pond	84	352	0	9.641	440	1050	68	0	12
Middle Pond	0	94	0	7.308	890	1250	38	0	0.5
East Pond	0	58	0	7.326	1230	1730	27	0	0.3
Total Effluent	12	76	0	10.127	380	330	27	16.0	2
API Separator	14	50	0	9.474	500	50	17	tr	0.5
N.D. Trap	36	184	0	9.381	530	130	1.78	19.2	3
S.D. Trap	534	662	0	12.359	40	110	440	0	0.5
City Water	0	170	0	7.168	620	24	1.25	0	0

Further samples of Pecos River water caught alongside of the game refuge matched the samples from above ponds and bridge. This is related to letter David Griffin received from the environmental people.

from

PATRICK G JUAREZ May 14, 1980

TO B.C. Clayton (OGE) - Metals in Wastewaters & Effluents for May, 1980

	Fe	Cu	Ni	Zn	Pb	Cr	Cd
PECOS RIVER ABOVE PONDS	0.048	0.000	0.055	0.011	0.000	0.000	0.006
PECOS RIVER AT BRIDGE	0.053	0.000	0.055	0.000	0.000	0.000	0.024
WEST POND	0.154	0.000	0.000	0.018	0.000	0.102	0.018
MIDDLE POND	0.150	0.002	0.018	0.028	0.000	0.121	0.016
EAST POND	0.505	0.000	0.036	0.044	0.000	0.000	0.032
TOTAL EFFLUENT	0.000	0.000	0.040	0.015	0.000	0.000	0.024
A.P.I. SEPARATOR	0.040	0.000	0.000	0.020	0.000	0.000	0.000
NORTH DIVISION TRAP	0.000	0.000	0.036	0.000	0.000	0.091	0.011
SOUTH DIVISION TRAP	0.335	0.002	0.000	0.016	0.000	0.045	0.017
CITY WATER	0.000	0.002	0.000	0.402	0.000	0.045	0.005

Sampled May 12, 1980, 10 days after Shutdown.

Water Well (Windmill) - NOT Available.

from

JAMES L. BROWN April 2, 1980

To Water Samples Sampled 4-1-80

	P Alk	M Alk	Acidity	pH	Hardness	Chlorides	F	S	Phenol
Pecos River above Ponds	0	118	0	8.125	2940	3530	0.3	0	0
Pecos River at Bridge	0	122	0	8.125	2880	2820	0.4	0	0
Water Well	not available								
West Pond	0	141	0	7.350	700	1240	83	0	12+
Middle Pond	0	102	0	6.981	870	1200	81	0	1
East Pond	0	86	0	7.024	950	1410	79	0	0
Total Effluent	108	514	0	9.030	400	500	80	160	12+
API Separator	0	352	0	8.328	680	430	83	128	12+
N. D. Trap	0	234	0	8.248	510	300	1	54	10
S. D. Trap	0	178	0	7.782	430	510	0.8	0	0
City Water	0	180	0	7.044	630	28	0.4	0	0

Jim B.

from

PATRICK G. JUAREZ April 2, 1980

TO Water Samples Sampled 4-1-80

	Fe	Cu	Ni	Zn	Pb	Cr	Cd
PECOS RIVER ABOVE PONDS	0.08	0.04	0.07	0.19	0.25	0.00	0.03
PECOS RIVER AT BRIDGE	0.12	0.05	0.10	0.05	0.40	0.00	0.03
WEST POND	0.23	0.02	0.04	0.04	0.19	0.15	0.007
MIDDLE POND	0.23	0.02	0.04	0.05	0.25	0.13	0.005
EAST POND	0.23	0.04	0.07	0.19	0.16	0.05	0.001
TOTAL EFFLUENT	0.06	0.02	0.05	0.07	0.06	0.06	0.01
A.P.I. SEPARATOR	0.01	0.003	0.04	0.04	0.04	0.14	0.007
NORTH DIVISION TRAP	0.07	0.02	0.06	0.04	0.31	0.33	0.001
SOUTH DIVISION TRAP	0.03	0.005	0.005	0.04	0.30	0.18	0.000
CITY WATER	0.03	0.01	0.01	0.53	0.00	0.01	0.000

Water well — not available

Patrick G. Juarez

from

JAMES L. BROWN 3-12, 1980

To B.C.D. Sampled 3-11-80

	P Alk.	M. Alk.	Acidity	pH	Hardness	Chloride	Chloride	Sulfide	Phenol
Pecos River gauge Ponds	0	138	0	8.034	3520	2600	0.74	0	0
Pecos River at Bridge	0	140	0	7.993	3550	2590	0.69	0	0
Water Well									
West Pond	0	100	0	7.485	1230	1170	46	0	12+
Middle Pond	0	104	0	7.044	1100	1150	39	0	7
East Pond	0	80	0	7.135	1150	1210	33	0	0
Total Effluent	1760	3230	0	11.331	180	350	300	806	0
API Separator	102	482	0	9.064	640	230	70	138	12+
N. D. Trap	44	236	0	8.867	1650	1690	1.10	22	6
S.D. Trap	0	154	0	8.121	1970	900	2.18	0	0
Air Water	0	176	0	7.173	686	26	0.69	0	0

Jim Brown

from

PATRICK G. JUAREZ 3-12, 1980

TO B C G. Sampled 3-11-80

ELEMENTS PPM	Cu	Fe	Ni	Pb	Zn	Cd	Cr		
Pecos River Above Ponds	0.010	0.215	0.045	0.200	0.00	0.030	0.037		
Pecos River At Bridge	0.010	0.200	0.061	0.200	0.000	0.022	0.037		
N.D TRAPS	0.000	0.092	0.045	0.066	0.003	0.011	0.000		
West Pond	0.000	0.308	0.045	0.066	0.021	0.019	0.037		
Middle Pond	0.000	0.446	0.045	0.066	0.026	0.034	0.074		
East Pond	0.000	0.231	0.015	0.066	0.036	0.007	0.037		
Total Effluent	0.010	0.092	0.061	0.066	0.094	0.007	0.037		
API Separator	0.000	0.109	0.028	0.000	0.023	0.007	0.103		
S D TRAPS	0.000	0.092	0.030	0.066	0.049	0.015	0.000		
City Water	0.010	0.123	0.061	0.066	0.473	0.000	0.000		

Patrick G. Juarez

from

JAMES L. BROWN 2-12, 1980

To BCB. - R. Gr. Sampled 2-11-80

	P alk.	M alk.	Acidity	pH	Hardness	Chlorides	Fluorides	Sulfide	Phenol
Pecos River above Ponds	0	166	0	8.157	2310	1830	1.80	0	0
Pecos River at Bridge	0	166	0	8.162	2280	1850	1.70	0	0
Water Well (Windmill)		Not available							
West Pond	0	12	0	7.575	820	1040	82	0	50
Middle Pond	0	90	0	6.785	710	960	92	0	20
East Pond	0	144	0	7.053	770	1090	74	0	2
Total Effluent	0	42	0	5.921	3200	360	87	0	1.6
API Separator	0	0	80	3.417	11200	380	150	3.2	2
N. Div. Trap	0	180	0	8.404	550	120	4.20	32	6
S. Div Trap	0	178	0	7.728	930	260	3.85	0	0
City Water	0	174	0	7.023	668	32	2.45	0	0

from

PATRICK G. JUAREZ 2-12, 19 80

TO BCA - D.Ggr Sampled 2-11-80

ppm	Fe	Cu	Ni	Cd	Zn	Pb	Cr
Pecos River above Ponds	0.07	0.06	0.00	0.02	0.01	0.22	0.00
Pecos River At Bridge	0.03	0.07	0.25	0.03	0.04	0.11	0.00
water well (windmill)		NOT AVAILABLE					
West Pond	9.51	0.06	0.33	0.01	0.36	0.22	0.14
Middle Pond	0.44	0.06	0.25	0.12	0.05	0.00	0.07
East Pond	0.12	0.06	0.00	0.02	0.03	0.22	0.07
Total Effluent	0.71	0.07	0.17	0.02	0.01	0.00	0.55
API Separator	1.20	0.06	0.00	0.01	0.15	0.00	0.51
N.D. TRAP	0.24	0.07	0.17	0.01	0.01	0.11	0.07
S.Div. TRAP	0.17	0.07	0.08	0.01	0.01	0.11	0.17
City Water	0.22	0.08	0.25	0.00	0.42	0.11	0.17

from

JAMES L. BROWN 1-9, 1980

To BCB- DBLR Sampled 1-7-80

	P alk	M alk	Acidity	pH	Hardness	Chlorides	F^-	$S^=$	Phenol
Pecos River above ponds	0	162	0	8.276	2300	1840	1.42	0	0
Pecos River at bridge	0	162	0	8.234	2330	1860	1.46	0	0
Water Well	not available								
West Pond	0	54	0	7.388	680	810	50.5	0	25+
Middle Pond	0	196	0	7.483	690	950	35.0	0	25
East Pond	0	222	0	7.442	840	1160	44.0	0	4
Total Effluent	10	238	0	8.473	1940	1780	34.8	205	20
API Separator	16	312	0	8.671	680	80	40.0	230	24
N.D. Trap	0	192	0	8.185	850	1400	1.98	230	1
L.D. Trap	0	158	0	7.264	10400	13200	1.90	170	0
Air Water	0	184	0	7.178	716	28	1.95	0	0

Jim Brown

from

JAMES L. BROWN 1-7, 1980

To Results in ppm - By AA

	Iron	Copper	Nickel	Zinc	Lead	Chromium	Arsenic	
Pecos River above ponds	.065	.028	.076	.000	.071	.000	—	
Pecos River at bridge	.049	.047	.076	.000	.071	.062		
Water Well								
West Pond	.098	.000	.030	.0079	.071	.000	—	
Middle Pond	.065	.009	.030	.000	.071	.000	—	
East Pond	.147	.009	.030	.000	.071	.000	—	
Solid Effluent	.065	.000	.106	.000	.142	.000	—	
API Separator	.033	.000	.015	.000	.000	.000	—	
N. D. Trap	.033	.000	.030	.000	.000	.000	—	
S. D. Trap	.180	.028	.287	.1597	.356	.000	—	
City Water	.000	.009	.000	.3968	.071	.000	—	

from

JAMES L. BROWN 12-6, 1977

To

Sampled 12-5-77

	Pelk	M Alk	Acidity	pH	Hardness	Chlorides	F	S	Phenol
Pecos River above Ponds	0	166	0	8.193	2530	1730	1.4	0	0
Pecos River at Bridge	0	168	0	8.228	2470	1750	1.2	0	0
Water Well									
West Pond	28	266	0	8.721	790	850	57.3	6.4	30
Middle Pond	0	318	0	7.766	860	1130	50.0	0	10
East Pond	0	250	0	7.408	1000	1370	44.3	0	0.3
Total Effluent	0	14	0	5.466	500	610	83.2	28.8	30+
API Separator	0	0	56	3.785	390	54	90.0	134.4	30+
N. D. Trap	20	238	0	8.804	660	22	4.2	9.6	3
S D Trap	0	188	0	7.554	1000	2610	2.8	0	0
City Water	0	184	0	7.069	736	28	1.9	0	0

from

JAMES L. BROWN 11-6, 1929

To BC&GRR Sampled 11-2-29

	P Alk.	M. Alk.	Acidity	pH	Hardness	Chloride	F	S	H2S
Pecos River above Ponds	0	114	0	8.152	1020	430	<.5	0	0
Pecos River Bridge	0	112	0	8.152	1010	440	<.5	0	0
Water Well	not available								
West Pond	0	200	0	8.178	690	1020	2.8	106	12+
Middle Pond	0	230	0	7.557	730	1020	28	0	1
East Pond	0	162	0	7.516	1100	1350	27.5	0	0.3
Total Effluent	0	570	0	8.101	820	2120	30	288	0
API Separator	0	174	0	6.868	440	650	.52	272	12+
N. W. Traps	0	190	0	7.720	920	2070	<.5	128	4
S.P. Traps	not applicable								
City Water	0	178	0	7.146	710	32	0.5	0	0

from

JAMES L. BROWN 10-4, 1979

To BCB-DB. Samples 10-3-79

	P Alk	M. Alk	Acidity	pH	Hardness	Chlorides	F	S	Plants
Pecos River above ponds.	0	122	0	8.144	3020	2530	1.60	0	0
Pecos River Bridge	0	122	0	8.125	3030 ~~2570~~	2580	1.37	0	0
Water Well	not available								
West Pond	0	180	0	8.185	850	900	39.3	0	12+
Middle Pond	0	134	0	7.385	1000	1070	33.0	0	0.4
East Pond	0	110	0	7.303	1260	1460	32.9	0	0
Total Effluent	34	314	0	8.741	950	520	17.3	86.4	20
API Separator	0	292	0	8.089	860	190	26.8	105.6	25
N.D. Trap	0	196	0	7.994	840	430	1.97	51.2	5
SD Trap	12	160	0	8.438	1630	980	2.18	19.2	3
City Water	0	180	0	7.042	690	24	1.58	0	0

Waste Waters & Effluents

Oct 3, 1979

	Pecos River Above Ponds	Pecos River at Bridge	West pond	Middle pond	East pond	Total Effluent	API Separator	North Division Tree	South Division Tree	City Water
Cu	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.1
Ni	0.025	0.025	0.083	0.054	0.185	0.063	0.061	0.084	0.142	0.148
Pb	0.010	0.001	0.007	0.000	0.023	0.012	0.025	0.000	0.015	0.000
As ±.2 s	0.671	0.659	0.138	0.242	0.343	0.271	0.206	0.438	0.164	0.206
Cr	0.075 ~~0.104~~	0.104	0.242	0.196	0.230	0.146	0.353	0.177	0.220	0.061
Fe	0.275	0.274	0.369	0.299	0.409	0.427	0.514	0.373	0.350	0.513
Zn	0.007	0.005	0.017	0.004	0.003	0.000	0.027	0.000	0.000	0.461 Water Fountain 0.623

from

JAMES L. BROWN 9-13, 19 79

To BCB-10B Sampled 9-11-79

	P. Alk.	M. Alk.	Acidity	pH	Hardness	Chlorides	F	S	Phenap.
Pecos River above Ponds	0	88	0	8.369	1800	1560	.82	0	0
Pecos River Bridge	0	88	0	8.292	1780	1570	.77	0	0
Water Well	not available								
West Pond	0	220	0	8.344	780	760	32.2	41.6	12+
Middle Pond	0	110	0	7.074	990	1110	30.1	0	0
East Pond	0	56	0	6.873	1300	1560	29.0	0	0
Total Effluent	0	62	0	6.760	550	800	46.5	32.0	12+
API Separator	0	0	80	3.573	390	290	74.0	0	12+
North Div Trap	50	206	0	9.942	1000	1990	2.40	67.2	0
South Div Trap	0	174	0	7.738	1550	1400	27.0	0	0
City Water	0	178	0	6.978	684	34	1.48	0	0

	City Water	Pecos River above Ponds	Pecos River At Bridge	west Pond	middle Pond	East Pond	Total Effluent	API separator	North Division Trap	South [illegible] + API
Cu	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Ni	0.00	0.12	0.12	0.11	0.12	0.10	0.15	0.175	0.10	0.14
Pb	0.01	0.01	0.015	0.01	0.01	0.01	0.00	0.01	0.01	0.00
±.10 As*	0.27	0.48	0.29	0.18	0.37	0.35	0.17	0.21	0.97	0.38
Cr	0.29	0.17	0.24	0.34	0.125	0.38	0.565	0.88	0.525	0.35
Fe	1.21	0.36	0.29	1.04	0.96	1.23	1.08	1.25	0.79	0.65
Zn	0.520	0.005	0.008	0.012	0.15	0.024	0.035	0.252	0.009	0.004

As* Lots of Noise/Interference AS = ± .10 ppm

from

JAMES L. BROWN 1-18, 19 79

To BCB-PH-DB: Sampled 1-16-79

	P Alk.	M Alk.	Acidity	pH	Hardness	Chlorides	F^-	$S^=$	Phenols
Pecos R. above Ponds.	no sample - too muddy to get to it.								
Pecos R at Bridge	0	186	0	8.252	1870	1230	3.7	0	0
Water Well	no sample - not running								
West Pond	no sample - too muddy.								
Middle Pond	no	sample - too muddy							
East Pond	no	sample - too muddy							
Total Effluent	0	188	0	8.093	530	270	42	54.4	5
API Separator	0	260	0	7.057	960	70	115	161	0
N.P. Trap	10	132	0	8.616	910	710	5.5	25.8	4
S.P. Trap	0	130	0	6.826	37500	36300	3.2	0	0
Air Water	0	180	0	7.136	708	56	4.0	0	0

from

JAMES L. BROWN 2-13, 1979

To Water Samples Sampled 2-12-79

	Alk. f	Alk. M	Acidity	pH	Hardness	Chlorides	Fluorides	Sulfides	Phenols
Recap from above Pond	0	190	0	8.182	2110	1490	3.2	0	0
Recap from at Bridge	0	160	0	7.830	2050	1560	1.9	0	0
Water Well	not available - pump N.G.								
West Pond	30	180	0	8.672	840	1000	48.0	9.6	12+
Middle Pond	0	170	0	7.492	900	1080	43.5	0	12+
East Pond	0	150	0	7.170	950	1070	34.5	0	4
Total Effluent	0	90	0	6.956	1650	1170	14.8	35.2	6
A.F.J. Separator	3130	5990	0	12.359	220	440	380	1366	0
N. P. Traps	35	260	0	8.478	5050	8450	2.7	83.2	0
S. P. Trap	0	190	0	7.870	940	760	3.1	0	0
City Water	0	186	0	7.105	712	28	3.1	0	0

from

JAMES L. BROWN 3-15, 1979

To BCB-DG. Sampled 3-12-79

	P. Alk.	M. Alk.	Acidity	pH	Hardness	Chloride	Fluoride	Sulfate	Phenols
Pecos River above Ponds	0	120	0	8.336	2980	2920	0.34	0	0
Pecos River Bridge	0	126	0	8.334	2960	2880	0.74	0	0
Water Well	not available								
West Pond	0	144	0	8.837	860	1260	43.0	28.8	12+
Middle Pond	0	118	0	7.325	890	1210	33.0	0	12
East Pond	0	108	0	6.943	970	1180	25.5	0	0.2
Total Effluent	46	660	0	9.047	500	700	52.0	221	0
API Separator	0	78	0	6.263	310	380	92.0	60.8	12+
N. D. Traps	952	2864	0	9.262	610	3330	0.67	1504	0
S. D. Traps	0	172	0	7.161	1000	310	1.08	0	0
Adj. Water	0	178	0	7.054	706	30	0.34	0	0

from

JAMES L. BROWN 4-9, 1977

To BCG-DC Samples 4-5-79

	P Alk.	M. Alk.	Acidity	pH	Hardness	Chlorides	F^-	$S^=$	Phenol.
Pecos R. above Ponds	0	96	0	8.546	3550	4690	0.32	0	0
Pecos R. @ Bridge	0	104	0	8.427	3600	4580	0.28	0	0
Water Well	not available								
West Pond	40	172	0	9.103	660	1070	18.2	12.8	12+
Middle Pond	0	156	0	7.308	970	1410	28.4	0	10
East Pond	0	154	0	7.049	1190	1430	18.0	0	0.2
Total Effluent	0	0	20	4.806	600	570	31.0	0	12+
A.P.I. Separator	0	0	650	3.001	230	230	176	0	12+
N.D. Trap	72	364	0	9.685	920	1830	3.0	99.2	1
S.D. Trap	0	188	0	7.712	390	400	1.0	0	0
City Water	0	186	0	7.107	702	40	0.68	0	0

from

JAMES L. BROWN May, 1979

To BCL-Q.A. Samples 5-14-79

	Phenol Alk.	Phenol Acid	Acidity	pH	Hardness	Chlorides	Fluoride	Sulfate	Phenol
Reception above Ponds	0	9.2	0	7.632	3620	1460	2.95	0	0
Reception at Dredge	0	96	0	7.453	3570	4300	2.50	0	0
Water Wells	not available								
West Pond	0	146	0	8.114	870	920	24.9	0	10+
Middle Pond	0	208	0	7.109	590	1430	46.5	0	2
East Pond	0	142	0	7.094	1350	1940	36.7	0	0.3
Total Effluent	0	204	0	8.195	750	710	65.8	6.4	30+
API Separator	0	64	0	6.270	500	360	64.0	12.8	30+
N.D. Traps	0	112	0	7.538	550	130	3.95	0	0
S.D. Traps	0	170	0	7.550	810	1610	4.75	0	0
City Water	0	180	0	7.010	690	32	2.67	0	0

from

JAMES L. BROWN 6-14, 1979

To BCS. Samples 6-13-79

	P Alk	M Alk.	Acidity	pH	Hardness	Chlorides	F^-	$S^=$	P-Phenol
Pegasus Lower Lagoons	0	94	0	8.153	920	120	1.27	0	0
Pegasus River at Bridge	0	92	0	7.795	940	120	1.25	0	0
Wind Mill	not available								
West Pond	0	120	0	7.077	900	980	45.5	0	12+
Middle Pond	0	148	0	7.240	930	1250	33.8	0	3
East Pond	0	126	0	7.350	1280	1830	24.3	0	0
Total Effluent	0	16	0	5.565	1140	1390	26.0	25.6	10
API Separator	0	238	0	7.336	470	200	37.0	144	0
N.D. Trap	34	208	0	9.034	920	1800	3.1	64.0	0
S.D. Trap	0	152	0	7.332	4540	4470	3.3	0	0
City Water	0	180	0	6.968	688	30	1.7	0	0

WATER TESTS

Date 7-11-79

Date Sampled 7-11-79

Results in ppm

	P Alk.	M. Alk.	Acidity	pH.	Hardness	Chlorides	$S^=$	F^-	Phenol	Cu	Ni	Pb	As	Cr
Pecos River above Ponds	0	96	0	8.233	1450	840	0	.35	0	.02	.00	.092	.000	.0000
Pecos River at Bridge	0	86	0	8.220	1530	860	0	.37	0	.01	.00	.097	.000	.0000
Water Well	Not available													
West Pond	0	196	0	7.748	2000	870	16 ~~17~~	37	12+	.06	.00	.115	.0001	.08
Middle Pond	0	84	0	7.660	2000	1430	0	39	.2	.04	.00	.141	.0000	.05
East Pond	0	70	0	7.384	1560	2000	0	24	0	.05	.00	.210	.0001	.000
Total Effluent	96	366	0	9.393	140	460	128	2.4	0	.03	.00	.145	.0002	.000
O. P. F. Separator	0	496	0	8.291	190	240	102	6.6	0	.14	.12	.532	.0006	.002
No. Rim Trap	16	212	0	9.025	560	180	12.8	.96	6	.07	.00	.047	.000	.000
So. Rim Trap	0	84	0	6.526	23100	20800	0	2.9	12+	.10	.46	.974	.000	.04
City Water	0	188	0	7.079	710	38	0	.88	0					

Jim Brown

from

JAMES L. BROWN 8-9, 1979

To BCB - DB

	P alk	M alk	Acidity	pH	Hardness	Chloride	F	S	Phenol
P. Basin Aboge Ponds	0	76	0	8.201	1690	1530	0.86	0	0
P. Basin at Bridge	0	84	0	8.206	1700	1480	0.70	0	0
Water Well									
West Pond	0	150	0	8.033	830	920	37.5	0	12
Middle Pond	0	122	0	7.544	860	1060	31.5	0	0
East Pond	0	44	0	7.347	1200	1540	31.5	0	0
Total Effluent	0	0	210	3.065	1130	560	140	12.8	12+
API Separator	0	0	800	2.429	350	350	300	57.6	2
N.D. Trap	40	306	0	8.943	570	180	1.65	73.6	0.2
S.D. Trap	0	164	0	8.275	1670	1910	3.1	0	5
City Water	0	182	0	7.040	710	30	1.15	0	0

Attachment 3
TAPE

HOLE NO.	DATE	T.O.P. EL.	RIVER BOTTOM EL.	WATER LEVEL	RIVER BTM TO WATER LEVEL	Δ WATER LEVEL
1	JULY 15/77	3311.27	3297.86	3300.37	2.51	-.06
2	"		"	DRY	—	—
3	"	3311.28	"	3300.35	2.49	-.00
4	"		"	DRY	—	—
5	"	3312.57	3299.35	3300.00	.65	-.05
6	JULY 15/77		"	DRY	—	—
7	"	3309.40	3297.44	3301.18	3.74	-.03
8	"		"	DRY	—	—
9	"	3309.41	"	3299.70	2.26	-.07
10	"		"	DRY	—	—
11	JULY 15		3297.86	DRY	—	—
12	"	3307.68	"	3298.35	.49	-.01
13	"	3307.52	"	3298.75	.89	-.02
14	"		"	DRY	—	—
15						
1	JULY 21 *	3311.27	3297.86	3301.39 LEVEL COMES TO BTM OF HOLE	3.53	+1.02
2	"		"			
3	"	3311.28	"	3301.01	3.15	+.66
4	"		"	DRY	—	—
5	"	3312.57	3299.35	3301.88	2.53	+1.88
6	JULY 21/77		"	DRY	—	—
7	"	3309.40	3297.44	3301.25	3.81	+.07
8	"		"	DRY	—	—
9	"	3309.41	"	3300.12	2.68	+.42
10	"		"	DRY	—	—
11	JULY 21/77		3297.86	DRY	—	—
12	"	3307.68	"	3298.45	.59	+.10
13	"	3307.52	"	3299.23	1.37	+.48
14	"		"	DRY	—	—

* RIVER LEVEL WAS HIGH ON THIS DATE.

	1	2	3	4	5
HOLE NO.	1977 DATE	T.O.P. EL.	RIVER BOTTOM EL.	WATER LEVLE	RIVER BTM. TO WATER LEVLE	Δ WATER LEVLE
1	AUG 25	3311.27	3297.86	3301.36	3.50	+.22
2			↓	DRY		
3		3311.28	↓	3301.16	3.30	+.48
4			↓	DRY		
5	↓	3312.57	3299.35	3301.28	1.93	-.14
6	AUG 25		↓	DRY		
7		3309.40	3297.44	3301.38	3.94	+.46
8			↓	DRY		
9		3309.41	↓	3300.24	2.80	+.41
10	↓		↓	DRY		
11	AUG 25		3297.86	DRY		
12		3307.68		3298.66	.80	+.73
13		3307.52	↓	3299.50	1.64	+.67
14	↓		↓	DRY		
15						
16	1 SEP. 9	3311.27	3297.86	3301.75	3.89	+.39
17	2		↓	DRY		
18	3	3311.28	↓	3301.67	3.81	+.51
19	4		↓	DRY		
20	5 ↓	3312.57	3299.85	3301.49	1.64	-.29
21	6 SEP 9					
22	7	3309.40	3297.44	3301.74	4.3	+.36
23	8		↓			
24	9	3309.41	↓	3300.57	3.13	+.33
25	10 ↓		↓			
26	11 SEP. 9		3297.86			
27	12	3307.68	↓	3298.79	.93	+.13
28	13	3307.52	↓	3299.63	1.77	+.13
29	14 ↓		↓			
30	RIVER WATERELEVATION @ #3		3301.58			
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						

HOLE NO.	DATE	T.O.P. EL.	RIVER BOTTOM ELEVATION	WATER LEVLE	RIVER BTM. TO WATER LEVLE	Δ WATER LEVLE
		1	2	3	4	5
1	SEP-19	3311.27	3297.86	3301.00	3.14	- .75
2						
3		3311.28		3301.19	3.33	- .48
4						
5		3312.57	3299.35	3300.72	1.37	- .27
6	SEP-19					
7		3309.40	3297.44	3301.57	4.13	- .17
8						
9		3309.41		3300.33	2.89	- .24
10						
11	SEP-19		3297.86			
12		3307.68		3298.55	.69	- .24
13		3307.52		3299.14	1.28	- .49
14						
	RIVER WATER ELEVATION @ #3 HOLE				3301.24	- .34
1	SEP 22	3311.27	3297.86	3300.90	3.04	- .10
2						
3		3311.28	3297.86	3301.13	3.27	- .06
4						
5		3312.57	3299.35	3300.74	1.39	+ .02
6						
7		3309.40	3297.44	3301.53	4.09	- .04
8						
9		3309.41	3297.44	3300.23	2.79	- .10
10						
11						
12		3307.68	3297.86	3298.48	.62	- .07
13		3307.52	3297.86	3299.02	1.16	- .12
14						
	RIVER WATER ELEVATION @ #3 HOLE				3301.02	- .22

HOLE NO.	DATE	1 T.O.P. EL.	2 RIVER BOTTOM EL.	3 WATER LEVLE	4 RIVER BTM. TO WATER LEVLE	5 Δ WATER LEVLE
1	SEP 28	3311.27	3297.86	3300.75	2.89	− .15
2						
3	↓	3311.28	↓	3300.95	3.09	− .18
4						
5		3312.57	3299.35	3300.63	1.28	− .11
6	SEP 28					
7	↓	3309.90	3297.44	3301.55	4.11	+ .02
8						
9		3309.41	↓	3300.17	2.73	− .06
10						
11	SEP 28		3297.86			
12	↓	3307.68	↓	3298.35	.49	− .13
13		3307.52		3298.85	.99	− .17
14						
	RIVER WATER ELEVATION @ #3 HOLE				3300.86	− .16
1	Oct 12	3311.27	3297.86	3301.33	3.47	+ .58
2			~			
3	↓	3311.28	3297.86	3301.28	3.42	+ .33
4			~			
5	Oct-12	3312.57	3299.35	3301.17	1.82	+ .54
6			~			
7	↓	3309.40	3297.44	3302.02	4.58	+ .97
8			~			
9		3309.41	3297.44	3300.41	2.97	+ .24
10	Oct-12					
11						
12	↓	3307.68	3297.86	3298.49	.63	+ .14
13		3307.52	3297.86	3299.37	1.51	+ .52
14						
	RIVER WATER ELEVATION @ #3 HOLE					

150 DATA PER MONTH, ELEVATIONS INCLUDED OF RIVER WATER

Analysis of #3 River every quarter, all others every year. cph 14/11/77

HOLE NO.	DATE	T.O.P. EL.	RIVER BOTTOM EL.	WATER LEVLE	RIVER BTM. TO WATER LEVLE	WATER LEVLE
1	NOV 4	3311.27	3297.86	3301.15	3.29	- .18
2				DRY		
3		3311.28		3301.03	3.17	- .25
4				DRY		
5		3312.57	3299.35	3300.86	1.51	- .31
6	NOV 4			DRY		
7		3309.90	3297.44	3302.46	5.02	+ .44
8				DRY		
9		3309.41		3300.47	3.03	+ .06
10						
11	NOV 4		3297.86			
12		3307.68		3298.67	.81	+ .18
13		3307.52		3299.46	1.60	+ .09
14						
1	DEC. 8	3311.27	3297.86	3301.14	3.28	- .01
2	DEC. 8		3297.86	DRY		
3	DEC. 8	3311.28	3297.86	3301.03	3.17	0.00
4	DEC. 8		3297.86	DRY		
5	DEC. 8	3312.57	3299.35	3300.78	1.43	- .08
6	DEC. 8		3299.35	DRY		
7	DEC. 8	3309.40	3297.44	3302.77	5.33	+ .31
8	DEC. 8		3297.44	DRY		
9	DEC. 8	3309.41	3297.44	3300.58	3.14	+ .11
10	DEC. 8		3297.44	DRY		
11	DEC 8		3297.86	DRY		
12	DEC. 8	3307.68	3297.86	3298.20	.94	+ .13
13	DEC. 8	3307.52	3297.86	3299.50	1.64	+ .04
14	DEC. 8		3297.86	DRY		
	DEC.	RIVER WATER ELEVATION @ #3 HOLE				
1	JAN 11					

		1	2	3	4	5
HOLE NO	DATE	TOP EL.	RIVER BOTTOM EL	WATER LEVEL	RIVER BOTTOM TO WATER LEVEL	Δ WATER LEVEL
1	JAN 11 78	3311.27	3297.86	3301.23	3.37	+.09
2			3297.86	DRY		
3		3311.28	3297.86	3301.26	3.40	+.23
4			3297.86	DRY		
5		3312.57	3299.35	3301.82	1.47	+.04
6			3299.35	DRY		
7		3309.40	3297.44	3302.73	5.29	-.04
8			3297.44	DRY		
9		3309.41	3297.44	3300.62	3.18	+.04
10			3297.44	DRY		
11			3297.86	DRY		
12		3307.68	3297.86	3298.85	.99	+.05
13		3307.52	3297.86	3299.54	1.69	+.05
14			3297.86	DRY		
	March 28/78					
1		3311.27	3297.86	3302.39	4.53	+1.16
2				DRY		
3		3311.28	3297.86	3302.53	4.67	+1.27
4				DRY		
5		3312.57	3299.35	3302.72	3.37	+1.90
6				DRY		
7		3309.40	3297.44	3300.44	3.00	-2.29
8				DRY		
9		3309.41	3297.44	3300.97	3.53	+0.35
10				DRY		
11				DRY		
12		3307.68	3297.86	3299.51	1.65	+.66
13		3307.52	3297.86	3300.31	2.45	+.76
14				DRY		
1						
2						
3						
4						
5						
6						
7						
8						
9						

HOLE No.	DATE	TOP ELEVATION	RIVER BOTTOM ELEVATION	WATER LEVEL	RIVER BOTTOM TO WATER LEVEL	△ WATER LEVEL
1	May 8-78	3311.27	3297.86	3300.12	2.26	-2.27
2			3297.86	DRY		
3		3311.28	3297.86	3301.81	3.95	-.72
4			3297.86	DRY		
5		3312.57	3299.35	3300.88	1.53	-1.84
6			3299.35	DRY		
7		3309.40	3297.44	3302.07	4.63	+1.63
8			3297.44	DRY		
9		3309.41	3297.44	3300.41	2.97	-.56
10			3297.44	DRY		
11			3297.86	DRY		
12		3307.68	3297.86	3299.26	1.4	-.25
13		3307.52	3297.86	3299.54	1.68	-.77
14			3297.86	DRY		
1	JUNE-16	3311.27	3297.86	3301.40	3.54	+1.28
2				DRY		
3		3311.28		3301.78	3.92	-.03
4				DRY		
5	JUNE-16	3312.57	3299.35	3301.07	1.72	+.19
6				DRY		
7		3309.40	3297.44	3301.75	4.31	-.32
8				DRY		
9		3309.91		3300.71	3.27	+.30
10	JUNE-16			DRY		
11			3297.86	DRY		
12		3307.68		3299.24	1.38	-.02
13		3307.52		3299.79	1.93	+.25
14				DRY		
	RIVER WATER ELEVATION @ #3 HOLE				3300.78	

COLUMN WRITE ⓔ

	1	2	3	4	5
HOLE No.	DATE	TOP ELEVATION	RIVER BOTTOM ELEVATION	WATER LEVLE	RIVER BOTTOM TO WATER LEVLE	△ WATER LEVLE
1	Aug 8-1978	3311.27	3297.86	3301.12	+ 3.26	− .28
2			"	DRY		
3		3311.28	"	3301.61	+ 3.75	− .17
4			"	DRY		
5		3312.57	3299.35	3300.49	+ 1.14	− .58
6				DRY		
7		3309.40	3297.44	3300.86	+ 3.42	− .89
8			"	DRY		
9		3309.41	"	3300.22	+ 2.78	− .99
10			"	DRY		
11			3297.86	DRY		
12		3307.68	"	3298.93	+ 1.07	− .31
13		3307.52	"	3299.17	+ 1.31	− .62
14			"	DRY		
1	DEC. 18-1978	3311.27	3297.86	3302.31	+ 4.45	+ 1.19
2			"	DRY		
3		3311.28	"	3301.57	+ 3.71	− .04
4			"	DRY		
5		3312.57	3299.35	3301.57	+ 2.22	+ 1.08
6			"	DRY		
7		3309.40	3297.44	3304.02	+ 6.58	+ 3.16
8			"	DRY		
9		3309.41	"	3302.20	+ 4.76	+ 1.98
10			"	DRY		
11			3297.86	DRY		
12		3307.68	"	3300.37	+ 2.51	+ 1.44
13		3307.52	"	3300.83	+ 2.97	+ 1.66
14			"	DRY		
	RIVER WATER ELEVATION @ #3 HOLE			3301.01		

COLUMN WRITE®

	1	2	3	4	5
HOLE NO.	DATE	TOP ELEVATION	RIVER BOTTOM ELEVATION	WATER LEVEL	RIVER BOTTOM TO WATER LEVEL	△ WATER LEVEL
1	JAN. 10, 1979	3311.27	3297.86	3302.48	+4.62	+.17
2			"	DRY		
3		3311.28	"	3301.74	+3.88	+.17
4			"	DRY		
5		3312.57	3299.35	3302.15	+2.80	+.58
6			"	DRY		
7		3309.40	3297.44	3304.28	+6.84	+.26
8			"	DRY		
9		3309.41	"	3302.12	+4.68	-.08
10			"	DRY		
11			3297.86	DRY		
12		3307.68	"	3300.37	+2.51	.00
13		3307.52	"	3300.89	+3.03	+.06
14			"	DRY		

ER 100 CF

2-19-78 Attachment 4

Water Samples from Test Holes near Ponds.

Sampled 12-18-78

Source	pH	Fluoride, ppm	Phenol, ppm
#1	7.744	2.12	0
#3	7.190	6.20	0.1
#5	7.644	1.65	0
#7	7.700	1.18	0
#9	7.383	2.64	0
#12	7.121	3.38	0
#13	7.434	5.64	0

T-30-SD Water Sample from Test Holes near Ponds

Sample	ppm Fluoride	ppm Phenol	pH	Dissolved Solids
# 3	4.825 ppm	0	7.050	4,286 ppm
# 5	1.525 ppm	0	7.045	12,242 ppm
# 7	1.870 ppm	0	7.599	8,537 ppm
# 9	3.020 ppm	0	7.313	8,477 ppm
# 12	3.050 ppm	0	7.424	15,824 ppm
# 13	4.150 ppm	0	7.184	2,511 ppm

CUSTOMER Navajo Refining Co.
ADDRESS 501 East Main Street
CITY Artesia, NM 88210
ATTENTION C.P. Havener
INVOICE NO. 710091

RECEIVED
OCT 19 1977
NAVAJO REFINERY

REPORT OF ANALYSIS

SAMPLES RECEIVED 10/3/77 | CUSTOMER ORDER NUMBER

TYPE OF ANALYSIS Water Analysis -

This column refers to a comparison of GROUND H_2O STANDARDS

Sample Identification	Analysis	mg/l	
Well Water	Fluoride	0.32	1.6 OK
	Chloride	1430	250 exceeds
	Phenols	< 0.001	.005 OK
	Sulfate	255	600 OK
	Total Dissolved Solids	6162	10000 OK
	pH Units	8.26	6 to 9 OK
# 3	Fluoride	3.21	exceed
	Chloride	1180	exceed
	Phenols	< 0.001	OK
	Sulfate	(2.86)?	OK
	Total Dissolved Solids	6777	OK
	pH Units	6.92	OK
# 7	Fluoride	0.46	OK
	Chloride	8075	exceed
	Phenols	< 0.001	OK
	Sulfate	943	exceed
	Total Dissolved Solids	28,050	exceed
	pH Units	6.73	OK
# 12	Fluoride	1.49	OK
	Chloride	7300	exceed
	Phenols	< 0.001	OK
	Sulfate	893	exceed
	Total Dissolved Solids	29,840	exceed
	pH Units	6.85	OK
# 13	Fluoride	1.47	OK
	Chloride	(123)?	OK
	Phenols	< 0.001	OK
	Sulfate	131	OK
	Total Dissolved Solids	2531	OK
	pH Units	7.04	OK

cet
Controls for Environmental Pollution, Inc.
P.O. Box 5351 • 1925 Rosina • Santa Fe, New Mexico 87502
Telephone 505/982-9841

APPROVED BY
Bud Summers, Environmental Sciences Mngr.
10/17/77

CUSTOMER Navajo Refining C
ADDRESS 501 East Main Street
CITY Artesia, NM 88210
ATTENTION C. P. Havner
INVOICE NO. 710115

REPORT OF ANALYSIS

SAMPLES RECEIVED 10/18/77	CUSTOMER ORDER NUMBER

TYPE OF ANALYSIS Water Analysis - Chromium

Sample Identification	mg/l
Well Water	0.001
#3	0.001
#7	0.001
#12	0.001
#13	0.002
#1	0.001
River #2	0.001
#5	0.001
River #1	0.003

EIA Standard 0.05 mg/l OK

#9

RECEIVED
OCT 25 1977
NAVAJO REFINERY

CEC

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10/24/77 PAGE 1 OF 1 PAGE

CUSTOMER Navajo Refining Co
ADDRESS P.O. Drawer 159
CITY Artesia, NM 88210
ATTENTION C. P. Havener
INVOICE NO. 710141

REPORT OF ANALYSIS

SAMPLES RECEIVED	10/6/77	CUSTOMER ORDER NUMBER	
TYPE OF ANALYSIS	Water Analysis -		

Sample Identification	Analysis	mg/l	
#1 (Uncontaminated Sample)	Fluoride	0.41	OK
	Chloride	2495	> exceed
	Phenols	< 0.001	OK
	Sulfate	1937	exceed
	Total Dissolved Solids	4959	OK
	pH Units	6.59	OK
River #2	Fluoride	0.43	OK
	Chloride	1550	exceed
	Phenols	< 0.001	OK
	Sulfate	1610	exceeds
	Total Dissolved Solids	7367	OK
	pH Units	6.50	OK
#5	Fluoride	0.59	OK
	Chloride	4565	exceed
	Phenols	< 0.001	OK
	Sulfate	2747	exceed
	Total Dissolved Solids	12140	exceed
	pH Units	6.49	OK

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Telephone 505/982-9841

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Bud Summers, Environmental Sciences Mgr.
10/27/77

JIM BROWN

CUSTOMER Navajo Refining Co.
ADDRESS 501 E. Main St. P.O. Drawer 159
CITY Artesia, NM 88210
ATTENTION
INVOICE NO. 710172

REPORT OF ANALYSIS

SAMPLES RECEIVED 10/14/77	CUSTOMER ORDER NUMBER
TYPE OF ANALYSIS Water Analysis -	

Sample Identification	Analysis	mg/l	
River #1	Fluoride	0.31	OK
	Chloride	292	exceed
	Phenols	< 0.001	OK
	Sulfate	758	exceed
	Total Solids (Dissolved)	1706	OK
	pH Units	7.51	OK

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Navajo Refi

Sample	# ID	pH	Conductivity (Mmhos/cm)	Eh (mv)	TDS	Hardness (as $CaCO_3$)	Total Alkalinity (as $CaCO_3$)	Cl	SO_4	F	Na	K	Mg
[illegible] Div. Cooling water [illegible] 7-15-82	2398	7.01	2250	227	2147	1123	70	3	1077	3.8	44	1.9	88
Div. Blow Pressure [illegible] B-3 Blowdown 7-15-82	2399	10.95	2750	244	1553	3.4	236	44	693	4.2	494	.6	<.1
[illegible] Boiler [illegible] 7-15-82	2400	11.5	6000	222	3444	9.3	438	76	1549	2.2	1125	5.4	<.1
[illegible] Cooling Tower Blowdown 7-8-82	2401	6.7	2550	237	2232	1245	6.6	14.6	1236	6.6	44	2.3	106
[illegible] Alky Cooling Water Blowdown 7-8-82	2403	7.15	2800	230	2850	1530	62	24	1461	10.8	63	3.0	131
Div. Gas Pressure [illegible] Boiler Blowdown 7-15-82	2404	11.6	4800	207	2726	3.5	477	83	1242	5.7	860	.65	<.1
Division FCC Unit Cooling Tower Blowdown 7-15-82	2402	7.6	2500	225	2032	1170	108	53	1067	3.8	41	2.5	109
Div. Cooling Tower Blowdown 6-11-82	2405	6.7	2000			1180	42	3	1130		35	2.5	98
Div. Boiler Blowdown 6-11-82	2406	11.4	7000			6.4	1404	100	1909		1350	5.3	.1
Plant Separator Water 6-11-82	2408	8.4	7000		3574	794	284	1300*	1630	.33	713	2.35	70
[illegible] Plant Separator South 6-11-82	2409	4.35	2950		2446	275		253	1659	.48	538	18	54
[illegible] Alky Unit [illegible] Sewer 7-9-82	2934	3.9	15,000		6878	1617		42	839	.41	380	27	53
[illegible] E-202 Process Effluent TCC Unit 7-8-82	2935	5.9	950		912	369	19	38	40.3	2.3	15	1.5	35
[illegible] Div Desalter Effluent 7-8-82	2936	8.05	2100		2044	551	24	403	47	1.3	24	11	55
[illegible] Div-FCC Unit [illegible] Tower 7-15-82	2944	8.65	15,000		981	10.0	8331	1111*	22	1.10	65	<.5	<.5
[illegible] Division Desalter Effluent 7-15-82	2943	7.9	9500		2254	6.0	2043	[illegible]*	3.5	.2	5.5	<.5	<.5
[illegible] Crude Unit [illegible] 7-15-82	2942	4.95	60		67	4.5	2.2	15	.66	<.1	9	<.5	<.5
[illegible] FCC Unit [illegible] 7-15-82	2941	8.9	14,500		670	15	5515	[illegible]*	34	.51	140	1	<.5
[illegible] Crude Unit [illegible] 7-14-82	2940	7.7	1150		1210	457		58	527		28	2.7	20
[illegible] Crude Unit [illegible] 7-14-82	2939	6.7	420		164	51	88	[illegible]*	1.6	.46	1.5	<.5	11.5
[illegible] TCC Unit W-58 [illegible] 7-9-82	2938	5.35	210		244	42	2.2	7	8.4	.44	1.2	<.5	4.2
[illegible] [illegible]	2937	7.1	370		80	3.3	.5	119	1.0	.32	2.2	<.5	<.5

Tag Co.

Values in ppm

Ca	Fe	Mn	Cr	As	V	Ni	Cu	Pb	Chemical Oxygen Demand (mg/l)	
295	.6	<1	9.4		—	.13	<.5	.6		
1.4	1.2	<1	<.1		—	<.1	<.5	.4	48	
37	.9	<1	<.1		—	<.1	<.5	.7	176	
325	2.8	<1	2.0		—	<.1	<.5	.4	1560	
395	.4	<1	32.8		—	.1	<.5	.6	120	
1.5	.7	<1	<.1		—	<.1	<.5	.4	184	
290	.4	<1	12.4		—	.13	<.5	.5	232	
312										
2.5									160	
203	<.5	<.5	1.5		—		<.5		576	*Quantab Chloride titrator
21	61	1.0	.2		—		<.5		4188	
560	15	<.5	.9		—	.2	<.5	.2	1960	
90	<.5	<.5	.2		—	<.1	<.5	.6	1808	
130	<.5	<.5	<.1		—	.17	<.5	.8	608	
4	3.8	<.5	.2		—	<.1	<.5	.6	1960	*Gravimetric Chloride
2.4	<.5	<.5	<.1		—	<.1	<.5	.7	1960	*Quantab Chloride Titrator
1.8	<.5	<.5	<.1		—	<.1	<.5	.6	368	
6	<.5	<.5	<.1		—	.1	<.5	.6	1960	*Quantab Chloride Titrators
50	<.5	<.5	<.1		—	<.1	<.5	.4	384	
15	<.5	<.5	<.1		—	.1	<.5	.2	1648	*Quantab Chloride Titrators
10	17	14.2	.3		—	<.1	<.5	.3	952	
13	<.5	<.5	<.1		—	<.1	1.3	3	172	