GW - 1

REPORTS

YEAR(S):

1989

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

OIL CONSERVATION DIVISION
RECEIVED
'89 NOV 13 AM 11 10

November 8, 1989

Mr. David G. Boyer
New Mexico Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87504-2088

RE: Sullivan Road to Highway 44 Investigation

Dear Mr. Boyer:

As we agreed in our letter of August 23, 1989, we have completed a study designed to quantify the level of pollution and delineate a possible plume existing in the arroyo extending along Sullivan Road from Hammond Ditch to Highway 44.

Sampling Locations

Twenty-seven sample locations were selected to provide a significant number of results. The locations were gridded over the target area as shown on the attached Sampling Locations drawing.

Sampling Procedures

The following sampling procedures were used:

1. The sampling team consisted of Craig West an Environmental Engineer from Western Slope Refining Company and Chris Hawley from Bloomfield Refining Company.

2. A log book of field observations was kept. A summary of these observations is attached.

3. Sampling equipment included a post hole digger, shovel, trowel, bucket, sample bottles, ice chest, alconox soap solution, and double-distilled water. The post hole digger, shovel, and trowel were steam cleaned before beginning the sampling. Sample bottles included one quart mason jars for soil samples and vials (with preservative added) for water samples.

4. All sampling equipment used to obtain samples was washed with alconox soap solution and then rinsed with distilled water between sampling locations.

5. Each sample location was marked with a numbered stake.

6. Samples were kept on ice and delivered to the local laboratory on the same day.

7. A field blank was included with the samples.

8. Soil samples were obtained from six inches to about one foot below grade. The samples were biased toward selecting soil that showed discoloration at sites where this was noted. Soil samples were taken at locations where the water table was above grade.

9. Surface water samples were taken at the soil sample locations immediately after digging the soil samples. In most cases the surface water samples included disturbed sediments.

10. Groundwater samples were taken from holes that required digging with the post hole digger. Each groundwater sample hole was bailed to dryness, allowed to recover, and then sampled. Conductivity was recorded.

11. On the next day after sampling, conductivity and groundwater levels were remeasured. It was also discovered that sample points 10 and 11 were missed on September 21, 1989 so they were sampled on September 25, 1989. Sample points 8 and 9 were also repeated to allow comparison and verification of the results. These samples were handled in the same manner as the others.

Discussion of Field Observations

On the private property belonging to Mrs. Avis Salmon, the soil discoloration seems to be most pronounced (and beginning near sample point 4) through the center of the low area where the sample holes were dug. This is evidenced by darker discoloration at sample points 5 and 8 and less discoloration on the edges at sample points 6, 7, 10, and 11. The discoloration seems to end at about sample point 12. Sample points 14 and 16 do not indicate any visual contamination. The area to the north of sample points 11, 12, 14, and 16 was previously used as a Bloomfield City landfill and some dumping (as evidenced by buried dynamite blasting caps at sample point 8) may have occurred in the arroyo. The conductivity of the groundwater was notably higher along the northern portion of the arroyo with an even more substantial increase at sample points 11 and 12. These two points also appeared to have more alkaline soil at the surface.

The soil samples were taken primarily on BLM property from the marshy area to the south of Sullivan Road. This marsh was obviously well charged from Hammond Ditch. The area was doing very well biologically including substantial vegetation and animal life such as worms. Most of the sample holes were difficult to dig because of extensive roots and rocks. Only sample point 25 was obviously contaminated with some sort of hydrocarbon. The contamination seemed to be localized around sample point 25.

There was no visual evidence linking the contamination on Mrs. Salmon's property with the contamination at sample point 25.

Analytical Results

Soil samples were analyzed for Total Petroleum Hydrocarbons (TPH) and benzene, toluene, ethyl-benzene, and xylene (BTEX). Water samples were analyzed for BTEX. The parameters were selected because of their relationship to refining operations. BTEX contamination has also been noted in some of the groundwater underlying Bloomfield Refining Company's facility.

As you can see from the Summary of Analytical Data, low levels of benzene were found at sample points 4 and 5 with xylene found at sample points 5 and 7. TPH was significantly high at sample point 25, with a low level at sample point 26, and even lower levels at sample points 24 and 23.

Conclusions

1. There is no significant westward migration of contamination toward Highway 44 being caused by the seepage of water from Hammond Ditch. All surface samples showed no BTEX contamination.

2. The contamination near sample point 25 is not a result of refining operations. This is substantiated by the fact that no BTEX was found in the samples near this point and the distance upgradient to the closest detected contamination of BTEX at sample point 7 is nearly ¼ of a mile. Discussion with long-term employees at the facility indicates that spills have occurred at the intersection of Sullivan Road and Highway 44, but no refinery owned or operated equipment has been involved.

3. Contamination at sample points 4, 5, and 7 either migrated to that area many years ago or, more likely, was a result of someone dumping or spilling in the area. This is evidenced by no detectable contamination at sample points 1, 2, and 3. Also, the ditch beginning near sample point 2 would stop the westward movement of any contamination from the facility. This ditch has existed since at least 1962 (probably constructed in the 1950's). The facility began operations in about 1960.

4. The contamination is very minor, very localized, and not of significant concern, especially when considering the potential use of the groundwater.

Proposed Remediation

1. Although the petroleum contamination near sample point 25 is not a result of Bloomfield Refining Company operations, we would be willing to assist you in a reasonable clean-up activity. This would not include removal of the material as a hazardous waste. We believe that natural biological activity (leave it alone) would be the best course of action.

2. In the vicinity of sample points 4, 5, and 7, we propose to dig a trench through the area about 2½ feet deep and wide enough to capture the water in the area, and then aerate the water, in-situ, with a portable pump and nozzle. After acceptable levels of BTEX are obtained the removed surface sediments will be replaced. It is believed that the impermiable Nacimiento formation will be encountered at about two to three feet below grade in this area. We propose to do this work during the summer of 1990.

The data submitted herewith was done in fulfillment of an agreement with the New Mexico Oil Conservation Division. It should not be construed, for any purpose, as an admission of liability under any governmental statute or rule or an admission of any question of law. Furthermore, given the complexity of the investigation, Bloomfield Refining Company reserves the right to further interpret or modify any statements or data contained here, if appropriate, in the future.

Please feel free to call me or Chris Hawley for further discussion of this matter.

Sincerely,

for Richard Traylor
Refinery Manager

RT/jm

cc: Joe Warr
Chris Hawley
Mike Macy
Craig West

BLOOMFIELD REFINING COMPANY
SUMMARY OF FIELD OBSERVATIONS

LOC	TYPE	TOTAL DEPTH	DEPTH TO H2O	COND.	OBSERVATIONS
1	WELL	2'5"	1'5"	1400	TOP OF HOLE VERY CLAYEY. SAND AND SMALL GRAVEL REACHED AT 1'6". NO EVIDENCE OF HC'S.
2	SURF	1'0"	0"	1400	DUG A SMALL HOLE AT SIDE OF THE DITCH THAT DIRECTS STORM WATER TO THE RIVER. FRESH HAMMOND SEEPAGE CONSTANTLY RUNNING.
3	WELL	2'4"	1'10"	2800	HOLE THRU SILT/SAND THEN GRAVEL. NO SIGNIFICANT EVIDENCE OF HC'S.
4	WELL	2'6"	1'5"	5400	DUG SILT/SAND TO GRAVEL. SAND & GRAVEL WAS BLACK. POSSIBLE HC ODOR.
5	WELL	2'4"	1'5"	2600	SILT IN 1ST FOOT, THEN BLACK SAND POSSIBLE NACIMIENTO AT 2'2". DEFINITE HC ODOR.
6	WELL	2'0"	1'2"	1600	SILT FOR 1ST FOOT, THE 8" OF SAND COBBLES AT 1'8". SLIGHT GRAY DISCOLORATION. POSSIBLE ODOR?
7	WELL	2'0"	1'5"	3200	SAND IMMEDIATELY, COBBLES AT 1 FOOT. SLIGHT DISCOLORATION.
8	WELL	1'6"	4"	4300	SAND THEN COBBLES AT 6". BLACK BUT NO HC ODOR. DYNAMITE BLASTING CAPS WERE FOUND BURIED HERE.
9	SURF	0"	0"	3800	HAMMOND DITCH SEEPAGE. NO HC'S.
10	WELL	2'0"	8"	1300	SAND TO 1 FT, THEN COBBLES. SLIGHT GRAY DISCOLORATION IN SATURATED ZONE.
11	WELL	2'0"	1'4"	9200	SAND TO 1 FT, THEN GRAVEL/ROCKS. NO DISCOLORATION. NEAR DUMP.
12	WELL	2'0"	1'2"	8800	SANDY, NOT MUCH GRAVEL. POSSIBLE NACIMIENTO AT 2 FT. NEAR DUMP. ALKALINE SHOW AT SURFACE.
13	SURF	0"	0"	-----	SURFACE ONLY SAMPLE. LOOKS CLEAN
14	WELL	2'0"	11"	2600	CLEAN SAND, SOME CLAY AT 2 FEET.
15	SURF	0"	0"	-----	SURFACE ONLY SAMPLE. LOOKS CLEAN
16	WELL	3'0"	2'8"	4000	SILT TO 1 FT. SAND TO 2 FT. THEN ROCKS/COBBLES TO 3 FT. NO HC'S.

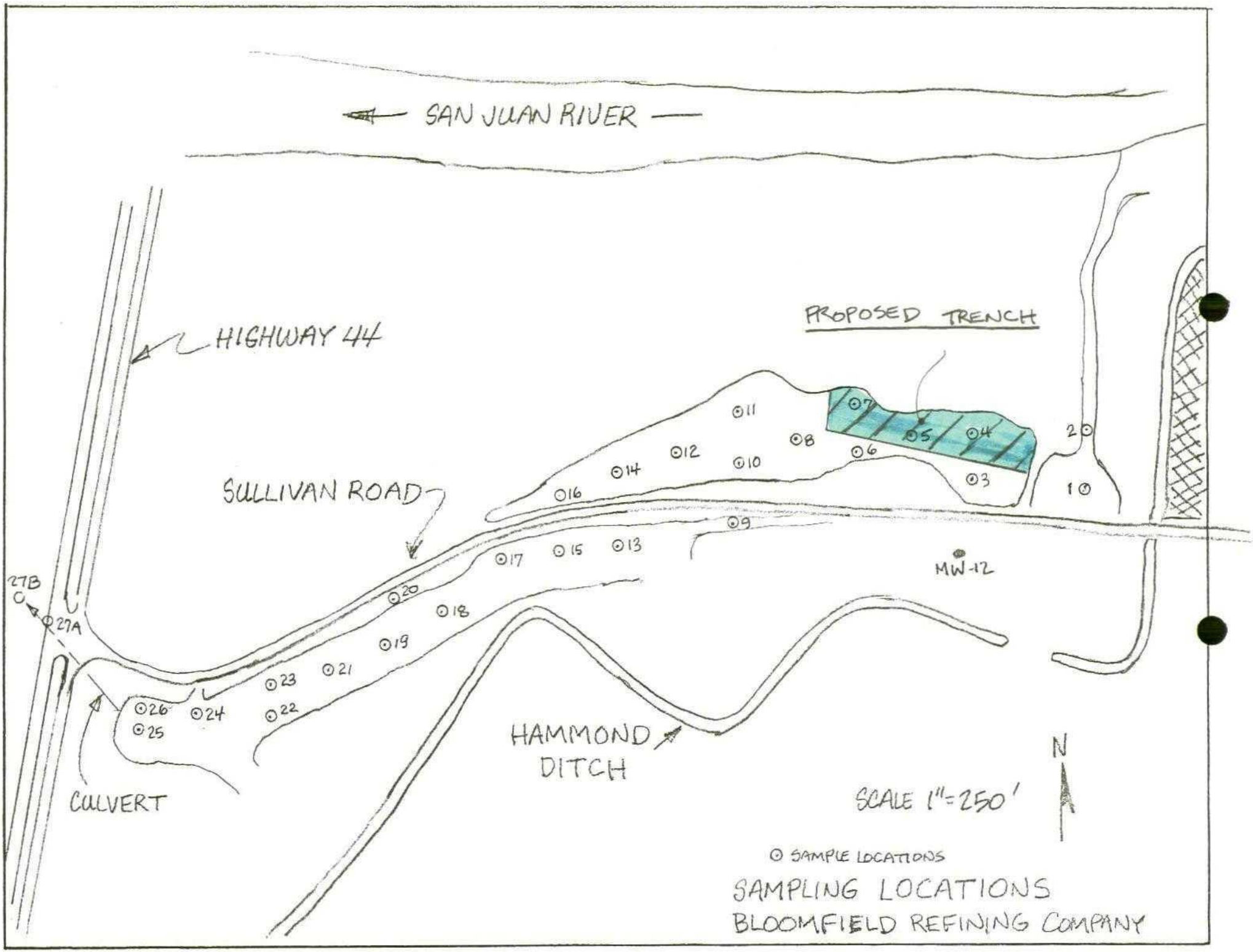
BLOOMFIELD REFINING COMPANY
SUMMARY OF FIELD OBSERVATIONS

LOC	TYPE	TOTAL DEPTH	DEPTH TO H2O	COND.	OBSERVATIONS
17	SOIL	6"	0"	-----	SOIL AND SURFACE WATER SAMPLE.
	SURF		0"	-----	NO VISIBLE CONTAMINATION.
18	SOIL	6"	0"	-----	SOIL AND SURFACE WATER SAMPLE.
	SURF		0"	-----	NO VISIBLE CONTAMINATION.
19	SOIL	6"	0"	-----	SOIL AND SURFACE SAMPLE.
	SURF		0"	-----	NO VISIBLE CONTAMINATION.
20	SOIL	6"	NA	-----	SOIL SAMPLE TAKEN 10 FT FROM ROAD
21	SOIL	6"	0"	-----	SOIL AND SURFACE SAMPLE.
	SURF		0"	-----	NO VISIBLE CONTAMINATION.
22	SOIL	6"	0"	-----	SOIL AND SURFACE SAMPLE. SANDY.
	SURF		0"	-----	NO VISIBLE CONTAMINATION.
23	SOIL	6"	0"	-----	LOTS OF COBBLE IN AREA. SLIGHT DISCOLORATION.
24	SOIL	6"	0"	-----	DUG SOIL SAMPLE OUT OF CENTER OF
	SURF				STREAM. LOTS OF WATER FLOW HERE.
25	SOIL	1'0"	0"	-----	CENTER OF MARSH/STREAM. VERY BLACK SOIL. VERY LIKELY HC'S.
26	SOIL	6"	0"	-----	SOIL AND WATER SAMPLE. HOLE
	SURF		0"	-----	DID NOT SHOW MUCH DISCOLORATION.
27A	SURF	0"	0"	-----	WATER SAMPLE OF RUNNING WATER TAKEN JUST BELOW SURFACE AS IT EXITS CULVERT WEST SIDE OF HWY 44
27B	SOIL	6"	0"	-----	SOIL SAMPLE ABOUT 20 FEET FROM
	SURF		0"	-----	CULVERT, CENTER OF DITCH. NO VISIBLE CONTAMINATION.

SLOOMFIELD REFINING COMPANY
SUMMARY OF ANALYTICAL DATA

		UNITS	BENZENE	TOLUENE	E-BENZENE	XYLENES	TPH
1	WELL	UG/L	ND	ND	ND	ND	NR
2	SURF	UG/L	ND	ND	ND	ND	NR
3	WELL	UG/L	ND	ND	ND	ND	NR
4	WELL	UG/L **	485 **	ND **	ND **	ND **	NR
5	WELL	UG/L **	302 **	ND **	ND **	2730 **	NR
6	WELL	UG/L	ND	ND	ND	ND	NR
7	WELL	UG/L **	ND **	ND **	ND **	88 **	NR
8	WELL	UG/L	ND	ND	ND	ND	NR
9	SURF	UG/L	ND	ND	ND	ND	NR
10	WELL	UG/L	ND	ND	ND	ND	NR
11	WELL	UG/L	ND	ND	ND	ND	NR
12	WELL	UG/L	ND	ND	ND	ND	NR
13	SURF	UG/L	ND	ND	ND	ND	NR
14	WELL	UG/L	ND	ND	ND	ND	NR
15	SURF	UG/L	ND	ND	ND	ND	NR
16	WELL	UG/L	ND	ND	ND	ND	NR
17	SURF	UG/L	ND	ND	ND	ND	NR
17	SOIL	MG/KG	ND	ND	ND	ND	ND
18	SURF	UG/L	ND	ND	ND	ND	NR
18	SOIL	MG/KG	ND	ND	ND	ND	ND
19	SURF	UG/L	ND	ND	ND	ND	NR
19	SOIL	MG/KG	ND	ND	ND	ND	ND
20	SOIL	MG/KG	NR	NR	NR	NR	ND
21	SURF	UG/L	ND	ND	ND	ND	NR
21	SOIL	MG/KG	ND	ND	ND	ND	ND
22	SURF	UG/L	ND	ND	ND	ND	NR
22	SOIL	MG/KG	ND	ND	ND	ND	ND
23	SOIL	MG/KG **	ND **	ND **	ND **	ND **	20.2
24	SURF	UG/L	ND	ND	ND	ND	NR
24	SOIL	MG/KG **	ND **	ND **	ND **	ND **	21.2
25	SOIL	MG/KG **	ND **	ND **	ND **	ND **	1050
26	SURF	UG/L	ND	ND	ND	ND	NR
26	SOIL	MG/KG **	ND **	ND **	ND **	ND **	87.9
27A	SURF	UG/L	ND	ND	ND	ND	NR
27B	SURF	UG/L	ND	ND	ND	ND	NR
27B	SOIL	MG/KG	ND	ND	ND	ND	ND

NOTES: ND=NOT DETECTED, NR=NOT RUN, SURF=SURFACE SAMPLE,
SOIL=SOIL SAMPLE, WELL=GROUNDWATER SAMPLE.



SAMPLING LOCATIONS
BLOOMFIELD REFINING COMPANY

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-1
LAB NO: B397
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/05/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-2
LAB NO: B398
Analysis Requested: Purgeable aromatics in water.

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/05/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-3
LAB NO: B399
Analysis Requested: Purgeable aromatics in water.

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/05/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-4
LAB NO: B400
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/10/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	485 (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Senior Chemist

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2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-5
LAB NO: B401
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/10/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	302 (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
p-Xylene	ND (6.0)	ug/l
m-Xylene	2730 (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Senior Chemist

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Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-6
LAB NO: B402
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/05/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

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Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-7
LAB NO: B403
Analysis Requested: Purgeable aromatics in water.

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/05/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	88 (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-8
LAB NO: B404
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/10/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Senior Chemist

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Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-8R 3224
LAB NO: B456
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
DATE RECEIVED: 09/26/89
DATE COLLECTED: 09/25/89

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Senior Chemist

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Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-9
LAB NO: B405
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/10/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
SITE: BRC-10R 3223
DATE RECEIVED: 09/26/89
LAB NO: B457
DATE COLLECTED: 09/25/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-11R 3222
LAB NO: B458
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
DATE RECEIVED: 09/26/89
DATE COLLECTED: 09/25/89

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-12
LAB NO: B406
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/10/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Senior Chemist

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Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-12R 3221
LAB NO: B459
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
DATE RECEIVED: 09/26/89
DATE COLLECTED: 09/25/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

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Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-13
LAB NO: B407
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/10/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
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CLIENT: Bloomfield Refinery
SITE: BRC-14
LAB NO: B408
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/10/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
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CLIENT: Bloomfield Refinery
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/10/89
SITE: BRC-15
DATE RECEIVED: 09/22/89
LAB NO: B409
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Senior Chemist

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CLIENT: Bloomfield Refinery
SITE: BRC-16
LAB NO: B410
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/10/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
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CLIENT: Bloomfield Refinery
SITE: BRC-17
LAB NO: B411
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/04/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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2506 West Main Street
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Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-17
LAB NO: B421
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	ND (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
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Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-17
LAB NO: B421A
Analysis Requested: Purgeable aromatics in soil.

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/20/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (2.0)	mg/kg
Toluene	ND (2.0)	mg/kg
Ethylbenzene	ND (2.0)	mg/kg
p-Xylene	ND (2.0)	mg/kg
m-Xylene	ND (2.0)	mg/kg
o-Xylene	ND (2.0)	mg/kg

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

Note: Samples arrived with large headspace and non-teflon lids.

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CLIENT: Bloomfield Refinery
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/04/89
SITE: BRC-18
DATE RECEIVED: 09/22/89
LAB NO: B412
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-18
LAB NO: B422
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	ND (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-18
LAB NO: B422A
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/20/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in soil.

Parameter	Concentration	Units
Benzene	ND (2.0)	mg/kg
Toluene	ND (2.0)	mg/kg
Ethylbenzene	ND (2.0)	mg/kg
p-Xylene	ND (2.0)	mg/kg
m-Xylene	ND (2.0)	mg/kg
o-Xylene	ND (2.0)	mg/kg

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

Note: Samples arrived with large headspace and non-teflon lids.

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CLIENT: Bloomfield Refinery
SITE: BRC-19
LAB NO: B413
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-19
LAB NO: B423
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	ND (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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CLIENT: Bloomfield Refinery
SITE: BRC-19
LAB NO: B423A
Analysis Requested: Purgeable aromatics in soil.

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/20/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (2.0)	mg/kg
Toluene	ND (2.0)	mg/kg
Ethylbenzene	ND (2.0)	mg/kg
p-Xylene	ND (2.0)	mg/kg
m-Xylene	ND (2.0)	mg/kg
o-Xylene	ND (2.0)	mg/kg

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

Note: Samples arrived with large headspace and non-teflon lids.

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CLIENT: Bloomfield Refinery
SITE: BRC-20
LAB NO: B424
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	ND (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-20
LAB NO: B424

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Analysis Requested: Purgeable aromatics in soil.

Parameter	Concentration	Units
Benzene	N/A *(2.0)	mg/kg
Toluene	N/A *(2.0)	mg/kg
Ethylbenzene	N/A *(2.0)	mg/kg
p-Xylene	N/A *(2.0)	mg/kg
m-Xylene	N/A *(2.0)	mg/kg
o-Xylene	N/A *(2.0)	mg/kg

OK BLANK FOR ROADSIDE

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

* Due to laboratory error in labeling this entire sample was used in the TPH extraction. Thus no sample was available for this 8020 analysis.

C. Neal Schaeffer
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2506 West Main Street
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CLIENT: Bloomfield Refinery
SITE: BRC-21
LAB NO: B414
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

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CLIENT: Bloomfield Refinery
SITE: BRC-21
LAB NO: B425
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	ND (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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CLIENT: Bloomfield Refinery
SITE: BRC-21
LAB NO: B425A
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/20/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in soil.

Parameter	Concentration	Units
Benzene	ND (2.0)	mg/kg
Toluene	ND (2.0)	mg/kg
Ethylbenzene	ND (2.0)	mg/kg
p-Xylene	ND (2.0)	mg/kg
m-Xylene	ND (2.0)	mg/kg
o-Xylene	ND (2.0)	mg/kg

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

Note: Samples arrived with large headspace and non-teflon lids.

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2506 West Main Street
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CLIENT: Bloomfield Refinery
SITE: BRC-22
LAB NO: B415
Analysis Requested: Purgeable aromatics in water.

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Senior Chemist

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Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-22
LAB NO: B426
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	ND (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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CLIENT: Bloomfield Refinery
SITE: BRC-22
LAB NO: B426A
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/20/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in soil.

Parameter	Concentration	Units
Benzene	ND (2.0)	mg/kg
Toluene	ND (2.0)	mg/kg
Ethylbenzene	ND (2.0)	mg/kg
p-Xylene	ND (2.0)	mg/kg
m-Xylene	ND (2.0)	mg/kg
o-Xylene	ND (2.0)	mg/kg

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

Note: Samples arrived with large headspace and non-teflon lids.

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CLIENT: Bloomfield Refinery
SITE: BRC-23
LAB NO: B427
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	20.2 (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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CLIENT: Bloomfield Refinery
SITE: BRC-23
LAB NO: B427A
Analysis Requested: Purgeable aromatics in soil

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/20/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (2.0)	mg/kg
Toluene	ND (2.0)	mg/kg
Ethylbenzene	ND (2.0)	mg/kg
p-Xylene	ND (2.0)	mg/kg
m-Xylene	ND (2.0)	mg/kg
o-Xylene	ND (2.0)	mg/kg

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

Note: Samples arrived with large headspace and non-teflon lids.

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2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-24
LAB NO: B416
Analysis Requested: Purgeable aromatics in water.

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

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2506 West Main Street
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Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-24
LAB NO: B428
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	21.2 (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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Farmington, New Mexico 87401
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CLIENT: Bloomfield Refinery
SITE: BRC-24
LAB NO: B428A
Analysis Requested: Purgeable aromatics in soil

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/20/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (2.0)	mg/kg
Toluene	ND (2.0)	mg/kg
Ethylbenzene	ND (2.0)	mg/kg
p-Xylene	ND (2.0)	mg/kg
m-Xylene	ND (2.0)	mg/kg
o-Xylene	ND (2.0)	mg/kg

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

Note: Samples arrived with large headspace and non-teflon lids.

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CLIENT: Bloomfield Refinery
SITE: BRC-25
LAB NO: B429
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	1050 (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

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CLIENT: Bloomfield Refinery
SITE: BRC-25
LAB NO: B429A
Analysis Requested: Purgeable aromatics in soil

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/23/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (2.0)	mg/kg
Toluene	ND (2.0)	mg/kg
Ethylbenzene	ND (2.0)	mg/kg
p-Xylene	ND (2.0)	mg/kg
m-Xylene	ND (2.0)	mg/kg
o-Xylene	ND (2.0)	mg/kg

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

Note: Samples arrived with large headspace and non-teflon lids.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-26
LAB NO: B417
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/13/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-26
LAB NO: B430
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	87.9 (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-26
LAB NO: B430A
Analysis Requested: Purgeable aromatics in soil

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/23/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (2.0)	mg/kg
Toluene	ND (2.0)	mg/kg
Ethylbenzene	ND (2.0)	mg/kg
p-Xylene	ND (2.0)	mg/kg
m-Xylene	ND (2.0)	mg/kg
o-Xylene	ND (2.0)	mg/kg

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

Note: Samples arrived with large headspace and non-teflon lids.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
SITE: BRC-27A
DATE RECEIVED: 09/22/89
LAB NO: B418
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-27B
LAB NO: B419
Analysis Requested: Purgeable aromatics in water.

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-27
LAB NO: B431
Analysis Requested: Total Petroleum Hydrocarbons

DATE REPORTED: 10/26/89
DATE ANALYZED: 09/26/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
TPH	ND (20.0)	mg/kg

Method:
Fuel oils, light, total recoverable, gas, chromatographic, 0-3109-83, USGS, Method for the determination of Organic Substances in Water and Fluvial Sediments.

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Bloomfield Refinery
SITE: BRC-27
LAB NO: B431A
Analysis Requested: Purgeable aromatics in soil

DATE REPORTED: 10/26/89
DATE ANALYZED: 10/23/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89

Parameter	Concentration	Units
Benzene	ND (2.0)	mg/kg
Toluene	ND (2.0)	mg/kg
Ethylbenzene	ND (2.0)	mg/kg
p-Xylene	ND (2.0)	mg/kg
m-Xylene	ND (2.0)	mg/kg
o-Xylene	ND (2.0)	mg/kg

Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

Note: Samples arrived with large headspace and non-teflon lids.

C. Neal Schaeffer
Senior Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

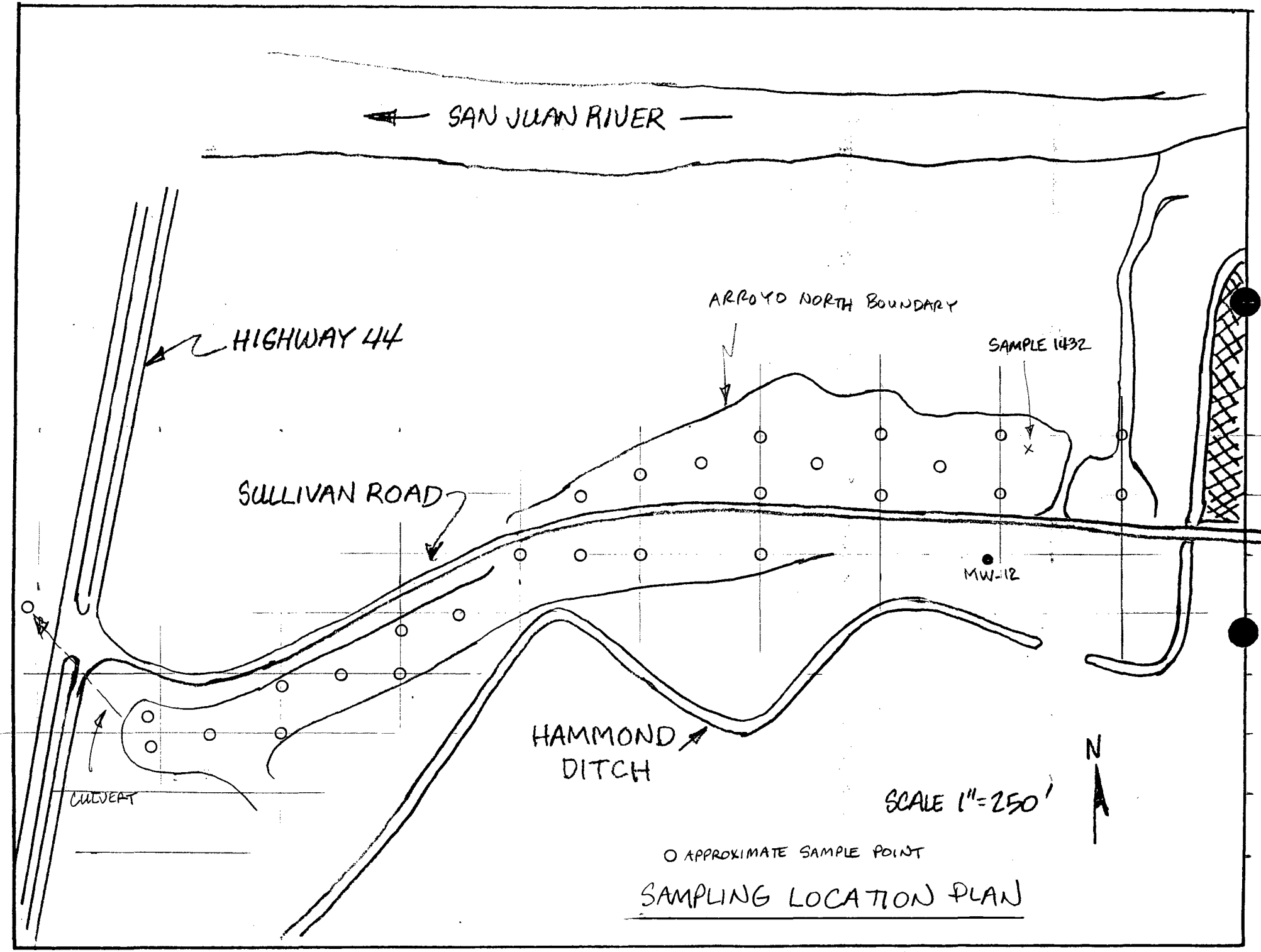
CLIENT: Bloomfield Refinery
SITE: Trip Blank
LAB NO: B420
DATE REPORTED: 10/26/89
DATE ANALYZED: 10/12/89
DATE RECEIVED: 09/22/89
DATE COLLECTED: 09/21/89
Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	ND (6.0)	ug/l
Toluene	ND (6.0)	ug/l
Ethylbenzene	ND (6.0)	ug/l
m,p-Xylene	ND (6.0)	ug/l
o-Xylene	ND (6.0)	ug/l

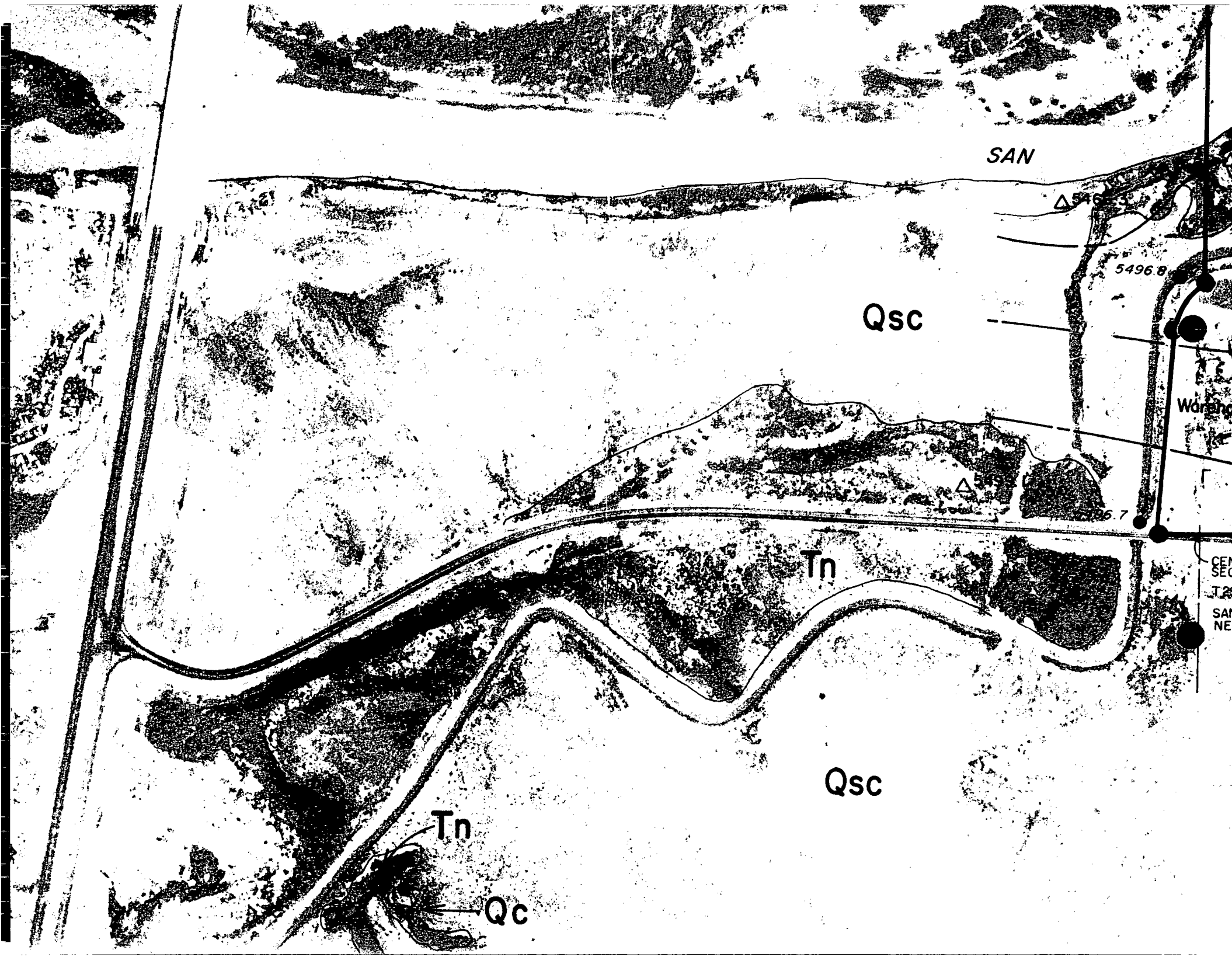
Method:
8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

(Detection limit in parenthesis.)
ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist



SAMPLING LOCATION PLAN


SAN
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Qsc
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Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

August 23, 1989

RECEIVED
AUG 25 1989
OIL CONSERVATION DIV.
SANTA FE

Mr. David G. Boyer
New Mexico Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87504-2088

Dear Mr. Boyer:

As we agreed at our meeting on June 20, 1989, we are herewith submitting the information you requested as detailed in Item #2 of your letter dated July 7, 1989.

Sullivan Road to Highway 44 Contamination

Extending from near the west end of Bloomfield Refining Company at the intersection of Hammond Ditch and Sullivan Road to a culvert at Highway 44 is an arroyo that eventually empties into the San Juan River on the west side of Highway 44. A very shallow water table (about 2 feet below grade on the east end and above grade at the culvert on the west end) exists in this arroyo. This water table is recharged primarily from Hammond Ditch seepage and runoff.

Some concern has been raised about a possible plume of hydrocarbon contamination migrating to the west down this arroyo. A sample (identified as Sample #1432) taken from a hole dug into the water table on the north side of Sullivan Road on May 24, 1989 showed low levels of contamination (about 3 ppm total BTEX). A monitoring well (MW-12) to the south across Sullivan Road from this sampling point has not indicated any BTEX contamination. Your office has also indicated soil contamination at the Highway 44 intersection of the arroyo. We believe that the possible plume from the east and the contamination at Highway 44 may not be related.

In order to facilitate the remediation of this contamination we propose the following:

1. Quantify the level of pollution and delineate a possible plume.

This will involve taking a significant number of samples in the arroyo (see Sampling Location Plan). In marshy areas, a surface sample and soil sample will be taken. Where digging is required, a post hole digger will be used. The hole will be bailed, at least three-hole volumes, before a sample is taken. All samples will be analyzed for BTEX.

The sampling will be done during September, 1989.

2. Evaluate the results.

During October, the results of the sampling will be evaluated. If the results are inconclusive, additional sampling may be required.

3. Prepare a remediation plan.

Until the analytical results are evaluated, a detailed remediation plan cannot be prepared. If soil removal is required in the marshy areas near Highway 44 this will need to be done during the winter months when Hammond Ditch is closed. Due to the fact that the groundwater is very shallow, remediation of a hydrocarbon plume on the property to the north of Sullivan Road may be the most easily accomplished with a trench, provided access to the property can be obtained.

Request for Additional Information

1. A response to the comments in your letter of May 22, 1989 concerning our groundwater remediation project and a revised "Final Report on Soil Vapor Survey, Well Installation, and Hydrocarbon Recovery System, Bloomfield Refining Company" is enclosed.

2. Results from monitoring well #13 do not indicate that diesel fuel from our facility has contaminated groundwater.

We propose to review the data, including results from our groundwater remediation program, and install, as necessary, any additional monitoring wells to the south and west of MW-11 by August 30, 1990.

3. Our groundwater remediation program is currently working quite well. We are inspecting and maintaining the pumps on a weekly basis. We prefer to operate the system at least a year before making any conclusions as to the necessity for additional recovery wells. At this time, we do not have sufficient wastewater disposal capacity, but, as you are aware, we are installing additional capacity. If our analysis shows that additional recovery wells are needed, we would first consider putting recovery pumps in monitoring wells P-3 and MW-11. We propose to have the evaluation and expanded system in service, if necessary, by August 30, 1990.

4. We have received a permit to relocate our fresh water diversion point to a pond constructed on the river terrace just below the cliff seeps that have contained some hydrocarbons. As this pond is pumped for our fresh water the draw down will cause a flushing out of any hydrocarbons that have accumulated in the river terrace water table. Additionally, hydrocarbon contaminated discharges from the cliff seeps will be routed to the new pond and pumped with our raw water. It is anticipated that the extreme dilution of the seeps coupled with pumping and aeration will reduce the dissolved hydrocarbons to a level that will not impact operations.

Currently, we maintain a hydraulic barrier at Hammond Ditch to avoid additional hydrocarbon migration to the cliff seeps. Additionally, we have completed source control projects (new slabs and sewers, tank inspections) to reduce the causes of contamination. During the irrigation season, Hammond Ditch would probably recharge the groundwater to rapidly to effectively pump from MW-9, but there may be some opportunity for recovery during the non-irrigation season.

For scheduling purposes, we propose to study the contamination at MW-9 during the summer of 1990 and propose and implement the needed remediation by the end of 1990.

At this time, we are utilizing the majority of our environmental resources toward the installation of the first of our lined evaporation ponds as per our discharge plan. With its completion, estimated for November, 1989, we will be in a better position to further detail our other environmental projects and needs. Please feel free to call me or Chris Hawley anytime.

Sincerely,

For Richard Traylor
Refinery Manager

RT/CH/jm

cc: Joe Warr
Mike Macy
Chris Hawley

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

SAMPLE # 1432

Date: 05/31/89

Client: Bloomfield Refinery
Sample Site: Salmon
IML Sample No: F89180 O
Analysis Requested: Purgeable Aromatics
Sample Matrix: Water

Date Sampled: 05/24/89
Date Received: 05/24/89
Date Extracted: N/A
Date Analyzed: 05/26/89

Parameter	Concentration	Units
BENZENE	1400 (10)	ug/l
TOLUENE	13 (10)	ug/l
ETHYLBENZENE	130 (10)	ug/l
m,p-XYLENE	1400 (10)	ug/l
o-XYLENE	ND (10)	ug/l

Method: 8020 Aromatic Volatile Organics, SW-846, USEPA (1982)
602 Purgeable Aromatics, 40 CFR, Part 136

Note: Method Detection Limit (MDL) is given in parenthesis.
ND means analyte was not detected.

C. Neal Schaeffer
Senior Organic Chemist

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

Client: Bloomfield Refining Company

Sample ID: MW12
Laboratory Number: F1529
Analysis Requested: Method 602, 8010
Sample Matrix: Water
Date Sampled: 06/03/88
Date Received: 06/06/88

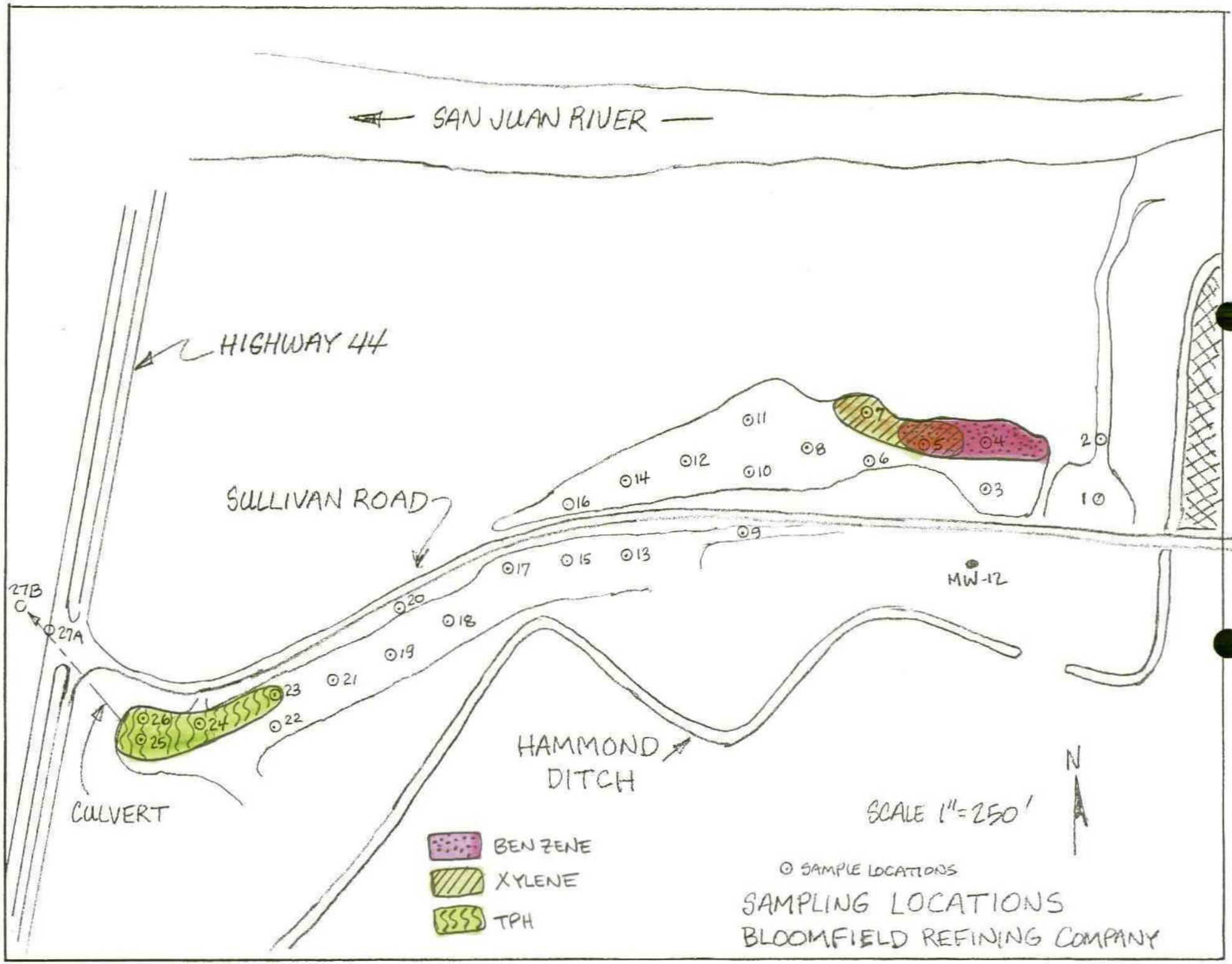
Parameter	Method	Concentration		Units
BENZENE	602	ND	(0.001)	mg/l
TOLUENE	602	ND	(0.001)	mg/l
CARBONTETRACHLORIDE	8010	ND	(0.001)	mg/l
1,2-DICHLOROETHENE	8010	ND	(0.001)	mg/l
1,1-DICHLOROETHYLENE	8010	ND	(0.001)	mg/l
1,1,2,2-TETRACHLOROETHYLENE	8010	ND	(0.001)	mg/l
1,1,2-TRICHLOROETHYLENE	8010	ND	(0.001)	mg/l

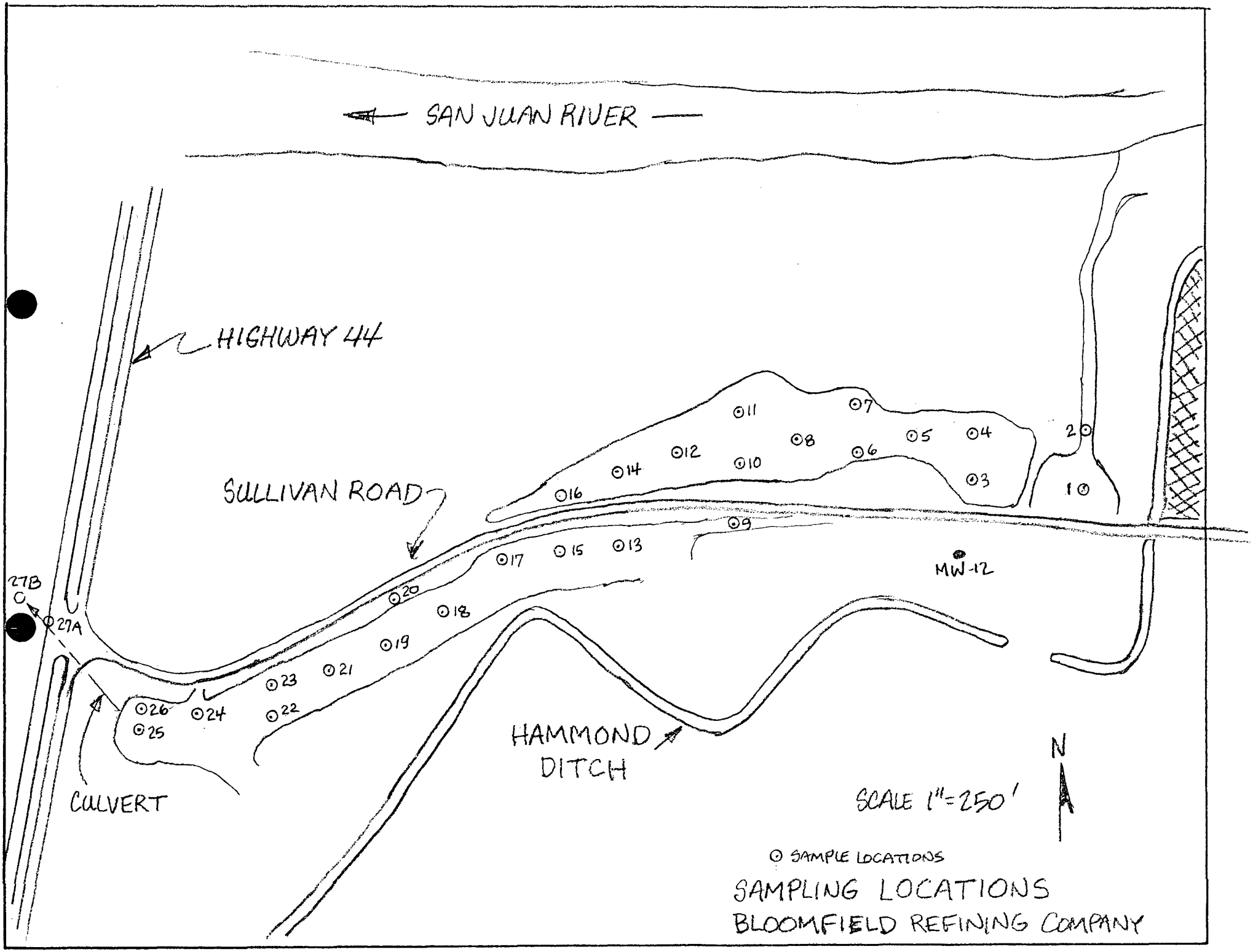
Method: 602, Purgeable Aromatics, Methods for Organic Chemical Analysis of of Muicipal and Industrial Wasrewater, USEPA (1984).

Method: 8010, Halogenated Volatile Organics, SW-846, USEPA (1982).

(Detection limit in Parenthesis)
ND - Parameter not detected at the stated detection limit.

Ron R. Richardson
Lab. Director


SAN JUAN RIVER
HIGHWAY 44
SULLIVAN ROAD
HAMMOND DITCH
CULVERT
MW-12
27B
27A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
BENZENE
XYLENE
TPH
SCALE 1"=250'
N
⊙ SAMPLE LOCATIONS
SAMPLING LOCATIONS
BLOOMFIELD REFINING COMPANY


SAN JUAN RIVER
HIGHWAY 44
SULLIVAN ROAD
CULVERT
HAMMOND DITCH
MW-12
27B
27A
1
2
3
4
5
6
7
8
9
10
11
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13
14
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22
23
24
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26
N
SCALE 1"=250'
⊙ SAMPLE LOCATIONS
SAMPLING LOCATIONS
BLOOMFIELD REFINING COMPANY

MEETING WITH BLOOMFIELD REFINING COMPANY

June 20, 1989

(Notes of D. Boyer, D. Englert summarized here.)

Attending

Richard Traylor - Refinery Manager
Chris Hawley - Refinery Environmental Engineer
Bruce Garber - Legal Counsel
David Boyer - OCD, Environmental Bureau Chief
Roger Anderson - OCD, Environmental Engineer
David Englert - OCD, Geologist
Bob Stovall - OCD, General Counsel

Meeting purpose to discuss contamination study and cleanup requirements as per May 22, 1989 letter, and discharge plan comments in May 8 letter.

Contamination Investigation and Remedial Action

OCD discussed the necessity for BRC to adequately address the following issues:

1. Site cleanup west of the refinery along Sullivan Road (north and south sides) to the vicinity of Highway 44, including:

   - OCD preference for BRC to remove oil-soaked and contaminated soils (vs. pump and treat contaminated fluids).

   - Investigation of whether contamination is migrating or continuing to migrate beneath Hammond Ditch to the east-west arroyo immediately west of monitor well P-1. A trench may be required to determine the extent and magnitude of contamination seepage. This determination should be made sometime after the close of the irrigation season to avoid direct drainage from the ditch.

   - BRC again needs to contact property owners to pursue access to the property west of Hammond Ditch and north of Sullivan Road.

   The OCD will request that San Juan County erect signing to prohibit dumping alongside Sullivan road.

2. Investigation and recovery of contamination south of Sullivan Road, east of Hammond Ditch.

   - BRC needs to define the extent of the plume south and west of MW-1. (A timetable to accomplish this should be proposed.)

- Cleanup of contamination at (and north of) MW-11 is necessary but BRC can defer recovery of fluids until summer 1990 because of limited pond capacity.

- BRC needs to investigate, no later than summer of 1990, possible diesel fuel occurrence in the vicinity of soil vapor survey point #17.

3. Investigation of floating hydrocarbons in MW-9.

   - OCD would consider the possibility of seasonal pumping to reduce the amount of water pumped.

Discharge Plan Issues

1. BRC will need to cement or otherwise modify the surface casing at cathodic protection well #1 by Tank 28 to prevent contamination from the surface.

2. OCD disagreed with BRC's response concerning replacement of the oily water ponds with double-lined ponds in the event of a leak requiring significant repair. OCD wants replacement in this case; BRC only wants to consider replacement.

3. BRC disagreed with OCD's date of 12/31/90 for a final decision by BRC on use of the spray irrigation system or replacement with additional ponds. BRC proposed an additional year to evaluate effectiveness.

4. OCD disagreed with BRC's response on the issue of relining the clay evaporation ponds with a synthetic liner (with leak detection). OCD wants the ponds retrofitted or replaced within 5-years; BRC wants only to consider OCD's concerns.

Agreement on Future Submittals

BRC will provide responses to OCD's May 8 comments on the site inspection within 30 days from the meeting date, and respond to OCD's May 22 comments on contamination investigation within 60 days from the meeting.

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

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

May 23, 1989

Mr. R. W. Traylor
Refinery Manager
Bloomfield Refining Company
P.O. Box 159
Bloomfield, New Mexico 87413

RE: Ground Water Remediation Plan

Dear Mr. Traylor:

Attached please find a corrected page 3 and page 5 to your May 22, 1989 letter. The correction to page 3 is the dates in the first paragraph and the correction to page 5 is to the word "containment" (versus "contaminant") in Section B.4.

I'm sorry for any inconvenience this may have caused. If you have any questions, please contact me at 827-5812.

Sincerely,

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

Attachments

2. OCD believes that the 1/16/89 and 2/15/89 water table maps shown in Plates 5 and 7 are incorrect and misleading because water levels used for monitor wells 1, 2, 3, 5, 8, and 9 were those of September 9, 1988. For example, MW-1 recorded a 1.98 Ft. drop between September 9 and November 18, 1988. Also, there is likely a ground water mound under the raw water ponds since OCD has documented seepage from them to the ditch in winter. We request that Plates 5 and 7 be redrawn using only the measured water levels shown in Table 3-1, p. 32, of the report.

3. Plates 6 and 8 showing observed water level decline on 1/16/89 and 2/15/89 after 12 and 42 days of pumping are incorrect and misleading. First, since data from September 9, 1988, was used to draw the water table maps of January 16 and February 15, water levels in the eastern part of the refinery obviously would not show a decline.

   Second, no water levels were taken in any wells immediately prior to the start of the product recovery test. Without knowing a static water level at the start of the test, there is no way to measure the amount of decline due to drainage into Hammond Ditch between September 9 and the start of the test on January 4, 1989, or any decline due to cessation of land application. Declines in MW-13 are most likely a response to winter decreases in land application. It is likely that the drainage to Hammond Ditch continued through the test, though probably at a lesser rate as water levels in bank storage and the ditch approach equilibrium. Since Plate 4 shows MW-11 off gradient from the recovery wells and the capture cone from pumping after 12-days could not have reached MW-11, an estimate can be made of the water level decline in the piezometers due to natural drainage with the remainder of the decline due to pumping effects. Based on this, I estimate that at least 1/3 to 1/2 of the water level decline observed in the piezometers adjacent to the recovery wells is not from pumping but was the result of drainage of bank storage water into Hammond Ditch or decline due to cessation of land application. Therefore unless the decline directly due to pumping can be quantified and separated from those of other declines, Plates 6 and 8 should be omitted from the report.

4. The discussion in Section 4.3 (beginning on p. 47) of the results of the product recovery pumping tests is incorrect because the assumption is made that the drawdowns observed in the recovery wells and surrounding monitor wells is wholly due to pumping and not seasonal declines. This introduces serious doubts as to whether the system can work as designed to capture product that would otherwise migrate from refinery property to BLM land.

4. No discussion was presented in the report on any aspect of the off-site contamination west of Hammond Ditch along Sullivan Road to Highway 44.

B. Request for Additional Investigation

Based on information presented in the report and the requests made in OCD's letter of November 4, 1988, BRC is requested to perform the following:

1. Respond to the OCD comments provided in Section A above including reevaluation of recovery pumping results and revision of plates 3, 5 and 7, and deletion of plates 6 and 8 unless water level declines can be attributed to recovery pumping.

2. Prepare a schedule to install an additional monitor well near vapor survey location 17 to determine if diesel fuel has contaminated ground water, and a schedule for additional well installation to determine migration of hydrocarbons south and west of MW-11.

3. Unless BRC can demonstrate that the existing recovery wells can capture hydrocarbons on BLM land, prepare a schedule for installation of additional recovery wells and initiation of hydrocarbon recovery between P-3 and MW-11.

4. Prepare a schedule for further investigation of the floating hydrocarbons in MW-9. The investigation report should include a proposal for containment and removal to prevent floating or dissolved hydrocarbon discharge from the cliff seeps.

5. On the evening of April 27, OCD re-documented the presence of oil in shallow sediments along Highway 44 right-of-way both on the east and west sides of the highway culvert. BRC has continued to ignore our request for investigation of this problem. Prepare a schedule for complete delineation of the extent of the oil, and for removal of this contamination.

C. Requirement to Meet with OCD

Upon receipt of this letter, you are required to schedule a meeting with OCD that will occur within 30-days of receiving this letter. At the meeting, BRC should provide a schedule for responding to OCD's comments and requests for additional investigation. BRC will be required to show why OCD should not initiate legal action against BRC for offsite contamination in light of BRC's continued failure to respond to numerous requests for investigation and clean-up of the West Sullivan Road contamination.

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

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

May 22, 1989

CERTIFIED MAIL
RETURN RECEIPT NO. P-106 675 536

Mr. R. W. Traylor
Refinery Manager
Bloomfield Refining Company
P. O. Box 159
Bloomfield, New Mexico 87413

RE: Ground Water Remediation Plan

Dear Mr. Traylor:

The New Mexico Oil Conservation Division (OCD) has completed review of the ground water remediation plan for the Bloomfield Refinery that was submitted as Attachment 3 to the discharge plan received March 7, 1989. The document is entitled "Report on Soil Vapor Survey, Well Installation, and Hydrocarbon Recovery System, Bloomfield Refining Company", was prepared by Geoscience Consultants, Ltd., and is dated February 24, 1989. The technical report was submitted in accordance with the agreement made during a telephone conference call on October 27, 1988, between Chris Hawley of your staff, Mr. Randy Hicks of GCL Consultants, and myself, and formalized in writing in my letter (attached) of November 4, 1988 to Mr. Hawley.

The November 4 letter required that, in addition to soil survey results and on-site recovery of product, the final technical report address hydrocarbon recovery and ground water cleanup east of the ditch and south of Sullivan Road (#2, p. 3 of 11/4/88 letter), and investigation and remedial action to remove and recover oil along Sullivan Road west from the refinery to Highway 44 (#4, p. 3). The first requirement did not receive substantive discussion in the February technical report; the investigation and recovery of oil along Sullivan Road west of the refinery was not even mentioned. In addition, OCD has serious differences with GCL's interpretation of the results, including mapping of results, and overestimation of the water level decline due to pumping of the recovery wells. These issues are discussed in detail below, along with a requirement to meet to attempt to resolve these matters.

A. Comments on Final Report

From review of several years of reports and data, OCD's understanding of the hydrologic situation is as follows:

Water in the cobble beds underlying the refinery and under BLM land immediately south of Sullivan Road is due to seepage from the Hammond Ditch, seepage from the raw water ponds and the clay-lined evaporation ponds, and from excess water applied at the spray irrigation/land application area. Hydrocarbons in the water zones are from spills, leaks or other past discharges at loading areas, process areas, or storage areas. Except for occasional trace levels of dissolved hydrocarbons, no oily water is discharged to the spray irrigation area. Ground water levels and water movement are mainly controlled by water levels in Hammond Ditch and mounding under the spray irrigation area. Water levels in wells immediately adjacent to the ditch and spray area respond quickly to changes in water application while those further away show delayed responses. The situation is further complicated by the occurrence of buried channels cut into the top of the Nacimiento Formation that could act as natural "French Drains" to collect and channel the water.

As part of the remedial action plan, BRC was to better define the underlying geology to aid in locating recovery well sites and to assist the interpretation of results once wells are installed. Based on the following comments, OCD does not believe this has yet been accomplished.

1. Plate 3 showing the top of the Nacimiento is incorrect for the following reasons:

   a. Depth to the top of the Nacimiento (as shown in the driller's logs) was subtracted from top-of-pipe (TOP) elevations instead of ground surface elevations at all monitor well locations. This error apparently began with American Ground Water Consultants maps in 1984 and was continued in the 1985 Engineering-Science (ES) Report ("A review of subsurface Petroleum Hydrocarbons at the Bloomfield Refinery", January, 1985, Figure 2-1). Nacimiento elevations in the neutron-probe holes surrounding the north evaporation pond may also be incorrect.

   b. Elevations for the west refinery area shown on GCL's Plate 3 are similarly incorrect since the ground elevations listed on the logs are actually top-of-pipe elevations that may be from one to four feet above ground elevation. Errors in subtraction were also made in calculating the Nacimiento elevations at MW-10 and MW-11. Since this information is critical to understanding the location and orientation of the subsurface channels in the west refinery area, OCD requests that BRC provide a revised Plate 3 for the area west of a line joining MW-6, MW-2 and the San Juan River. Based on review of available information, we believe that the formation outcrop information shown in ES Figure 2.1 is correct and only the monitor, recovery and piezometer well information needs correction.

2. OCD believes that the 1/16/89 and 2/15/89 water table maps shown in Plates 5 and 7 are incorrect and misleading because water levels used for monitor wells 1, 2, 3, 5, 8, and 9 were those of September 9, 1988. For example, MW-1 recorded a 1.98 Ft. drop between September 9 and November 18, 1988. Also, there is likely a ground water mound under the raw water ponds since OCD has documented seepage from them to the ditch in winter. We request that Plates 5 and 7 be redrawn using only the measured water levels shown in Table 3-1, p. 32, of the report.

3. Plates 6 and 8 showing observed water level decline on 1/16/89 and 2/15/89 after 12 and 42 days of pumping are incorrect and misleading. First, since data from September 9, 1988, was used to draw the water table maps of January 16 and February 15, water levels in the eastern part of the refinery obviously would not show a decline.

   Second, no water levels were taken in any wells immediately prior to the start of the product recovery test. Without knowing a static water level at the start of the test, there is no way to measure the amount of decline due to drainage into Hammond Ditch between September 9 and the start of the test on January 4, 1989, or any decline due to cessation of land application. Declines in MW-13 are most likely a response to winter decreases in land application. It is likely that the drainage to Hammond Ditch continued through the test, though probably at a lesser rate as water levels in bank storage and the ditch approach equilibrium. Since Plate 4 shows MW-11 off gradient from the recovery wells and the capture cone from pumping after 12-days could not have reached MW-11, an estimate can be made of the water level decline in the piezometers due to natural drainage with the remainder of the decline due to pumping effects. Based on this, I estimate that at least 1/3 to 1/2 of the water level decline observed in the piezometers adjacent to the recovery wells is not from pumping but was the result of drainage of bank storage water into Hammond Ditch or decline due to cessation of land application. Therefore unless the decline directly due to pumping can be quantified and separated from those of other declines, Plates 6 and 8 should be omitted from the report.

4. The discussion in Section 4.3 (beginning on p. 47) of the results of the product recovery pumping tests is incorrect because the assumption is made that the drawdowns observed in the recovery wells and surrounding monitor wells is wholly due to pumping and not seasonal declines. This introduces serious doubts as to whether the system can work as designed to capture product that would otherwise migrate from refinery property to BLM land.

5. The statement is made on page 22 that the soil vapor level of toluene found at MW-11 is "roughly equal to background" (p. 22). The level of 10.9 ppm is over 200 times levels of toluene found south and west of MW-11, and therefore cannot be considered background. Based on the geologic logs of MW-11, 12 and 13, and P-3, it is likely that geologic control (i.e. silt and clay) can influence vapor survey results to the east of MW-11. However, the underlying sand and gravel may continue to the west of MW-11 for some distance, and to the south for a short distance. I believe that contamination may not be extensive much further southwest of MW-11, while there may be contamination east of MW-11 to survey point 17 that may indicate another source. Indeed, the high soil vapor levels of toluene (1.88 ppm) and ethybenzene (9.27) at location 17 together with surface observations of diesel fuel spills and leaks at the fueling area during OCD's April 25, 1989 inspection point to the likelihood of at least subsurface soil contamination needing further investigation.

6. Figure 3-7 (p. 41) is labeled as a map of 1, 2 Dichloroethene (1, 2 DCE) concentration in ground water. This map was mislabeled and the concentrations should be shown as 1, 2 Dichloroethane (1, 2 DCA) a common lead scavenger at oil refineries. DCE, a daughter product of trichloroethylene (TCE) and tetrachloroethylene (PCE) is only seen at one well (P-1) and then only slightly above the detection limit. Our April sampling of MW-11, 13 and RW-3 found Dichloroethane only at MW-13, and no DCE, TCE or PCE. Detection limits were 1 ppb or lower.

The following is a summary of our comments on the Geoscience report:

1. Because of errors in plotting the top of the Nacimiento, no evidence was presented that a buried stream channel exists that will allow the existing product recovery system to recover oil from BLM land.

2. Because water levels were not measured immediately prior to the start of the pump test and water level declines were not considered in the analysis of the results, it is not known at this time whether the current pumping arrangement will prevent further hydrocarbon movement onto BLM land. BRC needs to reevaluate the pump test results in lieu of known changes in water levels due to Hammond Ditch and land application.

3. The extent of petroleum hydrocarbon contamination on BLM land has not been documented. The southward and westward extent of contamination near MW-11 has not been shown. A second source near the diesel fueling area may be present and moving onto BLM property.

4. No discussion was presented in the report on any aspect of the off-site contamination west of Hammond Ditch along Sullivan Road to Highway 44.

B. Request for Additional Investigation

Based on information presented in the report and the requests made in OCD's letter of November 4, 1988, BRC is requested to perform the following:

1. Respond to the OCD comments provided in Section A above including reevaluation of recovery pumping results and revision of plates 3, 5 and 7, and deletion of plates 6 and 8 unless water level declines can be attributed to recovery pumping.

2. Prepare a schedule to install an additional monitor well near vapor survey location 17 to determine if diesel fuel has contaminated ground water, and a schedule for additional well installation to determine migration of hydrocarbons south and west of MW-11.

3. Unless BRC can demonstrate that the existing recovery wells can capture hydrocarbons on BLM land, prepare a schedule for installation of additional recovery wells and initiation of hydrocarbon recovery between P-3 and MW-11.

4. Prepare a schedule for further investigation of the floating hydrocarbons in MW-9. The investigation report should include a proposal for containment and removal to prevent floating or dissolved hydrocarbon discharge from the cliff seeps.

5. On the evening of April 27, OCD re-documented the presence of oil in shallow sediments along Highway 44 right-of-way both on the east and west sides of the highway culvert. BRC has continued to ignore our request for investigation of this problem. Prepare a schedule for complete delineation of the extent of the oil, and for removal of this contamination.

C. Requirement to Meet with OCD

Upon receipt of this letter, you are required to schedule a meeting with OCD that will occur within 30-days of receiving this letter. At the meeting, BRC should provide a schedule for responding to OCD's comments and requests for additional investigation. BRC will be required to show why OCD should not initiate legal action against BRC for offsite contamination in light of BRC's continued failure to respond to numerous requests for investigation and clean-up of the West Sullivan Road contamination.

If you have any questions, please contact me at 827-5812.

Sincerely,

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

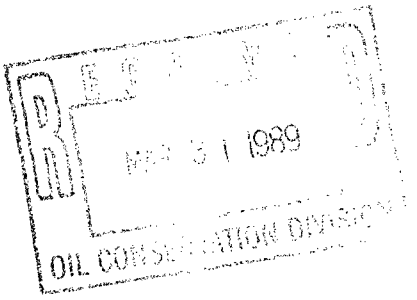
DGB/sl

Enclosures

cc: OCD Aztec Office
W.J. LeMay, OCD Director
Robert Stovall, OCD General Counsel
Ron Fellows, BLM Farmington
Keith Phillips, EPA-RCRA - Dallas
Randy Hicks, GCL Consultants

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

March 30, 1989



Mr. David Boyer
Environmental Bureau Chief
New Mexico Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87504

Dear Mr. Boyer:

Enclosed are two copies of the "Report on Soil Vapor Survey, Well Installation, and Hydrocarbon Recovery System, Bloomfield Refining Company" for your review. I have reviewed it and concur with the overall conclusions discussed in Sections 2.3, 3.3 and 4.3. Hydraulic head data following 10 weeks of recovery were not collected due to recent shutdown of the hydrocarbon recovery pumps. This data will be collected following repair of pump check valves and replacement of float-cable seals. Since the aquifer has likely recovered from previous pumping at wells RW-1, RW-2, and RW-3, the final set of hydraulic head data will be collected after 10 weeks of additional recovery in order to demonstrate long-term hydraulic impacts of recovery on the groundwater flow regime.

Very truly yours,

Chris Hawley jm

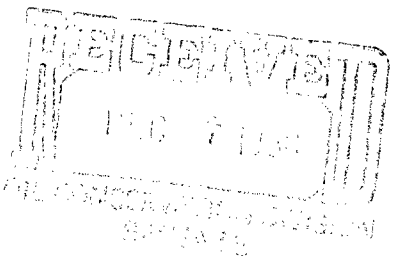
Chris Hawley
Environmental Engineer

CH/jm

Enclosures

cc: Joe Warr
Richard Traylor
Mike Macy
Ron Fellows, U.S. Department of the Interior

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary



December 6, 1988

Mr. David Boyer
Environmental Bureau Chief
New Mexico Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87504

RE: Response To Comments On Groundwater Remediation
at Bloomfield Refining Company

Dear Mr. Boyer:

Enclosed are responses to comments pertaining to the soil vapor survey, incompleted Work Plan items, requests for the OCD letter dated May 13, 1988, and miscellaneous issues. I am confident that remaining issues will be resolved in the technical progress report which is scheduled for submission in mid-February.

Also, we have made significant progress with source control projects that should be considered in your evaluation of our progress toward groundwater remediation. In November, we completed the installation of entirely new sewer systems for the crude unit and reformer unit. The sewer systems included the addition of extensive, curbed concrete paving to ensure the recovery of oil and oily water from those units to the API separator. Additional surface drains were also added outside the process areas to improve overall area drainage. In the tank farm, a project to provide exterior cathodic protection for all tanks and some underground piping is well underway and should be completed by the end of this year.

Please feel free to call me or Randy Hicks at Geoscience Consultants, Ltd. if you have any questions.

Sincerely,

Chris Hawley
Environmental Engineer

Document response filed separately. DPB

CH/jm

cc: Richard Traylor
Mike Macy
Joe Warr

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

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

November 4, 1988

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Chris Hawley
Environmental Engineer
Bloomfield Refining Company
P. O. Box 159
Bloomfield, New Mexico 87413

RE: Ground Water Remedial Action at Bloomfield Refining Company

Dear Mr. Hawley:

This letter provides Oil Conservation Division (OCD) evaluation and comments on the progress made to date in the identification and recovery of petroleum hydrocarbons at the Bloomfield Refinery. It also incorporates and formalizes agreements made during the October 27 conference call between yourself, Mr. Randy Hicks of Geoscience Consultants, Ltd., and myself.

OCD previously commented on proposed work at the site in my letter of May 13, 1988 (copy attached). In summary the letter required Bloomfield Refining Company (BRC) to move expeditiously to define the extent and movement of hydrocarbons in the subsurface in the vicinity of the southwest corner of the refinery, and begin recovery of these fluids. Since then BRC has submitted a work plan for a soil vapor survey and monitor/recovery well installation, the results of the soil vapor survey, and a letter progress report on the action taken to date. It was agreed during the phone call that a final technical report would be submitted to OCD in mid-February, 1989.

Comments on Soil Vapor Survey

1. Extensive OCD sampling since 1985 of ground water at several monitoring wells where PCE and TCE chlorinated solvents were detected in surface soil vapor shows no evidence of these solvents. 1,2-dichloroethane has been detected in some wells at low levels. Based on available sampling information, OCD does not believe that PCE and TCE are present at detectable levels in ground water at the site. If present, they are at levels of less than one part per billion (ug/l).

2. High levels of aromatic hydrocarbons (BTEX) found in the soil vapor have correlated well with known zones of hydrocarbon contaminated ground water. It is likely that similar zones exist beneath other locations where high levels of BTEX soil vapor were found.

Agreement on Uncompleted Work Plan Items

Submittal of the requested information with the technical report, and initiation or completion of the tasks listed below was agreed to by BRC during the October 27 conference call:

1. Logs and completion data on wells MW-13, P-1, 2, and 3.

2. Map of paleochannels on the surface of the Nacimiento Formation. (See also item 3 on p. 5 of OCD's 5/13/88).

3. Start of pumping of RW 1, 2, and 3 (MW-10) by mid-November. Pumping rates will range between 1 and 3 gpm depending on rate of capture and on the rate the current wastewater system can support.

4. Technical report by mid-February 1989 on recovery system installation, startup, and results to date as detailed in Section 3.5 of the work plan (see also comments below for other issues required by OCD to be addressed in the technical report).

Requests from May 13, 1988 OCD letter

1. Land ownership maps and dates of the MW-10 aquifer test have not been submitted as requested (See "Specific Comments" 1 and 3, p. 2, 5/13/88 letter.)

2. The OCD discussion on the possible use of infiltration trenches (comment 9, p. 3) is modified as follows:

> Use of upgradient infiltration trenches receiving recovered wastewater to enhance hydrocarbon movement and recovery would be authorized by OCD under several circumstances. First, the total salt mass recovered should equal or exceed that injected. This would likely necessitate pumping more water than injected with the difference going to the refinery wastewater system. Second, the wastewater supplied to the trenches should be stripped of organic contaminants to below WQCC standards. If not located at surface spill sites, the trenches should be buried as close to the

water table as possible to minimize leaching of salts from the vadose zone. BRC should submit details of design, location and operation of such a system for OCD review prior to installation.

Other Issues

1. OCD requests that the large-scale aerial photomap (Plate 1 of American Ground Water Consultants' discharge plan) be updated to show all monitoring and recovery well locations and other pertinent features. A table with X-Y coordinates and measuring point elevations for the wells and Hammond Ditch water level measurements is requested to track changes in water table gradients.

2. As discussed during the call, BRC needs to address hydrocarbon recovery and ground water cleanup east of the ditch and south of Sullivan Road to at least the area of MW-11. The soil vapor survey indicated the presence of high levels of aromatic hydrocarbons (area in red on attached map) and MW-11 has high dissolved levels of BTEX. BRC must present a schedule proposing when recovery of this material will commence.

3. Hammond Ditch must be blocked again this winter to prevent water contaminated with salts and oil from migrating downstream. OCD agreed that only water in those lengths of the ditch that receive seepage of oil or high salt concentrations need be removed for disposal of in the waste water system. An OCD representative will inspect the ditch area in late winter for compliance.

4. Once again OCD informs BRC of the need to investigate, report, and prepare necessary remedial action for containment and removal of the oil and hydrocarbon material along Sullivan Road from the culvert at Highway 44 east to Hammond Ditch. Although BRC has asserted that this is the result of past truck accidents or illegal dumping, OCD has traced oil up the arroyo to Hammond Ditch at a point opposite where BRC has installed hydrocarbon recovery wells. In letters dated March 4, July 30 and October 24, 1986; and February 23 and May 13, 1988; the OCD requested investigation of the matter. Because of the delay, an unknown amount of hydrocarbon has likely moved west of Highway 44. The matter has now been referred to our legal bureau for enforcement action. However, such action will be deferred until after receipt of the technical report in mid-February. If this contamination problem is not addressed in a comprehensive way, we will initiate such legal action.

If you need any information or clarification regarding this letter, please contact me at 827-5812. Please note the change of mailing address for the Division as given on the letterhead above.

Sincerely,

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/sl

Attachments

cc: OCD General Counsel
OCD Aztec Office
Guy Tidmore, EPA-RCRA Dallas
Randy Hicks, GCL Consultants

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

RECEIVED
OCT - 5 1988
OIL CONSERVATION DIVISION
SANTA FE

October 4, 1988

Mr. Charles Wohlenberg
Office of the New Mexico State Engineer
2340 Menaul Boulevard, Suite 206
Albuquerque, New Mexico 87107-1884

Dear Mr. Wohlenberg:

Enclosed is a completed application for permit of three pollution recovery wells located at Bloomfield Refining Company in Bloomfield, New Mexico. Until recently, the refinery experienced accidental losses of hydrocarbons to the perched alluvial aquifer underlying the site. It is anticipated that remedial clean-up measures involving recovery from three wells and treatment of intercepted groundwater for dissolved and non-aqueous hydrocarbons will be initiated sometime during the next several months.

The three recovery wells are screened throughout the saturated thickness of the alluvial aquifer, as indicated by the attached lithologic logs and well completion diagrams. It is expected that maximum discharge rates of approximately 3 gpm at each well will induce cones of depression in the alluvial aquifer sufficient to capture residual dissolved and floating hydrocarbons from the subsurface. The recovered water will be diverted to the refinery treatment system, where it will undergo separation, aeration, evaporation, and spray-irrigation under New Mexico Waste Water Discharge Plan GRW-1-A.

Initially, the refinery will operate the 3-well recovery system at a maximum of 3 gpm (1 gpm per well) because of limitations with the refinery waste water treatment system. The refinery is currently negotiating with the U.S. EPA and N.M. EID for approval of an NPDES discharge. Approval of this discharge may allow the diversion of additional recovered water up to the 9 gpm maximum as applied for in this permit. Otherwise, if 3 gpm is not adequate to create the required cone of depression, reinjection of the recovered water after air stripping may be required and a new permit application will be submitted.

The perched system underlying the facility has developed primarily in response to application of wastewater from the present treatment system to the spray-irrigation area located in the southeastern part of the refinery; seepage of rain water in self-contained areas created by diking; seepage from raw water ponds; seepage from evaporation ponds; and seepage from the Hammond irrigation ditch that loops around the facility. If this is the case, rights to some of the water currently stored in the perched alluvial system are already owned by Bloomfield Refining Company under the doctrine of prior appropriation. Since at least the total of 9 gpm of

water to be extracted from the perched system by the recovery wells has previously been used at the facility during the course of normal refinery operations, its re-use following treatment and spray-irrigation can be viewed as appropriation under already existing water rights.

If you should have any questions concerning the permit application, please contact me at 1-632-8013. Questions of a technical nature can also be directed to Susan Colarullo or Randy Hicks of Geoscience Consultants, Ltd. in Albuquerque at 842-0001.

Yours very truly,

Chris Hawley
Environmental Engineer

CH/jm

Enclosures

cc: Randy Hicks, Geoscience Consultants
Dave Boyer, N.M. OCD
Joe Warr
Richard Traylor
Mike Macy

Revised August 1967

IMPORTANT–READ INSTRUCTIONS ON BACK BEFORE FILLING OUT THIS FORM

APPLICATION FOR PERMIT
of Pollution Recovery Wells

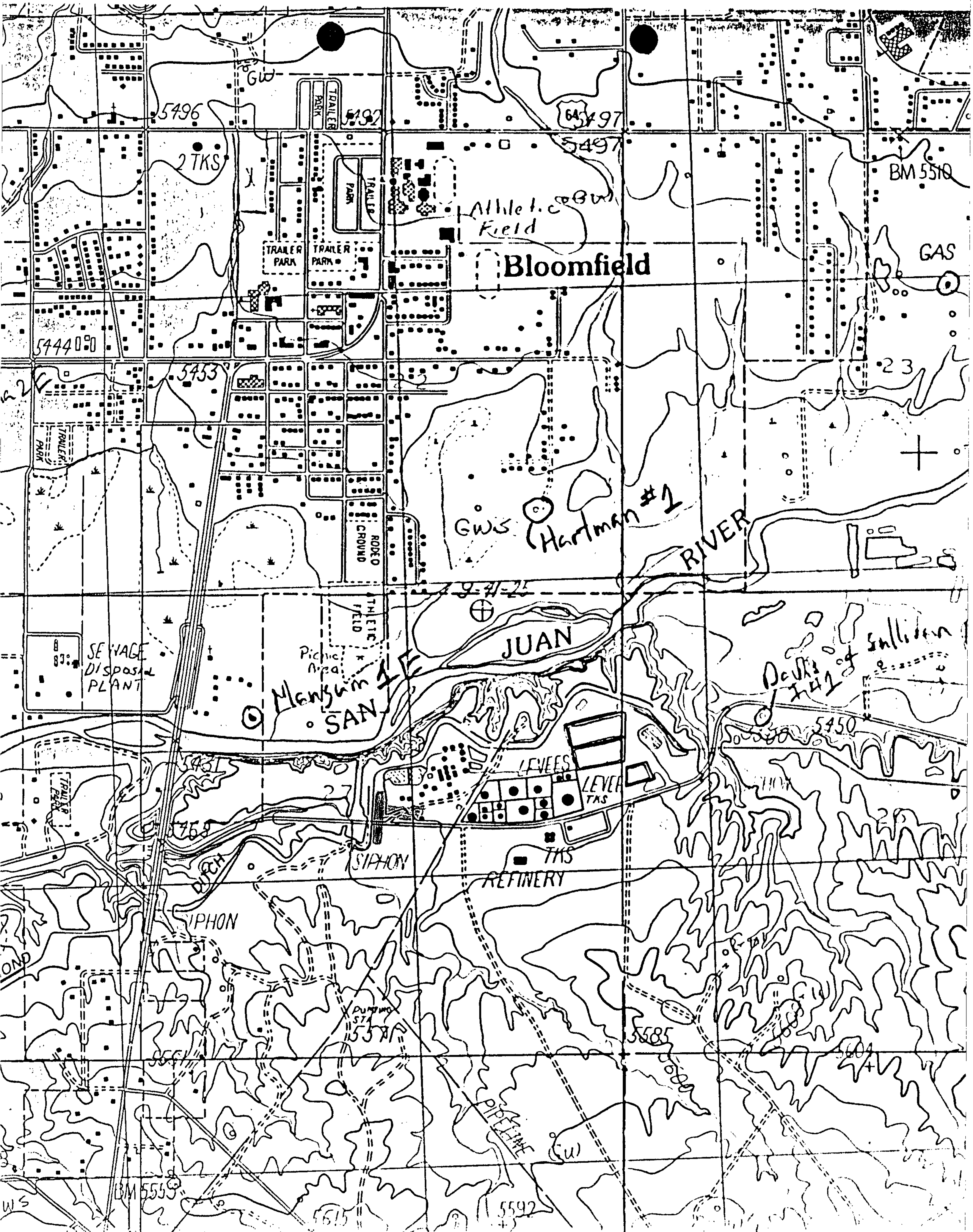
~~To Appropriate the Underground Waters of the State of New Mexico~~

Date Received _____ File No. _____

1. Name of applicant Bloomfield Refining Company
   Mailing address P.O. Box 159
   City and State Bloomfield, New Mexico 87413
2. Source of water supply shallow water aquifer, located in San Juan Basin
   (artesian or shallow water aquifer) (name of underground basin)
3. The well ~~is~~ to be located in the NE ¼ SW ¼ ¼, Section 27 Township 29N
   Range 11W N.M.P.M., or Tract No. ____ of Map No. ____ of the _____ District,
   on land owned by Bloomfield Refining Company.
4. Description of well: name of driller Beeman Brothers Drilling, Inc.;
   ~~Outside~~ Inside Diameter of casing 4 inches; Approximate depth to be drilled (see logs) feet;
5. Quantity of water to be appropriated and beneficially used 9 gpm or 14.5 acre feet/yr
   (consumptive use, diversion)
   for ground water remediation purposes.
6. Acreage to be irrigated or place of use N/A acres.

Subdivision	Section	Township	Range	Acres	Owner

7. Additional statements or explanations
   Until recently, the Bloomfield Refi[illegible]


Bloomfield
5496
5497
64
5497
2 TKS
TRAILER PARK
TRAILER PARK
TRAILER PARK
TRAILER PARK
Athletic Field
BM 5510
GAS
5444
5453
23
RODEO GROUND
ATHLETIC FIELD
Hartman #1
GWS
RIVER
JUAN
SAN
Mangum 1E
Picnic Area
SEWAGE DISPOSAL PLANT
5450
LEVEES
LEVEE
TKS
TKS
REFINERY
SIPHON
SIPHON
DITCH
27
5585
PIPELINE
BM 5555
5592