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REPORTS

DATE:

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BURLINGTON RESOURCES

SAN JUAN DIVISION

March 29, 2000

Certified: P 895 114 539

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

RE: 1999 Annual Groundwater Investigation and Remediation Reports
San Juan Basin, New Mexico

Dear Mr. Olson:

As required in Burlington Resources' approved Groundwater Investigation and Remediation Plan dated August, 1998, enclosed are the 1999 annual reports for Burlington's groundwater impact sites in the San Juan Basin. Separate reports are enclosed for the following locations:

Cozzens B#1
Fogelson #4-1
Hampton #4M
Johnson Federal #4 Metering Station
Standard Oil Com. #1
Taylor Com. #2A

If you have questions or additional information is needed, please contact me at (505) 326-9841.

Sincerely,

Ed Hasely
Sr. Staff Environmental Representative

Attachments - Groundwater Investigation and Remediation Reports

cc: Denny Foust - NMOCD Aztec
Bruce Gantner - BR
PNM - Maureen Gannon (Cozzens B#1, Hampton #4M)
EPFS - Scott Pope (Fogelson #4-1, Johnson Fed. #4, Standard Oil Com.#1)
Facility Files
Correspondence

BURLINGTON RESOURCES 1999 ANNUAL GROUNDWATER REPORT

Hampton #4M

SITE DETAILS

Location: Unit Letter N, Section 13, Township 30N, Range 11W; San Juan County, New Mexico
Land Type: Federal

PREVIOUS ACTIVITIES

PNM conducted limited excavation (approximately 60 cubic yards) of impacted soil underneath their former earthen pit and installed groundwater monitoring wells and a product recovery well.

Burlington Resources (BR) excavated impacted soil down to groundwater depth underneath our former area of operation and installed groundwater monitoring wells. During November 1998, BR began excavation of additional impacted soils to a depth of approximately 27 feet from under and around PNM's former earthen pit. Approximately 77 cubic yards of additional soils were also removed from BR's excavation in the southeast part of the location.

1999 ACTIVITIES

BR continued excavation work at the Hampton #4M location, continuing south from PNM's area of operation toward BR's area of operation. Impacted soils were excavated until all apparent source materials had been removed. Prior to backfilling, 30 barrels of Oxy-1 chemical was applied to the bottom and sides of the excavation to stimulate bioremediation. BR also installed a monitoring well (MW-13) in the vicinity of the former MW-4 and downgradient of BR's original excavation under the former tank battery. Details on these activities can be found in the status report submitted to the OCD on September 16, 1999.

BR installed three additional monitoring wells (MW-14,15,16) on the Hampton #4M location. BR also attempted to install two downgradient offsite wells, but both wells hit "auger refusal" prior to contacting any groundwater. Details on these wells and attempts can be found in the status reports submitted to the OCD on October 28, 1999 and January 11, 2000.

The OCD sampled the groundwater seep to the northwest side of the well pad on April 14, 1999. The analytical results show that benzene is present in concentrations in excess of New Mexico Water Quality Control Commission groundwater standards.

Quarterly groundwater monitoring continued through 1999. A summary, provided by PNM, of all groundwater analytical data is presented in Attachment 1. A site diagram is presented as Attachment 2. An aerial photograph, which is from PNM's OCD exhibits and modified with Burlington's information, showing the approximate location of the two attempted downgradient monitoring wells is included as Attachment 3.

CONCLUSIONS

The excavation work appears to have greatly reduced or eliminated the free phase hydrocarbons in the northwest part of location, although the dissolved BTEX concentrations remain high. Groundwater from MW-15, near BR's separator, was clean indicating the separator pit is not a source of contamination. Groundwater from MW-16, along the eastern edge of location, exceeded only the benzene standard, indicating the eastern wall is not a source of free phase hydrocarbons.

Groundwater sampling from monitoring well (MW-14) revealed a level of free phase hydrocarbons in the extreme southeast part of location.

The auger refusal encountered on the two downgradient offsite monitoring well attempts support the theory that the groundwater is located in a relatively narrow band generally following the surface drainage.

RECOMMENDATIONS

- Burlington Resources recommends that quarterly sampling at this site is continued.
- As discussed in BR's letter dated February 10, 2000, BR plans to excavate to groundwater in the vicinity of MW-14.
- As discussed in BR's letter dated February 10, 2000, BR also plans to remove impacted soil near the seep located to the northwest of the well location.

Attachments: Attachment 1 - Groundwater Sampling Results Summary
Attachment 2 - Site Diagram
Attachment 3 - Aerial Photo

Attachment 1

GROUNDWATER ANALYTICAL RESULTS SUMMARY

ANALYTICAL RESULTS SUMMARY - Hampton 4M

Well	Sample Notes	Date Sampled	GW Elev. (ft,msl)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	Total BTEX (ppb)	Product Thickness (ft)
Existing Monitor Well Network									
MW-1		10/30/97	6110.10	2.4	2.3	<0.2	1.1	5.8	–
Upgradient well		01/12/98	6107.47	4.3	3.3	0.2	1.0	8.8	–
		04/14/98	6107.52	1.0	1.3	<0.5	<0.5	2.3	–
		07/01/98	6107.13	1.3	1.0	<0.5	3.7	6.0	–
		10/05/98	6106.09	<1.0	<1.0	<1.0	<3.0	<6.0	–
		11/09/98	6107.40	NA	NA	NA	NA	NA	–
		01/27/99	6107.51	0.8	0.9	<0.5	<1.5	1.7	–
		05/05/99	6106.76	NA	NA	NA	NA	NA	–
		07/12/99	6106.55	1.1	0.5	<0.5	<0.5	1.6	–
		08/17/99	6106.47	NA	NA	NA	NA	NA	–
		10/21/99	6106.60	NA	NA	NA	NA	NA	–
MW-5		10/29/97	6075.23	5934.0	10024.0	709.0	8188.0	24855.0	–
Downgradient along wash		1/12/98	6075.09	7521.0	11213.0	779.0	8436.0	27949.0	–
		4/14/98	6075.33	7000.0	11000.0	720.0	7800.0	26520.0	–
		7/1/98	6075.43	6500.0	10000.0	780.0	7500.0	24780.0	–
		10/5/98	6074.48	6800.0	8400.0	740.0	6900.0	22840.0	–
		11/9/98	6074.89	6200.0	8200.0	670.0	6500.0	21570.0	–
		1/27/99	6074.87	6400.0	8900.0	660.0	6700.0	22660.0	–
		5/5/99	6075.23	6800.0	9800.0	900.0	7800.0	25300.0	–
	(Burlington)	5/26/99	NR	6600.0	10000.0	650.0	8100.0	25350.0	–
		7/12/99	6075.60	6300.0	10000.0	750.0	8800.0	25850.0	–
		8/17/99	6076.23	5400.0	9800.0	670.0	7500.0	23370.0	Sheen
	(Eco. Split)	8/17/99	6076.23	5900.0	8900.0	500.0	6200.0	21500.0	Sheen
	(prelim.)	10/21/99	6076.17	5200.0	9600.0	650.0	6900.0	22350.0	Sheen
MW-7		1/12/98	6047.12	780.0	246.0	258.0	3942.0	5226.0	–
Downgradient along wash; adj pipeline		04/14/98	6047.09	820.0	340.0	190.0	2450.0	3800.0	–
		07/01/98	6047.03	950.0	440.0	200.0	3020.0	4610.0	–
		10/05/98	6046.77	1600.0	930.0	180.0	1530.0	4240.0	–
		11/09/98	6046.77	1800.0	1000.0	160.0	1240.0	4200.0	–
		01/27/99	6046.77	2100.0	1000.0	160.0	1050.0	4310.0	–
		05/05/99	6048.44	210.0	2.9	30.0	147.0	389.9	–
	(Burlington)	05/26/99	–	190.0	7.4	32.0	150.0	379.4	–
		7/12/99	6046.04	130.0	7.2	22.0	101.3	260.5	–
		8/17/99	6046.61	NA	NA	NA	NA	NA	–
	(prelim.)	10/21/99	6047.47	260.0	11.0	15.0	89.0	375.0	–
MW-9		7/1/98	6100.12	12.0	0.2	0.6	1.3	14.1	–
Upgradient PNM, crossgradient Burlington		10/5/98	6100.03	16.0	<1.0	1.1	2.1	19.2	–
		11/9/98	6100.40	12.0	<1.0	<1.0	<3.0	12.0	–
		1/27/99	6099.23	0.8	<0.5	<0.5	2.2	3.0	–
		5/5/99	6099.92	73.0	<0.5	2.2	1.6	76.8	–
		5/26/99	6100.07	120.0	<0.5	2.5	1.8	124.3	–
	(Burlington)	5/26/99	–	120.0	<0.5	1.6	0.8	122.4	–
		7/12/99	6100.18	140.0	<0.5	1.5	<0.5	141.5	–
	(prelim.)	8/17/99	6100.92	290.0	<0.5	0.6	<1.5	290.6	–
	(prelim.)	10/21/99	6100.73	320.0	<0.5	0.6	<1.5	320.0	Sheen
MW-11		1/27/99	5958.60	<0.5	2.5	0.7	13.1	16.3	–
Downgradient well - 1800', near road		5/5/99	5958.65	<0.5	<0.5	<0.5	<1.5	0.0	–
	(Burlington)	5/26/99	–	0.8	1.7	<0.5	1.1	3.6	–
		7/12/99	5958.27	NA	NA	NA	NA	NA	–
		8/17/99	5958.62	NA	NA	NA	NA	NA	–
	(prelim.)	10/21/99	5958.90	<0.5	<0.5	<0.5	<1.5	<3.0	–
MW-12		5/5/99	–	790.0	840.0	260.0	2880.0	4770.0	–
New source well @ MW-6	(Soil sample)	5/5/99	–	1200.0	13000.0	5100.0	68000.0	87300.0	TPH = 2350 mg/kg
		5/26/99	6099.45	1900.0	820.0	200.0	1720.0	4640.0	Sheen
	(Burlington)	5/26/99	–	1800.0	640.0	160.0	1600.0	4200.0	–
		7/12/99	6099.63	4500.0	760.0	400.0	3100.0	8760.0	Sheen
	(duplicate)	7/12/99	–	4600.0	730.0	390.0	3080.0	8800.0	Sheen
		8/17/99	6100.56	4800.0	5000.0	320.0	3390.0	13510.0	Sheen
	(Eco. Split)	8/17/99	6100.56	5900.0	6100.0	390.0	4100.0	16490.0	Sheen
	(prelim.)	10/21/99	6100.17	5600.0	650.0	540.0	2890.0	9680.0	Sheen
MW-13		5/26/99	–	1800.0	25.0	12.0	35.3	1872.3	–
BROG well between pit & MW-4	(Burlington)	5/26/99	–	2100.0	22.0	8.8	29.0	2159.8	–
		7/12/99	6104.3	2100.0	14.0	9.9	10.9	2134.8	–
		8/17/99	6104.7	1900.0	<10	<10	<30	1900.0	–
	(prelim.)	10/21/99	6104.71	1600.0	<10	<10	<30	1600.0	–
MW-14	–	10/21/99	–	not sampled - 2 feet of free product					1.92
BROG well near TPW07				depth to water 22.14, depth to product 20.22 (no datum surveyed yet)					

ANALYTICAL RESULTS SUMMARY - Hampton 4M

Well	Sample Notes	Date Sampled	GW Elev. (ft,msl)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	Total BTEX (ppb)	Product Thickness (ft) / TPH
MW-15	(prelim.)	10/21/99	–	<0.5	1.2	<0.5	1.5	2.7	–
BROG well near separator pit		depth to water 17.84 (no datum surveyed yet)							
MW-16	(prelim.)	10/21/99	–	220.0	300.0	5.4	142.0	667.4	–
Recovery well near excavation	(Burlington)	10/21/99	–	214.0	268.0	4.0	151.0	637.0	–
		depth to water 14.93 (no datum surveyed yet)							
TMP-1		11/11/97	–	2171.0	4185.0	190.0	2856.0	9402.0	–
Temporary well; wash midway MW-5, MW-7		7/1/98	6057.61	2000.0	4300.0	180.0	2700.0	9180.0	–
		11/9/98	–	980.0	1900.0	84.0	1540.0	4504.0	–
	(prelim.)	10/21/99	6058.11	1000.0	3100.0	410.0	9700.0	14210.0	–
Destroyed Monitor Well Network Points									
MW-2		12/16/96	–	3840.0	7960.0	896.0	7920.0	20616.0	NM
PNM drip pit well		02/04/97	–	NA	NA	NA	NA	NA	4.40
		08/27/97	–	NA	NA	NA	NA	NA	4.75
		10/29/97	–	NA	NA	NA	NA	NA	4.58
		01/12/98	–	NA	NA	NA	NA	NA	4.41
		04/14/98	–	NA	NA	NA	NA	NA	2.59
		07/01/98	–	NA	NA	NA	NA	NA	2.25
		10/05/98	–	NA	NA	NA	NA	NA	2.01
		11/09/98	–	NA	NA	NA	NA	NA	2.15
		Well destroyed during Burlington excavation							
MW-3		1/31/97	–	<0.2	<0.2	<0.2	<0.2	<0.2	–
Up & cross-gradient to PNM		2/4/97	6101.06	NA	NA	NA	NA	NA	–
		5/5/97	–	NA	NA	NA	NA	NA	–
	(Burlington)	10/29/97	6101.19	<0.2	<0.2	<0.2	<0.2	<0.2	–
		1/12/98	6101.11	<0.2	<0.2	<0.2	<0.2	<0.2	–
		4/14/98	6100.97	<0.5	<0.5	<0.5	<0.5	<0.5	–
		7/1/98	6101.14	0.03 JB	0.05 JB	<0.5	<0.5	0.08 JB	–
		10/5/98	6100.57	<1.0	<1.0	<1.0	<3.0	<6.0	–
		11/9/98	6100.89	<1.0	<1.0	<1.0	<3.0	<6.0	–
		Well destroyed during Burlington excavation							
MW-4		1/31/97	–	811.7	1420.5	31.0	388.1	2651.3	–
Upgradient PNM; downgradient Burlington		2/4/97	6106.16	NA	NA	NA	NA	NA	–
	(Burlington)	5/1/97	–	1162.0	1797.0	41.0	486.0	3486.0	–
		8/27/97	6106.87	NA	NA	NA	NA	NA	–
		10/29/97	6106.73	NA	NA	NA	NA	NA	–
		1/12/98	6105.88	1251.0	6.0	82.0	24.0	1363.0	–
		4/14/98	6105.93	1100.0	7.2	28.0	12.0	1147.2	–
		7/1/98	6106.14	1400.0	50.0	120.0	124.0	1694.0	–
		10/5/98	–	NA	NA	NA	NA	NA	0.63
		11/9/98	–	NA	NA	NA	NA	NA	0.26
		1/27/99	–	NA	NA	NA	NA	NA	0.40
		Well destroyed during Burlington excavation							
MW-6		11/12/97	–	NA	NA	NA	NA	NA	4.80
PNM drip pit/product recovery		1/12/98	–	NA	NA	NA	NA	NA	4.71
		4/14/98	–	NA	NA	NA	NA	NA	pumping
		7/1/98	–	NA	NA	NA	NA	NA	pumping
		10/5/98	–	NA	NA	NA	NA	NA	pumping
		11/9/98	–	NA	NA	NA	NA	NA	2.27
		Well destroyed during Burlington excavation							
MW-8		1/12/98	6104.71	6410.0	17301.0	693.0	9397.0	33801.0	Sheen
Upgradient PNM; downgradient Burlington		4/14/98	6104.41	NA	NA	NA	NA	NA	0.37
		7/1/98	6105.14	NA	NA	NA	NA	NA	0.37
		10/5/98	6104.54	NA	NA	NA	NA	NA	0.13
		11/9/98	6104.77	NA	NA	NA	NA	NA	0.02
		Well destroyed during Burlington excavation							
MW-10		7/1/98	–	NA	NA	NA	NA	NA	2.00
Upgradient PNM, downgradient Burlington		10/5/98	–	NA	NA	NA	NA	NA	1.91
		11/9/98	–	NA	NA	NA	NA	NA	2.10
		Well destroyed during Burlington excavation							

ANALYTICAL RESULTS SUMMARY - Hampton 4M

Sample Point	Sample Notes	Date Sampled	GW Elev. (ft.msl)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	Total BTEX (ppb)	Product Thickness (ft) / TPH
Other Sampling Points									
EB WELL		11/25/97	5959.74	<0.2	<0.2	<0.2	<0.2	<0.2	--
Downgradient private well		10/21/99	5960.93	NA	NA	NA	NA	NA	--
Burlington Excavation	Surface Water	2/11/98	--	1800	1700	<25	1420	4920	rainbow
(Fall 1998 near former PNM pit)	Surface Water	7/1/98	--	10.0	0.4	0.1	1.5	12.0	rainbow
	Surface Water	11/9/98	--	2.9	16.0	<1	18.1	37.0	--
	Soil - @ water	7/1/98	--	36000.0	560000.0	100000.0	1430000.0	2126000.0	--
Hydrocarbon Seep		7/1/98	6098.72	1.6	0.7	0.6	0.36	3.26	rainbow
(Surface Water)		4/14/99	--	40.0	2.2	2.1	19.00	63.30	rainbow
	(prelim.)	10/21/99	--	65.0	230.0	11.0	434.00	740.00	rainbow
TPW-01	Water	6/5/97	--	20.0	<1	<1	<1	20.0	--
(Temporary Burlington well point)	Soil	6/5/97	25-26'	<1	<1	<1	<1	<1	TPH <10 mg/kg
TPW-02	Water	6/5/97	Product	NA	NA	NA	NA	NA	NM
(Temporary Burlington well point)	Soil	6/5/97	25-26'	2000.0	4600.0	14000.0	39000.0	59600.0	TPH = 600 mg/kg
TPW-03	Water	6/5/97	Dry	NA	NA	NA	NA	NA	--
(Temporary Burlington well point)	Soil	6/5/97	25-26	<1	<1	<1	<1	<1	TPH = 25 mg/kg
TPW-04	Water	6/6/97	--	2000.0	3100.0	57.0	810.0	5967.0	--
(Temporary Burlington well point)	Soil	6/6/97	20-21.5'	28.0	3.4	76.0	40.0	147.4	TPH = 52 mg/kg
TPW-05	Water	6/6/97	--	5800.0	460.0	16000.0	7000.0	29260.0	--
(Temporary Burlington well point)	Soil	6/6/97	15-16'	4000.0	10000.0	4500.0	28000.0	46500.0	TPH = 61 mg/kg
TPW-06	Water	6/6/97	--	1600.0	3400.0	48.0	690.0	5738.0	--
(Temporary Burlington well point)	Soil	6/6/97	16-16.5'	<1	<1	2.8	4.8	7.6	TPH = 11 mg/kg
TPW-07	Water	6/6/97	--	5300.0	18000.0	620.0	9300.0	33220.0	--
(Temporary Burlington well point)	Soil	6/6/97	15-16'	7000.0	74000.0	20000.0	170000.0	271000.0	TPH = 250 mg/kg
SB-1 (near BROG excavation) (Soil boring)	Soil	10/8/98	15-16'	335.0	697.0	181.0	1808.0	3021.0	TPH = 26.4 mg/kg
SB-2 (near PNM former pit) (Soil boring)	Soil	10/8/98	15'	1950.0	9960.0	2460.0	22590.0	36960.0	TPH = 194 mg/kg
TH-1 (PNM test hole along wash)	Soil	11/11/97	12.7'	NA	NA	NA	NA	NA	PID = 1412 ppm
TH-2 (PNM test hole along wash)	Soil	11/11/97	14.4'	NA	NA	NA	NA	NA	PID = 1357 ppm
TH-3 (PNM test hole along wash)	Soil	11/11/97	16.5'	NA	NA	NA	NA	NA	PID = 0 ppm
TH-4 (PNM test hole along wash)	Soil	11/11/97	15'	NA	NA	NA	NA	NA	PID = 279 ppm
TH-5 (PNM test hole along wash)	Soil	11/11/97	14.5'	NA	NA	NA	NA	NA	PID - 1211 ppm
TH-6 (PNM test hole along wash)	Soil	11/11/97	16'	NA	NA	NA	NA	NA	PID = 0 ppm
TH-7 (temporary well along wash)	Water	11/11/97	NA	2171.0	4185.0	190.0	2858.0	170000.0	PID = 279 ppm
TH-8 (PNM test hole along wash)	Soil	11/12/97	14'	NA	NA	NA	NA	NA	PID = 0 ppm

Notes:

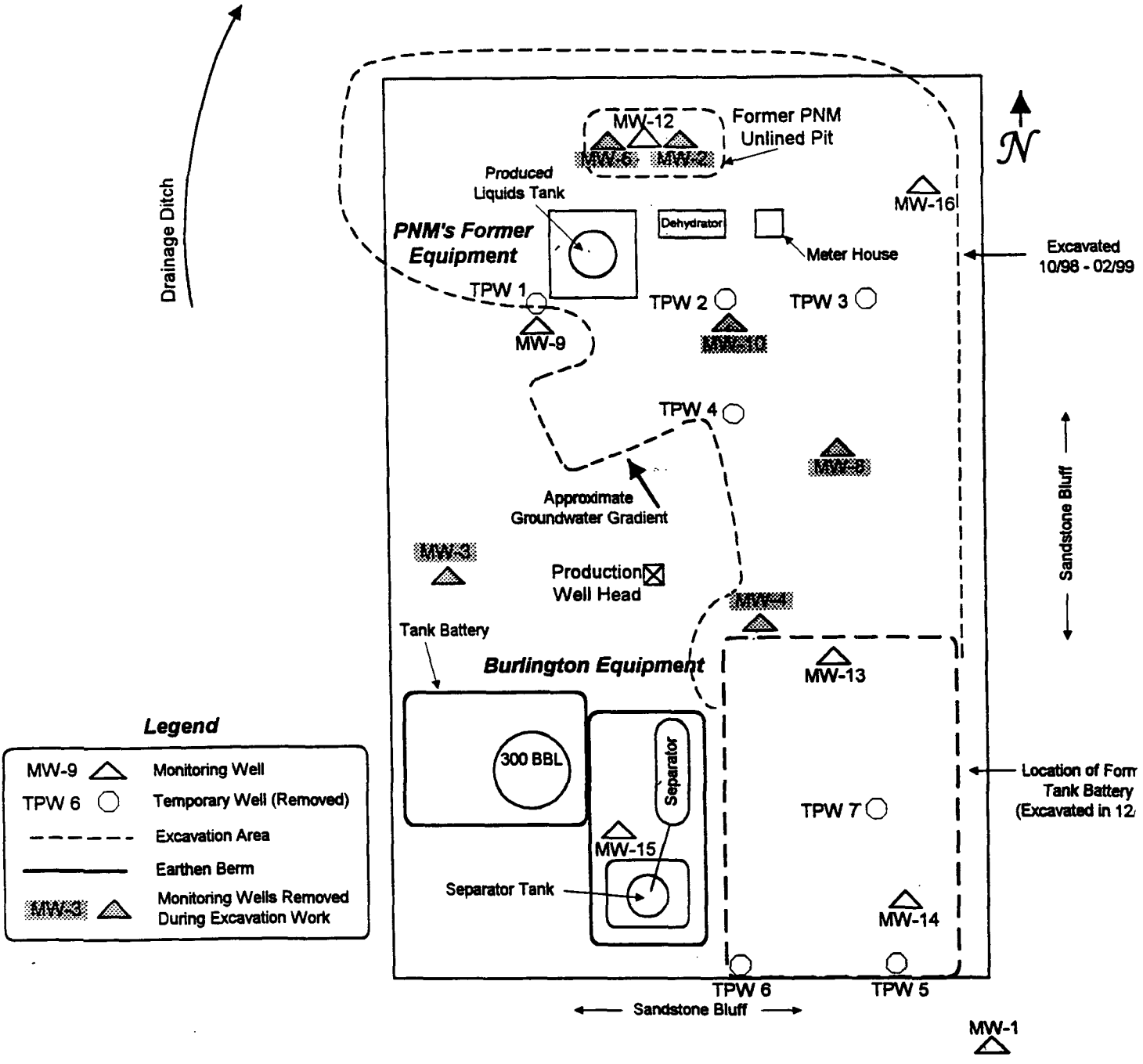
All samples are water, and sampled by PNM, unless otherwise noted in "Sample Notes" column.
Analytical results for benzene, toluene, xylene, ethylbenzene, and BTEX given in ppb (for water, ug/L, and for soil, ug/kg).
"Product Thickness (ft) / TPH" column gives product thickness (ft) in wells. For soil samples, analytical results for TPH given in mg/kg or PID results given in ppm.

J = Analyte detected below Practical Quantitation Limit
B = Analyte detected in the associated Method Blank
NM = Not measured
NA = Not analyzed
-- = Not measured or not analyzed, or not calculated (free product)

Attachment 2

SITE DIAGRAM

Hampton #4M Site Diagram



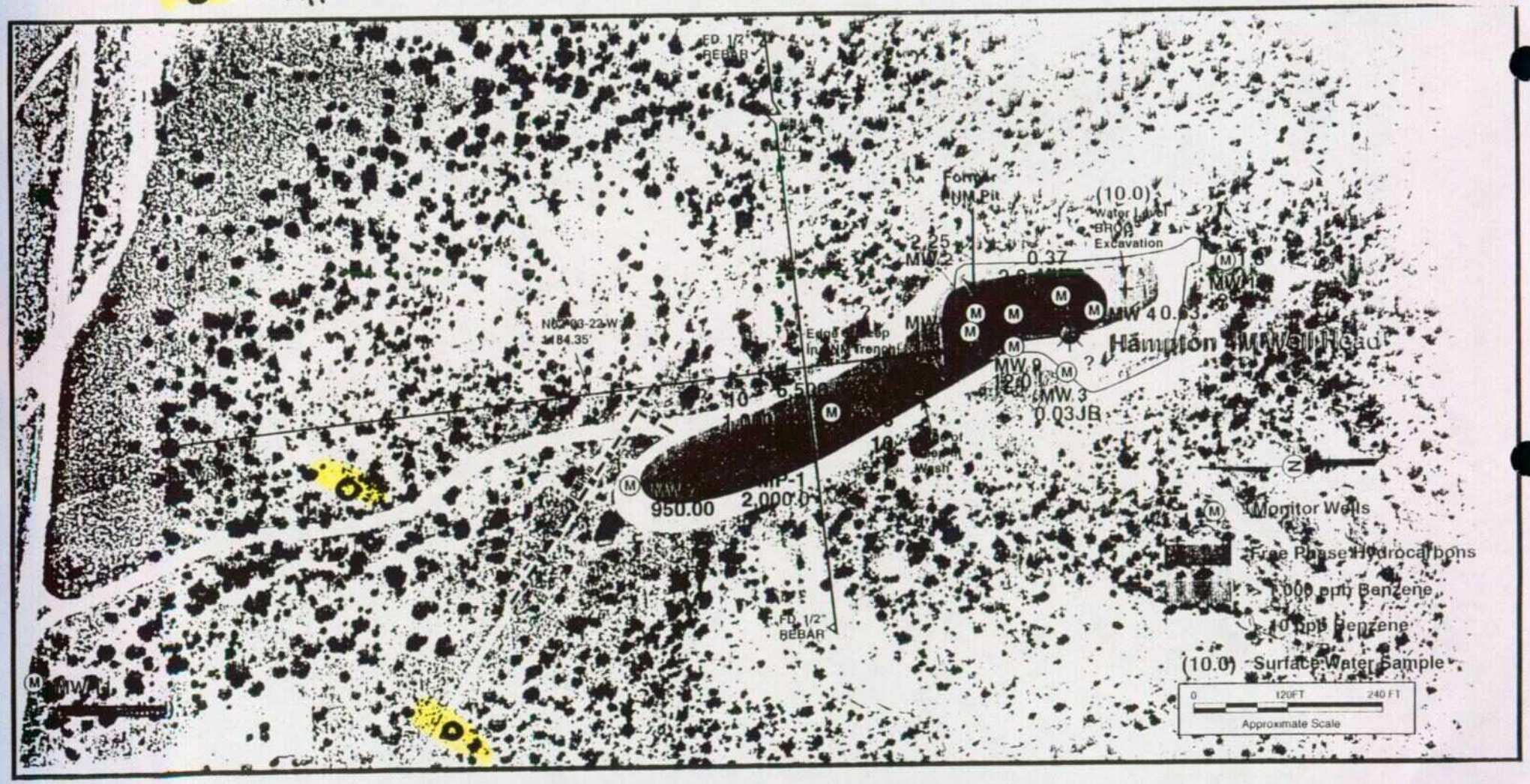
Revised 10/28/99

Attachment 3

AERIAL PHOTO
APPROXIMATE LOCATION OF
ATTEMPTED MONITORING WELLS
(Auger Refusal)

Hampton #4M

O - Approximate Location of Attempted Downgradient Monitoring Well (Auger Refusal)



~~Free Phase & Dissolved Hydrocarbons~~
~~(through July 1998)~~

Modified by BR
3/27/00