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March 31, 1998

Bill Olson  
Hydrologist, Environmental Bureau  
New Mexico Oil Conservation Division  
2040 South Pacheco  
Santa Fe, NM 87505

RE: Hampton 4M Site  
Free Product and Groundwater Contamination

Dear Bill:

In response to your letter of March 13, 1998, PNM has concerns regarding the effectiveness of any further remedial actions taken by PNM in the face of continuing hydrocarbon sources at this site. We provide a summary of PNM activities, a review of Burlington's reports concerning effectiveness of source removal actions performed by Burlington, and our position regarding free phase hydrocarbons.

#### I. Summary of PNM Activities

PNM removed soils associated with the former PNM drip pit shown on Figure 1 in April 1996. Approximately 300 cubic yards of soil were excavated, with a total excavation dimension of approximately 32' x 21' x 12'. Soils remaining at the bottom of the excavation exceeded 1000 ppm as measured by a photoionization detector. Excavation was stopped due to safety concerns related to excessive side-wall sloughing and proximity to the edges of the well pad and onsite equipment. The excavation was backfilled with clean soil; approximately 286 cubic yards of soil excavated from Hampton 4M were landfarmed at the Hampton #2 site.

In December 1996, PNM assessed the vertical extent of contamination remaining beneath the former PNM drip pit. Groundwater was encountered at 28 feet, with approximately 2 inches of free phase hydrocarbons observed in the bailer upon sampling. The initial groundwater sample from this boring (completed as MW-2) contained 3,840 ppb benzene and 20,620 ppb total BTEX. Free product thickness in MW-2 accumulated to 4.41 feet in January 1998 (see Table 1).

PNM has continued to monitor groundwater and recover free product at the Hampton 4M site in accordance with your letter of August 27, 1997. Analytical results for groundwater sampling are reported in Table 1. PNM and Burlington have installed a total of eight monitoring wells and one temporary well at this site. PNM also performed extensive test augering along the wash in November 1997 to determine the downgradient extent of groundwater contamination.

A groundwater potentiometric surface map is provided for January 1998. As shown on the map, groundwater flow is down-canyon towards the northwest. The hydraulic gradient is fairly steep and subparallel to the topographic gradient at approximately 0.10. This is a high energy environment, where contamination will move relatively quickly downgradient from the site of release. This is corroborated by

the extent to which dissolved phase contamination is detected along the wash. The furthest downgradient monitoring well installed to date, MW-7, contains 780 ppb benzene and 5226 ppb total BTEX. Only MW-5 exceeds proposed remediation reference concentrations when comparing downgradient water quality to water quality (e.g., TPW-2 and MW-8) upgradient of PNM equipment.

Hydrographs and contaminant trends with time are provided for each well in Attachment A. The graphs provided for monitoring wells MW-2 and MW-6 do not reflect the presence of free product.

The privately-owned EB well is located cross-gradient (north-northeast). No hydrocarbon constituents above the 0.2 ppb detection limit have been detected in this well.

PNM installed a free product recovery well, MW-6, in November 1997 and initiated free product recovery in January 1998. Initial free product thickness in MW-6 was 4.71 feet on January 12, 1998. Approximately 470 gallons of free product were recovered from MW-6, with an accompanying 2 foot drop in free product thickness, between January 12 and March 18, 1998. Attachment B provides a figure demonstrating free product thickness decrease over the course of free product recovery.

## **II. Burlington Document Review**

PNM reviewed the documents listed below concerning contamination at the Hampton 4M site, submitted to NMOCD by Burlington.

- Burlington Resources, 1998, Hampton 4M - Groundwater Contamination (Status Report); Unit Letter N, Section 13, Township 30N, Range 11W
- Burlington Resources, 1997, Data Summary: Hampton 4M Production Location

Following our review of these documents and our field records for site investigation and remediation data, we are concerned that upgradient source removal is not complete and continuing sources of hydrocarbons will continue to affect downgradient areas, including not only the well pad, but a significant volume of offsite groundwater. Relevant soil and groundwater data collected by both PNM and Burlington is compiled in Table 1. Figure 1 provides a site map of the well pad, equipment, and general vicinity surrounding the site.

- Burlington states they have removed contaminated soils to a depth of 15 feet in the deepest areas of their source area excavation. Sampling of temporary well borings TPW-05 and -07 by Burlington detected significant contamination in the 15 to 16-foot interval. Thus, excavating the source area only to 15 feet at the deepest location leaves documented contamination in place to act as a continuing source to areas downgradient.
- While total BTEX concentrations in MW-4 did decrease as stated by Burlington, concentrations of the most mobile and most toxic constituent, benzene, increased following remediation activities conducted by Burlington. PNM does not agree with the statement that the decrease in total BTEX concentrations in the quarter immediately following excavation points to the success of source removal activities; additional monitoring is needed.
- Monitoring well MW-8 was installed by PNM as an additional well downgradient of the Burlington source area, and upgradient of the former PNM pit. This well detected soil contamination at depths of 14 to 20 feet below grade; groundwater was visibly contaminated by sheen and high dissolved phase contamination.
- Temporary well TPW-02 was installed by Burlington at a location upgradient of the former PNM pit. This temporary monitoring well encountered free product on installation and significant soil contamination at a depth of 25 to 26 feet. Free product is not likely to migrate upgradient in an

environment where both the topographic and groundwater flow gradients are as steep as 0.10. Thus, the contamination at TPW-02 likely originated from upgradient sources.

- If NMOCD considers MW-8 and TPW-02 as upgradient wells for the purposes of establishing remediation reference concentrations for PNM, the upgradient reference concentrations related to contamination caused by PNM are as follows:

Free phase as indicated by TPW-02 (accumulation) and MW-8 (sheen)			
Benzene	=	6,410	ppb
Toluene	=	17,301	ppb
Ethylbenzene	=	693	ppb
Xylenes (total)	=	9,397	ppb
BTEX	=	33,801	ppb

Our conclusions relative to the effectiveness of remedial actions undertaken by Burlington are as follows:

- Continuing sources of free phase, sorbed, and dissolved hydrocarbons remain in Burlington source areas and areas immediately downgradient of their facilities.
- These continuing sources will continue to migrate downgradient in the absence of significant containment and/or remediation, beyond the activities documented by Burlington to date.

### III. Free Phase Hydrocarbon Discharge

With regard to the presence and remediation of free product beneath the well pad, this site has had numerous problems associated with equipment operations, including separators throwing fluids and inadequate tankage to handle fluids discharged. Even if PNM has in the past provided dehydration, PNM, by contract with producers, is not responsible for free product. Further, PNM has not provided dehydration at this site since June 30, 1995, when the sale of the gathering system to Williams Field Services (WFS) was concluded. Free product belongs to the producers, even when it is discharged under conditions of system upset. Therefore, free product contamination, regardless of where it occurs, is not the responsibility of PNM, but of the producer.

PNM detected over 4.5 feet of free product in MW-2 and MW-6 in January 1998. In response to NMOCD concerns, PNM installed and continues to operate a single free product recovery well, MW-6. Approximately 450 gallons of free phase were recovered from January 12, 1998 through March 17, 1998. Free product thicknesses as measured in monitoring wells MW-2 and -6 have declined approximately 2 feet since the inception of free product recovery. As the product is not the result of PNM operations prior to June 30, 1995, PNM has placed Burlington and Williams Field Services on notice that PNM will be seeking cost recovery from the responsible party for actions concerning free product and groundwater investigation and remediation activities performed to date at this site.

The presence of significant free phase in the subsurface is also the most likely cause of dissolved phase groundwater contamination detected at this site. Burlington, PNM, and NMOCD are aware of continuing hydrocarbon surface discharges in the area of the hydrocarbon seep along the northwestern area of the well pad. This seep continues to visibly impact soils and dissolved phase groundwater from monitoring wells sampled along the wash. As PNM did not discharge free product at this site, PNM maintains it is not the responsible party for groundwater contamination associated with this ongoing hydrocarbon seep.

If you have any questions related to the proposed activities for the Hampton 4M site or other project-related activities, please contact me at 505.241.2974.

Sincerely,

*Maureen Gannon*

Maureen Gannon  
Project Manager

cc: Roger Anderson, NMOCD  
Ed Haseley, Burlington Resources  
Ingrid Deklau, Williams Field Services  
Colin Adams, PNM  
Denny Foust, NMOCD - Aztec

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**Table 1: SUMMARY OF ANALYTICAL RESULTS**

GROUNDWATER MONITORING DATA - collected by PNM, except as noted

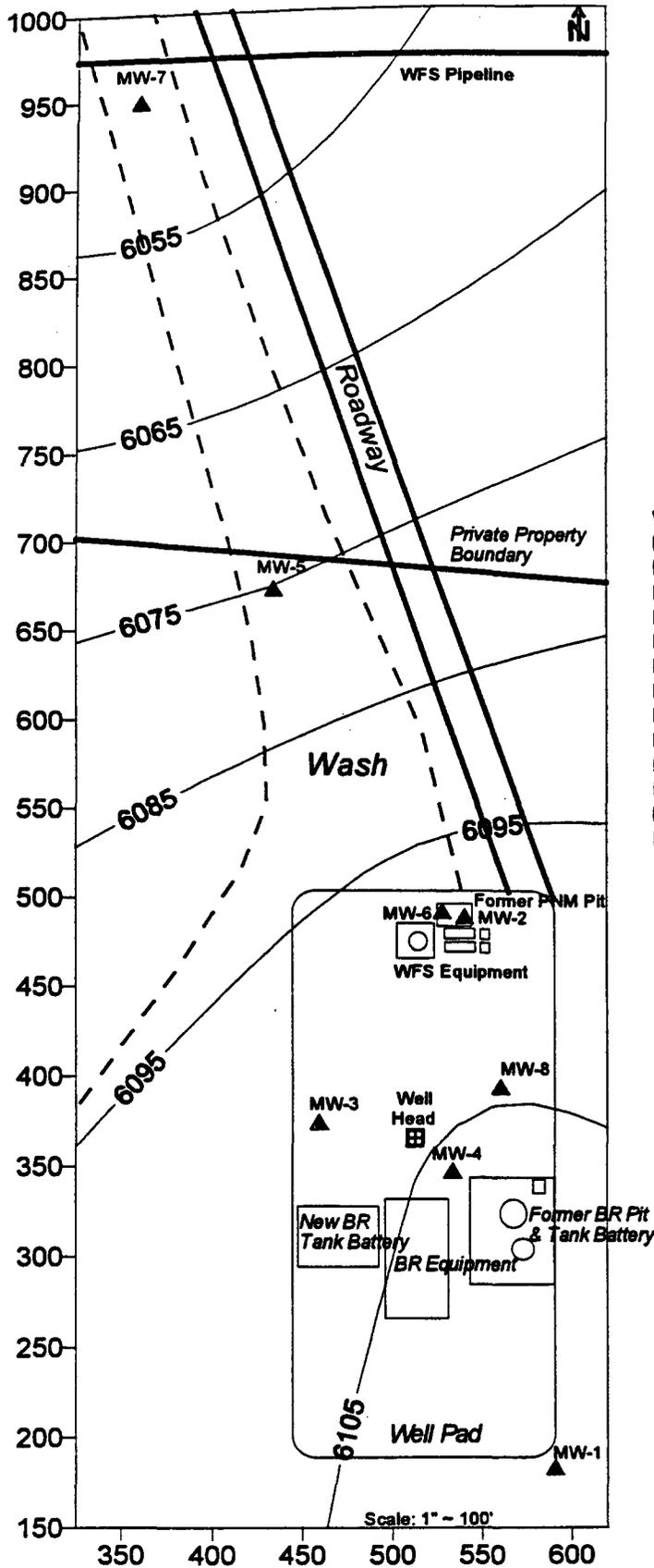
Well	Date Sampled	GWEL (ft,msl)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Total BTEX (ug/L)	Product Thickness (ft)
MW-1 Upgradient well	10/30/97	6110.10	2.4	2.3	<0.2	1.1	5.8	--
	01/12/98	6107.47	4.3	3.3	0.2	1.0	8.8	--
MW-2 PNM drip pit well	01/04/96	6097.88	NA	NA	NA	NA	NA	4.40
	12/16/96	NM	3840.0	7960.0	896.0	7920.0	20616.0	NM
	08/27/97	6097.87	NA	NA	NA	NA	NA	4.75
	10/29/97	6098.08	NA	NA	NA	NA	NA	4.58
	01/12/98	6098.10	NA	NA	NA	NA	NA	4.41
MW-3 Up & cross-gradient to PNM Burlington	1/4/96	6101.06	NA	NA	NA	NA	NA	--
	1/31/97	NM	<0.2	<0.2	<0.2	<0.2	<0.2	--
	5/5/97	NM	NA	NA	NA	NA	NA	--
	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	--
MW-4 Upgradient PNM; downgradient Burlington	1/4/96	6106.16	NA	NA	NA	NA	NA	--
	1/31/97		811.7	1420.5	31.0	388.1	2651.3	--
	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	--	
MW-5 Downgradient along wash	10/29/97		5934.0	10024.0	709.0	8188.0	24855.0	--
	1/12/98	6075.09	7521.0	11213.0	779.0	8436.0	27949.0	--
MW-6 PNM drip pit/product recovery	11/12/97	6098.08	NA	NA	NA	NA	NA	4.80
	1/12/98	6097.43	NA	NA	NA	NA	NA	4.71
MW-7 Downgradient along wash; adj pipeline	1/12/98	6047.12	780.0	246.0	258.0	3942.0	5226.0	--
MW-8 Upgradient PNM; downgradient Burlington	1/12/98	6104.71	6410.0	17301.0	693.0	9397.0	33801.0	Sheen
EB WELL Downgradient private well	11/25/97	DTW=68.	<0.2	<0.2	<0.2	<0.2	<0.2	--

Sample	Matrix	Date Sampled	Depth (ft)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	Total BTEX (ppb)	TPH (mg/Kg)	PID (ppm)
<b>Burlington Temporary Monitoring Well Sampling</b>										
TPW-01	Water	6/5/97		20.0	<1	<1	<1	20.0	NA	
	Soil		25-26'	<1	<1	<1	<1	<1	<10	
TPW-02	Water	6/5/97	Product	NA	NA	NA	NA	NA	NA	
	Soil		25-26'	2000.0	4600.0	14000.0	39000.0	59600.0	600.0	
TPW-03	Water	6/5/97	Dry	NA	NA	NA	NA	NA	NA	
	Soil		25-26'	<1	<1	<1	<1	<1	25	
TPW-04	Water	6/6/97		2000.0	3100.0	57.0	810.0	5967.0	NA	
	Soil		20-21.5'	28.0	3.4	76.0	40.0	147.4	52	
TPW-05	Water	6/6/97		5800.0	460.0	16000.0	7000.0	29260.0	NA	
	Soil		15-16'	4000.0	10000.0	4500.0	28000.0	46500.0	61	
TPW-06	Water	6/6/97		1600.0	3400.0	48.0	690.0	5738.0	NA	
	Soil		16-16.5'	<1	<1	2.8	4.8	7.6	11	
TPW-07	Water	6/6/97		5300.0	18000.0	620.0	9300.0	33220.0	NA	
	Soil		15-16'	7000.0	74000.0	20000.0	170000.0	271000.0	250	
<b>PNM Test Holes along Wash</b>										
TH-1	Soil	11/11/97	12.7'	NA	NA	NA	NA	NA	1412	
TH-2	Soil	11/11/97	14.4'	NA	NA	NA	NA	NA	1357	
TH-3	Soil	11/11/97	16.5'	NA	NA	NA	NA	NA	0	
TH-4	Soil	11/11/97	15'	NA	NA	NA	NA	NA	279	
TH-5	Soil	11/11/97	14.5'	NA	NA	NA	NA	NA	1211	
TH-6	Soil	11/11/97	16'	NA	NA	NA	NA	NA	0	
TH-7 (temporary well)	Water	11/11/97	NA	2171.0	4185.0	190.0	2856.0	17000.0	279	
TH-8	Soil	11/12/97	14'	NA	NA	NA	NA	NA	0	
Sample from Burlington Excavation Groundwater	Water	2/11/98	15'	1800	1700	<25	1420	4920	NA	

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**Figure 1**  
**Ampton 4M site map & analytical results (ppb)**  
**(January, 1998)**

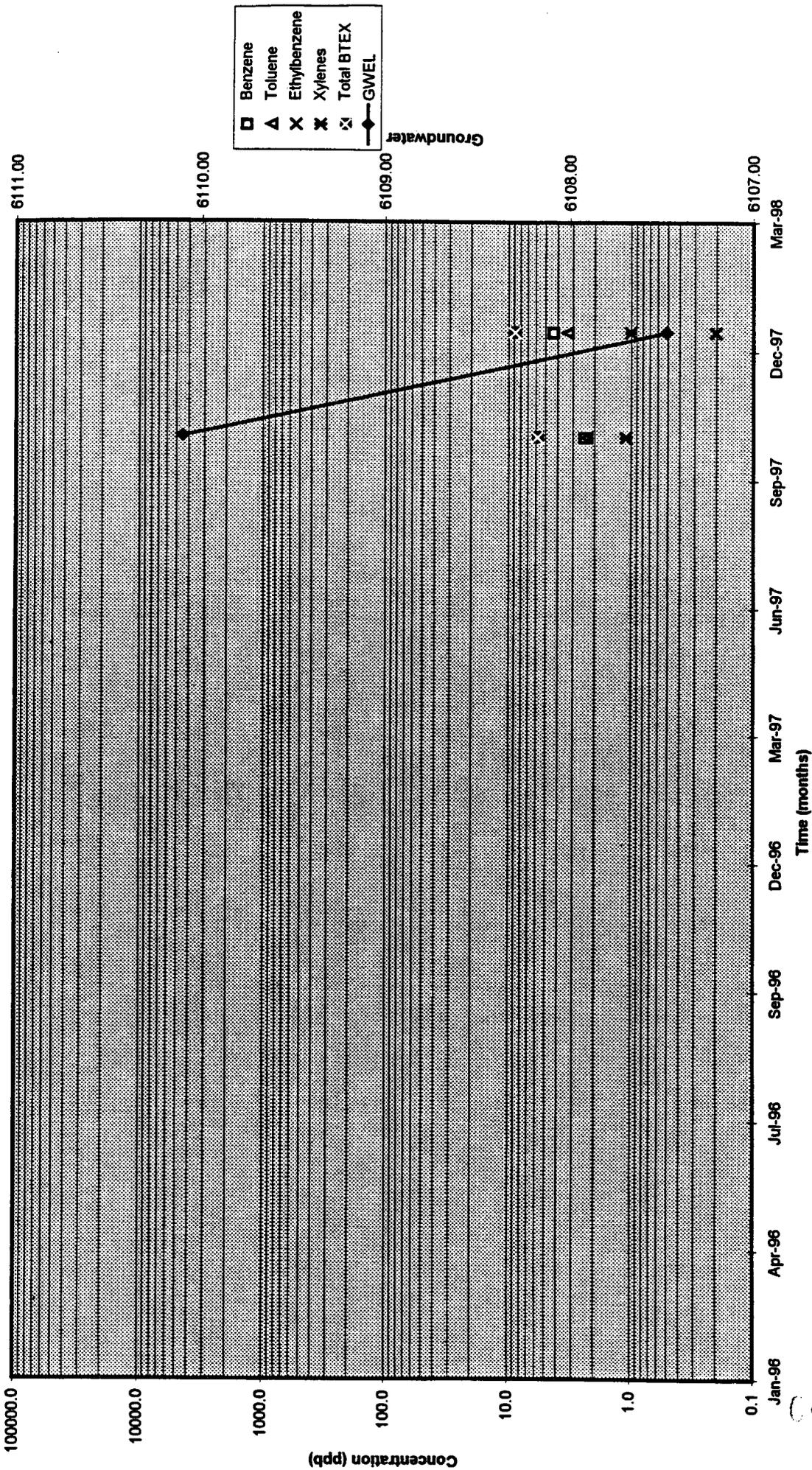
△  
 EB - Private Well  
 (Not to Scale)



Well #	Date	B	T	E	X
MW-1	10/30/97	2.4	2.3	<0.2	1.1
MW-1	1/12/98	4.3	3.3	0.2	1
MW-2	1/12/98	4.41 feet of product			
MW-3	1/31/97	<0.2	<0.2	<0.2	<0.2
MW-3	1/12/98	<0.2	<0.2	<0.2	<0.2
MW-4	1/31/97	811.7	1420.5	31.0	388.1
MW-4	1/12/98	1251	6	81	24
MW-5	10/29/97	5934	10024	709	8188
MW-5	1/12/98	7521	11213	779	8436
MW-6	1/12/98	4.71 feet of product			
MW-7	1/12/98	780	246	258	3942
MW-8	1/12/98	6410	17301	693	9397
EB-Well	11/25/97	<0.2	<0.2	<0.2	<0.2

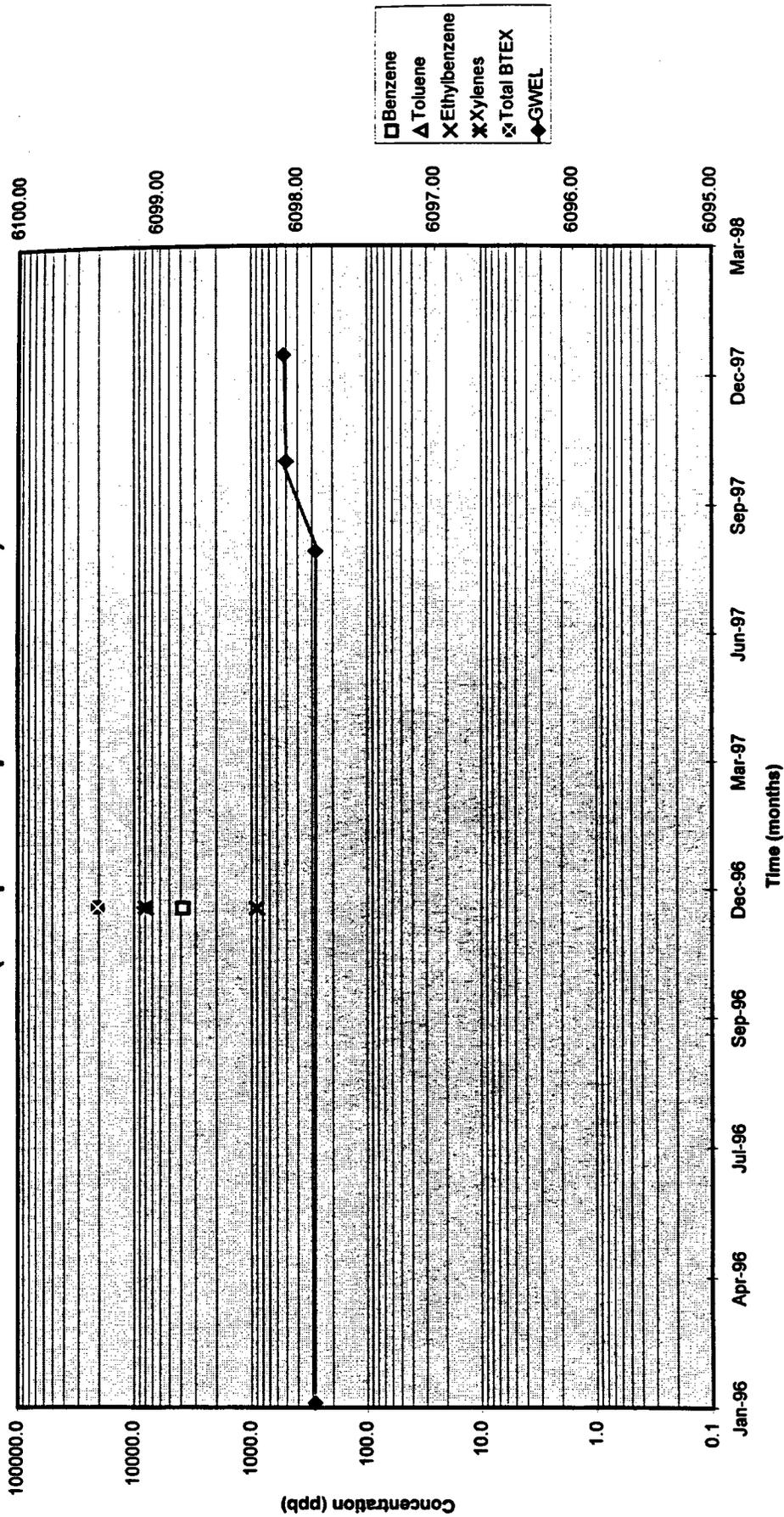
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# MW-1: Trends with Time



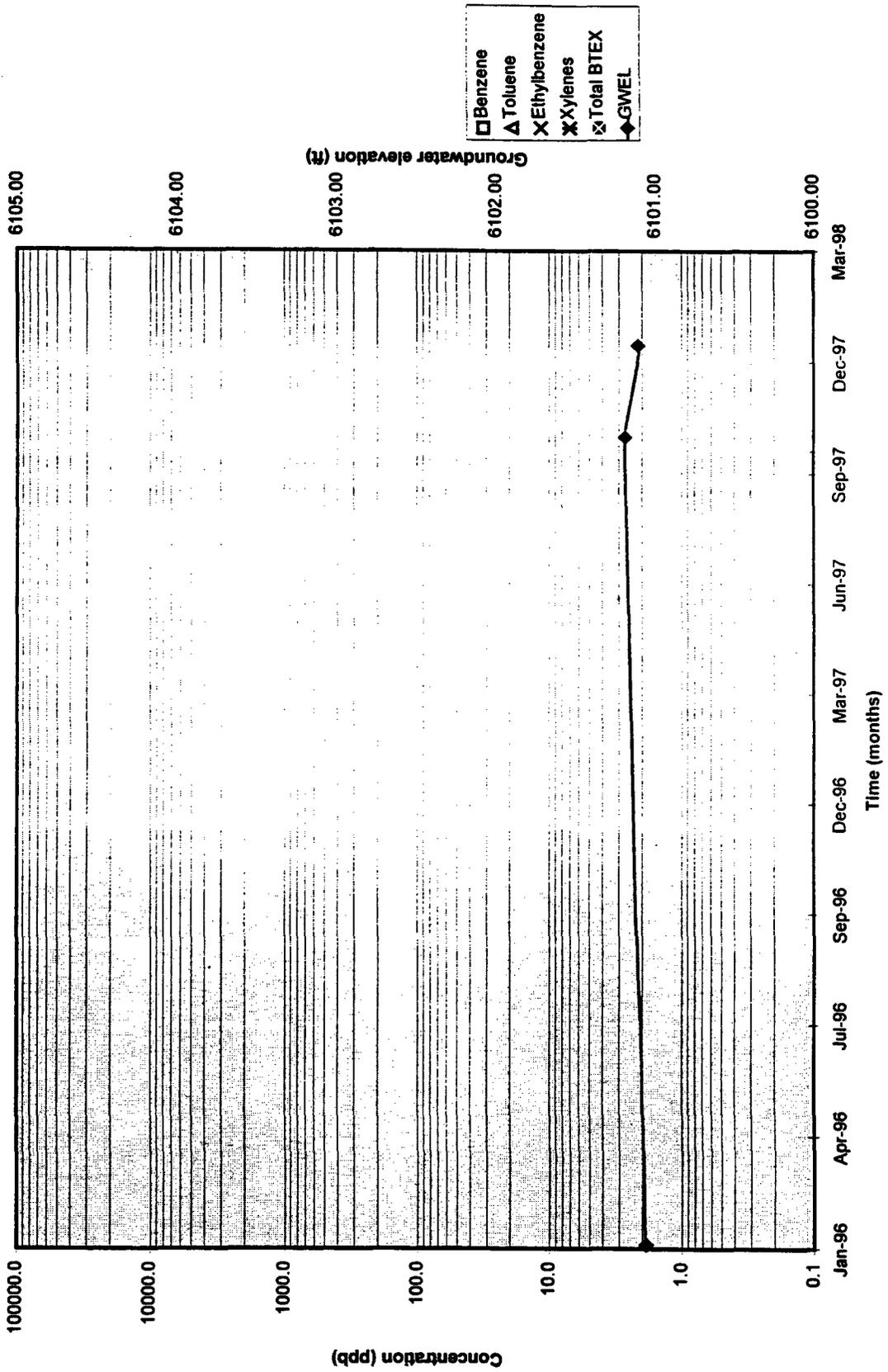
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**MW-2: Trends with Time  
(free product present in well)**



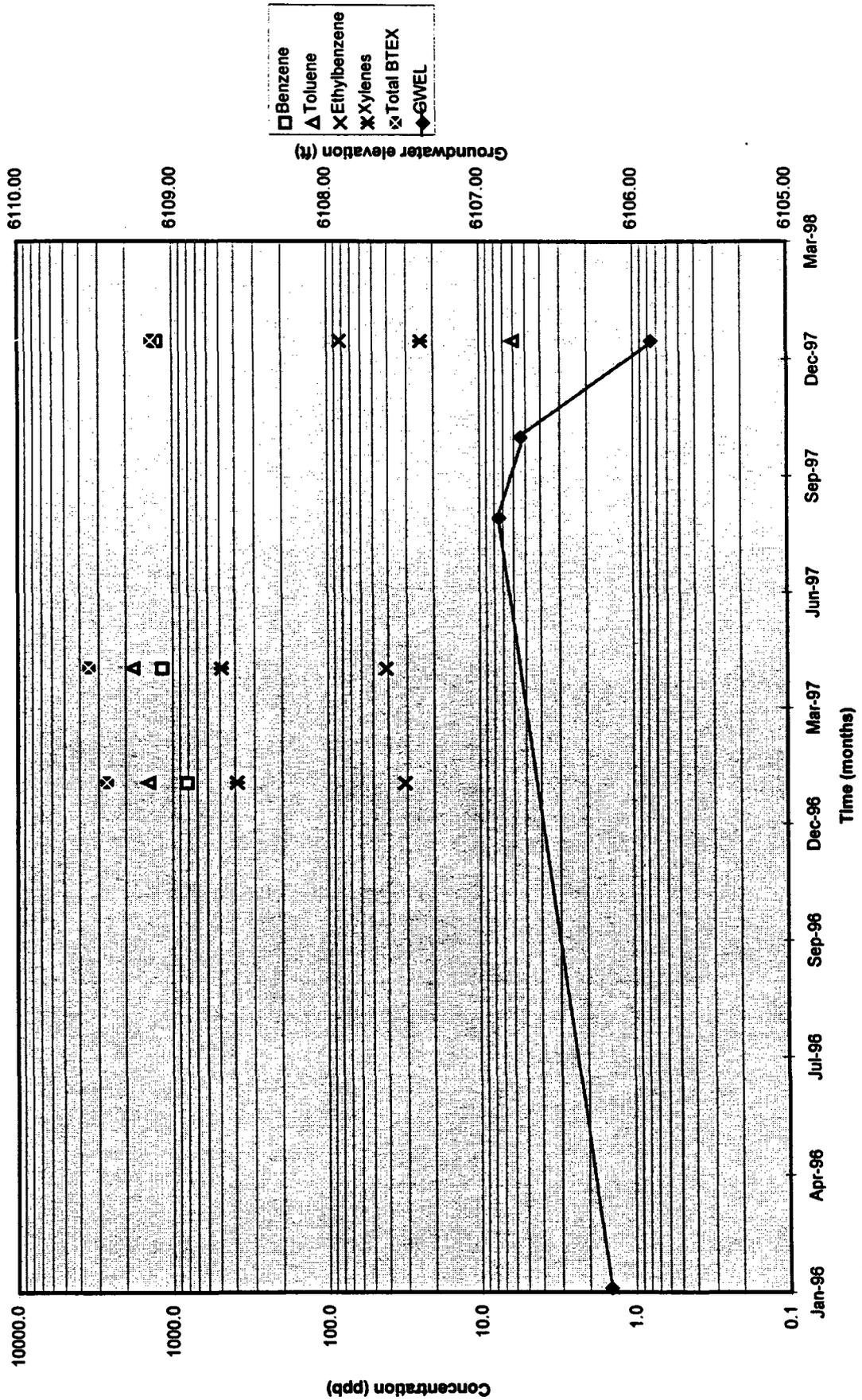
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# MW-3: Trends with Time

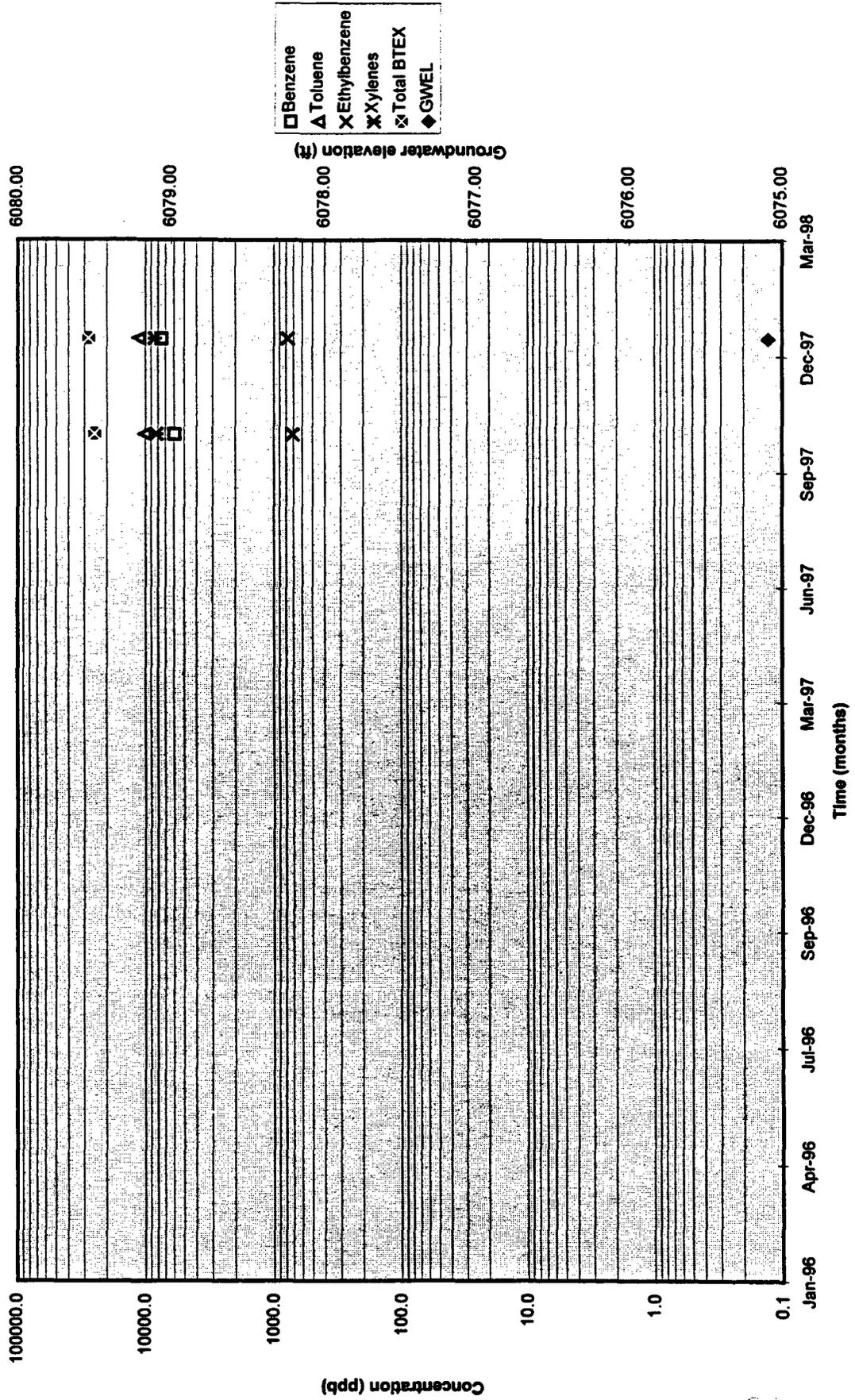


100001

# MW-4: Trends with Time

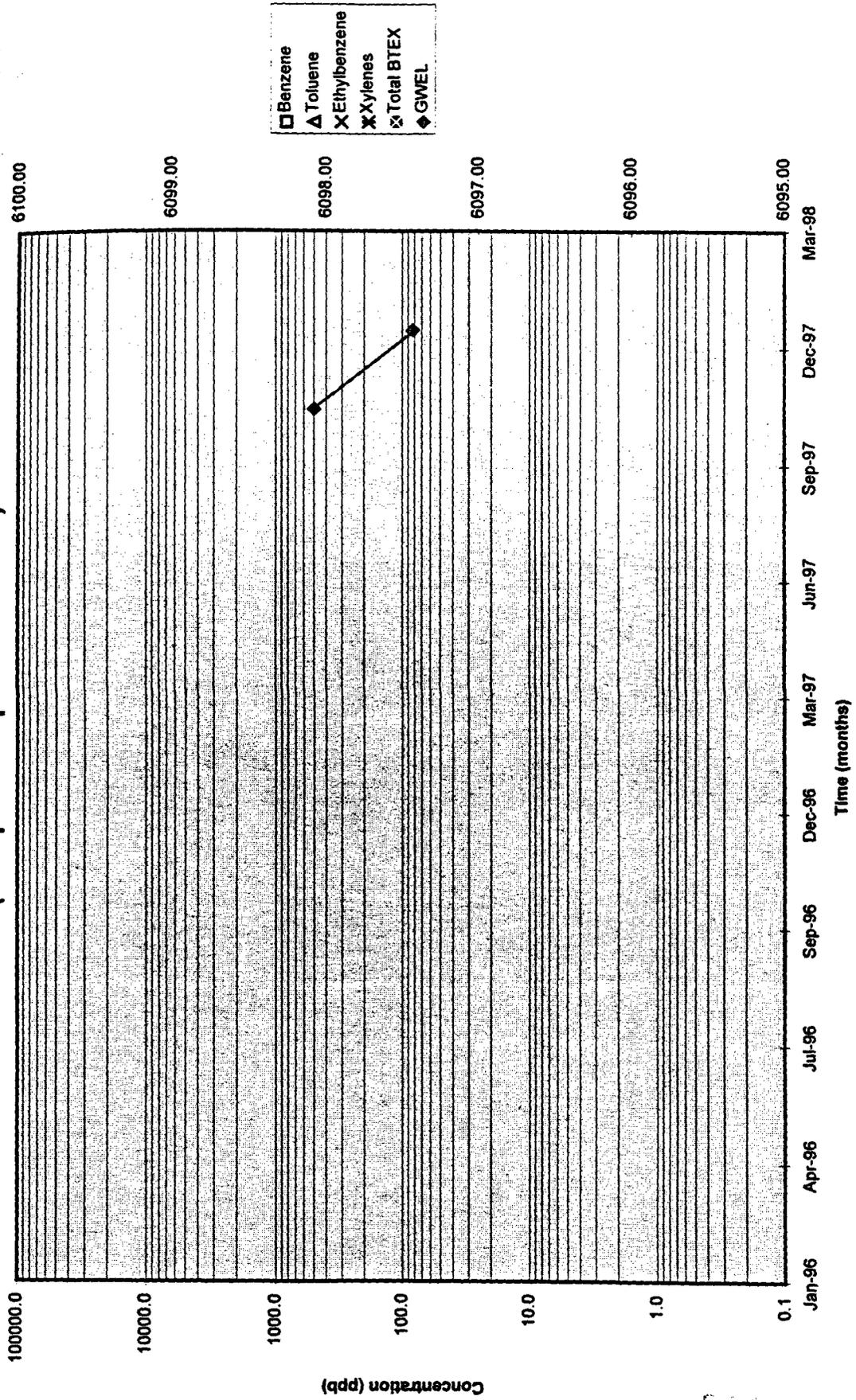


# MW-5: Trends with Time



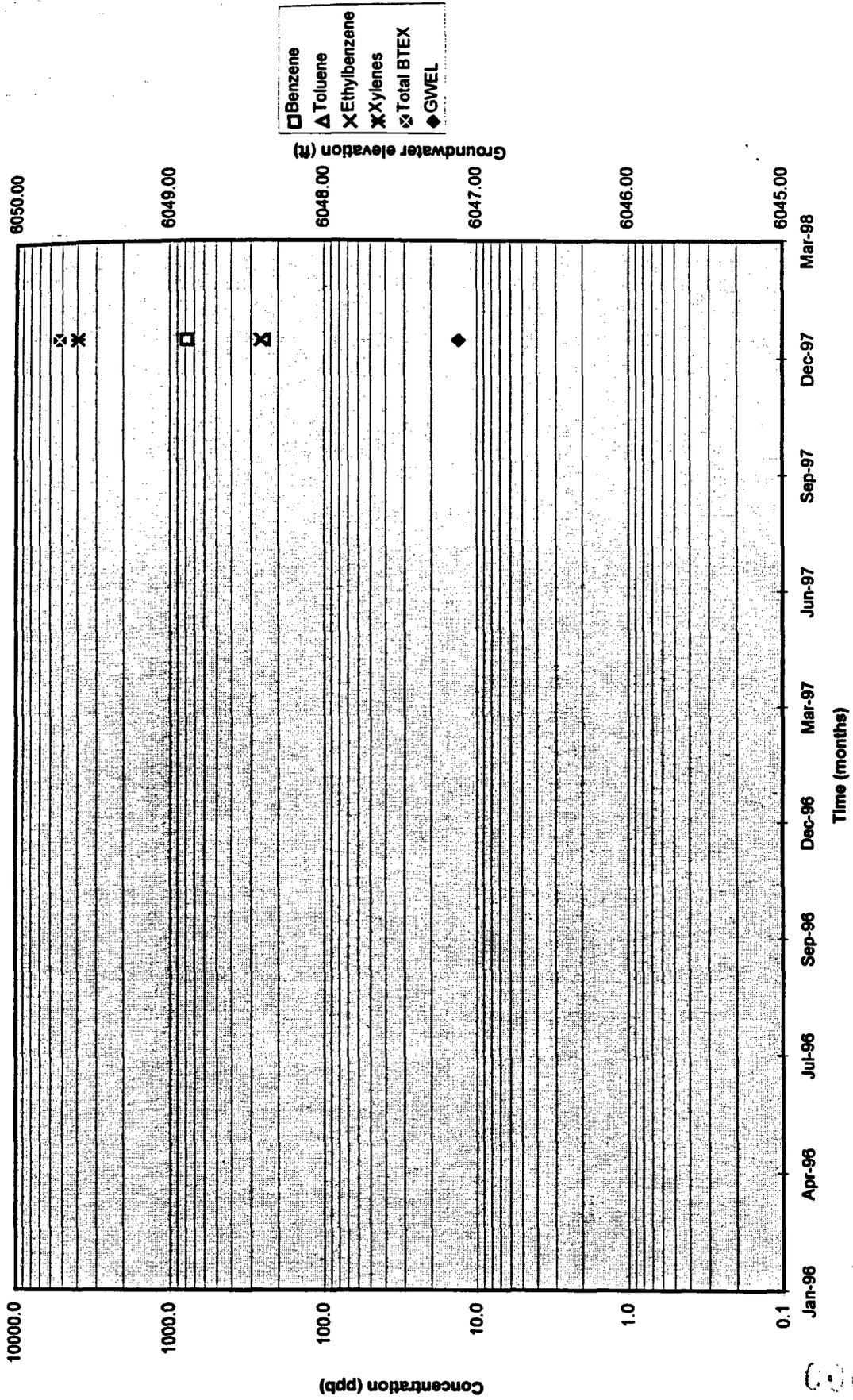
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**MW-6: Trends with Time**  
**(free product present in well)**



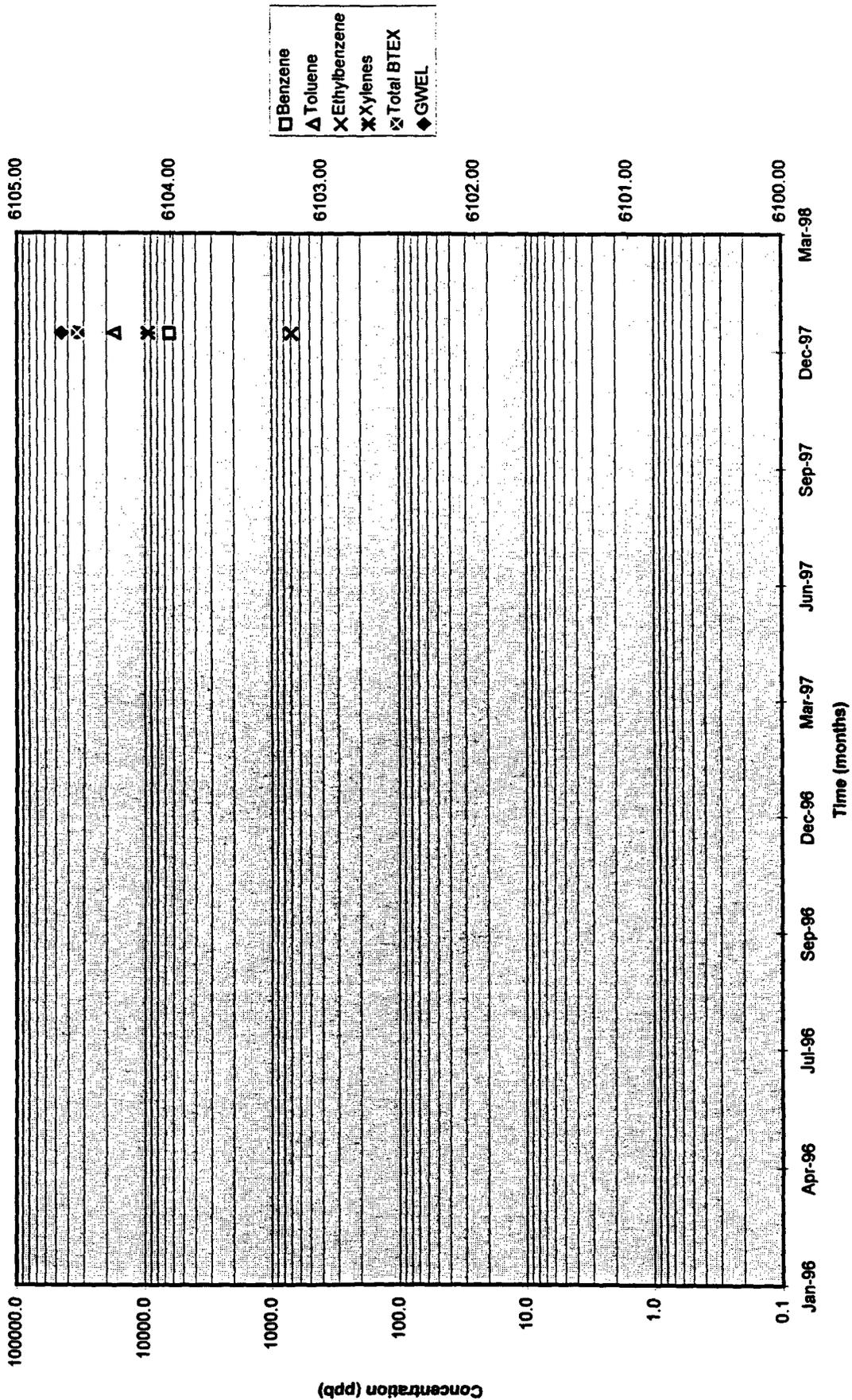
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# MW-7: Trends with Time



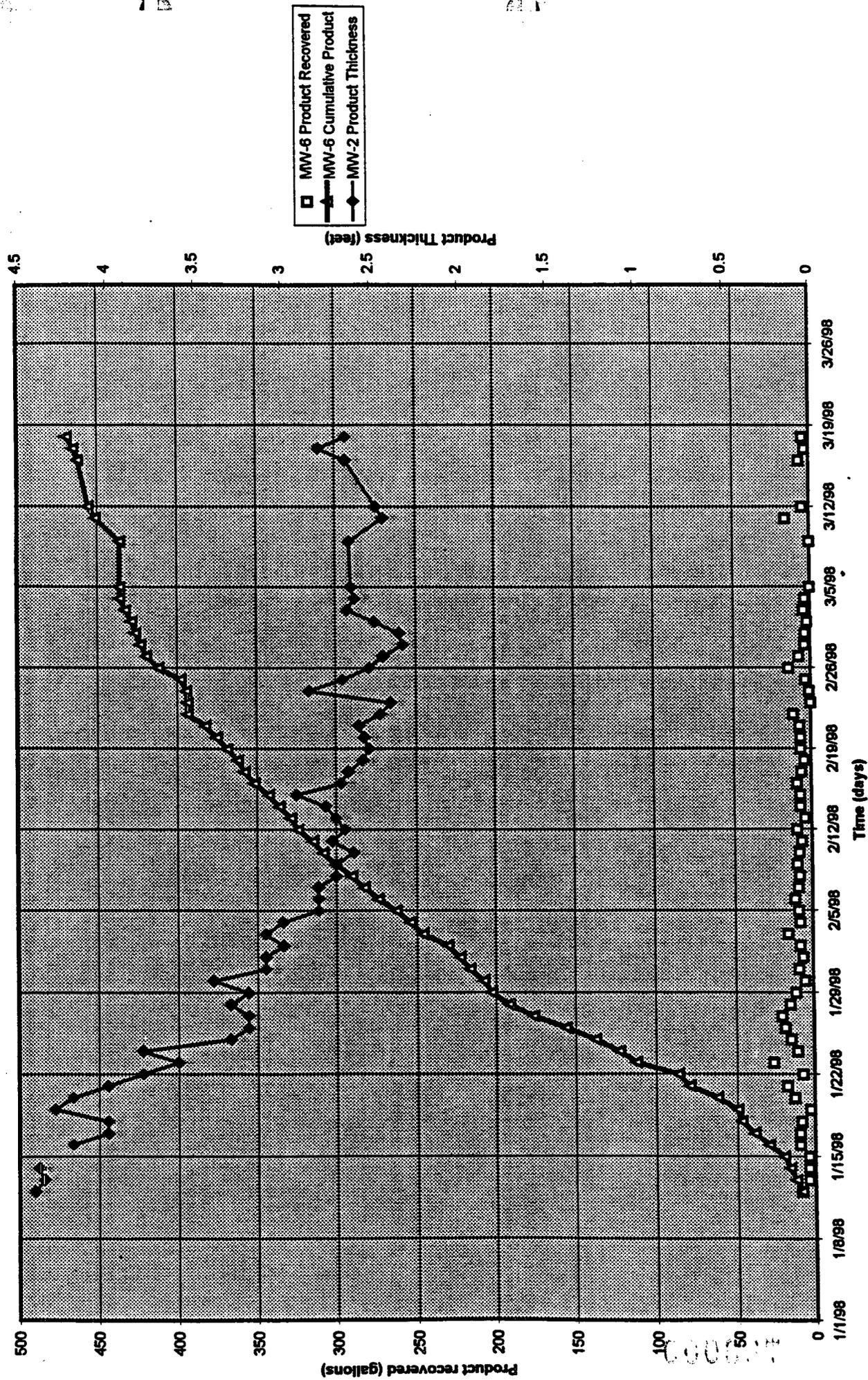
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# MW-8: Trends with Time



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# Hampton 4M Free Product Recovery



# HAMPTON 4M

DATE	TIME	PUMP TIME SET	CYCLES / DAY	PUMPING TIME TOTAL	NITROGEN PRESSURE	NITROGEN TANK LEVEL	DRUM LEVEL	MW #2 PRODUCT LEVEL	MW #2 WATER LEVEL
1/4/78	1323	5 min.	3	2 Hr. 10 min.	58	675	0	20.78	25.04
1/7/78	1419	5 min.	3	2 Hr. 32 min.	58	775	5 3/4"	20.98	25.04
1/11/78	1527	5 min.	3	2 Hr. 53 min.	58	275	11 1/2"	20.96	24.96
1/14/78	1323	5 min.	3	3 Hr. 3 min.	58	58	15 1/2"	20.69	25.04
1/20/78	1454	5 min.	3	3 Hr. 30 min.	50	750	17"	20.83	25.06
1/21/78	0534	Cont.	1	4 Hr. 23 min.	50	550	24 1/2"	20.93	24.77
1/22/78	1344	10 min.	3	5 Hr. 17 min.	50	400	5 1/4"	21.00	24.88
1/23/78	1418	10 min.	6	6 Hrs 33 min.	50	50	14"	21.11	24.74
1/24/78	1454	20 min.	6	6 Hr. 51 min.	50	2175	16 1/2"	20.97	24.78
1/25/78	1153	10 min.	6	7 Hr. 03 min.	50	1875	25 1/4"	21.18	24.50
1/26/78	1330	10 min.	6	7 Hr. 54 min.	50	1625	11 1/4"	21.20	24.43
1/27/78	1431	10 min.	6	10 Hr. 07 min.	50	1375	23 1/2"	21.16	24.39
1/28/78	1320	10 min.	6	10 Hr. 48 min.	50	600	6"	20.09	24.40
1/29/78	1421	10 min.	6	11 Hr. 08 min.	50	325	12 3/4"	21.11	24.21
1/30/78	1525	10 min.	6	12 Hr. 10 min.	50	150	12 3/4"	21.05	24.48
1/31/78	1150	10 min.	6	19 Hr. 02 min.	50	2275	18"	21.17	24.27
2/1/78	1143	10 min.	6	20 Hr. 06 min.	60	1875	21 3/4"	21.19	24.29
2/2/78	1517	10 min.	6	22 Hr. 12 min.	60	1600	26 1/2"	21.25	24.25
2/3/78	1516	10 min.	6	23 Hr. 13 min.	60	1410	9 1/2"	21.10	24.20
2/4/78	1315	10 min.	6	24 Hrs 15 min.	60	1120	14 1/4"	21.09	24.23
2/5/78	1303	10 min.	6	25 Hrs 18 min.	60	875	19 1/2"	21.27	24.13
2/6/78	1518	5 min.	12	26 Hrs 14 min.	60	600	26 1/4"	21.25	24.10
2/7/78	1121	5 min.	12	27 Hrs 07 min.	60	375	5 1/4"	21.26	24.10
2/8/78	1522	5 min.	12	28 Hrs 21 min.	60	0	10"	21.24	23.98
2/9/78	1615	5 min.	12	30 Hrs 07 min.	55	2325	15 3/4"	21.21	24.00
2/10/78	1611	5 min.	12	31 Hrs 17 min.	55	2110	20 1/2"	21.36	24.00
2/11/78	1350	5 min.	12	32 Hrs 21 min.	55	1875	24 1/2"	21.23	23.95
2/12/78	1718	5 min.	12	33 Hrs 21 min.	55	1625	5 3/4"	21.30	23.95
2/13/78	1603	5 min.	6	34 Hrs 30 min.	55	1500	8 1/4"	21.22	23.92
2/14/78	1623	5 min.	6	34 Hrs 59 min.	55	1225	12 1/2"	21.19	23.95

# HAMPTON 4M

DATE	TIME	PUMP TIME SET	CYCLES / DAY	PUMPING TIME TOTAL	NITROGEN PRESSURE	NITROGEN TANK LEVEL	DRUM LEVEL	MW #2 PRODUCT LEVEL	MW #2 WATER LEVEL
2/1/98	1529	5 min	12	37 Hrs 23 min	55	990	16 3/4"	21.08	24.00
2/1/98	1613	5 min	12	38 Hrs 17 min	55	675	22 1/2"	21.26	23.93
2/17/98	1740	5 min	12	39 Hrs 22 min	55	450	26 3/4"	21.26	23.89
2/18/98	1344	5 min	12	40 Hrs 14 min	55	2475	2 1/2"	21.32	23.87
2/19/98	1717	5 min	12	41 Hrs 27 min	55	2075	6 1/2"	21.34	23.85
2/20/98	1418	5 min	12	42 Hrs 25 min	55	1775	10 1/2"	21.24	23.82
2/21/98	1631	5 min	12	43 Hrs 33 min	55	1500	14 3/4"	21.30	23.87
2/22/98	1445	5 min	6	43 Hrs 14 min	55	1375	21 1/2"	21.35	23.80
2/23/98	1602	5	6	44 Hrs 38 min	55	1175	19 1/2"	21.36	23.75
2/24/98	1601	5	6	50 Hrs 25 min	55	6	22.0"	21.10	23.95
2/24/98	1429	5	12	50 Hrs 5 min	60	2150	24.0"	21.24	23.90
2/26/98	1572	5	12	51 Hrs 5 min	58	1650	32 1/2"	21.29	23.80
2/27/98	1543	5	12	52 Hrs 5 min	50	1100	4 1/2"	21.35	23.78
2/28/98	1604	5	12	54 Hrs 57 min	50	400	6 3/4"	21.41	23.73
2/19/98	1105	5	12	54 Hrs 17 min	50	0	8 3/4"	21.41	23.75
2/19/98	1131	5	12	55 Hrs 38 min	50	2525 1300	10"	21.32	23.80
2/19/98	1711	5	12	55 Hrs 5 min	50	1150	12 1/2"	21.25	23.88
2/19/98							14 1/2"	21.29	23.88
2/19/98								21.29	23.90
2/19/98	1707	5	12	56 Hrs 56 min	50	900		21.38	24.00
2/11/98	1730	5	12	59 Hrs 00 min	50	200	23 3/4"	21.38	23.81
2/2/98	1604	5	12	59 Hrs.	50	2700	26 1/2"	21.34	23.81
2/16/98	1610 1620	5	12	62 Hrs 36 min	50	0	4"	21.31	23.95
2/17/98	16732	5	12/6	63 Hrs 40 min	50	1850	7 1/2"	21.26	24.05
2/18/98	1623	-	-	64 Hrs 14 min	50	1600	10"	21.36	24.02

20 60  
14 42  
15 1400

26.53  
24.06  
2.47  
1.25

24.10  
21.38  
-2.72

40000

DEPARTMENT	
FILE	SHEET OF
BY	DATE
CHECKED	DATE

Hampton 4M

Product removed (gallons) from MW-6

11	5.0 gal.	in November	Feb. 16 - 9.13
12	0.50 gal.		17 - 6.23
13	3.75 gal.		18 - 4.15
14	3.75 gal.		19 - 6.64 - 353.6
15	3.80 gal.		20 - 6.64
16	9.55 gal.		21 - 7.06
17	9.55 gal.		22 - 11.21 - 378.54
18	8.30 gal.		23 - <del>0</del>
19	2.49 gal.		24 - 0.83
20	12.45 gal.		25 - 3.32
21	17.72 gal.		26 - 14.11 - 396.80
22	7.00 gal.	Total 86.86 gal. + 5	27 - 7.47
23	20.26 gal.	" 112.14 gal	28 - 3.74
24	10.65 gal.		mand - 3.32 - 411.33 gal
25	14.53 gal.		2 - 2.08
26	18.68 gal.		3 - 3.325
27	20.34 gal.	Total 176.34 gal	4 - 4.15
28	14.96 gal.		11 - 15.36
29	11.21 gal.	Total 187.55 gal	12 - 4.57
30	5.00 gal.		16 - 6.64
31	8.72 gal.	Total 201.27 gal	17 - 5.81 - 453.26 gal
1	6.23 gal.		18 - 4.15
2	7.89 gal.		
3	15.77 gal.	Total 231.16 gal	
4	7.89 gal.		
5	8.72 gal.		
6	11.21 gal.	Total 258.98 gal	
7	8.72 gal.		
8	7.89 gal.		
9	9.55 gal.		
10	7.89 gal.	Total 293.02 gal.	
	6.64 gal.	299.66	
12	9.55 gal.		
13	4.15 gal.		
14	7.06 gal.		
15	7.06 gal.		

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