APPENDIX S
DRAFT WASTE MANAGEMENT PLAN

ATTACHMENT S-2
Chevron USA Products Company
El Segundo Refinery

Liquid Hydrocarbon Recovery Project
Annual Report for 1999

Chevron U.S.A. Products Company
El Segundo Refinery

Liquid Hydrocarbon Recovery Project Annual Report for 1999

15 February 2000

Submitted to:

California Regional
Water Quality Control Board
Data & Information Management Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013

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CHEVRON U.S.A. PRODUCTS COMPANY
EL SEGUNDO REFINERY
LIQUID HYDROCARBON
RECOVERY PROJECT
ANNUAL REPORT FOR 1999

Prepared for:

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15 February 2000

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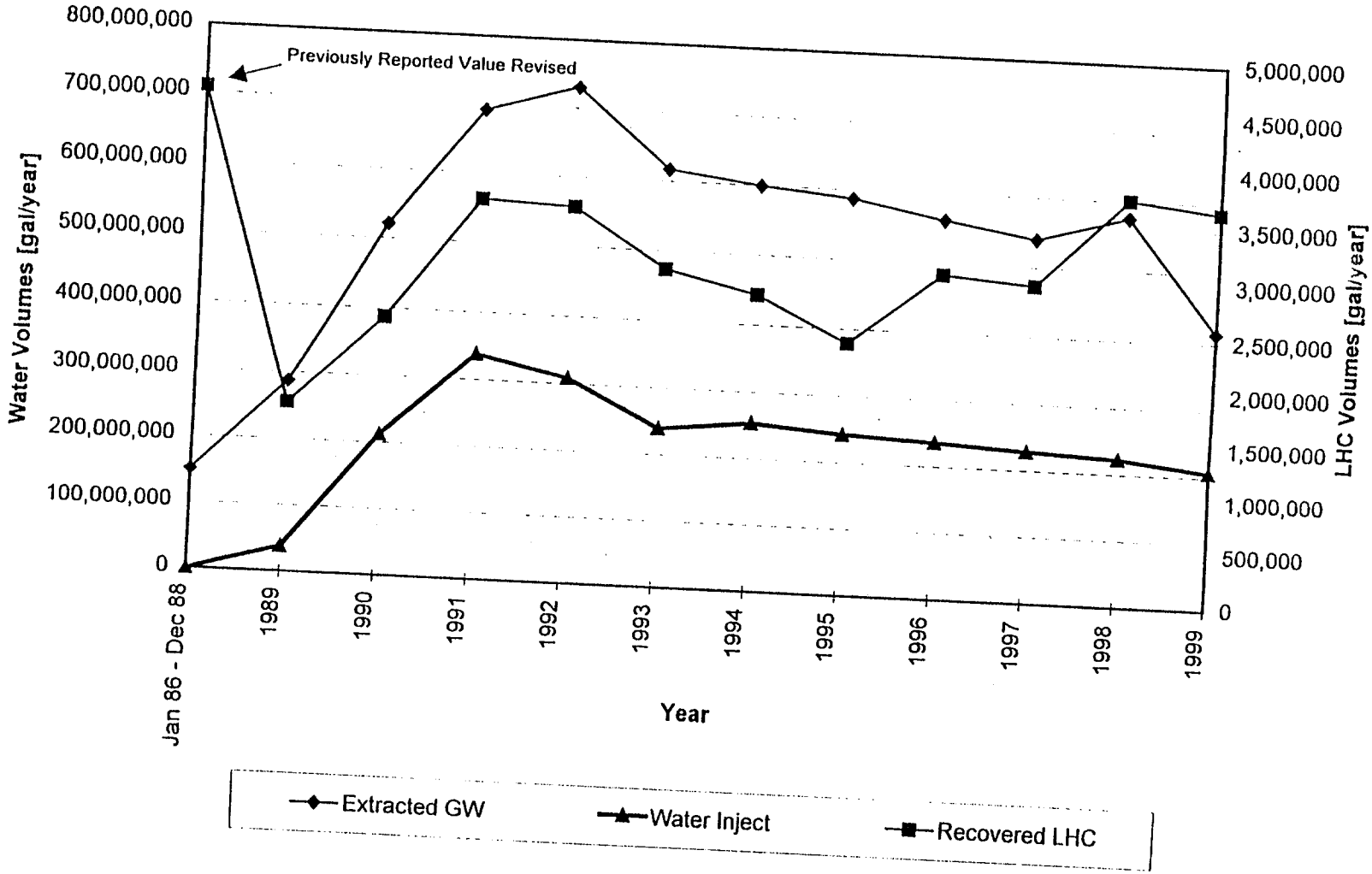


Figure 1-1. Summary of Annual LHC Recovery, Groundwater Extraction, and Water Injection

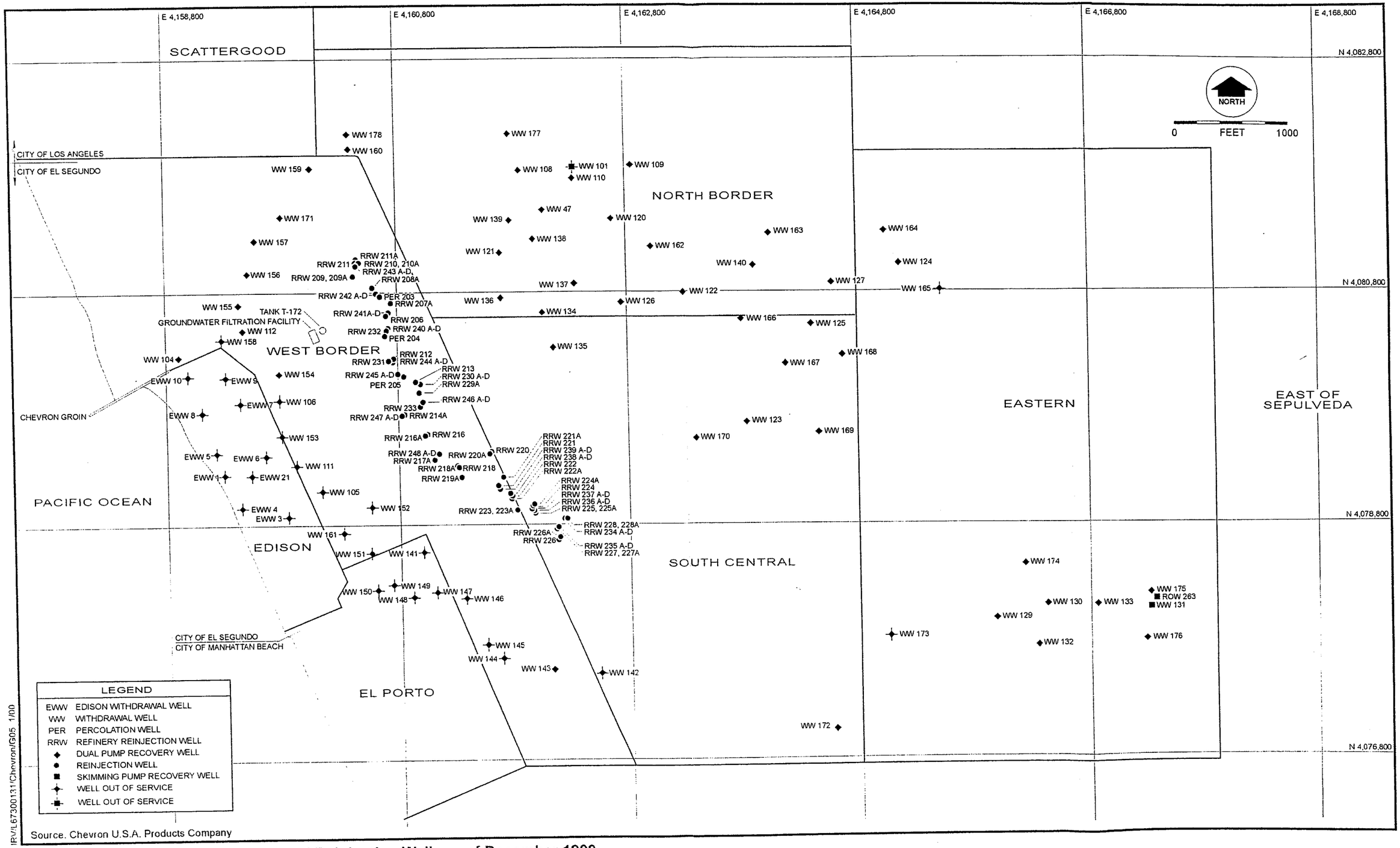
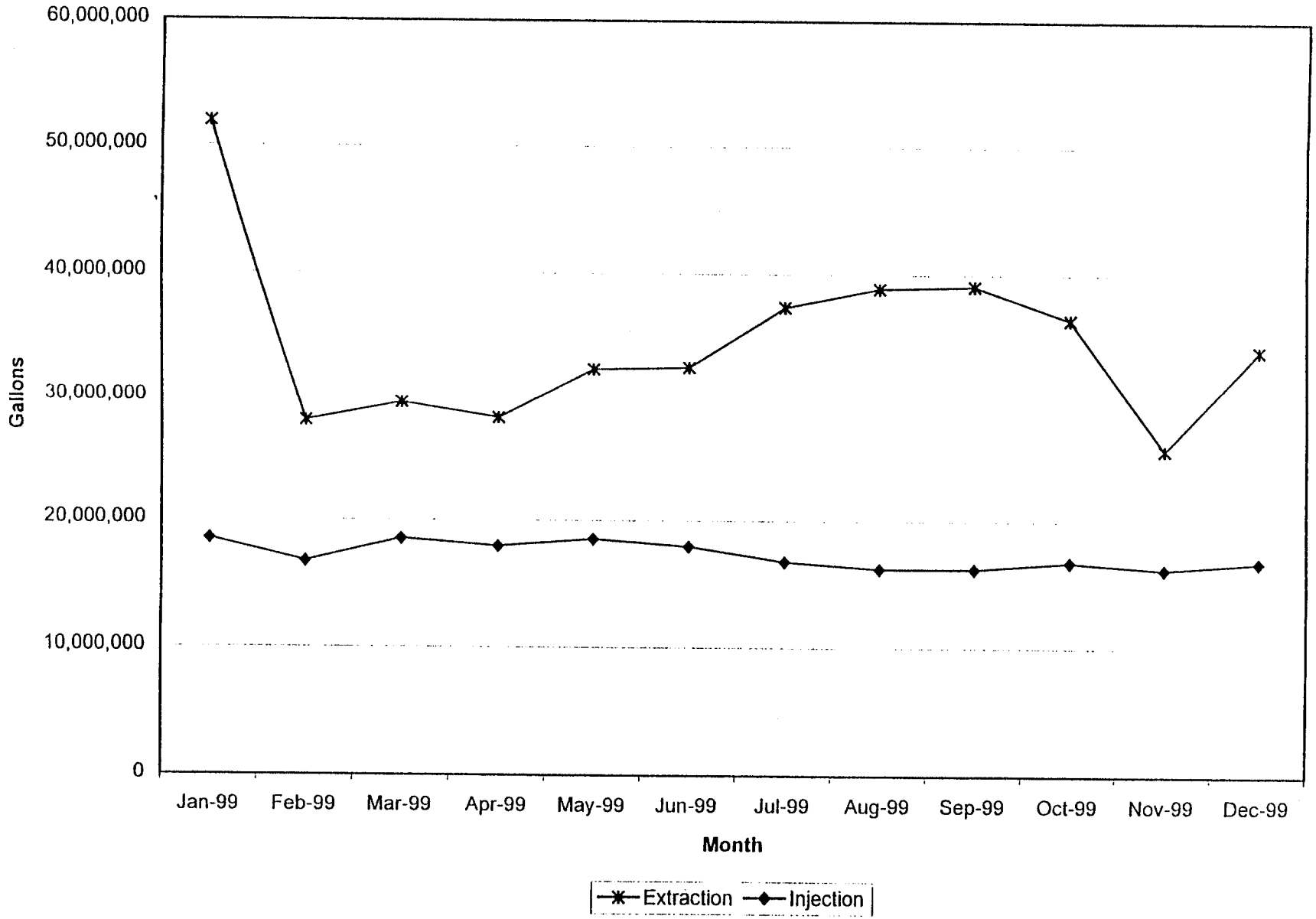


Figure 3-1. Location of Withdrawal and Reinjection Wells as of December 1999



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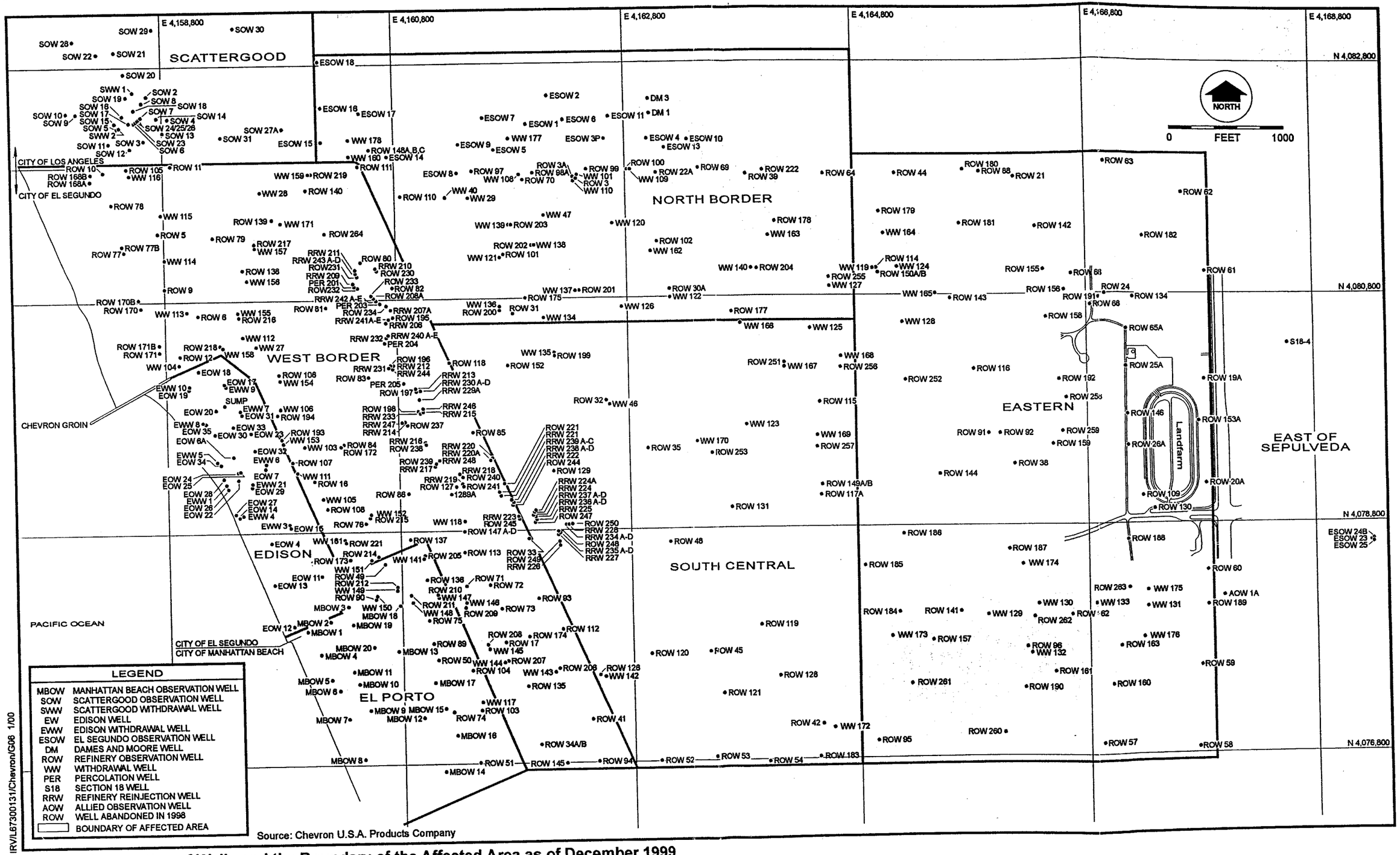

Source: Chevron U.S.A. Products Company

IRV/L87300131/Chevron/G08 1/00

Figure 4-1. Location of Wells and the Boundary of the Affected Area as of December 1999

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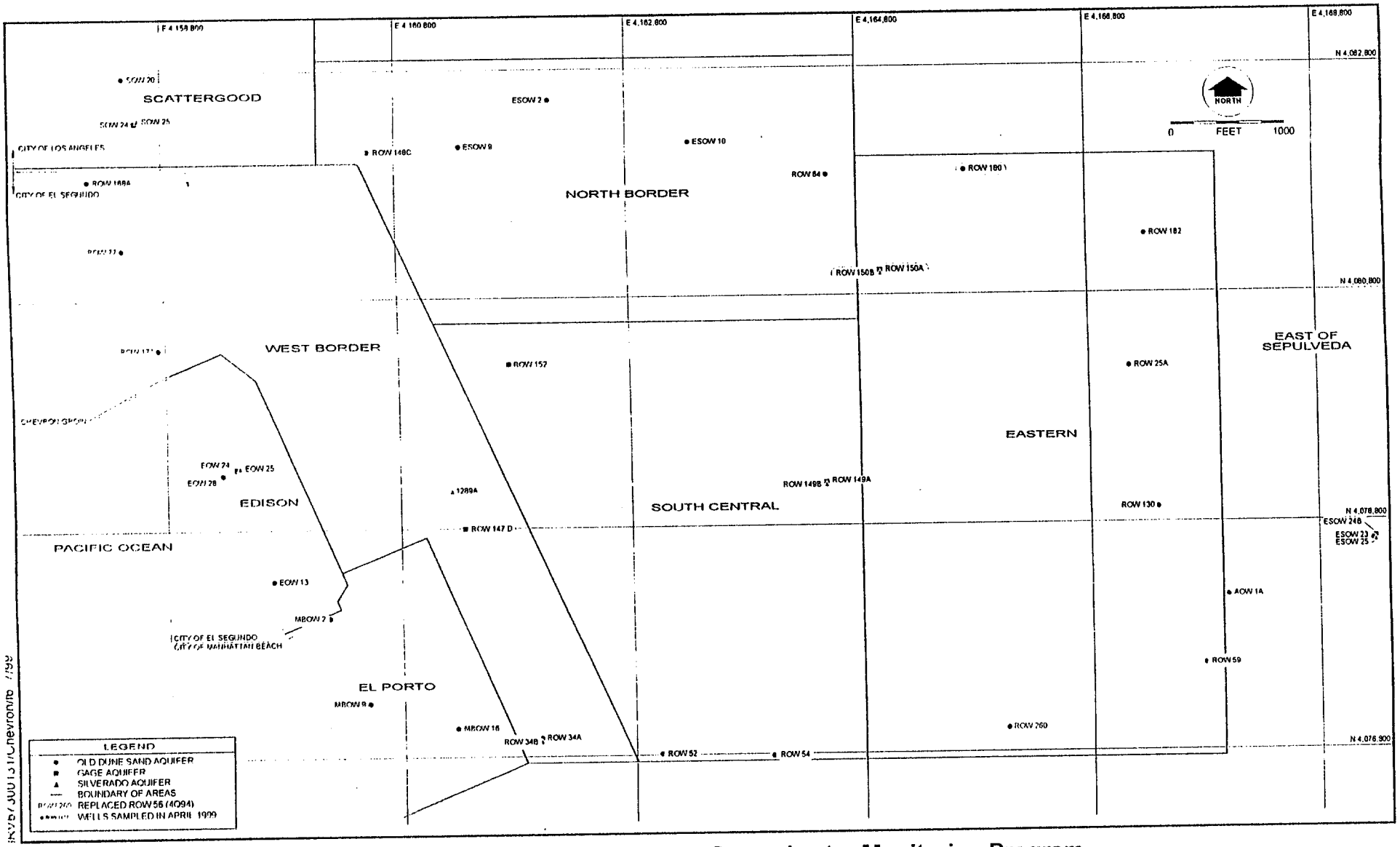

Figure 5-1. Location of Groundwater Monitoring Wells in the Groundwater Monitoring Program

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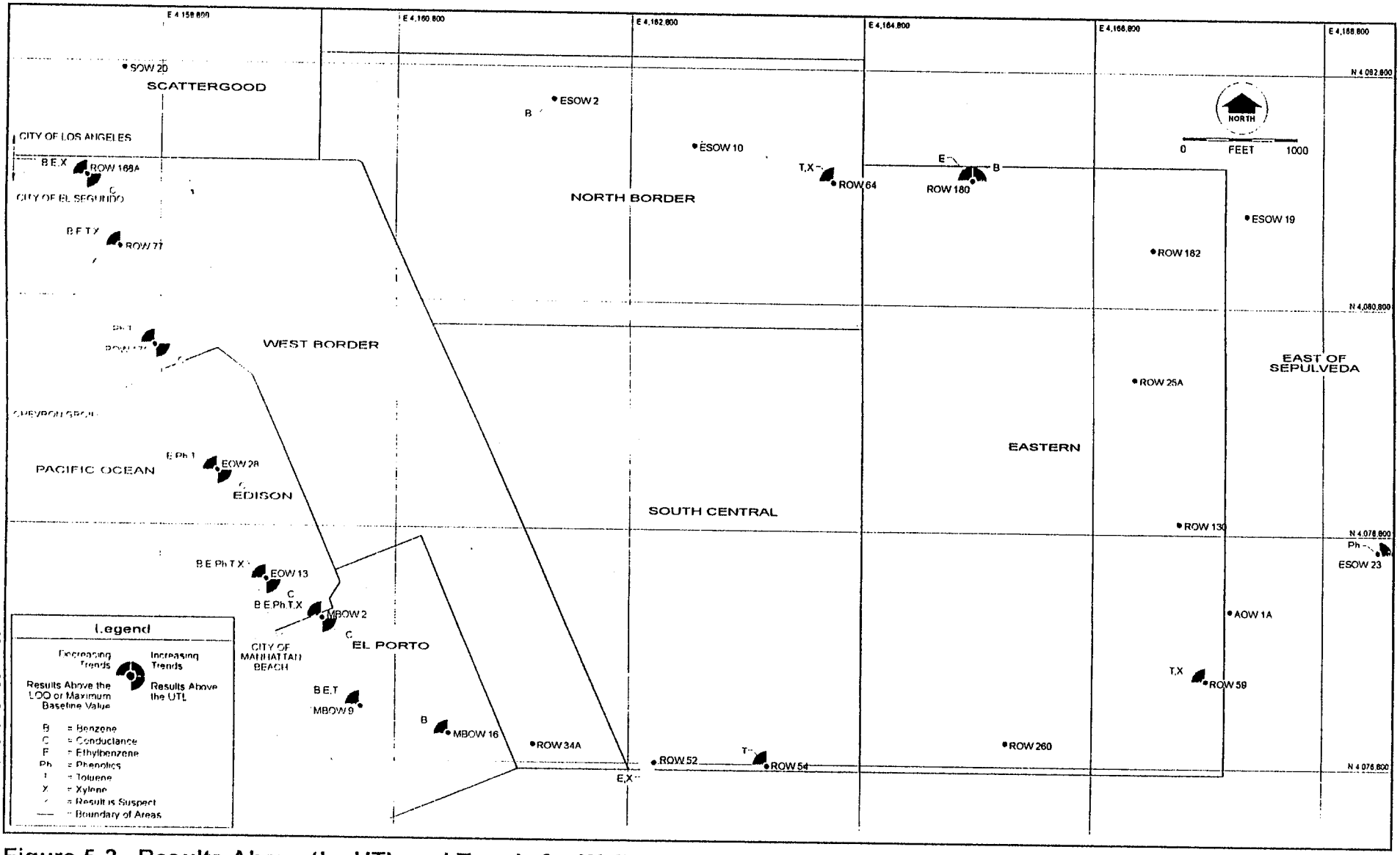

Figure 5-2. Results Above the UTL and Trends for Wells in the Old Dune Sand Aquifer, October 1999

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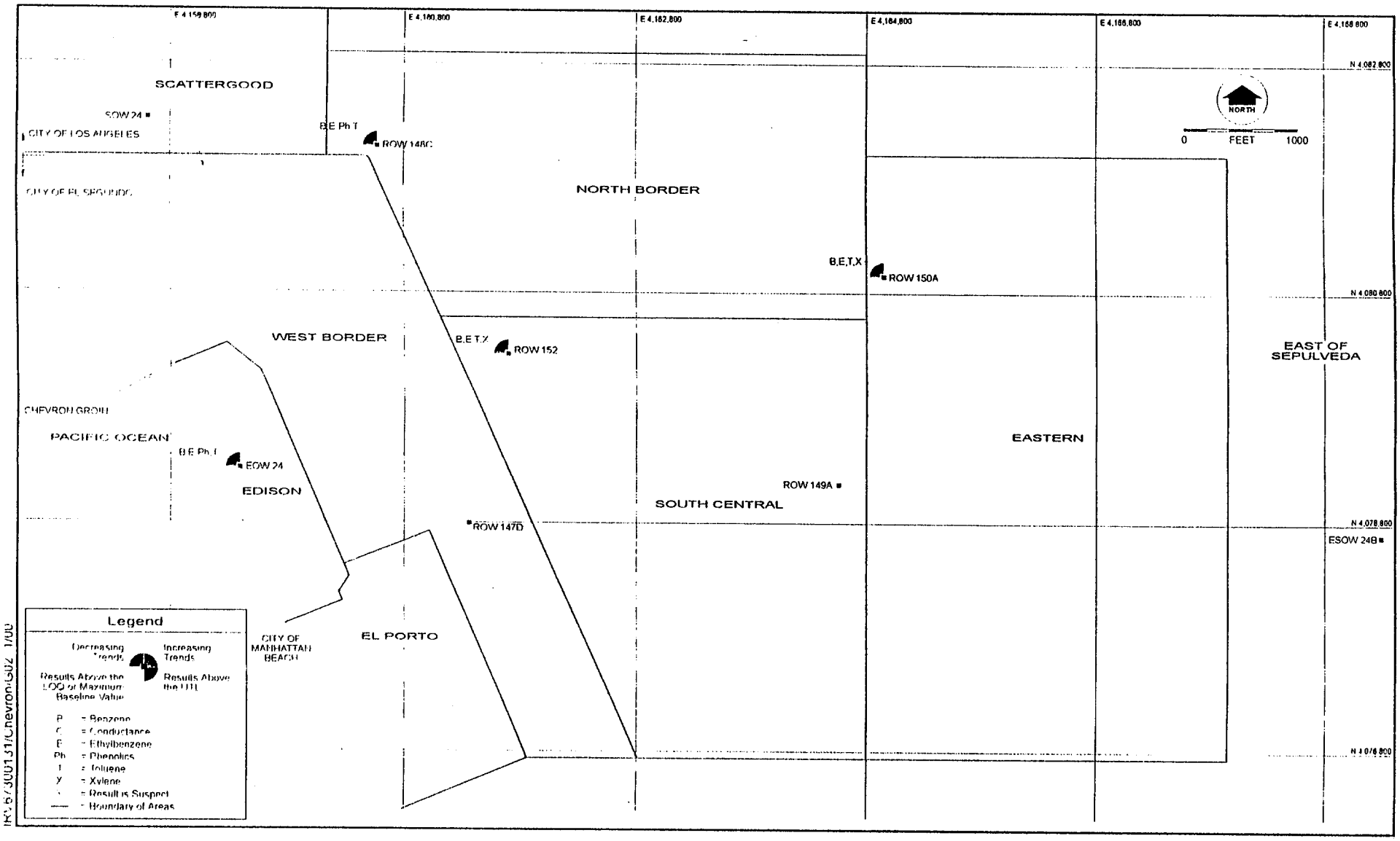

Figure 5-3. Results Above the UTL and Trends for Wells in the Gage Aquifer, October 1999

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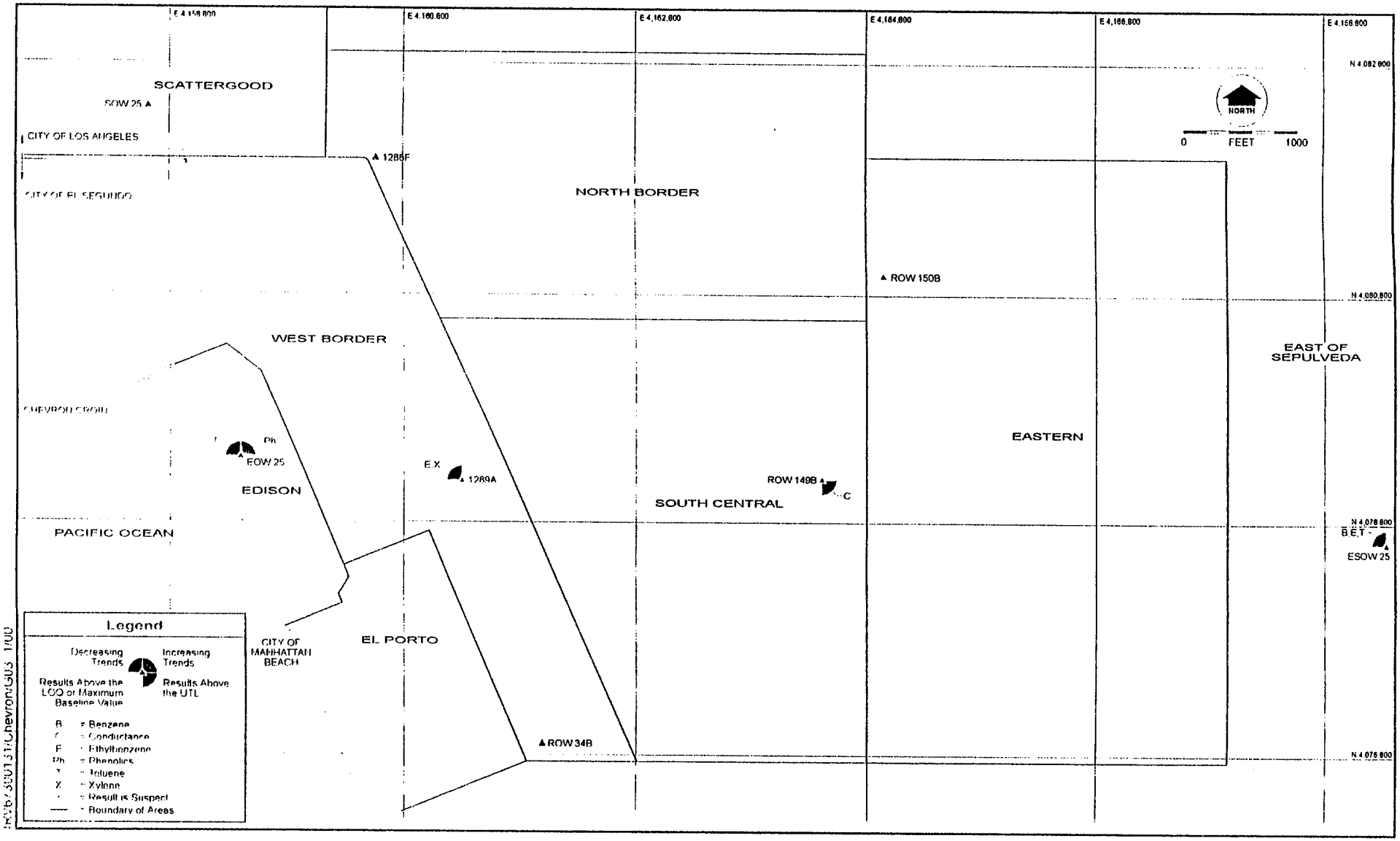

Figure 5-4. Results Above the UTL and Trends for Wells in the Silverado Aquifer, October 1999

Table 5-1. October 1999 Well Sampling and Analyses

Aquifer/Area/ Well Name	Routine Parameters				
	EPA 8260 (BETX)	EPA 8260 (MTBE)	EPA 420.4 (Phenolics)	EPA 1664 (TRPH)	EPA 206.2 (Arsenic)
Old Dune Sand					
Scattergood					
SOW-20	✓	✓	✓	✓	
West Border					
ROW-34A	✓	✓	✓	✓	
ROW-77	✓	✓	✓	✓	
ROW-168A	✓	✓	✓	✓	
ROW-171	✓	✓	✓	✓	
Edison					
EOW-13	✓	✓	✓	✓	
EOW-28	✓	✓	✓	✓	
El Porto					
MBOW-2	✓	✓	✓	✓	
MBOW-9	✓	✓	✓	✓	
MBOW-16	✓	✓	✓	✓	
South Central					
ROW-52	✓	✓	✓	✓	
ROW-54	✓	✓	✓	✓	
North Border					
ESOW-2	✓	✓	✓	✓	
ESOW-9	✓	✓	✓	✓	
ESOW-10	✓	✓	✓	✓	
ROW-64	✓	✓	✓	✓	
Eastern					
ROW-25A	✓	✓	✓	✓	
ROW-260 (replaces ROW-56)	✓	✓	✓	✓	
ROW-59	✓	✓	✓	✓	
ROW-130	✓	✓	✓	✓	
ROW-180	✓	✓	✓	✓	✓
ROW-182	✓	✓	✓	✓	
East of Sepulveda					
AOW-1A	✓	✓	✓	✓	
ESOW-23	✓	✓	✓	✓	
Gage					
Scattergood					
SOW-24	✓	✓	✓	✓	
West Border					
ROW-147D	✓	✓	✓	✓	
Edison					
EOW-24	✓	✓	✓	✓	
South Central					
ROW-149A	✓	✓	✓	✓	
ROW-152	✓	✓	✓	✓	
North Border					
ROW-148C	✓	✓	✓	✓	

Table 5-1 (Continued)

Aquifer/Area/ Well Name	Routine Parameters				
	EPA 8260 (BETX)	EPA 8260 (MTBE)	EPA 420.4 (Phenolics)	EPA 1664 – (TRPH)	EPA 206.2 (Arsenic)
Eastern					
ROW-150A	✓	✓	✓	✓	
East of Sepulveda					
ESOW-24B	✓	✓	✓	✓	
Silverado					
Scattergood					
SOW-25	✓	✓	✓	✓	
West Border					
ROW-34B	✓	✓	✓	✓	
1289A	✓	✓	✓	✓	
Edison					
EOW-25	✓	✓	✓	✓	
South Central					
ROW-149B	✓	✓	✓	✓	
Eastern					
ROW-150B	✓	✓	✓	✓	
East of Sepulveda					
ESOW-25	✓	✓	✓	✓	

BETX = Benzene, ethylbenzene, toluene, and xylene
MTBE = Methyl *tert*-butyl ether
TRPH = Total recoverable petroleum hydrocarbons

Table 5-2

Groundwater Monitoring Data Exceeding Upper Tolerance Limits
or Demonstrating Significantly Increasing Trends in the Old Dune Sand Aquifer
October 1999

Area	Well	Parameter (Method)	Units	Value	UTL or LOQ (*) or MAX (#)	Exceeds UTL?	Increasing Trend?	Significant Value?	Comments
Eastern	ROW-180	benzene	UG/L	0.622	NA	NA	Yes	Unknown	Low result consistent with last three samplings.
East of Sepulveda Edison	ESOW-23	phenolics (EPA 420.4)	MG/L	BLOD	NA	NA	Yes	No	Not detected in last two samplings.
	EOW-13	Conductance (EPA 120.1)	umhos	18642	4660	Yes	NA	No	Elevated result attributable to seawater intrusion.
	EOW 28	Conductance (EPA 120.1)	umhos	17900	15200	Yes	NA	No	Elevated result attributable to seawater intrusion.
El Porto	MBOW-02	Conductance (EPA 120.1)	umhos	12344	3070	Yes	NA	No	Elevated result attributable to seawater intrusion.
North Border	ESOW-02	benzene (EPA 8260)	UG/L	1.29	0.780 #	Yes	No	No	Consistent with results from recent years.
South Central	ROW-052	ethylbenzene (EPA 8260)	UG/L	0.492	0.184 *	Yes	No	No	Anomalous result. Analyte has been non-detect in this well since 1990.
		xylene (EPA 8260)	UG/L	2.64	0.456 *	Yes	No	No	Anomalous result. Analyte has been below the limit of quantitation since 1991.

BLOD- Below the Limit of Detection
UTL - Upper Tolerance Limit
* - Exceeds Limit of Quantitation (3.33 times the detection limit
\# - Exceeds Maximum Baseline Value
S - Result is suspect

Table 5-2

(Continued)

Area	Well	Parameter (Method)	Units	Value	UTL or LOQ (*) or MAX (#)	Exceeds UTL?	Increasing Trend?	Significant Value?	Comments
West Border	ROW-077	xylene (EPA 8260)	UG/L	4.93	0.546 *	Yes	No	No	Result within range of decreasing concentrations.
	ROW-168A	Conductance (EPA 120.1)	umhos	2709	2620	Yes	NA	No	Elevated result attributable to seawater intrusion.
	ROW-171	Conductance (EPA 120.1)	umhos	11876	4110	Yes	NA	No	Elevated result attributable to seawater intrusion.

UTL = Upper Tolerance Limit
* = Exceeds Limit of Quantitation (3.3) times the detection limit)
\# = Exceeds Maximum Baseline Value
S = Result is suspect

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Table 5-3

Groundwater Monitoring Data Exceeding Upper Tolerance Limits
or Demonstrating Significantly Increasing Trends in the Silverado Aquifer
October 1999

Area	Well	Parameter (Method)	Units	Value	UTL or LOQ (*) or MAX (#)	Exceeds UTL?	Increasing Trend?	Significant Value?	Comments
Edison	EOW-25	phenolics (EPA 420.4)	MG/L	BLOD	0.027 *	No	Yes	No	Current result and most previous results are non-detect.
South Central	ROW-149B	Conductance (EPA 120.1)	umhos	8321	1340	Yes	NA	No	Elevated result attributable to seawater intrusion.

UTL = Upper Tolerance Limit
* = Exceeds Limit of Quantitation (3.33 times the detection limit)
# = Exceeds Maximum Baseline Value
S = Result in suspect

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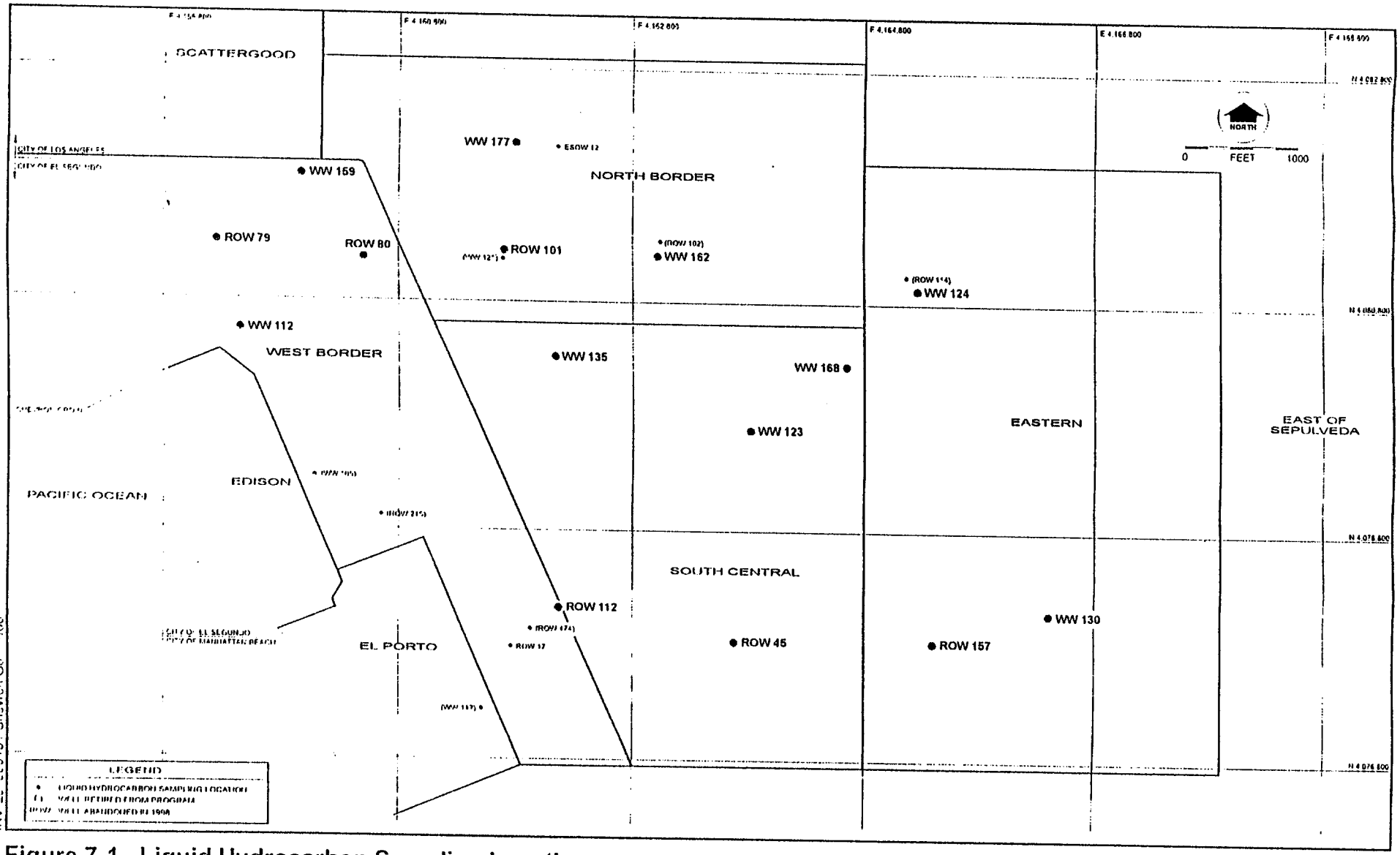

Figure 7-1. Liquid Hydrocarbon Sampling Locations

Table 7-1. Characterization of Types of Liquid Hydrocarbon

Generic Category	Boiling Range °F	Typical Component Name
Light Distillate	50 - 380	Gasoline Blend or Product Naphtha Thinners
Jet Range	380 - 470	Jet Blend or Product Kerosene Thinners
Diesel Range	470 - 560	Diesel Blend or Product Light Cycle Oil
Gas Oil	560 - 750	Light Gas Oil
Fuel Oil	750 - 975	Heavy Gas Oil Bunker Oil Low Sulfur Fuel Oil
Residuum	975 - 1200+	Heavy Residuum Tar Asphalt
Crude Oil	50 - 1200+	Crude Oil

Table 7-2. Liquid Hydrocarbon Characterization Results 1988 Through 1998

Well No.	Date Sampled	Sample Control No.	Composition (%)				
			Light Dist.	Jet	Diesel	Gas Oil	Fuel Oil
ESOW-12	07/05/88	C8-07-007	57	21	21	1	-
	08/09/88	C8-08-997	63	17	19	1	-
	11/02/88	C8-11-350	36	28	32	4	-
	11/03/89	C9-11-332	55	29	12	4	-
	10/24/90	C90-10-317	52	31	13	3	-
	10/23/91	C91-10-F73	83	4	10	3	-
	10/02/92	C92-10-252	44	38	14	4	0*
	10/28/93	C93-11-013	57	31	11	2	-
	10/13/94	C94-10-397	47	37	15	0*	0*
	11/30/95	C95-11-152	52	31	13	4	0*
	11/30/95	C95-11-153	52	31	13	4	0*
	10/30/96	C96-11-030	38	47	11	5	0*
	10/24/97	C97-10-296	46	39	11	4	1
ROW-17 [a]	10/23/96	C96-11-038	90	10	1	0*	0*
	10/23/97	C97-10-290	94	5	1	0*	0*
ROW-045	07/05/88	C8-07-011	5	35	44	14	2
	08/09/88	C8-08-994	3	35	36	21	5
	11/02/88	C8-11-351	2	24	48	14	11
	11/03/89	C9-11-331	9	20	15	23	33
	10/24/90	C90-10-332	6	18	16	25	35
	10/23/91	C91-10-F77	8	18	14	20	40
	10/02/92	C92-10-242	4	18	14	25	39
	10/28/93	C93-11-011	11	25	12	11	41
	10/13/94	C94-10-400	5	19	14	23	39
	11/20/95	C95-11-131	4	18	12	24	43
	10/24/96	C96-11-032	3	21	11	25	39
	10/23/97	C97-10-291	6	14	13	22	40
	10/29/98	C98-10-800	2	13	14	25	34
ROW-079	07/05/88	C8-07-010	73	10	15	2	-
	08/09/88	C8-08-990	86	10	4	-	-
	11/02/88	C8-11-352	74	8	16	1	-
	11/03/89	C9-11-334	59	21	13	7	1
	10/24/90	C90-10-313	58	20	12	7	2
	10/23/91	C91-10-F71	62	20	12	6	0*
	10/02/92	C92-10-254	62	21	11	6	0*
	10/28/93	C93-11-015	89	7	2	1	0*
	10/13/94	C94-10-399	65	19	15	1	0*
	11/20/95	C95-11-132	56	19	14	7	5
	10/23/96	C96-11-036	60	20	10	7	3

Table 7-2 (Continued)

Well No.	Date Sampled	Sample Control No.	Composition (%)				
			Light Dist.	Jet	Diesel	Gas Oil	Fuel Oil
ROW-101 [b]	10/23/91	C91-10-F72	55	30	11	4	0*
	10/02/92	C92-10-250	50	27	18	5	0*
	10/28/93	C93-11-014	39	42	15	4	0*
	10/13/94	C94-10-396	42	36	17	4	1
	10/13/94	C94-10-401 FD	42	37	17	4	0*
	11/20/95	C95-11-133	48	29	17	7	0*
	10/24/96	C96-11-031	34	46	14	7	0*
	10/24/96	C96-11-049 FD	33	46	15	7	0*
	10/24/97	C97-10-293	60	28	9	2	0*
	10/29/98	C98-10-801	24	39	26	9	0*
ROW-102	07/05/88	C8-07-009	43	24	31	2	-
	08/09/88	C8-08-998	55	7	37	1	-
	11/02/88	C8-11-349	55	7	39	1	-
	11/03/89	C9-11-335	51	31	14	4	0*
	10/24/90	C90-10-320	48	34	14	4	-
	10/24/90	C90-10-321 FD	48	34	14	4	0*
	10/23/91	C91-10-F74	55	32	10	3	-
	10/02/92	C92-10-248	56	27	13	4	0*
	10/28/93	C93-11-012	53	31	13	3	-
	10/13/94	C94-10-395	45	39	16	0*	0*
	11/20/95	C95-11-134	50	32	15	4	0*
	10/24/96	C96-11-033	51	34	12	4	0*
	10/24/97	C97-10-294	16	34	16	16	16
	10/29/98	C98-10-802	46	28	19	6	0*
ROW-114 [c]	07/05/88	C8-07-012	64	33	3	-	-
	08/09/88	C8-08-A01	67	30	3	-	-
	08/09/88	C8-08-999 FD	67	30	3	-	-
	11/02/88	C8-11-357	76	20	4	-	-
	11/03/89	C9-11-333	89	9	1	1	-
	10/24/90	C90-10-318	88	9	2	0*	-
	10/23/91	C91-10-F75	88	9	2	1	-
	10/02/92	C92-10-246	82	18	0*	0*	0*
	05/13/94	C94-05-016	92	8	1	0*	-
	10/13/94	C94-10-394	88	11	1	0*	0*
	11/20/95	C95-11-135	88	7	3	2	0*
	10/24/96	C96-11-034	82	15	4	0*	0*
	10/24/96	C96-11-050 FD	82	15	4	0*	0*
	10/23/97	C97-10-292	85	13	1	1	0*
	10/29/98	C98-10-803	78	17	3	2	0*

Table 7-2 (Continued)

Well No.	Date Sampled	Sample Control No.	Composition (%)				
			Light Dist.	Jet	Diesel	Gas Oil	Fuel Oil
ROW-157	07/05/88	C8-07-014	5	27	37	28	3
	08/09/88	C8-08-995	4	26	31	30	9
	11/02/88	C8-11-348	1	22	44	28	5
	11/03/89	C9-11-330	13	27	20	22	19
	10/24/90	C90-10-319	9	27	20	24	20
	10/23/91	C91-10-F76	13	26	21	21	19
	10/02/92	C92-10-244	9	25	25	21	18
	10/28/93	C93-11-017	19	37	24	19	2
	10/13/94	C94-10-398	10	33	21	20	16
	11/20/95	C95-11-129	10	36	16	16	23
	11/20/95	C95-11-130	10	35	18	17	22
	10/30/96	C96-11-029	8	40	18	18	16
	10/24/97	C97-10-295	3	23	26	33	14
	10/29/98	C98-10-804	4	28	25	22	6
ROW-174 [c]	07/05/88	C8-07-016	100	-	-	-	-
	07/05/88	C8-07-017 FD	100	-	-	-	-
	08/09/88	C8-08-993	100	-	-	-	-
	11/02/88	C8-11-355	98	1	1	-	-
	11/03/89	C9-11-328	99	1	0*	0*	-
	10/24/90	C90-10-316	99	1	-	-	-
	10/23/91	C91-10-F68	98	2	-	-	-
	10/02/92	C92-10-240	100	0*	0*	0*	0*
	05/13/94[d]	-	-	-	-	-	-
	10/13/94[d]	-	-	-	-	-	-
	11/20/95[d]	-	-	-	-	-	-
ROW-215 [a]	10/23/96	C96-11-035	48	38	10	3.3	0*
WW-105 [c]	07/05/88	C8-07-013	74	11	12	3	-
	08/09/88	C8-08-991	79	8	12	1	-
	11/02/88	C8-11-353	62	13	17	8	-
	11/03/89	C9-11-336	67	17	12	4	0*
	10/24/90	C90-10-314	61	22	14	4	-
	10/23/91	C91-10-F70	54	32	11	-	3
	10/02/92	C92-10-235	57	30	13	0*	0*
	10/02/92	C92-10-236 FD	58	26	16	0*	0*
	05/13/94[d]	-	-	-	-	-	-
	10/13/94[d]	-	-	-	-	-	-
	11/20/95[d]	-	-	-	-	-	-
WW-117 [c]	07/05/88	C8-07-015	100	-	-	-	-
	08/09/88	C8-08-992	100	-	-	-	-
	11/02/88	C8-11-354	88	10	1	-	-
	10/24/90	C90-10-315	99	1	0*	0*	-
	10/23/91	C91-10-F69	98	2	-	-	-
	10/02/92	C92-10-238	100	0*	0*	0*	0*
	05/13/94[d]	-	-	-	-	-	-
	10/13/94[d]	-	-	-	-	-	-
	11/20/95[d]	-	-	-	-	-	-

Table 7-2 (Continued)

Well No.	Date Sampled	Sample Control No.	Composition (%)				
			Light Dist.	Jet	Diesel	Gas Oil	Fuel Oil
WW-121 [e]	07/05/88	C8-07-008	35	32	29	4	-
	08/09/88	C8-08-996	35	32	29	4	-
	11/02/88	C8-11-356	26	32	35	4	-
	11/03/89	C9-11-329	67	20	9	4	1

FD = Field Duplicate
* = Less than 0.5 percent
- = zero.
[a] ROW-17 and ROW-215 replaced ROW-174 and WW-105 in 1996.
[b] ROW-101 was mislabled as WW-101 in Table 7-1 of the second semiannual report for 1991. This error has been corrected in the database for sample control number C91-10-F72.
[c] Well was not sampled in the fourth quarter of 1993 due to a scheduling error.
[d] No product present in well.
[e] WW-121 was capped due to excessive odors in October 1991, and replaced by ROW-101 in the LHC characterization sampling program.

Table 7-3. Liquid Hydrocarbon Characterization Results for 1999

Well	Sampling Date	Light Distillates	Jet	Diesel	Gas Oil	Fuel Oil	Residium
ROW-79	07-Jul-99	62.2	19.3	6.6	6.1	3.5	2.3
WW-112	07-Jul-99	67.4	23.6	5.6	2.7	0.7	ND
WW-123	27-Jul-99	69.6	22.5	4.7	2.8	0.4	ND
ROW-101	16-Nov-99	54.4	30.6	7.5	3.9	1.7	1.9
ROW-112	16-Nov-99	28.6	15.7	8.6	19.4	19.2	8.5
ROW-157	16-Nov-99	25.2	31.0	9.2	16.5	12.4	5.7
ROW-45	16-Nov-99	10.8	16.8	9.0	26.6	31.0	5.8
WW-124	16-Nov-99	88.6	6.3	2.4	2.2	0.5	ND
WW-130	16-Nov-99	52.6	44.3	1.9	0.9	0.3	ND
WW-135	16-Nov-99	83.8	11.8	2.6	1.5	0.3	ND
WW-162	16-Nov-99	63.0	28.0	6.1	2.4	0.5	ND
WW-168	16-Nov-99	35.3	26.8	23.5	13.9	0.5	ND
WW-177	16-Nov-99	94.4	2.7	1.2	1.3	0.4	ND
ROW-80	10-Dec-99	74.4	14.4	5.6	4.5	1.1	<0.01
WW-159	10-Dec-99	53.7	23.2	10.6	9.4	2.5	0.6

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Appendix A

Groundwater and Liquid Hydrocarbon Gauging Data, 1999

* The East of Sepulveda area referred to in the report is synonymous with Section 18 on the following table.

** Elevations in tables in feet above mean lower low water (MLLW).

Source: Chevron U.S.A. Products Company

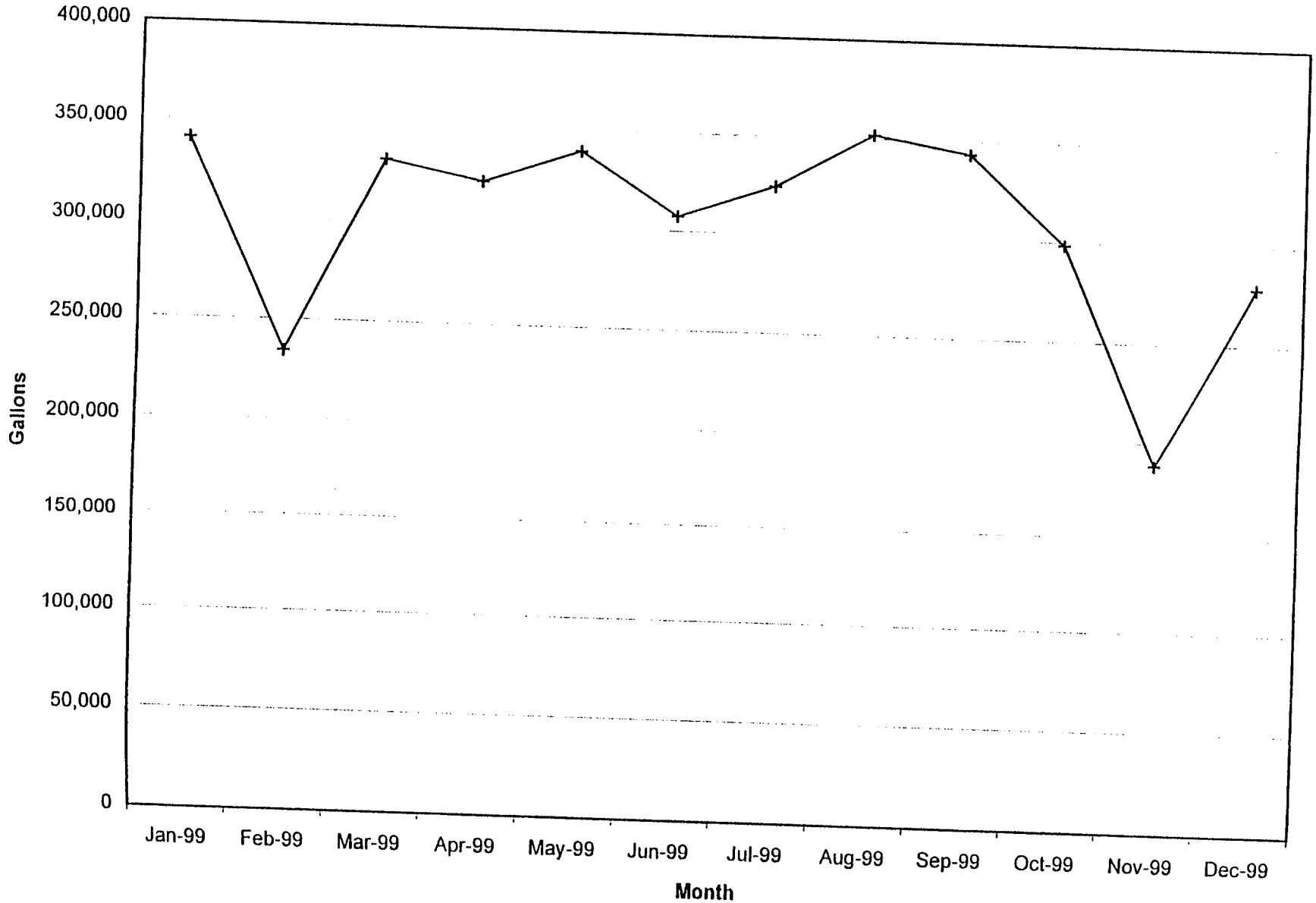

Figure 3-3. Monthly Volumes of Liquid Hydrocarbon Recovered, 1999

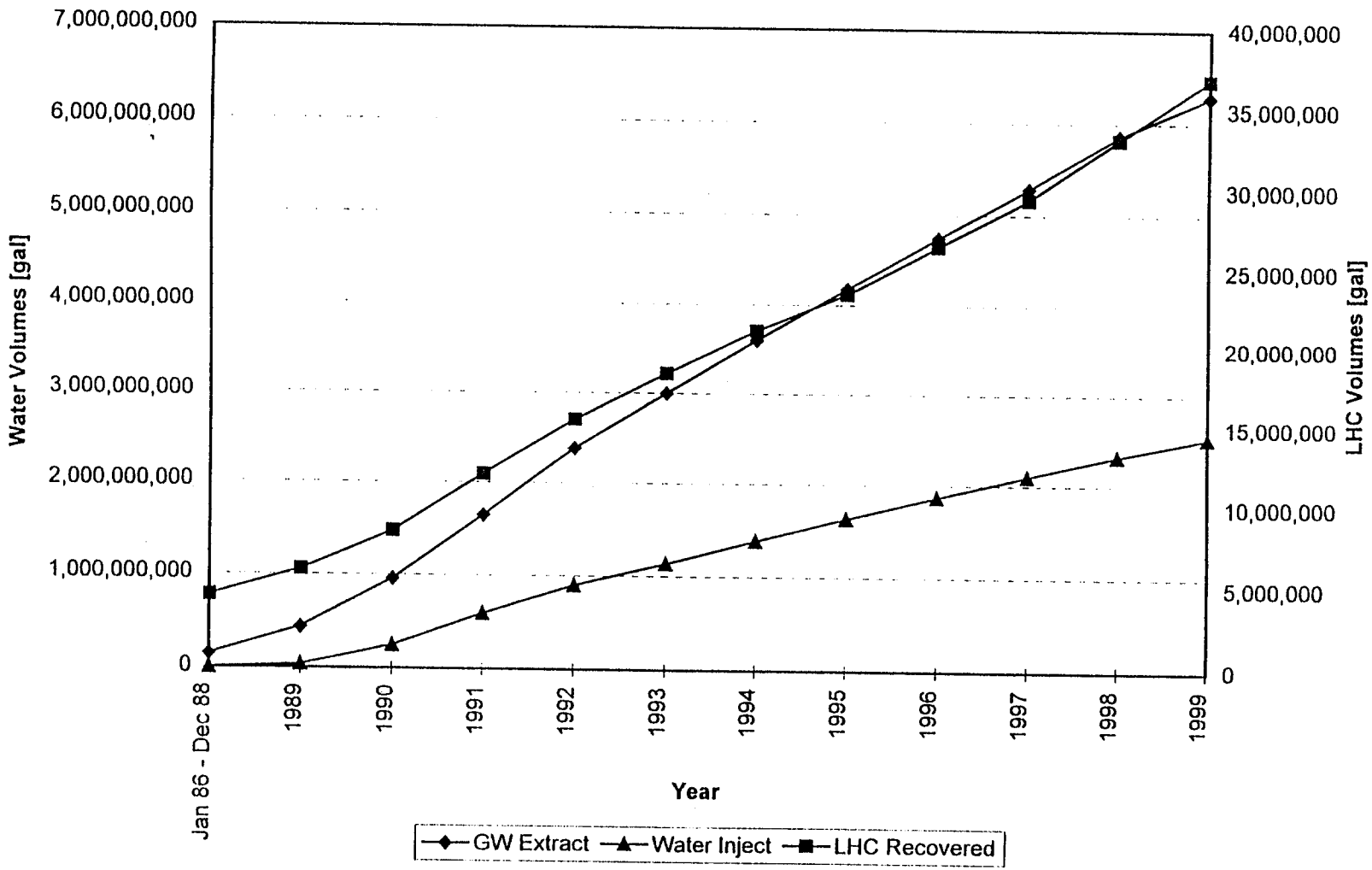

Figure 3-4. Summary of Cumulative Volumes of LHC Recovery, Groundwater Extraction, and Water Injection

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Table 3-1. Status of Withdrawal and Reinjection Wells
January Through December 1999

Well Number	Months in Service											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Withdrawal Wells (Dual Pump Wells)												
WW-47	X	O[h]	X	O[h]	O[h]	X	X	X	X	X	O[h]	X
WW-104	O[a]	O[a]	O[b]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-105	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-106	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-108	X	X	X	X	X	X	X	X	X	X	O[h]	X
WW-109	X	O[h]	O[h]	O[h]	O[h]	X	X	X	X	X	O[h]	X
WW-110	X	X	X	X	O[a]	X	X	X	X	X	O[h]	X
WW-111	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	X
WW-112	X	X	X	X	X	X	X	X	X	X	X	X
WW-120	X	O[h]	X	X	X	X	X	X	X	X	O[h]	X
WW-121	O[c]	O[c]	O[c]	O[c]	O[c]	O[c]	O[c]	O[c]	O[c]	O[c]	O[c]	O[c]
WW-122	X	X	X	X	X	X	X	X	X	X	X	X
WW-123	X	O[h]	X	X	X	X	X	X	X	X	X	X
WW-124	X	X	X	X	X	X	X	X	X	X	X	X
WW-125	X	O[h]	X	X	X	X	X	X	X	X	O[h]	X
WW-126	X	X	X	X	X	X	X	X	X	X	O[h]	X
WW-127	X	O[h]	X	O[h]	X	X	X	X	X	X	O[h]	X
WW-129	X	O[h]	X	O[h]	X	X	X	X	X	X	X	X
WW-130	X	X	X	X	X	X	X	X	X	X	X	X
WW-132	X	O[h]	X	X	X	X	X	X	X	X	X	X
WW-133	X	X	X	X	X	X	X	X	X	X	O[i]	X
WW-134	X	X	X	X	X	X	X	X	X	X	O[h]	X
WW-135	O[c]	O[c]	O[c]	O[c]	O[c]	X	X	X	X	X	X	X
WW-136	X	X	X	X	X	X	X	X	X	X	O[h]	X
WW-137	X	X	X	X	X	X	X	X	X	X	O[h]	X
WW-138	X	X	X	X	X	X	X	X	X	X	O[h]	X
WW-139	X	X	X	X	X	X	X	X	X	X	X	X
WW-140	X	X	X	X	X	X	X	X	X	X	X	X

Table 3-1 (Continued)

Well Number	Months in Service											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WW-141	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-142	O[d]	O[d]	O[d]	O[d]	O[d]	O[d]	O[d]	O[d]	O[d]	O[d]	O[d]	O[d]
WW-143	X	X	X	X	X	X	X	X	X	X	X	X
WW-144	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-145	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-146	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-147	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-148	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-149	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-150	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-151	X	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-152	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-153	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-154	X	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-155	X	X	X	X	X	X	X	X	X	X	X	X
WW-156	X	X	X	X	X	X	X	X	X	X	X	X
WW-157	X	X	X	X	X	X	X	X	X	X	X	X
WW-158	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-159	X	X	X	X	X	X	X	X	X	X	X	X
WW-160	X	X	X	X	X	X	X	X	X	X	X	X
WW-161	X	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
WW-162	X	O[h]	X	O[h]	X	X	X	X	X	X	X	X
WW-163	X	X	X	X	X	X	X	X	X	X	X	X
WW-164	X	X	X	X	X	X	X	X	X	X	X	X
WW-165	O[f]	O[f]	O[f]	O[f]	O[f]	O[f]	O[f]	O[f]	O[f]	O[f]	O[f]	O[f]
WW-166	X	X	X	X	X	X	X	X	X	X	X	X
WW-167	X	X	X	X	X	X	X	X	X	X	X	X
WW-168	X	O[h]	O[h]	O[h]	X	X	X	X	X	X	O[h]	O[h]
WW-169	X	X	X	X	X	X	X	X	X	X	X	X
WW-170	X	O[h]	O[h]	O[h]	O[f]	O[f]	O[f]	O[f]	O[f]	O[f]	O[f]	O[f]

Table 3-1 (Continued)

Well Number	Months in Service											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WW-171	X	X	X	X	X	X	X	X	X	X	X	X
WW-172	X	O[h]	O[h]	O[h]	O[h]	X	X	X	X	X	O[h]	X
WW-174	X	O[h]	O[h]	O[h]	O[h]	X	X	X	X	X	O[h]	O[h]
WW-175	X	X	X	X	X	X	X	X	X	X	O[h]	O[h]
WW-176	X	X	O[h]	O[h]	O[h]	O[a]	X	X	X	X	O[h]	O[h]
WW-177	X	X	O[h]	O[h]	O[h]	X	X	X	X	X	X	O[b]
WW-178	X	X	O[c]	O[c]	O[h]	X	X	X	X	O[b]	O[b]	O[b]
EWW-1	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
EWW-3	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
EWW-4	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
EWW-5	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
EWW-6	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
EWW-7	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
EWW-8	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
EWW-9	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
EWW-10	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
EWW-21	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]	O[e]
Withdrawal Wells (Skimming Wells)												
WW-101	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]
WW-131	X	X	X	X	X	X	X	X	X	X	X	X
ROW-263	X	X	X	X	X	X	X	X	X	X	X	X
Injection Wells												
PER-203	X	X	X	X	X	X	X	X	X	X	X	X
PER-204 (RRW)	X	X	X	X	X	X	X	X	X	X	X	X
PER-205 (RRW)	X	X	X	X	X	X	X	X	X	X	X	X
RRW-206	X	X	X	X	X	X	X	X	X	X	X	X
RRW-207A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-208A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-209	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]
RRW-209A	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]	O[g]

Table 3-1 (Continued)

Well Number	Months in Service											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
RRW-210	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-210A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-211	X	X	X	X	X	X	X	X	X	X	X	X
RRW-211A	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-212	X	X	X	X	X	X	X	X	X	X	X	X
RRW-213	X	X	X	X	X	X	X	X	X	X	X	X
RRW-214A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-216	X	X	X	X	X	X	X	X	X	X	X	X
RRW-216A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-217A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-218	X	X	X	X	X	X	X	X	X	X	X	X
RRW-218A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-219A	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-220	X	X	X	X	X	X	X	X	X	X	X	X
RRW-220A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-221	X	X	X	X	X	X	X	X	X	X	X	X
RRW-221A	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-222	X	X	X	X	X	X	X	X	X	X	X	X
RRW-222A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-223	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-223A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-224	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-224A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-225	X	X	X	X	X	X	X	X	X	X	X	X
RRW-225A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-226	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-226A	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-227	X	X	X	X	X	X	X	X	X	X	X	X
RRW-227A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-228	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og

Table 3-1 (Continued)

Well Number	Months in Service											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
RRW-228A	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-229A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-230A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-231	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-232	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-233	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-234A-D	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-235A-D	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-236A-E	X	X	X	X	X	X	X	X	X	X	X	X
RRW-237A-E	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-238A	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-239B	X	X	X	X	X	X	X	X	X	X	X	X
RRW-240A	X	X	X	X	X	X	X	X	X	X	X	X
RRW-241D	X	X	X	X	X	X	X	X	X	X	X	X
RRW-242D	X	X	X	X	X	X	X	X	X	X	X	X
RRW-243	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-244C	X	X	X	X	X	X	X	X	X	X	X	X
RRW-245D	X	X	X	X	X	X	X	X	X	X	X	X
RRW-246D	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og
RRW-247C	X	X	X	X	X	X	X	X	X	X	X	X
RRW-248A-C	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og	Og

SOURCE: CHEVRON U.S.A. PRODUCTS COMPANY
O = Out of service.
X = In service.
** = Recommissioned well.
[a] Removed from service to allow LHC line piping replacement.
[b] No product in area or on standby until LHC returns to area.
[c] Removed from service while modifications were made to control odors.
[d] Removed from service to allow water line piping replacement.
[e] Too viscous to pump.
[f] Will not produce.
[g] Standby.
[h] Effluent Treatment Plant Upset Condition.
[i] Electrical Power – Out of service.

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Table 3-2. Annual/Monthly and Cumulative Totals of Groundwater Extracted, Fresh Water Injected, and Liquid Hydrocarbon Recovered Through December 1999

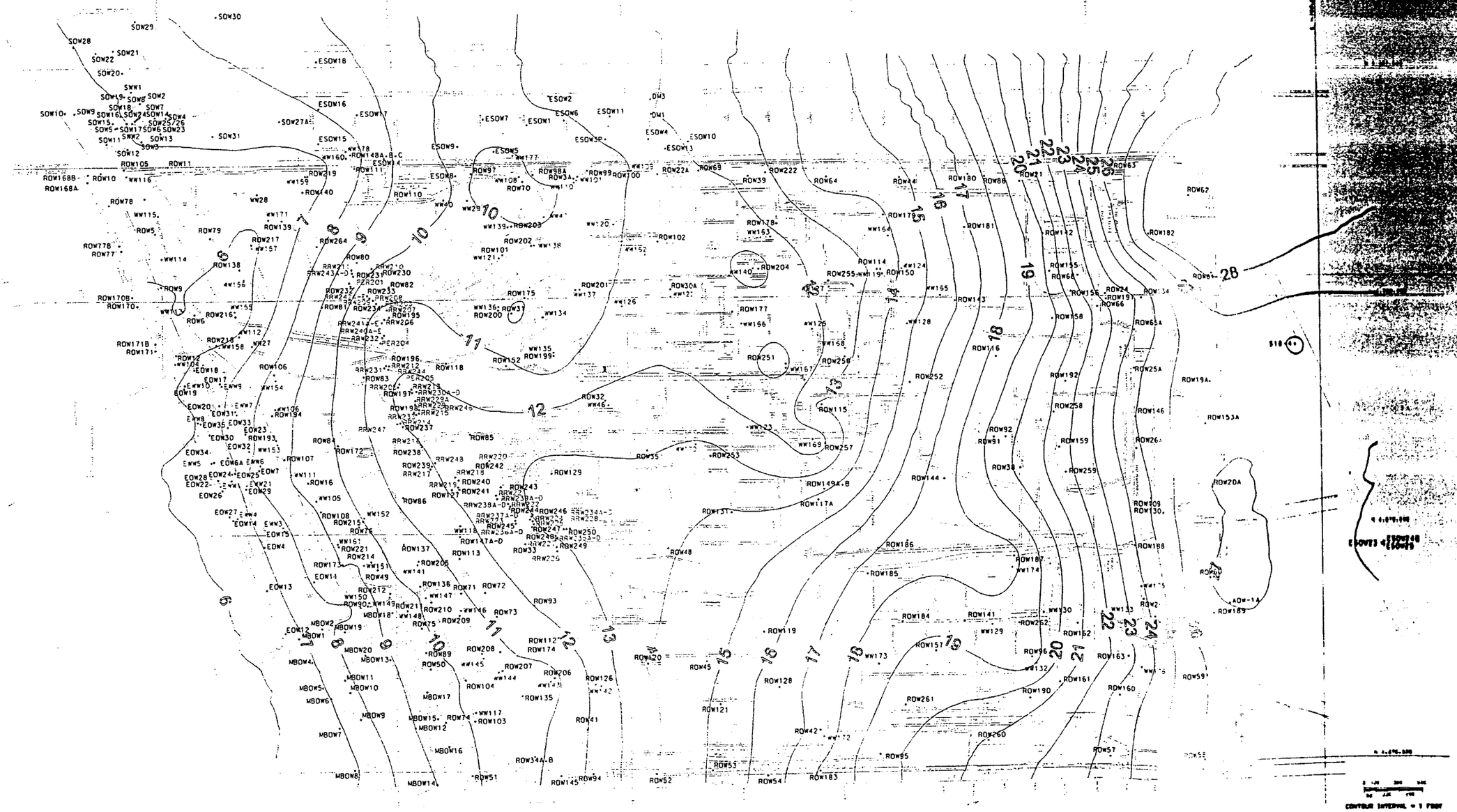
Month(s)	Annual/Monthly Total of GW Extracted [1]	Cumulative Total of GW Extracted [1]	Annual/Monthly Total of LHC Recovered	Cumulative Total of LHC Recovered	Annual/Monthly Total of Water Injected [2]	Cumulative Total of Water Injected [2]
	(all volumes in gallons)					
Jan 86 – Dec 88	149,705,280	149,705,280	4,429,030	4,429,030	NA	NA
Jan 89 – Dec 89	287,346,254	437,051,534	1,593,756	6,022,786	37,372,320	37,372,320
Jan – Dec 90	521,246,331	958,297,865	2,421,039	8,443,825	212,382,880	249,755,200
Jan – Dec 91	691,800,480	1,650,098,345	3,512,065	11,955,890	338,284,800	588,040,000
Jan – Dec 92	730,086,768	2,380,185,113	3,480,765	15,436,655	308,154,240	896,194,240
Jan – Dec 93	617,258,851	2,997,443,964	2,960,473	18,397,128	239,558,400	1,135,752,640
Jan – Dec 94	599,535,677	3,596,979,641	2,768,602	21,165,730	253,677,600	1,389,430,240
Jan – Dec 95	586,817,410	4,183,797,051	2,365,619	23,531,349	242,987,040	1,632,417,280
Jan – Dec 96	561,480,620	4,745,277,671	3,024,189	26,555,538	236,309,760	1,868,727,040
Jan – Dec 97	540,083,520	5,285,361,191	2,956,862	29,512,400	228,838,976	2,097,566,016
Jan – Dec 98	575,716,320	5,861,077,511	3,753,543	33,265,943	222,709,440	2,320,275,456
January 1999	51,960,960	5,913,308,471	340,729	33,606,672	18,525,600	2,338,801,056
February 1999	28,072,800	5,941,111,271	234,361	33,841,033	16,732,800	2,355,533,856
March 1999	29,568,960	5,970,680,231	332,006	34,173,039	18,525,600	2,374,059,456
April 1999	28,337,760	5,999,017,991	322,146	34,495,185	17,928,000	2,391,987,456
May 1999	32,346,720	6,031,364,711	339,042	34,834,227	18,525,600	2,410,513,056
June 1999	32,516,640	6,063,881,351	307,497	35,141,724	17,928,000	2,428,441,056
July 1999	37,373,760	6,101,255,111	324,262	35,465,986	16,740,000	2,445,181,056
August 1999	38,884,320	6,140,139,431	351,934	35,817,920	16,200,000	2,461,381,056
September 1999	39,074,400	6,179,213,831	343,266	36,161,186	16,200,000	2,477,581,056
October 1999	36,447,840	6,215,661,671	298,297	36,459,483	16,740,000	2,494,321,056
November 1999	25,824,960	6,241,486,631	188,338	36,647,821	16,200,000	2,510,521,056
December 1999	33,976,800	6,275,463,431	278,372	36,926,193	16,740,000	2,527,261,056
Jan 99 – Dec 99	414,385,920	6,275,463,431	3,660,250	36,926,193	206,985,600	2,527,261,056

NA = Not available

SOURCE: CHEVRON U.S.A. PRODUCTS COMPANY

1 Groundwater volumes were not totaled prior to 1 June 1988.

2 Groundwater reinjection began on 9 February 1989. On 4 March 1993, Chevron began injecting fresh water instead of filtered groundwater after the EPA exemption to the federal Toxicity Characteristic rule lapsed.

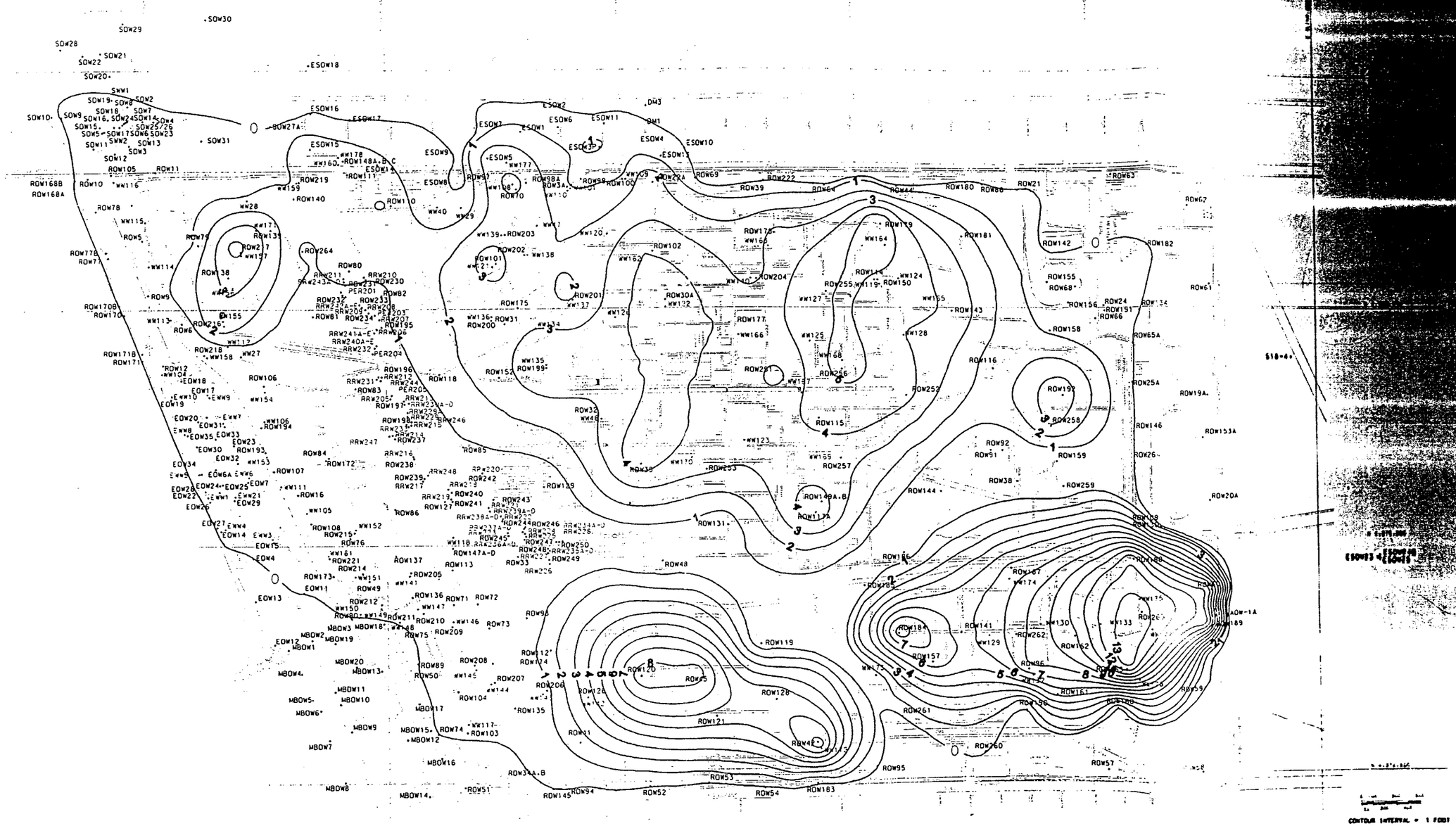


Chevron Products Company El Segundo Refinery

Fourth Quarter 1999 - Potentiometric Surface

LEGEND

MBOW	MANHATTAN BEACH OBSERVATION WELL	DW	DAMES AND MOORE WELL	WW	WITHDRAWAL WELL
SOW	SCATTERGOOD OBSERVATION WELL	ROW	REFINERY OBSERVATION WELL	ROW 263	REFINERY SKIMMING WELL
SWW	SCATTERGOOD WITHDRAWAL WELL	S18	SECTION 18 WELL		
EOW	EDISON OBSERVATION WELL	AOW	ALLIED OBSERVATION WELL		
EWW	EDISON WITHDRAWAL WELL	PER	PERCOLATION WELL		
ESOW	EL SEGUNDO OBSERVATION WELL	RRW	REFINERY REINJECTION WELL		



Chevron Products Company El Segundo Refinery

Fourth Quarter 1999 - Apparent Product Thickness

LEGEND

MBOW	MANHATTAN BEACH OBSERVATION WELL	DM	DAMES AND MOORE WELL	WW	WITHDRAWAL WELL
SOW	SCATTERGOOD OBSERVATION WELL	ROW	REFINERY OBSERVATION WELL	ROW-263	REFINERY SKIMMING WELL
SWW	SCATTERGOOD WITHDRAWAL WELL	S18	SECTION 18 WELL		
EOW	EDISON OBSERVATION WELL	AOW	ALLIED OBSERVATION WELL		
EWW	EDISON WITHDRAWAL WELL	[illegible]	[illegible] WELL		
ESOW	EL SEGUNDO OBSERVATION WELL	[illegible]	[illegible] WELL		