

GW - 28

REPORTS

YEAR(S):

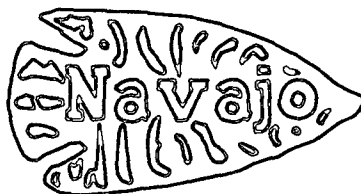
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GW-28

Volume II

**RCRA Facility Investigation
Three-Mile Ditch and Evaporation Ponds
Phase II Report
Navajo Refinery
Artesia, New Mexico
(Revised)**



prepared for

Navajo Refining Company
501 East Main Street
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Artesia, New Mexico 88210

by

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NOVEMBER 1993



APPENDIX A

APPENDIX A

Acronyms

BTEX	benzene, toluene, ethylbenzene, and xylenes
CLP	Contract Laboratory Program
CMS	Corrective Measures Study
EPA	U.S. Environmental Protection Agency
FID	flame-ionization detector
FR	<i>Federal Register</i>
HSWA	Hazardous and Solid Waste Amendments of 1984
I.D.	inner diameter
IML	Inter-Mountain Laboratories
MCL	maximum contaminant level
MSL	mean sea level
O.D.	outer diameter
PID	photoionization detector
PQL	practical quantitation limit
PR	Preliminary Review
QAPP	Quality Assurance Project Plan
RFI	RCRA Facility Investigation
SCS	U.S. Soil Conservation Service
SLD	Scientific Laboratory Division
SWMU	solid waste management unit
TC	toxicity characteristic
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
QA/QC	quality assurance/quality control
USGS	U.S. Geological Survey
WQCC	Water Quality Control Commission (New Mexico)

APPENDIX B

APPENDIX B

Stream Flow and Water Quality Artesia Gauge, 1980-1992



Water Resources Data for New Mexico

U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-80-1
WATER YEAR 1980

Prepared in cooperation with the State of New Mexico
and with other agencies

RIO GRANDE BASIN

347

08396500 PECOS RIVER NEAR ARTESIA, NM
(Surveillance program station)

LOCATION.--Lat 32°50'25", long 104°19'23", in NW¼NW¼ sec.18, T.17 S., R.27 E., Eddy County, Hydrologic Unit 13060007, near left bank on downstream end of bridge pier on State Highway 83, 4.3 mi (6.9 km) east of Artesia, 7.0 mi (11.3 km) upstream from Rio Penasco, 17 mi (27.4 km) upstream from McMillan Dam, and at mile 503.9 (810.8 km).
DRAINAGE AREA.--15,300 mi² (39,630 km²), approximately (contributing area).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1905 to June 1909, August 1909 to current year. Monthly discharge only for some periods, published in WSP 1312 and 1712. Records for Aug. 22-31, 1934, and October 1936 to April 1937, published in WSP 763 and 828, respectively are not reliable and should not be used. Prior to February 1936, published as "near Dayton."
REVISED RECORDS.--WSP 1312 and 1512: 1913, 1915, 1917-18(M), 1920, 1923, 1931-36. WSP 1712: 1906(M), 1908-11(M), 1919, 1921-23(M), 1929, 1931-32(M), 1935-36(M), 1937, 1939(M), 1941(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 3,291.92 ft (1,003.376 m) National Geodetic Vertical Datum of 1929. Prior to Aug. 27, 1914, nonrecording gage and Aug. 27, 1914, to Feb. 20, 1936, water-stage recorder at site 6.5 mi (10.5 km) downstream at different datum. Feb. 21, 1936, to Apr. 4, 1941, water-stage recorder at site 600 ft (183 m) downstream at different datum.

REMARKS.--Water-discharge records fair. Flow partly regulated by Lake Sumner (station 08384000) since August 1937. Diversions and ground-water withdrawals for irrigation of about 154,000 acres (620 km²), 1959 determination, above station.

AVERAGE DISCHARGE.--44 years, 250 ft³/s (7.080 m³/s) 181,100 acre-ft/yr (223 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge probably occurred May 30, 1937, when a discharge of 51,500 ft³/s (1,460 m³/s) was measured by slope-area method at a point 15 mi (24.1 km) upstream, gage height, 14.7 ft (4.48 m), site and datum then in use; no flow at times in 1934, 1946-47, 1953-54, 1957, 1964-65.

EXTREMES OUTSIDE PERIOD OF RECORD.--Greatest flood since at least 1893 occurred Oct. 2, 1904, discharge not determined; the peak inflow to Lake McMillan, which includes Rio Penasco and Fourmile Draw, was estimated at 82,000 ft³/s (2,320 m³/s). The second highest flood occurred July 25, 1905, discharge below Rio Penasco, 50,300 ft³/s (1,420 m³/s), based on gain in storage and spill from Lake McMillan. The floods in August 1893 and October 1904 damaged McMillan Dam and washed out Avalon Dam.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 1,670 ft³/s (47.3 m³/s) Sept. 12, gage height, 9.00 ft (2.743 m) no peak above base of 2,000 ft³/s (57 m³/s); minimum, 3.4 ft³/s (0.096 m³/s) June 14.

SEP

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	165	54	62	83	49	25	417	23	583	204	14
2	25	149	54	62	92	48	18	194	22	576	125	21
3	22	137	55	62	104	48	18	173	25	593	99	14
4	19	131	56	62	106	51	22	148	19	593	72	11
5	13	128	56	60	94	48	21	131	17	617	45	9.6
6	12	114	58	59	86	46	20	103	16	641	39	12
7	13	103	59	60	80	45	21	83	11	655	50	11
8	14	93	59	60	71	42	22	83	8.9	718	71	8.9
9	17	87	57	59	72	41	21	71	8.2	740	52	38
10	14	84	55	57	70	41	21	62	7.5	720	49	100
11	13	81	54	56	65	42	21	56	7.5	720	44	740
12	13	78	54	57	68	39	34	105	6.4	715	46	1070
13	13	76	57	57	70	39	468	84	4.9	720	50	497
14	15	75	64	57	72	38	638	51	5.2	715	55	537
15	15	70	62	58	72	37	619	44	16	698	44	564
16	15	69	69	57	72	37	619	53	17	705	217	668
17	15	67	72	56	75	36	641	54	7.5	720	107	415
18	411	66	74	51	75	36	680	64	4.7	718	49	216
19	739	64	70	50	74	34	670	132	4.7	715	77	169
20	780	62	66	50	72	30	672	98	4.7	710	31	140
21	444	59	68	53	74	28	692	64	4.1	725	25	114
22	185	59	68	59	69	25	690	53	4.1	730	35	93
23	314	59	66	74	64	22	718	39	57	750	33	82
24	760	59	66	75	61	19	718	31	419	710	19	68
25	828	57	66	87	58	17	732	30	487	690	12	75
26	873	57	64	84	55	16	808	29	524	700	11	125
27	905	56	64	83	52	14	795	28	540	690	14	248
28	877	55	64	83	51	15	715	27	547	685	12	359
29	393	54	64	83	51	17	735	24	571	730	9.6	235
30	230	55	62	82	---	16	738	24	595	649	11	173
31	174	---	62	82	---	17	---	27	---	534	11	---
TOTAL	8186	2469	1919	1997	2108	1033	12612	2582	3984.4	21165	1668.6	6327.5
MEAN	264	82.3	61.9	64.4	72.7	33.3	420	83.3	133	683	53.8	211
MAX	905	165	74	87	106	51	808	417	595	750	217	1070
MIN	12	54	54	50	51	14	18	24	4.1	534	9.6	8.9
AC-FT	16240	4900	3810	3960	4180	2050	25020	5120	7900	41980	3310	12550

CAL YR 1979 TOTAL 53623.1 MEAN 147 MAX 1170 MIN 3.9 AC-FT 106400
WTR YR 1980 TOTAL 66051.5 MEAN 180 MAX 1070 MIN 4.1 AC-FT 131000

RIO GRANDE BASIN
08196500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURES: April 1949 to current year.

SUSPENDED SEDIMENT DISCHARGE: January 1949 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 micromhos June 24, 1977; minimum daily, 464 micromhos Sept. 23, 1974.

WATER TEMPERATURES: Maximum, 36.0°C July 27, 1966, July 25, 1969; minimum, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATIONS: Maximum daily, 21,300 mg/L Aug. 1, 1962; minimum daily, no flow on many days during July 1953, July and August 1954, July 1957, July to October 1964.

SEDIMENT LOADS: Maximum daily, 183,000 tons (166,000 tonnes) Sept. 26, 1955; minimum daily, 0 tons (0 tonnes) on many days during July 1953, July and August 1954, July 1957, July to October 1964.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 26,000 micromhos Mar. 28; minimum daily, 1,160 micromhos July 24, 26.

WATER TEMPERATURES: Maximum, 33.0°C June 13, 23; minimum, 3.0°C Dec. 2, 16-17.

SEDIMENT CONCENTRATIONS: Maximum daily, 5,950 mg/L Sept. 17; minimum daily, 5 mg/L Mar. 15

SEDIMENT LOADS: Maximum daily, 9,380 tons (8,510 tonnes) Oct. 19; minimum daily, 0.20 ton (0.18 tonne) June 18.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS) (00095)	PH FIELD (UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE, WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL)	HARD- NESS (MG/L AS CACO3) (00900)	
									(MG/L) (00340)		
OCT 12...	0912	13	13800	8.1	24.5	15.5	12	9.0	59	3400	
NOV 09...	0945	87	4050	8.5	15.5	10.5	63	10.2	35	1500	
DEC 05...	0845	56	7300	8.5	16.0	5.0	4.8	--	150	2000	
JAN 18...	1030	51	8700	8.6	19.5	9.0	1.1	13.2	49	2100	
FEB 26...	1000	55	8770	8.4	23.0	11.0	2.8	14.4	72	2400	
MAR 25...	0945	17	14900	8.3	23.5	15.0	5.9	11.6	3400	3300	
APR 30...	0930	738	2170	8.1	31.0	19.0	560	7.0	2	1100	
MAY 27...	1030	28	6250	8.2	31.0	25.0	37	8.2	160	2100	
JUN 24...	1030	419	3600	7.9	39.0	25.5	4000	4.8	180	1600	
JUL 22...	1000	730	1200	8.2	32.0	25.0	420	3.2	32	580	
AUG 26...	1030	11	7200	8.3	34.5	27.0	17	7.2	41	1500	
SEP 29...	1030	235	2800	8.1	23.0	20.0	460	7.4	64	1000	
DATE		HARD- NESS, NONCAR- BONATE (MG/L AS CACO3) (00902)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY (MG/L AS CACO3) (00410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
OCT 12...	3300	500	520	2100	16	22	130	3200	3700	.8	
NOV 09...	1400	420	110	450	5.1	7.6	130	1100	770	.5	
DEC 05...	1900	430	230	1000	9.7	9.5	170	2600	860	.8	
JAN 18...	2000	480	220	1200	11	11	150	1800	2100	.9	
FEB 26...	2300	560	240	1200	11	11	100	1800	2100	.6	
MAR 25...	3100	750	340	2400	18	21	190	2600	4200	.9	
APR 30...	1000	370	49	110	1.4	4.2	96	970	150	.6	
MAY 27...	2000	540	190	1100	10	13	97	1600	1900	.5	
JUN 24...	1500	470	100	320	3.5	9.5	100	1500	480	.9	
JUL 22...	490	190	26	55	1.0	2.9	88	470	74	.7	
AUG 26...	1400	420	110	930	10	13	110	1300	1600	.5	
SEP 29...	--	280	76	380	5.2	9.5	--	720	650	.6	

RIO GRANDE BASIN
08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

349

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, RESIDUE AT 105 DEG. C, SUS- PENDE (MG/L) (00530)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)
OCT 12...	9.0	9990	10100	35	.71	.73	.270	.260	.54
NOV 09...	15	3200	2960	154	.83	.84	.170	.090	.44
DEC 05...	16	5770	5260	17	1.6	1.6	.340	.260	1.5
JAN 18...	11	6210	5920	12	.83	.83	.230	.260	1.8
FEB 26...	14	6070	5990	7	.02	.06	.940	.120	1.2
MAR 25...	7.8	10700	10400	15	.04	.04	.180	.170	1.1
APR 30...	8.4	1810	1720	1250	.09	.10	.140	.110	1.5
MAY 27...	12	5920	5410	81	.00	.00	.200	.220	1.3
JUN 24...	8.0	3090	2950	1670	.32	.19	.380	.400	2.3
JUL 22...	7.1	945	879	224	.01	.05	.010	.000	2.6
AUG 26...	8.8	4730	4450	19	.00	.00	.350	.070	.75
SEP 29...	12	2430	2130	748	.63	.59	.120	.060	2.1

DATE	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, ORTHOPH OSPATE DISSOL. (MG/L AS P) (00671)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE (MG/L AS C) (00689)
OCT 12...	1.5	.070	.010	990	50	--	--	4.5	.9
NOV 09...	1.4	.070	.010	280	20	--	--	4.8	.6
DEC 05...	3.4	.100	.020	470	60	20	8.5	5.6	1.7
JAN 18...	2.8	.090	.040	490	30	--	--	5.2	--
FEB 26...	2.1	.280	.000	510	70	--	--	9.5	22
MAR 25...	1.3	.110	.040	870	50	440	--	5.4	1.9
APR 30...	1.7	.870	.000	100	110	20	5.3	2.4	.5
MAY 27...	1.5	.090	.000	580	50	--	--	6.6	1.6
JUN 24...	3.0	1.700	.000	310	160	20	50	6.9	.6
JUL 22...	2.6	.670	.010	100	50	--	--	9.4	1.1
AUG 26...	1.1	.030	.000	420	50	--	--	4.8	1.9
SEP 29...	2.8	.590	.030	110	840	--	--	5.3	.6

RIO GRANDE BASIN
08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

TRACE ELEMENT ANALYSES, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)
DEC 05...	0845	2	1	400	300	470	0	0	0	10
MAR 25...	0945	--	1	--	200	870	--	1	--	20
APR 30...	0930	3	1	800	400	100	1	0	30	10
JUN 24...	1030	10	1	1000	100	310	0	1	50	10

DATE	COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)
DEC 05...	3	0	1	2	300	60	6	2	40
MAR 25...	--	0	--	1	--	50	--	1	--
APR 30...	11	0	27	3	19000	110	55	2	930
JUN 24...	18	0	150	44	33000	160	57	4	3600

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
DEC 05...	20	.1	.0	2	4	0	0	40	60
MAR 25...	440	--	.1	--	2	--	0	--	80
APR 30...	20	.1	.0	0	1	0	0	150	150
JUN 24...	20	.1	.0	2	1	0	0	230	30

CHEMICAL ANALYSES OF BOTTOM MATERIAL, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	ARSENIC TOTAL RECOV. IN BOT- TOM MA- TERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CD) (01028)	CHRO- MIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU) (01029)	COPPER, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU) (01043)	LEAD, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS PB) (01052)	MERCURY RECOV. FM BOT- TOM MA- TERIAL (UG/G AS HG) (71921)
SEP 29...	1030	0	1	1	2	0	.01

RIO GRANDE BASIN
08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

351

PESTICIDE ANALYSES, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	PCB TOTAL (UG/L) (39516)	ALDRIN, TOTAL (UG/L) (39330)	CHLOR- DANE, TOTAL (UG/L) (39350)	DDD, TOTAL (UG/L) (39360)	DDE, TOTAL (UG/L) (39365)	DDT, TOTAL (UG/L) (39370)	DI- AZINON, TOTAL (UG/L) (39570)	DI- ELDRIN TOTAL (UG/L) (39380)	
SEP 29...	1030	.00	.00	.0	.00	.00	.00	.01	.00	
DATE	TIME	ENDO- SULFAN, TOTAL (UG/L) (39388)	ENDRIN, TOTAL (UG/L) (39390)	ETHION, TOTAL (UG/L) (39398)	HEPTA- CHLOR, TOTAL (UG/L) (39410)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L) (39420)	LINDANE TOTAL (UG/L) (39340)	MALA- THION, TOTAL (UG/L) (39530)	METH- OXY- CHLOR, TOTAL (UG/L) (39480)	METHYL PARA- THION, TOTAL (UG/L) (39600)
SEP 29...	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
DATE	TIME	METHYL TRI- THION, TOTAL (UG/L) (39790)	PARA- THION, TOTAL (UG/L) (39540)	TOX- APHENE, TOTAL (UG/L) (39400)	TOTAL TRI- THION (UG/L) (39786)	2,4,5-T TOTAL (UG/L) (39740)	SILVEX, TOTAL (UG/L) (39760)	PER- THANE TOTAL (UG/L) (39034)	NAPH- THA- LENES, POLY- CHLOR, TOTAL (UG/L) (39250)	MIREX, TOTAL (UG/L) (39755)
SEP 29...	.00	.00	.00	0	.00	.00	.00	.00	.0	.00

MICROBIOLOGICAL ANALYSES, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT 12...	0912	53	460
NOV 09...	0945	20	85
DEC 05...	0845	1	25
JAN 18...	1030	54	58
FEB 26...	1000	160	800
MAR 25...	0945	7	12
APR 30...	0930	230	1600
MAY 27...	1030	3	12
JUN 24...	1030	14	980
JUL 22...	1000	100	130
AUG 26...	1030	28	28
SEP 29...	1030	2000	5200

RIO GRANDE BASIN
08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

INSTANTANEOUS SUSPENDED SEDIMENT AND PARTICLE SIZE, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE, WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)
OCT									
28...	0810	877	14.0	2470	5850	37	43	--	61
DEC									
05...	0845	56	5.0	55	8.3	64	69	72	75
JAN									
18...	1030	51	9.0	26	3.6	--	--	--	--
FEB									
26...	1000	55	11.0	29	4.3	--	--	--	--
MAR									
25...	0945	17	15.0	34	1.6	--	--	--	--
APR									
14...	0910	638	10.0	2440	4200	33	43	--	66
27...	0900	795	13.0	1830	3930	31	38	--	54
30...	0930	738	19.0	1950	3890	24	33	--	43
MAY									
27...	1030	28	25.0	100	7.6	--	--	--	--
JUN									
24...	1030	419	25.5	4720	5340	38	49	--	73
26...	1112	524	26.0	2470	3500	35	45	--	65
JUL									
02...	1600	576	27.0	1280	1990	39	49	--	67
22...	1000	730	25.0	1990	3920	22	25	--	35
AUG									
16...	1000	217	27.0	2040	1200	26	42	--	72
26...	1030	11	27.0	33	.98	--	--	--	--
SEP									
12...	1300	1070	24.0	2980	8610	35	44	--	57
18...	1535	216	26.0	3900	2270	64	82	--	98
29...	1030	235	20.0	945	600	42	51	--	71

DATE	SED. SUSP. FALL DIAM. % FINER THAN .031 MM (70341)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70331)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70332)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70333)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70334)
OCT									
28...	--	--	--	--	--	95	100	--	--
DEC									
05...	79	--	--	--	--	85	90	100	--
JAN									
18...	--	--	--	--	--	35	64	97	100
FEB									
26...	--	--	--	--	--	41	63	94	100
MAR									
25...	--	--	--	--	--	39	72	96	100
APR									
14...	--	95	100	--	--	--	--	--	--
27...	--	92	100	--	--	--	--	--	--
30...	--	84	95	100	--	--	--	--	--
MAY									
27...	--	--	--	--	--	76	85	96	100
JUN									
24...	--	90	96	100	--	--	--	--	--
26...	--	95	100	--	--	--	--	--	--
JUL									
02...	--	--	--	--	--	97	100	--	--
22...	--	71	87	96	100	--	--	--	--
AUG									
16...	--	--	--	--	--	99	100	--	--
26...	--	--	--	--	--	85	92	100	--
SEP									
12...	--	82	96	100	--	--	--	--	--
18...	--	100	--	--	--	--	--	--	--
29...	--	--	--	--	--	87	95	100	--

RIO GRANDE BASIN
08396500 PECOS RIVER NEAR ARTESIA, NM --- Continued
WATER-QUALITY RECORDS

353

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DAY	ONCE-DAILY											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11700	2850	7510	7960	8000	9450	15100	2200	10400	2330	1890	14900
2	11800	2830	7740	7790	7590	9450	12900	2470	11300	2310	2360	11700
3	11100	3000	7670	7960	7110	9720	13200	2700	12000	2280	2740	11600
4	10800	3160	7800	7840	6290	9900	14500	2720	11200	2290	3180	10100
5	10800	3400	7830	7960	6070	9810	13600	3240	11700	2290	3300	10200
6	10200	3470	7920	8070	6250	10100	13100	3420	13700	2290	3490	10900
7	11700	3730	7870	8010	6760	9900	13300	3800	13700	2290	3570	11300
8	14800	3980	7830	8070	7240	10300	12600	4170	13400	2320	3960	13700
9	14900	4030	7770	8130	7320	10400	12200	4520	13600	2300	4020	12400
10	14100	4270	7790	8060	7500	10500	12100	5050	13600	2290	4980	7230
11	13100	4400	7770	8200	7820	10400	12300	5470	14200	2300	5340	3850
12	13500	4510	7890	8260	7770	10500	12400	5530	16700	2290	5370	1460
13	15000	4540	7930	8450	7980	10700	12800	4680	14800	2330	5340	1390
14	15100	4910	7670	8450	8860	10700	3050	4940	18300	2280	6080	1480
15	15000	5210	7690	8320	8230	11100	2470	5120	21500	2270	5870	1900
16	14800	5300	7790	8320	7800	10900	2310	5220	13400	2170	5770	2280
17	14900	5370	7760	8320	7210	11100	2230	5530	12700	2020	2510	1920
18	9080	5960	8070	8520	7470	11700	2200	5830	11500	1860	2830	1870
19	2140	6110	7730	8720	7510	11400	2170	6270	11200	1700	3110	2040
20	1580	6340	7420	8780	7610	11700	2150	4520	12400	1530	4700	2640
21	1690	6470	7260	8790	7750	12100	2130	4640	14500	1240	6520	3450
22	1770	6720	7210	7620	8070	12600	2100	4820	16200	1260	6600	3810
23	1960	6740	7460	7840	7850	13500	2140	5050	18800	1180	5910	4270
24	1910	6980	7720	7960	7830	13900	2140	5560	3560	1160	5840	4900
25	1470	7210	7710	7680	8100	14800	2180	7160	2640	1170	5840	5540
26	1470	7190	7670	7730	8380	15300	2190	7620	2510	1160	6970	3330
27	1470	7320	7510	7900	8570	16400	2200	8080	2330	1280	7650	4540
28	1480	7490	7620	7790	8910	26000	2210	8510	2320	1260	9620	1940
29	1640	7530	7890	7790	8880	15500	2110	9380	2350	1210	11000	3250
30	1930	7540	7970	7660	---	14900	2110	10300	2310	1350	10900	3370
31	2250	---	8080	7790	---	14000	---	10500	---	1390	11200	---
MEAN	8230	5290	7730	8090	7680	12200	6940	5450	11300	1850	5430	5780
WTR YR 1980	MEAN	7160	MAX	26000	MIN	1160						

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

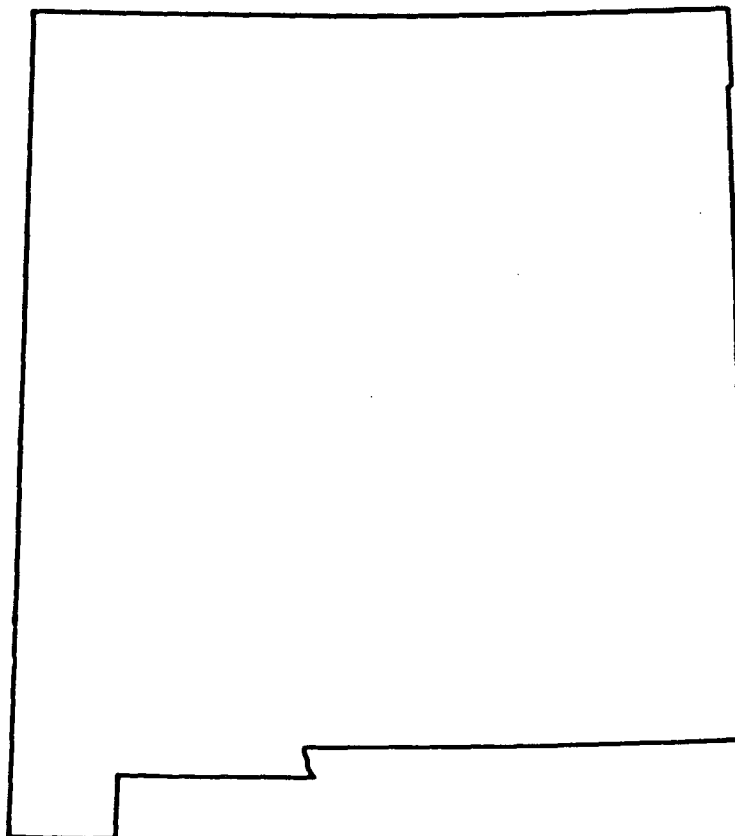
DAY	ONCE-DAILY											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24.0	10.0	7.5	5.5	6.0	9.5	11.0	20.0	24.0	26.5	27.0	29.0
2	16.5	11.0	3.0	6.5	4.5	12.0	17.0	21.0	26.5	27.0	25.0	22.5
3	24.5	13.0	6.0	6.5	7.5	7.0	18.0	19.0	29.0	27.0	30.0	29.0
4	27.5	10.0	7.0	5.5	9.5	10.0	19.0	19.5	24.0	27.5	29.0	26.0
5	23.5	10.5	6.0	5.0	9.0	10.5	17.0	24.0	31.0	26.0	24.5	27.0
6	16.0	11.5	9.0	7.0	9.0	13.0	22.0	24.0	29.5	26.5	28.0	24.5
7	25.0	11.0	5.0	5.5	10.5	12.0	18.0	25.5	29.0	27.5	23.5	26.0
8	18.5	11.0	10.0	5.0	8.0	12.0	20.0	26.0	26.0	27.0	30.0	27.0
9	15.0	14.0	9.5	8.0	4.5	15.0	12.5	23.5	26.0	27.5	29.0	24.0
10	14.5	11.5	10.0	5.0	3.5	15.0	20.0	23.0	25.0	27.5	28.0	20.0
11	22.0	13.5	11.5	8.0	4.5	15.0	23.0	22.0	25.0	26.5	26.5	21.0
12	16.0	11.5	7.5	9.0	6.0	13.0	21.5	22.0	28.0	27.0	24.5	21.5
13	15.0	12.5	7.0	10.5	5.0	18.0	20.0	20.0	33.0	27.5	23.0	24.5
14	15.5	11.5	5.0	10.0	8.5	10.0	10.0	19.0	30.0	28.0	26.0	23.0
15	22.0	11.0	4.0	12.5	12.0	14.0	13.0	21.0	28.5	27.5	25.0	24.0
16	24.5	10.0	3.0	9.0	12.0	15.0	15.0	19.0	29.5	28.0	27.0	24.5
17	17.0	7.5	3.0	9.0	6.5	13.5	17.5	16.5	29.0	28.0	25.0	23.0
18	17.0	13.0	3.5	10.0	13.0	13.0	19.0	24.0	31.5	27.5	25.5	26.0
19	16.5	12.0	5.5	11.5	11.0	17.0	16.5	24.0	29.0	26.0	26.0	22.5
20	16.5	10.0	9.0	7.0	11.5	15.0	19.0	28.0	30.0	25.5	25.0	23.0
21	17.0	13.5	7.0	7.5	11.0	16.0	18.0	24.5	28.0	26.5	23.5	27.0
22	13.5	6.5	9.5	6.5	13.0	16.0	18.0	27.0	26.0	26.5	24.5	21.0
23	12.5	5.0	9.0	5.0	11.5	10.0	20.5	26.0	33.0	27.0	28.5	20.5
24	12.5	8.0	11.5	5.0	10.5	13.5	17.5	26.0	28.0	28.5	27.0	22.5
25	13.0	11.0	9.0	7.0	10.0	18.0	16.0	26.0	27.0	26.5	27.0	22.0
26	15.0	8.0	6.5	4.0	10.5	20.0	15.0	27.5	26.0	27.0	25.5	18.0
27	15.5	11.0	8.0	5.0	11.0	18.0	13.0	25.0	26.0	25.0	23.0	18.0
28	14.0	7.0	7.5	5.5	12.0	17.0	19.0	23.5	26.5	26.5	30.5	17.5
29	14.0	4.0	4.5	5.0	13.0	12.0	18.0	27.5	27.0	28.0	27.0	18.5
30	13.5	5.5	5.0	5.0	---	16.0	20.0	27.5	27.5	26.0	29.5	21.5
31	12.0	---	5.0	5.0	---	12.0	---	29.5	---	28.0	31.5	---
MEAN	17.5	10.0	7.0	7.0	9.0	14.0	17.5	23.5	28.0	27.0	26.5	23.0
WTR YR 1980	MEAN	17.5	MAX	33.0	MIN	3.0						

DAY	MEAN CONCENTRATION		MEAN CONCENTRATION		MEAN CONCENTRATION		MEAN CONCENTRATION		MEAN CONCENTRATION		MEAN CONCENTRATION	
	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	58	3.9	398	177	21	3.1	207	35	108	24	13	1.7
2	29	2.0	310	125	80	12	7	1.2	106	26	10	1.3
3	35	2.1	237	88	16	2.4	11	1.8	50	14	8	1.0
4	70	3.6	214	76	20	3.0	43	7.2	76	22	7	.96
5	47	1.6	198	68	39	5.9	6	.97	70	18	10	1.3
6	32	1.0	180	55	59	9.2	6	.96	66	15	9	1.1
7	218	7.7	151	42	73	12	11	1.8	72	16	6	.73
8	22	.83	98	25	38	6.1	7	1.1	77	15	7	.79
9	26	1.2	125	29	26	4.0	9	1.4	77	15	6	.66
10	19	.72	117	27	18	2.7	6	.92	32	6.0	10	1.1
11	23	.81	125	27	31	4.5	7	1.1	51	9.0	9	1.0
12	35	1.2	116	24	31	4.5	6	.92	25	4.6	8	.84
13	56	2.0	100	21	41	6.3	26	4.0	23	4.3	8	.84
14	24	.97	90	18	116	20	18	2.8	25	4.9	6	.62
15	30	1.2	86	16	21	3.5	12	1.9	46	8.9	5	.50
16	36	1.5	159	30	19	3.5	9	1.4	34	6.6	9	.90
17	23	.93	105	19	21	4.1	15	2.3	24	4.9	10	.97
18	4360	6320	40	7.1	14	2.8	47	6.5	34	6.9	9	.87
19	4700	9380	44	7.6	19	3.6	15	2.0	34	6.8	8	.75
20	2650	5580	38	6.4	28	5.0	17	2.3	57	11	8	.63
21	2130	2550	36	5.7	19	3.5	11	1.6	28	5.6	11	.83
22	1510	754	56	8.9	46	8.4	152	24	17	3.2	12	.81
23	1610	1830	178	28	38	6.8	38	7.6	18	3.1	8	.48
24	3130	6420	22	3.5	31	5.5	56	11	22	3.6	9	.46
25	3010	6730	35	5.4	26	4.6	50	12	33	5.2	20	.92
26	2780	6550	30	4.6	15	2.6	97	22	24	3.6	15	.65
27	2540	6210	115	17	27	4.7	70	16	18	2.5	15	.57
28	2330	5520	34	5.0	9	1.6	73	16	22	3.0	12	.49
29	1360	1440	23	3.4	10	1.7	48	11	14	1.9	16	.73
30	855	531	16	2.4	11	1.8	99	22	---	---	12	.52
31	617	290	---	---	30	5.0	58	13	---	---	14	.64
TOTAL	---	60138.26	---	972.0	---	164.4	---	233.77	---	270.6	---	25.66

DAY	MEAN CONCENTRATION (MG/L)		LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)		LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)		LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)		LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)		LOADS (T/DAY)
	APRIL	MAY		JUNE	JULY		AUGUST	SEPTEMBER							
1	16	1.1	1160	1370	63	3.9	1600	2520	553	305	40	1.5			
2	19	.92	655	343	56	3.3	1300	2020	248	84	30	1.7			
3	20	.97	513	240	64	4.3	1600	2560	130	35	39	1.5			
4	31	1.8	505	202	49	2.5	3950	6320	125	24	25	.74			
5	28	1.6	612	216	63	2.9	1690	2820	39	4.7	21	.54			
6	43	2.3	271	75	72	3.1	2080	3600	72	7.6	13	.42			
7	40	2.3	45	10	59	1.8	2950	5220	125	17	13	.39			
8	40	2.4	32	7.2	31	.74	1890	3660	99	19	17	.41			
9	29	1.6	19	3.6	36	.80	1700	3400	77	11	447	.75			
10	41	2.3	35	5.9	59	1.2	2650	5150	46	6.1	694	187			
11	42	2.4	35	5.3	61	1.2	1700	3300	46	5.5	395	256			
12	43	3.9	93	26	36	.62	1770	3420	51	6.3	2110	6840			
13	1300	2010	56	13	37	.49	1900	3690	62	8.4	1580	2080			
14	2340	4030	36	5.0	107	1.5	1740	3360	42	6.2	1660	2430			
15	2010	3360	37	4.4	58	2.5	1830	3450	55	6.5	1810	2760			
16	2220	3710	28	4.0	23	1.1	2940	5600	1110	797	3030	5680			
17	1960	3390	30	4.4	20	.41	2160	4200	453	131	5950	6670			
18	2050	3760	34	5.9	16	.20	1690	3280	40	5.3	4220	2460			
19	2010	3640	156	56	22	.28	1610	3110	55	4.0	3310	1510			
20	2000	3630	402	106	35	.44	1800	3450	36	3.0	2470	934			
21	1840	3440	366	63	21	.23	1620	3170	35	2.4	742	228			
22	1800	3350	330	47	19	.21	2410	4750	574	54	435	109			
23	1800	3490	226	24	277	163	1960	3970	137	12	259	57			
24	1880	3640	66	5.5	3550	4020	1590	3050	51	2.6	138	25			
25	1790	3540	45	3.6	2890	3800	1810	3370	57	1.8	162	33			
26	1790	3910	40	3.1	2460	3480	1570	2970	34	1.0	338	114			
27	1800	3860	75	5.7	2010	2930	1650	3070	26	.98	930	1090			
28	1660	3200	51	3.7	1950	2880	1510	2790	36	1.2	1230	1190			
29	1800	3570	46	3.0	2050	3160	1430	2820	22	.57	838	532			
30	1820	3630	49	3.2	1900	3050	1300	2280	24	.71	435	203			
31	---	---	60	4.4	---	---	1430	2110	36	1.1	---	---			
TOTAL	---	63183.59	---	2868.9	---	23516.72	---	108480	---	1564.96	---	35470.20			
TOTAL LOAD FOR YEAR:		296889.06 TONS.													



Water Resources Data New Mexico Water Year 1981



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-81-1
Prepared in cooperation with the State of New Mexico
and with other agencies

08396500 PECOS RIVER NEAR ARTESIA, NM
(Surveillance program station)

LOCATION.--Lat 32°50'27", long 104°19'23", in NW¼NW¼ sec.18, T.17 S., R.27 E., Eddy County, Hydrologic Unit 13060007, on left bank 250 ft (76 m) upstream from bridge on State Highway 83, 4.3 mi (6.9 km) east of Artesia, 7.0 mi (11.3 km) upstream from Rio Penasco, 17 mi (27.4 km) upstream from McMillan Dam, and at mile 503.9 (810.8 km). Prior to Apr. 3, 1981, at site 250 ft (76 m) downstream.

DRAINAGE AREA.--15,300 mi² (39,630 km²), approximately (contributing area).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1905 to June 1909, August 1909 to current year. Monthly discharge only for some periods, published in WSP 1312 and 1712. Records for Aug. 22-31, 1934, and October 1936 to April 1937, published in WSP 763 and 828, respectively are not reliable and should not be used. Prior to February 1936, published as "near Dayton."

REVISED RECORDS.--WSP 1312 and 1512: 1913, 1915, 1917-18(M), 1920, 1923, 1931-36. WSP 1712: 1906(M), 1908-11(M), 1919, 1921-23(M), 1929, 1931-32(M), 1935-36(M), 1937, 1939(M), 1941(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 3,291.92 ft (1,003.376 m) National Geodetic Vertical Datum of 1929. See WSP 1923 or 2123 for history of changes prior to Apr. 5, 1941. Apr. 5, 1941 to Apr. 2, 1981, water-stage recorder at site 250 ft (76 m) downstream at same datum.

REMARKS.--Water-discharge records fair. Flow regulated by Santa Rosa Lake (station 08382810) since April 1980, by Lake Sumner (station 08384000) since August 1937, and by Two Rivers Reservoir (station 08390600) since July 1963. Diversions and ground-water withdrawals for irrigation of about 154,000 acres (620 km²), 1959 determination, above station.

AVERAGE DISCHARGE.--45 years, 246 ft³/s (6.967 m³/s), 178,200 acre-ft/yr (220 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge probably occurred May 30, 1937, when a discharge of 51,500 ft³/s (1,460 m³/s) was measured by slope-area method at a point 15 mi (24.1 km) upstream, gage height, 14.7 ft (4.48 m), site and datum then in use; no flow at times in 1934, 1946-47, 1953-54, 1957, 1964-65.

EXTREMES OUTSIDE PERIOD OF RECORD.--Greatest flood since at least 1893 occurred Oct. 2, 1904, discharge not determined; the peak inflow to Lake McMillan, which includes Rio Penasco and Fourmile Draw, was estimated at 82,000 ft³/s (2,320 m³/s). The second highest flood occurred July 25, 1905, discharge below Rio Penasco, 50,300 ft³/s (1,420 m³/s), based on gain in storage and spill from Lake McMillan. The floods in August 1893 and October 1904 damaged McMillan Dam and washed out Avalon Dam.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,080 ft³/s (30.6 m³/s) Aug. 13, gage height, 7.21 ft (2.198 m), no peak above base of 2,000 ft³/s (57 m³/s); minimum, 2.8 ft³/s (0.079 m³/s) July 27.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

SEP	DAT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
84													
97	1	149	77	66	42	45	18	9.3	13	712	36	38	26
43	2	132	81	65	39	43	19	17	11	733	75	18	79
41	3	124	78	66	41	43	25	13	14	740	49	13	60
53	4	103	82	64	42	44	31	10	107	747	113	13	44
	5	92	81	62	43	45	36	9.4	82	755	71	20	57
525													
461	6	78	72	62	43	47	33	11	48	788	46	18	382
453	7	69	66	59	42	46	35	15	358	732	27	21	477
317	8	65	64	55	44	47	30	15	192	718	19	26	446
236	9	62	62	49	45	47	19	12	114	685	14	153	279
	10	64	57	49	45	45	30	17	73	597	158	168	202
184													
156													
136	11	62	54	49	45	44	24	18	45	528	230	112	165
120	12	59	51	49	44	44	18	12	27	441	169	231	144
107	13	60	48	49	44	42	16	14	17	408	175	744	124
	14	58	45	49	43	38	23	20	12	169	94	648	111
86	15	53	44	49	43	31	30	17	11	96	51	427	99
76													
75	16	47	50	48	43	36	30	22	10	62	34	286	84
74	17	46	57	48	46	27	30	20	15	47	23	302	79
75	18	46	59	49	48	28	25	19	21	33	24	388	73
	19	47	45	49	50	33	21	19	20	26	18	272	76
69	20	47	65	48	51	33	19	26	14	23	14	265	73
70													
69	21	48	64	48	52	34	18	29	14	24	15	261	66
70	22	48	62	48	52	39	20	23	13	29	8.8	185	69
69	23	48	59	48	52	39	21	20	12	24	10	136	69
	24	47	57	48	52	39	16	24	7.8	20	6.7	107	68
64	25	52	62	47	53	37	11	31	9.3	15	4.0	71	68
61													
60	26	62	65	47	52	34	14	18	10	61	4.1	60	62
67	27	64	65	46	51	31	14	16	7.8	99	3.0	49	58
65	28	59	66	45	48	27	14	25	6.7	56	4.9	38	56
	29	59	67	45	47	---	12	19	6.0	36	155	35	63
63	30	66	67	45	46	---	11	15	226	33	139	31	64
35	31	74	---	43	46	---	10	---	602	---	77	29	---
25													
41	TOTAL	2090	1892	1594	1434	1088	673	530.7	2118.6	9432	1867.5	5165	3723
60	MEAN	67.4	63.1	51.4	46.3	38.9	21.7	17.7	68.3	314	60.2	167	124
	MAX	149	82	66	53	47	36	31	602	788	230	744	477
	MIN	46	44	43	39	27	10	9.3	6.0	15	3.0	13	26
	AC-FT	4150	3750	3160	2840	2160	1330	1050	4200	18710	3700	10240	7380
	CAL YR 1980	TOTAL	59053.5	MEAN	161	MAX	1070	MIN	4.1	AC-FT	117100		
	YR 1981	TOTAL	31607.8	MEAN	86.6	MAX	788	MIN	3.0	AC-FT	62690		

RIO GRANDE BASIN
08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURES: April 1949 to current year.

SUSPENDED SEDIMENT DISCHARGE: January 1949 to current year.

REMARKS.--Continuous water-temperature and specific conductance recorder since July 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 micromhos June 24, 1977; minimum daily, 464 micromhos Sept. 23, 1974.

WATER TEMPERATURES: Maximum, 36.0°C July 27, 1966, July 25, 1969; minimum, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATIONS: Maximum daily, 21,300 mg/L Aug. 1, 1962; minimum daily, no flow on many days during July 1953, July and August 1954, July 1957, July to October 1964.

SEDIMENT LOADS: Maximum daily, 183,000 tons (166,000 tonnes) Sept. 26, 1955; minimum daily, 0 tons (0 tonnes) on many days during July 1953, July and August 1954, July 1957, July to October 1964.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 18,800 micromhos Mar. 27; minimum daily, 600 micromhos July 29.

WATER TEMPERATURES: Maximum, 35.5°C July 19, 20, 21, Aug. 2; minimum, 3.0°C Nov. 25, Dec. 22, Jan. 20.

SEDIMENT CONCENTRATIONS: Maximum daily, 13,800 mg/L Aug. 13; minimum daily, 4 mg/L Dec. 17, Feb. 17.

SEDIMENT LOADS: Maximum daily, 29,300 tons (26,600 tonnes) Aug. 13; minimum daily, 0.29 ton (0.26 tonne) Feb. 17.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	PH (UNITS) (00400)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L AS CACO3) (00902)	HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902)
NOV 19...	1100	65	9400	8.0	8.0	7.0	10.9	68	2400	2200	--
JAN 30...	1430	46	9500	8.5	14.0	8.0	11.8	66	2400	2200	--
MAR 19...	1400	30	13600	8.7	26.0	12.0	13.1	99	3500	--	3500
MAY 27...	1225	19	15400	8.0	37.0	29.0	9.9	130	3300	--	3200
JUL 23...	1330	9.3	11200	8.3	40.0	33.0	7.6	180	2500	--	2400
SEP 16...	1400	86	6200	8.5	28.0	25.0	--	230	1700	--	1700

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)
NOV 19...	590	220	1200	11	13	180	1600	2200	.2	13	5950
JAN 30...	580	240	1500	13	11	190	2000	2500	1.2	45	6990
MAR 19...	300	680	2200	16	15	84	2600	3800	.8	1.8	9650
MAY 27...	740	360	2500	19	1.3	120	2700	4300	.7	9.2	10700
JUL 23...	590	240	1600	14	20	83	2100	3000	.7	11	7610
SEP 16...	430	160	780	8.2	8.2	75	1400	1300	.7	8.4	4130

DATE	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00671)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
NOV 19...	1.1	1.1	.690	1.1	2.9	.080	.070	440	50	5.1
JAN 30...	.53	.54	.490	1.2	2.2	.230	.040	600	70	16
MAR 19...	.00	.00	.220	1.5	1.7	.130	.000	800	70	15
MAY 27...	.02	.00	.100	1.3	1.4	.150	.070	1100	70	11
JUL 23...	<.10	<.10	.190	1.5	1.7	.190	<.010	880	50	7.4
SEP 16...	--	.16	--	--	--	--	<.010	390	70	8.4

X = 0.695

RIO GRANDE BASIN
08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

373

TRACE ELEMENT ANALYSES, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)
NOV 19...	1100	1	1	440	3	1	20	0	2	2
MAY 27...	1225	2	2	1100	0	0	3	30	5	1

DATE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
NOV 19...	50	6	4	.0	.0	2	2	30	40
MAY 27...	70	4	2	.2	.0	2	2	60	20

CHEMICAL ANALYSES OF BOTTOM MATERIAL, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DATE	TIME	NITRO- GEN, NO2+NO3 TOT. IN BOT MAT (MG/KG AS N) (00633)	NITRO- GEN, NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	NITRO- GEN, TOT IN BOT- TOM MA- TERIAL (MG/KG AS N) (00603)	PHOS- PHORUS, TOTAL IN BOT. MAT. (MG/KG AS P) (00668)	ARSENIC TOTAL IN BOT- TOM MA- TERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CD) (01028)	CHRO- MIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS ZN) (01029)
MAY 27...	1225	15	4.1	65	170	0	0	1

	COBALT, RECOV. FM BOT- TOM MA- TERIAL {UG/G AS CO) (01038)	COPPER, RECOV. FM BOT- TOM MA- TERIAL {UG/G AS CU) (01043)	IRON, RECOV. FM BOT- TOM MA- TERIAL {UG/G AS FE) (01170)	LEAD, RECOV. FM BOT- TOM MA- TERIAL {UG/G AS PB) (01052)	MANGA- NESE, RECOV. FM BOT- TOM MA- TERIAL {UG/G (UG/G) (01053)	MERCURY RECOV. FM BOT- TOM MA- TERIAL {UG/G AS HG) (71921)	ZINC, RECOV. FM BOT- TOM MA- TERIAL {UG/G AS ZN) (01093)
DATE							

RADIOCHEMICAL ANALYSES, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DATE	TIME	GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90) (80060)	RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM NATURAL DIS- SOLVED (UG/L AS U) (22703)
MAY 27...	1225	< 270	1.8	< 130	2.9	< 130	2.8	.15	6.9

PESTICIDE ANALYSES, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DATE	TIME	2,4,5-T TOTAL (UG/L) (39740)	SILVEX, TOTAL (UG/L) (39760)
MAY 27...	1225	.00	.00

RIO GRANDE BASIN
08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

MICROBIOLOGICAL ANALYSES, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DATE	TIME	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV 19...	1100	7	380
JAN 30...	1430	4	32
MAR 19...	1400	1	260
MAY 27...	1225	21	10
JUL 23...	1330	0	18
SEP 16...	1400	230	140

INSTANTANEOUS SUSPENDED SEDIMENT AND PARTICLE SIZE, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	TEMPER- ATURE (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)
NOV 19...	1100	65	7.0	57	10	--	--	--
MAR 19...	1400	30	12.0	61	4.9	--	--	--
MAR 31...	1410	10	23.0	99	2.7	--	--	--
MAY 07...	1012	392	18.0	4990	5280	48	69	97
MAY 30...	1536	430	23.0	3750	4350	35	50	84
MAY 31...	0812	576	22.0	3800	5910	33	49	82
JUN 02...	1114	748	23.0	3400	6870	41	55	85
JUN 06...	1810	788	24.5	3130	6660	25	35	56
JUN 13...	1057	408	26.0	1550	1710	29	42	67
JUN 14...	0930	169	25.0	889	406	49	64	83
JUL 10...	1130	301	23.5	4630	3760	50	66	81
JUL 10...	1851	219	28.5	7400	4380	57	77	96
JUL 30...	1639	136	30.0	9170	3370	69	82	100
AUG 14...	1519	629	26.0	9400	16000	52	69	89
AUG 15...	1510	369	26.5	6440	6420	60	78	93
SEP 07...	1838	487	21.0	3520	4630	45	61	84
SEP 10...	1419	317	24.0	1860	1590	58	73	94

DATE	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	SED. SUSP. SIEVE DIAM. % FINER THAN .125 MM (70332)	SED. SUSP. SIEVE DIAM. % FINER THAN .250 MM (70333)	SED. SUSP. SIEVE DIAM. % FINER THAN .500 MM (70334)
NOV 19...	--	--	--	73	82	96	100
MAR 19...	--	--	--	85	--	--	--
MAR '31...	--	--	--	70	75	96	100
MAY 07...	100	--	--	--	--	--	--
MAY 30...	--	--	--	98	100	--	--
MAY 31...	--	--	--	98	100	--	--
JUN 02...	--	--	--	98	100	--	--
JUN 06...	89	100	--	--	--	--	--
JUN 13...	--	--	--	89	99	100	--
JUN 14...	--	--	--	95	100	--	--
JUL 10...	93	99	100	--	--	--	--
JUL 10...	100	--	--	--	--	--	--
JUL 30...	--	--	--	--	--	--	--
AUG 14...	98	100	--	--	--	--	--
AUG 15...	--	--	--	98	100	--	--
SEP 07...	--	--	--	95	100	--	--
SEP 10...	--	--	--	99	100	--	--

RIO GRANDE BASIN
08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

375

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG.°C), WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4440	7820	9020	10100	10000	11700	16000	15400	4090	5770	4160	8350
2	4730	7480	8860	10200	10100	11800	16300	16000	3560	5800	4920	8360
3	4950	6580	8630	10200	10100	14700	16300	16500	3300	4060	6020	6160
4	5050	6670	8560	10200	10400	14700	16100	16600	3300	3990	7950	6180
5	5200	6500	8630	10300	10500	13200	16100	3590	3260	3990	10200	5180
6	6150	6580	8710	10200	10600	13300	16100	4530	3210	4510	12900	5180
7	6930	7030	8710	10300	10500	12000	16100	4410	3000	4490	10600	2450
8	7220	6980	8780	10300	10500	11900	16400	4350	3070	4510	10600	2450
9	7760	7170	9090	10300	10700	11400	16400	4510	3020	5710	9530	2650
10	8250	7650	9620	10300	10600	11300	16100	4760	3070	4040	3900	3310
11	8170	7880	9710	10300	10900	11500	16200	5260	3090	2600	2860	4060
12	8170	8190	9900	10200	10900	11500	16000	6110	3130	3120	3340	4320
13	8310	8520	9710	10300	10800	13100	16100	8220	3150	2850	3340	4340
14	8310	8520	9530	10300	10800	13100	16000	8140	3130	3370	1940	4870
15	8370	8810	9440	10200	10700	14200	16100	9180	3510	3290	1680	5260
16	9040	8810	9520	10300	10800	14100	15900	9180	3840	3280	1740	6110
17	9450	8970	9620	10300	11500	13000	16000	13800	4330	5430	2170	6540
18	9720	8150	9510	10100	11500	13000	15700	13800	4900	7210	2020	7230
19	9630	8290	9420	10100	12400	13200	15800	12100	6430	8560	2860	7670
20	9630	8970	9450	10000	12300	13200	16000	12400	6390	8210	2700	7820
21	9540	8000	9520	9900	11600	14000	16000	12400	8560	10000	2310	7950
22	9450	8000	9520	9900	11500	14000	15700	14800	8630	12700	2390	8350
23	9630	8120	9620	9900	11300	14000	15700	16400	8280	11200	2790	8350
24	9200	8120	9710	9810	11300	14000	15700	15500	8210	13400	3860	8230
25	9200	8060	10100	9450	11500	13600	15700	15600	9020	14700	4240	8230
26	8880	8060	10000	9450	11500	13600	15400	17300	4490	14700	4720	8160
27	8000	8460	10000	9280	11700	18800	15400	17300	4510	14900	6050	8430
28	7700	8460	10000	9450	11700	18600	15600	15500	4670	14600	6470	8430
29	7700	8970	10100	9630	---	16000	15600	15900	4670	1080	6820	9180
30	7760	9040	9980	9900	---	16000	16000	11400	4630	2940	10800	8630
31	7880	---	10000	10000	---	16000	---	11400	---	2870	10900	---
MEAN	7880	7960	9450	10000	11000	13700	16000	11400	4680	6710	5380	6410
WTR YR 1981		MEAN	9200	MAX	18800	MIN	1080					

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG.°C), WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

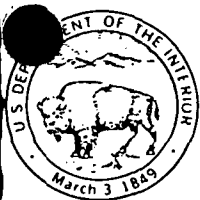
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	---	---	---	4100	2800	3570	9300	8100	8580
2	---	---	---	---	---	---	4900	3100	4220	9300	7230	8430
3	---	---	---	---	---	---	3900	3200	3580	7040	5990	6450
4	---	---	---	---	---	---	5100	3900	4470	5930	4970	5330
5	---	---	---	---	---	---	---	5300	---	5050	4970	5010
6	---	---	---	---	---	---	---	---	---	5050	4780	4940
7	---	---	---	---	---	---	---	6100	---	4760	4170	4460
8	---	---	---	---	---	---	---	5200	---	4140	3660	3910
9	---	---	---	7500	7300	7410	---	2600	---	3630	3360	3520
10	---	---	---	9680	3640	6300	4500	3000	3330	3340	2910	3180
11	---	---	---	3390	2540	2790	3000	2600	2720	3070	2840	2950
12	---	---	---	3240	2990	3070	2900	1100	2030	3170	2930	3060
13	---	---	---	3310	2840	3080	2600	1100	1930	3420	3100	3250
14	---	---	---	2930	2750	2820	2300	2000	2120	3730	3380	3570
15	---	---	---	3730	2960	3330	2000	1800	1950	4210	3710	3990
16	---	---	---	4500	3710	4090	1900	1700	1760	4410	4160	4230
17	---	---	---	5600	4400	5000	1900	1600	1740	---	---	---
18	---	---	---	7700	5600	6630	1900	800	1730	---	---	---
19	---	---	---	8700	7800	8330	2700	800	2150	---	---	---
20	---	---	---	8600	7600	8090	3000	2700	2880	---	---	---
21	---	---	---	---	8400	---	2700	2300	2520	---	---	---
22	---	---	---	---	---	---	2300	2100	2210	---	---	---
23	---	---	---	---	---	---	3100	2200	2670	---	---	---
24	---	---	---	---	---	---	3700	3100	3430	---	---	---
25	---	---	---	---	---	---	4000	3500	3730	---	---	---
26	---	---	---	---	---	---	5100	3800	4340	---	---	---
27	---	---	---	---	---	---	6000	4800	5530	---	---	---
28	---	---	---	---	---	---	6400	4800	6000	---	---	---
29	---	---	---	---	600	---	7300	6300	6810	---	---	---
30	---	---	---	4600	2700	3230	7600	3400	5970	---	---	---
31	---	---	---	2900	2600	2740	8500	7400	7870	---	---	---

MONTH YEAR 9680 600 4160
NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

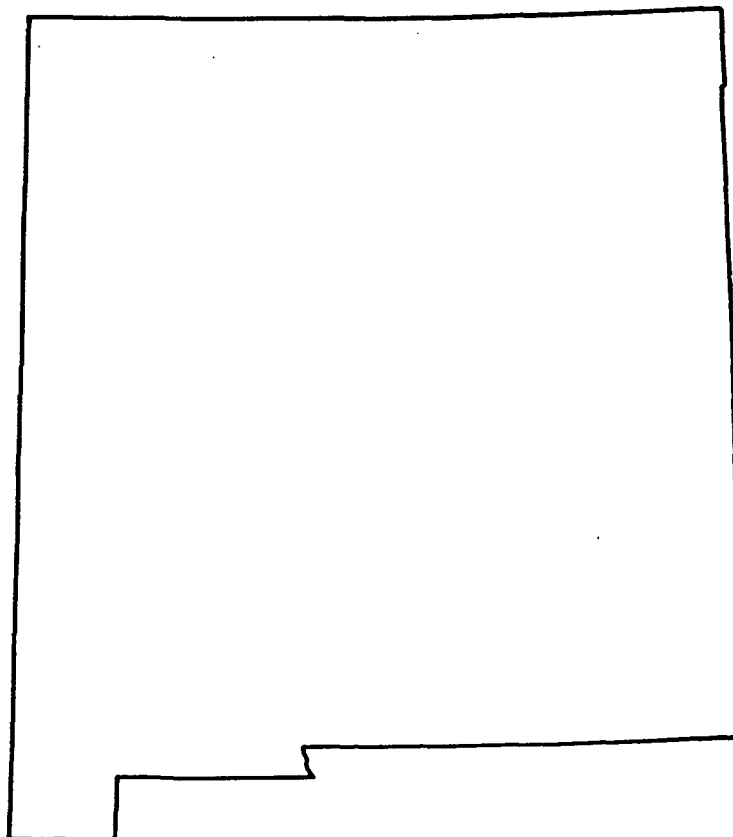
DAY	ONCE-DAILY											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21.0	14.5	7.0	8.0	6.5	15.0	22.0	27.0	21.0	30.5	29.5	29.0
2	25.5	13.0	11.5	8.0	6.5	15.5	16.5	22.5	23.0	25.5	25.5	28.5
3	21.0	15.0	9.0	9.0	5.0	16.5	16.0	20.5	24.0	30.5	26.0	23.5
4	25.0	12.5	8.5	8.5	9.0	11.5	19.0	21.0	24.5	29.5	27.0	24.0
5	19.0	13.5	12.5	9.0	7.0	15.0	18.5	23.5	24.0	30.0	25.0	24.5
6	20.0	15.0	11.5	10.5	7.0	14.5	14.0	25.0	24.5	28.0	25.5	22.5
7	25.5	13.5	12.5	8.0	7.0	9.5	13.5	18.0	26.0	28.5	24.0	21.0
8	20.0	15.5	13.5	8.0	7.5	11.5	20.0	19.0	27.5	33.0	24.0	20.5
9	19.0	19.0	6.5	8.5	11.0	9.5	20.5	23.5	28.0	28.5	25.0	20.0
10	23.0	13.5	5.0	9.0	9.0	10.5	23.0	22.5	28.0	28.5	25.0	24.0
11	22.0	14.5	9.5	8.5	11.0	12.5	18.0	19.5	29.0	29.0	25.5	25.0
12	23.0	15.0	8.5	8.0	5.5	11.0	23.0	27.0	26.5	25.0	24.0	25.0
13	22.5	14.0	7.5	7.0	5.0	16.0	25.0	25.0	26.0	27.5	23.5	24.5
14	23.0	15.0	6.0	5.0	11.5	15.5	18.0	26.0	25.0	31.0	26.0	24.0
15	18.0	14.5	12.0	6.5	7.5	12.5	16.0	22.5	22.5	28.0	26.5	23.5
16	19.0	14.0	12.0	7.0	8.0	13.0	22.0	23.0	23.0	29.5	24.0	27.0
17	19.0	13.5	12.5	6.0	15.5	17.5	23.0	22.0	25.0	30.0	25.0	21.5
18	19.5	13.0	11.0	5.0	15.0	15.0	18.0	22.5	29.0	32.0	25.0	19.0
19	14.5	5.0	7.0	3.5	18.0	15.0	19.0	26.5	28.0	29.5	26.0	25.0
20	19.0	4.0	5.5	3.0	12.0	15.5	21.5	25.0	28.5	35.0	27.0	19.5
21	19.0	9.0	5.0	4.5	7.5	15.0	21.5	25.5	33.0	29.0	27.0	20.0
22	15.0	4.0	3.0	6.5	9.0	11.0	22.0	27.0	34.0	27.0	25.5	21.5
23	18.5	4.0	5.0	5.0	11.0	16.5	22.5	27.5	28.0	33.5	23.5	21.0
24	16.5	5.5	6.0	8.5	10.5	18.0	23.0	26.5	28.5	31.0	28.5	21.0
25	17.0	3.0	8.0	7.0	13.0	19.0	26.0	27.0	29.0	29.0	30.0	21.5
26	13.0	4.5	12.0	6.5	17.5	22.0	27.5	24.5	29.0	30.5	23.5	23.0
27	16.5	6.0	7.0	6.0	15.0	22.0	25.5	25.0	28.0	29.0	25.0	24.5
28	11.0	8.0	10.0	11.0	11.0	21.0	24.0	24.5	29.0	25.0	24.0	25.0
29	7.0	6.0	12.5	9.0	---	15.0	24.5	25.5	25.0	22.0	30.0	26.0
30	14.5	7.0	12.0	10.0	---	16.0	26.5	23.0	25.0	30.0	23.0	21.0
31	13.0	---	7.0	8.0	---	23.0	---	22.0	---	25.5	23.5	---
MEAN	18.5	11.0	9.0	7.5	10.0	15.0	21.0	24.0	26.5	29.0	25.5	23.0
WTR YR 1981	MEAN	18.5	MAX	35.0	MIN	3.0						

[illegible]

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	44	1.1	29	1.0	5750	11100	144	14	2220	288	77	5.4
2	22	.71	25	.74	3400	6730	187	38	200	9.7	74	16
3	22	.77	29	1.1	2860	5710	1120	148	128	4.5	29	4.7
4	21	.57	27	7.8	3510	7030	408	124	127	4.5	290	34
5	19	.48	20	4.4	2580	5260	372	71	133	7.2	450	69
6	13	.39	14	1.8	3130	6660	1820	226	56	2.7	4000	6100
7	18	.73	4990	4820	2600	5140	1810	132	1360	77	4460	5740
8	22	.89	4960	2570	2390	4630	1280	66	2080	146	4140	4990
9	25	.81	3980	1230	2160	3990	155	5.9	5760	2970	2710	2040
10	39	1.8	1820	359	2090	3370	4630	1980	8490	3850	1920	1150
11	35	1.7	632	77	1850	2640	5430	3370	7720	2330	1310	672
12	23	.75	136	9.9	1790	2130	4850	2210	9630	6050	1050	451
13	19	.72	58	3.0	1550	1710	6140	2900	13800	29300	960	345
14	18	.97	60	2.3	889	406	4950	1260	10400	18200	525	206
15	17	.78	30	1.1	514	133	2820	388	7180	8280	347	128
16	42	2.5	34	1.2	299	50	2860	263	5300	4090	88	24
17	34	1.8	70	3.8	99	13	143	8.9	4180	3990	36	7.7
18	26	1.3	71	5.4	65	5.8	210	14	4970	6010	47	9.3
19	26	1.3	72	5.4	43	3.0	186	9.0	2000	1470	44	9.0
20	24	1.7	67	4.0	45	2.8	97	3.7	2300	1650	30	5.9
21	33	2.6	63	3.9	170	11	96	3.9	1650	1160	33	5.9
22	33	2.0	73	4.3	228	18	80	1.9	902	451	23	4.3
23	39	2.1	73	4.1	39	2.5	100	2.7	536	197	26	4.8
24	56	3.6	111	4.8	35	1.9	83	1.5	383	111	30	5.5
25	55	4.6	106	5.4	32	1.3	119	1.3	161	31	35	6.4
26	34	1.7	116	6.6	413	68	111	1.2	45	7.3	22	3.7
27	38	1.6	110	5.6	388	104	81	.66	32	4.2	24	3.8
28	29	2.0	64	3.1	198	30	65	.86	34	3.5	29	4.4
29	30	1.5	54	2.5	146	14	3900	1630	40	3.8	29	4.9
30	50	2.0	3750	2290	267	24	9870	3700	59	4.9	26	4.5
31	---	---	3800	6180	---	---	6360	1320	74	5.8	---	---
TOTAL	---	45.47	---	17619.24	---	66988.3	---	19895.52	---	90709.1	---	22055.2



Water Resources Data New Mexico Water Year 1982



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-82-1
Prepared in cooperation with the State of New Mexico
and with other agencies

RIO GRANDE BASIN

367

08396500 PECOS RIVER NEAR ARTESIA, NM
(Surveillance program station)

LOCATION.--Lat 32°50'27", long 104°19'23", in NW¼NW¼ sec.18, T.17 S., R.27 E., Eddy County, Hydrologic Unit 13060007, on left bank 250 ft (76 m) upstream from bridge on State Highway 83, 4.3 mi (6.9 km) east of Artesia, 7.0 mi (11.3 km) upstream from Rio Penasco, 17 mi (27.4 km) upstream from McMillan Dam, and at mile 503.9 (810.8 km). Prior to Apr. 3, 1981, at site 250 ft (76 m) downstream.

DRAINAGE AREA.--15,300 mi² (39,630 km²), approximately (contributing area).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1905 to June 1909, August 1909 to current year. Monthly discharge only for some periods, published in WSP 1312 and 1712. Records for Aug. 22-31, 1934, and October 1936 to April 1937, published in WSP 763 and 828, respectively are not reliable and should not be used. Prior to February 1936, published as "near Dayton."

REVISED RECORDS.--WSP 1312 and 1512: 1913, 1915, 1917-18(M), 1920, 1923, 1931-36. WSP 1712: 1906(M), 1908-11(M), 1919, 1921-23(M), 1929, 1931-32(M), 1935-36(M), 1937, 1939(M), 1941(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 3,291.92 ft (1,003.376 m) National Geodetic Vertical Datum of 1929. See WSP 1923 or 2123 for history of changes prior to Apr. 5, 1941. Apr. 5, 1941 to Apr. 2, 1981, water-stage recorder at site 250 ft (76 m) downstream at same datum.

REMARKS.--Water-discharge records fair. Flow regulated by Santa Rosa Lake (station 08382810) since April 1980, by Lake Sumner (station 08384000) since August 1937, and by Two Rivers Reservoir (station 08390600) since July 1963. Diversions and ground-water withdrawals for irrigation of about 154,000 acres (620 km²), 1959 determination, above station.

AVERAGE DISCHARGE.--46 years, 244 ft³/s (6.910 m³/s), 176,800 acre-ft/yr (218 hm³/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge probably occurred May 30, 1937, when a discharge of 51,500 ft³/s (1,460 m³/s) was measured by slope-area method at a point 15 mi (24.1 km) upstream, gage height, 14.7 ft (4.48 m), site and datum then in use; no flow at times in 1934, 1946-47, 1953-54, 1957, 1964-65.

EXTREMES OUTSIDE PERIOD OF RECORD.--Greatest flood since at least 1893 occurred Oct. 2, 1904, discharge not determined; the peak inflow to Lake McMillan, which includes Rio Penasco and Fourmile Draw, was estimated at 82,000 ft³/s (2,320 m³/s). The second highest flood occurred July 25, 1905, discharge below Rio Penasco, 50,300 ft³/s (1,420 m³/s), based on gain in storage and spill from Lake McMillan. The floods in August 1893 and October 1904 damaged McMillan Dam and washed out Avalon Dam.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,070 ft³/s (58.6 m³/s) at 2230 hours Sept. 15, gage height, 10.15 ft (3.094 m) from floodmarks, no other peak above base of 2,000 ft³/s (57 m³/s); minimum, 1.3 ft³/s (0.037 m³/s) Sept. 2.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	56	96	59	53	58	49	23	285	24	70	25	2.1
2	53	95	62	53	57	49	24	845	19	55	30	1.3
3	87	88	62	53	56	48	24	754	16	154	37	4.9
4	57	83	62	53	56	42	25	517	13	423	57	129
5	95	77	62	52	56	40	25	246	11	537	87	564
6	117	92	62	51	56	39	24	177	10	620	56	654
7	109	104	62	51	56	39	23	143	11	760	34	684
8	269	93	62	51	56	40	24	117	8.6	740	32	713
9	182	83	61	51	55	41	24	106	7.3	800	22	744
10	164	71	60	50	56	40	22	98	7.7	930	18	750
11	168	67	60	50	59	38	26	81	6.4	920	15	758
12	153	64	60	50	59	36	27	66	11	880	8.0	755
13	127	64	60	50	59	39	29	58	7.5	1100	6.0	769
14	107	64	60	50	58	41	28	50	5.5	900	6.0	842
15	95	65	60	115	58	39	26	51	5.3	911	5.0	973
16	88	65	60	120	59	35	550	50	5.7	900	6.0	1240
17	78	64	59	120	59	35	662	48	13	878	6.5	966
18	73	60	58	110	55	36	715	38	8.6	849	5.5	710
19	71	55	58	62	51	35	752	35	9.2	798	6.0	324
20	69	58	58	64	49	34	805	32	8.1	549	4.0	454
21	67	56	57	69	49	32	832	26	8.3	190	4.5	307
22	67	59	56	77	49	31	950	22	8.1	146	3.5	256
23	72	56	55	89	48	32	875	19	14	106	3.5	203
24	60	54	55	80	48	29	965	20	11	87	4.0	181
25	66	53	54	78	49	26	888	27	8.6	92	4.0	166
26	97	53	54	74	49	25	362	25	6.9	55	7.0	165
27	101	50	54	69	49	25	618	27	8.0	36	30	148
28	94	52	54	65	49	26	812	32	6.9	39	35	128
29	102	54	53	61	---	24	815	26	7.8	31	20	99
30	103	56	53	60	---	21	770	29	18	25	10	82
31	93	---	53	58	---	20	---	25	---	22	7.0	---
TOTAL	3180	2053	1805	2095	1518	1086	12345	4685	305.5	14665	594.5	13772.3
MEAN	103	68.4	58.2	67.6	54.2	35.0	412	151	10.2	473	19.2	459
MAX	269	104	62	120	59	49	965	865	24	1100	87	1240
MIN	53	50	53	50	46	20	22	19	5.3	22	3.5	1.3
AC-FT	6310	4070	3580	4160	3010	2150	24490	9290	606	29090	1180	27320
CAL YR 1981	TOTAL	33069.8	MEAN	90.6	MAX	788	MIN	3.0	AC-FT	65590		
WTP YR 1982	TOTAL	58104.3	MEAN	159	MAX	1240	MIN	1.3	AC-FT	115200		

RIO GRANDE BASIN
08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURES: April 1949 to current year.

SUSPENDED SEDIMENT DISCHARGE: January 1949 to current year.

REMARKS.--Continuous water-temperature and specific conductance recorder since July 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 micromhos June 24, 1977; minimum daily, 111 micromhos Aug. 31, 1982.

WATER TEMPERATURES: Maximum, 36.0°C July 27, 1966, July 25, 1969; minimum, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATIONS: Maximum daily, 21,300 mg/L Aug. 1, 1962; minimum daily, 0 mg/L on several days in December, 1982

SEDIMENT LOADS: Maximum daily, 183,000 tons (166,000 tonnes) Sept. 26, 1955; minimum daily, 0 tons (0 tonnes) on many days during July 1953, July and August 1954, July 1957, July to October 1964, December, 1982.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 25,200 micromhos Aug. 29; minimum daily, 111 micromhos Aug. 31.

WATER TEMPERATURES: Maximum, 35.5°C Sept. 1; minimum, 2.0°C Jan. 15.

SEDIMENT CONCENTRATIONS: Maximum daily, 6,350 mg/L Apr. 17; minimum daily, 0 mg/L on several days in December.

SEDIMENT LOADS: Maximum daily, 11,300 tons (10,300 tonnes) Apr. 17; minimum daily, 0 ton (0 tonne) on several days in December.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982

		STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE, AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)	HARD- NESS (MG/L AS CACO3) (00900)	
DEC												
02...	1300	60	10000	10300	8.2	7.7	13.0	8.5	--	<94	2653	
APR												
01...	1100	22	14500	13400	8.0	7.1	21.0	14.0	8.3	250	3255	
16...	1600	--	10400	--	--	--	--	--	--	--	--	
26...	1600	866	2870	2870	8.0	7.5	33.0	16.0	8.2	53	1599	
AUG												
31...	1215	7.3	--	7500	8.2	8.3	28.0	28.0	--	32	1957	
		HARD- NESS, NONCAR- BONATE (MG/L AS CACO3) (00902)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE ITFLD (MG/L AS HCO3) (99440)	CAR- BONATE ITFLD (MG/L AS CO3) (99445)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
DEC												
02...	2483	650	250	1300	11	10	--	--	2100	2500	.8	
APR												
01...	3105	710	360	2200	17	18	180	.00	2600	4000	.9	
16...	--	--	--	--	--	--	--	--	--	--	--	
26...	1499	520	73	150	1.7	4.2	200	.00	1500	190	.7	
AUG												
31...	1869	520	160	1100	11	12	--	--	1800	1800	.7	
		SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	
DEC												
02...		9.8	6930	1.1	1.1	.320	.98	2.4	.130	.060	3.9	
APR												
01...		8.0	9990	<.10	.15	.300	.21	--	.280	.090	8.8	
16...		--	--	--	--	--	--	--	--	--	--	
26...		9.9	2510	.13	.16	.120	2.6	2.8	--	.030	13	
AUG												
31...		10	5460	.20	.12	.130	1.1	1.4	.090	.050	5.3	

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM
(Surveillance program station)

LOCATION.--Lat 32°50'27", long 104°19'23", in NW¼NW¼ sec.18, T.17 S., R.27 E., Eddy County, Hydrologic Unit 13060007, on left bank 250 ft upstream from bridge on State Highway 83, 4.3 mi east of Artesia, 7.0 mi upstream from Rio Penasco, 17 mi upstream from McMillan Dam, and at mile 503.9.

DRAINAGE AREA.--15,300 mi², approximately (contributing area).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1905 to June 1909, August 1909 to current year. Monthly discharge only for some periods, published in WSP 1312 and 1712. Records for Aug. 22-31, 1934, and October 1936 to April 1937, published in WSP 763 and 828, respectively are not reliable and should not be used. Prior to February 1936, published as "near Dayton."

REVISED RECORDS.--WSP 1312 and 1512: 1913, 1915, 1917-18(M), 1920, 1923, 1931-36. WSP 1712: 1906(M), 1908-11(M), 1919, 1921-23(M), 1929, 1931-32(M), 1935-36(M), 1937, 1939(M), 1941(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 3,291.92 ft National Geodetic Vertical Datum of 1929. See WSP 1923 or 2123 for history of changes prior to Apr. 5, 1941. Apr. 5, 1941 to Apr. 2, 1981, water-stage recorder at site 250 ft downstream at same datum.

REMARKS.--Records fair. Flow regulated by Santa Rosa Lake (station 08382810) since April 1980, by Lake Sumner (station 08384000) since August 1937, and by Two Rivers Reservoir (station 08390600) since July 1963. Diversions and ground-water withdrawals for irrigation of about 154,000 acres, 1959 determination, above station.

AVERAGE DISCHARGE.--48 years (1937-84), 241 ft³/s, 174,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge probably occurred May 30, 1937, when a discharge of 51,500 ft³/s was measured by slope-area method at a point 15 mi upstream, gage height, 14.7 ft, site and datum then in use; no flow at times in 1934, 1946-47, 1953-54, 1957, 1964-65.

EXTREMES OUTSIDE PERIOD OF RECORD.--Greatest flood since at least 1893 occurred Oct. 2, 1904, discharge not determined; the peak inflow to Lake McMillan, which includes Rio Penasco and Fourmile Draw, was estimated at 82,000 ft³/s. The second highest flood occurred July 25, 1905, discharge below Rio Penasco, 50,300 ft³/s, based on gain in storage and spill from Lake McMillan. The floods in August 1893 and October 1904 damaged McMillan Dam and washed out Avalon Dam.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 4	0900	2080	10.76	Aug. 13	0230	*2220	11.94

Minimum discharge, 4.9 ft³/s April 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	75	75	64	78	53	28	23	13	70	130	540	118
2	152	72	65	66	50	30	25	17	59	125	617	96
3	138	232	67	56	45	30	29	19	63	68	646	96
4	164	1450	66	58	43	31	23	21	58	62	683	83
5	109	415	66	61	48	33	19	22	66	54	693	113
6	98	463	66	70	45	37	19	22	59	47	676	105
7	76	260	65	73	44	39	12	271	47	36	681	71
8	63	188	66	76	40	39	12	586	37	28	730	71
9	66	158	65	76	38	35	14	648	29	25	1090	61
10	73	128	66	70	39	35	16	685	41	46	1420	55
11	67	111	64	65	38	35	19	695	37	28	1700	49
12	58	98	63	61	37	34	18	718	25	29	2060	46
13	54	96	61	59	38	33	18	757	14	31	1560	41
14	54	91	60	57	36	26	15	811	13	28	595	32
15	50	85	59	55	31	21	10	812	13	17	519	27
16	49	81	59	56	32	17	9.9	853	20	11	500	21
17	52	76	58	56	23	16	14	943	19	12	471	21
18	51	76	58	57	28	16	11	971	16	12	437	32
19	72	76	56	56	32	17	10	984	217	9.2	395	35
20	196	72	56	57	29	17	9.0	1020	329	7.9	286	107
21	469	71	58	57	29	20	8.9	972	350	6.9	202	82
22	373	68	54	54	28	29	8.8	927	369	6.7	181	58
23	271	69	91	53	30	26	12	926	357	6.5	198	42
24	184	69	132	55	31	16	17	706	197	7.8	200	36
25	168	68	68	57	33	14	14	303	149	10	168	28
26	152	67	69	58	25	19	18	211	116	11	154	20
27	136	65	80	56	30	25	17	157	105	8.2	188	16
28	121	64	74	60	27	20	10	134	105	7.8	237	45
29	114	66	77	62	29	20	6.6	115	160	7.8	238	41
30	102	64	76	59	---	17	7.0	99	145	75	190	47
31	80	---	82	56	---	19	---	86	---	439	160	---
TOTAL	3887	4974	2111	1890	1031	794	445.2	15504	3285	1392.8	18415	1695
MEAN	125	166	68.1	61.0	35.6	25.6	14.8	500	110	44.9	594	56.5
MAX	469	1450	132	78	53	39	29	1020	369	439	2060	118
MIN	49	64	54	53	23	14	6.6	13	13	6.5	154	16
AC-FT	7710	9870	4190	3750	2040	1570	883	30750	6520	2760	36530	3360

CAL YR 1983	TOTAL	66247.9	MEAN 182	MAX 1450	MIN 4.7	AC-FT 131400
WTR YR 1984	TOTAL	55424.0	MEAN 151	MAX 2060	MIN 6.5	AC-FT 109900

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURES: April 1949 to current year.

SUSPENDED-SEDIMENT DISCHARGES: January 1949 to current year.

REMARKS.--Continuous water-temperature and specific conductance recorder since July 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 microsiemens June 24, 1977; minimum daily, 111 microsiemens Aug. 31, 1982.

WATER TEMPERATURES: Maximum daily, 36.0°C July 27, 1966, July 25, 1969; minimum daily, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 21,300 mg/L Aug. 1, 1962; minimum daily mean, 0 mg/L on several days in December, 1982, and Feb. 8, 1984.

SEDIMENT LOADS: Maximum daily, 183,000 tons Sept. 26, 1955; minimum daily, 0 tons on many days during 1953, 1954, 1957, 1964, 1982, Feb. 8, 1984.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 16,800 microsiemens Apr. 23; minimum daily, 618 microsiemens Oct. 7.

WATER TEMPERATURES: Maximum daily, 33.0°C July 5, 10; minimum daily, 0.0°C Dec. 22, 25, 29, 30.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 13,000 mg/L June 23; minimum daily mean, 0 mg/L Feb. 8.

SEDIMENT LOADS: Maximum daily, 13,300 tons June 23; minimum daily, 0 tons Feb. 8.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (UMHOS) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)	HARD- NESS (MG/L AS CAC03) (00900)	HARD- NESS, NONCAR- BONATE (MG/L CAC03) (00902)
NOV 01...	1615	75	5100	5080	8.3	7.5	22.0	20.5	10.2	35	1700	1500
JAN 02...	1500	64	11800	--	8.2	--	15.5	5.5	13.2	33	--	--
FEB 29...	1230	31	11400	11300	8.2	7.9	14.0	10.5	12.6	110	2800	2700
APR 30...	1030	5.4	12200	12600	8.1	7.2	20.0	16.0	13.0	80	2900	2700
30...	1500	5.0	5000	5140	8.0	7.8	25.5	20.0	9.8	--	1900	1700
JUL 02...	1130	82	7200	7400	8.3	7.3	28.5	30.0	7.4	53	1700	1700
SEP 03...	1100	97	5200	--	8.2	--	22.0	24.0	9.5	50	--	--

DATE	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE IT-PLD (MG/L AS HCO3) (99440)	CAR- BONATE IT-PLD (MG/L AS CO3) (99445)	ALKA- LINITY FIELD (MG/L AS CAC03) (00410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
NOV 01...	460	130	600	7	6.7	180	.000	--	1300	1100	.60
JAN 02...	--	--	--	--	--	220	18	210	--	--	--
FEB 29...	650	290	1600	14	13	190	.000	160	2200	3200	.80
APR 30...	670	300	1800	15	18	170	16	--	2600	3400	.90
30...	520	140	450	5	5.0	--	--	--	1700	870	1.0
JUL 02...	450	150	1000	11	11	62	11	--	1600	1800	.70
SEP 03...	--	--	--	--	--	--	--	--	--	1200	--

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
NOV 01...	14	3700	.70	.67	.280	--	1.2	2.2	.200	.020	4.5
JAN 02...	--	--	1.2	1.1	1.20	--	.50	2.9	.190	.120	4.5
FEB 29...	7.5	8100	5.3	.14	.140	.100	.76	6.2	.040	.030	3.7
APR 30...	10	8900	.20	<.10	1.40	--	3.1	4.7	2.00	.320	14
30...	16	3800	--	--	--	--	--	--	--	--	--
JUL 02...	3.1	5100	<.10	<.10	<.010	--	--	--	.170	.020	8.6
SEP 03...	--	--	.10	.13	.250	--	1.5	1.8	.160	<.010	5.9

TRACE ELEMENT ANALYSES, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)
NOV 01...	1615	1	1	330	<1	1	40	10	6	1
FEB 29...	1230	--	--	620	--	--	--	--	--	--
APR 30...	1030	--	--	860	--	--	--	--	--	--
30...	1500	--	--	270	--	--	--	--	--	--
JUL 02...	1130	<1	1	490	2	<1	20	10	11	4

DATE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
NOV 01...	80	9	<1	.1	<.1	2	2	60	30
FEB 29...	90	--	--	--	--	--	--	--	--
APR 30...	100	--	--	--	--	--	--	--	--
30...	70	--	--	--	--	--	--	--	--
JUL 02...	50	5	8	.1	<.1	4	3	10	20

CHEMICAL ANALYSES OF BOTTOM MATERIAL, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	NITRO- GEN, NO2+NO3 TOT. IN BOT MAT (MG/KG AS N) (00633)	NITRO- GEN, NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	PHOS- PHORUS, TOTAL IN BOT. MAT. (MG/KG AS P) (00668)	ARSENIC TOTAL IN BOT- TOM MA- TERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CD) (01028)	CHRO- MIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CR) (01029)
NOV 02...	1045	<2.0	3.8	130	1	<1	1
DATE	COBALT, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU) (01043)	IRON, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS FE) (01170)	LEAD, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS PB) (01052)	MANGA- NESE, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS MN) (01053)	MERCURY RECOV. FM BOT- TOM MA- TERIAL (UG/G AS HG) (71921)	ZINC, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS ZN) (01093)
NOV 02...	<10	1	550	<10	220	<.01	4

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

RADIOCHEMICAL ANALYSES, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90) (80060)	RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM NATURAL DIS- SOLVED (UG/L AS U) (22703)
NOV 01...	1615	<150	8.4	<58	7.0	<48	6.0	.12	7.3

PESTICIDE ANALYSES, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	PCB, TOTAL (UG/L) (39516)	ALDRIN, TOTAL (UG/L) (39330)	CHLOR- DANE, TOTAL (UG/L) (39350)	DDD, TOTAL (UG/L) (39360)	DDE, TOTAL (UG/L) (39365)	DDT, TOTAL (UG/L) (39370)	DI- AZINON, TOTAL (UG/L) (39570)	DI- ELDRIN TOTAL (UG/L) (39380)	ENDO- SULFAN, TOTAL (UG/L) (39388)
FEB 29...	1230	--	--	--	--	--	--	--	--	--
SEP 03...	1100	<.1	<.010	<.1	<.010	<.010	<.010	<.01	<.010	<.010

DATE	ENDRIN, TOTAL (UG/L) (39390)	ETHION, TOTAL (UG/L) (39398)	HEPTA- CHLOR, TOTAL (UG/L) (39410)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L) (39420)	LINDANE TOTAL (UG/L) (39340)	MALA- THION, TOTAL (UG/L) (39530)	METH- OXY- CHLOR, TOTAL (UG/L) (39480)	METHYL PARA- THION, TOTAL (UG/L) (39600)	METHYL TRI- THION, TOTAL (UG/L) (39790)
FEB 29...	--	--	--	--	--	--	--	--	--
SEP 03...	<.010	<.01	<.010	<.010	<.010	<.01	<.01	<.01	<.01

DATE	PARA- THION, TOTAL (UG/L) (39540)	TOX- APHENE, TOTAL (UG/L) (39400)	TOTAL TRI- THION (UG/L) (39786)	2,4-D, TOTAL (UG/L) (39730)	2,4,5-T TOTAL (UG/L) (39740)	SILVEX, TOTAL (UG/L) (39760)	PER- THANE TOTAL (UG/L) (39034)	NAPH- THA- LENES, POLY- CHLOR. TOTAL (UG/L) (39250)	MIREX, TOTAL (UG/L) (39755)
FEB 29...	--	--	--	<.01	<.01	<.01	--	--	--
SEP 03...	<.01	<.1	<.01	--	--	--	<.1	<.10	<.01

MICROBIOLOGICAL ANALYSES, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV 01...	1615	930	1200
JAN 02...	1500	--	--
FEB 29...	1230	0	260
APR 30...	1030	18	360
JUL 02...	1130	15	240
SEP 03...	1100	79	210

WATER-QUALITY RECORDS

INSTANTANEOUS SUSPENDED SEDIMENT AND PARTICLE SIZE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (000061)	TEMPER- ATURE (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)
OCT								
03...	1330	130	22.5	1820	639	51	74	94
22...	0811	373	13.5	4720	4750	47	64	89
NOV								
01...	1615	75	20.5	188	38	--	--	--
04...	0743	2060	15.0	2490	13800	43	62	88
04...	1450	1630	15.5	2890	12700	40	54	81
JAN								
02...	1500	64	5.5	58	10	--	--	--
FEB								
02...	1515	49	11.5	26	3.4	--	--	--
29...	1230	31	10.5	21	1.8	--	--	--
APR								
02...	1415	25	19.0	34	2.3	--	--	--
30...	1030	5.4	16.0	23	.34	--	--	--
MAY								
09...	1115	663	18.0	2710	4850	41	54	85
10...	1345	708	20.5	2420	4630	35	47	75
19...	1727	983	23.0	2640	7010	22	29	44
22...	1619	928	25.0	2290	5740	20	26	43
JUN								
22...	1717	415	27.0	6280	7040	63	79	89
23...	0458	311	24.0	5520	4640	54	66	81
25...	0904	179	25.5	6530	3160	71	84	99
29...	1701	329	30.0	2040	1810	47	61	90
JUL								
02...	1130	82	30.0	68	15	--	--	--
29...	2028	179	27.0	1990	962	--	--	--
31...	0900	480	25.5	10700	13900	--	--	--
31...	1230	480	27.0	6610	8570	47	59	87
31...	1932	494	27.0	5500	7340	--	--	--
AUG								
09...	1500	1300	23.0	3150	11100	--	--	--
12...	0802	2690	21.0	1780	12900	--	--	--
13...	1657	1080	26.0	3160	9210	37	50	72
SEP								
03...	1100	97	24.0	93	24	--	--	--

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

INSTANTANEOUS SUSPENDED SEDIMENT AND PARTICLE SIZE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	SED. SUSP. FALL DIAM. X FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. X FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. X FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. X FINER THAN .062 MM (70331)	SED. SUSP. FALL DIAM. X FINER THAN .125 MM (70332)	SED. SUSP. FALL DIAM. X FINER THAN .250 MM (70333)	SED. SUSP. FALL DIAM. X FINER THAN .500 MM (70334)
OCT							
03...	--	--	--	97	99	100	--
22...	--	--	--	97	99	100	--
NOV							
01...	--	--	--	83	--	--	--
04...	--	--	--	99	100	--	--
04...	92	98	100	--	--	--	--
JAN							
02...	--	--	--	48	67	97	100
FEB							
02...	--	--	--	89	--	--	--
29...	--	--	--	53	--	--	--
APR							
02...	--	--	--	81	91	97	100
30...	--	--	--	90	95	98	100
MAY							
09...	--	--	--	100	--	--	--
10...	--	--	--	96	100	--	--
19...	83	99	100	--	--	--	--
22...	92	100	--	--	--	--	--
JUN							
22...	--	--	--	99	100	--	--
23...	96	100	--	--	--	--	--
25...	--	--	--	100	--	--	--
29...	--	--	--	99	100	--	--
JUL							
02...	--	--	--	77	--	--	--
29...	--	--	--	95	--	--	--
31...	--	--	--	55	--	--	--
31...	96	99	100	--	--	--	--
31...	--	--	--	97	--	--	--
AUG							
09...	--	--	--	92	--	--	--
12...	--	--	--	100	--	--	--
13...	--	--	--	95	100	--	--
SEP							
03...	--	--	--	86	--	--	--

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG.° C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1			8100	9450	8770	11800	12100	14600	3960	6620	2620	3430
2		5560	8160	9530	8960	11500	11600	16300	4350	7440	2350	3200
3		5450	8180	9270	8870	11400	11600	14500	3330	7490	2250	3390
4		751	8370	9200	8940	11600	11000	13100	4960	7900	2150	5870
5		1790	8390	9080	9550	11600	11300	13100	5140	8230	1750	6420
6		1870	8190	9950	9680	11300	11500	13300	5390	8480	1260	4940
7		2300	8330	8970	9860	11200	11700	9300	5760	8930	1180	5690
8		2590	8270	7640	9890	10900	10900	4060	5430	9030	1140	6620
9		3940	8160	7090	10100	10800	14000	3510	5720	9130	1380	7610
10		4040	8220	7070	10100	10900	16400	3310	6500	9350	1430	7810
11		4460	8120	7140	10300	11100	13200	3200	6820	8250	1630	8160
12		5200	8310	7570	10400	11800	12100	3190	6690	7440	827	8760
13		5460	8410	7910	10300	12100	11800	3220	6390	7320	1480	8820
14		6120	8800	8140	10400	11800	11900	3190	7510	6720	1840	9090
15		6310	8710	8610	10600	11700	11700	3080	10100	7000	2050	9000
16		6640	9030	8640	11100	11800	12500	3010	11100	8110	2280	10000
17		6850	8990	8790	11000	12800	14200	2590	8610	8590	2020	10400
18		6900	8900	8900	12300	14300	14700	2100	6810	10000	2150	10400
19		7020	8940	9010	12000	14300	16100	1960	5690	13200	2340	12100
20		7040	8950	8800	11200	14100	15500	1970	3260	11600	2520	10300
21		7600	9180	8990	11600	13300	13700	1630	2430	11600	2940	7700
22		7560	9200	9120	11600	13600	13800	1530	2640	10000	3540	5190
23		7640	9480	9030	11600	11500	16800	1480	2380	9940	3710	5760
24		7650	9430	9290	11400	11400	16700	1840	1830	12600	3210	7570
25		7700	9140	9730	11400	13400	13500	1790	2150	15600	3340	8120
26		7570	10100	9500	11300	14100	14000	1940	2530	14600	4180	8310
27		8030	11100	9220	12300	13500	13400	2200	3310	14200	3980	9480
28		7960	9590	9330	11600	12200	12400	2520	3820	---	3030	3610
29		8150	9560	9030	11400	11900	12100	2710	3890	11800	2910	9920
30		8090	9540	8970	---	12000	12100	2980	4470	3200	2830	9220
31		---	9310	8730	---	12100	---	3440	---	2900	3120	---
MEAN			8880	8760	10600	12200	13100	5050	5100	9240	2370	7560

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG.° C), RECORDER MAXIMUM, MINIMUM, AND MEAN,
WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1			1970			4810						
2			2150			---						
3			2340			---						
4			2410			---						
5			2430			---						
6			2740			---						
7			2490			---						
8			1110			---						
9			1500			---						
10			2640			---						
11			2610			---						
12			780			---						
13			693			---						
14			677			---						
15			640			---						
16			643			---						
17			618			---						
18			---			---						
19			4170			---						
20			1600			---						
21			3000			---						
22			2570			---						
23			2560			---						
24			2690			---						
25			2810			---						
26			2990			---						
27			3120			---						
28			3340			---						
29			3580			---						
30			3830			---						
31			4310			---						
MONTH			2230			4810						

TEMPERATURE WATER (DEG.° C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1			6.0	1.5	6.5	12.5	13.0	17.0	22.0	32.0	24.0	24.5
2		19.5	8.5	3.0	12.0	16.0	16.0	25.0	25.0	30.0	25.0	28.5
3		18.0	9.0	10.0	12.0	17.0	20.0	19.0	20.0	25.0	27.0	29.0
4		15.0	10.5	8.5	7.5	10.0	20.0	19.0	27.0	31.0	27.0	23.0
5		17.0	9.5	10.0	6.0	16.5	12.5	27.0	26.0	33.0	27.0	20.5
6		17.5	10.0	7.0	8.0	10.0	21.5	25.0	28.0	31.5	26.0	25.0
7		18.0	7.0	6.0	12.5	6.0	15.5	24.0	21.0	31.0	27.0	20.0
8		16.0	6.5	7.0	8.0	15.0	17.0	20.0	24.0	30.0	25.0	25.0
9		15.0	7.0	10.0	13.0	8.5	17.5	18.0	29.0	31.0	23.0	25.5
10		15.5	12.0	7.5	14.5	10.0	14.0	20.5	24.0	33.0	22.0	28.0
11		12.0	8.0	10.0	9.0	10.0	17.0	23.0	24.0	29.0	22.0	22.0
12		13.0	12.0	5.0	7.0	9.5	23.0	23.0	27.0	26.0	21.0	25.0
13		18.0	13.0	5.0	12.0	15.0	20.0	24.0	25.0	31.0	26.0	23.0
14		16.0	10.0	8.5	13.5	16.0	19.5	23.0	28.5	32.0	24.0	28.0
15		12.0	7.0	4.0	15.0	17.5	14.0	22.0	24.0	27.0	25.0	24.0
16		12.0	10.0	6.5	13.0	17.0	23.0	21.0	30.0	30.0	24.0	22.0
17		12.5	8.5	3.0	14.0	15.0	26.5	20.0	23.0	27.0	24.0	19.0
18		15.5	4.0	1.0	11.5	15.0	25.0	19.0	24.0	25.5	24.0	19.0
19		13.0	2.0	3.0	6.5	14.5	18.5	23.0	22.5	27.0	25.0	27.5
20		14.0	1.5	2.5	11.0	18.0	24.0	24.0	23.0	26.0	26.0	28.0
21		14.0	2.0	3.0	13.0	20.5	15.0	25.0	25.0	32.0	25.0	21.5
22		12.0	.0	5.0	13.0	15.0	23.0	25.0	27.0	27.0	27.0	19.0
23		9.0	1.0	9.0	8.0	11.0	15.0	25.0	24.0	32.5	26.0	19.0
24		11.5	4.0	4.5	11.0	11.5	25.0	25.0	28.0	22.0	25.0	27.0
25		8.0	.0	3.0	15.0	11.5	17.5	24.0	25.5	25.0	28.5	23.0
26		8.5	.5	10.0	8.5	14.0	21.0	27.0	26.5	27.0	28.0	27.5
27		9.0	3.5	6.0	13.0	12.0	13.5	28.0	26.0	31.5	30.0	22.5
28		6.0	1.5	9.0	10.0	12.0	16.5	22.0	25.0	---	25.0	16.0
29		10.0	.0	10.0	5.0	17.0	14.0	21.0	30.0	27.0	27.0	15.0
30		6.0	.0	9.5	---	15.0	23.0	19.5	31.0	25.5	25.0	12.5
31		---	3.0	10.0	---	15.0	---	23.0	---	27.0	29.0	---
MEAN			5.5	6.5	10.5	13.5	18.5	22.5	25.5	29.0	25.5	23.0

RIO GRANDE BASIN

297

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

TEMPERATURE WATER (DEG.° C), RECORDER MAXIMUM, MINIMUM, AND MEAN, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1			23.0			17.5						
2			23.0			---						
3			22.0			---						
4			21.5			---						
5			22.0			---						
6			22.5			---						
7			22.5			---						
8			21.5			---						
9			21.5			---						
10			20.5			---						
11			20.5			---						
12			19.0			---						
13			17.5			---						
14			18.0			---						
15			18.5			---						
16			18.5			---						
17			18.0			---						
18			18.5			---						
19			16.5			---						
20			13.0			---						
21			13.0			---						
22			13.5			---						
23			15.0			---						
24			15.5			---						
25			13.5			---						
26			13.5			---						
27			14.5			---						
28			15.5			---						
29			16.5			---						
30			16.5			---						
31			17.5			---						
MONTH			18.0			17.5						

SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	40	8.1	180	36	8	1.4	9	1.9	2	.29	3	.23
2	389	183	94	18	10	1.8	39	6.7	14	1.9	4	.32
3	1710	637	213	302	9	1.6	13	2.0	2	.24	4	.32
4	3040	1350	2620	10700	17	3.0	9	1.4	5	.57	3	.25
5	1650	486	4380	5320	12	2.1	10	1.6	2	.25	5	.45
6	2010	532	8710	11600	8	1.4	12	2.3	1	.12	4	.40
7	1510	310	3800	2670	8	1.4	14	2.8	1	.11	3	.32
8	1090	185	1300	660	7	1.2	15	3.1	0	.00	2	.21
9	508	91	483	206	8	1.4	20	4.1	2	.21	3	.28
10	334	66	393	136	10	1.8	11	2.1	5	.53	6	.57
11	103	19	232	70	6	1.0	11	1.9	2	.21	5	.47
12	74	12	175	46	7	1.2	7	1.2	5	.50	8	.73
13	83	12	185	48	6	.99	6	.96	3	.31	7	.62
14	98	14	165	41	12	1.9	7	1.1	4	.39	7	.49
15	48	6.5	117	27	7	1.1	5	.74	3	.25	13	.74
16	46	6.1	63	14	14	2.2	8	1.2	2	.17	8	.37
17	58	8.1	65	13	7	1.1	7	1.1	11	.68	16	.69
18	34	4.7	65	13	6	.94	8	1.2	8	.60	31	1.3
19	55	11	26	5.3	3	.45	6	.91	5	.43	21	.96
20	1860	1330	49	9.5	8	1.2	4	.62	4	.31	28	1.3
21	5300	6710	35	6.7	7	1.1	8	1.2	4	.31	30	1.6
22	4790	4820	11	2.0	8	1.2	6	.84	4	.30	53	4.1
23	4660	3410	29	5.4	9	2.2	6	.86	3	.24	13	.91
24	3450	1710	7	1.3	12	4.3	4	.57	6	.50	5	.22
25	3340	1520	10	1.8	47	8.6	11	1.7	5	.45	12	.45
26	1610	661	10	1.8	6	1.1	8	1.2	6	.41	9	.46
27	1660	610	7	1.2	8	1.7	10	1.5	4	.32	7	.47
28	1010	330	7	1.2	22	4.4	10	1.6	3	.22	9	.49
29	504	155	10	1.8	12	2.5	7	1.2	12	.94	5	.27
30	290	80	12	2.1	34	7.0	8	1.3	---	---	6	.28
31	180	39	---	---	23	5.1	8	1.2	---	---	11	.56
TOTAL	---	25316.5	---	31960.1	---	68.38	---	52.10	---	11.76	---	20.83

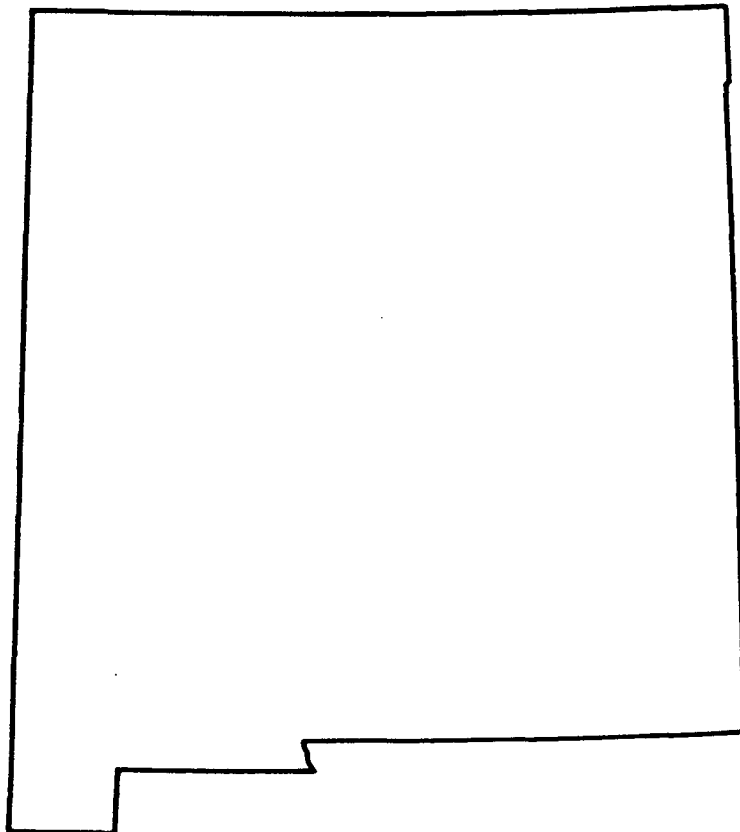
WATER-QUALITY RECORDS

DAY	MEAN CONCENTRATION (MG/L)		LOADS (T/DAY)		MEAN CONCENTRATION (MG/L)		LOADS (T/DAY)		MEAN CONCENTRATION (MG/L)		LOADS (T/DAY)		MEAN CONCENTRATION (MG/L)		LOADS (T/DAY)	
	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER										
1	6	.37	19	.7	38	7.2	79	28	4170	6080	710	226				
2	20	1.4	41	1.9	35	5.6	68	23	3500	5830	539	140				
3	12	.94	20	1.0	72	12	26	4.8	3700	6450	248	64				
4	9	.56	24	1.4	41	6.4	38	6.4	3700	6820	30	6.7				
5	3	.15	33	2.0	80	14	42	6.1	3500	6550	31	9.5				
6	8	.41	24	1.4	36	5.7	55	7.0	2500	4560	45	13				
7	4	.13	1240	1520	25	3.2	55	5.3	1710	3140	22	4.2				
8	3	.10	3390	5360	36	3.6	75	5.7	2460	4850	33	6.3				
9	7	.26	2700	4720	31	2.4	75	3.6	3460	9530	43	7.1				
10	10	.43	2420	4480	109	12	80	9.9	2490	9550	28	4.2				
11	14	.72	2830	5310	142	14	55	4.2	2150	9870	20	2.6				
12	14	.68	2380	4610	36	2.4	77	6.0	1990	11100	32	4.0				
13	17	.83	3330	6810	48	1.8	77	6.4	3120	12400	18	2.0				
14	14	.57	2040	4470	38	1.3	83	6.3	2360	3780	40	3.5				
15	13	.35	2300	5040	56	2.0	47	2.2	1370	1920	22	1.6				
16	17	.45	2370	5460	58	3.1	56	1.7	1590	2150	28	1.6				
17	20	.76	2370	6030	9	.46	38	1.2	1210	1540	19	1.1				
18	16	.48	2890	7580	21	.91	42	1.4	1160	1370	20	1.7				
19	22	.59	2750	7310	1140	884	42	1.0	738	787	36	3.4				
20	11	.27	4350	12000	3880	3450	39	.83	821	634	104	30				
21	16	.38	3130	8210	8300	10100	41	.76	535	292	65	14				
22	12	.29	2460	6160	9710	11100	116	2.1	480	235	172	27				
23	14	.45	2600	6500	13000	13300	127	2.2	461	246	136	15				
24	36	1.7	1470	2800	11700	6220	35	.74	657	355	75	7.3				
25	14	.53	1000	818	6490	2610	26	.70	467	212	45	3.4				
26	22	1.1	844	481	3580	1120	14	.42	391	163	34	1.8				
27	14	.64	753	319	1660	471	560	13	567	288	34	1.5				
28	21	.57	244	88	947	268	1000	21	1440	921	139	17				
29	25	.45	172	51	2040	881	1720	36	1380	887	42	4.6				
30	22	.42	115	31	920	360	3010	618	1250	641	39	4.9				
31	---	---	65	15	---	---	7680	9100	820	354	---	---				
TOTAL	---	16.98	---	106181.4	---	50862.07	---	9925.95	---	113505	---	629.0				
TOTAL LOAD FOR YEAR: 338550.07 TONS.																



Water Resources Data New Mexico Water Year 1985

by Louis P. Denis, Linda V. Beal and Harriet R. Allen



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-85-1
Prepared in cooperation with the State of New Mexico
and with other agencies

08396500 PECOS RIVER NEAR ARTESIA, NM
(Surveillance program station)

LOCATION.--Lat 32°50'27", long 104°19'23", in NW¼ sec. 18, T.17 S., R.27 E., Eddy County, Hydrologic Unit 13060007, on left bank 250 ft upstream from bridge on State Highway 83, 4.3 mi east of Artesia, 7.0 mi upstream from Rio Penasco, 17 mi upstream from McMillan Dam, and at mile 503.9.

DRAINAGE AREA.--15,300 mi², approximately (contributing area).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1905 to June 1909, August 1909 to current year. Monthly discharge only for some periods, published in WSP 1312 and 1712. Records for Aug. 22-31, 1934, and October 1936 to April 1937, published in WSP 763 and 828, respectively are not reliable and should not be used. Prior to February 1936, published as "near Dayton."

REVISED RECORDS.--WSP 1312 and 1512: 1913, 1915, 1917-18(M), 1920, 1923, 1931-36. WSP 1712: 1906(M), 1908-11(M), 1919, 1921-23(M), 1929, 1931-32(M), 1935-36(M), 1937, 1939(M), 1941(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Elevation of gage is 3,291.92 ft above National Geodetic Vertical Datum of 1929 (U.S. Bureau of Reclamation bench mark). See WSP 1923 or 2123 for history of changes prior to Apr. 5, 1941. Apr. 5, 1941 to Apr. 2, 1981, water-stage recorder at site 250 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Oct. 2, Dec. 6-15, 21-28, Dec. 31 to Jan. 6, Mar. 11, May 18-22, May 30 to June 10, June 25-28, June 30 to July 2, July 6-16, July 30 to Aug. 5, Aug. 12, 13, and Sept. 1-3. Records good except for estimated daily discharges, which are poor. Flow regulated by Santa Rosa Lake (station 08382810) since April 1980, by Lake Sumner (station 08384000) since August 1937, and by Two Rivers Reservoir (station 08390600) since July 1963. Diversions and ground-water withdrawals for irrigation of about 154,000 acres, 1959 determination, upstream from station.

AVERAGE DISCHARGE.--49 years, (1937-85), 240 ft³/s, 173,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge probably occurred May 30, 1937, when a discharge of 51,500 ft³/s was measured by slope-area method at a point 15 mi upstream, gage height, 14.7 ft, site and datum then in use; no flow at times in 1934, 1946-47, 1953-54, 1957, 1964-65.

EXTREMES OUTSIDE PERIOD OF RECORD.--Greatest flood since at least 1893 occurred Oct. 2, 1904, discharge not determined; the peak inflow to Lake McMillan, which includes Rio Penasco and Fourmile Draw, was estimated at 82,000 ft³/s. The second highest flood occurred July 25, 1905, discharge below Rio Penasco, 50,300 ft³/s, based on gain in storage and spill from Lake McMillan. The floods in August 1893 and October 1904 damaged McMillan Dam and washed out Avalon Dam.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
June 19	1900	*1,480	*8.59				
Minimum discharge, 9.3 ft ³ /s, July 18.							

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	69	100	121	352	139	123	60	117	21	142	103	240
2	53	95	113	350	134	118	45	119	19	131	88	171
3	49	91	107	323	128	112	38	104	17	100	68	146
4	53	89	100	300	123	104	34	96	16	81	57	142
5	63	94	98	250	124	108	32	88	20	64	53	122
6	122	103	92	240	129	111	28	82	18	58	50	129
7	102	114	90	240	127	99	29	77	19	46	57	110
8	85	109	90	240	132	87	35	68	20	40	47	95
9	79	98	92	230	145	78	37	56	21	38	37	94
10	87	91	92	211	152	79	25	49	80	30	34	88
11	92	86	92	197	150	68	33	55	438	26	36	77
12	96	83	92	183	148	60	34	72	776	18	42	72
13	94	80	90	182	146	51	33	59	1070	19	175	68
14	93	77	94	180	163	50	35	47	938	18	520	68
15	86	75	105	176	157	60	37	47	772	22	570	62
16	79	73	136	169	135	114	39	42	682	27	711	69
17	74	71	166	168	120	123	62	36	632	14	949	149
18	78	72	160	165	112	115	64	30	769	12	772	101
19	75	71	159	163	104	105	61	30	1330	15	730	102
20	67	77	167	156	102	118	69	36	991	20	723	279
21	68	79	170	154	92	130	62	34	810	16	685	956
22	76	79	250	147	90	139	72	30	779	15	736	646
23	92	79	360	138	105	132	79	34	800	25	786	326
24	116	97	410	132	100	109	77	58	785	16	710	194
25	117	101	410	127	99	96	76	50	812	21	738	174
26	151	166	400	123	116	77	60	138	800	235	826	153
27	148	147	350	137	128	62	39	115	780	234	784	130
28	146	130	250	130	127	44	109	82	760	229	760	111
29	143	133	227	131	---	38	91	70	561	174	741	103
30	129	135	223	137	---	29	147	40	241	112	711	99
31	114	---	286	137	---	94	---	28	---	102	473	---
TOTAL	2896	2895	5592	5968	3527	2833	1642	1989	15777	2200	13772	5276
MEAN	93.4	96.5	180	193	126	91.4	54.7	64.2	526	71.0	444	176
MAX	151	166	410	352	163	139	147	138	1330	334	949	956
MIN	49	71	90	123	90	29	25	28	16	12	34	62
AC-FT	5740	5740	11090	11840	7000	5620	3260	3950	31290	4360	27320	10460
CAL YR 1984	TOTAL	55835.0	MEAN 153	MAX	2060	MIN 6.5	AC-FT	110700				
WTR YR 1985	TOTAL	64367.0	MEAN 176	MAX	1330	MIN 12	AC-FT	127700				

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURES: April 1949 to current year.

SUSPENDED-SEDIMENT DISCHARGES: January 1949 to current year.

REMARKS.--Continuous water-temperature and specific-conductance recorder July 1981 to November 1983.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 microsiemens June 24, 1977; minimum daily, 111 microsiemens Aug. 31, 1982.

WATER TEMPERATURES: Maximum daily, 36.0°C July 27, 1966, July 25, 1969; minimum daily, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 21,300 mg/L Aug. 1, 1962; minimum daily mean, 0 mg/L on several days in 1982 and 1984.

SEDIMENT LOADS: Maximum daily, 183,000 tons Sept. 26, 1955; minimum daily, 0 ton on many days during 1953-54, 1957, 1964, 1982, and 1984.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 17,200 microsiemens June 7; minimum daily, 1,380 microsiemens Aug. 31.

WATER TEMPERATURES: Maximum daily, 35.0°C Aug. 6; minimum daily, 0.0°C Feb. 2.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 7,700 mg/L Sept. 22; minimum daily mean, 5 mg/L Dec. 4.

SEDIMENT LOADS: Maximum daily, 13,600 tons June 14; minimum daily, 0.77 ton July 22.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	TIME	STREAM-FLOW, INSTANTANEOUS (CFS) (00061)	SPE-CIFIC CONDUCTANCE (US/CM) (00095)	SPE-CIFIC CONDUCTANCE (US/CM) (90095)	PH (STANDARD) (00400)	PH LAB (STANDARD) (00403)	TEMPERATURE, AIR (DEG C) (00020)	TEMPERATURE (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L) (00340)
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NOV 01...	1200	99	6600	6520	8.2	8.2	21.0	16.0	10.8	65
DEC 8...	1400	246	3320	3510	8.2	7.9	18.5	8.5	10.1	52
MAY 11...	1000	62	8000	7670	8.4	7.2	28.5	15.5	11.7	93
JUL 01...	1145	111	4450	4250	8.5	7.5	22.0	21.0	9.2	74
AUG 02...	1115	132	3500	3020	8.1	7.6	32.0	25.0	8.3	24
AUG 28...	1115	785	1450	1540	7.8	7.9	31.5	25.5	6.6	46

DATE	HARDNESS (MG/L AS CaCO3) (00900)	HARDNESS, NONCARBONATE (MG/L AS CaCO3) (00902)	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)	MAGNESIUM DIS-SOLVED (MG/L AS Mg) (00925)	SODIUM DIS-SOLVED (MG/L AS Na) (00930)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM DIS-SOLVED (MG/L AS K) (00935)	BICARBONATE IT-FLD AS HCO3 (99440)	CARBONATE IT-FLD AS CO3 (99445)
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NOV 01...	1900	1800	490	170	780	8	6.5	160	11
DEC 28...	1300	1000	320	110	370	5	4.1	230	12
MAR 11...	2100	1900	480	210	1000	10	8.4	120	12
MAY 01...	940	850	230	90	550	8	5.8	110	6.0
JUL 02...	1300	1100	370	80	230	3	4.2	140	7.0
AUG 28...	710	600	230	33	72	1	2.9	--	--

DATE	ALKALINITY FIELD (MG/L AS CaCO3) (00410)	ALKALINITY, CARBONATE IT-FLD (MG/L AS CaCO3) (99430)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE DIS-SOLVED (MG/L AS F) (00950)	SILICA DIS-SOLVED (MG/L AS SiO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L) (70301)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)
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NOV 01...	150	--	1600	1400	.80	12	4600	.90	.80
DEC 28...	--	210	780	640	.50	13	2400	.70	.75
MAR 11...	--	--	1600	2000	.70	11	5400	<.10	<.10
MAY 01...	100	100	840	650	.60	7.7	2400	.50	.49
JUL 02...	130	130	1200	380	.60	11	2400	<.10	<.10
AUG 28...	110	--	590	99	.60	11	1100	.20	.22

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
NOV 01...	.240	.96	2.1	.150	<.010	7.9
DEC 28...	.460	1.5	2.7	.610	.080	11
MAR 11...	.230	1.3	--	.210	.020	4.9
MAY 01...	.340	1.1	1.9	.160	.010	5.0
JUL 02...	.230	.67	--	.200	.030	8.0
AUG 28...	.080	.42	.70	.020	<.010	10

TRACE ELEMENT ANALYSES, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)
NOV 01...	1200	<1	<1	370	<1	<1	20	40	11	2
DEC 28...	1400	--	--	140	--	--	--	--	--	--
MAR 11...	1000	--	--	430	--	--	--	--	--	--
MAY 01...	1145	--	--	230	--	--	--	--	--	--
JUL 02...	1115	2	<1	150	1	<1	20	<10	9	1
AUG 28...	1115	--	--	110	--	--	--	--	--	--

DATE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
NOV 01...	50	<1	5	.1	<.1	--	2	20	30
DEC 28...	20	--	--	--	--	--	--	--	--
MAR 11...	60	--	--	--	--	--	--	--	--
MAY 01...	30	--	--	--	--	--	--	--	--
JUL 02...	30	7	1	<.1	.1	1	1	60	70
AUG 28...	17	--	--	--	--	--	--	--	--

CHEMICAL ANALYSES OF BOTTOM MATERIAL, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	TIME	NITRO- GEN, NO2+NO3 TOT. IN BOT MAT (MG/KG AS N) (00633)	NITRO- GEN, NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	PHOS- PHORUS, TOTAL IN BOT. MAT. (MG/KG AS P) (00668)	ARSENIC TOTAL IN BOT- TOM MA- TERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CD) (01028)	CHRO- MIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01029)
NOV 01...	1200	<5.0	28	200	2	<1	5

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

CHEMICAL ANALYSES OF BOTTOM MATERIAL, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	COBALT, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU) (01043)	IRON, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS FE) (01170)	LEAD, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS PB) (01052)	MANGA- NESE, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS HG) (01053)	MERCURY RECOV. FM BOT- TOM MA- TERIAL (UG/G AS HG) (71921)	ZINC, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS ZN) (01093)
NOV 01...	<10	3	1300	<10	120	.60	6

RADIOCHEMICAL ANALYSES, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	TIME	GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90) (80060)	RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM NATURAL DIS- SOLVED (UG/L AS U) (22703)
NOV 01...	1200	<120	4.2	<67	4.6	<58	4.0	.07	6.6

PESTICIDE ANALYSES, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	TIME	PCB, TOTAL (UG/L) (39516)	ALDRIN, TOTAL (UG/L) (39330)	CHLOR- DANE, TOTAL (UG/L) (39350)	DDD, TOTAL (UG/L) (39360)	DDE, TOTAL (UG/L) (39363)	DDT, TOTAL (UG/L) (39370)	DI- AZINON, TOTAL (UG/L) (39570)	DI- ELDRIN, TOTAL (UG/L) (39380)	ENDO- SULFAN, TOTAL (UG/L) (39388)
MAR 11...	1000	--	--	--	--	--	--	--	--	--
AUG 28...	1115	<.1	<.010	<.1	<.010	<.010	<.010	<.01	<.010	<.010

DATE	ENDRIN, TOTAL (UG/L) (39390)	ETHION, TOTAL (UG/L) (39398)	HEPTA- CHLOR, TOTAL (UG/L) (39410)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L) (39420)	LINDANE TOTAL (UG/L) (39340)	MALA- THION, TOTAL (UG/L) (39530)	METH- OXY- CHLOR, TOTAL (UG/L) (39480)	METHYL PARA- THION, TOTAL (UG/L) (39600)	METHYL TRI- THION, TOTAL (UG/L) (39790)
MAR 11...	--	--	--	--	--	--	--	--	--
AUG 28...	<.010	<.01	<.010	<.010	<.010	<.01	<.01	<.01	<.01

DATE	PARA- THION, TOTAL (UG/L) (39540)	TOX- APHENE, TOTAL (UG/L) (39400)	TOTAL TRI- THION (UG/L) (39786)	2,4-D, TOTAL (UG/L) (39730)	2,4,5-T TOTAL (UG/L) (39740)	SILVEX, TOTAL (UG/L) (39760)	PER- THANE TOTAL (UG/L) (39034)	NAPH- THA- LENES, POLY- CHLOR- TOTAL (UG/L) (39250)	MIREX, TOTAL (UG/L) (39755)
MAR 11...	--	--	--	.03	<.01	<.01	--	--	--
AUG 28...	<.01	<1	<.01	--	--	--	<.1	<.10	<.01

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

MICROBIOLOGICAL ANALYSES, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	TIME	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCY FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV			
01...	1200	48	350
DEC			
28...	1400	5800	2600
MAR			
11...	1000	240	300
MAY			
01...	1145	260	38
JUL			
02...	1115	110	620
AUG			
28...	1115	430	1400

PARTICLE SIZE OF SEDIMENT, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	TIME	STREAM-FLOW, INSTANTANEOUS (CFS) (00061)	TEMPERATURE (DEC C) (00010)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. X FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. X FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. X FINER THAN .016 MM (70340)
OCT								
02...	1400	53	17.0	68	9.7	--	--	--
NOV								
01...	1200	99	16.0	110	29	--	--	--
DEC								
24...	1125	360	7.0	1530	1490	45	63	79
28...	1400	246	8.5	851	565	33	39	58
28...	1707	243	10.0	667	438	--	--	--
MAR								
11...	1000	65	15.5	102	18	--	--	--
JUN								
13...	1145	1130	21.0	4090	12500	37	47	71
14...	1603	902	25.0	5380	13100	40	54	77
16...	1846	636	26.5	2770	4760	35	50	76
22...	0840	782	23.0	7430	15700	53	67	87
28...	1826	760	25.0	1680	3450	30	37	57
JUL								
02...	1115	132	25.0	583	208	44	50	63
AUG								
14...	1440	561	26.5	3250	4920	41	49	75
26...	1758	865	26.5	2940	6870	17	25	38
28...	1115	785	25.5	3190	6760	31	39	57
SEP								
22...	1030	636	22.0	9050	15500	39	53	79

DATE	SED. SUSP. FALL DIAM. X FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. X FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. X FINER THAN .250 MM (70344)	SED. SUSP. SIEVE DIAM. X FINER THAN .062 MM (70331)	SED. SUSP. SIEVE DIAM. X FINER THAN .125 MM (70332)	SED. SUSP. SIEVE DIAM. X FINER THAN .250 MM (70333)	SED. SUSP. SIEVE DIAM. X FINER THAN .500 MM (70334)
OCT							
02...	--	--	--	72	85	98	100
NOV							
01...	--	--	--	83	93	99	100
DEC							
24...	--	--	--	96	100	--	--
28...	--	--	--	71	84	99	100
28...	--	--	--	92	99	100	--
MAR							
11...	--	--	--	82	89	98	100
JUN							
13...	93	100	--	--	--	--	--
14...	94	100	--	--	--	--	--
16...	--	--	--	98	100	--	--
22...	--	--	--	98	100	--	--
28...	--	--	--	92	99	100	--
JUL							
02...	--	--	--	75	89	99	100
AUG							
14...	--	--	--	95	100	--	--
26...	79	100	--	--	--	--	--
28...	82	96	100	--	--	--	--
SEP							
22...	96	100	--	--	--	--	--

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG.° C), WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985
ONCE-DAILY

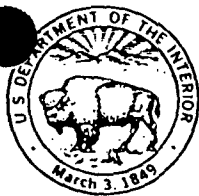
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9680	5970	6760	4060	5600	5600	5760	4980	7630	3750	5910	1540
2	9200	6660	6980	3080	5580	5950	7290	7230	9180	2930	5770	1760
3	9290	7610	7280	2690	5670	6250	9510	6530	11400	3310	6150	2010
4	8240	8370	7780	2670	5270	6210	9640	5890	13100	3340	6810	2250
5	8010	7430	7780	2770	5390	6440	10400	5970	13400	3690	7710	2530
6	8830	7330	7700	2720	6330	6330	10500	6120	12800	4110	8830	3100
7	7250	6930	7910	4070	6320	6160	10400	6670	17200	5020	9100	3410
8	6580	7060	8030	4030	6440	5700	11400	6800	12700	5730	9630	3670
9	7120	7010	8140	4110	5910	6040	10100	7090	11800	6310	9630	4130
10	7000	7620	8270	4120	5740	7110	9830	7340	11500	6850	11100	4480
11	6320	7930	8200	4060	5190	7820	12000	7650	4440	7240	11100	5050
12	6500	8160	8200	4360	5260	7860	11200	6170	3520	8730	11100	5790
13	6240	8630	8210	4480	5330	8710	9510	5950	2940	7810	10400	6350
14	6460	8830	8130	4520	5240	9770	9780	6850	3150	8190	3050	6300
15	6490	9050	8040	4720	5150	10600	9510	7070	3180	10200	2280	6360
16	6750	9250	7490	4880	4750	11200	8980	6970	3090	9320	2200	7090
17	7130	9700	6850	5150	4970	4480	9440	7090	3040	10100	2130	5270
18	7140	9550	6400	5390	5440	4440	8420	8010	3020	11000	2180	4480
19	7290	9410	6360	5480	6110	4920	7100	10700	2880	13000	1800	4810
20	7400	9530	6270	5530	6330	5110	6230	9360	2550	12600	2000	4680
21	6660	9270	6360	5550	6800	4930	6160	10500	2710	12500	2040	3570
22	6760	9500	6270	5780	7140	5440	6200	11300	2610	10900	2000	1930
23	6310	9530	6730	5840	7510	5400	6040	12200	2700	11600	1900	1740
24	5550	9290	3150	5970	7930	6030	5720	10400	2660	11500	1920	2210
25	6280	9250	2650	6130	7290	6320	5590	7430	2660	10800	3480	2560
26	7020	8010	2640	6090	6880	7870	5150	5880	2290	10800	1660	2910
27	6470	8150	2710	6120	6410	8220	5500	4970	2200	2300	1590	3540
28	6550	7860	2770	6400	5600	8520	7030	5020	2150	2020	1450	3890
29	6030	7400	3410	6200	---	9110	6610	4700	2210	4060	1450	4380
30	6090	6990	3640	6290	---	10200	8550	4960	2430	4350	1420	5050
31	5960	---	4020	6240	---	12000	---	7120	---	5260	1380	---
WTR YR 1985	7050	8240	6290	4820	5990	7120	8320	7260	5900	7400	4810	3890
MEAN	6430				17200		MIN	1380				

TEMPERATURE WATER (DEG.° C), WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15.0	17.5	6.5	10.0	2.0	14.0	20.0	25.0	25.0	25.5	30.0	25.0
2	17.0	19.0	7.0	9.0	.0	12.0	22.5	21.0	20.0	25.0	28.0	25.0
3	22.0	11.0	10.0	4.5	2.0	16.5	23.5	25.0	25.0	25.0	28.0	24.5
4	17.0	17.0	7.0	5.0	5.0	13.0	17.0	23.0	26.5	27.0	25.0	24.0
5	23.0	13.0	5.0	5.5	6.0	14.0	20.5	25.5	21.0	24.0	27.5	27.0
6	22.0	15.0	8.0	7.0	10.0	10.5	15.0	27.0	28.0	23.5	35.0	26.0
7	18.0	12.0	3.0	6.0	7.0	12.0	21.0	25.5	31.5	26.0	26.0	27.0
8	17.0	14.0	9.0	8.0	6.0	13.0	18.0	24.0	32.0	25.0	27.5	27.0
9	18.0	16.0	8.0	9.0	9.0	14.0	21.0	28.5	32.0	25.0	31.5	25.0
10	22.0	14.0	10.0	9.0	11.0	16.5	20.5	23.5	27.5	24.0	23.0	27.5
11	22.0	10.5	12.0	10.5	12.0	15.0	23.5	22.0	26.0	26.0	24.0	24.0
12	20.0	11.0	11.0	10.0	10.0	17.0	21.0	22.0	22.0	29.0	30.0	26.0
13	19.5	14.0	12.5	7.0	8.5	17.0	21.5	22.5	21.0	27.0	29.0	26.0
14	16.0	14.5	7.0	3.0	11.5	15.0	19.0	23.0	25.0	29.5	26.5	23.0
15	19.0	12.0	6.0	4.0	10.0	10.0	23.0	20.5	24.0	33.0	27.0	22.0
16	18.5	16.0	4.0	5.0	10.0	12.5	18.0	22.5	26.5	25.0	27.0	26.0
17	18.5	9.0	7.0	7.0	14.0	13.5	26.0	18.0	26.0	25.0	26.0	22.5
18	15.0	9.0	7.5	8.0	9.0	17.0	25.5	20.5	25.0	33.5	25.0	27.0
19	18.0	10.5	10.0	7.0	13.5	15.0	20.0	24.0	24.5	33.0	26.0	22.5
20	15.0	12.0	12.0	9.0	11.5	12.0	25.0	25.5	24.5	33.5	26.5	25.0
21	11.0	8.5	11.5	3.0	13.5	14.5	18.0	26.0	25.0	28.5	25.0	22.0
22	11.0	10.0	7.0	3.0	18.0	15.0	24.0	21.0	23.0	24.0	25.0	20.0
23	11.0	8.0	7.5	5.0	15.0	15.0	19.0	22.0	26.5	23.0	28.0	19.0
24	12.0	8.0	7.0	5.0	12.0	18.0	21.0	23.0	25.0	29.0	26.0	19.0
25	10.5	10.0	6.5	6.0	10.0	20.0	23.0	25.5	25.5	28.0	27.0	22.0
26	12.0	10.0	8.0	9.0	12.5	15.0	23.0	27.5	25.0	24.0	26.5	21.0
27	15.0	8.0	7.0	7.5	11.5	14.0	20.0	22.0	25.0	24.0	27.0	23.5
28	12.0	10.5	10.0	9.0	10.5	17.0	20.0	27.0	25.0	26.0	26.0	19.0
29	13.0	10.0	9.0	10.5	---	14.5	16.5	25.0	23.0	30.0	26.0	17.0
30	16.0	7.0	11.0	8.0	---	12.0	23.5	21.0	22.0	31.0	24.5	16.0
31	18.0	---	9.0	6.0	---	12.0	---	24.5	---	28.0	25.5	---
MEAN	16.5	12.0	8.5	7.0	9.5	14.5	21.0	23.5	25.5	27.0	27.0	23.5
WTR YR 1985	MEAN	18.0		MAX	35.0		MIN	.0				

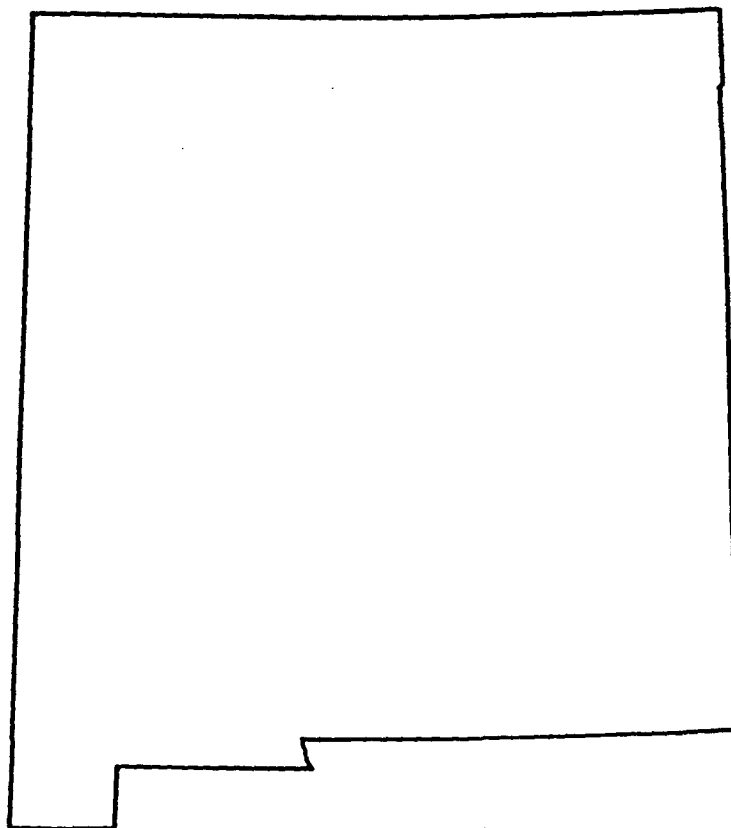
WATER-QUALITY RECORDS

DAY	MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)	
	LOADS (T/DAY)	LOADS (T/DAY)	LOADS (T/DAY)	LOADS (T/DAY)	LOADS (T/DAY)	LOADS (T/DAY)	LOADS (T/DAY)	LOADS (T/DAY)	LOADS (T/DAY)	LOADS (T/DAY)	LOADS (T/DAY)	
OCTOBER												
1	52	9.7	125	34	13	4.2	788	749	62	23	13	4.3
2	57	8.2	99	25	11	3.4	1000	945	55	20	9	2.9
3	52	6.9	16	8.8	7	2.0	761	664	46	16	10	3.0
4	45	6.4	44	11	5	1.4	898	727	41	14	7	2.0
5	50	8.5	39	9.9	7	1.9	655	442	37	12	16	4.7
6	80	26	39	11	7	1.7	579	375	32	11	19	5.7
7	56	15	35	11	8	1.9	330	214	31	11	19	5.1
8	36	8.3	31	9.1	9	2.2	271	176	24	8.6	17	4.0
9	54	12	33	8.7	8	2.0	269	167	34	13	23	4.8
10	78	18	24	5.9	8	2.0	271	154	35	14	45	9.6
11	74	18	16	3.7	7	1.7	274	146	44	18	68	12
12	64	17	15	3.4	7	1.7	278	137	27	11	39	6.3
13	74	19	22	4.8	7	1.7	179	88	26	10	25	3.4
14	35	8.8	22	4.6	6	1.5	137	67	24	11	11	1.5
15	53	12	21	4.3	17	4.8	203	96	47	20	7	1.1
16	59	13	21	4.1	14	5.1	158	72	31	11	11	3.4
17	36	7.2	19	3.6	15	6.7	128	58	30	9.7	15	5.0
18	37	7.8	14	2.7	14	6.0	101	45	22	6.7	10	3.1
19	40	8.1	17	3.3	15	6.4	102	45	20	5.6	17	4.8
20	44	8.0	27	5.6	18	8.1	110	46	18	5.0	21	6.7
21	29	5.3	14	3.0	24	11	79	33	18	4.5	15	5.3
22	35	7.2	21	4.5	25	17	63	25	16	3.9	18	6.8
23	31	7.7	17	3.6	308	299	71	26	10	2.8	31	11
24	47	15	12	3.1	1530	1690	61	22	19	5.1	17	5.0
25	44	14	15	4.1	1200	1330	38	13	9	2.4	34	8.8
26	124	51	56	25	1070	1160	55	18	16	5.0	23	4.8
27	153	61	18	7.1	798	754	48	18	15	5.2	20	3.3
28	117	46	22	7.7	751	507	49	17	14	4.8	18	2.1
29	193	75	25	9.0	631	387	55	19	---	---	21	2.2
30	191	67	18	6.6	549	331	38	14	---	---	21	1.6
31	246	76	---	---	414	320	36	13	---	---	42	11
TOTAL	---	663.1	---	248.2	---	6872.4	---	5631	---	284.3	---	155.3
APRIL												
1	39	6.3	125	39	53	3.0	600	230	103	29	1110	719
2	38	4.6	112	36	87	4.5	488	173	46	11	710	328
3	33	3.4	78	22	41	1.9	207	56	33	6.1	472	186
4	26	2.4	109	28	120	5.2	189	41	30	4.6	277	106
5	17	1.5	101	24	69	3.7	114	20	28	4.0	269	89
6	19	1.4	88	19	139	6.8						



Water Resources Data New Mexico Water Year 1986

by Linda V. Beal and Robert L. Gold



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-86-1
Prepared in cooperation with the State of New Mexico
and with other agencies

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT DISCHARGES: January 1949 to current year.

SEDIMENT LOADS: Maximum daily, 183,000 tons, Sept. 26, 1955; minimum daily, 0 ton on many days during 1953-54, 1957, 1964, 1982, 1984.

SEDIMENT LOADS: Maximum daily, 21,800 tons, June 28; minimum daily, 0 ton, Jan. 7.

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS	SPE- CIFIC CON- DUCT- ANCE	SPE- CIFIC CON- DUCT- ANCE	PH	PH	TEMPER-	TEMPER-	OXYGEN,	OXYGEN
		(CFS) (00061)	(US/CM) (00095)	(US/CM) (90095)	(STAND- ARD UNITS)	(STAND- ARD UNITS)	ATURE, AIR (DEG C) (00020)	ATURE (DEG C) (00010)	DIS- SOLVED (MG/L) (00300)	CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)
NOV 04...	1345	162	4400	--	8.30	--	21.0	13.5	10.0	--
29...	1115	68	8500	8950	8.20	8.10	18.0	10.0	10.2	53
JAN 06...	1115	57	9000	--	8.40	--	15.0	5.0	12.2	30
MAR 04...	1145	42	11300	11700	8.50	7.80	15.0	13.0	10.8	52
MAY 06...	1345	571	3050	3200	8.20	7.60	31.5	30.0	9.2	110
JUL 31...	1315	71	17800	16300	7.90	7.50	31.0	27.0	--	160
AUG 29...	1250	127	3530	--	8.11	--	20.5	21.0	7.2	47

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1985 TO SEPTEMBER 1986

DATE	ALKA-LINITY, CARBONATE (MG/L - CAC03) (99430)	ALKA-LINITY LAB (MG/L AS CAC03) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L) (70301)	NITROGEN, NO2+NO3 (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)
NOV 04...	--	--	--	--	--	--	--	--	--	--
29...	--	181	1800	2000	0.80	15	6000	1.10	1.10	0.510
JAN 06...	--	--	--	1900	--	--	--	0.800	0.830	0.230
MAR 04...	160	142	2400	2300	0.90	7.5	7100	<0.100	<0.100	0.200
MAY 06...	219	101	1300	290	0.70	9.8	2500	0.200	0.160	0.340
JUL 31...	220	192	2900	5200	0.70	15	12000	0.200	0.150	0.340
AUG 29...	--	--	--	--	--	--	--	0.900	0.950	0.170

DATE	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITROGEN, TOTAL (MG/L AS N) (00600)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREPTOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	SAMPLING METHOD, CODES (82398)
NOV 04...	--	--	--	--	--	29	72	--	--	10.0
29...	0.19	1.8	0.110	0.080	3.2	--	--	520	60	10.0
JAN 06...	0.37	1.4	0.040	0.020	18	7	24	--	--	10.0
MAR 04...	0.70	--	0.080	0.020	6.8	7	32	630	160	10.0
MAY 06...	2.8	3.3	0.610	0.020	38	--	--	160	8700	10.0
JUL 31...	0.96	1.5	0.060	<0.010	6.7	39	360	1100	60	10.0
AUG 29...	1.0	2.1	0.060	0.010	11	290	1300	--	--	10.0

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD) (01027)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR) (01034)	CHROMIUM, DIS-SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOVERABLE (UG/L AS CU) (01042)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	LEAD, TOTAL RECOVERABLE (UG/L AS PB) (01051)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
NOV 04...	1345	--	--	--	--	--	--	--	--	--	--
29...	1115	2	2	1	<1	10	20	3	3	1	1
JUL 31...	1315	3	2	<1	<1	20	10	3	3	<5	<5

DATE	MERCURY TOTAL RECOVERABLE (UG/L AS HG) (71900)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	SELENIUM, TOTAL (UG/L AS SE) (01147)	SELENIUM, DIS-SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	NITROGEN, NO2+NO3 TOT. IN BOT. MAT. (MG/KG AS N) (00633)	NITROGEN, NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	PHOSPHORUS, TOTAL IN BOT. MAT. (MG/KG AS P) (00668)	ARSENIC TOTAL IN BOTTOM MATERIAL (UG/G AS AS) (01003)
NOV 04...	--	--	--	--	--	--	4.0	3.9	99	2
29...	--	<0.1	2	2	50	40	--	--	--	--
JUL 31...	0.20	<0.1	1	1	40	40	--	--	--	--

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1985 TO SEPTEMBER 1986

DATE	CADMIUM RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CD) (01028)	CHRO- MIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01029)	COBALT, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU) (01043)	IRON, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS FE) (01170)	LEAD, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS PB) (01052)	MANGA- NESE, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01053)	MERCURY RECOV. FM BOT- TOM MA- TERIAL (UG/G AS HG) (71921)	ZINC, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS ZN) (01093)	SAM- PLING METHOD, CODES (82398)
NOV										
04...	<1	20	<10	20	950	<10	230	0.03	10	10.0
29...	--	--	--	--	--	--	--	--	--	10.0
JUL										
31...	--	--	--	--	--	--	--	--	--	10.0

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE (DEG C) (00010)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT							
13...	1400	858	--	18.0	6390	14800	98
19...	1715	942	--	19.0	7480	19000	--
MAY							
05...	0845	486	--	20.0	3850	5050	--
06...	1345	571	3050	30.0	2740	4220	97
07...	0856	579	--	20.0	3510	5490	--
14...	1630	687	--	23.0	2060	3820	--
26...	1907	820	--	20.0	2190	4850	--
29...	1803	766	--	22.0	2130	4410	--
JUN							
02...	1828	252	--	23.0	1520	1030	98
07...	1933	204	--	27.0	3500	1930	100
28...	0703	3550	--	23.5	4680	44900	100
JUL							
05...	0705	978	--	22.5	3790	10000	--
31...	1315	71	17800	27.0	73	14	74
AUG							
30...	0848	126	--	21.0	1760	599	99
SEP							
05...	0832	681	--	21.0	4820	8860	--
06...	1209	620	--	23.0	6170	10300	--

DATE	SED. SUSP. SIEVE DIAM. % FINER THAN .125 MM (70332)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SAM- PLING METHOD, CODES (82398)
OCT							
13...	100	44	63	88	--	--	--
19...	--	42	54	78	98	100	--
MAY							
05...	--	34	47	74	94	100	--
06...	100	38	48	78	--	--	10.0
07...	--	27	37	63	91	100	--
14...	--	27	34	56	95	100	--
26...	--	21	23	40	85	100	--
29...	--	29	33	49	92	100	--
JUN							
02...	100	44	53	87	--	--	--
07...	--	67	84	92	--	--	--
28...	--	44	54	92	--	--	--
JUL							
05...	--	45	60	84	97	100	--
31...	--	--	--	--	--	--	10.0
AUG							
30...	100	66	85	98	--	--	--
SEP							
05...	--	54	71	90	98	100	--
06...	--	50	65	87	98	100	--

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SPECIFIC CONDUCTANCE, MICROSIEMENS PER CENTIMETER AT 25, WATER YEAR OCTOBER 1985 TO SEPTEMBER 1986
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5450	4740	9070	9250	9890	11700	12100	15300	1560	5120	19000	3640
2	5820	4630	9030	9510	9230	11800	12000	15700	2110	5080	18500	1620
3	5620	4900	9230	9370	9330	11700	13500	17600	2060	4250	19100	2390
4	5410	4860	9280	9490	9480	12600	14200	18000	1860	2560	19000	2450
5	5320	4680	9050	9490	10000	12000	15300	4120	1950	2830	21100	1430
6	5550	4540	8860	9490	9940	11800	14300	3060	1900	4860	21200	2420
7	5580	4550	8920	9760	9970	12200	16500	2860	2270	5490	22200	2250
8	5740	4630	8940	9190	9860	12500	19800	2750	2170	6350	21400	2420
9	5800	4960	9190	9460	9890	12500	14800	2710	2850	7510	20500	2410
10	5760	5950	9280	9230	9510	12600	13100	2670	3060	8190	20400	3210
11	5750	6230	9370	8980	9300	12700	14000	2660	3260	8140	21300	3630
12	5190	6610	9270	8910	8830	12400	18900	2650	4110	8050	14500	3040
13	1670	6820	9310	9790	8110	12200	19800	2610	4190	8430	10000	4130
14	1560	6990	9360	9820	8700	11500	14900	2540	4300	8160	10400	4600
15	1570	7390	9220	9820	8340	10400	14400	2530	4790	9000	10900	5190
16	1570	7650	9270	9790	8460	10600	13000	2460	5130	10100	10400	6300
17	1720	7920	9610	9560	8190	10900	12600	2390	5360	10700	12000	6050
18	3060	8050	9580	9420	7260	10900	13900	2420	5620	11500	12100	6530
19	2150	8010	9810	9390	7440	10600	13600	2330	5900	11900	13300	7300
20	1900	8060	9560	9660	7740	10000	16400	2210	6100	12400	8500	7510
21	1630	8110	9630	9870	8410	9860	17800	1850	6350	13700	6510	7790
22	1680	8190	9840	9950	8740	10300	19000	1740	6420	13800	10800	7640
23	1980	8440	9760	9970	9360	10800	15300	1850	3120	13200	10900	8600
24	2210	8700	9220	10100	9530	10600	15700	1890	3680	14100	11800	5090
25	2400	8500	8950	10400	9460	10500	15300	1900	525	14700	17000	3710
26	2830	8560	8600	10500	9690	11300	15600	1710	386	14800	3390	4250
27	3740	8720	8800	10700	9640	12000	16200	1830	372	15500	3040	5160
28	3690	8670	8820	10700	10300	11600	19300	1570	866	15400	3310	6470
29	3940	8740	9270	10700	---	11600	21400	1530	2700	16400	3130	7160
30	4020	8920	9250	10600	---	11600	14700	1700	3780	16300	3340	7290
31	4670	---	9250	10300	---	12800	---	1640	---	17300	---	---
MEAN	3710	6920	9250	9780	9090	11500	15600	4150	3290	10200	13300	4720
WTR YR 1986	MEAN	8450	MAX	22200	MIN	372						

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1985 TO SEPTEMBER 1986
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15.0	14.0	7.5	9.5	13.0	16.5	23.0	25.0	20.5	28.0	22.5	24.0
2	18.0	11.0	7.0	7.0	13.0	18.0	23.0	22.5	23.0	25.0	34.0	20.5
3	21.5	14.5	6.0	10.5	15.0	14.0	21.0	21.0	22.0	23.0	23.5	24.0
4	20.0	15.5	7.0	6.5	11.0	14.0	15.0	17.5	24.0	23.5	24.0	24.5
5	15.0	16.0	10.0	11.0	11.0	18.0	18.0	20.0	24.0	22.5	25.0	21.0
6	15.0	16.0	8.0	10.5	6.0	18.0	16.5	20.0	24.0	27.0	32.0	23.0
7	22.0	15.0	6.0	5.0	8.0	12.0	24.0	20.0	27.0	26.0	31.0	21.0
8	19.0	16.0	7.0	4.0	9.0	18.0	19.0	20.0	24.0	25.5	24.5	22.0
9	20.0	14.5	9.0	5.0	4.0	16.0	24.0	19.0	27.0	26.0	24.0	23.0
10	18.0	13.5	8.0	5.0	3.0	13.0	15.0	18.0	27.0	26.5	23.0	24.0
11	20.0	12.0	6.5	5.5	4.5	15.0	19.0	19.0	23.5	27.5	23.5	24.0
12	20.0	14.0	4.0	6.5	5.0	12.5	16.5	22.0	30.0	28.0	29.0	23.0
13	18.0	14.0	1.0	5.0	10.0	10.0	18.0	23.0	25.0	25.0	30.0	22.0
14	15.0	14.5	2.0	9.0	10.0	13.0	15.0	23.0	30.0	27.0	29.0	22.5
15	17.0	12.5	2.0	11.5	9.0	12.5	15.0	22.5	30.0	28.5	25.0	22.0
16	17.0	9.0	5.5	10.0	14.0	17.5	16.0	22.5	26.0	28.0	33.0	23.0
17	16.5	9.0	5.0	12.5	15.0	15.5	23.0	17.0	30.0	25.0	33.0	22.5
18	17.5	14.0	7.0	12.0	14.0	10.5	25.0	15.0	24.0	30.0	32.5	27.0
19	19.0	12.0	4.5	8.5	15.0	12.0	26.0	16.0	31.5	30.0	31.5	27.0
20	17.5	13.5	7.0	13.5	18.0	12.5	24.0	21.0	25.0	25.0	31.5	25.0
21	17.0	8.0	5.0	13.0	16.0	18.0	21.5	22.0	28.0	28.0	32.0	22.0
22	19.0	10.0	4.5	8.0	10.0	15.0	16.0	22.5	25.0	23.0	24.0	23.0
23	17.0	12.0	5.5	12.0	16.5	19.0	25.0	23.0	23.0	25.0	26.0	26.5
24	17.0	13.0	3.5	9.0	18.0	19.5	22.0	20.0	23.5	28.0	23.0	22.0
25	16.0	14.5	9.0	11.0	18.0	15.5	22.0	23.0	20.0	24.0	29.0	20.0
26	18.0	15.0	4.5	7.0	19.5	18.0	18.0	22.0	20.5	33.0	25.0	19.5
27	18.0	11.5	5.0	5.5	17.0	23.5	13.0	20.0	22.0	32.0	25.5	18.0
28	17.5	14.0	9.0	13.0	17.0	21.0	25.0	22.0	23.5	31.5	23.0	20.5
29	17.5	10.0	9.0	8.0	---	16.5	20.0	22.0	25.0	24.0	22.0	22.0
30	17.0	13.0	7.5	13.0	---	24.0	22.0	20.5	26.5	25.0	21.0	21.0
31	17.5	---	10.0	8.0	---	25.0	---	22.0	---	24.0	---	---
MEAN	18.0	13.0	6.0	9.0	12.0	16.0	20.0	20.5	25.0	26.5	27.0	22.5
WTR YR 1986	MEAN	18.0	MAX	34.0	MIN	1.0						

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1985 TO SEPTEMBER 1986

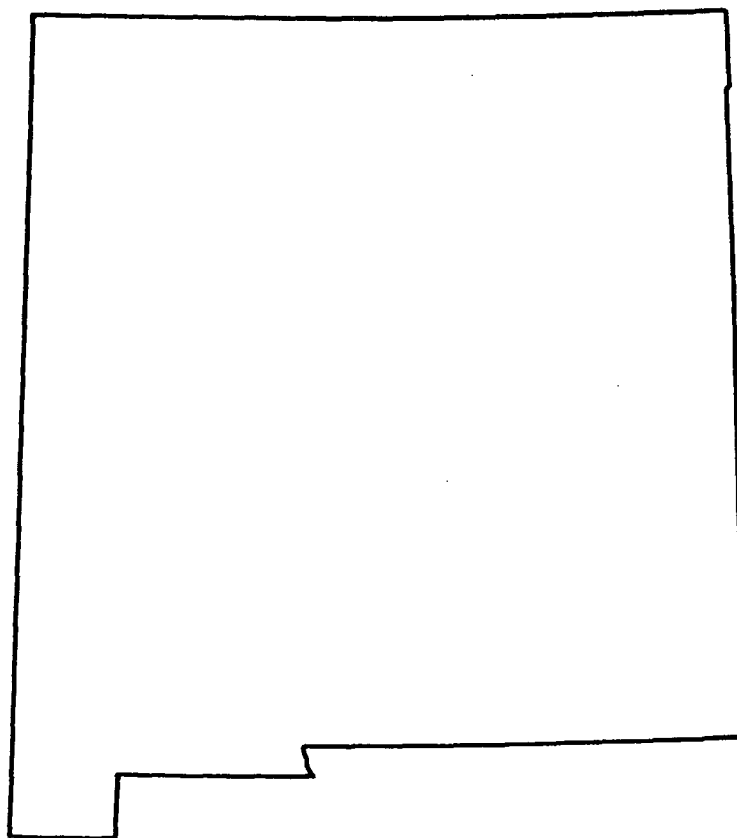
DAY	MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)	
	LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)	
APRIL												
1	31	2.1	16	.5	1910	2200	534	708	61	4.9	1420	1222
2	28	1.7	16	.5	1560	1090	572	1130	67	5.1	3990	7990
3	34	1.6	12	.5	1680	1120	1830	4860	69	4.8	8820	16600
4	39	1.8	1120	726	6780	11100	2510	4660	68	5.0	5630	8910
5	32	1.1	3620	5130	3150	3120	3680	8000	41	3.1	5580	9510
MAY												
6	30	.81	2950	4530	2080	1240	2430	3240	51	3.6	6330	15200
7	46	1.4	3290	5330	2920	1670	1270	1280	38	2.6	6470	10000
8	48	2.2	2590	4310	2480	1140	652	532	30	2.0	3930	5050
9	31	.92	2870	4830	3130	2030	351	244	13	.95	3380	2870
10	25	.57	2170	3810	1010	398	273	193	13	1.4	3040	3600
JUNE												
11	29	.63	3400	6120	343	112	273	198	29	5.6	1810	1530
12	34	1.2	3850	7040	196	60	246	158	29	5.2	2670	1690
13	29	1.3	3160	6060	182	54	204	112	29	4.9	2010	1060
14	32	1.2	2190	4200	171	41	180	86	31	5.7	1130	506
15	31	1.5	2300	4340	187	38	147	58	39	5.8	731	292
JULY												
16	27	1.0	2180	4270	54	9.5	83	28	50	6.9	523	208
17	26	.77	2230	4320	40	6.0	45	14	50	6.2	986	421
18	23	.61	2730	5640	36	4.4	66	19	42	7.4	804	282
19	28	.62	2470	5310	47	5.2	67	17	39	11	444	144
20	24	.49	2210	4350	34	3.4	43	9.8	61	14	312	99
AUGUST												
21	29	.78	2200	4400	81	15	68	15	42	7.1	158	51
22	30	.97	2120	4200	42	7.7	40	9.0	44	5.5	115	36
23	33	.98	1970	3930	741	214	35	6.3	52	5.5	115	57
24	30	.97	1910	3840	1910	1530	38	6.3	50	4.3	1460	1300
25	21	.50	2330	4720	1880	10500	17	2.8	130	24	1970	1440
SEPTEMBER												
26	17	.36	2180	4700	1110	15000	51	8.0	4530	4130	1750	921
27	23	.42	2140	4830	149	3830	53	8.3	3220	1620	1120	435
28	28	.59	2710	6340	3450	21800	49	6.4	1490	652	553	206
29	64	2.8	2240	4720	4540	10000	31	3.6	1360	503	387	144
30	21	.79	1530	2810	735	1220	41	4.1	1820	693	291	108
31	---	---	1410	2480	---	---	34	3.1	2130	1060	---	---
TOTAL	---	32.68	---	127287.5	---	89558.2	---	25619.7	---	8810.55	---	91880
TOTAL	LOAD	FOR YEAR:	417706.60	TONS.								



Water Resources Data New Mexico

Water Year 1987

by Linda V. Beal and Robert L. Gold



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-87-1
Prepared in cooperation with the State of New Mexico
and with other agencies

LOCATION.--Lat 32°50'27", long 104°19'23", in NW¼NW¼ sec.18, T.17 S., R.27 E., Eddy County, Hydrologic Unit 13060007, on left bank 250 ft upstream from bridge on State Highway 83, 4.3 mi east of Artesia, 7.0 mi upstream from Rio Penasco, 17 mi upstream from McMillan Dam, and at mile 503.9.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1905 to June 1909, August 1909 to current year. Monthly discharge only for some periods, published in WSP 1312 and 1712. Records for Aug. 22-31, 1934, and October 1936 to April 1937, published in WSP 763 and 828, respectively are not reliable and should not be used. Prior to February 1936, published as "near Dayton."

REVISED RECORDS.--WSP 1312 and 1512: 1913, 1915, 1917-18(M), 1920, 1923, 1931-36. WSP 1712: 1906(M), 1908-11(M), 1919, 1921-23(M), 1929, 1931-32(M), 1935-36(M), 1937, 1939(M), 1941(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Elevation of gage is 3,291.92 ft above National Geodetic Vertical Datum of 1929 (U.S. Bureau of Reclamation bench mark). See WSP 1923 or 2123 for history of changes prior to Apr. 5, 1941. Apr. 5, 1941 to Apr. 2, 1981, water-stage recorder at site 250 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Jan. 19 to Feb. 1 and July 28, 29. Water-discharge records good except for estimated daily discharges, which are poor. Considerable flow regulation by Lake Sumner (station 08384000) since August 1937, and by Two Rivers Reservoir (station 08390600) since July 1963. Diversions and ground-water withdrawals for irrigation of about 154,000 acres, 1959 determination, upstream from station. Several observations of water temperatures were made during the year.

AVERAGE DISCHARGE.--51 years (water years 1937-87), 242 ft³/s, 175,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge probably occurred May 30, 1937, when a discharge of 51,500 ft³/s was measured by slope-area method at a point 15 mi upstream, gage height, 14.7 ft, site and datum then in use; no flow at times in 1934, 1946-47, 1953-54, 1957, 1964-65.

EXTREMES OUTSIDE PERIOD OF RECORD.--Greatest flood since at least 1893 occurred Oct. 2, 1904, discharge not determined; the peak inflow to Lake McMillan, which includes Rio Penasco and Fourmile Draw, was estimated at 82,000 ft³/s. The second highest flood occurred July 25, 1905, discharge below Rio Penasco, 50,300 ft³/s, based on gain in storage and spill from Lake McMillan. The floods in August 1893 and October 1904 damaged McMillan Dam and washed out Avalon Dam.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 25	0100	*1,210	*9.00				
Minimum discharge, 11 ft ³ /s, Aug. 9.							

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	134	381	206	375	330	366	321	510	712	231	19	847
2	129	393	198	358	325	355	320	409	721	359	19	833
3	138	472	196	333	313	344	299	389	741	683	19	832
4	114	628	193	305	309	346	276	375	852	679	18	834
5	129	631	185	300	311	337	225	518	743	679	16	831
6	207	555	176	295	318	328	212	581	592	395	14	882
7	335	507	179	284	287	311	218	599	589	171	13	882
8	331	494	177	278	284	348	231	581	605	141	14	666
9	288	342	176	273	263	637	230	634	666	123	13	468
10	303	296	186	274	253	618	199	708	724	107	16	321
11	446	291	194	271	259	680	188	703	644	98	25	459
12	1050	340	201	267	256	669	170	719	627	83	33	320
13	751	326	212	252	246	538	165	730	536	70	46	175
14	497	295	216	240	242	411	152	721	478	60	64	160
15	421	282	214	257	256	565	157	708	473	53	60	141
16	374	272	251	242	265	638	157	735	445	55	52	126
17	352	262	313	251	242	643	146	826	419	56	48	122
18	336	247	332	266	225	643	160	932	385	61	43	118
19	304	244	347	260	249	485	315	917	395	60	33	124
20	281	235	346	245	280	406	828	932	376	68	25	120
21	294	226	340	230	322	423	954	854	359	76	21	122
22	412	222	343	340	381	360	1020	730	357	55	19	109
23	320	221	380	345	367	315	1020	724	452	47	18	97
24	371	225	391	380	340	327	1050	1060	559	44	23	95
25	350	229	368	405	325	309	1050	1040	455	40	27	85
26	295	231	358	435	319	307	1050	886	445	37	61	82
27	305	228	365	420	319	332	1040	901	547	39	227	85
28	370	224	359	425	346	333	1050	822	525	32	665	99
29	417	218	354	390	---	334	1030	763	605	24	772	84
30	385	213	362	350	---	351	822	744	346	22	799	82
31	367	---	370	330	---	359	---	733	---	20	816	---
TOTAL	10806	9730	8488	9676	8232	13418	15055	22484	16373	4668	4040	10201
MEAN	349	324	274	312	294	433	502	725	546	151	130	340
MAX	1050	631	391	435	381	680	1050	1060	852	683	816	882
MIN	114	213	176	230	225	307	146	375	346	20	13	82
AC-FT	21430	19300	16840	19190	16330	26610	29860	44600	32480	9260	8010	20230
CAL YR 1986	TOTAL	97942.3		MEAN	268	MAX	9520	MIN	6.8	AC-FT	194300	
WTR YR 1987	TOTAL	133171		MEAN	365	MAX	1060	MIN	13	AC-FT	264100	

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURES: April 1949 to current year.

SUSPENDED-SEDIMENT DISCHARGES: January 1949 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 microsiemens, June 24, 1977; minimum daily, 111 microsiemens, Aug. 31, 1982.

WATER TEMPERATURES: Maximum daily, 36.0°C, July 27, 1966, July 25, 1969; minimum daily, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 21,300 mg/L, Aug. 1, 1962; minimum daily mean, 0 mg/L on several days in 1982, 1984, and 1986.

SEDIMENT LOADS: Maximum daily, 183,000 tons, Sept. 26, 1955; minimum daily, 0 ton on many days during 1953-54, 1957, 1964, 1982, 1984.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 24,300 microsiemens, Aug. 10; minimum daily, 1,550 microsiemens, Aug. 31.

WATER TEMPERATURES: Maximum daily, 35.0°C, Aug. 1, 2, 7; minimum daily, 3.0°C, Jan. 18.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 7,530 mg/L, Sept. 11; minimum daily mean, 3 mg/L, Aug. 9.

SEDIMENT LOADS: Maximum daily, 9,550 tons, May 25; minimum daily, 0.11 ton, Aug. 9.

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)
OCT 31...	1500	356	3420	3410	7.99	8.10	26.0	17.5	8.1	34
MAR 02...	1345	352	3710	3850	8.07	7.97	19.0	10.5	11.4	22
MAY 05...	1155	581	2730	2920	7.96	8.10	27.0	17.5	8.2	38
AUG 31...	1430	839	1550	1630	8.14	7.90	34.5	23.0	7.1	20

DATE	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS (00902)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER WHOLE IT-FLD (MG/L) (00450)	CAR- BONATE WATER WHOLE IT-FLD (MG/L) (00447)	ALKA- LITY, CARBON- ATE IT-FLD (MG/L CACO3) (00419)
OCT 31...	1100	960	300	83	340	5	4.8	165	0	135
MAR 02...	1200	1000	320	95	410	5	4.2	183	0	150
MAY 05...	1000	910	290	69	260	4	4.1	--	--	--
AUG 31...	710	630	220	40	86	1	3.0	107	0	88

DATE	ALKA- LITY WH WAT TOTAL FIELD MG/L AS CACO3 (00410)	ALKA- LITY LAB AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT 31...	129	91	940	540	0.60	11	2300	0.600	0.600	0.190
MAR 02...	145	144	1100	490	0.70	11	2500	0.600	0.650	0.280
MAY 05...	--	101	960	400	0.60	11	2100	0.400	0.400	0.200
AUG 31...	88	94	590	120	0.50	9.7	1100	0.200	0.130	0.070

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

[illegible]

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	SED. SUSP. SIEVE DIAM. % FINER THAN .125 MM (70332)
DEC								
01...	1540	206	5670	8.5	287	160	46	--
20...	1449	324	4510	7.5	512	448	89	--
31...	1235	362	4110	5.0	784	766	52	--
FEB								
02...	1330	322	4390	10.0	552	480	62	--
25...	1531	324	4900	11.0	266	233	99	--
MAR								
02...	1345	352	3710	10.5	658	625	56	--
APR								
01...	1150	322	4020	11.0	551	479	69	--
MAY								
05...	1155	581	2730	17.5	1770	2780	--	--
13...	1030	728	--	22.5	1480	2910	--	--
25...	1637	930	--	21.5	3380	8490	--	--
JUN								
02...	1550	726	--	24.0	1770	3470	--	--
12...	1530	664	2810	25.5	1110	1990	93	--
JUL								
04...	1142	685	--	27.0	3020	5590	99	100
06...	1130	402	--	26.0	1630	1770	--	--
29...	1330	23	11800	30.0	35	2.2	66	--
AUG								
28...	1136	701	--	22.5	7390	14000	--	--
31...	0904	815	--	23.0	2880	6340	--	--
31...	1430	839	1550	23.0	1780	4030	98	--
SEP								
02...	1817	835	--	24.5	2050	4620	--	--
13...	0807	172	--	22.0	1730	803	99	100

DATE	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
DEC							
01...	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--
31...	--	--	--	--	--	--	--
FEB							
02...	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--
MAR							
02...	--	--	--	--	--	--	--
APR							
01...	--	--	--	--	--	--	--
MAY							
05...	16	20	33	62	88	100	--
13...	25	32	49	89	100	--	--
25...	34	43	61	90	100	--	--
JUN							
02...	19	25	35	64	87	99	100
12...	--	--	--	--	--	--	--
JUL							
04...	50	62	82	--	--	--	--
06...	20	37	55	78	92	100	--
29...	--	--	--	--	--	--	--
AUG							
28...	46	61	76	96	100	--	--
31...	34	44	61	88	100	--	--
31...	--	--	--	--	--	--	--
SEP							
02...	33	42	62	92	100	--	--
13...	62	80	96	--	--	--	--

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SPECIFIC CONDUCTANCE, MICROSIEMENS PER CENTIMETER AT 25, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8130	3630	5320	4100	4070	4530	3960	2650	1930	2830	14800	1630
2	8450	3780	5910	4140	4410	4410	3950	3100	2090	3360	15900	---
3	8600	3660	6170	4150	4530	4450	4110	3160	2110	2380	17600	1800
4	8350	3770	6290	4150	4600	4430	4160	3330	2070	---	18000	1780
5	8680	---	6330	4460	4620	4380	4130	3350	2350	1820	18600	1750
6	8960	3790	6660	4730	4480	4570	4240	2960	2710	1790	17700	1760
7	9340	3780	7150	4860	4560	4840	4730	2860	2800	2120	18600	1770
8	9210	3460	6970	5090	4520	4700	5090	3030	2790	2470	18500	1810
9	8060	3730	7040	5060	4780	4720	5480	2970	2680	2650	19600	2140
10	---	4640	7110	5130	5000	---	5510	2770	2470	3630	24300	2050
11	3240	5130	6770	5110	5040	3160	6020	2660	2640	4270	20800	1790
12	3450	5050	6680	5310	5130	3050	6170	2580	---	5990	17400	2430
13	3290	4540	6620	5280	5300	3030	6380	---	2800	6130	14800	---
14	3340	4390	6280	5560	5290	3260	6180	2550	2810	7040	11400	2480
15	3450	4720	6180	5410	5260	3450	6470	2560	2880	7970	8600	2610
16	3550	5370	6140	5700	5340	3300	6440	2550	2950	8410	6950	2880
17	3720	5540	5750	5440	5020	3130	6310	2460	2970	9040	6310	3430
18	3710	5920	5160	5270	5040	3050	6130	2400	3010	9010	6810	3810
19	3980	6200	4740	5310	5200	3120	6180	2350	3020	8880	7380	3990
20	4350	6180	---	5090	5070	3110	4850	2300	3010	8300	8360	4020
21	4490	6110	4770	5120	4970	3400	3130	2290	3010	7440	9940	4210
22	4880	6300	4710	5540	4970	3580	---	2470	2990	7540	11300	4310
23	5200	6380	4440	5910	4890	3590	2410	2490	3040	8780	13000	4860
24	5120	6000	4620	5330	4820	3900	2410	2610	2610	9790	14100	4850
25	4630	5780	4730	4930	---	4430	2380	---	2420	11100	14900	5110
26	4640	5960	4920	4710	4860	4120	2400	2330	2350	11200	13800	5640
27	4440	5910	5170	4180	4880	4060	2440	2170	2340	11600	5840	5760
28	4240	5920	4920	4060	4780	4080	---	2240	2350	11700	---	5640
29	---	6010	4750	3990	---	4040	2460	2190	2340	12300	1840	6060
30	3880	6040	4780	3940	---	4010	2490	2170	2900	14300	1840	6100
31	4080	---	4750	---	---	3960	---	2140	---	15900	---	---
MEAN	5500	5090	5730	4900	4870	3860	4520	2610	2640	7320	13100	3450
WTR YR 1987	MEAN	5290	MAX	24300	MIN	1630						

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19.0	17.0	8.5	6.0	10.0	10.5	10.0	22.5	25.0	28.0	35.0	23.0
2	22.5	13.0	7.0	6.0	10.0	13.0	13.0	22.0	22.0	29.0	35.0	---
3	23.0	11.5	8.5	5.0	12.0	11.0	14.5	18.0	25.0	27.0	34.0	23.0
4	21.0	11.0	---	7.0	11.0	11.5	15.0	20.0	23.0	---	32.0	24.0
5	19.0	---	8.0	5.0	10.0	15.0	12.0	20.0	22.0	27.0	33.0	24.5
6	22.5	10.5	10.0	7.0	10.0	13.0	11.5	20.0	23.0	27.5	26.0	23.0
7	19.5	11.5	13.0	7.0	10.0	15.0	13.0	20.5	24.0	28.0	35.0	24.0
8	19.0	13.0	12.0	8.0	10.0	13.0	12.0	20.0	24.0	28.5	25.0	25.0
9	18.0	12.0	10.0	7.5	10.0	13.0	10.0	19.0	23.0	26.5	25.0	23.0
10	---	12.5	6.5	5.0	10.0	---	11.0	20.5	23.0	25.5	32.0	25.0
11	18.0	10.0	7.0	7.5	11.0	12.0	17.0	22.0	25.0	26.0	31.5	24.0
12	14.0	7.0	5.0	7.0	10.0	13.0	18.0	20.5	---	24.0	26.0	25.0
13	14.5	6.0	5.5	9.0	12.0	15.0	17.0	---	28.0	26.5	32.0	---
14	16.0	6.0	7.0	7.0	12.0	13.0	14.0	23.5	26.5	23.0	32.0	22.0
15	14.5	7.0	7.5	9.0	13.0	16.0	18.0	24.0	29.5	23.0	26.5	19.0
16	18.0	8.0	8.0	7.0	10.0	14.0	18.5	24.0	30.0	31.0	27.0	24.0
17	15.0	13.0	7.0	4.0	11.0	11.0	18.0	24.0	29.0	24.0	25.5	20.0
18	18.5	13.0	6.5	3.0	9.5	11.0	20.0	21.0	29.0	27.0	24.5	21.0
19	16.5	13.0	6.0	5.0	9.5	13.0	21.0	21.0	30.0	22.5	25.0	17.5
20	17.5	11.0	---	4.0	8.0	12.0	17.5	20.5	28.0	25.0	27.0	22.0
21	18.0	14.0	7.0	3.5	6.5	12.0	17.0	22.0	28.5	25.0	31.5	23.5
22	17.0	11.0	5.5	5.5	5.0	14.0	---	22.0	27.0	25.0	24.0	21.0
23	18.0	11.0	7.0	4.0	8.0	13.0	13.5	21.0	29.0	25.0	30.0	18.0
24	17.0	10.0	6.0	5.0	9.0	14.5	17.5	20.5	27.0	25.0	23.0	24.0
25	15.0	9.5	7.0	5.0	---	12.0	19.0	---	28.5	29.5	24.0	24.0
26	17.0	8.0	6.0	5.5	12.0	13.0	17.0	21.0	28.5	29.0	23.5	24.0
27	15.0	7.0	5.0	7.0	12.0	12.0	20.0	23.0	25.0	26.0	26.0	24.0
28	14.0	7.0	6.0	9.5	11.5	11.0	---	22.0	27.0	31.0	---	24.5
29	---	7.5	8.0	9.0	---	10.0	20.0	23.0	25.0	31.5	23.0	18.0
30	16.5	8.0	6.0	10.0	---	10.0	20.0	24.0	26.0	26.0	22.0	20.5
31	16.0	---	7.5	---	---	7.0	---	24.5	---	23.0	---	---
MEAN	17.5	10.5	7.5	6.5	10.0	12.5	16.0	21.5	26.0	26.5	28.0	22.5
WTR YR 1987	MEAN	17.0	MAX	35.0	MIN	3.0						

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued
WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)
1	110	40	1120	1150	154	86	394	399	490	437	374	370
2	99	34	960	1020	65	35	430	416	501	440	442	424
3	93	35	1160	1480	53	28	440	396	449	379	397	369
4	140	43	2330	3950	53	28	437	360	408	340	323	302
5	65	23	3000	5110	44	22	321	260	308	259	320	291
6	68	38	2460	3690	38	18	285	227	374	321	283	251
7	78	71	2440	3340	43	21	262	201	413	320	293	246
8	89	80	2200	2930	53	25	232	174	365	280	408	383
9	214	166	1180	1090	34	16	245	181	307	218	1420	2440
10	2300	1880	656	524	35	18	196	145	248	169	2660	4440
11	3700	4460	444	349	33	17	190	139	245	171	2000	3670
12	2570	7290	373	342	73	40	173	125	249	172	1500	2710
13	1410	2860	378	333	50	29	169	115	215	143	1400	2030
14	1270	1700	290	231	42	24	143	93	193	126	944	1050
15	919	1040	233	177	35	20	142	99	200	138	814	1240
16	828	836	217	159	93	63	130	85	201	144	1250	2150
17	670	637	177	125	331	280	135	91	219	143	1240	2150
18	616	559	171	114	462	414	141	101	249	151	1140	1980
19	533	437	153	101	590	553	160	112	214	144	1110	1450
20	407	309	125	79	512	478	164	108	247	187	1050	1150
21	395	314	142	87	620	569	162	101	340	296	760	868
22	701	780	127	76	398	369	143	131	369	380	715	695
23	765	661	132	79	368	378	135	126	512	507	665	566
24	1090	1090	138	84	362	382	268	275	356	327	629	555
25	1360	1290	127	79	332	330	396	433	281	247	708	591
26	1100	876	145	90	352	340	483	567	306	264	511	424
27	1240	1020	143	88	365	360	794	900	289	249	447	401
28	1500	1500	126	76	435	422	865	993	291	272	430	387
29	2230	2510	110	65	372	356	766	807	---	---	470	424
30	1640	1700	94	54	378	369	744	703	---	---	456	432
31	1050	1040	---	---	489	489	1220	1090	---	---	477	462

TOTAL	---	35319	---	27072	---	6579	---	9953	---	7224	---	34901
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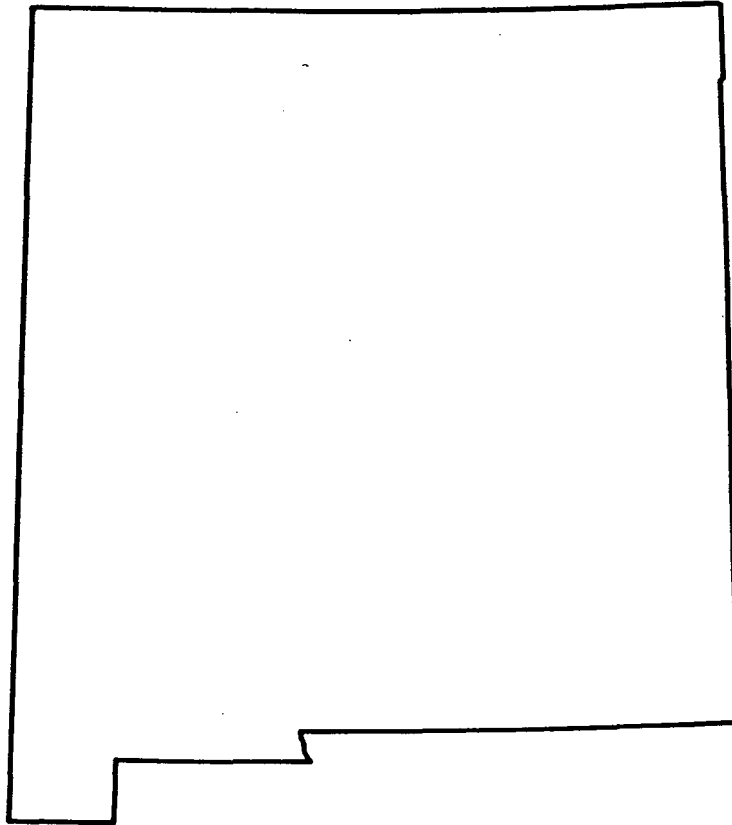
DAY	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)	MEAN CONCENTRATION (MG/L)	LOADS (T/DAY)
1	482	418	1600	2200	1160	2230	605	377	19	.97	2280	5210
2	462	399	1020	1130	1130	2200	1590	1540	25	1.3	2390	5380
3	450	363	750	788	1080	2160	2200	4060	22	1.1	2400	5390
4	477	355	644	652	1220	2810	2130	3900	30	1.5	2460	5540
5	448	272	880	1230	2200	4410	1910	3500	24	1.0	2220	4980
6	414	237	953	1490	1580	2530	1540	1640	18	.68	2360	5620
7	368	217	1040	1680	1360	2160	985	455	14	.49	2320	5520
8	293	183	926	1450	1400	2290	566	215	6	.23	1740	3130
9	246	153	260	445	1360	2450	471	156	3	.11	1120	1420
10	251	135	1590	3040	1400	2740	260	75	6	.29	1630	1410
11	236	120	1030	1960	1260	2190	136	36	11	.74	7530	9330
12	174	80	1270	2470	1150	1950	41	9.2	8	.71	3620	3130
13	181	81	1950	3840	1290	1870	34	6.4	15	1.9	1960	926
14	133	55	992	1930	929	1200	22	3.6	19	3.3	1800	778
15	163	69	1280	2450	776	991	26	3.7	22	3.6	1390	529
16	98	42	1390	2760	718	863	29	4.3	20	2.8	1230	418
17	74	29	1790	3990	645	730	24	3.6	14	1.8	521	172
18	136	59	2330	5860	581	604	21	3.5	12	1.4	377	120
19	791	673	1580	3910	526	561	24	3.9	11	.98	252	84
20	4010	8960	2610	6570	553	561	21	3.9	10	.68	134	43
21	3070	7910	2090	4820	485	470	29	6.0	10	.57	187	62
22	2880	7930	1680	3310	545	525	18	2.7	6	.31	156	46
23	2610	7190	1260	2460	1180	1440	23	2.9	4	.19	111	29
24	2500	7090	1910	5470	1270	1920	22	2.6	5	.31	105	27
25	2610	7400	3400	9550	1530	1880	23	2.5	7	.51	84	19
26	2350	6660	2910	6960	1120	1350	26	2.6	11	1.8	57	13
27	2380	6680	2640	6420	1240	1830	15	1.6	3620	2220	65	15
28	2510	7120	2170	4820	1250	1770	17	1.5	3530	6340	85	23
29	2680	7450	1670	3440	1320	2160	22	1.4	3330	6940	56	13
30	2370	5260	1550	3110	695	649	24	1.4	2670	5760	49	11
31	---	---	1250	2470	---	---	14	.76	1840	4050	---	---
TOTAL	---	83590	---	102675	---	51494	---	16022.06	---	25339.27	---	59388

TOTAL LOAD FOR YEAR: 459556.33 TONS.



Water Resources Data New Mexico Water Year 1988

by John P. Borland and Linda V. Beal



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-88-1
Prepared in cooperation with the State of New Mexico
and with other agencies

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM
(Surveillance program station)

LOCATION.--Lat 32°50'27", long 104°19'23", in NW¼NW¼ sec.18, T.17 S., R.27 E., Eddy County, Hydrologic Unit 13060007, on left bank 250 ft upstream from bridge on State Highway 83, 4.3 mi east of Artesia, 7.0 mi upstream from Rio Penasco, 17 mi upstream from McMillan Dam, and at-mile 503.9.

DRAINAGE AREA.--15,300 mi², approximately (contributing area).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1905 to June 1909, August 1909 to current year. Monthly discharge only for some periods, published in WSP 1312 and 1712. Records for Aug. 22-31, 1934, and October 1936 to April 1937, published in WSP 763 and 828, respectively are not reliable and should not be used. Prior to February 1936, published as "near Dayton."

REVISED RECORDS.--WSP 1312 and 1512: 1913, 1915, 1917-18(M), 1920, 1923, 1931-36. WSP 1712: 1906(M), 1908-11(M), 1919, 1921-23(M), 1929, 1931-32(M), 1935-36(M), 1937, 1939(M), 1941(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Elevation of gage is 3,291.92 ft above National Geodetic Vertical Datum of 1929 (U.S. Bureau of Reclamation bench mark). See WSP 1923 or 2123 for history of changes prior to Apr. 5, 1941. Apr. 5, 1941 to Apr. 2, 1981, water-stage recorder at site 250 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 19-30, Dec. 28, 29. Water-discharge records good except for estimated daily discharges, which are poor. Considerable flow regulation by Lake Sumner (station 08384000) since August 1937, and by Two Rivers Reservoir (station 08390600) since July 1963. Diversions and ground-water withdrawals for irrigation of about 154,000 acres, 1959 determination, upstream from station. Several observations of water temperatures were made during the year.

AVERAGE DISCHARGE.--52 years (water years 1937-88), 241 ft³/s, 174,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge probably occurred May 30, 1937, when a discharge of 51,500 ft³/s was measured by slope-area method at a point 15 mi upstream, gage height, 14.7 ft, site and datum then in use; no flow at times in 1934, 1946-47, 1953-54, 1957, 1964-65.

EXTREMES OUTSIDE PERIOD OF RECORD.--Greatest flood since at least 1893 occurred Oct. 2, 1904, discharge not determined; the peak inflow to Lake McMillan, which includes Rio Penasco and Fourmile Draw, was estimated at 82,000 ft³/s. The second highest flood occurred July 25, 1905, discharge below Rio Penasco, 50,300 ft³/s, based on gain in storage and spill from Lake McMillan. The floods in August 1893 and October 1904 damaged McMillan Dam and washed out Avalon Dam.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Sept. 24	2030	*1,130	*7.99				
Minimum discharge, 17 ft ³ /s, part of each day Aug. 23, 24, 28.							

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	76	363	85	123	107	111	44	33	208	667	40	848
2	75	232	86	120	107	113	43	37	165	699	36	917
3	75	194	85	120	105	88	44	39	143	718	39	1010
4	78	169	85	107	104	78	64	35	123	704	40	1020
5	75	144	84	93	115	74	63	30	98	687	35	981
6	60	134	83	94	117	72	46	26	91	701	28	915
7	51	123	85	94	134	69	56	23	78	736	31	877
8	50	110	83	95	148	70	53	28	66	859	33	878
9	49	99	77	94	151	66	38	32	59	1000	35	897
10	53	93	76	93	146	65	31	35	51	948	36	832
11	54	88	79	91	142	68	28	34	47	989	27	774
12	66	87	83	90	142	65	27	33	40	749	32	765
13	59	85	84	113	139	62	27	32	42	395	31	793
14	54	83	95	178	136	66	27	30	43	285	31	847
15	62	82	90	127	130	64	34	203	42	196	50	818
16	77	82	77	126	126	74	31	549	35	150	40	817
17	69	79	78	124	121	68	33	589	81	133	31	822
18	63	79	115	121	122	56	39	636	270	155	25	805
19	68	79	113	118	119	55	49	741	121	127	22	832
20	70	80	119	116	118	68	38	832	90	130	21	759
21	77	80	142	114	122	83	34	911	64	188	22	622
22	77	80	163	114	130	85	36	807	47	480	19	628
23	78	80	161	113	151	91	36	796	37	235	19	756
24	81	81	144	110	145	89	41	773	31	188	18	1040
25	82	81	128	110	132	80	43	778	25	156	25	980
26	81	81	123	109	113	69	41	767	29	124	26	911
27	73	81	121	111	115	67	28	783	37	101	22	886
28	333	82	115	108	111	63	32	794	128	91	19	864
29	566	82	99	104	113	52	35	699	558	80	328	788
30	615	82	113	109	---	49	33	365	652	59	676	704
31	598	---	123	107	---	46	---	245	---	45	785	---
TOTAL	3945	3295	3194	3446	3661	2226	1174	11715	3501	12775	2622	25386
MEAN	127	110	103	111	126	71.8	39.1	378	117	412	84.6	846
MAX	615	363	163	178	151	113	64	911	652	1000	785	1040
MIN	49	79	76	90	104	46	27	23	25	45	18	622
AC-FT	7820	6540	6340	6840	7260	4420	2330	23240	6940	25340	5200	50350
CAL YR 1987 TOTAL		114581		MEAN	314	MAX	1060	MIN	13	AC-FT	227300	
WTR YR 1988 TOTAL		76940		MEAN	210	MAX	1040	MIN	18	AC-FT	152600	

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURES: April 1949 to current year.

SUSPENDED-SEDIMENT DISCHARGES: January 1949 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 microsiemens, June 24, 1977; minimum daily, 111 microsiemens, Aug. 31, 1982.

WATER TEMPERATURES: Maximum daily, 36.0°C, July 27, 1966, July 25, 1969; minimum daily, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 21,300 mg/L, Aug. 1, 1962; minimum daily mean, 0 mg/L on several days in 1982, 1984, and 1986.

SEDIMENT LOADS: Maximum daily, 183,000 tons, Sept. 26, 1955; minimum daily, 0 ton on many days during 1953-54, 1957, 1964, 1982, 1984.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 17,500 microsiemens, Aug. 26; minimum daily, 1,060 microsiemens, Aug. 13.

WATER TEMPERATURES: Maximum daily, 34.0°C, Aug. 21; minimum daily, 0.0°C, Dec. 27.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 8,410 mg/L, Sept. 18; minimum daily mean, 12 mg/L, Oct. 27.

SEDIMENT LOADS: Maximum daily, 16,200 tons, Sept. 18; minimum daily, 1.9 ton, Oct. 8.

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (00340)
NOV 02...	1200	234	2400	2470	7.77	7.90	19.5	17.0	8.8	16
FEB 29...	1115	107	7000	7100	8.29	7.80	14.0	14.0	10.8	32
MAY 03...	1215	41	12000	12000	8.08	7.50	19.5	18.0	9.6	67
SEP 01...	1100	862	1800	1770	7.76	7.90	24.0	22.0	8.0	13

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	HARD- NESS NONCARB WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)
NOV 02...	860	760	250	57	180	3	3.4	121	0	99
FEB 29...	2000	1900	520	170	890	9	7.8	177	0	145
MAY 03...	3200	3100	720	340	1900	15	11	146	0	120
SEP 01...	810	720	250	46	90	1	3.1	117	0	96

DATE	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)
NOV 02...	98	860	300	0.70	11	1720	0.300	0.270	0.100
FEB 29...	151	1700	1400	0.80	10	4790	1.30	0.680	0.190
MAY 03...	125	2600	3100	0.70	5.8	8750	<0.100	<0.100	0.150
SEP 01...	94	750	130	0.50	11	1340	0.300	0.270	0.060

RIO GRANDE BASIN

271

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	STREAM- FLOW, INSTAN- TANEOUS (CFS) (000061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (000095)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT							
01...	1345	74	--	--	463	93	90
28...	1641	472	--	18.0	3210	4090	--
NOV							
02...	1200	234	2400	17.0	926	585	92
02...	1639	246	--	18.5	780	518	98
DEC							
29...	0816	99	--	--	409	109	86
FEB							
29...	1115	107	7000	14.0	364	105	89
MAR							
31...	1432	50	--	--	561	76	91
MAY							
03...	1215	41	12000	18.0	853	94	89
21...	1132	949	--	18.5	3710	9510	--
22...	1039	815	--	--	4610	10100	76
JUN							
30...	0718	538	--	--	3820	5550	88
JUL							
11...	1827	645	1380	25.0	2640	4600	75
12...	1437	708	--	27.5	2280	4360	--
SEP							
01...	1100	862	1800	22.0	2120	4930	97

DATE	SED. SUSP. SIEVE DIAM. % FINER THAN .125 MM (70332)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)
OCT						
01...	--	--	--	--	--	--
28...	--	34	45	68	90	100
NOV						
02...	--	--	--	--	--	--
02...	100	52	64	86	--	--
DEC						
29...	--	--	--	--	--	--
FEB						
29...	--	--	--	--	--	--
MAR						
31...	--	--	--	--	--	--
MAY						
03...	--	--	--	--	--	--
21...	--	40	52	75	95	100
22...	--	--	--	--	--	--
JUN						
30...	--	--	--	--	--	--
JUL						
11...	--	--	--	--	--	--
12...	--	41	52	71	95	100
SEP						
01...	--	--	--	--	--	--

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SPECIFIC CONDUCTANCE, MICROSIEMENS PER CENTIMETER AT 25, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5540	2190	8580	6680	7100	7370	10100	12600	4170	2400	6520	1750
2	5880	2550	8310	6800	7140	7400	10200	12400	4470	2420	7700	1740
3	6020	2810	7900	7020	7280	7610	10300	12700	4650	2470	8330	1620
4	6240	3450	7820	7020	7250	7840	10300	12600	4690	2160	9060	1560
5	6290	3860	7810	6860	7060	9250	8880	12000	4990	1990	8470	1470
6	6470	4150	8150	8060	7240	9650	9300	12900	5440	1920	9380	1510
7	6730	4240	8120	8300	6800	9770	9160	13800	5790	1800	9900	1500
8	7060	4940	8220	8250	6450	9930	8420	14600	5990	1740	11100	1460
9	7490	5200	8280	8470	6610	10100	8870	12800	6030	1870	10700	1370
10	8040	5250	8450	8460	6760	10100	9490	12100	7540	1520	9770	1400
11	8120	5210	8300	8610	7420	10100	11000	12300	7750	1380	9230	1490
12	8150	6090	8350	8680	7370	10000	11200	12200	8430	1500	11100	1450
13	7480	6560	8000	4540	7390	10300	12300	12100	8800	1970	1060	1390
14	8050	6850	7500	4500	7350	10500	13800	12100	8000	2540	10300	1390
15	7960	7070	7580	4860	7360	9840	12800	1200	8570	2730	10800	1350
16	7380	7300	7830	6270	7450	9450	11700	4650	9190	3070	8000	1350
17	7450	7360	7930	6560	7480	9490	11700	3640	9400	3280	7850	1340
18	7790	7770	8110	6530	7290	8930	12100	3310	3830	3530	10100	1360
19	7730	7770	7890	6720	7390	9720	12100	3080	3130	3690	10600	1330
20	7380	7910	7460	6730	7330	9790	10600	3080	3610	3840	11800	1420
21	7300	8200	7120	6800	7270	8100	11600	3070	3910	4250	14700	1620
22	7460	8180	7050	6890	7130	7540	11700	3090	4140	3290	15100	1690
23	7160	8090	7050	6820	6720	7210	11500	2850	4980	2970	14000	1820
24	7050	8200	6410	6930	6450	7100	11400	3030	7410	2930	15200	1530
25	6900	8350	6080	6720	6370	7040	11900	3030	8270	2960	16300	1500
26	6850	8430	6470	6750	6400	7590	10900	3090	9130	2960	17500	1410
27	6970	8460	5820	6590	6810	7900	10800	3060	10200	4450	12400	1340
28	5300	8430	6480	6580	7050	8400	11400	3080	10200	4460	11800	1340
29	3120	8580	---	7130	7040	9100	11500	2980	3590	4860	7110	1350
30	2380	8460	7250	7180	---	9570	13800	3330	2730	5430	2550	1380
31	2280	---	---	6730	---	---	---	3600	---	5760	2200	---
MEAN	6650	6400	7600	6940	7060	8890	11000	7430	6300	2970	10000	1470
WTR YR 1988		MEAN	6890		MAX	17500	MIN	1060				

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17.0	17.0	7.0	4.0	11.0	17.0	11.0	19.0	23.0	26.5	27.5	23.0
2	17.0	18.5	5.0	4.0	11.0	10.0	12.0	20.0	25.0	25.0	31.5	24.0
3	16.5	16.0	11.0	6.0	9.5	12.0	20.0	17.0	21.5	25.5	27.5	23.0
4	16.5	19.0	7.0	5.0	7.0	9.0	18.0	18.0	28.0	28.0	24.0	24.0
5	21.5	18.0	10.0	6.0	4.0	10.0	21.0	16.0	28.0	28.5	31.5	21.0
6	15.5	15.5	2.0	5.0	4.0	15.0	17.5	26.0	29.0	27.0	29.0	23.0
7	21.0	15.0	8.0	4.5	4.0	17.0	14.0	19.0	28.5	27.0	25.0	21.5
8	14.5	15.0	6.5	5.0	6.0	13.0	20.5	14.0	23.0	27.0	27.5	23.0
9	22.0	12.0	10.5	5.0	6.0	13.0	16.0	27.0	25.0	25.0	24.0	23.0
10	17.0	15.0	6.0	3.5	11.0	15.0	11.0	28.0	21.0	24.0	24.5	23.0
11	23.0	10.0	8.0	6.0	11.5	16.0	12.5	19.0	29.0	26.0	31.0	21.5
12	17.0	13.0	12.0	4.5	12.0	11.0	23.0	16.0	25.0	27.5	32.0	22.0
13	17.0	11.0	8.0	5.5	10.5	9.5	23.0	28.0	29.0	27.0	32.5	22.0
14	22.0	11.0	4.0	5.0	8.0	15.0	15.5	18.0	30.0	28.0	25.0	24.0
15	22.5	10.0	2.0	8.0	14.0	9.5	15.5	28.5	25.0	31.0	27.0	24.0
16	19.5	9.0	3.0	6.0	8.0	15.0	18.0	24.0	30.5	29.0	26.0	23.5
17	19.0	9.0	1.5	7.5	9.5	10.0	14.5	23.0	27.5	30.0	30.0	23.5
18	15.0	9.0	5.0	7.0	7.5	15.0	18.0	25.0	24.0	28.0	32.5	22.0
19	20.0	12.5	7.0	7.0	11.0	15.5	16.0	21.5	26.0	26.0	25.0	23.0
20	15.0	8.0	6.0	3.0	10.0	10.0	17.0	20.5	28.5	25.0	27.5	22.0
21	14.0	12.5	9.0	4.0	11.0	19.0	16.0	18.5	30.5	22.5	34.0	21.5
22	15.0	10.0	7.0	4.0	7.0	19.0	18.0	18.0	23.0	24.5	32.5	22.0
23	18.0	12.5	9.0	5.0	9.0	20.0	23.0	21.0	31.0	28.0	30.0	22.0
24	15.0	8.0	8.0	5.5	9.0	15.0	15.0	27.0	29.0	24.0	24.0	21.0
25	20.0	11.5	9.0	4.0	13.5	20.0	21.5	23.0	29.0	28.5	27.5	21.0
26	15.0	9.0	2.0	6.0	13.0	21.0	14.0	21.5	25.0	25.0	26.0	21.0
27	21.0	5.0	.0	5.0	19.0	16.5	19.0	22.0	23.0	29.0	28.0	20.5
28	18.0	5.0	4.0	6.0	14.5	20.0	19.5	22.0	32.0	29.0	20.0	23.0
29	17.0	9.0	---	7.0	16.5	18.0	24.0	21.5	26.0	30.0	19.0	20.0
30	19.0	5.0	6.0	11.0	---	13.0	16.5	22.0	24.5	25.0	19.5	18.0
31	18.0	---	---	8.0	---	---	---	25.0	---	24.0	20.0	---
MEAN	18.0	11.5	6.5	5.5	10.0	14.5	17.5	21.5	26.5	27.0	27.0	22.0
WTR YR 1988		MEAN	17.5		MAX	34.0	MIN	.0				

WATER-QUALITY RECORDS

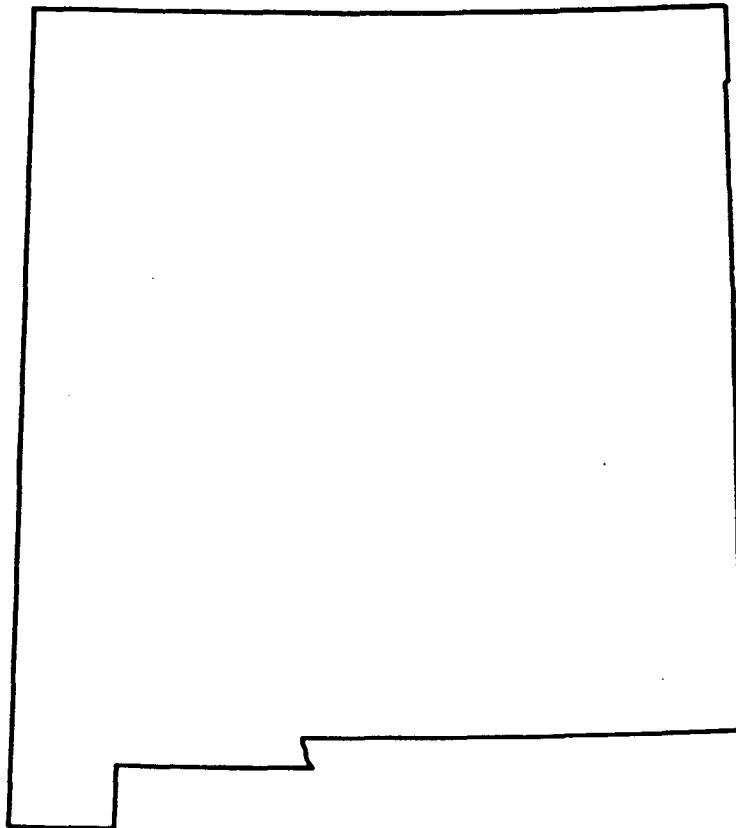
SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

	MEAN CONCEN- TRATION	LOADS	MEAN CONCEN- TRATION	LOADS	MEAN CONCEN- TRATION	LOADS	MEAN CONCEN- TRATION	LOADS	MEAN CONCEN- TRATION	LOADS	MEAN CONCEN- TRATION	LOADS
DAY	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)	(MG/L)	(T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	308	37	743	66	410	230	3890	7010	145	16	3190	7300
2	621	72	623	62	310	138	3030	5720	228	22	2600	6380
3	338	40	368	39	300	116	2500	4850	474	50	2810	7540
4	278	48	459	43	290	96	2090	3970	4400	475	3190	8580
5	369	63	462	37	273	72	2110	3910	468	44	2570	6590
6	323	40	389	27	269	66	2190	4150	518	39	2440	5740
7	271	41	751	47	202	43	2810	5580	225	19	2140	4730
8	366	52	630	48	346	62	2580	5980	478	43	2110	4630
9	512	53	414	36	492	78	3520	9500	363	34	2210	4900
10	274	23	382	36	287	40	2970	7600	364	35	1810	3650
11	297	22	543	50	222	28	3020	8060	302	22	1300	2400
12	360	26	604	54	277	30	2190	4430	172	15	1540	2800
13	438	32	443	38	358	41	1290	1380	131	11	1900	3600
14	485	35	547	44	408	47	848	653	245	21	2270	4640
15	696	64	1810	992	314	36	470	249	336	45	1720	3380
16	680	57	2620	3880	306	29	420	170	138	15	1430	2810
17	505	45	2300	3660	651	142	606	218	191	16	1330	2630
18	394	41	2240	3850	1900	1390	347	145	192	13	8410	16200
19	448	59	2650	5300	3310	1080	222	76	195	12	1880	3770
20	407	42	2310	5190	2060	501	383	134	373	21	1330	2400
21	521	48	2460	6050	972	168	6820	3460	394	23	1180	1690
22	533	52	2340	5100	375	48	2040	2640	534	27	1210	1750
23	339	33	2570	5520	313	31	2160	1370	497	25	1370	2460
24	547	61	2580	5380	262	22	3020	1530	640	31	2850	7500
25	567	66	2330	4890	228	15	2850	1200	572	39	2970	7360
26	460	51	1930	4000	273	21	1790	599	790	55	3400	7890
27	400	30	2300	4860	1050	105	227	62	336	20	1910	4380
28	367	32	2490	5340	1560	539	165	41	559	29	2070	4720
29	442	42	1610	3040	5130	7730	281	61	5100	4520	1680	3570
30	451	40	1440	1420	4580	8060	235	37	4980	9090	2310	4390
31	---	---	910	602	---	---	162	20	3830	8120	---	---
TOTAL	---	1347	---	69701	---	21004	---	84805	---	22947	---	150380
TOTAL LOAD FOR YEAR:		376928.0		TONS.								



Water Resources Data New Mexico Water Year 1989

by J.P. Borland, R.K. DeWees, R.L. McCracken, R.L. Lepp, D. Ortiz,
and D.A. Shaul



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-89-1
Prepared in cooperation with the State of New Mexico
and with other agencies

251

DAY	MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	745	98	57	52	e69	87	35	763	469	e16	9.7	125
2	805	87	57	52	70	81	36	766	472	e20	8.5	120
3	750	88	57	54	67	82	42	761	501	42	6.2	96
4	454	89	57	57	67	77	41	773	549	25	5.8	80
5	263	99	57	56	70	81	32	777	496	e32	5.9	138
6	210	100	56	54	70	83	28	792	483	46	5.5	114
7	178	99	55	55	66	90	28	797	460	28	11	72
8	154	86	57	e58	70	73	26	795	478	e14	8.5	50
9	140	76	61	e56	78	67	29	796	477	e8.9	7.4	39
10	141	70	63	e57	90	71	28	801	354	e8.6	6.3	48
11	153	68	66	e57	97	64	34	799	241	8.8	6.0	40
12	156	68	68	e55	110	59	30	828	174	8.9	5.6	39
13	141	68	73	e53	146	60	32	892	117	8.5	5.6	35
14	131	65	77	e53	159	57	216	1070	91	8.7	7.2	144
15	132	63	76	e54	147	52	524	840	73	8.2	7.7	185
16	130	62	75	e54	135	49	602	820	61	7.9	8.2	130
17	121	60	72	e56	130	46	630	822	60	7.3	6.8	131
18	103	63	72	e53	128	48	649	844	57	7.1	8.3	111
19	97	63	73	e50	129	48	674	842	52	6.3	11	81
20	99	62	66	e54	129	48	695	816	47	7.0	11	56
21	96	61	64	e52	116	48	704	810	39	6.0	10	39
22	93	61	62	e52	109	47	720	782	42	5.6	9.9	48
23	99	63	71	e60	105	48	738	793	38	6.7	11	49
24	99	64	78	e62	108	45	742	780	33	10	10	46
25	92	64	71	e64	109	40	736	751	32	22	8.9	44
26	100	64	66	e62	104	41	741	682	33	14	10	39
27	99	62	64	e62	100	39	744	539	29	11	11	34
28	97	61	61	e62	95	37	736	499	26	8.8	21	30
29	103	59	58	e61	---	36	752	498	22	7.3	27	28
30	106	58	55	e65	---	37	764	502	24	7.2	97	25
31	103	---	53	e68	---	35	---	478	---	7.3	157	---
TOTAL	6190	2151	1998	1760	2873	1776	11788	23508	6030	425.1	525.0	2216
MEAN	200	71.7	64.5	56.8	103	57.3	393	758	201	13.7	16.9	73.9
MAX	805	100	78	68	159	90	764	1070	549	46	157	185
MIN	92	58	53	50	66	35	26	478	22	5.6	5.5	25
AC-FT	12280	4270	3960	3490	5700	3520	23380	46630	11960	843	1040	4400
CAL YR 1988	TOTAL	76845	MEAN 210	MAX 1040	MIN 18	AC-FT 152400						
WTR YR 1989	TOTAL	61240.1	MEAN 168	MAX 1070	MIN 5.5	AC-FT 121500						

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURE: April 1949 to current year.

SUSPENDED-SEDIMENT DISCHARGE: January 1949 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 microsiemens, June 24, 1977; minimum daily, 111 microsiemens, Aug. 31, 1982.

WATER TEMPERATURE: Maximum daily, 36.0°C, July 27, 1966, July 25, 1969; minimum daily, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATION: Maximum daily mean, 21,300 mg/L, Aug. 1, 1962; minimum daily mean, 0 mg/L on several days in 1982, 1984, and 1986.

SEDIMENT LOAD: Maximum daily, 183,000 tons, Sept. 26, 1955; minimum daily, 0 ton on many days during 1953-54, 1957, 1964, 1982, 1984.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 21,300 microsiemens, Aug. 17; minimum daily, 339 microsiemens, May 1.

WATER TEMPERATURE: Maximum daily, 34.0°C, July 13; minimum daily, 1.0°C, Dec. 6, Feb. 4.

SEDIMENT CONCENTRATION: Maximum daily mean, 5,030 mg/L, Sept. 17; minimum daily mean, 133 mg/L, Oct. 19.

SEDIMENT LOAD: Maximum daily, 7,910 tons, Oct. 2; minimum daily, 4.4 tons, July 9.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)
OCT 26...	1545	99	--	5160	8.26	7.40	29.0	19.0	10.9	25
MAR 02...	1130	79	7250	7770	8.23	7.90	15.0	11.0	11.7	38
MAY 08...	1300	799	1390	1460	7.86	8.00	39.5	19.5	9.4	16
SEP 05...	1315	156	3890	4040	7.81	7.50	31.0	26.5	7.1	72

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)
OCT 26...	1500	1400	390	120	570	7	5.7	140	0	115
MAR 02...	2000	1800	490	180	1000	10	7.4	187	0	153
MAY 08...	630	530	200	32	81	1	2.6	129	0	106
SEP 05...	1400	1200	390	97	410	5	5.7	137	0	112

DATE	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT 26...	112	1400	960	0.60	<0.50	3520	0.400	0.410	0.190
MAR 02...	138	1700	1800	0.80	9.2	5270	0.400	0.380	0.160
MAY 08...	100	550	110	0.50	8.4	1050	<0.100	1.40	0.080
SEP 05...	128	1200	660	0.70	13	2860	0.400	0.470	0.100

RIO GRANDE BASIN

253

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI KF AGAR (COLS. PER 100 ML) (31673)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
OCT 26...	0.61	1.2	0.090	0.010	3.6	K3	23	320	20
MAR 02...	0.54	1.1	0.040	<0.010	2.9	K1	K21	400	40
MAY 08...	0.32	--	0.070	<0.010	9.5	K180	K110	80	5
SEP 05...	2.1	2.6	0.570	<0.010	13	K22	350	240	180

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)
OCT 26...	1545	2	2	<1	<1	2	2	5	2	<5
SEP 05...	1315	2	1	<1	<1	22	4	15	1	7

DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	NITRO- GEN, NO2+NO3 TOT. IN BOT MAT (MG/KG AS N) (00633)	NITRO- GEN,NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	PHOS- PHOROUS TOTAL IN BOT. MAT. (MG/KG AS P) (00668)
OCT 26...	<5	0.30	0.5	2	1	20	<10	<2.0	2.3	<40
SEP 05...	<1	<0.10	<0.1	2	<1	90	10	--	--	--

DATE	ARSENIC TOTAL IN BOT- TOM MA- TERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CD) (01028)	CHRO- MIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01029)	COBALT, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU) (01043)	IRON, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS FE) (01170)	LEAD, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS PB) (01052)	MANGA- NESE, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01053)	MERCURY RECOV. FM BOT- TOM MA- TERIAL (UG/G AS HG) (71921)	ZINC, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS ZN) (01093)
OCT 26...	2	1	1	<50	3	1600	<100	140	<0.01	<10

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 26...	1545	99	--	19.0	292	78	70
MAR 02...	1130	79	7250	11.0	148	32	71
MAY 08...	1300	799	1390	19.5	1550	3340	61
SEP 05...	1315	156	3890	26.5	1160	489	90

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SPECIFIC CONDUCTANCE, MICROSIEMENS PER CENTIMETER AT 25, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1300	5610	8470	8990	10200	8070	10300	339	---	8900	19400	3480
2	1230	5930	8770	9220	9670	8010	10400	1640	1420	7780	17300	3040
3	1170	6060	8980	9200	9530	8350	10300	1470	1420	8060	16000	2680
4	1620	6230	8990	9360	9170	8610	10300	1460	1460	7590	16500	3310
5	1760	6100	9010	9340	9220	8490	10300	1360	1510	8520	18000	3160
6	2090	5800	8990	9310	9220	8650	10300	1360	1500	9300	18900	2960
7	2310	5710	8950	9200	9100	8600	10500	1450	1520	---	15500	2920
8	2790	5500	8980	9130	9230	8160	10400	1400	1600	7450	12400	3580
9	3020	6190	8810	9320	8960	9060	10500	1390	1730	7360	16100	4670
10	3350	6900	8920	9280	8100	9900	10500	1320	2190	9570	19400	5690
11	3390	7140	8490	9480	8210	9620	10400	1320	2200	9800	20900	5270
12	753	7300	8420	9780	7820	9720	10400	1340	2210	17100	19200	5860
13	1560	7370	8580	9750	7220	9980	10500	1310	2540	16800	18100	6170
14	3380	7480	8750	9900	6230	10200	10400	1400	2990	16500	18100	4260
15	3410	7620	8740	9830	5640	10200	4500	---	3420	16700	20800	3820
16	3560	7500	7990	9700	5530	10200	3490	1430	4320	17400	19600	2400
17	3710	8180	7970	9580	5740	10300	3280	1360	4770	17200	21300	2980
18	4010	8280	8130	9660	6230	10300	3200	1230	5220	17800	20000	2430
19	4360	8330	8420	9940	6490	10300	3140	1320	5470	18100	15400	3450
20	4510	8390	8570	9580	6640	10300	3100	1260	6000	18900	16100	3640
21	4690	8480	8710	9680	6970	10300	3080	1230	6320	19600	15400	4480
22	4940	8520	8700	9710	7420	10300	2990	1270	6540	19600	17100	5040
23	4830	8620	8810	9700	7410	10300	2710	1200	6960	19900	17200	5170
24	4780	8530	8870	9670	7420	10200	2560	1210	6740	18200	17900	5270
25	4960	8580	8690	9530	7460	10300	---	1160	7750	---	17800	5400
26	5490	8470	8810	9340	7420	10300	2360	1170	7730	13000	17200	5700
27	5110	8570	8420	9160	7630	10300	2390	1460	7660	13900	16500	6640
28	5190	8570	8590	9100	7830	10400	2310	1420	8230	14100	11600	7010
29	5060	8550	8670	9380	---	10300	2150	1400	8310	14100	12100	7120
30	5120	8630	8750	9600	---	10400	1940	1430	8380	13300	8420	7860
31	5500	---	8890	9520	---	10400	---	1410	---	---	---	---
MEAN	3510	7440	8670	9480	7780	9690	6510	1320	4420	13800	17000	4520
WTR YR 1989	MEAN 7830	MAX 21300	MIN 339									

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
ONCE-DAILY

[illegible]

WATER-QUALITY RECORDS

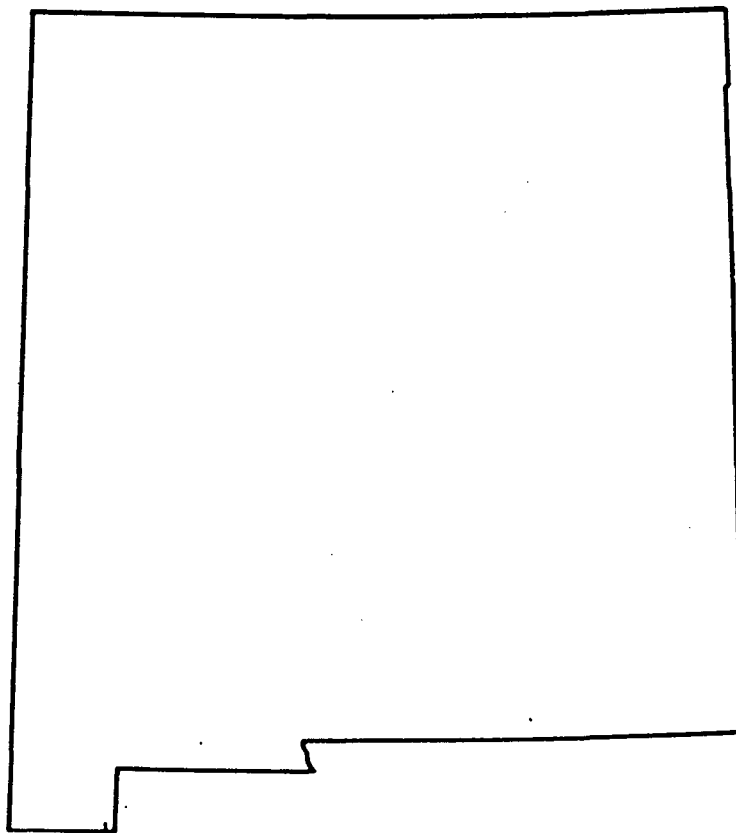
SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	314	30	1620	3340	634	803	257	11	824	22	1800	607
2	253	25	1710	3540	714	910	290	16	922	21	1980	642
3	430	49	1760	3620	772	1040	250	28	582	9.7	469	122
4	406	45	1650	3440	836	1240	251	17	902	14	1030	222
5	417	36	1690	3550	893	1200	219	19	723	12	1230	458
6	619	47	3320	7100	815	1060	279	35	193	2.9	1440	443
7	533	40	1890	4070	925	1150	308	23	181	5.4	654	127
8	496	35	1770	3800	779	1010	299	11	521	12	265	36
9	516	40	1590	3420	2410	3100	182	4.4	553	11	273	29
10	753	57	1650	3570	954	912	338	7.8	625	11	203	26
11	479	44	1990	4290	703	457	620	15	569	9.2	285	31
12	426	35	1850	4140	512	241	574	14	375	5.7	335	35
13	566	49	1580	3810	536	169	523	12	606	9.2	1200	113
14	949	553	1260	3640	1040	256	418	9.8	959	19	3540	1380
15	2330	3300	1320	2990	1040	205	357	7.9	892	19	3920	1960
16	1800	2930	1730	3830	382	63	423	9.0	489	11	2620	920
17	1920	3270	1590	3530	205	33	554	11	489	9.0	5030	1780
18	1700	2980	1640	3740	223	34	777	15	1260	28	1460	438
19	1600	2910	1580	3590	221	31	712	12	1320	39	897	196
20	1350	2530	1420	3130	240	30	500	9.5	1110	33	809	122
21	1270	2410	1700	3720	279	29	422	6.8	489	13	512	54
22	1300	2530	1860	3930	228	26	484	7.3	374	10	234	30
23	1450	2890	1760	3770	179	18	695	13	682	20	434	57
24	1630	3270	1330	2800	271	24	701	19	734	20	339	42
25	1590	3160	1020	2070	407	35	765	45	969	23	279	33
26	1490	2980	969	1780	295	26	931	35	674	18	474	50
27	1560	3130	973	1420	211	17	795	24	347	10	375	34
28	1560	3100	887	1200	179	13	534	13	309	18	223	18
29	1520	3090	847	1140	223	13	636	13	413	30	349	26
30	1750	3610	831	1130	232	15	365	7.1	775	203	196	13
31	---	---	666	860	---	---	580	11	1380	585	---	---
TOTAL	---	49175	---	99960	---	14160	---	481.6	---	1253.1	---	10044
TOTAL LOAD FOR YEAR: 204761.7 TONS.												



Water Resources Data New Mexico Water Year 1990

by J.P. Borland, R.R. Cruz, R.L. McCracken, R.L. Lepp, D. Ortiz,
and D.A. Shaul



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-90-1
Prepared in cooperation with the State of New Mexico
and with other agencies

RIO GRANDE BASIN

08395500 PECOS RIVER NEAR LAKE ARTHUR, NM

LOCATION.--Lat 32°59'18", long 104°19'20", in SW¼NE¼ sec.27, T.15 S., R.26 E., Chaves County, Hydrologic Unit 13060007, on left bank 400 ft upstream from bridge on Yuma Road, 2.5 mi east of Lake Arthur, 7 mi upstream from Cottonwood Creek, 11 mi northeast of Artesia, and at mile 522.0.

DRAINAGE AREA.--14,760 mi², approximately (contributing area).

PERIOD OF RECORD.--August 1938 to current year.

GAGE.--Water-stage recorder and rock control. Elevation of gage is 3,327.07 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated by Lake Sumner (station 08384000) 180 mi upstream, since August 1937, and by Two Rivers Reservoir (station 08390600) 77 mi upstream, since July 1963. Diversions and ground-water withdrawals for irrigation of about 124,000 acres, 1959 determination, upstream from station. Several observations of water temperature were made during the year.

AVERAGE DISCHARGE.--52 years, 224 ft³/s, 162,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 49,600 ft³/s, Sept. 24, 1941, gage height, 21.90 ft, from rating curve extended above 16,100 ft³/s on basis of slope-area measurement at gage height 21.77 ft; no flow at times in 1947, 1953, 1954, 1962, 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 30, 1937, reached a stage of 21.77 ft, discharge, 51,500 ft³/s on basis of slope-area measurement of peak flow.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,170 ft³/s, at 2200 hours Aug. 16, gage height, 5.47 ft; minimum recorded, 2.6 ft³/s, part of each day July 19-21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	47	34	53	37	46	43	9.9	705	4.3	52	40
2	20	48	32	56	37	47	48	8.3	720	3.8	28	31
3	10	53	36	58	42	51	43	9.5	748	5.1	14	40
4	7.4	53	37	49	39	49	41	9.9	750	4.7	12	30
5	8.0	58	39	46	38	44	46	12	753	5.3	237	26
6	8.4	64	42	45	39	47	48	19	765	6.1	618	22
7	10	57	43	44	61	49	56	25	774	5.6	713	33
8	12	48	42	43	63	47	53	16	797	4.9	865	37
9	17	48	42	45	72	47	44	14	795	4.5	822	35
10	15	44	42	43	80	45	42	15	802	4.1	782	50
11	12	43	39	42	72	46	44	14	785	3.8	797	118
12	17	38	32	42	81	48	44	11	771	3.9	751	117
13	16	38	36	40	71	48	39	14	781	3.5	846	86
14	14	38	28	40	65	40	31	14	678	3.5	937	53
15	10	38	28	43	74	47	33	17	270	4.0	641	32
16	12	36	32	40	79	45	39	15	163	4.7	843	21
17	11	37	37	40	74	41	34	17	120	5.1	709	40
18	13	40	34	42	67	41	32	9.1	88	3.4	366	37
19	15	39	31	43	53	41	34	6.8	66	2.9	231	45
20	20	39	28	50	46	35	36	6.4	47	2.8	175	57
21	24	39	27	55	39	28	32	7.0	32	4.3	136	55
22	32	39	e35	55	43	26	35	7.9	19	4.8	573	95
23	33	38	e47	54	40	25	42	6.7	11	4.3	369	70
24	35	38	e57	55	47	27	38	15	7.3	3.8	240	54
25	38	38	49	70	48	26	29	110	14	5.7	192	62
26	46	38	48	71	47	27	23	443	11	5.0	159	111
27	47	38	46	63	49	30	17	524	4.8	6.0	132	132
28	43	36	44	59	51	30	13	569	5.8	5.9	99	110
29	50	35	43	54	---	29	9.9	719	6.1	5.2	75	111
30	55	35	45	41	---	36	14	726	5.6	5.3	51	196
31	52	---	49	40	---	38	---	744	---	4.7	38	---
TOTAL	723.8	1280	1204	1521	1554	1226	1082.9	4134.5	11494.6	141.0	12503	1946
MEAN	23.3	42.7	38.8	49.1	55.5	39.5	36.1	133	383	4.55	403	64.9
MAX	55	64	57	71	81	51	56	744	802	6.1	937	196
MIN	7.4	35	27	40	37	25	9.9	6.4	4.8	2.8	12	21
AC-FT	1440	2540	2390	3020	3080	2430	2150	8200	22800	280	24800	3860

CAL YR 1989 TOTAL 54122.4 MEAN 148 MAX 1230 MIN 5.2 AC-FT 107400
WTR YR 1990 TOTAL 38810.8 MEAN 106 MAX 937 MIN 2.8 AC-FT 76980

e Estimated

DAY	MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	51	37	50	41	47	46	20	712	6.8	7.3	33
2	22	47	36	54	38	43	51	16	704	5.9	37	34
3	21	50	34	58	37	47	54	14	740	5.2	25	30
4	13	53	37	57	41	50	47	15	757	4.9	15	39
5	10	53	39	50	40	46	46	14	744	5.2	47	33
6	9.4	60	41	48	39	43	48	16	738	4.9	569	30
7	10	61	42	47	45	46	55	23	758	5.1	699	29
8	12	56	44	46	62	46	59	28	750	5.0	806	34
9	13	48	44	46	63	46	53	20	742	5.1	822	37
10	18	48	44	47	71	46	48	17	742	4.4	824	38
11	17	46	43	45	72	45	45	19	742	4.0	814	52
12	14	44	37	45	73	45	50	17	760	4.5	758	105
13	18	41	37	45	77	47	47	14	748	4.2	808	83
14	19	41	38	43	67	46	41	17	711	3.6	876	60
15	16	40	32	44	65	41	36	17	364	3.8	760	48
16	13	39	30	44	73	47	41	19	131	4.0	638	33
17	14	38	28	41	76	46	43	18	103	3.7	824	32
18	14	39	39	42	71	43	38	21	74	4.0	457	45
19	15	41	41	43	61	43	37	13	e54	3.6	211	37
20	17	40	33	44	49	43	42	9.1	e38	3.0	167	46
21	22	41	30	50	44	35	40	7.9	e27	3.6	135	53
22	26	41	21	54	38	30	37	7.4	e19	4.5	452	63
23	32	41	29	55	41	28	42	9.0	e14	4.0	410	72
24	33	40	41	54	40	29	47	6.6	e9.8	3.3	202	56
25	36	40	45	53	48	30	42	12	e8.0	2.9	164	52
26	40	40	60	72	47	29	34	327	e16	2.6	124	68
27	46	40	49	67	47	30	27	495	e12	3.8	90	107
28	45	39	48	61	46	34	22	518	7.8	5.5	76	96
29	43	38	46	58	---	35	18	657	7.0	5.6	65	94
30	50	37	45	51	---	36	16	700	7.2	4.3	52	134
31	54	---	47	42	---	42	---	740	---	4.6	39	---
TOTAL	736.4	1333	1217	1556	1512	1264	1252	3827.0	11239.8	135.6	11973.3	1673
MEAN	23.8	44.4	39.3	50.2	54.0	40.8	41.7	123	375	4.37	386	55.8
MAX	54	61	60	72	77	50	59	740	760	6.8	876	134
MIN	9.4	37	21	41	37	28	16	6.6	7.0	2.6	7.3	29
AC-FT	1460	2640	2410	3090	3000	2510	2480	7590	22290	269	23750	3320
CAL YR 1989	TOTAL	54187.5	MEAN	148	MAX	1070	MIN	5.5	AC-FT	107500		
WTR YR 1990	TOTAL	37719.1	MEAN	103	MAX	876	MIN	2.6	AC-FT	74820		

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURE: April 1949 to current year.

SUSPENDED-SEDIMENT DISCHARGE: January 1949 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 microsiemens, June 24, 1977; minimum daily, 111 microsiemens, Aug. 31, 1982.

WATER TEMPERATURE: Maximum daily, 36.0°C, July 27, 1966, July 25, 1969; minimum daily, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATION: Maximum daily mean, 21,300 mg/L, Aug. 1, 1962; minimum daily mean, 0 mg/L on several days in 1982, 1984, and 1986.

SEDIMENT LOAD: Maximum daily, 183,000 tons, Sept. 26, 1955; minimum daily, 0 ton on many days during 1953-54, 1957, 1964, 1982, 1984.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 21,900 microsiemens, July 29; minimum daily, 1250 microsiemens, Aug. 13.

WATER TEMPERATURE: Maximum daily, 36.0°C, July 9; minimum daily, 0.0°C, Dec. 18.

SEDIMENT CONCENTRATION: Maximum daily mean, 12,200 mg/L, Aug. 17; minimum daily mean, 9 mg/L, Oct. 17.

SEDIMENT LOAD: Maximum daily, 27,100 tons, Aug. 17; minimum daily, .34 tons, Oct. 17.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L) (00340)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	
NOV 01...	1140	52	6250	8.1	9.5	10.5	10.3	71	2200	590	170	760	
MAR 06...	1515	44	10100	8.4	20.0	18.0	11.2	160	2700	650	250	1500	
APR 30...	1345	14	13900	8.3	20.0	22.0	12.2	200	2900	700	290	2000	
SEP 04...	0930	41	6900	7.9	25.0	22.5	6.2	60	1800	470	150	900	
DATE		SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR-BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CAC03) (39086)	ALKA-LINITY LAB (MG/L AS CAC03) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (70301)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
NOV 01...	7	7.0	159	0	130	121	2000	1300	0.80	12	4920	0.500	
MAR 06...	13	11	111	10	107	110	2200	2800	1.0	5.1	7480	<0.100	
APR 30...	16	19	111	10	107	69	2500	4000	1.0	4.8	9580	<0.100	
SEP 04...	9	10	144	0	118	112	1600	1500	0.60	16	4720	<0.100	
DATE		NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO-GEN, TOTAL (MG/L AS N) (00600)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	
NOV 01...		<0.100	0.160	0.54	1.2	0.040	0.010	3.9	<1	K18	430	40	
MAR 06...		<0.100	0.040	0.76	--	0.020	<0.010	3.8	<1	K4	550	50	
APR 30...		<0.100	0.030	0.67	--	0.040	<0.010	4.7	K1400	<1	900	70	
SEP 04...		<0.100	0.040	0.66	--	0.040	<0.010	5.5	<10	K32	510	40	

RIO GRANDE BASIN

249

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)
NOV 01...	1140	<1	<1	<1	<1.0	1	4	4	1	1
SEP 04...	0930	2	2	<1	<1.0	2	2	3	1	<1

DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	NITRO- GEN, NO2+NO3 TOT. IN BOT MAT (MG/KG AS N) (00633)	NITRO- GEN, NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	ARSENIC TOTAL IN BOT- TOM MA- TERIAL (UG/G AS AS) (01003)
NOV 01...	<1	<0.10	<0.1	2	2	30	20	<10	<10	<1
SEP 04...	<1	0.10	<0.1	1	1	30	20	--	--	--

DATE	CADMIUM RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CD) (01028)	CHRO- MIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01029)	COBALT, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU) (01043)	IRON, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS FE) (01170)	LEAD, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS PB) (01052)	MANGA- NESE, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01053)	MERCURY RECOV. FM BOT- TOM MA- TERIAL (UG/G AS HG) (71921)	ZINC, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS ZN) (01093)
NOV 01...	<1	2	<5	2	1600	<10	260	<0.01	5

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. 1/16 IN THAN .062 MM (70331)
NOV 01...	1140	52	6250	10.5	319	45	87
MAR 06...	1515	44	10100	18.0	348	41	94
APR 30...	1345	14	13900	22.0	732	28	85
SEP 04...	0930	41	6900	22.5	341	37	88

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SPECIFIC CONDUCTANCE, MICROSIEMENS PER CENTIMETER AT 25, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8970	5750	7520	---	6330	8430	9760	16000	2500	8260	15800	---
2	9160	5930	7520	---	6540	8810	9350	14000	2510	9250	16600	---
3	9170	6030	7500	---	6670	9320	8770	14000	2540	9510	6030	5980
4	9570	6190	7510	---	6690	9420	8880	15900	2470	9370	5310	6200
5	9420	5890	7410	---	6730	9870	8980	18000	2480	11400	5730	6550
6	14500	5870	7490	7280	6860	11200	8880	17000	2500	12700	2950	7010
7	16400	5610	7550	7530	6970	11300	9050	13100	2100	13300	2460	7310
8	15300	5640	7460	7220	6510	11100	8560	12300	2010	12800	1880	7950
9	14100	7220	7180	7350	5620	11000	8000	12600	1880	16300	1760	7420
10	12300	7330	7040	7580	5120	11000	8170	13500	1850	16500	1600	7340
11	12300	7490	7170	7020	5040	11200	8670	14800	1800	16300	1410	7000
12	12900	7520	---	7290	5050	11200	8940	15200	1710	16200	1310	5400
13	12000	7680	---	6600	4870	11400	8860	13400	1630	16000	1250	4570
14	12000	7720	---	6560	4810	11800	8890	13700	1620	15300	1260	4570
15	12200	7810	---	6820	4940	12100	9100	13600	1630	15200	1260	4750
16	12500	7830	---	6850	4870	11800	9540	12900	2140	15600	1720	5790
17	13200	7940	---	6670	4860	11900	9540	12500	2270	16300	1670	6660
18	13500	8030	7000	6530	5050	11800	9770	12000	2430	16800	1720	7180
19	13300	8030	7410	6520	5090	11900	9980	13900	2770	18100	1740	7550
20	13200	7330	7640	6640	5620	11900	12300	14800	3110	17700	2270	7950
21	13300	7310	8370	6440	6130	12100	11500	16800	3490	17200	2540	7150
22	13000	7370	8040	6520	6310	12400	11000	18500	4110	15500	2800	6630
23	11600	7460	8070	6600	6480	13400	11500	18400	4240	16500	2610	5600
24	11000	7310	---	6700	6540	13200	11500	17400	4960	16500	1970	5500
25	10300	7440	---	6600	6520	13100	11400	17300	5510	16800	2050	5860
26	7310	7420	---	6360	5980	12900	12700	4560	5490	17700	2120	5690
27	6700	7470	---	5630	5840	12900	14100	3740	7250	18900	3860	4870
28	6340	7460	---	5150	5870	12800	15400	3220	---	19000	4470	3120
29	6240	7440	---	5350	---	11900	15000	3140	8100	21900	4620	3010
30	5820	7500	---	---	---	11900	15700	2960	7800	19200	4770	2830
31	5700	---	---	---	---	9470	---	2690	---	17400	5060	---
MEAN	11100	7100	7520	6660	5850	11400	10500	12600	3270	15500	3630	5980
WTR YR 1990		MEAN	8570	MAX	21900	MIN	1250					

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16.0	12.0	8.0	---	8.0	7.5	21.0	16.0	20.0	31.0	25.0	---
2	25.0	9.5	7.0	---	11.0	15.0	17.0	11.5	23.5	30.0	24.0	---
3	16.5	7.0	8.0	---	11.5	13.0	21.0	23.0	24.0	24.0	31.0	25.5
4	23.0	13.0	6.0	---	10.0	11.0	16.0	24.0	24.5	27.0	25.0	23.5
5	18.0	15.0	5.0	---	5.0	12.5	16.5	23.0	24.0	23.5	22.0	29.0
6	16.0	12.0	5.0	6.5	12.5	16.0	14.0	14.0	25.0	23.0	22.5	23.5
7	17.0	12.0	9.5	3.0	9.0	10.0	18.0	20.0	23.5	31.5	21.5	24.0
8	15.5	17.0	9.5	9.0	9.5	17.5	22.0	21.5	24.0	26.0	23.0	23.0
9	24.0	10.0	6.0	6.0	10.0	10.0	19.0	17.5	25.5	36.0	25.0	29.0
10	15.0	17.0	5.0	11.0	13.0	18.5	17.5	20.0	24.5	28.0	26.5	22.5
11	17.0	10.0	6.0	5.0	9.0	15.0	23.0	19.5	26.0	27.0	24.0	22.0
12	14.0	15.0	---	9.5	10.0	13.0	17.0	26.0	25.0	29.0	25.0	24.0
13	15.0	10.0	---	10.0	11.0	10.0	17.0	9.0	25.0	29.5	25.0	22.5
14	22.0	14.0	---	5.0	14.0	8.5	17.5	24.0	26.5	25.0	25.0	24.5
15	13.0	6.5	---	9.0	10.0	13.5	25.0	25.0	24.5	26.0	25.0	23.0
16	21.0	14.0	---	11.0	6.0	8.0	23.0	18.0	28.0	23.0	25.0	28.0
17	19.0	5.5	---	7.5	5.0	10.0	17.0	23.5	25.0	22.0	25.0	29.0
18	15.0	12.0	.0	8.5	12.0	17.0	14.0	21.5	27.5	23.0	25.0	26.5
19	18.0	6.0	4.0	3.5	6.0	12.0	14.0	19.5	25.0	21.0	24.0	24.0
20	9.0	12.0	6.5	9.0	12.0	18.0	25.5	28.0	24.0	23.0	27.5	28.0
21	18.0	13.0	2.0	9.0	13.0	21.0	20.0	29.5	24.5	22.0	27.0	23.0
22	22.0	16.0	7.0	8.0	13.0	14.0	27.0	21.5	29.5	25.0	25.0	24.0
23	14.5	14.0	7.0	10.0	15.0	15.0	19.0	30.0	25.0	27.5	24.0	21.5
24	13.0	8.0	---	9.5	9.5	10.0	17.0	28.0	27.5	30.0	26.0	24.0
25	21.0	12.0	---	6.0	15.0	10.0	15.5	31.5	25.0	24.0	28.0	19.0
26	20.0	9.0	---	5.5	16.0	13.0	20.0	25.0	25.0	24.0	25.0	20.0
27	19.5	14.5	---	6.5	13.0	11.0	26.0	25.0	32.0	23.0	31.0	20.0
28	19.0	7.0	---	4.0	8.5	13.0	20.0	25.0	31.5	23.0	24.0	24.0
29	13.5	8.0	---	9.0	---	14.0	25.0	24.0	32.0	23.5	23.0	22.0
30	10.0	7.0	---	---	---	19.0	24.0	22.0	24.5	28.0	31.5	21.0
31	14.0	---	---	---	---	15.0	---	23.0	---	23.5	25.0	---
MEAN	17.0	11.5	6.0	7.5	10.5	13.5	19.5	22.0	25.5	26.0	24.5	24.0
WTR YR 1990		MEAN	18.0	MAX	36.0	MIN	.0					

WATER-QUALITY RECORDS

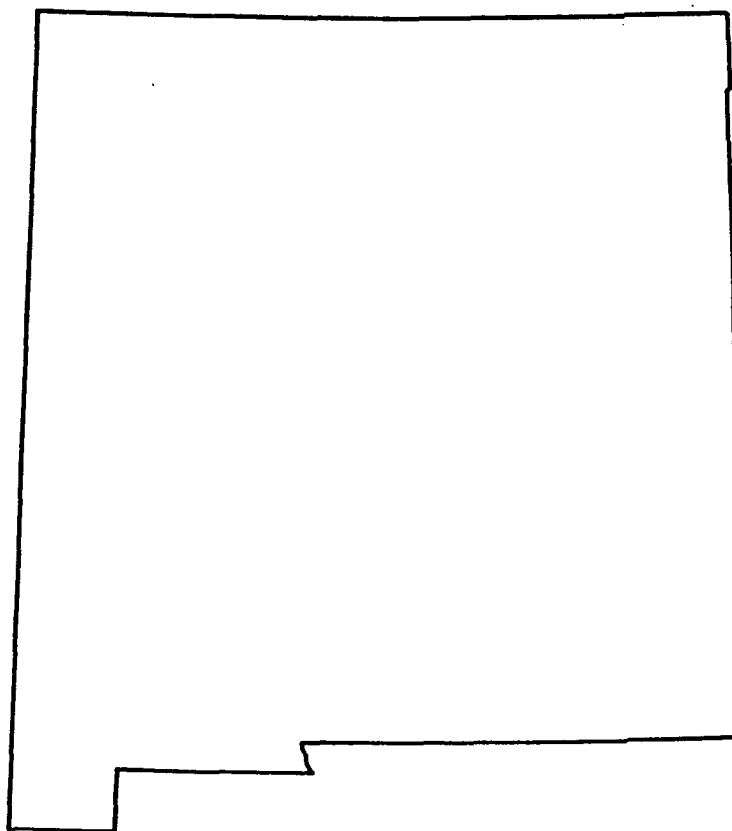
SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DAY	MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)	
	LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)	
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	464	58	440	24	2280	4380	333	6.1	457	9.0	184	16
2	404	56	560	24	2300	4370	468	7.5	463	46	320	29
3	394	57	546	21	1940	3880	430	6.0	558	38	647	52
4	423	54	544	22	1840	3760	565	7.5	512	21	390	41
5	397	49	397	15	1890	3800	550	7.7	719	91	545	49
6	314	41	528	23	1890	3770	568	7.5	5140	7900	637	52
7	428	64	378	23	1600	3270	546	7.5	3700	6980	604	47
8	355	57	353	27	1450	2940	535	7.2	2450	5330	564	52
9	319	46	334	18	1560	3130	621	8.6	4500	9990	557	56
10	440	57	479	22	1470	2940	328	3.9	2300	5120	536	55
11	440	53	774	40	1480	2970	563	6.1	1780	3910	484	68
12	383	52	748	34	1270	2610	503	6.1	1820	3720	607	172
13	324	41	797	30	1430	2890	471	5.3	1600	3490	392	88
14	309	34	543	25	1420	2730	493	4.8	1480	3500	383	62
15	331	32	500	23	1380	1360	490	5.0	1360	2790	374	48
16	281	31	430	22	705	249	278	3.0	2820	4860	487	40
17	323	38	489	24	1350	375	508	5.1	12200	27100	464	43
18	397	41	576	33	292	58	640	6.9	5730	7070	469	57
19	584	58	518	18	172	25	795	7.7	7460	4250	538	54
20	499	57	589	14	159	16	1000	8.1	3790	1710	451	56
21	359	39	982	21	188	14	954	9.3	1640	598	563	81
22	396	40	904	18	192	9.8	644	7.8	4790	5850	628	107
23	639	72	776	19	343	13	646	7.0	6130	6790	608	118
24	265	34	936	17	258	6.8	926	8.3	3670	2000	508	77
25	335	38	799	26	135	2.9	838	6.6	3030	1340	425	60
26	419	38	2520	2220	145	6.3	754	5.3	1820	609	446	82
27	428	31	3530	4720	227	7.4	645	6.6	424	103	529	153
28	324	19	3500	4900	266	5.6	878	13	123	25	335	87
29	293	14	2720	4830	293	5.5	933	14	172	30	435	110
30	375	16	3100	5860	236	4.6	458	5.3	164	23	1140	412
31	---	---	2490	4980	---	---	486	6.0	172	18	---	---
TOTAL	---	1317	---	28093	---	49598.9	---	216.8	---	115311.0	---	2424
TOTAL LOAD FOR YEAR: 200074.51 TONS.												



Water Resources Data New Mexico Water Year 1991

by J.P.Borland, R.K.DeWees, R.L.McCracken, R.L.Lepp, D.Ortiz, and D.Shaul



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-91-1
Prepared in cooperation with the State of New Mexico
and with other agencies

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM
(Surveillance program station)

LOCATION.--Lat 32°50'27", long 104°19'23", in NW¼NW¼ sec.18, T.17 S., R.27 E., Eddy County, Hydrologic Unit 13060007, on left bank 250 ft upstream from bridge on U.S. Highway 82, 4.3 mi east of Artesia, 7.0 mi upstream from Rio Penasco, 17 mi upstream from McMillan Dam, and at mile 503.9.

DRAINAGE AREA.--15,300 mi², approximately (contributing area).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1905 to June 1909, August 1909 to current year. Monthly discharge only for some periods, published in WSP 1312 and 1712. Records for Aug. 22-31, 1934, and October 1936 to April 1937, published in WSP 763 and 828, respectively, are not reliable and should not be used. Prior to February 1936, published as "near Dayton."

REVISED RECORDS.--WSP 1312 and 1512: 1913, 1915, 1917-18(M), 1920, 1923, 1931-36. WSP 1712: 1906(M), 1908-11(M), 1919, 1921-23(M), 1929, 1931-32(M), 1935-36(M), 1937, 1939(M), 1941(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Elevation of gage is 3,291.92 ft above National Geodetic Vertical Datum of 1929 (U.S. Bureau of Reclamation bench mark). See WSP 1923 or 2123 for history of changes prior to Apr. 5, 1941. Apr. 5, 1941 to Apr. 2, 1981, water-stage recorder at site 250 ft downstream at same datum.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are poor. Considerable flow regulation by Lake Sumner (station 08384000) since August 1937, and by Two Rivers Reservoir (station 08390600) since July 1963. Diversions and ground-water withdrawals for irrigation of about 154,000 acres, 1959 determination, upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--55 years (water years 1937-91), 238 ft³/s, 172,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge probably occurred May 30, 1937, when a discharge of 51,500 ft³/s was measured by slope-area method at a point 15 mi upstream, gage height, 14.7 ft, site and datum then in use; no flow at times in 1934, 1946-47, 1953-54, 1957, 1964-1965.

EXTREMES OUTSIDE PERIOD OF RECORD.--Greatest flood since at least 1893 occurred Oct. 2, 1904, discharge not determined; the peak inflow to Lake McMillan, which includes Rio Penasco and Fourmile Draw, was estimated at 82,000 ft³/s. The second highest flood occurred July 25, 1905, discharge downstream from Rio Penasco, 50,300 ft³/s, based on gain in storage and spill from Lake McMillan. The floods in August 1893 and October 1904 damaged McMillan Dam and washed out Avalon Dam.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
July 18	1700	*4,060	*11.50	Aug. 16	0915	2,040	10.77
Minimum daily, 3.5 ft ³ /s, June 30.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	272	52	64	64	64	51	33	475	89	e4.1	291	157
2	161	56	63	66	63	48	30	492	76	e5.8	231	154
3	177	68	60	67	59	47	29	492	71	10	155	151
4	155	77	60	68	56	47	29	515	94	21	137	157
5	132	94	61	71	63	67	26	551	106	9.1	141	140
6	118	129	65	73	81	81	29	589	70	6.0	156	129
7	130	150	67	69	81	52	25	605	61	8.5	184	150
8	139	135	67	68	73	49	18	630	53	9.5	213	248
9	118	117	67	68	71	51	20	624	62	11	185	358
10	102	104	66	66	72	47	23	647	61	13	281	462
11	102	97	66	65	73	53	25	844	51	6.5	703	1020
12	101	91	67	63	81	49	24	850	54	7.4	1050	1390
13	98	86	67	63	91	49	31	810	82	8.4	864	1410
14	106	89	67	62	98	49	44	720	60	259	1370	1110
15	112	86	68	61	96	47	34	726	60	1370	1800	1020
16	108	80	66	61	83	43	32	726	e46	1720	1810	1130
17	95	75	68	60	70	40	24	740	e29	2350	975	1310
18	89	73	68	62	63	40	21	742	e27	3900	716	1340
19	86	70	71	60	61	38	23	742	e34	2110	570	1380
20	85	69	72	58	59	36	23	742	59	e1060	504	1420
21	82	68	67	57	66	37	24	762	28	e758	447	1360
22	84	68	63	58	63	37	22	800	e10	e504	381	969
23	74	68	59	58	59	40	29	866	e7.8	e335	338	702
24	66	66	57	60	58	40	31	989	e5.8	e311	319	588
25	70	67	53	60	57	35	31	954	e5.2	289	285	563
26	68	69	68	59	56	29	24	e740	e4.5	770	263	538
27	63	69	68	59	54	26	24	e500	e4.0	1270	249	481
28	60	68	60	61	52	25	23	e270	e3.8	1160	211	438
29	53	66	61	61	---	24	38	e190	e3.6	743	181	425
30	51	66	62	69	---	26	420	e150	e3.5	520	166	392
31	48	---	63	67	---	34	---	e118	---	390	163	---
TOTAL	3205	2473	2001	1964	1923	1337	1209	19601	1321.2	19939.3	15339	21092
MEAN	103	82.4	64.5	63.4	68.7	43.1	40.3	632	44.0	643	495	703
MAX	272	150	72	73	98	81	420	989	106	3900	1810	1420
MIN	48	52	53	57	52	24	18	118	3.5	4.1	137	129
AC-FT	6360	4910	3970	3900	3810	2650	2400	38880	2620	39550	30420	41840
CAL YR 1990	TOTAL 42111.7	MEAN 115	MAX 876	MIN 2.6	AC-FT 83530							
WTR YR 1991	TOTAL 91404.5	MEAN 250	MAX 3900	MIN 3.5	AC-FT 181300							
e Estimated												

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURE: April 1949 to current year.

SUSPENDED-SEDIMENT DISCHARGE: January 1949 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 microsiemens, June 24, 1977; minimum daily, 111 microsiemens, Aug. 31, 1982.

WATER TEMPERATURE: Maximum daily, 36.0°C, July 27, 1966, July 25, 1969; minimum daily, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATION: Maximum daily mean, 21,300 mg/L, Aug. 1, 1962; minimum daily mean, 0 mg/L on several days in 1982, 1984, and 1986.

SEDIMENT LOAD: Maximum daily, 183,000 tons, Sept. 26, 1955; minimum daily, 0 ton on many days during 1953-54, 1957, 1964, 1982, 1984.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 9,930 microsiemens, Dec. 28; minimum daily, 400 microsiemens, April 15.

WATER TEMPERATURE: Maximum daily, 34.0°C, June 26, July 26; minimum daily, 0.0°C, Dec. 21.

SEDIMENT CONCENTRATION: Maximum daily mean, 7,470 mg/L, Aug. 12; minimum daily mean, 68 mg/L, Mar. 11.

SEDIMENT LOAD: Maximum daily, 21,200 tons, Aug. 12; minimum daily, 4.5 tons, April 8.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
NOV 01...	1200	53	7900	8.6	23.0	15.5	13.2	61	2100	540
MAR 01...	1015	52	10500	8.3	14.5	8.0	11.3	140	2200	470
MAY 03...	1600	507	3750	7.9	30.0	19.0	12.0	62	1800	560
SEP 05...	1345	137	7100	8.2	25.0	24.0	8.8	54	2100	510

DATE	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD (MG/L AS CO3 (00452)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
NOV 01...	190	1200	11	8.5	128	19	137	1800	1800
MAR 01...	240	1600	15	12	176	0	144	1900	2300
MAY 03...	100	220	2	4.9	115	0	94	1900	350
SEP 05...	190	930	9	13	171	0	140	1700	1600

DATE	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)
NOV 01...	0.70	9.7	5630	0.180	0.180	0.020	0.020	0.200	0.200	0.090
MAR 01...	1.5	7.1	6620	--	--	<0.010	<0.010	<0.050	<0.050	0.070
MAY 03...	0.70	10	3200	--	--	--	--	--	--	--
SEP 05...	0.70	15	5040	0.800	--	0.020	<0.010	0.820	0.091	0.090

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCOCI FECAL, KF AGAR (COLS. FER 100 ML) (31673)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
NOV 01...	0.060	0.51	0.80	0.060	<0.010	5.3	97	31	500	<10
MAR 01...	0.040	0.53	--	0.030	<0.010	3.5	K2	410	570	90
MAY 03...	--	--	--	--	--	14	>600	K83	180	10
SEP 05...	0.080	1.0	1.9	0.100	0.020	6.4	120	32	490	40

DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)
NOV 01...	1200	<1	2	<1	<1.0	2	4	2	1	<1
SEP 05...	1345	--	2	<1	<1.0	11	<1	4	3	<1

DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	NITRO- GEN, NO2+NO3 TOT. IN BOT. MAT. (MG/KG AS N) (00633)	NITRO- GEN, NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	PHOS- PHORUS TOTAL IN BOT. MAT. (MG/KG AS P) (00668)
NOV 01...	<1	--	<0.1	1	1	40	10	<2.0	1.0	41
SEP 05...	<1	<0.10	0.3	--	1	<10	20	--	--	--

DATE	ARSENIC TOTAL IN BOT- TOM MA- TERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CD) (01028)	CHRO- MIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01029)	COBALT, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU) (01043)	IRON, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS FE) (01170)	LEAD, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS PB) (01052)	MANGA- NESE, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01053)	MERCURY RECOV. FM BOT- TOM MA- TERIAL (UG/G AS HG) (71921)	ZINC, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS ZN) (01093)
NOV 01...	<1	<1	1	<10	1	1100	<10	180	<0.01	4

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. X FINER THAN .062 MM (70331)
OCT 02...	0821	162		3410	20.0	452	198
NOV 01...	1200	53		7900	15.5	63	9.0
MAR 01...	1015	52		10500	8.0	2370	335
MAY 03...	1600	507		3750	19.0	2560	3500
SEP 05...	1345	137		7100	24.0	252	93

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SPECIFIC CONDUCTANCE, MICROSIEMENS PER CENTIMETER AT 25, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3100	7760	8460	8960	8370	2000	1200	3780	2880	3700	4040	6150
2	---	7730	8590	9230	8800	2200	500	3490	3170	1440	4750	6300
3	2340	7600	8780	9080	8890	2200	1000	3290	3840	4430	5030	6600
4	2690	6970	8840	8680	9240	2300	500	3300	3910	5040	6030	5850
5	3080	6460	8820	8450	9470	660	800	3250	3770	3500	6800	5900
6	3320	6170	8870	8260	9260	1460	800	3140	3540	1500	6500	6030
7	3420	5960	8450	8100	8600	8000	500	3090	3800	3500	6350	6200
8	3240	5350	8160	8290	8350	5700	1500	3070	4430	3800	5700	6400
9	3240	5420	8120	8520	8330	9850	3000	3050	4420	6000	4750	6200
10	3650	5730	8180	8640	8300	600	2500	2970	4610	4500	4570	3670
11	3760	6000	8390	8550	8430	500	1800	2860	5410	3100	5150	3400
12	4680	5980	8240	8810	8170	9380	1800	2780	5410	3300	2720	2030
13	4800	6380	8350	8830	7750	9210	1400	2050	5560	2600	2170	1080
14	4620	6490	8350	8750	7290	9180	600	1930	4710	3300	1760	2010
15	4560	6500	8270	8980	7230	9470	400	1820	4510	2060	1380	1800
16	4700	6740	8230	9010	7240	9610	8820	1550	5070	1370	1510	1710
17	4850	7050	8470	8900	7580	1200	9210	1490	4570	1830	1680	1450
18	5010	7350	8570	8630	8470	1600	1100	1540	5060	1850	2280	1500
19	5150	7670	8460	8850	8980	1400	2000	1390	7000	2440	2350	1520
20	5360	7880	8150	9090	9290	1300	2400	1350	7180	2700	3340	1730
21	6120	7840	8380	9210	9260	1300	2400	1340	6330	3040	3600	1600
22	6180	7870	9050	9250	9600	1200	2400	1440	6570	3400	4050	1750
23	5940	8010	9390	9320	9540	1200	2300	1360	7140	4100	4400	2120
24	6000	8240	8730	9450	1200	900	1400	1390	8410	5100	4530	2400
25	5850	8160	8960	9340	1300	700	700	1700	9330	5300	4500	2480
26	6110	---	8960	9210	1400	700	700	1480	1200	4850	5150	2480
27	6150	---	9360	9530	1400	1800	1200	1640	3300	2720	5100	2550
28	6510	---	9930	9540	1700	2500	1500	1920	3400	1820	5100	2800
29	6780	---	9200	9470	---	3000	900	2100	1420	2420	5300	2850
30	7060	8370	9070	9260	---	2800	4730	2200	1440	2820	5800	3050
31	7610	---	8870	8910	---	2600	---	2380	---	3360	5970	---
MEAN	---	---	8670	8940	7270	3440	2000	2260	4710	3250	4270	3390
MAX	---	---	9930	9540	9600	9850	9210	3780	9330	6000	6800	6600
MIN	---	---	8120	8100	1200	500	400	1340	1200	1370	1380	1080

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19.5	13.5	6.0	5.0	5.0	17.0	8.5	18.5	26.0	24.0	29.0	24.5
2	20.0	15.5	10.0	9.0	10.5	16.0	21.0	17.0	20.0	34.0	29.0	28.0
3	19.0	18.5	9.0	7.0	13.5	10.0	12.0	16.0	21.5	31.0	26.5	27.0
4	19.0	13.0	8.0	6.0	12.0	11.0	20.0	19.0	21.0	33.5	26.0	25.5
5	25.0	14.0	5.0	5.0	13.0	19.0	13.0	18.0	22.5	29.0	29.5	27.0
6	20.0	11.0	8.0	7.0	7.5	20.0	25.0	20.0	22.5	34.0	30.0	27.0
7	24.0	13.5	7.0	7.0	13.0	18.0	23.0	18.0	29.5	24.0	26.5	25.0
8	22.0	8.0	9.0	7.0	9.5	9.5	25.0	21.0	27.0	25.0	27.5	28.0
9	23.0	12.0	5.0	8.0	12.0	9.0	20.0	20.0	25.0	28.0	27.0	24.0
10	14.0	10.0	9.0	7.0	8.0	12.5	25.0	24.0	25.0	33.0	25.0	26.0
11	20.0	10.0	5.0	6.0	11.5	12.5	26.0	21.0	25.5	25.0	27.0	24.0
12	20.0	15.0	9.0	5.0	12.0	17.0	12.5	24.5	21.0	25.0	26.0	23.5
13	20.0	10.0	5.0	7.5	13.0	9.5	15.0	21.5	24.0	23.5	25.0	22.0
14	17.0	15.0	11.0	7.0	15.0	15.5	13.0	23.5	22.5	24.0	26.0	25.0
15	19.0	11.0	9.0	5.0	10.0	16.5	13.5	20.0	21.5	22.0	24.0	24.0
16	19.0	12.0	9.0	7.0	14.5	11.0	14.0	21.5	29.5	23.0	25.0	23.0
17	19.5	10.5	10.0	8.0	11.0	18.0	8.0	24.0	22.0	24.0	25.0	23.5
18	15.0	11.0	6.0	6.5	12.0	9.0	18.0	22.0	24.0	25.0	27.0	21.0
19	18.5	13.5	9.0	8.0	13.0	13.0	15.0	24.0	30.0	28.0	27.0	18.0
20	13.0	16.0	6.0	7.0	15.0	11.0	24.0	24.0	25.0	27.0	29.0	16.5
21	18.0	13.0	.0	5.0	9.0	9.5	16.0	24.0	28.0	28.0	28.5	15.0
22	13.0	13.0	3.0	3.0	10.0	10.0	21.0	22.5	32.0	28.0	29.5	16.0
23	19.0	12.0	1.0	5.0	13.0	9.0	25.0	24.0	24.0	29.0	27.0	17.0
24	14.0	14.0	1.0	10.0	10.0	12.0	26.0	24.0	25.0	26.0	28.0	23.0
25	20.0	9.0	5.0	10.0	9.5	13.0	24.0	22.0	32.0	25.0	26.0	17.0
26	14.0	---	7.0	10.0	9.0	13.0	24.0	22.0	34.0	24.0	28.5	20.0
27	19.5	---	8.0	10.0	8.0	18.0	25.0	22.0	32.0	24.0	28.5	22.0
28	15.0	7.0	7.0	6.0	10.0	10.0	14.0	27.0	33.0	26.0	28.0	22.0
29	20.0	5.0	10.5	7.0	---	11.0	25.0	27.0	28.0	28.0	25.0	20.0
30	13.5	11.0	5.0	7.0	---	10.0	19.0	24.0	30.5	29.0	25.0	20.0
31	13.0	---	9.5	5.0	---	6.0	---	22.0	---	29.5	29.0	---
MEAN	18.2	---	6.8	6.9	11.1	12.8	19.0	21.9	26.1	27.0	27.1	22.5
MAX	25.0	---	11.0	10.0	15.0	20.0	26.0	27.0	34.0	34.0	30.0	28.0
MIN	13.0	---	.0	3.0	5.0	6.0	8.0	16.0	20.0	22.0	24.0	15.0

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT. WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

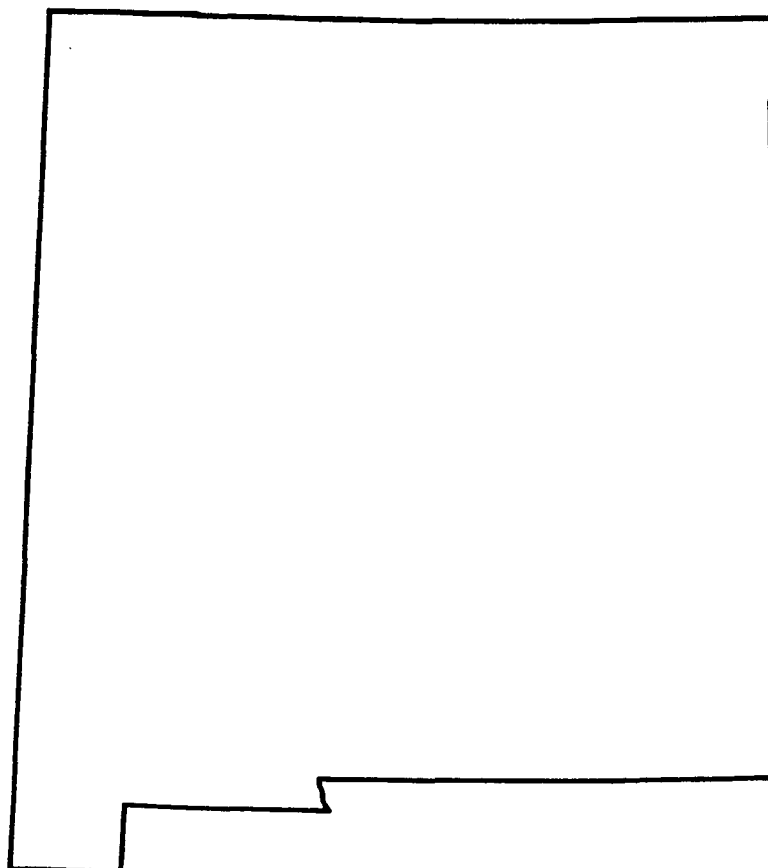
DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	1760	1290	233	33	331	57	436	75	338	58	595	82
2	1550	675	341	52	214	36	422	75	366	62	578	75
3	1530	733	268	49	247	40	469	85	231	37	371	47
4	1030	432	235	49	286	46	299	55	277	42	254	32
5	733	261	231	59	309	51	217	42	353	60	103	19
6	614	196	341	119	245	43	225	44	335	73	85	19
7	581	204	428	173	226	41	266	50	245	54	93	13
8	571	214	291	106	247	45	223	41	130	26	81	11
9	457	146	340	107	225	41	392	72	242	46	93	13
10	399	110	371	104	184	33	326	58	321	62	87	11
11	278	77	191	50	245	44	269	47	228	45	68	9.7
12	226	62	307	75	248	45	312	53	285	62	70	9.3
13	217	57	190	44	299	54	239	41	345	85	126	17
14	207	59	304	73	362	65	277	46	257	68	87	12
15	208	63	320	74	284	52	383	63	261	68	68	8.6
16	201	59	337	73	313	56	375	62	323	72	78	9.1
17	210	54	247	50	319	59	312	51	424	80	75	8.1
18	221	53	293	58	273	50	266	45	120	20	78	8.4
19	254	59	259	49	379	73	297	48	92	15	83	8.5
20	252	58	373	69	231	45	346	54	189	30	78	7.6
21	304	67	319	59	290	52	326	50	144	26	78	7.8
22	239	54	265	49	290	49	254	40	271	46	85	8.5
23	260	52	267	49	417	66	440	69	256	41	115	12
24	262	47	295	53	505	78	336	54	338	53	87	9.4
25	242	46	314	57	375	54	226	37	344	53	85	8.0
26	231	42	305	57	343	63	301	48	396	60	76	6.0
27	246	42	293	55	468	86	532	85	419	61	85	6.0
28	310	50	293	54	476	77	547	90	513	72	85	5.7
29	349	50	340	61	442	73	551	91	---	---	79	5.1
30	397	55	590	105	302	51	455	85	---	---	80	5.6
31	278	36	---	---	285	48	243	44	---	---	80	7.3
TOTAL	---	5403	---	2065	---	1673	---	1800	---	1477	---	501.7

DAY	MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)		MEAN CONCENTRATION (MG/L)	
	LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)		LOADS (T/DAY)	
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	82	7.3	3420	4390	163	39	678	38	538	423	409	173
2	83	6.7	3220	4280	352	72	361	20	410	256	543	226
3	89	7.0	2810	3740	259	50	219	5.9	350	146	290	118
4	79	6.2	3120	4330	456	116	124	7.0	272	101	415	176
5	104	7.3	2360	3510	402	115	232	5.7	222	85	440	166
6	82	6.4	1980	3150	436	82	402	6.5	209	88	373	130
7	79	5.3	1840	3010	484	80	242	5.6	272	135	272	110
8	93	4.5	1930	3280	273	39	198	5.1	475	273	372	249
9	91	4.9	1900	3190	338	57	257	7.6	489	244	1350	1300
10	86	5.3	2390	4170	291	48	284	10	786	596	2230	2780
11	125	8.4	1900	4320	162	22	277	4.9	1570	2990	2700	7440
12	83	5.4	1850	4240	222	32	391	7.8	7470	21200	2240	8410
13	84	7.0	2330	5090	181	40	432	9.8	6410	15000	1780	6770
14	89	11	2100	4090	202	33	1290	904	4900	18100	2150	6450
15	89	8.2	2050	4020	140	23	3400	12600	2570	12500	3270	9000
16	99	8.6	2080	4070	240	30	1200	5570	1080	5270	2450	7470
17	89	5.8	1720	3430	318	36	681	4320	1100	2890	2010	7110
18	83	4.7	2050	4100	326	33	468	4930	2100	4070	1740	6280
19	86	5.3	1630	3260	458	42	1230	7020	2450	3770	2040	7580
20	108	6.7	1460	2920	446	71	5560	15900	950	1290	1400	5370
21	83	5.4	1640	3380	222	17	2050	4190	780	941	1570	5750
22	78	4.6	1890	4090	158	9.0	704	958	642	660	1780	4650
23	166	13	1810	4230	179	10	785	710	516	471	1540	2920
24	162	14	2200	5870	249	14	629	528	459	395	1310	2090
25	94	7.9	2540	6530	362	21	599	467	507	390	1020	1550
26	81	5.2	1960	3910	482	27	1420	2940	434	308	711	1030
27	140	9.1	1360	1830	436	25	2470	8460	551	370	711	923
28	150	9.3	903	658	486	28	995	3120	432	246	566	669
29	181	19	695	357	414	23	1030	2070	356	174	670	769
30	2830	3210	543	220	428	24	1320	1850	311	139	576	610
31	---	---	390	124	---	---	812	855	273	120	---	---
TOTAL	---	3429.5	---	107789	---	1258.0	---	77525.9	---	93641	---	98269
TOTAL LOAD FOR YEAR: 394832.1 TONS.												



Water Resources Data New Mexico Water Year 1992

by R.R. Cruz, R.K. DeWees, D.E. Funderburg, R.L. Lepp, D. Ortiz,
and D. Shaul



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NM-92-1
Prepared in cooperation with the State of New Mexico
and with other agencies

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM

(Surveillance program station)

LOCATION.--Lat 32°50'27", long 104°19'23", in NW¼ sec.18, T.17 S., R.27 E., Eddy County, Hydrologic Unit 13060007, on left bank 250 ft upstream from bridge on U.S. Highway 82, 4.3 mi east of Artesia, 7.0 mi upstream from Rio Penasco, 17 mi upstream from McMillan Dam, and at mile 503.9.

DRAINAGE AREA.--15,300 mi², approximately (contributing area).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1905 to June 1909, August 1909 to current year. Monthly discharge only for some periods, published in WSP 1312 and 1712. Records for Aug. 22-31, 1934, and October 1936 to April 1937, published in WSP 763 and 828, respectively, are not reliable and should not be used. Prior to February 1936, published as "near Dayton."

REVISED RECORDS.--WSP 1312 and 1512: 1913, 1915, 1917-18(M), 1920, 1923, 1931-36. WSP 1712: 1906(M), 1908-11(M), 1919, 1921-23(M), 1929, 1931-32(M), 1935-36(M), 1937, 1939(M), 1941(M). See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Elevation of gage is 3,291.92 ft above National Geodetic Vertical Datum of 1929 (U.S. Bureau of Reclamation bench mark). See WSP 1923 or 2123 for history of changes prior to Apr. 5, 1941. Apr. 5, 1941 to Apr. 2, 1981, water-stage recorder at site 250 ft downstream at same datum.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are poor. Considerable flow regulation by Lake Sumner (station 08384000) since August 1937, and by Two Rivers Reservoir (station 08390600) since July 1963. Diversions and ground-water withdrawals for irrigation of about 154,000 acres, 1959 determination, upstream from station. U.S. Army Corps of Engineers satellite telemeter at station. No flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Greatest flood since at least 1893 occurred Oct. 2, 1904, discharge not determined; the peak inflow to Lake McMillan, which includes Rio Penasco and Fourmile Draw, was estimated at 82,000 ft³/s. The second highest flood occurred July 25, 1905, discharge downstream from Rio Penasco, 50,300 ft³/s, based on gain in storage and spill from Lake McMillan. The floods in August 1893 and October 1904 damaged McMillan Dam and washed out Avalon Dam.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	364	113	103	181	173	197	109	e290	e1100	189	73	111
2	320	125	104	172	163	446	113	e280	e1150	e185	82	96
3	264	132	104	168	161	667	113	e270	e1040	e178	85	92
4	234	136	105	167	160	729	125	e260	e970	e158	94	156
5	205	151	113	166	159	829	119	e270	e920	e148	84	134
6	219	152	110	167	159	806	122	e500	e860	e140	76	117
7	259	143	111	166	157	835	104	e505	e820	e125	66	113
8	236	128	114	170	153	887	95	e500	e900	e108	54	105
9	221	120	114	172	150	863	88	e495	865	e92	62	99
10	194	116	109	173	147	902	84	e480	786	e80	85	96
11	178	113	110	177	145	907	93	e450	654	e70	59	85
12	177	111	116	179	142	797	97	e430	579	e62	44	82
13	169	110	126	195	139	651	100	e500	546	e54	44	86
14	158	109	138	206	134	511	93	e420	511	e56	44	89
15	156	110	129	236	133	361	136	e400	513	52	77	85
16	146	118	131	230	130	e270	144	e380	514	47	85	93
17	140	132	134	213	128	e210	135	e345	576	45	98	111
18	134	169	133	206	131	e182	146	e345	507	45	81	107
19	130	156	137	192	131	e150	229	e370	417	59	78	106
20	131	157	142	195	130	e130	372	e400	382	45	101	108
21	129	146	177	195	126	e122	521	e390	307	39	98	112
22	127	135	202	192	125	e122	473	e620	241	34	110	106
23	125	128	245	189	125	e119	502	e750	207	30	120	99
24	128	125	237	186	135	e119	590	e720	204	54	109	95
25	137	120	221	182	145	126	567	e760	203	e65	97	91
26	134	117	215	182	208	114	492	e790	210	e51	86	85
27	130	114	230	181	211	107	e420	e790	259	42	93	85
28	124	112	231	174	209	106	e360	e700	220	42	96	484
29	123	108	219	173	202	104	e320	e820	228	106	101	663
30	109	103	198	191	---	101	e300	e1000	208	103	127	767
31	108	---	190	183	---	104	---	e1070	---	78	124	---
TOTAL	5409	3809	4748	5759	4411	12574	7162	16300	16897	2582	2633	4658
MEAN	174	127	153	186	152	406	239	526	563	83.3	84.9	155
MAX	364	169	245	236	211	907	590	1070	1150	189	127	767
MIN	108	103	103	166	125	101	84	260	203	30	44	82
AC-FT	10730	7560	9420	11420	8750	24940	14210	32330	33520	5120	5220	9240

e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1992, BY WATER YEAR (WY)

MEAN	254	135	108	106	94.0	184	233	372	375	340	256	384
MAX	4203	1240	614	499	504	768	1292	3834	3495	1453	880	5704
(WY)	1942	1942	1942	1942	1942	1941	1942	1941	1937	1960	1941	1941
MIN	2.26	31.5	33.6	34.6	28.5	21.7	10.7	15.8	5.42	.77	.065	.27
(WY)	1965	1968	1967	1965	1972	1981	1967	1975	1977	1954	1964	1964

SUMMARY STATISTICS

FOR 1991 CALENDAR YEAR

FOR 1992 WATER YEAR

WATER YEARS 1937 - 1992

ANNUAL TOTAL	97691.5		86942									
ANNUAL MEAN	268		238									
HIGHEST ANNUAL MEAN										237		
LOWEST ANNUAL MEAN										1378		1941
HIGHEST DAILY MEAN										64.8		1964
LOWEST DAILY MEAN	3900	Jul 18	1150	Jun 2						44300	Sep 25 1941	
ANNUAL SEVEN-DAY MINIMUM	3.5	Jun 30	30	Jul 23						.00	Aug 14 1946	
INSTANTANEOUS PEAK FLOW	4.1	Jun 25	42	Jul 17						.00	Aug 14 1946	
INSTANTANEOUS PEAK STAGE			1250	Jun 2						a51500	May 30 1937	
INSTANTANEOUS LOW FLOW										b14.70	May 30 1937	
ANNUAL RUNOFF (AC-FT)	193800		30	Jul 23						172000		
10 PERCENT EXCEEDS	749		577							654		
50 PERCENT EXCEEDS	114		143							74		
90 PERCENT EXCEEDS	25		85							14		

a-From a slope-area measurement made at a point 15 mi upstream.

b-Site and datum then in use.

PEI

PEI

RE

EXT

EXT

NOV
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MAR
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MAY
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AUG
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MAR
1
MAY
1
AUG
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MAR
1
MAY
1
AUG
2

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1937 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1937 to current year.

WATER TEMPERATURE: April 1949 to current year.

SUSPENDED-SEDIMENT DISCHARGE: January 1949 to current year.

REMARKS.--Once-daily water temperature readings were made by the field observer, and once-daily specific conductance values were determined in the laboratory from daily suspended sediment samples collected by the field observer.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 28,800 microsiemens, June 24, 1977; minimum daily, 111 microsiemens, Aug. 31, 1982.

WATER TEMPERATURE: Maximum daily, 36.0°C, July 27, 1966, July 25, 1969; minimum daily, 0.0°C on many days during winter months of most years.

SEDIMENT CONCENTRATION: Maximum daily mean, 21,300 mg/L, Aug. 1, 1962; minimum daily mean, 0 mg/L on several days in 1982, 1984, and 1986.

SEDIMENT LOAD: Maximum daily, 183,000 tons, Sept. 26, 1955; minimum daily, 0 ton on many days during 1953-54, 1957, 1964, 1982, 1984.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 12,900 microsiemens, July 24; minimum daily, 2,100 microsiemens, May 31.

WATER TEMPERATURE: Maximum daily, 34.5°C, Aug. 8; minimum daily, 2.5°C, Jan. 19.

SEDIMENT CONCENTRATION: Maximum daily mean, 5,160 mg/L, Sept. 29; minimum daily mean, 2 mg/L, Feb. 15, 18.

SEDIMENT LOAD: Maximum daily, 9,170 tons, Sept. 29; minimum daily, .77 tons, Feb. 18.

WATER QUALITY DATA, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV 08...	1445	125	6900	8.2	13.0	11.5	685	9.9	55	K8	K16
MAR 12...	1225	773	2350	8.1	19.0	9.0	681	10.2	35	K34	330
MAY 12...	1015	439	2550	7.1	29.0	17.0	--	--	41	260	230
AUG 26...	1300	80	3720	8.1	26.0	22.0	694	8.1	22	K21	K18

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	HARD- NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L) (00904)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD (MG/L AS CO3 (00452)	ALKA- LITY WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)
NOV 08...	1800	1700	490	150	810	8	7.3	220	0	180
MAR 12...	1000	900	330	54	160	2	3.1	183	0	150
MAY 12...	1000	940	310	64	190	3	3.8	122	0	100
AUG 26...	1300	1200	340	110	440	5	5.8	115	0	94

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
NOV 08...	1500	1400	1.6	14	4490	1.07	1.06	0.030	0.040	1.10	1.10
MAR 12...	790	240	0.60	9.9	1680	0.150	--	0.010	<0.010	0.160	0.150
MAY 12...	860	310	0.40	11	1810	--	--	<0.010	<0.010	0.230	0.230
AUG 26...	800	82	0.60	8.7	1840	--	--	<0.010	<0.010	0.180	0.170

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992

DATE	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
NOV 08...	0.100	0.070	0.50	0.60	1.7	0.050	0.020	<0.010	3.6	360	<10
MAR 12...	0.060	0.050	--	<0.20	--	0.010	0.020	0.010	7.4	110	20
MAY 12...	0.030	0.030	0.67	0.70	0.93	0.280	0.020	<0.010	6.0	140	<10
AUG 26...	0.020	0.030	0.48	0.50	0.68	0.040	<0.010	<0.010	3.7	110	20
DATE	TIME	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
NOV 08...	1445	2	1	<1	<1.0	3	1	3	2	<1	<1
AUG 26...	1300	3	3	<1	<1.0	<1	<1	1	1	<1	<1
DATE	TIME	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	NITRO- GEN, NO2+NO3 TOT. IN BOT MAT (MG/KG AS N) (00633)	NITRO- GEN,NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	NITRO- GEN,NH4 + ORG. TOT IN BOT MAT (MG/KG AS N) (00626)	PHOS- PHORUS TOTAL IN BOT. MAT. (MG/KG AS P) (00668)
NOV 08...		<0.10	0.5	2	1	20	<10	<2.0	1.0	50	78
AUG 26...		<0.10	<0.1	1	1	10	10	--	--	--	--
DATE	TIME	ARSENIC TOTAL IN BOT- TOM MA- TERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CD) (01028)	CHRO- MIUM, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01029)	COBALT, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU) (01043)	IRON, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS FE) (01170)	LEAD, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS PB) (01052)	MANGA- NESE, RECOV. FM BOT- TOM MA- TERIAL (UG/G) (01053)	MERCURY RECOV. FM BOT- TOM MA- TERIAL (UG/G AS HG) (71921)	ZINC, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS ZN) (01093)
NOV 08...		2	<1	2	<5	3	930	<10	210	<0.01	<1
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. X FINER THAN .062 MM (70331)				
NOV 08...	1445	125		6900	11.5	101	34	32			
MAR 12...	1225	773		2350	9.0	1050	2190	81			
MAY 12...	1015	439		2550	17.0	419	497	98			
AUG 26...	1300	80		3720	22.0	91	20	24			

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SPECIFIC CONDUCTANCE, MICROSIEMENS PER CENTIMETER AT 25, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992
ONCE-DAILY

OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
3240	6130	8350	7370	7320	5270	7220	3130	2030	3760	5290	3590
3450	6120	8300	7400	7210	5380	7000	3160	1970	3830	5120	3790
3690	6270	8260	7490	7030	3490	7080	3270	2080	3780	5550	4360
4240	6210	8220	7480	6910	2880	6780	3450	1820	3790	5460	4040
4610	5990	8120	7470	6840	2610	6490	3510	2110	4550	5280	3250
5010	5910	7840	7430	6860	2500	6530	3230	2140	5160	5790	3510
4870	6080	7880	7370	6880	2450	6550	2760	2150	5220	6350	3600
4370	6060	7860	7350	6880	2440	6980	2550	2140	5760	6590	3800
4170	6310	7690	7240	6910	2340	7450	2510	2100	6370	6970	3940
4290	6750	7500	7530	6920	2320	8070	2550	2310	6700	5500	3910
4750	6990	7500	7040	6990	2210	7900	2520	2460	7130	5300	4410
5380	7240	7440	6920	7010	2260	7820	2610	2490	7660	6290	4510
5560	7540	7500	6580	7100	2240	7310	2460	2630	8070	6490	4520
5860	7570	7520	6540	7190	2290	7170	2510	2640	8750	7100	4490
5950	7630	7360	6660	7330	2640	7040	2570	2660	8730	6450	4530
6040	7340	8040	6610	7240	3050	5270	2650	2630	8900	4390	4390
6150	7430	7400	6820	7350	3350	5020	2750	2470	9510	4430	4430
6160	7070	7030	6700	7390	3700	4800	2720	2360	9500	4320	4140
6350	7770	6900	6710	7200	4080	4200	2680	2440	9820	6150	4140
6380	7760	6770	6740	7060	4640	4020	2760	2530	8720	5100	4080
6450	7340	6480	6580	7000	4950	3250	2710	2840	9130	4410	4220
6360	7350	6810	6630	7100	5380	2880	2690	3300	10000	4370	4240
6420	7710	6760	6650	7180	5710	2760	2540	3720	11100	3850	4270
6520	7690	6860	6810	6940	5990	2740	3470	4000	12900	3830	4480
6290	7820	6690	6720	6700	6240	2720	3510	4230	9120	3790	4700
6120	7900	6580	6620	6450	6480	2730	3950	3520	6970	4260	4820
6170	8030	6640	6560	6110	6590	2820	2960	2910	7080	4160	4950
6300	8170	6580	6850	5350	6960	3090	3170	3500	9160	4210	2300
6790	8200	6880	6800	5190	7330	3080	2990	3710	6920	4110	2240
6800	8280	7020	6930	---	7320	3100	2270	3590	4410	3330	2040
6710	---	7330	7040	---	7450	---	2100	---	4670	3440	---
5530	7160	7360	6960	6880	4280	5330	2860	2720	7330	5090	3990
6800	8280	8350	7530	7390	7450	8070	3950	4230	12900	7100	4950
3240	5910	6480	6540	5190	2210	2720	2100	1820	3760	3330	2040

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992
ONCE-DAILY

OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
23.0	6.0	5.5	8.0	11.0	11.0	13.0	25.0	19.5	26.0	31.0	24.0
23.5	9.0	6.5	6.5	8.0	15.0	14.0	24.0	21.0	28.5	25.0	28.5
20.0	8.0	7.0	6.5	10.0	15.0	11.0	23.0	22.0	23.0	28.0	30.0
21.0	13.0	4.0	7.0	8.0	12.0	20.0	23.0	23.0	25.5	31.5	24.0
19.0	12.0	7.0	6.0	6.0	11.0	15.0	24.0	24.0	29.0	27.0	25.0
17.0	16.0	9.0	7.5	11.0	12.0	16.0	23.0	22.5	26.5	32.0	29.0
17.0	12.0	10.5	7.0	7.0	12.0	22.0	20.0	22.5	32.5	28.0	23.0
23.5	14.0	8.0	9.0	11.0	14.0	22.5	21.0	23.0	28.0	34.5	28.0
19.0	9.0	7.0	7.0	8.0	15.0	25.0	22.0	23.0	31.0	25.5	23.0
19.0	11.0	10.0	6.0	8.5	9.0	20.0	19.0	25.0	28.0	32.5	27.5
19.0	8.0	9.5	5.5	9.5	10.0	26.0	22.5	26.5	28.0	31.5	20.5
18.5	9.0	10.0	5.5	9.5	14.0	19.0	20.0	24.0	23.0	30.0	27.0
23.0	9.0	8.5	5.5	13.0	10.5	22.0	19.0	27.5	25.0	24.0	22.0
17.5	13.0	7.0	4.0	11.5	12.0	23.0	23.0	24.0	33.0	32.5	23.0
22.0	17.0	6.0	4.0	12.0	12.0	18.5	23.5	23.0	30.0	25.0	28.0
21.5	15.0	6.5	3.0	10.0	13.0	19.0	23.0	26.0	24.0	24.5	28.0
23.0	14.5	8.0	3.5	13.0	15.0	24.0	21.5	24.0	29.5	31.0	23.0
17.5	14.0	8.0	3.5	8.0	13.0	19.0	22.0	24.0	23.0	31.5	24.5
19.5	11.0	8.0	2.5	13.0	12.0	17.5	25.0	27.5	30.0	26.5	21.5
19.0	11.5	7.0	5.5	14.0	16.0	17.0	22.0	28.0	23.0	30.0	26.0
15.5	8.0	6.5	6.0	10.0	13.0	17.0	24.0	25.0	26.5	27.5	25.5
20.5	11.0	7.5	7.0	9.0	12.5	19.0	21.5	25.5	25.0	29.0	24.0
17.5	7.0	6.0	6.0	15.5	12.0	21.0	19.0	27.0	23.0	25.0	25.0
20.0	10.0	7.0	8.0	8.5	13.0	18.0	18.0	29.0	32.5	28.5	23.5
16.0	8.0	5.0	9.0	14.5	18.0	19.0	20.0	30.0	31.5	28.0	20.0
17.5	7.0	7.0	8.0	16.0	17.0	22.0	18.5	27.5	26.5	23.5	23.0
17.0	8.5	6.0	8.0	13.0	18.0	23.0	17.5	24.0	26.0	28.0	17.5
16.0	9.0	5.0	10.0	14.0	16.0	20.0	20.0	30.0	34.0	25.0	20.0
14.0	8.5	6.0	10.5	12.0	14.0	24.0	17.0	25.5	31.5	25.0	20.0
10.0	7.0	8.5	11.5	---	17.5	21.0	18.0	26.5	29.0	25.5	20.0
7.0	---	8.0	11.5	---	15.0	---	20.0	---	29.5	28.0	---
18.5	10.5	7.3	6.7	10.8	13.5	19.6	21.3	25.0	27.8	28.2	24.1
23.5	17.0	10.5	11.5	16.0	18.0	26.0	25.0	30.0	34.0	34.5	30.0
7.0	6.0	4.0	2.5	6.0	9.0	11.0	17.0	19.5	23.0	23.5	17.5

RIO GRANDE BASIN

08396500 PECOS RIVER NEAR ARTESIA, NM -- Continued

WATER-QUALITY RECORDS

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	437	429	60	18	51	14	46	22	13	6.0	22	12
2	350	303	64	22	43	12	60	28	13	5.0	604	995
3	281	201	90	32	39	11	26	12	18	8.0	1560	2810
4	238	151	93	34	30	8.0	10	4.0	41	18	1360	2670
5	197	109	77	31	46	14	28	13	14	6.0	1250	2810
6	207	124	86	35	20	6.0	32	14	13	5.0	1340	2910
7	282	197	61	24	15	4.0	55	25	5	2.0	1380	3120
8	252	161	103	35	45	14	45	21	9	3.0	1350	3230
9	207	123	55	18	35	11	10	4.0	21	8.0	1330	3090
10	214	112	35	11	81	24	31	15	22	8.0	1260	3060
11	256	123	28	8.0	33	9.0	43	20	22	8.0	1060	2600
12	143	69	18	5.0	39	12	16	7.0	23	8.0	1030	2220
13	142	65	32	9.0	35	12	35	19	18	6.0	895	1570
14	138	59	29	8.0	46	17	30	17	10	3.0	903	1240
15	132	55	37	11	38	13	30	19	2	.85	606	594
16	107	42	34	11	14	5.0	31	20	25	8.0	641	566
17	106	40	27	11	25	9.0	31	18	22	7.0	405	303
18	103	37	145	67	27	9.0	42	23	2	.77	392	273
19	93	33	40	17	30	11	38	20	9	3.0	305	199
20	83	29	27	11	30	12	48	25	12	4.0	359	229
21	76	27	24	9.0	209	103	68	36	26	8.0	78	49
22	67	23	23	8.0	98	53	61	32	25	8.0	54	35
23	98	33	27	9.0	51	34	51	26	21	7.0	51	26
24	88	31	31	10	51	32	23	12	29	10	32	12
25	75	28	29	9.0	58	34	22	11	19	7.0	32	11
26	55	20	40	13	44	26	46	23	23	13	29	9.0
27	84	29	42	13	75	47	43	21	27	15	37	11
28	68	23	62	19	59	37	25	12	24	14	31	8.0
29	52	17	56	17	54	32	15	6.0	14	7.0	32	8.0
30	58	17	50	14	22	12	42	22	---	---	37	10
31	57	17	---	---	28	14	23	11	---	---	35	9.0
TOTAL	---	2727	---	539.0	---	651.0	---	558.0	---	206.62	---	34689.0

DAY	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)	MEAN CONCEN- TRATION (MG/L)	LOADS (T/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	31	9.0	267	297	1450	3750	243	124	21	4.0	31	9.0
2	31	9.0	267	297	1730	4480	202	96	21	4.0	144	36
3	28	8.0	237	263	1940	5050	86	37	38	8.0	60	14
4	43	14	221	245	1770	4610	17	6.0	33	8.0	104	45
5	36	12	232	256	1740	4540	39	14	19	4.0	1010	356
6	39	13	366	430	1370	3580	12	4.0	29	5.0	1090	344
7	36	10	598	12	1250	3290	15	5.0	27	4.0	626	191
8	36	9.0	554	320	1190	2930	16	5.0	17	2.0	479	136
9	40	9.0	504	673	1050	2460	26	8.0	17	3.0	369	99
10	32	7.0	418	562	2000	4190	28	9.0	24	5.0	282	73
11	35	8.0	365	493	1750	3090	26	9.0	22	3.0	165	38
12	27	7.0	405	506	897	1400	16	5.0	14	1.0	182	40
13	28	7.0	354	421	817	1200	13	4.0	12	1.0	101	23
14	21	5.0	340	408	504	695	19	4.0	12	1.0	142	34
15	73	27	346	418	464	643	29	4.0	25	5.0	62	14
16	50	19	316	384	452	628	40	5.0	28	6.0	52	13
17	47	17	281	342	510	795	32	3.0	31	8.0	117	35
18	59	24	271	332	523	717	35	4.0	24	5.0	184	53
19	208	137	291	360	473	532	57	9.0	19	4.0	174	50
20	524	558	299	371	424	437	18	2.0	31	8.0	197	58
21	1240	1760	460	575	348	289	22	2.0	26	7.0	154	46
22	914	1170	615	695	284	185	43	3.0	29	8.0	190	54
23	658	887	1860	1940	239	134	32	2.0	31	10	81	22
24	580	923	2370	2500	197	109	33	4.0	23	6.0	29	7.0
25	537	822	2600	2760	164	90	31	6.0	18	4.0	30	7.0
26	502	665	2030	3760	262	150	16	2.0	18	4.0	24	5.0
27	424	561	2640	6410	227	156	13	1.0	18	4.0	32	7.0
28	293	325	2760	6710	151	90	13	1.0	23	6.0	2970	4530
29	300	335	1830	4310	162	100	43	12	22	5.0	5160	9170
30	275	306	1740	3880	228	127	88	24	23	7.0	3100	6390
31	---	---	1580	3880	---	---	45	10	43	14	---	---
TOTAL	---	8663.0	---	44810	---	50447	---	424.0	---	164.0	---	21899.0

TOTAL LOAD FOR YEAR: 165777.62 TONS.

Table C1 (continued). Water Chemistry for Navajo Refinery Effluent Stream Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	METHOD*	AMMONIA	BICARBONATE	CARBONATE	CHLORIDE	FLUORIDE	NITRATE	SULFATE	KJELDAHL
NM/HED SLD	WC-1710	8504100955	System #4 Outfall	4/10/85	136.3	NM	243.00	ND	NM	0.59	NM	663.00	NM
NM/HED SLD	WC-5087	8711121050	Pipe Outfall	11/12/87	136.3	NM	ND	NM	680.00	26.60	NM	630.00	NM
NM/HED SLD	WC-1972	8806011755	Pipe Outfall	6/1/88	136.3	NM	3.00	NM	1190.00	29.50	NM	855.00	NM
IML	F1817	8907261545	Pipe Outfall	7/26/89	136.3	NM	787.56	ND	577.18	62.51	NM	860.04	NM
E-RMAL	011889-0001	9010190845	Treated	10/19/90	136.3	16.50	10.00	282.00	775.00	48.10	0.72	612.00	NM
WLI	9312167	9305130900	Effluent: Pond	5/13/93	136.3	NM	330.00	410.00	2100.00	120.00	NM	630.00	NM
WLI	9312175	9305131000	R.O. Reject	5/13/93	136.3	NM	350.00	ND	250.00	2.70	NM	1700.00	NM

Notes:

* All results shown in mg/L

NM/HED SLD

IML

E-RMAL

WLI

NM

ND

New Mexico Health and Environment Department: Scientific Laboratory Division

Inter-Mountain Laboratories

Enseco-Rocky Mountain Analytical Laboratory

Westech Laboratories Inc.

Not measured

Not detected

Table C1 (continued). Water Chemistry for Navajo Refinery Effluent Stream Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	COD (mg/L)	EC (umhos/cm)	pH (s.u.)	TDS (mg/L)	TOC (mg/L)
NMHED SLD	OR-335	8504100955	South Ditch	4/10/85	NM	2300.00	6.80	NM	NM
NMHED SLD	HM-0692	8504100955	System #4 Outfall	4/10/85	NM	2610.00	6.75	NM	NM
NMHED SLD	WC-1710	8504100955	System #4 Outfall	4/10/85	NM	2300.00	6.14	2670.00	NM
NMHED SLD	ICP-246	8704281425	System #4 Outfall	4/28/87	NM	2300.00	7.00	NM	NM
NMHED SLD	OR-1830	8711121050	Pipe Outfall	11/12/87	NM	4280.00	10.00	NM	NM
NMHED SLD	WC-5087	8711121050	Pipe Outfall	11/12/87	NM	4648.00	9.98	3060.00	NM
NMHED SLD	ICP-239	8806011755	Pipe Outfall	6/1/88	NM	8700.00	11.00	NM	NM
NMHED SLD	OR-796	8806011755	Pipe Outfall	6/1/88	NM	8700.00	11.00	NM	NM
NMHED SLD	OR-805	8806011755	Pipe Outfall	6/1/88	NM	8700.00	11.00	NM	NM
NMHED SLD	WC-1972	8806011755	Pipe Outfall	6/1/88	NM	6440.00	9.79	4392.00	NM
ALC	149763	8907261545	Pipe Outfall	7/26/89	NM	3870.00	9.47	NM	NM
IML	F1817	8907261545	Pipe Outfall	7/26/89	NM	3467.00	9.80	2655.00	NM
NMHED SLD	ICP-446	8907261545	Pipe Outfall	7/26/89	NM	3870.00	9.47	NM	NM
E-RMAL	011889-0001	9010190845	Treated	10/19/90	NM	3900.00	9.80	2750.00	NM
NMHED SLD	OR-514	9203161110	Final Outfall	3/16/92	NM	12800.00	12.50	NM	NM
WLI	9312167	9305130900	Effluent: Pond	5/13/93	NM	9500.00	NM	4700.00	NM
WLI	9312175	9305131000	R.O. Reject	5/13/93	NM	3400.00	NM	3100.00	NM

Notes:

NMHED SLC
 WLI
 ALC
 IML
 E-RMAL
 COD
 EC
 TDS
 TOC
 NM

New Mexico Health and Environment Department: Scientific Laboratory Division
 Westech Laboratories Inc.
 Ana-Lab Corp.
 Inter-Mountain Laboratories
 Enseco-Rocky Mountain Laboratory
 Chemical Oxygen Demand
 Electrical conductivity
 Total dissolved solids
 Total organic carbon
 Not measured

APPENDIX C

APPENDIX C1

Effluent Water Quality Data

Table C1. BTEX Analyses for Navajo Refinery Effluent Stream Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	METHOD	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	UNITS	DETECTION
NMHED SLD	OR-335	8504100955	Effluent: South Ditch	4/10/85	8020	3285.00	2845.00	390.00	410.00	ug/L	n/a
NMHED SLD	OR-1830	8711121050	Effluent: Pipe Outfall	11/12/87	8020	4400.00	14000.00	1780.00	7060.00	ug/L	200.00
NMHED SLD	OR-796	8806011755	Effluent: Pipe Outfall	6/1/88	8020	7440.00	11440.00	1600.00	5300.00	ug/L	100.00
NMHED SLD	OR-805	8806011755	Effluent: Pipe Outfall	6/1/88	8020	NM	NM	NM	NM	ug/L	n/a
ALC	149763	8907261545	Effluent: Pipe Outfall	7/26/89	8020	1200.00	1300.00	600.00	1800.00	ug/L	n/a
ALC	170087	9008011640	Effluent: Pipe Outfall	8/1/90	8240	14000.00	NM	NM	NM	ug/L	n/a
PSI	09786	9009241345	Effluent: DAF	9/25/90	602	290.00	NM	NM	NM	ug/L	1.00
BAS	C0110515	9201090000	Effluent: Pipe Outfall	1/9/92	8020	2300.00	2200.00	620.00	1300.00	ug/L	500.00
NMHED SLD	OR-514	9203161110	Effluent: Final Outfall	3/16/92	602	10500.00	9900.00	1100.00	2700.00	ug/L	200.00
SWL	AF819	9203161110	Effluent: Final Outfall	3/16/92	8240	14000.00	16000.00	4100.00	1800.00	ug/L	n/a
BAS	C0710510	9207091425	Effluent: Outfall Box	7/9/92	8020	2500.00	NM	NM	NM	ug/L	500.00
BAS	C1002502	9210010800	Effluent: DAF	10/1/92	8020	1600.00	NM	NM	NM	ug/L	50.00
BAS	C1009515	9210071630	Effluent: DAF	10/7/92	8020	2200.00	NM	NM	NM	ug/L	50.00
BAS	C1023513	9210211530	Effluent: DAF	10/21/92	8020	1600.00	NM	NM	NM	ug/L	500.00
BAS	C1030575	9210281630	Effluent: DAF	10/28/92	8020	2800.00	NM	NM	NM	ug/L	500.00
BAS	C1111501	9211091650	Effluent: DAF	11/9/92	8020	3000.00	NM	NM	NM	ug/L	500.00
BAS	C1118522	9211171215	Effluent: DAF	11/17/92	8020	1700.00	NM	NM	NM	ug/L	500.00
BAS	C1125508	9211241230	Effluent: DAF	11/24/92	8020	7100.00	NM	NM	NM	ug/L	500.00
BAS	C1204512	9212030800	Effluent: DAF	12/3/92	8020	210.00	NM	NM	NM	ug/L	5.00
BAS	C1211509	9212111340	Effluent: DAF	12/11/92	8020	3200.00	NM	NM	NM	ug/L	50.00
BAS	C1218517	9212171235	Effluent: DAF	12/17/92	8020	190.00	NM	NM	NM	ug/L	50.00
BAS	D0108506	9301061730	Effluent: DAF	1/6/93	8020	2700.00	NM	NM	NM	ug/L	500.00
BAS	D0118515	9301150915	Effluent: DAF	1/15/93	8020	1300.00	NM	NM	NM	ug/L	50.00
BAS	D0121501	9301201050	Effluent: DAF	1/20/93	8020	1400.00	NM	NM	NM	ug/L	50.00
BAS	D0129509	9301281110	Effluent: DAF	1/28/93	8020	15.00	NM	NM	NM	ug/L	1.00
BAS	D0205523	9302040945	Effluent: DAF	2/4/93	8020	180.00	NM	NM	NM	ug/L	50.00
BAS	D0212536	9302110810	Effluent: DAF	2/11/93	8020	76.00	NM	NM	NM	ug/L	50.00
BAS	D0225516	9302241400	Effluent: DAF	2/24/93	8020	24.00	NM	NM	NM	ug/L	5.00
WLI	9312167	9305130900	Effluent: Pond	5/13/93	602	ND	ND	ND	ND	ug/L	1.00

Table C1(continued). BTEX Analyses for Navajo Refinery Effluent Stream Samples

Notes:

NMHED SLD	New Mexico Health and Environment Department: Scientific Laboratory Division
ALC	Ana-Lab Corp.
PSI	Professional Service Industries Inc.
BAS	Betz Analytical Services
SWL	Southwestern Laboratories
WLI	Westech Laboratories Inc.
NM	Not measured
ND	Not detected

Table C1 (continued). Volatiles for Navajo Refinery Effluent Stream Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	METHOD	PARAMETER	RESULT	UNITS	DETECTION
NM/HED SLD	OR-335	8504100955	South Ditch	4/10/85	8010	1,1,1-Trichloroethane	ND	ug/L	10.00
						1,1,2,2-Tetrachloroethane	ND	ug/L	10.00
						1,1,2-Trichloroethane	ND	ug/L	10.00
						1,1-Dichloroethane	ND	ug/L	10.00
						1,1-Dichloroethene	ND	ug/L	10.00
						1,2-Dichloroethane	20.00	ug/L	10.00
						1,2-Dichloropropane	ND	ug/L	10.00
						2-Chloroethylvinyl ether	ND	ug/L	10.00
						Bromodichloromethane	ND	ug/L	10.00
						Bromoform	ND	ug/L	10.00
						Bromomethane	ND	ug/L	10.00
						Carbon tetrachloride	ND	ug/L	10.00
						Chlorobenzene	ND	ug/L	10.00
						Chloroethane	ND	ug/L	10.00
						Chloroform	ND	ug/L	10.00
						Chloromethane	ND	ug/L	10.00
						Cis-1,3-dichloropropene	ND	ug/L	10.00
						Dibromochloromethane	ND	ug/L	10.00
						Freon	ND	ug/L	10.00
						Methylene chloride	ND	ug/L	10.00
						Tetrachloroethane	ND	ug/L	10.00
						Trans-1,2-dichloroethene	ND	ug/L	10.00
						Trans-1,3-dichloropropene	ND	ug/L	10.00
						Trichloroethene	ND	ug/L	10.00
						Vinyl chloride	ND	ug/L	10.00

Notes:

NM/HED SLD

New Mexico Health and Environment Department: Scientific Laboratory Division

ND

Not detected

Table C1 (continued). Semi-volatiles for Navajo Refinery Effluent Stream Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	METHOD	PARAMETER	RESULT	UNITS	DETECTION
NMHED SLD	ARO901	8406251527	Effluent: #1 Inlet	6/25/84	625	2,4-Dimethylphenol	2300.00	ug/L	n/a
						2-Methylnaphthalene	210.00	ug/L	n/a
						2-Methylphenol	8200.00	ug/L	n/a
						4-Methylphenol	16100.00	ug/L	n/a
						Anthracene	250.00	ug/L	n/a
						Dibenzofuran	38.00	ug/L	n/a
						Fluorene	46.00	ug/L	n/a
						Naphthalene	64.00	ug/L	n/a
						Phenol	31200.00	ug/L	n/a
						Pyrene	120.00	ug/L	n/a

Notes:

NMHED SLD
ND

New Mexico Health and Environment Department: Scientific Laboratory Division
Not detected

Table C1 (continued). ICP Metals for Navajo Refinery Effluent Stream Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	METHOD*	Al	As	Ba	B	Ca	Cr	Fe	Pb	Mg	Mn	K	Se	Si	Na	St	Sn	Zn
NMHED SLD	HM-0692	8504100955	System #4 Outfall	4/10/85	6010	<0.10	0.03	0.13	0.20	260.00	<0.10	<0.10	<0.10	140.00	0.42	NM	NM	43.00	NM	4.80	<0.10	<0.10
NMHED SLD	WC-1710	8504100955	System #4 Outfall	4/10/85	200.7	NM	NM	NM	NM	241.00	NM	NM	NM	148.00	NM	1.17	NM	NM	189.00	NM	NM	NM
NMHED SLD	ICP-246	8704281425	System #4 Outfall	4/28/87	6010	<0.10	NM	0.10	0.30	260.00	<0.10	<0.10	<0.10	140.00	0.39	NM	NM	42.00	NM	5.00	0.10	<0.10
NMHED SLD	WC-5087	8711121050	Pipe Outfall	11/12/87	200.7	NM	NM	NM	NM	120.00	NM	NM	NM	36.60	NM	6.24	NM	NM	856.00	NM	NM	NM
NMHED SLD	ICP-239	8806011755	Pipe Outfall	6/1/88	6010	<0.10	0.22	<0.10	0.10	190.00	<0.10	<0.10	<0.10	36.00	<0.10	NM	NM	3.50	NM	3.10	<0.10	<0.10
NMHED SLD	WC-1972	8806011755	Pipe Outfall	6/1/88	200.7	NM	NM	NM	NM	224.00	NM	NM	NM	41.50	NM	8.00	NM	NM	1328.00	NM	NM	NM
IML	F1817	8907261545	Pipe Outfall	7/26/89	200.7	NM	NM	NM	NM	95.40	NM	NM	NM	70.74	NM	8.80	NM	NM	656.00	NM	NM	NM
NMHED SLD	ICP-446	8907261545	Pipe Outfall	7/26/89	6010	0.10	0.21	<0.10	0.80	59.00	<0.10	<0.10	<0.10	18.00	<0.10	NM	NM	5.30	NM	1.30	<0.10	<0.10
E-RMAL	011889-0001	9010190845	Treated	10/19/90	6010	NM	NM	NM	NM	52.20	NM	NM	0.46	31.40	NM	38.90	NM	NM	832.00	NM	NM	NM
WLI	9312167	9305130900	Effluent: Pond	5/13/93	6010	2.40	0.34	<0.05	1.50	36.00	<0.05	1.90	1.90	29.00	0.11	38.00	0.13	19.00	990.00	NM	NM	0.24
WLI	9312175	9305131000	R.O. Reject	5/13/93	6010	1.10	<0.05	0.07	0.13	500.00	<0.05	0.25	<0.05	110.00	<0.05	3.20	<0.05	13.00	150.00	NM	NM	<0.05

Notes:

* All values reported in mg/L. Nickel was analyzed for but not detected in Method 6010 samples.

WLI

Westech Laboratories Inc.

NMHED SLD

New Mexico Health and Environment Department: Scientific Laboratory Division

IML

Inter-Mountain Laboratories

E-RMAL

Enseco-Rocky Mountain Laboratory

NM

Not measured

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Not detected

APPENDIX C2

Pond Water Quality Data

Table C2. BTEX Analyses for Navajo Refinery Pond Water Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	METHOD	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	UNITS	DETECTION
NMHED SLD	OR-337	8504101055	Pond: #1 Inlet	4/10/85	8020	100.00	470.00	70.00	175.00	ug/L	2.00
NMHED SLD	OR-334	8504101135	Pond: #3 NE Bank	4/10/85	8020	ND	ND	ND	390.00	ug/L	1.00
NMHED SLD	OR-331	8504101201	Pond: #4 North Bank	4/10/85	8020	ND	ND	ND	40.00	ug/L	1.00
NMHED SLD	OR-764	8704291045	New Pond: North of MW-9	4/29/87	8020	ND	ND	ND	ND	ug/L	10.00
NMHED SLD	OR-754	8705011055	Pond: #3 North Bank	5/1/87	8020	ND	ND	ND	ND	ug/L	2.00
NMHED SLD	OR-1352	8708121150	New Pond: Opposite MW-7	8/12/87	8020	ND	ND	ND	37.00	ug/L	10.00
NMHED SLD	OR-789	8806011000	Pond: #3 East Bank	6/1/88	8020	ND	ND	ND	6.50	ug/L	5.00
NMHED SLD	OR-799	8806011600	Pond: #3 NW Bank	6/1/88	8020	10.00	14.00	ND	20.00	ug/L	5.00
ALC	149770	8907251829	Pond: #3 East Bank	7/25/89	8020	280.00	250.00	28.00	ND	ug/L	n/a
E-RMAL	11768-000	9010091405	Pond: Evaporation	10/9/90	8020	290.00	660.00	210.00	450.00	ug/L	25.00
BAS	C0612567	9206101555	Pond: P-1	6/10/92	8020	88.00	NM	NM	NM	ug/L	5.00
BAS	C0612568	9206101600	Pond: P-2	6/10/92	8020	78.00	NM	NM	NM	ug/L	5.00
BAS	C0612569	9206101612	Pond: P-3	6/10/92	8020	48.00	NM	NM	NM	ug/L	5.00
BAS	C0612570	9206101618	Pond: P-4	6/10/92	8020	17.00	NM	NM	NM	ug/L	5.00
BAS	C0612571	9206101625	Pond: P-5	6/10/92	8020	14.00	NM	NM	NM	ug/L	5.00
BAS	C0612572	9206101630	Pond: P-6	6/10/92	8020	44.00	NM	NM	NM	ug/L	5.00
BAS	C0612573	9206101635	Pond: P-7	6/10/92	8020	74.00	NM	NM	NM	ug/L	5.00
WLI	9312174	9305130930	Effluent: NE Pond	5/13/93	602	ND	ND	ND	ND	ug/L	1.00

Notes:

NMHED SLD	New Mexico Health and Environment Department: Scientific Laboratories Division
ALC	Ana-Lab Corp.
E-RMAL	Enseco: Rocky Mountain Analytical Laboratory
BAS	Betz Analytical Services
WLI	Westech Laboratories Inc.
NM	Not measured
ND	Not detected

Table C2 (continued). Semi-volatiles for Navajo Refinery Pond Water Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	METHOD	PARAMETER	RESULT	UNITS	DETECTION
E-RMAL	011768-0001	9010091405	Pond: Evaporation	10/9/90	8270	2,4-Dimethylphenol	1100.00	ug/L	500.00
						2-Methylnaphthalene	ND	ug/L	500.00
						2-Methylphenol	1800.00	ug/L	500.00
						4-Methylphenol	2600.00	ug/L	500.00
						Anthracene	ND	ug/L	500.00
						Dibenzofuran	ND	ug/L	500.00
						Fluorene	ND	ug/L	500.00
						Naphthalene	ND	ug/L	500.00
						Phenol	6100.00	ug/L	500.00
						Pyrene	120.00	ug/L	500.00

Notes:

E-RMAL Enseco-Rocky Mountain Analytical Laboratory

ND Not detected

Table C2 (continued). ICP Metals for Navajo Refinery Pond Water Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	METHOD*	Al	As	Ba	B	Ca	Cr	Fe	Pb	Mg	Mn	K	Se	Si	Na	St	Sn	Zn
NM/HED SLD	HM-0695	8504101055	#1 Inlet	4/10/85	6010	<0.10	0.40	<0.10	0.23	133.00	<0.10	0.15	<0.10	56.00	0.10	NM	NM	15.00	NM	2.20	<0.10	<0.10
NM/HED SLD	WC-1712	8504101055	#1 Inlet	4/10/85	200.7	NM	NM	NM	NM	126.00	NM	NM	NM	64.40	NM	5.85	NM	NM	803.00	NM	NM	NM
NM/HED SLD	HM-0694	8504101135	#3 NE Bank	4/10/85	6010	<0.10	0.61	0.11	0.34	87.00	<0.10	0.11	<0.10	62.00	0.13	NM	NM	8.60	NM	2.60	<0.10	<0.10
NM/HED SLD	WC-1706	8504101135	#3 NE Bank	4/10/85	200.7	NM	NM	NM	NM	99.70	NM	NM	NM	72.00	NM	183.00	NM	NM	1907.00	NM	NM	NM
NM/HED SLD	ICP-245	8704291045	#4 South Bank	4/29/87	6010	<0.10	NM	<0.10	0.30	140.00	<0.10	<0.10	<0.10	60.00	0.28	NM	NM	7.50	NM	3.30	<0.10	<0.10
NM/HED SLD	WC-1647	8704291045	#4 South Bank	4/29/87	200.7	NM	NM	NM	NM	164.00	NM	NM	NM	56.00	NM	17.20	NM	NM	1450.00	NM	NM	NM
NM/HED SLD	WC-1660	8705011055	#3 North Bank	5/1/87	200.7	NM	NM	NM	NM	152.00	NM	NM	NM	54.00	NM	17.20	NM	NM	1596.00	NM	NM	NM
NM/HED SLD	ICP-247	8806011000	#3 East Bank	6/1/88	6010	<0.10	0.59	<0.10	0.40	220.00	<0.10	0.10	<0.10	97.00	0.12	NM	NM	0.90	NM	4.40	<0.10	<0.10
NM/HED SLD	WC-198	8806011000	#3 East Bank	6/1/88	200.7	NM	NM	NM	NM	288.00	NM	NM	NM	104.90	NM	30.00	NM	NM	1690.00	NM	NM	NM
E-RMAL	011768-0001	9010091405	Evaporation Pond	10/9/90	6010	NM	0.08	0.04	NM	NM	0.50	NM	0.01	NM	NM	NM	0.04	NM	NM	NM	NM	NM
WLI	9312174	9305130930	NE Pond	5/13/93	6010	1.00	0.41	<0.05	0.90	34.00	<0.05	0.76	<0.05	62.00	0.14	57.00	0.07	12.00	2000.00	NM	NM	<0.05

Notes:

* All values reported in mg/L. Nickel was analyzed for but not detected in Method 6010 samples.

NM/HED SLD

New Mexico Health and Environment Department: Scientific Laboratory Division

E-RMAL

Enseco-Rocky Mountain Laboratory

WLI

Westech Laboratories Inc.

NM

Not measured

<

Not detected

Table C2 (continued). Water Chemistry for Navajo Refinery Pond Water Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	METHOD*	AMMONIA	BICARBONATE	CARBONATE	CHLORIDE	FLUORIDE	NITRATE	SULFATE	KJELDAHL
NMHED SLD	WC-1698	8504101055	#1 Inlet	4/10/85	136.3	13.50	NM	NM	NM	NM	1.24	NM	15.00
NMHED SLD	WC-1712	8504101055	#1 Inlet	4/10/85	136.3	NM	50.70	ND	209.80	63.70	NM	980.00	NM
NMHED SLD	WC-1699	8504101135	#3 NE Bank	4/10/85	136.3	7.53	NM	NM	NM	NM	0.08	NM	10.60
NMHED SLD	WC-1706	8504101135	#3 NE Bank	4/10/85	136.3	NM	274.90	15.10	2037.60	31.00	NM	2162.00	NM
NMHED SLD	WC-1647	8704291045	#4 South Bank	4/29/87	136.3	NM	172.00	NM	1517.00	32.80	NM	1127.00	NM
NMHED SLD	WC-1660	8705011055	#3 North Bank	5/1/87	136.3	NM	128.00	NM	1869.00	30.10	NM	1355.00	NM
NMHED SLD	WC-198	8806011000	#3 East Bank	6/1/88	136.3	NM	167.00	NM	2050.00	17.60	NM	1980.00	NM
WLI	9312174	9305130930	NE Pond	5/13/93	136.3	NM	340.00	ND	2500.00	57.00	NM	2300.00	NM

Notes:

* All results shown in mg/L

NMHED SLD New Mexico Health and Environment Department: Scientific Laboratory Division

WLI Westech Laboratories Inc.

NM Not measured

ND Not detected

Table C2 (continued). Water Chemistry for Navajo Refinery Pond Water Samples

LAB	LAB ID	CLIENT ID	SOURCE	SAMPLED	COD (mg/L)	EC (umhos/cm)	pH (s.u.)	TDS (mg/L)	TOC (mg/L)
NMHED SLD	HM-0695	8504101055	#1 Inlet	4/10/85	NM	4050.00	8.50	NM	NM
NMHED SLD	OR-337	8504101055	#1 Inlet	4/10/85	NM	4050.00	8.50	NM	NM
NMHED SLD	WC-1698	8504101055	#1 Inlet	4/10/85	443.00	4050.00	8.50	NM	88.00
NMHED SLD	WC-1712	8504101055	#1 Inlet	4/10/85	NM	4780.00	7.12	3263.00	NM
NMHED SLD	HM-0694	8504101135	#3 NE Bank	4/10/85	NM	6900.00	7.60	NM	NM
NMHED SLD	OR-334	8504101135	#3 NE Bank	4/10/85	NM	6900.00	7.60	NM	NM
NMHED SLD	WC-1699	8504101135	#3 NE Bank	4/10/85	300.00	6900.00	7.60	NM	12.50
NMHED SLD	WC-1706	8504101135	#3 NE Bank	4/10/85	NM	7840.00	9.18	5752.00	NM
NMHED SLD	OR-331	8504101201	#4 North Bank	4/10/85	NM	8200.00	7.70	NM	NM
NMHED SLD	OR-764	8704291045	#1 North of MW-9	4/29/87	NM	7800.00	7.00	NM	NM
NMHED SLD	ICP-245	8704291045	#4 South Bank	4/29/87	NM	7800.00	7.00	NM	NM
NMHED SLD	WC-1647	8704291045	#4 South Bank	4/29/87	NM	8372.00	7.80	5454.00	NM
NMHED SLD	OR-754	8705011055	#3 North Bank	5/1/87	NM	8100.00	7.00	NM	NM
NMHED SLD	WC-1660	8705011055	#3 North Bank	5/1/87	NM	8405.00	7.25	5328.00	NM
NMHED SLD	OR-1352	8708121150	#1 Opposite MW-7	8/12/87	NM	10180.00	7.00	NM	NM
NMHED SLD	OR-1370	8708121150	#1 Opposite MW-7	8/12/87	NM	10180.00	7.00	NM	NM
NMHED SLD	ICP-247	8806011000	#3 East Bank	6/1/88	NM	7600.00	7.00	NM	NM
NMHED SLD	OR-789	8806011000	#3 East Bank	6/1/88	NM	7600.00	7.00	NM	NM
NMHED SLD	WC-198	8806011000	#3 East Bank	6/1/88	NM	9282.00	7.75	6146.00	NM
ALC	149770	8907251829	#3 East Bank	7/25/89	NM	7100.00	NM	NM	NM
WLI	9312174	9305130930	NE Pond	5/13/93	NM	10900.00	NM	5700.00	NM

Notes:

NMHED SLC New Mexico Health and Environment Department: Scientific Laboratory Division

ALC Ana-Lab Corp.

WLI Westech Laboratories Inc.

COD Chemical Oxygen Demand

EC Electrical conductivity

TDS Total dissolved solids

TOC Total organic carbon

NM Not measured

APPENDIX D

APPENDIX D

Selected Data from the Navajo RFI Phase I Report

Table 5.6

Three-Mile Ditch - Trench and Boring Soils Analytical Results, Volatiles, RFI Phase I Report,
Navajo Refining Company, October 1990.

		Sample Number							
		KMO-TR- 000-01	KMO-TR- 000-02	KMO-TR- 000-03	KMO-TR- 001-02	KMO-TR- 001-03	KMO-TR- 001-04	KMO-TR- 001-05	KMO-TR- 004-02
Sampling Depth (feet)		2	4	7	3 - 7	3.5 - 4	8.5 - 9	1.7 - 2	3 - 4
COMPOUND	UNITS								
Chloromethane	ng/kg					0.69	0.31		0.4
Benzene	ng/kg	2	10	5.8					
1,1,2,2-Tetrachloroethane	ng/kg				1.2			0.51	0.78
Toluene	ng/kg	5.7	56	17					0.72
Ethylbenzene	ng/kg	24	34	0.5					0.36
Xylenes	ng/kg	120	60	30					1.5

1/ Blanks and all other analyses were below reported limits.

Table 5.6 (Continued).

Sampling Depth (feet)	Sample Number									
	NMO-TR-005-02	NMO-TR-005-03	NMO-TR-005-05	NMO-TR-010-01	NMO-TR-010-01SP	NMO-TR-010-01SP	NMO-TR-010-02	NMO-TR-010-03	NMO-TR-010-05	NMO-TR-011-02
	4	6	6	2	2	2	4	6	2	2
COMPOUND	Lab. Dup.*									
UNITS										
Benzene	ug/kg	3.2								
Toluene	ug/kg	4.2	0.78	1.3			8.5	0.33		1.2
Ethylbenzene	ug/kg	4.1	1.4	1.7	0.4	1.5	2.9	15	0.77	0.5
Xylenes	ug/kg	15	2.5	3	0.4	1.8	3.5	30	2	0.3

1/ Blanks and all other analyses were below reported limits.

* Sample analysis was duplicated in the laboratory.

SP = Spiked sample

Table 5.6 (Continued).

		Sample Number						
		NMO-TR- 012-01	NMO-TR- 012-02	NMO-TR- 012-03	NMO-TR- 013-01	NMO-TR- 013-02	NMO-TR- 013-03	NMO-TR- 013-05
	Sampling Depth (feet)	7	9.5	8	2	6.5	8.5 - 9	
COMPOUND	UNITS							
Benzene	ug/kg	4.5		0.6		1.8	1.4	1.8
1,1,2,2-Tetrachloroethane	ug/kg			0.8				
Toluene	ug/kg	14.4	3.3	7.9	0.67	7	1.2	6.6
Ethylbenzene	ug/kg	13.6	4.2	10		8.5	1.3	8.6
Xylenes	ug/kg	21	7.4	16		19	2.8	19

1/ Blanks and all other analyses were below reported limits.

Table 5.7

Three-Mile Ditch -Trench and Soil Borings, Analytical Results, Semivolatiles, RFI Phase I
Report, Navajo Refining Company, October 1990.

SAMPLING DEPTH (feet)	Sample Number								
	KMO-TR- 000-01	KMO-TR- 000-02	KMO-TR- 000-03	KMO-TR- 001-01	KMO-TR- 001-02	KMO-TR- 001-03	KMO-TR- 001-04	KMO-TR- 001-05	KMO-TR- 002-03
	2	4	7	3 - 7	1.7 - 2	3.5 - 4	8.5 - 9	1.7 - 2	5
COMPOUND	UNITS								
Acenaphthene	ng/kg	31	9.2	4.5					
Anthracene	ng/kg	88	20	23	0.66	0.67		1.7	
Benzo(a)anthracene	ng/kg	7.1	2	1.6					
Benzo(b)fluoranthene	ng/kg	4.9	0.8						
Benzo(a)pyrene	ng/kg	2.7							
Bis(2-ethylhexyl)phthalate	ng/kg	0.79		1.1	1.4	2.6	0.89	1.9	
Butylbenzyl phthalate	ng/kg				0.73				
4-Chloroaniline	ng/kg								
4-Chloro-3-methylphenol	ng/kg								
Chrysene	ng/kg	14	3.4	2.4					
Dibenzofuran	ng/kg	34	9.7	12					
Di-n-butyl phthalate	ng/kg			2.6	2.7	2.2	1.2		
Fluoranthene	ng/kg	120	22	11					
Fluorene	ng/kg		43	25	0.66				
2-Methylnaphthalene	ng/kg	260	65	43	2.7	0.95		0.66	
Naphthalene	ng/kg	89	20	9.1					
Phenanthrene	ng/kg	72	18	15	0.98			4.3	5
Pyrene	ng/kg	53	15	14					0.7

1/ Blanks and all other analyses were below reported limits.

Table 5.7 (Continued).

COMPOUND	UNITS	Sample Number						
		NMO-TR-002-04	NMO-TR-003-03	NMO-TR-004-01	NMO-TR-004-02	NMO-TR-004-03	NMO-TR-005-01	NMO-TR-005-02
Sampling Depth (feet)		5.5 - 6	5	1	3 - 4	3 - 4	1.5	4
Acenaphthene	ng/kg							3.2
Anthracene	ng/kg							20.4
Benzo(a)anthracene	ng/kg							6.8
Benzo(g,h,i)perylene	ng/kg						3.6	2
Benzo(a)pyrene	ng/kg						1	1
Bis(2-ethylhexyl)phthalate	ng/kg				1.7	1.7	1	28.2
Chrysene	ng/kg							3.2
Dibenzofuran	ng/kg							5.6
Di-n-butyl phthalate	ng/kg	1.7	2.3			1.1		
Diethylphthalate	ng/kg		4.2					
Fluoranthene	ng/kg							9.8
Fluorene	ng/kg							27.2
2-Methylnaphthalene	ng/kg				0.99			39
Naphthalene	ng/kg							9.4
2-Nitroaniline	ng/kg							
Phenanthrene	ng/kg			8				71
Pyrene	ng/kg						1.2	11

1/ Blanks and all other analyses were below reported limits.

Table 5.7 (Continued).

		Sample Number							
		NMD-TR- 005-03	NMD-TR- 005-05	NMD-TR- 006-01	NMD-TR- 006-02	NMD-TR- 006-03	NMD-TR- 007-01	NMD-TR- 007-03	NMD-TR- 007-04
	Sampling depth (feet)	6	6	1	2	5	1.5 - 2	4	4.5
COMPOUND	UNITS								
Anthracene	ng/kg		0.88						
Benzo(b)fluoranthene	ng/kg		0.82						
Benzo(g,h,i)perylene	ng/kg				2.4				
Bis(2-chloroisopropyl)ether	ng/kg					1.5			
Bis(2-ethylhexyl)phthalate	ng/kg			1.3	4	0.81		1.1	1.1
Butyl benzyl phthalate	ng/kg			1		0.75			1
Di-n-butyl phthalate	ng/kg		1.4	1.3	1.1	1.5			
Fluoranthene	ng/kg	0.7							
Fluorene	ng/kg	2.5	1.2						
2-Methylnaphthalene	ng/kg	2.3	2.3						
Phenanthrene	ng/kg	6.7	2.6		6.8				
Pyrene	ng/kg	1.3					2.3		

1/ Blanks and all other analyses were below reported limits.

Table 5.7 (Continued).

COMPOUND	UNITS	Sample Number									
		NND-TR-008-01	NND-TR-008-02	NND-TR-008-03	NND-TR-009-01	NND-TR-009-02	NND-TR-009-03	NND-TR-010-01	NND-TR-010-01SP	NND-TR-010-02	
Sampling Depth (feet)		5	1.8 - 2.5	3 - 3.3	1.5	3	5.5	2	2	4	
Acenaphthene	ng/kg										15
Anthracene	ng/kg										21
Benzo(a)anthracene	ng/kg				14						
Benzo(b)fluoranthene	ng/kg				7.5						
Benzo(g,h,i)perylene	ng/kg				5.8						
Benzo(a)pyrene	ng/kg				7.2						11
Bis(2-ethylhexyl)phthalate	ng/kg				6.5	1.2	1.4				
Chrysene	ng/kg				15						
Dibenzofuran	ng/kg										29
Dimethylphthalate	ng/kg							1.4			
Di-n-butyl phthalate	ng/kg				0.67			1			2
2,4-Dinitrotoluene	ng/kg										
2,6-Dinitrotoluene	ng/kg										17
Di-n-octyl phthalate	ng/kg										2
Fluoranthene	ng/kg				6.6						15
Fluorene	ng/kg										56
2-Methylnaphthalene	ng/kg										230
Naphthalene	ng/kg							0.7			46
Pentachlorophenol	ng/kg							1.4			
Phenanthrene	ng/kg				5.1			8.5	6.6		270
Pyrene	ng/kg				25			7.5	3.2		60

1/ Blanks and all other analyses were below reported limits.

* Sample analysis was duplicated in the laboratory.

SP = Spiked sample

Table 5.7 (Continued).

		Sample Number								
		NMO-TR-010-03	NMO-TR-010-04	NMO-TR-010-05	NMO-TR-011-01	NMO-TR-011-02	NMO-TR-011-03	NMO-TR-012-01	NMO-TR-012-02	NMO-TR-013-01
Sampling Depth (feet)		6	9	2	1.3	2	4.5	7	9.5	2
COMPOUND	UNITS									
Acenaphthene	ng/kg	0.77				6.1		15	12.4	
Anthracene	ng/kg								14.1	
Benzo(a)anthracene	ng/kg	2.8				14.7		19.8	27	
Benzo(g,h,i)perylene	ng/kg								6.1	
Benzo(a)pyrene	ng/kg								9.9	
Bis(2-ethylhexyl)phthalate	ng/kg	2.8	1.2							
Chrysene	ng/kg	2.2				15		20	29	
Dibenzofuran	ng/kg	1.8				14.7		27	18.4	
Di-n-butyl phthalate	ng/kg		0.69	0.8	1.6	1.2		1.8	5.3	
2,4-Dinitrotoluene	ng/kg			2.9	7.9	10.2		3.1		
2,6-Dinitrotoluene	ng/kg				1.2	12.8		12.6	13.5	
Fluoranthene	ng/kg	1.2				6.1	0.75	5.4	13.8	
Fluorene	ng/kg	4.1				29.9		37	52	
2-Methylnaphthalene	ng/kg	12								
Naphthalene	ng/kg	2				22.3		55	33	
4-Nitrophenol	ng/kg									
Phenanthrene	ng/kg	18		10.2	15.4	101	2.6		220	3.3
Pyrene	ng/kg	4.1		8.9	14.9	31	3	33	43	1.5

1/ Blanks and all other analyses were below reported limits.

Table 5.7 (Continued).

COMPOUND	UNITS	Sample Number					
		NMO-TR-	NMO-TR-	NMO-TR-	NMO-TR-	NMO-TR-	NMO-TR-
		013-02	013-03	013-05	S1-01	S1-02	S1-03
Sampling Depth (feet)		6.5	8.5 - 9	6.5	1.5	3 - 4	8
Acenaphthene	ng/kg		0.71	11			
Anthracene	ng/kg		5.9				
Benzo(a)anthracene	ng/kg		1.8	5			
Butyl-benzyl phthalate	ng/kg					0.92	1.3
Dibenzofuran	ng/kg	3.8	1.2	4.2			
Di-n-butyl phthalate	ng/kg		10	20	1.4	2	
2,4-Dinitrotoluene	ng/kg	2.4		8.4			
2,6-Dinitrotoluene	ng/kg	5.1		8			
Fluoranthene	ng/kg		0.9	2.2			
Fluorene	ng/kg	7.2	6.1	13			
2-Methylnaphthalene	ng/kg	2.5	5	37			
Naphthalene	ng/kg	5		5			
Phenanthrene	ng/kg		10	27			
Pyrene	ng/kg		0.82	13			

1/ Blanks and all other analyses were below reported limits.

Table 5.8

Three-Mile Ditch - Trench and Soil Borings Analytical Results, Metals and Oil and Grease,
RFI Phase I Report, Navajo Refining Company, October 1990.

		Sample Number								
		NMO-TR- SI-01	NMO-TR- SI-02	NMO-TR- SI-03	NMO-TR- 000-01	NMO-TR- 000-02	NMO-TR- 000-03	NMO-TR- 001-01	NMO-TR- 001-02	NMO-TR- 001-03
Sampling Depth (feet)		1.5	3 - 4	8	2	4	7	3 - 7	1.7 - 2	3.5 - 4
METAL	UNITS									
Antimony	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	ng/kg	15.2	5.29	6.11	12.9	3.03	13.9	3.16	6.92	2.89
Barium	ng/kg	70.8	124	96.1	73.5	75.9	366	75.8	85	99.3
Beryllium	ng/kg	0.621	0.809	0.611	< 0.30	< 0.30	< 0.30	0.85	0.58	< 0.30
Cadmium	ng/kg	5.59	3.95	3.2	3.03	0.94	0.74	6.2	4.98	2.64
Chromium	ng/kg	433	< 0.30	< 0.30	3390	5.9	10.5	19.5	13.7	10.2
Lead	ng/kg	22.3	6.22	< 0.50	2175	0.974	1.01	13.3	10.2	17
Mercury	ng/kg	0.17	< 0.05	< 0.05	1	0.17	0.07	0.09	0.07	0.06
Nickel	ng/kg	14.3	11.5	8.61	12	4.84	0.29	16.1	12.7	6.43
Selenium	ng/kg	< 0.50	< 0.50	< 0.50	1.39	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silver	ng/kg	2.79	< 0.50	4.72	1.2	3.03	3.25	< 0.50	< 0.50	2.25
Zinc	ng/kg	35.4	22.4	6.4	57.2	4	2.16	47.3	31.2	11.8
Oil and Grease	percent	16.7	0.014	0.034	5.15	2.21	2.19	0.076	0.144	0.026

Table 5.8 (Continued).

COMPOUND/I	UNITS	Monitor Well Number Date									
		MW-4 3-88	MW-4 6-89	MW-4 7-89	MW-4 7-89	MW-5 9-86	MW-5 8-87	MW-5 11-87	MW-5 7-89	MW-5 7-89	MW-6 9-86
Butyl benzyl phthalate	ug/l										< 5
Cresols (methyl phenols)	ug/l				< 1						
Chrysene	ug/l	< 10		< 10	< 1					< 1	< 5
Dibenzofuran	ug/l										< 5
Dibenzo(a,h)anthracene	ug/l	< 10		< 10	< 1					< 1	< 5
Dibenzo(a,i)acridine	ug/l				< 1					< 1	
Dibenzo(a,e)pyrene	ug/l				< 1					< 1	
Dibenzo(a,h)pyrene	ug/l				< 1					< 1	
Dibenzo(a,i)pyrene	ug/l				< 1					< 1	
Diethyl phthalate	ug/l										< 5
Dimethyl phthalate	ug/l										< 5
Di-n-butyl phthalate	ug/l										< 5
Di-n-octyl phthalate	ug/l										< 5
Fluoranthene	ug/l	< 10		< 10	< 1					< 1	< 5
Fluorene	ug/l	< 10		< 10	< 1					< 1	< 5
Hexachlorobenzene	ug/l										< 5
Hexachlorobutadiene	ug/l										< 5
Hexachloroethane	ug/l										< 5
Hexachlorocyclopentadiene	ug/l										< 5
Indeno(1,2,3-cd)pyrene	ug/l	< 10		< 10	< 1					< 1	< 5
Isophorone	ug/l										< 5
Naphthalene	ug/l	< 10		< 10	< 1.8					< 1.8	< 5
Nitrobenzene	ug/l										< 5
N-nitrosodipropylamine	ug/l										< 5
N-nitrosodiphenylamine	ug/l										< 5
Pentachlorophenol	ug/l			< 50	< 8	< 5			< 50		
Phenanthrene	ug/l	< 10		< 10	< 1					< 1	< 5
Phenol	ug/l			< 10	30	< 5			< 10		
Pyrene	ug/l	< 10		< 10	< 1					< 1	< 5
1,2-Dichlorobenzene	ug/l					< 20					< 5
1,3-Dichlorobenzene	ug/l					< 20					< 5
1,4-Dichlorobenzene	ug/l					< 20					< 5

Table 5.8 (Continued).

		Sample Number										
		NMO-TR-001-04	NMO-TR-001-05	NMO-TR-002-01	NMO-TR-002-03	NMO-TR-002-04	NMO-TR-003-01	NMO-TR-003-02	NMO-TR-003-03	NMO-TR-004-01	NMO-TR-004-02	NMO-TR-004-03
Sampling Depth (feet)		8.5 - 9	1.7 - 2	3 - 5	5	5.5 - 6	4 - 1	1.3 - 1.7	5	1	3 - 4	3 - 4
METAL	UNITS											
Antimony	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.668	< 0.50	< 0.50
Arsenic	ng/kg	2.79	12.3	2.89	3.5	3.81	32.7	14.6	2.34	22.9	6.01	4.08
Barium	ng/kg	21	93.3	124	78.6	82.2	80.7	135	69.5	210	95.9	79.5
Beryllium	ng/kg	0.46	0.68	0.78	0.32	0.41	0.76	0.62	0.3	0.63	0.72	0.58
Cadmium	ng/kg	3.1	5.52	5.4	2.5	2.8	5.07	4.05	2.31	6.4	6	3
Chromium	ng/kg	19.2	37.4	31.6	10.2	13.5	56.3	18.8	9.53	373	20.1	11
Lead	ng/kg	3.98	30.9	11.6	3.63	4.05	67.7	14.7	2.79	480	682	48.1
Mercury	ng/kg	0.05	0.07	< 0.05	< 0.05	< 0.05	*	< 0.05	< 0.05	1	0.067	0.19
Nickel	ng/kg	7	13	13.3	7	7.5	14.7	11.5	5.26	14.4	13.5	10.2
Selenium	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silver	ng/kg	< 0.50	< 0.50	1.45	1.28	1.45	1.09	1.41	1.17	2.2	< 0.50	< 0.50
Zinc	ng/kg	16.9	39.8	44.5	17.3	21.3	46.8	33.7	16.5	200	43.4	27.8
Oil and Grease	percent	0.016	0.142	0.206	0.297	0.036	0.379	1.5	0.049	1.35	0.136	0.065

* Insufficient sample

Table 5.8 (Continued).

SAMPLING DEPTH (feet)	Sample Number								
	NMO-TR-004-04	NMO-TR-005-01	NMO-TR-005-02	NMO-TR-005-03	NMO-TR-005-05	NMO-TR-006-01	NMO-TR-006-02	NMO-TR-006-03	NMO-TR-007-01
	5	1.5	4	6	6	1	2	5	1.5 - 2
METAL	UNITS								
Antimony	ng/kg	< 0.50	0.616	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	ng/kg	5.17	46.1	17.3	11	6.62	3.53	15.2	11
Barium	ng/kg	195	122	185	110	183	80.2	140	54
Beryllium	ng/kg	0.81	0.29	0.62	0.59	1.2	0.48	0.71	< 0.30
Cadmium	ng/kg	7.3	4.7	5.9	2.9	6.9	5.3	7.7	7.2
Chromium	ng/kg	19.4	16.8	305	22.6	35.3	17.7	76.7	6.05
Lead	ng/kg	123	18.03	830	35.2	60.8	340	223	3.3
Mercury	ng/kg	< 0.05	1	0.67	< 0.05	0.1	0.08	0.7	0.03
Nickel	ng/kg	15.2	25.8	15.3	10.1	21.7	11.9	17.5	8.24
Selenium	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silver	ng/kg	< 0.50	2.64	1.47	1.31	3.31	0.962	2.26	2.44
Zinc	ng/kg	45.6	352	264	28	59.1	35.6	171	15.7
Oil and Grease	percent	< 0.01	3.98	6.5	0.584	0.266	< 0.01	2.95	0.023

Table 5.8 (Continued).

		Sample Number											
		NMO-TR-007-02	NMO-TR-007-03	NMO-TR-007-04	NMO-TR-008-01	NMO-TR-008-02	NMO-TR-008-03	NMO-TR-009-01	NMO-TR-009-02	NMO-TR-009-03	NMO-TR-009-04	NMO-TR-010-01	
Sampling Depth (feet)		2	4	4.5	.5	1.8	2.5-3	3.3	1.5	3	5.5	6	2
METAL	UNITS												
Antimony	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Arsenic	ng/kg	2.65	18.5	9.49	48.3	4.96	3.91	32.9	2.53	3.42	3.27	91.4	
Barium	ng/kg	35	116	82	75.2	90.1	113	171	75.7	46.1	47.8	71.5	
Beryllium	ng/kg	< 0.30	< 0.30	0.6	0.39	0.69	0.62	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	
Cadmium	ng/kg	1.53	5.7	4.1	3.7	4.4	1.5	4.06	3.44	1.89	1.75	3.62	
Chromium	ng/kg	8.4	171	11.6	61.9	28.3	18.5	594	12.8	9	6.6	1220	
Lead	ng/kg	467	863	10.1	2196	15.5	6.63	305	7.7	8.93	2.92	206	
Mercury	ng/kg	0.07	0.27	0.03	0.67	< 0.05	< 0.05	0.533	< 0.05	< 0.05	< 0.05	0.153	
Nickel	ng/kg	4.36	13.2	12.7	12.2	12.1	10.1	19.4	7.7	5.52	4.08	9.46	
Selenium	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Silver	ng/kg	1.57	2.96	< 0.50	1.93	0.83	0.98	2.15	1.38	< 0.50	< 0.50	8.11	
Zinc	ng/kg	11.6	336	29.5	84.7	41	35.6	683	29.6	19.1	15	250	
Oil and Grease	percent	< 0.01	0.056	< 0.01	4.47	1.66	1.54	12.2	0.208	0.021	< 0.01	5.61	

Table 5.8 (Continued).

		Sample Number										
		NMO-TR-010-01SP	NMO-TR-010-02	NMO-TR-010-03	NMO-TR-010-04	NMO-TR-010-05	NMO-TR-011-01	NMO-TR-011-02	NMO-TR-011-03	NMO-TR-011-04	NMO-TR-012-01	NMO-TR-012-02
Sampling Depth (feet)		2	4	6	9	2	1.3	2	4.5	10	7	9.5
METAL	UNITS											
Antimony	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	ng/kg	127	29.9	39	8.43	124	108	98	110	69.6	57.4	130
Barium	ng/kg	123	102	224	87	112	82	75	140	64.3	32.8	184
Beryllium	ng/kg	< .3	< 0.30	0.33	0.33	0.3	< 0.30	< 0.30	0.71	0.55	< 0.30	0.61
Cadmium	ng/kg	3.57	3.41	5.14	4.46	4.05	3.13	3.38	5.29	3.41	1.75	5.3
Chromium	ng/kg	1500	1173	500	33	1600	1950	2080	28.7	31.2	2550	1070
Lead	ng/kg	226	252	378	24.9	422	239	362	671	10.9	110	47.1
Mercury	ng/kg	0.17	0.3	< 0.05	< 0.05	0.195	0.067	< 0.05	0.1	< 0.05	0.133	0.133
Nickel	ng/kg	15.2	13	14.4	11.1	13	10.6	11.1	14.9	11.4	10.1	18.4
Selenium	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silver	ng/kg	6.52	2.22	2.52	1.51	7.73	5.71	7.67	3.25	5.27	1.62	5.33
Zinc	ng/kg	583	480	267	41.2	291	210	571	68.1	30.1	510	400
Oil and Grease	percent	6.68	10.8	5.28	0.046	9.45	15.3	8.09	2.91	0.01	18.3	11.4

SP = Spiked sample

Table 5.8 (Continued).

		Sample Number				
		NMO-TR-012-03	NMO-TR-013-01	NMO-TR-013-02	NMO-TR-013-03	NMO-TR-013-05
Sampling depth (feet)		8	2	6.5	8.5-9	6.5
METAL	UNITS					
Antimony	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	ng/kg	112	4.48	12.6	4.05	14.7
Barium	ng/kg	136	222	41.7	240	41
Beryllium	ng/kg	0.78	0.47	< 0.30	0.41	< 0.30
Cadmium	ng/kg	5.4	2.93	1.33	2.5	1.17
Chromium	ng/kg	174	47.4	547	11.1	760
Lead	ng/kg	25.1	22.8	14.5	3.08	11
Mercury	ng/kg	< 0.05	0.1	0.07	< 0.05	0.1
Nickel	ng/kg	15.3	11.1	4.1	9	4
Selenium	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silver	ng/kg	2.79	0.53	1.26	0.58	0.67
Zinc	ng/kg	98.5	40.9	50.5	20.8	63.6
Oil and Grease	percent	5.82	*	4.92	0.562	5.83

* Insufficient sample

Table 5.9

Three-Mile Ditch - Background Soil Borings Analytical Results, Metals and Oil and Grease,
RFI Phase I Report, Navajo Refining Company, October 1990.

		Sample Number									
		NMO-SB-002-01	NMO-SB-002-02	NMO-SB-007-01	NMO-SB-007-02	NMO-SB-010-01	NMO-SB-010-02	NMO-SB-012-01N	NMO-SB-012-02N	NMO-SB-012-01S	NMO-SB-012-02S
Sampling Depth (feet)		1 - 1.5	5 - 5.5	1.5 - 2	5 - 5.5	1.5	5 - 5.5	1 - 1.5	5.5 - 6	1.5 - 2	5 - 5.5
METAL	UNITS										
Antimony	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	ng/kg	6.42	4.58	3.58	3.81	7.12	9.09	4.41	1.03	83	70
Barium	ng/kg	106	109	77.4	89.2	87.3	76	270	132	241	59.8
Beryllium	ng/kg	< 0.30	< 0.30	< 0.30	< 0.30	0.3	0.47	0.83	< 0.30	0.68	0.44
Cadmium	ng/kg	4.08	2.21	3.28	3.91	3.01	5.25	4.4	1.4	3.81	3.42
Chromium	ng/kg	17.5	10	12.6	13.2	11.3	15.3	13.8	5.4	26.8	25
Lead	ng/kg	19.7	8.01	9.54	19.7	8.79	10.3	14.6	5.16	9.51	4.91
Mercury	ng/kg	0.05	0.05	< 0.05	0.03	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	ng/kg	12.4	5.45	9.24	10.8	9.31	13.5	16.5	5.7	15.2	10.4
Selenium	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silver	ng/kg	2.02	3.53	1.79	2.22	< 0.50	1.47	< 0.50	< 0.50	3.1	1.58
Zinc	ng/kg	41.6	17.4	29.2	34.1	30.5	40.1	35.7	15.9	34.4	26.5
Oil and Grease	percent	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.032	0.002	0.002

N - North, S - South

Table 5.16 Eagle Creek Sediments Analytical Results, Semivolatiles, RFI Phase I Report, Navajo Refining Company, October 1990.

COMPOUND	UNITS	Sample Number
		NEC-S0- 001-01 (Surface Sediment Sample)
Bis(2-ethylhexyl)phthalate	ng/kg	0.81
Di-n-butyl phthalate	ng/kg	1.7

1/ Blanks and all other analyses were below reported limits.

Table 5.17 Eagle Creek Sediments Analytical Results, Metals, RFI Phase I Report, Navajo Refining Company, October 1990.

		Sample Number					
		NEC-SO- 001-01	NEC-SO- 002-01	NEC-SO- 003-01	NEC-SO- 003-02	NEC-SS- 004-01	NEC-SS- 005-01
METAL	UNITS	(Surface Sediment Samples)					
Antimony	ng/kg	3.16	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00
Arsenic	ng/kg	2.47	4.13	3.62	3.03	< 0.2	4.87
Barium	ng/kg	85.6	5.9	65.5	100	143	109
Beryllium	ng/kg	0.3	0.254	0.23	0.212	<±0.03	0.189
Cadmium	ng/kg	2.4	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chromium	ng/kg	8.29	5.08	12.3	8.17	17	4.7
Lead	ng/kg	15.4	12.7	37.7	13	69.3	4.06
Mercury	ng/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	ng/kg	6.45	5.4	5.3	4.5	8.81	7.3
Selenium	ng/kg	< 0.50	< 1.50	< 1.50	< 1.50	< 1.50	< 1.50
Silver	ng/kg	< 0.50	1.9	1.65	2.72	0.85	2.7
Zinc	ng/kg	46.5	11.1	16.1	11.8	48.3	0.31

Table 5.20

Eagle Creek/Three-Mile Ditch - Ground Water Analytical Results, Semivolatiles, RFI Phase I Report, Navajo Refining Company, October 1990.

		----- Sample Number -----						
COMPOUND	UNITS	XMO-GW- 006-01	XMO-GW- 006-01	XMO-GW- 007-01	XMO-GW- 007-01	XMO-GW- 045-01	XMO-GW- 045-01	XMO-GW- 046-01
		MV-8	Lab. Dup. *	MV-9	Lab. Dup. *	# 45	Lab. Dup. *	# 46
Bis(2-ethylhexyl)phthalate	ug/l	24	38	31	26	23	20	21

1/ Blanks and all other analyses were below reported limits.

* Sample analysis was duplicated in the laboratory.

Table 5.21

Three-Mile Ditch/Eagle Creek - Ground Water Analytical Results, RFI Phase I Report, Navajo Refining Company, October 1990.

COMPOUND	UNITS	Sample Number				
		Monitor Well				
		NMO-GW-	NMO-GW-	NMO-GW-	NMO-GW-	NMO-GW-
		030-01	045-01	046-01	006-01	007-01
		#30	#45	#46	NW-8	NW-9
Antimony	ng/l	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	ng/l	0.058	0.055	0.037	0.014	0.035
Barium	ng/l	1.56	0.62	0.33	<0.10	<0.10
Beryllium	ng/l	0.008	0.004	0.001	<0.001	<0.001
Cadmium	ng/l	0.005	<0.005	<0.005	<0.005	<0.005
Chromium	ng/l	0.05	0.1	0.05	2.27	3.99
Lead	ng/l	0.09	1.83	0.028	<0.01	<0.01
Mercury	ng/l	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	ng/l	0.09	0.09	0.08	0.28	1.2
Selenium	ng/l	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	ng/l	<0.01	0.02	<0.01	<0.01	<0.01
Zinc	ng/l	0.11	0.13	<0.01	<0.01	<0.01

Table 5.22

Three-Mile Ditch/Eagle Creek - Ground Water Analytical Results, Inorganics, RFI Phase I
Report, Navajo Refining Company, October 1990.

		Sample Number				
		Monitor Well				
		NND-GW- 030-01	NND-GW- 045-01	NND-GW- 046-01	NND-GW- 006-01	NND-GW- 007-01
		#30	#45	#46	MW-8	MW-9
COMPOUND	UNITS					
Bicarbonate	ng/l	460	338	358		
Chloride	ng/l	354	283	638		
Fluoride	ng/l	1.67	2.59	3.17		
Sulfate	ng/l	964	1310	1250		
Total Dissolved Solids	ng/l	2820	3160	364	5640	5430

Evaporation Ponds - Historical Ground Water Quality, Volatiles, RFI Phase I Report, Navajo Refining Company, October 1990.

		Monitor Well Number									
		Date									

COMPOUND / I	UNITS	OCD-1 7/89b	OCD-2 7/89b	OCD-3 7/89b	OCD-4 7/89b	OBC-5 7/89b	OCD-6 7/89b	OCD-7 7/89b	OCD-8 7/89a	OCD-8 7/89b	OCD-8 6/89
1,1,1,2-Tetrachloroethane	ug/l								< 1		
1,1,1-Trichloroethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
1,1,2,2-Tetrachloroethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
1,1,2-Trichloroethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
1,1-Dichloroethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
1,2,3-Trichloropropane	ug/l								< 1		
1,2-Dichloroethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
1,2-Dichloropropane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
1,3-Dichloropropylene	ug/l								< 1		
1-Chloroethyl vinyl ether	ug/l								< 1		
1-Chlorohexane	ug/l								< 1		
1-Methylnaphthalene	ug/l										
2,2-Dichloropropane	ug/l								< 1		
2-Chloroethyl vinyl ether	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10		< 10	
2-Methylnaphthalene	ug/l										
2-Sec-butyl-4,6-dinitrophenol	ug/l										
Benzene	ug/l	< 5	< 5	< 5	< 5	6.0	< 5	< 5	< 0.2	< 5	4.4
Benzyl chloride	ug/l								< 1		
Bromobenzene	ug/l								< 1		
Bromodichloromethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
Bromoform	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
Bromomethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 1	< 10	
Carbon tetrachloride	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
Chloroacetaldehyde	ug/l								< 1		
Chlorobenzene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.2	< 5	
Chloroethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 1	< 10	
Chloroform	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
Chloromethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 1	< 10	
Chloromethyl methyl ether	ug/l								< 1		
Chlorotoluene	ug/l								< 1		
Cis-1,3-dichloropropene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5		< 5	

Table 6.1 (Continued).

COMPOUND /1	UNITS	Monitor Well Number Date									
		OC0-1 7/89b	OC0-2 7/89b	OC0-3 7/89b	OC0-4 7/89b	OC0-5 7/89b	OC0-6 7/89b	OC0-7 7/89b	OC0-8 7/89a	OC0-8 7/89b	OC0-8 6/89
Dibromochloromethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
Dibromomethane	ug/l								< 1		
Dichlorodifluoromethane	ug/l								< 1		
Dichloromethane	ug/l								< 1		
Ethylbenzene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.2	< 5	14
Freon	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5		< 5	
Methylene chloride	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5		< 5	
m-Xylene	ug/l								< 0.2		
o-Xylene	ug/l								< 0.2		
p-Xylene	ug/l								< 0.2		
Tetrachloroethene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
Tetrachlorophenol	ug/l										
Toluene	ug/l	< 5	< 5	< 5	< 5	6.0	< 5	< 5	18.38	< 5	
Trans-1,2-dichloroethene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
Trans-1,3-dichloropropene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5		< 5	
Trichloroethene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 1	< 5	
Trichlorofluoromethane	ug/l								< 1		
Trichlorophenol	ug/l										
Vinyl chloride	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1		< 1	
Xylenes	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10		< 10	35

Source: Evaporation Ponds Special Analysis. Scientific Laboratory,
June 01, 1988; April 27, 1987; August 12, 1987; November 12, 1987
Evaporation Ponds Special Analysis. Rocky Mountain Laboratories,
March 16, 1988; June 22, 1988
Evaporation Ponds Special Analysis. Inter-mountain Laboratories,
July 25, 1989; July 26, 1989
Evaporation Ponds Special Analysis. Ana-Lab,
July 25, 1989; July 26, 1989
Evaporation Ponds Special Analysis. ENESCO,
June 22, 1989

1/ Blanks designate components for which no analyses were requested.

Table 6.1 (Continued).

COMPOUND/1	UNITS	Monitor Well Number Date									
		MW-1 9/86	MW-1 7/89a	MW-2 9/86	MW-2 7/89a	MW-3 9/86	MW-3 7/89a	MW-3 7/89b	MW-4 9/86	MW-4 8/87	MW-4 11/87
1,1,1,2-Tetrachloroethane	ug/l	< 5				< 5		< 1			
1,1,1-Trichloroethane	ug/l	< 5	< 5		< 5	< 5	< 5	< 1			
1,1,2,2-Tetrachloroethane	ug/l		< 5		< 5		< 5	< 1			
1,1,2-Trichloroethane	ug/l	< 5	< 5		< 5	< 5	< 5	< 1			
1,1-Dichloroethane	ug/l	< 5	< 5		< 5	< 5	< 5	< 1			
1,2,3-Trichloropropane	ug/l							< 1			
1,2-Dichloroethane	ug/l	< 5	< 5		< 5	< 5	< 5	< 1			
1,2-Dichloropropane	ug/l	< 5	< 5		< 5	< 5	< 5	< 1			
1,3-Dichloropropylene	ug/l	< 5				< 5		< 1			
1-Chloroethyl vinyl ether	ug/l							< 1			
1-Chlorohexane	ug/l							< 1			
1-Methylnaphthalene	ug/l									98	
2,2-Dichloropropane	ug/l							< 1			
2-Chloroethyl vinyl ether	ug/l	< 5	< 10		< 10	< 5	< 10				
2-Methylnaphthalene	ug/l									< 10	
2-Sec-butyl-4,6-dinitrophenol	ug/l							< 1			
Benzene	ug/l	< 5	< 5	< 0.5	< 5	< 5	< 5	< 0.2	< 5	45	51
Benzyl chloride	ug/l							< 1			
Bromobenzene	ug/l							< 1			
Bromodichloromethane	ug/l		< 5		< 5		< 5				
Bromoform	ug/l	< 5	< 5		< 5	< 5	< 5	< 1			
Bromomethane	ug/l		< 10		< 10		< 10	< 1			
Carbon tetrachloride	ug/l	< 5	< 5		< 5	< 5	< 5	< 1			
Chloroacetaldehyde	ug/l							< 1			
Chlorobenzene	ug/l	< 5	< 5	< 1	< 5	< 5	< 5	< 0.2	< 10		
Chloroethane	ug/l	< 10	< 10		< 10	< 10	< 10	< 1			
Chloroform	ug/l	< 5	< 5		< 5	< 5	< 5	< 1			
Chloromethane	ug/l		< 10		< 10		< 10	< 1			
Chloromethyl methyl ether	ug/l							< 1			
Chlorotoluene	ug/l							< 1			
Cis-1,3-dichloropropene	ug/l		< 5		< 5		< 5				

Table 6.1 (Continued).

COMPOUND/1	UNITS	Monitor Well Number Date									
		MW-1 9/86	MW-1 7/89a	MW-2 9/86	MW-2 7/89a	MW-3 9/86	MW-3 7/89a	MW-3 7/89b	MW-4 9/86	MW-4 8/87	MW-4 11/87
Dibromochloromethane	ug/l		< 5		< 5		< 5	< 1			
Dibromomethane	ug/l							< 1			
Dichlorodifluoromethane	ug/l							< 1			
Dichloromethane	ug/l							< 1			
Ethylbenzene	ug/l	< 5	< 5	< 1	< 5	< 5	< 5	< 0.2	< 10	130	156
Freon	ug/l		< 5		< 5		< 5				
Methylene chloride	ug/l	< 10	< 5		< 5	< 10	< 5				
m-Xylene	ug/l							< 0.2		942	12
o-Xylene	ug/l							< 0.2		40	32
p-Xylene	ug/l							< 0.2		10	15
Tetrachloroethene	ug/l	< 5	< 5		< 5	< 5	< 5	< 1			
Tetrachlorophenol	ug/l										
Toluene	ug/l	< 5	< 5	6.4	< 5	< 5	< 5	21.9	< 10	280	25
Trans-1,2-dichloroethene	ug/l		< 5		< 5		< 5	< 1			
Trans-1,3-dichloropropene	ug/l		< 5		< 5		< 5				
Trichloroethene	ug/l	< 5	< 5		< 5	< 5	< 5	< 1			
Trichlorofluoromethane	ug/l							< 1			
Trichlorophenol	ug/l										
Vinyl chloride	ug/l	< 10	< 1		< 1	< 10	< 1				
Xylenes	ug/l		< 10		< 10		< 10				

Table 6.1 (Continued).

COMPOUND/1	UNITS	Monitor Well Number Date									
		KW-4 3/88	KW-4 6/89	KW-4 7/89a	KW-4 7/89b	KW-5 9/86	KW-5 8/87	KW-5 11/87	KW-5 7/89a	KW-5 7/89b	KW-6 9/86
1,1,1,2-Tetrachloroethane	ug/l				< 1					< 1	
1,1,1-Trichloroethane	ug/l			< 5	< 1			< 5	< 1	< 5	
1,1,2,2-Tetrachloroethane	ug/l			< 5	< 1			< 5	< 1	< 5	
1,1,2-Trichloroethane	ug/l			< 5	< 1			< 5	< 1	< 5	
1,1-Dichloroethane	ug/l			< 5	< 1			< 5	< 1	< 5	
1,2,3-Trichloropropane	ug/l				< 1					< 1	
1,2-Dichloroethane	ug/l			< 5	< 1			< 5	< 1	< 5	
1,2-Dichloropropane	ug/l			< 5	< 1			< 5	< 1	< 5	
1,3-Dichloropropylene	ug/l				< 1					< 1	< 5
1-Chloroethyl vinyl ether	ug/l				< 1					< 1	
1-Chlorohexane	ug/l				< 1					< 1	
1-Methylnaphthalene	ug/l										
2,2-Dichloropropane	ug/l				< 1					< 1	
2-Chloroethyl vinyl ether	ug/l			< 10					< 10		< 5
2-Methylnaphthalene	ug/l										
2-Sec-butyl-4,6-dinitrophenol	ug/l				< 1					< 1	
Benzene	ug/l	30	14	< 5	< 0.2	< 5	TR		< 5	< 0.2	< 5
Benzyl chloride	ug/l				< 1					< 1	
Bromobenzene	ug/l				< 1					< 1	
Bromodichloromethane	ug/l			< 5	< 1				< 5	< 1	
Bromoform	ug/l			< 5	< 1				< 5	< 1	< 5
Bromomethane	ug/l			< 10	< 1				< 10	< 1	
Carbon tetrachloride	ug/l			< 5	< 1				< 5	< 1	< 5
Chloroacetaldehyde	ug/l				< 1					< 1	
Chlorobenzene	ug/l			< 5	< 1	< 10			< 5	< 1	< 5
Chloroethane	ug/l			< 10	< 1				< 10	< 1	< 10
Chloroform	ug/l			< 5	< 1				< 5	< 1	< 5
Chloromethane	ug/l			< 10	< 1				< 10	< 1	
Chloromethyl methyl ether	ug/l				< 1					< 1	
Chlorotoluene	ug/l				< 1					< 1	
Cis-1,3-dichloropropene	ug/l			< 5					< 5		

Table 6.1 (Continued).

COMPOUND/1	UNITS	Monitor Well Number Date									
		MW-4 3/88	MW-4 6/89	MW-4 7/89a	MW-4 7/89b	MW-5 9/86	MW-5 8/87	MW-5 11/87	MW-5 7/89a	MW-5 7/89b	MW-6 9/86
Dibromochloromethane	ug/l			< 5	< 1				< 5	< 1	
Dibromomethane	ug/l				< 1					< 1	
Dichlorodifluoromethane	ug/l				< 1					< 1	
Dichloromethane	ug/l				< 1					< 1	
Ethylbenzene	ug/l	78	65	< 5	< 0.2	< 10	656	52	< 5	< 0.2	< 5
Freon	ug/l			< 5					< 5		
Methylene chloride	ug/l			< 5					< 5		< 10
m-Xylene	ug/l	53			< 0.2		830	755		< 0.2	
o-Xylene	ug/l				< 0.2					< 0.2	
p-Xylene	ug/l				< 0.2			TR		< 0.2	
Tetrachloroethene	ug/l			< 5	< 1				< 5	< 1	
Tetrachlorophenol	ug/l				< 1						
Toluene	ug/l	220	160	< 5	35.72	< 10	TR		< 5	27.58	< 5
Trans-1,2-dichloroethene	ug/l			< 5	< 1				< 5	< 1	
Trans-1,3-dichloropropene	ug/l			< 5					< 5		
Trichloroethene	ug/l			< 5	< 1				< 5	< 1	< 5
Trichlorofluoromethane	ug/l				< 1				< 1		
Trichlorophenol	ug/l				< 1						
Vinyl chloride	ug/l			< 1					< 1		< 10
Xylenes	ug/l	203	93	< 10					< 10		

Table 6.1 (Continued).

COMPOUND/1	UNITS	Monitor Well Number Date				
		MW-6 7/89a	MW-6 7/89b	MW-7 9/86	MW-7 7/89a	MW-7 7/89b
1,1,1,2-Tetrachloroethane	ug/l		< 1			
1,1,1-Trichloroethane	ug/l	< 5	< 1		< 5	
1,1,2,2-Tetrachloroethane	ug/l	< 5	< 1		< 5	
1,1,2-Trichloroethane	ug/l	< 5	< 1		< 5	
1,1-Dichloroethane	ug/l	< 5	< 1		< 5	
1,2,3-Trichloropropane	ug/l		< 1			
1,2-Dichloroethane	ug/l	< 5	< 1		< 5	
1,2-Dichloropropane	ug/l	< 5	< 1		< 5	
1,3-Dichloropropylene	ug/l		< 1			
1-Chloroethyl vinyl ether	ug/l		< 1			
1-Chlorohexane	ug/l		< 1			
1-Methylnaphthalene	ug/l					
2,2-Dichloropropane	ug/l		< 1			
2-Chloroethyl vinyl ether	ug/l	< 10			< 10	
2-Methylnaphthalene	ug/l					
2-Sec-butyl-4,6-dinitrophenol	ug/l		< 1			< 1
Benzene	ug/l	26	< 0.2	< 0.5	< 5	
Benzyl chloride	ug/l		< 1			
Bromobenzene	ug/l		< 1			
Bromodichloromethane	ug/l	< 5	< 1		< 5	
Bromoform	ug/l	< 5	< 1		< 5	
Bromomethane	ug/l	< 10	< 1		< 10	
Carbon tetrachloride	ug/l	< 5	< 1		< 5	
Chloroacetaldehyde	ug/l		< 1			
Chlorobenzene	ug/l	< 5	< 0.2	< 1	< 5	
Chloroethane	ug/l	< 10	< 1		< 10	
Chloroform	ug/l	< 5	< 1		< 5	
Chloromethane	ug/l	< 10	< 1		< 10	
Chloromethyl methyl ether	ug/l		< 1			
Chlorotoluene	ug/l		< 1			
Cis-1,3-dichloropropene	ug/l	< 5			< 5	

Table 6.1 (Continued).

COMPOUND/1	UNITS	Monitor Well Number				
		Date				
		MW-6 7/89a	MW-6 7/89b	MW-7 9/86	MW-7 7/89a	MW-7 7/89b
Dibromochloromethane	ug/l	< 5	< 1		< 5	
Dibromomethane	ug/l		< 1			
Dichlorodifluoromethane	ug/l		< 1			
Dichloromethane	ug/l		< 1			
Ethylbenzene	ug/l	< 5	< 0.2	< 1	< 5	
Freon	ug/l	< 5			< 5	
Methylene chloride	ug/l	< 5			< 5	
m-Xylene	ug/l		< 0.2			
o-Xylene	ug/l		< 0.2			
p-Xylene	ug/l		< 0.2			
Tetrachloroethene	ug/l	< 5	< 1		< 5	
Tetrachlorophenol	ug/l					
Toluene	ug/l	20	27.01	7.2	< 5	
Trans-1,2-dichloroethene	ug/l	< 5	< 1		< 5	
Trans-1,3-dichloropropene	ug/l	< 5			< 5	
Trichloroethene	ug/l	< 5	< 1		< 5	
Trichlorofluoromethane	ug/l		< 1			
Trichlorophenol	ug/l					
Vinyl chloride	ug/l	< 1			< 1	
Xylenes	ug/l	20			< 10	

Table 6.2

Evaporation Ponds - Historical Ground Water Quality, Semivolatiles, RFI Phase I Report,
Navajo Refining Company, October 1990.

Monitor Well Number
Date

COMPOUND / 1	UNITS	MW-1 9-86	MW-1 7-89	MW-2 9-86	MW-2 7-89	MW-3 9-86	MW-3 7-89	MW-3 9-86	MW-4 9-86	MW-4 8-87	MW-4 11-87
1,2,4-Trichlorobenzene	ug/l										
2,4,5-Trichlorophenol	ug/l										
2,4,6-Trichlorophenol	ug/l	< 5		< 5		< 5	< 10		< 5		
2,4-Dichlorophenol	ug/l	< 5		< 5		< 5	< 10		< 5		
2,4-Dimethylphenol	ug/l	< 5		< 5		< 5	< 10		< 5		
2,4-Dinitrophenol	ug/l	< 10		< 10		< 10	< 50		< 10		
2,4-Dinitrotoluene	ug/l	< 5				< 5					
2,6-Dichlorophenol	ug/l										
2,6-Dinitrotoluene	ug/l	< 5				< 5					
2-Chloronaphthalene	ug/l	< 5				< 5					
2-Chlorophenol	ug/l	< 5		< 5		< 5	< 10		< 5		
2-Cylohexyl-4,6- dinitrophenol	ug/l										
2-Methyl-4,6-dinitrophenol	ug/l						< 50				
2-Methylnaphthalene	ug/l	< 5				< 5				< 10	
2-Methylphenol	ug/l	< 5		< 5		< 5					
2-Nitroaniline	ug/l										
2-Nitrophenol	ug/l	< 5		< 5		< 5	< 10		< 5		
3,3'-Dichlorobenzidine	ug/l	< 5				< 5					
3-Methylcholanthrene	ug/l						< 1				
3-Nitroaniline	ug/l										
4,6-Dinitro-2-methylphenol	ug/l										
4-Bromophenyl phenyl ether	ug/l	< 5				< 5					
4-Chloroaniline	ug/l										
4-Chlorophenyl phenyl ether	ug/l	< 5				< 5					
4-Chloro-3-methylphenol	ug/l						< 20				
4-Methylphenol	ug/l			< 5							
4-Nitroaniline	ug/l										
4-Nitrophenol	ug/l	< 10		< 10		< 10	< 50		< 10		
7H-Dibenzo(c,g)carbazole	ug/l							< 1			
Acenaphthene	ug/l	< 5				< 5		< 1.8		< 10	
Acenaphthylene	ug/l	< 5				< 5		< 2.3		31	
Anthracene	ug/l	< 5				< 5		< 1			
Benzoic acid	ug/l										
Benzo(a)anthracene	ug/l	< 5				< 5		33.4			
Benzo(a)pyrene	ug/l	< 5				< 5		< 1			
Benzo(b)fluoranthene	ug/l							< 1			
Benzo(g,h,i)perylene	ug/l	< 5				< 5		< 1			
Benzo(j)fluoranthene	ug/l							< 1			
Benzo(k)fluoranthene	ug/l	< 5				< 5		< 1			
Benzyl alcohol	ug/l										
Bis(2-chloroethyl)ether	ug/l	< 5				< 5					
Bis(2-chloroethoxy)methane	ug/l	< 5				< 5		< 1			
Bis(2-chloroisopropyl)ether	ug/l	< 5				< 5		< 1			
Bis(2-ethylhexyl)phthalate	ug/l	< 5				< 5					

Table 6.2 (Continued).

COMPOUND/1	UNITS	Date									
		MW-1 9-86	MW-1 7-89	MW-2 9-86	MW-2 7-89	MW-3 9-86	MW-3 7-89	MW-3 7-89	MW-4 9-86	MW-4 8-87	MW-4 11-87
Butyl benzyl phthalate	ug/l	< 5				< 5					
Cresols (methyl phenols)	ug/l										
Chrysene	ug/l	< 5				< 5		< 1			
Dibenzofuran	ug/l	< 5				< 5					
Dibenzo(a,h)anthracene	ug/l							< 1			
Dibenzo(a,j)acridine	ug/l							< 1			
Dibenzo(a,e)pyrene	ug/l							< 1			
Dibenzo(a,h)pyrene	ug/l							< 1			
Dibenzo(a,i)pyrene	ug/l							< 1			
Diethyl phthalate	ug/l										
Dimethyl phthalate	ug/l	< 5				< 5					
Di-n-butyl phthalate	ug/l	< 5				< 5					
Di-n-octyl phthalate	ug/l	< 5				< 5					
Fluoranthene	ug/l	< 5				< 5		< 1			
Fluorene	ug/l	< 5				< 5		< 1		< 10	
Hexachlorobenzene	ug/l	< 5				< 5					
Hexachlorobutadiene	ug/l	< 5				< 5					
Hexachloroethane	ug/l	< 5				< 5					
Hexachlorocyclopentadiene	ug/l	< 5				< 5					
Indeno(1,2,3-cd)pyrene	ug/l	< 5				< 5		< 1			
Isophorone	ug/l	< 5				< 5					
Naphthalene	ug/l	< 5				< 5		< 1.8		< 10	
Nitrobenzene	ug/l	< 5				< 5					
N-nitrosodipropylamine	ug/l	< 5				< 5					
N-nitrosodiphenylamine	ug/l	< 5				< 5					
Pentachlorophenol	ug/l	< 5		< 5		< 5	< 50		< 5		
Phenanthrene	ug/l	< 5				< 5		< 1			
Phenol	ug/l	< 5		< 5		< 5	< 10		< 5		
Pyrene	ug/l	< 5				< 5		25.4			
1,2-Dichlorobenzene	ug/l	< 5		< 2		< 5			< 20		
1,3-Dichlorobenzene	ug/l	< 5		< 2		< 5			< 20		
1,4-Dichlorobenzene	ug/l	< 5		< 2		< 5			< 20		

Source: Evaporation Ponds Special Analysis. Scientific Laboratory,
June 01, 1988; April 27, 1987; August 12, 1987; November 12, 1987
Evaporation Ponds Special Analysis. Rocky Mountain Laboratories, March 16, 1988; June 22, 1988
Evaporation Ponds Special Analysis. Inter-mountain Laboratories, July 25, 1989; July 26, 1989
Evaporation Ponds Special Analysis. Ana-Lab, July 25, 1989; July 26, 1989
Evaporation Ponds Special Analysis. ENESCO, June 22, 1989

1/ Blanks designate components for which no analyses were requested.

		Monitor Well Number									
		Date									

COMPOUND/1	UNITS	MW-4 3-88	MW-4 6-89	MW-4 7-89	MW-4 7-89	MW-5 9-86	MW-5 8-87	MW-5 11-87	MW-5 7-89	MW-5 7-89	MW-6 9-86
1,2,4-Trichlorobenzene	ug/l										< 5
2,4,5-Trichlorophenol	ug/l										
2,4,6-Trichlorophenol	ug/l			< 10	< 1	< 5			< 10		
2,4-Dichlorophenol	ug/l			< 10	< 1	< 5			< 10		
2,4-Dimethylphenol	ug/l			< 10	59	< 5			< 10		
2,4-Dinitrophenol	ug/l			< 50	< 15	< 10			< 50		
2,4-Dinitrotoluene	ug/l										< 5
2,6-Dichlorophenol	ug/l				< 1						< 5
2,6-Dinitrotoluene	ug/l										< 5
2-Chloronaphthalene	ug/l			< 10							< 5
2-Chlorophenol	ug/l			< 10	3.1	< 5			< 10		
2-Cylohexyl-4,6-dinitrophenol	ug/l				< 1						
2-Methyl-4,6-dinitrophenol	ug/l			< 50	< 15				80		
2-Methylnaphthalene	ug/l										< 5
2-Methylphenol	ug/l					< 5					
2-Nitroaniline	ug/l										
2-Nitrophenol	ug/l			< 10	< 1	< 5			< 10		
3,3'-Dichlorobenzidine	ug/l										< 20
3-Methylcholanthrene	ug/l				< 1					< 1	
3-Nitroaniline	ug/l										
4,6-Dinitro-2-methylphenol	ug/l										
4-Bromophenyl phenyl ether	ug/l										1
4-Chloroaniline	ug/l										
4-Chlorophenyl phenyl ether	ug/l										< 5
4-Chloro-3-methylphenol	ug/l			< 20	< 1				< 20		
4-Methylphenol	ug/l					< 5					
4-Nitroaniline	ug/l										
4-Nitrophenol	ug/l			< 50	30	< 10			< 50		
7H-Dibenzo(c,g)carbazole	ug/l				< 1					< 1	
Acenaphthene	ug/l	< 10		< 10	<1.8				<1.8		< 5
Acenaphthylene	ug/l	< 10		< 10	<2.3				<2.3		< 5
Anthracene	ug/l	< 10			< 1				< 1		< 5
Benzoic acid	ug/l										
Benzo(a)anthracene	ug/l	< 10		< 10	< 1				< 1		< 5
Benzo(a)pyrene	ug/l	< 10		< 10	< 1				< 1		< 5
Benzo(b)fluoranthene	ug/l	< 10		< 10	< 1				< 1		< 5
Benzo(g,h,i)perylene	ug/l	< 10		< 10	< 1				< 1		< 5
Benzo(j)fluoranthene	ug/l				< 1				< 1		< 5
Benzo(k)fluoranthene	ug/l	< 10		< 10	< 1				< 1		< 5
Benzyl alcohol	ug/l										
Bis(2-chloroethyl)ether	ug/l										< 5
Bis(2-chloroethoxy)methane	ug/l				< 1					< 1	< 5
Bis(2-chloroisopropyl)ether	ug/l				< 1					< 1	< 5
Bis(2-ethylhexyl)phthalate	ug/l										< 5

Table 6.2 (Continued).

COMPOUND/1	UNITS	Monitor Well Number				
		Date				
		MW-6 7-89	MW-6 7-89	MW-7 9-86	MW-7 7-89	MW-7 7-89
1,2,4-Trichlorobenzene	ug/l					
2,4,5-Trichlorophenol	ug/l					
2,4,6-Trichlorophenol	ug/l	< 10		< 5	< 10	
2,4-Dichlorophenol	ug/l	< 10		< 5	< 10	
2,4-Dimethylphenol	ug/l	< 10		< 5	< 10	
2,4-Dinitrophenol	ug/l	< 50		< 10	< 50	
2,4-Dinitrotoluene	ug/l					
2,6-Dichlorophenol	ug/l					
2,6-Dinitrotoluene	ug/l					
2-Chloronaphthalene	ug/l					
2-Chlorophenol	ug/l	< 10		< 5	< 10	
2-Cylohexyl-4,6-dinitrophenol	ug/l					
2-Methyl-4,6-dinitrophenol	ug/l	< 50			< 50	
2-Methylnaphthalene	ug/l					
2-Methylphenol	ug/l			< 5		
2-Nitroaniline	ug/l					
2-Nitrophenol	ug/l	< 10		< 5	< 10	
3,3'-Dichlorobenzidine	ug/l					
3-Methylcholanthrene	ug/l		< 1			< 1
3-Nitroaniline	ug/l					
4,6-Dinitro-2-methylphenol	ug/l					
4-Bromophenyl phenyl ether	ug/l					
4-Chloroaniline	ug/l					
4-Chlorophenyl phenyl ether	ug/l					
4-Chloro-3-methylphenol	ug/l	< 20			< 20	
4-Methylphenol	ug/l			< 5		
4-Nitroaniline	ug/l					
4-Nitrophenol	ug/l	< 50		< 10	< 50	
7H-Dibenzo(c,g)carbazole	ug/l		< 1			< 1
Acenaphthene	ug/l		14.3			< 1.8
Acenaphthylene	ug/l		12.9			< 2.3
Anthracene	ug/l		< 1			< 1
Benzoic acid	ug/l					
Benzo(a)anthracene	ug/l		< 1			< 1
Benzo(a)pyrene	ug/l		< 1			< 1
Benzo(b)fluoranthene	ug/l		< 1			< 1
Benzo(g,h,i)perylene	ug/l		< 1			< 1
Benzo(j)fluoranthene	ug/l		< 1			< 1
Benzo(k)fluoranthene	ug/l		< 1			< 1
Benzyl alcohol	ug/l					
Bis(2-chloroethyl)ether	ug/l					
Bis(2-chloroethoxy)methane	ug/l		< 1			
Bis(2-chloroisopropyl)ether	ug/l		< 1			
Bis(2-ethylhexyl)phthalate	ug/l					

Table 6.2 (Continued).

COMPOUND/1	UNITS	Monitor Well Number				
		Date				
		MW-6 7-89	MW-6 7-89	MW-7 9-86	MW-7 7-89	MW-7 7-89
Butyl benzyl phthalate	ug/l					
Cresols (methyl phenols)	ug/l					
Chrysene	ug/l		< 1			< 1
Dibenzofuran	ug/l					
Dibenzo(a,h)anthracene	ug/l		< 1			< 1
Dibenzo(a,j)acridine	ug/l		< 1			< 1
Dibenzo(a,e)pyrene	ug/l		< 1			< 1
Dibenzo(a,h)pyrene	ug/l		< 1			< 1
Dibenzo(a,i)pyrene	ug/l		< 1			< 1
Diethyl phthalate	ug/l					
Dimethyl phthalate	ug/l					
Di-n-butyl phthalate	ug/l					
Di-n-octyl phthalate	ug/l					
Fluoranthene	ug/l		94.1			< 1
Fluorene	ug/l		< 1			< 1
Hexachlorobenzene	ug/l					
Hexachlorobutadiene	ug/l					
Hexachloroethane	ug/l					
Hexachlorocyclopentadiene	ug/l					
Indeno(1,2,3-cd)pyrene	ug/l		< 1			< 1
Isophorone	ug/l					
Naphthalene	ug/l		114			< 1.8
Nitrobenzene	ug/l					
N-nitrosodipropylamine	ug/l					
N-nitrosodiphenylamine	ug/l					
Pentachlorophenol	ug/l			< 5		
Phenanthrene	ug/l		206			< 1
Phenol	ug/l			< 5		
Pyrene	ug/l		< 1			12.5
1,2-Dichlorobenzene	ug/l			2		
1,3-Dichlorobenzene	ug/l			2		
1,4-Dichlorobenzene	ug/l			2		

Table 6.5

Evaporation Ponds - Soils Analytical Results, Semivolatiles, RFI Phase I Report, Navajo Refining Company, October 1990.

		-- Sample Number --	
COMPOUND	UNITS	NEP-SS-	NEP-SS-
		001-01	002-01
		(Surface Sediment Samples)	
Bis(2-ethylhexyl)phthalate	ng/kg	0.95	0.66

1/ Blanks and all other analyses were below reported limits.

Table 6.6

Evaporation Ponds - Soils Analytical Results, Metals and Oil and Grease, RFI Phase I Report,
Navajo Refining Company, October 1990.

METAL	UNITS	----- Sample Number -----					
		NEP-SS- 001-01	NEP-SS- 002-01	NEP-SS- 003-01	NEP-SS- 004-01	NEP-SS- 005-01	NEP-SS- 006-01
		(Surface Sediment Samples)					
Antimony	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	ng/kg	3.32	2.74	1.02	2.13	14.1	2.21
Barium	ng/kg	165	210	140	133	241	159
Beryllium	ng/kg	0.41	0.47	< 0.30	< 0.30	0.59	< 0.30
Cadmium	ng/kg	2.7	2.6	1.6	0.94	4.4	1.49
Chromium	ng/kg	23.6	10	5.6	4	259	6.39
Lead	ng/kg	20.6	7.93	5.72	4.14	90.6	3.47
Mercury	ng/kg	< 0.05	< 0.05	< 0.05	< 0.05	0.23	< 0.05
Nickel	ng/kg	8.6	10.7	5.7	3.2	11.9	7.18
Selenium	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silver	ng/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Zinc	ng/kg	27.9	24.7	16.1	11.8	109	16.2
Oil and Grease	percent	0.062	0.712	0.01	0.013	0.412	0.068

Table 6.10

Evaporation Ponds - Ground Water Analytical Results, Volatiles, RFI Phase I Report, Navajo Refining Company, October 1990.

		Well Number						
		NEP-GW- 005-01	NEP-GW- 005-01	NEP-GW- 008-01	NEP-GW- 008-01	NEP-GW- 010-01	NEP-GW- 010-01	NEP-GW- 021-01
COMPOUND	UNITS	KW-3	Lab. Dup.	KW-6	Lab. Dup.	KW-4	Lab. Dup.	OC0-8
Benzene	ug/l	41			41			
Toluene	ug/l			13	14			
Ethylbenzene	ug/l			11	11	32	31	
Xylenes	ug/l			19	18	23	23	
2-Hexanone	ug/l	14	26	23	18			12

1/ Blanks and all other analyses were below reported limits.

Table 6.11

Evaporation Ponds - Ground Water Analytical Results, Semivolatiles, RFI Phase I Report,
Navajo Refining Company, October 1990.

		----- Sample Number -----									
		Monitor Well									
COMPOUND	UNITS	NEP-GW- 002-01	NEP-GW- 005-01	NEP-GW- 005-01	NEP-GW- 008-01	NEP-GW- 008-01	NEP-GW- 009-01	NEP-GW- 009-01	NEP-GW- 010-01	NEP-GW- 010-01	NEP-GW- 011-01
		OCD-7	KW-3	Lab. Dup.*	KW-6	Lab. Dup.	KW-7	Lab. Dup.	KW-4	Lab. Dup.	KW-5
Bis(2-chloroisopropyl)ether	ug/l			63	22	36					
Bis(2-ethylhexyl)phthalate	ug/l	44	22	31	20	20	17	18	11	10	16
Di-n-butyl phthalate	ug/l									31	
Diethylphthalate	ug/l									140	

1/ Blanks and all other analyses were below reported limits.

* Sample analysis was duplicated in the laboratory.

Table 6.11 (Continued).

		----- Sample Number ----- Monitor Well							
COMPOUND	UNITS	NEP-GW- 019-01	NEP-GW- 019-01	NEP-GW- 020-01	NEP-GW- 020-01	NEP-GW- 021-01	NEP-GW- 021-01	NEP-GW- 022-01	NEP-GW- 022-01
		OC0-5	Lab. Dup.*	EPA-1	Lab. Dup.	OC0-8	Lab. Dup.	OC0-6	Lab. Dup.
Bis(2-ethylhexyl)phthalate	ug/l	16	13	14	16	26	11	18	24
Di-n-butyl phthalate	ug/l	31							

1/ Blanks and all other analyses were below reported limits.

* Sample analysis was duplicated in the laboratory.

Table 6.12

Evaporation Ponds - Ground Water Analytical Results, Metals, RFI Phase I Report, Navajo Refining Company, October 1990.

----- Sample Number -----
Monitor Well

NEP-GW- NEP-GW- NEP-GW- NEP-GW- NEP-GW- NEP-GW- NEP-GW- NEP-GW-
001-01 002-01 004-01 005-01 008-01 009-01 010-01 011-01

METAL

UNITS

OCD-3

OCD-7

Windmill

MW-3

MW-6

MW-7

MW-4

MW-5

Antimony

mg/L

< 0.01

< 0.01

< 0.01

< 0.10

< .1

< 0.01

< .1

< .1

Arsenic

mg/L

< 0.01

0.05

< 0.01

0.11

0.056

0.09

0.22

0.14

Barium

mg/L

< 0.10

< 0.10

< 0.10

< 0.10

< 0.10

< 0.10

0.14

0.07

Beryllium

mg/L

< 0.01

< 0.001

< 0.001

< 0.001

< 0.001

< 0.001

< 0.001

< 0.001

Cadmium

mg/L

0.025

< 0.001

< 0.001

< 0.005

< 0.005

< 0.005

< 0.005

< 0.005

Chromium

mg/L

< 0.01

< 0.01

0.01

0.01

0.02

0.02

0.02

Lead

mg/L

< 0.01

0.01

< 0.01

< 0.01

< 0.01

0.117

< 0.01

< 0.01

Mercury

mg/L

< 0.001

< 0.001

< 0.001

< 0.001

< 0.001

< 0.001

< 0.001

< 0.001

Nickel

mg/L

0.01

0.02

< 0.01

0.01

< 0.01

0.01

0.07

0.07

Selenium

mg/L

< 0.01

< 0.01

< 0.01

< 0.05

< 0.05

< 0.05

< 0.05

< 0.05

Silver

mg/L

0.02

< 0.01

< 0.01

< 0.01

< 0.01

< 0.01

< 0.01

0.03

Zinc

mg/L

0.073

0.037

0.038

< 0.01

< 0.01

< 0.01

< 0.01

0.03

1/ Blanks represent metals for which no analyses were requested.

Table 6.12 (Continued).

METAL	UNITS	Sample Number Monitor Well									
		NEP-GW- 012-01	NEP-GW- 013-01	NEP-GW- 014-01	NEP-GW- 015-01	NEP-GW- 017-01	NEP-GW- 018-01	NEP-GW- 019-01	NEP-GW- 020-01	NEP-GW- 021-01	NEP-GW- 022-01
		KW-1	KW-2	OC0-1	OC0-1	OC0-2	OC0-4	OC0-5	EPA-1	OC0-8	OC0-6
Antimony	ng/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	ng/l	0.02	0.19	0.21	0.21	<0.005	0.005	0.23	0.012	0.11	0.12
Barium	ng/l	0.06	0.05	0.08	0.1	0.02	0.06	0.07	0.25	0.15	0.56
Beryllium	ng/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Cadmium	ng/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	ng/l	1	0.18	0.03	0.07	0.02	0.02	0.02	<0.01	0.02	0.04
Lead	ng/l	<0.01	0.027	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.048
Mercury	ng/l	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	ng/l	0.13	0.07	0.05	0.07	0.08	0.11	0.06	0.02	0.04	0.07
Selenium	ng/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Silver	ng/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02
Zinc	ng/l	<0.01	<0.01	<0.01	<0.01	0.045	<0.01	<0.01	<0.01	0.02	0.15

Table 6.13

Evaporation Ponds - Ground Water Analytical Results, Inorganics, RFI Phase I Report, Navajo Refining Company, October 1990.

		----- Sample Number ----- Monitor Well									
COMPONENT	UNITS	NEP-GW- 001-01	NEP-GW- 002-01	NEP-GW- 004-01	NEP-GW- 005-01	NEP-GW- 008-01	NEP-GW- 009-01	NEP-GW- 010-01	NEP-GW- 011-01	NEP-GW- 012-01	NEP-GW- 013-01
		OC0-3	OC0-7	Windmill	MW-3	MW-6	MW-7	MW-4	MW-5	MW-1	MW-2
Bicarbonate	mg/l	236	567	167				245	413	421	478
Chloride	mg/l	5000	1910	1240				2130	5110	4180	2410
Fluoride	mg/l	1.41	2.44	1.31				1.75	6.15	1.7	6.77
Sulfate	mg/l	954	954	1010				2020	3530	2390	2710
Total Dissolved Solids	mg/l	11400	9360	4800	601	4540	1120	4060	15800	11400	6260

1/ Blanks designate components for which no analyses were performed.

Table 6.13 (Continued).

		Sample Number							
		Monitor Well							
COMPONENT	UNITS	NEP-GW- 014-01	NEP-GW- 015-01	NEP-GW- 017-01	NEP-GW- 018-01	NEP-GW- 019-01	NEP-GW- 020-01	NEP-GW- 021-01	NEP-GW- 022-01
		OC0-1	OC0-1	OC0-2	OC0-4	OC0-5	EPA-1	OC0-8	OC0-6
Bicarbonate	mg/l	504	472	511	255	181	181	490	424
Chloride	mg/l	2130	2570	4890	5600	4960	950	2550	3760
Fluoride	mg/l	5.56	4.12	1.82	1.58	1.58	1.1	1.12	1.66
Sulfate	mg/l	2760	2130	3870	2870	2770	1220	2240	2610
Total Dissolved Solids	mg/l	8760	8410	10100	9930	8780	3570	8640	426

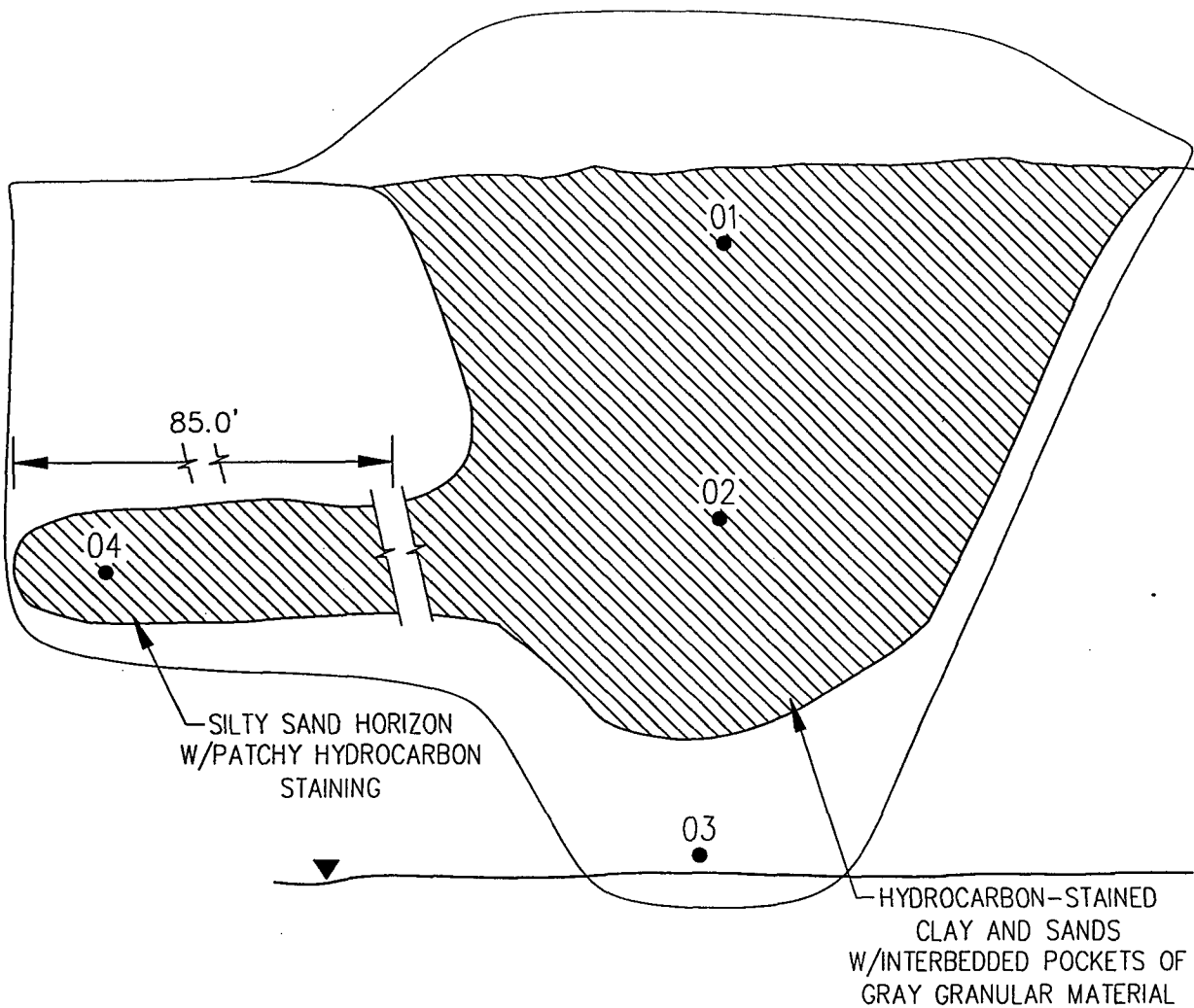
Table 6.14 Evaporation Ponds - Aquifer Parameters, RFI Phase I Report, Navajo Refining Company, October 1990.

Well Number	Assumed Aquifer Thickness (ft)	Hydraulic Conductivity (k) (ft/sec)	Average Ground Water Velocity (v) (ft/yr)
MW-4	200	1.15×10^{-4}	
MW-4	100	1.17×10^{-4}	18.45
MW-4	200	8.27×10^{-5}	13.04
MW-4	100	8.41×10^{-5}	13.26
MW-6	200	3.07×10^{-4}	48.41
MW-6	100	3.12×10^{-4}	49.19
MW-6	200	4.56×10^{-5}	7.19
MW-6	100	4.61×10^{-5}	7.27
MW-7	200	3.06×10^{-5}	4.83
MW-7	100	3.10×10^{-5}	4.89
MW-7	200	1.26×10^{-5}	1.99
MW-7	100	1.27×10^{-5}	2.00
OCD-3	200	2.27×10^{-5}	3.58
OCD-3	100	2.30×10^{-5}	3.63
OCD-3	200	2.62×10^{-5}	4.13
OCD-3	100	2.66×10^{-5}	4.19
EPA-1	200	2.90×10^{-5}	4.57
EPA-1	100	3.06×10^{-5}	4.83
EPA-1	200	2.18×10^{-5}	3.47
EPA-1	100	2.30×10^{-5}	3.63

APPENDIX E

APPENDIX E1

Three-Mile Ditch Trench Description Figures



EXPLANATION

● SAMPLE INTERVAL LOCATION

▼ WATER TABLE

4 0 4 FEET

NOTE: NO PID READINGS AVAILABLE IN THIS TRENCH

KWBES

Three-Mile Ditch trench
cross-section TMD-TR-001.

prepared for:



PROJECT: 622093004 (TREN-CS)

LOCATION: ARTESIA, NEW MEXICO

APPR:

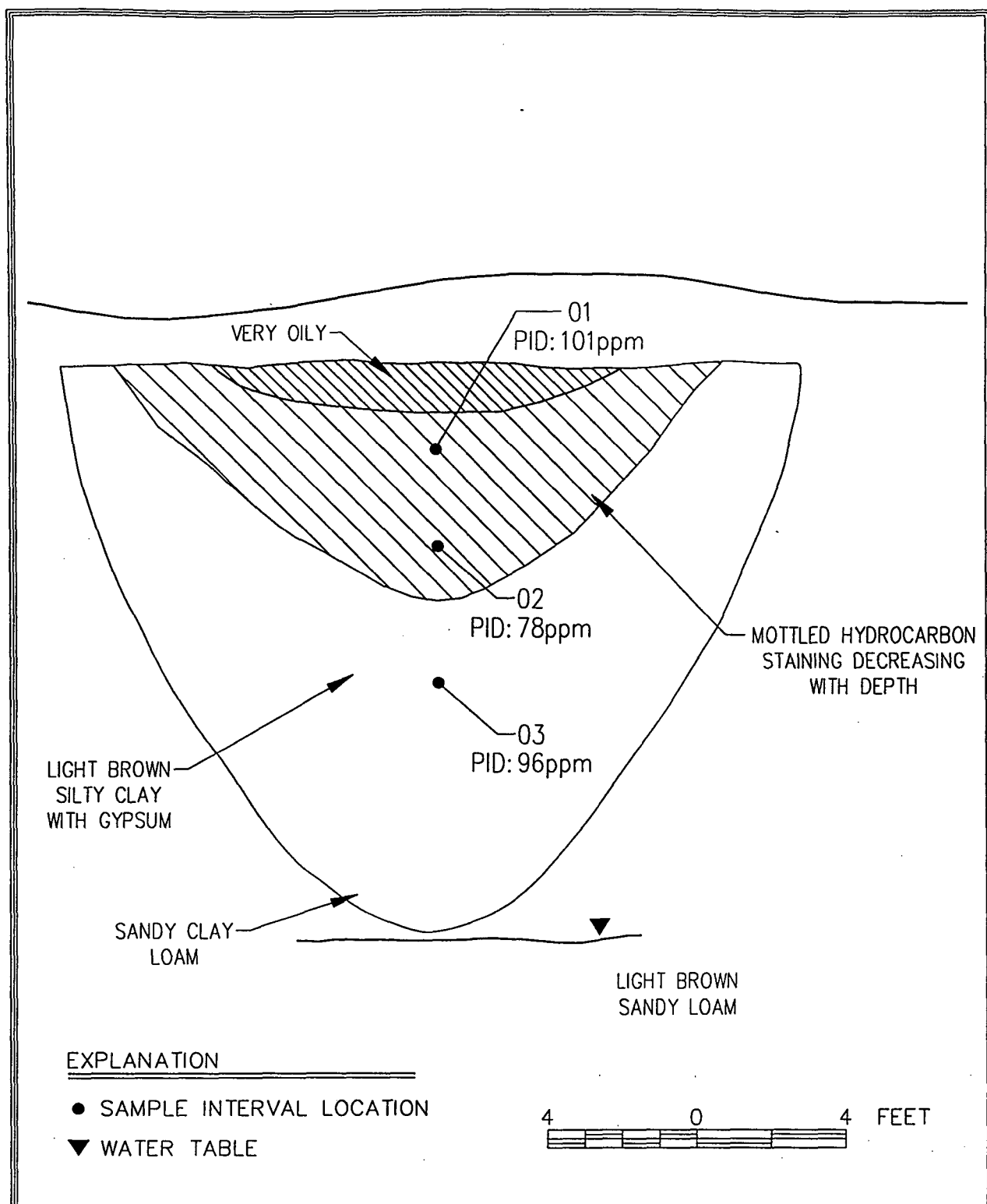
DATE: 11/17/93

DRAWN BY: RMO

SCALE: AS SHOWN

DATE: 11/17/93

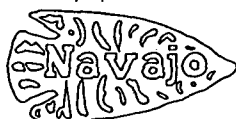
FIGURE: E2-1



KWBES

Three-Mile Ditch trench
cross-section TMD-TR-002.

prepared for:



PROJECT: 622093004 (TREN-CS)

LOCATION: ARTESIA, NEW MEXICO

APPR:

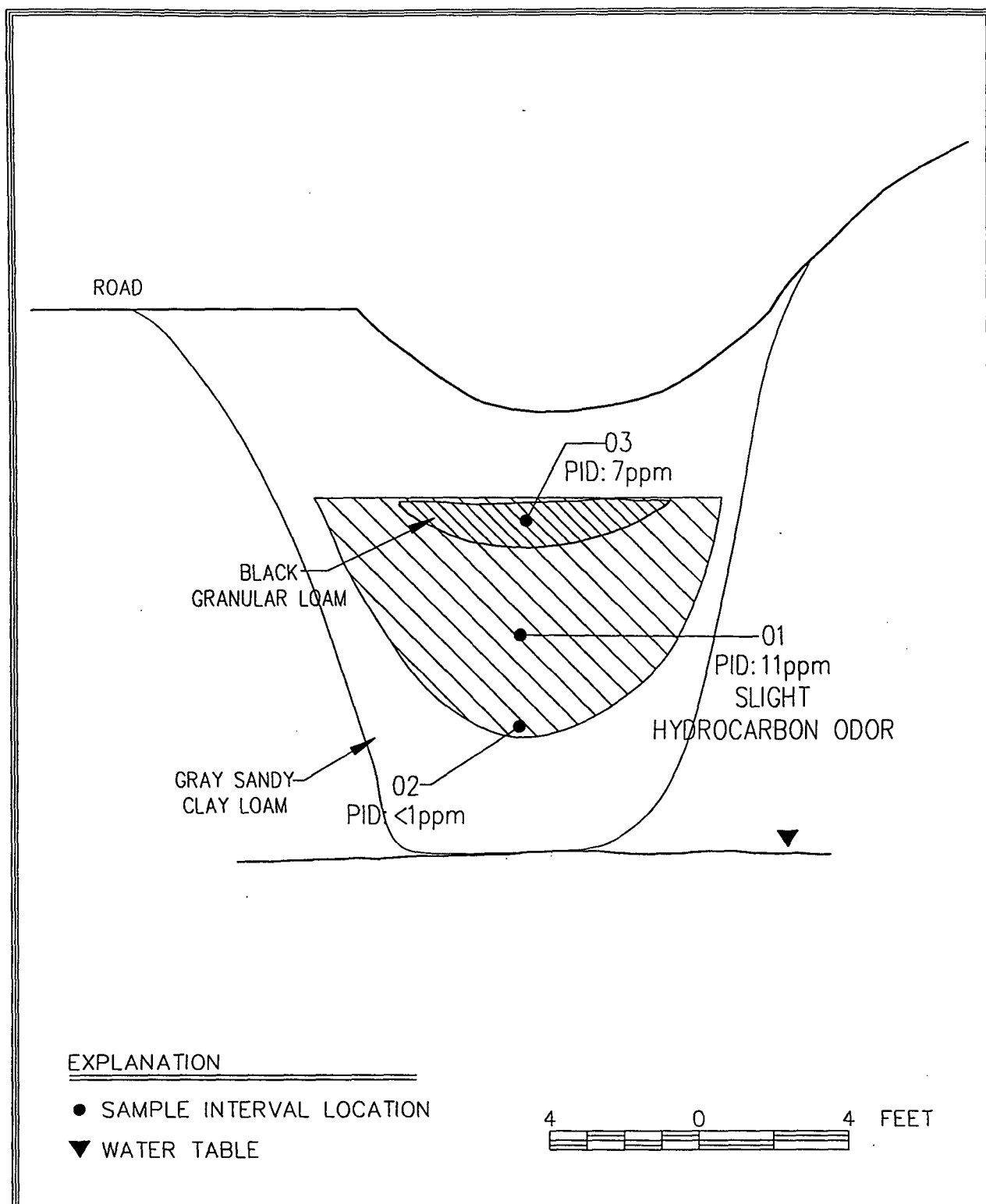
DATE: 11/17/93

DRAWN BY: RMO

SCALE: AS SHOWN

DATE: 11/17/93

FIGURE: E2-2



KWBES

prepared for:



Three-Mile Ditch trench
cross-section TMD-TR-003.

PROJECT: 622093004 (TREN-CS)

LOCATION: ARTESIA, NEW MEXICO

APPR:

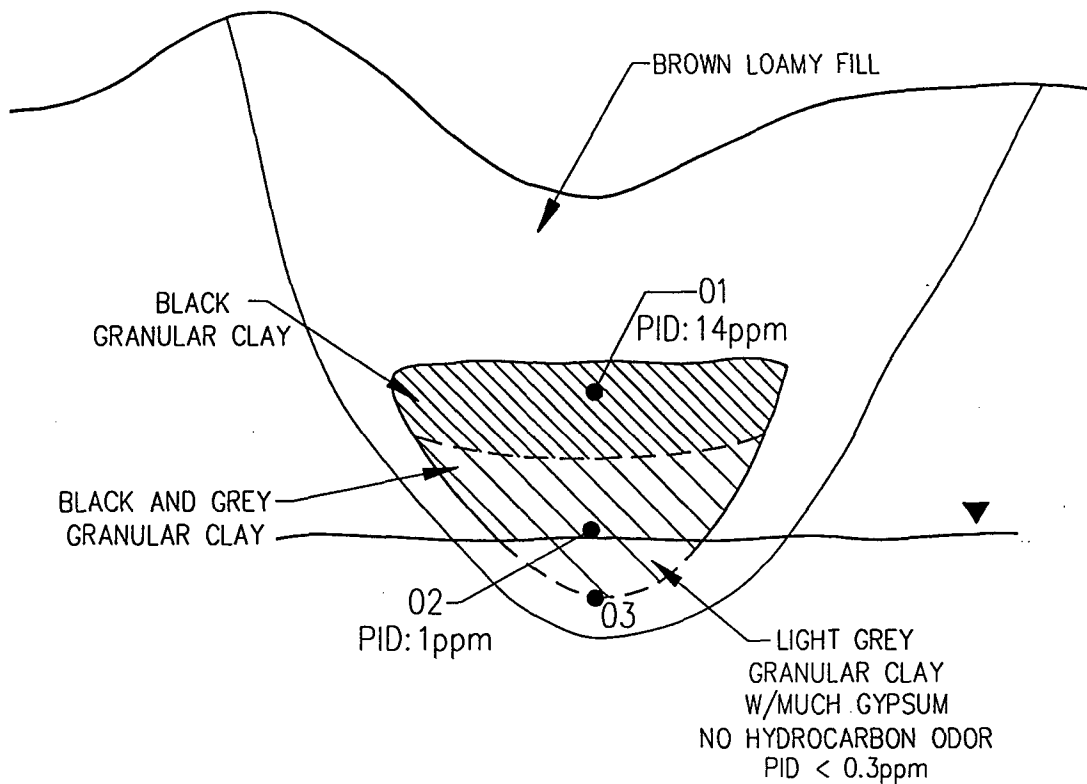
DATE: 11/17/93

DRAWN BY: RMO

SCALE: AS SHOWN

DATE: 11/17/93

FIGURE: E2-3



EXPLANATION

● SAMPLE INTERVAL LOCATION

▼ WATER TABLE

4 0 4 FEET

KWBES

Three-Mile Ditch trench
cross-section TMD-TR-004.

prepared for:



PROJECT: 622093004 (TREN-CS)

LOCATION: ARTESIA, NEW MEXICO

APPR:

DATE: 11/17/93

DRAWN BY: RMO

SCALE: AS SHOWN

DATE:

11/17/93

FIGURE: E2-4

APPENDIX E2

Evaporation Pond Trench Description Logs

VERTICAL SOIL PROFILES

PROJECT: 622093004-110 (EP-TR1)
 CLIENT: NAVAJO REFINERY
 BORING NUMBER: EP-TR-001
 LOCATION: POND 1
 FIRST ENCOUNTERED WATER: 15.5'
 DATE COMPLETED: 11/12/92

SHEET: 1 OF 1
 DRILLED BY:
 LOGGED BY: GBE/BPS
 SURF. ELEV:
 TOTAL DEPTH: 16.0'

DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-1.0' LOAMY, light brown mixed with much black soil, pulverized to massive.				
1.0-3.0' SAND, black, granular, few roots, strong hydrocarbon odor, (PID = 10 ppm).				
3.0-4.5' SANDY LOAM, black to reddish brown, black mottles, strong hydrocarbon odor.				
4.5-6.0' SILTY CLAY LOAM, black, plastic, strong hydrocarbon odor.				
6.0-8.0' CLAY LOAM, black, granular, few gypsum crystals, moderate to strong hydrocarbon odor, (PID = 23 ppm).				
8.0-11.0' CLAY LOAM, reddish brown with dark gray to black mixing, granular, few gypsum crystals, faint hydrocarbon odor, (PID < 2 ppm).				
11.0-13.0' CLAY LOAM, reddish brown, granular, few gypsum crystals.				
13.0-15.0' SANDY CLAY LOAM, reddish to pinkish brown, few black mottles, moist, plastic.				
15.0-16.0' SAND, gray, encountered groundwater at 15.5'. TD = 16.0'				

VERTICAL SOIL PROFILES

PROJECT: 622093004-110 (EP-TR2)
 CLIENT: NAVAJO REFINERY
 BORING NUMBER: EP-TR-002
 LOCATION: POND 1
 FIRST ENCOUNTERED WATER: 8.5'
 DATE COMPLETED: 11/12/92

SHEET: 1 OF 1
 DRILLED BY:
 LOGGED BY: GBE/BPS
 SURF. ELEV:
 TOTAL DEPTH: 18.0'

DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-1.0' LOAMY fill mixed with oily clods, light brown, (PID = 128 ppm).				
1.0-2.0' SILTY CLAY LOAM, black, strong hydrocarbon odor.				
2.0-3.0' SAND, black, strong hydrocarbon odor.				
3.0-8.5' LOAM, black, blocky grading to granular with depth, few gypsum crystals at 6.0', strong hydrocarbon odor, perched water table at 8.5' with sheen present, (PID = 17 TO 57 ppm).				
8.5-11.0' SILTY CLAY, red with black mottles, granular, few gypsum crystals, (PID = 6 ppm).				
11.0-17.0' CLAY, red, few gypsum crystals, moist.				
17.0-18.0 CLAY, gray, massive, water encountered at 17.5'. TD = 18.0'				

VERTICAL SOIL PROFILES

PROJECT: 622093004-110 (EP-TR3)
 CLIENT: NAVAJO REFINERY
 BORING NUMBER: EP-TR-003
 LOCATION: POND 1
 FIRST ENCOUNTERED WATER: 7.25'
 DATE COMPLETED: 11/10/92

SHEET: 1 OF 1
 DRILLED BY:
 LOGGED BY: GBE/BPS
 SURF. ELEV:
 TOTAL DEPTH: 14.0'

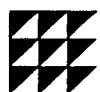
DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-0.5' OXIDIZED, light brown, few oil clods, fluff.				
0.5-2.5' SILTY SLUDGE CLAY, black, oily, few roots, strong odor.				
2.5-3.5' SAND, oily, many roots.				
3.5-4.0' SILTY CLAY, red, oil fingering.				
4.0-6.0' SILTY CLAY, red, moist, few roots, presence of gypsum crystals.				
6.0-9.0' CLAY LOAM, reddish gray, common gypsum crystals, slightly oily odor, abrupt change to oily black, granular structure, perched groundwater, (PID = 14 ppm).				
9.0-11.5' CLAY, red, variegated with dark gray pockets, blocky structure.				
11.5-14.0' SANDY CLAY LOAM, light brown to orange, little to no organic matter, massive structure, saturated.				
TD = 14.0'				

VERTICAL SOIL PROFILES

PROJECT: 622093004-110 (EP-TR4)
CLIENT: NAVAJO REFINERY
BORING NUMBER: EP-TR-004
LOCATION: POND 1
FIRST ENCOUNTERED WATER: 8.25'
DATE COMPLETED: 11/12/92

SHEET: 1 OF 1
DRILLED BY:
LOGGED BY: GBE/BPS
SURF. ELEV:
TOTAL DEPTH: 13.0'

DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-1.5' LOAMY TOPSOIL, light brown, few oily clods, (PID = 13 ppm).				
1.5-2.75' SANDY LOAM, black, moderate hydrocarbon odor.				
2.75-4.0' SAND, black, moderate hydrocarbon odor, (PID = 3 ppm).				
4.0-6.0' LOAMY, black, few sand pockets, angular blocky, very moist, slight hydrocarbon odor.				
6.0-9.5' SILTY CLAY, red, black mottles, angular blocky, many roots, very slight hydrocarbon odor, perched groundwater at 8.25'.				
9.5-13.0' SAND, dark gray with black mottles, water encountered at 10.5'.				
TD = 13.0'				



KWBES

PROJECT: 622093004-110 (EP-TR5)
CLIENT: NAVAJO REFINERY
BORING NUMBER: EP-TR-005
LOCATION: POND 1
FIRST ENCOUNTERED WATER: 13.0'
DATE COMPLETED: 11/11/92

SHEET: 1 OF 1
DRILLED BY:
LOGGED BY: GBE/BPS
SURF. ELEV:
TOTAL DEPTH: 13.0'



KWBE

VERTICAL SOIL PROFILES

PROJECT: 622093004-110 (EP-TR6)
 CLIENT: NAVAJO REFINERY
 BORING NUMBER: EP-TR-006
 LOCATION: POND 1
 FIRST ENCOUNTERED WATER: 11.0'
 DATE COMPLETED: 11/11/92

SHEET: 1 OF 1
 DRILLED BY:
 LOGGED BY: GBE/BPS
 SURF. ELEV:
 TOTAL DEPTH: 13.0'

DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-1.25' LOAMY MIXED FILL, light brown, few oily clods.				
1.25-6.0' CLAY, black oily, well structured, strong hydrocarbon odor, (PID = 10 TO 77 ppm).				
6.0-8.5' SILTY CLAY, gray with intermixing black, granular structure, moist, common gypsum crystals, (PID = 13 ppm).				
8.5-13.0' SILTY CLAY LOAM TO SILTY CLAY, reddish brown with many black mottles, water encountered at 11.0'. (PID = 1 ppm).				
TD = 13.0'				

APPENDIX F

APPENDIX F

Monitor Well and Piezometer Boring Logs

Geologic Description						Monitoring Well Piezometer		Design Specifications	
Samp.	Meth.	Samp.	Log	PID	Depth (ft)	Protective Casing	X		
					-2	0-3' SAND, reddish brown, fine grained, white rootlets, dry, hard at 0-2', no odor.			Elevations: 1 3306.18 2 3306.16 (feet MSL) 3 3305.94 4 3303.30
					-4				Coordinates: X 19511.68 Y 2964.70
					-6	3-13' CLAYEY SAND, reddish brown, fine grained, roots at 3-5', white nodules at 3-7', dark gray coloration starting at 8', light moist, hydrocarbon odor below 8', light to dark gray staining at 11.5-13', saturated at 11.5'.			Bore Hole Diameter: (Inner) 8" (Outer) 14" Type of Casing: (Inner) ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ (Outer) ☒ PVC Sched. 40
					-8				Casing Diameter: (Inner) ☒ 2" ☐ 4" ☐ 6" ☐ (Outer) ☐ 2" ☐ 4" ☐ 6" ☒ 10"
					-10				Screen Slot: ☐ 0.008 ☒ 0.010 ☐
					-12				Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐
					-14				Sand Pack: Colorado Silica 16-40
					-16	13-15' CLAY, reddish brown, gray coloration starting at 14', moist, soft, hydrocarbon odor.			Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐
					-18				Grout Type: Portland/Bentonite Weight:
					-20				Drill Rig: ☒ Hollow Stem ☐ Rotary ☐
					-22	15-51' SAND, light gray to dark gray coloration, medium to coarse grained, interbedded clay seams (2" thick) at 16-18.5', some gravel starting at 23', saturated (heaving), hydrocarbon odor. TD = 51'			Logged By: WCZ
					-24				Completion Date: 12/16/92
					-26				Depth First Encountered Water: 11.5' BLS
					-28				Date D-T-W D-T-P Prod Thick Field pH Field EC
					-30				1/22/93 7.34 7.22 6.75 7.400
					-32				2/10/93 7.22 6.75 7.400
					-34				
					-36				
					-38				
					-40				
					-42				
					-44				
					-46				
					-48				

KWBE

Project: 622092005-110 (MW-5B)
Location: Artesia, New Mexico

Depths in Feet
from Ground Surface
(Not to Scale)

LOG-7

Geologic Description				Monitoring Well Piezometer		Design Specifications																			
Samp. Meth.	Samp. Log	PID (ppm)	Depth (feet)	Protective Casing	YES																				
						Elevations: 1 <u>3307.38</u> 2 <u>3307.36</u> (feet MSL) 3 <u>3307.15</u> 4 <u>3304.40</u> Coordinates: X <u>20844.47</u> Y <u>4857.72</u> Bore Hole Diameter: (Inner) <u>8"</u> (Outer) <u>14"</u> Type of Casing: (Inner) ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ (Outer) ☐ Casing Diameter: (Inner) ☒ 2" ☐ 4" ☐ 6" ☐ (Outer) ☐ 2" ☐ 4" ☒ 6" ☐ 10" Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: <u>Colorado Silica 16-40</u> Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: <u>Portland/Bentonite</u> Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: <u>Precision Engineering</u> Lic. #: _____ Logged By: <u>WCZ</u> Completion Date: <u>12/14/92</u> Depth First Encountered Water: <u>10.0'</u> BLS																			
						<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Date</th> <th>D-T-W</th> <th>D-T-P</th> <th>Prod Thick</th> <th>Field pH</th> <th>Field EC</th> </tr> <tr> <td>1/18/93</td> <td>7.79</td> <td></td> <td></td> <td>7.38</td> <td>8,800</td> </tr> <tr> <td>2/10/93</td> <td>7.72</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC	1/18/93	7.79			7.38	8,800	2/10/93	7.72				
Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC																				
1/18/93	7.79			7.38	8,800																				
2/10/93	7.72																								
						Comments: _____ 																			
0-1' CLAY, reddish brown, some sand throughout, white rootlets, dry, hard, no odor. 1-11' CLAY, reddish brown, some sand throughout, white nodules, white crystals (gypsum?) @ 7-10', moist, hard, earthy odor, saturated @ 10'. 11-51.5' SAND, brown, fine grained with increasing grain size with depth (medium to coarse grained), some gravel starting @ 24', saturated (heaving), hydrocarbon odor, no odor below 50'. TD = 51.5'																									
								Project: 622092005-110 (MW-7B) Location: Artesia, New Mexico																	
Sample Method Symbols ☒ RB=Recovery Barrel ☒ 5' ☐ ☒ ST=Shelby Tube ☒ SS=Split Spoon ☒ C=Cutting																									
Depths in Feet from Ground Surface (Not to Scale) LOG-7																									

Geologic Description				Monitoring Well Piezometer		X		Design Specifications			
Samp. Meth.	Samp. Log	PID (ppm)	Depth (feet)	0-3.5' CLAYEY SAND, brown, moist to slightly moist, friable to hard, many thin seams of fine caliche sand. 3.5-3.8' SAND TO SILTY SAND, saturated, fine to medium grain, transition zone. 3.8-20.0' SAND, brown to light brown, saturated, fine to medium grain, silt content varies but classification remains a sand. TD = 20.0'				Elevations: 1 3308.23 2 3308.21 (feet MSL) 3 3307.46 4 3305.30 Coordinates: X 21432.32 Y 6021.39 Bore Hole Diameter: 12" Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ Casing Diameter: ☐ 2" ☒ 4" ☐ 6" ☐ Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: CSSI 10/20 and 12/20 Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: _____ Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: Pool Environmental Drilling Lic. #: WD 1266 Logged By: PWC Completion Date: 12/10/92 Depth First Encountered Water: 3.5' BLS			
RB			2								
			4								
			6								
			8								
			10	Comments: Bentonite pellets placed to within 1.0' of the surface.							
			12								
			14								
			16								
			18								
			20	Project: 622092005-110 (MW-11A) Location: Artesia, New Mexico							

KWBE



MW-11A

Depths in Feet
from Ground Surface
(Not to Scale)

LOG-1

Sample Method Symbols

☒ RB=Recovery Barrel	☒ 5'	☐
☒ ST=Shelby Tube	☒ SS=Split Spoon	☒ C=Cutting

Geologic Description		Monitoring Well Piezometer		X		Design Specifications	
Samp. Meth.	Log	PID	Depth (feet)	Protective Casing	YES	Cover (Closed)	3 Lip
RB			2	2 Lip			
			4	4 Surface			
			6				
			8				
			10				
			12				
			14				
			16				
			18				
			20				
			22				
			24				
			26				
			28				
			30				
			32				
			34				
			36				
			38				
			40				
			42				
			44				
			46				
			48				
SS							
0-3.5' CLAYEY SAND, brown, moist to slightly moist, friable to stiff, roots and root channels. -many thin seams of fine white sand 3.5-45.0' SAND, brown, saturated, fine grain, some silt -grain size is fine to medium grain after 5.0' -occasional thin layers (<6") of CLAYEY SAND interbedded in column TD = 45.0'				Elevations: 1 3307.68 2 3307.66 (feet MSL) 3 3307.55 4 3304.80 Coordinates: X 21442.45 Y 6009.65 Bore Hole Diameter: (Inner) 8" (Outer) 14" Type of Casing: (Inner) ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ (Outer) ☒ PVC Sched. 40 Casing Diameter: (Inner) ☒ 2" ☐ 4" ☐ 6" (Outer) ☐ 2" ☐ 4" ☒ 6" ☐ 10" Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: CSSI 10/20 12/20 Bentonite Seal: ☐ 1/4" Pellets ☐ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☒ Slurry Grout Type: ☒ Portland/Bentonite Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: Pool Environmental Drilling Lic. #: WD 1266 Logged By: PWC Completion Date: 12/14/92 Depth First Encountered Water: 3.5' BLS			
Depths in Feet from Ground Surface (Not to Scale) LOG-7				Comments:			
Project: 622092005-110 (MW11B) Location: Artesia, New Mexico				MW-11B			

Geologic Description				Monitoring Well		Design Specifications	
Somp Meth	Somp Log	PD (ppm)	Depth (feet)	Piezometer	X		
RB			0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain.	Protective Casing YES 2 Lip 4 Surface 3 Lip Cover (Closed)			
			3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5'				
C			TD = 20.0'				
0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain. 3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5' TD = 20.0'				Monitoring Well Piezometer			
0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain. 3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5' TD = 20.0'				Protective Casing YES 2 Lip 4 Surface 3 Lip Cover (Closed)			Elevations: 1 3312.18 2 3312.16 (feet MSL) 3 3311.55 4 3308.5 Coordinates: X 17530.48 Y 3634.28 Bore Hole Diameter: 12"
0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain. 3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5' TD = 20.0'				Protective Casing YES 2 Lip 4 Surface 3 Lip Cover (Closed)			Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ Casing Diameter: ☐ 2" ☒ 4" ☐ 6" ☐ Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: CSSI 10/20 and 12/20 Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: _____ Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: Pool Environmental Drilling Lic. #: WD 1266 Logged By: PWC Completion Date: 12/16/92 Depth First Encountered Water: 9.0' BLS
0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain. 3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5' TD = 20.0'				Protective Casing YES 2 Lip 4 Surface 3 Lip Cover (Closed)			Date 12/17/92 12.20 7.73 4,600 2/10/93 11.27
0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain. 3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5' TD = 20.0'				Protective Casing YES 2 Lip 4 Surface 3 Lip Cover (Closed)			Comments: Bentonite pellets placed to within 3.5' of the surface.
0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain. 3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5' TD = 20.0'				Protective Casing YES 2 Lip 4 Surface 3 Lip Cover (Closed)			Project: 622092005-110 (MW-13) Location: Artesia, New Mexico
0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain. 3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5' TD = 20.0'				Protective Casing YES 2 Lip 4 Surface 3 Lip Cover (Closed)			Logo: KWBEES
0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain. 3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5' TD = 20.0'				Protective Casing YES 2 Lip 4 Surface 3 Lip Cover (Closed)			MW-13
0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain. 3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5' TD = 20.0'				Protective Casing YES 2 Lip 4 Surface 3 Lip Cover (Closed)			LOG-1
0-3.0' SAND TO SILTY SAND, tan, moist to dry, some roots and caliche, fine to medium grain. 3.0-20.0' SAND, tan, moist to saturated at 9.0', fine to medium grain. -thin clayey sand lens from 5.5 to 5.8' and 7.0 to 7.5' TD = 20.0'				Protective Casing YES 2 Lip 4 Surface 3 Lip Cover (Closed)			Sample Method Symbols ☒ RB=Recovery Barrel ☒ 5' ☐ ☐ ST=Shelby Tube ☐ SS=Split Spoon ☒ C=Cutting

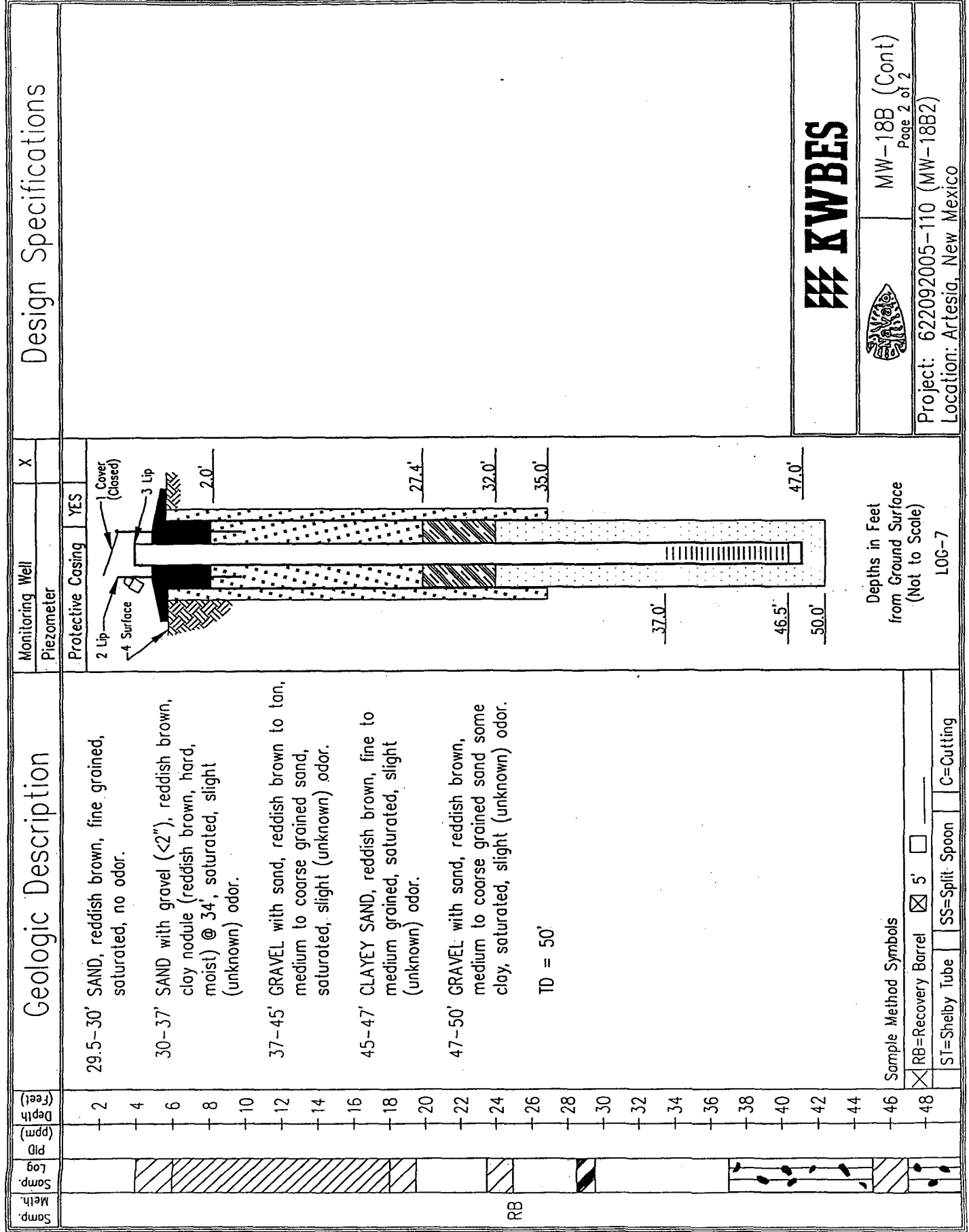
Geologic Description				Monitoring Well Piezometer		Design Specifications															
Smp. Meth. RB Log Smp. PID (ppm) Depth (feet)	0-20.0' SAND, tan, moist to saturated at 9.5', fine to medium grain -root systems noted to 9.0' -hydrocarbon staining (gray) and odor detected at 9.0' -occasional thin lenses of clayey sand encountered (<4" in thickness) TD = 20.0'	Protective Casing YES 2 Lip 4 Surface	Elevations: 1 3309.54 2 3309.52 (feet MSL) 3 3308.78 4 3306.50 Coordinates: X 21043.42 Y 4823.72 Bore Hole Diameter: 12" Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ Casing Diameter: ☐ 2" ☒ 4" ☐ 6" Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: GSSI 10/20 and 12/20 Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: _____ Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: Pool Environmental Drilling Lic. #: WD 1266 Logged By: PWC Completion Date: 12/16/92 Depth First Encountered Water: 9.5' BLS <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>D-T-W</th> <th>D-T-P</th> <th>Prod Thick</th> <th>Field pH</th> <th>Field EC</th> </tr> </thead> <tbody> <tr> <td>12/17/93</td> <td>12.56</td> <td></td> <td></td> <td>7.35</td> <td>16,000</td> </tr> <tr> <td>2/10/93</td> <td>11.42</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC	12/17/93	12.56			7.35	16,000	2/10/93	11.42				
Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC																
12/17/93	12.56			7.35	16,000																
2/10/93	11.42																				
Comments: Bentonite pellets placed to within 1.0' of the surface.																					
Project: 622092005-110 (MW-14) Location: Artesia, New Mexico																					

Depths in Feet from Ground Surface (Not to Scale)

LOG-1

Geologic Description				Monitoring Well Piezometer		X		Design Specifications			
Samp. Meth.	Samp. Log	PID (ppm)	Depth (feet)								
			2	Protective Casing YES 2 Lip 4 Surface 3 Lip 1 Cover (Closed)							
			4								
			6								
			8								
			10								
			12								
			14								
			16								
			18								
			20								
0-3.0' SAND, reddish/brown, fine grained, white rootlets, dry, no odor. 3.0-6.0' SANDY CLAY, dark brown, fine grained sand, decreasing sand content with depth, white nodules, white rootlets, dry, hard, earthy odor. 6.0-15.0' SANDY CLAY, reddish/brown, fine grained sand, white nodules at 6.0-9.0', white rootlets at 6.0-9.0', light gray coloration at 13.0-15.0', moist, saturated at 11.0', earthy odor at 6.0-9.0', hydrocarbon odor starting at 9.0'. 15.0-19.0' SAND, reddish/brown, fine to medium grained, saturated, hydrocarbon odor. 19.0-20.0' CLAYEY SAND, reddish/brown, some rust staining throughout, fine grained, saturated, hydrocarbon odor. TD = 20.0'											
RB											
Sample Method Symbols ☒ RB=Recovery Barrel ☒ 5' ☐ ☐ ST=Shelby Tube SS=Split Spoon C=Cutting											
Depths in Feet from Ground Surface (Not to Scale) LOG-1											
Comments:											
Date D-T-W D-T-P Prod Thick Field pH Field EC 1/20/93 10.62 7.41 3,500 2/10/93 10.65											
Completion Date: 12/16/92 Depth First Encountered Water: 11' BLS											
Elevations: 1 3311.05 2 3311.03 (feet MSL) 3 3310.93 4 3308.00 Coordinates: X 16773.12 Y 3410.01 Bore Hole Diameter: 12" Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ Casing Diameter: ☐ 2" ☒ 4" ☐ 6" ☐ Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: Colorado Silica 16-40 Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: Portland/Bentonite Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: Pool Environmental Drilling Lic. #: WD 1266 Logged By: WCZ											
Project: 622092005-110 (MW-15) Location: Artesia, New Mexico											
KWBES											
MW-15											

Geologic Description				Monitoring Well Piezometer		Design Specifications																			
	Samp. Meth.	Somp. Log	Depth (feet)	Protective Casing	YES	X																			
			2				Elevations: 1 <u>3320.60</u> 2 <u>3220.58</u> (feet MSL) 3 <u>3320.38</u> 4 <u>3317.50</u>																		
			4				Coordinates: X <u>13231.97</u> Y <u>6725.24</u>																		
			6				Bore Hole Diameter: <u>12"</u>																		
			8				Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐																		
			10				Casing Diameter: ☐ 2" ☒ 4" ☐ 6"																		
			12				Screen Slot: ☐ 0.008 ☒ 0.010 ☐																		
			14				Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐																		
			16				Sand Pack: <u>Colorado Silica 20-40</u>																		
			18				Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐																		
			20				Grout Type: <u>Portland/Bentonite</u> Weight: _____																		
			22		Drill Rig: ☒ Hollow Stem ☐ Rotary ☐																				
			24		Drilled By: <u>Precision Engineering</u> Lic. #: _____																				
			26		Logged By: <u>WCZ</u>																				
			28		Completion Date: <u>1/20/93</u>																				
			30		Depth First Encountered Water: <u>19' BLS</u>																				
			32				<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>D-T-W</th> <th>D-T-P</th> <th>Prod Thick</th> <th>Field pH</th> <th>Field EC</th> </tr> </thead> <tbody> <tr> <td>1/26/93</td> <td>16.83</td> <td></td> <td></td> <td>7.04</td> <td>2,200</td> </tr> <tr> <td>2/10/93</td> <td>14.64</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC	1/26/93	16.83			7.04	2,200	2/10/93	14.64				
Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC																				
1/26/93	16.83			7.04	2,200																				
2/10/93	14.64																								
0-1.0' SAND, dark brown very fine grained, roots, dry, earthy odor. 1.0-8.0' SAND, brown, very fine to fine grained, roots at 1.0-3.0', hard, white (gypsum) crystals at 3.0-8.0', dry, no odor. 8.0-10.0' SANDY CLAY, reddish/brown, fine grained sand, interbedded with carbonate gravel seams (< 2" thick), soft, moist, no odor. 10.0-15.0' CLAYEY SAND, reddish/brown, fine grained, interbedded with carbonate gravel seams (< 2" thick) at 12.0', 13.0', and 14.5', increasing clay content with depth, moist, no odor. 15.0-19.0' SANDY CLAY, tan to light gray, fine grained sand, interbedded with carbonate gravel throughout, moist, saturated at 19.0', no odor. 19.0-21.0' SANDY CLAY, reddish/brown, fine grained sand, increasing sand content with depth, stiff, moist, no odor. 21.0-23.0' CLAYEY SAND, reddish/brown, fine grained, interbedded with carbonate gravel, decreasing clay content with depth, moist, no odor. 23.0-32.0' SAND, reddish/brown, fine to medium grained, increasing grain size with depth, some clay at 23.0-25.0', saturated, no odor. Depths in Feet from Ground Surface (Not to Scale) LOG-1				KWBE																					
							Project: 622092005-110 (MW-17) Location: Artesia, New Mexico																		
										MW-17															
Sample Method Symbols ☒ RB=Recovery Barrel ☒ 5' ☐ _____ ☐ ST=Shelby Tube ☐ SS=Split Spoon ☐ C=Cutting																									



Geologic Description				Monitoring Well		Design Specifications			
Sampl. Meth.	Sampl. Log	Depth (feet)		Piezometer					
		2	0-4.0' SAND, reddish/brown, fine grained, roots at 0-2.0', moist at 0-1.0', dry below 1.0', earthy odor.		X				
		4	4.0-6.0' CLAYEY SAND, reddish/brown, fine grained, white (carbonate) nodules throughout, increasing clay content with depth, moist, no odor.						
		6	6.0-18.0' SANDY CLAY, reddish/brown, fine grained, white (carbonate) nodules throughout, black nodules at 8.0-13.5' and at 15.0-18.0', clear crystals (gypsum?) at 13.5-15.0', increasing sand content with depth, moist, saturated at 13.0-13.5', no odor.						
		8	18.0-19.5' CLAYEY SAND, reddish/brown, fine to medium grained, saturated, no odor.						
		10	19.5-23.5' SAND WITH GRAVEL (<1/4" dia.), tan, medium to coarse grained, some clay with increasing clay content with depth, saturated, slight (unknown) odor.						
		12	23.5-25.0' CLAYEY SAND, tan, medium to coarse grained sand with gravel, saturated, slight (unknown) odor.						
		14	25.0-28.5' SAND WITH GRAVEL (<2" dia.), tan, medium to coarse grained sand, increasing gravel content with depth, saturated, slight (unknown) odor.						
		16	28.5-29.5' CLAY, reddish/brown, some sand, stiff, moist, no odor.						
		18	29.5-30.0' SAND, reddish/brown, fine grained, saturated, no odor.						
		20	30.0-37.0' SAND WITH GRAVEL (<2" dia.), reddish/brown, clay nodule (reddish/brown, hard, moist) at 34.0', saturated, slight (unknown) odor.						
		22	37.0-45.0' GRAVEL WITH SAND, reddish/brown to tan, medium to coarse grained sand, saturated, slight (unknown) odor.						
		24	45.0-47.0' CLAYEY SAND, reddish/brown, fine to medium grained, saturated, slight (unknown) odor.						
		26	47.0-48.0' GRAVEL WITH SAND, reddish/brown, medium to coarse grained sand, some clay, saturated, slight (unknown) odor.						
		28							
		30							
		32							
		34							
		36							
		38							
		40							
		42							
		44							
		46							
		48							

Geologic Description

0-4.0' SAND, reddish/brown, fine grained, roots at 0-2.0', moist at 0-1.0', dry below 1.0', earthy odor.

4.0-6.0' CLAYEY SAND, reddish/brown, fine grained, white (carbonate) nodules throughout, increasing clay content with depth, moist, no odor.

6.0-18.0' SANDY CLAY, reddish/brown, fine grained, white (carbonate) nodules throughout, black nodules at 8.0-13.5' and at 15.0-18.0', clear crystals (gypsum?) at 13.5-15.0', increasing sand content with depth, moist, saturated at 13.0-13.5', no odor.

18.0-19.5' CLAYEY SAND, reddish/brown, fine to medium grained, saturated, no odor.

19.5-23.5' SAND WITH GRAVEL (<1/4" dia.), tan, medium to coarse grained, some clay with increasing clay content with depth, saturated, slight (unknown) odor.

23.5-25.0' CLAYEY SAND, tan, medium to coarse grained sand with gravel, saturated, slight (unknown) odor.

25.0-28.5' SAND WITH GRAVEL (<2" dia.), tan, medium to coarse grained sand, increasing gravel content with depth, saturated, slight (unknown) odor.

28.5-29.5' CLAY, reddish/brown, some sand, stiff, moist, no odor.

29.5-30.0' SAND, reddish/brown, fine grained, saturated, no odor.

30.0-37.0' SAND WITH GRAVEL (<2" dia.), reddish/brown, clay nodule (reddish/brown, hard, moist) at 34.0', saturated, slight (unknown) odor.

37.0-45.0' GRAVEL WITH SAND, reddish/brown to tan, medium to coarse grained sand, saturated, slight (unknown) odor.

45.0-47.0' CLAYEY SAND, reddish/brown, fine to medium grained, saturated, slight (unknown) odor.

47.0-48.0' GRAVEL WITH SAND, reddish/brown, medium to coarse grained sand, some clay, saturated, slight (unknown) odor.

Monitoring Well

Piezometer

Protective Casing

2 Lip

4 Surface

3 Lip

1 Cover (Closed)

2.4

37.0

46.5

48.0

8.3

14.0

47.0

Depths in Feet from Ground Surface (Not to Scale)

LOG-1

Geologic Description

0-4.0' SAND, reddish/brown, fine grained, roots at 0-2.0', moist at 0-1.0', dry below 1.0', earthy odor.

4.0-6.0' CLAYEY SAND, reddish/brown, fine grained, white (carbonate) nodules throughout, increasing clay content with depth, moist, no odor.

6.0-18.0' SANDY CLAY, reddish/brown, fine grained, white (carbonate) nodules throughout, black nodules at 8.0-13.5' and at 15.0-18.0', clear crystals (gypsum?) at 13.5-15.0', increasing sand content with depth, moist, saturated at 13.0-13.5', no odor.

18.0-19.5' CLAYEY SAND, reddish/brown, fine to medium grained, saturated, no odor.

19.5-23.5' SAND WITH GRAVEL (<1/4" dia.), tan, medium to coarse grained, some clay with increasing clay content with depth, saturated, slight (unknown) odor.

23.5-25.0' CLAYEY SAND, tan, medium to coarse grained sand with gravel, saturated, slight (unknown) odor.

25.0-28.5' SAND WITH GRAVEL (<2" dia.), tan, medium to coarse grained sand, increasing gravel content with depth, saturated, slight (unknown) odor.

28.5-29.5' CLAY, reddish/brown, some sand, stiff, moist, no odor.

29.5-30.0' SAND, reddish/brown, fine grained, saturated, no odor.

30.0-37.0' SAND WITH GRAVEL (<2" dia.), reddish/brown, clay nodule (reddish/brown, hard, moist) at 34.0', saturated, slight (unknown) odor.

37.0-45.0' GRAVEL WITH SAND, reddish/brown to tan, medium to coarse grained sand, saturated, slight (unknown) odor.

45.0-47.0' CLAYEY SAND, reddish/brown, fine to medium grained, saturated, slight (unknown) odor.

47.0-48.0' GRAVEL WITH SAND, reddish/brown, medium to coarse grained sand, some clay, saturated, slight (unknown) odor.

Monitoring Well

Piezometer

Protective Casing

2 Lip

4 Surface

3 Lip

1 Cover (Closed)

2.4

37.0

46.5

48.0

8.3

14.0

47.0

Depths in Feet from Ground Surface (Not to Scale)

LOG-1

Geologic Description

0-4.0' SAND, reddish/brown, fine grained, roots at 0-2.0', moist at 0-1.0', dry below 1.0', earthy odor.

4.0-6.0' CLAYEY SAND, reddish/brown, fine grained, white (carbonate) nodules throughout, increasing clay content with depth, moist, no odor.

6.0-18.0' SANDY CLAY, reddish/brown, fine grained, white (carbonate) nodules throughout, black nodules at 8.0-13.5' and at 15.0-18.0', clear crystals (gypsum?) at 13.5-15.0', increasing sand content with depth, moist, saturated at 13.0-13.5', no odor.

18.0-19.5' CLAYEY SAND, reddish/brown, fine to medium grained, saturated, no odor.

19.5-23.5' SAND WITH GRAVEL (<1/4" dia.), tan, medium to coarse grained, some clay with increasing clay content with depth, saturated, slight (unknown) odor.

23.5-25.0' CLAYEY SAND, tan, medium to coarse grained sand with gravel, saturated, slight (unknown) odor.

25.0-28.5' SAND WITH GRAVEL (<2" dia.), tan, medium to coarse grained sand, increasing gravel content with depth, saturated, slight (unknown) odor.

28.5-29.5' CLAY, reddish/brown, some sand, stiff, moist, no odor.

29.5-30.0' SAND, reddish/brown, fine grained, saturated, no odor.

30.0-37.0' SAND WITH GRAVEL (<2" dia.), reddish/brown, clay nodule (reddish/brown, hard, moist) at 34.0', saturated, slight (unknown) odor.

37.0-45.0' GRAVEL WITH SAND, reddish/brown to tan, medium to coarse grained sand, saturated, slight (unknown) odor.

45.0-47.0' CLAYEY SAND, reddish/brown, fine to medium grained, saturated, slight (unknown) odor.

47.0-48.0' GRAVEL WITH SAND, reddish/brown, medium to coarse grained sand, some clay, saturated, slight (unknown) odor.

Monitoring Well

Piezometer

Protective Casing

2 Lip

4 Surface

3 Lip

1 Cover (Closed)

2.4

37.0

46.5

48.0

8.3

14.0

47.0

Depths in Feet from Ground Surface (Not to Scale)

LOG-1



KWBES

MW-18T

Project: 622092005-110 (MW-18T)
Location: Artesia, New Mexico

Comments: Temporary well. The annular space from 8.3 to 5.0' below grade consists of backfill soil instead of grout. Bentonite chips were placed from 5.0' to 2.4' to seal the backfill.

Completion Date: 1/22/93
Depth First Encountered Water: 13.0' BLS

Logged By: WCZ

Drilled By: Precision Engineering Lic. #

Drill Rig: Hollow Stem Rotary

Grout Type: None Weight:

Bentonite Seal: 1/2" Pellets 1/2" Pellets

Sand Pack: Colorado Silica 20-40

Screen Style: Machine Slot Wire Wrap

Screen Slot: 0.008 0.010

Casing Diameter: 2" 4" 6"

Type of Casing: PVC Sched. 40 Flush Thread

Bore Hole Diameter: 8"

Coordinates: X 21230.91 Y 1260.69

Elevations: 1 3305.84 2 3305.82

(feet MSL) 3 3305.62 4 3303.00

Design Specifications

Geologic Description				Monitoring Well Piezometer		X		Design Specifications			
	Depth (feet)	Pit (ppm)	Log	Samp. Meth.							
0-1.0' SAND, brown, fine grained, roots, white (carbonate) nodules, dry, earthy odor. 1.0-3.0' SAND, reddish/brown, fine grained, roots, some clay with increasing clay content with depth, moist, no odor. 3.0-7.0' CLAYEY SAND, reddish/brown, fine grained, moist, no odor. 7.0-10.0' SAND, reddish/brown, fine grained, some clay, saturated at 7.0', no odor. 10.0-20.0' SAND, brown, fine grained, some clay, saturated, no odor. TD = 20.0'	2										
	4										
	6										
	8										
	10										
	12										
14											
16											
18											
20											
				Protective Casing YES 2 Lip 4 Surface 1 Cover (Closed) 3 Lip 1.3 3.2 5.0 19.5 20.0		Elevations: 1 3303.37 2 3303.35 (feet MSL) 3 3303.09 4 3300.5 Coordinates: X 20577.54 Y 410.21 Bore Hole Diameter: 12" Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ Casing Diameter: ☐ 2" ☒ 4" ☐ 6" Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: Colorado Silica 20-40 Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: None Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: Precision Engineering Lic. #: _____ Logged By: WCZ Completion Date: 1/23/93 Depth First Encountered Water: 7.0' BLS					
Comments: Dark gray discoloration and hydrocarbon odors were detected on the sands brought to the surface when the lead auger was recovered. Bentonite pellets placed to within 1.3' of the surface.				KWBES				MW-19			
Depths in Feet from Ground Surface (Not to Scale)				LOG-1		Project: 622092005-110 (MW-19) Location: Artesia, New Mexico					
Sample Method Symbols ☒ RB=Recovery Barrel ☒ 5' ☐ ☐ ST=Shelby Tube ☐ SS=Split Spoon ☐ C=Cutting				RB		TD = 20.0'					

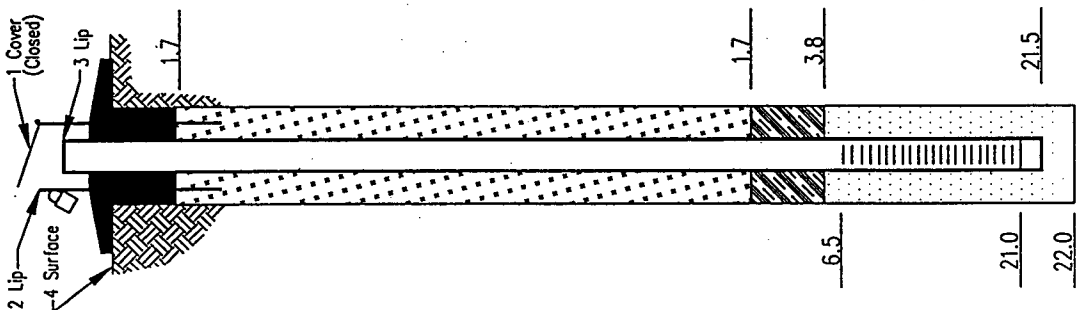
Geologic Description				Monitoring Well Piezometer		X		Design Specifications			
Somp. Meth.	Somp. Log	P.D. (ppm)	Depth (feet)	Protective Casing YES		1 Cover (closed) 2 Lip 3 Lip 4 Surface		Elevations: 1 <u>3340.69</u> 2 <u>3340.67</u> (feet MSL) 3 <u>3340.00</u> 4 <u>3337.20</u> Coordinates: X <u>5606.12</u> Y <u>2420.80</u> Bore Hole Diameter: <u>12"</u> Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ Casing Diameter: ☐ 2" ☒ 4" ☐ 6" Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: <u>C.S.S.L. 20/40</u> Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: <u>Portland/Bentonite</u> Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: <u>Pool Environmental</u> Lic. #: <u>WD 1266</u> Logged By: <u>PWC</u> Completion Date: <u>01/21/93</u> Depth First Encountered Water: <u>14.0' BLS</u>			
0-1' SILTY SAND, brown, moist, medium to fine grained, many roots. 1-8.5' CLAYEY SAND, brown, changing to tan near 4', moist, friable, many roots and root channels, clay content increasing with depth. 8.5-13' CLAY, brown, moist, plastic, some gray mottling, gypsum crystals noted. 13-14' CLAYEY SAND, tan, moist, friable. 14-14.5' SAND with silt, tan, saturated, fine to medium grain. 14.5-20' CLAY, with gravel, clay is reddish/brown, very moist, plastic; gravel is < 1" dia. and saturated. 20-20.5 CLAYEY SAND, gray, saturated, some gravel fragments. 20.5-24' CLAY, reddish/brown, moist, plastic, blocky. - thin zone of gravel near 23' is saturated (<4"). TD = 24'											
Sample Method Symbols ☒ RB=Recovery Barrel ☒ 5' ☐ ST=Shelby Tube SS=Split Spoon C=Cutting				KWBE'S MW-20							
Project: <u>622092005-110 (MW-20)</u> Location: <u>Artesia, New Mexico</u>											

Geologic Description		Monitoring Well Piezometer	X	Design Specifications																			
Smp. Meth. Log P.D. (ppm) Depth (feet) 2 4 6 8 10 12 14 16 18 20 22 24	0-3.0' CLAYEY SAND, light brown, fine grained, white (carbonate nodules throughout, hard, dry, earthy odor. 3.0-7.5' SANDY CLAY, dark brown, color change to light gray at 6.0', fine grained sand, rust staining (dendritic) throughout, some clear crystals (gypsum?), soft, moist, earthy odor. 7.5-10.5' CALICHE (carbonate) GRAVEL, light gray, some clay throughout, hard, saturated at 10.0', no odor. 10.5-12.0' SANDY CLAY, light gray, fine grained sand, moist, no odor. 12.0-13.0' CALICHE (carbonate) GRAVEL, light gray, some clay throughout, hard, saturated, no odor. 13.0-23.0' CALICHE (carbonate) GRAVEL, reddish/brown, some clay throughout, hard, saturated at 13.0-13.5', 14.5-15.5', and 19.0-19.5', no odor. TD = 23.0'	2 Lip 4 Surface 3 Lip Cover (Closed)		Elevations: 1 3336.39 2 3336.37 (feet MSL) 3 3336.18 4 3333.50 Coordinates: X 6925.27 Y 1807.82 Bore Hole Diameter: 12" Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel Casing Diameter: ☐ 2" ☒ 4" ☐ 6" Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: Colorado Silica 20-40 Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: None Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary Drilled By: Precision Engineering Lic. #: _____ Logged By: WCZ Completion Date: 1/23/93 Depth First Encountered Water: 10.0' BLS																			
				<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>D-T-W</th> <th>D-T-P</th> <th>Prod Thick</th> <th>Field pH</th> <th>Field EC</th> </tr> </thead> <tbody> <tr> <td>1/27/93</td> <td>10.65</td> <td></td> <td></td> <td>6.85</td> <td>5,200</td> </tr> <tr> <td>2/10/93</td> <td>10.92</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC	1/27/93	10.65			6.85	5,200	2/10/93	10.92				
Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC																		
1/27/93	10.65			6.85	5,200																		
2/10/93	10.92																						
				Comments: Replacement well between MW-8 and MW-9.																			
				Project: 622092005-110 (MW-21) Location: Artesia, New Mexico																			
				MW-21																			

Geologic Description		Monitoring Well Piezometer		Design Specifications																	
0-3.5' SANDY CLAY, dark brown, fine grained sand, white (carbonate) nodules throughout, roots at 0-3.0', hard and dry at 0-2.0', soft and moist at 2-3.5', earthy odor. 3.5-6.0' SAND, reddish/brown, fine grained, some clay, gray coloration at 5.5-6.0', moist, very moist at 4.0-6.0', no odor. 6.0-15.0' CLAYEY SAND, and sand (interbedded), reddish/brown, fine grained, gray coloration at 14.5-15.0', moist, saturated at 7.5-8.5' and below 9.5', slight hydrocarbon odor starting at 7.0'. 15.0-22.0' SAND, brown, very fine to fine grained, gray coloration throughout, saturated, distinct hydrocarbon odor at 15.0-20.0'. TD = 22.0'	Protective Casing YES Depths in Feet from Ground Surface (Not to Scale) LOG-1	Elevations: 1 3304.58 2 3304.56 (feet MSL) 3 3304.30 4 3302.20 Coordinates: X 19580.96 Y 1559.43 Bore Hole Diameter: 12" Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ Casing Diameter: ☐ 2" ☒ 4" ☐ 6" ☐ Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: Colorado Silica 20-40 Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: None Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: Precision Engineering Lic. #: _____ Logged By: WCZ Completion Date: 1/27/93 Depth First Encountered Water: 7.5' BLS																			
Sample Method Symbols ☒ RB=Recovery Barrel ☒ 5' ☐ _____ ST=Shelby Tube SS=Split Spoon C=Cutting		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>D-T-W</th> <th>D-T-P</th> <th>Prod Thick</th> <th>Field pH</th> <th>Field EC</th> </tr> </thead> <tbody> <tr> <td>1/29/93</td> <td>6.95</td> <td></td> <td></td> <td>7.50</td> <td>4,300</td> </tr> <tr> <td>2/10/93</td> <td>6.75</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Comments: Bentonite pellets placed to within 0.5' of the surface.		Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC	1/29/93	6.95			7.50	4,300	2/10/93	6.75				
Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC																
1/29/93	6.95			7.50	4,300																
2/10/93	6.75																				
KWBES		MW-22A																			
Project: 622092005-110 (MW-22A) Location: Artesia, New Mexico																					

Geologic Description				Monitoring Well Piezometer		Design Specifications				
Samp. Meth.	Samp. Log	P.D.	Depth (feet)	Protective Casing	YES					
			3			Elevations: 1 3304.69 2 3304.67 (feet MSL) 3 3304.45 4 3301.90				
			6			Coordinates: X 19566.48 Y 1559.11				
			9			Bore Hole Diameter: (Inner) 8" (Outer) 14"				
			12			Type of Casing: (Inner) ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐				
			15			(Outer) ☒ PVC Sched. 40				
			18			Casing Diameter: (Inner) ☒ 2" ☐ 4" ☐ 6" ☐ 10"				
			21			(Outer) ☐ 2" ☐ 4" ☐ 6" ☒ 10"				
			24			Screen Slot: ☐ 0.008 ☒ 0.010 ☐				
			27			Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐				
			30			Sand Pack: Colorado Silica 16-40				
			33	Bentonite Seal: ☒ 1/4" Pellets ☐ 1/2" Pellets						
			36	☐ 1/2" Chips ☐ Hole Plug ☒ 3/8" Pellets						
			39	Grout Type: ☒ Portland/Bentonite ☐ Weight:						
			41	Drill Rig: ☒ Hollow Stem ☐ Rotary ☐						
			44	Drilled By: Precision Engineering Lic. #:						
			47	Logged By: WCZ						
			50	Completion Date: 01/28/93						
			53	Depth First Encountered Water: 7.5' BLS						
				Date		D-T-W	D-T-P	Prod Thick	Field pH	Field EC
				1/29/93	9.63				7.06	4,800
				2/10/93	6.61					
				Comments:						
						MW-22B				
				Project: 622092005-110 (MW-22B)						
				Location: Artesia, New Mexico						

Design Specifications	
Elevations: 1	3309.88
(feet MSL) 3	3309.65
Coordinates: X	21862.87
Bore Hole Diameter: 12"	Y
Type of Casing: ☒ PVC Sched. 40 Flush Thread	
☐ Stainless Steel	
Casing Diameter: ☐ 2" ☒ 4" ☐ 6"	
Screen Slot: ☐ 0.008 ☒ 0.010	
Screen Style: ☒ Machine Slot ☐ Wire Wrap	
Sand Pack: Colorado Silica 20-40	
Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets	
☐ 1/2" Chips ☐ Hole Plug ☒ 3.8" Pellets	
Grout Type: _____ Weight: _____	
Drill Rig: ☒ Hollow Stem ☐ Rotary	
Drilled By: Precision Engineering	Lic. #: _____
Logged By: WCZ	
Completion Date: 1/27/93	
Depth First Encountered Water: 8.5' BLS	
Date	D-T-W
1/27/93	11.79
2/10/93	11.87
Field pH	16,000
Comments: Bentonite pellets placed to within 1.7' of the surface.	
	
	
Project: 622092005-110 (MW-24) Location: Artesia, New Mexico	

Monitoring Well		X	
Piezometer			
Protective Casing	YES		
			
Depths in Feet from Ground Surface (Not to Scale)	LOG-1		

Geologic Description	
0-5.5' SAND, reddish/brown, very fine to fine grained, roots at 0-1.5', dry, moist below 3.0', earthy odor.	
5.5-6.0' CLAYEY SAND, reddish/brown, very fine to fine grained, moist, no odor.	
6.0-10.0' SAND, reddish/brown, fine grained, sandy clay seam (reddish/brown, soft, <1" thick) at 7.5', moist, saturated at 8.5', no odor.	
10.0-14.0' CLAYEY SAND, with sand and sandy clay (interbedded, <6" thick), reddish/brown, fine to medium grained sand, saturated, no odor.	
14.0-22.0' SAND, reddish/brown to brown, fine grained, slight gray coloration below 15.0', saturated, slight hydrocarbon odor below 15.0'.	
TD = 22.0'	

Sample Method Symbols	
☒ RB=Recovery Barrel	☒ 5' ☐ _____
ST=Shelby Tube	SS=Split Spoon
	C=Cutting

Depths in Feet
from Ground Surface
(Not to Scale)

LOG-1

Geologic Description				Monitoring Well Piezometer		X		Design Specifications	
Somp.	Log	Pld	Depth (feet)	Protective Casing		YES			
RB	RB	RB	2	2 Lip		YES			
			4	4 Surface		YES			
			6	3 Lip		YES			
			8	Cover (Closed)		YES			
			10	2.0		YES			
			12	27.0		YES			
			14	33.0		YES			
			16	36.0		YES			
			18	48.0		YES			
			20	38.5		YES			
			22	47.5		YES			
			24	48.0		YES			
			26	48.0		YES			
			28	48.0		YES			
			30	48.0		YES			
			32	48.0		YES			
			34	48.0		YES			
			36	48.0		YES			
			38	48.0		YES			
			40	48.0		YES			
			42	48.0		YES			
			44	48.0		YES			
			46	48.0		YES			
			48	48.0		YES			
			50	48.0		YES			
			52	48.0		YES			
			54	48.0		YES			
			56	48.0		YES			
			58	48.0		YES			
			60	48.0		YES			
			62	48.0		YES			
			64	48.0		YES			
			66	48.0		YES			
			68	48.0		YES			
			70	48.0		YES			
			72	48.0		YES			
			74	48.0		YES			
			76	48.0		YES			
			78	48.0		YES			
			80	48.0		YES			
			82	48.0		YES			
			84	48.0		YES			
			86	48.0		YES			
			88	48.0		YES			
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			298	48.0		YES			
			300	48.0		YES			
			302	48.0		YES			
			304	48.0		YES			
			306	48.0		YES			
			308	48.0		YES			
			310						

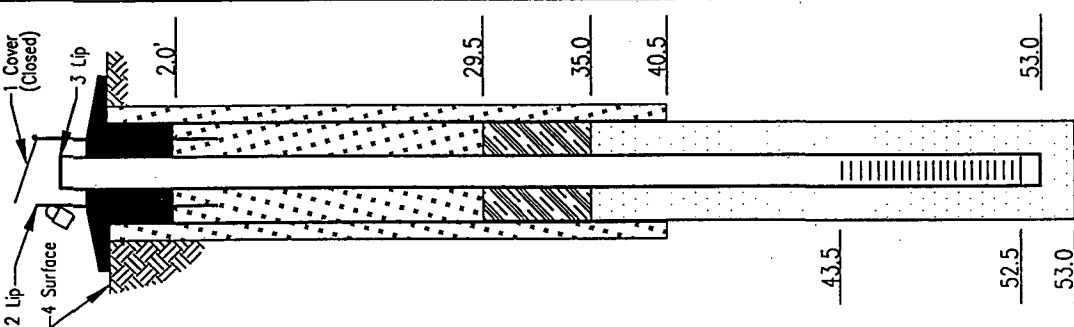
Geologic Description		Monitoring Well		Design Specifications																			
Samp. Meth.	Log	Piezometer	X	Protective Casing	YES																		
				Depths in Feet from Ground Surface (Not to Scale) LOG-1																			
				Sample Method Symbols ☒ RB=Recovery Barrel ☒ 5' ☐ SS=Split Spoon ☐ C=Cutting																			
				0-4.0' SAND TO SILTY SAND, brown, slightly moist to saturated at 4.0', many fine roots. -thin bands of CLAYEY SAND (<4" thick) appear at 1.5', 2.5', and 3.5'. -slight hydrocarbon odor detected at 4.0'. 4.0-6.0' SAND, brown, saturated, thin clay layers, hydrocarbon odor noted. 6.0-9.0' CLAY, reddish/brown, saturated to moist, hydrocarbon odor noted. 9.0-18.0' CLAY, alternating with SAND, brown, clay very moist, sand is saturated, sand is fine to medium grain, hydrocarbon odor and gray discoloration noted. 18.0-20.0' SAND, gray, saturated, fine to medium grain, hydrocarbon odor and staining. TD = 20.0'																			
				Elevations: 1 3308.10 2 3308.08 (feet MSL) 3 3307.05 4 3304.50 Coordinates: X 20834.63 Y 4870.19 Bore Hole Diameter: 12" Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel Casing Diameter: ☐ 2" ☒ 4" ☐ 6" Screen Slot: ☐ 0.008 ☒ 0.010 Screen Style: ☒ Machine Slot ☐ Wire Wrap Sand Pack: ☒ 10/20 and 12/20 Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug Grout Type: ☒ Portland Cement Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary Drilled By: ☒ Pool Environmental Drilling Lic. #: WD 1266 Logged By: PWC Completion Date: 12/15/92 Depth First Encountered Water: 4.0' BLS																			
				<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>D-T-W</th> <th>D-T-P</th> <th>Prod Thick</th> <th>Field pH</th> <th>Field EC</th> </tr> </thead> <tbody> <tr> <td>12/19/93</td> <td>7.52</td> <td></td> <td></td> <td>7.04</td> <td>9,700</td> </tr> <tr> <td>2/10/93</td> <td>7.89</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC	12/19/93	7.52			7.04	9,700	2/10/93	7.89				
Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC																		
12/19/93	7.52			7.04	9,700																		
2/10/93	7.89																						
				Comments: This well is a replacement for OCD-7, which was removed and grouted back to surface. Bentonite pellets were placed to within 1.0' of the surface.																			
				KWBEs																			
				OCD-7AR																			
				Project: 622092005-110 (OCD-7R) Location: Artesia, New Mexico																			

Design Specifications	
Elevations: 1	3306.21
(feet MSL) 3	3306.08
Coordinates: X	21143.90
Bore Hole Diameter: (Inner) 8"	(Outer) 14"
Type of Casing: (Inner) ☒ PVC Sched. 40 Flush Thread	☐ Stainless Steel ☐
(Outer) ☒ PVC Sched. 40	
Casing Diameter: (Inner) ☒ 2" ☐ 4" ☐ 6"	(Outer) ☐ 2" ☐ 4" ☒ 6" ☐ 10"
Screen Slot: ☐ 0.008 ☒ 0.010 ☐	
Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐	
Sand Pack: Colorado Silica 16-40	
Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets	
☐ 1/2" Chips ☐ Hole Plug ☐	
Grout Type: Portland/Bentonite	Weight: _____
Drill Rig: ☒ Hollow Stem ☐ Rotary ☐	
Drilled By: Precision Engineering	Lic. #: _____
Logged By: WCZ	
Completion Date: 12/14/92	
Depth First Encountered Water: 10.0' BLS	
Date	D-T-W
1/23/93	7.55
2/10/93	7.66
Prod Thick	Field pH
	6.94
	6.500
Comments: _____	

	
	
Project: 622092005-110 (OCD-8B) Location: Artesia, New Mexico	

Monitoring Well	X
Piezometer	

Protective Casing YES

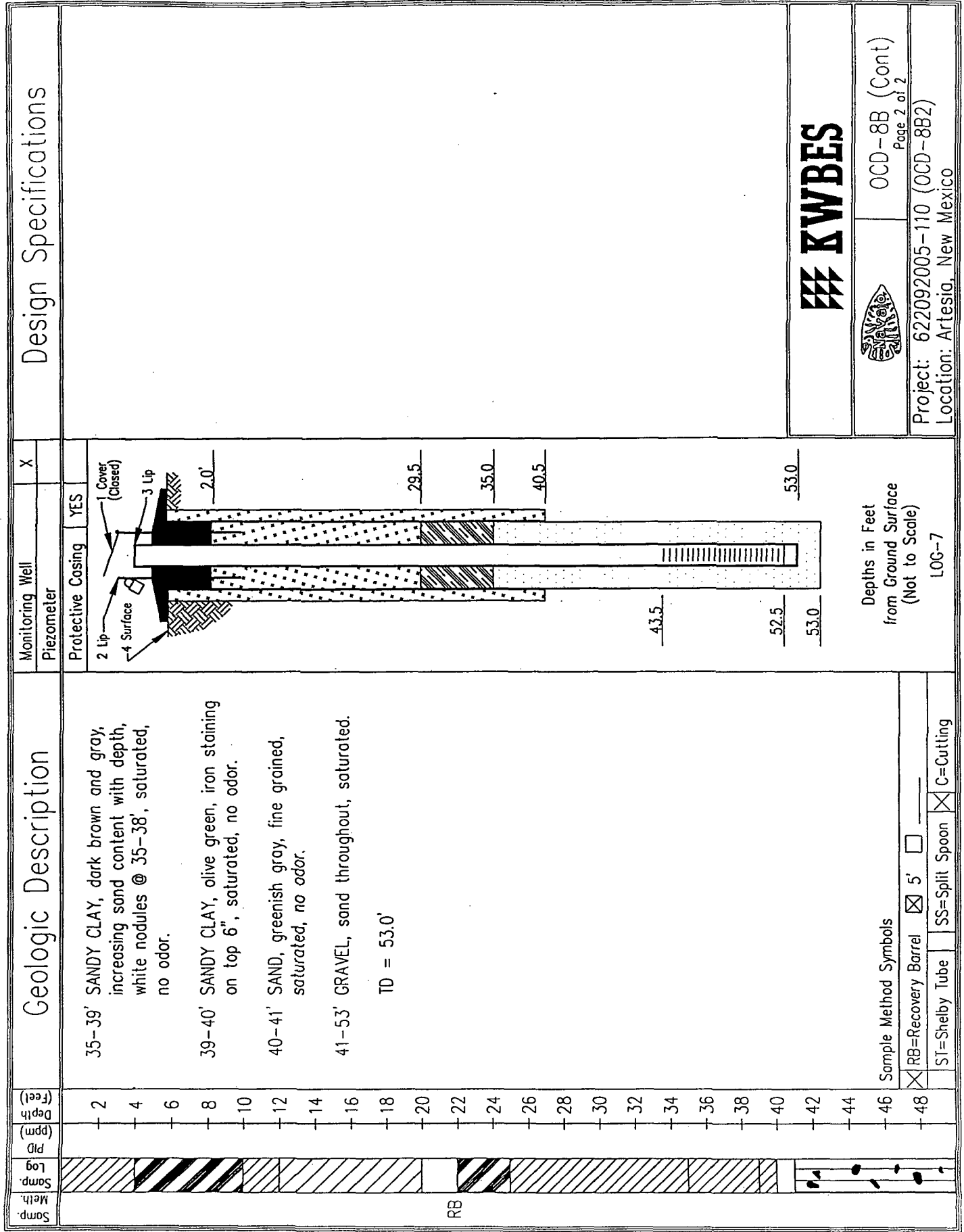


Depths in Feet from Ground Surface (Not to Scale)

LOG-7

Geologic Description	
0-4' SANDY CLAY AND SAND (interbedded- less than 6" thick), reddish brown, fine grained sand, white nodules within sandy clay, moist, earthy odor.	
4-10' CLAY, reddish brown some sand throughout, increasing sand content with depth, white nodules, clear crystals (gypsum?) roots, moist, tight, earthy odor, hydrocarbon odor, starting @ 8.5'.	
10-12' SANDY CLAY, reddish brown, saturated @ 10', hydrocarbon odor, gradational contact with underlying clayey sand.	
12-20' CLAYEY SAND, reddish brown, very fine to fine grained sand, decreasing clay content with depth, gray coloration @ 15-19', saturated, hydrocarbon odor, gradational contact with underlying sand.	
20-22' SAND, reddish brown, fine grained, saturated, hydrocarbon odor.	
22-25' CLAY, reddish brown, fine grained sand seam @ 23', (6" thick), moist, hydrocarbon odor.	
25-35' SANDY CLAY, reddish brown, fine grained sand, white nodules @ 25-30', some gray colorations @ 27-29' and 30-35', hydrocarbon odor above 30', no odor below 30'.	
Sample Method Symbols	
RB=Recovery Barrel ☒ 5' ☐	
ST=Shelby Tube	SS=Split Spoon
	C=Cutting





Geologic Description				Monitoring Well Piezometer		Design Specifications			
Samp. Meth.	Samp. Log	PID (ppm)	Depth (feet)	Protective Casing	YES	NO			
			1				Elevations: 1 3341.64 2 3341.62		
			2				(feet MSL) 3 3341.49 4 3338.60		
			3				Coordinates: X 5810.74 Y 1613.93		
			4				Bore Hole Diameter: 8"		
			5				Type of Casing: ☒ PVC Sched. 40 Flush Thread		
			6				☐ Stainless Steel ☐		
			7				Casing Diameter: ☒ 2" ☐ 4" ☐ 6"		
			8				Screen Slot: ☐ 0.008 ☒ 0.010 ☐		
			9				Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐		
			10				Sand Pack: <u>C.S.S.L. 20/40</u>		
			11				Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets		
			12				☐ 1/2" Chips ☐ Hole Plug ☐		
			13				Grout Type: <u>Portland/Bentonite</u> Weight: _____		
			14				Drill Rig: ☒ Hollow Stem ☐ Rotary ☐		
			15				Drilled By: <u>Pool Environmental</u> Lic. #: <u>WD 1266</u>		
			16				Logged By: <u>PWC</u>		
			17				Completion Date: <u>01/22/93</u>		
			18				Depth First Encountered Water: <u>14.0' BLS</u>		
			19						
			20						
			21						
			22						
			23						
			24						

0-10' CLAYEY SAND, brown, dry to moist near 9', stiff to friable, roots decreasing with depth, clay content increasing with depth, rock fragments noted at 9'.

10-11' SANDY CLAY, brown, moist, gravel fragments throughout.

11-12.5' CLAYEY SAND, tan, moist, plastic.

12.5-14' SILTY SAND, tan with orange mottling, moist to saturated at 14'.

14-18' SAND with gravel, sand is tan, saturated, fine grained, gravel is up to 1" dia. and well rounded, blue/grey color.

18-19' SILTY SAND, tan, saturated to very moist at 19'.

TD = 19.0'

Depths in Feet
from Ground Surface
(Not to Scale)

Sample Method Symbols

☒ RB=Recovery Barrel ☒ 5' ☐

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

Comments:

KWBES

EC-NP1

Project: 622092005-110 (EC-P1)

Location: Artesia, New Mexico

LOG-1

Geologic Description				Monitoring Well Piezometer		Design Specifications	
				Protective Casing	YES		
Samp. Meth.	Samp. Log	PID	Depth (feet)	Depths in Feet from Ground Surface (Not to Scale) LOG-1			
			1				
			2				
			3				
			4				
			5				
			6				
			7				
			8				
			9				
			10				
			11				
			12				
			13				
			14				
			15				
			16				
			17				
			18				
			19				
			20				
			21				
			22				
			23				
			24				
0-8.5' CLAYEY SAND, brown to tan, dry to moist, friable, roots decreasing with depth. 8.5-9' CLAYEY GRAVELS, brown and tan, dry, clay very stiff. 9-10' GRAVEL, tan to white, up to 1-1/2" dia., dry. 10-12' CLAYEY GRAVELS, brown and white, saturated. 12-13.5' SILTY SAND, brown, saturated, fine grained, some small gravel fragments. 13.5-17' CLAYEY SAND, brown, saturated to 16' then moist, clay content increasing with depth. 17-18' CLAYEY GRAVEL, brown and white, saturated. 18-19' SILTY SAND, saturated, fine grained. TD = 19.0'				Elevations: 1 3342.09 2 3342.07 (feet MSL) 3 3341.89 4 3339.10 Coordinates: X 5384.01 Y 2190.68 Bore Hole Diameter: 8" Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ Casing Diameter: ☒ 2" ☐ 4" ☐ 6" Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: C.S.S.I. 20/40 Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: ☒ Portland/Bentonite ☐ Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: Pool Environmental Lic. #: WD 1266 Logged By: PWC Completion Date: 01/21/93 Depth First Encountered Water: 10.0' BLS			
				Date 2/10/93 D-T-W 11.13 D-T-P _____ Prod Thick _____ Field pH _____ Field EC _____ Comments: _____			
				EC-NP2			
				Project: 622092005-110 (EC-P2) Location: Artesia, New Mexico			

Geologic Description				Monitoring Well Piezometer		Design Specifications				
Samp. Meth.	Samp. Log	PID (ppm)	Depth (feet)	Protective Casing	YES	X				
RB	0-1.5' CLAYEY GRAVELS, brown clay, gray gravel, clay is dry, gravel is well rounded. 1.5-8' CLAYEY SAND, brown, moist, friable, clay content increasing with depth. 8-11.5' SILTY GRAVELS, tan silts and sand, gravel is well-rounded, saturated. 11.5-13' CLAYEY SAND, brown, very moist, friable. 13-16' CLAYEY GRAVELS, brown clay, gray gravel, saturated, gravel is well rounded. 16-19' SILTY SAND, tan, saturated, fine grained. TD = 19.0' Depths in Feet from Ground Surface (Not to Scale) LOG-1			1						
				2						
				3						
				4						
				5						
				6						
				7						
				8						
				9						
				10						
				11						
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						
				21						
				22						
						23				
						24				

Design Specifications:

Elevations: 1 3342.24 2 3342.22 (feet MSL) 3 3342.05 4 3339.40

Coordinates: X 5790.02 Y 2612.22

Bore Hole Diameter: 8"

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

Casing Diameter: ☒ 2" ☐ 4" ☐ 6" ☐

Screen Slot: ☐ 0.008 ☒ 0.010 ☐

Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐

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

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

Grout Type: ☒ Portland/Bentonite ☐ Weight: _____

Drill Rig: ☒ Hollow Stem ☐ Rotary ☐

Drilled By: Pool Environmental Lic. #: WD 1266

Logged By: PWC

Completion Date: 01/22/93

Depth First Encountered Water: 8.0' BLS

Date	D-T-W	D-T-P	Prod Thick	Field pH	Field EC
2/10/93	13.32				

Comments: _____

KWBE

Project: 622092005-110 (EC-P3)
Location: Artesia, New Mexico

EC-NP3

Geologic Description		Monitoring Well Piezometer		Design Specifications	
Samp. Meth.	Samp. Log	Depth (feet)	Protective Casing	NO	X
0-11.5' SILTY GRAVELS, sand and silt are tan, dry, gravel is well rounded. 11.5-19' SANDY CLAY, reddish/brown, moist, plastic, clay content increasing with depth. 19-25' CLAY, brown, moist, plastic. 25-29' SANDY CLAY, brown, saturated. 29-34' SILTY SAND, brown, saturated, fine grained. TD = 34.0'			Elevations: 1 3345.01 2 3344.99 (feet MSL) 3 3344.84 4 3342.10 Coordinates: X 6120.29 Y 2960.65 Bore Hole Diameter: 8" Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ Casing Diameter: ☒ 2" ☐ 4" ☐ 6" Screen Slot: ☐ 0.008 ☒ 0.010 ☐ Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐ Sand Pack: C.S.S.L. 20/40 Bentonite Seal: ☐ 1/4" Pellets ☒ 1/2" Pellets ☐ 1/2" Chips ☐ Hole Plug ☐ Grout Type: ☒ Portland/Bentonite ☐ Weight: _____ Drill Rig: ☒ Hollow Stem ☐ Rotary ☐ Drilled By: Pool Environmental Lic. #: WD 1266 Logged By: PWC Completion Date: 01/23/93 Depth First Encountered Water: 25.0' BLS	Date D-T-W D-T-P Prod Thick Field pH Field EC 2/10/93 18.58	
					Comments: _____
Sample Method Symbols ☒ RB=Recovery Barrel ☒ 5' ☐ _____ ST=Shelby Tube SS=Split Spoon C=Cutting		Depths in Feet from Ground Surface (Not to Scale) LOG-1			
KWBES		EC-NP4			
Project: 622093001-115 (EC-P4) Location: Artesia, New Mexico					

APPENDIX G

Aquifer Test Data and Graphs

Navajo-RFI Pump test:			
Pumping Data			
filename: pumptest.xls			
SE2000			
Environmental Logger			
1/29/93 10:48			
Unit# 162 Test 0			
Setups:	INPUT 1	INPUT 2	INPUT 3
Type	Level (F)	Level (F)	Level (F)
Mode	TOC	TOC	TOC
I.D.	MW-18A	MW-18B	MW-18T
Reference	0	0	0
SG	1	1	1
Linearity	0.035	0.254	0.131
Scale factor	10.066	29.883	29.768
Offset	0.024	-0.005	0.027
Delay mSEC	50	50	50
Step 0	1/27/93	9:17:41 AM	
Elapsed Time	INPUT1	INPUT2	INPUT3
0	0	0	0.009
0.0083	0.003	-0.009	0.009
0.0166	0	0.038	0.009
0.025	0	0.18	0.009
0.0333	0	0.171	0.009
0.0416	0	0.161	0.009
0.05	0	0.218	0.009
0.0583	0.003	0.304	0.009
0.0666	0	0.38	0.009
0.075	0.003	0.484	0.009
0.0833	0	0.589	0.018
0.0916	0.003	0.694	0.018
0.1	0	0.808	0.009
0.1083	0	0.903	0.018
0.1166	0	0.96	0.018
0.125	0	1.055	0.028
0.1333	0.003	1.169	0.028
0.1416	0	1.264	0.028
0.15	0.003	1.349	0.037
0.1583	0	1.435	0.037
0.1666	0.006	1.502	0.028
0.175	0	1.587	0.037
0.1833	0.003	1.644	0.037
0.1916	0	1.711	0.047
0.2	0.003	1.758	0.047

0.2083	0	1.815	0.056
0.2166	0.003	1.882	0.047
0.225	0.003	1.91	0.066
0.2333	0	1.958	0.066
0.2416	0	2.005	0.066
0.25	0.003	2.043	0.066
0.2583	0	2.091	0.075
0.2666	0	2.129	0.075
0.275	0.003	2.157	0.084
0.2833	0.006	2.186	0.084
0.2916	0	2.214	0.094
0.3	0	2.243	0.103
0.3083	0	2.281	0.094
0.3166	0.003	2.309	0.103
0.325	0	2.319	0.094
0.3333	0.003	2.347	0.103
0.35	0.003	2.395	0.113
0.3666	0	2.433	0.113
0.3833	0	2.471	0.122
0.4	0	2.499	0.132
0.4166	0	2.528	0.132
0.4333	0.003	2.547	0.132
0.45	0	2.585	0.141
0.4666	0	2.604	0.151
0.4833	0.003	2.613	0.16
0.5	0.003	2.642	0.151
0.5166	0.003	2.661	0.16
0.5333	-0.003	2.68	0.16
0.55	0.003	2.699	0.169
0.5666	0	2.708	0.179
0.5833	0	2.718	0.169
0.6	0	2.756	0.179
0.6166	0.003	2.765	0.179
0.6333	0	2.784	0.188
0.65	0	2.784	0.179
0.6666	0.003	2.813	0.198
0.6833	0	2.832	0.198
0.7	0	2.841	0.198
0.7166	0.003	2.86	0.198
0.7333	-0.003	2.87	0.198
0.75	0	2.889	0.207
0.7666	0	2.899	0.198
0.7833	0	2.908	0.207
0.8	0	2.918	0.207
0.8166	0	2.937	0.217
0.8333	0	2.937	0.226
0.85	0	2.946	0.217
0.8666	0	2.965	0.217
0.8833	0	2.975	0.226
0.9	-0.003	2.984	0.226
0.9166	0	2.984	0.235
0.9333	0	3.003	0.226

0.95	0	3.013	0.226
0.9666	0	3.022	0.226
0.9833	0	3.013	0.235
1	0	3.032	0.235
1.2	-0.003	3.108	0.254
1.4	0	3.174	0.264
1.6	-0.006	3.203	0.273
1.8	-0.003	3.269	0.283
2	0	3.345	0.292
2.2	0	3.364	0.302
2.4	0	3.402	0.311
2.6	0	3.421	0.311
2.8	0.003	3.459	0.311
3	0	3.488	0.311
3.2	0.003	3.488	0.32
3.4	0	3.497	0.32
3.6	0.003	3.526	0.32
3.8	0.003	3.535	0.33
4	0.003	3.545	0.33
4.2	0	3.554	0.33
4.4	0.003	3.573	0.339
4.6	0.006	3.564	0.33
4.8	0.006	3.583	0.33
5	0.003	3.592	0.339
5.2	0.003	3.592	0.349
5.4	0.006	3.573	0.339
5.6	0.006	3.564	0.339
5.8	0.006	3.564	0.339
6	0.006	3.564	0.339
6.2	0.006	3.583	0.339
6.4	0.006	3.573	0.349
6.6	0.003	3.583	0.339
6.8	0.006	3.564	0.339
7	0.009	3.592	0.339
7.2	0.009	3.573	0.339
7.4	0.009	3.592	0.339
7.6	0.009	3.602	0.349
7.8	0.009	3.592	0.349
8	0.009	3.611	0.349
8.2	0.009	3.611	0.339
8.4	0.012	3.602	0.349
8.6	0.012	3.63	0.349
8.8	0.015	3.63	0.349
9	0.019	3.63	0.358
9.2	0.019	3.621	0.349
9.4	0.019	3.63	0.349
9.6	0.019	3.64	0.349
9.8	0.015	3.64	0.349
10	0.015	3.64	0.358
12	0.022	3.668	0.349
14	0.028	3.687	0.349
16	0.031	3.697	0.358

18	0.038	3.716	0.358
20	0.041	3.735	0.358
22	0.044	3.735	0.368
24	0.05	3.754	0.368
26	0.05	3.754	0.368
28	0.054	3.763	0.358
30	0.057	3.782	0.368
32	0.063	3.782	0.358
34	0.066	3.792	0.368
36	0.066	3.782	0.358
38	0.066	3.792	0.358
40	0.07	3.801	0.358
42	0.076	3.801	0.368
44	0.076	3.811	0.368
46	0.076	3.811	0.349
48	0.079	3.811	0.358
50	0.079	3.82	0.368
52	0.079	3.849	0.358
54	0.079	3.839	0.368
56	0.086	3.839	0.358
58	0.089	3.839	0.368
60	0.089	3.839	0.368
62	0.086	3.839	0.368
64	0.089	3.858	0.368
66	0.092	3.849	0.368
68	0.092	3.868	0.377
70	0.092	3.868	0.368
72	0.092	3.849	0.368
74	0.092	3.877	0.368
76	0.092	3.858	0.358
78	0.089	3.868	0.368
80	0.092	3.858	0.368
82	0.089	3.858	0.368
84	0.089	3.858	0.377
86	0.092	3.868	0.368
88	0.092	3.877	0.368
90	0.092	3.887	0.368
92	0.092	3.887	0.368
94	0.092	3.896	0.368
96	0.092	3.896	0.358
98	0.095	3.887	0.368
100	0.089	3.896	0.368
120	0.092	3.925	0.358
140	0.095	3.925	0.368
160	0.089	3.944	0.358
180	0.092	3.963	0.368
200	0.086	3.953	0.358
220	0.082	4.01	0.358
240	0.086	4.02	0.358
260	0.079	4.039	0.358
280	0.082	4.048	0.358
300	0.082	4.048	0.358

320	0.082	4.048	0.358
340	0.079	4.077	0.358
360	0.079	4.115	0.358
380	0.076	4.105	0.358
400	0.076	4.134	0.339
420	0.079	4.143	0.358
440	0.079	4.153	0.358
460	0.079	4.134	0.349
480	0.082	4.134	0.358
500	0.082	4.134	0.358
520	0.082	4.153	0.349
540	0.082	4.172	0.349
560	0.086	4.172	0.358
580	0.086	4.181	0.349
600	0.086	4.2	0.358
620	0.086	4.219	0.349
640	0.086	4.229	0.349
660	0.082	4.219	0.349
680	0.089	4.21	0.349
700	0.082	4.21	0.349
720	0.086	4.219	0.349
740	0.079	4.21	0.349
760	0.082	4.219	0.349
780	0.086	4.219	0.349
800	0.082	4.229	0.349
820	0.082	4.229	0.358
840	0.086	4.229	0.349
860	0.082	4.21	0.349
880	0.079	4.21	0.349
900	0.082	4.219	0.349
920	0.082	4.229	0.358
940	0.079	4.229	0.339
960	0.082	4.229	0.349
980	0.082	4.229	0.349
1000	0.079	4.238	0.339
1020	0.082	4.229	0.349

Navajo-RFI Pump test:			
Recovery and Background Data			
filename: rectest.xls			
SE2000			
Environmental Logger			
1/29/93 10:54			
Unit# 162 Test 0			
Setups:	INPUT 1	INPUT 2	INPUT 3
Type	Level (F)	Level (F)	Level (F)
Mode	TOC	TOC	TOC
I.D.	MW-18A	MW-18B	MW-18T
Reference	0	0	0
SG	1	1	1
Linearity	0.035	0.254	0.131
Scale factor	10.066	29.883	29.768
Offset	0.024	-0.005	0.027
Delay mSEC	50	50	50
Step 1	1/28/93	2:33:38 AM	
Elapsed Time	INPUT 1	INPUT 2	INPUT 3
0	0.079	4.703	0.358
0.0083	0.079	4.703	0.358
0.0166	0.079	4.694	0.358
0.025	0.079	4.694	0.368
0.0333	0.079	4.703	0.358
0.0416	0.079	4.713	0.358
0.05	0.079	4.713	0.358
0.0583	0.082	4.703	0.368
0.0666	0.079	4.713	0.368
0.075	0.082	4.722	0.358
0.0833	0.086	4.722	0.368
0.0916	0.082	4.703	0.358
0.1	0.082	4.722	0.358
0.1083	0.082	4.732	0.358
0.1166	0.082	4.713	0.358
0.125	0.079	4.713	0.358
0.1333	0.082	4.722	0.358
0.1416	0.082	4.722	0.358
0.15	0.079	4.713	0.358
0.1583	0.082	4.722	0.358
0.1666	0.082	4.732	0.358
0.175	0.079	4.732	0.368
0.1833	0.079	4.732	0.358
0.1916	0.079	4.722	0.358
0.2	0.082	4.722	0.368
0.2083	0.079	4.713	0.368
0.2166	0.079	4.732	0.368

0.225	0.076	4.722	0.368
0.2333	0.079	4.722	0.368
0.2416	0.082	4.732	0.368
0.25	0.082	4.722	0.368
0.2583	0.082	4.732	0.368
0.2666	0.082	4.732	0.368
0.275	0.079	4.722	0.368
0.2833	0.079	4.732	0.358
0.2916	0.082	4.732	0.368
0.3	0.079	4.722	0.368
0.3083	0.082	4.798	0.368
0.3166	0.079	3.735	0.368
0.325	0.082	4.048	0.368
0.3333	0.079	4.067	0.368
0.35	0.079	3.545	0.368
0.3666	0.079	3.06	0.358
0.3833	0.079	2.661	0.358
0.4	0.082	2.328	0.349
0.4166	0.086	2.043	0.349
0.4333	0.082	1.806	0.349
0.45	0.079	1.616	0.349
0.4666	0.079	1.445	0.339
0.4833	0.082	1.321	0.33
0.5	0.082	1.188	0.32
0.5166	0.079	1.083	0.32
0.5333	0.079	0.988	0.32
0.55	0.079	0.903	0.302
0.5666	0.082	0.827	0.302
0.5833	0.082	0.751	0.292
0.6	0.079	0.665	0.292
0.6166	0.082	0.627	0.283
0.6333	0.079	0.57	0.264
0.65	0.079	0.513	0.273
0.6666	0.082	0.465	0.264
0.6833	0.082	0.437	0.254
0.7	0.082	0.399	0.254
0.7166	0.086	0.37	0.254
0.7333	0.079	0.342	0.235
0.75	0.082	0.313	0.226
0.7666	0.082	0.294	0.226
0.7833	0.082	0.266	0.226
0.8	0.079	0.237	0.217
0.8166	0.086	0.237	0.217
0.8333	0.082	0.218	0.207
0.85	0.082	0.209	0.207
0.8666	0.082	0.19	0.198
0.8833	0.079	0.18	0.198
0.9	0.082	0.18	0.188
0.9166	0.079	0.161	0.179
0.9333	0.082	0.161	0.179
0.95	0.086	0.152	0.179
0.9666	0.079	0.152	0.169

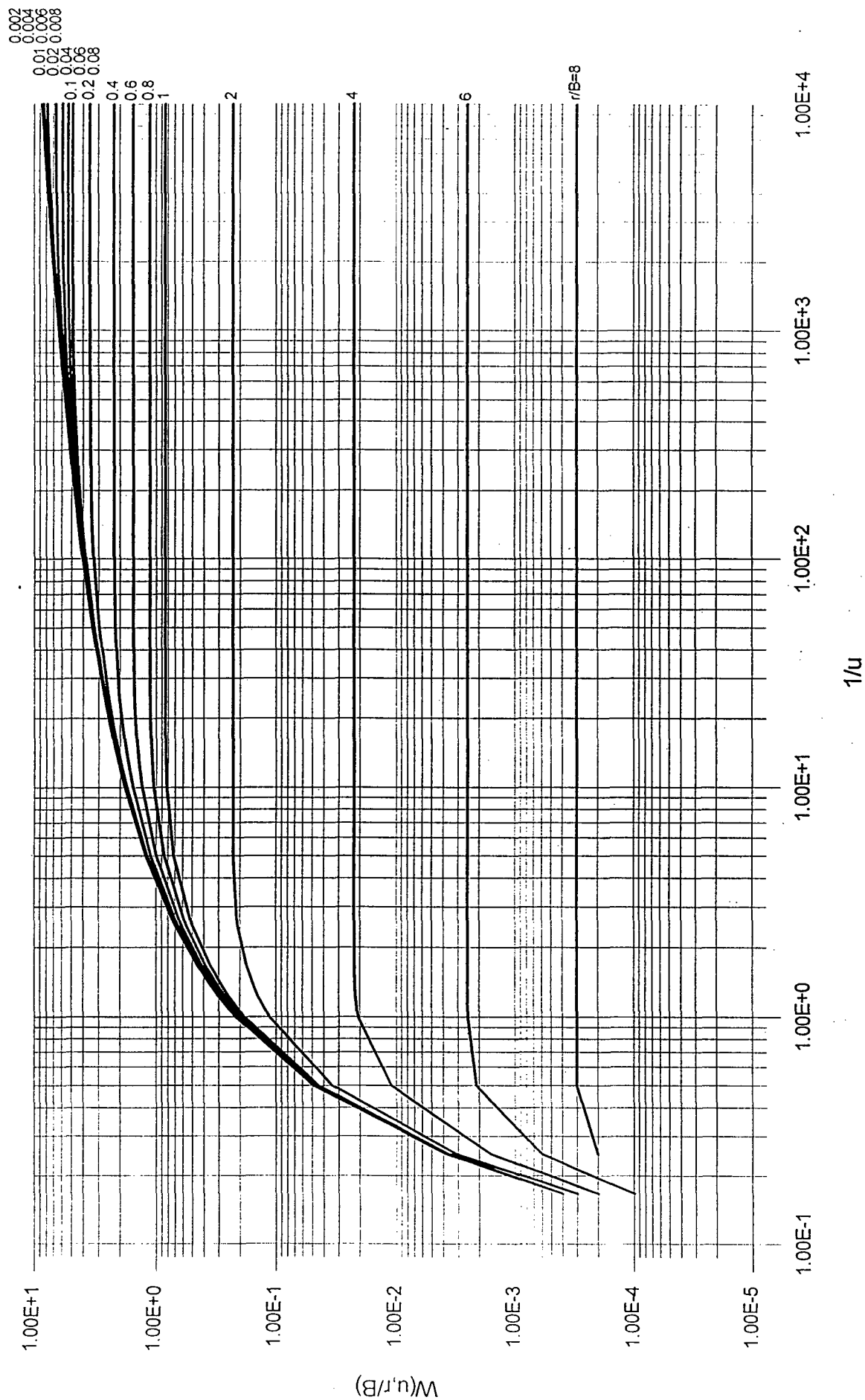
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1.4	0.082	0.076	0.113
1.6	0.082	0.066	0.094
1.8	0.079	0.066	0.075
2	0.079	0.057	0.066
2.2	0.082	0.047	0.056
2.4	0.079	0.038	0.056
2.6	0.086	0.038	0.047
2.8	0.082	0.019	0.047
3	0.079	0.038	0.047
3.2	0.079	0.028	0.047
3.4	0.076	0.028	0.047
3.6	0.079	0.028	0.037
3.8	0.079	0.028	0.037
4	0.079	0.019	0.037
4.2	0.079	0.019	0.028
4.4	0.079	0.019	0.028
4.6	0.079	0.009	0.028
4.8	0.079	0.028	0.028
5	0.076	0.009	0.028
5.2	0.076	0.019	0.028
5.4	0.079	0	0.028
5.6	0.079	0.009	0.018
5.8	0.076	0.019	0.018
6	0.076	0.009	0.009
6.2	0.073	0.009	0.018
6.4	0.076	0.009	0.018
6.6	0.073	0.009	0.018
6.8	0.076	0.009	0.018
7	0.073	0	0.009
7.2	0.076	0.009	0.009
7.4	0.073	0	0.009
7.6	0.07	0	0.009
7.8	0.073	0.009	0.009
8	0.07	0	0.009
8.2	0.073	0	0.009
8.4	0.07	0	0.009
8.6	0.07	-0.009	0.009
8.8	0.066	0	0
9	0.066	0.009	0.009
9.2	0.066	0	0.009
9.4	0.066	0.009	0.009
9.6	0.063	0	0.018
9.8	0.063	0.009	0.009
10	0.066	0	0.009
12	0.06	0	0.009
14	0.057	-0.009	0
16	0.047	0	-0.009
18	0.041	-0.009	0
20	0.038	-0.009	-0.009

22	0.035	-0.009	-0.009
24	0.035	-0.009	-0.009
26	0.031	-0.009	0
28	0.025	-0.009	-0.009
30	0.019	0	-0.009
32	0.019	-0.019	-0.009
34	0.015	-0.009	-0.018
36	0.012	-0.019	-0.009
38	0.012	0	-0.009
40	0.009	-0.009	-0.009
42	0.009	-0.009	-0.009
44	0.009	-0.019	-0.018
46	0.006	-0.009	-0.009
48	0.006	-0.019	-0.009
50	0.003	-0.019	-0.018
52	0.003	-0.009	-0.009
54	0.003	-0.019	-0.018
56	0.003	-0.028	-0.018
58	0	-0.019	-0.018
60	-0.006	-0.009	-0.018
62	-0.006	-0.009	-0.018
64	-0.003	-0.019	-0.018
66	-0.003	-0.019	-0.018
68	-0.003	-0.019	-0.018
70	-0.003	-0.019	-0.018
72	-0.003	-0.019	-0.009
74	-0.006	-0.019	-0.018
76	-0.006	-0.019	-0.009
78	-0.006	-0.019	-0.028
80	-0.009	-0.019	-0.018
82	-0.006	-0.009	-0.018
84	-0.006	-0.019	-0.018
86	-0.006	-0.028	-0.028
88	-0.006	-0.019	-0.018
90	-0.009	-0.009	-0.028
92	-0.009	-0.019	-0.018
94	-0.006	-0.019	-0.018
96	-0.009	-0.009	-0.018
98	-0.009	-0.019	-0.018
100	-0.009	-0.009	-0.018
120	-0.012	-0.019	-0.018
140	-0.012	-0.019	-0.018
160	-0.012	-0.019	-0.028
180	-0.012	-0.028	-0.028
200	-0.012	-0.019	-0.028
220	-0.009	-0.019	-0.009
240	-0.015	-0.019	-0.028
260	-0.009	-0.009	-0.018
280	-0.006	-0.009	-0.018
300	-0.009	-0.009	-0.018
320	-0.009	-0.019	-0.018
340	0	-0.009	-0.018

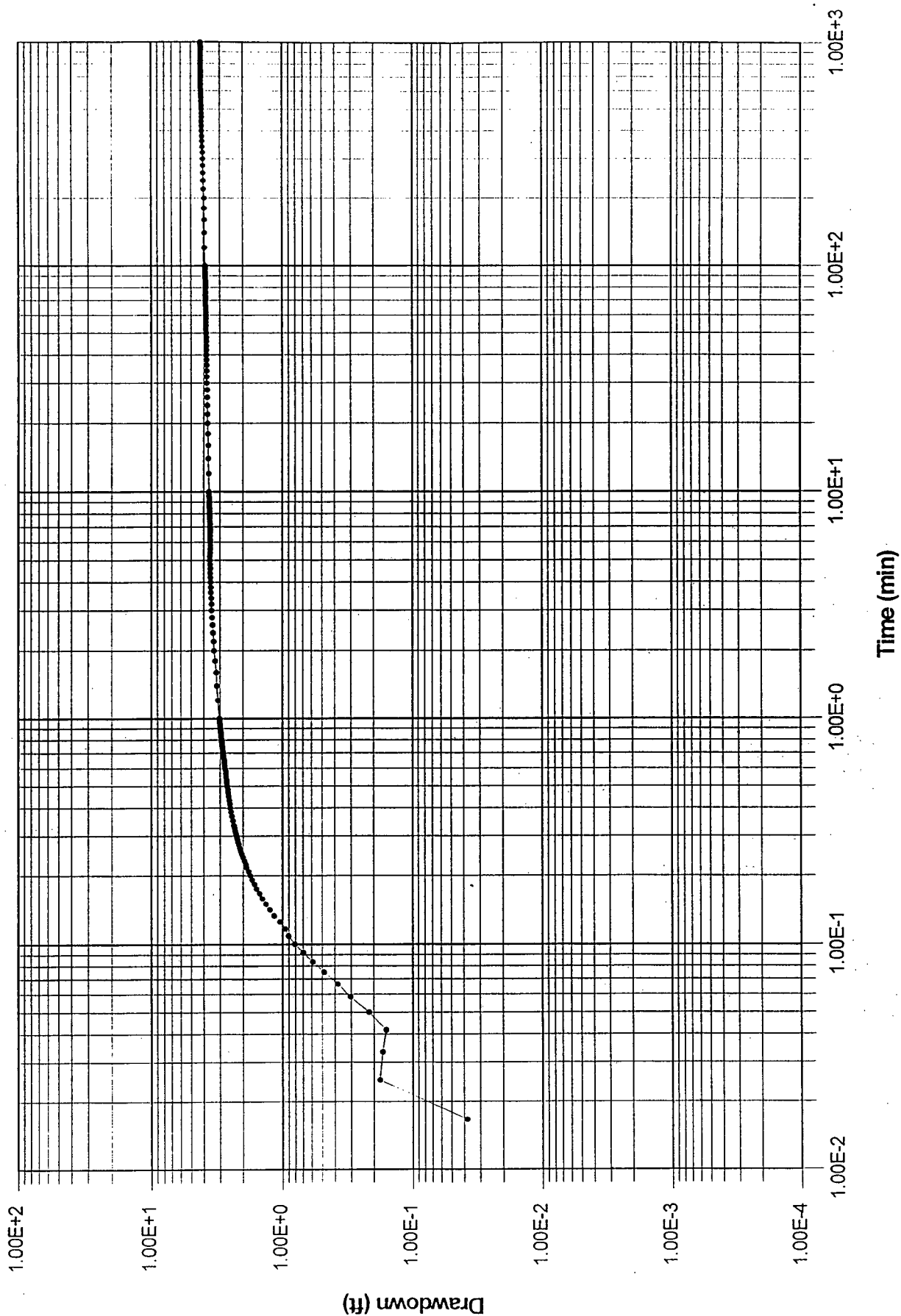
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440	0.003	0.009	0
460	0.003	0	-0.009
480	0.003	0	0.009
500	0	0	0
520	0.003	-0.009	0
540	-0.003	0	0
560	-0.009	0	-0.009
580	-0.006	0	-0.009
600	-0.009	-0.009	-0.009
620	-0.009	0	-0.018
640	-0.009	-0.009	-0.009
660	-0.012	-0.009	-0.018
680	-0.012	-0.009	-0.018
700	-0.012	0	-0.018
720	-0.009	0	-0.009
740	-0.009	-0.009	-0.018
760	-0.012	-0.009	-0.009
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800	-0.012	-0.009	-0.018
820	-0.012	-0.009	-0.018
840	-0.012	-0.009	-0.009
860	-0.009	0	-0.018
880	-0.009	-0.009	-0.009
900	-0.009	-0.009	-0.018
920	-0.006	-0.009	-0.009
940	0.015	-0.009	-0.009
960	0.019	-0.009	-0.009
980	0.019	0	0
1000	0.019	0	-0.009
1020	0.022	0	-0.009
1040	0.025	0	-0.018
1060	0.025	-0.009	0
1080	0.022	-0.009	-0.009
1100	0.022	-0.009	-0.009
1120	0.025	0	-0.009
1140	0.022	-0.009	-0.009
1160	0.028	0	0
1180	0.028	-0.009	0
1200	0.028	0	0
1220	0.031	0.009	-0.009
1240	0.035	0	0
1260	0.035	0	0
1280	0.035	0	0
1300	0.035	0.009	-0.018
1320	0.028	0	0
1340	0.035	0	0
1360	0.035	0	0
1380	0.031	0	-0.009

1400	0.035	0	0
1420	0.031	0	-0.009
1440	0.031	-0.009	-0.009
1460	0.031	-0.009	0
1480	0.031	0	0
1500	0.031	0	0
1520	0.031	0	0
1540	0.028	0	-0.009
1560	0.031	0	0
1580	0.031	0	0
1600	0.035	0	0
1620	0.035	-0.009	-0.009
1640	0.028	0	-0.009
1660	0.035	0	-0.009
1680	0.035	0.009	-0.009
1700	0.035	0	-0.009
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1760	0.041	0.009	0
1780	0.038	0.009	-0.009

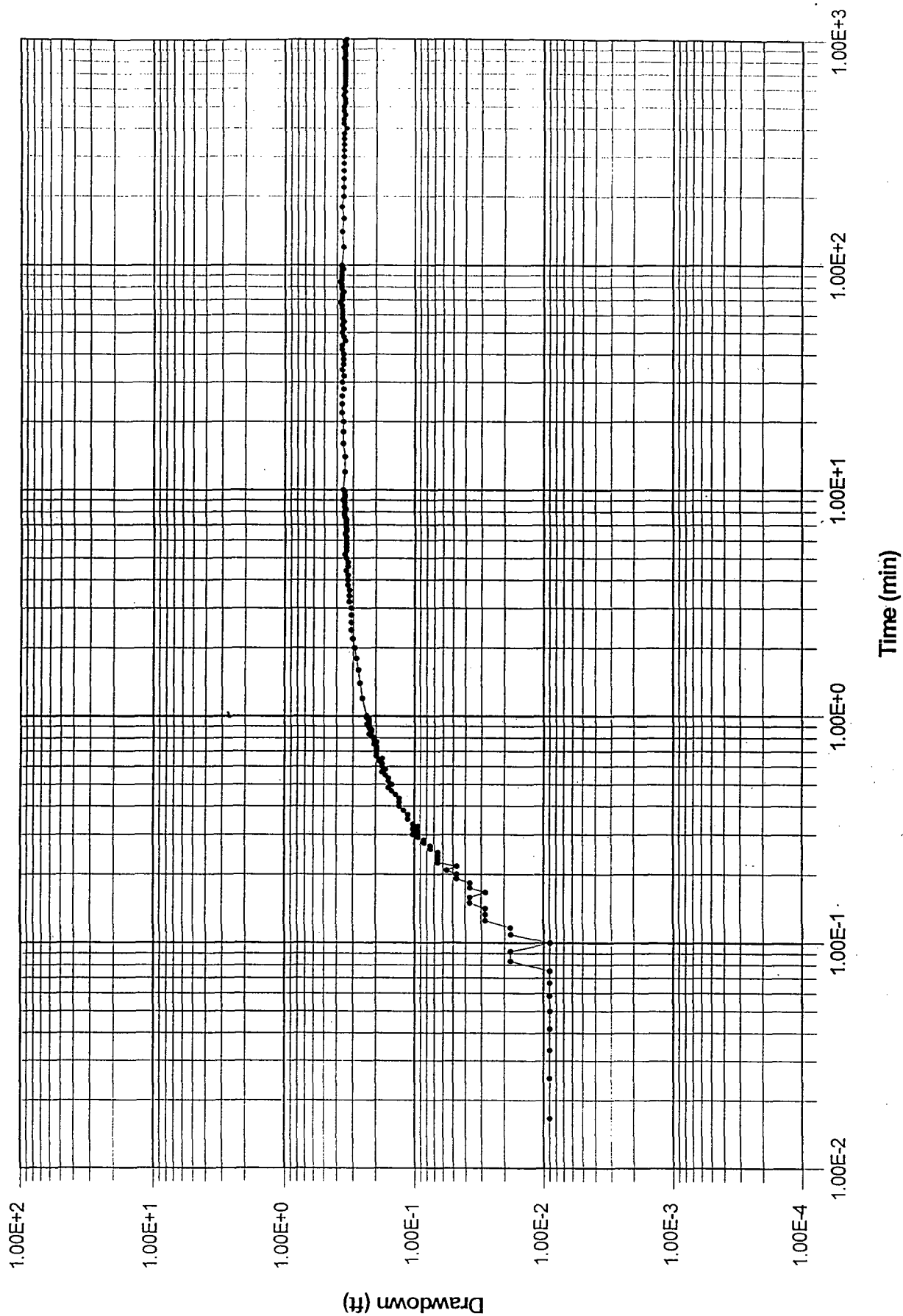
Type Curves for Leaky Confined Aquifers



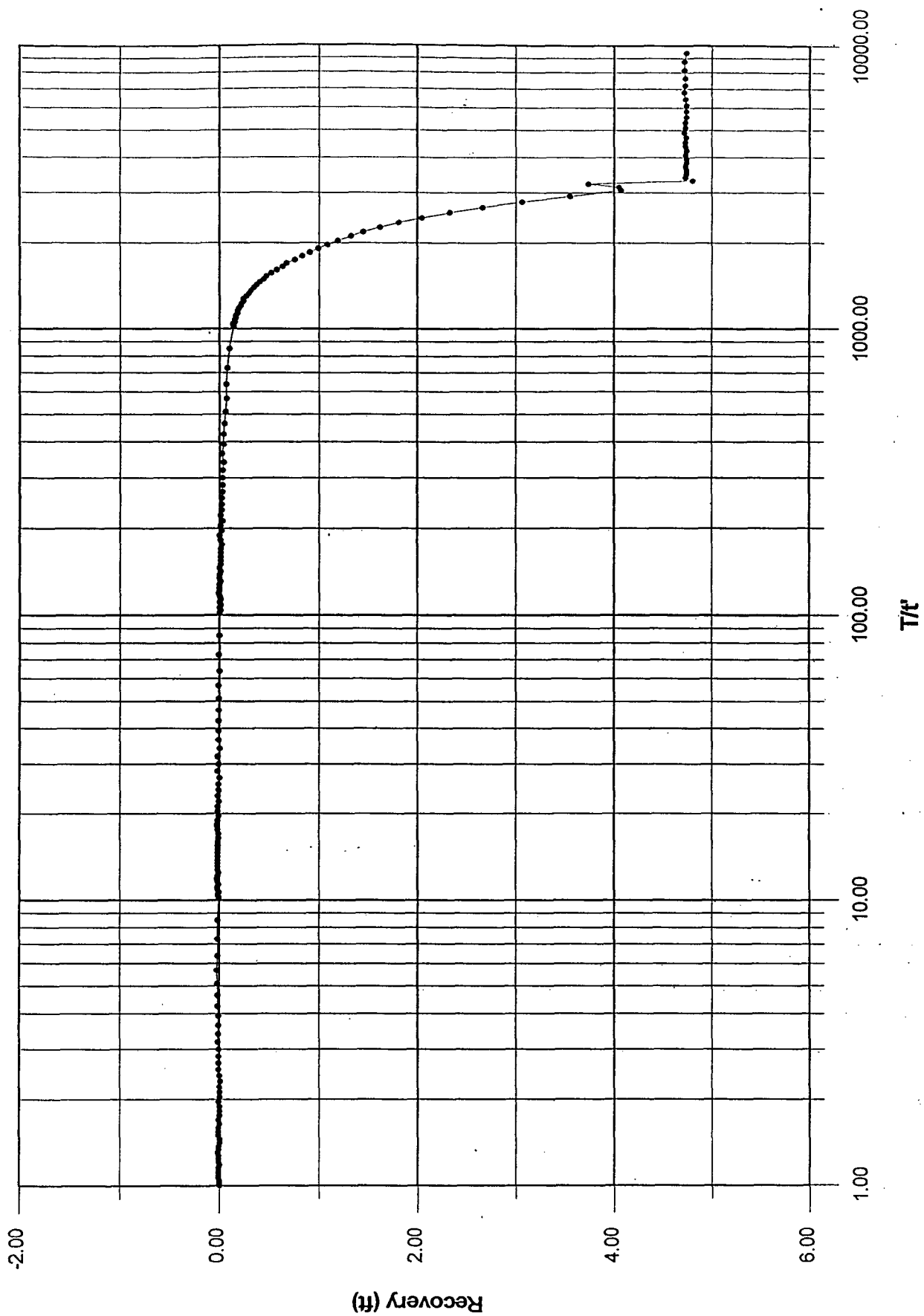
Time/Drawdown Curve for MW-18B



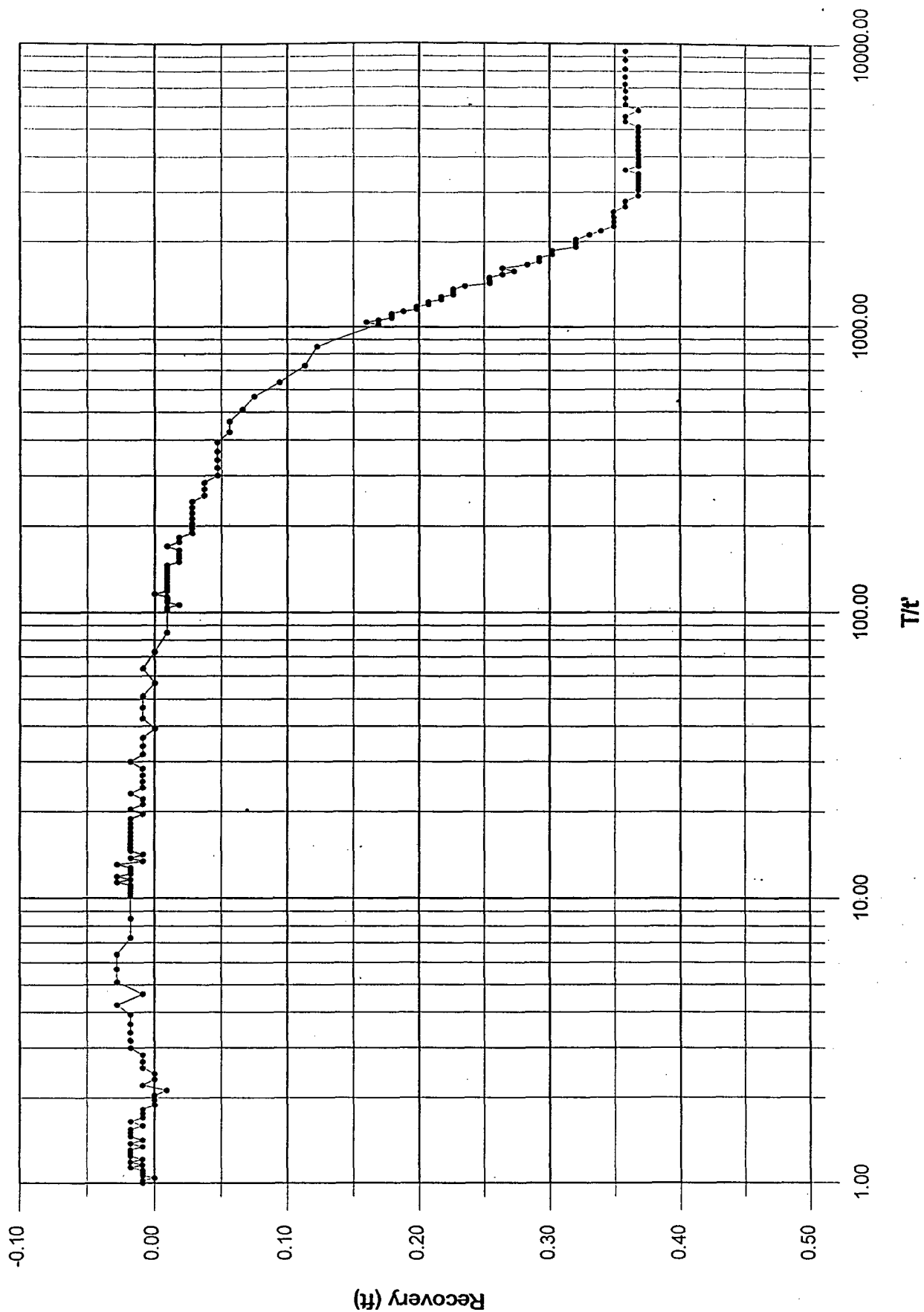
Time/Drawdown Curve for MW-18T



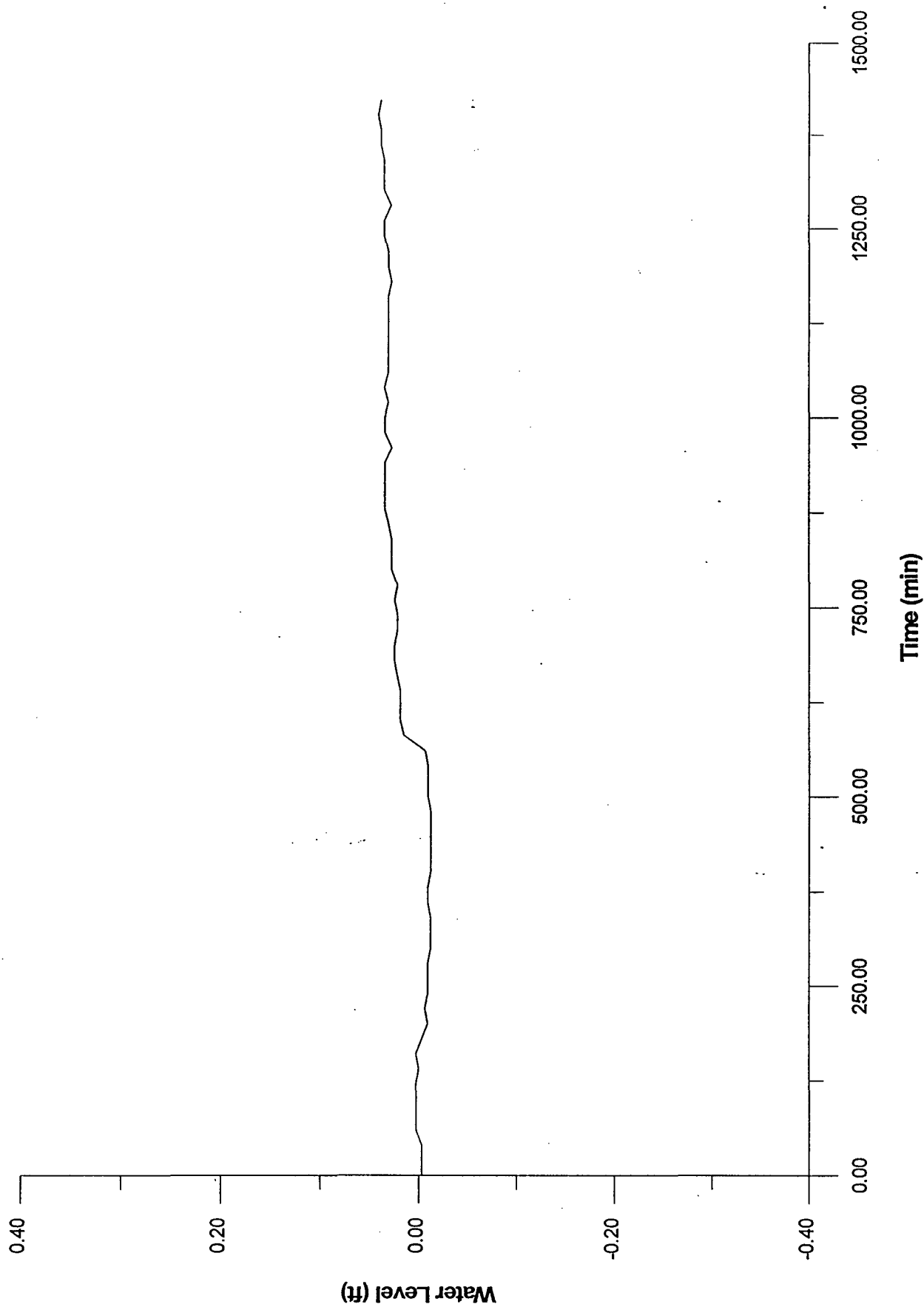
Time/Recovery Curve for MW-18B



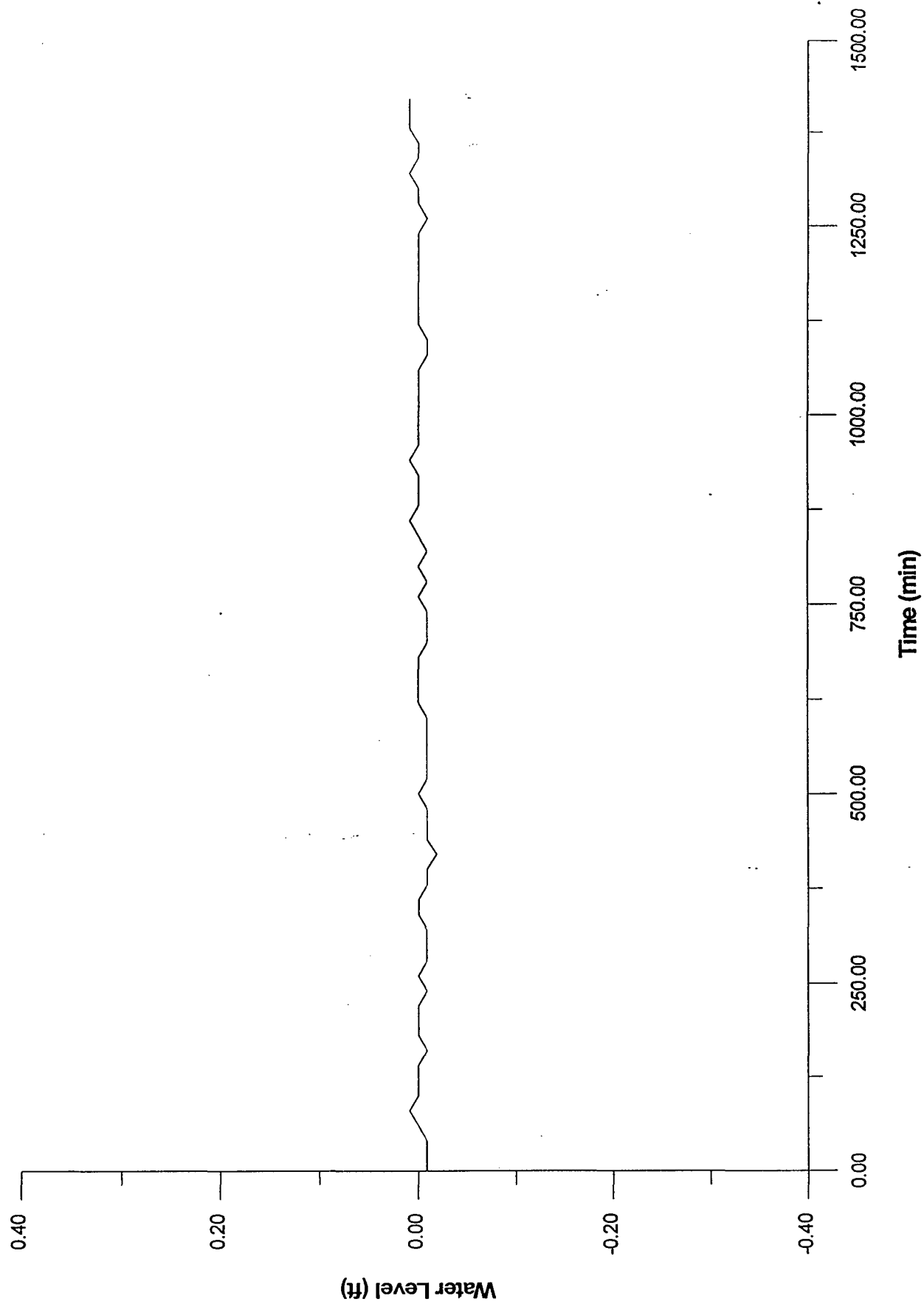
Time/Recovery Curve for MW-18T



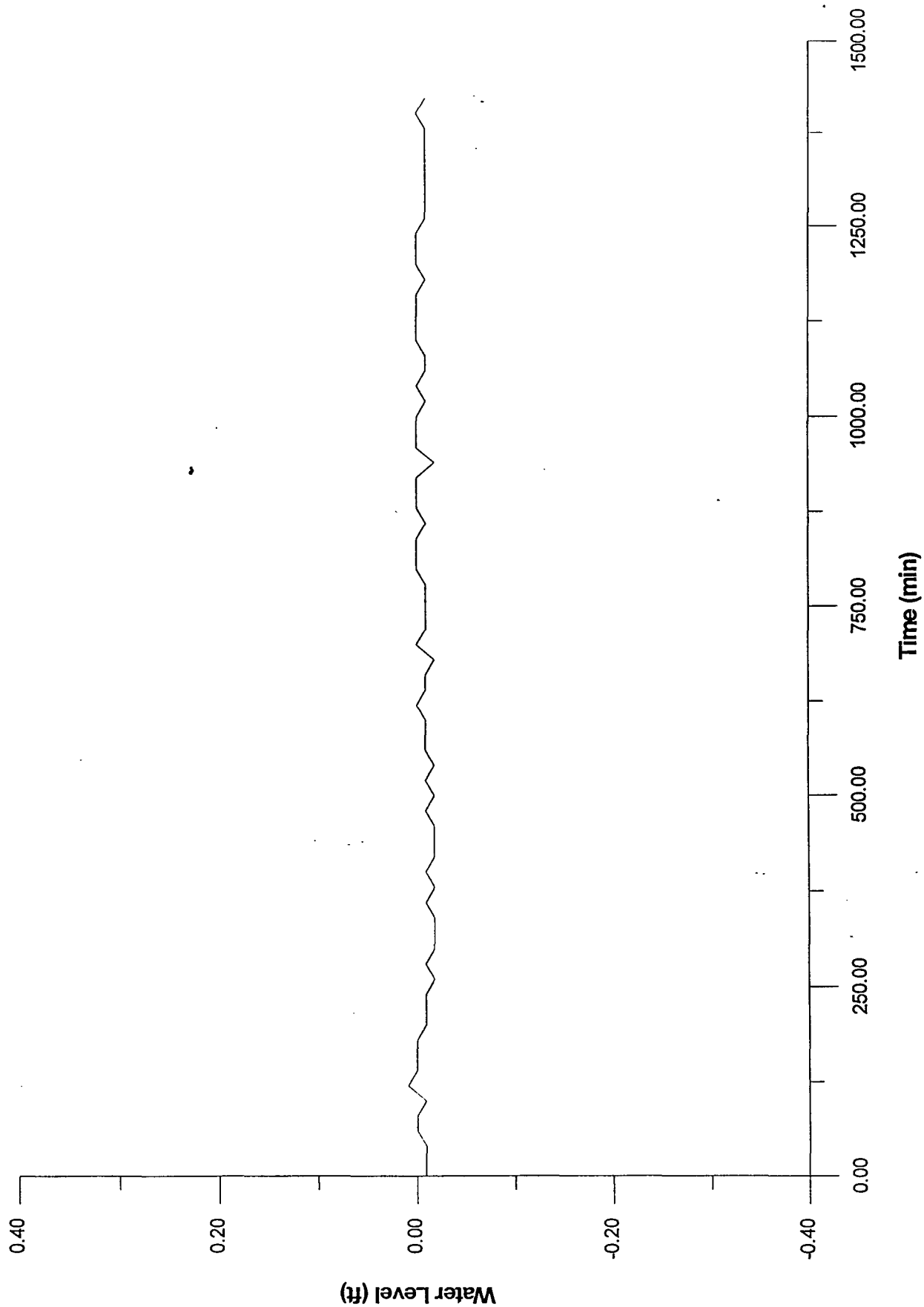
Background Water Level Trend for MW-18A



Background Water Level Trend for MW-18B



Background Water Level Trend for MW-18T



APPENDIX H

Computer Modeling Methodology

APPENDIX H — COMPUTER MODELING METHODOLOGY

The flow path was evaluated using GWPATH 4.0, a ground water flow simulation computer program. GWPATH allows the user to evaluate a time weighted flow line associated with potentiometric distribution by tracking particle migration under the specified head conditions. GWPATH uses an input data file of ground water head specified at the intersection points of a user-defined, finite-difference grid. The specified head grid across the simulation domain was created by MODFLOW, a USGS finite-difference ground water flow model. The input data of MODFLOW was from the measured ground water elevations across the entire domain.

MODEL APPLICATION

In order to calculate time-related flow paths, two assumptions were made: 1) flow in the aquifer is steady; and 2) Darcy's law is valid under the existing conditions. GWPATH requires as input parameters the hydraulic conductivities in the principal X and Y directions and the effective porosity of the aquifer. Hydraulic head must also be input over the entire flow domain.

1. MODFLOW

The input data file for GWPATH, which contained the value of ground water head at each node point over the model domain, was generated by MODFLOW. MODFLOW was selected to evaluate the available ground water elevation data collected from monitoring wells in this area.

"MODFLOW" is an acronym representing the Modular Three-Dimensional Finite-Difference Ground-Water Flow Model (McDonald and Harbaugh, 1988). Developed by the U.S. Geological Survey in 1984, MODFLOW has earned praise from ground water modelers for its accuracy and ease of use. It is highly recommended by "Ground-water Modeling Compendium" published by EPA (EPA, 1992).

The principal element of interest in this modeling study was the vertical cross-section along the line of A-A', 5800 ft long, and to a depth of 100 ft. The total model domain was divided by a uniform grid of 41 in the horizontal direction and 51 in the vertical direction. Constant boundary conditions were assumed along the perimeter of the model domain. The constant boundary heads were determined by the evaluation of the measured heads across the entire

domain. The groundwater head at each node generated by MODFLOW was listed in Table H-1. This distributed hydraulic head was used as the input head data for GWPATH.

2. GWPATH

For two-dimensional vertical flow, the X and Z components of the Darcy velocity vector are expressed as:

$$q_x(x,z) = -K_x(x,z) \, dh(x,z)/dx \quad (1)$$

$$q_z(x,z) = -K_z(x,z) \, dh(x,z)/dz \quad (2)$$

The internodal average ground water pore velocity in each coordinate direction equals the Darcy velocity divided by the effective porosity. The expressions of the pore velocity can be written in differential equations:

$$dx/dt = V_x(x,z) = q_x(x,z)/n_e(x,z) \quad (3)$$

$$dz/dt = V_z(x,z) = q_z(x,z)/n_e(x,z) \quad (4)$$

where $n_e(x,z)$ is the effective porosity.

3. FORWARD PARTICLE TRACING ANALYSIS

A particle flow path line is defined as a line along which the velocity at every point satisfies the velocity equations described in equations 1 and 2. To determine a path line, GWPATH first calculates the velocity at each node point across the domain. The velocities are then interpreted between adjacent node points across each cell of the domain. Once the internodal velocities have been determined, they are integrated over time and a path line for a given time period is defined. This integration may be calculated forward in time (i.e. downgradient) or reverse in time (i.e. upgradient).

A forward particle tracing, or forward flow path line, is the representation of the mean trajectory a fluid "particle" will follow from one discrete location to another in accordance with downgradient integration. The origin of the tracing particles may be placed at any location within the model domain. The particles are then tracked over a specified time period. All particles were tracked for a period of 60 years. In the current particle tracing model, the horizontal and vertical conductivities were assumed as 35 ft/day and 0.1 ft/day respectively. The effective porosity was assumed as 10%. The forward pathlines are shown in Figure 19.

Table H-1 Data input file for MODFLOW computer simulation

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 3297.14 3297.04 3296.95 3296.86 3296.77 3296.68 3296.59 3296.49 3296.40 3296.31
 3296.22 3296.13 3296.04 3295.95 3295.86 3295.77 3295.69 3295.60 3295.51 3295.43
 3295.41
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 3297.17 3297.07 3296.97 3296.88 3296.78 3296.69 3296.60 3296.51 3296.42 3296.33
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 3295.42
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 3296.25 3296.16 3296.07 3295.98 3295.89 3295.80 3295.72 3295.63 3295.55 3295.48
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APPENDIX I

Phase II Laboratory Analytical Data

APPENDIX K

Pond I TPH Sampling Results



CHAIN OF CUSTODY RECORD

LEANA

Page 1 of 2

Client/Project Name		Project Location		ANALYSES / PARAMETERS			
Cavio Refinery - Evaporation Pond		Artesia, New Mexico					
Sampler: (Signature) <i>Todd Williams</i>		Chain of Custody Tape No.		Remarks			
Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers	TPH	Remarks
EP # 1	11-9-93	1300	0693602853	Soil	1	X	* Quick turnaround
EP # 2	11-9-93	1335	0693602854	Soil	1	X	is requested for
EP # 3	11-9-93	1355	0693602855	Soil	1	X	these samples.
EP # 4	11-9-93	1420	0693602856	Soil	1	X	
EP # 5	11-9-93	1445	0693602857	Soil	1	X	If you have any
EP # 6	11-9-93	1450	0693602858	Soil	1	X	questions, please call
EP # 7	11-9-93	1510	0693602859	Soil	1	X	Dave Byer at KUBES.
EP # 8	11-9-93	1530	0693602860	Soil	1	X	
EP # 9	11-9-93	1545	0693602861	Soil	1	X	
EP # 10	11-9-93	1600	0693602862	Soil	1	X	
EP # 11	11-9-93	1615	0693602863	Soil	1	X	
EP # 12	11-9-93	1630	0693602864	Soil	1	X	
EP # 13	11-9-93	1650	0693602865	Soil	1	X	
EP # 14	11-9-93	1700	0693602866	Soil	1	X	
Relinquished by: (Signature) <i>Todd Williams</i>		Date	Time	Received by: (Signature)		Date	Time
		11-10-93	1500				
Relinquished by: (Signature)		Date	Time	Received by: (Signature)		Date	Time
Relinquished by: (Signature)		Date	Time	Received by: (Signature)		Date	Time

Inter-Mountain Laboratories, Inc.

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Sheridan, Wyoming 82801
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Gillette, Wyoming 82716
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☐ 2506 West Main Street
Farmington, NM 87401
Telephone (505) 326-4737

☐ 1160 Research Dr.
Bozeman, Montana 59715
Telephone (406) 586-8450

☒ 3304 Longmire Drive
College Station, TX 77845
Telephone (409) 774-4999

17406



CHAIN OF CUSTODY RECORD

Page 2 of 2

Client/Project Name		Project Location		ANALYSES / PARAMETERS				
Navajo Refinery - Evaporation Pond		Artesia, New Mexico						
Sampler: (Signature)		Chain of Custody Tape No.		No. of Containers	TPH	PH	TKN, K ₁ +P	Remarks
Sample No./ Identification	Date	Time	Lab Number	Matrix				
EP # 15	11-9-93	1717	0693602867	Soil	X			* Quick turnaround
EP # 16	11-9-93	1725	0693602868	Soil	X			requested for TPH analysis only.
EP # 17	11-9-93	1735	0693602869	Soil	X			
EP # 18	11-9-93	1745	0693602870	Soil	X			
EP Duplicate	11-9-93		0693602871	Soil	X			If you have any questions, please contact Dave Boyer at KLJBS.
EP - pH # 3	11-9-93	1355	0693602872	Soil		X		
EP - pH # 6	11-9-93	1450	0693602873	Soil		X		
EP - pH # 9	11-9-93	1545	0693602874	Soil		X		
EP - pH # 12	11-9-93	1630	0693602875	Soil		X		
EP - pH # 15	11-9-93	1717	0693602876	Soil		X		
EP - pH # 18	11-9-93	1745	0693602877	Soil		X		
EP - NPK # 1	11-9-93	1355	0693602878	Soil			X	
EP - NPK # 2	11-9-93	1715	0693602879	Soil			X	
Relinquished by: (Signature)		Date	Time	Received by: (Signature)	Time			
Tode Williams		11-10-93	1500					
Relinquished by: (Signature)		Date	Time	Received by: (Signature)	Time			
Relinquished by: (Signature)		Date	Time	Received by: (Signature)	Time			
Inter-Mountain Laboratories, Inc.					17405			
☐ 1633 Terra Avenue Sheridan, Wyoming 82801 Telephone (307) 672-8945 ☐ 1714 Phillips Circle Gillette, Wyoming 82716 Telephone (307) 682-8945 ☐ 2506 West Main Street Farmington, NM 87401 Telephone (505) 326-4737 ☐ 1160 Research Dr. Bozeman, Montana 59715 Telephone (406) 586-8450 ☐ 1183 SH 30 College Station, TX 77845 Telephone (409) 776-8945 ☒ 3304 Longmire Drive College Station, TX 77845 Telephone (409) 774-4999								

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #1
Laboratory ID: 0693GO2853
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	ND	10

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:

Analyst

Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #2
Laboratory ID: 0693G02854
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

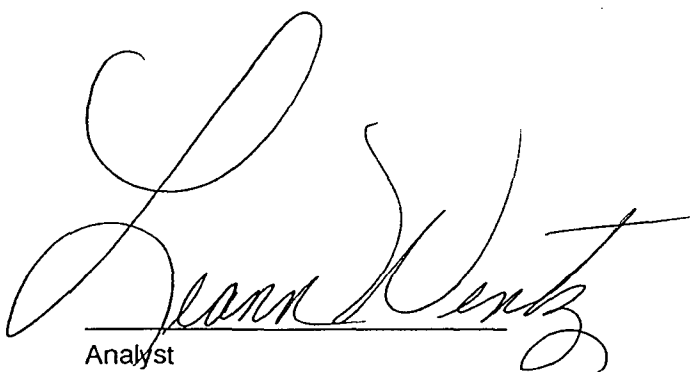
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	32	10

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #3
Laboratory ID: 0693GO2855
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

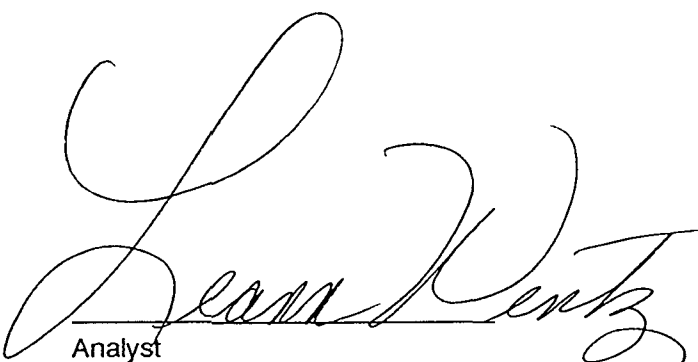
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	1970	25

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Loc.: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #4
Laboratory ID: 0693GO2856
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

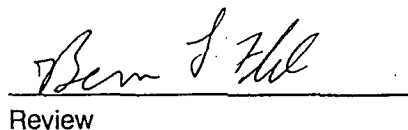
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	59	10

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #5
Laboratory ID: 0693GO2857
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

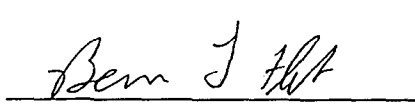
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	26500	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

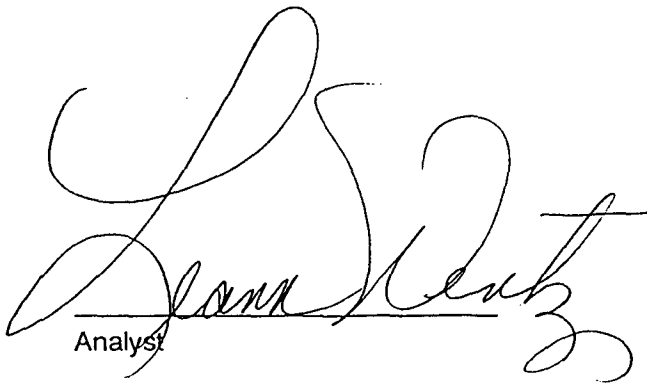
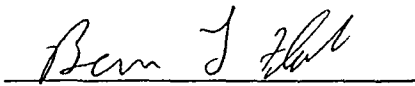
Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #6
Laboratory ID: 0693GO2858
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	48300	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:
Analyst
Review

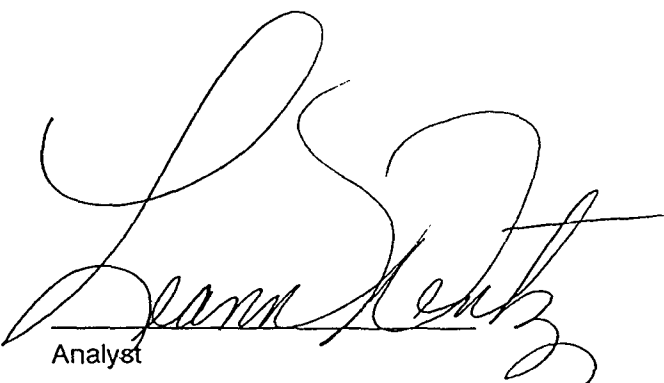
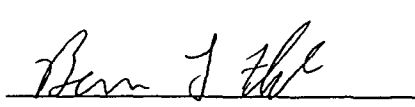
TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client:	NAVAJO REFINERY CO.	Report Date:	11/15/93
Project Name:	Evaporation Pond	Date Sampled:	11/09/93
Project Loc.:	Artesia, New Mexico	Date Received:	11/11/93
Sample ID:	EP #7	Date Extracted:	11/13/93
Laboratory ID:	0693GO2859	Date Analyzed:	11/14/93
Sample Matrix:	Soil		
Preservative:	Cool		
Condition:	Intact		

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	32400	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:
Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #8
Laboratory ID: 0693GO2860
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

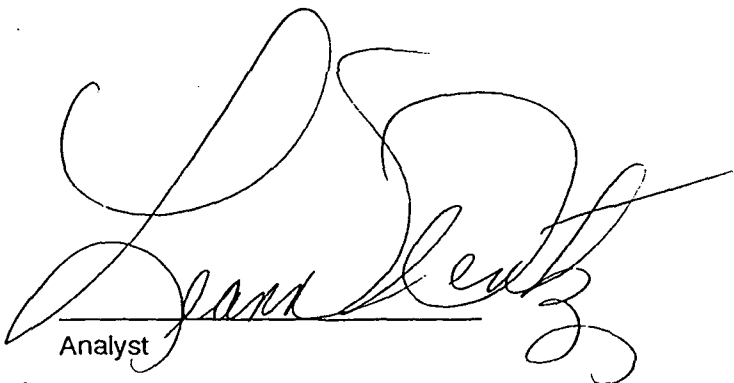
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	2890	50

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #9
Laboratory ID: 0693GO2861
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

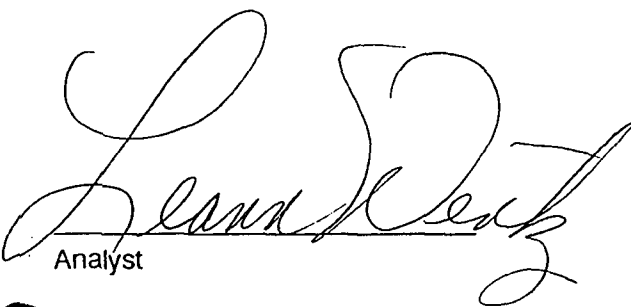
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	21000	250

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst

Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #10
Laboratory ID: 0693GO2862
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

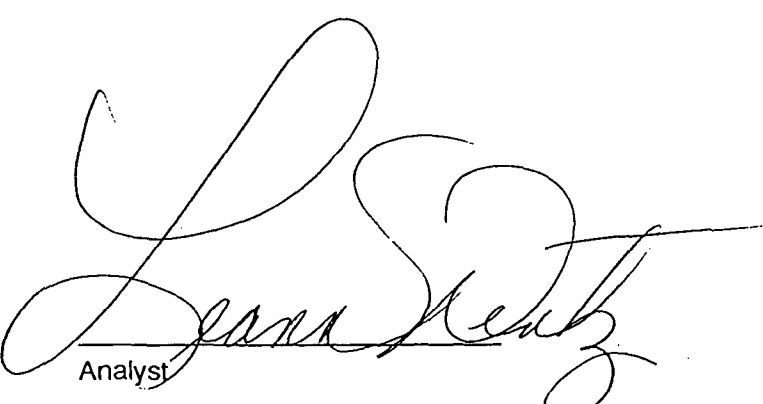
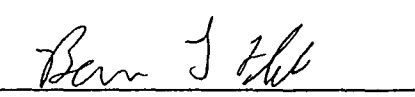
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	2940	50

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #11
Laboratory ID: 0693GO2863
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

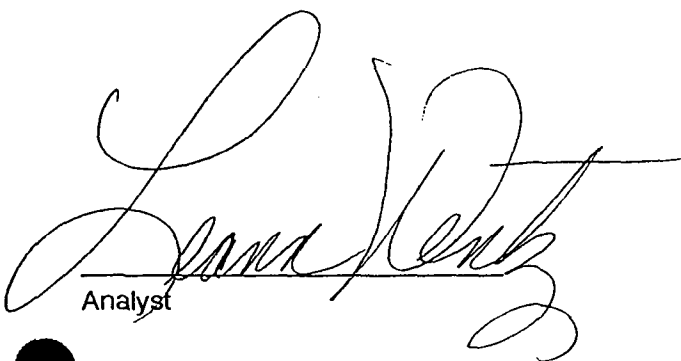
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

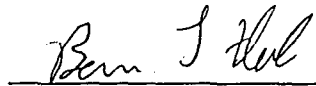
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	33500	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable Chemical Analysis of Water and Waste, United States Environmental Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #12
Laboratory ID: 0693GO2864
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	105000	1875

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #13
Laboratory ID: 0693GO2865
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

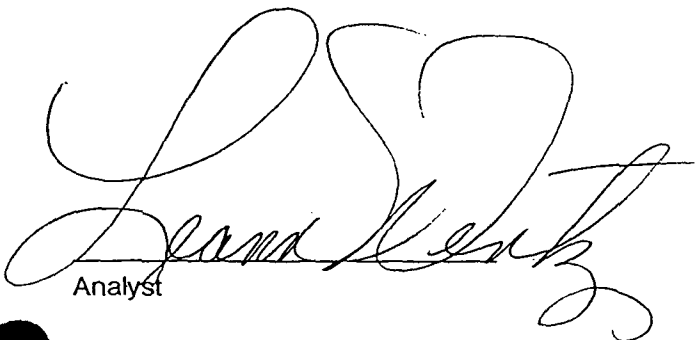
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

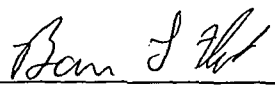
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	81700	1250

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #14
Laboratory ID: 0693GO2866
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

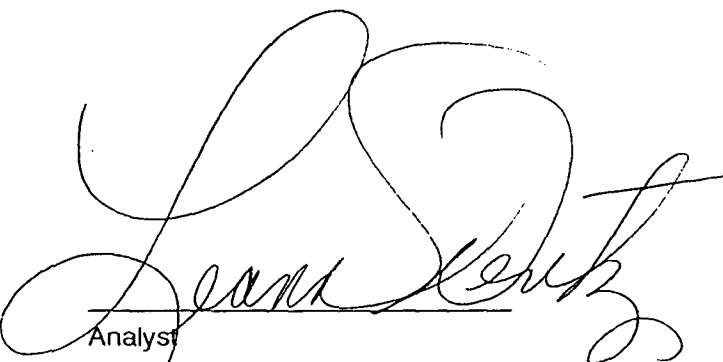
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	2940	50

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Loc.: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #15
Laboratory ID: 0693GO2867
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

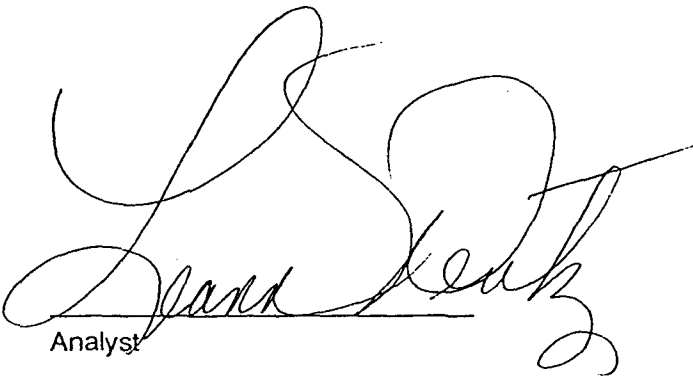
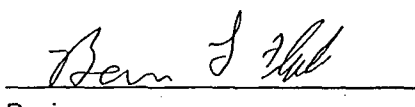
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	51100	250

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #16
Laboratory ID: 0693GO2868
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

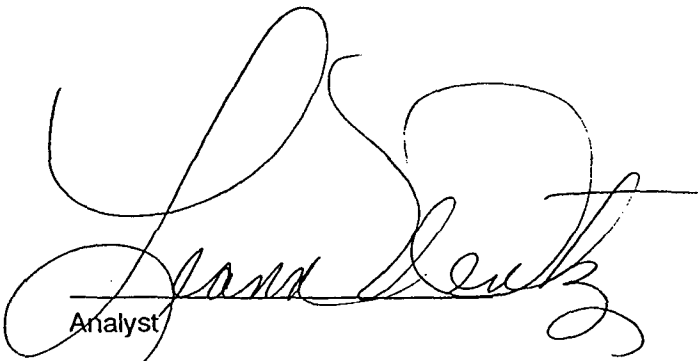
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

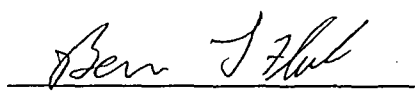
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	58200	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: **Evaporation Pond**
Project Loc.: **Artesia, New Mexico**
Sample ID: **EP #17**
Laboratory ID: **0693GO2869**
Sample Matrix: **Soil**
Preservative: **Cool**
Condition: **Intact**

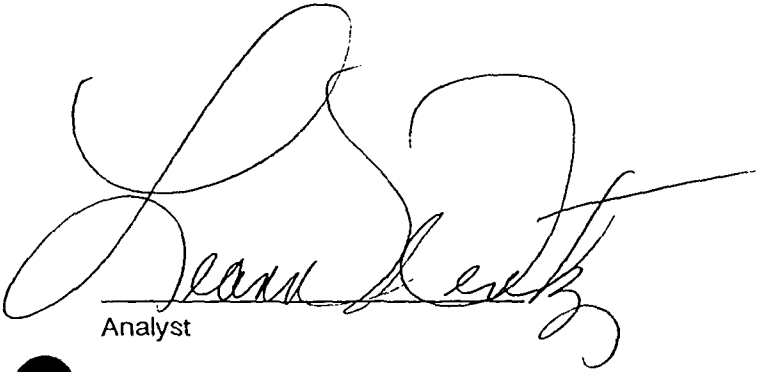
Report Date: **11/15/93**
Date Sampled: **11/09/93**
Date Received: **11/11/93**
Date Extracted: **11/13/93**
Date Analyzed: **11/14/93**

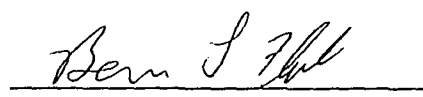
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	41100	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

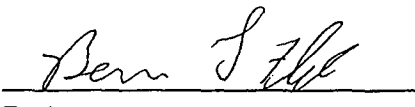
Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #18
Laboratory ID: 0693GO2870
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	33600	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:
Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP Duplicate
Laboratory ID: 0693GO2871
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

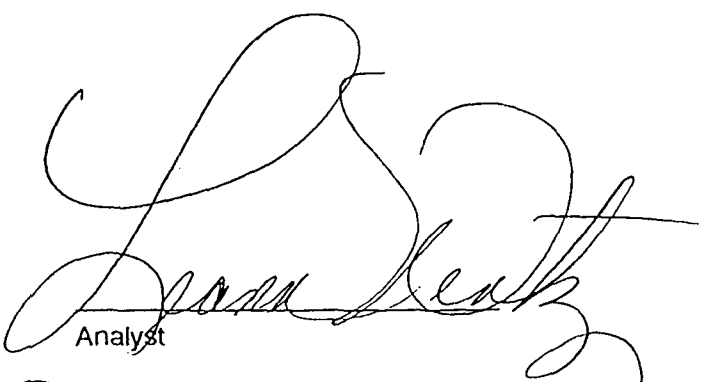
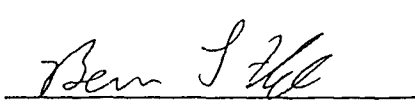
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	1820	25

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:

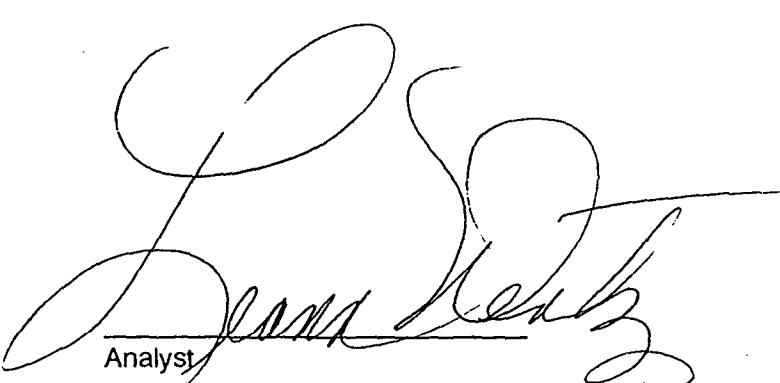
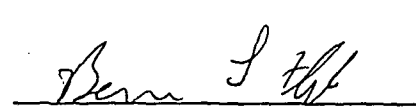

Analyst
Review

QUALITY CONTROL REPORT - METHOD BLANK
TOTAL RECOVERABLE PETROLEUM HYDROCARBONSSample ID: MB 795
Sample Matrix: SoilReport Date: 11/15/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	ND	10

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:
Analyst
Review

QUALITY CONTROL REPORT - METHOD BLANK
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: MB 797
Sample Matrix: Soil

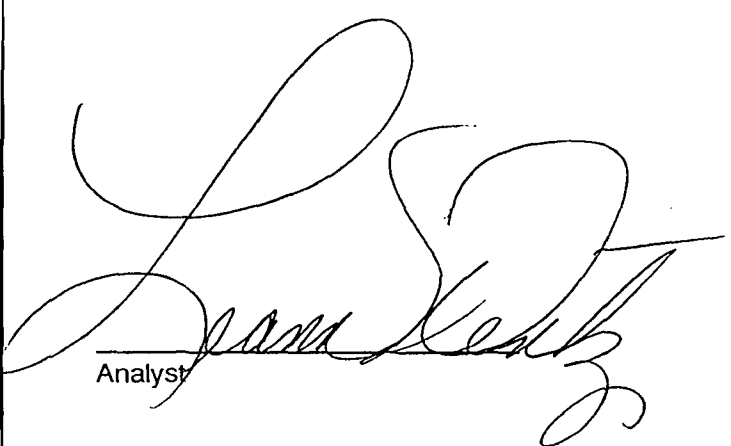
Report Date: 11/15/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

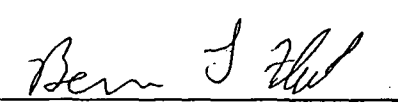
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	ND	10

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

QUALITY CONTROL REPORT - BLANK SPIKE
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: Blank Spike
Laboratory ID: BSPK 796
Sample Matrix: Soil
Preservative: NA
Condition: NA

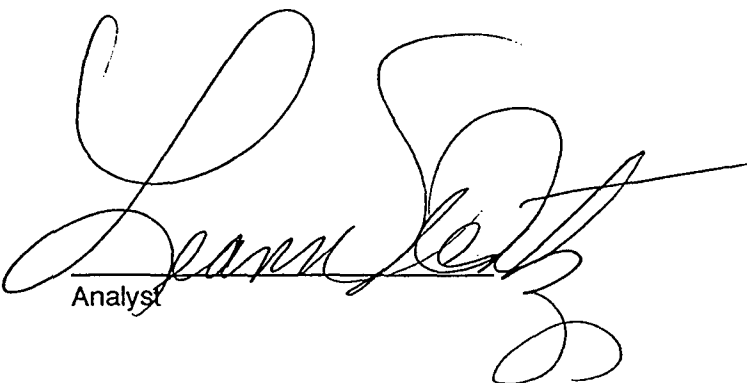
Report Date: 11/15/93
Date Sampled: NA
Date Received: NA
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

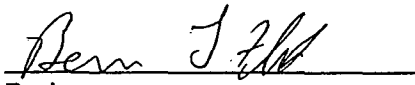
Parameter	Spike Added (mg/Kg)	Sample Result (mg/Kg)	Spiked Sample Result (mg/Kg)	Percent Recovery
Total Recoverable Petroleum Hydrocarbons	487	ND	386	79%

ND - Parameter not detected at established detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

QUALITY CONTROL REPORT - BLANK SPIKE
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: Blank Spike
Laboratory ID: BSPK 798
Sample Matrix: Soil
Preservative: NA
Condition: NA

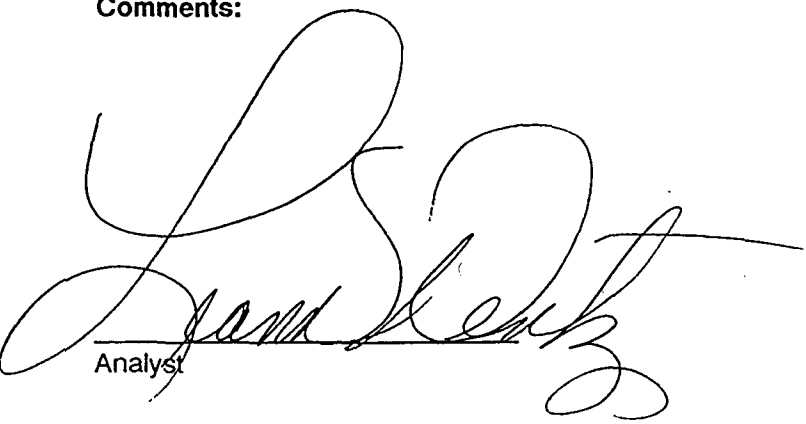
Report Date: 11/15/93
Date Sampled: NA
Date Received: NA
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

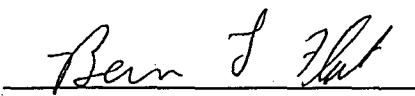
Parameter	Spike Added (mg/Kg)	Sample Result (mg/Kg)	Spiked Sample Result (mg/Kg)	Percent Recovery
Total Recoverable Petroleum Hydrocarbons	489	ND	401	82%

ND - Parameter not detected at established detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

QUALITY CONTROL REPORT - MATRIX DUPLICATE
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: Matrix Duplicate
Laboratory ID: 0693GO2867 Dup.
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Sample Result (mg/Kg)	Duplicate Result (mg/Kg)	Percent Difference
Total Recoverable Petroleum Hydrocarbons	51100	53400	5%

ND - Parameter not detected at established detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:

Analyst

Review

QUALITY CONTROL REPORT - MATRIX DUPLICATE
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: Matrix Duplicate
Laboratory ID: 0693GO2861 Dup.
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

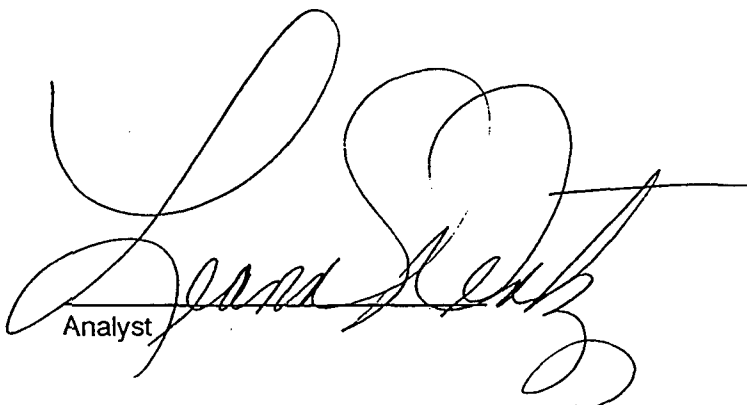
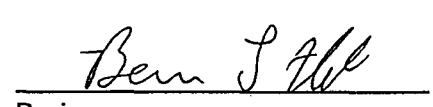
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Sample Result (mg/Kg)	Duplicate Result (mg/Kg)	Percent Difference
Total Recoverable Petroleum Hydrocarbons	21000	20300	3%

ND - Parameter not detected at established detection limit

Reference:

Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:
Analyst
Review

QUALITY CONTROL REPORT - MATRIX SPIKE
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: Matrix Spike
Laboratory ID: 0693GO2856 SPK
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

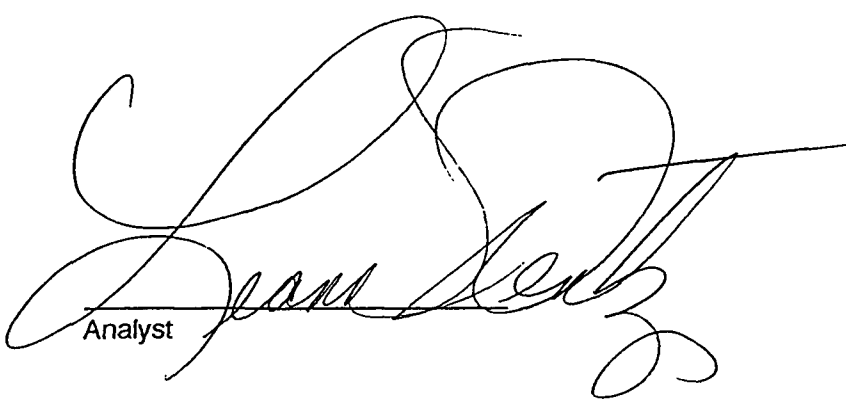
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

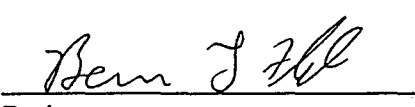
Parameter	Spike Added (mg/Kg)	Sample Result (mg/Kg)	Spiked Sample Result (mg/Kg)	Percent Recovery
Total Recoverable Petroleum Hydrocarbons	494	59	407	71%

ND - Parameter not detected at established detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Truck Bypass Land Farm
Project Loc.: Artesia, New Mexico
Sample ID: EP - #21
Laboratory ID: 0683GO2947
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/19/93
Date Sampled: 11/12/93
Date Received: 11/12/93
Date Extracted: 11/17/93
Date Analyzed: 11/18/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	99400	1250

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable Chemical Analysis of Water and Waste, United States Environmental Protection Agency, 1978.

Comments:

Analyst

Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Truck Bypass Land Farm
Project Loc.: Artesia, New Mexico
Sample ID: EP - #20
Laboratory ID: 0693GO2948
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

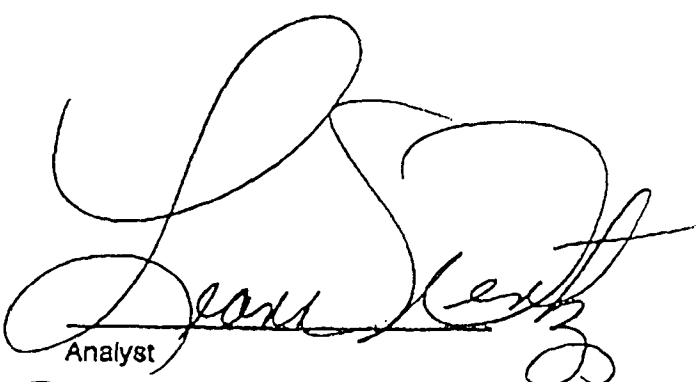
Report Date: 11/19/93
Date Sampled: 11/12/93
Date Received: 11/12/93
Date Extracted: 11/17/93
Date Analyzed: 11/18/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	110000	1250

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable Chemical Analysis of Water and Waste, United States Environmental Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Truck Bypass Land Farm
Project Loc.: Artesia, New Mexico
Sample ID: EP - #19
Laboratory ID: 0693GO2945
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

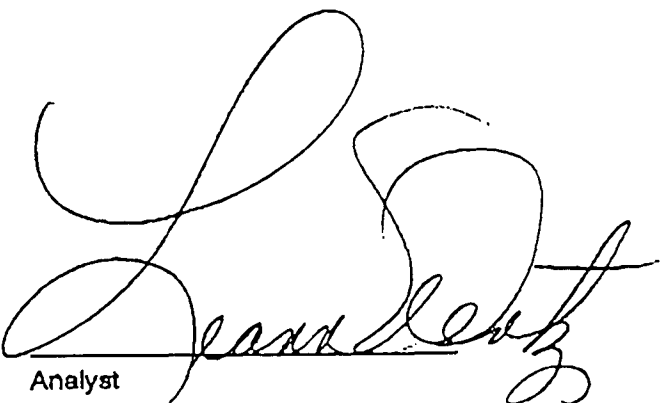
Report Date: 11/19/93
Date Sampled: 11/12/93
Date Received: 11/12/93
Date Extracted: 11/17/93
Date Analyzed: 11/18/93

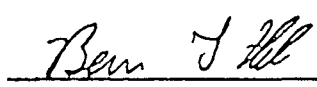
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	279000	5000

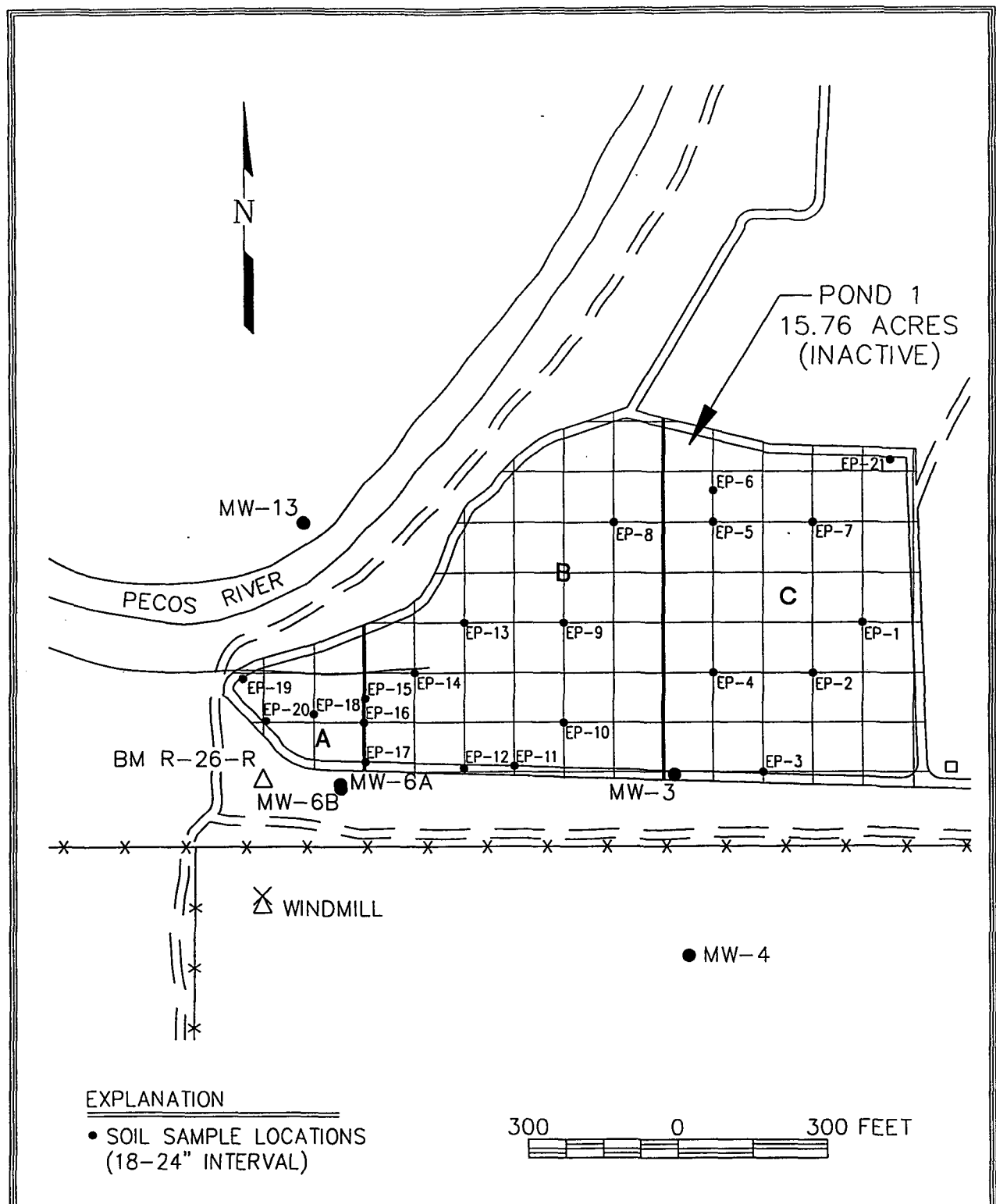
ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable Chemical Analysis of Water and Waste, United States Environmental Protection Agency, 1978.

Comments:

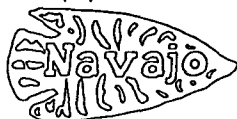

Analyst


Review



KWBES

prepared for:



Pond 1 soil sample locations,
TPH sampling, November, 1993.

PROJECT: 622093004-110 (POND1)	
LOCATION: ARTESIA, NEW MEXICO	
APPR:	DATE: 11/23/93
DRAWN BY: RMO	SCALE: AS SHOWN
DATE: 11/23/93	FIGURE: K-1

APPENDIX I

**Phase II Laboratory Analytical Data
(continued)**

APPENDIX I

Phase II Laboratory Analytical Data

APPENDIX I

**Phase II Laboratory Analytical Data
(continued)**

APPENDIX I

**Phase II Laboratory Analytical Data
(continued)**

APPENDIX J

APPENDIX J

PRC Analytical Results

TABLE 4
THREE-MILE DITCH - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA

(Sheet 1 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC T1-5,0	NAVAJO TMD-TR-001-01	
VOCs (µg/kg)			
Toluene	320 (J)	2,480	154
Ethylbenzene	920 (J)	5,550	143
Xylenes	2,400 (J)	13,600	140
TICs			
Fuel-related	[7] (J-N)		
Unknowns	[3] (J-N)	[7]	
SVOCs (µg/kg)			
Naphthalene	5,000 (J)	17,000 (U)	—
2-Methylnaphthalene	23,000	20,000	14
Acenaphthene	1,900 (J)	17,000 (U)	—
Dibenzofuran	5,000 (J)	17,000 (U)	—
Fluorene	13,000	22,500	54
Phenanthrene	42,000	77,500	59
Anthracene	1,800 (J)	17,000 (U)	—
Carbazole	820	17,000 (U)	—
Fluoranthene	3,300	17,000 (U)	—
Pyrene	6,200	17,000 (U)	—
Benzo(a)anthracene	1,700	17,000 (U)	—
Chrysene	2,400	17,000 (U)	—
Benzo(b)fluoranthene	790	17,000 (U)	—
Benzo(a)pyrene	640	17,000 (U)	—
TICs			
Fuel-related	[11] (J-N)		
Unknowns	[8] (J-N)	[5]	
Others	[1] (J-N)		
Metals (mg/kg)			
Arsenic	14.0 (J)	7.1	65
Chromium	25.9	40.0	43
Lead	15.6	19.0	20
Nickel	23.5	30.0	24
Zinc	66.7	68.0	2
Oil & Grease (%)			
	0.91	0.72	23
Notes:	Relative Percent Difference $100[(X_1-X_2)/X_{max}]$		
RPD	Volatile Organic Compounds by Method 8240		
VOCs	Semivolatile Organic Compounds by Method 8270		
SVOCs	Arsenic by Method 7060		
Metals	Chromium by Method 7191		
(PRC Only)	Lead by Method 7421		
	Nickel by Method 7520		
	Zinc by Method 7950		
Oil & Grease	Method 9071		
TICs	Tentatively identified compounds - not listed individually but numbers shown in []		
Data Qualifiers (in parentheses)	Refer to discussion in Appendix D		

TABLE 4
THREE-MILE DITCH - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA

(Sheet 2 of 6)

Analytical Parameters	Sample Numbers		
	PRC T1-10,0	NAVAJO TMD-TR-001-02	RPD
VOCs (µg/kg)			
Methylene Chloride	26 (U)		
Acetone	140 (J)	631 (U)	—
Carbon Disulfide	15 (U)		
Toluene	30 (J)	798	185
Ethylbenzene	170 (J)	2,320	173
Xylenes	350 (J)	4,840	173
TICs			
Fuel-related	[5] (J-N)		
Unknowns	[5] (J-N)	[7]	
SVOCs (µg/kg)			
Acenaphthene	340 (J)	600 (U)	—
Dibenzofuran	1,600 (J)	600 (U)	—
Fluorene	1,400	600 (U)	—
Phenanthrene	3,600	1,100	106
Anthracene	170 (J)	600 (U)	—
Fluoranthene	130 (J)	600 (U)	—
Pyrene	980	600 (U)	—
Chrysene	170 (J)	600 (U)	—
TICs			
Fuel-related	[12] (J-N)		
Unknowns	[7] (J-N)	[5]	
Others	[1] (J-N)		
Metals (mg/kg)			
Arsenic	7.7 (J)	10.6	32
Chromium	2.4 (U)	16.0	—
Lead	4.8	7.0	54
Nickel	11.2	12.0	7
Zinc	27.1	38.0	34
Oil & Grease (%)			
	0.18	0.05	113
Notes:			
RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{avg}]$		
VOCs	Volatile Organic Compounds by Method 8240		
SVOCs	Semivolatile Organic Compounds by Method 8270		
Metals	Arsenic by Method 7060		
(PRC Only)	Chromium by Method 7191		
	Lead by Method 7421		
	Nickel by Method 7520		
	Zinc by Method 7950		
Oil & Grease	Method 9071		
TICs	Tentatively identified compounds - not listed individually but numbers shown in []		
Data Qualifiers (in parentheses)	Refer to discussion in Appendix D		

TABLE 4
THREE-MILE DITCH - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA
(Sheet 3 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC T2-4,5	NAVAJO TMD-TR-002-01	
VOCs (µg/kg)			
Carbon disulfide	270 (J)	214 (U)	—
Benzene	870 (U)	2,680	—
Toluene	860 (J)	12,000	173
Ethylbenzene	1,800 (J)	16,000	160
Xylenes	5,000 (J)	36,300	152
TICs			
Fuel-related	[6] (J-N)		
Unknowns	[4] (J-N)	[6]	
SVOCs (µg/kg)			
Naphthalene	1,100 (J)	140,000 (U)	—
2-Methylnaphthalene	5,200	140,000 (U)	—
Acenaphthene	710 (J)	140,000 (U)	—
Dibenzofuran	1,600 (J)	140,000 (U)	—
Fluorene	3,500	140,000 (U)	—
Phenanthrene	16,000	234,000	174
Fluoranthene	1,700 (J)	140,000 (U)	—
Pyrene	2,700	140,000 (U)	—
Benzo(a)anthracene	780 (J)	140,000 (U)	—
Chrysene	1,600 (J)	140,000 (U)	—
Benzo(a)pyrene	430 (J)	140,000 (U)	—
TICs			
Fuel-related	[8] (J-N)		
Unknowns	[12] (J-N)	[1]	
Metals (mg/kg)			
Arsenic	5.9 (J)	18.1	102
Chromium	36.2	148.0	121
Lead	20.4	55.0	92
Nickel	27.5	41.0	39
Zinc	99.2	170.0	53
Oil & Grease (%)			
	0.70	0.68	3

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	Oil & Grease	Method 9071
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 4
THREE-MILE DITCH - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA

(Sheet 4 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC T2-11.0	NAVAJO TMD-TR-002-03	
VOCs (µg/kg)			
Methylene Chloride	4.0 (U)		
Acetone	170 (J)	620 (U)	—
2-Butanone	41	620 (U)	—
Ethylbenzene	13 (U)	1,340	—
Xylenes	13 (U)	3,350	—
TICs			
Fuel-related	[0]		
Unknowns	[10] (J-N)	[6]	
SVOCs (µg/kg)			
Di-n-butylphthalate	430 (U)	1,800	—
TICs			
Fuel-related	[6] (J-N)		
Unknowns	[4] (J-N)	[2]	
Others	[2] (J-N)		
Metals (mg/kg)			
Arsenic	3.6 (J)	5.6	43
Chromium	29.1	28.0	4
Lead	5.6	12.0	73
Nickel	18.8	28.0	39
Zinc	57.6	68.0	17
Oil & Grease (%)			
	0.02	0.05 (U)	—
Notes:			
RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{max}}]$		
VOCs	Volatile Organic Compounds by Method 8240		
SVOCs	Semivolatile Organic Compounds by Method 8270		
Metals	Arsenic by Method 7060		
(PRC Only)	Chromium by Method 7191		
	Lead by Method 7421		
	Nickel by Method 7520		
	Zinc by Method 7950		
Oil & Grease	Method 9071		
TICs	Tentatively identified compounds - not listed individually but numbers shown in []		
Data Qualifiers (in parentheses)	Refer to discussion in Appendix D		

TABLE 4
THREE-MILE DITCH - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA
(Sheet 5 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC T3-6.5	NAVAJO TMD-TR-004-02	
VOCs (µg/kg)			
Methylene Chloride	8.0 (U)	40	—
Acetone	14 (U)	35	—
Carbon Disulfide	30 (U)		
2-Butanone	15	14 (U)	—
Toluene	2.0 (J)	7.0 (U)	—
TICs			
Fuel-related	[0]		
Unknowns	[10] (J-N)	[1]	
SVOCs (µg/kg)			
Diethylphthalate	36 (U)		
Di-n-butylphthalate	450 (U)	4,200	—
TICs			
Fuel-related	[2] (J-N)		
Unknowns	[6] (J-N)	[2]	
Others	[3] (J-N)	[2]	
Metals (mg/kg)			
Arsenic	8.5 (J)	10.2	18
Chromium	20.3 (J)	22.0	8
Lead	4.2	8.0	62
Nickel	14.9	28.0	61
Zinc	42.3	47.0	11
Oil & Grease (%)			
	0.02	0.05 (U)	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	Oil & Grease	Method 9071
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 4
THREE-MILE DITCH - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA

(Sheet 6 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC T3-8.5	NAVAJO TMD-TR-004-03	
VOCs (µg/kg)			
Methylene Chloride	8.0 (U)	245	—
Carbon Disulfide	9.0 (U)		
Toluene	2.0 (J)	7.0 (U)	—
TICs			
Fuel-related	[0]		
Unknowns	[10] (J-N)	[1]	
SVOCs (µg/kg)			
Di-n-butylphthalate	440 (U)	1,900	—
TICs			
Fuel-related	[3] (J-N)		
Unknown	[2] (J-N)	[3]	
Others	[2] (J-N)		
Metals (mg/kg)			
Arsenic	3.2 (J)	16.1	134
Chromium	6.2	14.0	77
Lead	2.0	7.0	111
Nickel	12.8	18.0	34
Zinc	18.4	33.0	57
Oil & Grease (%)			
	0.01	0.05 (U)	—

Notes:	RPD VOCs SVOCs Metals (PRC Only) Oil & Grease TICs Data Qualifiers (in parentheses)	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$ Volatile Organic Compounds by Method 8240 Semivolatile Organic Compounds by Method 8270 Arsenic by Method 7060 Chromium by Method 7191 Lead by Method 7421 Nickel by Method 7520 Zinc by Method 7950 Method 9071 Tentatively identified compounds - not listed individually but numbers shown in []. Refer to discussion in Appendix D
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TABLE 5

THREE-MILE DITCH - COMPARISON OF TCLP ANALYTICAL DATA

(Sheet 1 of 3)

Analytical Parameters	Sample Numbers		
	PRC T1-5.0	NAVAJO TMD-TR-001-01	RPD

VOCs (mg/L)

NO TC-VOCs DETECTED

SVOCs (mg/L)

NO TC-SVOCs DETECTED

Metals (mg/L)

TC-METALS BELOW THRESHOLD LIMITS
OR NOT DETECTED

Notes:	TCLP	Toxicity Characteristic Leaching Procedure (Method 1311)
	TC	Toxicity Characteristic
	VOCs	Volatile Organic Compounds (Method 8240)
	SVOCs	Semivolatile Organic Compounds (Method 8270)
	Metals	TC Metals (Method 6010)

TABLE 5

THREE-MILE DITCH - COMPARISON OF TCLP ANALYTICAL DATA

(Sheet 2 of 3)

Analytical Parameters	Sample Numbers		
	PRC T2-4.5	NAVAJO EP-TR-002-01	RPD
VOCs (mg/L)	NO TC-VOCs DETECTED		
SVOCs (mg/L)	NO TC-SVOCs DETECTED		
Metals (mg/L)	TC-METALS BELOW THRESHOLD LIMITS OR NOT DETECTED		

Notes:	TCLP	Toxicity Characteristic Leaching Procedure (Method 1311)
	TC	Toxicity Characteristic
	VOCs	Volatile Organic Compounds (Method 8240)
	SVOCs	Semivolatile Organic Compounds (Method 8270)
	Metals	TC Metals (Method 6010)

TABLE 5

THREE-MILE DITCH - COMPARISON OF TCLP ANALYTICAL DATA

(Sheet 3 of 3)

Analytical Parameters	Sample Numbers		
	PRC T3-6.5	NAVAJO TMD-TR-004-02	RPD
VOCs (mg/L)	NO TC-VOCs DETECTED		
SVOCs (mg/L)	NO TC-SVOCs DETECTED		
Metals (mg/L)	TC-METALS BELOW THRESHOLD LIMITS OR NOT DETECTED		

Notes:	TCLP	Toxicity Characteristic Leaching Procedure (Method 1311)
	TC	Toxicity Characteristic
	VOCs	Volatile Organic Compounds (Method 8240)
	SVOCs	Semivolatile Organic Compounds (Method 8270)
	Metals	TC Metals (Method 6010)

- Sample T3-12.3, a duplicate of T3-6.5, was also analyzed for TC-constituents. No TC-VOCs or TC-SVOCs were detected and TC-metals were below threshold limits or were not detected.

TABLE 6
EVAPORATION POND No. 1 - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA

(Sheet 1 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC EPTR-1-03	NAVAJO EP-TR-003-02	
VOCs (µg/kg)			
Methylene Chloride	12 (U)	14	—
Acetone	210 (J)	228	8
2-Butanone	63 (J)	25	86
Toluene	41 (J)	7 (U)	—
Ethylbenzene	37 (J)	7 (U)	—
Xylenes	210	7 (U)	—
TICs			
Fuel-related	[8] (J-N)		
Unknowns	[4] (J-N)	[5]	
SVOCs (µg/kg)			
Phenanthrene	83 (J)	1,200 (U)	—
TICs			
Fuel-related	[10] (J-N)		
Unknowns	[6] (J-N)	[5]	
Others	[3] (J-N)		
Metals (mg/kg)			
Arsenic	7.2 (J)	9.1	23
Chromium	2.7 (U)	30.0	—
Lead	15.4	14.0	10
Nickel	21.8	23.0	6
Zinc	46.9	57.0	19
Oil & Grease (%)			
	0.04	0.05 (U)	—
Notes:	RPD	Relative Percent Difference $100[(X_1-X_2)/X_{\text{avg}}]$	
	VOCs	Volatile Organic Compounds by Method 8240	
	SVOCs	Semivolatile Organic Compounds by Method 8270	
	Metals	Arsenic by Method 7060	
	(PRC Only)	Chromium by Method 7191	
		Lead by Method 7421	
		Nickel by Method 7520	
		Zinc by Method 7950	
	Oil & Grease	Method 9071	
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []	
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D	

TABLE 6
EVAPORATION POND No. 1 - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA

(Sheet 2 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC EPTR-1-06	NAVAJO EP-TR-003-04	
VOCs (µg/kg)			
Methylene Chloride	4.0 (U)		
Acetone	220 (J)	14 (U)	—
Carbon Disulfide	7.0 (U)		
2-Butanone	70	14 (U)	—
Toluene	8.0 (J)	7 (U)	—
Ethylbenzene	7.0 (J)	7 (U)	—
Xylenes	35	7 (U)	—
TICs			
Fuel-related	[8] (J-N)		
Unknowns	[2] (J-N)	[0]	
SVOCs (µg/kg)			
Di-n-butylphthalate	430 (U)	6,400	—
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[1] (J-N)	[4]	
Metals (mg/kg)			
Arsenic	4.3 (J)	7.1	49
Chromium	2.6	24.0	161
Lead	6.6	7.0	6
Nickel	18.8	14.0	29
Zinc	45.9	53.0	15
Oil & Grease (%)			
	0.05	0.05	0

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{max}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	Oil & Grease	Method 9071
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 6
EVAPORATION POND No. 1 - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA

(Sheet 3 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC EPTR-2-3.0	NAVAJO EP-TR-005-02	
VOCs (µg/kg)			
Methylene Chloride	5.0 (U)		
Acetone	430 (J)	264	48
Carbon Disulfide	7.0 (U)		
2-Butanone	93	30	102
Toluene	3.0 (J)	7 (U)	—
Ethylbenzene	1.0 (J)	7 (U)	—
Xylenes	3.0 (J)	7 (U)	—
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[9] (J-N)	[7]	
Others	[1] (J-N)		
SVOCs (µg/kg)			
Di-n-butylphthalate	430 (U)	5,600	—
TICs			
Fuel-related	[2] (J-N)		
Unknowns	[1] (J-N)	[1]	
Metals (mg/kg)			
Arsenic	0.70 (J)	1.5	73
Chromium	13.0 (UJ)	19.0	38
Lead	5.6	7.0	22
Nickel	13.3	13.0	2
Zinc	28.5	33.0	15
Oil & Grease (%)			
	0.18	0.11	48

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	Oil & Grease	Method 9071
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 6

EVAPORATION POND No. 1 - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA

(Sheet 4 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC EPTR-2-9.0	NAVAJO EP-TR-005-04	
VOCs (µg/kg)			
Methylene Chloride	3.0 (U)	122	—
Acetone	250 (J)	172	37
Carbon Disulfide	19 (U)		
2-Butanone	83	13 (U)	—
Toluene	1.0 (J)	6.0 (U)	—
Xylenes	4.0 (J)	6.0 (U)	—
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[9] (J-N)	[5]	
Others	[1] (J-N)		
SVOCs (µg/kg)			
NO TARGET COMPOUNDS REPORTED			
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[2] (J-N)	[1]	
Metals (mg/kg)			
Arsenic	9.1 (J)	11.6	24
Chromium	2.3 (U)	26.0	—
Lead	3.0	8.0	91
Nickel	15.2	14.0	8
Zinc	39.8	38.0	5
Oil & Grease (%)			
	NA	0.10	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{max}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	Oil & Grease	Method 9071
	NA	Analysis not performed
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 6
EVAPORATION POND No. 1 - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA

(Sheet 5 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC EPTR-3-3.0	NAVAJO EP-TR-001-02	
VOCs (µg/kg)			
Acetone	660 (J)	437	41
Carbon Disulfide	25 (U)		
Toluene	47 (J)	82	54
Ethylbenzene	180 (J)	128	34
Xylenes	870 (J)	484	57
TICs			
Fuel-related	[6] (J-N)		
Unknowns	[4] (J-N)	[8]	
SVOCs (µg/kg)			
Naphthalene	170 (J)	10,000 (U)	—
Dibenzofuran	1,400 (J)	10,000 (U)	—
Fluorene	1,100 (J)	10,000 (U)	—
Phenanthrene	1,700 (J)	10,000 (U)	—
Chrysene	250 (J)	10,000 (U)	—
Benzo(a)pyrene	73 (J)	10,000 (U)	—
Benzo(g,h,i)perylene	110 (J)	10,000 (U)	—
TICs			
Fuel-related	[10] (J-N)		
Unknowns	[9] (J-N)	[5]	
Others	[1] (J-N)		
Metals (mg/kg)			
Arsenic	1.1 (J)	3.9	112
Chromium	18.5	29.0	44
Lead	8.4	17.0	68
Nickel	12.3	26.0	72
Zinc	33.0	64.0	64
Oil & Grease (%)			
	1.1	1.11	0

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	Oil & Grease	Method 9071
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 6
EVAPORATION POND No. 1 - COMPARISON OF SOIL SAMPLE ANALYTICAL DATA

(Sheet 6 of 6)

Analytical Parameters	Sample Numbers		RPD
	PRC EPTR-3-6.0	NAVAJO EP-TR-001-03	
VOCs (µg/kg)			
Methylene Chloride	270	25 (U)	—
Acetone	720 (J)	295	84
Carbon Disulfide	110 (U)		
2-Butanone	230	49 (U)	—
Toluene	11 (J)	32	—
Ethylbenzene	31 (J)	52	51
Xylenes	120	159	28
TICs			
Fuel-related	[6] (J-N)		
Unknowns	[4] (J-N)	[8]	
SVOCs (µg/kg)			
Naphthalene	62 (J)	9,000 (U)	—
2-Methylnaphthalene	130 (J)	9,000 (U)	—
Phenanthrene	640	13,000	181
Pyrene	140 (J)	9,000 (U)	—
TICs			
Fuel-related	[8] (J-N)		
Unknowns	[10] (J-N)	[5]	
Others	[2] (J-N)		
Metals (mg/kg)			
Arsenic	15.1 (J)	7.6	66
Chromium	24.4	17.0	36
Lead	4.9	7.0	35
Nickel	18.4	24.0	26
Zinc	42.0	44.0	5
Oil & Grease (%)			
	0.31	0.40	25

Notes:	RPD Relative Percent Difference $100[(X_1 - X_2)/X_{\text{max}}]$ VOCs Volatile Organic Compounds by Method 8240 SVOCs Semivolatile Organic Compounds by Method 8270 Metals Arsenic by Method 7060 (PRC Only) Chromium by Method 7191 Lead by Method 7421 Nickel by Method 7520 Zinc by Method 7950 Oil & Grease Method 9071 TICs Tentatively identified compounds - not listed individually but numbers shown in [] Data Qualifiers Refer to discussion in Appendix D (in parentheses)
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TABLE 8
THREE-MILE DITCH GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 1 of 5)

Analytical Parameters	Sample Numbers		
	PRC MW-1	NAVAJO NEP-GW-MW-1	RPD
VOCs (µg/L)			
1,2-Dichloroethane	53 (U)		
TICs			
Fuel-related	[0]		
Unknowns	[1] (J-N)	[1]	
SVOCs (µg/L)			
NO TARGET COMPOUNDS REPORTED			
TICs			
Fuel-related	[2] (J-N)		
Unknowns	[12] (J-N)		
Others	[2] (J-N)		
Metals (µg/L)			
Arsenic (Total)	8.0 (J)	20.0	86
Arsenic (Dissolved)	NA	5.0 (U)	—
Chromium (Total)	1,830 (J)	3,650	66
Chromium (Dissolved)	NA	20.0 (U)	—
Lead (Total)	2.0 (UJ)	20.0 (U)	—
Lead (Dissolved)	NA	20.0 (U)	—
Nickel (Total)	284	350	21
Nickel (Dissolved)	NA	200	—
Zinc (Total)	34 (J)	NA	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{max}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 8
THREE-MILE DITCH GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 2 of 5)

Analytical Parameters	Sample Numbers		
	PRC MW-8	NAVAJO TMD-GW-MW-8	RPD
VOCs (µg/L)			
Methylene Chloride	10 (U)	16	—
Benzene	1.0 (U)		
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[0]	[0]	
Others	[0]		
SVOCs (µg/L)			
Bis(2-ethylhexyl)phthalate	10 (U)		
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[9] (J-N)	[0]	
Metals (µg/L)			
Arsenic (Total)	8.4 (J)	14.0	50
Arsenic (Dissolved)	NA	5.0 (U)	—
Chromium (Total)	2,200 (J)	2,260	3
Chromium (Dissolved)	NA	20.0 (U)	—
Lead (Total)	7.8 (J)	20.0 (U)	—
Lead (Dissolved)	NA	20.0 (U)	—
Nickel (Total)	527	740	34
Nickel (Dissolved)	NA	360	—
Zinc (Total)	57.0 (J)	NA	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 8
THREE-MILE DITCH GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 3 of 5)

Analytical Parameters	Sample Numbers		RPD
	PRC MW-9	NAVAJO TMD-GW-MW-9	
VOCs (µg/L)			
Methylene Chloride	10 (U)	13	—
Benzene	1.0 (U)		
TICs			
Fuel-related	[0]		
Unknowns	[1] (J-N)	[1]	
SVOCs (µg/L)			
Di-n-butylphthalate	0.5 (U)		
TICs			
Fuel-related	[7] (J-N)		
Unknowns	[11] (J-N)	[2]	
Others	[2] (J-N)		
Metals (µg/L)			
Arsenic (Total)	18.1 (J)	21.0	15
Arsenic (Dissolved)	NA	5.0 (U)	—
Chromium (Total)	15,900 (J)	18,420	15
Chromium (Dissolved)	NA	30.0	—
Lead (Total)	2.2 (J)	20.0 (U)	—
Lead (Dissolved)	NA	20.0 (U)	—
Nickel (Total)	6,040	8,040	28
Nickel (Dissolved)	NA	2,600	—
Zinc (Total)	69.0 (J)	NA	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 8
THREE-MILE DITCH GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 4 of 5)

Analytical Parameters	Sample Numbers		RPD
	PRC MW-15	NAVAJO NEP-GW-MW-15	
VOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[4] (J-N)	[1]	
SVOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Unknowns	[1] (J-N)	[1]	
Metals (µg/L)			
Arsenic (Total)	3.0 (U)	10.0	--
Arsenic (Dissolved)	NA	6.0	--
Barium (Total)	100 (U)	NA	--
Cadmium (Total)	5.0 (U)	NA	--
Chromium (Total)	10.0 (U)	30.0	--
Chromium (Dissolved)	NA	20.0 (U)	--
Lead (Total)	2.0	20.0 (U)	--
Lead (Dissolved)	NA	20.0 (U)	--
Nickel (Total)	30.0 (U)	10.0 (U)	--
Nickel (Dissolved)	NA	10.0 (U)	--
Selenium (Total)	3.0 (U)	NA	--

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Barium by Method 6010
		Cadmium by Method 7130
		Chromium by Method 6010
		Lead by Method 7421
		Nickel by Method 7520
		Selenium by Method 7740
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 8
THREE-MILE DITCH GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 5 of 5)

Analytical Parameters	Sample Numbers		RPD
	PRC MW-45	NAVAJO & Well #45	
VOCs (µg/L)			
Methylene Chloride	10 (U)	13	—
Carbon disulfide	18 (U)	34	—
Benzene	2.0 (U)		
Toluene	3.0 (J)	5.0 (U)	—
Ethylbenzene	3.0 (J)	5.0 (U)	—
Xylenes	12	13	8
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[2] (J-N)	[5]	
Others	[1] (J-N)		
SVOCs (µg/L)			
2-Methylphenol	4.0 (J)	10 (U)	—
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[16] (J-N)	[5]	
Others	[3] (J-N)		
Metals (µg/L)			
Arsenic (Total)	11.8 (J)	9.0	27
Arsenic (Dissolved)	NA	8.0	—
Chromium (Total)	10.0 (U)	30.0	—
Chromium (Dissolved)	NA	20.0 (U)	—
Lead (Total)	46.3 (J)	50.0	—
Lead (Dissolved)	NA	20.0 (U)	—
Nickel (Total)	40.0 (U)	100	—
Nickel (Dissolved)	NA	90.0	—
Zinc (Total)	38.0 (J)	NA	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 9
EVAPORATION POND COMPLEX SHALLOW GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 1 of 4)

Analytical Parameters	Sample Numbers		
	PRC MW-2	NAVAJO NEP-GW-MW-2	RPD
VOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[3] (J-N)		
Unknowns	[4] (J-N)	[8]	
Others	[1] (J-N)	[1]	
SVOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[3] (J-N)		
Unknowns	[14] (J-N)	[2]	
Others	[3] (J-N)		
Metals (µg/L)			
Arsenic (Total)	212 (J)	87.0	84
Arsenic (Dissolved)	232 (J)	73.0	104
Chromium (Total)	25.2 (J)	100	119
Chromium (Dissolved)	10.0 (U)	20.0 (U)	—
Lead (Total)	2.0 (UJ)	20.0 (U)	—
Lead (Dissolved)	2.0 (UJ)	20.0 (U)	—
Nickel (Total)	40.0 (U)	120	—
Nickel (Dissolved)	40.0 (U)	100	—
Zinc (Total)	20.0 (U)	NA	—
Zinc (Dissolved)	26.0 (J)	NA	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

- Unfiltered and filtered samples collected for metals analyses.

TABLE 9
EVAPORATION POND COMPLEX SHALLOW GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 2 of 4)

Analytical Parameters	Sample Numbers		
	PRC MW-4	NAVAJO NEP-GW-MW-4	RPD
VOCs (µg/L)			
Acetone	4.0 (J)	10 (U)	—
Benzene	16 (J)	21	27
Toluene	7.0 (J)	9.0	25
Ethylbenzene	15 (J)	19	24
Xylenes	29 (J)	32	10
TICs			
Fuel-related	[7] (J-N)		
Unknowns	[2] (J-N)	[8]	
Others	[1] (J-N)		
SVOCs (µg/L)			
NO TARGET COMPOUNDS REPORTED			
TICs			
Fuel-related	[4] (J-N)		
Unknowns	[14] (J-N)	[2]	
Others	[2] (J-N)		
Metals (µg/L)			
Arsenic (Total)	213 (J)	80.0	91
Arsenic (Dissolved)	198 (J)	69.0	97
Chromium (Total)	10.0 (U)	20.0 (U)	—
Chromium (Dissolved)	10.0 (U)	20.0 (U)	—
Lead (Total)	4.0 (J)	20.0 (U)	—
Lead (Dissolved)	2.0 (U)	20.0 (U)	—
Nickel (Total)	40.0 (U)	110	—
Nickel (Dissolved)	40.0 (U)	70.0	—
Zinc (Total)	23.0 (J)	NA	—
Zinc (Dissolved)	20.0 (U)	NA	—
Notes:			
RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$		
VOCs	Volatile Organic Compounds by Method 8240		
SVOCs	Semivolatile Organic Compounds by Method 8270		
Metals	Arsenic by Method 7060		
(PRC Only)	Chromium by Method 7191		
	Lead by Method 7421		
	Nickel by Method 7520		
	Zinc by Method 7950		
TICs	Tentatively identified compounds - not listed individually but numbers shown in []		
NA	Analysis not performed		
Data Qualifiers	Refer to discussion in Appendix D		
(in parentheses)			
•	Unfiltered and filtered samples collected for metals analyses.		

TABLE 9
EVAPORATION POND COMPLEX SHALLOW GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 3 of 4)

Analytical Parameters	Sample Numbers		
	PRC MW-7	NAVAJO NEP-GW-MW-7	RPD
VOCs (µg/L)			
Acetone	16	10 (U)	—
TICs			
Fuel-related	[3] (J-N)		
Unknowns	[5] (J-N)	[6]	
Others	[2] (J-N)	[1]	
SVOCs (µg/L)			
Bis(2-ethylhexyl)phthalate	4.0 (U)	25 (U)	—
TICs			
Fuel-related	[6]		
Unknowns	[10]		
Others	[4]		
Metals (µg/L)			
Arsenic (Total)	143 (J)	38.0	116
Arsenic (Dissolved)	NA	30.0	—
Chromium (Total)	10.0 (UJ)	70.0	—
Chromium (Dissolved)	NA	20.0 (U)	—
Lead (Total)	2.0 (UJ)	20.0 (U)	—
Lead (Dissolved)	NA	20.0 (U)	—
Nickel (Total)	40.0 (U)	130	—
Nickel (Dissolved)	NA	90.0	—
Zinc (Total)	20.0 (J)	NA	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 9
EVAPORATION POND COMPLEX SHALLOW GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 4 of 4)

Analytical Parameters	Sample Numbers		
	PRC OCD-1	NAVAJO NEP-GW-OCD-1	RPD
VOCs (µg/L)			
TICs	Carbon Disulfide	1.0 (U)	
	Fuel-related	[5] (J-N)	
	Unknowns	[3] (J-N)	[1]
	Others	[1] (J-N)	
SVOCs (µg/L)			
TICs	Bis(2-ethylhexyl)phthalate	2.0 (U)	
	Fuel-related	[5] (J-N)	
	Unknowns	[13] (J-N)	[5]
	Others	[2] (J-N)	
Metals (µg/L)			
	Arsenic (Total)	235 (J)	97.0
	Arsenic (Dissolved)	231 (J)	71.0
	Chromium (Total)	10.0 (U)	60.0
	Chromium (Dissolved)	10.0 (U)	20.0 (U)
	Lead (Total)	3.6 (J)	30.0
	Lead (Dissolved)	2.0 (U)	20.0 (U)
	Nickel (Total)	40.0 (U)	160
	Nickel (Dissolved)	40.0 (U)	110
	Zinc (Total)	107 (J)	NA
	Zinc (Dissolved)	20.0 (U)	NA

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

- Unfiltered and filtered samples collected for metals analyses.

TABLE 10
EVAPORATION POND COMPLEX DEEP GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 1 of 4)

Analytical Parameters	Sample Numbers		
	PRC MW-2B	NAVAJO NEP-GW-MW-2B	RPD
VOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs Unknowns	[0]	[0]	
SVOCs (µg/L)			
Bis(2-ethylhexyl)phthalate	10 (U)	28	—
TICs Fuel-related	[1] (J-N)		
Unknowns	[6] (J-N)	[5]	
Others	[4] (J-N)		
Metals (µg/L)			
Arsenic (Total)	3.0 (U)	5.0 (U)	—
Arsenic (Dissolved)	NA	5.0 (U)	—
Barium (Total)	100 (U)	NA	—
Cadmium (Total)	5.0 (U)	NA	—
Chromium (Total)	10.0 (U)	20.0 (U)	—
Chromium (Dissolved)	NA	20.0 (U)	—
Lead (Total)	2.0 (U)	20.0 (U)	—
Lead (Dissolved)	NA	20.0 (U)	—
Nickel (Total)	30.0 (U)	40.0	—
Nickel (Dissolved)	NA	10.0 (U)	—
Selenium (Total)	3.0 (U)	NA	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{max}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Barium by Method 6010
		Cadmium by Method 7130
		Chromium by Method 6010
		Lead by Method 7421
		Nickel by Method 7520
		Selenium by Method 7740
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 10
EVAPORATION POND COMPLEX DEEP GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 2 of 4)

Analytical Parameters	Sample Numbers		RPD
	PRC MW-5B	NAVAJO NEP-GW-MW-5B	
VOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[6] (J-N)		
Unknowns	[2] (J-N)	[9]	
Others	[2] (J-N)		
SVOCs (µg/L)			
Bis(2-chloroethyl)ether	11	20 (U)	—
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[16] (J-N)	[2]	
Others	[3] (J-N)		
Metals (µg/L)			
Arsenic (Total)	200	131	42
Arsenic (Dissolved)	NA	106	—
Barium (Total)	100 (U)	NA	—
Cadmium (Total)	5.0 (U)	NA	—
Chromium (Total)	10.0 (U)	20.0 (U)	—
Chromium (Dissolved)	NA	20.0 (U)	—
Lead (Total)	2.0 (U)	20.0 (U)	—
Lead (Dissolved)	NA	20.0 (U)	—
Nickel (Total)	30.0 (U)	10.0 (U)	—
Nickel (Dissolved)	NA	10.0 (U)	—
Selenium (Total)	3.0 (UJ)	NA	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{avg}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Barium by Method 6010
		Cadmium by Method 7130
		Chromium by Method 6010
		Lead by Method 7421
		Nickel by Method 7520
		Selenium by Method 7740
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 10
EVAPORATION POND COMPLEX DEEP GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 3 of 4)

Analytical Parameters	Sample Numbers		RPD
	PRC MW-7B	NAVAJO NEP-GW-MW-7B	
VOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[6] (J-N)		
Unknowns	[3] (J-N)	[8]	
Other	[1] (J-N)		
SVOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[6] (J-N)		
Unknowns	[11] (J-N)	[5]	
Others	[3] (J-N)		
Metals (µg/L)			
Arsenic (Total)	17.0	14.0	19
Arsenic (Dissolved)	NA	11.0	--
Barium (Total)	100 (U)	NA	--
Cadmium (Total)	5.0 (U)	NA	--
Chromium (Total)	10.0 (U)	20.0 (U)	--
Chromium (Dissolved)	NA	20.0 (U)	--
Lead (Total)	2.0 (U)	20.0 (U)	--
Lead (Dissolved)	NA	20.0 (U)	--
Nickel (Total)	30.0 (U)	10.0 (U)	--
Nickel (Dissolved)	NA	10.0 (U)	--
Selenium (Total)	3.0 (UJ)	NA	--

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Barium by Method 6010
		Cadmium by Method 7130
		Chromium by Method 6010
		Lead by Method 7421
		Nickel by Method 7520
		Selenium by Method 7740
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 10
EVAPORATION POND COMPLEX DEEP GROUND-WATER WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 4 of 4)

Analytical Parameters	Sample Numbers		
	PRC OCD-2B	NAVAJO NEP-GW-OCD-2B	RPD
VOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[5] (J-N)		
Unknowns	[2] (J-N)	[6]	
Others	[1] (J-N)		
SVOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[7] (J-N)		
Unknowns	[6] (J-N)	[1]	
Others	[1] (J-N)		
Metals (µg/L)			
Arsenic (Total)	29.0	7.0	122
Arsenic (Dissolved)	NA	6.0	--
Barium (Total)	100 (U)	NA	--
Cadmium (Total)	5.0 (U)	NA	--
Chromium (Total)	10.0 (U)	20.0 (U)	--
Chromium (Dissolved)	NA	20.0 (U)	--
Lead (Total)	2.0	20.0 (U)	--
Lead (Dissolved)	NA	20.0 (U)	--
Nickel (Total)	30.0 (U)	10.0	--
Nickel (Dissolved)	NA	10.0 (U)	--
Selenium (Total)	3.0 (UJ)	NA	--

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Barium by Method 6010
		Cadmium by Method 7130
		Chromium by Method 6010
		Lead by Method 7421
		Nickel by Method 7520
		Selenium by Method 7740
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 11
PRIVATE WATER SUPPLY WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 1 of 5)

Analytical Parameters	Sample Numbers		RPD
	PRC PW-2723	NAVAJO NEP-DW-#2723	
VOCs (µg/L)			
Toluene	9.0	5.0 (U)	—
TICs			
Unknowns	[0]	[0]	
SVOCs (µg/L)			
	NO TARGET COMPOUNDS REPORTED		NA
TICs			
Unknowns	[1] (J-N)		
Others	[2] (J-N)		
Metals (µg/L)			
Arsenic (Total)	3.0 (U)	NA	
Barium (Total)	100 (U)	NA	
Cadmium (Total)	5.0 (U)	NA	
Chromium (Total)	10.0 (U)	NA	
Lead (Total)	2.0 (U)	NA	
Nickel (Total)	30.0 (U)	NA	
Selenium (Total)	3.0 (UJ)	NA	
Notes:	RPD VOCs SVOCs Metals (PRC Only)		
	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$ Volatile Organic Compounds by Method 8240 Semivolatile Organic Compounds by Method 8270 Arsenic by Method 7060 Barium by Method 6010 Cadmium by Method 7130 Chromium by Method 6010 Lead by Method 7421 Nickel by Method 7520 Selenium by Method 7740 Tentatively identified compounds - not listed individually but numbers shown in [] Analysis not performed Refer to discussion in Appendix D		
	TICs NA Data Qualifiers (in parentheses)		

TABLE 11
PRIVATE WATER SUPPLY WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 2 of 5)

Analytical Parameters	Sample Numbers		
	PRC 3368-1	NAVAJO NMD-GW-3368-1	RPD
VOCs (µg/L)			
Benzene	3.0 (U)		
TICs			
Unknowns	[0]	[0]	
SVOCs (µg/L)			
	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[2] (J-N)		
Unknowns	[11] (J-N)	[0]	
Others	[0]		
Metals (µg/L)			
Arsenic (Total)	2.3 (J)	5.0 (U)	--
Chromium (Total)	10.0 (U)	20.0 (U)	--
Lead (Total)	2.0 (U)	20.0 (U)	--
Nickel (Total)	40.0 (U)	60.0 (U)	--
Zinc (Total)	20.0 (U)	NA	--
Notes:	RPD Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$ VOCs Volatile Organic Compounds by Method 8240 SVOCs Semivolatile Organic Compounds by Method 8270 Metals Arsenic by Method 7060 (PRC Only) Chromium by Method 7191 Lead by Method 7421 Nickel by Method 7520 Zinc by Method 7950 TICs Tentatively identified compounds - not listed individually but numbers shown in [] NA Analysis not performed Data Qualifiers Refer to discussion in Appendix D (in parentheses)		

TABLE 11
PRIVATE WATER SUPPLY WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 3 of 5)

Analytical Parameters	Sample Numbers	
	PRC PW-3368	NAVAJO NEP-DW-#3368
		RPD
VOCs (µg/L)	NO TARGET COMPOUNDS REPORTED	
TICs		
Unknowns	[0]	[0]
SVOCs (µg/L)	NO TARGET COMPOUNDS REPORTED	
TICs		NA
Unknowns	[1] (J-N)	
Others	[1] (J-N)	
Metals (µg/L)		
Arsenic (Total)	3.0 (U)	NA
Barium (Total)	100 (U)	NA
Cadmium (Total)	5.0 (U)	NA
Chromium (Total)	10.0 (U)	NA
Lead (Total)	2.0 (U)	NA
Nickel (Total)	30.0 (U)	NA
Selenium (Total)	8.0	NA
Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{avg}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
	(PRC Only)	Barium by Method 6010
		Cadmium by Method 7130
		Chromium by Method 6010
		Lead by Method 7421
		Nickel by Method 7520
		Selenium by Method 7740
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	NA	Analysis not performed
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

TABLE 11
PRIVATE WATER SUPPLY WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 4 of 5)

Analytical Parameters	Sample Numbers		RPD
	PRC PW-4196	NAVAJO NEP-DW-#4196	
VOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Unknowns	[1] (J-N)	[0]	
SVOCs (µg/L)	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[1] (J-N)	[0]	
Metals (µg/L)			
Arsenic (Total)	3.0 (U)	5.0 (U)	--
Arsenic (Dissolved)	NA	5.0 (U)	--
Barium (Total)	100 (U)	NA	--
Cadmium (Total)	5.0 (U)	NA	--
Chromium (Total)	10.0 (U)	20.0 (U)	--
Chromium (Dissolved)	NA	20.0 (U)	--
Lead (Total)	26.0	30.0	14
Lead (Dissolved)	NA	20.0 (U)	--
Nickel (Total)	30.0 (U)	10.0	--
Nickel (Dissolved)	NA	10.0 (U)	--
Selenium (Total)	3.0 (U)	NA	--
Notes:	RPD Relative Percent Difference $100[(X_1 - X_2)/X_{\text{max}}]$ VOCs Volatile Organic Compounds by Method 8240 SVOCs Semivolatile Organic Compounds by Method 8270 Metals Arsenic by Method 7060 (PRC Only) Barium by Method 6010 Cadmium by Method 7130 Chromium by Method 6010 Lead by Method 7421 Nickel by Method 7520 Selenium by Method 7740 TICs Tentatively identified compounds - not listed individually but numbers shown in [] NA Analysis not performed Data Qualifiers Refer to discussion in Appendix D (in parentheses)		

TABLE 11
PRIVATE WATER SUPPLY WELLS
COMPARISON OF ANALYTICAL DATA

(Sheet 5 of 5)

Analytical Parameters	Sample Numbers		RPD
	PRC WIND-1	NAVAJO NEP-WINDMILL ¹	
VOCs (µg/L)			
Methylene Chloride	10 (U)	10	—
Tetrachloroethene	1.0 (U)		
TICs			
Fuel-related	[0]		
Unknowns	[4] (J-N)	[1]	
Others	[0]		
SVOCs (µg/L)			
NO TARGET COMPOUNDS REPORTED			
TICs			
Fuel-related	[1] (J-N)		
Unknowns	[10] (J-N)	[0]	
Others	[2] (J-N)		
Metals (µg/L)			
Arsenic (Total)	1.5 (J)	5.0 (U)	—
Chromium (Total)	10.0 (U)	20.0 (U)	—
Lead (Total)	2.0 (UJ)	20.0 (U)	—
Nickel (Total)	40.0 (U)	10.0 (U)	—
Zinc (Total)	26.0 (J)	NA	—
Notes:	RPD	Relative Percent Difference $100[(X_1-X_2)/X_{\text{avg}}]$	
	VOCs	Volatile Organic Compounds by Method 8240	
	SVOCs	Semivolatile Organic Compounds by Method 8270	
	Metals	Arsenic by Method 7060	
	(PRC Only)	Chromium by Method 7191	
		Lead by Method 7421	
		Nickel by Method 7520	
		Zinc by Method 7950	
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []	
	NA	Analysis not performed	
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D	
	¹	Navajo sample collected in December 1992	

TABLE 12
TRIP BLANKS - SUMMARY OF ANALYTICAL DATA

Analytical Parameters	Sample Numbers									
	NAV-2	NAV-3	NAV-4	NAV-5	NAV-6	NAV-7	NAV-8	NAV-9	NAV-10	NAV-11
<u>VOCs</u> ($\mu\text{g/L}$)										
Methylene Chloride	0.9 (U)	0.5 (U)	10 (U)	0.8 (U)	1.0 (U)	10 (U)	10 (U)	5.0 (U)	5.0 (U)	5.0 (U)
Acetone	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)
Benzene	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	2.0 (U)	5.0 (U)	5.0 (U)	5.0 (U)	5.0 (U)
Toluene	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	5.0 (U)	5.0 (U)	5.0 (U)	5.0 (U)
Ethylbenzene	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	5.0 (U)	5.0 (U)	5.0 (U)	5.0 (U)
Xylenes	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	10 (U)	5.0 (U)	5.0 (U)	5.0 (U)	5.0 (U)
TICs										
Unknowns	[0]	[10] (J-N)	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]

Notes: VOCs Volatile Organic Compounds by Method 8240
TICs Tentatively identified compounds - not listed individually but number of compounds shown in []
Data Qualifiers Refer to discussion in Appendix D
(in parentheses)

TABLE 13
FIELD QC SAMPLES - SUMMARY OF ANALYTICAL DATA

Analytical Parameters	Sample Numbers			
	MW-013	MW-015	MW-016	MW-2D
VOCs ($\mu\text{g/L}$)				
Methylene Chloride	0.8 (U)	10 (U)	10 (U)	5.0 (U)
Carbon disulfide	6.0 (J)	10 (U)	10 (U)	5.0 (U)
Benzene	10 (U)	10 (U)	1.0 (J)	5.0 (U)
Toluene	10 (U)	10 (U)	10 (U)	5.0 (U)
Ethylbenzene	10 (U)	10 (U)	10 (U)	5.0 (U)
Xylenes	10 (U)	10 (U)	10 (U)	5.0 (U)
1,2-Dichloroethane	10 (U)	120	10 (U)	5.0 (U)
TICs				
Unknown	[0]	[0]	[0]	[10]
SVOCs ($\mu\text{g/L}$)				
Phenol	10 (U)	10 (U)	0.7 (J)	11 (U)
Diethylphthalate	10 (U)	4.0 (J)	4.0 (J)	11 (U)
Di-n-butylphthalate	10 (U)	10 (U)	0.4 (J)	11 (U)
Bis(2-ethylhexyl)phthalate	3.0 (J)	3.0 (J)	2.0 (U)	11 (U)
TICs				
Fuel-related	[1] (J-N)	[5] (J-N)	[6] (J-N)	[1] (J-N)
Unknown	[2] (J-N)	[11] (J-N)	[11] (J-N)	[1] (J-N)
Others	[0]	[2] (J-N)	[2] (J-N)	[1] (J-N)
Metals ($\mu\text{g/L}$)				
Arsenic (Total)	1.0 (UJ)	1.0 (UJ)	1.0 (UJ)	3.0 (U)
Barium (Total)	NA	NA	NA	100 (U)
Cadmium (Total)	NA	NA	NA	5.0 (U)
Chromium (Total)	10.0 (U)	10.0 (U)	10.0 (U)	10.0 (U)
Lead (Total)	2.0 (UJ)	2.0 (UJ)	2.0 (UJ)	2.0 (U)
Nickel (Total)	40.0 (U)	40.0 (U)	40.0 (U)	30.0 (U)
Selenium (Total)	NA	NA	NA	3.0 (UJ)
Zinc (Total)	20.0 (U)	20.0 (U)	20.0 (U)	NA
Notes:	VOCs Volatile Organic Compounds by Method 8240 SVOCs Semivolatile Organic Compounds by Method 8270 Metals Arsenic by Method 7060 Barium by Method 6010 Cadmium by Method 7130 Chromium by Method 7191 or 6010 Lead by Method 7421 Nickel by Method 7520 Selenium by Method 7740 Zinc by Method 7950			
	TICs Tentatively identified compounds - not listed individually but numbers shown in []			
	NA Analysis not performed			
	Data Qualifiers Refer to discussion in Appendix D (in parentheses)			

TABLE 14
DUPLICATE SAMPLES - COMPARISON OF ANALYTICAL DATA
(Sheet 1 of 3)

Analytical Parameters	MW-4	Sample Numbers	MW-014	RPD
VOCs (µg/L)				
Acetone	4.0 (J)		10 (U)	—
Benzene	16 (J)		19 (J)	17
Toluene	7.0 (J)		9.0 (J)	25
Ethylbenzene	15 (J)		17 (J)	13
Xylenes	29 (J)		31 (J)	7
Tetrachloroethene	10 (U)		23 (J)	
TICs				
Fuel-related	[7] (J-N)		[5] (J-N)	
Unknowns	[2] (J-N)		[1] (J-N)	
Others	[1] (J-N)		[4] (J-N)	
SVOCs (µg/L)				
NO TARGET COMPOUNDS REPORTED				
TICs				
Fuel-related	[4] (J-N)		[4] (J-N)	
Unknowns	[14] (J-N)		[14] (J-N)	
Others	[2] (J-N)		[2] (J-N)	
Metals (µg/L)				
Arsenic (Total)	213 (J)		210 (J)	1
Arsenic (Dissolved)	198 (J)		169 (J)	16
Chromium (Total)	10.0 (U)		10.0 (U)	—
Chromium (Dissolved)	10.0 (U)		10.0 (U)	—
Lead (Total)	4.0 (J)		3.6 (J)	11
Lead (Dissolved)	2.0 (U)		2.0 (U)	—
Nickel (Total)	40.0 (U)		40.0 (U)	—
Nickel (Dissolved)	40.0 (U)		40.0 (U)	—
Zinc (Total)	23.0 (J)		20.0 (U)	—
Zinc (Dissolved)	20.0 (U)		20.0 (U)	—

Notes:	RPD	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$
	VOCs	Volatile Organic Compounds by Method 8240
	SVOCs	Semivolatile Organic Compounds by Method 8270
	Metals	Arsenic by Method 7060
		Chromium by Method 7191
		Lead by Method 7421
		Nickel by Method 7520
		Zinc by Method 7950
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D

• Sample MW-014 is a duplicate of MW-4. Unfiltered and filtered samples collected for metals analyses.

TABLE 14
DUPLICATE SAMPLES - COMPARISON OF ANALYTICAL DATA
(Sheet 2 of 3)

Analytical Parameters	Sample Numbers		RPD
	MW-7B	MW-7C	
VOCs (µg/L)			
	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[6] (J-N)	[5] (J-N)	
Unknowns	[3] (J-N)	[4] (J-N)	
Others	[1] (J-N)	[1] (J-N)	
SVOCs (µg/L)			
	NO TARGET COMPOUNDS REPORTED		
TICs			
Fuel-related	[6] (J-N)	[5] (J-N)	
Unknowns	[11] (J-N)	[12] (J-N)	
Others	[2] (J-N)	[3] (J-N)	
Metals (µg/L)			
Arsenic (Total)	17.0	18.0	6
Barium (Total)	100 (U)	100 (U)	—
Cadmium (Total)	5.0 (U)	5.0 (U)	—
Chromium (Total)	10.0 (U)	10.0 (U)	—
Lead (Total)	2.0 (U)	2.0 (U)	—
Nickel (Total)	30.0 (U)	30.0 (U)	—
Selenium (Total)	3.0 (UJ)	3.0 (UJ)	—
Notes:	RPD VOCs SVOCs Metals	Relative Percent Difference $100[(X_1-X_2)/X_{\text{ave}}]$ Volatile Organic Compounds by Method 8240 Semivolatile Organic Compounds by Method 8270 Arsenic by Method 7060 Barium by Method 6010 Cadmium by Method 7130 Chromium by Method 6010 Lead by Method 7421 Nickel by Method 7520 Selenium by Method 7740	
	TICs	Tentatively identified compounds - not listed individually but numbers shown in []	
	Data Qualifiers (in parentheses)	Refer to discussion in Appendix D	

TABLE 14
DUPLICATE SAMPLES - COMPARISON OF ANALYTICAL DATA
(Sheet 3 of 3)

Analytical Parameters	Sample Numbers		RPD
	T3-6,5	T3-12,3	
VOCs (µg/kg)			
Methylene Chloride	8.0 (U)	7.0 (U)	—
Acetone	14 (U)	57 (J)	—
Carbon disulfide	30 (U)	35	—
2-Butanone	15	25	50
Benzene	14 (U)	14 (U)	—
Toluene	2.0 (J)	2.0 (J)	0
Ethylbenzene	14 (U)	14 (U)	—
Xylenes	14 (U)	14 (U)	—
TICs			
Fuel-related	[0]	[0]	
Unknowns	[10] (J-N)	[10] (J-N)	
SVOCs (µg/kg)			
Diethylphthalate	36 (U)	450 (U)	
TICs			
Fuel-related	[2] (J-N)	[2] (J-N)	
Unknowns	[6] (J-N)	[1] (J-N)	
Others	[3] (J-N)	[0] (J-N)	
Metals (mg/kg)			
Arsenic	8.5 (J)	8.0 (J)	6
Chromium	20.3 (J)	15.4	27
Lead	4.2	9.0	73
Nickel	14.9	16.8	12
Zinc	42.3	46.8	10
O&G (%)			
	0.02	0.02	0

Notes:	RPD VOCs SVOCs Metals TICs Data Qualifiers (in parentheses)	Relative Percent Difference $100[(X_1 - X_2)/X_{\text{avg}}]$ Volatile Organic Compounds by Method 8240) Semivolatile Organic Compounds by Method 8270) Arsenic by Method 7060 Chromium by Method 7191 Lead by Method 7421 Nickel by Method 7520 Zinc by Method 7950. Tentatively identified compounds - not listed individually but numbers shown in [] Refer to discussion in Appendix D.
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1.0 INTRODUCTION

The field activities at Navajo Refining Company (Navajo) were conducted in accordance with the quality assurance (QA) requirements described in PRC Environmental Management Inc.'s (PRC) Quality Assurance Project Plan (QAPjP) (PRC, 1992). The QAPjP defines the data quality objectives (DQO) for measurement systems associated with field and laboratory analyses and presents the procedures to be followed to achieve those objectives. Sections 2.0 through 6.0 summarize the results of the analytical data reviews. Section 7.0 provides an overall assessment of the data quality.

PRC reviewed Halliburton NUS Environmental Laboratory's (Halliburton) organics and inorganics analytical data for PRC's sample splits according to U.S. Environmental Protection Agency (USEPA) guidance documents, including "National Functional Guidelines for Organic Data Review" (USEPA, 1991) and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" (USEPA, 1988). Halliburton adhered to the quality control (QC) requirements of the analytical methods described in Section 5.0 of the Phase II RFI Report. PRC's QA/QC narratives and data validation worksheets are included as attachments to this appendix.

The organics data were reviewed on the basis of (1) holding time, (2) gas chromatograph/mass spectrometer (GC/MS) system tuning, (3) instrument calibrations, (4) field QC blank samples, (5) laboratory blanks, (6) surrogate spike recoveries, (7) matrix spike/matrix spike duplicate (MS/MSD) recoveries, (8) field duplicate precision, (9) internal standard performance, (10) instrument performance, and (11) compound identification and quantitation. In addition to those items, review of the inorganics data also included (1) interference check samples, (2) laboratory control samples (LCS), (3) graphite furnace QC, and (4) detection limits.

QC sampling and analysis activities included field and laboratory QC samples. Field QC samples consisted of ten trip blanks, one field blank, two water matrix duplicate samples, one soil matrix duplicate sample, and three sampling equipment rinsate samples. Laboratory QC samples included method blanks, surrogates, matrix duplicates, MSs, and MSDs. Other QC activities regularly conducted by the laboratory included instrument tuning, calibration checks, and control checks.

Analytical criteria which were not met and justifications for qualification of the sample results are discussed in Sections 2.0 through 6.0. The following data qualifiers are used:

- U The compound was analyzed for but not detected. The associated numerical value is the stated quantitation limit.
- J The associated numerical value is an estimated quantity.

- N Indicates presumptive evidence of a compound. Used only for tentatively identified compounds (TIC) where identification is based on a mass spectral library search.
- R QC indicates that the data are unusable. The compound may or may not be present. Resampling or reanalysis is necessary for verification.

All reviewed data reported in the summary tables in Section 6.0 of the Phase II RFI report are found to be acceptable. Please note that the tables which summarize the analytical data (Tables 4 through 12) contain only those compounds detected by either PRC or Navajo and do not contain all of the compounds which were not detected, but whose values were considered estimated and qualified "UJ." The reader should refer to the laboratory data sheets in Appendix E to review PRC's qualifiers for all analytical results.

2.0 VOLATILE ORGANICS DATA ASSESSMENT

This section summarizes PRC's review of Halliburton's analyses for volatile organic compounds (VOC) in PRC's sample splits from Navajo.

2.1 NOVEMBER 1992 SAMPLE DATA - WATER MATRIX

All water samples were extracted and analyzed within the established holding times for volatile organic analyses (VOA). No problems were noted with GC/MS system tuning with bromofluorobenzene (BFB) or with internal standard performance. The volatile compound 2-butanone failed to meet instrument calibration criteria, but since the compound was not detected in the associated samples, no sample data were affected. No other problems with instrument performance were noted. MS/MSD recoveries from sample MW-7 were within established control limits.

The percent recovery for the volatile surrogate compound BFB exceeded control limits for samples MW-4 and MW-014 and their reanalyses. The values of all volatile compounds detected in these samples were considered estimated and were qualified "J".

Methylene chloride, carbon disulfide, and 1,2-dichloroethene (DCE) were found in the field QC blank samples (trip blanks, field blank, or equipment rinsate samples) (refer to Tables 12 and 13). Methylene chloride and tetrachloroethene (PCE) were found in the laboratory method blank. If the concentrations of these compounds in the associated samples were less than the action limit, these occurrences were considered not detected and were qualified "U". The action limit is defined as 10 times the maximum concentration in the blanks for common laboratory contaminants (CLC), such as methylene chloride, or five times the maximum concentration for all other compounds. The

concentrations of the following compounds in the following samples were below action limits, and therefore, the compounds were considered not detected and the values were qualified "U:" benzene in MW-8, -9, and -45; carbon disulfide in MW-45; acetone in MW-4; DCE in MW-1; and PCE in WIND-1. Compounds with concentrations above the action limits (PCE in MW-014) were not qualified on this basis.

Samples MW-4 and MW-014 were field duplicates. The duplicate precision was considered acceptable and no qualifiers were required.

There were no apparent problems with compound identification. Samples MW-4 and MW-014 were reanalyzed due to poor surrogate spike recoveries. The surrogates for both reanalyses (denoted by the suffix "RE") were closer to acceptable limits. Therefore, the final concentrations from the reanalyses were used for determining the level of contamination (refer to Table 9, Sheet 2, and Table 14, Sheet 1).

2.2 NOVEMBER 1992 SAMPLE DATA - SOIL MATRIX

All soil samples were extracted and analyzed within the established holding times for VOA. No problems were noted with GC/MS system tuning with BFB or with internal standard performance.

Several volatile compounds failed to meet established criteria for initial or continuing calibrations. Acetone and 2-hexanone values were affected for samples EPTR-1-03, EPTR-1-06, EPTR-2-3.0, EPTR-2-9.0, EPTR-3-3.0, EPTR-3-6.0, and T-2-11.0. Acetone values were also affected for samples T1-5.0, T1-5.0RE, and T3-12.3, while the 2-hexanone value was affected for sample T3-8.5. Carbon disulfide values for samples T1-5.0RE and T2-4.5 were also qualified. Values were considered estimated and were qualified "UJ" if not detected or "J" if positive. Several other compounds failed to meet acceptable calibration criteria, but these compounds were not detected in the associated samples and the percent difference was less than 50 percent. Therefore, the data were considered acceptable and no qualifiers were required. No other problems with instrument performance were noted.

No soil matrix field QC blank samples (trip blanks, field blank, or rinsate samples) were submitted for analysis. However, the field QC sample results for the water matrix, discussed in Section 2.1, are applicable. Carbon disulfide was present in the field blank, while acetone and methylene chloride were present in the laboratory method blanks. Acetone was either present at concentrations greater than the action limit, or was not detected, and therefore, no qualifiers were required. Methylene chloride and carbon disulfide were reported at concentrations below the action

limits in most of the soil samples, and therefore, were considered not detected and the values were qualified "U."

The surrogate recovery for BFB exceeded established control limits in samples EPTR-3-3.0, T2-4.5, T2-4.5RE, T1-10.0, and T1-10.0RE. Recovery of toluene- d_8 was below limits in samples T1-5.0 and T1-5.0RE. All volatile results for those samples were considered estimated and were qualified "UJ" if not detected or "J" if positive.

Samples T3-6.5 and T3-12.3 were field duplicate samples. The duplicate precision was acceptable and no qualifiers were required.

No problems were noted with compound identification. Samples T1-5.0, T1-10.0, and T2-4.5 were reanalyzed due to poor surrogate recoveries. The recoveries for the reanalyses were closer to the acceptable limit and those results were used for determining the level of contamination (summarized in Table 4). Acetone was detected above the calibration range in samples EPTR-2-3.0 and EPTR-2-9.0. The laboratory failed to perform the required dilution to bring the response within the calibration range. Therefore, the acetone results for these samples were considered estimated and were qualified "J."

2.3 DECEMBER 1992 AND JANUARY 1993 SAMPLE DATA

All samples were extracted and analyzed within the established holding times for VOA. No problems with instrument performance were noted. GC/MS system tuning with BFB and internal standard performance were acceptable. The initial instrument calibration runs were not submitted by the laboratory, but the continuing calibration verifications were within acceptable limits.

No contaminants were detected in the field QC samples [four trip blanks and a sampling equipment rinsate sample (MW-2D)]. Acetone was detected in three of the laboratory method blanks with the highest blank concentration at 37.8 $\mu\text{g/L}$. Any sample result less than 10 times that amount (sample MW-7C) was considered not detected and the value was qualified "U."

Surrogate spike recoveries for volatile compounds were acceptable. MS/MSD recoveries were within established control limits for sample MW-2B. However, percent recoveries for 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, and 1,2-dinitrotoluene did not meet the established criteria in MS/MSDs of sample MW-15. These compounds were not detected in any of the associated samples (all samples collected in January 1993), and therefore, no qualifiers were required.

Samples MW-7B and MW-7C were field duplicate samples. The duplicate precision was acceptable and no qualifiers were required. No problems were noted with compound identification or compound quantitation.

3.0 SEMIVOLATILE ORGANICS DATA ASSESSMENT

This section summarizes PRC's review of Halliburton's analyses for semivolatile organic compounds (SVOC) in PRC's sample splits from Navajo.

3.1 NOVEMBER 1992 SAMPLE DATA - WATER MATRIX

All water samples were extracted and analyzed within the established holding times for semivolatile analyses. No problems were noted with GC/MS system tuning with decafluorotriphenylphosphine (DFTPP) or with internal standard performance.

The SVOCs 2,4-dinitrophenol, 4-nitrophenol, 3-nitroaniline, 4-nitroaniline, pentachlorophenol, and benzo(g,h,i)perylene failed to meet calibration criteria during one or more tests, but since the compounds were not detected in the associated samples, no sample data were affected. The compound 4-nitrophenol failed to meet established calibration criteria with the percent difference exceeding 50 percent. Therefore, although the compound was not detected, the following samples were considered estimated for that compound and the values were qualified "UJ": 3368-1, MW-4, MW-8, MW-013, MW-014, MW-014RE, MW-015, MW-45, OCD-1, and WIND-1. No other problems with instrument performance were noted.

The percent recovery for the semivolatile surrogate compounds nitrobenzene-d₅, 2-fluorobiphenyl-d₅, 2-fluorophenol, and terphenyl-d₁₄, exceeded control limits for several samples. Samples with only one surrogate out of control were considered acceptable and no qualifiers were required. For sample MW-014, with two of the base/neutral and two of the acid fraction surrogates out of control, all semivolatile results were considered estimated and were qualified "UJ" for results less than the instrument detection limit (IDL) and "J" for positive results. All base/neutral results for samples MW-1 and MW-014RE were considered estimated and were qualified "UJ" if not detected and "J" if positive.

Bis(2-ethylhexyl)phthalate, diethylphthalate, phenol, and di-n-butylphthalate were found in the field QC blank samples (field blank and/or equipment rinsate samples) (refer to Table 13). Therefore, these compounds were considered not detected in the associated samples and the values were qualified "U" if the concentration was less than the action limit. The action limit is defined as

10 times the maximum concentration in the blank for CLCs, such as bis(2-ethylhexyl)phthalate and diethylphthalate, or five times the maximum concentration for all other compounds.

The percent recoveries of 4-nitrophenol and pentachlorophenol exceeded established control limits for the MS/MSD sample MW-7. However, these compounds were not detected in any samples, and therefore, the data were acceptable and no qualifiers were required.

Samples MW-4 and MW-014 were field duplicates. The duplicate precision was considered acceptable and no qualifiers were required.

There were no apparent problems with compound identification. Samples MW-1 and MW-014 were reanalyzed due to poor surrogate spike recoveries. The surrogate recoveries for both reanalyses were closer to the acceptable limits. Since the recoveries for MW-014RE require that only the base/neutral compounds be considered as estimated and recoveries for MW-1RE do not require any qualifiers, the final concentrations from the reanalyses were used (refer to Tables 8 and 14).

3.2 NOVEMBER 1992 SAMPLE DATA - SOIL MATRIX

All soil samples were extracted and analyzed within the established holding times for semivolatile analysis with the exception of the re-extraction of sample EPTR-3-3.0 (EPTR-3-3.0RE). SVOCs in EPTR-3-3.0RE were considered estimated and the values were qualified "UJ" if not detected or "J" if positive. No problems were noted with GC/MS system tuning with DFTPP or with internal standard performance.

Several SVOCs failed to meet established criteria for initial or continuing calibrations. However, most of the compounds were not detected in the associated samples. Since their percent differences were less than 50, those data were judged acceptable and no qualifiers were required. Only the 2,4-dinitrophenol value in sample T1-5.0DL was qualified "UJ." No other problems with instrument performance were noted.

No soil matrix field QC blank samples were submitted for analysis. However, the field QC blank sample results for the water matrix, discussed in Section 3.1, were applicable. No semivolatile contaminants were detected in the laboratory method blanks.

Several semivolatile surrogate spike percent recoveries were below established control limits in sample EPTR-3-3.0. Since more than two surrogate spikes per fraction (base/neutral and acid) were out of control limits and most of the recoveries were less than 10 percent, all semivolatile

results for this sample were considered unusable and were qualified "R." Sample EPTR-3-3.0 was reanalyzed. The results of the reanalysis, EPTR-3-3.0RE, were used in determining the level of contamination, although the analysis was performed outside of the acceptable holding time and the results were considered estimated. The percent recovery of phenol in the MS/MSD analyses exceeded established control limits. However, phenol was not detected in any of the soil samples, and therefore, no qualifiers were required.

A two-fold dilution was performed on sample T1-10.0 because dibenzofuran, fluorene, phenanthrene, and pyrene were detected at concentrations above the calibration range. The dilution (T1-10.0DL) results for these compounds were used in place of the original analysis, except for dibenzofuran. Dibenzofuran was not detected in the dilution; therefore, the original result was used, but was considered estimated and qualified "J." For all other compounds, the results of the original analysis were used.

Napthalene, 2-methylnapthalene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, and chrysene were detected above the calibration range in sample T1-5.0. The laboratory performed a 14-fold dilution to bring the responses within the calibration range. The dilution (T1-5.0DL) results for these compounds were used in place of the original analysis.

3.3 DECEMBER 1992 AND JANUARY 1993 SAMPLE DATA

All samples were extracted and analyzed within the established holding times for semivolatile analysis. No problems with instrument performance were noted. GC/MS system tuning with DFTPP and internal standard performance were acceptable. The initial instrument calibration runs were not submitted by the laboratory, but the continuing calibration verifications were within acceptable limits.

No contaminants were detected in the sampling equipment rinsate sample (MW-2D) or the laboratory method blanks.

Surrogate percent recoveries for nitrobenzene-d₅, terphenyl-d₁₄, and/or 2-fluorobiphenyl were outside of the established control limits for several samples. Samples with only one surrogate per fraction out of control (samples MW-7B, MW-7C, and MW-15) were acceptable and no qualifiers were required. Although more than one base/neutral surrogate was out of control in sample MW-2B, no base/neutral SVOCs were detected in the sample, and therefore, no qualifiers were required.

MS/MSD recoveries for sample MW-2B were within established control ranges and were acceptable. However, in MS/MSD sample MW-15, percent recoveries for 4-nitrophenol, 2-chlorophenol, acenaphthene, pyrene, and n-nitroso-di-n-propylamine did not meet the established criteria. These compounds were not detected in any samples, and therefore, no qualifiers were required.

Samples MW-7B and MW-7C were field duplicate samples. The duplicate precision was acceptable and no qualifiers were required.

No problems with compound identification were noted. Sample MW-2B was reanalyzed due to poor surrogate spike recoveries. However, the reanalysis was performed outside the established holding time for SVOCs, making all results estimated. Since only the base/neutral compounds were considered estimated in the original analysis, those data were used instead of the reanalysis.

4.0 METALS DATA ASSESSMENT

This section summarizes PRC's review of Halliburton's analyses for metals in PRC's sample splits from Navajo.

4.1 NOVEMBER 1992 SAMPLE DATA - WATER MATRIX

The water samples were extracted and analyzed within established holding times for metals analyses. No problems were noted with the initial or continuing calibration. No inorganic compounds were detected in the field QC samples or laboratory blanks. The LCS was analyzed and met specified criteria. Samples MW-4 and MW-014 were field duplicates and duplicate precision was within accepted limits. All criteria for laboratory duplicate precision were met.

Recoveries of arsenic, chromium, lead, and zinc from MS sample MW-7 were outside established limits. Due to the possibility of low bias, sample results for arsenic and lead were considered estimated and were qualified "UJ" if less than the detection limit and "J" if positive. Positive results for chromium and zinc were considered estimated and were qualified "J" due to the possibility of a high bias (refer to Tables 8 and 9).

The graphite furnace analytical spike recoveries were out of the established control range for a number of samples. If the absorbance of the sample was less than 50 percent of the analytical spike absorbance, the values were considered estimated and were qualified "UJ" if below detection limits or "J" if positive. If the sample absorbance was greater than 50 percent, the method of standard additions (MSA) was applied, as required. If the MSA correlation coefficient was less than

95 percent, the value was considered estimated and qualified "J," as with sample MW-2F for arsenic. All other MSA results were acceptable and no qualifiers were required.

The laboratory indicated that "since no IDLs were established for chromium by graphite furnace atomic absorption (AA) and nickel and zinc by flame-AA, the contract required detection limit (CRDL) for inductively-coupled plasma (ICP) was used instead." The quantitation limits reported by the laboratory are considered reasonable and acceptable.

The results for sample MW-4 exceed the calibration range for arsenic; however, the appropriate dilution was applied. Sample MW-8 was analyzed for chromium at a 500-fold dilution. Because there is no apparent reason for the dilution, the result was considered estimated and qualified "J."

4.2 NOVEMBER 1992 SAMPLE DATA - SOIL MATRIX

No problems were noted with holding times or initial and continuing calibrations. No inorganic compounds were detected in the field QC samples or laboratory blanks. The LCS, field duplicates, and laboratory duplicates were acceptable.

Recovery of arsenic in MS sample EPTR-2-3.0 exceeded the established control limits. Due to the possibility of a high bias, all sample results for arsenic in soil were considered estimated and were qualified "J" (refer to Tables 4 and 6).

The graphite furnace analytical spike recoveries for chromium and lead were below the established control range for a number of samples. Since the sample absorbance was greater than 50 percent of the analytical spike absorbance, the MSA was applied. If the MSA correlation coefficient was less than 95 percent, the value was considered estimated and qualified "J," as with sample T2-6.5 for chromium. All other MSA results were acceptable and no qualifiers were required.

The laboratory applied ICP-CRDL quantitation limits for chromium by graphite furnace AA and nickel and zinc by flame-AA. This item was discussed in Section 4.1. The limits reported by the laboratory were reasonable and considered acceptable.

The laboratory made appropriate dilutions as required for most samples analyzed for arsenic, chromium, and lead. Sample EPTR-2-3.0 was analyzed for chromium at a 5-fold dilution. Since there is no apparent reason for the dilution, the result was considered estimated and qualified "UJ."

4.3 DECEMBER 1992 AND JANUARY 1993 SAMPLE DATA

All samples were extracted and analyzed within the established holding times for metals analyses. No problems with instrument performance were noted. The percent recoveries for the initial and continuing instrument calibration were acceptable. No analytes were reported above the detection limit in the field QC sample (MW-2D) or in any of the laboratory blanks. An LCS was analyzed and met specified criteria.

The laboratory did not perform post-digestion analytical spikes for the graphite furnace analyses. Barium and chromium analyses were performed by ICP (Method 6010), but the laboratory did not perform an interference check sample or a serial dilution. For those reasons, those compounds cannot be evaluated for potential matrix interference.

Samples MW-7B and MW-7C were field duplicates and the analytical results indicate that the precision was acceptable. All criteria for laboratory duplicate precision were met.

The MS recoveries for sample MW-2B were acceptable and no data were qualified. However, the percent recovery for selenium in MS sample MW-15 was below established limits. Due to the possibility of a low bias, all selenium results associated with this MS/MSD sample (samples collected in January 1993) were considered estimated and were qualified "J" if positive (PW-3368) and "UJ" if not detected.

The detection limits used by the laboratory were acceptable. No problems were noted with sample quantitation.

5.0 OIL AND GREASE (O&G) DATA ASSESSMENT

All soil samples were analyzed for O&G within the established 28-day holding time. Calibration results were not submitted with the laboratory data, and therefore, an assessment of calibration was not possible.

Field QC blank samples were not submitted for O&G analysis. Samples T3-6.5 and T3-12.3 were field duplicates and the analytical results indicate that the precision was acceptable. None of the laboratory method blanks contained detectable O&G and the laboratory duplicates were acceptable. No qualifiers were required.

An MS/MSD was not analyzed for these samples and no LCSs were reported.

6.0 TOXICITY CHARACTERISTIC (TC) LEACHING PROCEDURE DATA ASSESSMENT

6.1 TOXICITY CHARACTERISTIC (TC) VOLATILE AND SEMIVOLATILE ORGANIC COMPOUNDS

The sample leachates were prepared and analyzed within the established holding times for volatile and semivolatile organic analyses. The criteria for GC/MS tuning for BFB (volatile analysis) and DFTPP (semivolatile analysis) were met. The initial and continuing instrument calibration and the internal standards performance were within established limits.

No field QC blank samples were submitted for TCLP analysis, but laboratory blanks contained no detectable contaminants. Surrogate spike and MS recoveries were within established limits, but no MSD was analyzed, and therefore, precision cannot be assessed. Samples T3-6.5 and T3-12.3 were field duplicate samples and no TC contaminants were reported in either sample.

No problems were noted with compound identification or quantitation.

6.2 TC METALS

Preparation and analysis of sample leachates were performed within the established holding times for inorganic compounds. The initial instrument calibration and the continuing calibration verifications were within acceptable limits.

Although no field QC blank samples were submitted for TCLP analysis, laboratory method blanks contained no detectable contaminants. Samples T3-6.5 and T3-12.3 were field duplicate samples and no contaminants were reported in either sample.

The MS recovery for silver was below established acceptance criteria. Therefore, although silver was not detected, all silver data were considered estimated and qualified "UJ." No problems were noted with compound identification or quantitation.

7.0 DATA QUALITY OBJECTIVES (DQO)

The DQOs for the field investigation conducted at Navajo are presented in PRC's QAPJP (PRC, 1992). Review of the field and laboratory QA results indicate that the DQOs were met. Halliburton's analytical precision was good, with more than 92 percent of the percent recoveries for surrogate and MS/MSD recoveries within the accepted QC limits. The accuracy of the analytical procedures was very good, with more than 98 percent of the MS/MSD relative percent differences

within the established control limits. The completeness objective was met as all of the data are considered usable.

PRC's data are considered acceptable. Following is a discussion of items which were considered in evaluating the overall data group. These items are quite common occurrences and are expected in moderation in all data sets.

Organic Calibration Criteria

A number of samples have been considered estimated and qualified "U" or "UJ" due to instrument calibration results outside the established control limits. A typical list of poor performers includes methylene chloride, acetone, and other ketones. These compounds often exhibit percent relative standard deviations, relative response factors, or percent differences outside the control limits. Contractually, the laboratory may only be required to stay within control limits for a limited number of compounds (excluding poor performers), whereas the data validation is based on criteria being applied to all compounds in the method.

Field and Laboratory Blank Contamination

Samples are assessed on the basis of blank contamination, regardless of its origin. An action limit is established by multiplying the highest concentration of each compound found in any blank by 5 (or by 10 if the compound is considered a CLC). Any sample result less than the action limit is considered not detected due to the potential for field or laboratory contamination. A number of compounds have been qualified "U" for this reason.

Organic Surrogate Spike Recoveries

System monitoring compounds (surrogates) are added to each sample prior to extraction/analysis to determine the efficiency of the preparation method (purge and trap for VOCs and solvent extraction for SVOCs) to remove the contaminants from the matrix. The efficiency of the system is measured by the percent recovery of the surrogate compounds. A number of samples have surrogate compounds with recoveries outside of the acceptable control range. When this occurs, the laboratory is required to re-extract the sample. If the surrogate recoveries are acceptable in the re-analysis, the initial results are attributed to poor laboratory efficiency and the acceptable results of the re-analysis are reported. If the surrogate recoveries are out of control limits for the second time, the results are attributed to a matrix effect and the sample results with the best surrogate recoveries are used with the appropriate qualifiers. Except for sample MW-2B, the re-

analysis exhibited better (though not always within control limits) surrogate recoveries and has been chosen for use in place of the original analysis.

REFERENCES

- PRC Environmental Management, Inc. (PRC), 1992. Quality Assurance Project Plan for RFI Phase II Split Sampling, Navajo Refining Company, Artesia, NM (December 8).
- U.S. Environmental Protection Agency (USEPA), 1988. Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (July).
- USEPA, 1991. National Functional Guidelines for Organic Data Review (June).

APPENDIX K

APPENDIX K

Pond I TPH Sampling Results



CHAIN OF CUSTODY RECORD

LEANN

Page 1 of 2

Client/Project Name		Project Location		ANALYSES / PARAMETERS			
Leanna Reliance - Evaporation Pond		Artesia, New Mexico					
Sampler: (Signature) Todd Wilson		Chain of Custody Tape No.		Remarks			
Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers	TPH	Remarks
EP # 1	11-9-93	1300	0693602853	Soil	1	X	* Quick turnaround
EP # 2	11-9-93	1335	0693602854	Soil	1	X	is requested for
EP # 3	11-9-93	1355	0693602855	Soil	1	X	these samples.
EP # 4	11-9-93	1420	0693602856	Soil	1	X	
EP # 5	11-9-93	1445	0693602857	Soil	1	X	If you have any
EP # 6	11-9-93	1450	0693602858	Soil	1	X	questions, please call
EP # 7	11-9-93	1510	0693602859	Soil	1	X	Dave Byer at KUBES.
EP # 8	11-9-93	1530	0693602860	Soil	1	X	
EP # 9	11-9-93	1545	0693602861	Soil	1	X	
EP # 10	11-9-93	1600	0693602862	Soil	1	X	
EP # 11	11-9-93	1615	0693602863	Soil	1	X	
EP # 12	11-9-93	1630	0693602864	Soil	1	X	
EP # 13	11-9-93	1650	0693602865	Soil	1	X	
EP # 14	11-9-93	1700	0693602866	Soil	1	X	
Relinquished by: (Signature) Todd Wilson		Date	Time	Received by: (Signature)		Date	Time
		11-10-93	1500				
Relinquished by: (Signature)		Date	Time	Received by: (Signature)		Date	Time
Relinquished by: (Signature)		Date	Time	Received by laboratory: (Signature)		Date	Time
Inter-Mountain Laboratories, Inc.							17406

☐ 1633 Terra Avenue
Sheridan, Wyoming 82801
Telephone (307) 672-8945

☐ 1714 Phillips Circle
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Telephone (307) 682-8945

☐ 2506 West Main Street
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Telephone (505) 326-4737

☐ 1160 Research Dr.
Bozeman, Montana 59715
Telephone (406) 586-8450

☐ 11183 SH 30
College Station, TX 77845
Telephone (409) 776-8945

☒ 3304 Longmire Drive
College Station, TX 77845
Telephone (409) 774-4999



CHAIN OF CUSTODY RECORD

Page 2 of 2

Client/Project Name		Project Location		ANALYSES / PARAMETERS				
Navajo Refinery - Evaporation Pond		Artesia, New Mexico						
Sampler: (Signature) <i>Todd Wilson</i>		Chain of Custody Tape No.		Remarks				
Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers	TPH	PH	TKN, K ₁ , P
EP # 15	11-9-93	1717	0693602867	Soil	1	X		
EP # 16	11-9-93	1725	0693602868	Soil	1	X		* Quick turnaround requested for TPH analysis only.
EP # 17	11-9-93	1735	0693602869	Soil	1	X		
EP # 18	11-9-93	1745	0693602870	Soil	1	X		
EP Duplicate	11-9-93		0693602871	Soil	1	X		If you have any questions, please contact Dave Boyer at KLUBES.
EP - pH # 3	11-9-93	1355	0693602872	Soil	1		X	
EP - pH # 6	11-9-93	1450	0693602873	Soil	1		X	
EP - pH # 9	11-9-93	1545	0693602874	Soil	1		X	
EP - pH # 12	11-9-93	1630	0693602875	Soil	1		X	
EP - pH # 15	11-9-93	1717	0693602876	Soil	1		X	
EP - pH # 18	11-9-93	1745	0693602877	Soil	1		X	
EP - NPK # 1	11-9-93	1355	0693602878	Soil	1			X
EP - NPK # 2	11-9-93	1715	0693602879	Soil	1			X
Relinquished by: (Signature) <i>Todd Wilson</i>		Date	Time	Received by: (Signature)		Date	Time	
		11-10-93	1500					
Relinquished by: (Signature)		Date	Time	Received by: (Signature)		Date	Time	
Relinquished by: (Signature)		Date	Time	Received by: (Signature)		Date	Time	
Inter-Mountain Laboratories, Inc.								
17405								

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Telephone (409) 776-8945

☒ 3304 Longmire Drive
College Station, TX 77845
Telephone (409) 774-4999

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #1
Laboratory ID: 0693GO2853
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

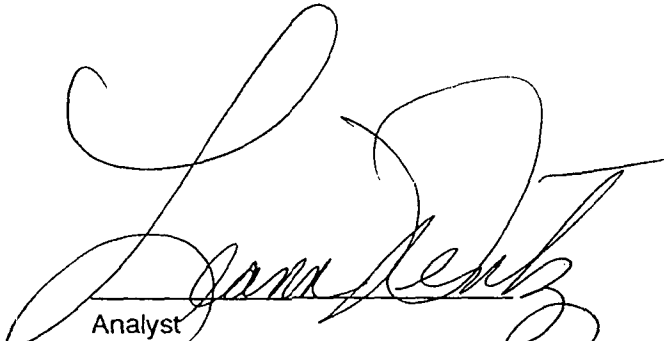
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Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

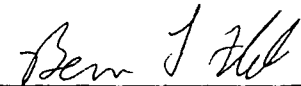
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	ND	10

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #2
Laboratory ID: 0693GO2854
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

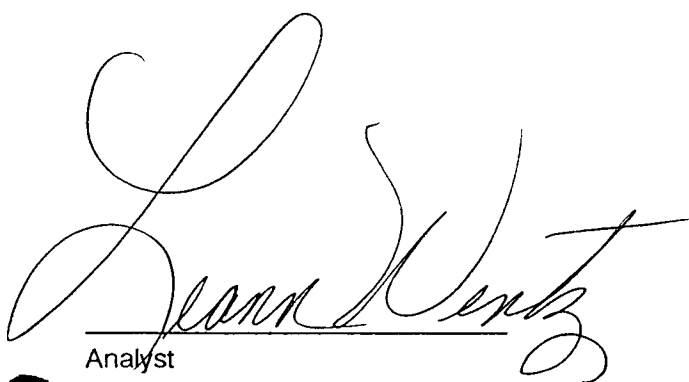
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	32	10

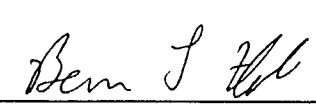
ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:



Analyst



Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #3
Laboratory ID: 0693GO2855
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

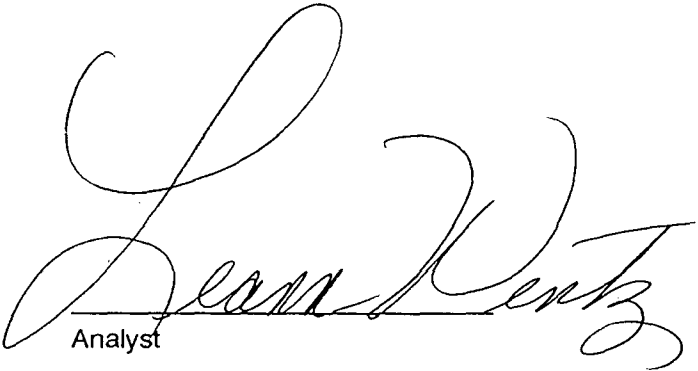
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Date Extracted: 11/13/93
Date Analyzed: 11/14/93

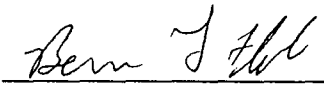
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	1970	25

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Loc.: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #4
Laboratory ID: 0693GO2856
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

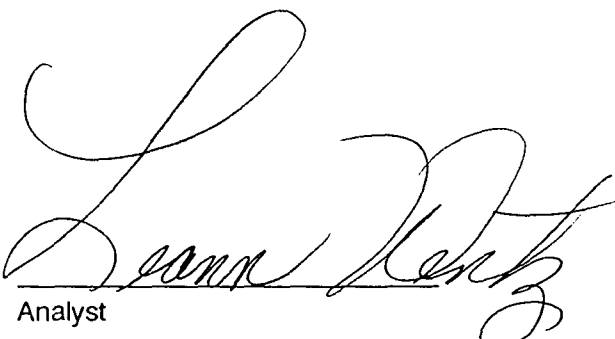
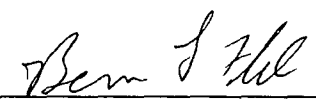
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	59	10

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction; Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #5
Laboratory ID: 0693GO2857
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

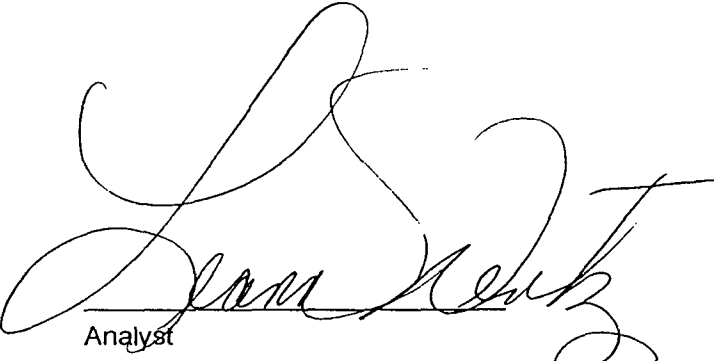
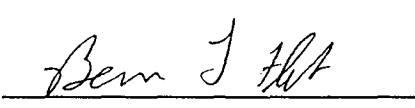
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	26500	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #6
Laboratory ID: 0693GO2858
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

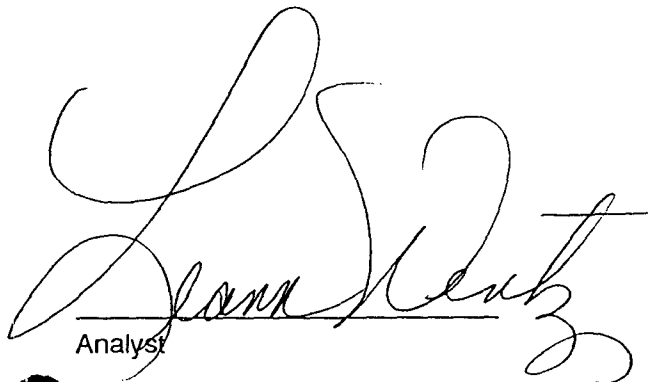
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	48300	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #7
Laboratory ID: 0693GO2859
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

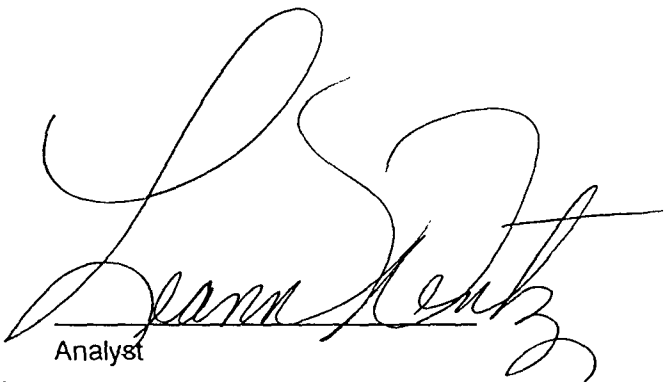
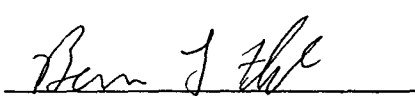
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Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	32400	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #8
Laboratory ID: 0693GO2860
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

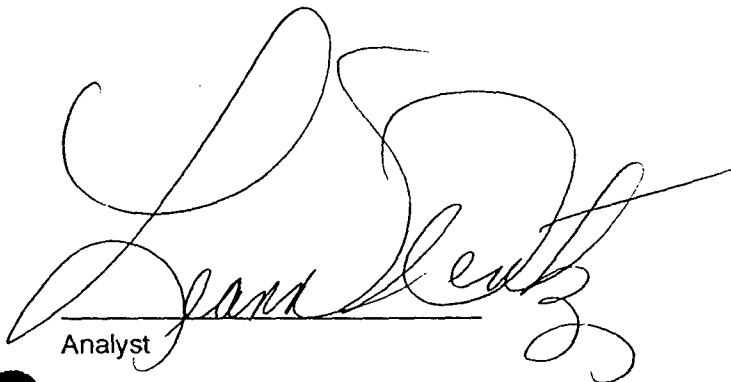
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Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

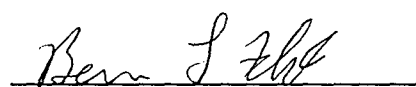
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	2890	50

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #9
Laboratory ID: 0693GO2861
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

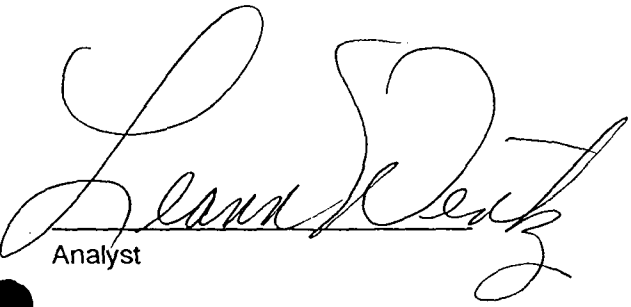
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	21000	250

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst

Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #10
Laboratory ID: 0693GO2862
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

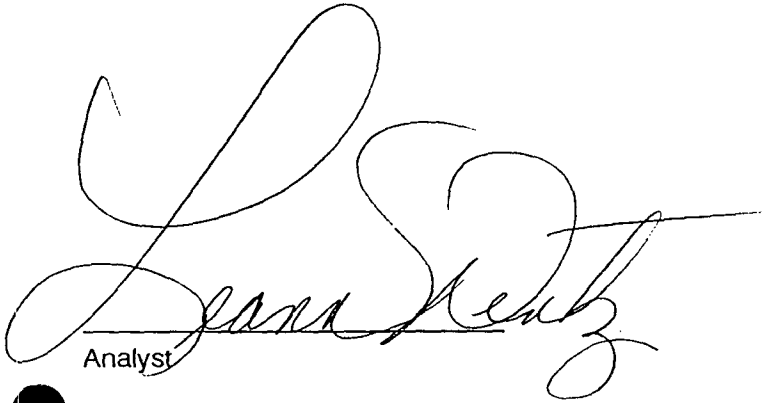
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Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

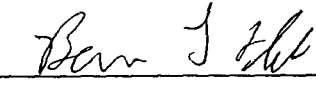
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	2940	50

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #11
Laboratory ID: 0693GO2863
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

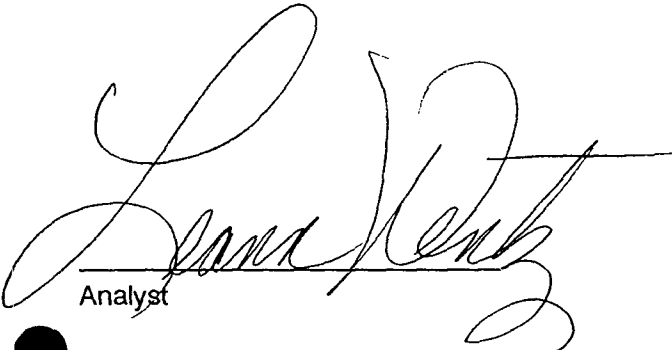
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Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

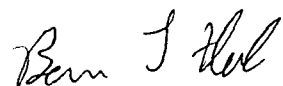
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	33500	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #12
Laboratory ID: 0693GO2864
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

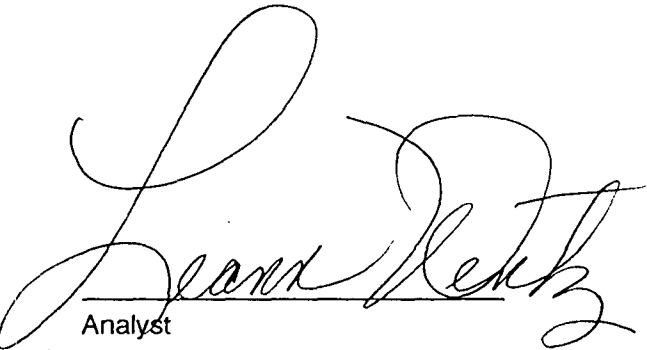
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	105000	1875

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #13
Laboratory ID: 0693GO2865
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

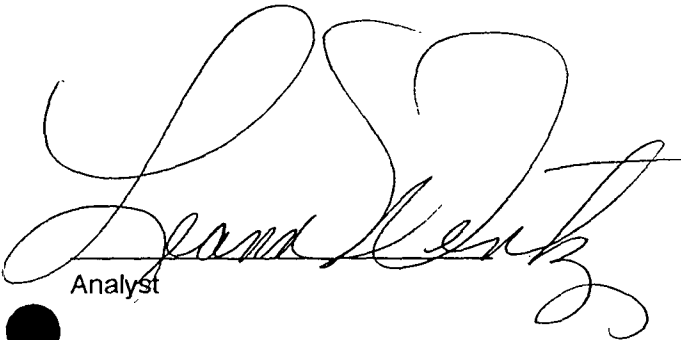
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Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

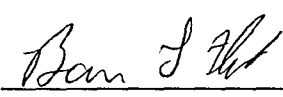
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	81700	1250

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

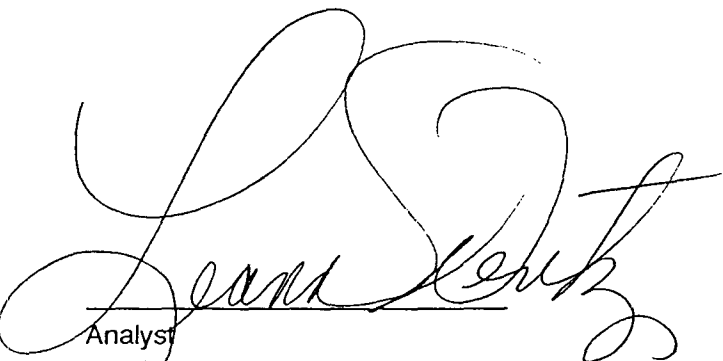
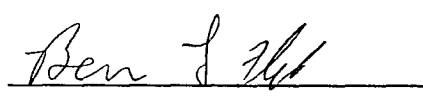
Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #14
Laboratory ID: 0693GO2866
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	2940	50

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable Chemical Analysis of Water and Waste, United States Environmental Protection Agency, 1978.

Comments:
Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Loc.: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #15
Laboratory ID: 0693GO2867
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

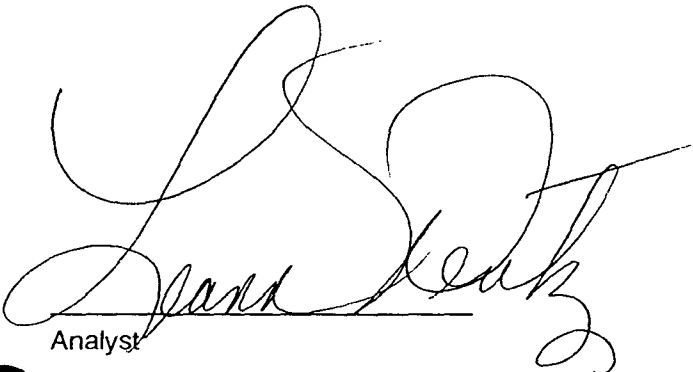
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Date Analyzed: 11/14/93

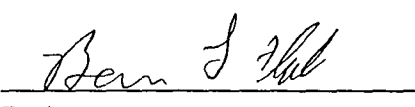
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	51100	250

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #16
Laboratory ID: 0693GO2868
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

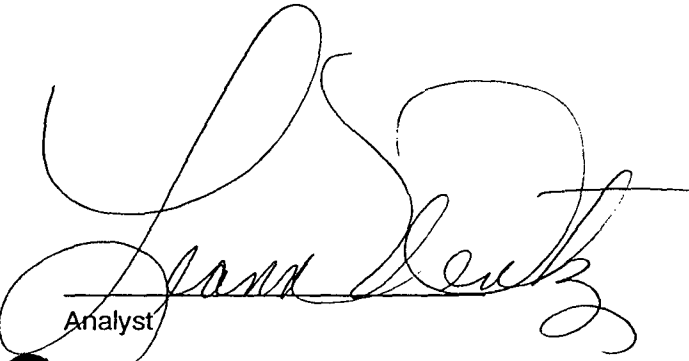
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Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

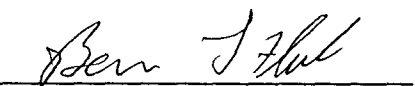
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	58200	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #17
Laboratory ID: 0693GO2869
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

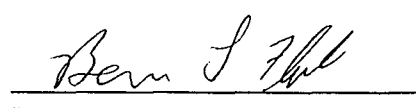
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	41100	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

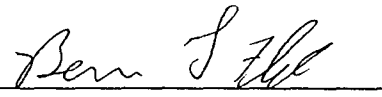
Client: NAVAJO REFINERY CO.
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP #18
Laboratory ID: 0693GO2870
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	33600	625

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:
Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: **NAVAJO REFINERY CO.**
Project Name: Evaporation Pond
Project Loc.: Artesia, New Mexico
Sample ID: EP Duplicate
Laboratory ID: 0693GO2871
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

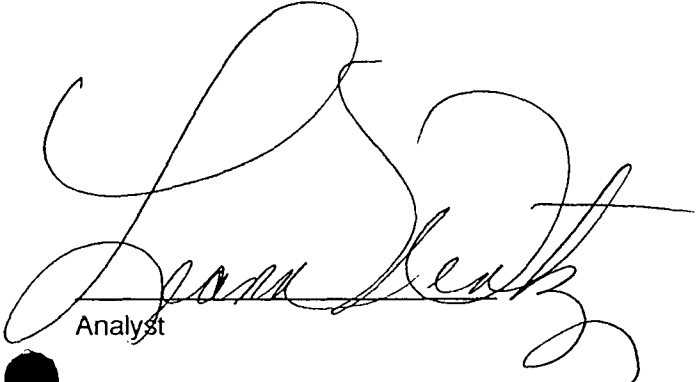
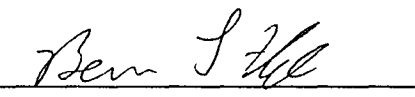
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	1820	25

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst
Review

QUALITY CONTROL REPORT - METHOD BLANK
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: MB 795
Sample Matrix: Soil

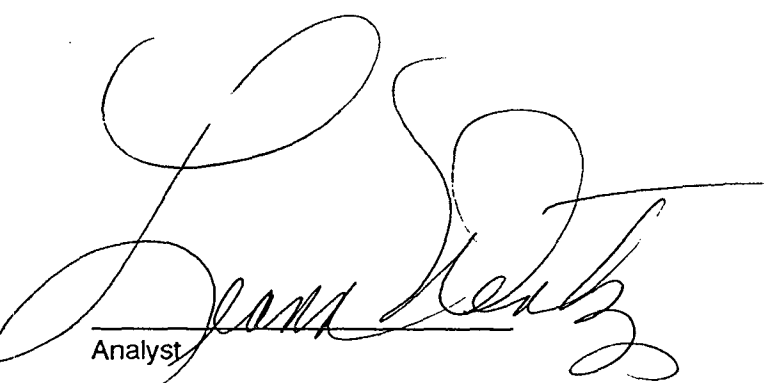
Report Date: 11/15/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

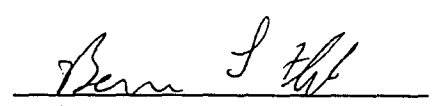
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	ND	10

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst

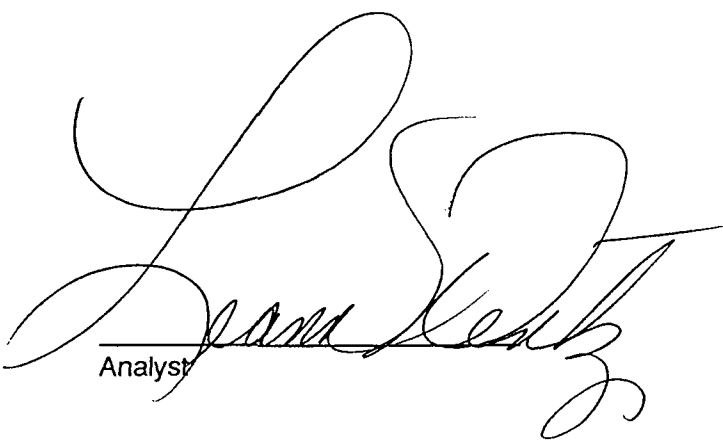
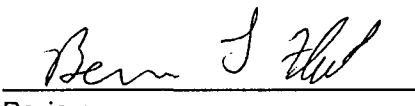

Review

QUALITY CONTROL REPORT - METHOD BLANK
TOTAL RECOVERABLE PETROLEUM HYDROCARBONSSample ID: MB 797
Sample Matrix: SoilReport Date: 11/15/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	ND	10

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable Chemical Analysis of Water and Waste, United States Environmental Protection Agency, 1978.

Comments:
Analyst
Review

QUALITY CONTROL REPORT - BLANK SPIKE
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: Blank Spike
Laboratory ID: BSPK 796
Sample Matrix: Soil
Preservative: NA
Condition: NA

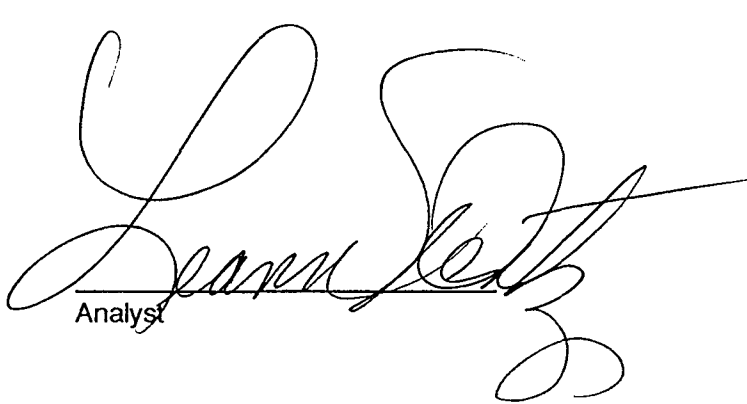
Report Date: 11/15/93
Date Sampled: NA
Date Received: NA
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

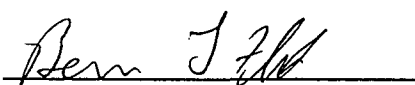
Parameter	Spike Added (mg/Kg)	Sample Result (mg/Kg)	Spiked Sample Result (mg/Kg)	Percent Recovery
Total Recoverable Petroleum Hydrocarbons	487	ND	386	79%

ND - Parameter not detected at established detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

QUALITY CONTROL REPORT - BLANK SPIKE
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: Blank Spike
Laboratory ID: BSPK 798
Sample Matrix: Soil
Preservative: NA
Condition: NA

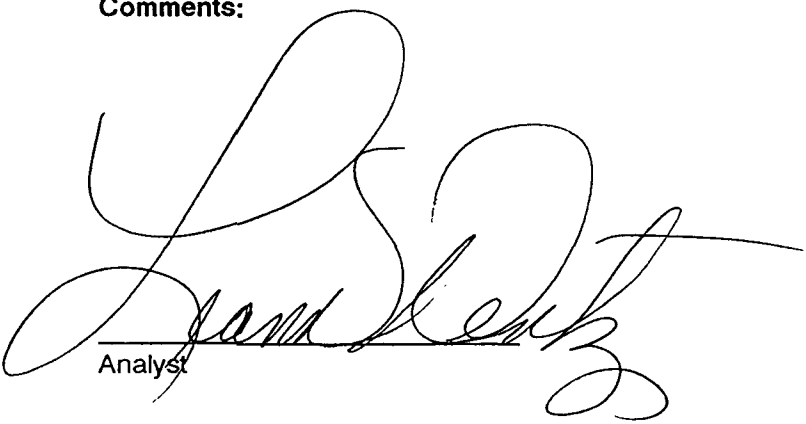
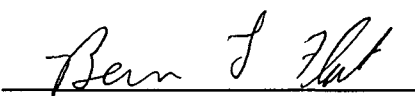
Report Date: 11/15/93
Date Sampled: NA
Date Received: NA
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Spike Added (mg/Kg)	Sample Result (mg/Kg)	Spiked Sample Result (mg/Kg)	Percent Recovery
Total Recoverable Petroleum Hydrocarbons	489	ND	401	82%

ND - Parameter not detected at established detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst
Review

QUALITY CONTROL REPORT - MATRIX DUPLICATE
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: Matrix Duplicate
Laboratory ID: 0693GO2867 Dup.
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

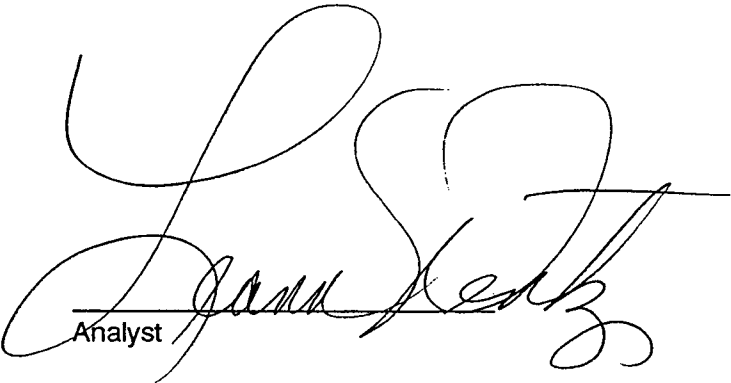
Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

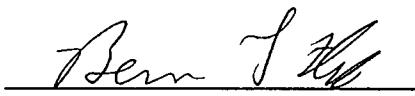
Parameter	Sample Result (mg/Kg)	Duplicate Result (mg/Kg)	Percent Difference
Total Recoverable Petroleum Hydrocarbons	51100	53400	5%

ND - Parameter not detected at established detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

QUALITY CONTROL REPORT - MATRIX DUPLICATE
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample ID: Matrix Duplicate
Laboratory ID: 0693G02861 Dup.
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Sample Result (mg/Kg)	Duplicate Result (mg/Kg)	Percent Difference
Total Recoverable Petroleum Hydrocarbons	21000	20300	3%

ND - Parameter not detected at established detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:

Analyst

Review

QUALITY CONTROL REPORT - MATRIX SPIKE
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

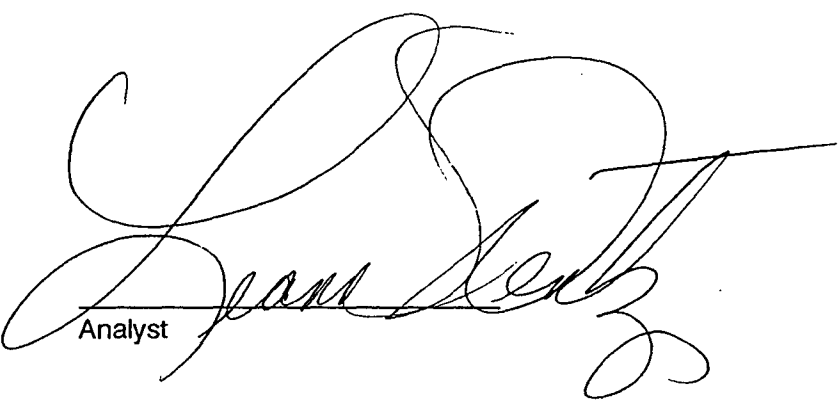
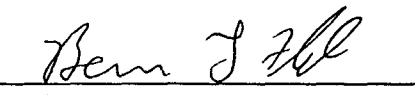
Sample ID: Matrix Spike
Laboratory ID: 0693GO2856 SPK
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

Report Date: 11/15/93
Date Sampled: 11/09/93
Date Received: 11/11/93
Date Extracted: 11/13/93
Date Analyzed: 11/14/93

Parameter	Spike Added (mg/Kg)	Sample Result (mg/Kg)	Spiked Sample Result (mg/Kg)	Percent Recovery
Total Recoverable Petroleum Hydrocarbons	494	59	407	71%

ND - Parameter not detected at established detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:
Analyst
Review

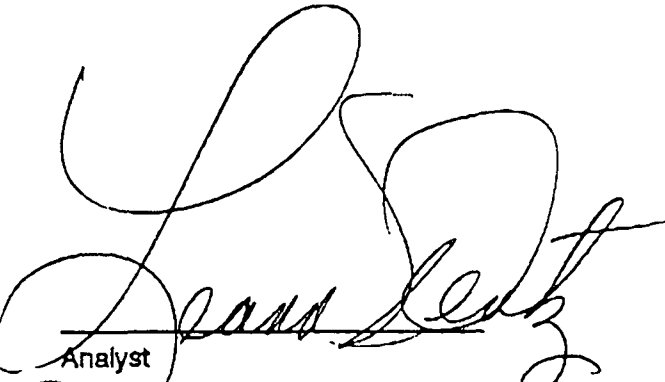
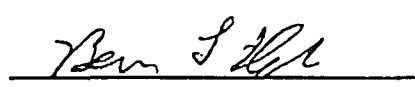
TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client:	NAVAJO REFINERY CO.	Report Date:	11/19/93
Project Name:	Truck Bypass Land Farm	Date Sampled:	11/12/93
Project Loc.:	Artesia, New Mexico	Date Received:	11/12/93
Sample ID:	EP - #21	Date Extracted:	11/17/93
Laboratory ID:	0683GO2947	Date Analyzed:	11/18/93
Sample Matrix:	Soil		
Preservative:	Cool		
Condition:	Intact		

Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	99400	1250

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:
Analyst
Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Truck Bypass Land Farm
Project Loc.: Artesia, New Mexico
Sample ID: EP - #20
Laboratory ID: 0693GO2948
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

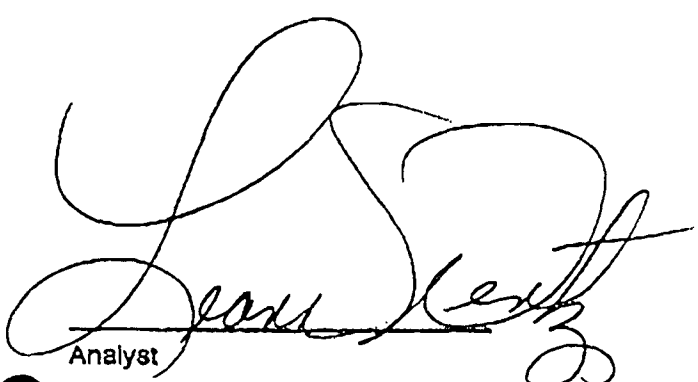
Report Date: 11/19/93
Date Sampled: 11/12/93
Date Received: 11/12/93
Date Extracted: 11/17/93
Date Analyzed: 11/18/93

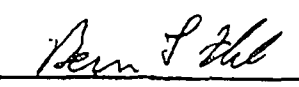
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	110000	1250

ND - Parameter not detected at stated detection limit

Reference: Method 3550A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste, 3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst


Review

TPH
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Client: NAVAJO REFINERY CO.
Project Name: Truck Bypass Land Farm
Project Loc.: Artesia, New Mexico
Sample ID: EP - #19
Laboratory ID: 0693GO2945
Sample Matrix: Soil
Preservative: Cool
Condition: Intact

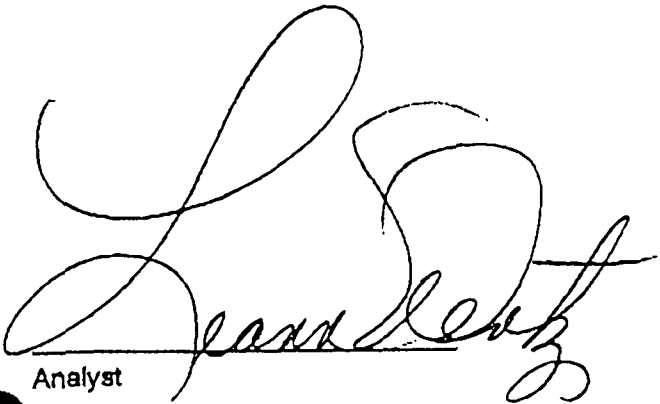
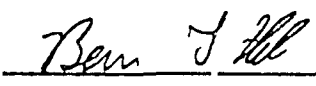
Report Date: 11/19/93
Date Sampled: 11/12/93
Date Received: 11/12/93
Date Extracted: 11/17/93
Date Analyzed: 11/18/93

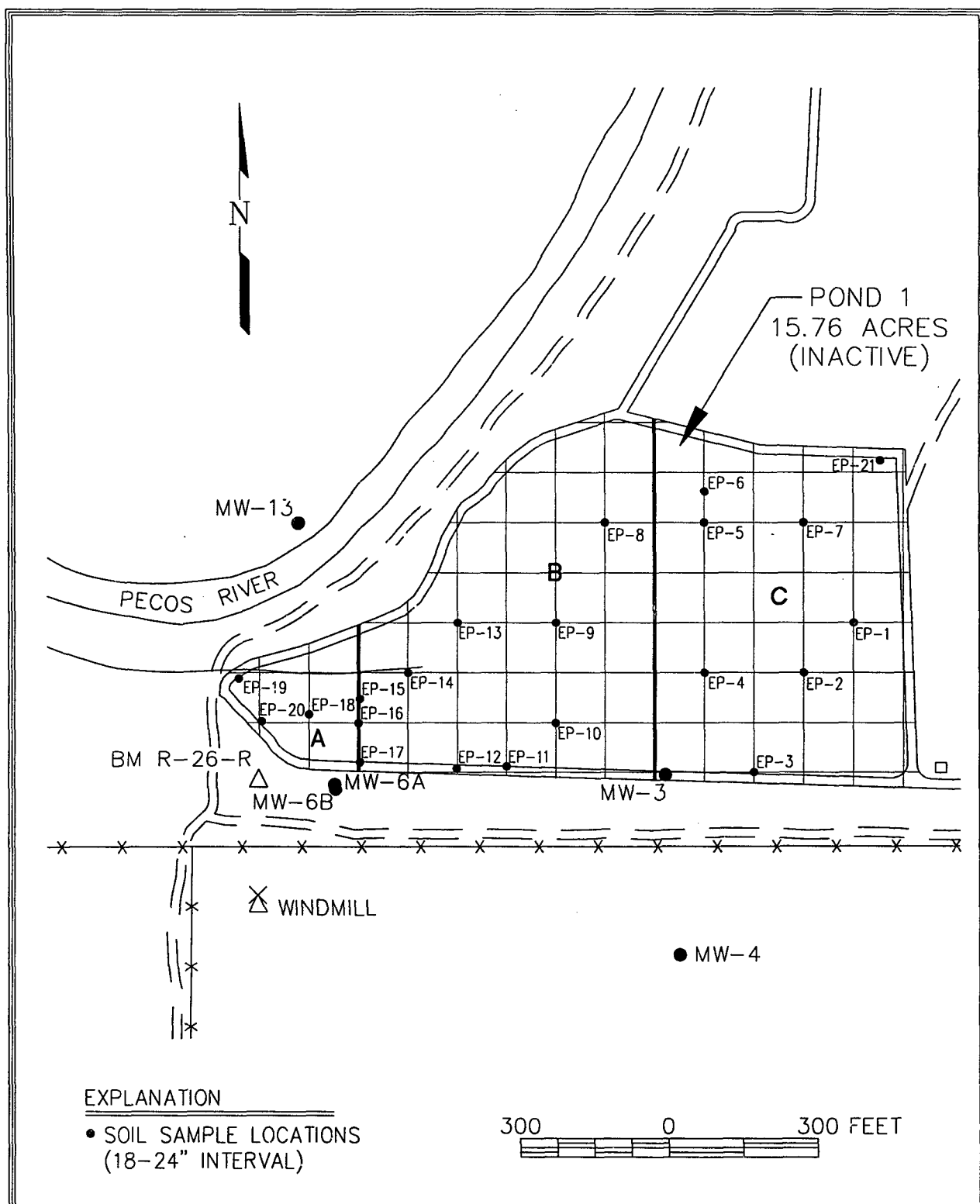
Parameter	Concentration (mg/Kg)	Detection Limit (mg/Kg)
Total Recoverable Petroleum Hydrocarbons	279000	5000

ND - Parameter not detected at stated detection limit

Reference: Method 3650A: Ultrasonic Extraction, Test Methods for Evaluating Solid Waste,
3rd Edition, Final Update I, USEPA, July 1992.
Method 418.1 - Petroleum Hydrocarbons, Total Recoverable
Chemical Analysis of Water and Waste, United States Environmental
Protection Agency, 1978.

Comments:


Analyst
Review



KWBES

Pond 1 soil sample locations,
TPH sampling, November, 1993.

prepared for:



PROJECT: 622093004-110 (POND1)

LOCATION: ARTESIA, NEW MEXICO

APPR:

DATE: 11/23/93

DRAWN BY: RMO

SCALE: AS SHOWN

DATE: 11/23/93

FIGURE: K-1