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WATER QUALITY DATA SUMMARY REPORT FOR COMPLETION OF THE HYDROGEOLOGIC EVALUATION MAVERIK REFINERY AND TANK FARM KIRTLAND, NEW MEXICO FOR MAVERIK COUNTRY STORES, INC.

Dames & Moore

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EXECUTIVE SUMMARY

This report summarizes the results of the Dames & Moore Phase I Study and Report, "Hydrogeologic Evaluation, Maverik Refinery and Tank Farm" (February 1988) and the subsequent Addendum Report (June 1988) and presents the data from Rounds 1, 2 and 3 water quality sampling, water level measurements and data analyses thereof. This report completes the comprehensive "Hydrogeologic Investigation" at the site. Background information detailing the purpose and scope of the investigation are presented in the Phase I Report. Data from the Phase II Study and Report, "Subsurface Soil and Solid Waste Contaminant Evaluation" (June 1988) are not presented herein. However, Phase II results pertinent to ground water contamination from the Tank Farm are included and summarized in the "Detailed Summary Conclusions" of this report.

The Round 3 selective water quality and water level monitoring data confirm the following:

1. Significant subsurface contamination from Maverik's Tank Farm is present in the west-southwest corner of the Tank Farm in the shallow silty-sand zone above the gravel aquifer. Movement of the organic compounds off-site has not been significant and based on Round 3 water quality data, has improved since March 1988 with the on-site construction and operation of the 350-foot long product interceptor trench.

2. The Farmer's Mutual and Westside Irrigation Ditches significantly influence the ground water quality and the rate and direction of ground water movement near the Tank Farm. When the ditches are full and ditch seepage results, recharge and aquifer flushing occur. When dry, the Westside Irrigation Ditch serves as a hydraulic sink and receives ground water inflow.

3. Biodegradation of organic compounds on-site and possibly off-site to the southwest was previously documented based on the inorganic water quality data that were obtained in Round 2. Lower levels of organic compounds detected during Rounds 2 and 3 are further evidence of biodegradation.

Rounds 1, 2 and 3 water quality data confirm that significant concentrations of the typical refinery-related volatile organics benzene, toluene, xylene, ethylbenzene and 1,2-dichloroethane (DCA) are only found on-site in one well located in the upper silty-sand zone in the southwest corner of the refinery. The only significant off-site contamination found was along the Westside Irrigation Ditch along the portion that parallels and receives ground water seepage from the west boundary of the refinery. Only trace levels (1.1 and 1.6 ug/l, i.e., parts per billion) of DCA and xylene, respectively, were detected farther downstream in ground water seeps along the Westside Irrigation Ditch.

Rounds 1, 2 and 3 water quality data verify the presence off-site of trace levels of benzene, ethylbenzene or xylene in 3 of 10 off-site wells. The concentrations were far below New Mexico drinking water standards. DCA was found in three other off-site wells. Only one measurement of 16 ug/l in

one of the wells exceeded the New Mexico drinking water standard of 10 ug/l for this compound. Concentrations of DCA in this well decreased to 7.7 ug/l in Round 2 and to 4.9 ug/l in Round 3.

Based on the analytical data from Rounds 1, 2 and 3 sampling and the EID analytical data from sampling conducted during the spring of 1987, ground water contamination by refinery-related organics is confined to the upper portion of the alluvial aquifer over a 200 to 400 foot area in an east-west direction and a 1,800 to 2,000 foot length downgradient (southwest) of the southwest corner of the tank farm. The low concentrations of the contaminants, their characteristics, the hydrogeologic setting, and the non-use of water for drinking water purposes from private wells in the contaminated area, all lead to the conclusion that the releases from the tank farm do not pose a threat to human health and the environment.

As agreed to by Maverik and the EID, the on-site interceptor trench product capture and cleanout will continue until additional remediation work begins. Periodic water quality monitoring at critical sites, as detailed in the September 14, 1988 ground water remediation work plan, will continue after remediation begins.

WATER QUALITY DATA SUMMARY REPORT
FOR COMPLETION OF THE HYDROGEOLOGIC EVALUATION
MAVERIK REFINERY AND TANK FARM
KIRTLAND, NEW MEXICO
FOR MAVERIK COUNTRY STORES, INC.

INTRODUCTION

This data summary report presents the data and final results of Rounds 1 and 2 (Phase I) comprehensive water quality sampling analysis and Round 3 selective water quality sampling (monitoring) analysis to complete the comprehensive hydrogeologic evaluation at the Maverik Refinery and Tank Farm in Kirtland, New Mexico. In addition, key results of the Phase II Subsurface Soil and Solid Waste Contaminant Study are presented. Detailed hydrogeologic and water quality conditions have been evaluated by Dames & Moore since November 1987, both on-site and approximately one mile downgradient (south) of the refinery property boundaries. The general site location map and detailed plot plan showing all of the sample sites and water level elevation measuring points for Rounds 1, 2 and 3 sampling, (monitor wells, private wells, well points, staff gauges), are included on Plates 1 and 2, respectively.

PURPOSE AND SCOPE

The purpose of the Round 3 selective sampling and monitoring was to continue to monitor, at key sites and prior to any additional ground water remediation, the changes in concentration of the organic contaminants in the ground water. Phase I (Rounds 1 and 2) comprehensive data and study results are presented in detail in the Dames & Moore reports dated February 1988 and June 1988. Those results and the Round 3 data evaluation are presented and summarized in this report.

The Phase II study, "Subsurface Soil and Solid Waste Contaminant Evaluation for The Maverik Refinery and Tank Farm" (June 1988), was conducted after the Round 2 water quality sampling to define the extent of and potential for soil contamination to act as a continuing source of ground water contamination. Although the data from the Phase II study are not included in this report, the key results have been presented in the "Detailed Summary Conclusions" herein.

The Round 3 hydrogeologic data were collected near the end of the irrigation season. The data were used to evaluate seasonal fluctuations and to confirm Rounds 1 and 2 water quality data and preliminary conclusions. These conclusions were used in defining the future remediation work plan (September 14, 1988). In particular, Round 3 data were used to confirm, prior to future remediation, the extent to which the irrigation ditch flows impact ground water levels, contaminant concentrations, ground water flow rates and directions.

Round 3 sampling included only those 7 monitor well sites (MW-6 and MW-8 through MW-13) where organic contaminants had previously been detected. Volatile and, for the first time, semivolatile refinery-related organic constituents were analyzed.

The Round 3 sampling program was approved by the New Mexico EID (September 19, 1988). Dames & Moore split Round 3 samples with the EID for their analysis of both inorganic and organic constituents. The EID results were not available at the time of this report preparation.

GROUND WATER AND SURFACE WATER LEVELS

Water level elevation data and water level changes from Round 1 to Round 2, and from Round 2 to Round 3 confirm that the nearby irrigation ditches have significant impacts on ground water levels and flow directions. All of the wells measured for water levels in Rounds 1 and 2, if accessible, were measured in Round 3. Rounds 1 and 3 data were collected at the end of the irri-

gation seasons, following nine months of flow in the irrigation ditches in both 1987 and 1988, respectively. Consequently the general hydrogeologic conditions encountered during these two sampling rounds were similar. Round 2 data however, were collected about three months after irrigation flows had ceased, just prior to the 1988 irrigation season. Ground water levels were at their lowest at this time.

Waters in the tributary Westside Irrigation Ditch have less impact on ground water levels than waters in the Farmer's Mutual Ditch. Flow rates are much lower in the former averaging several hundred gallons per minute (gpm) versus 40,000+ gpm, and typically waters flow for a shorter time period. Waters in the Farmer's Mutual Irrigation Ditch generally flow for about nine months from early to mid-March to early December of each year. Water flow in the Westside Irrigation Ditch typically begins about the same time but is shut off in late September to late November.

As presented in detail in Appendix A (Plate A-1 and Table A-1), major water level declines occurred between Rounds 1 and 2 in the northern part of the study area near the Farmer's Mutual Irrigation Ditch and along the Westside Irrigation Ditch. Round 1 water level data reflected the recharge of irrigation ditch waters to the ground water while Round 2 water level data did not. The largest ground water level decline from Round 1 to Round 2 (5.65 feet) occurred in monitor well 1 (MW-1), the well closest to and most significantly impacted by seepage from the Farmer's Mutual Irrigation Ditch. Conversely, the largest water level rise from Round 2 to Round 3 (5.58 feet) occurred in the same well. This water level rise resulted from Farmer's Mutual Irrigation Ditch waters recharging the ground water during the irrigation season.

The hydraulic gradient in the northern and eastern parts of the study area also decreased from about 0.01 ft/ft in November 1987 (Round 1) to about 0.008 ft/ft in February 1988 (Round 2), during the three month period after irrigation flows in both ditches had stopped. The gradient then increased

back to its previous level of 0.01 ft/ft in October 1988 (Round 3), as a result of recharge to the ground water from flows in the irrigation ditches.

In summary, the magnitude of water level changes in the northern part of the study area near the irrigation ditches and the types of water level changes as compared to those in the southern part of the study area, (e.g., increases versus decreases) illustrates the impact that the irrigation ditches have on the surrounding ground water levels.

ROUND 3 WATER QUALITY EVALUATIONS

GROUND WATER QUALITY

INTRODUCTION

As discussed previously, only the 3 on-site and 4 off-site monitor wells in which organic constituents had been detected in Rounds 1 and 2 were sampled in Round 3. Analysis included the volatile and semivolatile organic constituents that had been detected in the previous ground water, soils and solid waste samples.

Conductivity, pH and temperature were the only inorganic constituents tested in Round 3 and were analyzed in the field. Although Round 3 sampling conditions were similar to those in Round 1 in terms of irrigation ditch flows and ground water levels, waters in the monitor wells closest to the Westside Irrigation Ditch (MW-11, MW-12 and MW-13) had higher conductivities and higher temperatures than those measured in either Rounds 1 or 2 (Table B-1). In view of the fact that the concentrations of the organic constituents did not change significantly from Rounds 1 and 2 (except for MW-12 where they dropped), the field test results most likely reflect very short-term localized effects from the irrigation ditch waters and not from impacts of the refinery tank farm.

Although no inorganic constituents were analyzed for Round 3, the data results and isocon maps of the key inorganic constituents that were analyzed in Rounds 1 and 2 are included and summarized in Appendix B (Table B-1 and Plates B-1 through B-5). Detailed discussion of this data is included in the Phase I Report Addendum (June 1988).

ORGANIC CONSTITUENTS

On-Site

In addition to the five volatile organic constituents found on-site during Rounds 1 and 2 sampling which consisted of benzene, toluene, xylene, ethylbenzene and DCA, the semivolatiles naphthalene and m&p-cresols were detected in Round 3 (Table 3). They were detected only in MW-12 and at very low levels of 33 ug/l and 11 ug/l, respectively, with detection limits at 10 ug/l. As in the analytical results from Rounds 1 and 2, the only volatile organic constituents found at very high levels in Round 3 were found in the on-site shallow MW-12 completed in the upper silty sand above the deeper gravel aquifer.

Semivolatiles were not analyzed in Rounds 1 and 2. These constituents were included in the Round 3 analysis only after the results of the Phase II soil investigation verified the presence of these and other semivolatile constituents at high concentrations on-site in the soils and solid wastes.

As noted in our previous Phase I and II reports (February and June 1988), volatilization and biodegradation along with some adsorption are probably the primary mechanisms tending to reduce concentrations of the organic constituents found in the water and soils. Because of these active mechanisms, persistence of these compounds does not appear to be great. 1,2-DCA was the only organic constituent detected at enough monitor sites for which an isoconcentration contour map could be drawn (Plate B-6). The contour of 1,2-DCA for Round 3 illustrates lower 1,2-DCA concentrations detected in Round 3 as compared to those detected in Rounds 1 and 2.

Maps summarizing the concentrations for benzene, toluene, ethylbenzene and xylene for Rounds 1, 2 and 3 are also included (Plates B-7 through B-10). These maps also depict lower concentrations of these organic constituents detected during the Round 3 sampling period as compared to Rounds 1 and 2.

The concentrations of the organic constituents detected in the three monitor wells sampled on-site (MW-10, 11 and 12) were either lower in Round 3 or remained essentially the same as in the two previous sample rounds. The most significant changes occurred in on-site MW-12, where the concentration levels of all of the volatile organics decreased by an order of magnitude (see Table 3). Concentrations in MW-11, the deeper well next to MW-12, decreased to below detection limits.

A very slight increase in 1-2-DCA occurred at MW-10, the southernmost on-site monitor well. However, the concentration detected in Round 3 was still very low, measuring 5.7 ug/l as compared to 3.2 and 1.3 ug/l measured in Rounds 1 and 2, respectively.

The significantly lower concentrations of the volatile organic constituents found in MW-12 in Round 3 compared to Rounds 1 and 2 may be partially attributed to the removal of refinery-related product from the surrounding ground water by the interceptor trench. Although MW-12 is located about 100 feet north and east and slightly upgradient from this trench, the skimming of free product from the ground water flowing into the trench would also reduce the amount of contamination in the surrounding ground water.

Flows in the Westside Irrigation Ditch had only been shut off for about two weeks prior to Round 3 sampling. As a result of the large volume of recharge and changes in the hydraulic gradient to the ground water from the irrigation ditches there was also significant dilution of the contaminants in the surrounding ground water. This dilution effect from the irrigation ditch waters on the concentrations of the organic constituents in the aquifer was

also observed in Round 1 (in particular, at MW-12) and is discussed in detail in the Phase I Addendum Report.

Water levels measured during Round 1 sampling were slightly higher than those measured in Round 3. This indicates that there had been more ground water recharge at the time of Round 1 sampling and that there should have been more dilution of the contaminants in the aquifer in Round 1. As previously discussed, this was not the case. Other factors, most notably operation of the interceptor trench, contributed to the better quality ground waters found in MW-12 during the Round 3 sampling.

As noted previously, the semivolatiles, naphthalene and m&p cresols, which are often associated with refineries, were found in the ground water on-site only at MW-12. Naphthalene is rather soluble but does tend to be adsorbed by the soils. The Phase II study results indicated naphthalene concentrations at low levels (5,800 ug/kg) in the subsurface sediments at a depth of about 7 feet and at a distance of about 100 feet slightly upgradient and northwest of MW-12 at borehole 2 (BH-2). The highly soluble m&p cresols, however, were not detected in any of the four Phase II borehole sediment or solid waste samples which were analyzed for semivolatiles. It appears that the typical refinery semivolatile organic constituents are not present at significant concentrations in the on-site ground waters.

OFF-SITE

The concentrations of the volatile organic constituents detected in the four monitor wells that were sampled off-site for Round 3 (MW-6, MW-8, MW-9 and M-13) were slightly lower, but essentially the same as those concentrations that were measured in the previous two sampling rounds (see Table 3 and Plates B-6 through B-10).

Only one organic constituent, 1,2-DCA, was detected off-site in Round 3. The concentrations were very low and ranged from 2.3 ug/l at MW-8 to 5.6 ug/l at MW-9. Concentrations at MW-6 and MW-13 measured 4.9 ug/l and 1.9 ug/l, respectively.

The highest concentration of 1-2-DCA detected off-site was 16 ug/l at MW-6 in Round 1. The only other organic contaminants that have been detected off-site are xylene, ethylbenzene and total organic lead. These were detected at extremely low levels near detection limits during Rounds 1 and 2 only.

DETAILED SUMMARY CONCLUSIONS: PHASES I AND II, AND ROUND 3 WATER QUALITY

These summary conclusions are based on all of Dames & Moore's work at the Maverik Refinery and Tank Farm since 1987 and incorporate the results of the Round 3 water quality monitor data; the results of Dames & Moore's previous Phase I (Rounds 1 and 2 water quality data) Hydrogeologic Evaluation (February 1988 and June 1988); and the Phase II Subsurface Soil and Solid Waste Contaminant Evaluation (June 1988). This work has resulted in the following major conclusions.

ON-SITE GROUND WATER CONDITIONS

- Significant concentrations of the typical refinery-related volatile organics benzene, toluene, xylene, ethylbenzene and 1,2-dichloroethane (DCA), and low concentrations of the semivolatiles naphthalene and m&p cresols have been found in the ground water in one of six monitor wells completed in the upper silty-sand zone in the southwest corner of the refinery tank farm where a leaded gasoline spill occurred several years ago.

- The shallow silty sand alluvial zone on-site that has been significantly impacted by the tank farm has not impacted the deeper gravel zone. Very low levels of contaminants were observed in the deeper monitor wells and private wells downgradient from the tank farm. This is a result of the high permeability and flow rates, recharge and dilution from waters from the irrigation ditches and apparent lithologic separation of the lower gravel zone from the upper silty-sand zone. In addition, significant biodegradation of organic compounds also appears to be occurring on-site in the shallow zone at the highly contaminated monitor well on-site.

OFF-SITE GROUND WATER CONDITIONS

- The significantly high concentrations of the volatile and semi-volatile organic compounds at the tank farm in both the sludges and subsurface soils, versus the low concentrations of these same constituents in the ground water off-site can be accounted for in part by the Westside Irrigation Ditch effects. When dry, this ditch has served as an effective collection sump for contaminated ground waters that move off-site to the southwest. This ditch has prevented widespread movement of contaminated ground water off-site, as demonstrated by the fact that ground water contamination by refinery-related organics is limited to the upper part of the alluvial aquifer over a 200 to 400-foot wide (east-west) zone and a 1,800 to 2,000-foot long (north to southwest trending) zone. When flowing, the Westside Irrigation Ditch has served as a ground water boundary and recharge (dilution) mechanism to ground water movement off-site. Due to its location and depth, the interceptor trench built in March 1988 has been even more effective than the irrigation ditch in collecting refinery related contaminants on the ground water before they can migrate off-site.

- Benzene, xylene or ethylbenzene have only been found in 3 of 10 off-site monitor wells at concentrations just above detection limits and far below New Mexico drinking water standards for these compounds. DCA was found in three other off-site monitor wells, only one of which, with DCA levels ranging from 4.9 to 16 ug/l, exceeded the New Mexico drinking water standard of 10 ug/l.

- The private wells surrounding the Tank Farm average about 20 feet in depth and are generally open through at least 15 feet of saturated, highly permeable gravels, cobbles and sands. The ground water flow velocity through the coarse alluvial aquifer is estimated at 3 ft/day to the southwest toward the San Juan River.

- In more than 25 off-site private wells tested by the NMEID or by Dames & Moore, DCA has only been found in two wells, benzene in another and ethylbenzene in yet another. The concentrations were below New Mexico's drinking water standards for all of these compounds. These wells are utilized for irrigation or stock-watering purposes rather than for drinking water.

ON-SITE (SOILS AND SOLID WASTES)

- The major contaminant source areas on-site and as detailed in the Phase II study, include: the solid waste sludges in the northwest corner of the tank farm; the eastern sludge pit; the subsurface soils in the southwest corner contaminated from the leaded gasoline spill; the west-central part of the tank farm near the No. 5 Fuel Oil Tank; the Crude Oil Tank and the No-Lead Gas tanks; and the sludge disposal area south of the Crude Oil Tank.

- The concentrations of the eight RCRA metals tested using the EP toxicity test indicated that these metals concentrations in the subsurface soils are very low and not at levels considered toxic. The total metals concentrations in the subsurface soils in the southwest part of the tank farm as well as in the surface solid waste (sludge) samples in the east and northwest corner are low and typical of metals concentrations in soils.

- High concentrations of the volatile organic constituents (xylene, ethylbenzene, toluene, benzene) and total organic lead, and the semivolatile organics including bis(2-ethylhexyl)phthalate, 1-methyl-naphthalene, naphthalene, phenanthrene and chrysene have been detected in the subsurface soil and solid wastes on-site.

- The organic compounds in the subsurface soil and solid wastes were found primarily in the upper 7 to 12 feet of the silty-clayey sand zone in the southwest corner of the refinery tank farm where a leaded gasoline spill occurred, where the sludge from the Crude Oil Tank was placed and in the area near the Gasoline and Gasoline Blending Tanks. High levels of the volatile organics were also detected in the northwest corner of the refinery tank farm in the shallow sands and gravels which grade into silty-clayey sands to the south. No 1,2-DCA or m & p cresols were detected in the soils or sludge due probably to high solubility and subsequent transport of these organic compounds by ground and surface waters.

OFF-SITE (SOILS AND SOLID WASTES)

- Off-site contamination of the subsurface soils appears to be limited to two areas: a small 100-foot long, 10-foot deep and 100-foot wide zone immediately west of the southwest corner of the tank farm in the silty clayey sand, and a small 80-foot diameter area just south of the refinery and about 300 feet west of the northwest corner of the tank farm. The concentrations of the volatile organics in the subsurface soils off-site to the southwest are either below detection levels and/or are much lower than on-site concentrations, with

xylene, ethylbenzene, toluene and benzene being the only volatile organics detected. This contaminated zone is principally a silty-clayey fine sand zone of low permeability that overlies the coarser sand and gravel zone. It is from the latter zone that downgradient private wells draw their water. In the 80-foot diameter off-site zone referred to above, contamination was indicated by elevated field organic vapor analyzer results.

In conclusion, and as presented in our Phase I and Phase II reports, only low concentrations of organic contaminants have been detected off-site in the soils. In the water, organic contaminants have been detected off-site only at trace levels or slightly above NMEID drinking water standards. This and the fact that downgradient wells are not used for drinking water purposes confirm that the releases from the tank farm have not and do not pose an immediate threat to human health and the environment. Implementation in 1989 of the NMEID-approved Maverik Refinery Tank Farm ground water remediation plan will significantly reduce any potential future risks from ground water contamination.

REFERENCES

Dames & Moore, February 1988. Phase I Hydrogeologic Evaluation, Maverik Refinery and Tank Farm, Kirtland, New Mexico.

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Dames & Moore, June 1988. Phase II Subsurface Soil and Solid Waste Contaminant Evaluation For Maverik Refinery and Tank Farm, Kirtland, New Mexico.

Dames & Moore, September 14, 1988. Ground Water Remediation Plan for Maverik Country Stores, Inc., Kirtland, New Mexico Refinery Tank Farm.

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Freeze, R.A., and Cherry, J.A., 1979. Groundwater. Prentice-Hall, Inc.

New Mexico EID, September 19, 1988. Letter of Concurrence to Dames & Moore for Round 3 Sampling and Analytical Plan for Maverik Country Stores Kirtland, New Mexico Refinery Tank Farm.

TABLE 1

SAMPLE ROUND 3

LABORATORY WATER QUALITY PARAMETERS

Refinery Hazardous Constituent Semivolatiles
EPA Method 625

Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
bis(2-Ethylhexyl)phthalate
Butyl benzyl phthalate
Chrysene
Dibenzo(a,h)anthracene
Di-n-butyl phthalate
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Diethyl phthalate
7,12-Dimethylbenz-anthracene
Dimethyl phthalate
Di-n-octyl phthalate
Fluoranthene
Indene
1-Methylnaphthalene
Naphthalene
Phenanthrene
Pyrene
Pyridine
Quinoline
Benzenethiol
o-Cresol
m & p-Cresol(s)
2,4-Dimethylphenol
2,4-Dinitrophenol
4-Nitrophenol
Phenol

Halogenated Volatile Organics
EPA Method 601

Chloromethane
Bromomethane (Methylbromide)
Vinyl chloride
Chloroethane
Methylene chloride
1,1-Dichloroethene
1,1-Dichloroethane
1,2-Dichloroethene (cis/trans)
Chloroform
1,1,2-Trichloro-2,2,1-trifluoroethane
1,2-Dichloroethane
1,1,1-Trichloroethane
Carbon tetrachloride
Bromodichloromethane
1,2-Dichloropropane
trans-1,3-Dichloropropene
Trichloroethene
Chlorodibromomethane
cis-1,3-Dichloropropene
1,1,2-Trichloroethane
EDB (1,2-Dibromoethane)
Bromoform
1,1,2,2-Tetrachloroethane
Chlorobenzene

Aromatic Volatile Organics
EPA Method 602

Benzene
Toluene
Chlorobenzene
Ethylbenzene
Total xylenes
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,2-Dichlorobenzene

Note: For detail of methodology see ENSECO's (RMAL) attached report (Appendix B)

TABLE 2

LABORATORY RESULTS FOR MAJOR IONS SAMPLE ROUNDS 1 AND 2
FOR MAVERIK COUNTRY STORES, REFINERY TANK FARM, KIRTLAND, NEW MEXICO

(Round 1 Sampled November 10-27, 1987)
(Round 2 Sampled February 22-24, 1988)
(Round 3 Sampled October 12-13, 1988 no laboratory analysis for inorganics)

Sample Site Designation(1)	pH (field)	TDS (mg/l)	Sulfate mg/l	Chloride mg/l	Sodium mg/l	Calcium mg/l	Total Alkalinity as $CaCO_3$ mg/l	Iron mg/l	Manganese mg/l
NM MCL	6-9	1,000	600	250	NA	NA	NA	1.0	0.2
EPA MCL	6.5-8.5	500	250	250	NA	NA	NA	0.3	.05
Wells									
On-Site									
MW1	9.64;7.51	360;537	176;198	26;33	44;50	44;112	34;159	<.05(2)	- ;.013
MW2	7.75;6.63	1,360;2,000	526;955	67;101	243;334	152;268	309;365	<.05	- ;1.10*
MW10	7.66;8.22	1,240;2,725	568;1,640	46;191	250;578	126;196	153;271	<.05	- ;5.20*
MW11	7.85;7.80	1,250;1,470	592;615	45;184	234;263	138;186	267;242	<.05	- ;1.0*
MW12(3)	6.74;7.25	1,200;1,310	16;9	321;360	222;239	148;133	508;541	.13;.09	- ;3.6
W-3	- ;7.72	- ;960	- ;387	- ;50	- ;207	- ;103	- ;363	- ;<.05	- ;.28*
Off-Site									
MW3	7.78;7.16	1,620;1,730	670;713	97;138	349;377	148;167	215;387	<.05	- ;.64*
MW4	7.46;7.31	1,540;1,380	654;601	87;73	337;294	142;131	332;332	<.05	- ;.78*
MW5	7.85;7.19	1,250;1,190	499;545	68;61	258;244	129;142	397;301	<.05	- ;.76*
MW6	7.51;7.18	2,130;2,000	843;960	288;260	386;361	230;267	367;324	<.05	- ;2.3*
MW7	7.66;7.03	1,400;1,510	558;675	126;169	256;266	152;205	166;320	<.05	- ;.48*
MW8	7.41;7.00	950;1,230	401;605	67;65	166;174	159;193	273;256	<.05	- ;2.7*
MW9	7.11;7.08	1,520;2,160	863;1,510	43;81	146;357	324;396	372;250	<.05	- ;.11
MW13	8.14;8.36	3,700;1,850	1,980;920	257;82	666;370	364;219	419;581	.39;.12	- ;1.90*
R. Ball Well (W-1)	7.96;8.63	2,300;2,140	433;610	1,170;527	1,020;696	25;15	221;289	<.10;<.05	- ;.02
V. Murray Well (W-2)	8.06;8.55	600;640	114;97	43;37	147;126	42;28	368;297	.31;<.05	- ;.03
Farmer's Mutual Irrigation Ditch									
SW1(3)	8.5	400	136	16	29	86	159	<.05; -	-
West Side Irrigation Ditch									
SW4(3)	7.28	790	147	29	40	113	253	.12; -	-
SW5(3)	-	-	-	-	-	-	-	-	-
SW2	7.6;7.41	1,120;1,210	476;550	49;50	159;190	162;147	277;274	<.05	- ;.55*
SW3	8.05;8.16	1,400;1,200	602;550	77;52	223;205	178;146	297;253	.06;.13	- ;.16*
V. Murray's Drainage Ditch									
SW6	7.28;7.95	-	-	-	-	-	-	-	-

MW11 & MW12 (Composite of Cuttings) — Analyzed for EP Toxicity for 8 RCRA metals and sulfide and cyanide reactivity. Only barium detected at 0.94 mg/l.

Footnotes:
(1) Data from Rounds 1 and 2 presented for each sample site in the first and second columns, respectively. Where Round 1 results = Round 2 results, column 2 left blank. Indicates not analyzed.
(2) The values indicated as less than (<) are detection limits only, and not actual concentrations.
(3) Sample sites SW-4 and SW-5 (and MW-12 in Round 1 only) were contaminated with product and not representative of the water itself. SW-4 and SW-5, and SW-1 which was dry, were not sampled for Round 2.
* Exceeds New Mexico MCL For Drinking Water.

TABLE 3

SAMPLE ROUNDS 1, 2 and 3 LABORATORY RESULTS FOR DETECTED ORGANIC CONSTITUENTS
FOR MAVERIK COUNTRY STORES, REFINERY TANK FARM, KIRTLAND, NEW MEXICO

(Round 1 Sampled November 10-27, 1987)
(Round 2 Sampled February 22-24, 1988)
(Round 3 Selective Sampling October 12-13, 1988)

Sample Site Designation[1]	1-2 DCA (ug/l)	Total Xylene (ug/l)	Ethylbenzene (ug/l)	Toluene (ug/l)	Benzene (ug/l)	Total Organic Lead mg/l	Naphthalene (ug/l)	m & p Cresols (ug/l)
NM MCL	10	620	750	750	10	NA	N/A	N/A
EPA MCL	5	NA	NA	2,000	5	NA	N/A	N/A
Wells								
On-Site								
MW1	< 1	< 0.5	< 0.5	< 0.5	0.53[3];<0.5	<0.01;<0.002		
MW2	< 1	< 0.5	< 0.5	< 0.5	< 0.5	0.004		
MW10[2]	3.2;1.3;5.7	< 0.5	< 0.5	< 0.5	< 0.5	0.02;0.009;	---;---;<10	---;---;<10
MW11[2]	1.0;4.6;<1.0	< 0.5	< 0.5	< 0.5	0.81;3.8;<0.5	0.007;0.004;	---;---;<10	---;---;<10
MW12[2,5,6,7]	450.*;2,400*;<200	3,000.*;10,000*;470	1,300.*;1,500*;180*	2,000.*;20,000*;1,000*	19,000.* ;24,000*;6,200*	0.02;0.06;	---;---;33	---;---;11
W-3	< 1;30*?	5.8;<0.5	1.3;<0.5	< 0.5	< 0.5	- ;0.002		
Off-Site								
MW3	< 1	< 0.5	< 0.5	< 0.5	< 0.5	<0.01;0.005		
MW4	< 1	< 0.5	< 0.5	< 0.5	< 0.5	<0.002;0.003		
MW5	< 1	< 0.5	< 0.5	< 0.5	< 0.5	<0.02;0.002		
MW6[2]	16*;7.7;4.9	< 0.5	< 0.5	< 0.5	< 0.5	0.004;0.005;-	---;---;<10	---;---;<10
MW7	< 1	< 0.5	< 0.5	< 0.5	< 0.5	0.02;0.002	---;---;<10	---;---;<10
MW8[2]	2.8;1.1;2.3	< 0.5	< 0.5	< 0.5	< 0.5	<0.02;<0.004;-	---;---;<10	---;---;<10
MW9[2]	8.3;8.6;5.6	< 0.5	< 0.5	< 0.5	< 0.5	<0.01;0.004;-	---;---;<10	---;---;<10
MW13[2]	< 1;1.9;1.9	2.23;1.68;<0.50	0.54;<0.50;<0.50	< 0.5	< 0.5	<0.01;<0.004;-	---;---;<10	---;---;<10
R. Ball Well (W-1)	< 1	< 0.5	0.89;<0.5	< 0.5	< 0.5	<0.02;<0.002		
V. Murray Well (W-2)	< 1	< 0.5	< 0.5	< 0.5	1.0;<0.5	<0.01;<0.002		
Farmer's Mutual Irrigation Ditch								
SW1[5]	< 1	< 0.5	< 0.5	< 0.5	< 0.5			
West Side Irrigation Ditch								
SW4[5,6]	<10	61	<10	<10	<10			
SW5[5,6]	<250	57,000*	2,500*	470	<250	0.3; -;		
SW2	1.1;<1.0	1.6;<0.5	< 0.5	< 0.5	< 0.5	-		
SW3	< 1	< 0.5	< 0.5	< 0.5	< 0.5	<0.002;0.002		
						<0.01;<0.004		
V. Murray's Drainage Ditch								
SW6	< 1	< 0.5	< 0.5	< 0.5	< 0.5			

Footnotes:
(1) Data from Rounds 1, 2 and 3 are presented for each sample site in the first, second and third columns, respectively. Where Round 1 results = Round 2 and Round 3 results, columns 2 and 3 are left blank. - Indicates not analyzed.
(2) Sampled for Round 3 Selective Sampling Program.
(3) Benzene was not detected in a blind duplicate of this sample in Round 1.
(4) The values indicated as less than (<) are detection limits only, and not actual concentrations.
(5) Sample sites SW-4 and SW-5 (and MW-12 in Round 1 only) were contaminated with product and not representative of the water itself. SW-4 and SW-5, and SW-1 which was dry, were not sampled for Round 2.
(6) Volatile organics in samples for SW-4 and SW-5 were analyzed using GC/MS methods in Round 1, and for MW-12 in Rounds 1 and 2. All other samples were analyzed using GC methods.
(7) Napthalene and m & p cresols were only analyzed in Round 3 and only detected in MW-12.
* Exceeds New Mexico MCL for drinking water.
? Data Questionable
NA Not Applicable

TABLE 4

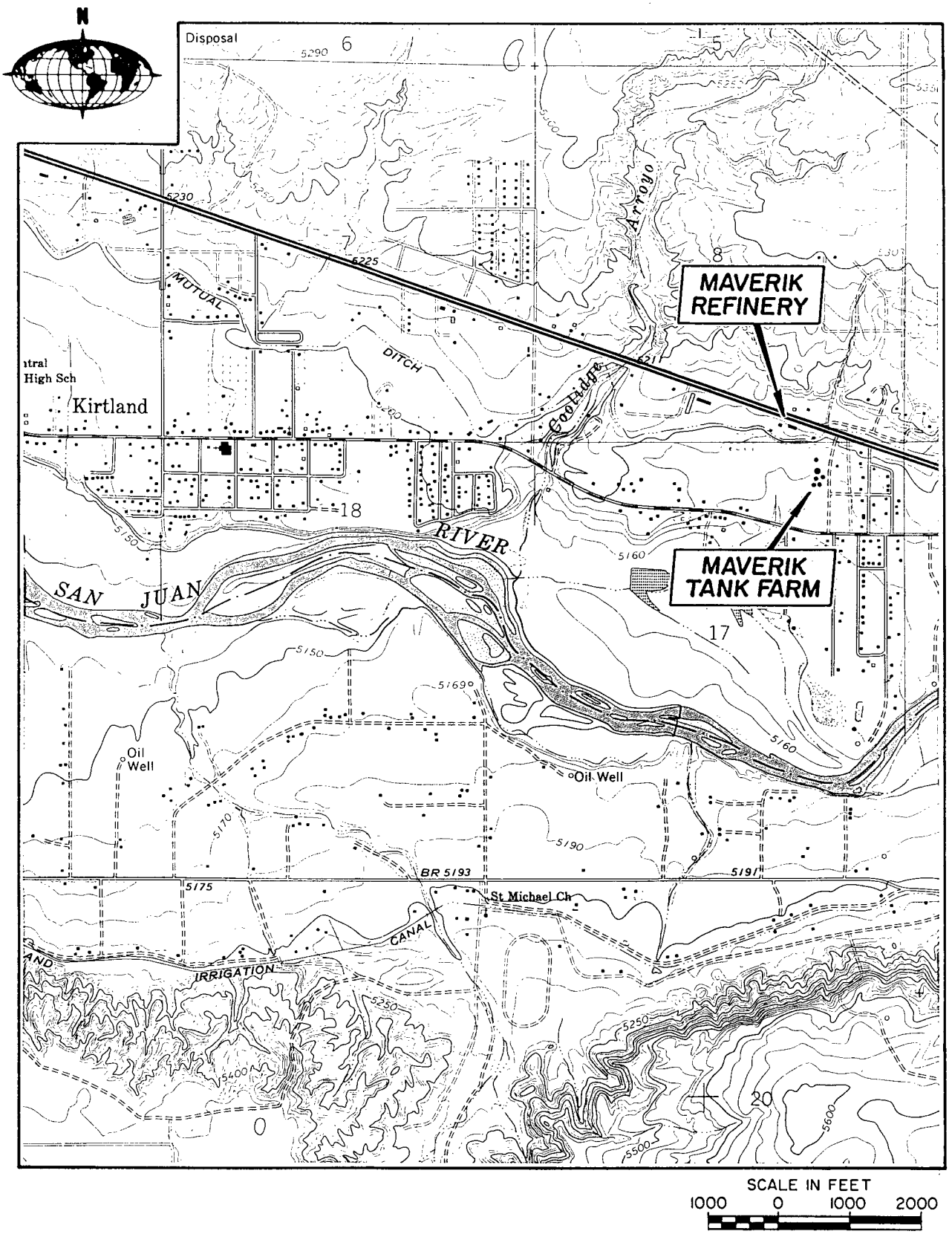
CHARACTERISTICS OF ORGANIC COMPOUNDS DETECTED

	Molecular Weight	Density (gm/cm^3)	Water Solubility (mg/l)	Vapor Pressure (mm Hg)	K_{oc}(1) (ml/g)	K_{ow}(2)
Volatile Organic Parameters						
Benzene	78	0.88	1,750	95	83	132
Ethylbenzene	106	0.87	152	7	1,100	1,412
Toluene	92	0.87	535	28	300	537
Xylene, m	106	0.86	130	10	871	1,820
Xylene, p	106	0.86	192	10	676	1,412
Xylene, o	106	0.88	175	10	426	891
1,2-Dichloroethane	99	1.26	8,520	64	14	30
Tetraethyl lead	323	1.65	0.3-0.8	0.1	4,900	-
Semivolatile Organic Parameters						
Phthlate Esters						
Bis(2-ethylhexyl phthalate	391	0.99	0.28	$3x10^{-7}$	-	75,850
Polycyclic Aromatic Hydrocarbons (PAH)						
1-Methyl naphthalene	142	1.02	12	-	-	-
Naphthalene	128	1.02	32	0.05	1,300	2,340
Phenanthrene	178	1.06	1	0.00068	14,000	28,840
Chrysene	228	1.27	0.001	$6x10^{-9}$	200,000	410,000
Phenols and Cresols						
m-Cresol	108		25,000			6
p-Cresol	108		25,000			6

(1) Organic carbon partition coefficient, a measure of the tendency for organics to be adsorbed by soil and sediment.

(2) Octanol-water partition coefficient, a measure of the tendency of a chemical at equilibrium to distribute between an organic phase (octanol) and water.

Source: Superfund Public Health Evaluation Manual, EPA 540/1-86/060, October 1986; Land Treatment of Appendix VIII Constituents in Petroleum Industry Wastes, American Petroleum Institute Publication 4379, May 1984.



VICINITY MAP

REFERENCE
U.S.G.S. QUADRANGLE ENTITLED
"KIRTLAND, NEW MEXICO" – 1966,
PHOTOREVISED 1979.

Dames & Moore

PLATE 1

T. 29 N., R. 14 W.

SECTION 9 | SECTION 16
SECTION 8 | SECTION 17

COUNTY ROAD 6251
COUNTY ROAD 6257
COUNTY ROAD 6261
COUNTY ROAD 6255
COUNTY ROAD 6259
COUNTY ROAD 6263
COUNTY ROAD 6256
COUNTY ROAD 6271
COUNTY ROAD 6275

550
489

HIGHWAY
HIGHWAY

U.S.
APPROXIMATE PROPERTY BOUNDARY

MW1
MW2
MW3
MW4
MW5
MW6
MW7
MW8
MW9
MW10
MW11
MW12
MW13
W1
W2
W3
WP1
WP2
WP3
WP4
WP5
SW1
SW2
SW3
SW4
SW5
SW6
ST1
ST2
ST3
ST4
ST5

TANK
FARM
WESTSIDE IRRIGATION DITCH
INTERCEPTOR TRENCH
FARMER'S MUTUAL IRRIGATION DITCH
DRAINAGE DITCH
NEW MEXICO
REFINERY
MAVERIK STORE
MARSH
SAN JUAN RIVER

R.J. TRAC
ERNEST MCLEMORE
EVERETT GRAY
ROBERT ESHOM
J. LEROY FLACK
RONALD NEFF
PAUL PICKARD
RAYMOND HOUSH % DON REED
ED L. PARRIS
JOHN DIVERS
GEORGE NELSON
ROBERT BALL
ROBERT H. WALKER
AGNES JACKSON
ROLAND JACKSON
CHARLES GRUBBS
WM. H. WALKER
MELVIN STONE
MELVIN JOHNSON % HARRY SADDLE
ETTA MAY JACKSON
VIRGIL LUCERO
VERNONE & DUANE PILCHER
ROBERT MADRID
W.D. YORK JR.
DONALD HOWELL
CHARLES S. HILL
GEN. CURLEY
IRENE B. HULL
BLOOMFIELD TRUSTEES % VIRGINIA L. MURRAY
VIRGINIA L. MURRAY
JAY BLOOMFIELD

LEGEND

- PRIVATE WELL LOCATION
- EXISTING WELL LOCATION SAMPLED (W1 – W3)
- WELL POINT LOCATION (WP1 – WP5)
- MONITOR WELL LOCATION (ROUNDS 1 & 2, MW1 – MW13)
- MONITOR WELL LOCATION (ROUND 3, MW6, MW8 – MW13)
- STAFF GAUGE LOCATION (ST1 – ST5)
- SURFACE WATER SAMPLE SITE LOCATION (ROUND 1, SW1 – SW6, ROUND 2, SW2, SW3 AND SW6 ONLY)
- INTERCEPTOR TRENCH LOCATION (SINCE MARCH, 1988)

200 0 200 400
SCALE IN FEET

REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

SITE SAMPLING LOCATION MAP
ROUNDS 1, 2 AND 3
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988
AND OCTOBER 1988

Dames & Moore

PLATE 2

APPENDIX A

WATER LEVEL ELEVATION DATA FOR LOCAL PRIVATE WATER WELLS, MONITOR WELLS AND SURFACE WATER SITES: ROUNDS 1, 2 AND 3

APPENDIX A

ROUNDS 1, 2 AND 3
WATER LEVEL ELEVATION DATA
FOR LOCAL PRIVATE WATER WELLS, MONITOR WELLS AND SURFACE WATER SITES

An electric water level probe was used during Round 1 (November 22-27, 1987), Round 2 (February 24-25, 1988) and Round 3 (October 12-14, 1988) to obtain static water levels to within 0.01 foot at the 13 monitor well sites, at the 5 well points and at the 19 to 21 private water wells that were accessible for water level monitoring. These sites are located on Plate A-1. Ten private wells, 4 well points and 2 staff gauges measured in previous sampling rounds were not accessible in Round 3. Well casing measuring point elevations, ground surface elevations and Rounds 1, 2 and 3 water level elevations and changes are presented in Table A-1. The well specification details including depths and screened intervals, are presented in the February 1988 report.

The Westside Irrigation Ditch was in use from mid-March 1987 through late October 1987 and from mid-March 1988 through late September 1988, but it was not in use during Rounds 1, 2 and 3 water level data reconnaissance. Consequently, all of the water level elevation measurements taken in this ditch reflect ground water level elevations and not surface water elevations in the ditch in late November 1987, late February 1988 and mid-October 1988. Water level measurements taken above ground surface at the staff gauges along and near the Westside Irrigation Ditch were similar during all three rounds, with water levels at their lowest in Round 2. The water level along the irrigation ditch and downgradient in the San Juan River declined continuously over the study period from Round 1 through Round 3 monitoring.

Comparison of water levels in Round 2 as compared to Rounds 1 and 3 shows that ground water levels were at their lowest in Round 2 in wells in the northern part of the study area after irrigation flows had been shut off for several months. The most significant water level declines in Round 2 (the measured declines as compared to Rounds 1 and 3) were recorded at MW-2 (at -2.07 and -1.17 feet), in MW-11 (at -1.69 and -0.78 feet), in C. Curley's well (at -3.17 and -2.42 feet) and in R. Madrid's well (at -5.25 and -5.24 feet). Water levels were slightly lower in Round 2 in five other private wells in the northeast part of the study area (Table A-1).

Less pronounced ground water level changes were observed in six wells to the south and southwest, with maximum depths to ground water also occurring in Round 2. The largest water level decline measured was about 1 foot which occurred at MW-4 over the period from Round 1 to 2. Wells to the south and southwest (MW-4, MW-5, MW-6, MW-7, MW-8 and W-1) are downgradient from the Westside Irrigation Ditch and though not as significantly affected as wells closer to the Ditch in the north and east, still demonstrate some influence of the Westside Irrigation Ditch on the ground water.

Ground water flow into the Westside Irrigation Ditch has been observed in the area between sample sites SW-5 and SW-3. This ditch has functioned as a hydraulic sink, receiving ground water when it was not full with irrigation water. When full, the ditch serves as a ground water recharge source and localized shallow ground water divide. It appears that the completion and operation of the on-site interceptor trench in March of 1988 may have also reduced the volume of ground water flowing into the irrigation ditch (Plate A-1).

Ground water levels in private wells located farther away from the irrigation ditches and to the southeast rose slightly in Round 2 as compared to Round 1. Round 3 water levels dropped below the Round 1 water levels. The decline in water levels in Round 3 in these private wells was probably due to increased well pumpage or possibly reduced ground water recharge to this area.

The Round 1, 2 and Round 3 water level elevation data show that the water level elevations in MW-11 and MW-12, the two nested wells, located 33.5 feet apart, are essentially the same. Based on the differences in these monitor well water level elevations, the shallow zone had a slightly higher hydraulic potential ranging from +0.07 to +0.27 feet. This difference can be accounted for by the horizontal distance between the wells and the horizontal hydraulic gradient. The vertical hydraulic gradient that may exist is very small and not significant with respect to influencing vertical downward movement of contaminants to the deeper gravel zone.

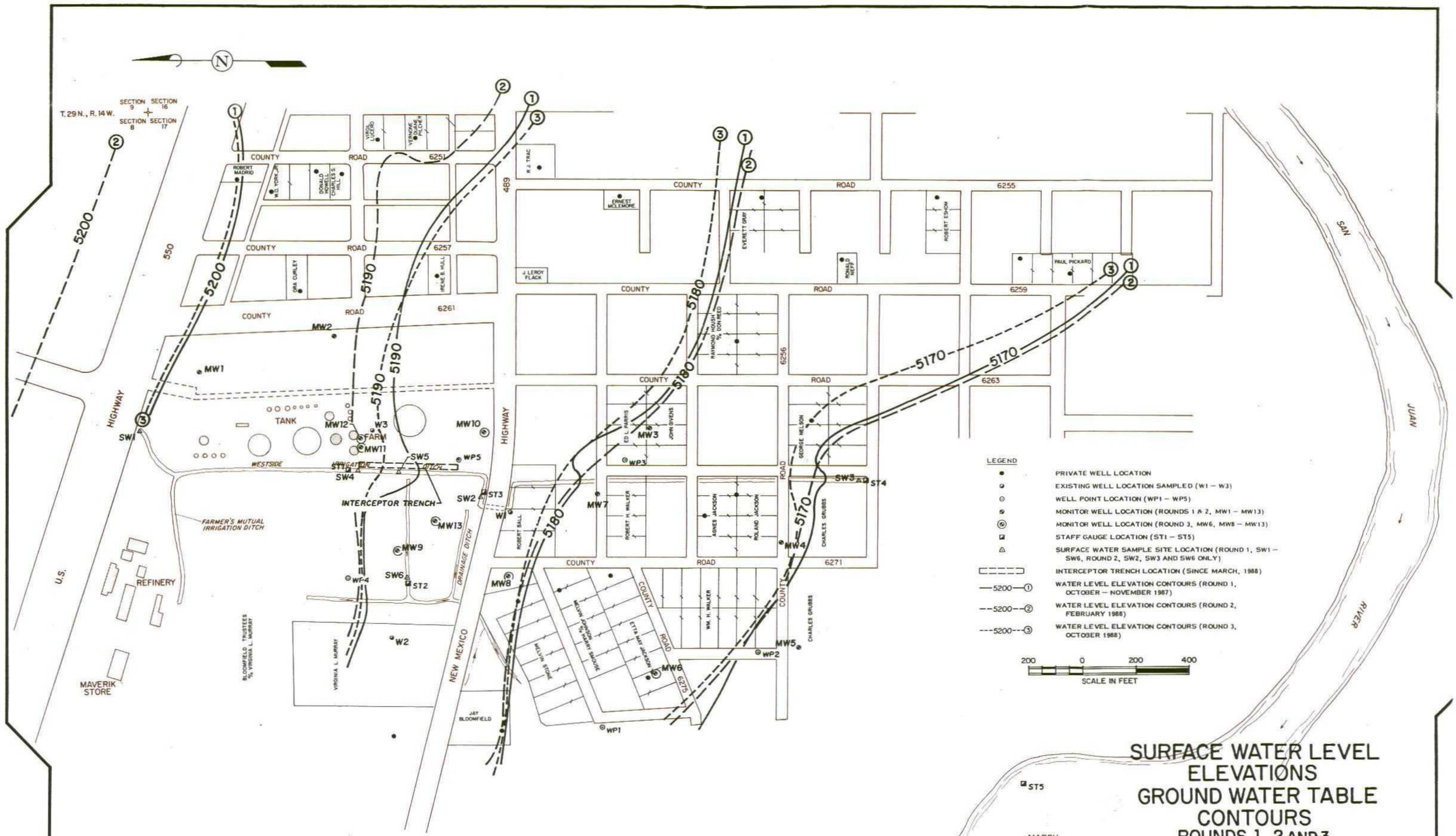
TABLE A-1

WATER LEVEL ELEVATION DATA[1]
Maverik Country Stores, Refinery Tank Farm, Kirtland, New Mexico

Site Designation	Depth to Water From[1] Measuring Point (ft) Round 1	Round 2	Round 3	Measuring Point Elevation (ft)		Water Level Elevation (ft) Round 1	Round 2	Round 3	Water Level Change[4] (ft) Rounds 1-2	Rounds 2-3	Ground Surface Elevation (ft)
Surface Water Sites											
Westside Irrigation Ditch											
Staff Gauge 1	3.90	Dry	4.47	5194.65		5190.75	-----[5]	5190.18	-----	-----	-----
Staff Gauge 2	0.90	1.91	2.45	5186.60		5185.70	5184.69	5184.15	-1.11	-0.54	-----
Staff Gauge 3	2.70	2.71	2.91	5186.22		5183.52	5183.51	5183.31	-0.01	-0.20	-----
Staff Gauge 4	2.83	2.84	Dry	5171.59		5168.76	5168.75	-----	-0.01	-----	-----
San Juan River											
Staff Gauge 5	3.70	4.08	4.35	-----		-----	-----	-----	-0.38	-0.27	-----
Monitor Well Sites				Steel Casing	PVC Casing						
MW-1	8.15	13.8	8.77[3]	5207.79	5207.24	5199.09	5193.44	5199.02	-5.65	+5.58	5205.75
MW-2	3.85	5.92	4.75	5197.10	5196.93	5193.08	5191.01	5192.18	-2.07	+1.17	5195.25
MW-3	3.40[3]	3.26[3]	4.80[3]	5183.00	5181.46	5179.6	5179.74	5178.20	-0.14	-1.54	5181.06
MW-4	6.71[3]	6.44	7.75[3]	5178.41	5177.10	5171.7	5170.66	5170.66	-1.04	0.00	5176.14
MW-5	5.72	5.84	6.65	5175.62	5175.09	5169.37	5169.25	5168.44	-0.12	-0.81	5173.67
MW-6	4.37	4.41	5.28	5176.40	5176.01	5172.03	5171.6	5170.73	-0.43	-0.87	5174.23
MW-7	5.13[3]	4.93	6.33[3]	5183.71	5182.84	5178.58	5177.91	5177.38	-0.67	-0.53	5181.73
MW-8	4.09	4.27	4.80	5186.00	5185.87	5181.78	5181.6	5181.07	-0.18	-0.53	5184.02
MW-9	2.51	3.43	3.24	5191.39	5191.22	5188.71	5187.79	5187.98	-0.92	+0.19	5189.53
MW-10	2.70	3.43	3.78	5189.80	5189.30	5186.6	5185.87	5185.52	-0.73	-0.35	5187.47
MW-11	5.89	7.58	6.80	5197.26	5197.15	5191.26	5189.57	5190.35	-1.69	+0.78	5194.97
MW-12	4.86	6.35	5.96	5196.66	5196.19	5191.33	5189.84	5190.23	-1.49	+0.39	5194.80
MW-13	0.34	0.56	0.86	5187.76	N.A.	5187.42	5187.20	5186.90	-0.22	-0.30	5187.56
W-3	5.10	6.78	5.96	5196.40	N.A.	5191.30	5189.62	5190.44	-1.68	+0.82	5194.62
Well Drive Point Sites											
WP1	-	2.79	Dry	5175.61		-----	5172.82	-----	-----	-----	5175.07
WP2	3.65[2]	3.4	----	5173.43		5169.78	5170.03	-----	+0.25	-----	5173.30
WP3	3.0 [2]	1.44	3.85	5180.92		5177.92	5179.48	5177.07	+1.56	-2.41	5180.79
WP4	1.36	Dry	----	5193.19		5191.83	-----	-----	-----	-----	5193.11
WP5	0.34	1.35	Destroyed By Ditch	5189.54		5189.20	5188.19	-----	-1.01	-----	5189.23
Private Wells (Inventoried)											
William Walker	No Access	No Access	No Access	5177.21		-----	-----	-----	-----	-----	
E.M. Jackson (House)	4.0	3.83	4.90	5175.73		5171.73	5171.9	5170.83	+0.17	-1.07	
(Field)	3.5	3.64	----	5175.85		5172.35	5172.21	-----	-0.14	-----	
H. Smouse	No Access	No Access	No Access	(Build. Locked)		-----	-----	-----	-----	-----	
M. Stone	No Access	No Access	No Access	-----		-----	-----	-----	-----	-----	
J. Bloomfield	8.06	No Access	No Access	5188.10		5180.04	-----	-----	-----	-----	
V. Murray (Corral)W-2	3.2	4.27	3.41	5191.69		5188.49	5187.42	5188.28	-1.07	+0.86	
(House)	3.55	5.74	No Access	-----		-----	-----	-----	-2.19	-----	
R. Ball W-1	2.33	2.53	3.10	5184.73		5182.40	5182.20	5181.63	-0.20	-0.57	
A. Jackson	No Access	No Access	No Access	5177.12		-----	-----	-----	-----	-----	
R. Jackson (Field)	4.95	4.63	6.08	5178.02		5173.07	5173.39	5171.94	+0.32	-1.45	
R. Housh	No Access	No Access	No Access	-----		-----	-----	-----	-----	-----	
R. Neff	5.22	4.47	6.55	5179.53		5174.31	5175.06	5172.98	+0.75	-2.08	
P. Pickard (Shed)	9.25	8.68	9.95	5180.14		5170.89	5171.46	5170.19	+0.57	-1.27	
(House)	No Access	No Access	No Access	5180.15		-----	-----	-----	-----	-----	
R. Eshome	6.65	5.98	6.90	5179.76		5173.11	5173.78	5172.86	+0.67	-0.92	
G. Nelson	7.50	7.07	8.40	5178.40		5170.90	5171.33	5170.00	+0.43	-1.33	
E. Mclemore	1.59	1.97	3.80	5186.15		5184.56	5184.18	5182.35	-0.36	-1.83	
E. Grey	No Access	No Access	No Access	-----		-----	-----	-----	-----	-----	
I. Hull	4.49	4.98	3.95	5194.32		5189.83	5189.34	5190.37	-0.49	+1.03	
C. Curley	4.68	7.85	5.43	5199.95		5195.27	5192.1	5194.52	-3.17	+2.42	
R. Madrid	8.23	13.48	8.24	5208.89		5200.66	5195.41	5200.65	-5.25	+5.24	
W. York	8.80	11.25	----	5206.05		5197.25	5194.8	-----	-2.45	-----	
C. Hill	6.40	9.47	----	5202.54		5196.14	5193.07	-----	-3.07	-----	
D. Pilcher	6.61	8.85	6.96	5201.51		5194.90	5192.66	5194.55	-2.24	+1.89	
D. Howell	8.18	No Access	----	5204.53		5196.35	-----	-----	-----	-----	
R. Tracey	1.63	2.39	----	5190.32		5188.69	5187.93	-----	-0.76	-----	
V. Lucero	7.33	9.94	7.66	5200.16		5192.83	5190.22	5192.50	-2.61	+2.28	

(1) Measured November 22 - 27, 1987, for Round 1; February 24-25, 1988 for Round 2, except where footnote (2) designated; and October 12-14, 1988 for Round 3.
(2) Measured October 30, 1987
(3) Measured from the top of the steel casing.
(4) A negative number indicates a water level decline from Round 1 to Round 2 and from Round 2 to Round 3.
- Round 1 measurements were taken immediately after the West Side Irrigation Ditch flows ceased.
- Round 2 measurements were taken about 3 months later, just prior to any Irrigation Ditch flows.
- Round 3 measurements were taken several weeks after the Westside Irrigation Ditch flows had ceased, but while there was flow in the Farmer's Mutual Irrigation Canal.

(5) —Indicates no measurement available.



LEGEND

- PRIVATE WELL LOCATION
- EXISTING WELL LOCATION SAMPLED (W1 – W3)
- WELL POINT LOCATION (WP1 – WP5)
- MONITOR WELL LOCATION (ROUNDS 1 & 2, MW1 – MW13)
- MONITOR WELL LOCATION (ROUND 3, MW6, MW8 – MW13)
- STAFF GAUGE LOCATION (ST1 – ST5)
- SURFACE WATER SAMPLE SITE LOCATION (ROUND 1, SW1 – SW6, ROUND 2, SW2, SW3 AND SW6 ONLY)
- INTERCEPTOR TRENCH LOCATION (SINCE MARCH, 1988)
- —5200—① WATER LEVEL ELEVATION CONTOURS (ROUND 1, OCTOBER – NOVEMBER 1987)
- --5200--② WATER LEVEL ELEVATION CONTOURS (ROUND 2, FEBRUARY 1988)
- ---5200---③ WATER LEVEL ELEVATION CONTOURS (ROUND 3, OCTOBER 1988)

200 0 200 400
SCALE IN FEET

SURFACE WATER LEVEL ELEVATIONS GROUND WATER TABLE CONTOURS

ROUNDS 1, 2 AND 3

MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988
AND OCTOBER 1988

Dames & Moore

REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

BY _____ DATE _____
PLATE _____ OF _____
BY _____ DATE 12-21-87
CHECKED BY _____ DATE _____

PLATE A-1

APPENDIX B

FIELD AND LABORATORY WATER QUALITY DATA FOR ROUNDS 1, 2 AND 3
SAMPLING AND ANALYSES, AND QA/QC FOR ROUND 3

APPENDIX B

FIELD AND LABORATORY WATER QUALITY DATA FOR ROUNDS 1, 2 AND 3
SAMPLING AND ANALYSES AND QA/QC FOR ROUND 3

WATER QUALITY SAMPLING

The monitor wells sampled during Round 3 (MW-6 and MW-8 through MW-13) were purged with a teflon bailer as they were in Rounds 1 and 2. Ground water samples were then collected, preserved and analyzed in accordance with EPA guidance. Field measurements for pH, conductivity and temperature were measured by Dames & Moore at the time the water quality samples were collected. A Beckman No. 21 digital pH meter and an Amber Science, Inc. No. 605 electric conductivity meter were used. The meters were calibrated using standards of pH 4.0 and 10.0 buffer solutions and potassium chloride solutions of 718 umhos/cm and 6680 umhos/cm, respectively. Bottom samples were collected by lowering a teflon bailer with an end ball valve to the bottom of the wells. Samples were collected after 3 to 5 casing volumes of water had been removed. The field water quality data are presented in Table B-1.

The drop pipes that had been installed in monitor wells MW-12 and MW-13 prior to Round 2 sampling were also used during Round 3 sampling. These are described in our February 1988 report. They were installed after a free oil phase had been detected in specific monitor wells during Round 1 sampling. Such a phase was present only in monitor wells MW-12 and MW-13 during Round 3 sampling.

Sample bottles, with appropriate preservatives as detailed in RMAL's report, herein, were shipped directly to the site by RMAL. All samples were iced immediately after collection and shipped to RMAL on the day of collection via overnight courier. Chain-of-custody documentation was maintained.

LABORATORY ANALYSIS

RMAL conducted the analysis on the water quality samples for Rounds 1, 2 and 3. Analytical findings for the major inorganic (Rounds 1 and 2 only) and

organic parameters for Rounds 1, 2 and 3 are included in Table B-2. The data are presented in columns for comparative purposes. The detailed report from RMAL for Round 3 analyses is also included in this appendix.

WATER QUALITY ANALYSES

Round 3 water quality analyses included a select list of analytes based on those detected previously in wells in Rounds 1 and 2 as agreed to by the EID. RMAL conducted analyses for 25 halogenated volatile organics, 8 aromatic volatile organics and 38 refinery semivolatile hazardous constituents. The specific parameters are listed in Table 1 along with the analytical methods used. GC methods 601 and 602 were used to detect volatile organics and GC/MS method 625 was used in the analysis of the semivolatiles.

ROCKY MOUNTAIN ANALYTICAL LABORATORY QA/QC PROGRAM

All analyses were conducted within approved holding times except for MW-12 and the field blank. Samples were originally extracted within the correct holding times but due to poor recovery of an internal standard (D4-1,4-dichlorobenzene) and two surrogate compounds (2-fluorophenol and D5-phenol), re-extractions were then performed. The re-extractions were performed outside of the maximum holding times. A surrogate recovery for MW-13 for D14-terphenyl was also conducted outside of the maximum holding time.

Chloroform and bromodichloromethane were detected in the field blank at 2.8 ug/l and 1.4 ug/l, respectively. These compounds were not however detected in any other water samples and are not refinery-related contaminants.

A duplicate of the sample from MW-6, designated by RMAL as MW-16, was subjected to the full suite of analyses in Round 3. The relative percent difference of 17 percent for 1,2-dichloroethane between the two samples (4.9 ug/l versus 5.8 ug/l) was within acceptable limits. No other compounds were detected in either sample.

TABLE B-1

FIELD WATER QUALITY DATA ROUNDS 1, 2 AND 3 SAMPLING[1,2,3]
(Maverik Country Stores, Inc., Kirtland, New Mexico)

Sample Site Designation	Conductivity (umhos/cm)			pH			Temperature °C			Remarks		
Ground Water	Rounds			Rounds			Rounds			Rounds		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
MW-1	400	595	-	9.64	7.51	-	15.3	14.9	-	No oil or sheen noted in glass bailer	Same Conditions	-
MW-2	1,100	2,000	-	7.75	6.63	-	14.2	9.7	-	No oil or sheen noted in glass bailer	Same Conditions	-
MW-3	1,080	1,700	-	7.78	7.16	-	12.0	8.9	-	No oil or sheen noted in glass bailer	Same Conditions	-
MW-4	1,510	1,500	-	7.46	7.31	-	14.1	10.8	-	No oil or sheen noted in glass bailer	Same Conditions	-
MW-5	1,310	1,340	-	7.85	7.19	-	15.5	10.8	-	No oil or sheen noted in glass bailer	Same Conditions	-
MW-6	1,880	2,050	2,225	7.51	7.18	-	12.1	7.9	18.0	No oil or sheen noted in glass bailer	Slight odor, yellow particulates	Same Conditions
MW-7	1,060	1,600	-	7.66	7.03	-	13.5	11.0	-	No oil or sheen noted in glass bailer	Same Conditions	-
MW-8	1,060	1,210	1,600	7.41	7.00	7.60	14.8	12.0	17.3	No oil or sheen noted in glass bailer	Same Conditions	Same Conditions
MW-9	1,400	2,200	1,600	7.11	7.08	6.52	13.3	13.9	15.5	No oil or sheen noted in glass bailer	Same Conditions	Same Conditions
MW-10	1,280	3,600	1,375	7.66	8.22	6.25	12.5	9.1	15.6	No oil or sheen noted in glass bailer	Same Conditions	Same Conditions
MW-11	1,050	2,050	2,600	7.85	7.80	6.94	14.5	15.3	19.4	No oil or sheen noted in glass bailer	Same Conditions	Same Conditions
MW-12	1,510	2,010	2,100	6.74	7.25	6.93	17.0	12.2	23.0	Yellow sheen, odoriferous	Same Conditions	Same Conditions
MW-13	2,300	2,600	4,350	8.14	8.36	7.51	8.1	8.6	18.3	Yellow sheen, no odor, multi-colored	Same Conditions	Same Conditions
Ball Well (W-1)	3,500	3,400	-	7.96	8.63	-	14.3	13.5	-	No oil or sheen noted in glass bailer	Same Conditions	-
V. Murray Well (W-2)	700	840	-	8.06	8.55	-	12.9	13.0	-	No oil or sheen noted in glass bailer	Same Conditions	-
On-Site Steel Well (W-3)	-	1,500	-	-	7.72	-	-	14.3	-	Yellow sheen, odoriferous	Same Conditions	-

Surface Water	Conductivity (umhos/cm)			pH			Temperature °C			Flow CFS			Remarks		
	Rounds			Rounds			Rounds			Rounds			Rounds		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
SW-1 Farmers Mutual Irrigation Ditch (Upstream)	280	-	-	8.5	-	-	6.5	-	-	46,675gpm	Dry	Flowing no measurement	No distinct oil or sheen noted	Same Conditions	Same Conditions
SW-2 West Irrigation Ditch (at Hwy 489)	1,080	1,800	-	7.60	7.41	-	10.0	8.9	-	<5gpm	1-2gpm	1-2gpm	No distinct oil or sheen noted	Same Conditions. Ground Water inflow only.	Same Conditions
SW-3 West Irrigation Ditch (Downstream)	1,210	1,620	-	8.05	8.16	-	6.8	8.3	-	5gpm	2-3gpm	1-2gpm	No distinct oil or sheen noted	Same Conditions. Ground Water inflow only.	Same Conditions
SW-4 West Irrigation Ditch (Across from Tank Farm)	565	-	-	7.28	-	-	7.8	-	-	<5gpm	Dry	Dry	Distinct oil and sheen noted	Dry	Dry - No oil
SW-5 West Irrigation Ditch (Across from Tank Farm)	Upper surface layer too contaminated to lower probes through for field tests.									<5gpm	Ponded	Dry	Distinct oil and sheen noted	Same Conditions. Pooled product. Highly contaminated and not sampled for Round 2.	No oil
SW-6 V. Murray's Ditch (West of Tank Farm)	3,080	3,150	-	7.28	7.95	-	14.2	15.4	-	<2gpm	<0.5gpm	0.59gpm	Distinct oil and sheen noted	No distinct oil or sheen	Occasional sheen along sides of ditch

(1) Round 1 Data, November 10-27, 1987
(2) Round 2 Data, February 22-24, 1988
(3) Round 3 Data, October 12-13, 1988
(4) - Indicates no sample collected.

TABLE B-2
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		MW-1		MW-1
DATE SAMPLED		11-11-87		2-22-88
INORGANIC PARAMETERS (mg/L except as noted)				
Calcium (Ca)		44.0		112.0
Magnesium (Mg)		6.4		17.0
Sodium (Na)		44.0		50.0
Potassium (K)	<	5.0	<	5.0
Iron (Fe)	<	.05	<	.05
Manganese (Mn)		*		.013
Ammonia (as N)	<	.1	<	.1
Chloride (Cl)		26.0		33.0
Sulfate (SO4)		176.		198.
Fluoride (F)		.4		.3
Nitrate and Nitrite (as N)		.2		.7
Total Alkalinity		20.4		159.0
Bicarbonate Alkalinity		20.4		159.0
Carbonate Alkalinity		5.0		*
Bicarbonate (HCO3)		24.9		193.9
Carbonate (CO3)		3.0		*
FIELD AND LABORATORY MEASUREMENTS				
Temperature (Degrees C)		15.3		*
Field pH		9.64		7.51
Lab pH (units)		8.60		7.85
Field Conductivity (umhos/cm		400.0		595.0
Lab Conductivity (umhos/cm)		497.0		755.0
Total Dissolved Solids(mg/l)		360.0		537.0
VOLATILE ORGANICS DETECTED (ug/L)				
Benzene		.53	<	.50
Ethylbenzene	<	.50	<	.50
Toluene	<	.50	<	.50
m-Xylene	<	.50	<	.50
o,p-Xylene	<	.50	<	.50
Total Xylene		*		*
1,2 Dichloroethane	<	1.00	<	1.00
TOTAL ORGANIC LEAD (mg/L)				
Total Organic Lead	<	.010	<	.002

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 2)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		MW-2		MW-2
DATE SAMPLED		11-11-87		2-22-88
INORGANIC PARAMETERS (mg/L except as noted)				
Calcium (Ca)		152.0		268.0
Magnesium (Mg)		25.0		43.0
Sodium (Na)		243.0		334.0
Potassium (K)	<	5.0	<	5.0
Iron (Fe)	<	.05	<	.05
Manganese (Mn)		*		1.100
Ammonia (as N)	<	.1	<	.1
Chloride (Cl)		67.0		101.0
Sulfate (SO4)		526.		955.
Fluoride (F)		.4		.3
Nitrate and Nitrite (as N)		.4	<	.1
Total Alkalinity		309.0		365.0
Bicarbonate Alkalinity		309.0		365.0
Carbonate Alkalinity	<	5.0		*
Bicarbonate (HCO3)		376.7		445.0
Carbonate (CO3)	<	3.0		*
FIELD AND LABORATORY MEASUREMENTS				
Temperature (Degrees C)		14.2		*
Field pH		7.75		6.63
Lab pH (units)		7.65		7.63
Field Conductivity (umhos/cm		1100.0		2000.0
Lab Conductivity (umhos/cm)		1770.0		2500.0
Total Dissolved Solids(mg/l)		1360.0		2000.0
VOLATILE ORGANICS DETECTED (ug/L)				
Benzene	<	.50	<	.50
Ethylbenzene	<	.50	<	.50
Toluene	<	.50	<	.50
m-Xylene	<	.50	<	.50
o,p-Xylene	<	.50	<	.50
Total Xylene		*		*
1,2 Dichloroethane	<	1.00	<	1.00
TOTAL ORGANIC LEAD (mg/L)				
Total Organic Lead	<	.004		.004

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 3)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	MW-3		MW-3
DATE SAMPLED	11-11-87		2-22-88
INORGANIC PARAMETERS (mg/L except as noted)			
Calcium (Ca)	148.0		167.0
Magnesium (Mg)	21.0		24.0
Sodium (Na)	349.0		377.0
Potassium (K)	< 5.0	<	5.0
Iron (Fe)	< .05	<	.05
Manganese (Mn)	*		.640
Ammonia (as N)	< .1	<	.1
Chloride (Cl)	97.0		138.0
Sulfate (SO4)	670.		713.
Fluoride (F)	.8		.8
Nitrate and Nitrite (as N)	.2		.3
Total Alkalinity	214.8		387.0
Bicarbonate Alkalinity	214.8		387.0
Carbonate Alkalinity	< 5.0		*
Bicarbonate (HCO3)	261.9		471.8
Carbonate (CO3)	< 3.0		*
FIELD AND LABORATORY MEASUREMENTS			
Temperature (Degrees C)	12.0		*
Field pH	7.78		7.16
Lab pH (units)	7.53		7.58
Field Conductivity (umhos/cm	1080.0		1700.0
Lab Conductivity (umhos/cm)	2160.0		2300.0
Total Dissolved Solids(mg/l)	1620.0		1730.0
VOLATILE ORGANICS DETECTED (ug/L)			
Benzene	< .50	<	.50
Ethylbenzene	< .50	<	.50
Toluene	< .50	<	.50
m-Xylene	< .50	<	.50
o,p-Xylene	< .50	<	.50
Total Xylene	*		*
1,2 Dichloroethane	< 1.00	<	1.00
TOTAL ORGANIC LEAD (mg/L)			
Total Organic Lead	< .010		.005

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 4)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	MW-4	MW-4
DATE SAMPLED	11-10-87	2-22-88
INORGANIC PARAMETERS (mg/L except as noted)		
Calcium (Ca)	142.0	131.0
Magnesium (Mg)	20.0	19.0
Sodium (Na)	337.0	294.0
Potassium (K)	< 5.0	< 5.0
Iron (Fe)	< .05	< .05
Manganese (Mn)	*	.780
Ammonia (as N)	< .1	< .1
Chloride (Cl)	87.0	73.0
Sulfate (SO4)	654.	601.
Fluoride (F)	.8	.7
Nitrate and Nitrite (as N)	.3	.2
Total Alkalinity	332.0	332.0
Bicarbonate Alkalinity	332.0	332.0
Carbonate Alkalinity	< 5.0	*
Bicarbonate (HCO3)	404.8	404.8
Carbonate (CO3)	< 3.0	*
FIELD AND LABORATORY MEASUREMENTS		
Temperature (Degrees C)	14.1	*
Field pH	7.46	7.31
Lab pH (units)	7.44	7.84
Field Conductivity (umhos/cm	1510.0	1500.0
Lab Conductivity (umhos/cm)	2060.0	1920.0
Total Dissolved Solids(mg/l)	1540.0	1380.0
VOLATILE ORGANICS DETECTED (ug/L)		
Benzene	< .50	< .50
Ethylbenzene	< .50	< .50
Toluene	< .50	< .50
m-Xylene	< .50	< .50
o,p-Xylene	< .50	< .50
Total Xylene	*	*
1,2 Dichloroethane	< 1.00	< 1.00
TOTAL ORGANIC LEAD (mg/L)		
Total Organic Lead	< .002	.003

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 5)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		MW-5		MW-5
DATE SAMPLED		11-10-87		2-22-88
INORGANIC PARAMETERS (mg/L except as noted)				
Calcium (Ca)		129.0		142.0
Magnesium (Mg)		20.0		22.0
Sodium (Na)		258.0		244.0
Potassium (K)	<	5.0	<	5.0
Iron (Fe)	<	.05	<	.05
Manganese (Mn)		*		.760
Ammonia (as N)	<	.1	<	.1
Chloride (Cl)		68.0		61.0
Sulfate (SO4)		499.		545.
Fluoride (F)		.8		.7
Nitrate and Nitrite (as N)		.2		.3
Total Alkalinity		397.0		301.0
Bicarbonate Alkalinity		397.0		301.0
Carbonate Alkalinity	<	5.0		*
Bicarbonate (HCO3)		484.0		367.0
Carbonate (CO3)	<	3.0		*
FIELD AND LABORATORY MEASUREMENTS				
Temperature (Degrees C)		15.5		*
Field pH		7.85		7.19
Lab pH (units)		7.42		7.60
Field Conductivity (umhos/cm		1310.0		1340.0
Lab Conductivity (umhos/cm)		1730.0		1700.0
Total Dissolved Solids(mg/l)		1250.0		1190.0
VOLATILE ORGANICS DETECTED (ug/L)				
Benzene	<	.50	<	.50
Ethylbenzene	<	.50	<	.50
Toluene	<	.50	<	.50
m-Xylene	<	.50	<	.50
o,p-Xylene	<	.50	<	.50
Total Xylene		*		*
1,2 Dichloroethane	<	1.00	<	1.00
TOTAL ORGANIC LEAD (mg/L)				
Total Organic Lead	<	.020		.002

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	MW-6	MW-6	MW-6
DATE SAMPLED	11-11-87	2-22-88	10-12-88
INORGANIC PARAMETERS (mg/L except as noted)			
Calcium (Ca)	230.0	267.0	*
Magnesium (Mg)	33.0	37.0	*
Sodium (Na)	386.0	361.0	*
Potassium (K)	< 5.0	< 5.0	*
Iron (Fe)	< .05	< .05	*
Manganese (Mn)	*	2.300	*
Ammonia (as N)	< .1	< .1	*
Chloride (Cl)	288.0	260.0	*
Sulfate (SO4)	843.	960.	*
Fluoride (F)	.6	.5	*
Nitrate and Nitrite (as N)	< .1	< .1	*
Total Alkalinity	367.0	324.0	*
Bicarbonate Alkalinity	367.0	324.0	*
Carbonate Alkalinity	< 5.0	*	*
Bicarbonate (HCO3)	447.5	395.0	*
Carbonate (CO3)	< 3.0	*	*
FIELD AND LABORATORY MEASUREMENTS			
Temperature (Degrees C)	12.1	*	18.0
Field pH	7.51	7.18	*
Lab pH (units)	7.42	7.53	*
Field Conductivity (umhos/cm	1880.0	2050.0	2225.0
Lab Conductivity (umhos/cm)	2870.0	2700.0	*
Total Dissolved Solids(mg/l)	2130.0	2000.0	*
VOLATILE ORGANICS DETECTED (ug/L)			
Benzene	< .50	< .50	< .50
Ethylbenzene	< .50	< .50	< .50
Toluene	< .50	< .50	< .50
m-Xylene	< .50	< .50	*
o,p-Xylene	< .50	< .50	*
Total Xylene	*	*	< .50
1,2 Dichloroethane	16.00	7.70	4.90
SEMIVOLATILE ORGANICS DETECTED (ug/L)			
Naphthalene	*	*	< 10.00
m & p-Cresol(s)	*	*	< 10.00
TOTAL ORGANIC LEAD (mg/L)			
Total Organic Lead	.004	.005	*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 7)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	MW-7	MW-7
DATE SAMPLED	11-11-87	2-22-88
INORGANIC PARAMETERS (mg/L except as noted)		
Calcium (Ca)	152.0	205.0
Magnesium (Mg)	22.0	29.0
Sodium (Na)	256.0	266.0
Potassium (K)	< 5.0	< 5.0
Iron (Fe)	< .05	< .05
Manganese (Mn)	*	.480
Ammonia (as N)	< .1	< .1
Chloride (Cl)	126.0	169.0
Sulfate (SO4)	558.	675.
Fluoride (F)	.6	.5
Nitrate and Nitrite (as N)	.7	1.0
Total Alkalinity	166.2	320.0
Bicarbonate Alkalinity	166.2	320.0
Carbonate Alkalinity	< 5.0	*
Bicarbonate (HCO3)	202.6	390.2
Carbonate (CO3)	< 3.0	*
FIELD AND LABORATORY MEASUREMENTS		
Temperature (Degrees C)	13.5	*
Field pH	7.66	7.03
Lab pH (units)	7.40	7.64
Field Conductivity (umhos/cm	1060.0	1600.0
Lab Conductivity (umhos/cm)	1840.0	2100.0
Total Dissolved Solids(mg/l)	1400.0	1510.0
VOLATILE ORGANICS DETECTED (ug/L)		
Benzene	< .50	< .50
Ethylbenzene	< .50	< .50
Toluene	< .50	< .50
m-Xylene	< .50	< .50
o,p-Xylene	< .50	< .50
Total Xylene	*	*
1,2 Dichloroethane	< 1.00	< 1.00
TOTAL ORGANIC LEAD (mg/L)		
Total Organic Lead	.020	.002

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	MW-8	MW-8	MW-8
DATE SAMPLED	11-23-87	2-22-88	10-12-88
INORGANIC PARAMETERS (mg/L except as noted)			
Calcium (Ca)	159.0	193.0	*
Magnesium (Mg)	21.0	26.0	*
Sodium (Na)	166.0	174.0	*
Potassium (K)	< 5.0	< 5.0	*
Iron (Fe)	< .05	< .05	*
Manganese (Mn)	*	2.700	*
Ammonia (as N)	< .1	< .1	*
Chloride (Cl)	67.0	65.0	*
Sulfate (SO4)	401.	605.	*
Fluoride (F)	.7	.6	*
Nitrate and Nitrite (as N)	< .1	< .1	*
Total Alkalinity	273.0	256.0	*
Bicarbonate Alkalinity	*	256.0	*
Carbonate Alkalinity	*	*	*
Bicarbonate (HCO3)	*	312.1	*
Carbonate (CO3)	*	*	*
FIELD AND LABORATORY MEASUREMENTS			
Temperature (Degrees C)	14.8	*	17.3
Field pH	7.41	7.00	7.60
Lab pH (units)	7.52	7.61	*
Field Conductivity (umhos/cm	1060.0	1210.0	1600.0
Lab Conductivity (umhos/cm)	1500.0	1640.0	*
Total Dissolved Solids(mg/l)	950.0	1230.0	*
VOLATILE ORGANICS DETECTED (ug/L)			
Benzene	< .50	< .50	< .50
Ethylbenzene	< .50	< .50	< .50
Toluene	< .50	< .50	< .50
m-Xylene	< .50	< .50	*
o,p-Xylene	< .50	< .50	*
Total Xylene	*	*	< .50
1,2 Dichloroethane	2.80	1.10	2.30
SEMIVOLATILE ORGANICS DETECTED (ug/L)			
Naphthalene	*	*	< 10.00
m & p-Cresol(s)	*	*	< 10.00
TOTAL ORGANIC LEAD (mg/L)			
Total Organic Lead	< .020	< .004	*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		MW-9		MW-9		MW-9
DATE SAMPLED		11-23-87		2-22-88		10-13-88
INORGANIC PARAMETERS (mg/L except as noted)						
Calcium (Ca)		324.0		396.0		*
Magnesium (Mg)		29.0		41.0		*
Sodium (Na)		146.0		357.0		*
Potassium (K)	<	5.0	<	5.0		*
Iron (Fe)	<	.05	<	.05		*
Manganese (Mn)		*		.110		*
Ammonia (as N)	<	.1	<	.1		*
Chloride (Cl)		43.0		81.0		*
Sulfate (SO4)		863.		1510.		*
Fluoride (F)		1.0		.8		*
Nitrate and Nitrite (as N)	<	.1	<	.1		*
Total Alkalinity		372.0		250.0		*
Bicarbonate Alkalinity		*		250.0		*
Carbonate Alkalinity		*		*		*
Bicarbonate (HCO3)		*		304.8		*
Carbonate (CO3)		*		*		*
FIELD AND LABORATORY MEASUREMENTS						
Temperature (Degrees C)		13.3		*		15.5
Field pH		7.11		7.08		6.52
Lab pH (units)		7.59		7.71		*
Field Conductivity (umhos/cm		1400.0		2200.0		1600.0
Lab Conductivity (umhos/cm)		1850.0		3000.0		*
Total Dissolved Solids(mg/l)		1520.0		2160.0		*
VOLATILE ORGANICS DETECTED (ug/L)						
Benzene	<	.50	<	.50	<	.50
Ethylbenzene	<	.50	<	.50	<	.50
Toluene	<	.50	<	.50	<	.50
m-Xylene	<	.50	<	.50		*
o,p-Xylene	<	.50	<	.50		*
Total Xylene		*		*	<	.50
1,2 Dichloroethane		8.30		8.60		5.60
SEMIVOLATILE ORGANICS DETECTED (ug/L)						
Naphthalene		*		*	<	10.00
m & p-Cresol(s)		*		*	<	10.00
TOTAL ORGANIC LEAD (mg/L)						
Total Organic Lead	<	.010		.004		*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	MW-10	MW-10	MW-10
DATE SAMPLED	11-23-87	2-23-88	10-12-88
INORGANIC PARAMETERS (mg/L except as noted)			
Calcium (Ca)	126.0	196.0	*
Magnesium (Mg)	22.0	41.0	*
Sodium (Na)	250.0	578.0	*
Potassium (K)	< 5.0	< 5.0	*
Iron (Fe)	< .05	< .05	*
Manganese (Mn)	*	5.200	*
Ammonia (as N)	< .1	< .1	*
Chloride (Cl)	46.0	191.0	*
Sulfate (SO4)	568.	1640.	*
Fluoride (F)	.8	.7	*
Nitrate and Nitrite (as N)	< .1	< .1	*
Total Alkalinity	153.0	271.0	*
Bicarbonate Alkalinity	*	271.0	*
Carbonate Alkalinity	*	*	*
Bicarbonate (HCO3)	*	330.4	*
Carbonate (CO3)	*	*	*
FIELD AND LABORATORY MEASUREMENTS			
Temperature (Degrees C)	12.5	*	15.6
Field pH	7.66	8.22	6.25
Lab pH (units)	7.74	7.70	*
Field Conductivity (umhos/cm	1280.0	3600.0	1375.0
Lab Conductivity (umhos/cm)	1640.0	3720.0	*
Total Dissolved Solids(mg/l)	1240.0	2725.0	*
VOLATILE ORGANICS DETECTED (ug/L)			
Benzene	< .50	< .50	< .50
Ethylbenzene	< .50	< .50	< .50
Toluene	< .50	< .50	< .50
m-Xylene	< .50	< .50	*
o,p-Xylene	< .50	< .50	*
Total Xylene	*	*	< .50
1,2 Dichloroethane	3.20	1.30	5.70
SEMIVOLATILE ORGANICS DETECTED (ug/L)			
Naphthalene	*	*	< 10.00
m & p-Cresol(s)	*	*	< 10.00
TOTAL ORGANIC LEAD (mg/L)			
Total Organic Lead	< .020	.009	*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		MW-11		MW-11		MW-11
DATE SAMPLED		11-11-87		2-23-88		10-12-88
INORGANIC PARAMETERS (mg/L except as noted)						
Calcium (Ca)		138.0		186.0		*
Magnesium (Mg)		21.0		28.0		*
Sodium (Na)		234.0		263.0		*
Potassium (K)	<	5.0	<	5.0		*
Iron (Fe)	<	.05	<	.05		*
Manganese (Mn)		*		1.000		*
Ammonia (as N)	<	.1	<	.1		*
Chloride (Cl)		45.0		184.0		*
Sulfate (SO4)		592.		615.		*
Fluoride (F)		.5		.5		*
Nitrate and Nitrite (as N)	<	.1	<	.1		*
Total Alkalinity		267.0		242.0		*
Bicarbonate Alkalinity		267.0		242.0		*
Carbonate Alkalinity	<	5.0		*		*
Bicarbonate (HCO3)		325.5		295.1		*
Carbonate (CO3)	<	3.0		*		*
FIELD AND LABORATORY MEASUREMENTS						
Temperature (Degrees C)		14.5		*		19.4
Field pH		7.85		7.80		6.94
Lab pH (units)		7.80		7.62		*
Field Conductivity (umhos/cm		1050.0		2050.0		2600.0
Lab Conductivity (umhos/cm)		1720.0		2120.0		*
Total Dissolved Solids(mg/l)		1250.0		1470.0		*
VOLATILE ORGANICS DETECTED (ug/L)						
Benzene		.81		25.00	<	.50
Ethylbenzene	<	.50	<	.50	<	.50
Toluene	<	.50	<	.50	<	.50
m-Xylene	<	.50	<	.50		*
o,p-Xylene	<	.50	<	.50		*
Total Xylene		*		*	<	.50
1,2 Dichloroethane		1.00		4.60	<	1.00
SEMIVOLATILE ORGANICS DETECTED (ug/L)						
Naphthalene		*		*	<	10.00
m & p-Cresol(s)		*		*	<	10.00
TOTAL ORGANIC LEAD (mg/L)						
Total Organic Lead		.007	<	.004		*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	MW-12	MW-12	MW-12
DATE SAMPLED	11-27-87	2-23-88	10-12-88
INORGANIC PARAMETERS (mg/L except as noted)			
Calcium (Ca)	148.0	133.0	*
Magnesium (Mg)	42.0	39.0	*
Sodium (Na)	222.0	239.0	*
Potassium (K)	< 5.0	< 5.0	*
Iron (Fe)	.13	.09	*
Manganese (Mn)	*	3.600	*
Ammonia (as N)	< .1	< .1	*
Chloride (Cl)	321.0	360.0	*
Sulfate (SO4)	16.	9.	*
Fluoride (F)	.3	.3	*
Nitrate and Nitrite (as N)	< .1	< .1	*
Total Alkalinity	508.0	541.0	*
Bicarbonate Alkalinity	*	541.0	*
Carbonate Alkalinity	*	*	*
Bicarbonate (HCO3)	*	659.6	*
Carbonate (CO3)	*	*	*
FIELD AND LABORATORY MEASUREMENTS			
Temperature (Degrees C)	17.0	*	23.0
Field pH	6.74	7.25	6.93
Lab pH (units)	6.99	7.05	*
Field Conductivity (umhos/cm	1510.0	2010.0	2100.0
Lab Conductivity (umhos/cm)	1930.0	2070.0	*
Total Dissolved Solids(mg/l)	1200.0	1310.0	*
VOLATILE ORGANICS DETECTED (ug/L)			
Benzene	19000.00	24000.00	6200.00
Ethylbenzene	1300.00	1500.00	180.00
Toluene	2000.00	20000.00	1000.00
m-Xylene	*	*	*
o,p-Xylene	*	*	*
Total Xylene	3000.00	10000.00	470.00
1,2 Dichloroethane	450.00	2400.00	< 200.00
SEMIVOLATILE ORGANICS DETECTED (ug/L)			
Naphthalene	*	*	33.00
m & p-Cresol(s)	*	*	11.00
TOTAL ORGANIC LEAD (mg/L)			
Total Organic Lead	< .020	.060	*

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#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	MW-13	MW-13	MW-13
DATE SAMPLED	11-27-87	2-24-88	10-12-88
INORGANIC PARAMETERS (mg/L except as noted)			
Calcium (Ca)	364.0	219.0	*
Magnesium (Mg)	105.0	47.0	*
Sodium (Na)	666.0	370.0	*
Potassium (K)	24.0	< 5.0	*
Iron (Fe)	.39	.12	*
Manganese (Mn)	*	1.900	*
Ammonia (as N)	.5	.5	*
Chloride (Cl)	257.0	82.0	*
Sulfate (SO4)	1980.	920.	*
Fluoride (F)	1.0	.8	*
Nitrate and Nitrite (as N)	.3	< .1	*
Total Alkalinity	419.0	581.0	*
Bicarbonate Alkalinity	*	581.0	*
Carbonate Alkalinity	*	*	*
Bicarbonate (HCO3)	*	708.4	*
Carbonate (CO3)	*	*	*
FIELD AND LABORATORY MEASUREMENTS			
Temperature (Degrees C)	8.1	*	18.3
Field pH	8.14	8.36	7.51
Lab pH (units)	7.89	8.11	*
Field Conductivity (umhos/cm	2300.0	2600.0	4350.0
Lab Conductivity (umhos/cm)	4300.0	2650.0	*
Total Dissolved Solids(mg/l)	3700.0	1850.0	*
VOLATILE ORGANICS DETECTED (ug/L)			
Benzene	< .50	< .50	< .50
Ethylbenzene	.54	< .50	< .50
Toluene	< .50	< .50	< .50
m-Xylene	1.40	1.10	*
o,p-Xylene	.83	.58	*
Total Xylene	*	*	< .50
1,2 Dichloroethane	< 1.00	1.90	1.90
SEMIVOLATILE ORGANICS DETECTED (ug/L)			
Naphthalene	*	*	< 10.00
m & p-Cresol(s)	*	*	< 10.00
TOTAL ORGANIC LEAD (mg/L)			
Total Organic Lead	< .010	< .004	*

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*: Parameter value not determined.
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#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		MW-1 DUP		MW-11 DUP		MW-6 DUP
DATE SAMPLED		11-11-87		2-23-88		10-12-88
INORGANIC PARAMETERS (mg/L except as noted)						
Calcium (Ca)		44.0		182.0		*
Magnesium (Mg)		6.2		28.0		*
Sodium (Na)		43.0		277.0		*
Potassium (K)	<	5.0	<	5.0		*
Iron (Fe)	<	.05		.19		*
Manganese (Mn)		*		1.200		*
Ammonia (as N)	<	.1	<	.1		*
Chloride (Cl)		25.0		171.0		*
Sulfate (SO4)		178.		615.		*
Fluoride (F)		.4		.5		*
Nitrate and Nitrite (as N)		.2	<	.1		*
Total Alkalinity		16.8		254.0		*
Bicarbonate Alkalinity		*		254.0		*
Carbonate Alkalinity		15.0		*		*
Bicarbonate (HCO3)		*		309.7		*
Carbonate (CO3)		9.0		*		*
FIELD AND LABORATORY MEASUREMENTS						
Temperature (Degrees C)		*		*		18.0
Field pH		*		*		*
Lab pH (units)		9.01		7.64		*
Field Conductivity (umhos/cm		*		*		2225.0
Lab Conductivity (umhos/cm)		488.0		2130.0		*
Total Dissolved Solids(mg/l)		360.0		1470.0		*
VOLATILE ORGANICS DETECTED (ug/L)						
Benzene	<	.50		3.80	<	.50
Ethylbenzene	<	.50	<	.50	<	.50
Toluene	<	.50	<	.50		.50
Total Xylene		*		*	<	.50
1,2 Dichloroethane	<	1.00		3.60		5.80
SEMIVOLATILE ORGANICS DETECTED (ug/L)						
Naphthalene		*		*	<	10.00
m & p-Cresol(s)		*		*	<	10.00
TOTAL ORGANIC LEAD (mg/L)						
Total Organic Lead	<	.020		.003		*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		EQBLK		EQBLK		EQBLK
DATE SAMPLED		11-23-87		2-23-88		10-12-88
INORGANIC PARAMETERS (mg/L except as noted)						
Calcium (Ca)		5.5		3.6		*
Magnesium (Mg)		.5		.6		*
Sodium (Na)		2.5		5.6		*
Potassium (K)	<	5.0	<	5.0		*
Iron (Fe)	<	.05	<	.05		*
Manganese (Mn)		*		.021		*
Ammonia (as N)	<	.0	<	.1		*
Chloride (Cl)	<	3.0	<	3.0		*
Sulfate (SO4)	<	5.	<	5.		*
Fluoride (F)	<	.1	<	.1		*
Nitrate and Nitrite (as N)	<	.0	<	.1		*
Total Alkalinity	<	5.0	<	5.0		*
Bicarbonate Alkalinity		*	<	5.0		*
Carbonate Alkalinity		*		*		*
Bicarbonate (HCO3)		*	<	6.1		*
Carbonate (CO3)		*		*		*
FIELD AND LABORATORY MEASUREMENTS						
Temperature (Degrees C)		*		*		*
Field pH		*		*		*
Lab pH (units)		5.17		5.14		*
Field Conductivity (umhos/cm		*		*		*
Lab Conductivity (umhos/cm)		2.0		2.0		*
Total Dissolved Solids(mg/l)	<	10.0	<	10.0		*
VOLATILE ORGANICS DETECTED (ug/L)						
Benzene	<	.50	<	.50	<	.50
Ethylbenzene	<	.50	<	.50	<	.50
Toluene	<	.50	<	.50	<	.50
Total Xylene		*		*	<	.50
1,2 Dichloroethane	<	.50	<	1.00	<	1.00
SEMIVOLATILE ORGANICS DETECTED (ug/L)						
Naphthalene		*		*	<	10.00
m & p-Cresol(s)		*		*	<	10.00
TOTAL ORGANIC LEAD (mg/L)						
Total Organic Lead	<	.020		.002		*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 15)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	W-1	W-1
DATE SAMPLED	11-20-87	2-23-88
INORGANIC PARAMETERS (mg/L except as noted)		
Calcium (Ca)	25.0	15.0
Magnesium (Mg)	3.8	2.6
Sodium (Na)	1020.0	696.0
Potassium (K)	< 5.0	< 5.0
Iron (Fe)	< .10	< .05
Manganese (Mn)	*	.021
Ammonia (as N)	.3	< .1
Chloride (Cl)	1170.0	527.0
Sulfate (SO4)	433.	610.
Fluoride (F)	1.0	1.2
Nitrate and Nitrite (as N)	< .1	< .1
Total Alkalinity	221.0	289.0
Bicarbonate Alkalinity	221.0	289.0
Carbonate Alkalinity	*	*
Bicarbonate (HCO3)	269.5	352.4
Carbonate (CO3)	*	*
FIELD AND LABORATORY MEASUREMENTS		
Temperature (Degrees C)	14.3	*
Field pH	7.96	8.63
Lab pH (units)	8.38	8.39
Field Conductivity (umhos/cm	3500.0	3400.0
Lab Conductivity (umhos/cm)	4520.0	3360.0
Total Dissolved Solids(mg/l)	2300.0	2140.0
VOLATILE ORGANICS DETECTED (ug/L)		
Benzene	< .50	< .50
Ethylbenzene	< .89	< .50
Toluene	< .50	< .50
m-Xylene	< .50	< .50
o,p-Xylene	< .50	< .50
Total Xylene	*	*
1,2 Dichloroethane	< 1.00	< 1.00
TOTAL ORGANIC LEAD (mg/L)		
Total Organic Lead	< .020	< .002

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 16)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		W-2		W-2
DATE SAMPLED		11-23-87		2-24-88
INORGANIC PARAMETERS (mg/L except as noted)				
Calcium (Ca)		42.0		28.0
Magnesium (Mg)		28.0		26.0
Sodium (Na)		147.0		126.0
Potassium (K)		13.0		7.0
Iron (Fe)		.31	<	.05
Manganese (Mn)		*		.032
Ammonia (as N)		.9		.7
Chloride (Cl)		43.0		37.0
Sulfate (SO4)		114.		97.
Fluoride (F)		.4		.2
Nitrate and Nitrite (as N)	<	.1	<	.1
Total Alkalinity		368.0		297.0
Bicarbonate Alkalinity		368.0		297.0
Carbonate Alkalinity		*		*
Bicarbonate (HCO3)		448.7		362.1
Carbonate (CO3)		*		*
FIELD AND LABORATORY MEASUREMENTS				
Temperature (Degrees C)		12.9		*
Field pH		8.06		8.55
Lab pH (units)		8.24		8.25
Field Conductivity (umhos/cm		700.0		840.0
Lab Conductivity (umhos/cm)		895.0		845.0
Total Dissolved Solids(mg/l)		600.0		640.0
VOLATILE ORGANICS DETECTED (ug/L)				
Benzene		1.00	<	.50
Ethylbenzene	<	.50	<	.50
Toluene	<	.50	<	.50
m-Xylene	<	.50	<	.50
o,p-Xylene	<	.50	<	.50
Total Xylene		*		*
1,2 Dichloroethane	<	1.00	<	1.00
TOTAL ORGANIC LEAD (mg/L)				
Total Organic Lead	<	.010	<	.002

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 17)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	W-3		W-3
DATE SAMPLED	11-27-87		2-23-88
INORGANIC PARAMETERS (mg/L except as noted)			
Calcium (Ca)	*		103.0
Magnesium (Mg)	*		22.0
Sodium (Na)	*		207.0
Potassium (K)	*		6.0
Iron (Fe)	*	<	.05
Manganese (Mn)	*		.280
Ammonia (as N)	*		9.8
Chloride (Cl)	*		50.0
Sulfate (SO4)	*		387.
Fluoride (F)	*		.4
Nitrate and Nitrite (as N)	*		1.1
Total Alkalinity	*		363.0
Bicarbonate Alkalinity	*		363.0
Carbonate Alkalinity	*		*
Bicarbonate (HCO3)	*		442.6
Carbonate (CO3)	*		*
FIELD AND LABORATORY MEASUREMENTS			
Temperature (Degrees C)	*		*
Field pH	*		7.72
Lab pH (units)	*		7.81
Field Conductivity (umhos/cm	*		1500.0
Lab Conductivity (umhos/cm)	*		1550.0
Total Dissolved Solids(mg/l)	*		960.0
VOLATILE ORGANICS DETECTED (ug/L)			
Benzene	< .50	<	.50
Ethylbenzene	1.30	<	.50
Toluene	< .50	<	.50
m-Xylene	2.60	<	.50
o,p-Xylene	3.20	<	.50
Total Xylene	*		*
1,2 Dichloroethane	< 1.00		30.00+
TOTAL ORGANIC LEAD (mg/L)			
Total Organic Lead	*		.002

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 18)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		SW-1	SW-1
DATE SAMPLED		11-10-87	0- 0- 0
INORGANIC PARAMETERS (mg/L except as noted)			
Calcium (Ca)		86.0	*
Magnesium (Mg)		13.0	*
Sodium (Na)		29.0	*
Potassium (K)	<	5.0	*
Iron (Fe)	<	.05	*
Manganese (Mn)		*	*
Ammonia (as N)	<	.1	*
Chloride (Cl)		16.0	*
Sulfate (SO4)		136.	*
Fluoride (F)		.3	*
Nitrate and Nitrite (as N)		.3	*
Total Alkalinity		159.0	*
Bicarbonate Alkalinity		159.0	*
Carbonate Alkalinity	<	5.0	*
Bicarbonate (HCO3)		193.9	*
Carbonate (CO3)	<	3.0	*
FIELD AND LABORATORY MEASUREMENTS			
Temperature (Degrees C)		6.5	*
Field pH		8.50	*
Lab pH (units)		8.12	*
Field Conductivity (umhos/cm		280.0	*
Lab Conductivity (umhos/cm)		581.0	*
Total Dissolved Solids(mg/l)		400.0	*
VOLATILE ORGANICS DETECTED (ug/L)			
Benzene	<	.50	*
Ethylbenzene	<	.50	*
Toluene	<	.50	*
m-Xylene	<	.50	*
o,p-Xylene	<	.50	*
Total Xylene		*	*
1,2 Dichloroethane	<	1.00	*
TOTAL ORGANIC LEAD (mg/L)			
Total Organic Lead	<	.002	*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 19)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		SW-2		SW-2
DATE SAMPLED		11-10-87		2-24-88
INORGANIC PARAMETERS (mg/L except as noted)				
Calcium (Ca)		162.0		147.0
Magnesium (Mg)		26.0		25.0
Sodium (Na)		159.0		190.0
Potassium (K)	<	5.0	<	5.0
Iron (Fe)	<	.05	<	.05
Manganese (Mn)		*		.550
Ammonia (as N)	<	.1		.2
Chloride (Cl)		49.0		50.0
Sulfate (SO4)		476.		550.
Fluoride (F)		.4		.5
Nitrate and Nitrite (as N)		1.5		.7
Total Alkalinity		277.0		274.0
Bicarbonate Alkalinity		277.0		274.0
Carbonate Alkalinity	<	5.0		*
Bicarbonate (HCO3)		337.7		334.1
Carbonate (CO3)	<	3.0		*
FIELD AND LABORATORY MEASUREMENTS				
Temperature (Degrees C)		10.0		*
Field pH		7.60		7.41
Lab pH (units)		7.64		7.82
Field Conductivity (umhos/cm		1080.0		1800.0
Lab Conductivity (umhos/cm)		1480.0		1680.0
Total Dissolved Solids(mg/l)		1120.0		1210.0
VOLATILE ORGANICS DETECTED (ug/L)				
Benzene	<	.50	<	.50
Ethylbenzene	<	.50	<	.50
Toluene	<	.50	<	.50
m-Xylene	<	.50	<	.50
o,p-Xylene		1.60	<	.50
Total Xylene		*		*
1,2 Dichloroethane		1.10	<	1.00
TOTAL ORGANIC LEAD (mg/L)				
Total Organic Lead	<	.002		.002

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 20)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		SW-3		SW-3
DATE SAMPLED		11-10-87		2-24-88
INORGANIC PARAMETERS (mg/L except as noted)				
Calcium (Ca)		178.0		146.0
Magnesium (Mg)		32.0		26.0
Sodium (Na)		223.0		205.0
Potassium (K)	<	5.0	<	5.0
Iron (Fe)		.06		.13
Manganese (Mn)		*		.160
Ammonia (as N)	<	.1	<	.1
Chloride (Cl)		77.0		52.0
Sulfate (SO4)		602.		550.
Fluoride (F)		.6		.5
Nitrate and Nitrite (as N)		1.0		.5
Total Alkalinity		297.0		253.0
Bicarbonate Alkalinity		297.0		253.0
Carbonate Alkalinity	<	5.0		*
Bicarbonate (HCO3)		362.1		308.5
Carbonate (CO3)	<	3.0		*
FIELD AND LABORATORY MEASUREMENTS				
Temperature (Degrees C)		6.8		*
Field pH		8.05		8.16
Lab pH (units)		8.00		8.19
Field Conductivity (umhos/cm		1210.0		1620.0
Lab Conductivity (umhos/cm)		1830.0		1650.0
Total Dissolved Solids(mg/l)		1400.0		1200.0
VOLATILE ORGANICS DETECTED (ug/L)				
Benzene	<	.50	<	.50
Ethylbenzene	<	.50	<	.50
Toluene	<	.50	<	.50
m-Xylene	<	.50	<	.50
o,p-Xylene	<	.50	<	.50
Total Xylene		*		*
1,2 Dichloroethane	<	1.00	<	1.00
TOTAL ORGANIC LEAD (mg/L)				
Total Organic Lead	<	.010	<	.004

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 21)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION		SW-4	SW-4
DATE SAMPLED		11-10-87	0- 0- 0
INORGANIC PARAMETERS (mg/L except as noted)			
Calcium (Ca)		113.0	*
Magnesium (Mg)		17.0	*
Sodium (Na)		40.0	*
Potassium (K)	<	5.0	*
Iron (Fe)		.12	*
Manganese (Mn)		*	*
Ammonia (as N)	<	.0	*
Chloride (Cl)		29.0	*
Sulfate (SO4)		147.	*
Fluoride (F)		.3	*
Nitrate and Nitrite (as N)	<	.1	*
Total Alkalinity		253.0	*
Bicarbonate Alkalinity		253.0	*
Carbonate Alkalinity	<	5.0	*
Bicarbonate (HCO3)		308.5	*
Carbonate (CO3)	<	3.0	*
FIELD AND LABORATORY MEASUREMENTS			
Temperature (Degrees C)		7.8	*
Field pH		7.28	*
Lab pH (units)		7.29	*
Field Conductivity (umhos/cm		565.0	*
Lab Conductivity (umhos/cm)		790.0	*
Total Dissolved Solids(mg/l)		790.0	*
VOLATILE ORGANICS DETECTED (ug/L)			
Benzene		*	*
Ethylbenzene		*	*
Toluene		*	*
m-Xylene		*	*
o,p-Xylene		*	*
Total Xylene		*	*
1,2 Dichloroethane		10.00	*
TOTAL ORGANIC LEAD (mg/L)			
Total Organic Lead		.300	*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 22)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	SW-5	SW-5
DATE SAMPLED	11-10-87	0- 0- 0
INORGANIC PARAMETERS (mg/L except as noted)		
Calcium (Ca)	*	*
Magnesium (Mg)	*	*
Sodium (Na)	*	*
Potassium (K)	*	*
Iron (Fe)	*	*
Manganese (Mn)	*	*
Ammonia (as N)	*	*
Chloride (Cl)	*	*
Sulfate (SO4)	*	*
Fluoride (F)	*	*
Nitrate and Nitrite (as N)	*	*
Total Alkalinity	*	*
Bicarbonate Alkalinity	*	*
Carbonate Alkalinity	*	*
Bicarbonate (HCO3)	*	*
Carbonate (CO3)	*	*
FIELD AND LABORATORY MEASUREMENTS		
Temperature (Degrees C)	*	*
Field pH	*	*
Lab pH (units)	*	*
Field Conductivity (umhos/cm	*	*
Lab Conductivity (umhos/cm)	*	*
Total Dissolved Solids(mg/l)	*	*
VOLATILE ORGANICS DETECTED (ug/L)		
Benzene	< 250.00	*
Ethylbenzene	2500.00	*
Toluene	470.00	*
m-Xylene	*	*
o,p-Xylene	*	*
Total Xylene	*	*
1,2 Dichloroethane	< 250.00	*
TOTAL ORGANIC LEAD (mg/L)		
Total Organic Lead	*	*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 23)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	SW-6	SW-6
DATE SAMPLED	11-10-87	2-24-88
INORGANIC PARAMETERS (mg/L except as noted)		
Calcium (Ca)	*	*
Magnesium (Mg)	*	*
Sodium (Na)	*	*
Potassium (K)	*	*
Iron (Fe)	*	*
Manganese (Mn)	*	*
Ammonia (as N)	*	*
Chloride (Cl)	*	*
Sulfate (SO4)	*	*
Fluoride (F)	*	*
Nitrate and Nitrite (as N)	*	*
Total Alkalinity	*	*
Bicarbonate Alkalinity	*	*
Carbonate Alkalinity	*	*
Bicarbonate (HCO3)	*	*
Carbonate (CO3)	*	*
FIELD AND LABORATORY MEASUREMENTS		
Temperature (Degrees C)	14.2	*
Field pH	7.28	7.95
Lab pH (units)	*	*
Field Conductivity (umhos/cm	3080.0	3150.0
Lab Conductivity (umhos/cm)	*	*
Total Dissolved Solids(mg/l)	*	*
VOLATILE ORGANICS DETECTED (ug/L)		
Benzene	< .50	< .50
Ethylbenzene	< .50	< .50
Toluene	< .50	< .50
m-Xylene	< .50	< .50
o,p-Xylene	< .50	< .50
Total Xylene	*	*
1,2 Dichloroethane	< .50	< 1.00
TOTAL ORGANIC LEAD (mg/L)		
Total Organic Lead	*	*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 25)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	TB-007	TB-017
DATE SAMPLED	11-23-87	2-23-88
INORGANIC PARAMETERS (mg/L except as noted)		
Calcium (Ca)	*	*
Magnesium (Mg)	*	*
Sodium (Na)	*	*
Potassium (K)	*	*
Iron (Fe)	*	*
Manganese (Mn)	*	*
Ammonia (as N)	*	*
Chloride (Cl)	*	*
Sulfate (SO4)	*	*
Fluoride (F)	*	*
Nitrate and Nitrite (as N)	*	*
Total Alkalinity	*	*
Bicarbonate Alkalinity	*	*
Carbonate Alkalinity	*	*
Bicarbonate (HCO3)	*	*
Carbonate (CO3)	*	*
FIELD AND LABORATORY MEASUREMENTS		
Temperature (Degrees C)	*	*
Field pH	*	*
Lab pH (units)	*	*
Field Conductivity (umhos/cm	*	*
Lab Conductivity (umhos/cm)	*	*
Total Dissolved Solids(mg/l)	*	*
VOLATILE ORGANICS DETECTED (ug/L)		
Benzene	< .50	< .50
Ethylbenzene	< .50	< .50
Toluene	< .50	< .50
m-Xylene	< .50	< .50
o,p-Xylene	< .50	< .50
Total Xylene	*	*
1,2 Dichloroethane	< .50	< 1.00
TOTAL ORGANIC LEAD (mg/L)		
Total Organic Lead	*	*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

TABLE B-2 (Cont. 26)
MAVERIK-KIRTLAND WATER QUALITY

SAMPLE IDENTIFICATION	TB-016	TB-023
DATE SAMPLED	11-11-87	2-24-88
INORGANIC PARAMETERS (mg/L except as noted)		
Calcium (Ca)	*	*
Magnesium (Mg)	*	*
Sodium (Na)	*	*
Potassium (K)	*	*
Iron (Fe)	*	*
Manganese (Mn)	*	*
Ammonia (as N)	*	*
Chloride (Cl)	*	*
Sulfate (SO4)	*	*
Fluoride (F)	*	*
Nitrate and Nitrite (as N)	*	*
Total Alkalinity	*	*
Bicarbonate Alkalinity	*	*
Carbonate Alkalinity	*	*
Bicarbonate (HCO3)	*	*
Carbonate (CO3)	*	*
FIELD AND LABORATORY MEASUREMENTS		
Temperature (Degrees C)	*	*
Field pH	*	*
Lab pH (units)	*	*
Field Conductivity (umhos/cm	*	*
Lab Conductivity (umhos/cm)	*	*
Total Dissolved Solids(mg/l)	*	*
VOLATILE ORGANICS DETECTED (ug/L)		
Benzene	< .50	< .50
Ethylbenzene	< .50	< .50
Toluene	< .50	< .50
m-Xylene	< .50	< .50
o,p-Xylene	< .50	< .50
Total Xylene	*	*
1,2 Dichloroethane	< .50	< 1.00
TOTAL ORGANIC LEAD (mg/L)		
Total Organic Lead	*	*

<: Less than given detection limits.
*: Parameter value not determined.
@: At least one sample used in statistical summary is below detection limit.
#: All samples are below detection limit.
+: Data questionable
DUP: Indicates duplicate sample

T. 29 N., R. 14 W.

SECTION 9 | SECTION 16
SECTION 8 | SECTION 17

COUNTY ROAD 6251
COUNTY ROAD 6257
COUNTY ROAD 6261
COUNTY ROAD 6255
COUNTY ROAD 6259
COUNTY ROAD 6256
COUNTY ROAD 6263
COUNTY ROAD 6271

550
489
HIGHWAY
HIGHWAY
U.S.
NEW MEXICO
SAN JUAN RIVER

MW1 (360) (537)
MW2 (1360) (2000)
MW3 (1626) (1730)
MW4 (1540) (1380)
MW5 (1250) (1190)
MW6 (2130) (2000)
MW7 (1400) (1510)
MW8 (950) (1230)
MW9 (1520) (2160)
MW10 (1240) (2725)
MW11 (1250) (1470)
MW12 (1200) (1310)
MW13 (3700) (1850)
W1 (2300) (2140)
W2 (600) (640)
W3 (960) FARM
SW1 (400)
SW2 (1120) (1210)
SW3 (1400) (1200)
SW4 (790)
SW5
SW6

TANK
WESTSIDE IRRIGATION DITCH
FARMER'S MUTUAL IRRIGATION DITCH
DRAINAGE DITCH
REFINERY
MAVERIK STORE
MARSH

2000
1000
500

R.J. TRAC
ERNEST MCLEMORE
EVERETT GRAY
ROBERT ESHOM
RONALD REFF
PAUL PICKARD
J. LEROY FLACK
RAYMOND HOVEN
JOHN REED
ED L. FARRIS
JOHN GIVENS
GEORGE NELSON
ROBERT H. WALKER
AGNES JACKSON
ROLAND JACKSON
CHARLES GRUBBS
WM. H. WALKER
MELVIN STONE
ETTA MAY JACKSON
VIRGIL LUCERO
VERNON DUANE PILCHER
ROBERT MADRID
W.O. YORK
DONALD HOWELL
CHARLES HILL
OPAL CURLEY
IRENE B. HILL
BLOOMFIELD TRUSTEES % VIRGINIA L. MURRAY
VIRGINIA L. MURRAY
JAY BLOOMFIELD

LEGEND

- PRIVATE WELL LOCATION
- EXISTING WELL LOCATION SAMPLED (W1 – W3)
- MONITORING WELL LOCATION (MW1 – MW13)
- SURFACE WATER SAMPLE SITE LOCATION (SW1 – SW6)
- 1400 / 1200 TDS LEVEL (mg/l), ROUND 1 / ROUND 2
- —500— TDS CONTOUR, ROUND 1
- --500-- TDS CONTOUR, ROUND 2

200 0 200 400
SCALE IN FEET

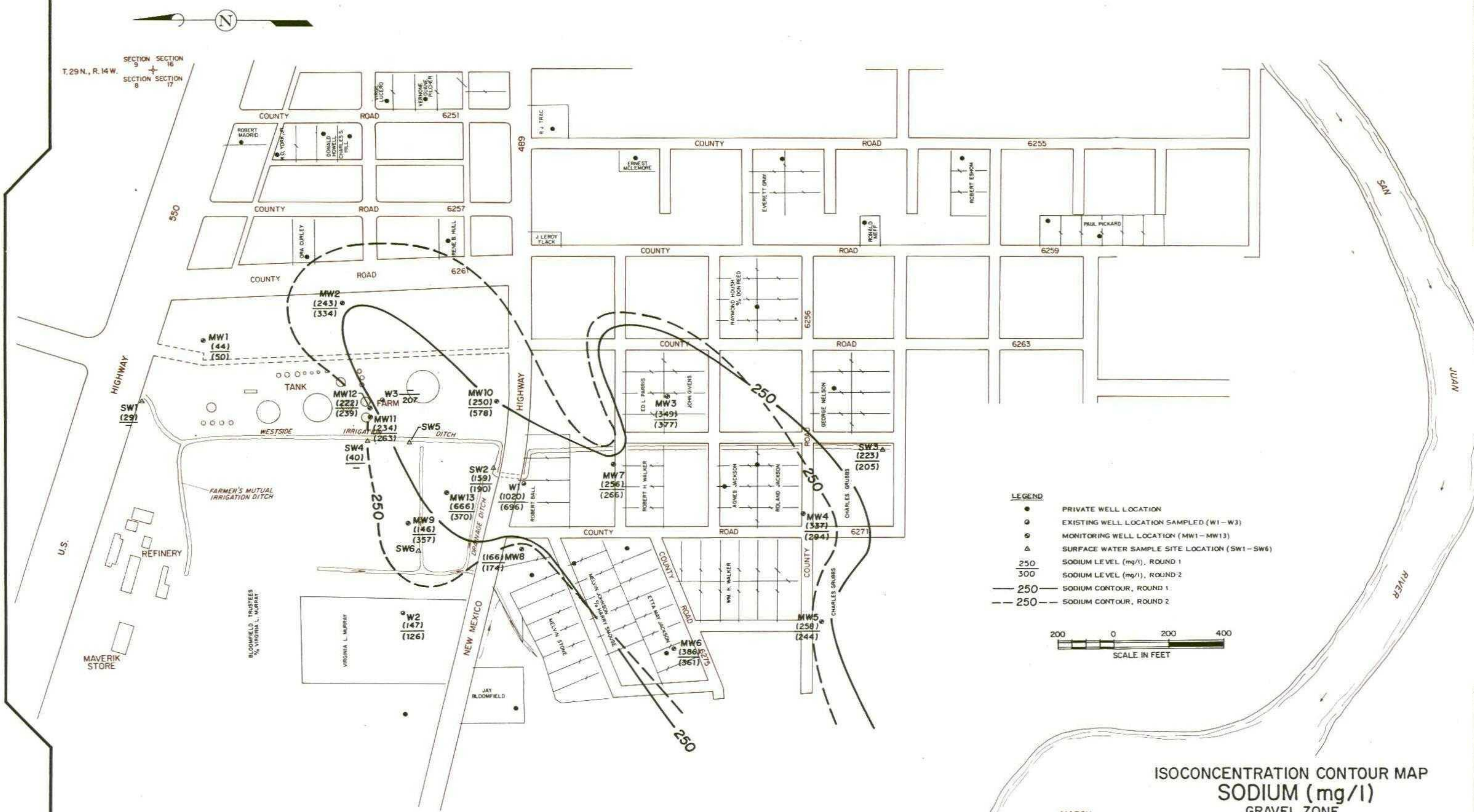
ISOCONCENTRATION CONTOUR MAP
TDS (mg/l)
GRAVEL ZONE
ROUNDS 1 AND 2 ONLY
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988

Dames & Moore

REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2-083-171, SHEET NUMBERS D-3-17-1 AND D-3-17-4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

BY ____ DATE ____
PLATE ____ OF ____
CHECKED BY ____ DATE ____
BY ____ DATE 12-21-87

PLATE B-1

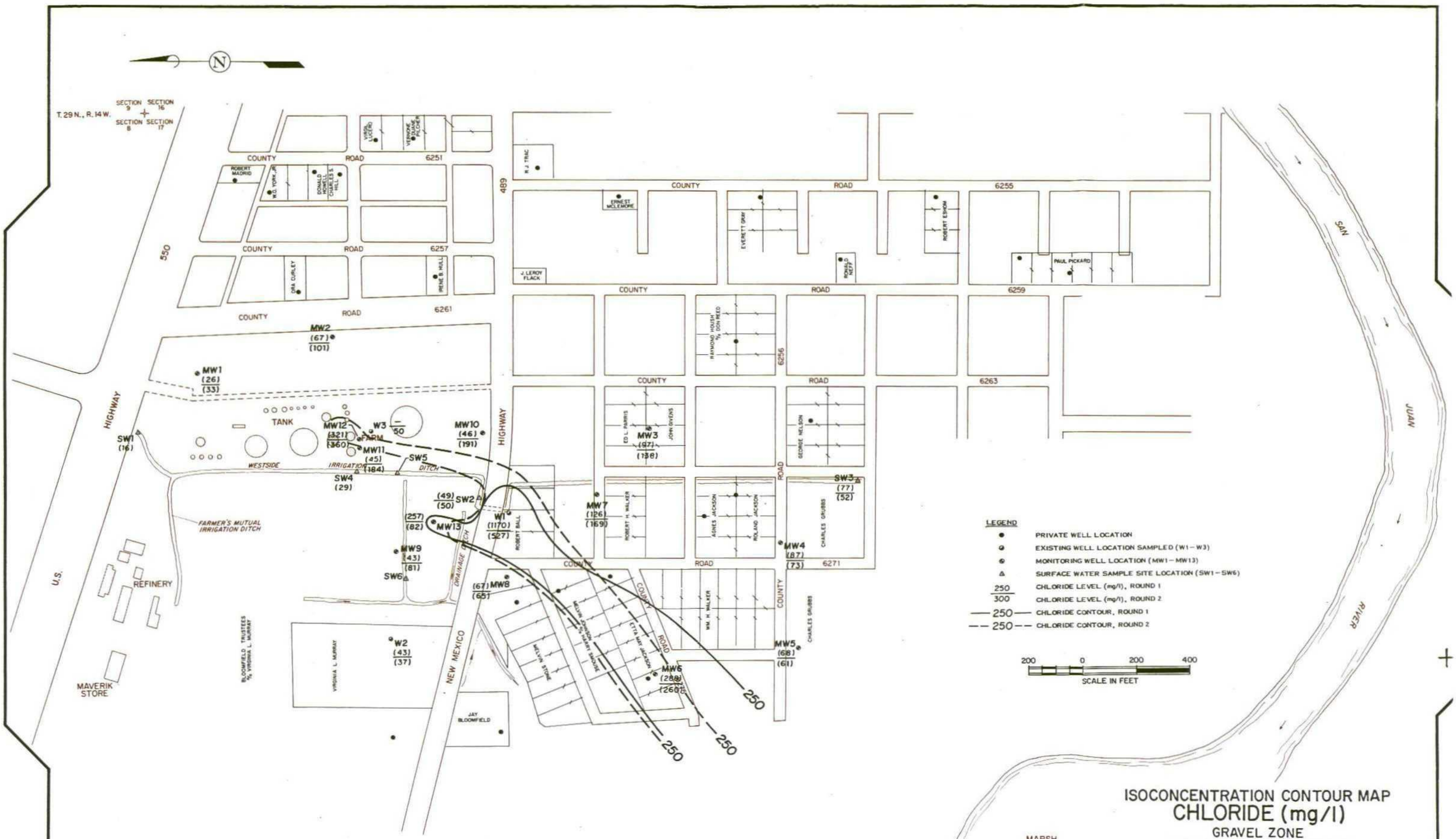


ISOCONCENTRATION CONTOUR MAP
SODIUM (mg/l)
GRAVEL ZONE
ROUNDS 1 AND 2 ONLY
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988

REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

Dames & Moore

PLATE B-2

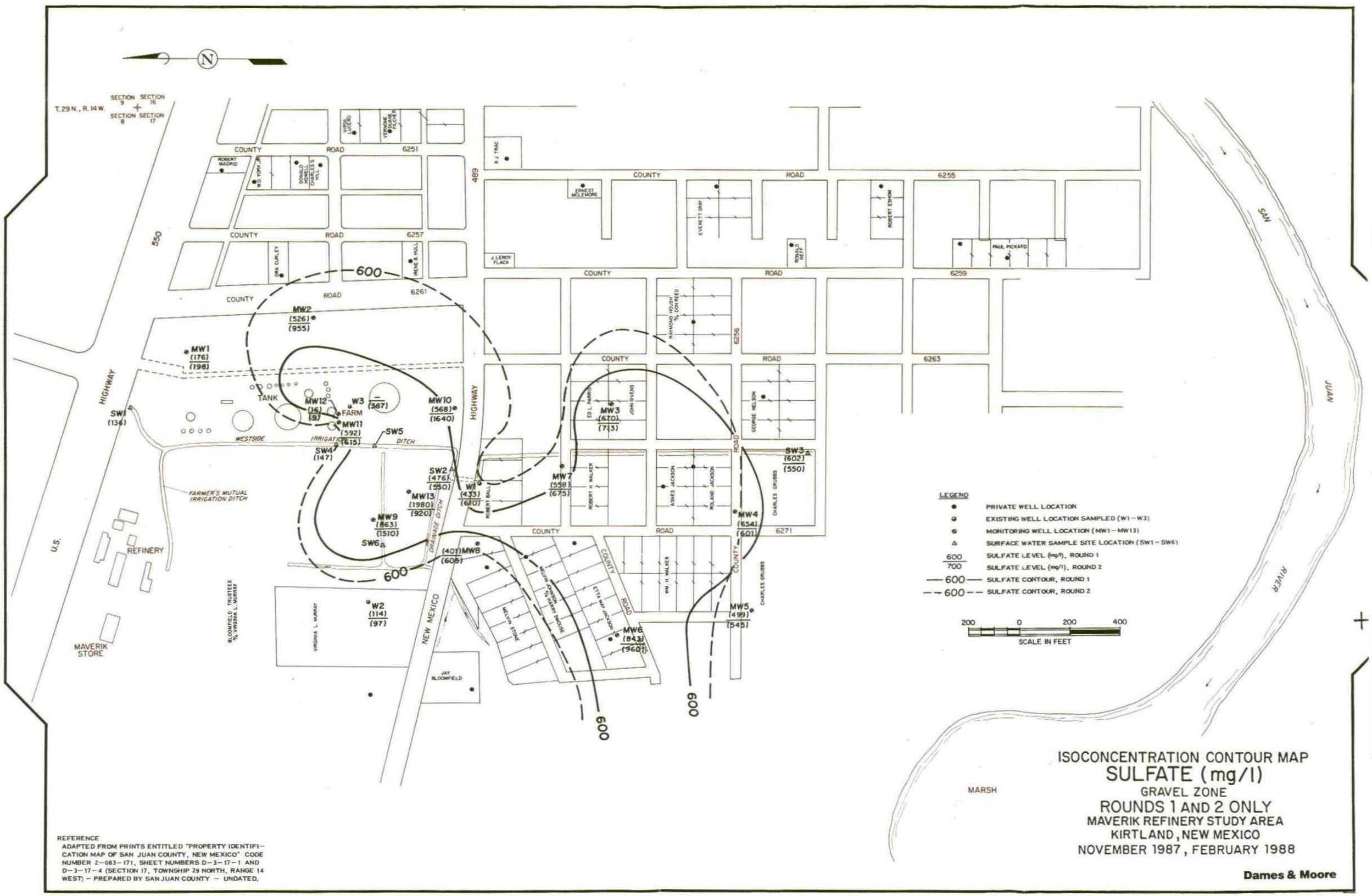


REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2-083-171, SHEET NUMBERS D-3-17-1 AND D-3-17-4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

ISOCONCENTRATION CONTOUR MAP
CHLORIDE (mg/l)
GRAVEL ZONE
ROUNDS 1 AND 2 ONLY
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988

Dames & Moore

PLATE B-3

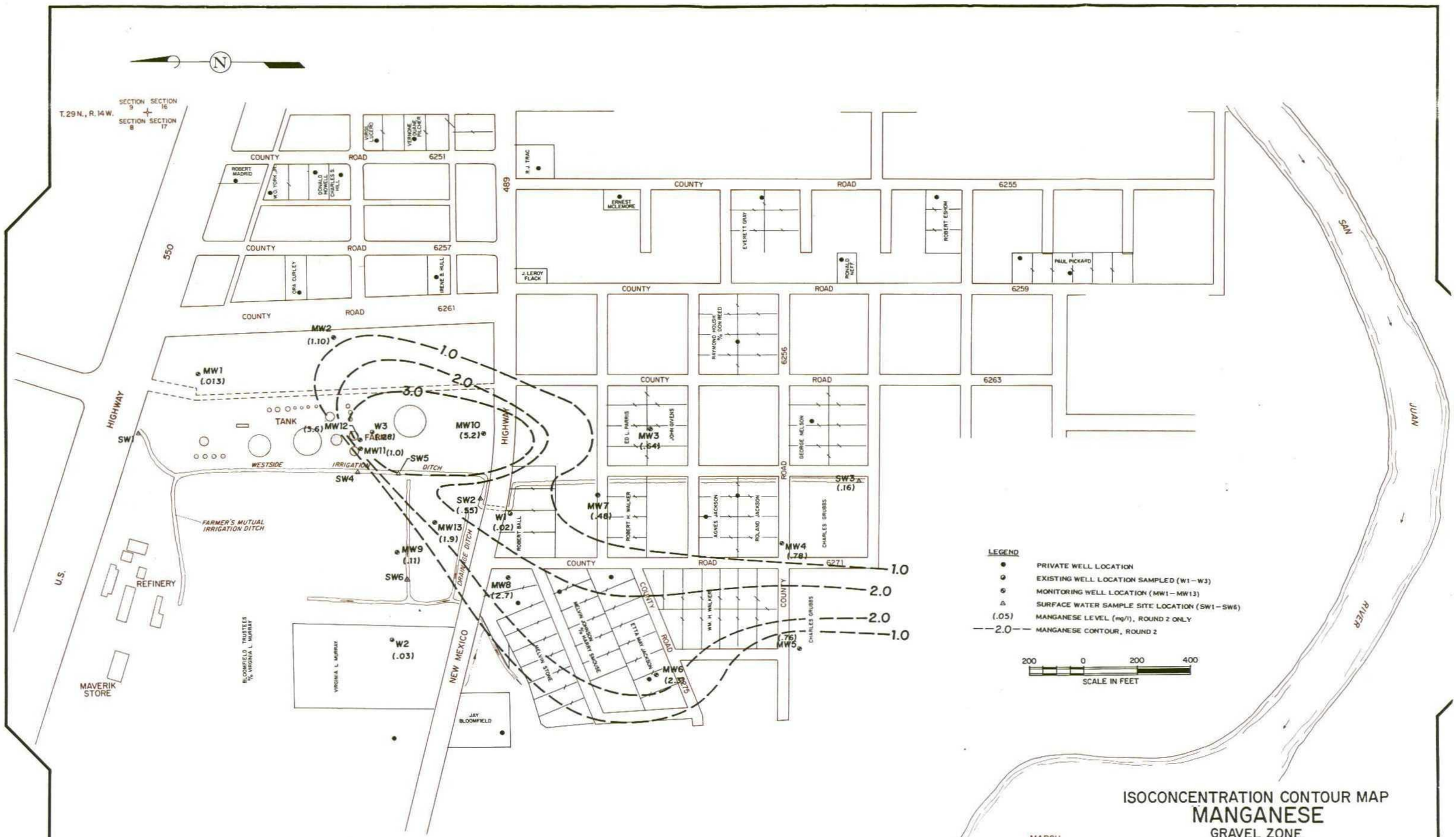


ISOCONCENTRATION CONTOUR MAP
SULFATE (mg/l)
GRAVEL ZONE
ROUNDS 1 AND 2 ONLY
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988

Dames & Moore

REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

PLATE B-4

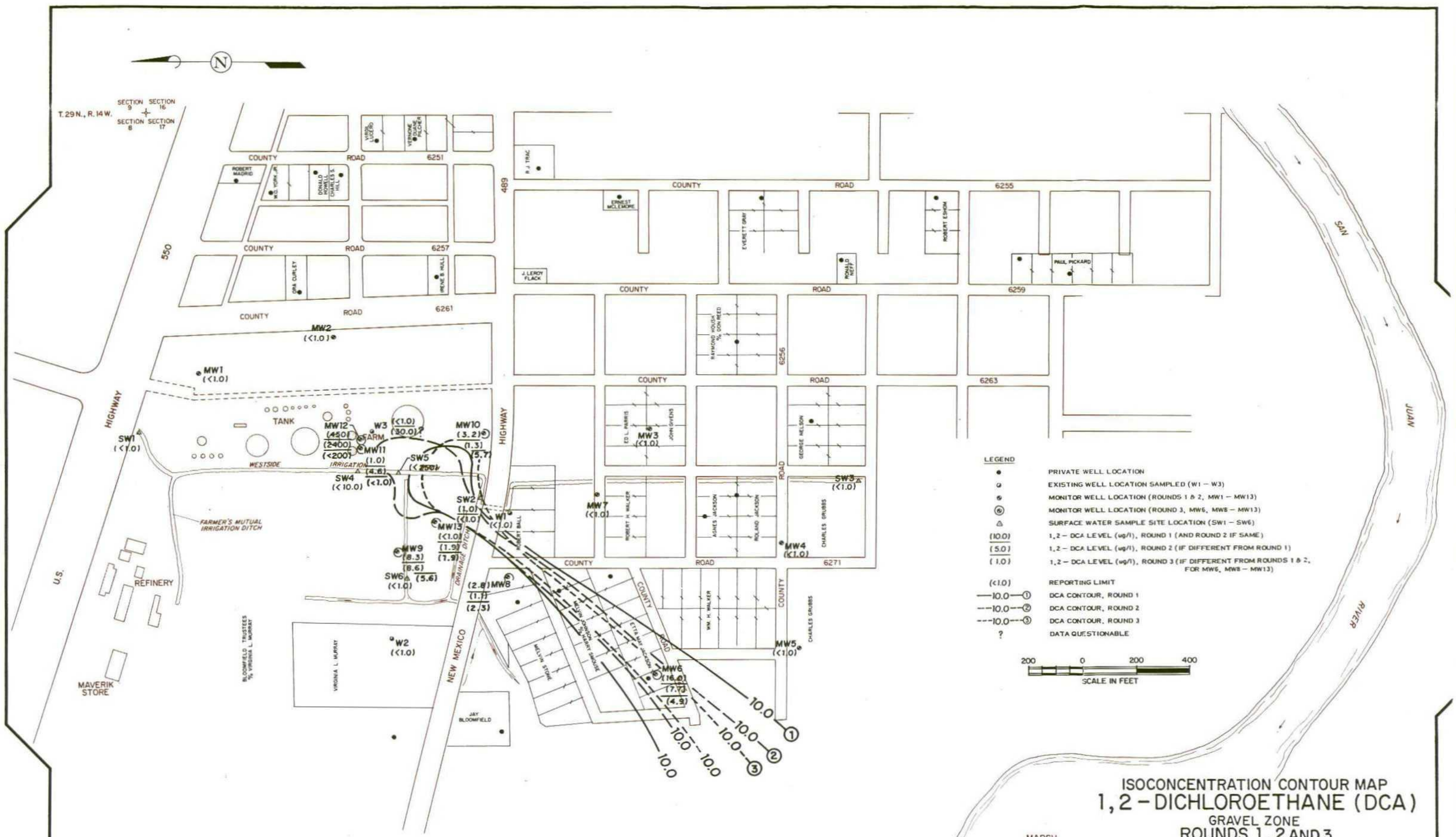


REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

ISOCONCENTRATION CONTOUR MAP
MANGANESE
GRAVEL ZONE
ROUND 2 ONLY
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
FEBRUARY 1988

Dames & Moore

PLATE B-5

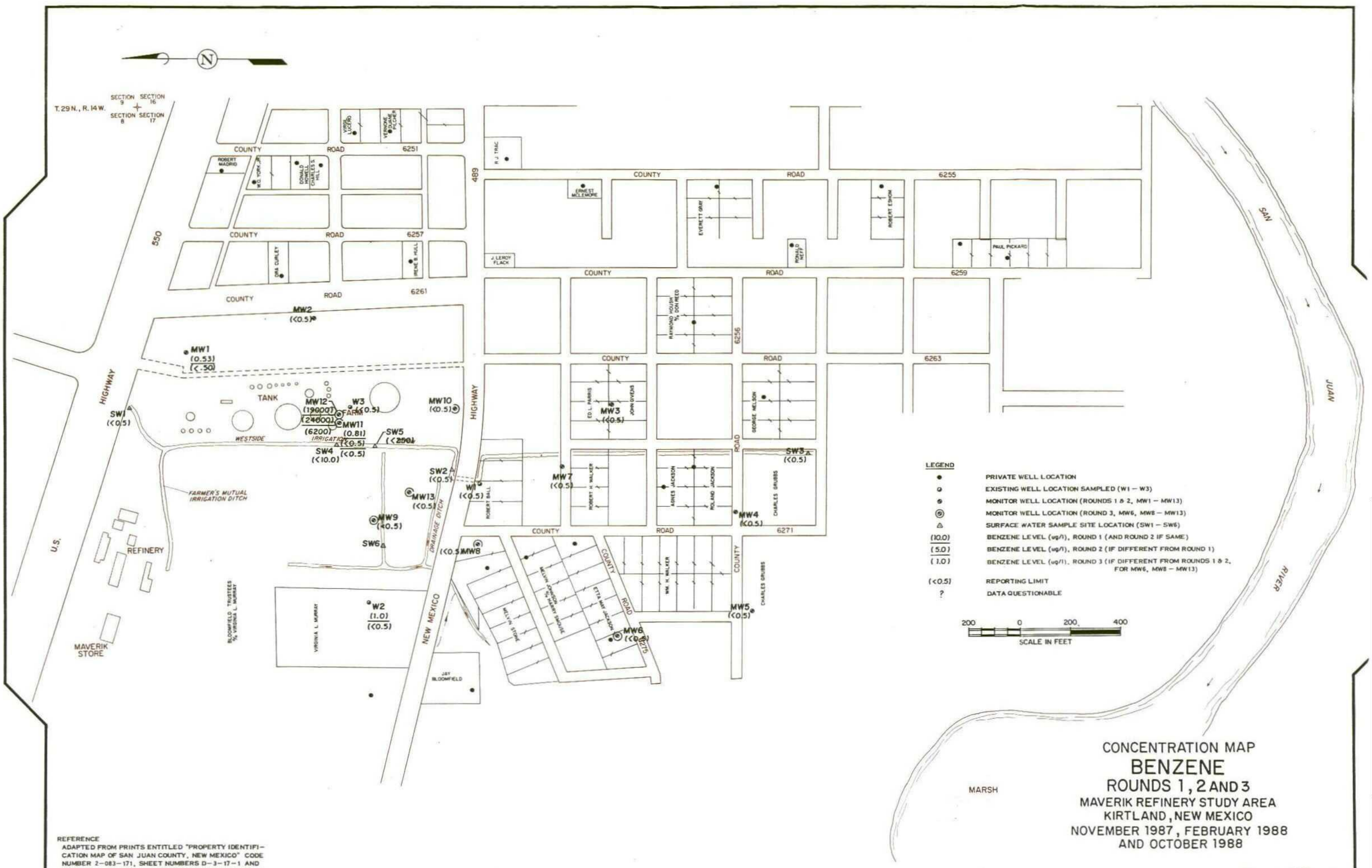


REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2-083-171, SHEET NUMBERS D-3-17-1 AND D-3-17-4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

ISOCONCENTRATION CONTOUR MAP
1,2-DICHLOROETHANE (DCA)
GRAVEL ZONE
ROUNDS 1, 2 AND 3
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988
AND OCTOBER 1988

Dames & Moore

PLATE B-6

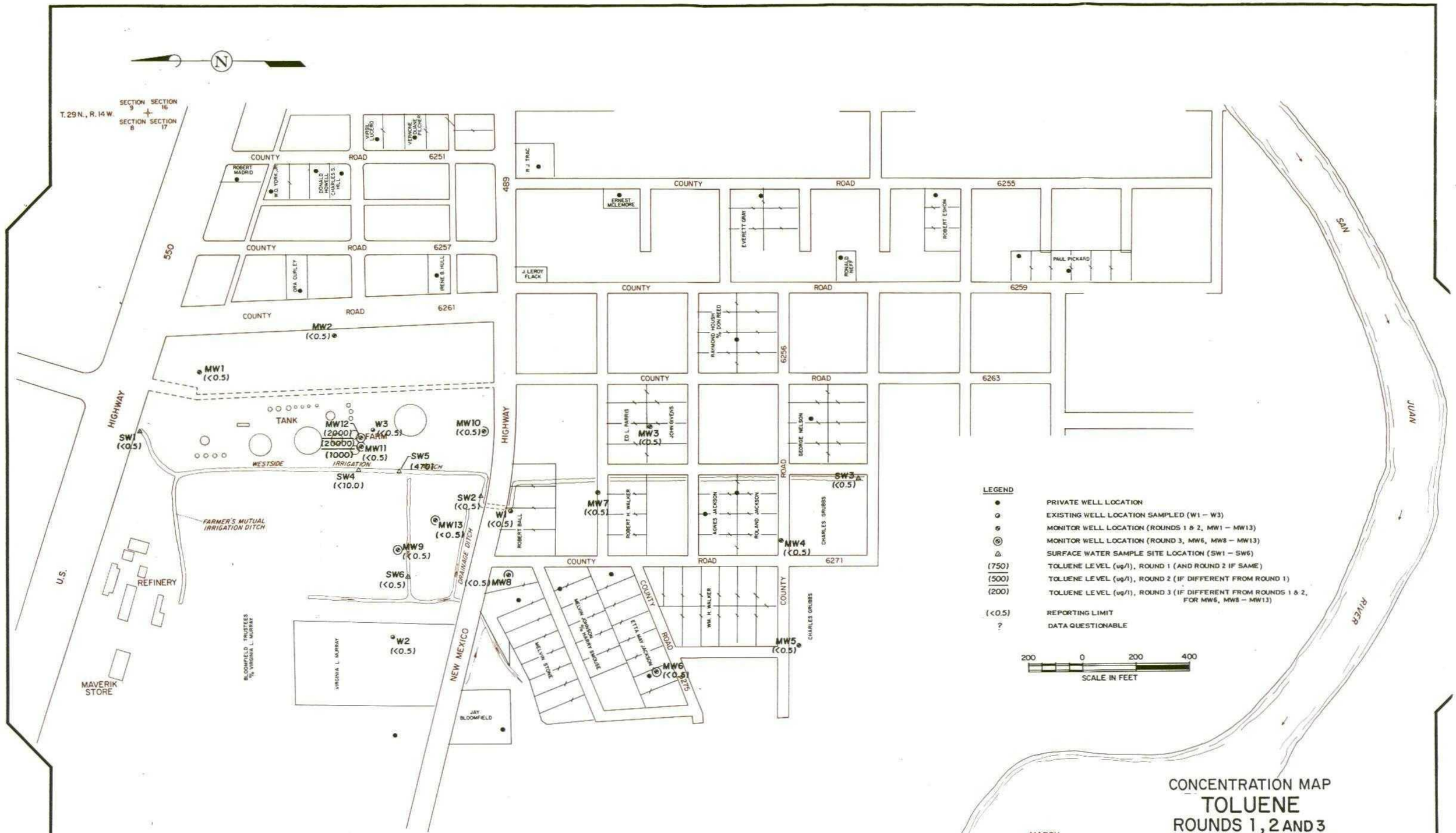


REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2-083-171, SHEET NUMBERS D-3-17-1 AND D-3-17-4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

CONCENTRATION MAP
BENZENE
ROUNDS 1, 2 AND 3
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988
AND OCTOBER 1988

Dames & Moore

PLATE B-7



REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2-083-171, SHEET NUMBERS D-3-17-1 AND D-3-17-4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

CONCENTRATION MAP
TOLUENE
ROUNDS 1, 2 AND 3
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988
AND OCTOBER 1988

Dames & Moore

PLATE B-8

BY _____ DATE _____
PLATE _____ OF _____
CHECKED BY _____ DATE 12-21-87

T. 29 N., R. 14 W.

SECTION 9 | SECTION 16
SECTION 8 | SECTION 17

COUNTY ROAD 6251
COUNTY ROAD 6257
COUNTY ROAD 6261
COUNTY ROAD 6255
COUNTY ROAD 6259
COUNTY ROAD 6256
COUNTY ROAD 6263
COUNTY ROAD 6271

550
489

HIGHWAY
HIGHWAY

U.S.

NEW MEXICO

SAN JUAN RIVER

WESTSIDE IRRIGATION

FARMER'S MUTUAL IRRIGATION DITCH

DRAINAGE DITCH

MW1 (<0.5)
MW2 (<0.5)
MW3 (<0.5)
MW4 (<0.5)
MW5 (<0.5)
MW6 (<0.5)
MW7 (<0.5)
MW8 (<0.5)
MW9 (<0.5)
MW10 (<0.5)
MW11 (<0.5)
MW12 (1300) (1500) (180)
MW13 (0.54) (<.50) (<.50)

W1 (0.89) (<.50) (<.50)
W2
W3 (1.3) (<.50)

SW1
SW2
SW3
SW4 (<10)
SW5 (2500)
SW6

TANK
FARM
REFINERY
MAVERIK STORE
MARSH

R. J. TRAC
ERNEST MCLEMORE
J. LEROY FLACK
EVERETT GRAY
RONALD NEFF
ROBERT ESHOM
PAUL PICKARD
RAYMOND HOUSH % JOHN REED
ED L. PARRIS
JOHN DIVERS
GEORGE NELSON
ROBERT H. WALKER
AGNES JACKSON
ROLAND JACKSON
CHARLES GRUBBS
ROBERT BALL
WM. H. WALKER
MELVIN JOHNSON % HARRY SMOOSE
ETTA MAY JAHNSON
MELVIN STONE
VIRGINIA L. MURRAY
BLOOMFIELD TRUSTEES % VIRGINIA L. MURRAY
JAY BLOOMFIELD
ROBERT MADRID
W.O. YORK JR.
DONALD HOWELL
CHARLES S. HILL
ORA CURLEY
IRENE B. HULL
VIRGIL LUCERO
VERNONE & DUANE PILCHER

LEGEND

- PRIVATE WELL LOCATION
- EXISTING WELL LOCATION SAMPLED (W1 – W3)
- MONITOR WELL LOCATION (ROUNDS 1 & 2, MW1 – MW13)
- MONITOR WELL LOCATION (ROUND 3, MW6, MW8 – MW13)
- SURFACE WATER SAMPLE SITE LOCATION (SW1 – SW6)
- (750) ETHYLBENZENE LEVEL (ug/l), ROUND 1 (AND ROUND 2 IF SAME)
- (500) ETHYLBENZENE LEVEL (ug/l), ROUND 2 (IF DIFFERENT FROM ROUND 1)
- (200) ETHYLBENZENE LEVEL (ug/l), ROUND 3 (IF DIFFERENT FROM ROUNDS 1 & 2, FOR MW6, MW8 – MW13)
- (<0.5) REPORTING LIMIT
- ? DATA QUESTIONABLE

200 0 200 400
SCALE IN FEET

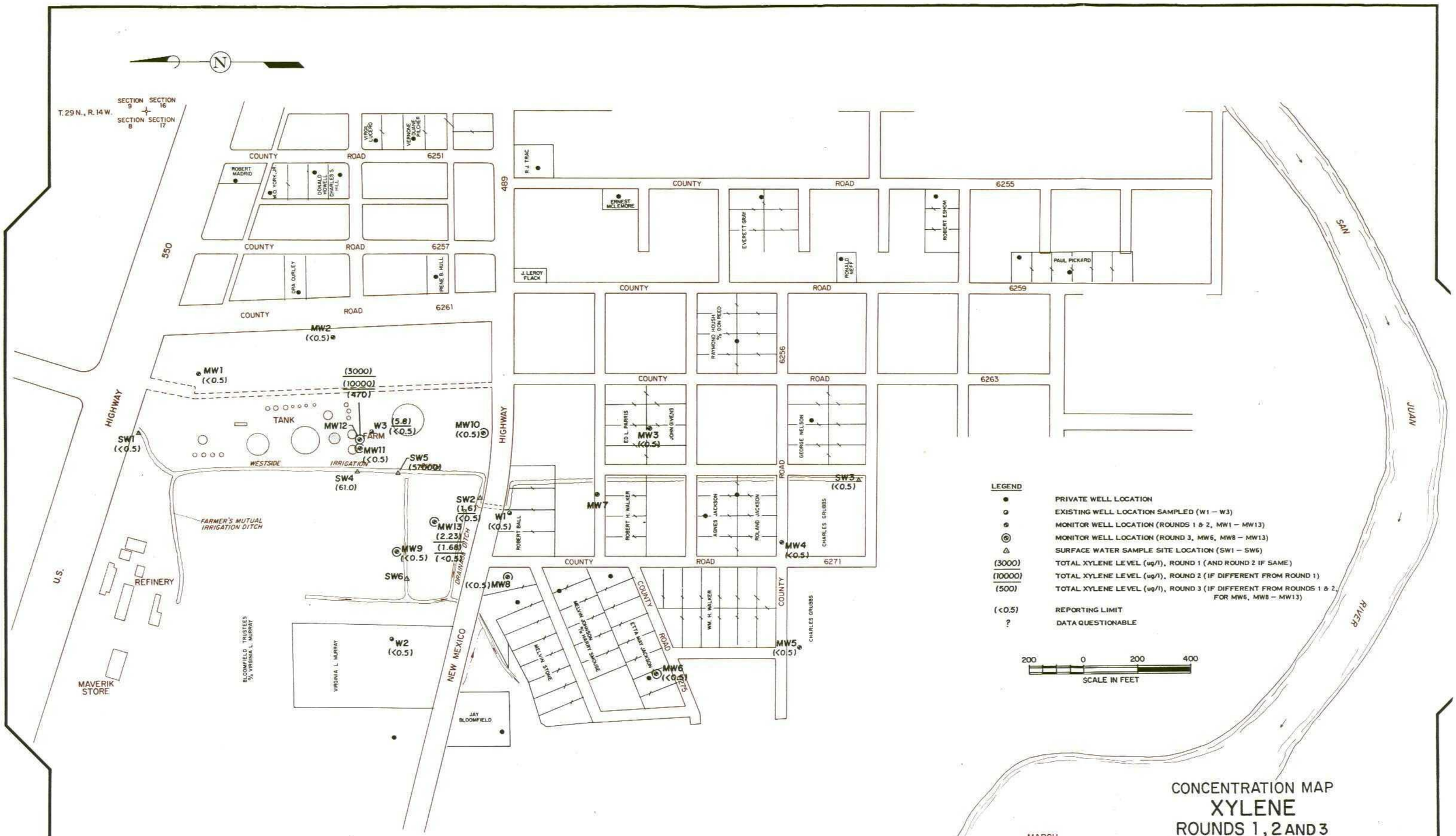
REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2-083-171, SHEET NUMBERS D-3-17-1 AND D-3-17-4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

CONCENTRATION MAP
ETHYLBENZENE
ROUNDS 1, 2 AND 3
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988
AND OCTOBER 1988

Dames & Moore

PLATE B-9

DAT
BY
DATE
PLATE
OF
DATE 12-21-88
BY
CHECKED BY
DATE



REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

CONCENTRATION MAP
XYLENE
ROUNDS 1, 2 AND 3
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
NOVEMBER 1987, FEBRUARY 1988
AND OCTOBER 1988

Dames & Moore

PLATE B-10

Rocky Mountain
Analytical Laboratory

Enseco

November 10, 1988

Peter F. Olsen, PH.D.
Dames and Moore
250 E. Broadway
Suite 200
Salt Lake City, UT 84111

Dear Pete:

Enclosed is the report for eight aqueous samples received at Rocky Mountain Analytical Laboratory on October 13, 1988.

Samples 2044-06 and 08 were originally extracted within holding times. Due to poor recovery of one of the internal standards (D4-1,4-Dichlorobenzene) and two of the surrogate compounds (2-Fluorophenol and D5-Phenol) in the original analysis, a reextraction of these samples was performed. The reextraction took place outside of holding times.

If you have any questions the Client Service Representative assigned to this project is Jeannie B. Howbert.

Sincerely,

Tracy Giberson

Tracy Giberson
Data Control Supervisor

Enclosures

cc: Jeannie B. Howbert, Client Service Rep.

RMAL #002044

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

SAMPLE DESCRIPTION INFORMATION
for
Dames and Moore

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
002044-0001-SA	MW-16 (Duplicate of MS-6)	AQUEOUS	12 OCT 88	15:00	13 OCT 88
002044-0002-SA	MW-6	AQUEOUS	12 OCT 88	14:30	13 OCT 88
002044-0003-SA	MW-8	AQUEOUS	12 OCT 88	15:00	13 OCT 88
002044-0004-SA	MW-13	AQUEOUS	12 OCT 88	16:00	13 OCT 88
002044-0005-SA	MW-10	AQUEOUS	12 OCT 88	10:30	13 OCT 88
002044-0006-SA	MW-12	AQUEOUS	12 OCT 88	12:30	13 OCT 88
002044-0007-SA	MW-11	AQUEOUS	12 OCT 88	12:10	13 OCT 88
002044-0008-SA	FIELD BLANK	AQUEOUS	12 OCT 88	16:30	13 OCT 88

Enseco

Refinery Hazardous Constituent Semivolatiles

Method 625

Client Name: Dames and Moore
Client ID: MW-16
Lab ID: 002044-0001-SA Enseco ID: 1016329
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: 14 OCT 88 Analyzed: 31 OCT 08

Parameter	Result	Wet wt. Units	Reporting Limit
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10
Nitrobenzene-d5	67.0	%	--
2-Fluorobiphenyl	66.9	%	--
Terphenyl-d14	66.5	%	--
Phenol-d5	73.5	%	--
2-Fluorophenol	66.0	%	--
2,4,6-Tribromophenol	61.3	%	--

ND=Not Detected
NA=Not Applicable

Reported By: Martin Koby Approved By: Jeff Lowry

The cover letter is an integral part of this report.
Rev 230787

Enseco

Halogenated Volatile Organics

Method 601

Client Name: Dames and Moore
Client ID: MW-16
Lab ID: 002044-0001-SA Enseco ID: 1016329
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 18 OCT 88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2, 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	5.8	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Aromatic Volatile Organics

Method 602

Client Name: Dames and Moore
Client ID: MW-16
Lab ID: 002044-0001-SA Enseco ID: 1016329
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 18 OCT 88

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Refinery Hazardous Constituent Semivolatiles

Method 625

Client Name: Dames and Moore
Client ID: MW-6
Lab ID: 002044-0002-SA Enseco ID: 1016330
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: 14 OCT 88 Analyzed: 31 OCT 88

Parameter	Result	Wet wt. Units	Reporting Limit
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10
Nitrobenzene-d5	62.9	%	--
2-Fluorobiphenyl	58.7	%	--
Terphenyl-d14	71.9	%	--
Phenol-d5	30.2	%	--
2-Fluorophenol	24.2	%	--
2,4,6-Tribromophenol	25.0	%	--

ND=Not Detected
NA=Not Applicable

Reported By: Martin Koby Approved By: Jeff Lowry

The cover letter is an integral part of this report.
Rev 230787

Enseco

Halogenated Volatile Organics

Method 601

Client Name: Dames and Moore
Client ID: MW-6
Lab ID: 002044-0002-SA Enseco ID: 1016330
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 17 OCT 88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2, 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	4.9	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Aromatic Volatile Organics

Method 602

Client Name: Dames and Moore
Client ID: MW-6
Lab ID: 002044-0002-SA Enseco ID: 1016330
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 17 OCT 88

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Refinery Hazardous Constituent Semivolatiles

Method 625

Client Name: Dames and Moore
Client ID: MW-8
Lab ID: 002044-0003-SA Enseco ID: 1016332
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: 14 OCT 88 Analyzed: 31 OCT 88

Parameter	Result	Wet wt. Units	Reporting Limit
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10
Nitrobenzene-d5	58.1	%	--
2-Fluorobiphenyl	52.2	%	--
Terphenyl-d14	63.9	%	--
Phenol-d5	22.8	%	--
2-Fluorophenol	19.9	%	--
2,4,6-Tribromophenol	22.6	%	--

ND=Not Detected
NA=Not Applicable

Reported By: Martin Koby Approved By: Jeff Lowry

The cover letter is an integral part of this report.
Rev 230787

Enseco

Halogenated Volatile Organics

Method 601

Client Name: Dames and Moore
Client ID: MW-8
Lab ID: 002044-0003-SA Enseco ID: 1016332
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 17 OCT 88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2, 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	2.3	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Aromatic Volatile Organics

Method 602

Client Name: Dames and Moore
Client ID: MW-8
Lab ID: 002044-0003-SA Enseco ID: 1016332
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 17 OCT 88

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Halogenated Volatile Organics

Method 601

Client Name: Dames and Moore
Client ID: MW-13
Lab ID: 002044-0004-SA Enseco ID: 1016335
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 17 OCT 88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2, 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	1.9	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Aromatic Volatile Organics

Method 602

Client Name: Dames and Moore
Client ID: MW-13
Lab ID: 002044-0004-SA Enseco ID: 1016335
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 17 OCT 88

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Refinery Hazardous Constituent Semivolatiles

Method 625

Client Name: Dames and Moore
Client ID: MW-10
Lab ID: 002044-0005-SA Enseco ID: 1016334
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: 14 OCT 88 Analyzed: 31 OCT 88

Parameter	Result	Wet wt. Units	Reporting Limit
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10
Nitrobenzene-d5	72.6	%	--
2-Fluorobiphenyl	67.1	%	--
Terphenyl-d14	70.2	%	--
Phenol-d5	58.8	%	--
2-Fluorophenol	49.3	%	--
2,4,6-Tribromophenol	47.3	%	--

ND=Not Detected
NA=Not Applicable

Reported By: Martin Koby Approved By: Jeff Lowry

The cover letter is an integral part of this report.
Rev 230787

Enseco

Halogenated Volatile Organics

Method 601

Client Name: Dames and Moore
Client ID: MW-10
Lab ID: 002044-0005-SA Enseco ID: 1016334
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 18 OCT 88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2, 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	5.7	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Aromatic Volatile Organics

Method 602

Client Name: Dames and Moore
Client ID: MW-10
Lab ID: 002044-0005-SA Enseco ID: 1016334
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 18 OCT 88

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Refinery Hazardous Constituent Semivolatiles

Method 625

Client Name: Dames and Moore
Client ID: MW-12
Lab ID: 002044-0006-SA Enseco ID: 1016336
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: 01 NOV 88 Analyzed: 07 NOV 88

Parameter	Result	Wet wt. Units	Reporting Limit
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	33	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	11	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10
Nitrobenzene-d5	79.1	%	--
2-Fluorobiphenyl	74.1	%	--
Terphenyl-d14	44.6	%	--
Phenol-d5	36.5	%	--
2-Fluorophenol	32.6	%	--
2,4,6-Tribromophenol	39.5	%	--

ND=Not Detected
NA=Not Applicable

Reported By: Tim Miller Approved By: Jeff Lowry

The cover letter is an integral part of this report.
Rev 230787

Enseco

Halogenated Volatile Organics

Method 601

Client Name: Dames and Moore
Client ID: MW-12
Lab ID: 002044-0006-SA Enseco ID: 1016336
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 21 OCT 88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	1000
Bromomethane (Methylbromide)	ND	ug/L	1000
Vinyl chloride	ND	ug/L	200
Chloroethane	ND	ug/L	1000
Methylene chloride	ND	ug/L	1000
1,1-Dichloroethene	ND	ug/L	100
1,1-Dichloroethane	ND	ug/L	100
1,2-Dichloroethene (cis/trans)	ND	ug/L	100
Chloroform	ND	ug/L	100
1,1,2-Trichloro-2,2, 1-trifluoroethane	ND	ug/L	200
1,2-Dichloroethane	ND	ug/L	200
1,1,1-Trichloroethane	ND	ug/L	100
Carbon tetrachloride	ND	ug/L	100
Bromodichloromethane	ND	ug/L	200
1,2-Dichloropropane	ND	ug/L	200
trans-1,3-Dichloropropene	ND	ug/L	200
Trichloroethene	ND	ug/L	100
Chlorodibromomethane	ND	ug/L	200
cis-1,3-Dichloropropene	ND	ug/L	400
1,1,2-Trichloroethane	ND	ug/L	200
EDB (1,2-Dibromoethane)	ND	ug/L	400
Bromoform	ND	ug/L	1000
1,1,2,2-Tetrachloroethane	ND	ug/L	200
Tetrachloroethene	ND	ug/L	100
Chlorobenzene	ND	ug/L	400

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Aromatic Volatile Organics

Method 602

Client Name: Dames and Moore
Client ID: MW-12
Lab ID: 002044-0006-SA Enseco ID: 1016336
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 19 OCT 88

Parameter	Result	Units	Reporting Limit
Benzene	6200	ug/L	100
Toluene	1000	ug/L	100
Chlorobenzene	ND	ug/L	100
Ethyl benzene	180	ug/L	100
Total xylenes	470	ug/L	100
1,3-Dichlorobenzene	ND	ug/L	100
1,4-Dichlorobenzene	ND	ug/L	100
1,2-Dichlorobenzene	ND	ug/L	100

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Refinery Hazardous Constituent Semivolatiles

Method 625

Client Name: Dames and Moore
Client ID: MW-11
Lab ID: 002044-0007-SA Enseco ID: 1016337
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: 14 OCT 88 Analyzed: 31 OCT 88

Parameter	Result	Wet wt. Units	Reporting Limit
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10
Nitrobenzene-d5	70.2	%	--
2-Fluorobiphenyl	62.1	%	--
Terphenyl-d14	51.4	%	--
Phenol-d5	39.6	%	--
2-Fluorophenol	35.4	%	--
2,4,6-Tribromophenol	42.4	%	--

ND=Not Detected
NA=Not Applicable

Reported By: Martin Koby Approved By: Jeff Lowry

The cover letter is an integral part of this report.
Rev 230787

Enseco

Halogenated Volatile Organics

Method 601

Client Name: Dames and Moore
Client ID: MW-11
Lab ID: 002044-0007-SA Enseco ID: 1016337
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 21 OCT 88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2, 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Aromatic Volatile Organics

Method 602

Client Name: Dames and Moore
Client ID: MW-11
Lab ID: 002044-0007-SA Enseco ID: 1016337
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 21 OCT 88

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Refinery Hazardous Constituent Semivolatiles

Method 625

Client Name: Dames and Moore
Client ID: FIELD BLANK
Lab ID: 002044-0008-SA Enseco ID: 1016338
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: 01 NOV 88 Analyzed: 07 NOV 88

Parameter	Result	Wet wt. Units	Reporting Limit
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10
Nitrobenzene-d5	65.7	%	--
2-Fluorobiphenyl	69.4	%	--
Terphenyl-d14	89.3	%	--
Phenol-d5	59.4	%	--
2-Fluorophenol	53.5	%	--
2,4,6-Tribromophenol	67.8	%	--

ND=Not Detected
NA=Not Applicable

Reported By: Tim Miller Approved By: Jeff Lowry

The cover letter is an integral part of this report.
Rev 230787

Enseco

Halogenated Volatile Organics

Method 601

Client Name: Dames and Moore
Client ID: FIELD BLANK
Lab ID: 002044-0008-SA Enseco ID: 1016338
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 19 OCT 88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (cis/trans)	ND	ug/L	0.50
Chloroform	2.8	ug/L	0.50
1,1,2-Trichloro-2,2, 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	1.4	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Aromatic Volatile Organics

Method 602

Client Name: Dames and Moore
Client ID: FIELD BLANK
Lab ID: 002044-0008-SA Enseco ID: 1016338
Matrix: AQUEOUS Sampled: 12 OCT 88 Received: 13 OCT 88
Authorized: 13 OCT 88 Prepared: NA Analyzed: 19 OCT 88

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS	SCS
002044-0001-SA	AQUEOUS	625-A	881014A	881014A
002044-0002-SA	AQUEOUS	625-A	881014A	881014A
002044-0003-SA	AQUEOUS	625-A	881014A	881014A
002044-0005-SA	AQUEOUS	625-A	881014A	881014A
002044-0006-SA	AQUEOUS	625-A	881031A	881101A
002044-0007-SA	AQUEOUS	625-A	881014A	881014A
002044-0008-SA	AQUEOUS	625-A	881031A	881101A

LABORATORY CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: 625-A Matrix: AQUEOUS QC Lot: 881014A Concentration Units: ug/L								
Phenol	100	75.9	79.5	76	80	12- 89	5.1	42
2-Chlorophenol	100	93.4	94.4	93	94	27-123	1.1	40
1,4-Dichlorobenzene	50	35.1	31.6	70	63	36- 97	11	28
N-Nitroso-di n-propylamine	50	49.8	51.4	100	103	41-116	2.9	38
1,2,4-Trichlorobenzene	50	33.8	31.4	68	63	39- 98	7.6	28
4-Chloro-3-methylphenol	100	94.6	101	95	101#	23- 97	6.1	42
Acenaphthene	50	45.9	44.2	92	88	46-118	4.4	31
4-Nitrophenol	100	90.0	99.5	90#	100#	10- 80	10	50
2,4-Dinitrotoluene	50	48.2	48.5	96	97#	24- 96	1.0	38
Pentachlorophenol	100	53.4	41.4	53	41	9-103	26	50
Pyrene	50	53.9	57.8	108	116	26-127	7.1	31
Category: 625-A Matrix: AQUEOUS QC Lot: 881031A Concentration Units: ug/L								
Phenol	100	86.6	77.3	87	77	12- 89	12	42
2-Chlorophenol	100	121	105	121	105	27-123	14	40
1,4-Dichlorobenzene	50	39.4	34.5	79	69	36- 97	14	28
N-Nitroso-di n-propylamine	50	54.6	46.3	109	93	41-116	16	38
1,2,4-Trichlorobenzene	50	44.8	37.3	90	75	39- 98	18	28
4-Chloro-3-methylphenol	100	141	123	141#	123#	23- 97	14	42
Acenaphthene	50	50.9	41.0	102	82	46-118	22	31
4-Nitrophenol	100	118	102	118#	102#	10- 80	14	50
2,4-Dinitrotoluene	50	59.9	52.4	120#	105#	24- 96	13	38
Pentachlorophenol	100	87.8	76.8	88	77	9-103	13	50
Pyrene	50	57.4	42.9	115	86	26-127	29	31

= Recovery outside standard QC limits.

SURROGATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 625-A Matrix AQUEOUS LCS Lot: 881014A SCS Lot: 881014A Concentration Units: ug/L				
Nitrobenzene-d5	100	99.2	99	35-114
2-Fluorobiphenyl	100	93.0	93	43-116
Terphenyl-d14	100	95.2	95	33-141
2-Fluorophenol	200	178	89	21-100
Phenol-d5	200	181	90	10- 94
2,4,6-Tribromophenol	200	204	102	10-123
Category: 625-A Matrix AQUEOUS LCS Lot: 881031A SCS Lot: 881101A Concentration Units: ug/L				
Nitrobenzene-d5	100	77.6	78	35-114
2-Fluorobiphenyl	100	76.1	76	43-116
Terphenyl-d14	100	97.8	98	33-141
2-Fluorophenol	200	132	66	21-100
Phenol-d5	200	138	69	10- 94
2,4,6-Tribromophenol	200	217	108	10-123

BLANK REPORT
Semivolatile Organics by GC/MS

Analyte	Result	Units	Reporting Limit
Test: 625-REF-A			
Matrix: AQUEOUS			
LCS Lot: 881014A SCS Lot: 881014A			
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10

BLANK REPORT
Semivolatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: 625-REF-A			
Matrix: AQUEOUS			
LCS Lot: 881031A SCS Lot: 881101A			
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10

QC LOT ASSIGNMENT REPORT
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS	SCS
002044-0001-SA	AQUEOUS	601-A	881018W	881018W
002044-0001-SA	AQUEOUS	602-A	881018W	881018W
002044-0002-SA	AQUEOUS	601-A	881017L	881017L
002044-0002-SA	AQUEOUS	602-A	881017L	881017L
002044-0003-SA	AQUEOUS	601-A	881017L	881017L
002044-0003-SA	AQUEOUS	602-A	881017L	881017L
002044-0004-SA	AQUEOUS	601-A	881017L	881017L
002044-0004-SA	AQUEOUS	602-A	881017L	881017L
002044-0005-SA	AQUEOUS	601-A	881018W	881018W
002044-0005-SA	AQUEOUS	602-A	881018W	881018W
002044-0006-SA	AQUEOUS	601-A	881021W	881021W
002044-0006-SA	AQUEOUS	602-A	881021W	881021W
002044-0007-SA	AQUEOUS	601-A	881021P	881021P
002044-0007-SA	AQUEOUS	602-A	881021P	881021P
002044-0008-SA	AQUEOUS	601-A	881019P	881019P
002044-0008-SA	AQUEOUS	602-A	881019P	881019P

LABORATORY CONTROL SAMPLE REPORT
Volatile Organics by GC

Analyte	Concentration Spiked	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: 601-A Matrix: AQUEOUS QC Lot: 881018W Concentration Units: ug/L								
1,1-Dichloroethane	5.0	5.14	5.11	103	102	60-140	1.0	20
Chloroform	5.0	5.07	5.08	101	102	60-140	1.0	20
Bromodichloromethane	10	10.1	10.3	101	103	60-140	2.0	20
Trichloroethene	5.0	4.16	4.31	83	86	60-140	3.6	20
Chlorobenzene	5.0	5.16	5.14	103	103	60-140	0.0	20
Category: 602-A Matrix: AQUEOUS QC Lot: 881018W Concentration Units: ug/L								
Benzene	5.0	4.87	4.85	97	97	77-123	0.0	20
Toluene	5.0	4.51	4.49	90	90	77-123	0.0	20
1,3-Dichlorobenzene	5.0	4.17	4.10	83	82	77-123	1.2	20
Ethyl benzene	5.0	4.51	4.47	90	89	77-123	1.1	20
Chlorobenzene	5.0	4.76	4.71	95	94	77-123	1.1	20
Category: 601-A Matrix: AQUEOUS QC Lot: 881017L Concentration Units: ug/L								
1,1-Dichloroethane	5.0	5.15	5.14	103	103	60-140	0.0	20
Chloroform	5.0	5.10	5.09	102	102	60-140	0.0	20
Bromodichloromethane	10	8.63	9.04	86	90	60-140	4.5	20
Trichloroethene	5.0	3.93	4.50	79	90	60-140	13	20
Chlorobenzene	5.0	5.05	5.12	101	102	60-140	1.0	20
Category: 602-A Matrix: AQUEOUS QC Lot: 881017L Concentration Units: ug/L								
Benzene	5.0	4.45	4.52	89	90	77-123	1.1	20
Toluene	5.0	5.00	4.89	100	98	77-123	2.0	20
1,3-Dichlorobenzene	5.0	5.13	4.65	103	93	77-123	10	20
Ethyl benzene	5.0	5.17	4.82	103	96	77-123	7.0	20

LABORATORY CONTROL SAMPLE REPORT
Volatile Organics by GC (cont.)

Analyte	Concentration Spiked	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: 602-A Matrix: AQUEOUS QC Lot: 881017L Concentration Units: ug/L								
Chlorobenzene	5.0	5.21	5.38	104	108	77-123	3.8	20
Category: 601-A Matrix: AQUEOUS QC Lot: 881021W Concentration Units: ug/L								
1,1-Dichloroethane	5.0	4.98	5.00	100	100	60-140	0.0	20
Chloroform	5.0	5.27	5.00	105	100	60-140	4.9	20
Bromodichloromethane	10	10.3	10.3	103	103	60-140	0.0	20
Trichloroethene	5.0	4.30	5.07	86	101	60-140	16	20
Chlorobenzene	5.0	5.34	5.24	107	105	60-140	1.9	20
Category: 602-A Matrix: AQUEOUS QC Lot: 881021W Concentration Units: ug/L								
Benzene	5.0	4.97	4.87	99	97	77-123	2.0	20
Toluene	5.0	4.62	4.55	92	91	77-123	1.1	20
1,3-Dichlorobenzene	5.0	4.21	4.14	84	83	77-123	1.2	20
Ethyl benzene	5.0	4.56	4.43	91	89	77-123	2.2	20
Chlorobenzene	5.0	4.83	4.73	97	95	77-123	2.1	20
Category: 601-A Matrix: AQUEOUS QC Lot: 881021P Concentration Units: ug/L								
1,1-Dichloroethane	5.0	5.94	6.28	119	126	60-140	5.7	20
Chloroform	5.0	5.48	5.56	110	111	60-140	0.9	20
Bromodichloromethane	10	9.92	9.85	99	98	60-140	1.0	20
Trichloroethene	5.0	5.08	5.03	102	101	60-140	1.0	20
Chlorobenzene	5.0	5.54	5.58	111	112	60-140	0.9	20

LABORATORY CONTROL SAMPLE REPORT
Volatile Organics by GC (cont.)

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: 602-A Matrix: AQUEOUS QC Lot: 881021P Concentration Units: ug/L								
Benzene	5.0	4.91	5.01	98	100	77-123	2.0	20
Toluene	5.0	4.87	4.67	97	93	77-123	4.2	20
1,3-Dichlorobenzene	5.0	4.67	4.59	93	92	77-123	1.1	20
Ethyl benzene	5.0	4.77	4.72	95	94	77-123	1.1	20
Chlorobenzene	5.0	5.08	5.08	102	102	77-123	0.0	20
Category: 601-A Matrix: AQUEOUS QC Lot: 881019P Concentration Units: ug/L								
1,1-Dichloroethane	5.0	5.87	4.93	117	99	60-140	17	20
Chloroform	5.0	5.51	6.26	110	125	60-140	13	20
Bromodichloromethane	10	9.79	8.57	98	86	60-140	13	20
Trichloroethene	5.0	5.02	4.46	100	89	60-140	12	20
Chlorobenzene	5.0	5.40	4.84	108	97	60-140	11	20
Category: 602-A Matrix: AQUEOUS QC Lot: 881019P Concentration Units: ug/L								
Benzene	5.0	4.86	4.86	97	97	77-123	0.0	20
Toluene	5.0	4.70	4.71	94	94	77-123	0.0	20
1,3-Dichlorobenzene	5.0	4.54	4.54	91	91	77-123	0.0	20
Ethyl benzene	5.0	4.68	4.64	94	93	77-123	1.1	20
Chlorobenzene	5.0	5.04	5.02	101	100	77-123	1.0	20

SURROGATE CONTROL SAMPLE REPORT
Volatile Organics by GC

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: 601-A Matrix AQUEOUS LCS Lot: 881018W SCS Lot: 881018W Concentration Units: ug/L				
Bromochloromethane	30.0	26.0	87	20-160
Category: 602-A Matrix AQUEOUS LCS Lot: 881018W SCS Lot: 881018W Concentration Units: ug/L				
a,a,a-Trifluorotoluene	30.0	29.8	99	20-160
Category: 601-A Matrix AQUEOUS LCS Lot: 881017L SCS Lot: 881017L Concentration Units: ug/L				
Bromochloromethane	30.0	20.7	69	20-160
Category: 602-A Matrix AQUEOUS LCS Lot: 881017L SCS Lot: 881017L Concentration Units: ug/L				
a,a,a-Trifluorotoluene	30.0	18.2	61	20-160
Category: 601-A Matrix AQUEOUS LCS Lot: 881021W SCS Lot: 881021W Concentration Units: ug/L				
Bromochloromethane	30.0	26.4	88	20-160

SURROGATE CONTROL SAMPLE REPORT
Volatile Organics by GC (cont.)

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 602-A Matrix AQUEOUS LCS Lot: 881021W SCS Lot: 881021W Concentration Units: ug/L				
a,a,a-Trifluorotoluene	30.0	29.3	98	20-160
Category: 601-A Matrix AQUEOUS LCS Lot: 881021P SCS Lot: 881021P Concentration Units: ug/L				
Bromochloromethane	30.0	28.6	95	20-160
Category: 602-A Matrix AQUEOUS LCS Lot: 881021P SCS Lot: 881021P Concentration Units: ug/L				
a,a,a-Trifluorotoluene	30.0	30.3	101	20-160
Category: 601-A Matrix AQUEOUS LCS Lot: 881019P SCS Lot: 881019P Concentration Units: ug/L				
Bromochloromethane	30.0	25.6	85	20-160
Category: 602-A Matrix AQUEOUS LCS Lot: 881019P SCS Lot: 881019P Concentration Units: ug/L				
a,a,a-Trifluorotoluene	30.0	27.9	93	20-160

BLANK REPORT
Volatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 601-A			
Matrix: AQUEOUS			
LCS Lot: 881018W SCS Lot: 881018W			
Chloromethane	ND	ug/L	5.0
Bromomethan (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethen (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0
Test: 602-AP			
Matrix: AQUEOUS			
LCS Lot: 881018W SCS Lot: 881018W			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50

BLANK REPORT
Volatile Organics by GC (cont.)

Analyte	Result	Units	Reporting Limit
Test: 602-AP Matrix: AQUEOUS LCS Lot: 881018W SCS Lot: 881018W			
1,2-Dichlorobenzene	ND	ug/L	0.50
Test: 601-A Matrix: AQUEOUS LCS Lot: 881017L SCS Lot: 881017L			
Chloromethane	ND	ug/L	5.0
Bromomethan (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethen (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

BLANK REPORT
Volatile Organics by GC (cont.)

Analyte	Result	Units	Reporting Limit
Test: 602-AP			
Matrix: AQUEOUS			
LCS Lot: 881017L SCS Lot: 881017L			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50
Test: 601-A			
Matrix: AQUEOUS			
LCS Lot: 881021W SCS Lot: 881021W			
Chloromethane	ND	ug/L	5.0
Bromomethan (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethen (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50

BLANK REPORT
Volatile Organics by GC (cont.)

Analyte	Result	Units	Reporting Limit
Test: 601-A Matrix: AQUEOUS LCS Lot: 881021W SCS Lot: 881021W			
Chlorobenzene	ND	ug/L	2.0
Test: 602-AP Matrix: AQUEOUS LCS Lot: 881021W SCS Lot: 881021W			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50
Test: 601-A Matrix: AQUEOUS LCS Lot: 881021P SCS Lot: 881021P			
Chloromethane	ND	ug/L	5.0
Bromomethan (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethen (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50

BLANK REPORT
Volatile Organics by GC (cont.)

Analyte	Result	Units	Reporting Limit
Test: 601-A			
Matrix: AQUEOUS			
LCS Lot: 881021P SCS Lot: 881021P			
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0
Test: 602-AP			
Matrix: AQUEOUS			
LCS Lot: 881021P SCS Lot: 881021P			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50
Test: 601-A			
Matrix: AQUEOUS			
LCS Lot: 881019P SCS Lot: 881019P			
Chloromethane	ND	ug/L	5.0
Bromomethan (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethen (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2 1-trifluoroethane	ND	ug/L	1.0

BLANK REPORT
Volatile Organics by GC (cont.)

Analyte	Result	Units	Reporting Limit
Test: 601-A			
Matrix: AQUEOUS			
LCS Lot: 881019P SCS Lot: 881019P			
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0
Test: 602-AP			
Matrix: AQUEOUS			
LCS Lot: 881019P SCS Lot: 881019P			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

Rocky Mountain Analytical Laboratory
4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF
ENSECO
INCORPORATED

10/14/88

Peter Olsen
Dames and Moore
Suite 200
250 East Broadway
Salt Lake City, UT 84111

Dear Dr. Olsen:

This is to acknowledge that we received your 8 samples at our laboratory. They have been assigned our lab project number 002044. Enclosed is a sample description form indicating our sample numbers and your corresponding identifications and a copy of the Chain of Custody.

If you have any questions regarding your project or need additional sample bottles please contact me.

Sincerely,

Jeanne Howbert

Jeanne Howbert
Project Coordinator

Rocky Mountain Analytical Lab

10/14/88

SAMPLE DESCRIPTION INFORMATION

for

Dames and Moore

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
*002044-0001	MW-16	AQUEOUS	10/12/88	10/13/88
*002044-0002	MW-6	AQUEOUS	10/12/88	10/13/88
*002044-0003	MW-8	AQUEOUS	10/12/88	10/13/88
*002044-0004	MW-13	AQUEOUS	10/12/88	10/13/88
*002044-0005	MW-10	AQUEOUS	10/12/88	10/13/88
*002044-0006	MW-12	AQUEOUS	10/12/88	10/13/88
*002044-0007	MW-11	AQUEOUS	10/12/88	10/13/88
*002044-0008	FIELD BLANK	AQUEOUS	10/12/88	10/13/88

* = Receipt of this new sample is acknowledged by this letter

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 5775

Attn: Jeanne Howbert

Enseco Client: Maverick (Caribou Gas Corp) Kirtland

Project:

Sampling Co.: Dames & Moore N. Mexico EID - Bill Lee

Sampling Site:

Team Leader: Larry Bardwell O+M

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description		Sample Type	No. Containers	Analysis Parameters (all samples)	Remarks
10/12/88	1500	MW-16	01	Ground water	5	* Halogenated Volatiles method 601	
	1430	MW-6	02		5	* Aromatic Volatiles method 602	
	1500	MW-8	03		5	* Priority Haz. Semi-Vols. method 8270	
	1600	MW-13	04		3	* AS PER ENCLOSED LIST OF PARAMETERS * VOA's bottles sent only	
	1030	MW-10	05		5		
	1230	MW-12	06		5		
	1210	MW-11	07		5		
	1630	Field Blank	08		5		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	L Bardwell	D Dellinger	10/12	1700
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: _____

Method of Shipment: _____ Airbill # _____

Received for Lab: RMA Signed: _____ Date/Time 10/13/88 0830

Enseco Project No. 2041

White and Pink Copies to Lab Yellow to Sampler

SS-001

Rocky Mountain
Analytical Laboratory

Enseco Incorporated

Enseco

November 4, 1988

Pete F. Olsen, Ph.D.
Dames and Moore
250 East Broadway
Suite 200
Salt Lake City, UT 84111

Dear Pete:

Enclosed is the report for two aqueous samples received at Rocky Mountain Analytical Laboratory on October 14, 1988.

The surrogate recovery for D14-Terphenyl in sample 2061-02 is outside the control limits. Both samples were very clean and target compounds were relatively unaffected. All other surrogate recoveries are within limits.

If you have any questions the Client Service Representative assigned to this project is Jeannie B. Howbert.

Sincerely,

Tracy Giberson

Tracy Giberson
Data Control Supervisor

Enclosures

cc: Jeannie B. Howbert. Client Service Rep.

RMAL #002061

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

SAMPLE DESCRIPTION INFORMATION
for
Dames and Moore

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
002061-0001-SA	MW-9	AQUEOUS	13 OCT 88	09:40	14 OCT 88
002061-0002-SA	MW-13	AQUEOUS	13 OCT 88	08:30	14 OCT 88

Enseco

Refinery Hazardous Constituent Semivolatiles

Method 625

Client Name: Dames and Moore
Client ID: MW-9
Lab ID: 002061-0001-SA Enseco ID: 1016431
Matrix: AQUEOUS Sampled: 13 OCT 88 Received: 14 OCT 88
Authorized: 14 OCT 88 Prepared: 18 OCT 88 Analyzed: 31 OCT 88

Parameter	Result	Wet wt. Units	Reporting Limit
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10
Nitrobenzene-d5	69.3	%	--
2-Fluorobiphenyl	62.3	%	--
Terphenyl-d14	57.2	%	--
Phenol-d5	31.0	%	--
2-Fluorophenol	42.4	%	--
2,4,6-Tribromophenol	45.2	%	--

ND=Not Detected
NA=Not Applicable

Reported By: Martin Koby Approved By: Jeff Lowry

The cover letter is an integral part of this report.
Rev 230787

Enseco

Halogenated Volatile Organics

Method 601

Client Name: Dames and Moore
Client ID: MW-9
Lab ID: 002061-0001-SA Enseco ID: 1016431
Matrix: AQUEOUS Sampled: 13 OCT 88 Received: 14 OCT 88
Authorized: 14 OCT 88 Prepared: NA Analyzed: 24 OCT 88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2, 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	5.6	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

Enseco

Refinery Hazardous Constituent Semivolatiles

Method 625

Client Name: Dames and Moore
Client ID: MW-13
Lab ID: 002061-0002-SA Enseco ID: 1016432
Matrix: AQUEOUS Sampled: 13 OCT 88 Received: 14 OCT 88
Authorized: 14 OCT 88 Prepared: 18 OCT 88 Analyzed: 31 OCT 88

Parameter	Result	Wet wt. Units	Reporting Limit
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10
Nitrobenzene-d5	56.8	%	--
2-Fluorobiphenyl	50.0	%	--
Terphenyl-d14	17.0	%	--
Phenol-d5	43.6	%	--
2-Fluorophenol	41.7	%	--
2,4,6-Tribromophenol	42.6	%	--

ND=Not Detected
NA=Not Applicable

Reported By: Martin Koby Approved By: Jeff Lowry

The cover letter is an integral part of this report.
Rev 230787

Enseco

Aromatic Volatile Organics

Method 602

Client Name: Dames and Moore
Client ID: MW-9
Lab ID: 002061-0001-SA Enseco ID: 1016431
Matrix: AQUEOUS Sampled: 13 OCT 88 Received: 14 OCT 88
Authorized: 14 OCT 88 Prepared: NA Analyzed: 24 OCT 88

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND=Not Detected
NA=Not Applicable

Reported By: Stan Dunlavy Approved By: Kathy Humphreys

The cover letter is an integral part of this report.
Rev 230787

QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS	SCS
002061-0001-SA	AQUEOUS	625-A	881017A	881018A
002061-0002-SA	AQUEOUS	625-A	881017A	881018A

LABORATORY CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: 625-A								
Matrix: AQUEOUS								
QC Lot: 881017A								
Concentration Units: ug/L								
Phenol	100	57.0	74.5	57	74	12- 89	26	42
2-Chlorophenol	100	66.6	85.5	67	86	27-123	25	40
1,4-Dichlorobenzene	50	26.1	34.1	52	68	36- 97	27	28
N-Nitroso-di n-propylamine	50	39.3	50.0	79	100	41-116	23	38
1,2,4-Trichlorobenzene	50	27.6	33.7	55	67	39- 98	20	28
4-Chloro-3-methylphenol	100	79.0	93.8	79	94	23- 97	17	42
Acenaphthene	50	37.7	44.3	75	89	46-118	17	31
4-Nitrophenol	100	85.2	89.1	85#	89#	10- 80	4.6	50
2,4-Dinitrotoluene	50	41.5	48.1	83	96	24- 96	14	38
Pentachlorophenol	100	51.8	49.5	52	50	9-103	3.9	50
Pyrene	50	45.1	58.0	90	116	26-127	25	31

= Recovery outside standard QC limits.

SURROGATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: 625-A				
Matrix AQUEOUS				
LCS Lot: 881017A SCS Lot: 881018A				
Concentration Units: ug/L				
Nitrobenzene-d5	100	93.0	93	35-114
2-Fluorobiphenyl	100	86.8	87	43-116
Terphenyl-d14	100	110	110	33-141
2-Fluorophenol	200	149	74	21-100
Phenol-d5	200	166	83	10- 94
2,4,6-Tribromophenol	200	156	78	10-123

BLANK REPORT
Semivolatile Organics by GC/MS

Test: 625-REF-A
Matrix: AQUEOUS
LCS Lot: 881017A SCS Lot: 881018A

Analyte	Result	Units	Reporting Limit
Anthracene	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl phthalate	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenzo(a,h)anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
7,12-Dimethylbenz anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Indene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	--
Quinoline	ND	ug/L	10
Benzenethiol	ND	ug/L	--
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Phenol	ND	ug/L	10

QC LOT ASSIGNMENT REPORT
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS	SCS
002061-0001-SA	AQUEOUS	601-A	881024W	881024W
002061-0001-SA	AQUEOUS	602-A	881024W	881024W

LABORATORY CONTROL SAMPLE REPORT
Volatile Organics by GC

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: 601-A Matrix: AQUEOUS QC Lot: 881024W Concentration Units: ug/L								
1,1-Dichloroethane	5.0	5.11	5.19	102	104	60-140	1.9	20
Chloroform	5.0	5.03	5.14	101	103	60-140	2.0	20
Bromodichloromethane	10	10.2	10.3	102	103	60-140	1.0	20
Trichloroethene	5.0	4.42	4.43	88	89	60-140	1.1	20
Chlorobenzene	5.0	5.00	5.23	100	105	60-140	4.9	20
Category: 602-A Matrix: AQUEOUS QC Lot: 881024W Concentration Units: ug/L								
Benzene	5.0	5.02	5.01	100	100	77-123	0.0	20
Toluene	5.0	4.68	4.68	94	94	77-123	0.0	20
1,3-Dichlorobenzene	5.0	4.12	4.20	82	84	77-123	2.4	20
Ethyl benzene	5.0	4.58	4.64	92	93	77-123	1.1	20
Chlorobenzene	5.0	4.80	4.84	96	97	77-123	1.0	20

SURROGATE CONTROL SAMPLE REPORT
Volatile Organics by GC

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: 601-A Matrix AQUEOUS LCS Lot: 881024W SCS Lot: 881024W Concentration Units: ug/L				
Bromochloromethane	30.0	26.3	88	20-160
Category: 602-A Matrix AQUEOUS LCS Lot: 881024W SCS Lot: 881024W Concentration Units: ug/L				
a,a,a-Trifluorotoluene	30.0	29.3	98	20-160

BLANK REPORT
Volatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 601-A			
Matrix: AQUEOUS			
LCS Lot: 881024W SCS Lot: 881024W			
Chloromethane	ND	ug/L	5.0
Bromomethan (Methylbromide)	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethen (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0
Test: 602-AP			
Matrix: AQUEOUS			
LCS Lot: 881024W SCS Lot: 881024W			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50

BLANK REPORT
Volatile Organics by GC (cont.)

Analyte	Result	Units	Reporting Limit
Test: 602-AP Matrix: AQUEOUS LCS Lot: 881024W SCS Lot: 881024W			
1,2-Dichlorobenzene	ND	ug/L	0.50

Rocky Mountain Analytical Laboratory
4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF
ENSECO
INCORPORATED

10/14/88

Peter Olsen
Dames and Moore
Suite 200
250 East Broadway
Salt Lake City, UT 84111

Dear Dr. Olsen:

This is to acknowledge that we received your 2 samples at our laboratory. They have been assigned our lab project number 002061. Enclosed is a sample description form indicating our sample numbers and your corresponding identifications and a copy of the Chain of Custody.

If you have any questions regarding your project or need additional sample bottles please contact me.

Sincerely,

Jeanne Howbert

Jeanne Howbert
Project Coordinator

Rocky Mountain Analytical Lab

10/14/88

SAMPLE DESCRIPTION INFORMATION

for

Dames and Moore

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
*002061-0001	MW-9	AQUEOUS	10/13/88	10/14/88
*002061-0002	MW-13	AQUEOUS	10/13/88	10/14/88

* = Receipt of this new sample is acknowledged by this letter

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 5769

Attn: Jeannie Hawbut

Enseco Client: Maverik-Caribou 4 Corners - Kirtland N.M.

Project:

Sampling Co.: Dames + Moore + EDD rep Bill Olsen

Sampling Site:

Team Leader: L. Bardwell

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
10/13/88	0940	MW-9	Groundwater	5	as per list sent with samples on 10/12 – VOA's 601-602 BNA's	
10/13	0830	MW-13	"	1	BNA's as per list sent with samples on 10/12	

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Larry Bardwell	Fed-x Farmington	10/13	1630
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: _____

Method of Shipment: _____ Airbill # _____

Received for Lab: RMA Signed: _____ Date/Time 10/14/88 0830

Enseco Project No. 2061

White and Pink Copies to Lab Yellow to Sampler

SS-001