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PHASE I HYDROGEOLOGIC EVALUATION
MAVERIK REFINERY AND TANK FARM
KIRTLAND, NEW MEXICO
FOR MAVERIK COUNTRY STORES, INC.

Dames & Moore

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EXECUTIVE SUMMARY

This progress report presents the results of the Phase I Hydrogeologic Investigation at the Maverik Refinery and Tank Farm, Kirtland, New Mexico. This study was authorized by Maverik Country Stores, Inc. following preliminary studies in 1985 by the Environmental Protection Agency (EPA) and the New Mexico Environmental Improvement Division (EID), that indicated past refinery operations had resulted in 1,2-dichloroethane (DCA) contamination of private water wells and surface waters southwest of the Maverik Refinery Tank Farm.

The Phase I investigation consisted of the following work elements: an area-wide survey for volatile organics using soil-gas techniques to determine the most appropriate locations for monitor wells; installation of 13 monitor wells, 5 well points and a deep borehole; sampling of the 13 monitor wells, 3 private wells and 6 surface water sites in November 1987 and analysis of these samples for organics and common ions; obtaining measurements of ground water and surface water elevations; performing aquifer characterization tests; conducting an inventory of private well locations and surface water users; review and analysis of data obtained during this and other investigations.

Significant concentrations of the typical refinery-related volatile organics benzene, toluene, xylene, ethylbenzene and DCA were found in one of six wells located on the refinery and at one location in the irrigation ditch along the west boundary of the refinery. The actual concentrations at these sites are exaggerated by the fact that the samples were contaminated with free product. After product was observed seeping from the tank farm into this non-flowing irrigation ditch, absorbent pads were placed in the ditch to contain this material. Only trace levels (1.1 to 1.6 ug/l, i.e., parts per billion) of DCA and xylene were found at one of two sampling sites farther downstream in this same ditch.

Benzene, ethylbenzene or xylene were found in 3 of 10 off-site 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 wells, only one of which, at 16 ug/l, exceeded the New Mexico drinking water standard of 10 ug/l for this compound.

Ground water contamination by refinery-related organics appears, on the basis of this Phase I sampling as well as the additional EID sampling conducted during the spring of 1987, to be confined to the upper portion of the alluvial gravel aquifer in an area a few hundred feet in an east-west direction and about 1,800 feet downgradient (southwest) of the south-west corner of the tank farm. The low concentrations of the contaminants, their characteristics, the hydrogeologic setting, and the non-use of water from private wells in the contaminated area for drinking water purposes, all lead to the conclusion that the releases from the tank farm do not pose a threat to human health and the environment.

Additional investigations during 1988 have been agreed to by Maverik and the EID to further evaluate and remedy contamination problems.

doesn't pose a current threat

PHASE I HYDROGEOLOGIC EVALUATION
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FOR MAVERIK COUNTRY STORES, INC.,

INTRODUCTION

This report presents the results of the Phase I hydrogeologic evaluation at the Maverik Refinery and Tank Farm in Kirtland, New Mexico. Hydrogeologic and water quality conditions were evaluated both on-site and approximately one mile downgradient (south) of the refinery property boundaries. The general site location map and detailed plot plan showing the monitor wells, private wells, well points, borehole, the soil-gas and soil-water sample locations are included on Plates 1 and 2, respectively.

PURPOSE AND SCOPE

The purpose of this study was to perform a hydrogeologic evaluation primarily to define the extent and magnitude of ground water contamination. Specifically, the EID in a letter dated December 31, 1986 to Maverik, stated that the refinery was the source of ground water contamination on-site as well as off-site, and that a hydrogeologic investigation was required that would:

1. Define the vertical and lateral extent of contaminated ground water and surface water.
2. Identify and quantify all contaminants present.
3. Identify all contaminant sources known or suspected.
4. Determine ground water flow directions and velocities.

The scope of the Phase I work conducted by Dames & Moore was approved by the New Mexico EID on May 11, 1987 prior to implementation. This report includes the information that accomplishes the above objectives, with the exception of the third objective, to identify all contaminant sources known or suspected. This will be more fully addressed in the Phase II work, which as

outlined by the EID (December 28, 1987), will define the source(s) and areal and vertical extent of soil contamination on-site, and the potential for such soil contamination to act as a continued source of ground water contamination.

Specifically, the following tasks were performed during the Phase I work:

TASK I - FIELD INVESTIGATIONS

- As a preliminary step to better characterizing the extent of volatile organics in the subsurface, 15 soil-gas, 21 soil-water and 2 surface water samples were analyzed by Tracer Research Corporation (TRC) for nine volatile organic compounds, both on-site and off-site (Appendix A and Plate 2).

- Twelve 2-inch diameter PVC cased and one 2-inch stainless steel drive point water quality monitor wells and one deep boring were completed at critical locations (Plate 2). Five of the 13 monitor wells were completed on-site. Construction methods and specifications and the geologic data for the monitor wells are presented in Appendix B.

- One 9-hour steady discharge aquifer pumping test and 12 slug tests were performed on the monitor wells (Appendix C).

- A site investigation of surface waters, on-site and off-site, to visually inspect for oil refinery waste product was conducted.

- A private water well inventory was completed, water levels measured in 21 of the private wells, and those wells without pumps were depth-sounded. In addition, elevations of the water level measuring points of the monitor wells, 5 well points, 6 surface water sites and 27 private water wells were surveyed by San Juan Engineers, a licensed surveyor from Farmington, New Mexico (Table D-1). A discussion of the water level elevation data is also included in Appendix D.

- One round of comprehensive water quality sampling was conducted in November 1987, shortly after irrigation flow in the westside ditch ceased. A total of 13 monitor wells, 2 private wells, one on-site (8-inch diameter) steel-cased well and 6 surface water sites were sampled for the constituents listed in Table 1 with the data presented in Appendix E and Table 2.

TASK II - LABORATORY INVESTIGATIONS

- Rocky Mountain Analytical Laboratory (RMAL) a division of ENSECO, Incorporated, a well known multi-state certified and EPA Contract-Laboratory-Program laboratory, in Arvada, Colorado, analyzed the water quality samples for halogenated volatile organics (26), aromatic volatile organics (9), total organic lead and metals (6) and common ions (11). Their comprehensive report is included in Appendix E.

- Drill cuttings from contaminated on-site shallow monitor well 12, and deep monitor well 11 were sent to RMAL to evaluate EP toxicity for 8 RCRA metals and sulfide and cyanide reactivity. The drill cuttings were monitored in the field for volatile organics using an Organic Vapor Analyzer (OVA) meter. These results are presented in Appendix E.

TASK III - DATA EVALUATION

- Initially, the TRC soil-gas, soil-water and water data were evaluated in conjunction with the existing water quality data obtained by the EPA and the EID. The method, results and limitations are discussed in detail in Appendix A. Also included in Appendix A is the TRC report, "Shallow Soil Gas Investigation at Maverik Refinery, Kirtland, New Mexico" (September 1987). Data results from the TRC survey are semi-quantitative, but were used successfully in optimizing the numbers and locations of the monitor wells.

- An evaluation was conducted of the regional geology and subsurface geology at the 13 monitor wells and one deep borehole as presented on Plates 3 to 7.

- The water level elevation data, and the aquifer pump test and slug test data were analyzed to define the direction and rate of movement of the ground water in the study area.

- The water quality data from these 13 monitor wells, surface water sites and private well sites were used to define the vertical and lateral extent of ground water contamination, both on-site and off-site, and to define the other factors, (the ditches and the natural ground water discharges) influencing the ground water quality. The analytical results which show the organic contaminants detected and major ions are summarized in Table 2 and Plates 9 to 13, with all of the data presented in Appendix E. Earlier water quality data (March and April 1987) analyzed by the New Mexico EID have also been included for comparison in Appendix F.

- o The significance of the contamination was evaluated based on the toxicity of the contaminants detected, their potential for transport via ground water and surface water pathways and their potential impact on private water well users.

- o This summary Phase I Report was prepared.

FACILITY DESCRIPTION AND BACKGROUND

Maverik Country Stores, Inc., previously known as Caribou Four Corners Inc., operated a small crude topping refinery near Kirtland, New Mexico from 1963 until April 1982 at which time it was shut down. During operation, crude oil was refined into regular and leaded gasoline, diesel fuel and No. 5 fuel oil. Within a few months of shutdown, all remaining product, feedstocks and intermediate products were removed from storage tanks and sold. Additional verification to ensure that all of the tanks were properly abandoned will be included in the Phase II work.

New Mexico EID personnel conducted a site inspection in December 1985. As part of this inspection, samples for chemical analysis were taken of soil, waste, surface water and ground water at and near the refinery. One of the samples, an oily water sample from a drainage ditch along the west boundary of the site, contained significant concentrations (280-1,850 ug/l) of the typical refinery-related volatile organics benzene, toluene, ethylbenzene and xylenes; in addition this sample contained 15 ug/l of DCA. DCA was also detected in a water sample about one mile further down this ditch at the detection limit of 1 ug/l. This same compound was also detected at a low level (9 ug/l) in a sample from a 40 foot deep private well located approximately 0.2 mile downgradient of the refinery site; DCA was the only organic detected in the aromatic and halogenated hydrocarbon volatile screen analysis performed (detection limits 1-2 ug/l).

A more recent water quality sampling round conducted by the EID in April and May 1987 of 24 private wells in the area did not reveal the presence of aromatic or halogenated volatiles above the 1-2 ug/l detection limits except for one downgradient private well, located approximately 0.2 miles from the refinery site, which exhibited DCA at 8 ug/l. This well is near MW-6, which in November 1987, also showed DCA at 16 ug/l (Plate 13). The New Mexico drinking water standard for DCA is set at 10 ug/l and the Federal EPA drinking water standard at 5 ug/l.

Maverik has addressed the contamination problem in a responsible manner. Maverik has covered the costs incurred by the local downgradient homeowners that have (or will be), as a result of contamination from the tank farm, hooking up their water lines to the Kirtland public water supply. In November 1987, immediately after being notified of oily waste product that had been observed along the westside irrigation ditch, Maverik placed a series of pads along the ditch to absorb the product.

The field work began in March 1987. Modifications to the original work plan (February 16, 1987) were made following the preliminary field site visit by Dames & Moore (October 12, 1987 letter to Dennis McQuillan, New Mexico EID).

Additional modifications to the scope of work and completion schedules were agreed to by the New Mexico EID, in early January 1988. These included, as agreed to in the January 8, 1988 letter to the EID, and as summarized in Table 3: a Phase II scope of work to include contaminant source and remedial action investigations and a Phase II completion report; and additional reduced selective water quality sampling (Round 3) with the subsequent Round 3 water quality report.

GEOLOGY

REGIONAL GEOLOGY

The study site is located in the San Juan Basin in old alluvial river channel deposits (cobbles, gravels, sands, silts) of the San Juan River. Upper Cretaceous shales and sandstones outcrop to the north and south, with the Kirtland Shale outcropping directly to the north and south of the site. The hogback monocline to the north-northwest is the only predominant geologic structural feature. It is located approximately 12 miles to the west of the study site (Plates 3 and 4).

The San Juan Basin is rich in energy resources and mineral and oil development is extensive. Surface coal mining has been developed in the Fruitland Coal area. Mine-power generation began in 1962 near Farmington. Oil/Gas well development, particularly to the north, is also prevalent.

LOCAL GEOLOGY

The study site is located approximately 0.4 mile north-northeast from the existing banks of the San Juan River (Plate 1). The tank farm is located within the floodplain of the San Juan River, with the northern boundary of the tank farm paralleling the edge of the floodplain. This is demonstrated by the obvious topographic rise from 5190 to greater than 5210 feet msl along the northern boundary, and the finer silty-clayey sands encountered at the northernmost monitor wells 1 and 2 located along the edge of the floodplain. The refinery site is located immediately to the north, out of the floodplain above the 5210-foot contour. As noted, the tank farm is located in the floodplain, at elevations from about 5187 feet msl, in the southern part, to 5206 feet msl along the northern boundary.

Based on the U.S. Geological Survey map of the Kirtland Quadrangle (1955), the refinery site is located in an area consisting primarily of Quaternary valley fill alluvium (QAL), and Quaternary terrace gravel, which consists primarily of a veneer of unconsolidated gravel and sand on river and stream

terrace surfaces. Bedrock at the site consists of the lower shale member of the Cretaceous Kirtland Shale Formation (Plates 3 through 7).

GROUND WATER HYDROLOGY

REGIONAL

The principal aquifers in the San Juan Basin of New Mexico occur in the coarser grained sandstones of Jurassic, Cretaceous and Tertiary age. These include the Entrada Sandstone, West Water Canyon Member of the Morrison Formation, Mesaverde Group sandstone members, and sandstones of Tertiary Age. Quaternary deposits filling stream channels are capable of yielding sufficient quantities of water for stock and domestic use in many areas. The major aquifers in the San Juan Basin are shown in cross-section on Plate 4. Major aquifers in this region are located in the sandstone of the Mesaverde Group. As shown on Plate 4, these sandstones are 1,000 to 2,000 feet below the Kirtland Shale, separated from it by the Fruitland Formation and Lewis Shale.

Most ground water flows from recharge areas on topographically high outcrops toward the San Juan River. Much of the water either moves through confining layers to other aquifers, to the land surface, or to alluvium-filled channels to streams or sinks.

Transmissivities of the more productive aquifers in the San Juan Basin range from 50 to 300 ft^2/day. Dissolved-solids concentrations range from less than 500 mg/l near recharge areas to more than 10,000 mg/l near discharge areas (Lyford, 1979).

Valley fill, near perennial streams and major ephemeral streams, normally does not exceed a thickness of 50 feet. Transmissivities range from less than 1,000 ft^2/day in ephemeral channels to more than 40,000 ft^2/day in gravel-filled perennial stream channels. The transmissivity of valley fill is highest in the coarse gravels along the San Juan, Animas, and La Plata rivers. Recharge to valley fill along irrigated portions of these river valleys results largely from the percolation of irrigation water and from leaking ditches (Lyford, 1979).

Dissolved-solids concentrations in water from valley-fill deposits range from less than 1,000 mg/l in headwater areas to more than 4,000 mg/l where bedrock contributions are significant.

LOCAL

The aquifer in the study area is part of the regional ground water discharge system to the San Juan River. It consists of shallow coarse sand-gravel-cobble river channel (alluvial) deposits along the floodplain of the San Juan River. Lithologic logs of the 13 monitor wells and the 1 boring are presented in Appendix B. As indicated in Table D-1, the private wells in the vicinity of the Maverik Refinery and Tank Farm (Plate 2) are generally about 20 feet deep, with the deepest well about 59 feet deep (Table D-1, Appendix D). These private water wells intercept the coarse alluvial deposits located within the floodplain of the San Juan River.

As indicated on the geologic logs from the monitor well drilling program, the underlying bedrock is the Kirtland Shale Formation which is dry, even though it is overlain by saturated highly transmissive river channel deposits. The thickness of this formation near the study site is not known. Borehole data from the monitor well drilling program verify it to be at least 20 feet thick.

Flows in the alluvial gravel aquifer are from the north-northeast to the south-southwest, ultimately discharging toward the San Juan River. The hydraulic gradient is approximately 0.01 ft/ft (Plate 8) along the top of the underlying unsaturated Kirtland Shale Formation. Flows in the shallower, siltier saturated zones near the irrigation ditches are probably significantly impacted by the irrigation ditch waters as well as by the topographic gradient toward the San Juan River. The topographic gradient is about 0.01 ft/ft, the same as the hydraulic gradient. Based on the water level elevation data at the two nested wells on-site (MW-11 and MW-12), there does not appear to be a significant vertical hydraulic gradient in the shallow alluvial aquifer.

The water table elevation map was constructed based on water level measurements taken from the monitor wells, well points and private wells during November 22-27, 1987, after inflow to the westside irrigation ditch had stopped.

Based on the water level elevations and field observation of ground water seepage into the westside irrigation ditch after ditch flows had stopped, the westside irrigation ditch appears to serve as a ground water sink when it is not flowing, and as a ground water recharge source and divide when it is flowing. The Farmer's Mutual Irrigation Ditch and tributary ditches probably contribute significant volumes of recharge of good quality water to the aquifer but may also serve as a transport mechanism for contaminants. Ground water would tend to flow in the same direction as the ditches, to the south-southwest, when they are flowing or empty, since the aquifer is part of the regional flow system toward the San Juan River. Additional water level elevation data (and water quality data) are needed to evaluate the impact of the ditches on the ground water flow directions. Private water wells in this area, if used at all, are used for irrigation and stock watering.

The ground water velocity in the coarse alluvial aquifer in the study site area is estimated at 3 ft/day. This is based on the hydraulic gradient of 0.01 ft/ft, the hydraulic conductivity computed for the coarse alluvial zone of 100 ft/day (see Appendix C), and a porosity of 0.3.

WATER QUALITY EVALUATIONS

SURFACE WATER QUALITY

BACKGROUND WATER QUALITY

Six surface water sites were sampled in November 1987, four of which (SW-2 to SW-5) were in the westside irrigation ditch after irrigation flow had stopped and the residual flow was less than 5 gpm. The background surface (irrigation) water site was upstream to the north (SW-1), in the Farmer's Mutual Irrigation Ditch. According to Jim Dunlap, President of Farmer's

Mutual Ditch Company, the Farmer's Mutual Ditch flows at about 46,675 gpm (telephone conversation 02/16/88). This water is diverted from the Animas River, and if the Animas River flow is low, also from the San Juan River. SW-1 is above the tank farm and refinery and just upstream from the diversion to the westside irrigation ditch. The sixth site (SW-6) was located to the west of the refinery, along Virginia Murray's drainage ditch.

The Farmer's Mutual Irrigation Ditch flows each year from March 1 to December 1. The flow is regulated by the Farmer's Mutual Ditch Company in Kirtland, New Mexico. The lateral irrigation ditches generally do not flow until early April, and the westside ditch generally does not flow until late April or early May. Flows in the lateral ditches are controlled by the water rights holders.

INORGANIC CONSTITUENTS

The concentrations of the major ions found in the ditch waters are summarized in Table 2 and Plates 9 through 12. A Piper diagram (Plate E-5 in Appendix E), summarizes the percentage concentrations of the cations and anions for waters from these sample sites. The waters are generally high in calcium, sodium and potassium, sulfate and bicarbonate.

Except for the Farmer's Mutual Irrigation Ditch water (which has very low TDS), the westside irrigation ditch waters downstream from the tank farm (SW-2 and SW-3) are fairly high TDS waters, primarily elevated in sulfate and sodium. The ditch waters immediately west of the tank farm (SW-4) are slightly lower in TDS, primarily lower in sulfate and sodium concentrations. Because irrigation flows had stopped just prior to sampling the westside irrigation ditch (SW-2, SW-3, SW-4 and SW-5), the water quality data from these sites at the time of sampling primarily reflect ground water inflow and possibly some of the better quality residual irrigation waters. SW-4 may have still been heavily impacted by these residual waters. When the Farmer's Mutual Irrigation ditch is flowing, the water quality in the tributary ditches should be very similar to it, and thus, of good quality as at SW-1.

The water quality in the Farmer's Mutual Irrigation Ditch is similar to that found in monitor well 1 probably as a result of recharge to the ground water from seepage from this ditch. The TDS level in the ditch is low, at about 400 mg/l, as are the sulfate, chloride and sodium concentrations (136 mg/l, 16 mg/l, and 29 mg/l, respectively).

The four westside irrigation ditch surface water sample sites, located downstream (from north to south), included SW-4, SW-5, SW-2 and SW-3.

In terms of inorganic parameters, the water quality at SW-4 is the best of the westside ditch water quality. There is an increase in TDS, from SW-1 to SW-4 from 400 mg/l to 790 mg/l, primarily due to increases in chloride, sodium, calcium and alkalinity (Table 2). The increases are believed to be due primarily to the fact that this is a major ground water discharge area and that the ditch waters at this time were a composite of poorer quality ground water inflow mixed with the better quality residual waters from the Farmer's Mutual Irrigation Ditch.

Water quality samples from SW-2 and SW-3 along the westside ditch and south of the tank farm and SW-4, have levels of sulfate, sodium and calcium elevated above those at SW-4, with TDS levels at 1,120 mg/l and 1,400 mg/l, respectively. SW-2 and SW-3 are located farthest south from the Farmer's Mutual Irrigation Ditch and probably reflect ground water inflows that are not as highly impacted by the good quality waters that seep from the Farmer's Mutual Irrigation Ditch. Also, these sample sites, especially SW-3, which is the farthest downstream site, would be expected at the time of sampling to be impacted most by the poorer quality ground water discharges in this area.

ORGANIC COMPOUNDS

Water quality samples at SW-4, SW-5 and SW-2 are impacted by tank farm product. In addition to visual observation, an OVA meter was used for locating the most highly contaminated sample points at SW-4 and SW-5. The OVA readings are included in Appendix E. SW-5 (which was an additional site added by Dames & Moore for comparison to SW-4) was only analyzed for organic consti-

tuents. SW-5 is located about 150 feet south of SW-4 in the westside irrigation ditch, across from the maximum contaminant area found on-site (at MW-12). The high concentrations of the 5 organic contaminants at SW-5, although probably due to contamination of the sample with free product, verify the movement of on-site contaminants to the westside irrigation ditch. Only trace levels of DCA and xylene were detected downstream at SW-2.

Only very low levels of the 5 organic contaminants were detected at SW-4. Total xylene was detected at 61 ug/l and total organic lead (TOL) at 0.3 mg/l. This is the highest TOL level found at any of the sample sites and the only surface water sample in which any organic lead was detected. The detection limit for the TOL was 0.2 mg/l.

The analytical method used for TOL is described in more detail in Appendix E and involves the preparation of three sample aliquots, using benzene for solvent extraction of TOL. The TOL and inorganic lead digests are finally analyzed by Graphite Furnace AA, with the final TOL concentration computed by subtracting the inorganic lead from the total lead result. Discussions with RMAL indicate that analyzing for TOL is difficult and that the analytical method is neither highly reliable nor reproducible.

The water sample from Virginia Murray's ditch (SW-6) was a sample site added to the sampling program by Dames & Moore and for comparison purposes was analyzed only for organic constituents. None were detected. This water is primarily ground water (as this particular ditch is closed and was constructed strictly for pasture drainage, not irrigation). The laboratory water-quality data indicate that this ditch has not been impacted by contaminants from the tank farm.

GROUND WATER QUALITY

BACKGROUND WATER QUALITY

The water quality at MW-1 to the north and Virginia Murray's well (W-2) to the west of the tank farm monitor ground waters that have not been affected by Maverik's tank farm but that are highly impacted by recharge of good quality irrigation waters that have seeped from the Farmer's Mutual Irrigation Ditch (Plate 9 and Table 2). As indicated in Table 2, the ground water at these two sites is basic (pH = 9.64 and 8) and for ground water in this region, very low in TDS and other common ions (sulfate, chloride, sodium, calcium and bicarbonate). These ground waters are very similar to the water in the Farmer's Mutual Irrigation Ditch.

The TDS concentrations from MW-1 and W-2 are low, at 360 and 600 mg/l, respectively. Sulfate, chloride and sodium concentrations are also low at 176 and 114 mg/l, 26 and 43 mg/l and 44 and 147 mg/l, respectively.

Benzene was the only organic constituent detected at these two sites, at 1.0 ug/l at W-2 and 0.53 ug/l at MW-1. The detection limit at MW-1 was 0.5 ug/l. The duplicate sample from MW-1 did not indicate the presence of benzene above detection limits (Appendix E) and makes its reported detection in MW-1 suspect.

INORGANIC CONSTITUENTS

The ground water quality at the remaining five on-site monitor wells (MW-2, MW-10, MW-11, MW-12 and W-3) varies significantly and is of much poorer quality than at MW-1 and W-2. The primary inorganic constituents found at these well sites include sodium, chloride, sulfate, calcium and bicarbonate. The water quality data are summarized by a series of plots, with the concentration levels as indicated, on Plates 9 through 12.

The Piper diagram in Appendix E (Plate E-5) also summarizes and compares the percentages of the major ions found at the ground water sample sites and demonstrates the wide variability in the ground water quality. TDS levels ranged from the low of 950 mg/l at MW-8 to a high of 3,700 mg/l at MW-13. Based on the Piper diagram, the ground waters would be defined predominately as sulfate-sodium type.

The elevated levels of sodium, chloride, calcium, sulfate, bicarbonate and TDS demonstrates that the ground waters at and around the tank farm are significantly impacted by natural mineralization. The study site is located along the floodplain of the San Juan River along which major ground water discharge zones are typically found (Lyford, 1979). This, in conjunction with flushing of the mineralized zones with waters seeping from the irrigation ditches, can and does result in high levels and significant variability in the levels of the naturally occurring inorganic constituents. The ground surface in the study area is covered with alkaline (white evaporite) deposits, probably calcium carbonate, which is typical in a highly mineralized ground water discharge area.

Based on the 1,000 mg/l contour for TDS (Plate 9), the principal area impacted by ground water discharges and aquifer flushing appears to extend about 1,500 feet east-west and 2,500 feet north-south in the vicinity of the tank farm and irrigation ditches. The concentration contours are consistent with the direction of ground water flow, which is from the north-northeast toward the south-southwest. The concentration contours for TDS, sodium and sulfate also indicate elevated levels of these constituents to the east.

The water quality at all of the off-site monitor wells (MW-3 through MW-9, MW-13 and W-1) is highly variable but generally quite poor. The monitor wells with the poorest water quality, in terms of high levels of TDS, at or above 1,500 mg/l (and up to 3,700 mg/l at MW-13 just west of the tank farm), are all off-site to the west and to the south of the tank farm (MW-3, MW-4, MW-6, MW-9, MW-13, W-1).

With the exception of well W-1 (to the southwest of the tank farm about 200 feet), all of these off-site wells have high sulfate levels above 600 mg/l (to 1,980 mg/l at MW-13), have moderately elevated chloride levels (from 43 mg/l to 288 mg/l at MW-6), moderately elevated sodium levels (from 146 mg/l to 666 mg/l at MW-13), and moderately elevated calcium levels (from 146 mg/l to 364 mg/l at MW-13).

The water quality in well W-1 (R. Ball well) is significantly different than at these other off-site wells. The elevated TDS levels in well W-1 are due, primarily, to the very high chloride and sodium concentrations (1,170 mg/l and 1,020 mg/l, respectively). Sulfate and calcium levels are much lower than in the other wells (433 mg/l and 25 mg/l, respectively). The water quality in this well cannot be readily explained based on one round of water quality data. This well is significantly deeper than the other wells, at 58.8 feet below ground surface (Table B-1). It probably intercepts waters that flowed down the well casing from the gravel zone and came into contact with the lower shale zone. This shale zone would be expected to have significantly different mineralization than the upper gravel zone. Well W-1 is adjacent to the westside irrigation ditch and Highway 489, and since the well is not sealed at ground surface, it may have also received some surface water contamination.

The water quality in MW-13, about 300 feet north of W-1, is somewhat similar to W-1 in that it too is elevated in sodium and chloride. However, sodium and chloride concentrations in MW-13 are still much lower than in W-1, (666 mg/l and 257 mg/l, respectively), but almost five times higher in sulfate (1,980 mg/l). The anomalous water quality at these two sites may be due to a combination of factors, which probably include the depth of W-1, the irrigation ditch, surface contamination and/or ground water discharge.

In addition to the wide variability and elevated levels of the inorganic constituents found in the ground waters both on-site and off-site, an anomalously low sulfate level (16 mg/l) was measured at shallow MW-12 on-site. The ion balance does not indicate an error in the analysis. The water quality

analyses from Round 2 sampling will verify if this sulfate concentration is valid.

ORGANIC COMPOUNDS

The five volatile organic constituents that were found on-site include benzene, toluene, xylene, ethylbenzene and DCA. These were found at very high levels only in shallow MW-12, on-site. A summary of the characteristics of these compounds is listed in Table 4. Benzene, toluene, xylene and ethylbenzene considered "typical" refinery-related volatile organics, are all light 6-8 carbon monocyclic aromatics, have a density less than water, relatively high vapor pressures, are quite soluble in water but do have more of an affinity to stay with an organic phase, and exhibit some moderate adsorption by organic material in soil. Volatilization and biodegradation along with some adsorption are probably the primary mechanisms tending to reduce concentrations of these chemicals in water and soils. Because of these active mechanisms, persistence of these compounds is probably not great.

DCA is used as an additive (lead scavenger) in tetraethyl lead antiknock mixtures added during the production of leaded gasoline; its function is to prevent lead oxide deposits from building up in engines by transforming the combustion products of lead alkyls to forms that are more likely to be vaporized and expelled with exhaust gases. The DCA detected in ground water at and near the tank farm could have resulted from leaded gasoline spills, disposal of waters present in the bottom of leaded gasoline storage tanks, or the leaching of land-disposed leaded tank bottoms.

This 2-carbon alkyl halide has a low molecular weight, but a high density, a high vapor pressure, is highly soluble in water and has a high affinity for the water rather than an organic liquid phase. Because of its low potential for being sorbed onto soil particles it is quite mobile and is often found at the leading edge of ground water contaminant plumes resulting from leaded gasoline spills. The primary removal mechanism of DCA from soil and water is probably volatilization. There is little data to indicate that biodegradation is a significant removal mechanism for this compound.

Although, as noted, DCA is dense (specific gravity of 1.25 gm/cm^3), so called "density effects" (i.e., concentration of this compound in lower parts of the aquifer) would not be expected since the DCA will be in the dissolved state rather than as a separate phase. Support for this contention is provided by comparing the results of the water quality analyses in shallow monitor well MW-12 and adjacent deep monitor well MW-11. In the former, DCA concentrations were measured at 450 ug/l while in the latter DCA was found at the detection limit of 1 ug/l.

Since DCA was the only organic contaminant found at detectable levels (at MW-6, MW-8 and MW-9, off-site and on-site at MW-10, MW-11 and MW-12), it was the only organic constituent for which an isoconcentration plot could be completed (Plate 13). As mentioned, DCA levels on-site were only 1.0 ug/l at MW-11 and 3.2 ug/l at MW-10. The lower DCA level at MW-11 versus MW-10 is believed to be due to dilution effects on MW-11 from the westside irrigation ditch and possibly DCA contaminant movement to the south from MW-12 to MW-10 in this area.

Well W-3, located on-site about 40 feet southeast of MW-12, exhibited xylene and ethylbenzene concentrations of 5.8 ug/l and 1.3 ug/l. The sample from MW-11 on-site also showed benzene at 0.81 ug/l. No DCA was detected in well W-3.

The water quality data from shallow MW-12 on-site shows very high levels of the organic compounds DCA (450 ug/l), total xylene (3,000 ug/l), ethylbenzene (1,300 ug/l), toluene (2,000 ug/l) and benzene (19,000 ug/l). The water sample from MW-12 was contaminated with free product and therefore is not truly representative of the shallow ground water at MW-12. This monitor well was constructed as the shallow nested monitor well next to deep well MW-11. MW-12 monitors the shallow silty-clayey sandy zone (2 to 12 feet) which overlies the deeper alluvial gravel zone monitored by MW-11 (23 to 33 feet). A comparison of the water quality in these two wells can be made from examining Table 2.

may not be representative of dissolved phase but does represent ground water with floating product

Although the upper silty-clayey zone at MW-12 is highly contaminated in this area, the deeper primary alluvial aquifer zone is not. The completion depths for MW-12 and MW-11 were based on the lithology and OVA readings of the drill cuttings (see Appendix E). As previously discussed, the only organic compounds detected at MW-11 were DCA (1.0 ug/l) and benzene (0.81 ug/l), both at very low levels, near detection limits. Based on the existing data, it appears that a gasoline spill may have occurred in this area but only penetrated the upper low permeability silty-clayey sand zone.

Off-site, organic contaminant levels are extremely low with xylene, ethylbenzene and benzene being found at or just above detection levels in nearby off-site monitor wells MW-13, W-1 and W-2. MW-13 and W-1 are located directly to the southwest and within 200 feet of the tank farm boundaries. Total xylene and ethylbenzene were measured at 2.23 ug/l and 0.54 ug/l, respectively, at MW-13. Ethylbenzene was measured at 0.89 ug/l at W-1 and benzene was measured at 1.0 ug/l at W-2. W-2 is located about 600 feet west of the tank farm's western boundary.

Total organic lead (TOL) was detected at very low concentrations at MW-6, MW-7 and MW-11, at 0.004 mg/l, 0.02 mg/l and 0.007 mg/l, respectively. Detection limits were 0.002 mg/l, 0.02 mg/l and 0.004 mg/l, respectively. Organic lead (primarily tetraethyl) is a relatively high molecular weight, dense, 8-carbon compound which has a very low water solubility, probably a high affinity for an organic phase, and has a high potential for being adsorbed by soils and sediments (Table 4). These data suggest that while organic lead would not be highly mobile, it would be highly persistent, slowly degrading to other organic and eventually inorganic compounds.

Based on the fact that the analysis for TOL is difficult, that very low TOL levels were detected in these three monitor wells, and that no TOL was detected at the highly contaminated shallow monitor well (MW-12) on-site, (Detection Limit = 0.02 mg/l) Dames & Moore believes these TOL results should be viewed with caution and interpretation of their significance should await the results of additional testing.

Yes

area impacted includes more than this
what about product seeping into ditch
MW-12 area should be in head of plume

Based on the concentration contour plot for DCA of 10 ppb (the New Mexico MCL for drinking water), the area impacted by the tank farm is about 200 feet in an east-west direction and 1,800 feet in a north-south direction (Plate 13). As previously discussed, the only ground water off-site that exceeded the drinking water standard of 10 ppb of DCA was at monitor well 6, at which DCA levels were measured at 16.0 ug/l. This well is located approximately 1,200 feet southwest of the Maverik tank farm property boundary. These data verify the New Mexico EID 1985 and 1987 water quality test results that ground water contamination off-site in the private wells to the southwest is limited to DCA contamination at very low levels in a limited number of wells. This is further discussed in Appendix F. In the EID surveys, only the Miller-Jackson #1 well and W. Walker well exhibited DCA levels above detection limits, at 8 ug/l and 1 ug/l, respectively. The Miller-Jackson #1 well is located close to MW-6 in which a DCA level of 16 ug/l was detected in November 1987 as part of this investigation.

Monitor well 8 and well W-1, located to the southwest of the property boundary only 400 feet and 200 feet, respectively, and in line with and upgradient of MW-6, both intercepted ground waters with very low and non-detectable DCA levels of 2.8 ug/l and 1 ug/l, respectively. Based on the concentrations of the common ions and DCA levels in these two wells (Plates 9 to 13) these wells have probably been strongly impacted by recharge from the irrigation ditches. The low to non-detectable levels of DCA in these wells may be due to dilution from recharge from irrigation ditch seepages. This could explain why a well farther from the site (MW-6), could have higher contaminant levels of DCA (at 16 ug/l) than would be detected in wells closer to the source area. Both DCA and organic lead, where detected, were present at very low concentrations in the off-site monitor wells (see Table 2, Plate 13 and Appendix E).

MW-13 - shallow
MW-6, 9, 8 at approx. same elev.

Head of DCA plume should include MW-12

CONCLUSIONS

This Phase I hydrogeologic and water quality investigation at the Maverik Refinery and Tank Farm near Kirtland, New Mexico has produced the following major findings:

1. Significant concentrations of the typical refinery-related volatile organics benzene, toluene, xylene, ethylbenzene and 1,2-dichloroethane (DCA) were found in one of six monitor wells installed at the refinery tank farm.

2. Benzene, xylene or ethylbenzene were 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, at 16 ug/l, exceeded the New Mexico drinking water standard.

3. In more than 25 off-site private wells tested by the NMEID or Dames & Moore, DCA was found in two wells, benzene in another and ethylbenzene in yet another; without exception, the concentrations were below New Mexico's drinking water standards for these compounds. These wells are utilized for irrigation or stock-watering purposes rather than for drinking water.

4. Product seepage was observed from one area in the tank farm to the westside irrigation ditch. However, even under the low flow conditions which existed at the time of sampling, off-site downstream contamination of this water body was not significant.

5. The shallow alluvial aquifer that has been impacted by the tank farm is rapidly flushed as a result of its high permeability, recharge from the irrigation ditches, and the large volumes of water that move through this aquifer. This results in very low levels of contaminants observed in the monitor wells downgradient from the tank farm, and in particular the private water wells closer to the irrigation ditches. These private wells 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 has been estimated at 3 ft/day to the southwest toward the San Juan River.

6. Contamination of the shallow alluvial aquifer and westside irrigation ditch from the tank farm appears to have occurred over an area only a few hundred feet wide in an east-west direction and about 1,800-feet long in a north-south direction toward the San Juan River. Off-site contamination appears to be strongly influenced by the direction of and flows in the irrigation ditches and may be

restricted to a more permeable alluvial (gravel, cobble, sand) zone that trends northeast to southwest to the San Juan River.

7. The low concentrations of the contaminants detected off-site, their characteristics, the hydrogeologic setting, and the non-use of water from private wells in the contaminated area for drinking water purposes, all lead to the conclusion that the releases from the tank farm do not pose a threat to human health and the environment.

Pure product could pose H+E threat
DCA in MW-6 above standards and
therefore could pose possible Health threat

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TABLE 1

LABORATORY WATER QUALITY PARAMETERS

HALOGENATED VOLATILE ORGANICS EPA METHOD 601	INORGANIC PARAMETERS	EPA METHOD
Bromoform	pH	150.1
Carbon tetrachloride	Specific Conductance @ 25C	120.1/9050
Chlorobenzene	Total Dissolved Solids	160.1
Chloroethane	Fluoride	340.2
Chloroform	Chloride	300.0
Dibromochloromethane	Nitrate + Nitrite as N	353.2
Bromodichloromethane	Sulfate	300.0
1,1-Dichloroethane	Total Alkalinity as $CaCO_3$	310.1/403
1,2-Dichloroethane	Bicarbonate Alkalinity	310.1/403
1,1-Dichloroethene	Carbonate Alkalinity as $CaCO_3$	310.1/403
1,2-Dichloropropane	Ammonia as N	350.1
cis-1,3-Dichloropropene		
trans-1,3-Dichloropropene		
Bromoethane		
Chloromethane		
Methylene chloride		
1,1,2,2-Tetrachloroethane		
Tetrachloroethene		
trans-1,2-Dichloroethene		
1,1,1-Trichloroethane		
1,1,2-Trichloroethane		
Trichloroethene		
Vinyl chloride		
1,1,2-Trichloro-2,2,1-trifluoroethane		
1,2-Dibromoethane (EDB)		

AROMATIC VOLATILE ORGANICS EPA METHOD 602	METALS PARAMETERS	
Benzene	Calcium	200.7
Chlorobenzene	Iron	200.7
Ethylbenzene	Magnesium	200.7
Toluene	Potassium	200.7
1,2-Dichlorobenzene	Sodium	200.7
1,3-Dichlorobenzene	Total Organic Lead	ENSECO Special
1,4-Dichlorobenzene		
m-Xylene		
o & p-Xylene(s)		

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

TABLE 2

LABORATORY RESULTS FOR DETECTED ORGANIC CONSTITUENTS AND MAJOR IONS
FOR MAVERIK COUNTRY STORES, INC., KIRTLAND, NEW MEXICO

ROUND 1

(Sampled November 10-27, 1987)

Sample Site Designation	1-2 DCA (ug/l)	Total Xylene (ug/l)	Ethylbenzene (ug/l)	Toluene (ug/l)	Benzene (ug/l)	pH (field)	TDS mg/l	Sulfate mg/l	Chloride mg/l	Sodium mg/l	Calcium mg/l	Total Alkalinity as $CaCO_3$ mg/l
NM MCL	10	620	750	750	10	6-9	1,000	600	250	NA	NA	NA
EPA MCL	5	NA	NA	2,000	5	6.5-8.5	500	250	250	NA	NA	NA
Wells												
On-Site												
MW1	< 1	< 0.5	< 0.5	< 0.5	0.53(1)	9.64	360	176	26	44	44	34
MW2	< 1	< 0.5	< 0.5	< 0.5	< 0.5	7.75	1,360	526	67	243	152	309
MW10	3.2	< 0.5	< 0.5	< 0.5	< 0.5	7.66	1,240	568	46	250	126	255
MW11	1.0	< 0.5	< 0.5	< 0.5	0.81	7.85	1,250	592	45	234	138	267
MW12(4)	450. *	3,000. *	1,300. *	2,000. *	19,000. *	6.74	1,200	16	321	222	148	508
W-3	< 1	5.8	1.3	< 0.5	< 0.5	-	-	-	-	-	-	-
Off-Site												
MW3	< 1	< 0.5	< 0.5	< 0.5	< 0.5	7.78	1,620	670	97	349	148	358
MW4	< 1	< 0.5	< 0.5	< 0.5	< 0.5	7.46	1,540	654	87	337	142	332
MW5	< 1	< 0.5	< 0.5	< 0.5	< 0.5	7.85	1,250	499	68	258	129	397
MW6	16*	< 0.5	< 0.5	< 0.5	< 0.5	7.51	2,130	843	288	386	230	367
MW7	< 1	< 0.5	< 0.5	< 0.5	< 0.5	7.66	1,400	558	126	256	152	277
MW8	2.8	< 0.5	< 0.5	< 0.5	< 0.5	7.41	950	401	67	166	159	273
MW9	8.3	< 0.5	< 0.5	< 0.5	< 0.5	7.11	1,520	863	43	146	324	372
MW13	< 1	2.23	0.54	< 0.5	< 0.5	8.14	3,700	1,980	257	666	364	419
R. Ball Well (W-1)	< 1	< 0.5	0.89	< 0.5	< 0.5	7.96	2,300	433	1,170	1,020	25	221
V. Murray Well (W-2)	< 1	< 0.5	< 0.5	< 0.5	1.0	8.06	600	114	43	147	42	368
Farmer's Mutual Irrigation Ditch												
SW1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	8.5	400	136	16	29	86	159
West Side Irrigation Ditch												
SW4(4)	<10	61	<10	<10	<10	7.28	790	147	29	40	113	253
SW5(4)	<250 *	57,000 *	2,500 *	470	<250 *	-	-	-	-	-	-	-
SW2	1.1	1.6	< 0.5	< 0.5	< 0.5	7.6	1,120	476	49	159	162	277
SW3	< 1	< 0.5	< 0.5	< 0.5	< 0.5	8.05	1,400	602	77	223	178	297
V. Murray's Drainage Ditch												
SW6	< 1	< 0.5	< 0.5	< 0.5	< 0.5	7.28	-	-	-	-	-	-

Drill Cuttings Sample

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

Footnotes:

(1) Benzene was not detected in a blind duplicate of this sample.

(2) The values indicated as less than (<) are detection limits only, and not actual concentrations.

(3) Sample sites SW-4, SW-5, and MW-12 were contaminated with product and not representative of the water itself.

(4) Volatile organics in samples for MW-12, SW-4 and SW-5 were analyzed using GC/MS methods. All other samples were analyzed using GC methods.

TABLE 3

PROPOSED PROJECT WORK SCHEDULE

MAVERIK KIRTLAND, N.M. REFINERY INVESTIGATIONS

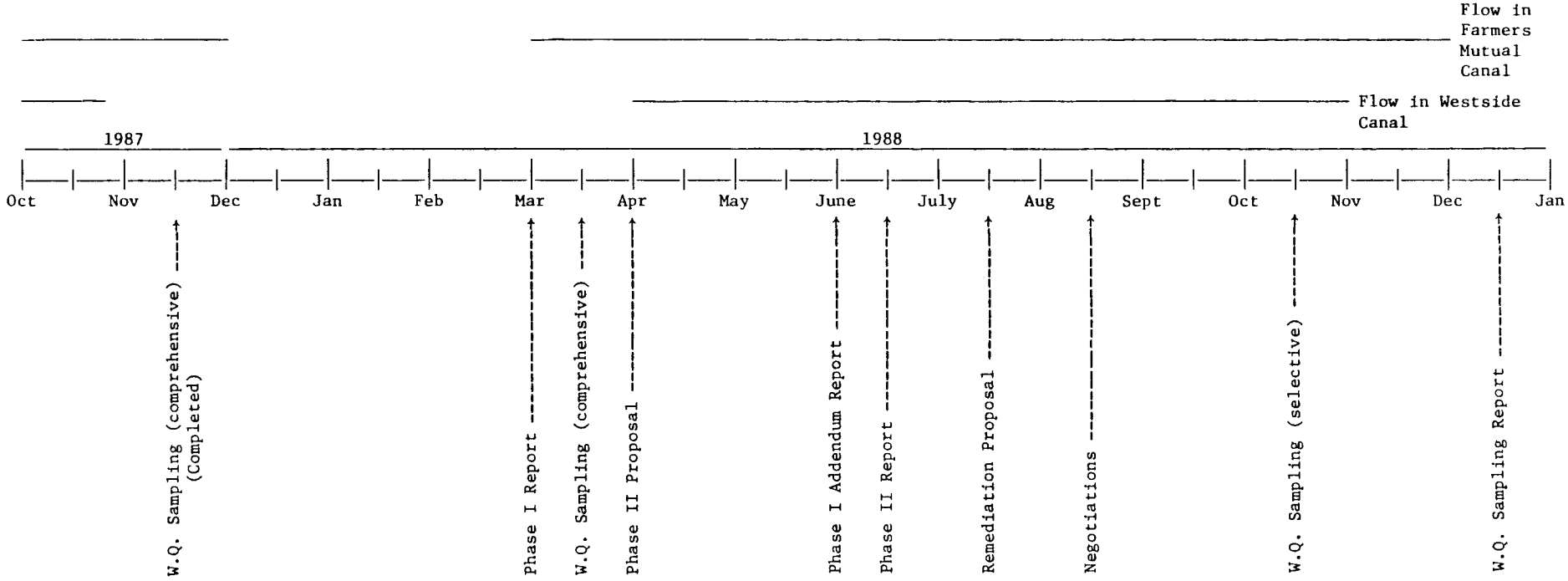


TABLE 4

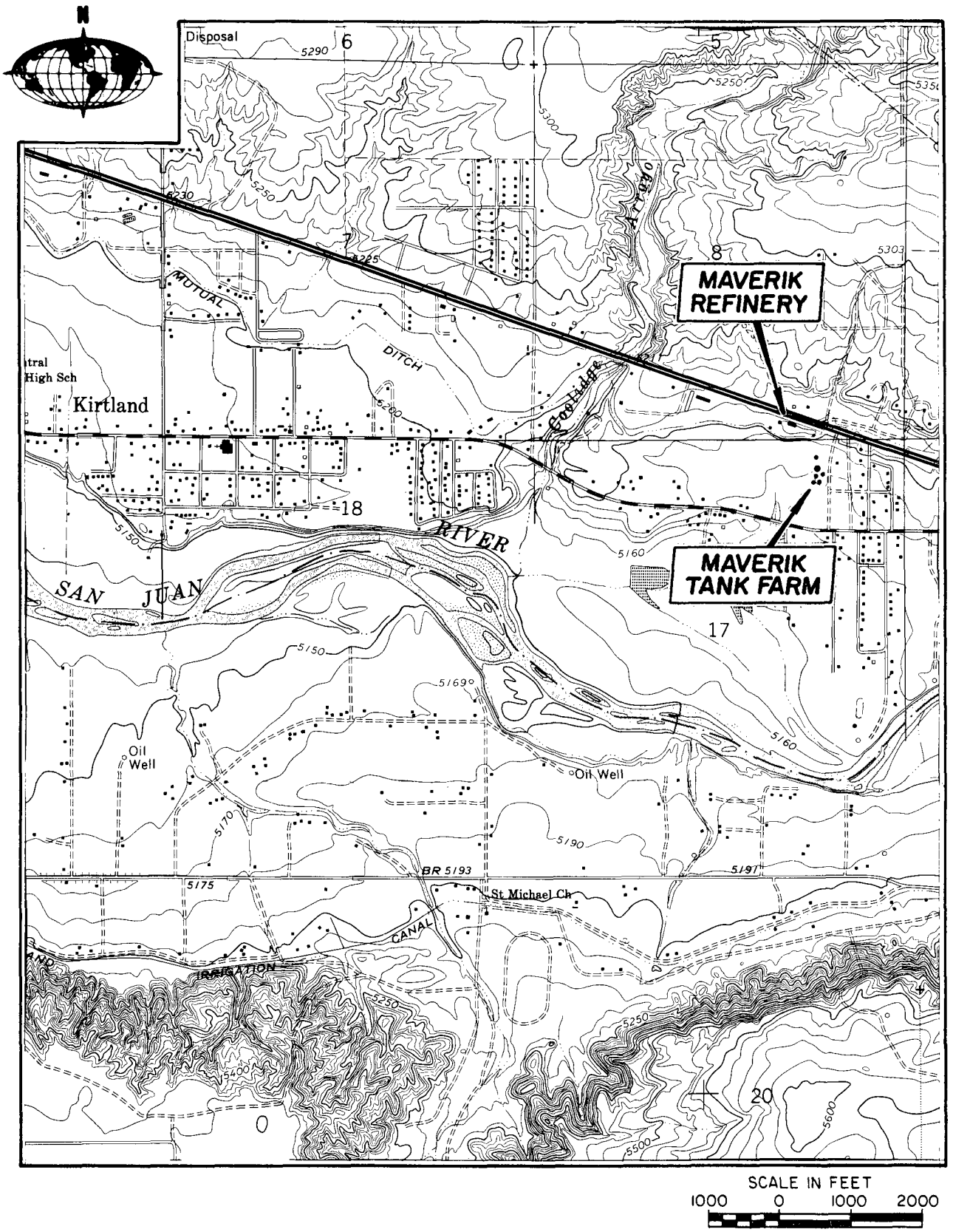
CHARACTERISTICS OF ORGANIC COMPOUNDS DETECTED

	Molecular Weight	Density (gm/cm^3)	Water Solubility (mg/l)	Vapor Pressure (mm Hg)	K_{oc}(1) (ml/g)	K_{ow}(2)
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	-

(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; and of Appendix VIII Constituents in Petroleum Industry Wastes, American Petroleum Institute Publication 4379, May 1984.



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

N

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

489
550

HIGHWAY
HIGHWAY

APPROXIMATE PROPERTY BOUNDARY

U.S.

NEW MEXICO

SAN JUAN RIVER

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

SG30
GW29
MW2
GW28
D
MW1
B
GW31
SG6
GW27
TANK
MW12
W3
FARM
MW10
SW1
SG8
SG7
MW11
WP5
SW5
WESTSIDE IRRIGATION DITCH
ST1
SG9
SW4
SW,GW10
GW22
SW13,13D
SW2
ST3
GW18
SG11
SG13
MW13
W1
MW7
C
MW9
GW17
B1
GW20
WP4
SW6
ST2
SG12
DRAINAGE DITCH
SG4,GW25
MW8
GW23
GW2,GW24
GW1
SG5
W2
MW5
SG,GW16
WP2
A
E
GW3
MW6
SG,GW14
WP1
F
MW3
GW19
WP3
GW26
SW3
ST4
GW15
MW4
FARMER'S MUTUAL IRRIGATION DITCH
REFINERY
MAVERIK STORE
ST5
MARSH

LEGEND

- PRIVATE WELL LOCATION
- EXISTING WELL LOCATION SAMPLED (W1 – W3)
- WELL POINT LOCATION (WP1 – WP5)
- MONITOR WELL LOCATION (MW1 – MW13)
- BORING LOCATION (B1)
- TRC SOIL–GAS AND WATER SURVEY POINT LOCATION (SG, GW1 – GW31, SW13 & SW13D)
- STAFF GAUGE LOCATION (ST1 – ST5)
- SURFACE WATER SAMPLE SITE LOCATION (SW1 – SW6)
- CROSS SECTION LOCATION (A–B, C–D, E–F)

200 0 200 400
SCALE IN FEET

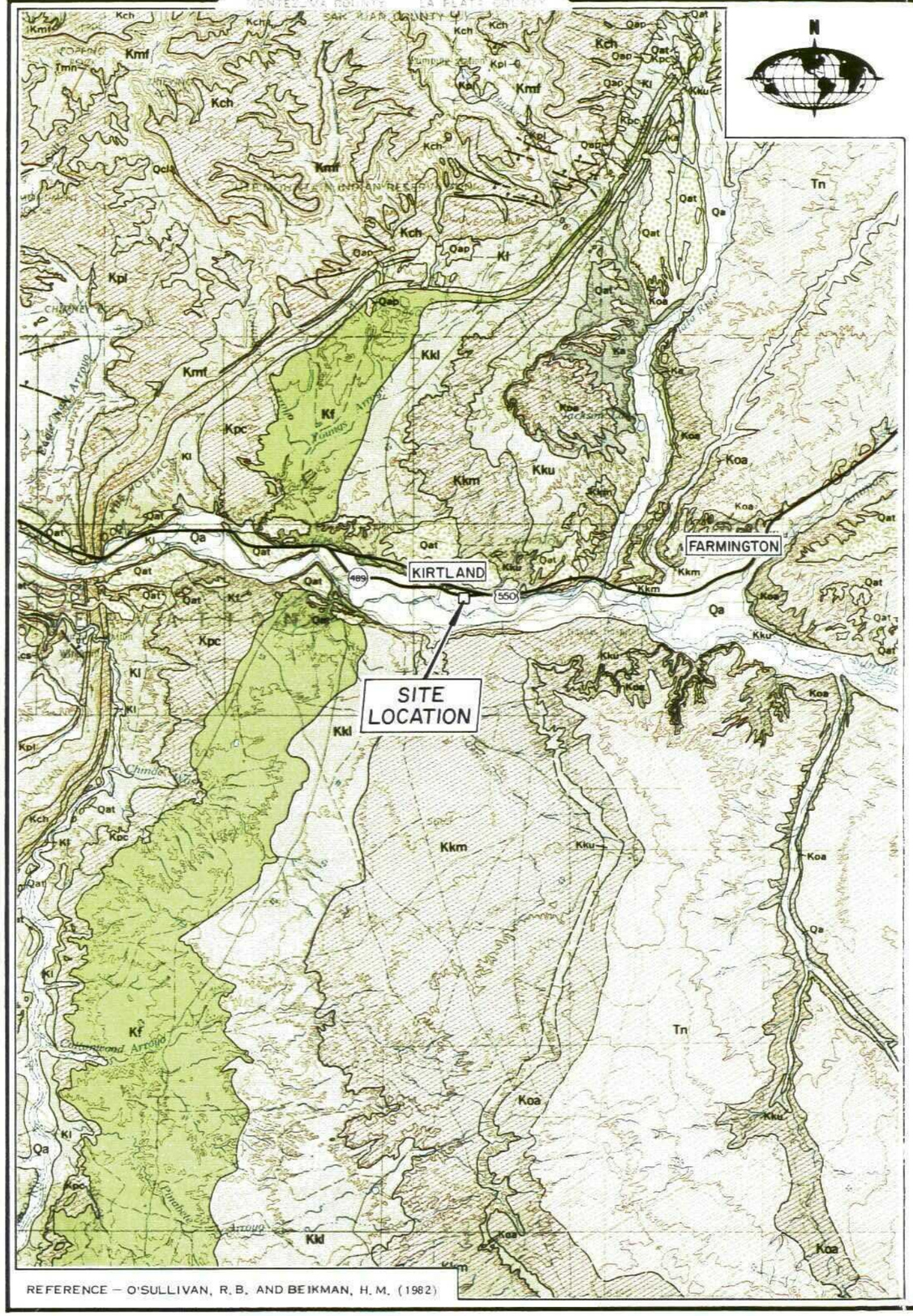
REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

SITE SAMPLING LOCATION MAP

MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO

Dames & Moore

PLATE 2



REFERENCE — O'SULLIVAN, R. B. AND BEIKMAN, H. M. (1982)

EXPLANATION

Recent	Qa — Alluvium	Qcl — Landslide debris	QUATERNARY
	Qap — Pediment gravel	Qat — Terrace gravel	
Eocene	Tsj — San José formation of Simpson (1948)		TERTIARY
Paleocene	Tn — Nacimiento formation		
	Koa — Ojo Alamo sandstone		
	Ka — Animas formation		
Upper Cretaceous	Kch — Cliff House sandstone*		CRETACEOUS
	Kmf — Menefee formation*		
	Kpl / Kph — Point Lookout sandstone*		
	Kms / Kmu / Km / Kmm / Kml — Mancos shale*		
	Kmd — Mancos shale and Dakota sandstone, undifferentiated		
	Kd — Dakota sandstone		
	UNCONFORMITY		
Lower and Upper Cretaceous	Kku / Kkm / Kkl — Kirtland shale	Kkf — Kirtland shale and Fruitland formation*	
	× Kf — Fruitland formation*		
	Kpc — Pictured Cliffs sandstone*		
	Kl — Lewis shale*		

Contact
Dashed where approximately located

Fault, showing downthrown side
Dashed where approximately located

Jte ← Jt → Je
Limit of deposition of a formation or member

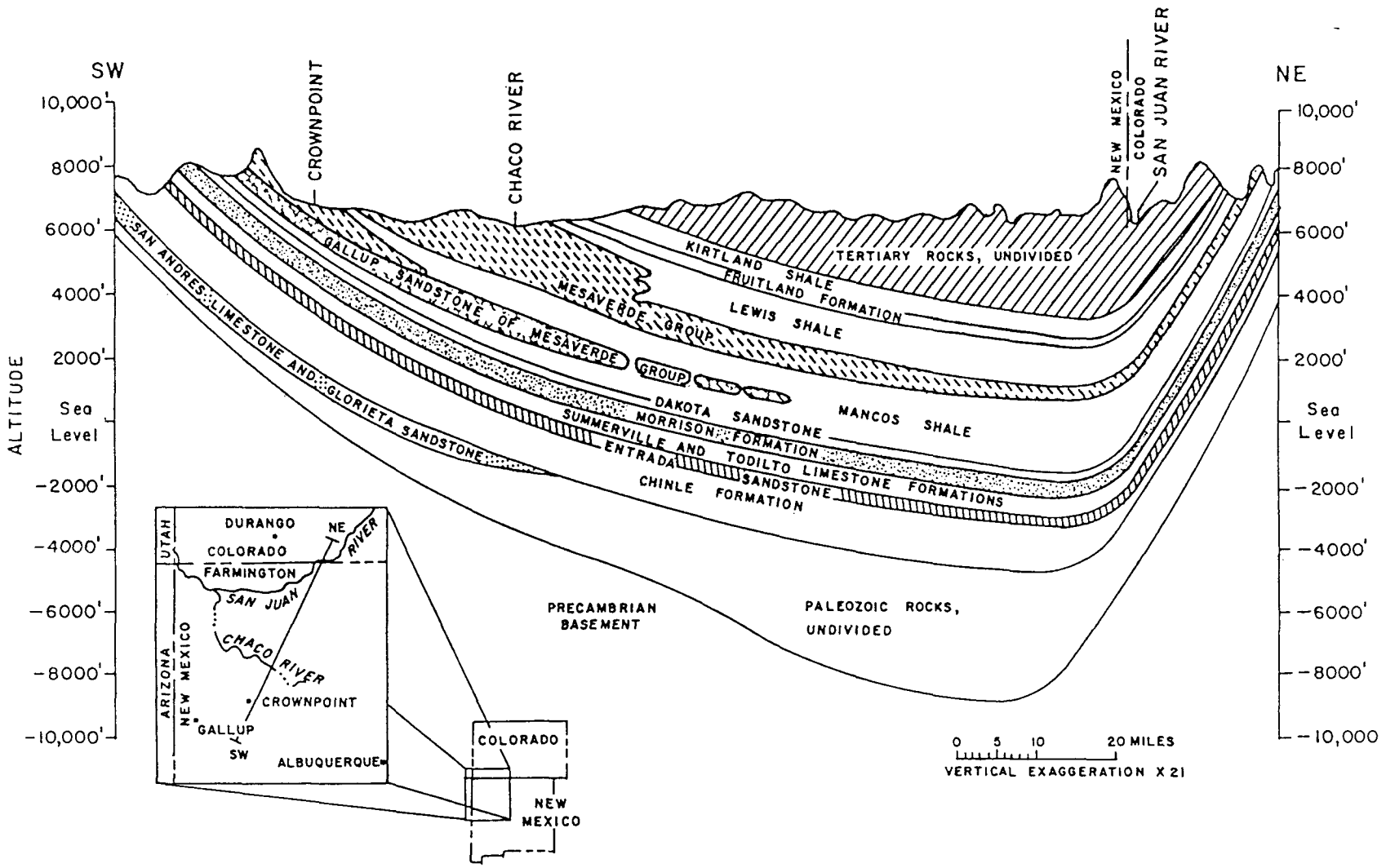
SCALE 1:250,000
5 0 5 MILES
CONTOUR INTERVAL 200 FEET
DATUM IS MEAN SEA LEVEL

REGIONAL GEOLOGIC MAP AND STRATIGRAPHIC SECTION

Dames & Moore

PLATE 3

FILE 14112-001 BY S.S. DATE 4/84 CHECKED BY TJV DATE 4/84



REGIONAL GEOLOGIC SECTION SHOWING MAJOR AQUIFERS (PATTERNS) IN THE SAN JUAN BASIN

Dames & Moore

PLATE 4

FILE 4382.002-05 BY STS DATE 12-7-82 CHECKED BY ____ DATE ____

SOUTHWEST — A — 2464' — B — NORTHEAST

ELEVATION IN FEET

5200
5190
5180
5170
5160
5150
5140
5130

SAN JUAN RIVER

MW-5
TOPSOIL
SC
GW

B-1
TOPSOIL
GW
CL
MH
KIRTLAND SHALE FORMATION (DRY)

GROUND WATER DISCHARGE ZONE

MW-10
TOPSOIL,FILL
SC
GW
SW
CL
MH
KIRTLAND SHALE FORMATION (DRY)

TANK FARM

MW-11,12
FILL
SC-SM
(MW-12)
CL
(MW-11)
GW
COARSER
CL
MH
KIRTLAND SHALE FORMATION (DRY)

MW-1
FILL,GC
SP
SW-GC
GC
CL

RIVER CHANNEL DEPOSITS

5210
5200
5190
5180
5170

SCALES IN FEET
0 333
HORIZONTAL
0 10
VERTICAL

WATER LEVEL GRADIENT

MW-1 — MW-5 = 29.72'/2464'= 0.012 ft./ft.

LEGEND

WATER LEVEL

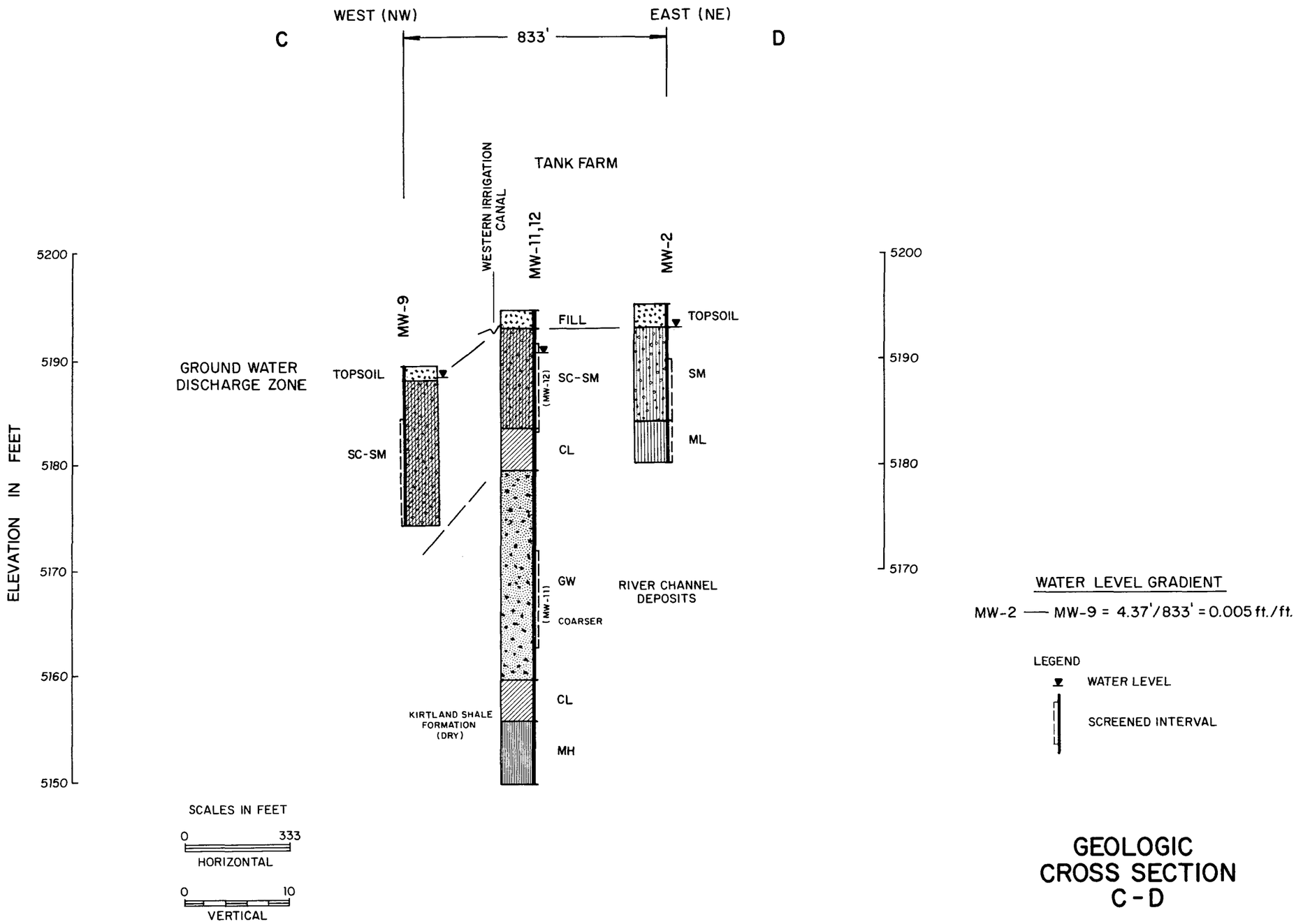
SCREENED INTERVAL

GEOLOGIC CROSS SECTION A-B

Dames & Moore

PLATE 5

46612 (11-82)



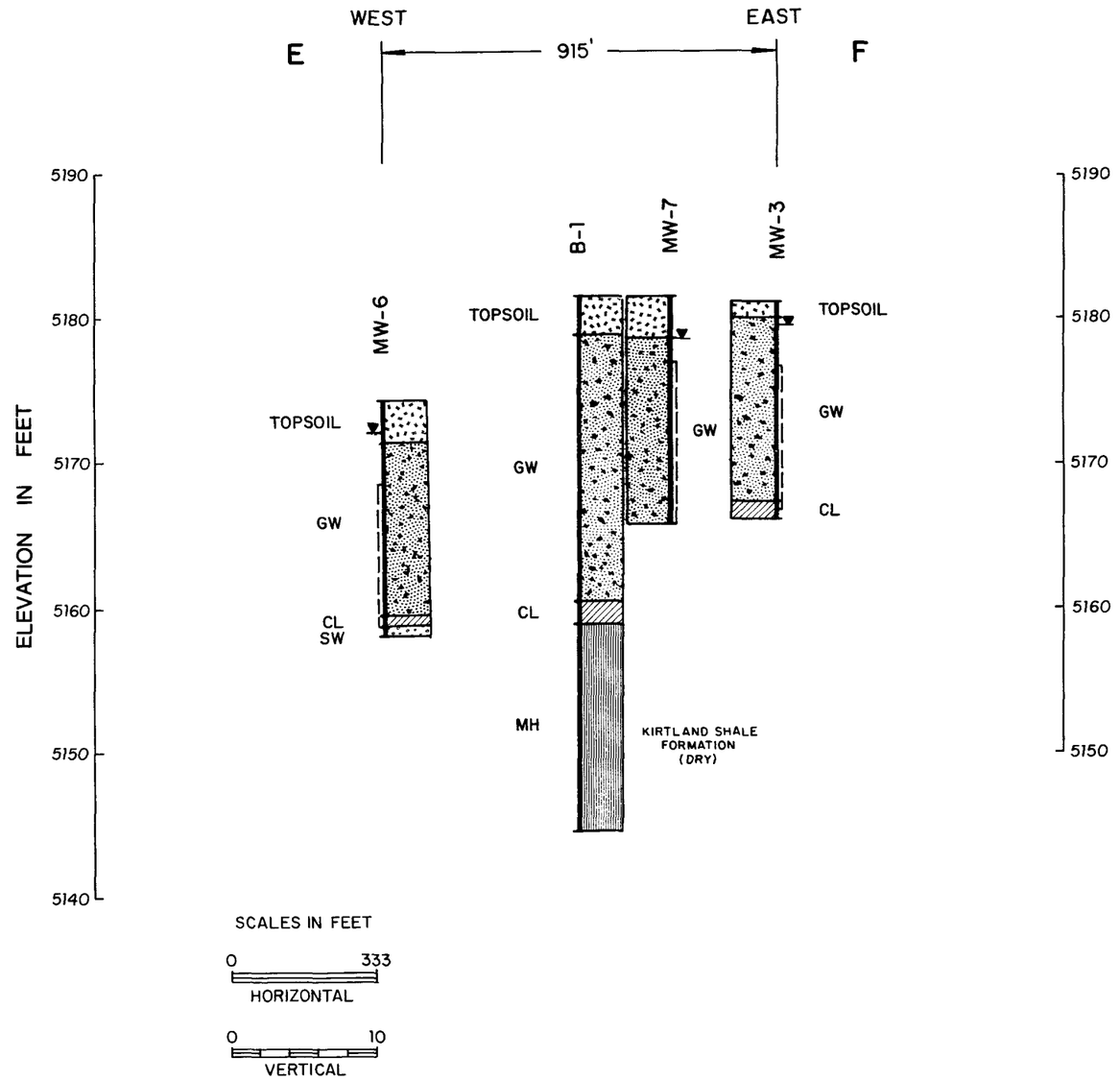
GEOLOGIC CROSS SECTION C - D

Dames & Moore

PLATE 6

FILE 14512-001-001 BY STS DATE 4-27-88 CHECKED BY _____ DATE _____
MAXFIELD REFINERY

46612 (11-82)



SCALES IN FEET

0 333

HORIZONTAL

0 10

VERTICAL

WATER LEVEL GRADIENT

MW-3 — MW-6 = 7.57'/915' = 0.008 ft./ft.

LEGEND

WATER LEVEL

SCREENED INTERVAL

GEOLOGIC CROSS SECTION E-F

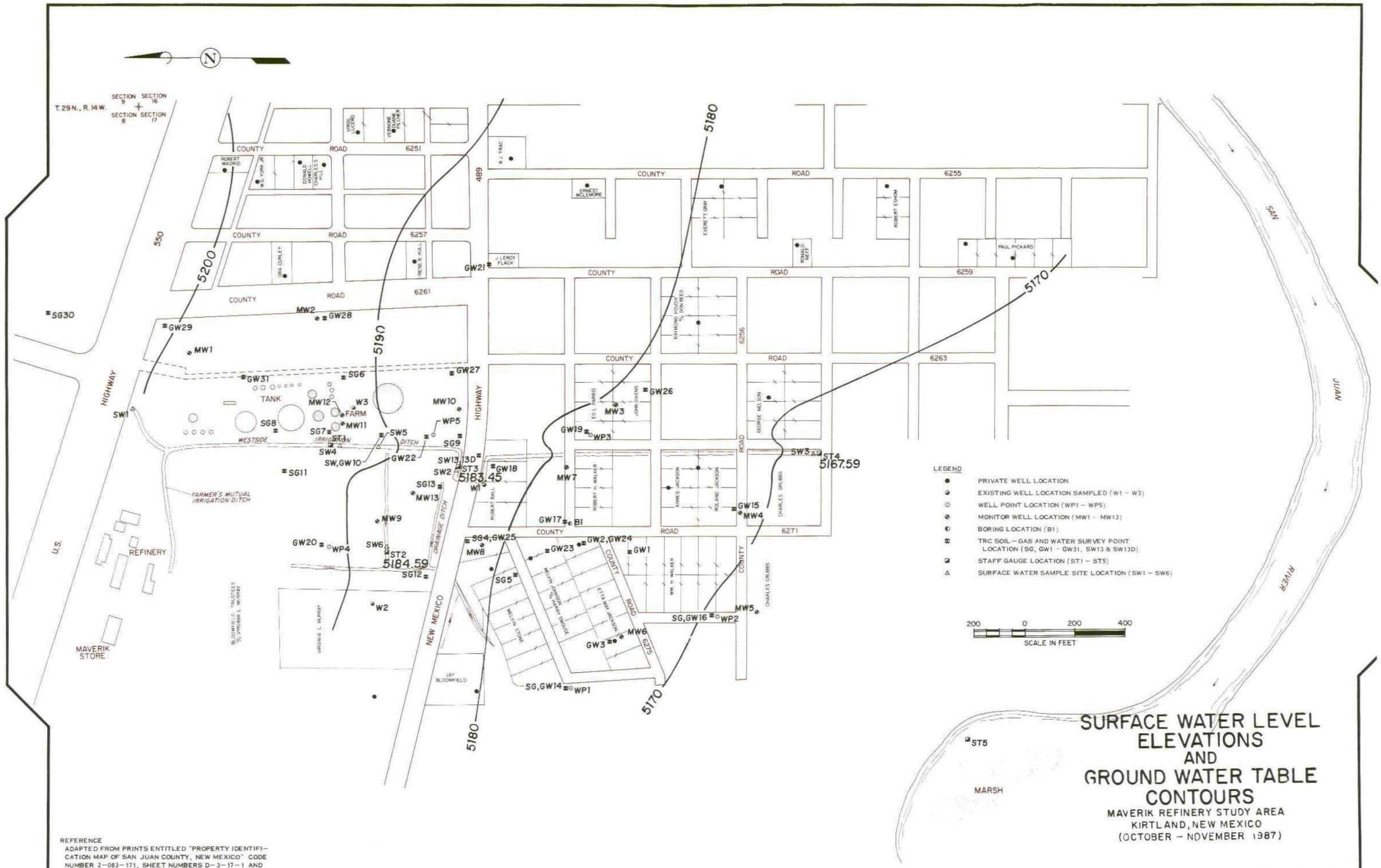
Dames & Moore

PLATE 7

FILE 14189-015-031 BY 525 DATE 6-22-82 CHECKED BY _____ DATE _____

MINERAL REFINERY

46612 (11-82)



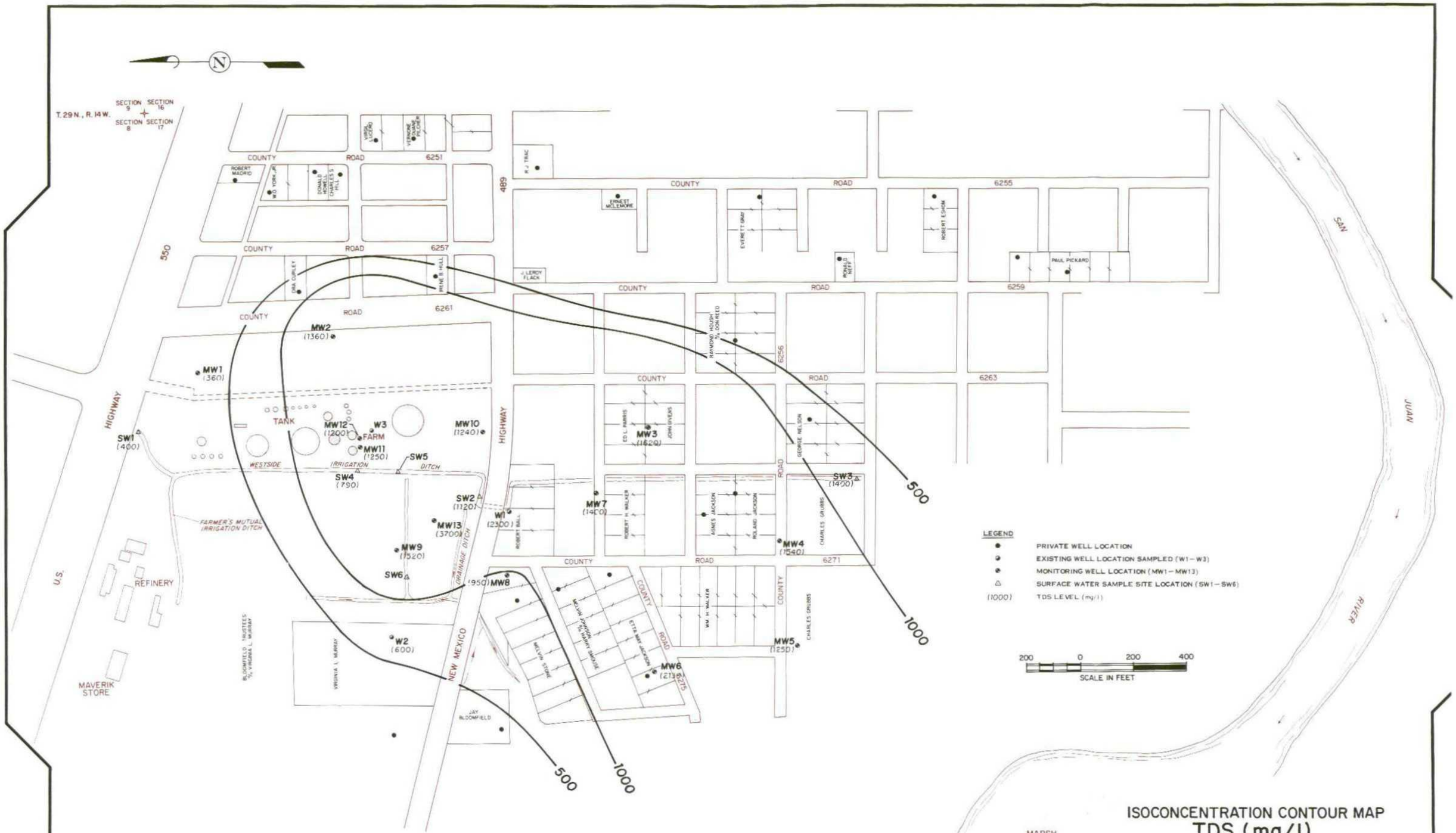
SURFACE WATER LEVEL ELEVATIONS AND GROUND WATER TABLE CONTOURS

MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(OCTOBER – NOVEMBER 1987)

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 8

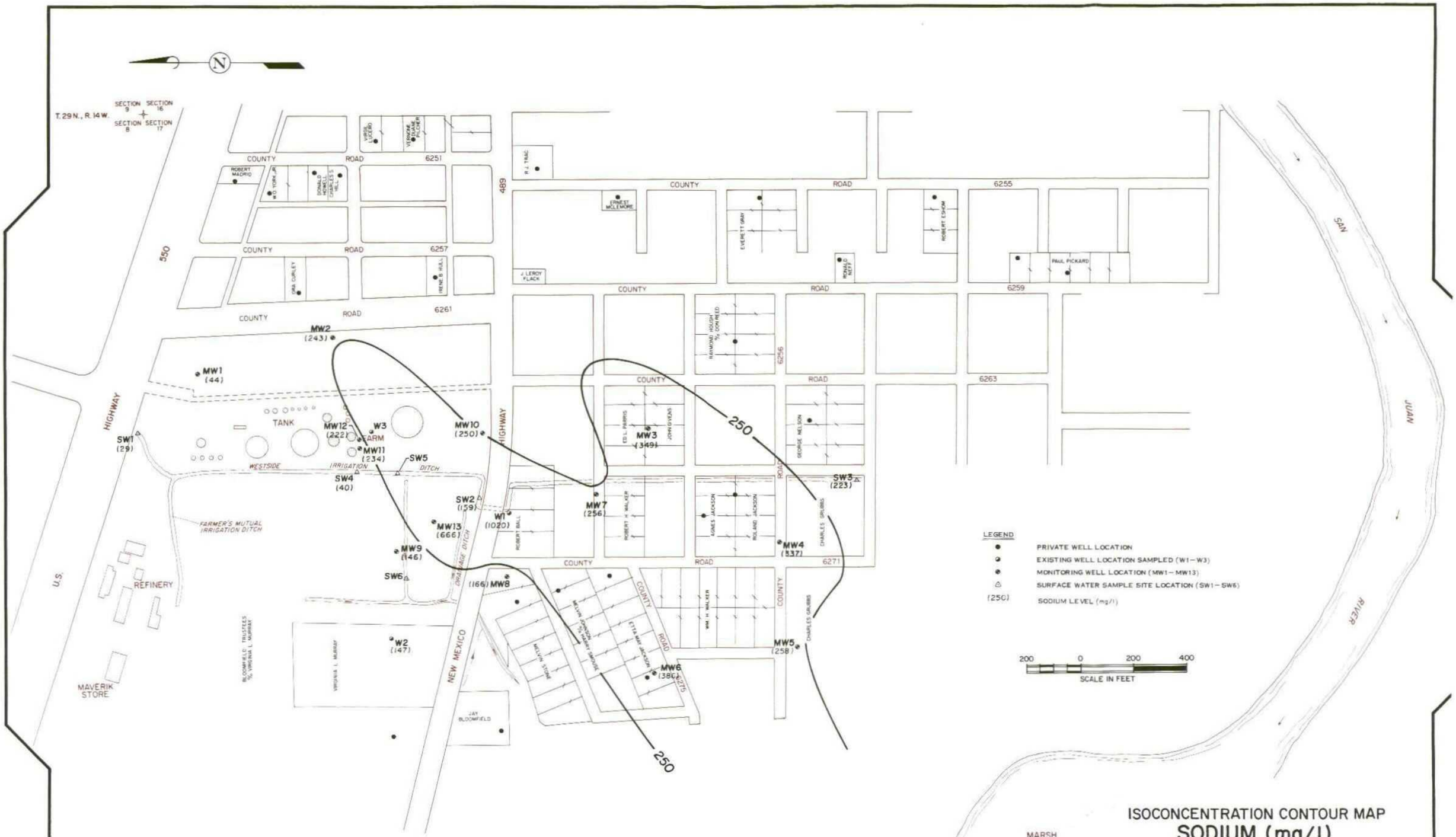


REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

ISOCONCENTRATION CONTOUR MAP
TDS (mg/l)
GRAVEL ZONE
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(NOVEMBER, 1987)

Dames & Moore

PLATE 9

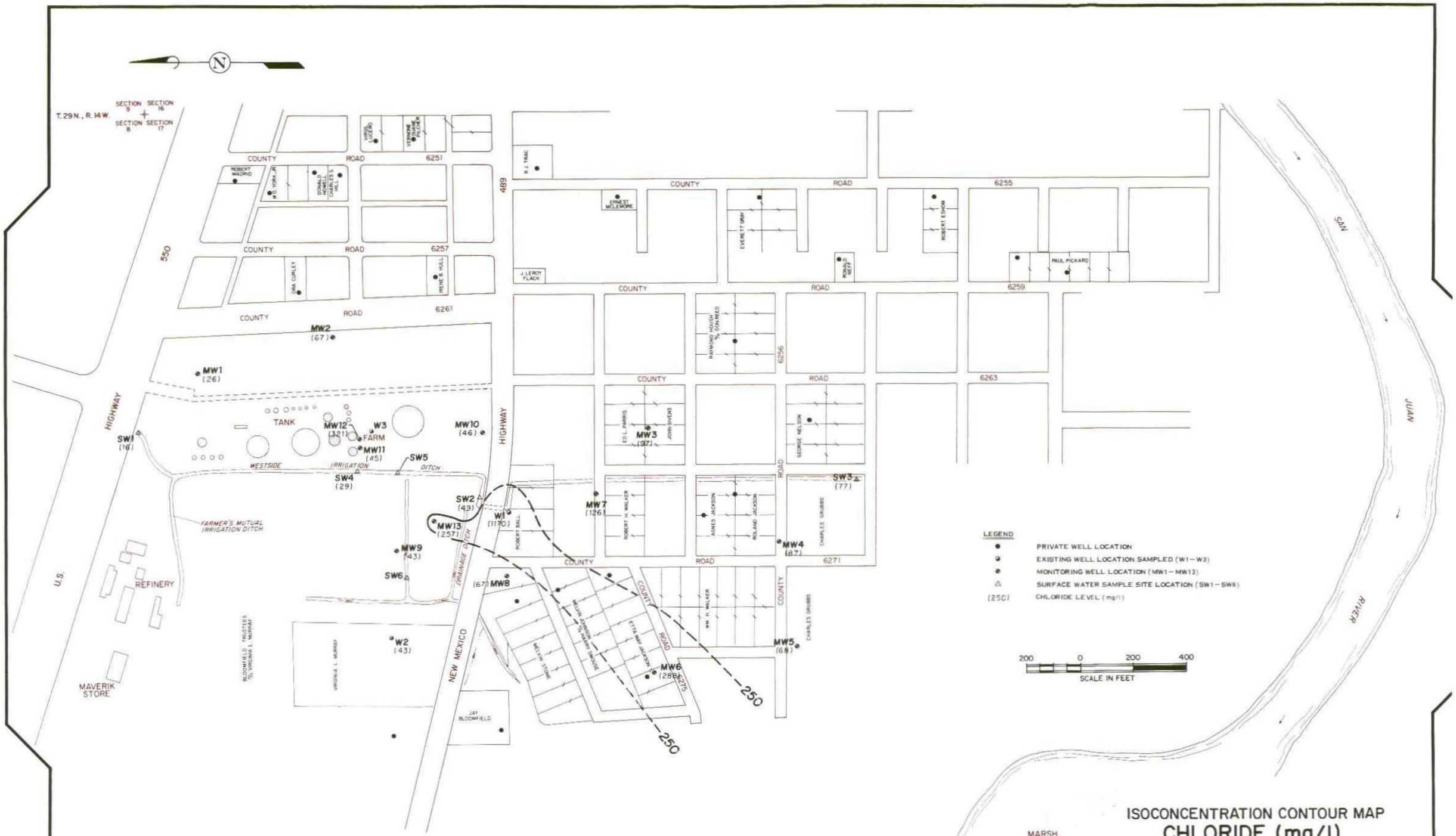


REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

ISOCONCENTRATION CONTOUR MAP
SODIUM (mg/l)
GRAVEL ZONE
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(NOVEMBER, 1987)

Dames & Moore

PLATE 10

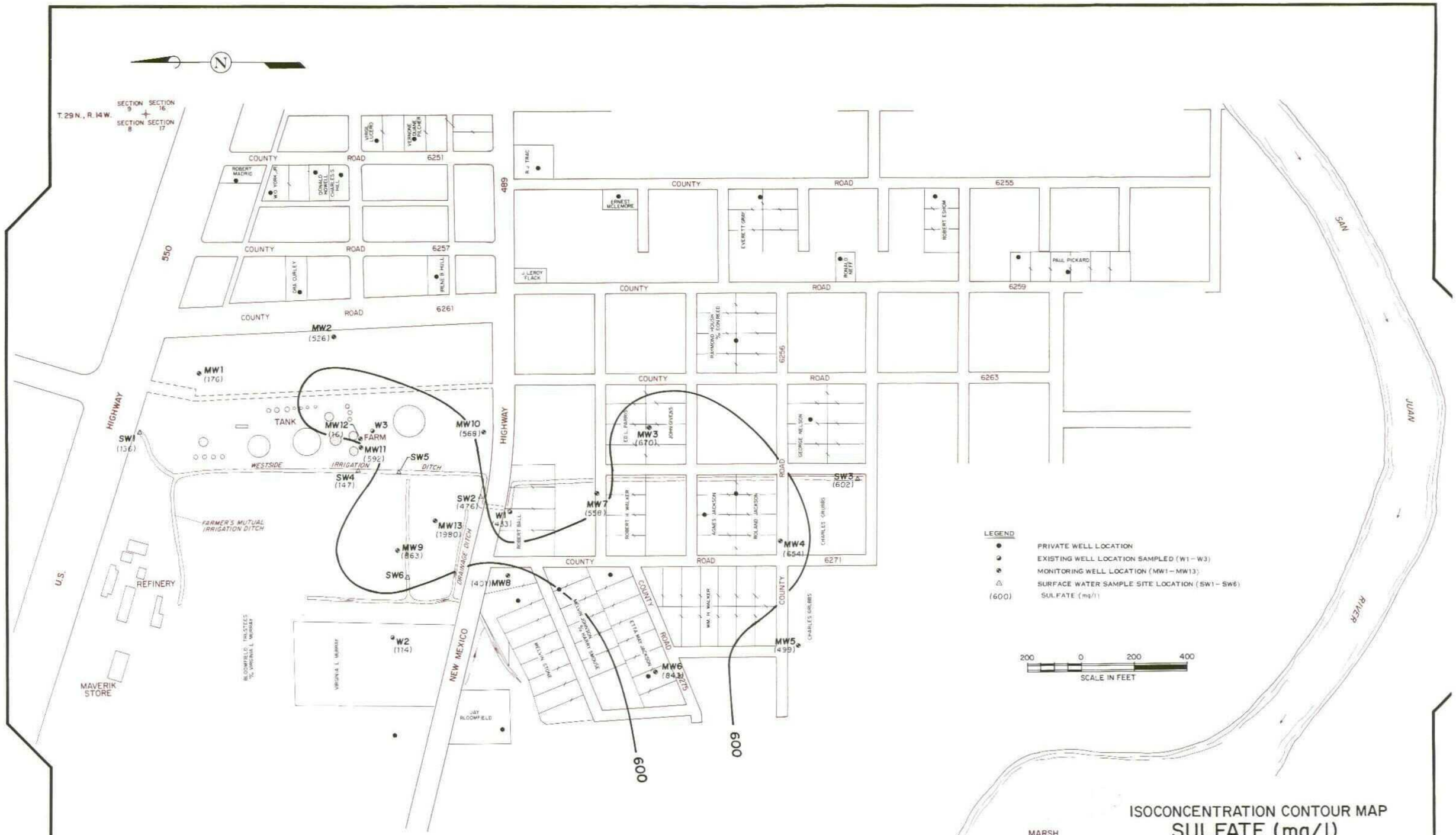


REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

ISOCONCENTRATION CONTOUR MAP
CHLORIDE (mg/l)
GRAVEL ZONE
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(NOVEMBER, 1987)

Dames & Moore

PLATE 11

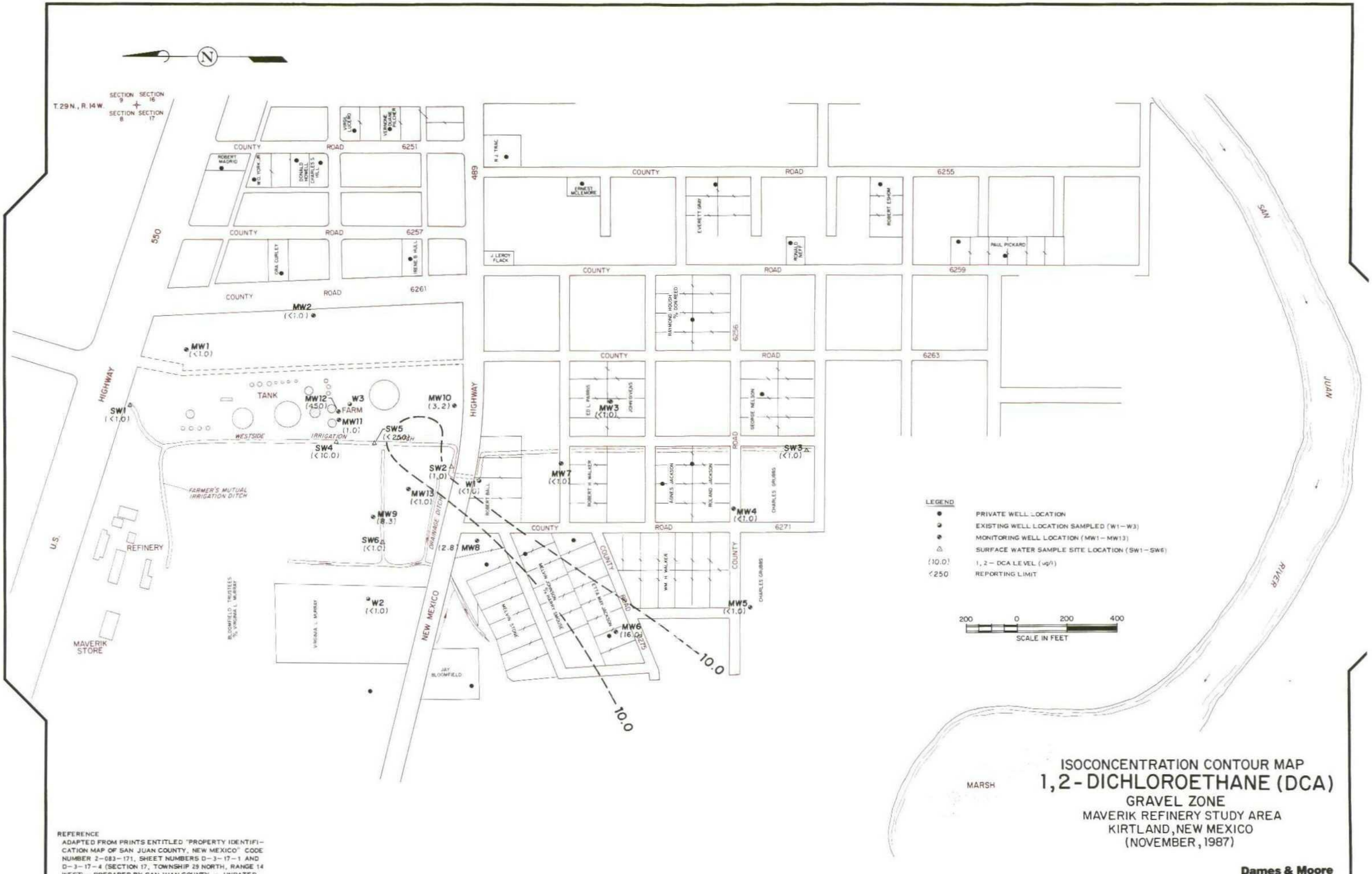


REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2-083-171, SHEET NUMBERS D-3-17-1 AND D-3-17-4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

ISOCONCENTRATION CONTOUR MAP
SULFATE (mg/l)
GRAVEL ZONE
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(NOVEMBER, 1987)

Dames & Moore

PLATE 12



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
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(NOVEMBER, 1987)

Dames & Moore

PLATE 13

APPENDIX A

TRC SOIL-GAS AND SOIL-WATER AND SURFACE WATER SURVEY RESULTS

APPENDIX A

TRC SOIL-GAS AND SOIL-WATER AND SURFACE WATER SURVEY

METHOD

Tracer Research Corporation's soil-gas and soil-water surveys involve pumping a small amount of soil-gas or soil-water out of the ground through a hollow probe driven a few feet into the ground and analyzing the gas or water for the presence of volatile contaminants. For this study nine volatile organic compounds were analyzed in the field using TRC's analytical field van, which is equipped with two gas chromatographs and two Spectra Physics SP4270 computing integrators. TRC has developed a QA/QC program that has been accepted by EPA for use on Superfund sites. This program is followed on all TRC jobs, and it is presented herein, along with details of the field study, the equipment and the condensed data, in TRC's report, "Shallow Soil Gas Investigation At Maverik Refinery, Kirtland, New Mexico" (September 1987).

RESULTS AND LIMITATIONS

The data obtained from the TRC survey are consistent with the earlier water quality data results from the EPA and EID sampling, with respect to the direction and approximate boundaries of the contaminant plume, and the original evaluation that ground water flow is toward the southwest from the Maverik Refinery and Tank Farm. However, DCA concentration levels based on the TRC survey were considerably higher than any of the historic or current laboratory water quality analyses. This is probably due to the fact that the TRC survey is only semi-quantitative and that the TRC survey was conducted over a very small interval (4-6 inches) generally at the top of the first "wet" zone encountered, not necessarily the top of the water table surface,

Data from the TRC survey were used to modify slightly the original proposed numbers and locations of the monitor wells as presented in the Phase I scope of work. The changes involved the addition of three monitor wells and the shifting of the nested monitor wells from the southwest to the north.

Because the TRC survey indicated that maximum contamination was on-site just north of the largest southernmost tank, the nested monitor wells were shifted to this area. This was done to evaluate worse case vertical contaminant migration, since the vertical downward movement of contaminants would be expected to show up first near the source and at the site where the maximum shallow contamination was observed.

The TRC survey results also indicated that maximum contamination extended off-site to the south and southwest and to the west of the westside irrigation ditch. Consequently, the number of monitor wells located to the east of the westside ditch and upgradient of the contaminant plume was limited to three (Plate 2). Only one monitor well was constructed off-site and to the east of the ditch. On-site, one well was completed along the eastern edge of the Tank Farm and one upgradient along the north-northeast boundary of the site. The remaining 10 monitor wells were constructed at critical downgradient sites to monitor potential and likely contamination.

SHALLOW SOIL GAS INVESTIGATION
AT
MAVERICK REFINERY
KIRTLAND, NEW MEXICO

SEPTEMBER, 1987

PREPARED FOR:

DAMES & MOORE
250 E. Broadway, Suite 200
Salt Lake City, Utah 84111-2480

SUBMITTED BY:

Mark D. Fam

Tracer Research Corporation

TABLE OF CONTENTS

INTRODUCTION

A shallow soil gas investigation was performed by Tracer Research Corporation at the Maverick Refinery in Kirtland, New Mexico. The investigation was conducted on September 22 through 24, 1987 under contract to Dames and Moore. The primary purpose of the investigation was to use the soil gas technology in an effort to help characterize and determine the extent of volatile organic compounds in the subsurface.

A total of 15 soil gas samples and 21 water samples were collected and analyzed during the investigation for the following compounds:

1,2-Dichloroethane (1,2-DCA)
1,1,1-Trichloroethane (TCA)
Trichloroethene (TCE)
Tetrachloroethene (PCE)
Benzene
Toluene
Ethylbenzene
Xylene
Total Hydrocarbons

BACKGROUND ON THE METHODOLOGY

The presence of volatile organic chemicals (VOCs) in shallow soil gas indicates the observed compounds may either be in the vadose zone near the probe or in groundwater below the probe. The soil gas technology is most effective in mapping low molecular weight halogenated solvent chemicals and petroleum hydrocarbons possessing high vapor pressures and low aqueous solubilities. These compounds readily partition out of the groundwater and into the soil gas as a result of their high gas/liquid partitioning coefficients. Once in the soil gas, VOCs diffuse vertically and horizontally through the soil to the ground surface where they dissipate into the atmosphere. The contamination acts as a source and the above ground atmosphere acts as a sink, and typically a concentration gradient develops between the two. The concentration gradient in soil gas between the source and ground surface may be locally distorted by hydrologic and geologic anomalies (e.g. clays, perched water); however, soil gas mapping generally remains effective because distribution of the contamination is usually broader in areal extent than the local geologic barriers and is defined using a large data base. The presence of geologic obstructions on a small scale tends to create anomalies in the soil gas-groundwater correlation, but generally does not obscure the broader areal picture of the contaminant distribution.

SAMPLING AND ANALYTIC PROCEDURES

Tracer Research Corporation utilized an analytical field van which was equipped with two gas chromatographs and two Spectra Physics SP4270 computing integrators. In addition, the van has two built-in gasoline powered generators which provide the electrical power (110 volts AC) to operate all of the gas chromatographic instruments and field equipment. A specialized hydraulic mechanism consisting of two cylinders and a set of jaws was used to drive and withdraw the sampling probes. Probes consist of 7-foot lengths of 3/4 inch diameter steel pipe which are fitted with detachable drive points. A hydraulic hammer was used to assist in driving probes past cobbles and through unusually hard soil.

Soil gas samples were collected by driving a hollow steel probe to a depth less than 14 feet into the ground. The above-ground end of the sampling probes was fitted with a steel reducer and a length of polyethylene tubing leading to a vacuum pump. Five to 10 liters of gas was evacuated with a vacuum pump. During the soil gas evacuation, samples were collected by inserting a syringe needle through a silicone rubber segment in the evacuation line and down into the steel probe. Ten milliliters of gas were collected for immediate analysis in the TRC analytical field van. Soil gas was subsampled (duplicate injections) in volumes ranging from 1 µL to 2 mL, depending on the VOC concentration at any particular location.

Groundwater samples were collected by driving a hollow steel probe to a maximum depth of 7 feet into the ground. A length of polyethylene tubing was inserted to the bottom of the probe. The tubing was attached to a peristaltic pump. Approximately 40 mL of water was collected in bottles with teflon lined septum caps so as to exclude air. Any sediment collected with the groundwater was allowed to settle. The water was subsampled (duplicate injections) in volumes ranging from 1 µL to 10 µL.

A gas chromatograph equipped with an electron capture detector was used for analyses of 1,2-DCA, TCA, TCE and PCE. Nitrogen was used as the carrier gas.

A second gas chromatograph , equipped with a flame ionization detector, was used for analyses of benzene, toluene, ethylbenzene, xylenes, and total hydrocarbons.

HEADSPACE ANALYSIS

Analytical instruments are calibrated each day by the use of chemical standards prepared in water by serial dilution from commercially available pure chemicals. A partition coefficient is generated for each analyte. The parition coeficient is generated by decanting 10 mL to 20 mL off of the aqueous standard so as to leave approximately the same amount of headspace that is in the water samples. The bottle is then resealed and shaken vigorously for 60 seconds. An analysis of the headspace and liquid in the bottle yields the partition coefficient. The value of the coefficient can then be used to accurately estimate the total mass of the analyte in the original water sample. Calibration and partition coeficient checks are also run after approximately every three hours.

DETECTION LIMITS

Detection limits are a function of the injection volume as well as the detector sensitivity for individual compounds. Thus, the detection limit varies with the sample size. Generally, the larger the injection size the greater the sensitivity. However, peaks for compounds of interest must be kept within the linear range of the detector. If any compound has a high concentration, it is necessary to use small injections, and in some cases to dilute the sample to keep it within linear range. This may cause decreased detection limits for other compounds in the analyses. The detection limits range down to 0.00003 µg/L for compounds such as TCA and PCE depending on the conditions of the measurement, in particular, the sample size. If any component being analyzed is not detected, the detection limit for that compound in that analysis is given as a "less than" value (e.g. <0.0001 µg/L). This number is calculated from the current response factor, the sample size, and the estimated minimum peak size (area) that would have been visible under the conditions of the measurement.

Date	Detection Limits September 22-24, 1987				
9-22-87	1,2-DCA	TCA	TCE	PCE	Benzene
soil gas	<0.005	<0.00005	<0.00009	<0.00003	<0.02
water	<0.9	<0.01	<0.02	<0.06	<4
	Toluene	Ethylbenzene	Xylene	Total Hydrocarbons	
soil gas	<0.02	<0.02	<0.02	<0.02	
water	<4	<4	<4	<4	
9-23-87	1,2-DCA	TCA	TCE	PCE	Benzene
soil gas	<0.002	NA	NA	NA	<0.008
water	<0.2	NA	NA	NA	<0.8
	Toluene	Ethylbezene	Xylene	Total Hydrocarbons	
soil gas	<0.009	<0.01	<0.009	<0.008	
water	<0.9	<1	<0.9	<0.8	

NA-Not Analyzed

9-24-87	1,2-DCA	TCA	TCE	PCE	Benzene
soil gas	<0.002	NA	NA	NA	<0.007
water	<0.5	NA	NA	NA	<0.05
	Toluene	Ethylbenzene	Xylene	Total Hydrocarbons	
soil gas	<0.008	<0.008	<0.008	<0.008	
water	<0.05	<0.05	<0.05	<0.05	

QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Tracer Research Corporation's normal quality assurance procedures were followed in order to prevent any cross-contamination of soil gas samples.

- Steel probes are used only once during the day and then washed with high pressure soap and hot water spray or steam-cleaned to eliminate the possibility of cross-contamination. Enough probes are carried on each van to avoid the need to reuse any during the day.

- Probe adaptors (steel reducer and tubing) are used once during the course of the day and cleaned at the end of each working day by baking in the GC oven. The tubing is replaced periodically as needed during the job to insure cleanliness and good fit.

- Silicone tubing (connecting the adaptor to the vacuum pump) is replaced as needed to insure proper sealing around the syringe needle. This tubing does not directly contact soil gas samples.

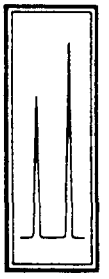
- Glass syringes are usually used for only one sample per day and are washed and baked out at night. If they must be used twice, they are purged with carrier gas (nitrogen) and baked out between probe samplings.

- Septa through which soil gas samples are injected into the chromatograph are replaced on a daily basis to prevent possible gas leaks from the chromatographic column.

- Analytical instruments are calibrated each day by the use of chemical standards prepared in water by serial dilution from commercially available pure chemicals. Calibration checks are also run after approximately every five soil gas sampling locations.

- 2 cc subsampling syringes are checked for contamination prior to sampling each day by injecting nitrogen carrier gas into the gas chromatograph.

- Prior to sampling each day, system blanks are run to check the sampling apparatus (probe, adaptor, 10 cc syringe) for contamination by drawing ambient air from above ground through the system and comparing the analysis to a concurrently sampled air analysis.



- All sampling and 2 cc subsampling syringes are decontaminated each day and no such equipment is reused before being decontaminated. Microliter size subsampling syringes are reused only after a nitrogen carrier gas blank is run to insure it is not contaminated by the previous sample.

- Soil gas pumping is monitored by a vacuum gauge to insure that an adequate gas flow from the vadose zone is maintained. A negative pressure (vacuum) of 2 in. Hg less than the maximum capacity of the pump (evacuation rate >0.02 cfm) usually indicates that a reliable gas sample cannot be obtained because the soil has a very low air permeability. -

APPENDIX A: CONDENSED DATA

DAMES & MOORE/MAVERICK REFINERY/KIRKLAND, NEW MEXICO

Sample	Depth	Date	1,2 DCA (ug/l)	TCA (ug/l)	TCE (ug/l)	PCE (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl Benzene (ug/l)	Xylene (ug/l)	Total Hydroc. (ug/l)
SG01	4'	09/22	0.2	0.0004	0.003	0.002	<0.02	<0.02	<0.02	<0.02	0.7
SG04	2'	09/22	0.04	0.0004	0.002	0.0004	<0.02	<0.02	<0.02	<0.02	<0.02
SG05	2'	09/22	0.7	0.007	0.04	0.0006	<0.02	<0.02	<0.02	<0.02	<0.02
SG06	2'	09/22	0.02	0.0002	0.003	0.001	<0.02	<0.02	<0.02	<0.02	<0.02
SG07	3'	09/22	12	0.2	0.1	1	30,000	10,000	1,000	<0.2	107,000
SG08	3'	09/22	0.8	0.008	0.08	0.02	28,000	4,200	1,200	<0.2	114,000
SG09	1.5'	09/22	2	0.03	0.08	0.003	16	<0.02	4	<0.02	19
SG10	3'	09/22	54	0.6	0.2	2	1,200	5,500	2,000	<0.4	55,000
SG11	3'	09/22	0.03	0.005	0.006	<0.00003	<0.02	<0.02	<0.02	<0.02	0.8
SG12	1.5'	09/22	0.4	0.005	0.008	<0.00003	<0.02	<0.02	<0.02	<0.02	1
SG13	1.5'	09/22	0.2	0.002	0.002	0.0008	<0.02	0.9	0.4	<0.02	0.8
SG14	3'	09/23	0.02	N/A	N/A	N/A	<0.006	<0.006	<0.006	<0.006	<0.006
SG15	2'	09/23	2	N/A	N/A	N/A	<0.8	<0.9	<1	<0.9	<0.008
SG16	3'	09/23	0.07	N/A	N/A	N/A	<0.008	0.08	<0.01	<0.009	1
SG30	6'	09/24	0.05	N/A	N/A	N/A	0.1	0.09	<0.008	<0.008	0.2
GW01		09/22	<0.9	<0.01	<0.02	<0.006	<4	<4	<4	<4	<4
GW02		09/22	<0.9	<0.01	<0.02	<0.006	<4	<4	<4	<4	<4
GW03		09/22	12	0.1	0.4	<0.006	<4	<4	<4	<4	<4
GW10	6'	09/22	68	0.7	0.2	0.5	7,000	1,100	560	170	13,000
GW14	5'	09/23	<0.2	N/A	N/A	N/A	<0.8	<0.9	<1	<0.9	1
GW15	5'	09/23	1	N/A	N/A	N/A	4	<0.9	<1	<0.9	6
GW16	5'	09/23	9	N/A	N/A	N/A	0.1	0.2	<0.01	<0.009	0.3
GW17	7'	09/23	<0.2	N/A	N/A	N/A	<0.8	<0.9	<1	<0.9	<0.8
GW18	6'	09/23	49	N/A	N/A	N/A	<0.8	<0.9	<1	<0.9	16
GW19	4'	09/23	<0.2	N/A	N/A	N/A	<0.8	<0.9	<1	<0.9	51
GW20	6'	09/23	<0.2	N/A	N/A	N/A	<0.8	<0.9	<1	<0.9	<0.8
GW21	6'	09/23	<0.2	N/A	N/A	N/A	<0.8	<0.9	<1	<0.9	1
GW22	6'	09/23	<0.2	N/A	N/A	N/A	<0.8	<0.9	<1	<0.9	<0.8
GW23	6'	09/24	14	N/A	N/A	N/A	4	2	<0.05	<0.08	8
GW24	4'	09/24	12	N/A	N/A	N/A	9	6	<0.05	6	126
GW25	6'	09/24	24	N/A	N/A	N/A	0.02	0.2	<0.05	0.08	0.7
GW26	6'	09/24	5	N/A	N/A	N/A	0.8	0.8	<0.05	<0.008	2
GW27	6'	09/24	14	N/A	N/A	N/A	1	<0.05	<0.05	0.08	2

Tracer Research Corporation

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by K. Larson

Checked by P. Craft

Proofed by L. Laplander

DAMES & MOORE/MAVERICK REFINERY/KIRKLAND, NEW MEXICO

Sample	Depth	Date	1,2 DCA (ug/l)	TCA (ug/l)	TCE (ug/l)	PCE (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl Benzene (ug/l)	Xylene (ug/l)	Total Hydroc. (ug/l)
GW28	6'	09/24	20	N/A	N/A	N/A	<0.06	0.2	<0.05	<0.08	0.1
GW29	6'	09/24	19	N/A	N/A	N/A	0.6	0.8	<0.05	<0.08	1
GW31	6'	*09/24*	*0.04*	*N/A*	*N/A*	*N/A*	*0.04*	*<0.008*	*<0.008*	*<0.008*	*1*
SW13		09/24	0.7	N/A	N/A	N/A	<2	<2	<2	<2	<2
SW13d		09/24	0.8	N/A	N/A	N/A	2	<0.05	<0.05	<0.08	14

Tracer Research Corporation

Notations:
I interference with adjacent peaks
NR not analyzed

Analyzed by K. Larson

Checked by P. Craft

Proofed by L. Laplander

APPENDIX B

GEOLOGIC, BOREHOLE AND WELL CONSTRUCTION SPECIFICATIONS AND LOGS

APPENDIX B

GEOLOGIC, BOREHOLE AND WELL CONSTRUCTION SPECIFICATIONS AND LOGS

WELL POINTS, MONITOR WELLS AND BOREHOLE COMPLETIONS

As part of the Phase I subsurface hydrogeologic evaluation, four 3-foot long (well points 1,3,4,5) and one 4-foot long (well point 2), galvanized steel well points, 13 monitor wells (twelve of 2-inch PVC and one 2-inch stainless steel well point) and one deep borehole were completed. The detailed geologic logs and well construction specifications are presented on Plates B-1 through B-8. Table D-1 in Appendix D summarizes the well construction and water level data.

CONSTRUCTION METHODS AND SPECIFICATIONS

WELL POINTS

The 5 well points were completed in areas without private water wells where water level elevation data were needed for completing a water table contour map. The depths to water below ground surface in these well points ranged from 1 foot at well point 5 (on-site in the southwest corner in the major ground water discharge zone), to 3.6 feet at well point 2, (off-site and downgradient to the southwest, just above the existing flood plain of the San Juan River).

MONITOR WELLS

The 12 PVC monitor wells (MW-1 to MW-12) and deep borehole were drilled with an air-rotary casing driver Speedstar SS15THH drill rig owned by Beeman Brothers Drilling, Inc. from Durango, Colorado. The wells were drilled with air, with minimal water (of drinking water quality), injected to aid in cleaning the drill cuttings out of the borehole.

An OVA meter was used on site to monitor the drill cuttings for high levels of volatile organics as drilling commenced. To prevent potential cross-contamination between drill holes, the drill casing and drill rod were steam cleaned after drilling each monitor well. Drill cuttings and discharges were containerized and stored on site.

A Dames & Moore hydrogeologist was in the field at all times during the drilling, monitor well construction (i.e., screening, casing, sand packing, grouting) and monitor well development (pumping and bailing until sediment free). Two-inch diameter Schedule 40 PVC well screen (0.01 inch) and pipe were used to complete the monitor wells. The PVC pipe was threaded so that no glue was used for connecting the joints or bottom caps.

Monitor well 13 was completed with a 5-foot long, 2-inch diameter stainless steel well point. A well point was hand driven at this location (Plate 2) because the drill rig could not access this site. This site is immediately southwest of the Maverik Tank Farm in a major ground water discharge area. In fact, in this particular area, the ground water level is above land surface in many places.

The shallow monitor wells were screened at or just below the water table into the gravel deposits. The silica sand pack varied from 8-12, 10-20 and 20-40 grain sizes, depending upon the type of material screened. The sand pack was extended up past the top of the water table to ensure interconnection with the top of the water table. The sand was extended as high as possible, while still permitting a good surface grout seal above the water table to land surface. The depth to water ranged from about 3.5 feet, to less than 1 foot in the ground water discharge zones. Monitor wells 2-9 were completed at about 15 feet, while monitor well 1 was completed at 21 feet, monitor well 10 at 12.5 feet and monitor well 12 at 12 feet.

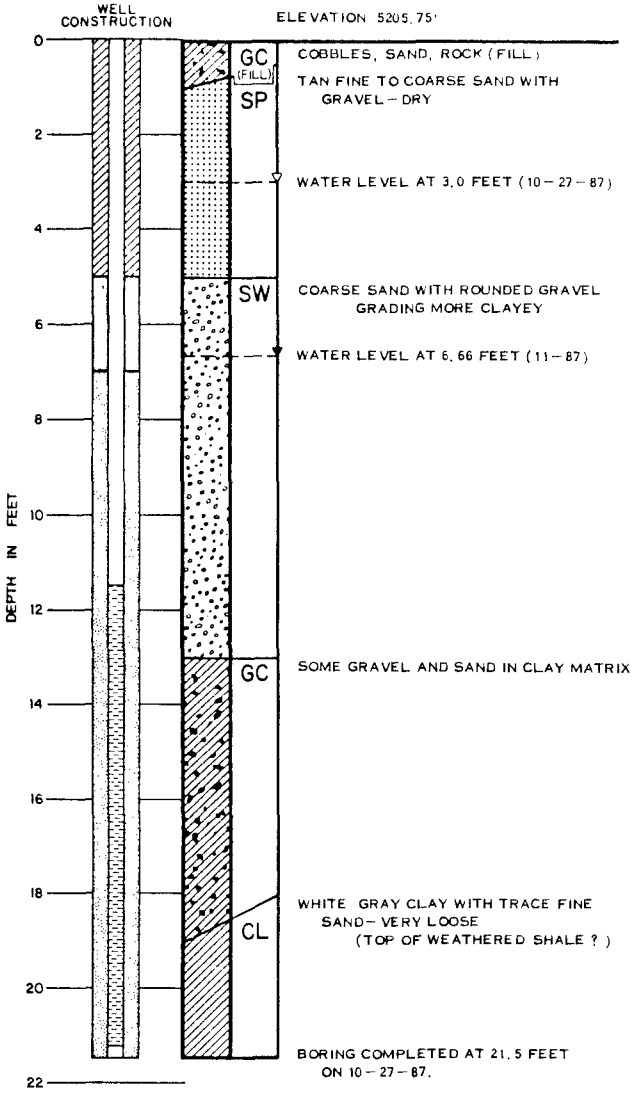
Monitor well 11, the deep nested monitor well, was completed on-site in the gravel and coarse sand at 33 feet. Based on the drill cuttings at MW-12 and MW-11 and the OVA readings in the field, MW-11 was constructed to inter-

cept the zone just below the highly contaminated zone to monitor the extent of vertical contamination. Monitor well 12 was completed in the upper silty-clayey-sand zone 33.5 feet east of monitor well 11 in the upper highly contaminated zone. Based on the OVA meter readings, this contaminated zone extended down to about 17 feet. Although three nested wells were originally planned, only two nested wells were completed, since the "dry" gray shale (Kirtland Shale Formation) was encountered underlying the upper saturated gravel alluvial deposits. A deeper well completed in this underlying dry shale zone would have been of no value for monitoring since it would have been a dry well.

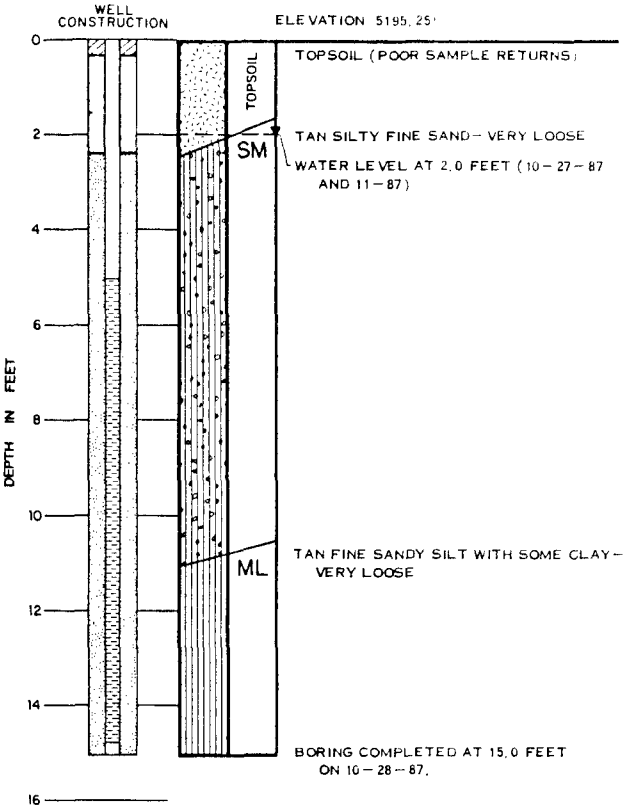
To verify the presence of this dry shale zone off-site, monitor well 10 was drilled to 52 feet, 20 feet into the upper dry Kirtland Shale Formation. The Kirtland Shale Formation consists of greenish gray shale members separated by the gray Farmington Sandstone member. It appears that some of the sandstone lenses were also encountered. The drill cuttings from this shale zone, as at monitor well 11, were also dry. The lower portion of this drill hole was backfilled with gravel pack and bentonite. Because the borehole started to slough in, the well screen was set in the hole and backfilled with gravel pack. A thicker bentonite seal was not possible. Monitor well 10 was then completed as a shallow monitor well in the saturated shallow alluvial deposits.

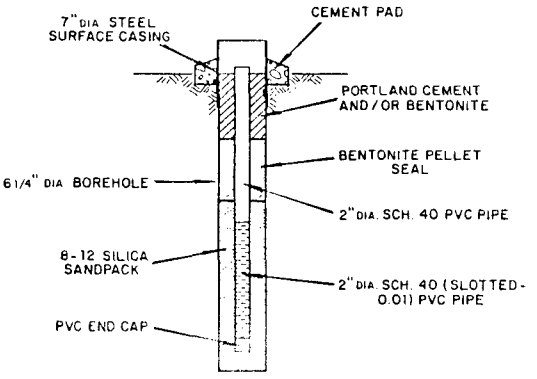
To document the presence of the Kirtland Shale Formation off-site, the decision was made to drill an additional deep borehole (B-1) approximately 550 feet to the southwest of the Tank Farm area. The top of the Kirtland Shale Formation was encountered at 23 feet. As at the other two sites, it was dry over this entire interval to the total borehole depth drilled of 38 feet.

MONITOR WELL 1



MONITOR WELL 2





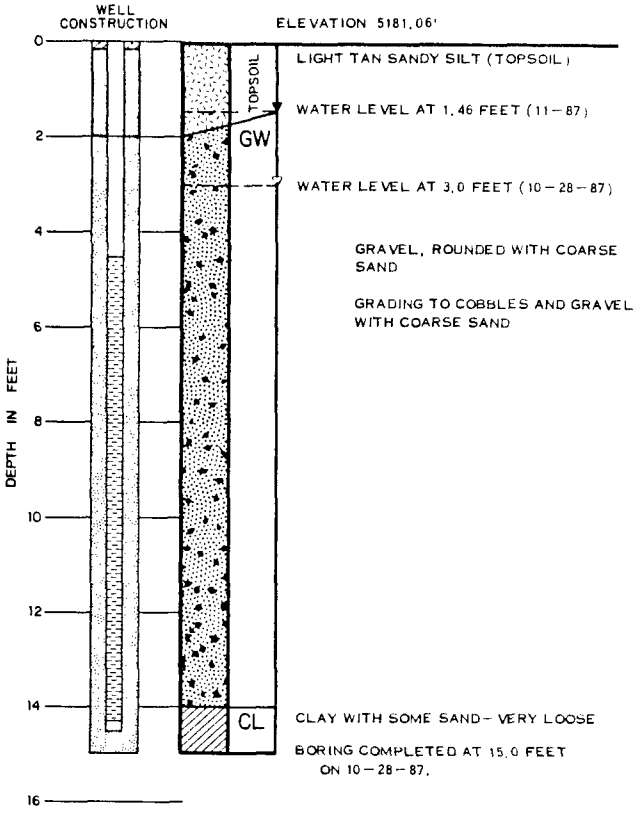
KEY TO WELL CONSTRUCTION

LOG OF BORINGS

Dames & Moore

PLATE B-1

MONITOR WELL 3



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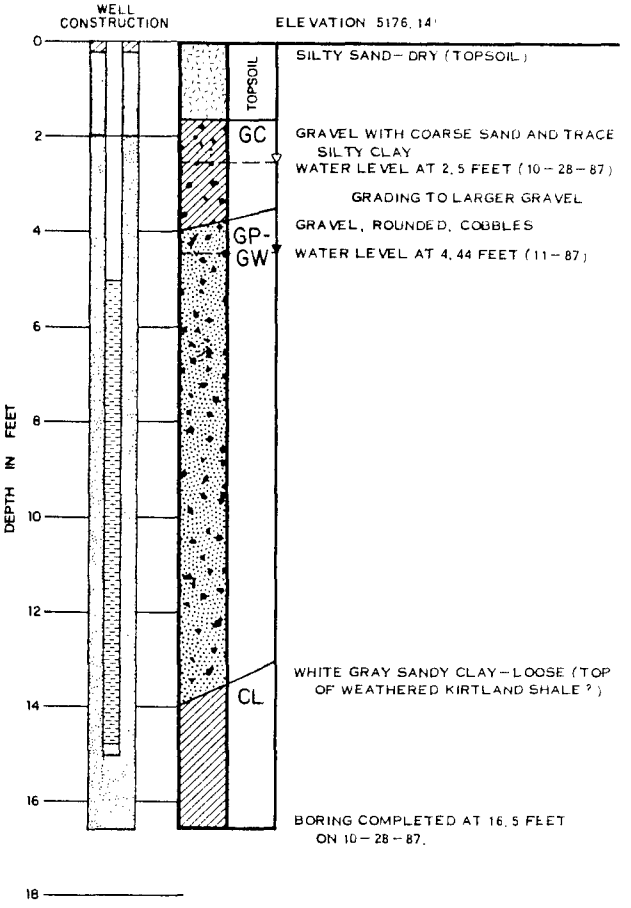
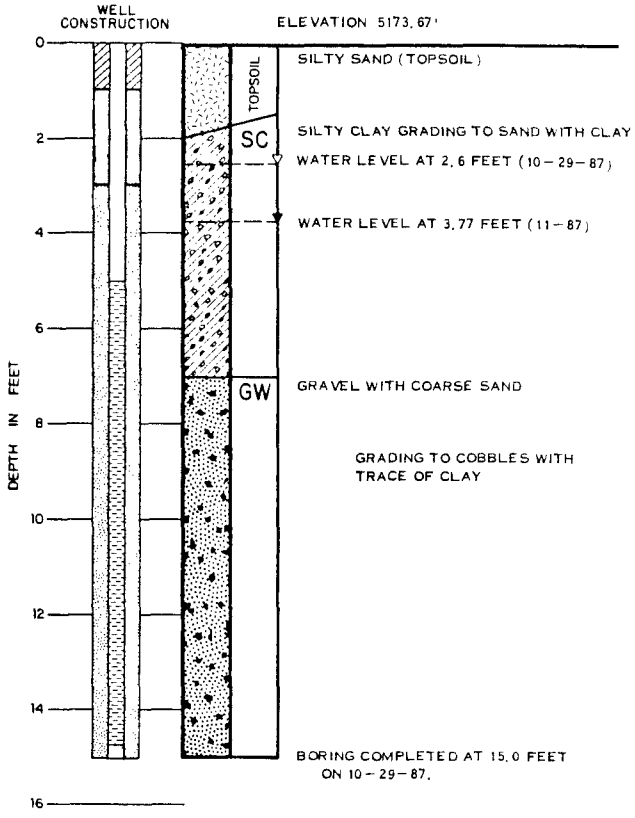


LOG OF BORINGS

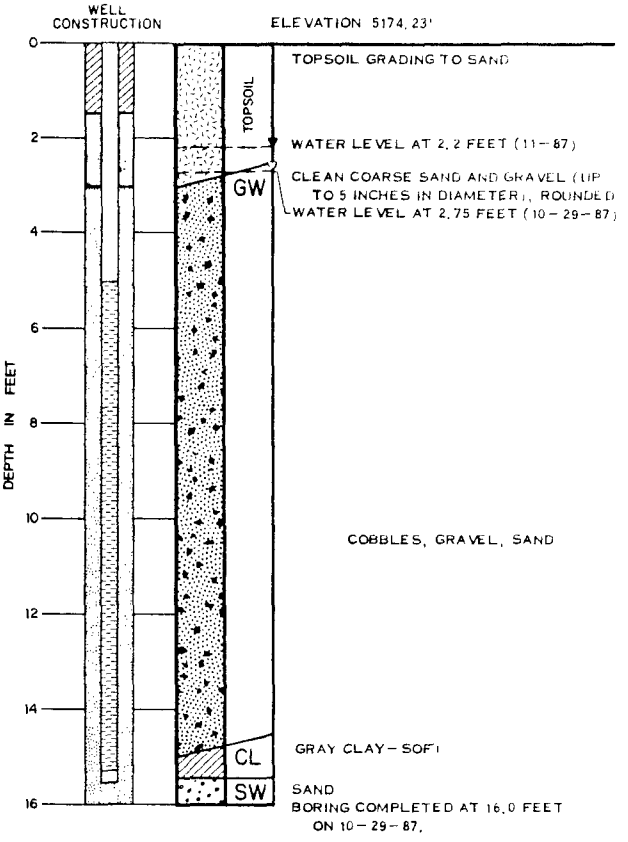
Dames & Moore

PLATE B-2

MONITOR WELL 5



MONITOR WELL 6



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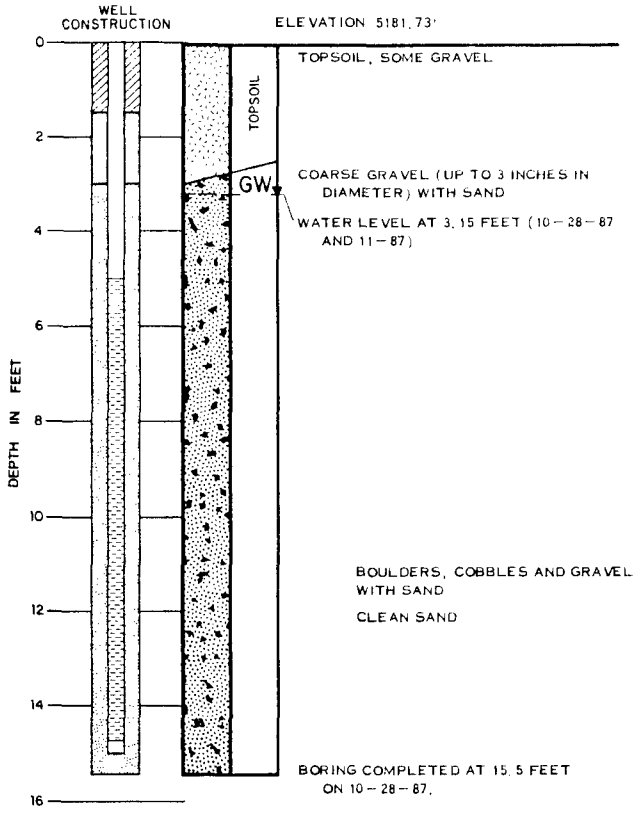
LOG OF BORINGS

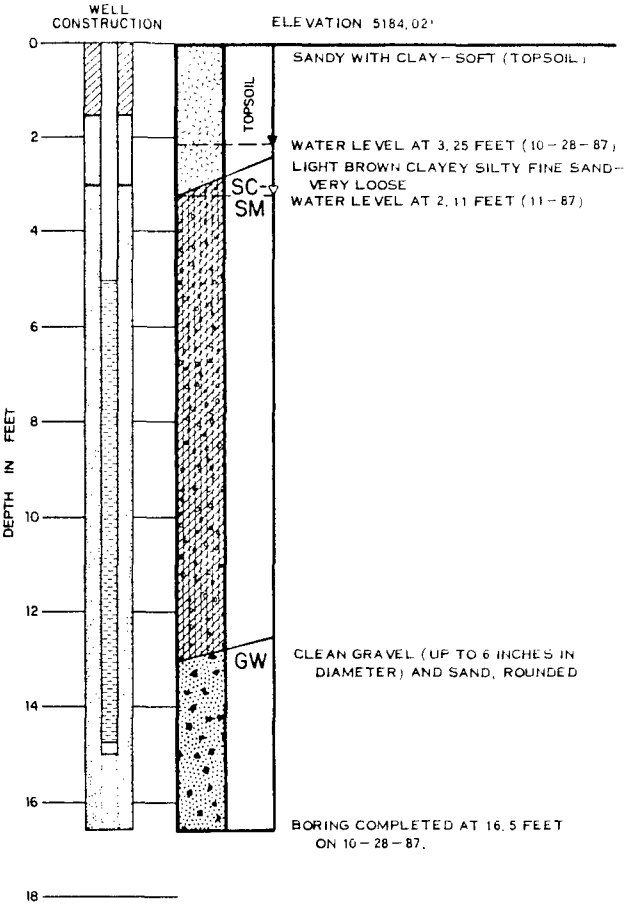
Dames & Moore

PLATE B-3

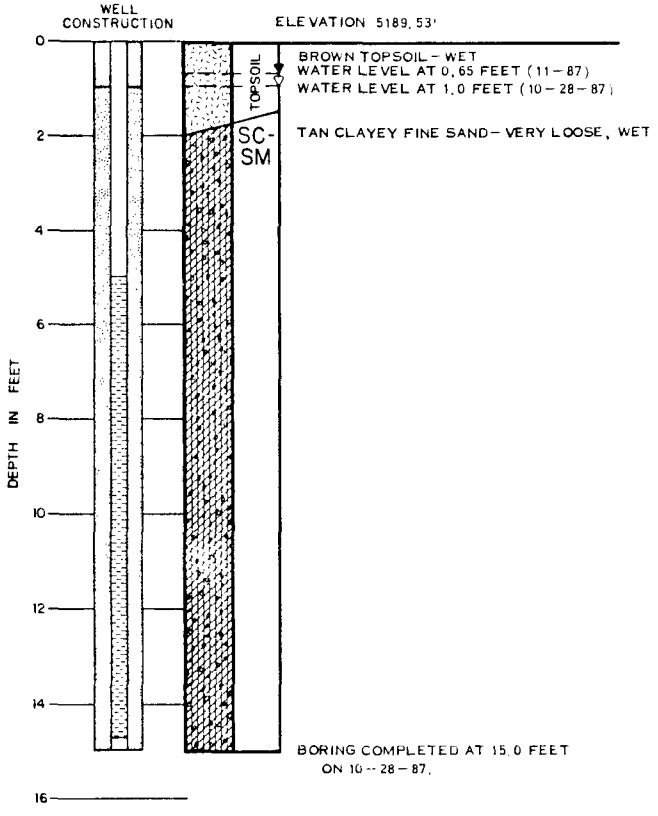
MONITOR WELL 7

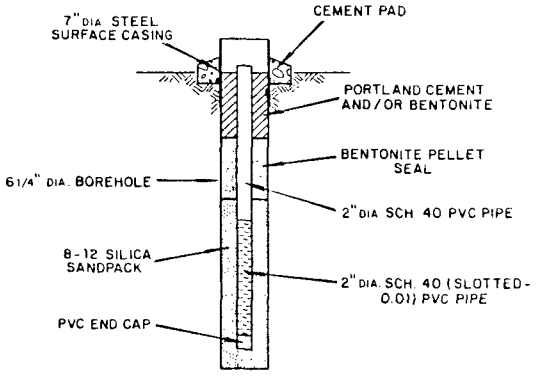


MONITOR WELL 8



MONITOR WELL 9



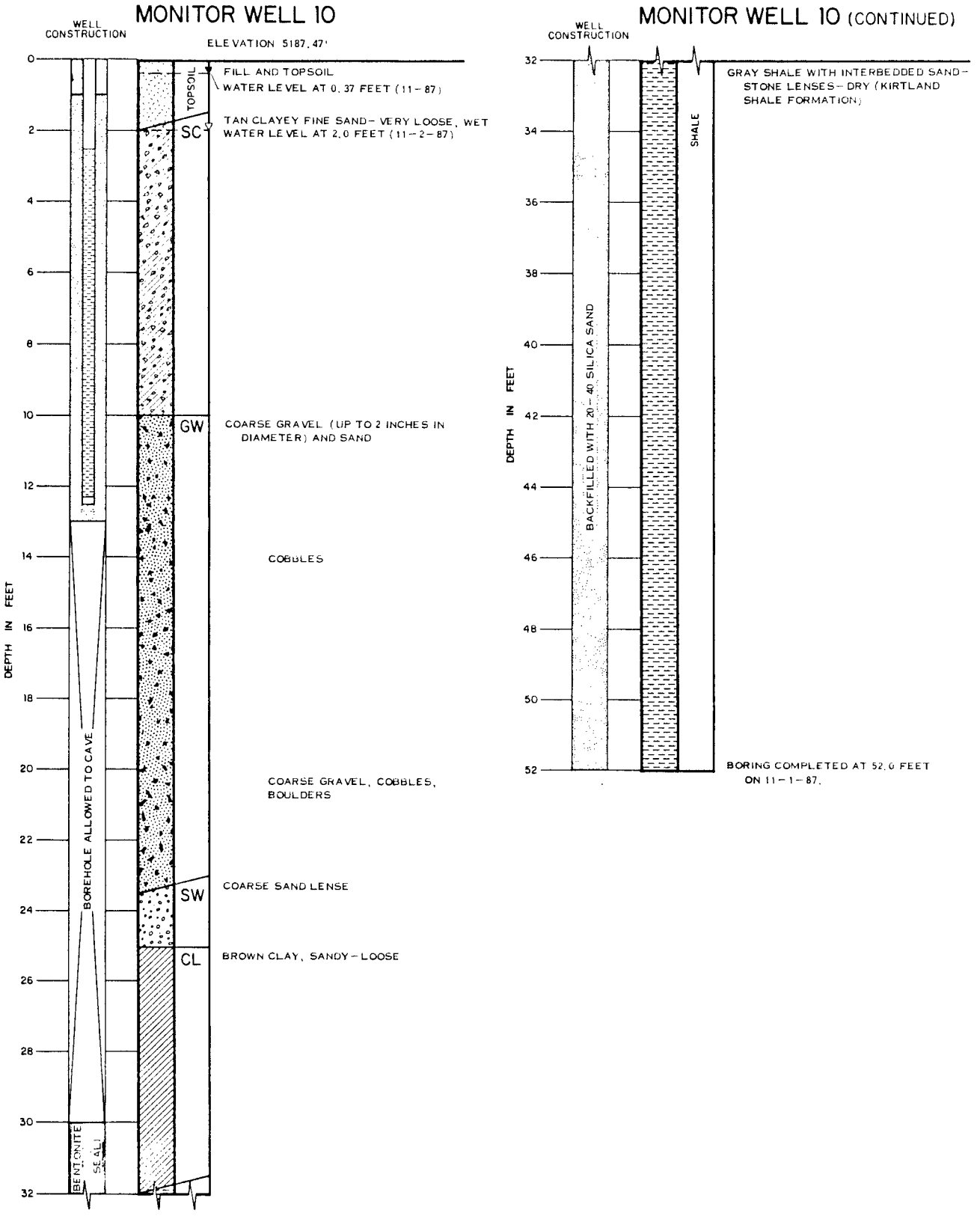


KEY TO WELL CONSTRUCTION

LOG OF BORINGS

Dames & Moore

PLATE B-4

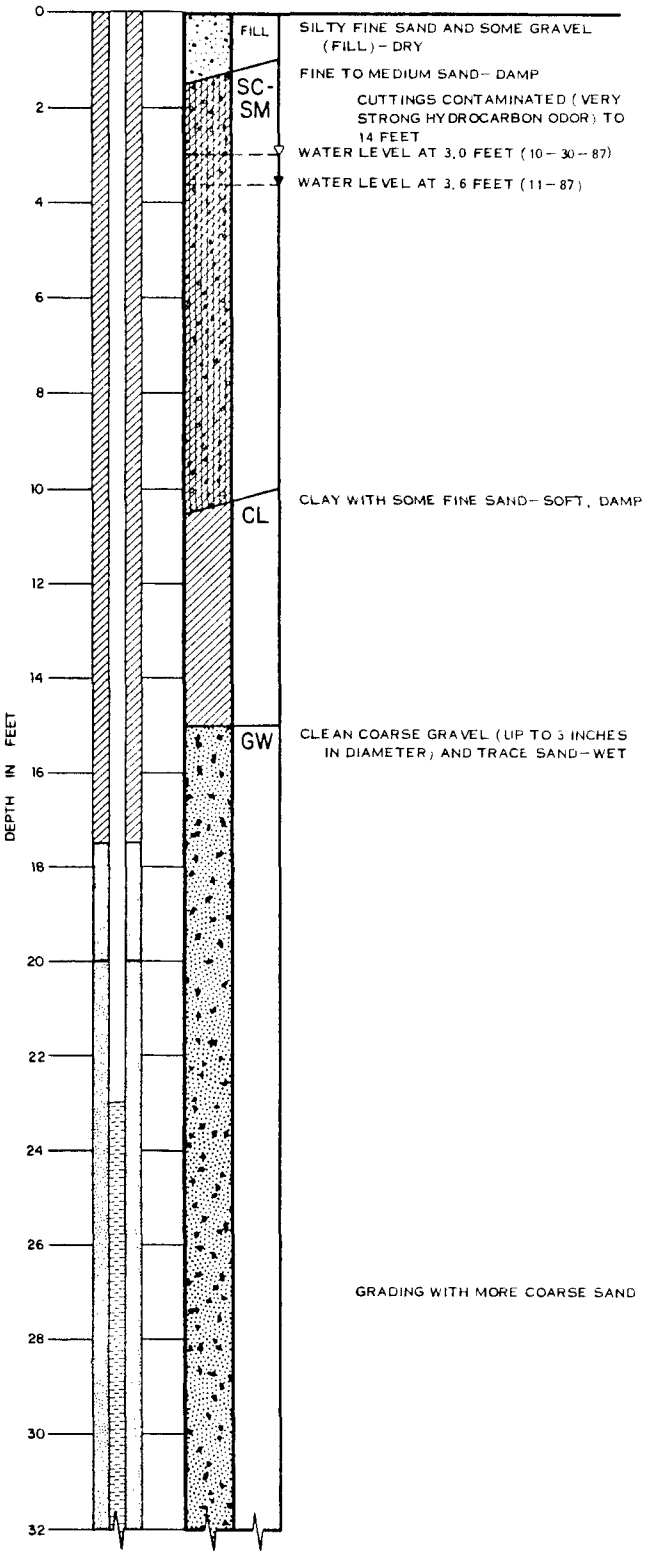


LOG OF BORINGS

Dames & Moore

PLATE B-5

MONITOR WELL 11



MONITOR WELL 11 (CONTINUED)

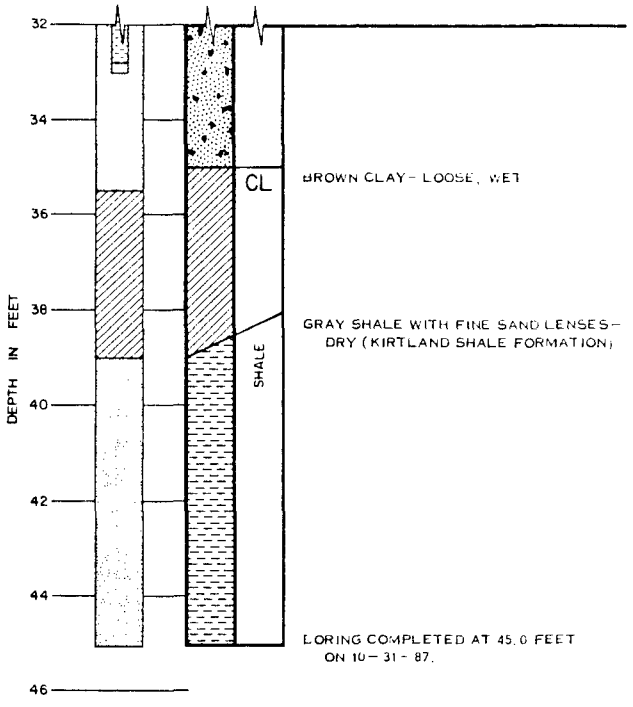


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PLATE [illegible]

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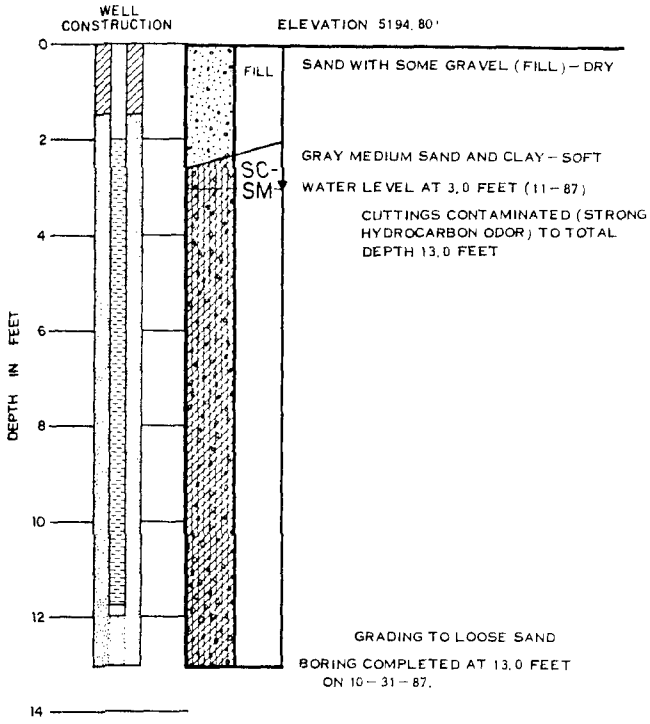
LOG OF BORINGS

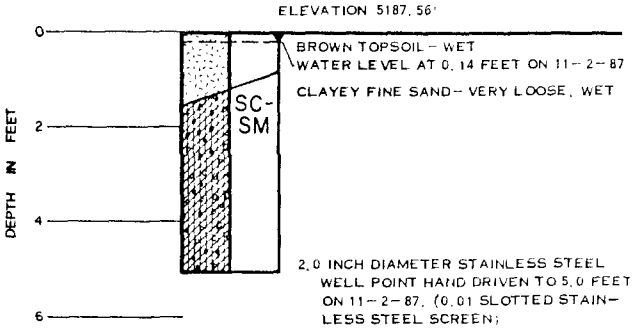
Dames & Moore

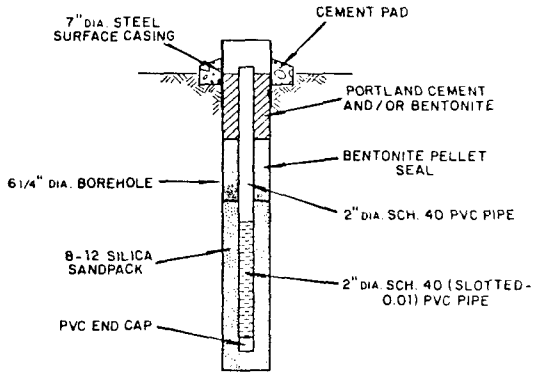
PLATE B-6

MONITOR WELL 12



MONITOR WELL 13 (WELL POINT)





KEY TO WELL CONSTRUCTION

LOG OF BORINGS

Dames & Moore

PLATE B-7

BY JJS DATE 4-21-88
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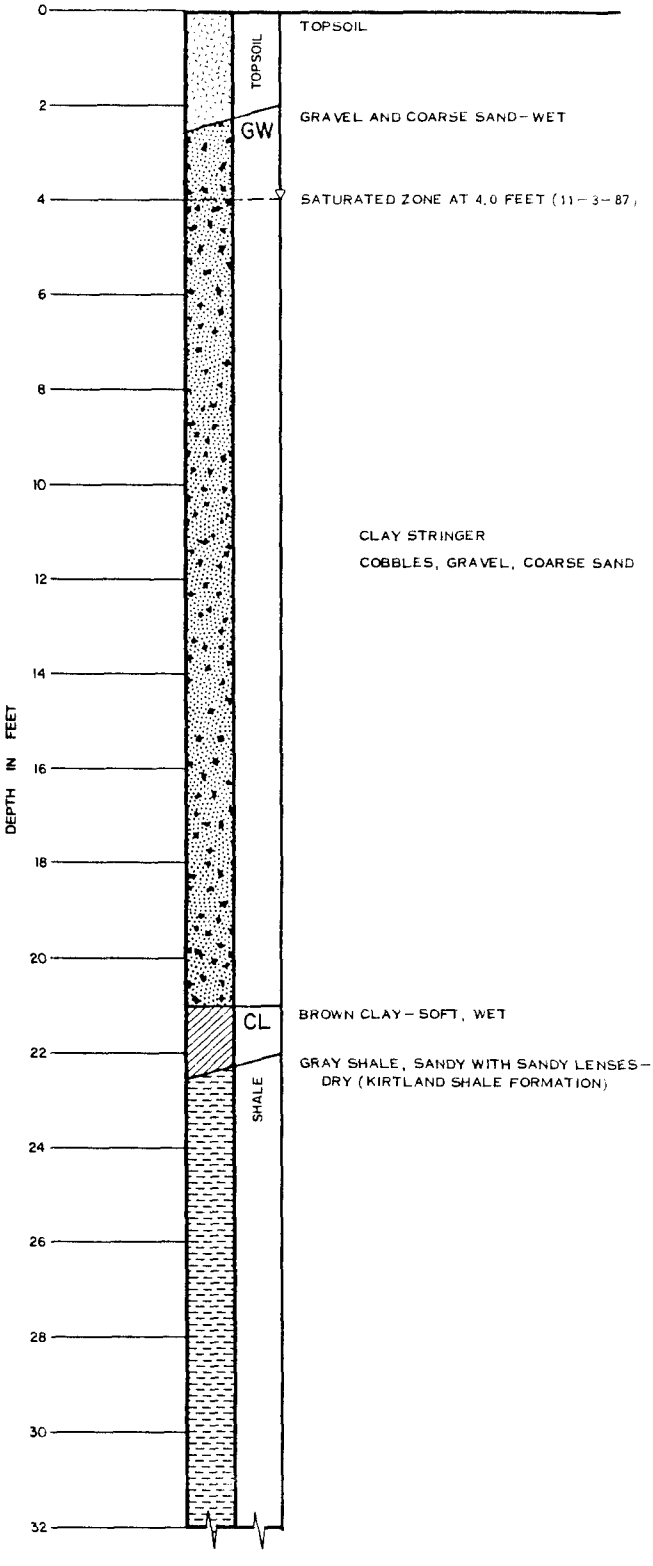
PLATE OF

MAVERICK AGENCY
BY SJS DATE 4-20-88
CHECKED BY DATE

BORING 1



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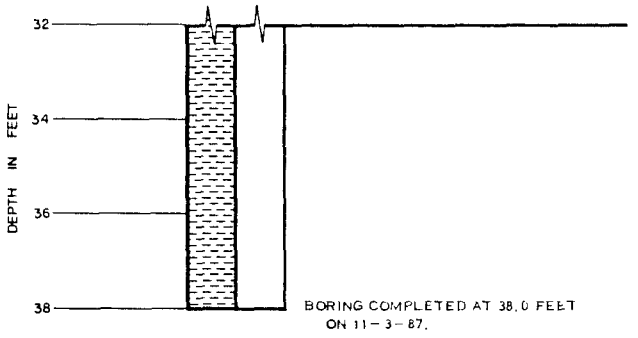

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PLATE _____

BY _____ DATE _____
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LOG OF BORINGS

Dames & Moore

PLATE B-8

APPENDIX C

SLUG TEST AND AQUIFER PUMP TEST DATA PLOTS AND RESULTS

APPENDIX C

SLUG TEST AND AQUIFER PUMP TEST DATA PLOTS AND RESULTS

AQUIFER SLUG AND PUMPING TESTS

FIELD METHODS; SLUG TESTS

The slug tests on monitor wells 1 to 12 were conducted by injecting, then withdrawing a 1.5-inch diameter "slug" consisting of a sealed sand-filled piece of PVC pipe with a volume of 0.21 gallons. This pipe was used to measure the displacement, then the recovery of the water in the monitor wells. An electric transducer was used to monitor the static water level, the water level at the instant of displacement, and the residual water levels after the sand-packed PVC pipe was removed.

DATA ANALYSIS: SLUG TESTS

The data collected during the slug withdrawal tests were coded and entered into Dames & Moore's computer program SLUG which performed data reduction and preliminary analysis. The computer program plots and analyzes the data using the methods of Hvorslev (1951) Cooper, Bredehoeft, and Papadopulos (Cooper et al., 1967), and Bouwer (1978). Plots of slug test data suitable for analysis by the method of Cooper, Bredehoeft, and Papadopulos are presented in Plates C-4 through C-23 and by the methods of Hvorslev and Bouwer, presented in Plates C-24 through C-42.

The analyses performed on the computer were reviewed and checked for anomalous data and to verify the applicability of each method to the data used. The results are presented in Table C-1. Any unusual water level responses are described directly on the plots.

DATA ANALYSES RESULTS: SLUG TESTS

Slug test data analyses by the three methods used yielded similar results (Table C-1). In fact, analyses using the method of Bouwer (1978), for water table aquifers, actually yielded slightly lower permeability values at five of the sites (MW-3, MW-7, MW-8, MW-10 and MW-12).

Analysis of the slug test data (for monitor wells: MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, and MW-11) indicate that the coarse alluvial deposits are highly permeable, on the order of 10-100 feet/day. This is typical for coarse gravel deposits, (Freeze and Cherry, 1979). → 3-30 m/day = Hydraulic Conductivity not permeability
3.5×10^{-5} — 3.5×10^{-4} m/s

Slug test data analysis for monitor wells screened primarily in finer silty-clayey fine sand (monitor wells: MW-1, MW-2, MW-9, MW-10, MW-12), indicated permeabilities of less than or about 1 foot/day (Table C-1).
→ 3×10^{-1} m/day
4×10^{-6} m/s

FIELD METHODS: AQUIFER PUMPING TEST

A 9-hour aquifer pumping test was conducted on deep monitor well 11. The existing on-site 8-inch diameter, 21-foot deep, steel cased well, designated as well W-3, and shallow monitor well 12 were used for observation wells. Pumped well MW-11 was pumped with a centrifugal pump at 18 gpm for 9 hours, and recovery water level data were collected to near full recovery for 92 minutes. Water level data were collected at MW-11 with an electric transducer and with electric water level meters at observation wells MW-12 and W-3. Discharge rates were measured with a stop watch and calibrated bucket and regulated with the pump throttle.

DATA ANALYSIS: AQUIFER PUMPING TEST

Based on the subsurface geology and water level data from monitor wells MW-11, MW-12 and W-3, as well as from all of the other on-site and off-site monitor wells, and based on the water level responses in MW-11, MW-12 and W-3 during the aquifer pumping test, the alluvial gravel aquifer is an unconfined aquifer. There is no confining bed above the water table, although the upper

part of the saturated zone consists of very fine-grained, silty-clayey sands. This was evidenced during the pumping test in the form of delayed gravity drainage from these upper fine-grained sediments in MW-12.

Monitor well 11, the pumped well, is screened from 23 to 33 feet in the coarse gravel alluvial deposits. Monitor well 12 is screened from 2 feet to 12 feet in the upper clayey silty fine-grained sand zone. The existing well W-3 is believed to be open to its total depth of 21 feet. No well construction logs are available on this well.

The aquifer pump test data for MW-11 and W-3 were analyzed using the Boulton (1963) type-curve fitting technique for unconfined aquifers with delayed-yield, for early-time data (Type A curves) and for later-time data (Type B curves). Because the drawdown data plot for MW-11 matched with the type curve of $r/D = 0$, these data were actually analyzed with the Theis type curve. This does not affect the results since a value for S cannot be computed from the data from a pumped well anyway. The data from MW-12, a partially penetrating observation well, was analyzed using the method of Stallman (1963), for unconfined anisotropic aquifers with partially penetrating pumped and/or observation wells.

DATA ANALYSES RESULTS: AQUIFER PUMP TEST

The data and data plots for the aquifer pumping test are presented in Table C-2 and Plates C-1 through C-3. The results of the aquifer pumping test indicate:

1. The upper fine-grained zone penetrated by MW-12 (the highly contaminated on-site shallow monitor well), is not directly interconnected with the underlying coarse gravel alluvial deposits intercepted by MW-11 and W-3. This was demonstrated by the fact that the maximum drawdown observed in shallow MW-12, located only 33.5 feet from pumped well MW-11, was 0.4 feet, whereas the maximum drawdown in the deeper well W-3, located 77 feet from pumped well MW-11 was 0.77 feet. However, this shallow zone was eventually impacted and water levels in MW-12 responded as a result of delayed gravity drainage.

2. A representative transmissivity and horizontal hydraulic conductivity for the coarse alluvial deposits are about 12,000 gpd/ft, and 100 ft/day, respectively. Values for the specific yield based on calculations from well W-3 water level data, are too low. A representative value would be around 0.10.

3. A representative transmissivity, vertical and horizontal permeability and specific yield for the shallow siltier clayey sands, above the coarser alluvial deposits, are about 12,000 gpd/ft, 40 ft/day and 0.16 ft/day, and 0.20, respectively. This is significant in that this zone limits potential vertical contaminant movement, particularly on-site in the area near MW-12, where ground water movement (as well as contaminant movement) would (and as the water quality data indicate), preferentially move laterally rather than vertically.

TABLE C-1

AQUIFER PUMP TEST AND SLUG TEST ANALYTICAL RESULTS

Aquifer Pump Test Results

Well	Zone(s) Monitored	Saturated Thickness Tested and Monitored (ft)	Q/s gpm/ft	Maximum Drawdown (ft)	T gpd/ft[1]	K ft/day[1]	S[1]
MW-11 (Pumped Well 18 gpm)	coarse alluvial gravels with silty sand	20 (gravel aquifer)	6.55	2.75	13,000[2]	K_h = 87[2]	-
					2,600[3]	K_h = 17[3]	-
MW-12 (r=33.5')	silty-clayey sands	7	-	0.4	9,300[4]	K_v = 0.16[4]	0.20[4]
						K_h = 40[4]	
W-3 (r=77')	coarse alluvial gravels with silty sand	15	-	0.77	12,100[5]	K_h = 108[5]	0.0001[5]
					12,100[3]	K_h = 108[3]	0.002[3]

Aquifer Slug Test Results

Well	Primary Zone(s) Tested	K ft/day[6]	K ft/day[7]	K ft/day[8]
MW-1	silty-clayey sands/ some gravel	2.	2	2
MW-2	silty-clayey sands	0.2	0.6	0.5
MW-3	sand and gravel	25	48	18
MW-4	sand and gravel	90.	10	19
MW-5	sand and gravel	76	(9)	(9)
MW-6	sand and gravel	48	(9)	(9)
MW-7	sand and gravel	90.	46	27
MW-8	sand and gravel	25.	37	6
MW-9	silty-clayey sands	2.	0.6	0.9
MW-10	silty-clayey sands/ some gravel	1.	0.7	0.3
MW-11	sand and gravel	28.	17	37
MW-12	silty-clayey sands	0.9	1	0.3

Footnotes:

(1) Where T = Transmissivity; K = Hydraulic conductivity; S = Specific Yield
(2) Based on drawdown data, Theis type curve fitting.
(3) Based on recovery data, Boulton unconfined aquifer delayed yield type curve fitting.
(4) Based on drawdown data, Stallman type curve fitting for partially penetrating observation wells and for aquifers where K_h (horizontal hydraulic conductivity) does not equal K_v (vertical hydraulic conductivity).
(5) Based on drawdown data, Boulton unconfined aquifer delayed yield type curve fitting.
(6) Based on the method of Cooper, H.H. , Bredehoeft, J.D., and Papadopulos, I.S. (1967).
(7) Based on the method of Hvorslev, M.J. (1978).
(8) Based on the method of Bouwer, H. (1978).
(9) Insufficient data to analyze by this method.

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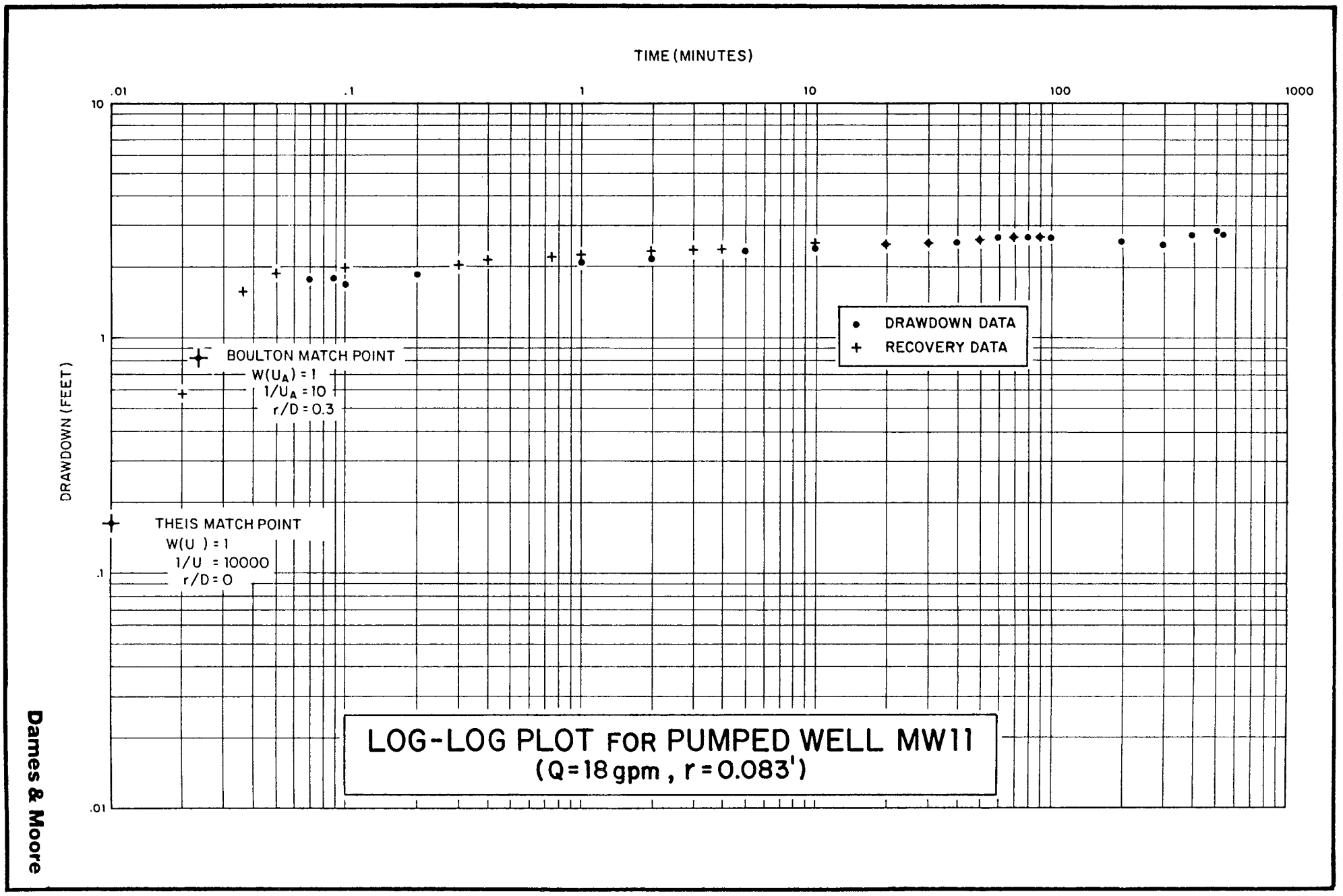

Dames & Moore

PLATE C-1

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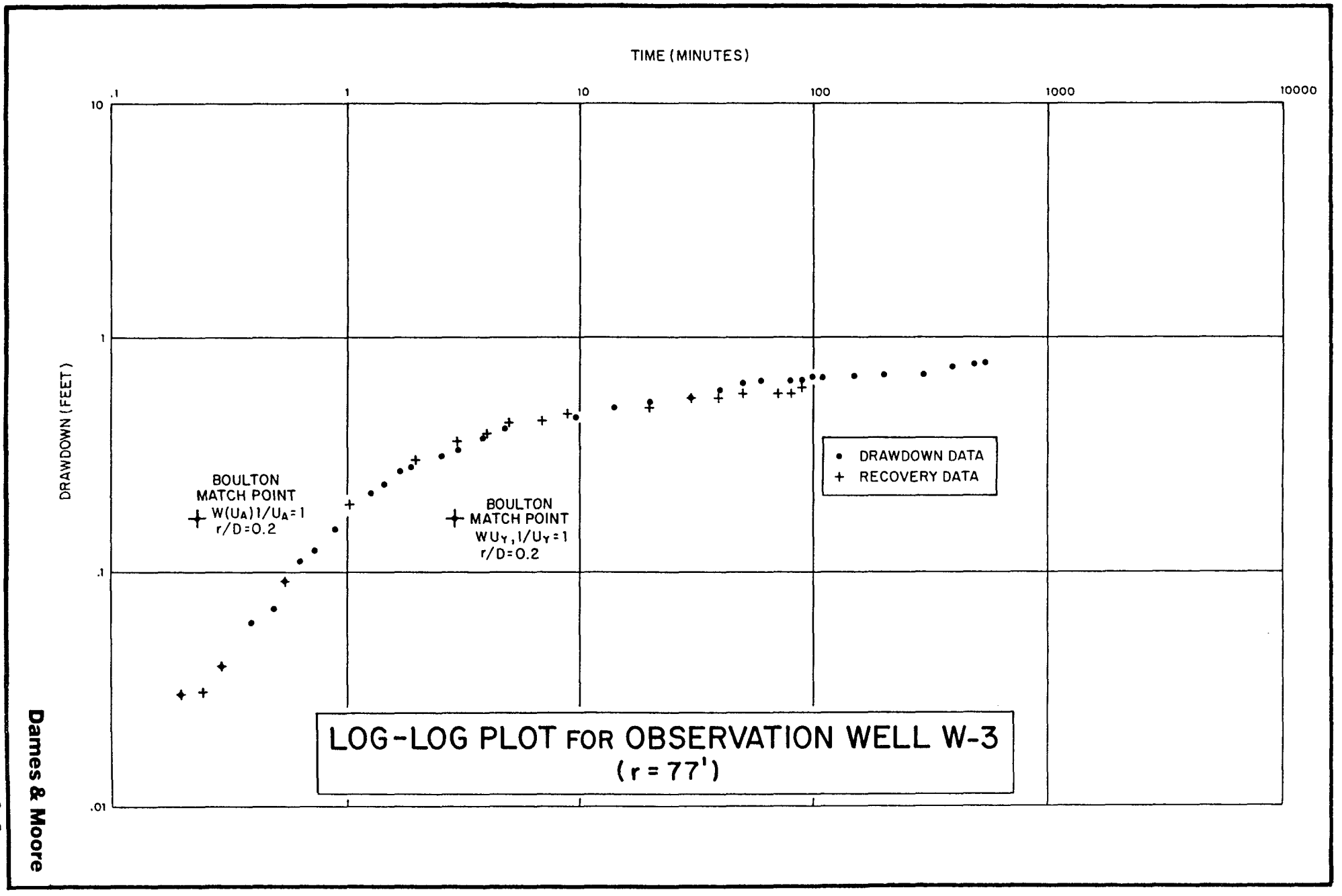

Dames & Moore

PLATE C-2

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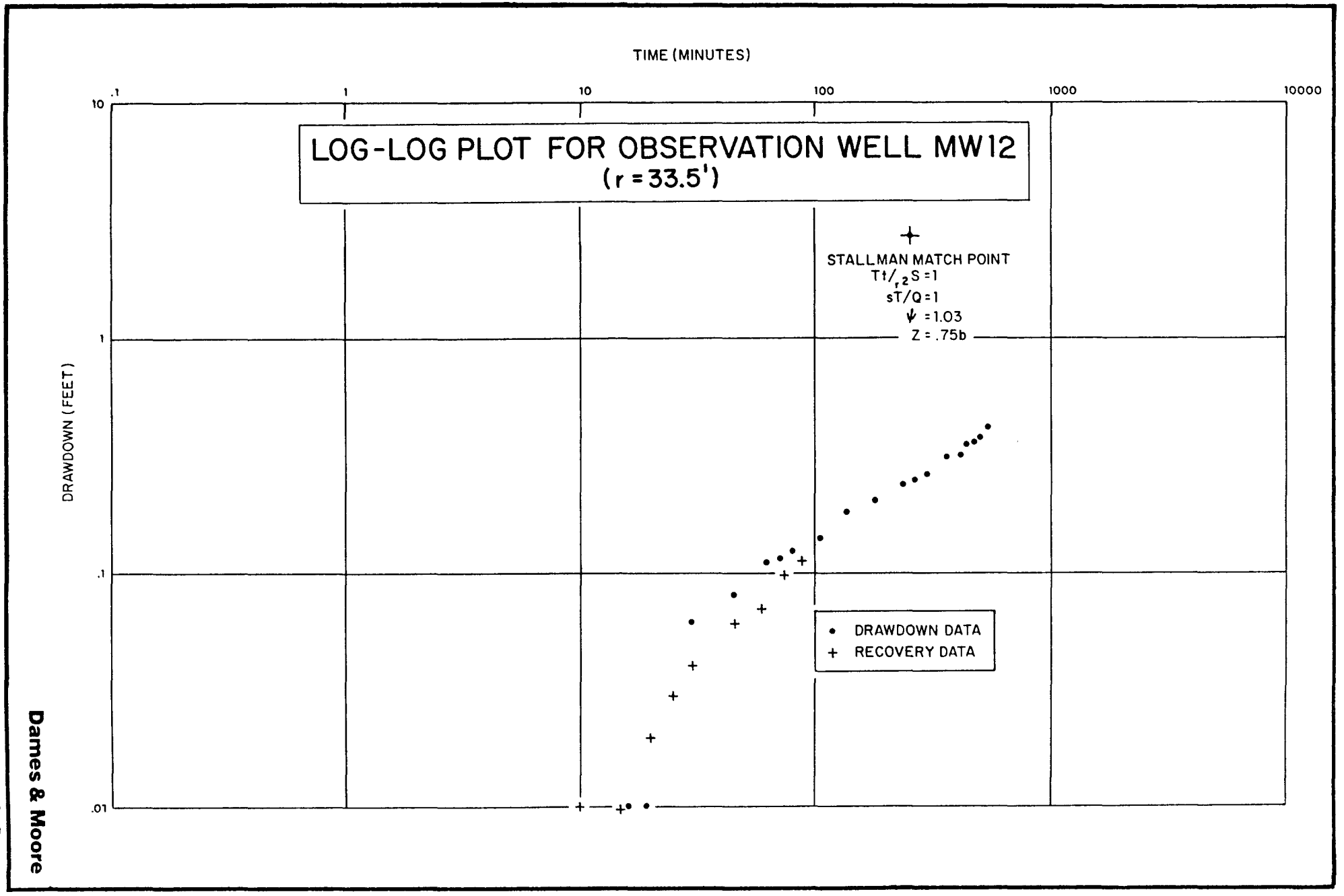

Dames & Moore

PLATE C-3

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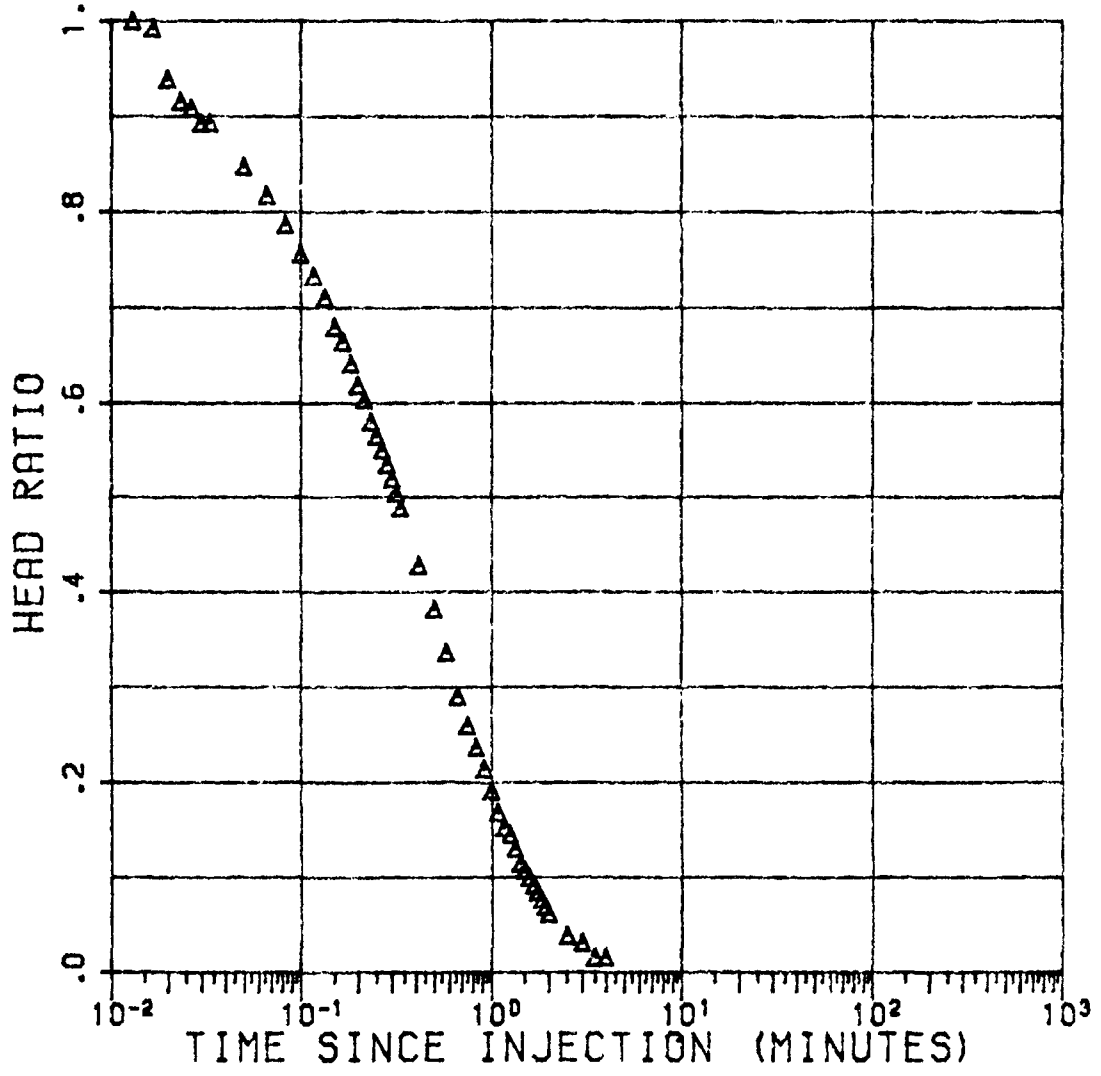

SLUG TEST OF WELL MW1 OUT
HEAD RATIO VS LOG TIME

PLATE C-4

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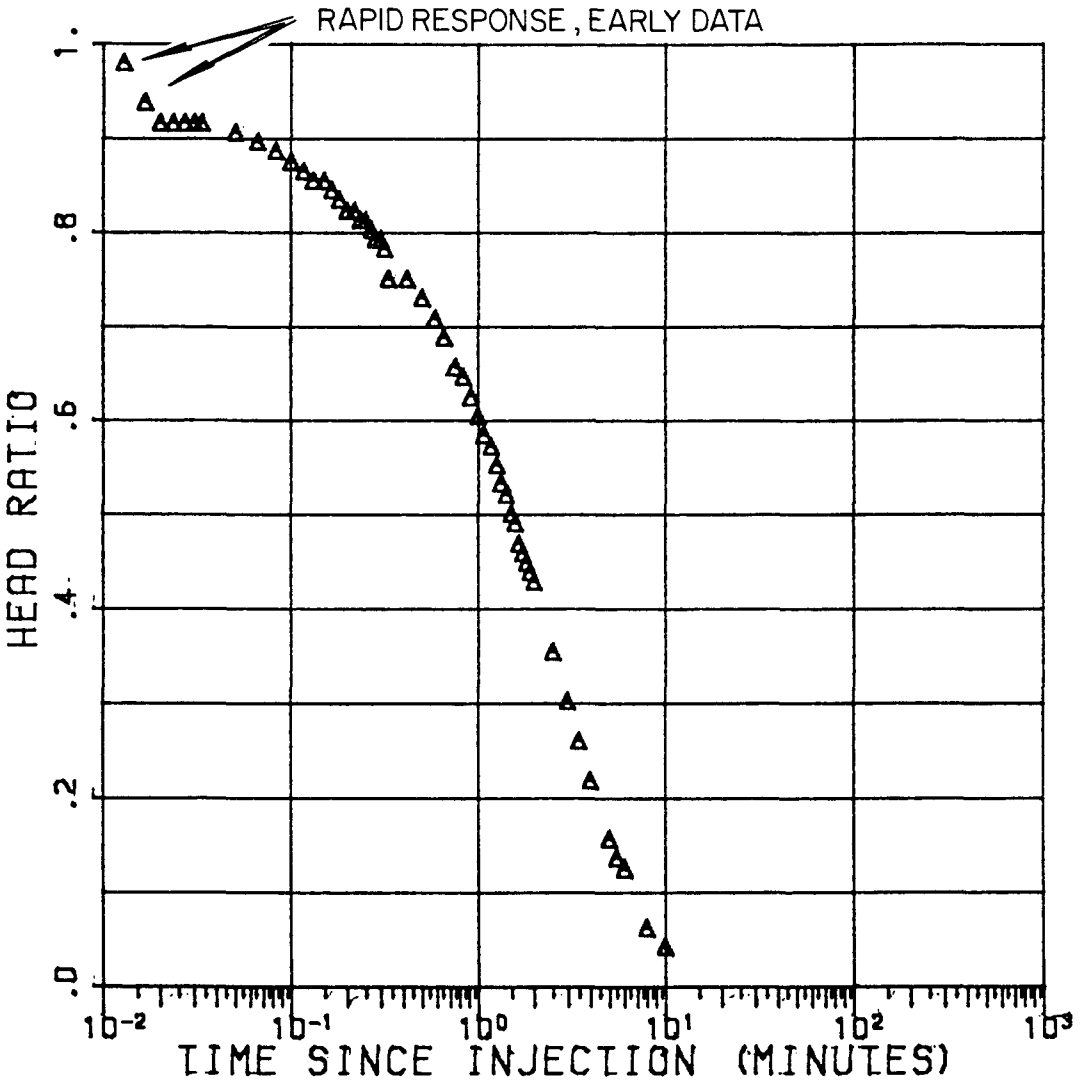

SLUG TEST OF WELL MW2 OUT
HEAD RATIO VS LOG TIME

PLATE C-5

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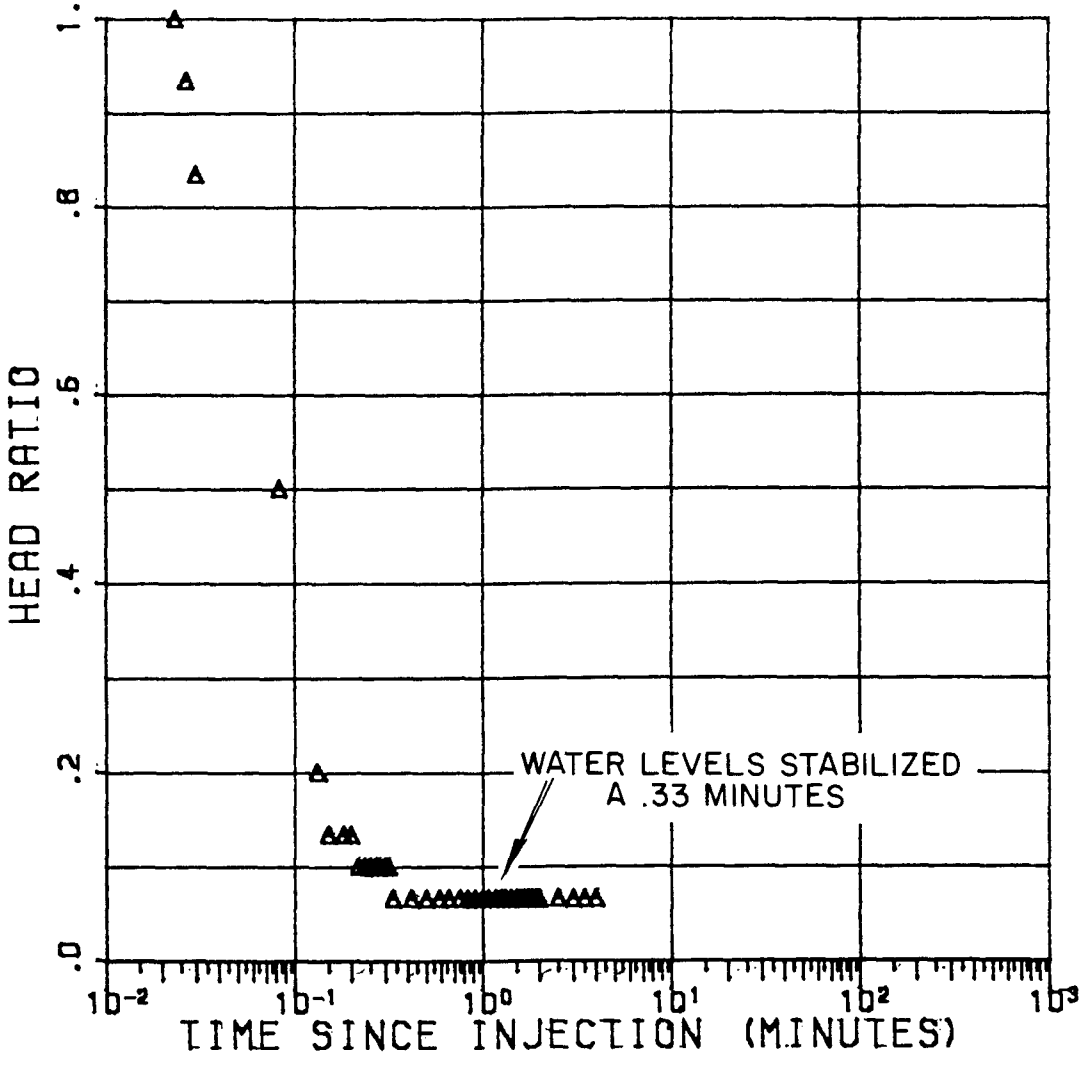

SLUG TEST OF WELL MW3 IN
HEAD RATIO VS LOG TIME

PLATE C-6

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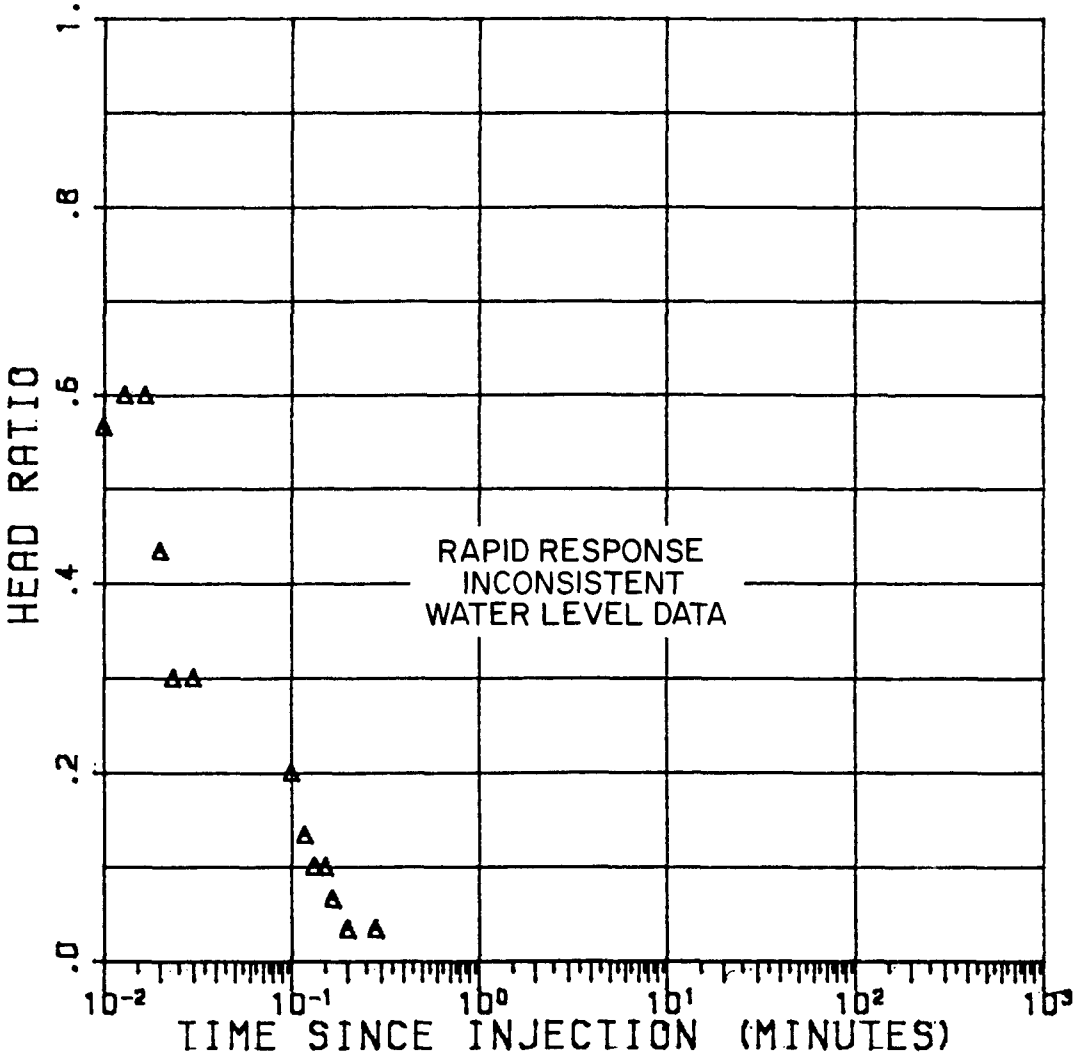

SLUG TEST OF WELL MW3 OUT
HEAD RATIO VS LOG TIME

PLATE C-7

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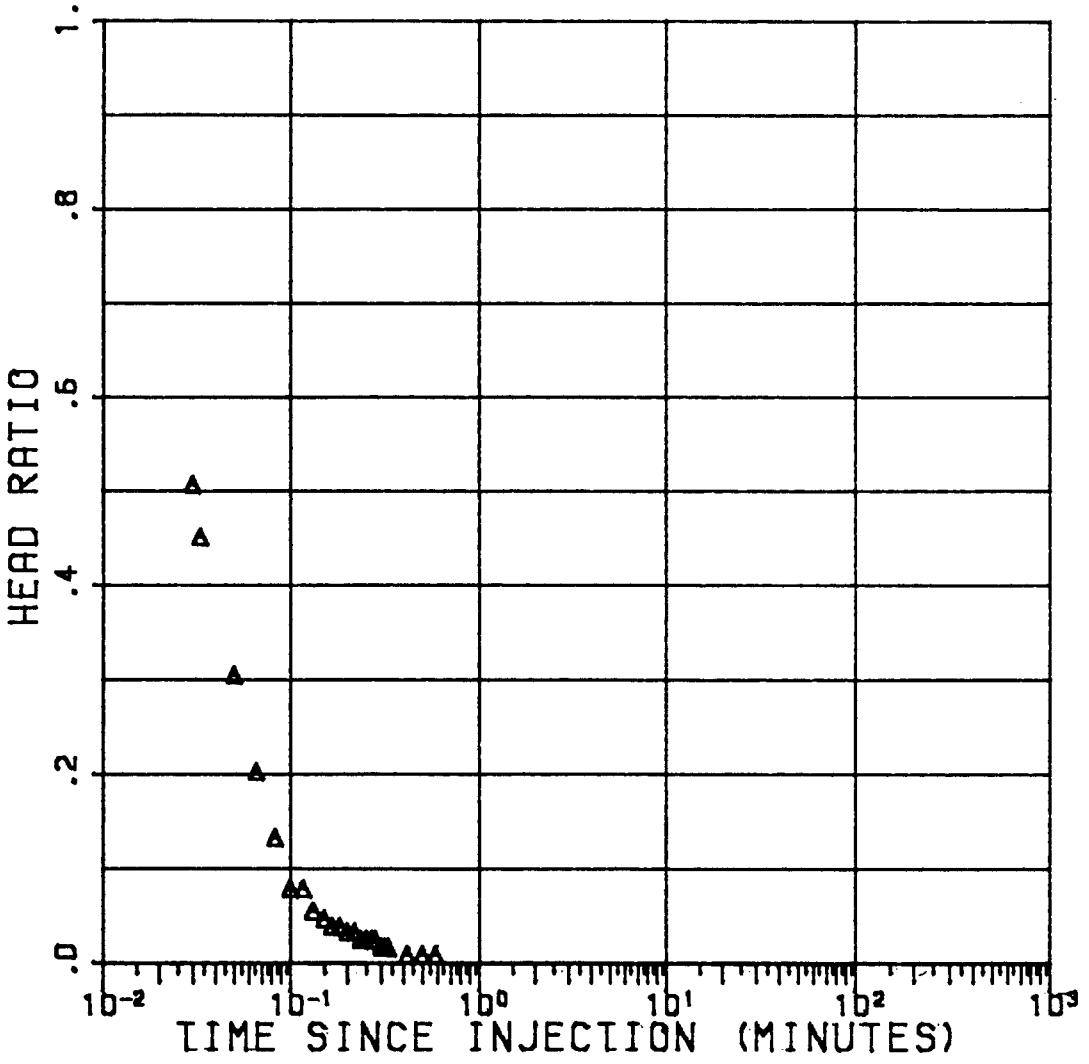

SLUG TEST OF WELL MW 4 IN
HEAD RATIO VS LOG TIME

PLATE C-8

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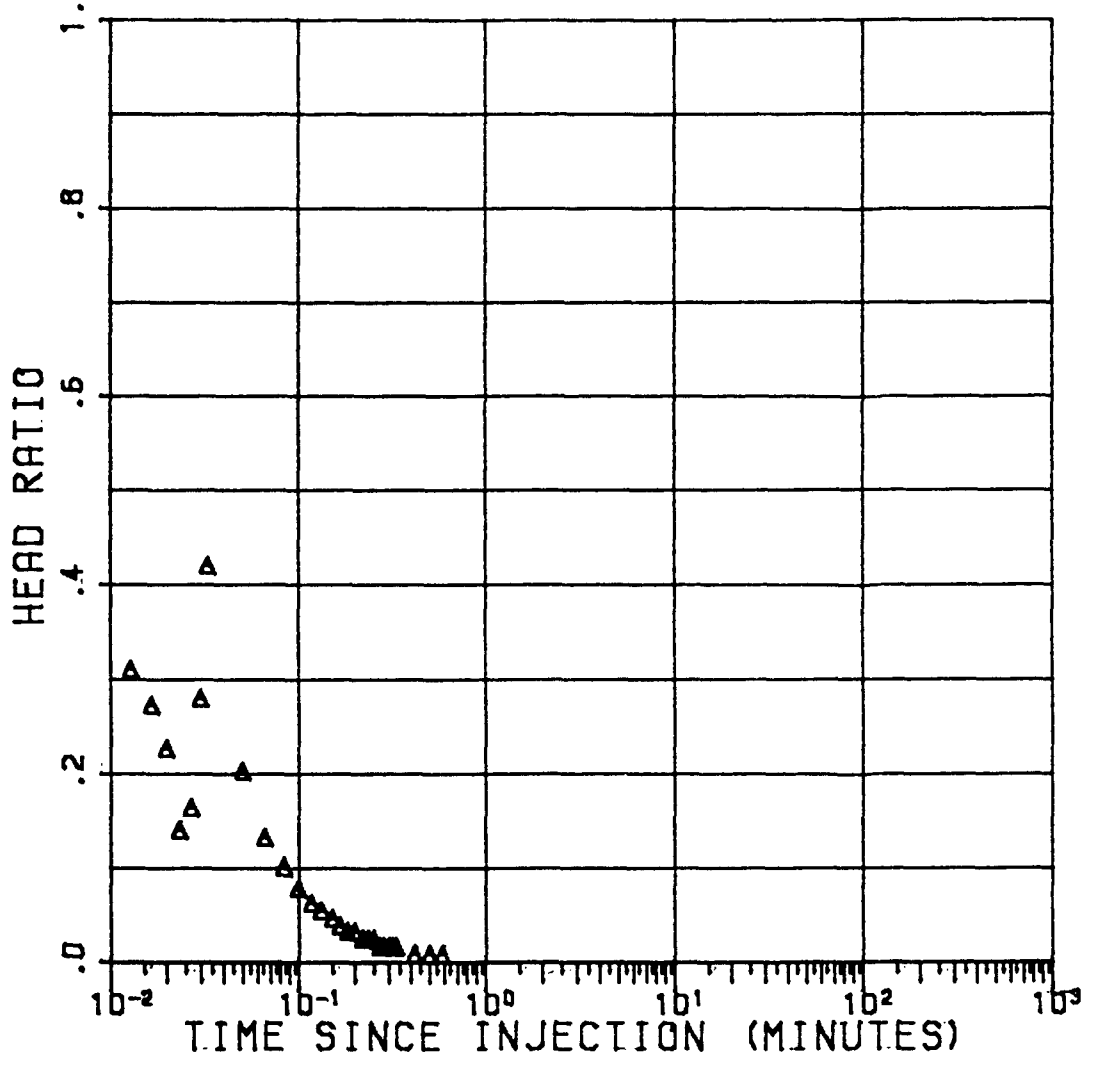

SLUG TEST OF WELL MW 4 OUT
HEAD RATIO VS LOG TIME

PLATE C-9

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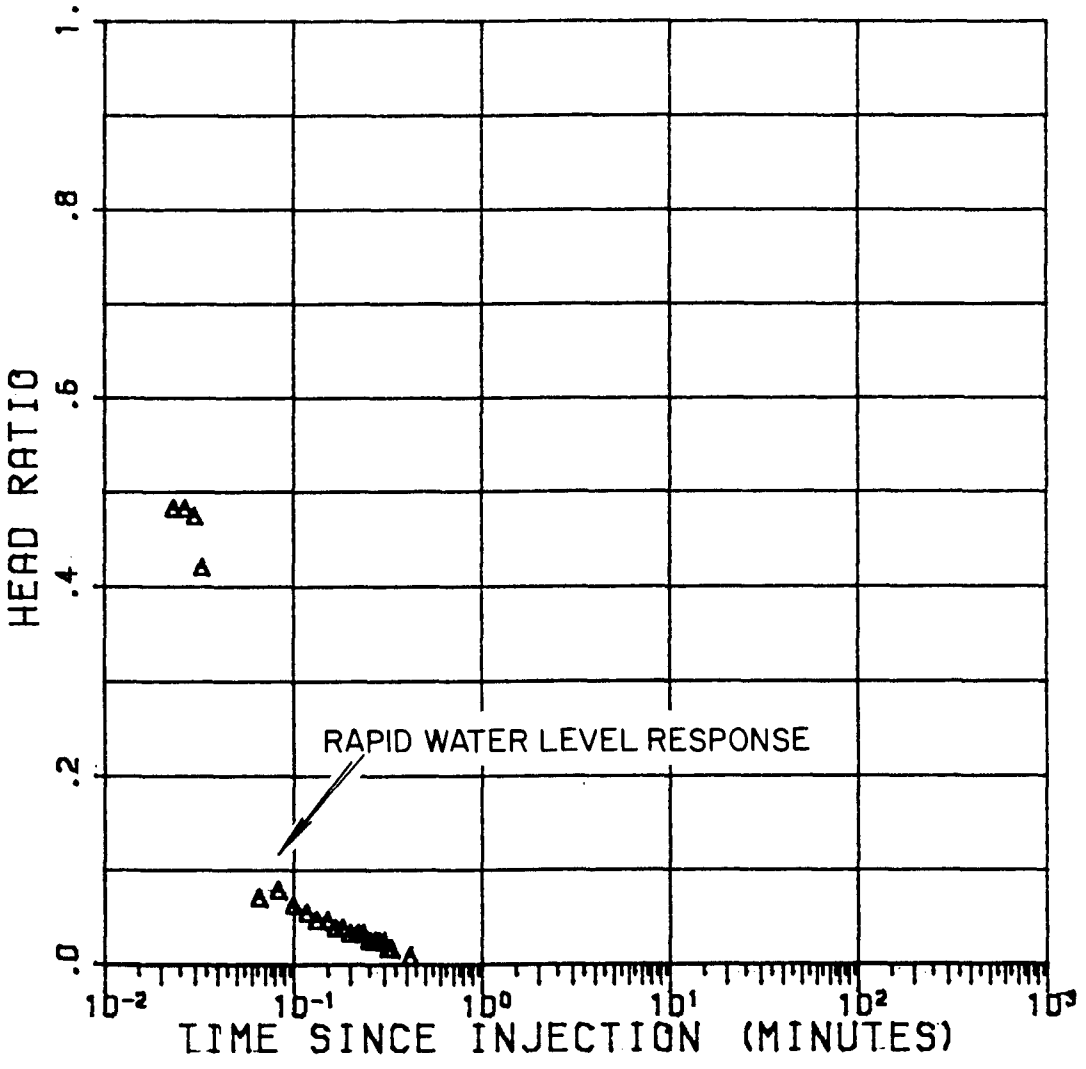

SLUG TEST OF WELL MW5 IN
HEAD RATIO VS LOG TIME

PLATE C-10

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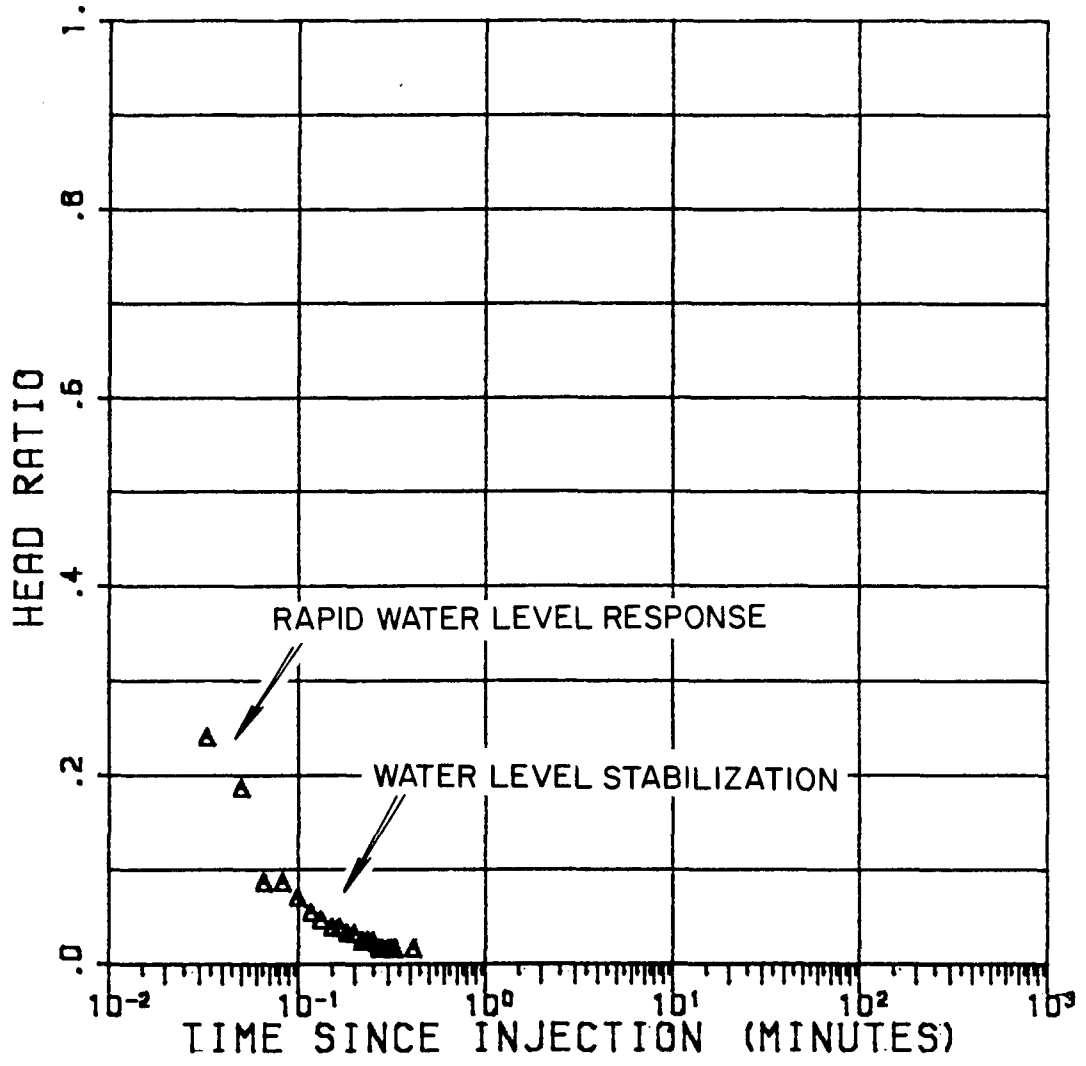

SLUG TEST OF WELL MW5 OUT
HEAD RATIO VS LOG TIME

PLATE C-11

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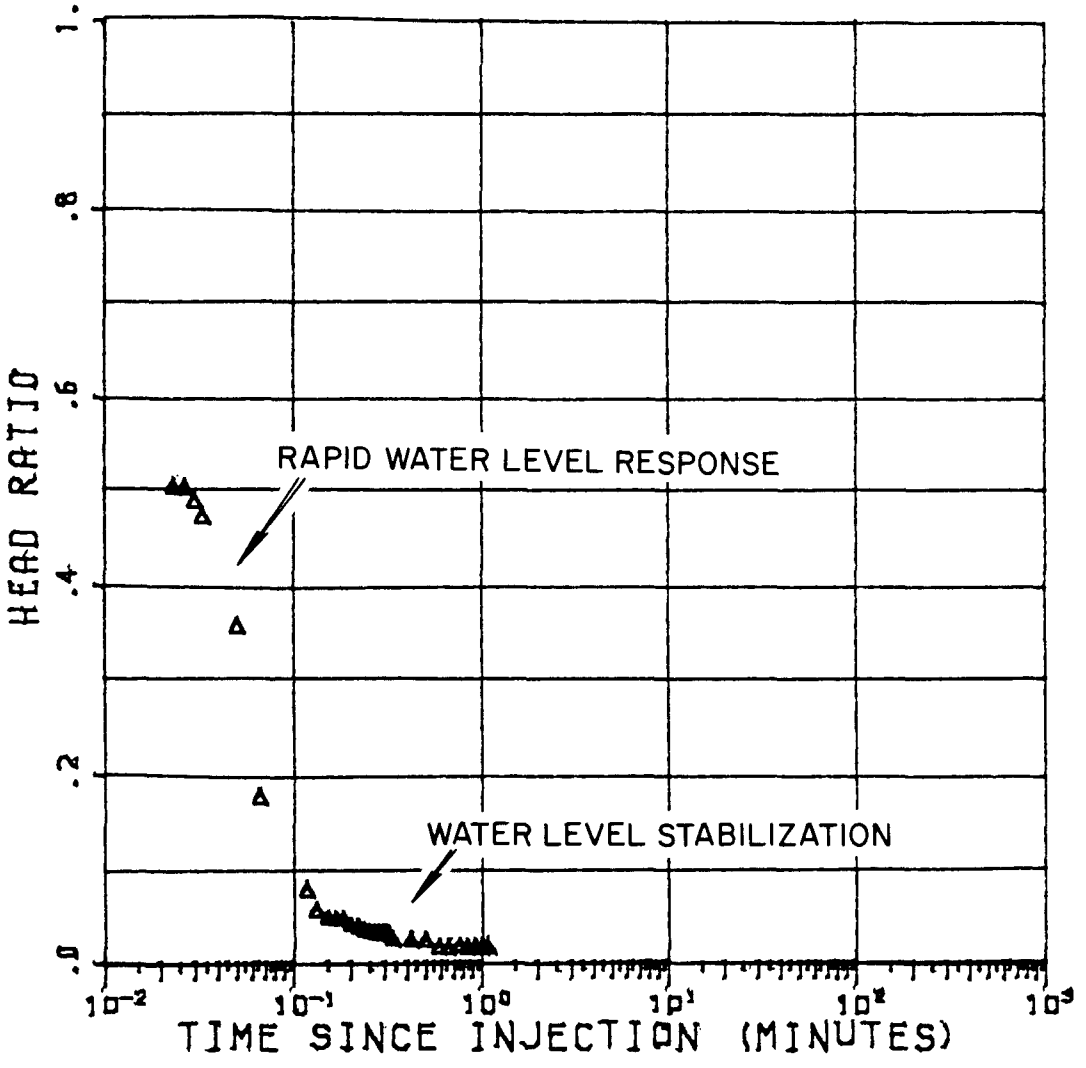

SLUG TEST OF WELL MW6 IN
HEAD RATIO VS LOG TIME

PLATE C-12

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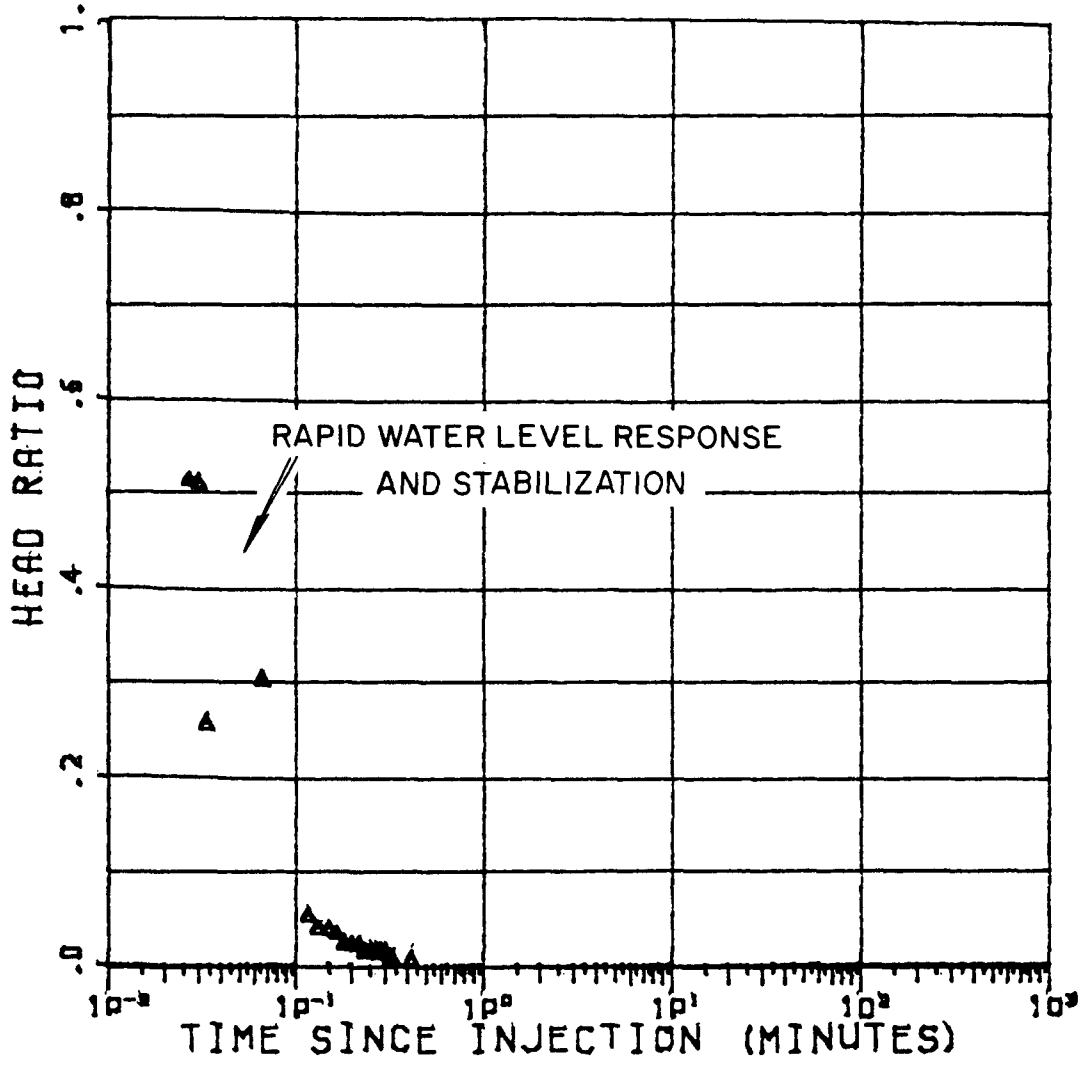

SLUG TEST OF WELL MW7 IN
HEAD RATIO VS LOG TIME

PLATE C-13

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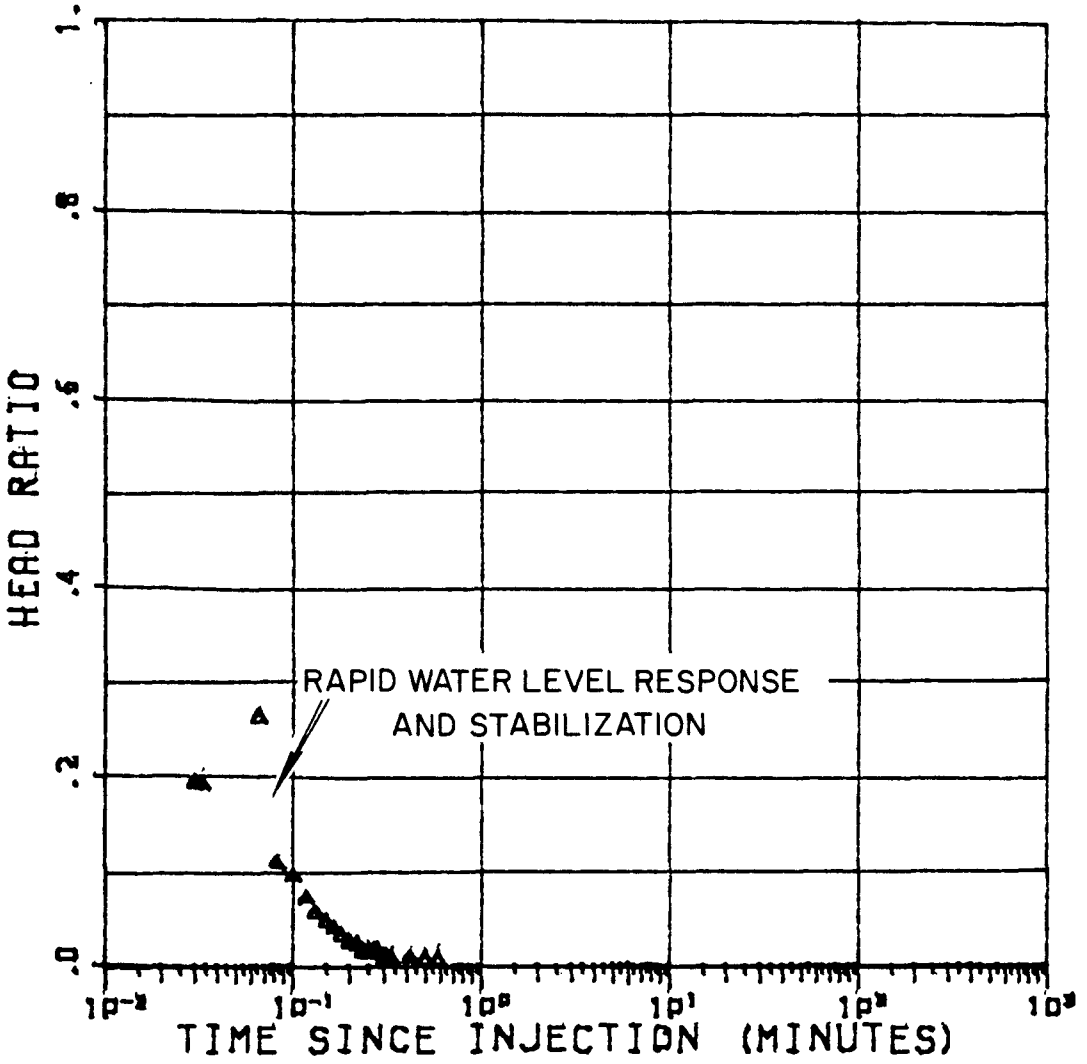

SLUG TEST OF WELL MW7 OUT
HEAD RATIO VS LOG TIME

PLATE C-14

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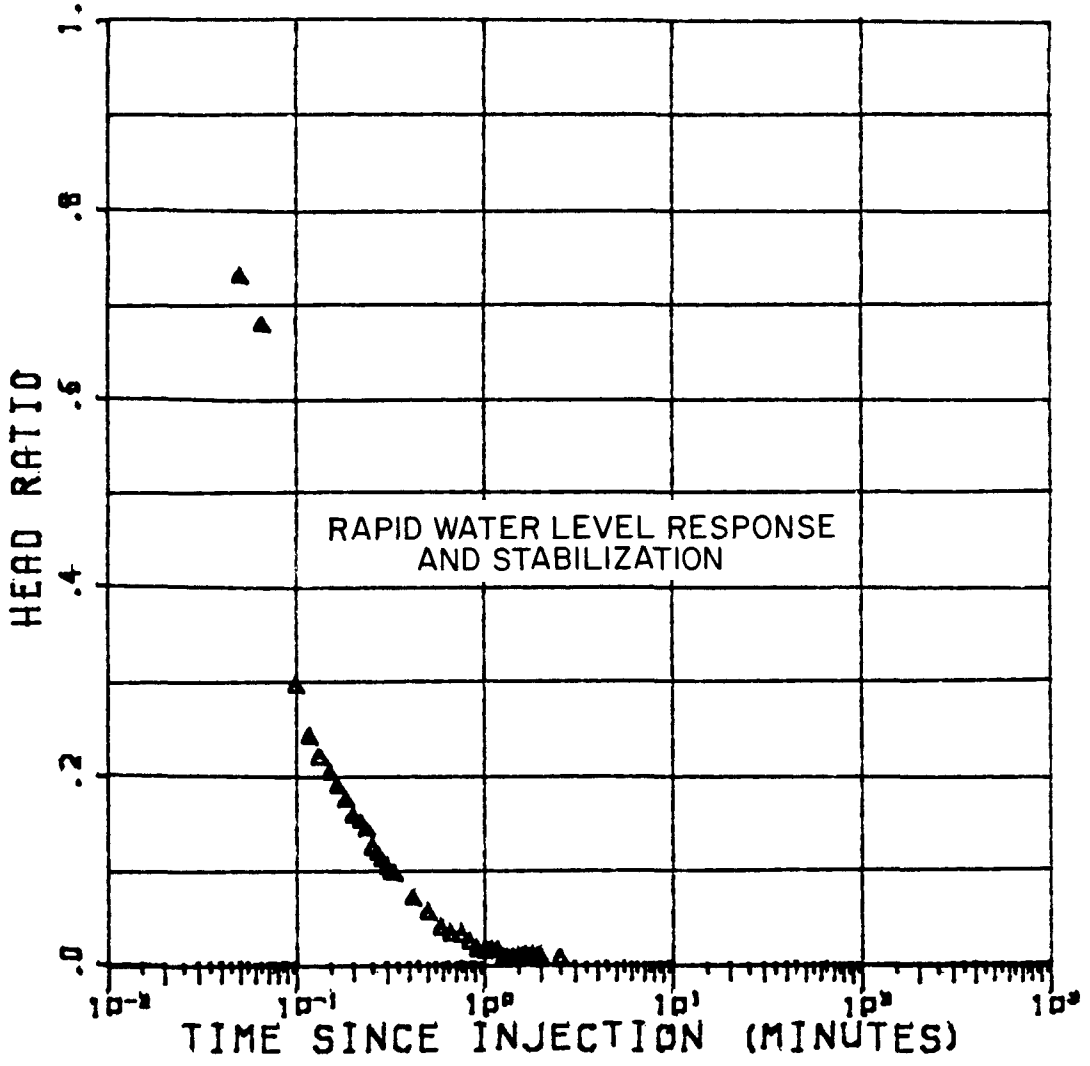

SLUG TEST OF WELL MW 8 IN
HEAD RATIO VS LOG TIME

PLATE C-15

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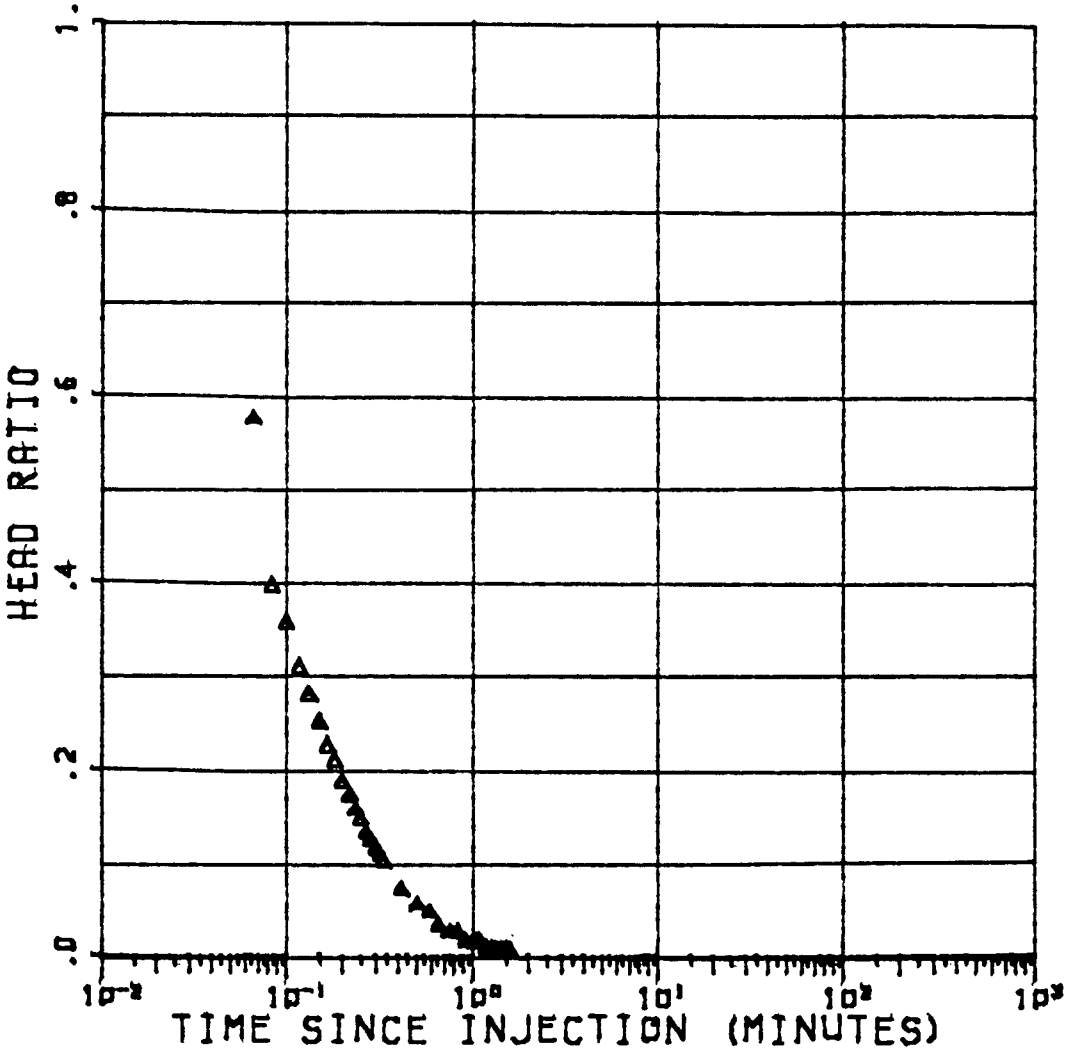
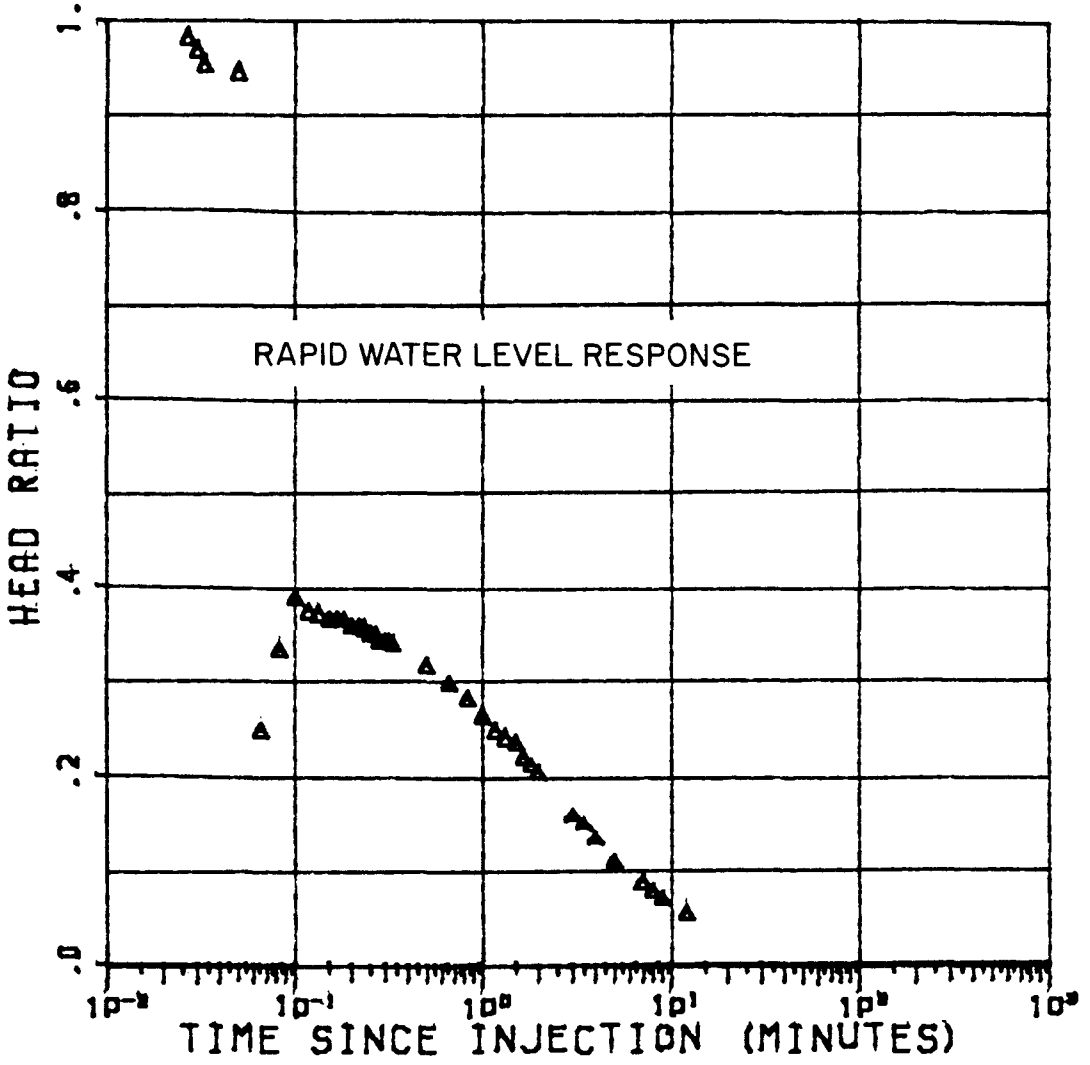


SLUG TEST OF WELL MW8 OUT

HEAD RATIO VS LOG TIME

PLATE C-16



SLUG TEST OF WELL MW9 IN
HEAD RATIO VS LOG TIME

MAVERIK COUNTRY STORES INC. KIRTLAND, NEW MEXICO
FRI 11-20-1987 07:43:56.49

PLATE C-17

MAVERIK COUNTRY STORES INC. KIRTLAND, NEW MEXICO
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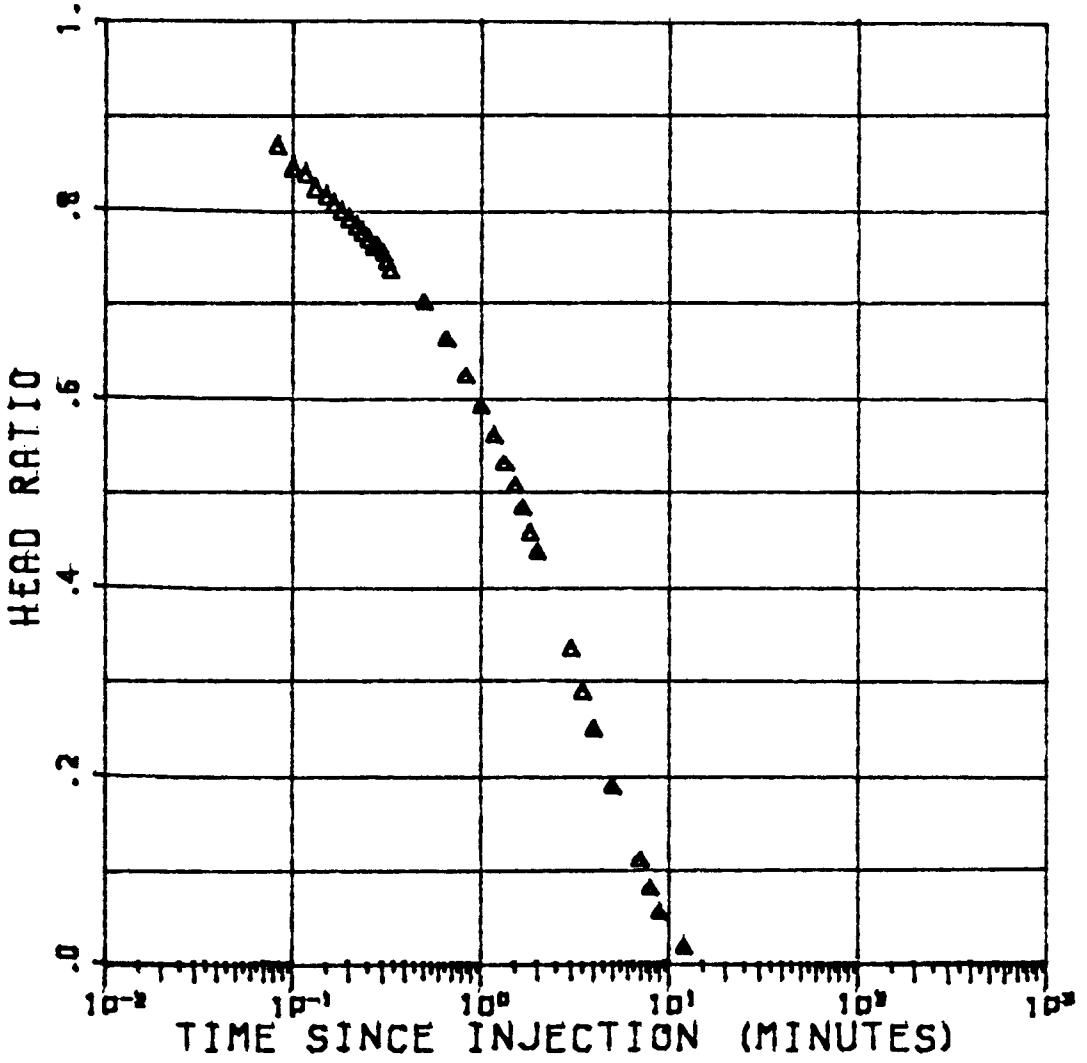
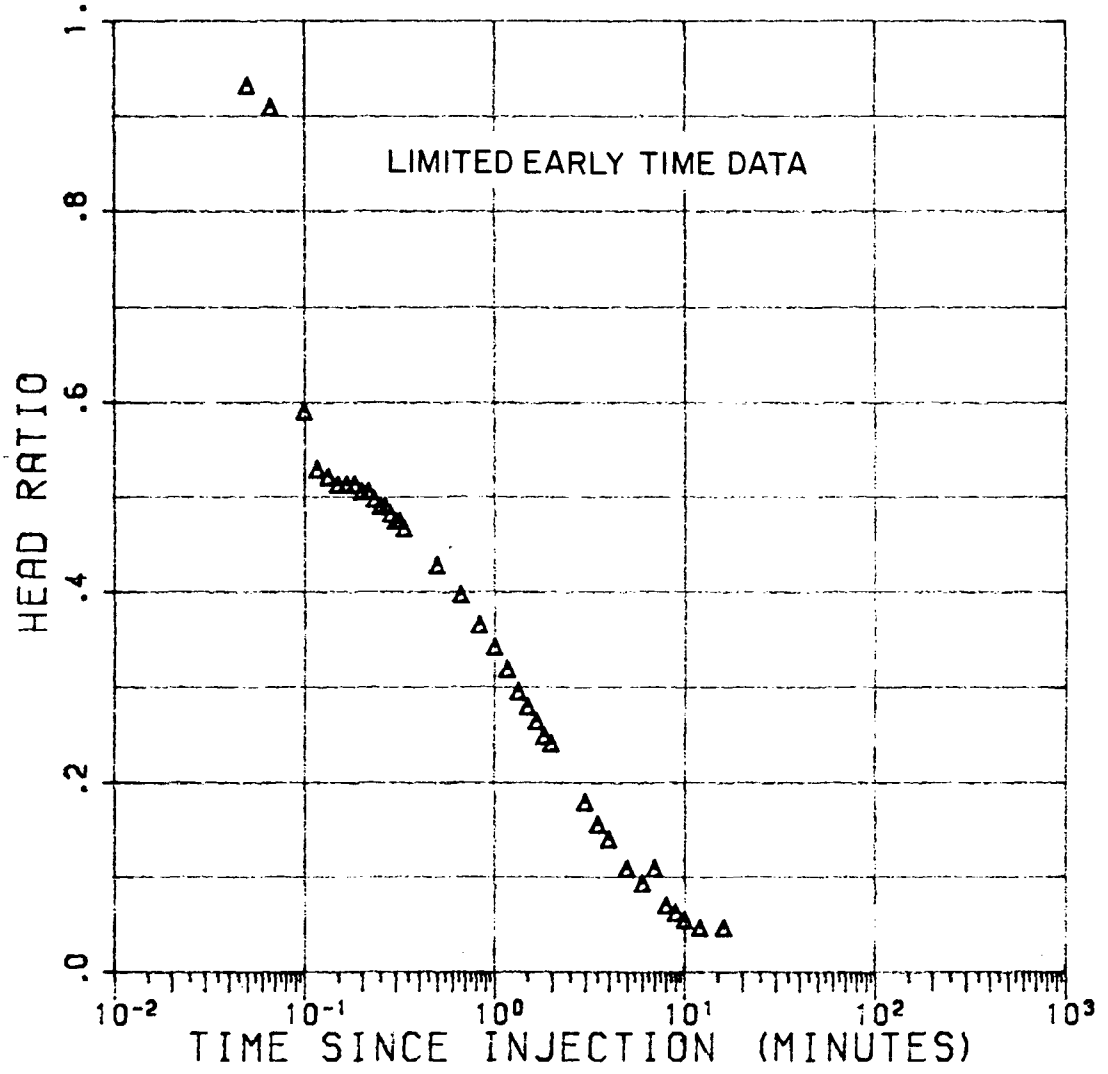


SLUG TEST OF WELL MW9 OUT
HEAD RATIO VS LOG TIME

PLATE C-18



SLUG TEST OF WELL MW10 IN
HEAD RATIO VS LOG TIME

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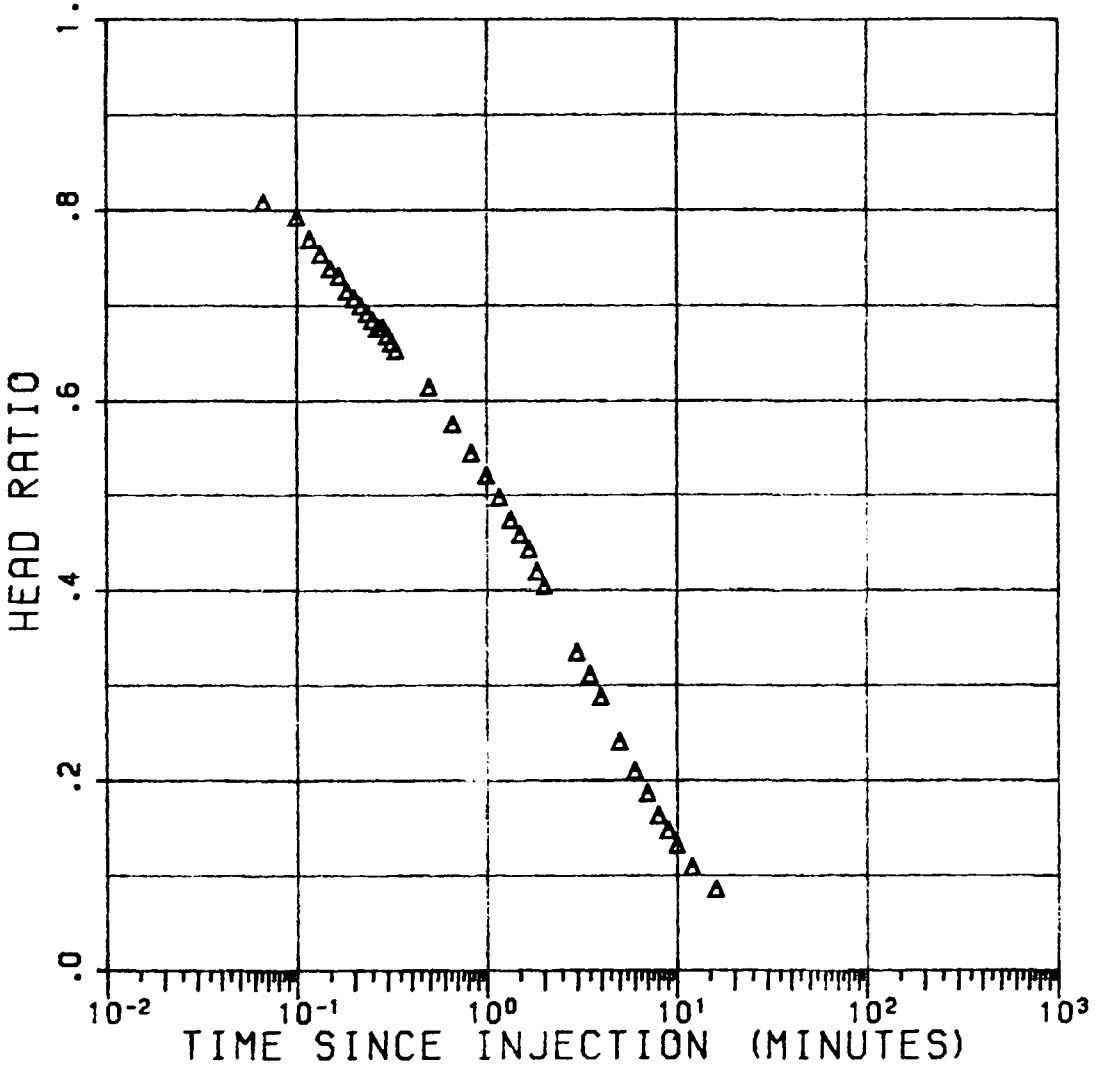

SLUG TEST OF WELL MW10 OUT
HEAD RATIO VS LOG TIME

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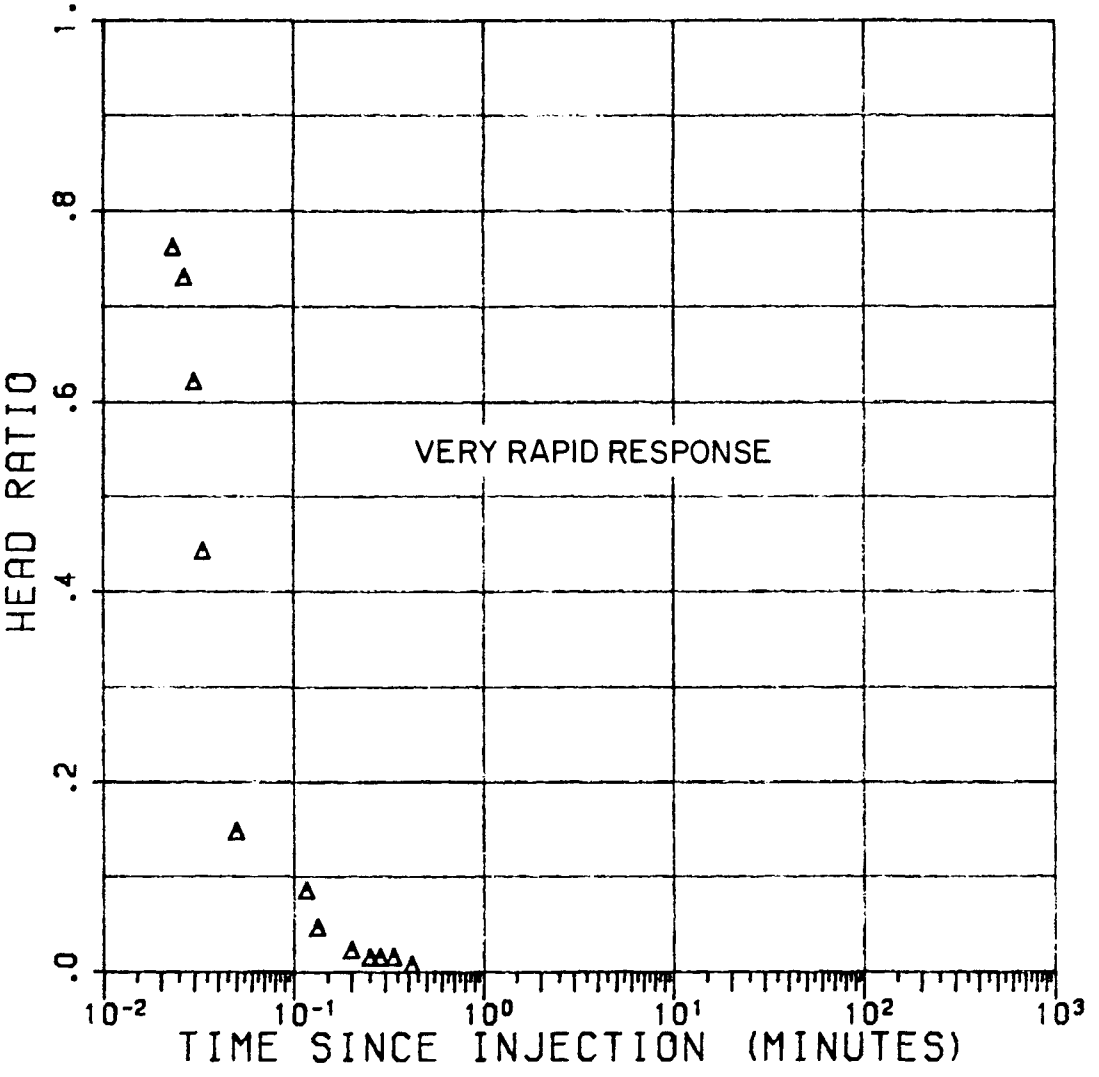

SLUG TEST OF WELL MW 11 IN
HEAD RATIO VS LOG TIME

PLATE C-21

MAVERIK COUNTRY STORES INC. KIRTLAND. NEW MEXICO
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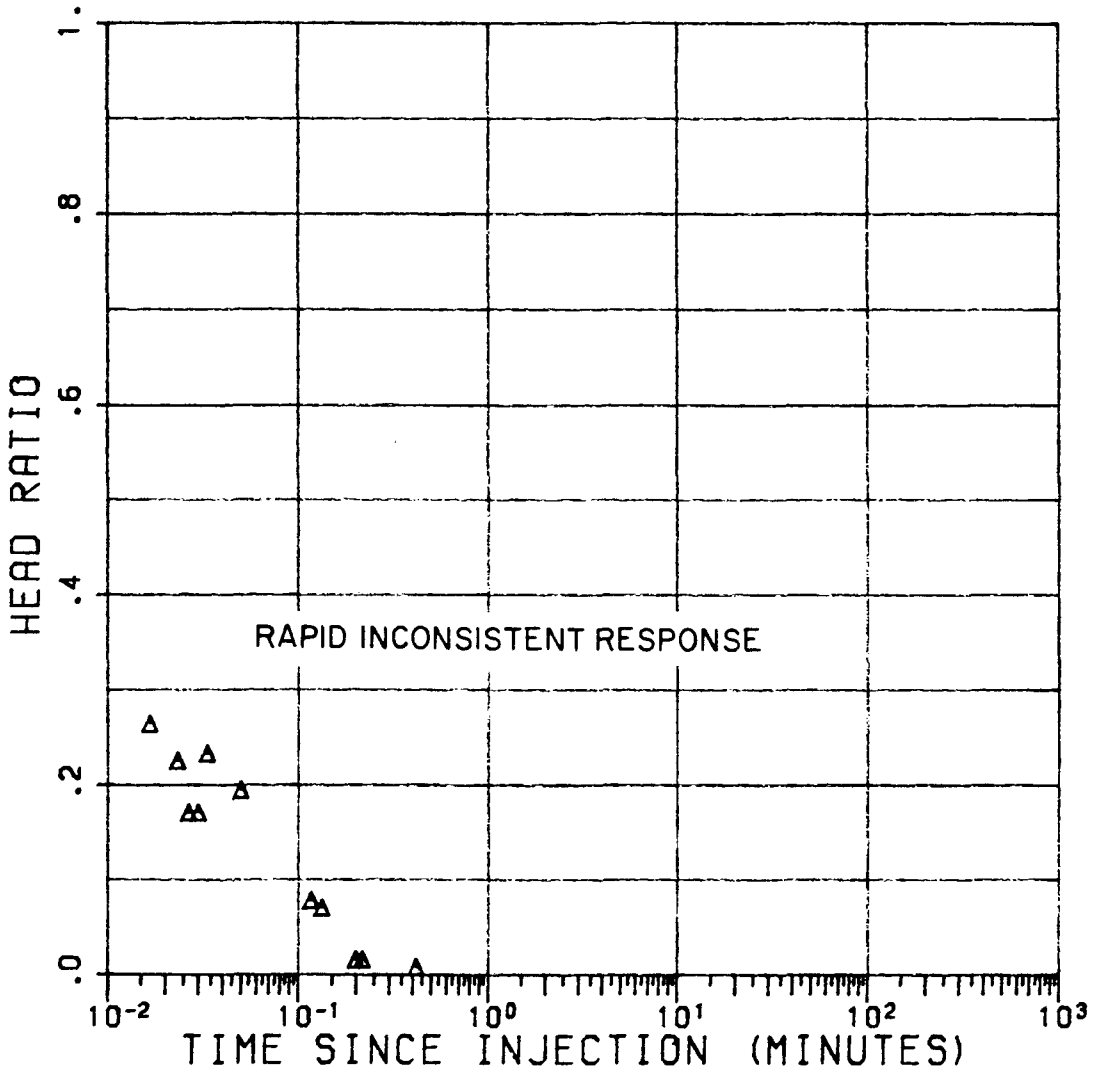

SLUG TEST OF WELL MW 11 OUT
HEAD RATIO VS LOG TIME

PLATE C-22

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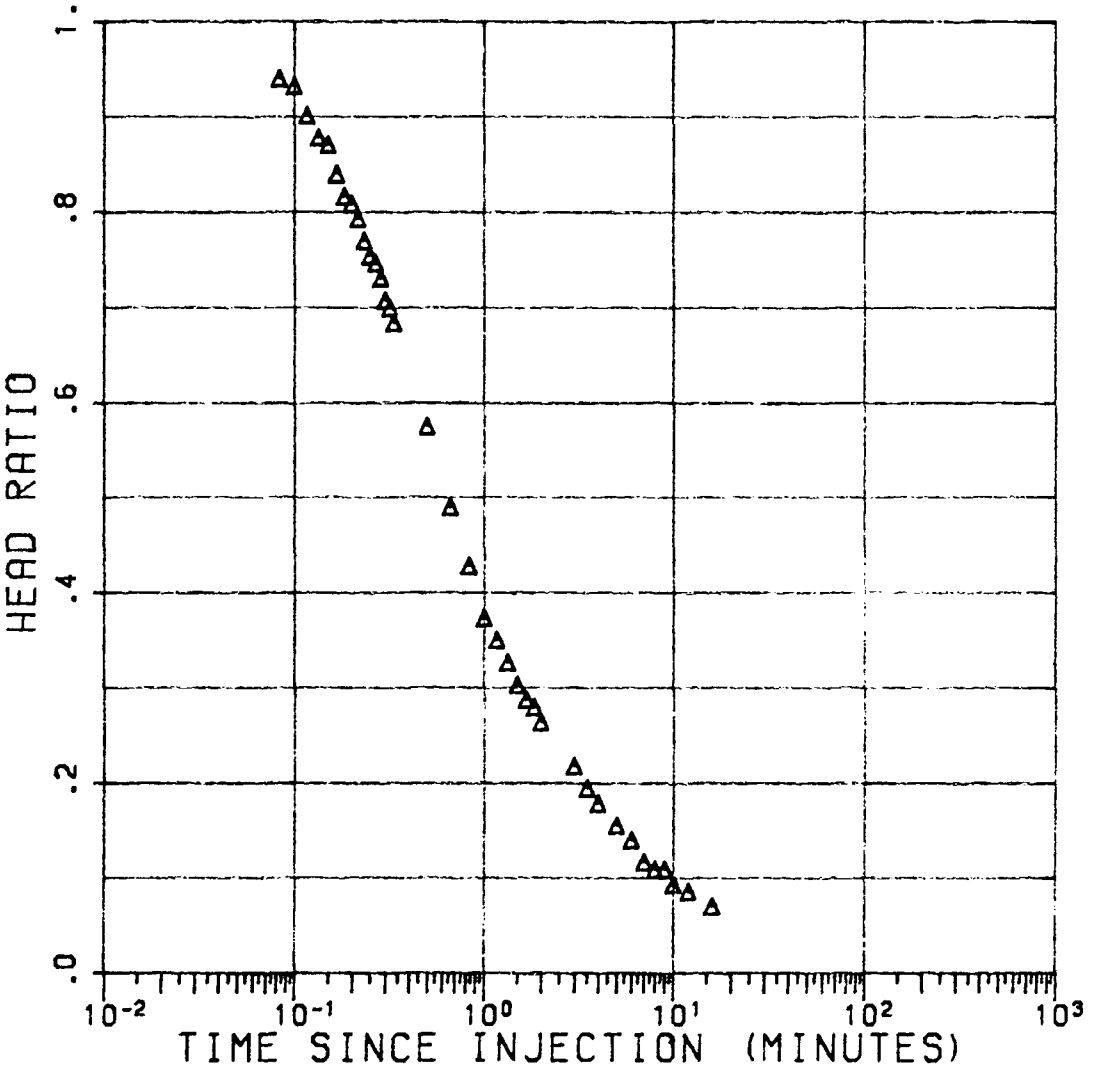

SLUG TEST OF WELL MW12 IN
HEAD RATIO VS LOG TIME

PLATE C-23

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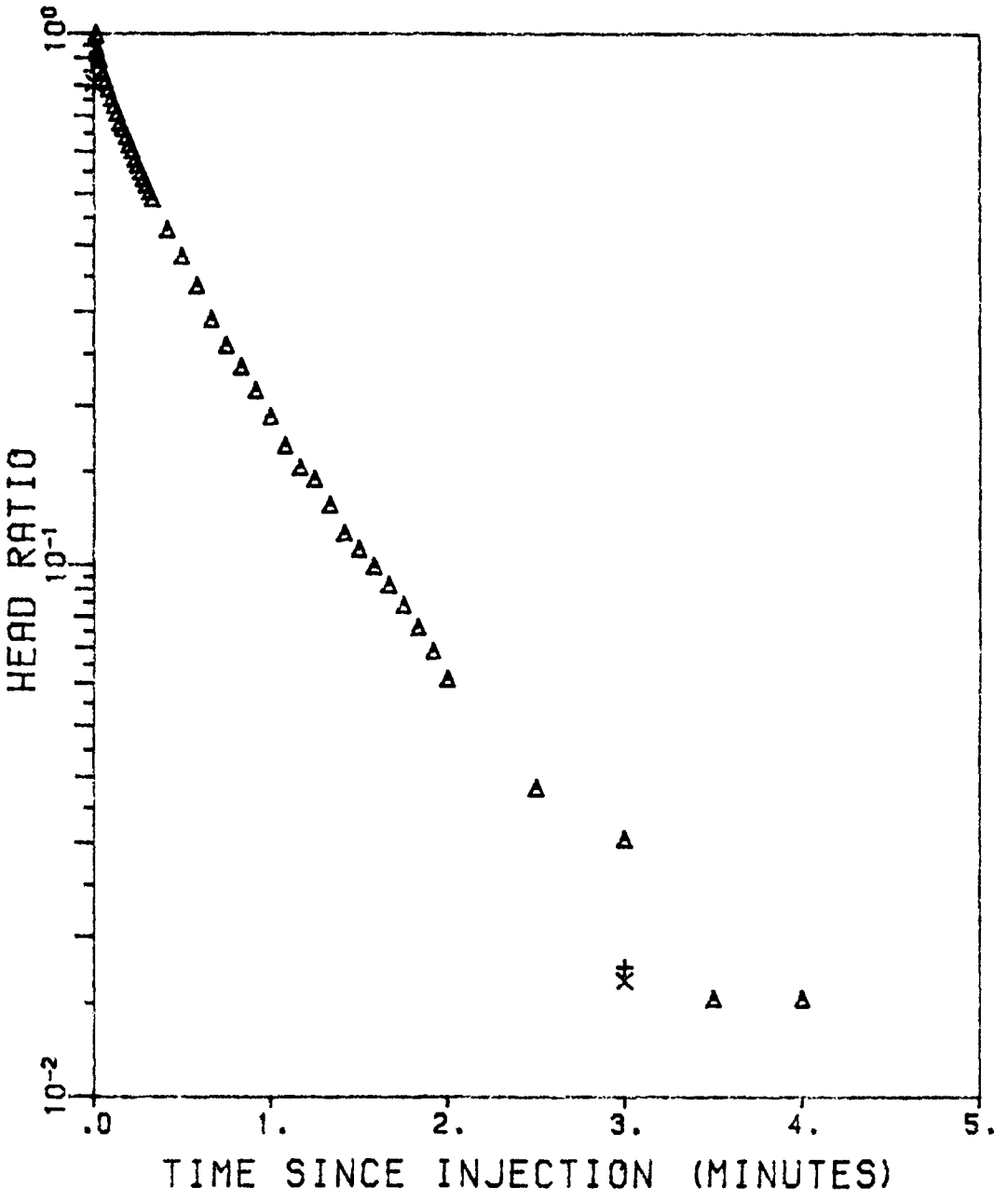
MON 02-08-1988 19:12:59.20



SLUG TEST OF WELL MW1 OUT
LOG HEAD RATIO VS TIME

PLATE C-24

MAVERIK COUNTRY STORES INC., KIRTLAND, NEW MEXICO
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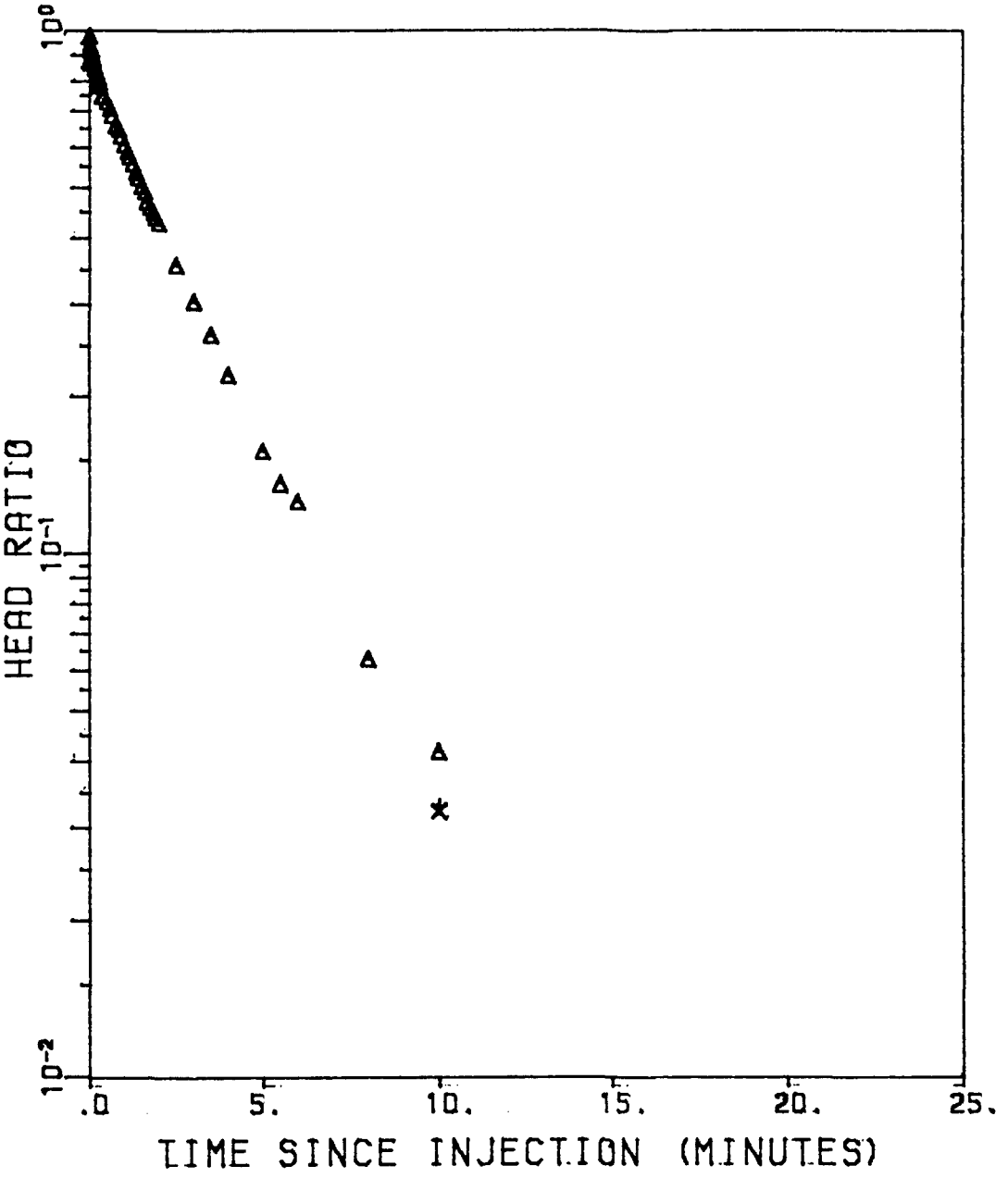

SLUG TEST OF WELL MW2 OUT

LOG HEAD RATIO VS TIME

PLATE C-25

MAVERIK COUNTRY STORES INC., KIRTLAND, NEW MEXICO
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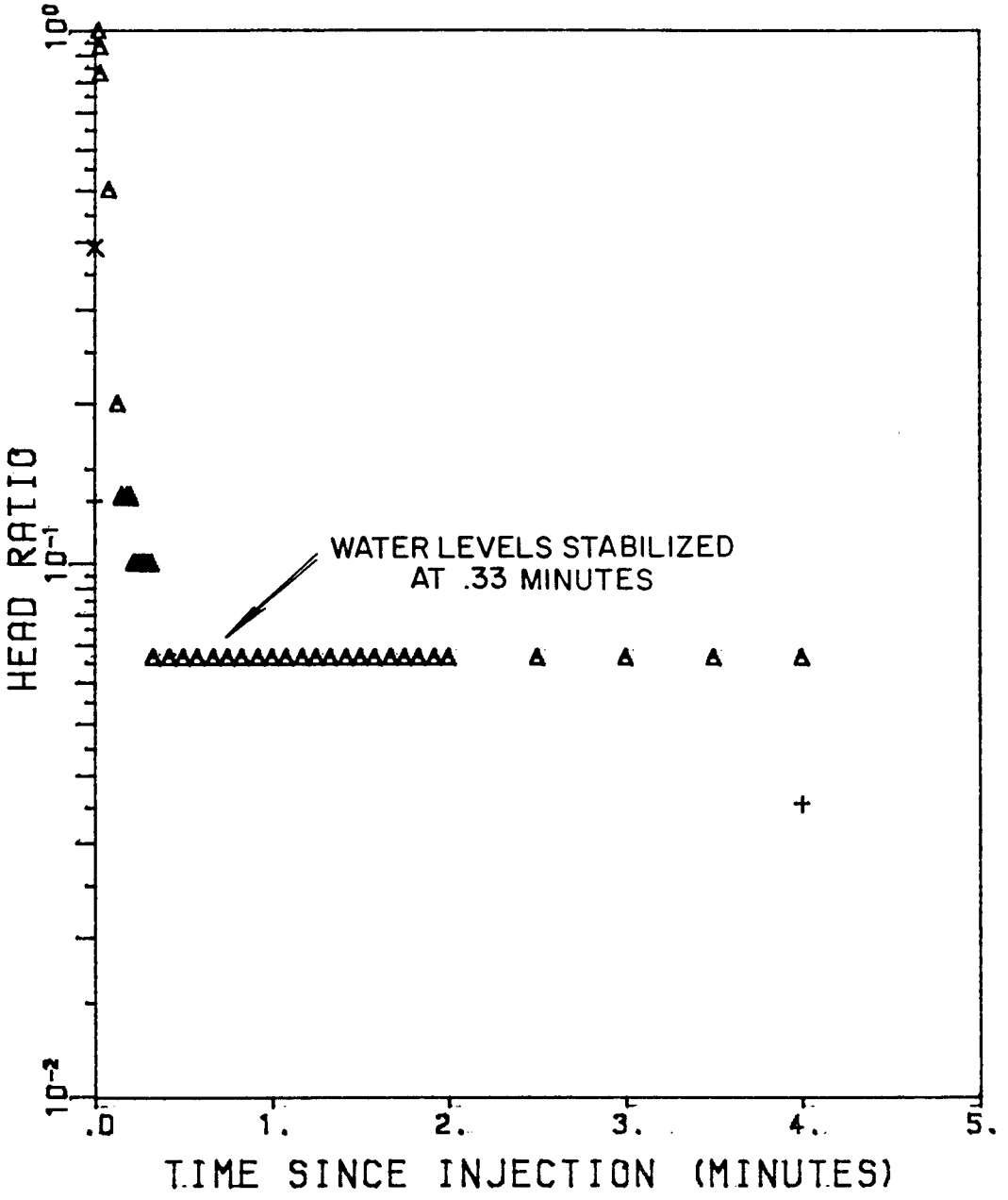

SLUG TEST OF WELL MW3 IN
LOG HEAD RATIO VS TIME

PLATE C-26

MAVERIK COUNTRY STORES INC. KIRTLAND, NEW MEXICO
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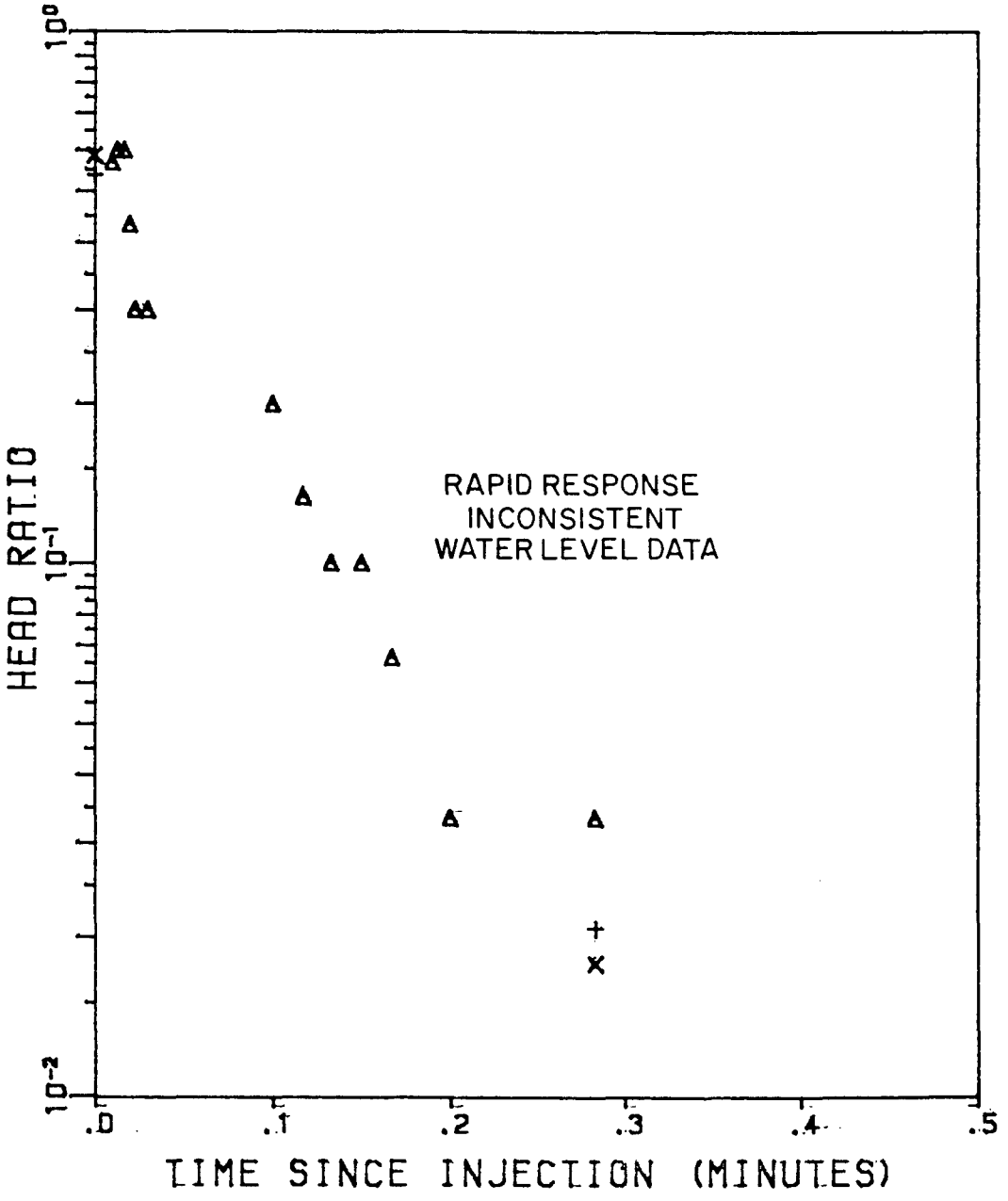

SLUG TEST OF WELL MW3 OUT
LOG HEAD RATIO VS TIME

PLATE C-27

MAVERIK COUNTRY STORES INC. KIRTLAND, NEW MEXICO
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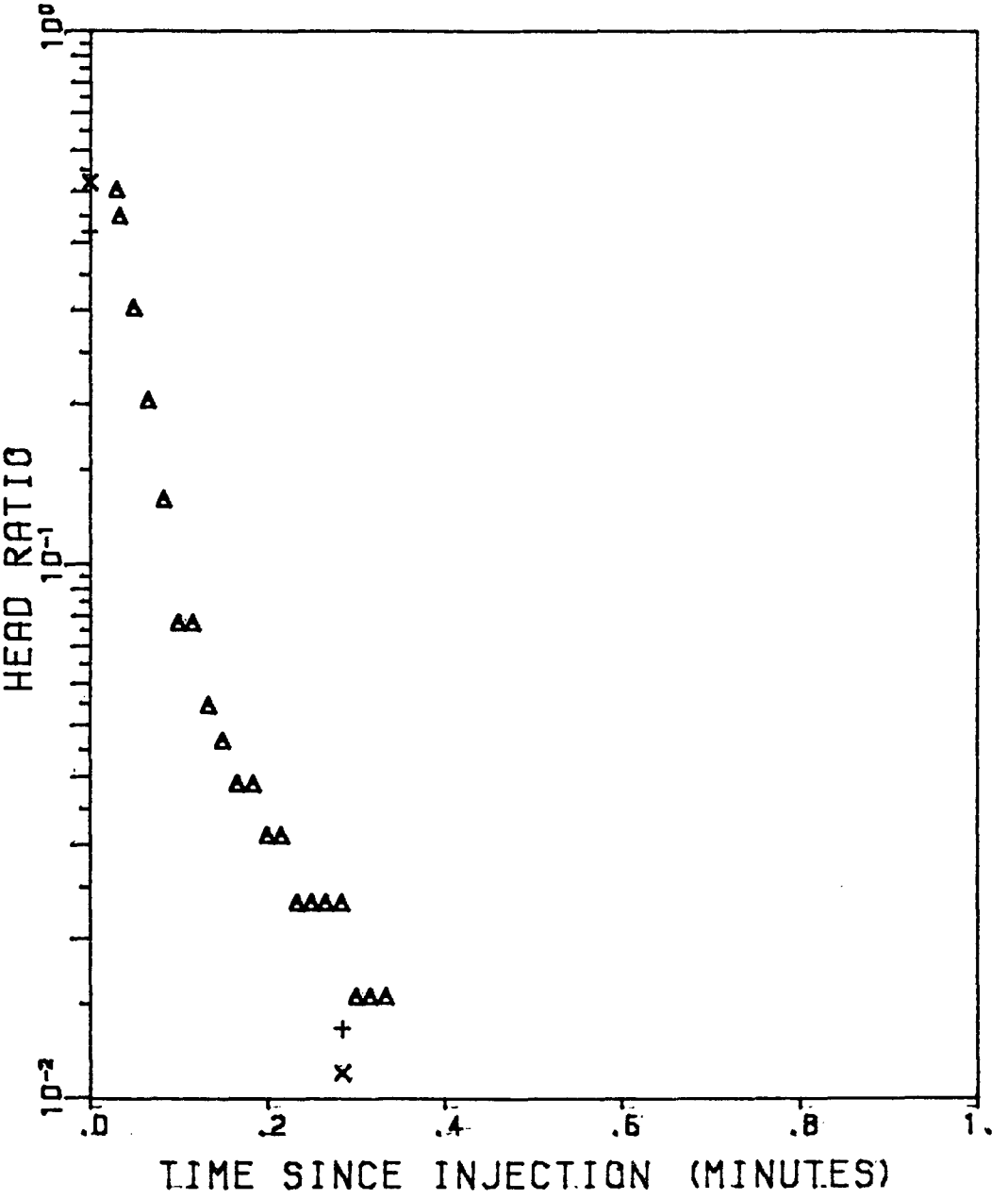

SLUG TEST OF WELL MW4 IN
LOG HEAD RATIO VS TIME

PLATE C-28

MAVERIK COUNTRY STORES INC. KIRTLAND, NEW MEXICO
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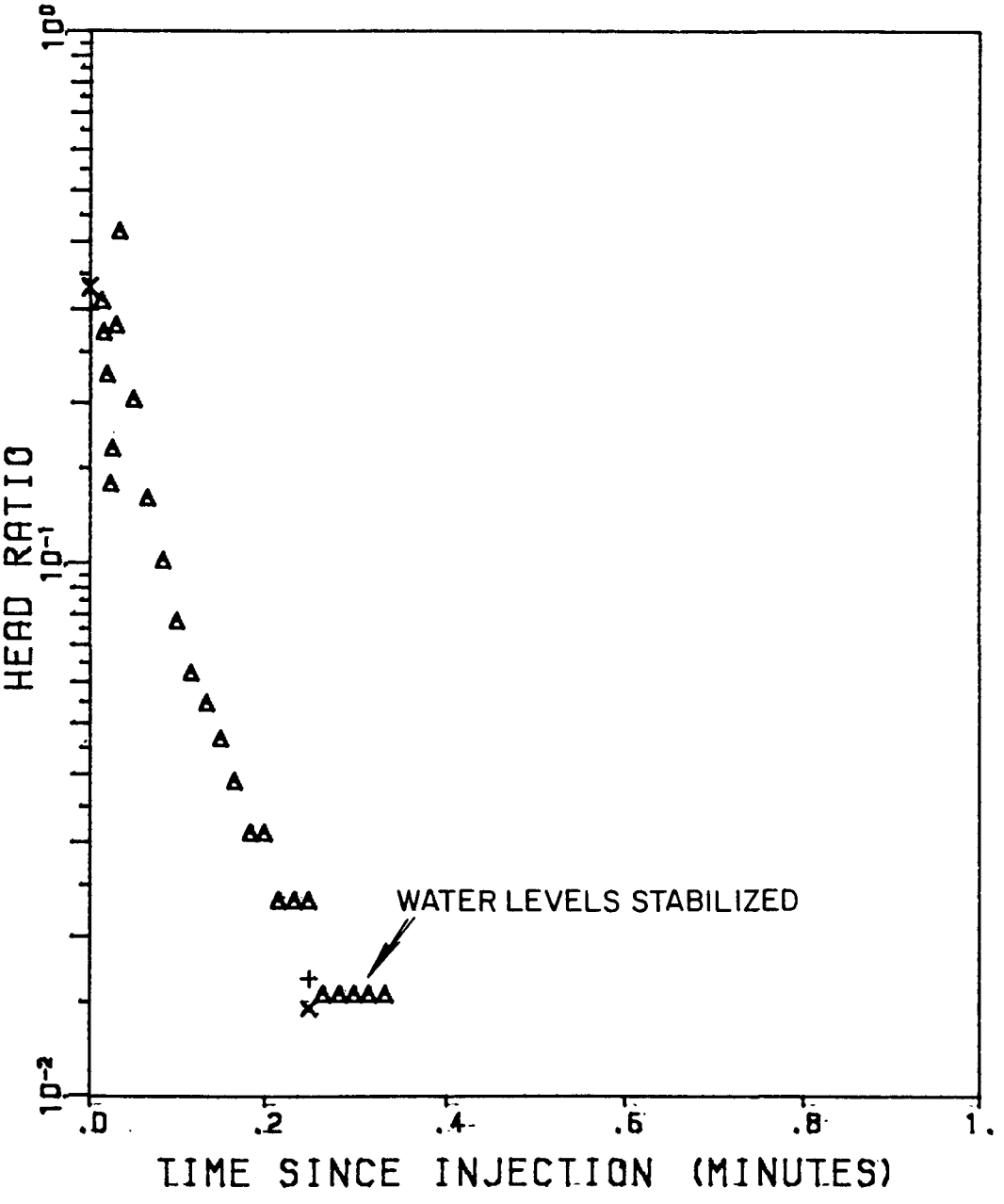

SLUG TEST OF WELL MW4 OUT
LOG HEAD RATIO VS TIME

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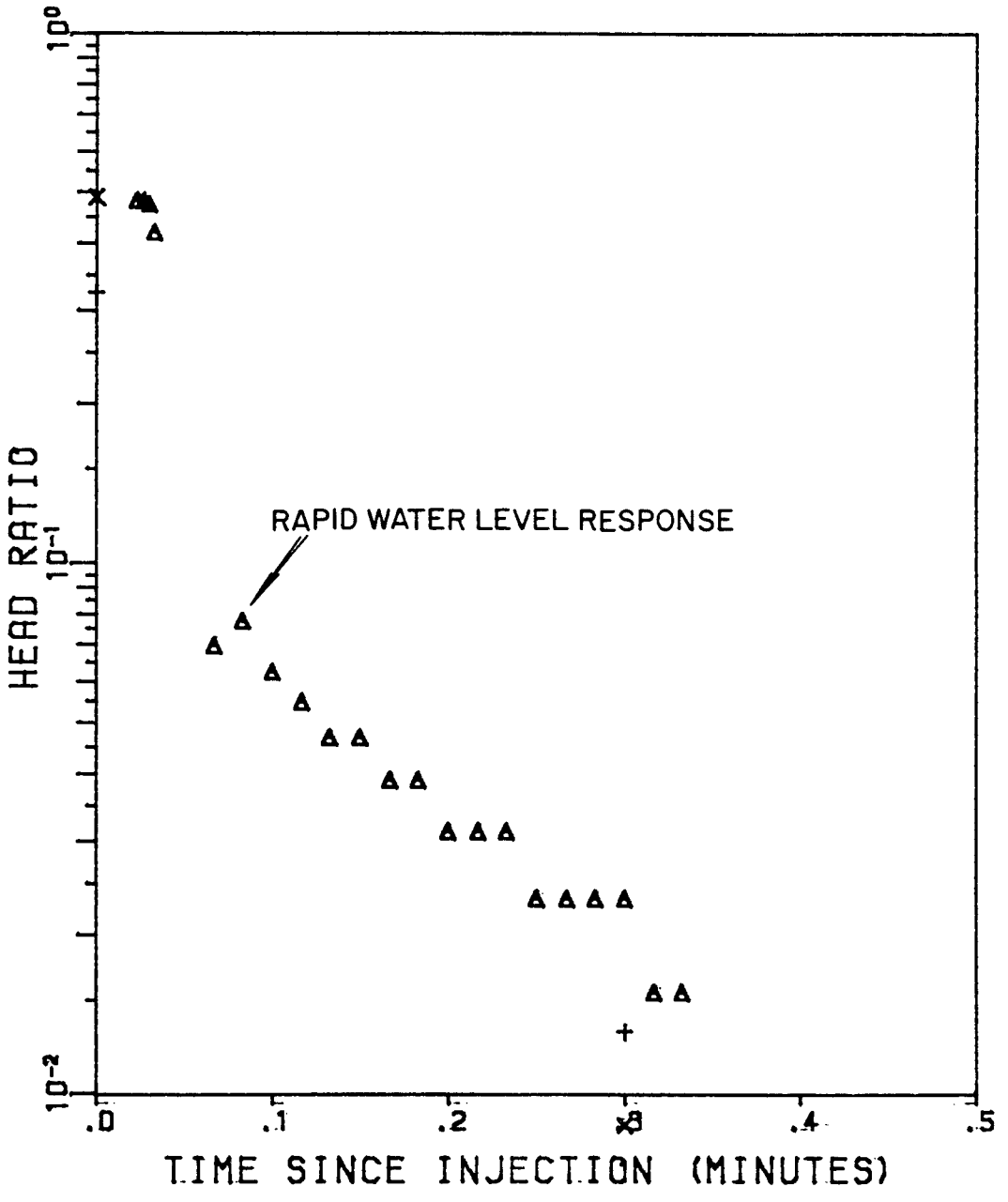

SLUG TEST OF WELL MW5 IN
LOG HEAD RATIO VS TIME

PLATE C-30

MAVERIK COUNTRY STORES INC., KIRTLAND, NEW MEXICO
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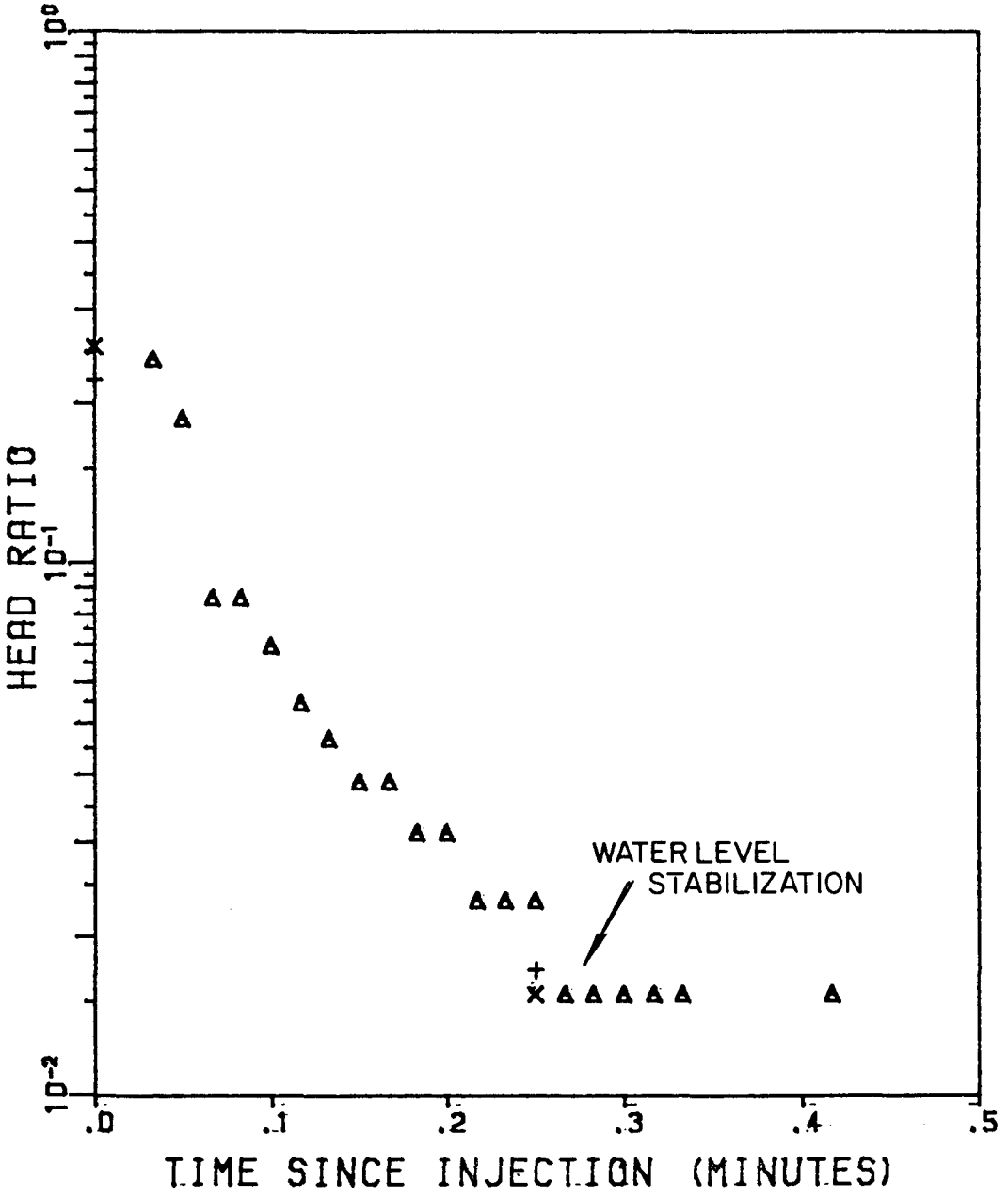

SLUG TEST OF WELL MW5 OUT
LOG HEAD RATIO VS TIME

PLATE C-31

MAVERIK COUNTRY STORES INC. KIRTLAND. NEW MEXICO
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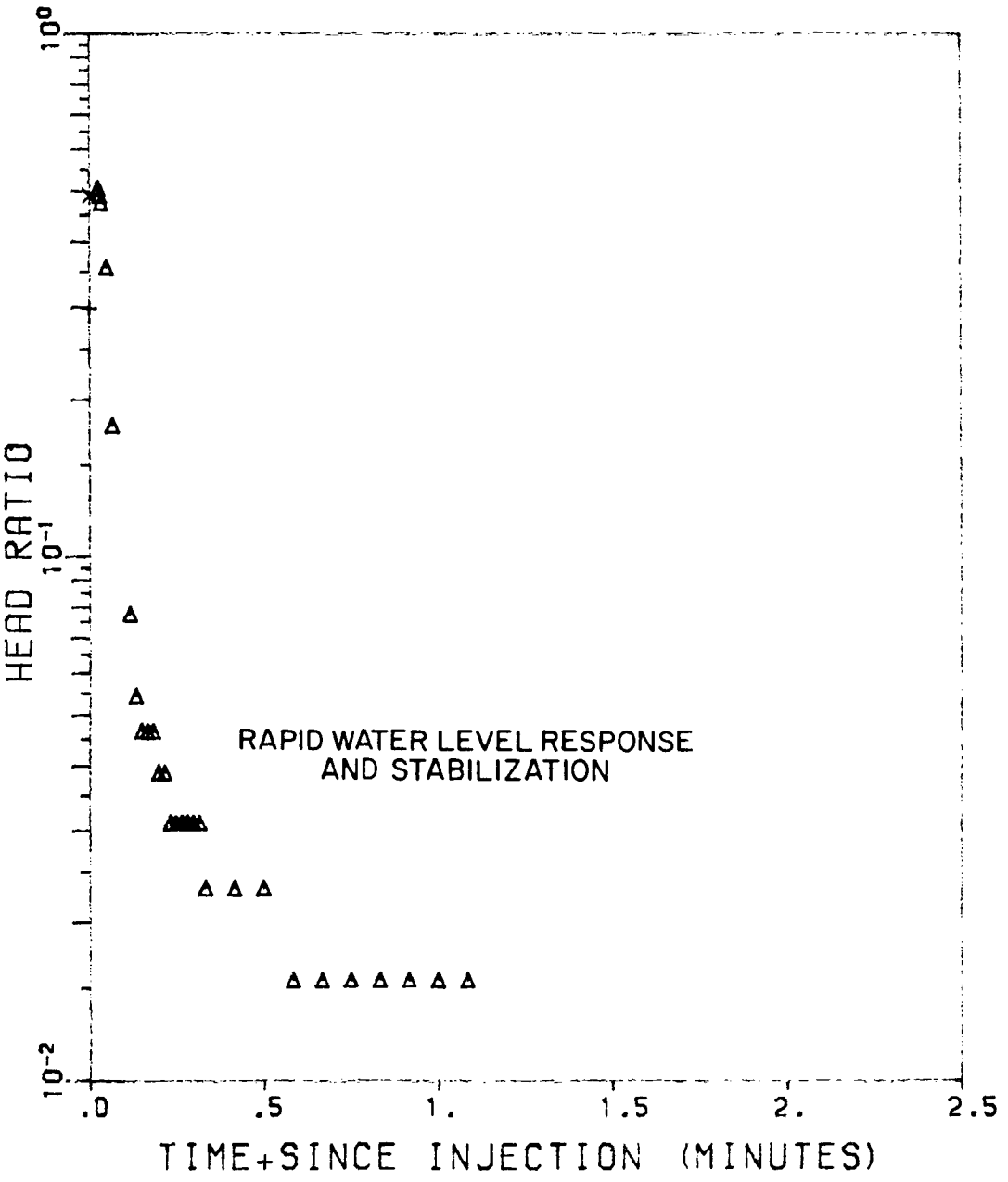
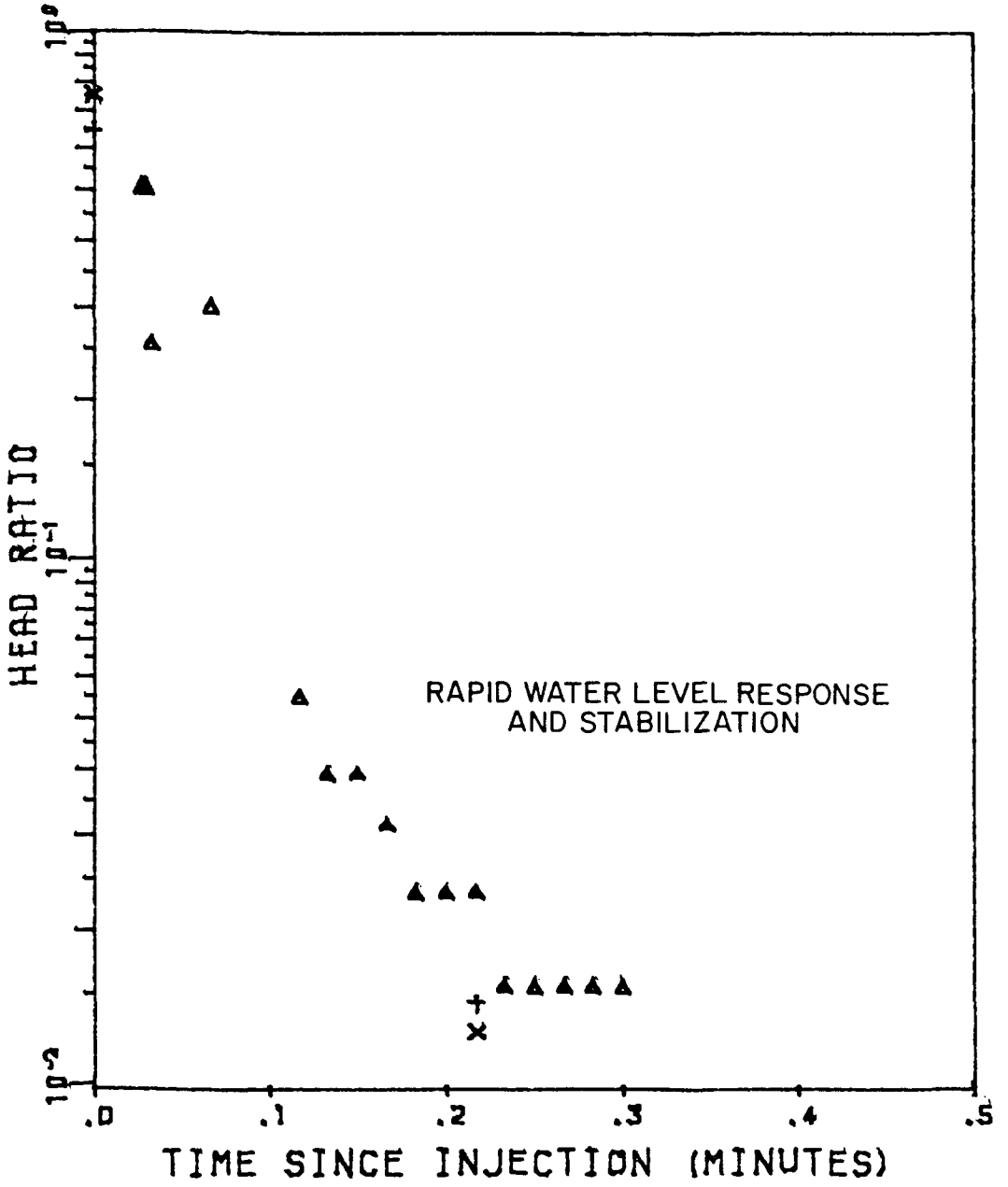


SLUG TEST OF WELL MW6 IN
LOG HEAD RATIO VS TIME

PLATE C-32

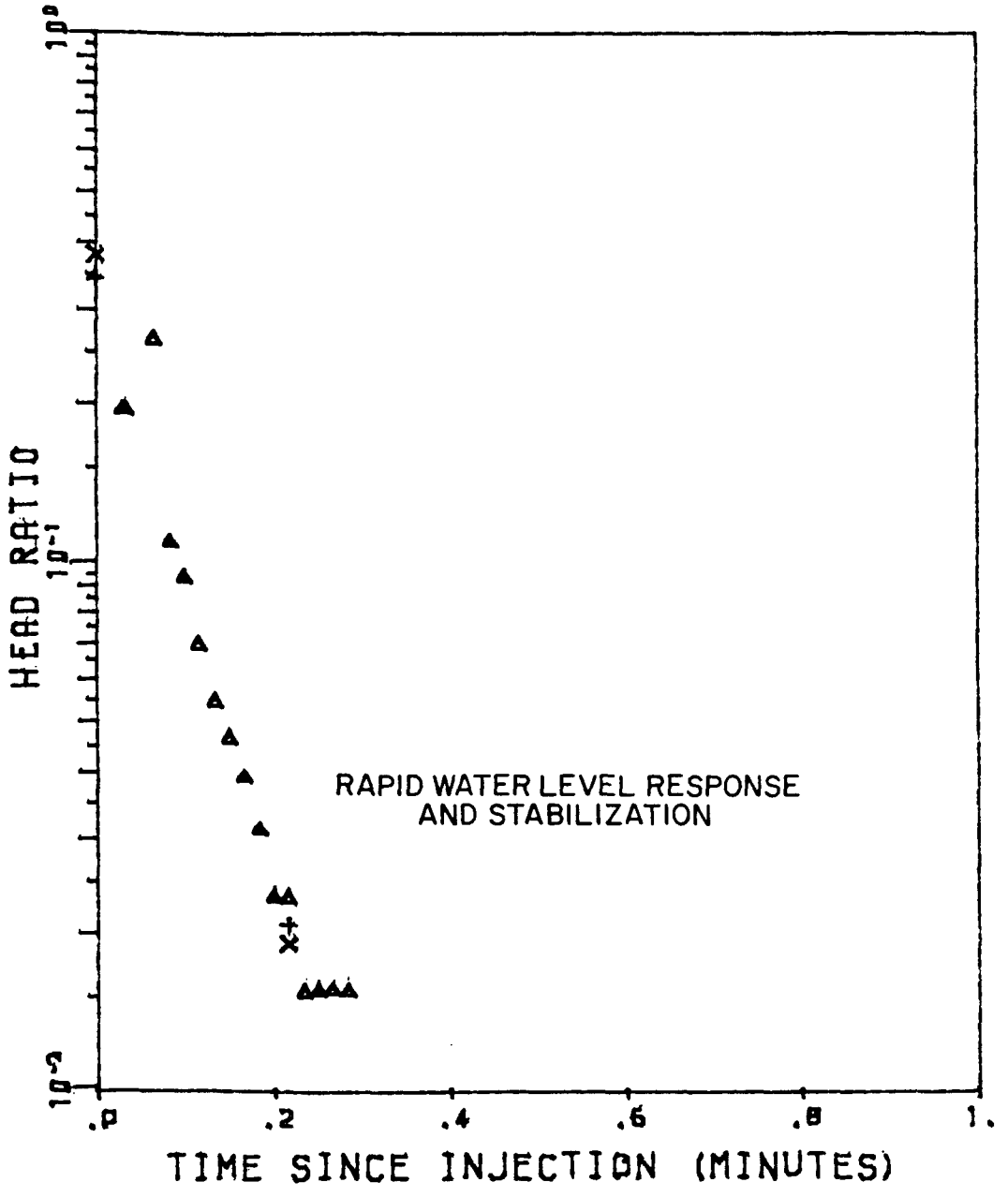


SLUG TEST OF WELL MW7 IN
LOG HEAD RATIO VS TIME

FRI 11-20-1987 06:21:44.08

PLATE C-33

MAVERIK COUNTRY STORES INC. KIRTLAND, NEW MEXICO
FRI 11-20-1987 06:43:43.25



SLUG TEST OF WELL MW7 OUT
LOG HEAD RATIO VS TIME

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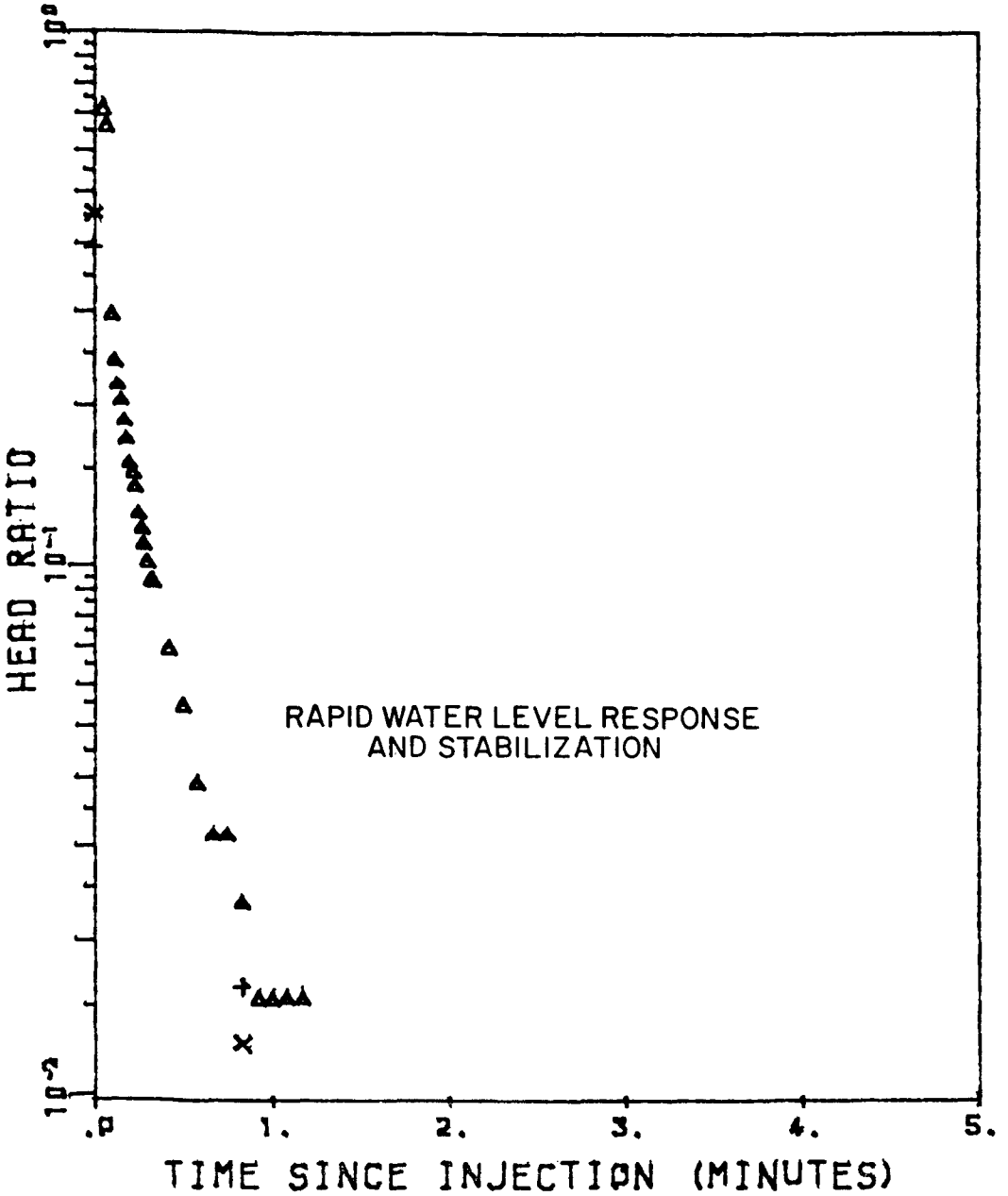
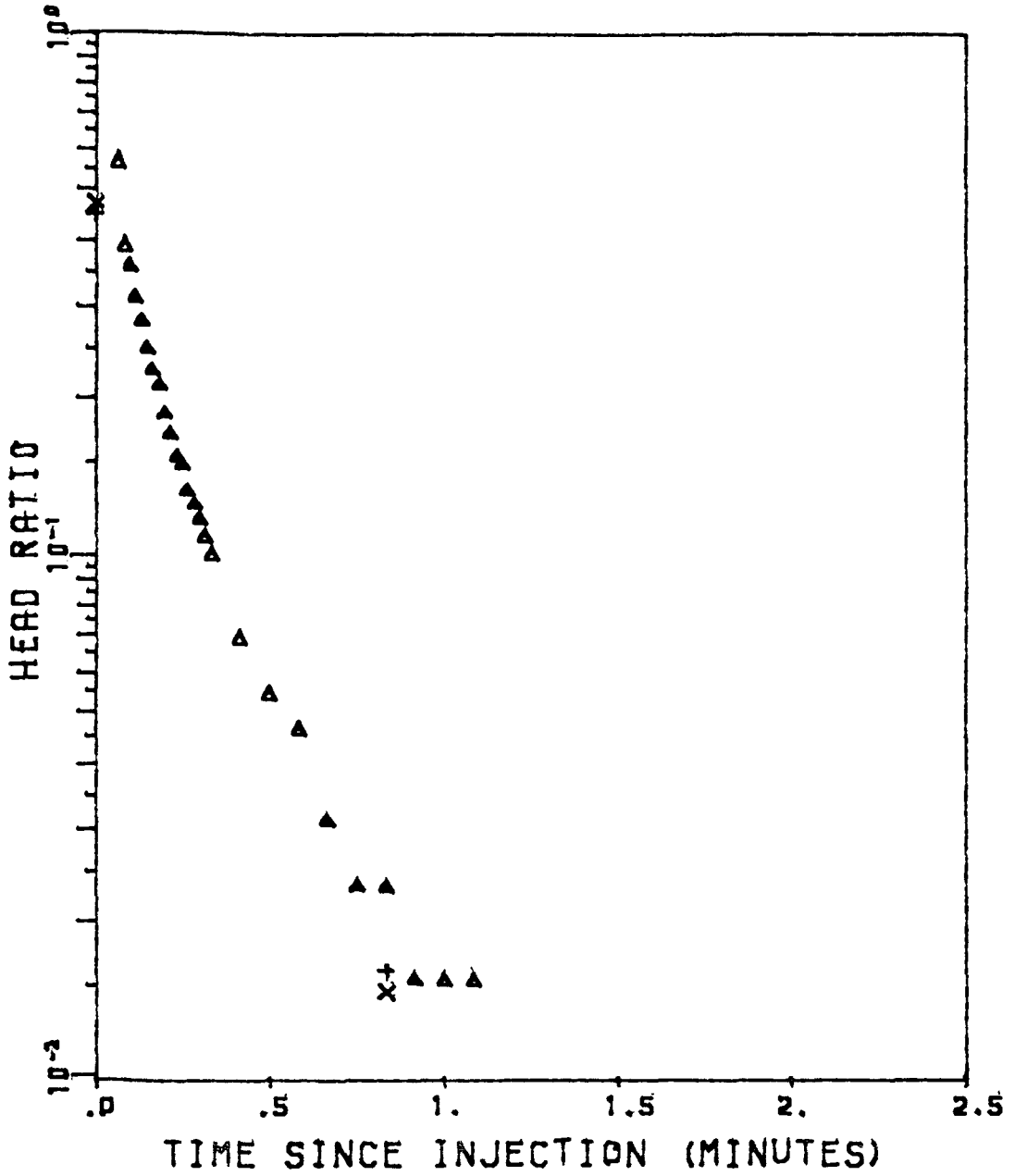


SLUG TEST OF WELL MW8 IN
LOG HEAD RATIO VS TIME

PLATE C-35



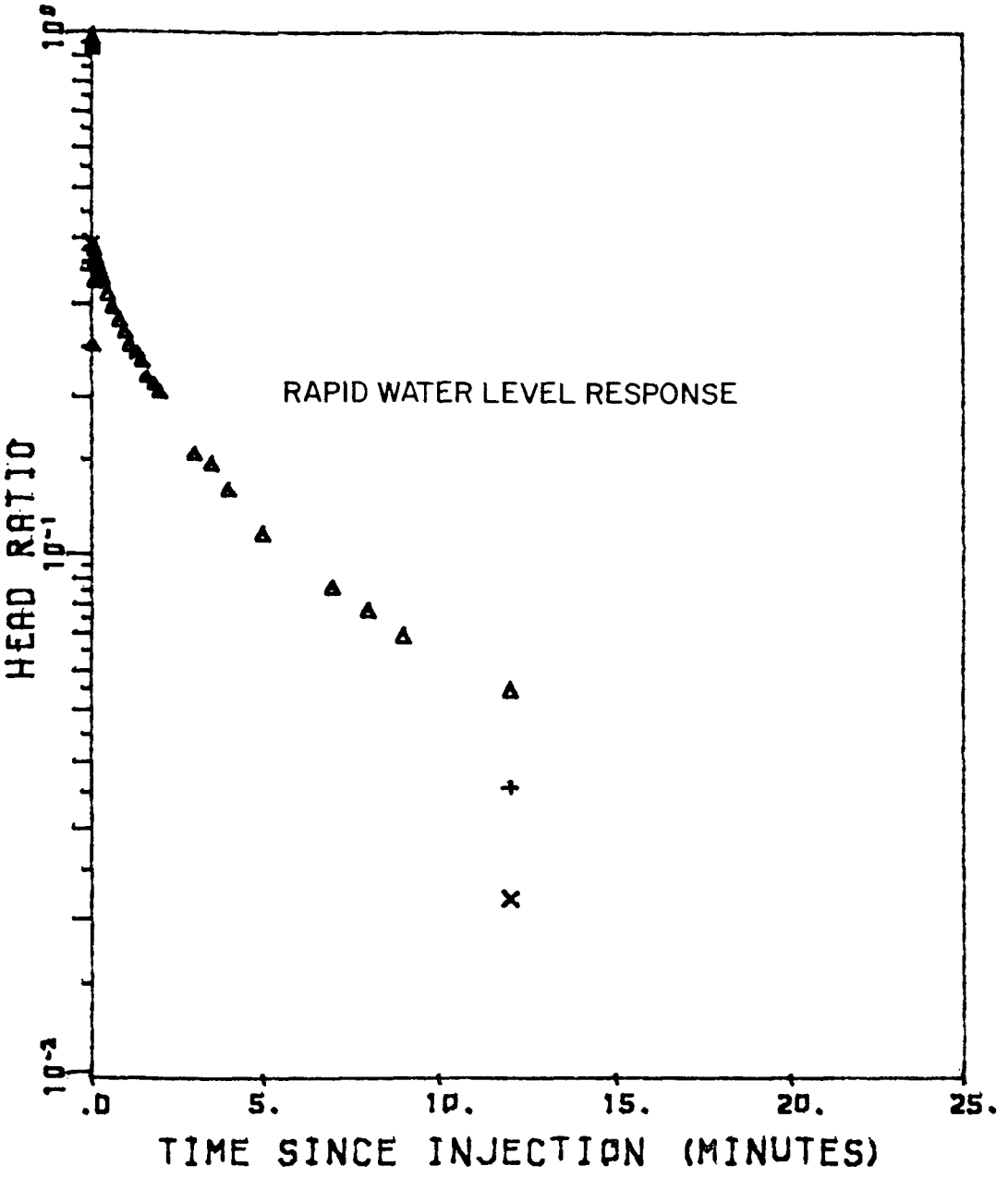
SLUG TEST OF WELL MW8 OUT

LOG HEAD RATIO VS TIME

FRI 11-20-1987 07:29:26.41

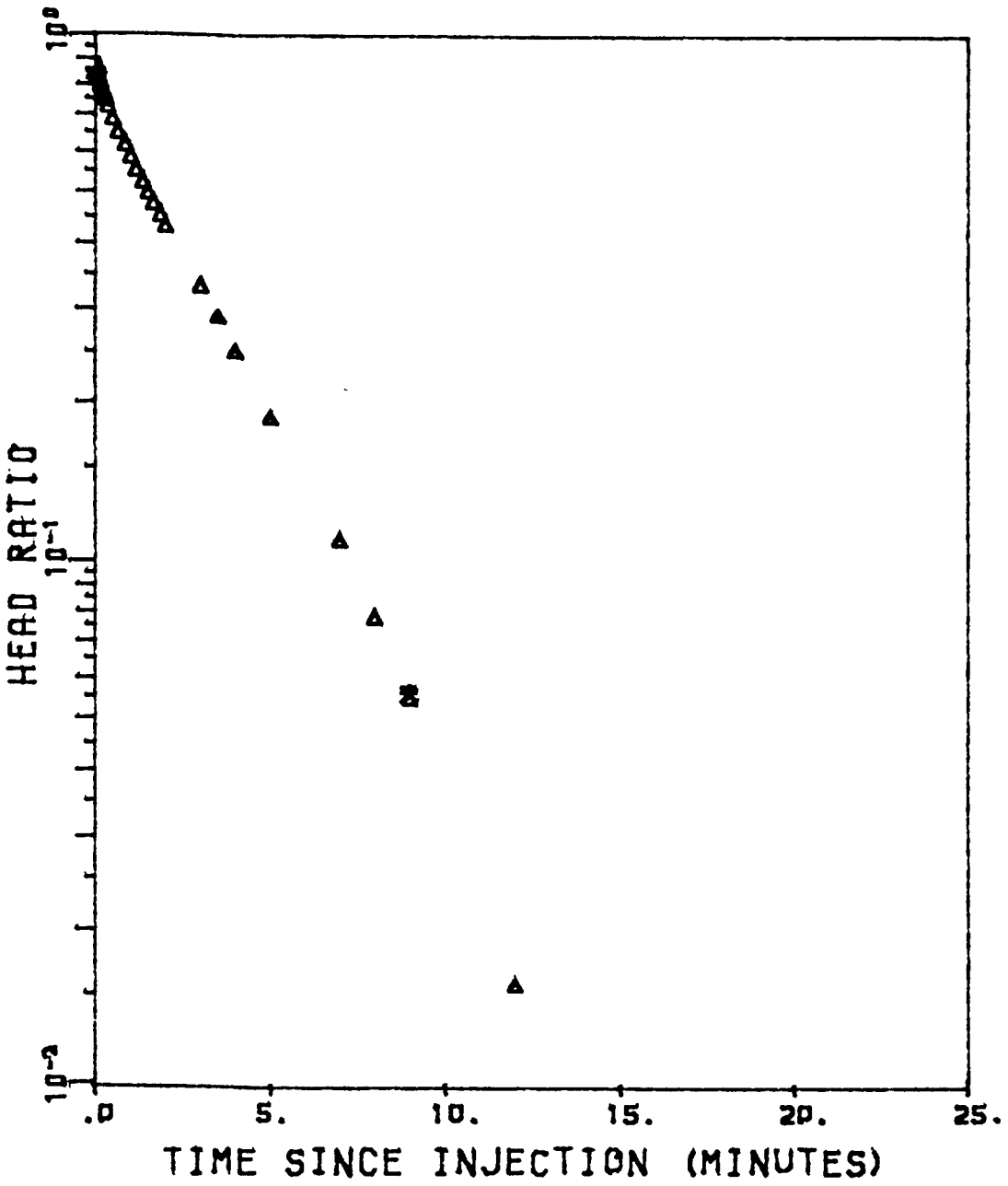
PLATE C-36

MAVERIK COUNTRY STORES INC. KIRTLAND, NEW MEXICO
FRI 11-20-1987 07:52:37.59



SLUG TEST OF WELL MW9 IN
LOG HEAD RATIO VS TIME

MAVERIK COUNTRY STORES INC. KIRTLAND, NEW MEXICO
FRI 11-20-1987 08:16:10.99



SLUG TEST OF WELL MW9 OUT
LOG HEAD RATIO VS TIME

MAVERIK COUNTRY STORES INC. KIRTLAND. NEW MEXICO
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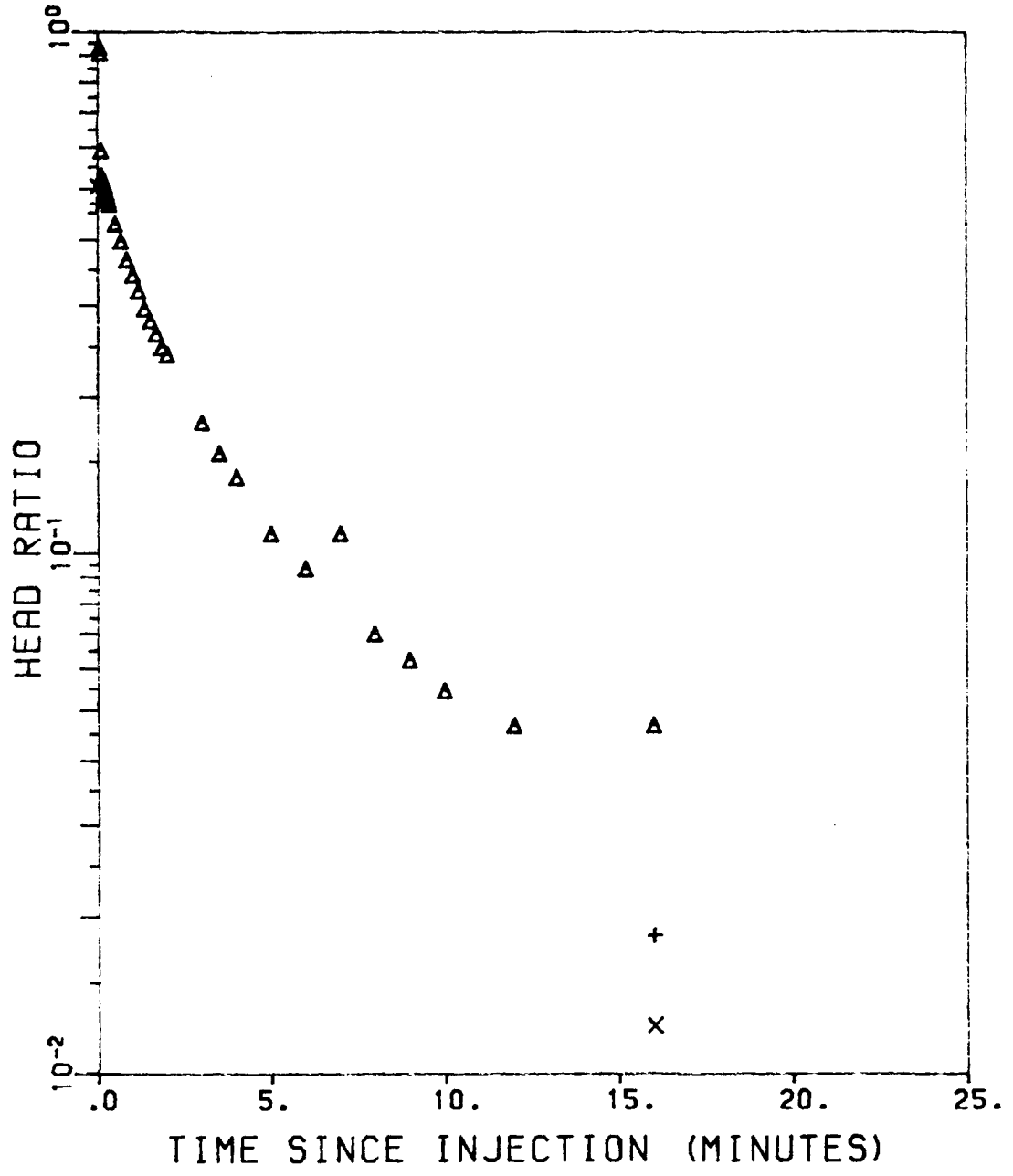

SLUG TEST OF WELL MW10 IN
LOG HEAD RATIO VS TIME

PLATE C-39

MAVERIK COUNTRY STORES INC. KIRTLAND. NEW MEXICO
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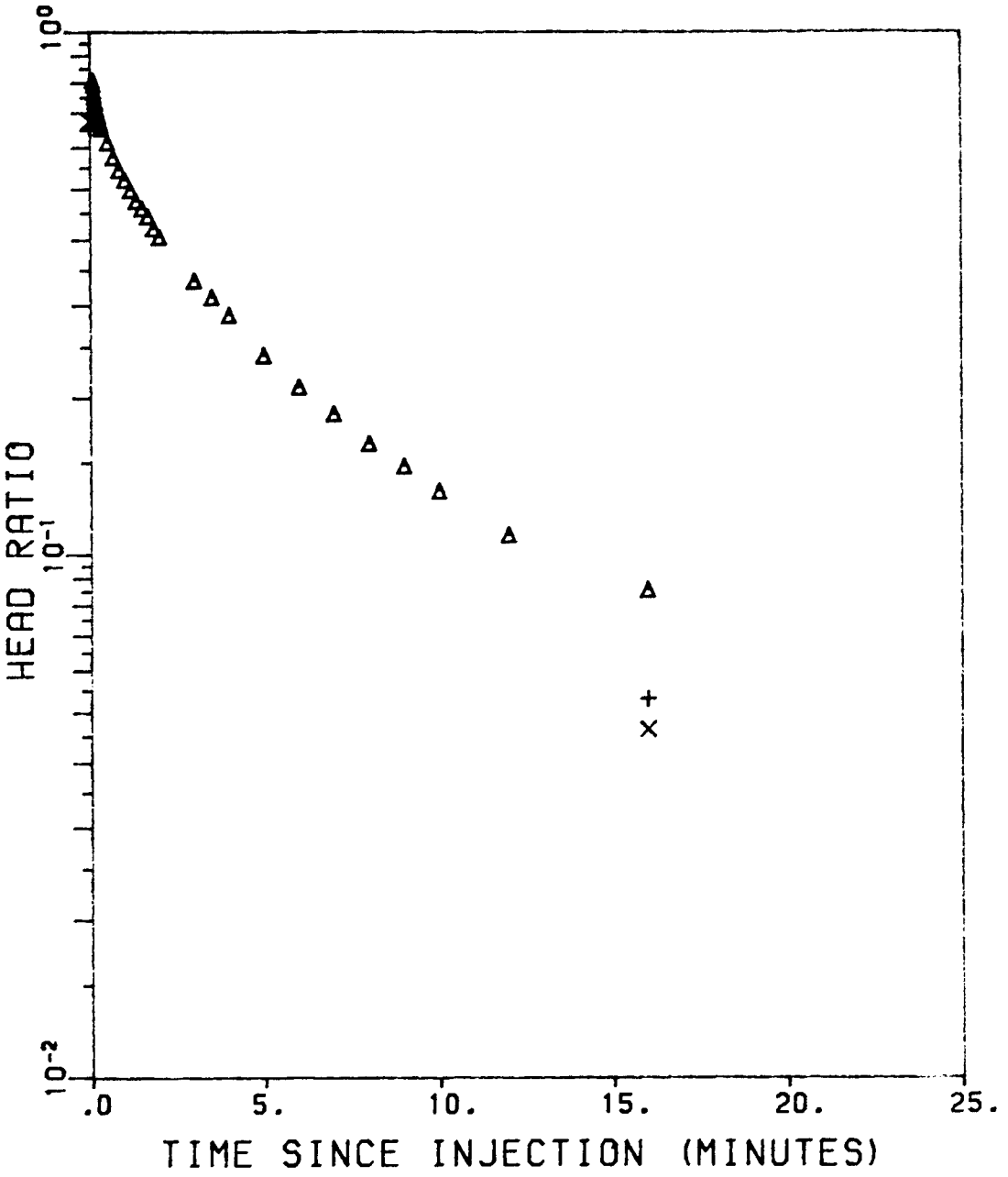

SLUG TEST OF WELL MW10 OUT
LOG HEAD RATIO VS TIME

PLATE C-40

MAVERIK COUNTRY STORES INC. KIRTLAND, NEW MEXICO
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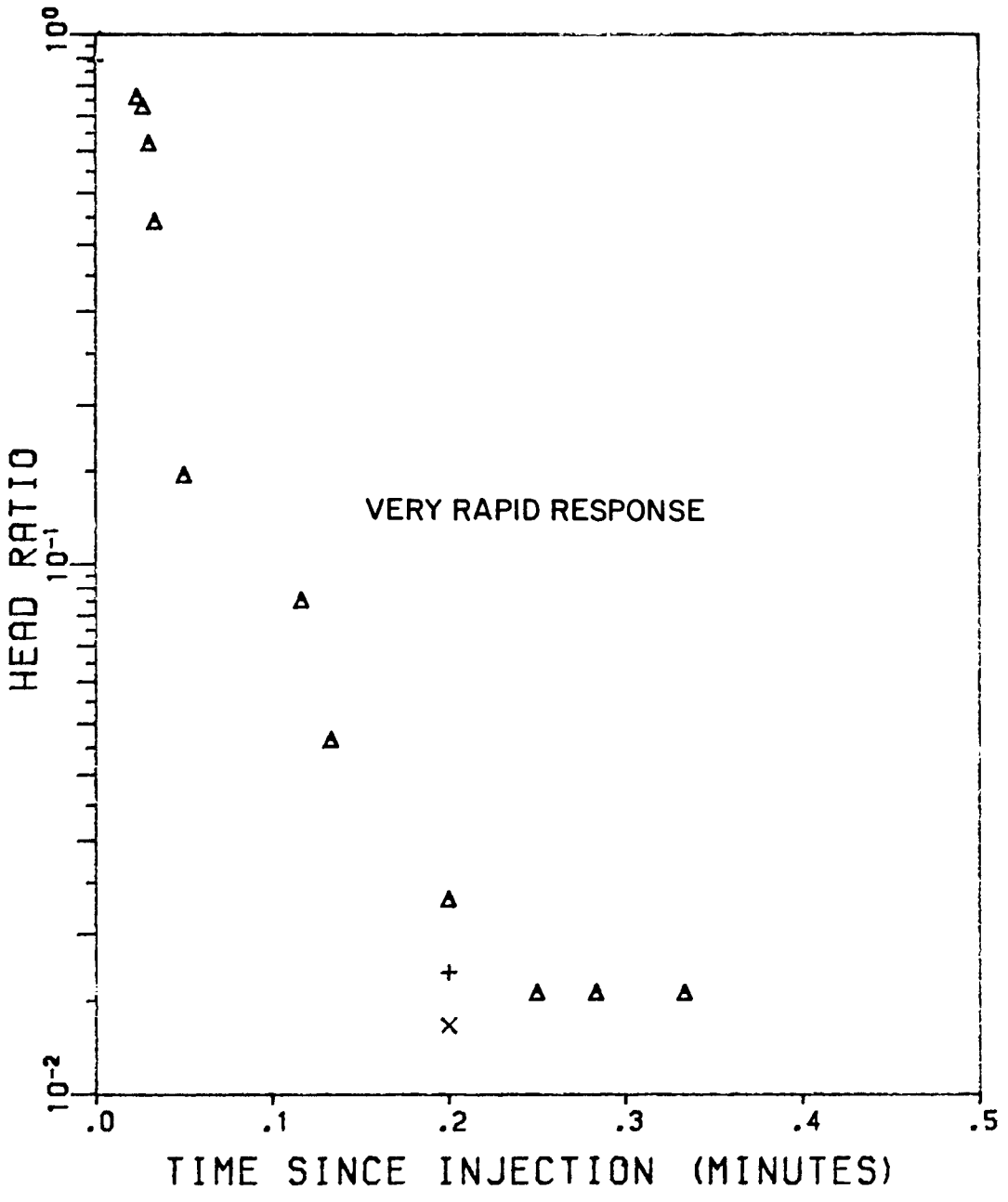
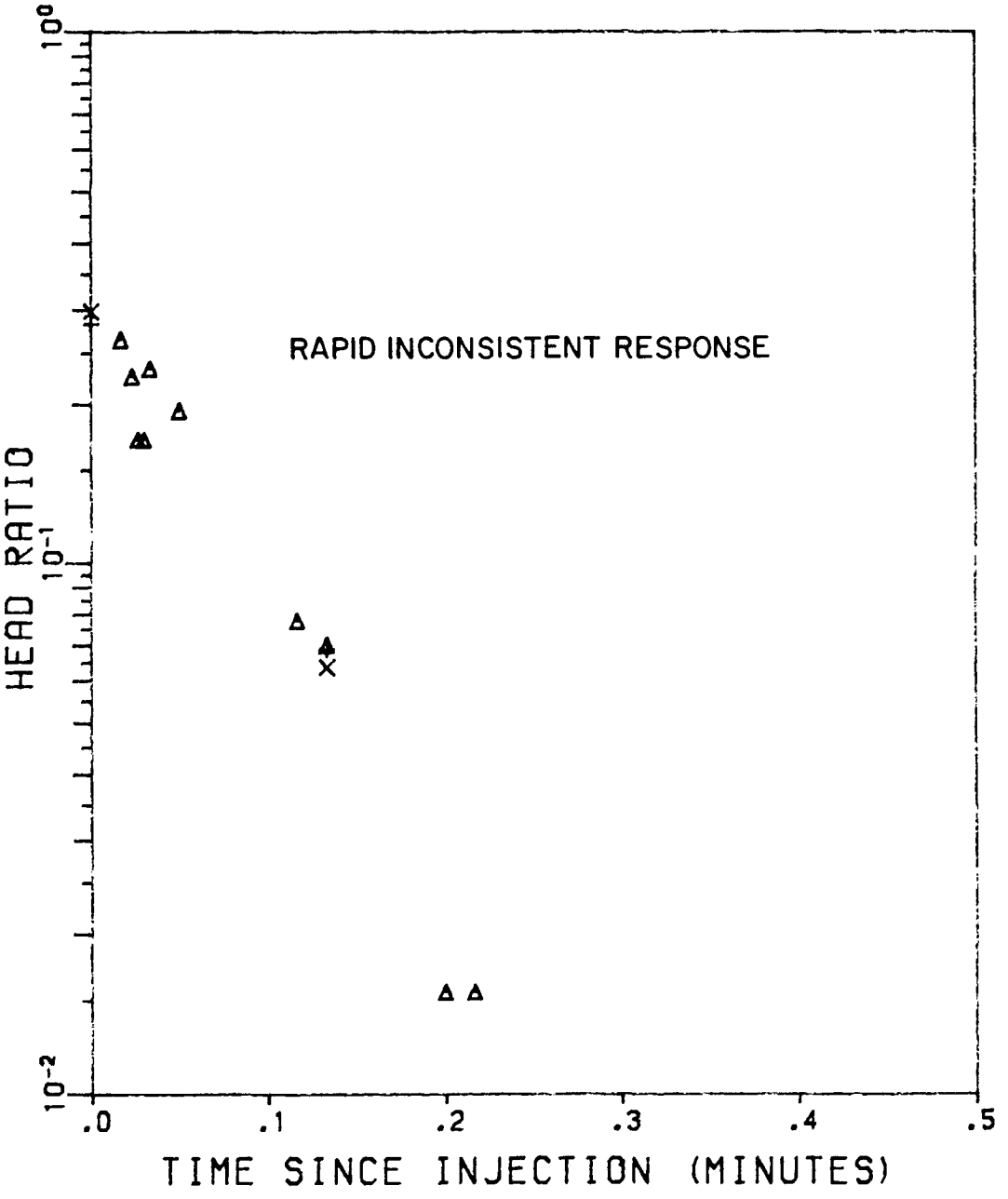


SLUG TEST OF WELL MW 11 IN
LOG HEAD RATIO VS TIME

MAVERIK COUNTRY STORES INC. KIRTLAND. NEW MEXICO
THU 12-03-1987 14:59:22.70



SLUG TEST OF WELL MW 11 OUT
LOG HEAD RATIO VS TIME

PLATE C-42

MAVERIK COUNTRY STORES INC. KIRTLAND, NEW MEXICO
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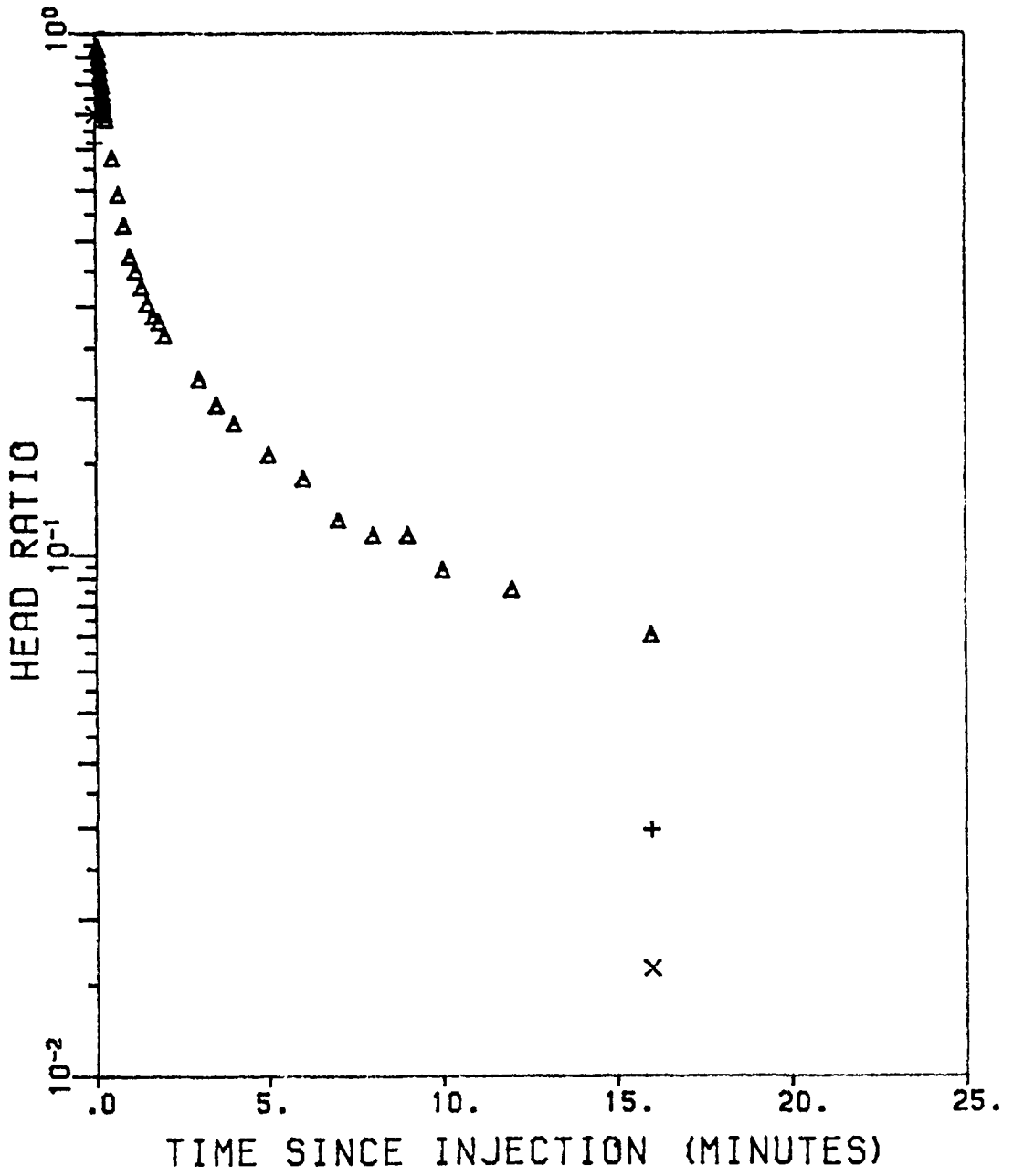


SLUG TEST OF WELL MW12 IN
LOG HEAD RATIO VS TIME

PLATE C-43

APPENDIX D

WATER LEVEL ELEVATION AND WELL DEPTH DATA FOR LOCAL PRIVATE WATER WELLS, MONITOR WELLS AND SURFACE WATER SITES

APPENDIX D

WATER LEVEL ELEVATION AND WELL DEPTH DATA FOR LOCAL PRIVATE WATER WELLS, MONITOR WELLS AND SURFACE WATER SITES

WATER LEVEL ELEVATION DATA

Using an electric probe to within 0.01 foot, static water levels were measured at the 13 monitor well sites, at the 5 well points and at the 21 private water wells that were accessible for measuring. These sites are located on Plate 8 with the well depths, well casing measuring point elevations, ground surface elevations, water level elevations and screened intervals presented in Table D-1. Staff gauges were installed along the west side irrigation ditch and along the floodplain of the San Juan River for surface water elevation measurements. Except for the staff gauge along the San Juan River that could not be accessed, measuring points were surveyed in by San Juan Engineers, a licensed surveyor from Farmington, New Mexico.

The westside irrigation ditch was in use through late October 1987, but was not in use at the time water level surveying was conducted. Consequently, the water level elevations in the ditch primarily reflect the ground water level elevation in mid-November 1987.

The water level elevations in MW-11 and MW-12, the two nested wells, located 33.5 feet apart, indicate essentially the same vertical hydraulic potential in the deeper gravel zone as in the upper silty-clayey sand zone at this site. Based on the exact water level elevations, the shallow zone, had a slightly higher hydraulic potential, but only about +0.07 feet (5191.33 feet versus 5191.26 feet). This can be accounted for by the horizontal distance between the wells and the horizontal hydraulic gradient. Consequently, any vertical hydraulic gradient that may exist is very small and is not significant with respect to impacting vertical downward movement of contaminants to the deeper gravel zone.

Water level elevations at all of the ground water and surface water sites will be collected again during Rounds 2 and 3 sampling in March 1987 and in October 1987.

TABLE D-1

WELL CONSTRUCTION AND WATER LEVEL ELEVATION DATA[1]

(Maverik Country Stores, Inc., Kirtland, New Mexico)

Site Designation	Depth to[1] Water From Measuring Point (ft)	Measuring Point Elevation (ft)		Water Level Elevation (ft)	Ground Surface Elevation (ft)	Well Depth From Ground Surface (ft)	Screened Interval (ft)
Surface Water Sites							
Westside Irrigation Ditch							
Staff Gauge 1	3.90	5194.65		-----	-----		
Staff Gauge 2	0.90	5186.60		5184.59	-----		
Staff Gauge 3	2.70	5186.22		5183.45	-----		
Staff Gauge 4	2.83	5171.59		5167.59	-----		
San Juan River							
Staff Gauge 5	3.70	-----		-----			
Monitor Well Sites		Steel Casing	PVC Casing				
MW-1	8.15	5207.79	5207.24	5199.09	5205.75	21.5	11.5-21.5
MW-2	3.85	5197.10	5196.93	5193.08	5195.25	15	5-15
MW-3	3.40[3]	5183.00	5181.46	5179.6	5181.06	14.5	4.5-14.5
MW-4	6.71[3]	5178.41	5177.10	5171.7	5176.14	15	5-15
MW-5	5.72	5175.62	5175.09	5169.37	5173.67	15	5-15
MW-6	4.37	5176.40	5176.01	5172.03	5174.23	15.5	5.5-15.5
MW-7	5.13[3]	5183.71	5182.84	5178.58	5181.73	15	5-15
MW-8	4.09	5186.00	5185.87	5181.78	5184.02	15	5-15
MW-9	2.51	5191.39	5191.22	5188.71	5189.53	15	5-15
MW-10	2.70	5189.80	5189.30	5186.6	5187.47	12.5	2.5-12.5
MW-11	5.89	5197.26	5197.15	5191.26	5194.97	33	23-33
MW-12	4.86	5196.66	5196.19	5191.33	5194.80	12	2-12
MW-13	0.34	5187.76	N.A.	5187.42	5187.56	5	0-5
W-3	5.10	5196.40	N.A.	5191.30	5194.62	21	-
Well Drive Point Sites							
WP1	-	5175.61		-----	5175.07		0-3
WP2	3.65[2]	5173.43		5169.78	5173.30		1-4
WP3	3.0 [2]	5180.92		5177.92	5180.79		0-3
WP4	1.36	5193.19		5191.83	5193.11		0-3
WP5	0.34	5189.54		5189.20	5189.23		0-3
Private Wells (Inventoried)							
William Walker	No Access	5177.21		-----		40	
E.M. Jackson (House)	4.0	5175.73		5171.73		30.7	
(Field)	3.5	5175.85		5172.35		40	
H. Smouse	No Access	(Build. Locked)		-----		-	
M. Stone	No Access	-----		-----		-	
J. Bloomfield	8.06	5188.10		5180.04		25	
V. Murray (Corral)	3.2	5191.69		5188.49		20	
(House)	3.55	-----		-----		18.5	
R. Ball	2.33	5184.73		5182.40		58.8	
A. Jackson	No Access	5177.12		-----		-	
R. Jackson (Field)	4.95	5178.02		5173.07		12.7	
R. Housh	No Access	-----		-----		-	
R. Neff	5.22	5179.53		5174.31		20.2	
P. Pickard (Shed)	9.25	5180.14		5170.89		17.3	
(House)	----	5180.15		-----		----	
R. Eshome	6.65	5179.76		5173.11		12.5	
G. Nelson	7.50	5178.40		5170.90		19.7	
E. Mclemore	1.59	5186.15		5184.56		17.7	
E. Grey	No Access	-----		-----		-	
I. Hull	4.49	5194.32		5189.83		15.2	
C. Curley	4.68	5199.95		5195.27		23.0	
R. Madrid	8.23	5208.89		5200.66		34.9	
W. York	8.80	5206.05		5197.25		21.6	
C. Hill	6.40	5202.54		5196.14		21.0	
D. Pilcher	6.61	5201.51		5194.90		25.8	
D. Howell	8.18	5204.53		5196.35		24.1	
R. Tracey	1.63	5190.32		5188.69		21.0	
V. Lucero	7.33	5200.16		5192.83		34.6	

(1) Measured November 22 - 27, 1987, except where footnote (2) designated
(2) Measured October 30, 1987
(3) Measured from the top of the steel casing

APPENDIX E

FIELD AND LABORATORY WATER QUALITY AND DRILL CUTTINGS DATA, AND QA/QC FOR ROUND 1 SAMPLING AND ANALYSES

APPENDIX E

FIELD AND LABORATORY WATER QUALITY AND DRILL CUTTINGS DATA, AND QA/QC FOR ROUND 1 SAMPLING AND ANALYSES

WATER QUALITY SAMPLING

After well development with centrifugal and peristaltic pumps, ground water and surface water samples were 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 digital pH meter and an electric conductivity meter were used and calibrated using solution standards. Samples were collected after 3 to 5 casing volumes of water had been removed, using a teflon bailer lowered to the bottom of the wells.

The monitor wells were checked for the presence of a free oil phase using a borosilicate glass bailer. Such a phase was present only in monitor wells MW-12 and MW-13, and well W-3. Although the water quality samples collected were sampled from below the upper oil phase, the sample from monitor well 12 evidently was contaminated with product. This was confirmed with RMAL. Drop pipes will be installed in all three of these monitor wells for Round 2 sampling so that such contamination does not reoccur. A PVC drop pipe will be dedicated to each well, such that it will extend down into the existing 2-inch PVC casing, below the upper oil phase, thereby blocking out contact of the teflon bailer with the product when the bailer is lowered. The sample will be bailed from below the drop pipe and below the upper oil phase.

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 and the drill cuttings. Their detailed report is included in this appendix.

WATER QUALITY ANALYSES

RMAL conducted analyses for halogenated volatile organics (26), aromatic volatile organics (9), total organic lead and metals (6), and common ions (11). 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 in all water samples with the exception of one ground water sample (MW-12) and two surface water samples (SW-4 and SW-5). Because of the presence of significant levels of volatiles a GC/MS method (624) was employed for these samples. The key organic and inorganic constituents found are presented in Plates E-1 and E-5.

All water samples were analyzed for the full suite of parameters listed on Table 1, with the exception of SW-5, SW-6 and well W-3 which were analyzed only for the organics. These three sites were added during the field study by Dames & Moore. They were included because of their accessibility for sampling, and strategic location with respect to defining and verifying the observed contaminated area on-site and immediately to the west. Field OVA readings at sites SW-4 and SW-5 measured at greater than 1,000 ppm volatile organics. OVA readings above 1,000 ppm were recorded directly above the ditch water at SW-4. OVA readings above 1,000 ppm were recorded at SW-5 about 4 to 6 feet above the ditch water over a radius of 5 to 8 feet from SW-5.

DRILL CUTTING SAMPLING AND ANALYSIS

Drill cuttings from on-site monitor wells 11 and 12 were evaluated for EP toxicity for 8 RCRA metals and sulfide and cyanide reactivity. This was done as a result of the high OVA readings (>1,000 ppm) measured in the field in the drill cuttings from the upper 13 feet. OVA readings dropped to about 500 ppm from 13 to 17 feet, and dropped to background levels below a depth of 17 feet. Barium was the only constituent detected and at a very low concentration of

0.94 mg/l (EP toxicity threshold = 100 mg/l). The analysis did not indicate the cuttings to be hazardous. Drill cuttings from MW-10, MW-11 and MW-12 were, nonetheless, containerized on-site in 55-gallon drums, with plastic liners and lids. All other on-site as well as off-site drill cuttings were collected and disposed of on-site on a flat cement slab which was lined with plastic.

ROCKY MOUNTAIN ANALYTICAL LABORATORY QA/QC PROGRAM

All analyses were conducted within approved holding times. Ion balances, detailed in RMAL's report, were all within the acceptance limits of $\pm$ 5 percent. As a result of the high levels of solids in the unfiltered water samples from MW-1, MW-3, MW-7 and MW-10, the initial alkalinity titration results reported by RMAL were high and not correct. The alkalinity titrations were re-run on the filtered samples, with these final corrected results included in RMAL's ion balance report.

Accuracy and precision of Laboratory Control Samples and Surrogate Control Samples were within acceptance limits with the exception of one QC lot in which the recovery of spiked concentrations of DCA was higher than the acceptable limit.

Two trip blanks were analyzed for volatile organics. Methylene chloride was detected in one sample at 11 ug/l and in the other at 9 ug/l. Laboratory contamination with this compound is very common and these levels are acceptable. No detections of this compound were made in any of the water samples or the equipment blank.

An equipment blank was analyzed for the entire suite of parameters. No organics were detected and the concentrations of inorganics detected were in the range expected of the distilled water used to flush the equipment.

A blind duplicate of the sample from MW-1 was subjected to the full suite of analyses. Precision for non-volatile analytes, as measured by the relative percent difference between the two samples, was within acceptable ranges. The only detection of volatiles was the presence of benzene in the MW-1 sample at

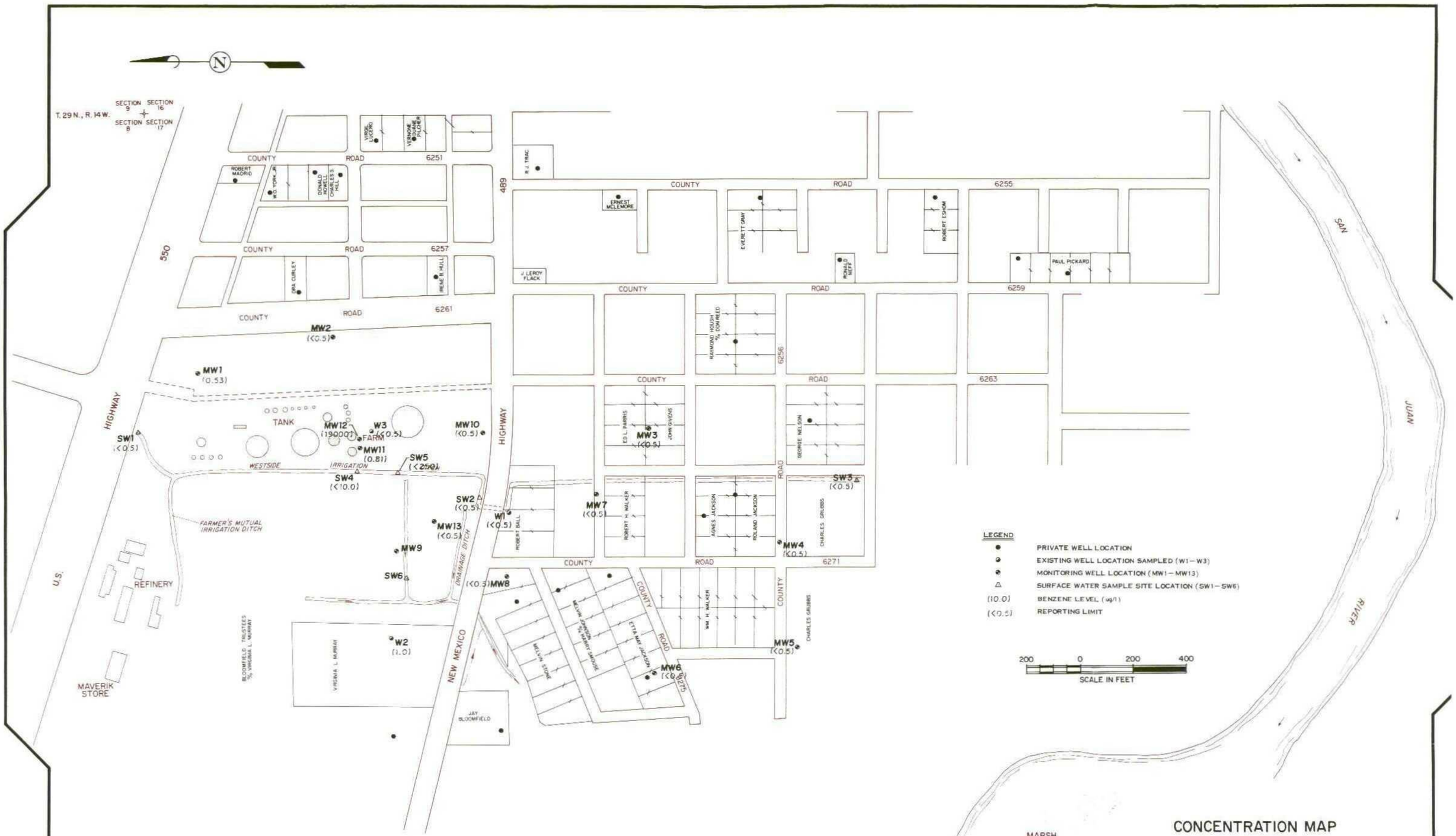
0.53 ug/l (detection limit, 0.50 ug/l); benzene was not detected in the blind duplicate sample. This variability is not unexpected at these very low detection limits.

TABLE E-1 FIELD WATER QUALITY DATA[1]

(Maverik Country Stores, Inc., Kirtland, New Mexico)

Sample Site Designation	Conductivity (umhos/cm)	pH	Temperature °C	Flow CFS	Remarks
Ground Water					
MW-1	400	9.64	15.3	-	No oil or sheen noted in glass bailer
MW-2	1,100	7.75	14.2	-	No oil or sheen noted in glass bailer
MW-3	1,080	7.78	12.0	-	No oil or sheen noted in glass bailer
MW-4	1,510	7.46	14.1	-	No oil or sheen noted in glass bailer
MW-5	1,310	7.85	15.5	-	No oil or sheen noted in glass bailer
MW-6	1,880	7.51	12.1	-	No oil or sheen noted in glass bailer
MW-7	1,060	7.66	13.5	-	No oil or sheen noted in glass bailer
MW-8	1,060	7.41	14.8	-	No oil or sheen noted in glass bailer
MW-9	1,400	7.11	13.3	-	No oil or sheen noted in glass bailer
MW-10	1,280	7.66	12.5	-	No oil or sheen noted in glass bailer
MW-11	1,050	7.85	14.5	-	No oil or sheen noted in glass bailer
MW-12	1,510	6.74	17.0	-	Yellow sheen, odoriferous
MW-13	2,300	8.14	8.1	-	Yellow sheen, no odor, multi-colored
Ball Well (W-1)	3,500	7.96	14.3	-	No oil or sheen noted in glass bailer
V. Murray Well (W-2)	700	8.06	12.9	-	No oil or sheen noted in glass bailer
On-Site Steel Well (W-3)	No field data recorded				Yellow sheen, odoriferous
Surface Water					
SW-1 Farmers Mutual Irrigation Ditch (Upstream)	280	8.5	6.5	46,675 gpm	
SW-2 West Irrigation Ditch (at Hwy 489)	1,080	7.60	10.0	<5 gpm Estimated	No distinct oil or sheen noted
SW-3 West Irrigation Ditch (Downstream)	1,210	8.05	6.8	5 gpm Estimated	No distinct oil or sheen noted
SW-4 West Irrigation Ditch (Across from Tank Farm)	565	7.28	7.8	<5 gpm Estimated	Distinct oil and sheen noted
SW-5 West Irrigation Ditch (Across from Tank Farm)	Upper surface layer too contaminated to lower probes through			<5 gpm Estimated	Distinct oil and sheen noted
SW-6 V. Murray's Ditch (West of Tank Farm)	3,080	7.28	14.2	<2 gpm Estimated	Distinct oil and sheen noted

(1) Measured in November 1987

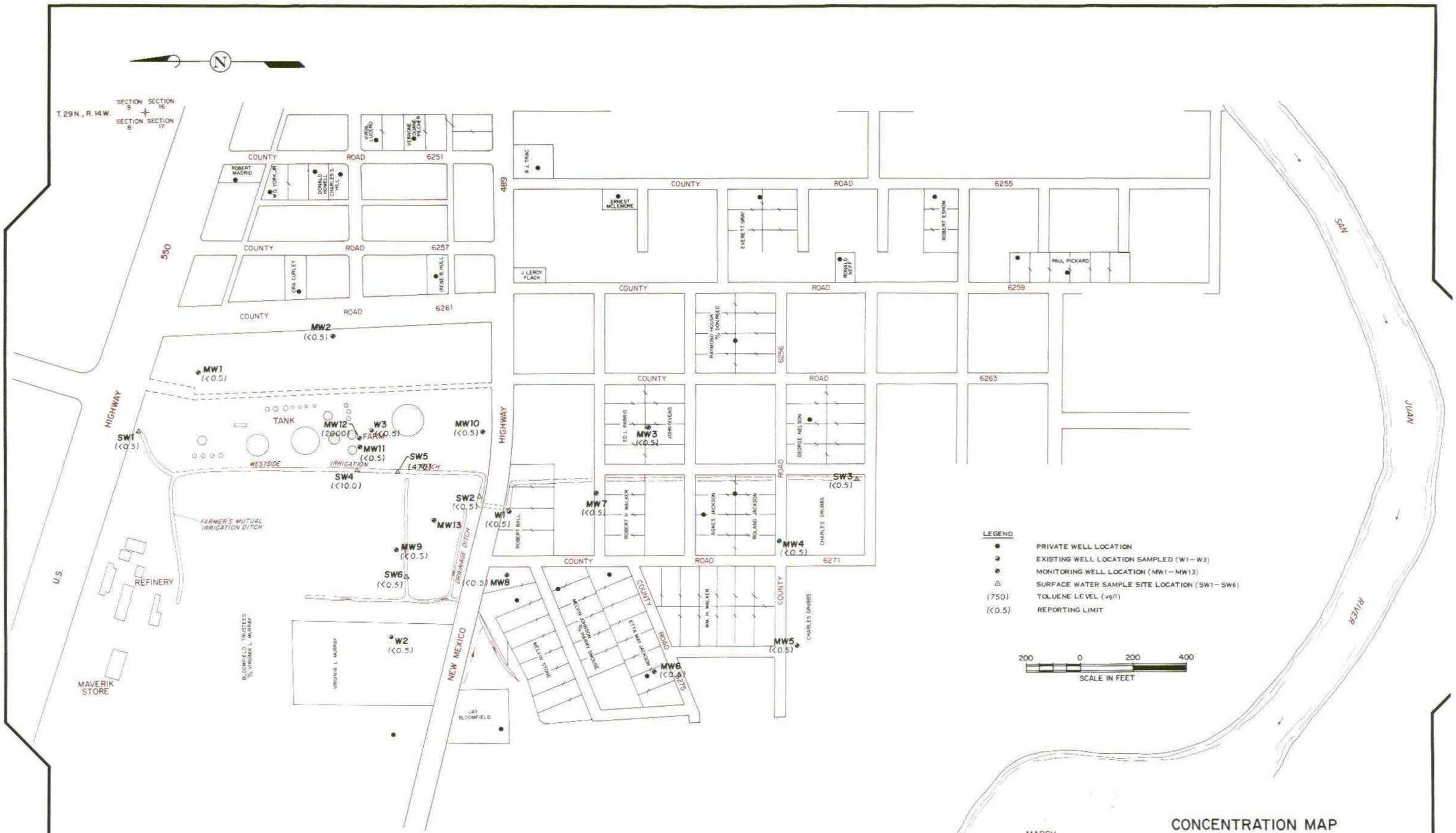


REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2–083–171, SHEET NUMBERS D–3–17–1 AND D–3–17–4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

CONCENTRATION MAP
BENZENE
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(NOVEMBER, 1987)

Dames & Moore

PLATE E-1



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
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(NOVEMBER, 1987)

Dames & Moore

PLATE E-2

N

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
COUNTY ROAD 6275

550
489

HIGHWAY
HIGHWAY

ROBERT MADRID
W. D. YORK JR.
DONALD HOWELL
CHARLES S. HILL
VERNONE PALMER PILCHER
ORA CURLEY
IRENE B. HULL
R. J. TRAC
ERNEST MCLEMORE
J. LEROY FLACK
EVERETT GRAY
RONALD NEFF
ROBERT ESHOM
PAUL PICKARD
RAYMOND HOUTH % DON REED
ED L. PARRIS
JOHN RIVERS
GEORGE NELSON
ROBERT H. WALKER
AGNES JACKSON
ROLAND JACKSON
CHARLES GRUBBS
MELVIN STONE
ETTA MAY JACKSON
NW H. WALKER
VIRGINIA L. MURRAY
BLOOMFIELD TRUSTEES % VIRGINIA L. MURRAY
JAY BLOOMFIELD

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)
MW13 (0.54)
W1 (0.89)
W2
W3 (1.3)
SW1
SW2
SW3
SW4 (<10)
SW5 (2500)
SW6

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

LEGEND

- ● PRIVATE WELL LOCATION
- ◒ EXISTING WELL LOCATION SAMPLED (W1 – W3)
- ◉ MONITORING WELL LOCATION (MW1 – MW13)
- △ SURFACE WATER SAMPLE SITE LOCATION (SW1 – SW6)
- (750) ETHYLBENZENE LEVEL (ug/l)
- (<0.5) REPORTING LIMIT

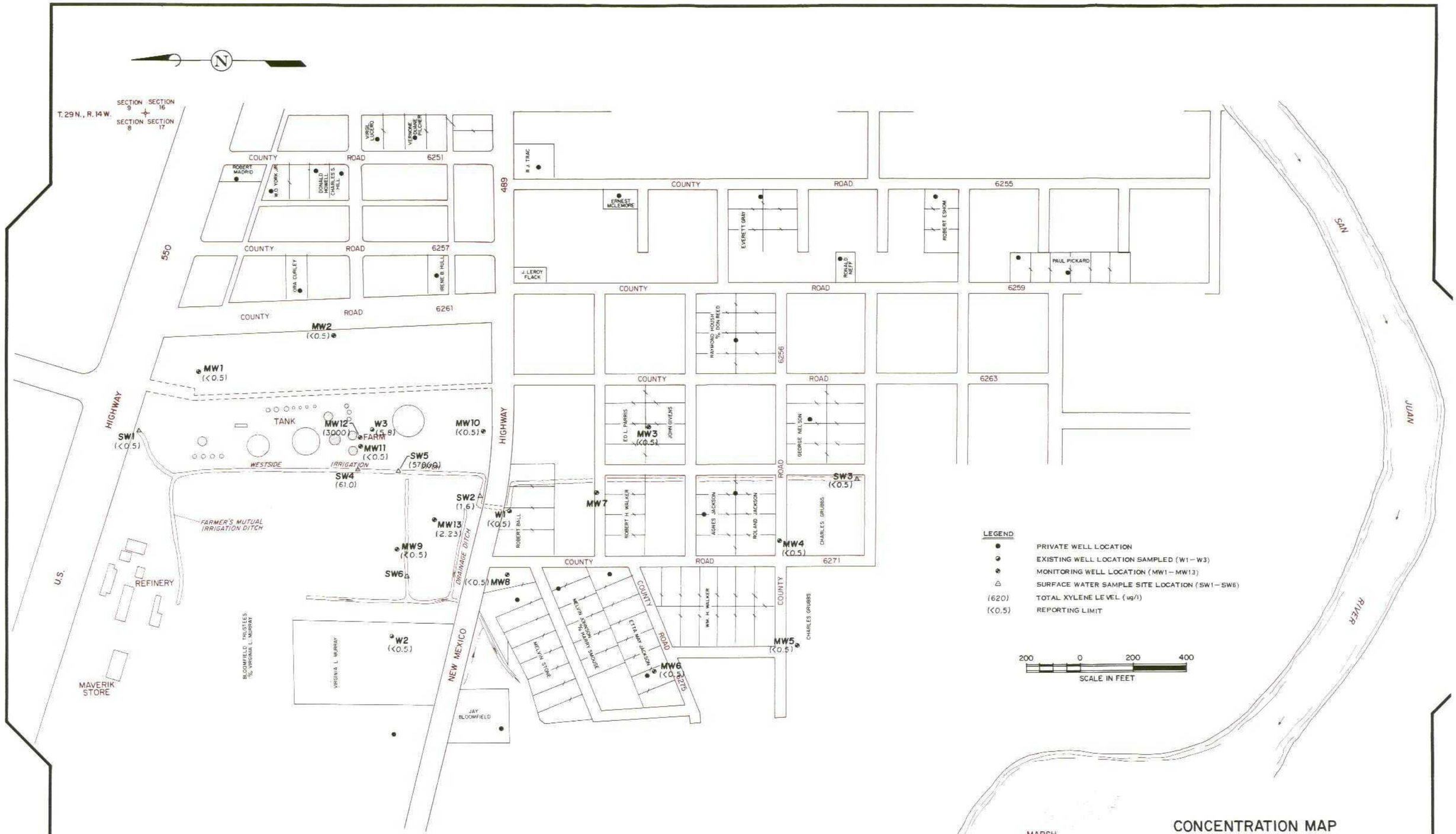
200 0 200 400
SCALE IN FEET

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
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(NOVEMBER, 1987)

Dames & Moore

PLATE E-3



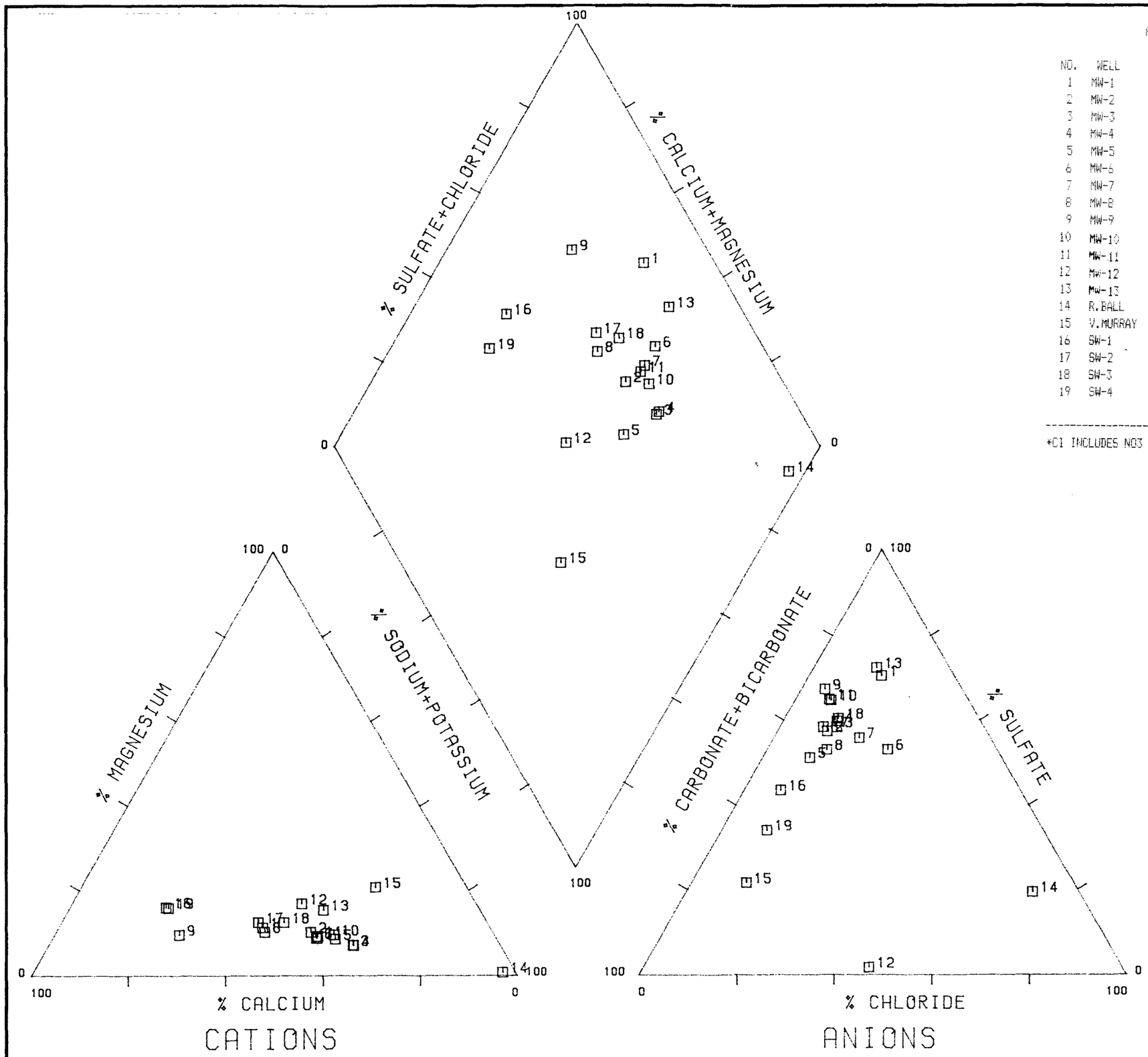
REFERENCE
ADAPTED FROM PRINTS ENTITLED "PROPERTY IDENTIFICATION MAP OF SAN JUAN COUNTY, NEW MEXICO" CODE NUMBER 2-083-171, SHEET NUMBERS D-3-17-1 AND D-3-17-4 (SECTION 17, TOWNSHIP 29 NORTH, RANGE 14 WEST) – PREPARED BY SAN JUAN COUNTY – UNDATED.

CONCENTRATION MAP
XYLENE
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(NOVEMBER, 1987)

Dames & Moore

PLATE E-4

FILE 14819-005-031 BY _____ DATE _____ CHECKED BY _____ DATE 1-88



PIPER DIAGRAM COORDINATES-IN PERCENT

NO.	WELL	Ca	Mg	K+Na	SO4	Cl*	CO3+HCO3	ION BALANCE	SYMBOL
1	MW-1	46.7	11.2	42.1	70.5	14.8	14.7	-5.0	0
2	MW-2	37.4	10.1	52.4	57.4	10.2	32.4	3.1	0
3	MW-3	30.3	7.1	62.6	56.4	11.7	30.0	.9	0
4	MW-4	30.2	7.0	62.8	59.8	11.1	29.1	1.5	0
5	MW-5	33.2	8.5	58.3	51.2	9.7	39.1	-2.3	0
6	MW-6	37.0	8.7	54.3	53.1	24.7	22.2	-3.1	0
7	MW-7	36.8	8.8	54.4	55.9	17.5	26.6	-.5	0
8	MW-8	46.8	10.2	43.0	53.1	12.3	34.7	3.7	0
9	MW-9	64.8	9.6	25.7	67.4	4.8	27.9	-3.3	0
10	MW-10	33.0	9.5	57.5	64.7	7.4	27.9	2.1	0
11	MW-11	36.5	9.2	54.3	65.0	6.9	28.2	-.3	0
12	Mw-12	35.9	16.8	47.3	1.7	46.4	51.9	2.5	0
13	Mw-13	32.2	15.3	52.5	72.4	12.9	14.7	-.5	0
14	R.BALL	2.7	.7	96.6	19.4	71.1	9.5	-.5	0
15	V.MURRAY	18.8	20.7	60.5	21.6	11.3	67.1	.7	0
16	SW-1	64.2	16.0	19.8	43.6	7.5	48.9	1.4	0
17	SW-2	47.0	12.4	40.6	58.4	8.9	32.7	.7	0
18	SW-3	41.7	12.4	45.9	60.4	11.0	28.6	1.3	0
19	SW-4	63.8	15.8	20.4	34.1	9.3	56.5	-.7	0

*Cl INCLUDES NO3 AND F

PIPER DIAGRAM (SAMPLE SITES 1-19)

Dames & Moore

PLATE E-5

I. OVERVIEW

On November 11 and 12, 1987, Enseco-Rocky Mountain Analytical Laboratory received sixteen samples from Dames & Moore Inc. A complete listing of tests requested, by sample, is given in Section III.

This report presents the analytical results as well as supporting information to aid in the evaluation and interpretation of the data and is arranged in the following order:

I. Overview
II. Sample Description Information
III. Analytical Tests Assigned (not included)
IV. Analytical Results
V. Quality Control Report
VI. Description of Analytical Methodology.

Please note that the ion balances were calculated using alkalinity results from filtered bottles for samples 64971-009, -010, -011, and -013 due to the large amount of sediment in the samples. However, the alkalinity results listed in the report are on a total basis consistent with the standard methodology.

II. 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 five digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the five 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.

IV. ANALYTICAL RESULTS

The analytical results for this project are presented in the following data tables. The results are presented by sample, by test, with tests reported in the following order: GC/MS, Chromatography, Metals and Inorganics.

Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed. The authorization data is the date when the project was defined by the client such that laboratory work could begin.

Data sheets contain a listing of the parameters measured in each test, the analytical results 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. All data is "blank corrected", i.e. the level of contamination, if any, found in the laboratory blank is subtracted from the analytical result before it is reported.

In addition, surrogate recovery data is presented for all GC/MS analyses. The surrogate recovery is an indication of the affect of the sample matrix on the performance of the method. The results from the Standard Enseco QA/QC Program, which generates data which are independent of matrix effects, is given in Section V.

SAMPLE DESCRIPTION INFORMATION

for

DAMES AND MOORE

RMAL Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
64971-001	SW-1	Water	11/10/87	11/11/87
64971-002	SW-2	Water	11/10/87	11/11/87
64971-003	SW-3	Water	11/10/87	11/11/87
64971-004	MW-4	Water	11/10/87	11/11/87
64971-005	MW-5	Water	11/10/87	11/11/87
64971-006	SW-6	Water	11/10/87	11/11/87
64971-007	SW-4	Water	11/10/87	11/11/87
64971-008	SW-5	Water	11/10/87	11/11/87
64971-009	MW-7	Water	11/11/87	11/12/87
64971-010	Duplicate = MW1	Water	11/11/87	11/12/87
64971-011	MW-1	Water	11/11/87	11/12/87
64971-012	MW-2	Water	11/11/87	11/12/87
64971-013	MW-3	Water	11/11/87	11/12/87
64971-014	MW-11	Water	11/11/87	11/12/87
64971-015	MW-6	Water	11/11/87	11/12/87
64971-016	TRIP BLANK	Water	11/11/87	11/12/87

Rocky Mountain
Analytical Laboratory

Enseco Incorporated

Enseco

ANALYTICAL RESULTS

FOR

DAMES & MOORE INC.

DECEMBER 4, 1987

Reviewed by: Jeannie B. Howbert

Jeannie B. Howbert

Mark J. Bollinger

Mark J. Bollinger, Ph.D.

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611

Facsimile: 303/431-7171

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: SW-1

Laboratory ID: 64971-001 Enseco ID: 64971-001

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: SW-1

Laboratory ID: 64971-001 Enseco ID: 64971-001

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: SW-1

Laboratory ID: 64971-001 Enseco ID: 64971-001

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	8.12	units	0.01	150.1	11/11/87
Specific Conductance @ 25C	581	umhos/cm	1	120.1/9050	11/11/87
Total Dissolved Solids	400	mg/L	10	160.1	11/17/87
Fluoride	0.3	mg/L	0.1	340.2	11/14/87
Chloride	16	mg/L	3	300.0	11/25/87
Nitrate + Nitrite as N	0.3	mg/L	0.1	353.2	12/01/87
Sulfate	136	mg/L	5	300.0	11/25/87
Total Alkalinity as CaCO3	159	mg/L	5	310.1/403	11/11/87
Bicarbonate Alkalinity	159	mg/L	5	310.1/403	11/11/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/11/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	6.6	meq/L	0.1	104C	12/02/87
Total Anions	6.5	meq/L	0.3	104C	12/02/87
% Difference	0.9	%	0.1	104C	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: SW-1

Laboratory ID: 64971-001 Enseco ID: 64971-001

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	86	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	13	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	29	mg/L	0.05	200.7	11/19/87
Total Organic Lead	N.D.	mg/L	0.002	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 64971-001

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: SW-2

Laboratory ID: 64971-002 Enseco ID: 64971-002

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	1.6	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: SW-2

Laboratory ID: 64971-002 Enseco ID: 64971-002

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Bromoform	N.D.	ug/L	5.0
Carbon tetrachloride	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	2.0
Chloroethane	N.D.	ug/L	5.0
Chloroform	N.D.	ug/L	0.50
Dibromochloromethane	N.D.	ug/L	1.0
Bromodichloromethane	N.D.	ug/L	1.0
1,1-Dichloroethane	N.D.	ug/L	0.50
1,2-Dichloroethane	1.1	ug/L	1.0
1,1-Dichloroethene	N.D.	ug/L	0.50
1,2-Dichloropropane	N.D.	ug/L	1.0
cis-1,3-Dichloropropene	N.D.	ug/L	2.0
trans-1,3-Dichloropropene	N.D.	ug/L	0.50
Bromomethane	N.D.	ug/L	5.0
Chloromethane	N.D.	ug/L	5.0
Methylene chloride	N.D.	ug/L	5.0
1,1,2,2-Tetrachloroethane	N.D.	ug/L	1.0
Tetrachloroethene	N.D.	ug/L	0.50
trans-1,2-Dichloroethene	N.D.	ug/L	0.50
1,1,1-Trichloroethane	N.D.	ug/L	0.50
1,1,2-Trichloroethane	N.D.	ug/L	1.0
Trichloroethene	N.D.	ug/L	1.0
Vinyl chloride	N.D.	ug/L	1.0
1,1,2-Trichloro-2,2,1-trifluoroethane	N.D.	ug/L	1.0
1,2-Dibromoethane (EDB)	N.D.	ug/L	2.0

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: SW-2

Laboratory ID: 64971-002 Enseco ID: 64971-002

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.64	units	0.01	150.1	11/11/87
Specific Conductance @ 25C	1480	umhos/cm	1	120.1/9050	11/11/87
Total Dissolved Solids	1120	mg/L	10	160.1	11/17/87
Fluoride	0.4	mg/L	0.1	340.2	11/14/87
Chloride	49	mg/L	3	300.0	11/25/87
Nitrate + Nitrite as N	1.5	mg/L	0.1	353.2	12/01/87
Sulfate	476	mg/L	5	300.0	11/25/87
Total Alkalinity as CaCO3	277	mg/L	5	310.1/403	11/11/87
Bicarbonate Alkalinity	277	mg/L	5	310.1/403	11/11/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/11/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	17.1	meq/L	0.1	104C	12/02/87
Total Anions	17.0	meq/L	0.3	104C	12/02/87
% Difference	0.6	%	0.1	104C	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: SW-2

Laboratory ID: 64971-002 Enseco ID: 64971-002

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	162	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	26	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	159	mg/L	0.05	200.7	11/19/87
Total Organic Lead	N.D.	mg/L	0.002	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 64971-002

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: SW-3

Laboratory ID: 64971-003 Enseco ID: 64971-003

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: SW-3

Laboratory ID: 64971-003 Enseco ID: 64971-003

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: SW-3

Laboratory ID: 64971-003 Enseco ID: 64971-003

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	8.00	units	0.01	150.1	11/11/87
Specific Conductance @ 25C	1830	umhos/cm	1	120.1/9050	11/11/87
Total Dissolved Solids	1400	mg/L	10	160.1	11/17/87
Fluoride	0.6	mg/L	0.1	340.2	11/14/87
Chloride	77	mg/L	3	300.0	11/25/87
Nitrate + Nitrite as N	1.0	mg/L	0.1	353.2	12/01/87
Sulfate	602	mg/L	5	300.0	11/25/87
Total Alkalinity as CaCO3	297	mg/L	5	310.1/403	11/11/87
Bicarbonate Alkalinity	297	mg/L	5	310.1/403	11/11/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/11/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	21.2	meq/L	0.1	104C	12/02/87
Total Anions	20.7	meq/L	0.3	104C	12/02/87
% Difference	1.2	%	0.1	104C	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: SW-3

Laboratory ID: 64971-003 Enseco ID: 64971-003

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	178	mg/L	0.1	200.7	11/19/87
Iron	0.06	mg/L	0.05	200.7	11/19/87
Magnesium	32	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	223	mg/L	0.05	200.7	11/19/87
Total Organic Lead	N.D.	mg/L	0.01	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 64971-003

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-4

Laboratory ID: 64971-004 Enseco ID: 64971-004

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-4

Laboratory ID: 64971-004 Enseco ID: 64971-004

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-4

Laboratory ID: 64971-004 Enseco ID: 64971-004

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.44	units	0.01	150.1	11/11/87
Specific Conductance @ 25C	2060	umhos/cm	1	120.1/9050	11/11/87
Total Dissolved Solids	1540	mg/L	10	160.1	11/17/87
Fluoride	0.8	mg/L	0.1	340.2	11/14/87
Chloride	87	mg/L	3	300.0	11/25/87
Nitrate + Nitrite as N	0.3	mg/L	0.1	353.2	12/01/87
Sulfate	654	mg/L	5	300.0	11/25/87
Total Alkalinity as CaCO3	332	mg/L	5	310.1/403	11/11/87
Bicarbonate Alkalinity	332	mg/L	5	310.1/403	11/11/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/11/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	23.4	meq/L	0.1	104C	12/02/87
Total Anions	22.8	meq/L	0.3	104C	12/02/87
% Difference	1.4	%	0.1	104C	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-4

Laboratory ID: 64971-004 Enseco ID: 64971-004

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	142	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	20	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	337	mg/L	0.05	200.7	11/19/87
Total Organic Lead	N.D.	mg/L	0.002	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 64971-004

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-5

Laboratory ID: 64971-005 Enseco ID: 64971-005

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-5

Laboratory ID: 64971-005 Enseco ID: 64971-005

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-5

Laboratory ID: 64971-005 Enseco ID: 64971-005

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.42	units	0.01	150.1	11/11/87
Specific Conductance @ 25C	1730	umhos/cm	1	120.1/9050	11/11/87
Total Dissolved Solids	1250	mg/L	10	160.1	11/17/87
Fluoride	0.8	mg/L	0.1	340.2	11/14/87
Chloride	68	mg/L	3	300.0	11/25/87
Nitrate + Nitrite as N	0.2	mg/L	0.1	353.2	12/01/87
Sulfate	499	mg/L	5	300.0	11/25/87
Total Alkalinity as CaCO3	397	mg/L	5	310.1/403	11/11/87
Bicarbonate Alkalinity	397	mg/L	5	310.1/403	11/11/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/11/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	19.3	meq/L	0.1	104C	12/02/87
Total Anions	20.3	meq/L	0.3	104C	12/02/87
% Difference	2.5	%	0.1	104C	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-5

Laboratory ID: 64971-005 Enseco ID: 64971-005

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	129	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	20	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	258	mg/L	0.05	200.7	11/19/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 64971-005

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: SW-6

Laboratory ID: 64971-006 Enseco ID: 64971-006

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: SW-6

Laboratory ID: 64971-006 Enseco ID: 64971-006

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

Sample: 64971-006

HAZARDOUS SUBSTANCE LIST (HSL)
VOLATILE ORGANICS (CONT.)
EPA METHOD 624

Client Name: DAMES AND MOORE

Client ID: SW-4

Laboratory ID: 64971-007 Enseco ID: 64971-007

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/19/87

Parameter	Result	Units	Reporting Limit
Trichloroethene	N.D.	ug/L	10
Vinyl acetate	N.D.	ug/L	20
Vinyl chloride	N.D.	ug/L	20
Total Xylenes	61	ug/L	10
Surrogate			
Toluene-D8	100	%	-
Bromofluorobenzene(BFB)	113	%	-
1,2-Dichloroethane-D4	106	%	-

N.D. = Not detected

Reported by: Jenifer Tavernier Approved by: Jeffrey Lowry

HAZARDOUS SUBSTANCE LIST (HSL)
VOLATILE ORGANICS
EPA METHOD 624

Client Name: DAMES AND MOORE

Client ID: SW-4

Laboratory ID: 64971-007 Enseco ID: 64971-007

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/19/87

Parameter	Result	Units	Reporting Limit
Acetone	N.D.	ug/L	50
Benzene	N.D.	ug/L	10
Bromoform	N.D.	ug/L	10
Bromomethane	N.D.	ug/L	20
2-Butanone	N.D.	ug/L	50
Carbon disulfide	N.D.	ug/L	10
Carbon tetrachloride	N.D.	ug/L	10
Chlorobenzene	N.D.	ug/L	10
Dibromochloromethane	N.D.	ug/L	10
Chloroethane	N.D.	ug/L	20
2-Chloroethyl vinyl ether	N.D.	ug/L	20
Chloroform	N.D.	ug/L	10
Chloromethane	N.D.	ug/L	20
Bromodichloromethane	N.D.	ug/L	10
1,1-Dichloroethane	N.D.	ug/L	10
1,2-Dichloroethane	N.D.	ug/L	10
1,1-Dichloroethene	N.D.	ug/L	10
1,2-Dichloropropane	N.D.	ug/L	10
cis-1,3-Dichloropropene	N.D.	ug/L	10
trans-1,3-Dichloropropene	N.D.	ug/L	10
Ethylbenzene	N.D.	ug/L	10
2-Hexanone	N.D.	ug/L	20
Methylene chloride	N.D.	ug/L	50
4-Methyl-2-pentanone	N.D.	ug/L	20
Styrene	N.D.	ug/L	10
1,1,2,2-Tetrachloroethane	N.D.	ug/L	10
Tetrachloroethene	N.D.	ug/L	10
Toluene	N.D.	ug/L	10
trans-1,2-Dichloroethene	N.D.	ug/L	10
1,1,1-Trichloroethane	N.D.	ug/L	10
1,1,2-Trichloroethane	N.D.	ug/L	10

N.D. = Not detected

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: SW-4

Laboratory ID: 64971-007 Enseco ID: 64971-007

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.29	units	0.01	150.1	11/11/87
Specific Conductance @ 25C	790	umhos/cm	1	120.1/9050	11/11/87
Total Dissolved Solids	790	mg/L	10	160.1	11/17/87
Fluoride	0.3	mg/L	0.1	340.2	11/14/87
Chloride	29	mg/L	3	300.0	11/25/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	147	mg/L	5	300.0	11/25/87
Total Alkalinity as CaCO3	253	mg/L	5	310.1/403	11/11/87
Bicarbonate Alkalinity	253	mg/L	5	310.1/403	11/11/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/11/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	8.8	meq/L	0.1	104C	12/02/87
Total Anions	9.0	meq/L	0.3	104C	12/02/87
% Difference	0.9	%	0.1	104C	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: SW-4

Laboratory ID: 64971-007 Enseco ID: 64971-007

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	113	mg/L	0.1	200.7	11/19/87
Iron	0.12	mg/L	0.05	200.7	11/19/87
Magnesium	17	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	40	mg/L	0.05	200.7	11/19/87
Total Organic Lead	0.3	mg/L	0.2	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

HAZARDOUS SUBSTANCE LIST (HSL)
VOLATILE ORGANICS (CONT.)
EPA METHOD 624

Client Name: DAMES AND MOORE

Client ID: SW-5

Laboratory ID: 64971-008 Enseco ID: 64971-008

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/19/87

Parameter	Result	Units	Reporting Limit
Trichloroethene	N.D.	ug/L	250
Vinyl acetate	N.D.	ug/L	500
Vinyl chloride	N.D.	ug/L	500
Total Xylenes	57000	ug/L	250
Surrogate			
Toluene-D8	98	%	-
Bromofluorobenzene(BFB)	114	%	-
1,2-Dichloroethane-D4	105	%	-

N.D. = Not detected

Reported by: Jenifer Tavernier Approved by: Jeffrey Lowry

HAZARDOUS SUBSTANCE LIST (HSL)
VOLATILE ORGANICS
EPA METHOD 624

Client Name: DAMES AND MOORE

Client ID: SW-5

Laboratory ID: 64971-008 Enseco ID: 64971-008

Matrix: Water Sampled: 11/10/87 Received: 11/11/87

Authorized: 11/11/87 Analyzed: 11/19/87

Parameter	Result	Units	Reporting Limit
Acetone	N.D.	ug/L	1200
Benzene	N.D.	ug/L	250
Bromoform	N.D.	ug/L	250
Bromomethane	N.D.	ug/L	500
2-Butanone	N.D.	ug/L	1200
Carbon disulfide	N.D.	ug/L	250
Carbon tetrachloride	N.D.	ug/L	250
Chlorobenzene	N.D.	ug/L	250
Dibromochloromethane	N.D.	ug/L	250
Chloroethane	N.D.	ug/L	500
2-Chloroethyl vinyl ether	N.D.	ug/L	500
Chloroform	N.D.	ug/L	250
Chloromethane	N.D.	ug/L	500
Bromodichloromethane	N.D.	ug/L	250
1,1-Dichloroethane	N.D.	ug/L	250
1,2-Dichloroethane	N.D.	ug/L	250
1,1-Dichloroethene	N.D.	ug/L	250
1,2-Dichloropropane	N.D.	ug/L	250
cis-1,3-Dichloropropene	N.D.	ug/L	250
trans-1,3-Dichloropropene	N.D.	ug/L	250
Ethylbenzene	2500	ug/L	250
2-Hexanone	N.D.	ug/L	500
Methylene chloride	N.D.	ug/L	1200
4-Methyl-2-pentanone	N.D.	ug/L	500
Styrene	N.D.	ug/L	250
1,1,2,2-Tetrachloroethane	N.D.	ug/L	250
Tetrachloroethene	N.D.	ug/L	250
Toluene	470	ug/L	250
trans-1,2-Dichloroethene	N.D.	ug/L	250
1,1,1-Trichloroethane	N.D.	ug/L	250
1,1,2-Trichloroethane	N.D.	ug/L	250

N.D. = Not detected

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-7

Laboratory ID: 64971-009 Enseco ID: 64971-009

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-7

Laboratory ID: 64971-009 Enseco ID: 64971-009

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-7

Laboratory ID: 64971-009 Enseco ID: 64971-009

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.40	units	0.01	150.1	11/12/87
Specific Conductance @ 25C	1840	umhos/cm	1	120.1/9050	11/12/87
Total Dissolved Solids	1400	mg/L	10	160.1	11/17/87
Fluoride	0.6	mg/L	0.1	340.2	11/14/87
Chloride	126	mg/L	3	300.0	11/25/87
Nitrate + Nitrite as N	0.7	mg/L	0.1	353.2	12/01/87
Sulfate	558	mg/L	5	300.0	11/25/87
Total Alkalinity as CaCO3	430	mg/L	5	310.1/403	11/12/87
Bicarbonate Alkalinity	430	mg/L	5	310.1/403	11/12/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/12/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	20.5	meq/L	0.1	104C	12/03/87
Total Anions	20.8	meq/L	0.3	104C	12/03/87
% Difference	0.6	%	0.1	104C	12/03/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-7

Laboratory ID: 64971-009 Enseco ID: 64971-009

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	152	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	22	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	256	mg/L	0.05	200.7	11/19/87
Total Organic Lead	0.02	mg/L	0.02	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 64971-009

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: Duplicate

Laboratory ID: 64971-010 Enseco ID: 64971-010

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: Duplicate

Laboratory ID: 64971-010 Enseco ID: 64971-010

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: Duplicate

Laboratory ID: 64971-010 Enseco ID: 64971-010

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	9.01	units	0.01	150.1	11/12/87
Specific Conductance @ 25C	488	umhos/cm	1	120.1/9050	11/12/87
Total Dissolved Solids	360	mg/L	10	160.1	11/17/87
Fluoride	0.4	mg/L	0.1	340.2	11/14/87
Chloride	25	mg/L	3	300.0	11/30/87
Nitrate + Nitrite as N	0.2	mg/L	0.1	353.2	12/01/87
Sulfate	178	mg/L	5	300.0	11/30/87
Total Alkalinity as CaCO3	125	mg/L	5	310.1/403	11/12/87
Bicarbonate Alkalinity	110	mg/L	5	310.1/403	11/12/87
Carbonate Alkalinity as CaCO3	15	mg/L	5	310.1/403	11/12/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	4.6	meq/L	0.1	104C	12/03/87
Total Anions	5.0	meq/L	0.3	104C	12/03/87
% Difference	4.5	%	0.1	104C	12/03/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: Duplicate

Laboratory ID: 64971-010 Enseco ID: 64971-010

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	44	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	6.2	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	43	mg/L	0.05	200.7	11/19/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-1

Laboratory ID: 64971-011 Enseco ID: 64971-011

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	0.53	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-1

Laboratory ID: 64971-011 Enseco ID: 64971-011

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-1

Laboratory ID: 64971-011 Enseco ID: 64971-011

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	8.60	units	0.01	150.1	11/12/87
Specific Conductance @ 25C	497	umhos/cm	1	120.1/9050	11/12/87
Total Dissolved Solids	360	mg/L	10	160.1	11/17/87
Fluoride	0.4	mg/L	0.1	340.2	11/14/87
Chloride	26	mg/L	3	300.0	11/30/87
Nitrate + Nitrite as N	0.2	mg/L	0.1	353.2	12/01/87
Sulfate	176	mg/L	5	300.0	11/30/87
Total Alkalinity as CaCO3	166	mg/L	5	310.1/403	11/12/87
Bicarbonate Alkalinity	161	mg/L	5	310.1/403	11/12/87
Carbonate Alkalinity as CaCO3	5	mg/L	5	310.1/403	11/12/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	4.6	meq/L	0.1	104C	12/03/87
Total Anions	5.1	meq/L	0.3	104C	12/03/87
% Difference	4.9	%	0.1	104C	12/03/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-1

Laboratory ID: 64971-011 Enseco ID: 64971-011

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	44	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	6.4	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	44	mg/L	0.05	200.7	11/19/87
Total Organic Lead	N.D.	mg/L	0.01	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-2

Laboratory ID: 64971-012 Enseco ID: 64971-012

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-2

Laboratory ID: 64971-012 Enseco ID: 64971-012

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-2

Laboratory ID: 64971-012 Enseco ID: 64971-012

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.65	units	0.01	150.1	11/12/87
Specific Conductance @ 25C	1770	umhos/cm	1	120.1/9050	11/12/87
Total Dissolved Solids	1360	mg/L	10	160.1	11/17/87
Fluoride	0.4	mg/L	0.1	340.2	11/14/87
Chloride	67	mg/L	3	300.0	11/30/87
Nitrate + Nitrite as N	0.4	mg/L	0.1	353.2	12/01/87
Sulfate	526	mg/L	5	300.0	11/30/87
Total Alkalinity as CaCO3	309	mg/L	5	310.1/403	11/12/87
Bicarbonate Alkalinity	309	mg/L	5	310.1/403	11/12/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/12/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	20.2	meq/L	0.1	104C	12/02/87
Total Anions	19.1	meq/L	0.3	104C	12/02/87
% Difference	2.9	%	0.1	104C	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-2

Laboratory ID: 64971-012 Enseco ID: 64971-012

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	152	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	25	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	243	mg/L	0.05	200.7	11/19/87
Total Organic Lead	N.D.	mg/L	0.004	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-3

Laboratory ID: 64971-013 Enseco ID: 64971-013

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-3

Laboratory ID: 64971-013 Enseco ID: 64971-013

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-3

Laboratory ID: 64971-013 Enseco ID: 64971-013

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.53	units	0.01	150.1	11/12/87
Specific Conductance @ 25C	2160	umhos/cm	1	120.1/9050	11/12/87
Total Dissolved Solids	1620	mg/L	10	160.1	11/17/87
Fluoride	0.8	mg/L	0.1	340.2	11/14/87
Chloride	97	mg/L	3	300.0	11/30/87
Nitrate + Nitrite as N	0.2	mg/L	0.1	353.2	12/01/87
Sulfate	670	mg/L	5	300.0	11/30/87
Total Alkalinity as CaCO3	517	mg/L	5	310.1/403	11/12/87
Bicarbonate Alkalinity	517	mg/L	5	310.1/403	11/12/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/12/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	24.3	meq/L	0.1	104C	12/03/87
Total Anions	23.9	meq/L	0.3	104C	12/03/87
% Difference	0.8	%	0.1	104C	12/03/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-3

Laboratory ID: 64971-013 Enseco ID: 64971-013

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	148	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	21	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	349	mg/L	0.05	200.7	11/19/87
Total Organic Lead	N.D.	mg/L	0.01	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 64971-013

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-11

Laboratory ID: 64971-014 Enseco ID: 64971-014

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.80	units	0.01	150.1	11/12/87
Specific Conductance @ 25C	1720	umhos/cm	1	120.1/9050	11/12/87
Total Dissolved Solids	1250	mg/L	10	160.1	11/17/87
Fluoride	0.5	mg/L	0.1	340.2	11/14/87
Chloride	45	mg/L	3	300.0	11/30/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	592	mg/L	5	300.0	11/30/87
Total Alkalinity as CaCO3	267	mg/L	5	310.1/403	11/12/87
Bicarbonate Alkalinity	267	mg/L	5	310.1/403	11/12/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/12/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	18.8	meq/L	0.1	104C	12/02/87
Total Anions	18.9	meq/L	0.3	104C	12/02/87
% Difference	0.4	%	0.1	104C	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-11

Laboratory ID: 64971-014 Enseco ID: 64971-014

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	138	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	21	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	234	mg/L	0.05	200.7	11/19/87
Total Organic Lead	0.007	mg/L	0.004	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-11

Laboratory ID: 64971-014 Enseco ID: 64971-014

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	0.81	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-11

Laboratory ID: 64971-014 Enseco ID: 64971-014

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

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

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-6

Laboratory ID: 64971-015 Enseco ID: 64971-015

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-6

Laboratory ID: 64971-015 Enseco ID: 64971-015

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Bromoform	N.D.	ug/L	5.0
Carbon tetrachloride	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	2.0
Chloroethane	N.D.	ug/L	5.0
Chloroform	N.D.	ug/L	0.50
Dibromochloromethane	N.D.	ug/L	1.0
Bromodichloromethane	N.D.	ug/L	1.0
1,1-Dichloroethane	N.D.	ug/L	0.50
1,2-Dichloroethane	16	ug/L	1.0
1,1-Dichloroethene	N.D.	ug/L	0.50
1,2-Dichloropropane	N.D.	ug/L	1.0
cis-1,3-Dichloropropene	N.D.	ug/L	2.0
trans-1,3-Dichloropropene	N.D.	ug/L	0.50
Bromomethane	N.D.	ug/L	5.0
Chloromethane	N.D.	ug/L	5.0
Methylene chloride	N.D.	ug/L	5.0
1,1,2,2-Tetrachloroethane	N.D.	ug/L	1.0
Tetrachloroethene	N.D.	ug/L	0.50
trans-1,2-Dichloroethene	N.D.	ug/L	0.50
1,1,1-Trichloroethane	N.D.	ug/L	0.50
1,1,2-Trichloroethane	N.D.	ug/L	1.0
Trichloroethene	N.D.	ug/L	1.0
Vinyl chloride	N.D.	ug/L	1.0
1,1,2-Trichloro-2,2,1-trifluoroethane	N.D.	ug/L	1.0
1,2-Dibromoethane (EDB)	N.D.	ug/L	2.0

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-6

Laboratory ID: 64971-015 Enseco ID: 64971-015

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.42	units	0.01	150.1	11/12/87
Specific Conductance @ 25C	2870	umhos/cm	1	120.1/9050	11/12/87
Total Dissolved Solids	2130	mg/L	10	160.1	11/17/87
Fluoride	0.6	mg/L	0.1	340.2	11/14/87
Chloride	288	mg/L	3	300.0	11/30/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	843	mg/L	5	300.0	11/30/87
Total Alkalinity as CaCO3	367	mg/L	5	310.1/403	11/12/87
Bicarbonate Alkalinity	367	mg/L	5	310.1/403	11/12/87
Carbonate Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/12/87
Ammonia as N	N.D.	mg/L	0.1	350.1	11/30/87
Total Cations	31.0	meq/L	0.1	104C	12/02/87
Total Anions	33.0	meq/L	0.3	104C	12/02/87
% Difference	3.2	%	0.1	104C	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-6

Laboratory ID: 64971-015 Enseco ID: 64971-015

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	230	mg/L	0.1	200.7	11/19/87
Iron	N.D.	mg/L	0.05	200.7	11/19/87
Magnesium	33	mg/L	0.1	200.7	11/19/87
Potassium	N.D.	mg/L	5	200.7	11/19/87
Sodium	386	mg/L	0.05	200.7	11/19/87
Total Organic Lead	0.004	mg/L	0.002	Enseco	12/04/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 64971-015

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: TRIP BLANK

Laboratory ID: 64971-016 Enseco ID: 64971-016

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: TRIP BLANK

Laboratory ID: 64971-016 Enseco ID: 64971-016

Matrix: Water Sampled: 11/11/87 Received: 11/12/87

Authorized: 11/11/87 Analyzed: 11/16/87

Parameter	Result	Units	Reporting Limit
Bromoform	N.D.	ug/L	5.0
Carbon tetrachloride	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	2.0
Chloroethane	N.D.	ug/L	5.0
Chloroform	N.D.	ug/L	0.50
Dibromochloromethane	N.D.	ug/L	1.0
Bromodichloromethane	N.D.	ug/L	1.0
1,1-Dichloroethane	N.D.	ug/L	0.50
1,2-Dichloroethane	N.D.	ug/L	1.0
1,1-Dichloroethene	N.D.	ug/L	0.50
1,2-Dichloropropane	N.D.	ug/L	1.0
cis-1,3-Dichloropropene	N.D.	ug/L	2.0
trans-1,3-Dichloropropene	N.D.	ug/L	0.50
Bromomethane	N.D.	ug/L	5.0
Chloromethane	N.D.	ug/L	5.0
Methylene chloride	9.1	ug/L	5.0
1,1,2,2-Tetrachloroethane	N.D.	ug/L	1.0
Tetrachloroethene	N.D.	ug/L	0.50
trans-1,2-Dichloroethene	N.D.	ug/L	0.50
1,1,1-Trichloroethane	N.D.	ug/L	0.50
1,1,2-Trichloroethane	N.D.	ug/L	1.0
Trichloroethene	N.D.	ug/L	1.0
Vinyl chloride	N.D.	ug/L	1.0
1,1,2-Trichloro-2,2,1-trifluoroethane	N.D.	ug/L	1.0
1,2-Dibromoethane (EDB)	N.D.	ug/L	2.0

N.D. = Not detected

Reported by: Mike Faught Approved by: Robert Keck

V. QUALITY CONTROL REPORT

The Enseco laboratories operate under a vigorous QA/QC program designed to ensure the generation of scientifically valid, legally defensible data by monitoring every aspect of laboratory operations. Routine QA/QC procedures include the use of approved methodologies, independent verification of analytical standards, use of duplicate Laboratory Control Samples to assess the precision and accuracy of the methodology on a routine basis, and a rigorous system of data review.

In addition, the Enseco laboratories maintain a comprehensive set of certifications from both state and federal governmental agencies which require frequent analyses of blind audit samples. Enseco - Rocky Mountain Analytical Laboratory is certified by the EPA under the EPA/CLP program for both Organic and Inorganic analyses, under the USATHAMA (U.S. Army) program, by the Army Corps of Engineers, and the states of Colorado, New Jersey, New York, Utah, and Florida, among others.

The standard laboratory QC package is designed to:

1) establish a strong, cost-effective QC program that ensures the generation of scientifically valid, legally defensible data

2) assess the laboratory's performance of the analytical method using control limits generated with a well-defined matrix

3) establish clear-cut guidelines for acceptability of analytical data so that QC decisions can be made immediately at the bench, and

4) provide a standard set of reportables which assures the client of the quality of his data.

The Enseco QC program is based upon monitoring the precision and accuracy of an analytical method by analyzing a set of duplicate Laboratory Control Samples (LCS) at frequent, well-defined intervals. An LCS is a well-characterized matrix which is spiked with target compounds at 5-100 times the reporting limit, depending upon the methodology being monitored. The purpose of the LCS is not to duplicate the sample matrix, but rather to provide an interference-free, homogeneous matrix from which to gather data to establish control limits. These limits are used to determine whether data generated by the laboratory on any given day is in control.

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/- 3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate LCS results) to the average, historical relative percent difference + 3 standard deviation units. These control limits are fairly narrow based on the consistency of the matrix being monitored and are updated on a quarterly basis.

For Organic analyses an additional control measure is taken in the form of a Surrogate Control Sample (SCS). The SCS is a control sample spiked with surrogate standards which is analyzed with every analytical lot. The recovery of the SCS is charted in exactly the same manner as described for the LCS, and provides a daily check on the performance of the method.

Accuracy for LCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for LCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{\text{Measured Concentration LCS1} - \text{Measured Concentration LCS2}}{(\text{Measured Concentration LCS1} + \text{Measured Concentration LCS2})/2}$$

All samples analyzed concurrently by the same test are assigned the same QC lot number. Projects which contain numerous samples, analyzed over several days, may have multiple QC lot numbers associated with each test. The QC information which follows includes a listing of the QC lot numbers associated with each of the samples reported, LCS and SCS (where applicable) recoveries from the QC lots associated with the samples, and control limits for these lots. The QC data is reported by test code, in the order that the tests are reported in the analytical results section of this report.

QC LOT ASSIGNMENT REPORT
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS	QC Lot Number SCS
64971-007-00	Reagent Water	VOA	VOA 057AK	VOA 057BK
64971-008-00	Reagent Water	VOA	VOA 057AK	VOA 057BK

LABORATORY CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Analyte	Concentration Spiking	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: VOA on Reagent Water								
QC Lot: VOA 057AK								
Concentration Units: (ug/L)								
1,1-Dichloroethene	50.0	54.1	54.5	108	109	61-145	0.7	14
Trichloroethene	50.0	51.2	52.3	102	105	71-120	2.1	14
Chlorobenzene	50.0	56.1	57.2	112	114	75-130	1.9	13
Toluene	50.0	53.8	54.7	108	109	76-125	1.7	13
Benzene	50.0	54.4	54.9	109	110	76-127	0.9	11

SURROGATE CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Analyte	Concentration Spiking	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Test: VOA on Reagent Water				
QC Lot: VOA 057BK				
Concentration Units: (ug/L)				
Toluene-D8	50.0	49.8	100	88-110
Bromofluorobenzene (BFB)	50.0	49.8	100	86-115
1,2-Dichloroethane-D4	50.0	46.4	93	76-114

QC LOT ASSIGNMENT REPORT
GAS CHROMATOGRAPHY

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS	QC Lot Number SCS
64971-001-00	Reagent Water	601	601 108AP	601 108AP
64971-001-00	Reagent Water	602	602 112AP	602 112AP
64971-002-00	Reagent Water	601	601 108AP	601 108AP
64971-002-00	Reagent Water	602	602 112AP	602 112AP
64971-003-00	Reagent Water	601	601 108AP	601 108AP
64971-003-00	Reagent Water	602	602 112AP	602 112AP
64971-004-00	Reagent Water	601	601 108AP	601 108AP
64971-004-00	Reagent Water	602	602 112AP	602 112AP
64971-005-00	Reagent Water	601	601 108AP	601 108AP
64971-005-00	Reagent Water	602	602 112AP	602 112AP
64971-006-00	Reagent Water	601	601 108AP	601 108AP
64971-006-00	Reagent Water	602	602 112AP	602 112AP
64971-009-00	Reagent Water	601	601 108AP	601 108AP
64971-009-00	Reagent Water	602	602 112AP	602 112AP
64971-010-00	Reagent Water	601	601 108AP	601 108AP
64971-010-00	Reagent Water	602	602 112AP	602 112AP
64971-011-00	Reagent Water	601	601 108AP	601 108AP
64971-011-00	Reagent Water	602	602 112AP	602 112AP
64971-012-00	Reagent Water	601	601 108AP	601 108AP
64971-012-00	Reagent Water	602	602 112AP	602 112AP
64971-013-00	Reagent Water	601	601 108AP	601 108AP
64971-013-00	Reagent Water	602	602 112AP	602 112AP
64971-014-00	Reagent Water	601	601 108AP	601 108AP
64971-014-00	Reagent Water	602	602 112AP	602 112AP
64971-015-00	Reagent Water	601	601 108AP	601 108AP
64971-015-00	Reagent Water	602	602 112AP	602 112AP
64971-016-00	Reagent Water	601	601 108AP	601 108AP
64971-016-00	Reagent Water	602	602 112AP	602 112AP

LABORATORY CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY

Analyte	Concentration Spiking	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: 601 on Reagent Water QC Lot: 601 108AP Concentration Units: (ug/L)								
Chloromethane	20	17.6	16.2	88	81	59-140	8.3	25
Bromomethane	20	14.5	14.0	73	70	58-141	3.5	25
Vinyl chloride	20	22.2	21.3	111	107	68-132	4.1	25
Chloroethane	20	20.9	20.7	104	103	77-123	1.0	25
Methylene chloride	20	21.6	21.0	108	105	77-123	2.8	20
Trichlorofluoromethane	20	20.2	21.1	101	106	66-134	4.4	25
1,1-Dichloroethene	20	20.2	19.7	101	98	63-137	2.5	20
1,1-Dichloroethane	20	20.8	21.6	104	108	84-116	3.8	20
trans-1,2-Dichloroethene	20	20.8	21.8	104	109	64-136	4.7	20
Chloroform	20	22.3	22.8	112	114	75-125	2.2	20
1,1,2-Trichloro-2,2,1-trifluoroethane	20	20.6	21.7	103	108	67-134	5.2	20
1,2-Dichloroethane	20	21.6	22.3	108	112	72-129	3.2	20
1,1,1-Trichloroethane	20	17.1	17.6	86	88	71-129	2.9	20
Carbon tetrachloride	20	20.1	20.6	101	103	68-131	2.5	20
Bromodichloromethane	20	18.5	19.2	93	96	76-124	3.7	20
1,2-Dichloropropane	20	20.2	20.3	101	102	74-126	0.5	20
trans-1,3-Dichloropropene	20	21.7	21.9	108	109	64-136	0.9	20
Trichloroethene	20	21.0	21.1	105	106	77-123	0.5	20
1,1,2-Trichloroethane	60	68.8	67.4	115	112	69-132	2.1	20
Dibromochloromethane	60	68.8	67.4	115	112	69-132	2.1	20
cis-1,3-Dichloropropene	60	68.8	67.4	115	112	69-132	2.1	20
1,2-Dibromoethane (EDB)	20	25.6	28.6	128#	143#	74-127	11.1	20
Bromoform	20	15.3	15.7	77	79	74-127	2.6	20
1,1,2,2-Tetrachloroethane	40	36.9	37.1	92	93	60-140	0.5	20
Tetrachloroethene	40	36.9	37.1	92	93	60-140	0.5	20
Chlorobenzene	20	19.4	22.8	97	114	72-128	16.1	20
Test: 602 on Reagent Water QC Lot: 602 112AP Concentration Units: (ug/L)								
Benzene	20	19.3	19.1	97	96	77-123	1.0	20
Toluene	20	18.8	18.5	94	93	77-123	1.6	20
Chlorobenzene	20	19.1	18.9	96	94	81-119	1.1	20
Ethylbenzene	20	19.5	19.2	98	96	63-137	1.6	20
m-Xylene	20	19.6	19.3	98	97	77-123	1.5	20
o & p-Xylene(s)	40	38.8	38.2	97	96	77-123	1.6	20
1,3-Dichlorobenzene	20	19.1	18.7	96	93	77-123	2.1	20

= Recovery outside standard QC limits.

LABORATORY CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: 602 on Reagent Water QC Lot: 602 112AP Concentration Units: (ug/L)								
1,2-Dichlorobenzene	20	18.5	18.6	93	93	63-137	0.5	20
1,4-Dichlorobenzene	20	18.5	17.8	93	89	70-130	3.9	20

SURROGATE CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY

Analyte	Concentration Spiking	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Test: 601 on Reagent Water QC Lot: 601 108AP Concentration Units: (ug/L)				
Bromochloromethane	30	25.4	85	20-160
Test: 602 on Reagent Water QC Lot: 602 112AP Concentration Units: (ug/L)				
a,a,a-Trifluorotoluene	30	32.7	109	20-160

QC LOT ASSIGNMENT REPORT
INORGANICS - METALS

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
64971-001-00	Reagent Water	FPBD	FPBD097AA
64971-001-00	Reagent Water	ICPD	ICPD173AA
64971-002-00	Reagent Water	FPBD	FPBD097AA
64971-002-00	Reagent Water	ICPD	ICPD173AA
64971-003-00	Reagent Water	FPBD	FPBD097AA
64971-003-00	Reagent Water	ICPD	ICPD173AA
64971-004-00	Reagent Water	FPBD	FPBD097AA
64971-004-00	Reagent Water	ICPD	ICPD173AA
64971-005-00	Reagent Water	FPBD	FPBD097AA
64971-005-00	Reagent Water	ICPD	ICPD173AA
64971-007-00	Reagent Water	FPBD	FPBD097AA
64971-007-00	Reagent Water	ICPD	ICPD173AA
64971-009-00	Reagent Water	FPBD	FPBD097AA
64971-009-00	Reagent Water	ICPD	ICPD173AA
64971-010-00	Reagent Water	FPBD	FPBD097AA
64971-010-00	Reagent Water	ICPD	ICPD173AA
64971-011-00	Reagent Water	FPBD	FPBD097AA
64971-011-00	Reagent Water	ICPD	ICPD173AA
64971-012-00	Reagent Water	FPBD	FPBD097AA
64971-012-00	Reagent Water	ICPD	ICPD173AA
64971-013-00	Reagent Water	FPBD	FPBD097AA
64971-013-00	Reagent Water	ICPD	ICPD173AA
64971-014-00	Reagent Water	FPBD	FPBD097AA
64971-014-00	Reagent Water	ICPD	ICPD173AA
64971-015-00	Reagent Water	FPBD	FPBD097AA
64971-015-00	Reagent Water	ICPD	ICPD173AA

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - METALS

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Limits	Precision(RPD) LCS	Limits
Test: FPBD on Reagent Water QC Lot: FPBD097AA Concentration Units: (mg/L)								
Lead	0.04	0.038	0.038	95	95	75-125	0.0	20
Test: ICPD on Reagent Water QC Lot: ICPD173AA Concentration Units: (mg/L)								
Aluminum	2.0	2.1	2.1	105	105	75-125	0.0	20
Antimony	0.5	0.51	0.50	102	100	75-125	2.0	20
Arsenic	0.5	0.46	0.46	92	92	75-125	0.0	20
Barium	2.0	2.0	2.0	100	100	75-125	0.0	20
Beryllium	0.05	0.048	0.047	96	94	75-125	2.1	20
Cadmium	0.05	0.046	0.049	92	98	75-125	6.3	20
Calcium	100	106	105	106	105	75-125	0.9	20
Chromium	0.2	0.20	0.20	100	100	75-125	0.0	20
Cobalt	0.5	0.50	0.50	100	100	75-125	0.0	20
Copper	0.25	0.27	0.27	108	108	75-125	0.0	20
Iron	1.0	1.0	1.0	100	100	75-125	0.0	20
Lead	0.5	0.50	0.49	100	98	75-125	2.0	20
Magnesium	50	49	49	98	98	75-125	0.0	20
Manganese	0.2	0.21	0.21	105	105	75-125	0.0	20
Nickel	0.4	0.41	0.40	103	100	75-125	2.5	20
Potassium	50	54	53	108	106	75-125	1.9	20
Silver	0.05	0.052	0.048	104	96	75-125	8.0	20
Sodium	100	104	104	104	104	75-125	0.0	20
Tin	0.4	0.44	0.43	110	108	75-125	2.3	20
Vanadium	0.5	0.51	0.50	102	100	75-125	2.0	20
Zinc	0.2	0.21	0.20	105	100	75-125	4.9	20

QC LOT ASSIGNMENT REPORT
INORGANICS - NON-METALS

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
64971-001-00	Reagent Water	ALK	ALK 194AA
64971-001-00	Reagent Water	CL	CL 171AA
64971-001-00	Reagent Water	COND	COND196AA
64971-001-00	Reagent Water	F	F 107AA
64971-001-00	Reagent Water	NH3	NH3 119AC
64971-001-00	Reagent Water	NO3	NO3 161AF
64971-001-00	Reagent Water	PH	PH 239AA
64971-001-00	Reagent Water	SO4	SO4 162AA
64971-001-00	Reagent Water	TDS	TDS 095AA
64971-002-00	Reagent Water	ALK	ALK 194AA
64971-002-00	Reagent Water	CL	CL 171AA
64971-002-00	Reagent Water	COND	COND196AA
64971-002-00	Reagent Water	F	F 107AA
64971-002-00	Reagent Water	NH3	NH3 119AC
64971-002-00	Reagent Water	NO3	NO3 161AF
64971-002-00	Reagent Water	PH	PH 239AA
64971-002-00	Reagent Water	SO4	SO4 162AA
64971-002-00	Reagent Water	TDS	TDS 095AA
64971-003-00	Reagent Water	ALK	ALK 194AA
64971-003-00	Reagent Water	CL	CL 171AA
64971-003-00	Reagent Water	COND	COND196AA
64971-003-00	Reagent Water	F	F 107AA
64971-003-00	Reagent Water	NH3	NH3 119AC
64971-003-00	Reagent Water	NO3	NO3 161AF
64971-003-00	Reagent Water	PH	PH 239AA
64971-003-00	Reagent Water	SO4	SO4 162AA
64971-003-00	Reagent Water	TDS	TDS 095AA
64971-004-00	Reagent Water	ALK	ALK 194AA
64971-004-00	Reagent Water	CL	CL 171AA
64971-004-00	Reagent Water	COND	COND196AA
64971-004-00	Reagent Water	F	F 107AA
64971-004-00	Reagent Water	NH3	NH3 119AC
64971-004-00	Reagent Water	NO3	NO3 161AF
64971-004-00	Reagent Water	PH	PH 239AA
64971-004-00	Reagent Water	SO4	SO4 162AA
64971-004-00	Reagent Water	TDS	TDS 095AA
64971-005-00	Reagent Water	ALK	ALK 194AA
64971-005-00	Reagent Water	CL	CL 171AA
64971-005-00	Reagent Water	COND	COND196AA
64971-005-00	Reagent Water	F	F 107AA
64971-005-00	Reagent Water	NH3	NH3 119AC
64971-005-00	Reagent Water	NO3	NO3 161AF

QC LOT ASSIGNMENT REPORT
INORGANICS - NON-METALS (cont.)

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
64971-005-00	Reagent Water	PH	PH 239AA
64971-005-00	Reagent Water	SO4	SO4 162AA
64971-005-00	Reagent Water	TDS	TDS 095AA
64971-007-00	Reagent Water	ALK	ALK 194AA
64971-007-00	Reagent Water	CL	CL 171AA
64971-007-00	Reagent Water	COND	COND196AA
64971-007-00	Reagent Water	F	F 107AA
64971-007-00	Reagent Water	NH3	NH3 119AC
64971-007-00	Reagent Water	NO3	NO3 161AF
64971-007-00	Reagent Water	PH	PH 239AA
64971-007-00	Reagent Water	SO4	SO4 162AA
64971-007-00	Reagent Water	TDS	TDS 095AA
64971-009-00	Reagent Water	ALK	ALK 195AA
64971-009-00	Reagent Water	CL	CL 171AA
64971-009-00	Reagent Water	COND	COND197AA
64971-009-00	Reagent Water	F	F 107AA
64971-009-00	Reagent Water	NH3	NH3 119AC
64971-009-00	Reagent Water	NO3	NO3 161AF
64971-009-00	Reagent Water	PH	PH 241AA
64971-009-00	Reagent Water	SO4	SO4 162AA
64971-009-00	Reagent Water	TDS	TDS 095AA
64971-010-00	Reagent Water	ALK	ALK 195AA
64971-010-00	Reagent Water	CL	CL 173AA
64971-010-00	Reagent Water	COND	COND197AA
64971-010-00	Reagent Water	F	F 107AA
64971-010-00	Reagent Water	NH3	NH3 119AC
64971-010-00	Reagent Water	NO3	NO3 161AF
64971-010-00	Reagent Water	PH	PH 241AA
64971-010-00	Reagent Water	SO4	SO4 164AA
64971-010-00	Reagent Water	TDS	TDS 095AA
64971-011-00	Reagent Water	ALK	ALK 195AA
64971-011-00	Reagent Water	CL	CL 173AA
64971-011-00	Reagent Water	COND	COND197AA
64971-011-00	Reagent Water	F	F 107AA
64971-011-00	Reagent Water	NH3	NH3 119AC
64971-011-00	Reagent Water	NO3	NO3 162AF
64971-011-00	Reagent Water	PH	PH 241AA
64971-011-00	Reagent Water	SO4	SO4 164AA
64971-011-00	Reagent Water	TDS	TDS 095AA
64971-012-00	Reagent Water	ALK	ALK 195AA
64971-012-00	Reagent Water	CL	CL 173AA
64971-012-00	Reagent Water	COND	COND197AA

QC LOT ASSIGNMENT REPORT
INORGANICS - NON-METALS (cont.)

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
64971-012-00	Reagent Water	F	F 107AA
64971-012-00	Reagent Water	NH3	NH3 119AC
64971-012-00	Reagent Water	NO3	NO3 162AF
64971-012-00	Reagent Water	PH	PH 241AA
64971-012-00	Reagent Water	SO4	SO4 164AA
64971-012-00	Reagent Water	TDS	TDS 095AA
64971-013-00	Reagent Water	ALK	ALK 195AA
64971-013-00	Reagent Water	CL	CL 173AA
64971-013-00	Reagent Water	COND	COND197AA
64971-013-00	Reagent Water	F	F 107AA
64971-013-00	Reagent Water	NH3	NH3 119AC
64971-013-00	Reagent Water	NO3	NO3 162AF
64971-013-00	Reagent Water	PH	PH 241AA
64971-013-00	Reagent Water	SO4	SO4 164AA
64971-013-00	Reagent Water	TDS	TDS 095AA
64971-014-00	Reagent Water	ALK	ALK 195AA
64971-014-00	Reagent Water	CL	CL 173AA
64971-014-00	Reagent Water	COND	COND197AA
64971-014-00	Reagent Water	F	F 107AA
64971-014-00	Reagent Water	NH3	NH3 119AC
64971-014-00	Reagent Water	NO3	NO3 162AF
64971-014-00	Reagent Water	PH	PH 241AA
64971-014-00	Reagent Water	SO4	SO4 164AA
64971-014-00	Reagent Water	TDS	TDS 095AA
64971-015-00	Reagent Water	ALK	ALK 195AA
64971-015-00	Reagent Water	CL	CL 173AA
64971-015-00	Reagent Water	COND	COND197AA
64971-015-00	Reagent Water	F	F 108AA
64971-015-00	Reagent Water	NH3	NH3 119AC
64971-015-00	Reagent Water	NO3	NO3 162AF
64971-015-00	Reagent Water	PH	PH 241AA
64971-015-00	Reagent Water	SO4	SO4 164AA
64971-015-00	Reagent Water	TDS	TDS 095AA

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - NON-METALS

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Limits	Precision(RPD) LCS	Limits
Test: ALK on Reagent Water QC Lot: ALK 194AA Concentration Units: (mg/L)								
Total Alkalinity as CaCO3	134	141	140	105	104	90-110	0.7	20
Test: ALK on Reagent Water QC Lot: ALK 195AA Concentration Units: (mg/L)								
Total Alkalinity as CaCO3	134	142	142	106	106	90-110	0.0	20
Test: CL on Reagent Water QC Lot: CL 171AA Concentration Units: (mg/L)								
Chloride	20	18.4	18.6	92	93	92-108	1.1	10
Test: CL on Reagent Water QC Lot: CL 173AA Concentration Units: (mg/L)								
Chloride	20	19.7	19.1	98	96	92-108	3.1	10
Test: COND on Reagent Water QC Lot: COND196AA Concentration Units: (umhos/cm)								
Specific Conductance @ 25C	1290	1250	1250	97	97	95-105	0.0	5
Test: COND on Reagent Water QC Lot: COND197AA Concentration Units: (umhos/cm)								
Specific Conductance @ 25C	1290	1230	1230	95	95	95-105	0.0	5

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - NON-METALS

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: F on Reagent Water QC Lot: F 107AA Concentration Units: (mg/L)								
Fluoride	6.5	6.8	6.7	105	103	88-112	1.5	15
Test: F on Reagent Water QC Lot: F 108AA Concentration Units: (mg/L)								
Fluoride	6.5	6.1	6.4	94	98	88-112	4.8	15
Test: NH3 on Reagent Water QC Lot: NH3 119AC Concentration Units: (mg/L)								
Ammonia as N	4.1	4.0	4.0	98	98	93-107	0.0	10
Test: NO3 on Reagent Water QC Lot: NO3 161AF Concentration Units: (mg/L)								
Nitrate as N	3.5	3.5	3.5	100	100	91-109	0.0	20
Test: NO3 on Reagent Water QC Lot: NO3 162AF Concentration Units: (mg/L)								
Nitrate as N	3.5	3.4	3.5	97	100	91-109	2.9	20
Test: PH on Reagent Water QC Lot: PH 239AA Concentration Units: (Units)								
pH	9.06	8.98	8.98	99	99	98-102	0.0	5

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - NON-METALS

Analyte	Concentration Spiking	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: PH on Reagent Water QC Lot: PH 241AA Concentration Units: (Units)								
pH	9.06	9.01	9.01	99	99	98-102	0.0	5
Test: SO4 on Reagent Water QC Lot: SO4 162AA Concentration Units: (mg/L)								
Sulfate	100	94.1	95.3	94	95	93-107	1.3	15
Test: SO4 on Reagent Water QC Lot: SO4 164AA Concentration Units: (mg/L)								
Sulfate	100	93.4	95.1	93	95	93-107	1.8	15
Test: TDS on Reagent Water QC Lot: TDS 095AA Concentration Units: (mg/L)								
Total Dissolved Solids	940	986	967	105	103	90-110	1.9	10

BLIND DUPLICATE RESULTS

FOR 64971

Parameter	64971-010	64971-011	Relative Percent Difference
HALOGENATED VOLATILES			
Bromoform	ND	ND	*
Carbon tetrachloride	ND	ND	*
Chlorobenzene	ND	ND	*
Chloroethane	ND	ND	*
Chloroform	ND	ND	*
Dibromochloromethane	ND	ND	*
Bromodichloromethane	ND	ND	*
1,1-Dichloroethane	ND	ND	*
1,2-Dichloroethane	ND	ND	*
1,1-Dichloroethene	ND	ND	*
1,2-Dichloropropane	ND	ND	*
cis-1,3-Dichloropropene	ND	ND	*
trans-1,3-Dichloropropene	ND	ND	*
Bromomethane	ND	ND	*
Chloromethane	ND	ND	*
Methylene chloride	ND	ND	*
1,1,2,2-Tetrachloroethane	ND	ND	*
Tetrachloroethene	ND	ND	*
trans-1,2-Dichloroethene	ND	ND	*
1,1,1-Trichloroethane	ND	ND	*
1,1,2-Trichloroethane	ND	ND	*
Trichloroethene	ND	ND	*
Vinyl chloride	ND	ND	*
1,1,2-Trichloro-2,2,1-trifluoroethane	ND	ND	*
1,2-Dibromoethane (EDB)	ND	ND	*
AROMATIC VOLATILES			
Benzene	ND	0.53	200
Chlorobenzene	ND	ND	*
Ethylbenzene	ND	ND	*
Toluene	ND	ND	*
1,2 Dichlorobenzene	ND	ND	*
1,3 Dichlorobenzene	ND	ND	*
1,4 Dichlorobenzene	ND	ND	*
m-xylene	ND	ND	*
o & p xylene(s)	ND	ND	*

*RPD cannot be calculated when both values are not detected.

ND = Not detected.

BLIND DUPLICATE RESULTS

FOR 64971

Parameter	64971-010	64971-011	Relative Percent Difference
METALS			
Calcium	44	44	0.0
Iron	ND	ND	*
Magnesium	6.2	6.4	3.2
Potassium	ND	ND	*
Sodium	43	44	2.3
Total Organic Lead	ND	ND	*
INORGANICS			
pH	9.01	8.60	4.7
Specific Conductance	488	497	1.8
TDS	360	360	0.0
Fluoride	0.4	0.4	0.0
Chloride	25	26	3.9
Nitrate + Nitrite	0.2	0.2	0.0
Sulfate	178	176	1.1
Total Alkalinity	125	166	28
Bicarbonate Alkalinity	110	161	38
Carbonate Alkalinity	15	5	100
Ammonia	ND	ND	0.0

*RPD cannot be calculated when both values are not detected.

ND = Not detected.

QC LOT ASSIGNMENT REPORT
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS	QC Lot Number SCS
65039-008-00	Reagent Water	VOA	VOA 059AK	VOA 059AK

ION BALANCE RESULTS
for sample #64971-001

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	86.000	4.2914
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	13.000	1.0699
K	ND	0.0000
Na	29.000	1.2615
NH4	ND	0.0000
TOTAL	128.000	6.6228

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	16.000	0.4512
F	0.400	0.0210
SO4	136.000	2.8288
Alk	95.400	3.1800
NO2+NO3	0.300	0.0214
TOTAL	248.100	6.5025

SUMMARY

% DIFFERENCE = 0.917
CATIONS + ANIONS (mg/L) = 376.100
TDS =400.000
HARDNESS = 268.300
CALCULATED THEORETICAL CONDUCTIVITY = 780.0731
MEASURED CONDUCTIVITY = 581.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.343
MEASURED CONDUCTIVITY/TDS RATIO = 1.453

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-002

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	162.000	8.0838
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	26.000	2.1398
K	ND	0.0000
Na	159.000	6.9165
NH4	ND	0.0000
TOTAL	347.000	17.1401

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	49.000	1.3818
F	0.400	0.0210
SO4	476.000	9.9008
Alk	166.200	5.5400
NO2+NO3	1.500	0.1071
TOTAL	693.100	16.9507

SUMMARY

% DIFFERENCE = 0.555
CATIONS + ANIONS (mg/L) =1040.100
TDS =%1120.000
HARDNESS = 511.600
CALCULATED THEORETICAL CONDUCTIVITY =2092.3243
MEASURED CONDUCTIVITY =1480.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.414
MEASURED CONDUCTIVITY/TDS RATIO = 1.321

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-003

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	178.000	8.8822
Fe+2	ND	0.0000
Fe+3	0.060	0.0032
Mg	32.000	2.6336
K	ND	0.0000
Na	223.000	9.7005
NH4	ND	0.0000
TOTAL	433.060	21.2195

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	77.000	2.1714
F	0.600	0.0316
SO4	602.000	12.5216
Alk	178.200	5.9400
NO2+NO3	1.000	0.0714
TOTAL	858.800	20.7360

SUMMARY

% DIFFERENCE = 1.153
CATIONS + ANIONS (mg/L) =1291.860
TDS =%1400.000
HARDNESS = 576.200
CALCULATED THEORETICAL CONDUCTIVITY =2590.8811
MEASURED CONDUCTIVITY =1830.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.416
MEASURED CONDUCTIVITY/TDS RATIO = 1.307

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-004

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	142.000	7.0858
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	20.000	1.6460
K	ND	0.0000
Na	337.000	14.6595
NH4	ND	0.0000
TOTAL	499.000	23.3913

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	87.000	2.4534
F	0.800	0.0421
SO4	654.000	13.6032
Alk	199.200	6.6400
NO2+NO3	0.300	0.0214
TOTAL	941.300	22.7601

SUMMARY

% DIFFERENCE = 1.368
CATIONS + ANIONS (mg/L) =1440.300
TDS =%1540.000
HARDNESS = 437.000
CALCULATED THEORETICAL CONDUCTIVITY =2815.8871
MEASURED CONDUCTIVITY =2060.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.367
MEASURED CONDUCTIVITY/TDS RATIO = 1.338

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-005

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	129.000	6.4371
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	20.000	1.6460
K	ND	0.0000
Na	258.000	11.2230
NH4	ND	0.0000
TOTAL	407.000	19.3061

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	68.000	1.9176
F	0.800	0.0421
SO4	499.000	10.3792
Alk	238.200	7.9400
NO2+NO3	0.200	0.0143
TOTAL	806.200	20.2932

SUMMARY

% DIFFERENCE =-2.493
CATIONS + ANIONS (mg/L) =1213.200
TDS =%1250.000
HARDNESS = 404.500
CALCULATED THEORETICAL CONDUCTIVITY =2364.2453
MEASURED CONDUCTIVITY =1730.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.367
MEASURED CONDUCTIVITY/TDS RATIO = 1.384

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-007

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	113.000	5.6387
Fe+2	ND	0.0000
Fe+3	0.120	0.0064
Mg	17.000	1.3991
K	ND	0.0000
Na	40.000	1.7400
NH4	ND	0.0000
TOTAL	170.120	8.7842

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	29.000	0.8178
F	0.300	0.0158
SO4	147.000	3.0576
Alk	151.800	5.0600
NO2+NO3	ND	0.0000
TOTAL	328.100	8.9512

SUMMARY

% DIFFERENCE =-0.941
CATIONS + ANIONS (mg/L) = 498.220
TDS =790.000
HARDNESS = 352.200
CALCULATED THEORETICAL CONDUCTIVITY =1029.5665
MEASURED CONDUCTIVITY = 790.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.303
MEASURED CONDUCTIVITY/TDS RATIO = 1.000

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-009

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	152.000	7.5848
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	22.000	1.8106
K	ND	0.0000
Na	256.000	11.1360
NH4	ND	0.0000
TOTAL	430.000	20.5314

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	126.000	3.5532
F	0.600	0.0316
SO4	558.000	11.6064
Alk	166.200	5.5400
NO2+NO3	0.700	0.0500
TOTAL	851.500	20.7811

SUMMARY

% DIFFERENCE =-0.605
CATIONS + ANIONS (mg/L) =1281.500
TDS =%1400.000
HARDNESS = 470.200
CALCULATED THEORETICAL CONDUCTIVITY =2554.7436
MEASURED CONDUCTIVITY =1840.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.388
MEASURED CONDUCTIVITY/TDS RATIO = 1.314

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-010

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	44.000	2.1956
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	6.200	0.5103
K	ND	0.0000
Na	43.000	1.8705
NH4	ND	0.0000
TOTAL	93.200	4.5764

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	25.000	0.7050
F	0.400	0.0210
SO4	178.000	3.7024
Alk	16.800	0.5600
NO2+NO3	0.200	0.0143
TOTAL	220.400	5.0027

SUMMARY

% DIFFERENCE =-4.451
CATIONS + ANIONS (mg/L) = 313.600
TDS =360.000
HARDNESS = 135.420
CALCULATED THEORETICAL CONDUCTIVITY = 629.8664
MEASURED CONDUCTIVITY = 488.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.291
MEASURED CONDUCTIVITY/TDS RATIO = 1.356

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-011

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	44.000	2.1956
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	6.400	0.5267
K	ND	0.0000
Na	44.000	1.9140
NH4	ND	0.0000
TOTAL	94.400	4.6363

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	26.000	0.7332
F	0.400	0.0210
SO4	176.000	3.6608
Alk	20.400	0.6800
NO2+NO3	0.200	0.0143
TOTAL	223.000	5.1093

SUMMARY

% DIFFERENCE =-4.853
CATIONS + ANIONS (mg/L) = 317.400
TDS =360.000
HARDNESS = 136.240
CALCULATED THEORETICAL CONDUCTIVITY = 635.8555
MEASURED CONDUCTIVITY = 488.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.303
MEASURED CONDUCTIVITY/TDS RATIO = 1.356

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-012

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	152.000	7.5849
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	25.000	2.0575
K	ND	0.0000
Na	243.000	10.5705
NH4	ND	0.0000
TOTAL	420.000	20.2128

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	67.000	1.8894
F	0.400	0.0210
SO4	526.000	10.9408
Alk	185.400	6.1800
NO2+NO3	0.400	0.0286
TOTAL	779.200	19.0598

SUMMARY

% DIFFERENCE = 2.936
CATIONS + ANIONS (mg/L) =1199.200
TDS =%1360.000
HARDNESS = 482.500
CALCULATED THEORETICAL CONDUCTIVITY =2385.9461
MEASURED CONDUCTIVITY =1770.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.348
MEASURED CONDUCTIVITY/TDS RATIO = 1.301

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-013

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	148.000	7.3852
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	21.000	1.7283
K	ND	0.0000
Na	349.000	15.1815
NH4	ND	0.0000
TOTAL	518.000	24.2950

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	97.000	2.7354
F	0.800	0.0421
SO4	670.000	13.9360
Alk	214.800	7.1600
NO2+NO3	0.200	0.0143
TOTAL	982.800	23.8878

SUMMARY

% DIFFERENCE = 0.845
CATIONS + ANIONS (mg/L) =1500.800
TDS =%1620.000
HARDNESS = 456.100
CALCULATED THEORETICAL CONDUCTIVITY =2934.9373
MEASURED CONDUCTIVITY =2160.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.359
MEASURED CONDUCTIVITY/TDS RATIO = 1.333

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-014

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	138.000	6.8862
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	21.000	1.7283
K	ND	0.0000
Na	234.000	10.1790
NH4	ND	0.0000
TOTAL	393.000	18.7935

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	45.000	1.2690
F	0.500	0.0263
SO4	592.000	12.3136
Alk	160.200	5.3400
NO2+NO3	ND	0.0000
TOTAL	797.700	18.9489

SUMMARY

% DIFFERENCE =-0.412
CATIONS + ANIONS (mg/L) =1190.700
TDS =%1250.000
HARDNESS = 431.100
CALCULATED THEORETICAL CONDUCTIVITY =2330.4302
MEASURED CONDUCTIVITY =1720.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.355
MEASURED CONDUCTIVITY/TDS RATIO = 1.376

ND - Not Detected

ION BALANCE RESULTS
for sample #64971-015

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	230.000	11.4770
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	33.000	2.7159
K	ND	0.0000
Na	386.000	16.7910
NH4	ND	0.0000
TOTAL	649.000	30.9839

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	288.000	8.1216
F	0.600	0.0316
SO4	843.000	17.5344
Alk	220.200	7.3400
NO2+NO3	ND	0.0000
TOTAL	1351.800	33.0276

SUMMARY

% DIFFERENCE =-3.193
CATIONS + ANIONS (mg/L) =2000.800
TDS =%2130.000
HARDNESS = 710.300
CALCULATED THEORETICAL CONDUCTIVITY =4015.8053
MEASURED CONDUCTIVITY =2870.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.399
MEASURED CONDUCTIVITY/TDS RATIO = 1.347

ND - Not Detected

Rocky Mountain Analytical Laboratory

4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF ENSECO INCORPORATED

CHAIN OF CUSTODY

64771

RMAL Client Dames & Moore

RMAL Project No. Carbon Canyon Refinery NM 11/8/1985

Sampling Co.

Sampling Personnel L. Bardwell

Project Name/No.

Sampling Site as above

Date	Time	Sample ID/Description	Type	No. Containers	Parameters	Remarks
11/10	900	SW-1		4	VOA Lead, Ions	1
11/10	1100	SW-2		4	"	2
11/10	1030	SW-3		7	"	3
11/10	1130	SW-4		~~X~~ 7	"	4 7
11/10	1200	SW-5		do both	VOA	5 8
11/10	1215	SW-6			VOA	6
11/10	1500	MW-5			VOA Lead Ions	7 5
11/10	1600	MW-4		6	"	8 4

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
L Bardwell	11/10 1630	PM	11/10 1630				
Method of Shipment:		**Shipped by: (Signature)**		**Delivered by: (Signature)**		**Received for Laboratory by: (Signature)**	**Date / Time**
							11/12/85 0840

White Copy to Lab — Pink Copy to Client — Yellow Copy to Sampler

SS - 001

Rocky Mountain Analytical Laboratory

4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF ENSECO INCORPORATED

CHAIN OF CUSTODY

64971

RMAL Client: Dana Bard

RMAL Project No.: Carlsbad Caverns Intl Bnd N.M.

Sampling Co.:

Sampling Personnel: L. Bardwell

Project Name/No.:

Sampling Site:

Date	Time	Sample ID/Description	Type	No. Containers	Parameters	Remarks
11/11/87	1015	MW-7	Groundwater	7	VOA Ion Balance, Lead	09
"	1430	MW-13	"	7	"	10
"	1130	MW-1	"	7	"	11
"		MW-2	"	7	"	12
"	1000	MW-3	"	7	"	13
"	1230	MW-11	"	7	"	14
"	1130	MW-6	"	7	"	15
"	915	MW-4	"	1	Ion Balance	re-sample 4
"	"	Trip Blank				16

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Larry Bardwell	11/11 1530	Fed Express	11/11 1530				

Method of Shipment:	Shipped by: (Signature)	Delivered by: (Signature)	Received for Laboratory by: (Signature)	Date / Time
Fed Express	Fed Express		Joseph A. Man	11/12 0800

White Copy to Lab — Pink Copy to Client — Yellow Copy to Sampler

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VI. ANALYTICAL METHODOLOGY

Enseco - Rocky Mountain Analytical Laboratory performs analytical services according to methods approved by EPA and other regulatory agencies, whenever possible.

Methods for metals and organic compounds are primarily derived from three sources of EPA methods, 1) the methods promulgated in 40 CFR 136 for priority pollutants, 2) the methods published in SW-846 and 3) methods developed by the EPA-EMSL/LV for Superfund investigations, as well as several documents published by the EPA and Enseco - Rocky Mountain Analytical Laboratory in 1984 and 1985. These methods all use the same generic technology as summarized below:

- Metals: acid digestion followed by analyses by ICP supported by graphite furnace AA
- Volatile Organics: purge and trap GC/MS or purge and trap GC with a selective detector.
- Semivolatile (base/neutral and acid) organics: solvent extraction followed by capillary column GC/MS, and
- Pesticides/Herbicides: solvent extraction, followed by gas chromatography.

Exact method references are given in the following tables.

ANALYTICAL METHODOLOGY - INORGANIC TESTS

Test	Description	Methodology	Reference
ICP	Trace Metals	ICP Emission Spectroscopy	200.7(1)/6010(2)
FSB	Antimony	Furnace Atomic Absorption	204.2(1)/7041(2)
FAS	Arsenic	Furnace Atomic Absorption	206.2(1)/7060(2)
FCD	Cadmium	Furnace Atomic Absorption	213.2(1)/7131(2)
FPB	Lead	Furnace Atomic Absorption	239.2(1)/7421(2)
FSE	Selenium	Furnace Atomic Absorption	270.2(1)/7740(2)
FAG	Silver	Furnace Atomic Absorption	272.2(1)/7761(2)
FTL	Thallium	Furnace Atomic Absorption	279.2(1)/7841(2)
CVHG	Mercury	Cold Vapor Atomic	245.1(1)/7471(2)
CR + 6	Chromium (VI)	Colorimetric	312B(3)
IC CL	Chloride	Ion Chromatography	300.0(1)
BURCL	Chloride	Manual Titrimetric	325.3(1)
METF	Fluoride	Electrode	340.2(1)
IC SO4	Sulfate	IC	300.0(1)
SPESO4	Sulfate	Manual Turbidimetric	375.4(1)
METALK	Alkalinity, Total	Titrimetric	310.1(1)
METACK	Alkalinity, Forms	Titrimetric	403(3)
TECNOXT	Nitrate+Nitrite as N	Cd Reduction Colorimetric	353.2(1)
METPH	pH	Meter	150.1(1)/9045(2)
CELSP	Specific Conductance @ 25°C	Bridge	120.1(1)
BALTDS	Total Dissolved Solids	Gravimetric, 180°C	160.1(1)
BALTSS	Total Suspended Solids	Gravimetric, 105°C	160.2(1)
BALTS	Total Solids	Gravimetric, 105°C	160.3(1)
BALTVS	Total Volatile Solids	Gravimetric, 550°C	160.4(1)
TECO P	Ortho-Phosphate as P	Two Reagent Colorimetric	365.3(1)
TECT P	Total Phosphorus as P	Digestion-Colorimetric	365.3(1)
ICP	Total Phosphorus as P	Digestion-ICP/AES	200.7(1)
ICP	Silica as SiO_2	ICP/AES	200.7(1)
SPESIO2	Silica as SiO_2	Colorimetric	370.1(1)
METBOD	Biochemical Oxygen Demand	Dilution Bottle-D.O. probe	405.1(1)
METCOD	Chemical Oxygen Demand	Micro Colorimetric	410.4(1)
TOCTOC	Total Organic Carbon	UV Oxidation-IR	415.2(1)
METNH3	Ammonia as N	Electrode	350.3(1)
TECNH3	Ammonia as N	Automated Colorimetric	350.1(1)
METTKN	Total Kjeldahl Nitrogen as N	Digestion-Electrode	351.4(1)
TECTKN	Total Kjeldahl Nitrogen as N	Digestion-Colorimetric	351.2(1)
TOXTOX	Total Organic Halogen	Combustion-Titrimetric	9020(2)
TONO1	Total Organic Nitrogen	Calculation (TKN-NH_3)	-
BAL O&G	Oil and Grease	Freon Extraction-Gravimetric	413.1(1)
IR AO&G	Oil and Grease	Freon Extraction-IR	413.2(1)
TECCN F	Cyanide Amendable to Chlorination	Chlorination-Distillation-Colorimetric	335.1(1)
TECCN W	Weak & Dissolved Cyanide	Distillation-Colorimetric	412H(3)
TECCN T	Total Cyanide	Distillation-Colorimetric	335.2(1)/9010(2)
STEPHEN	Phenolics	Distillation-Colorimetric	420.1(1)
COLIF F	Fecal Coliform	Membrane Filter	909C(3)
COLIF T	Total Coliform	Membrane Filter	909A(3)

ANALYTICAL METHODOLOGY - INORGANIC TESTS (CONT.)

Test	Description	Methodology	Reference
IC BR	Bromide	Ion Chromatography	300.0(1)
POTCL2R	Residual Chlorine	Amperometric	330.2(1)
NESCOLR	Color	Pt-Co Colorimetric	110.2(1)
ICPHAR	Hardness as $CaCo_3$	Calculation	200.7(1)/314A(3)
TECNO2	Nitrite as N	Colorimetric	354.1(1)
SPES	Sulfide	Colorimetric	376.2(1)/9030(2)
BURSO3	Sulfite	Titrimetric	377.1(1)
SPEMBAS	MBAS (Surfactants)	Colorimetric	425.1(1)
SPETURB	Turbidity	Turbidimeter	180.1(1)
Gross Alpha		Proportional Counter	703(3)
Gross Beta		Proportional Counter	703(3)
Radium 226		Separation - Counter	705(3)
Radium 228		Separation - Counter	707(3)
Uranium		Fluorimetric	D2907.75(4)

References

(1) Code of Federal Regulations, Chapter 40, Part 136 (40 CFR 136).
(2) SW-846, 2nd Edition, 1984.
(3) "Standard Methods for the Examination of Water and Wastewater", 15th Edition, 1980.
(4) "Annual Book of ASTM Standards", Part 31, Water, 1980.

ANALYTICAL METHODOLOGY - ORGANIC TESTS

Test	Description	Methodology	Reference
VOA	Volatile Organics	Purge & Trap, GC/MS	624(1)/8240(2)
BNA	Semivolatile Organics	Extraction, GC/MS	625(1)/8270(2)
DXN	Dioxin	Extraction, GC/MS	613(1)/8280(2)
601	Halogenated Volatile Organics	Purge & Trap GC/Hall	601(1)/8010(2)
THM	Trihalomethanes	Purge & Trap GC/Hall	601(1)/8010(2)
602	Aromatic Volatile Organics	Purge & Trap GC/PID	602(1)/8020(2)
OCP	Organochlorine Pesticides	Extraction, GC/ECD	608(1)/8080(2)
OPP	Organophosphate Pesticides	Extraction, GC/FPD	614(1)/8140(2)
619	Triazine Pesticides	Extraction, GC/NPD	619(1)
LC CARB	Carbamate and Urea Pesticides	Extraction, HPLC	632(1)
PCB	PCB's	Extraction, GC/ECD	608(1)/8080(2)
HRB	Phenoxyacid Herbicides	Extraction, GC/ECD	615(1)/8150(2)
603	Acrolein & Acrylonitrile	Purge & Trap GC/FID	603(1)/8030(2)
604	Phenols	Extraction, GC/FID	604(1)/8040(2)
605	Benzidines	Extraction, HPLC	605(1)/8050(2)
606	Phthalate Esters	Extraction, GC/FID	606(1)/8060(2)
607	Nitrosamines	Extraction, GC/NPD	607(1)
609	Nitroaromatics & Cyclic Ketones	Extraction, GC/NPD	609(1)/8090(2)
PNA	Polynuclear Aromatic Hydrocarbons	Extraction, HPLC	610(1)/8310(2)
611	Haloethers	Extraction, GC/ECD	611(1)
612	Chlorinated Hydrocarbons	Extraction, GC/ECD	612(1)/8120(2)
GD FID	Hydrocarbon Scan	Extraction, GC/FID	D3328-78(3)
GC BPD	Boiling Point Determination	Extraction, GC/FID	D2887-84(4)

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(1) Code of Federal Regulations, Chapter 40, Part 136 (40 CFR 136).
(2) SW-846, 2nd Edition, 1984.
(3) "Annual Book of ASTM Standards", Volume 11.01, 1985.
(4) "Annual Book of ASTM Standards", Volume 05.02, 1984.

Rocky Mountain
Analytical Laboratory

Enseco Incorporated

Enseco

December 17, 1987

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

Dear Pete:

Enclosed is a summary of the method we are currently using to analyze for Organic Lead. It is based on a method from Analytical Chemistry which I have also included.

Please call if you have any questions.

Sincerely,

Jeannie B. Howbert

Jeannie B. Howbert
Project Coordinator

JBH/brm
Enclosures

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

ORGANIC LEAD METHOD SUMMARY

1. Prepare a 100 mL aliquot of sample for Total Lead by Method 3020.

2. Aliquot a second 100 mL sample and pour into a separatory funnel. Add 10 mL benzene, shake by hand for 2 minutes and remove the benzene.

3. Repeat Step 2 using the same sample aliquot with another 10 mL benzene.

4. Place the rinsed sample in a beaker and prepare by Method 3020 for Inorganic Lead.

5. Analyze the Total Lead and Inorganic Lead digests by Graphite Furnace AA.

6. Calculate the Total Organic Lead by subtracting the Inorganic Lead from the Total Lead result.

30 Aug 85

Determination of Tetraalkyllead Compounds in Water, Sediment, and Fish Samples

Y. K. Chau,* P. T. S. Wong, G. A. Bengert, and O. Kramar

Canada Centre for Inland Waters, Burlington, Ontario L7R 4A6, Canada

A simple and rapid extraction procedure to extract five tetraalkyllead compounds (Me_4Pb, Me_3EtPb, Me_2Et_2Pb, $MeEt_3Pb$, and Et_4Pb) from water, sediment, and fish samples is described. The extracted compounds are analyzed in their authentic forms by a gas chromatographic–atomic adsorption spectrometry system. Other forms of inorganic and organic lead do not interfere. The detection limits for water (200 mL), sediment (5 g), and fish (2 g) are 0.50 μg/L, 0.01 μg/g, and 0.025 μg/g, respectively. The methods were developed to investigate the occurrence of these compounds in environmental samples. Experiments have established that tetramethyllead can be accumulated by fish and remains in its authentic form for some time.

Organolead compounds are generally more toxic than inorganic lead compounds (*1*) and the toxicity of the alkylated lead compounds varies with the degree of alkylation, with tetraalkyllead being the most toxic (*2*). Recently several research laboratories (*3–6*) have reported the biological methylation of inorganic and organic lead compounds in the aquatic environment by microorganisms. Subsequently, methods are being developed to detect the occurrence of these compounds in water, sediment, and biological samples. Tetraalkyllead in fish samples has been determined by solvent extraction, followed by digestion of the extract and atomic absorption measurement of the total lead (*7*). The procedure is based primarily on the assumption that only tetraalkyllead compounds are extracted from fish tissues. It suffers from the interferences of other organolead compounds co-extracted in the solvent, and the lack of specific differentiation of the alkyl groups. Another procedure (*8*) employs vacuum extraction of the tetraalkyllead into a cold trap under liquid nitrogen, followed by solvent extraction of the condensate for gas chromatographic determination. In both methods, tetraalkyllead compounds have been found in fish and mussels. Fairly high concentration of tetraethyllead (30 ppm) was detected in mussels collected at a buoy near the S.S. Cavtat incident where a shipload of tetraethyllead was sunk (*9*) in the Adriatic Sea. High organolead concentrations, mainly of tetraethyllead, were also found in mussels in other parts of Italian seas. The presence of tetraethyllead in aquatic organisms may indicate that the alkyllead compounds are not immediately metabolized by living organisms and may remain in their authentic forms in the living tissues for a long time (*8*). The occurrence of tetraalkyllead compounds in aquatic biota is highly significant because of the possibility of their incorporation into the food chain.

The present study describes techniques for separation and speciation in the determination of tetraalkyllead compounds in water, sediment, and fish samples.

EXPERIMENTAL

The gas chromatograph-atomic absorption spectrophotometer (GC-AAS) system reported elsewhere (*10*) and specific for the analysis of tetraalkyllead compounds was used without the sample trap. The extract was injected directly into the column injection port of the chromatograph. Instrumental parameters were identical as previously described. A Perkin-Elmer Electrodeless Discharge Lead Lamp was used; peak areas were integrated with an Autolab-Minigrator (Spectra-Physics, Calif.).

Tetramethyllead, 80% in toluene, and tetraethyllead, 99%, were obtained from Alfa Chemicals (Beverly, Mass.). The mixed lead alkyls, Me_3EtPb, Me_2Et_2Pb, $MeEt_3Pb$, were provided by the Ethyl Corporation, Ferndale, Mich. The purity of these compounds was assessed by gas chromatography and standardization was done by atomic absorption determination of the lead content as described in a previous study (*11*). High purity hexane was used for all extractions. EDTA 0.1 M was prepared by dissolving 37 g $Na_2EDTA{\cdot}2H_2O$ in 1 L of distilled water.

Procedures. *Water Analysis.* Place 200 mL of lake water and 5 mL of hexane in a 250-mL separatory funnel. Shake rigorously for 30 min in a reciprocating shaker. Let stand for about 20 min for phase separation. Drain off approximately 195 mL of the water and transfer the remaining mixture into a 25-mL tube with a Teflon-lined cap. Without separating the phases, inject a suitable aliquot, 5–10 μL of the hexane, to the GC-AAS system.

Sediment Analysis. Place 5 g of wet sediment, 5 mL of EDTA reagent, and 5 mL of hexane in a 25-mL test tube with a Teflon-lined screw cap. Shake rigorously in a reciprocating shaker for 2 h. Centrifuge the sample for 10 min at 2000 × g. Inject a suitable aliquot, 5–10 μL, of the hexane extract to the GC-AAS system.

Fish Analysis. Homogenize fish tissue in a Hobart grinder and a Polytron homogenizer. Place 2 g of the fish homogenated with 5 mL of EDTA reagent and 5 mL of hexane in a 25-mL test tube with a Teflon-lined screw cap. Shake rigorously for 2 h in a reciprocating shaker. Centrifuge to facilitate phase separation. Carefully withdraw a suitable aliquot, 5–10 μL, of the hexane phase and inject to the GC-AAS system.

Calibration. Add a known amount of standard tetramethyllead, 5 μg, to the hexane layer after injection of the sample. Mix gently, centrifuge again if necessary. Inject into the instrument the same volume as used in sample analysis. The increase in peak area due to the standard added is used to calculate the amount of tetraalkyllead in the sample. It is not necessary to separate the phases or to know the volume of hexane after extraction.

The calibration curves for each of the five tetraalkyllead compounds expressed as Pb were identical and linear up to at least 200 ng above which overlapping of peaks occurred. If only one compound was present (e.g., tetramethyllead), the curve was linear up to at least 2000 ng.

RESULTS AND DISCUSSION

Extraction of Tetraalkyllead Compounds. As the authenticity of the compounds to be analyzed must be preserved, any of the digestion methods with acids or alkalis are not suitable. Solvent extraction seems to be the method of choice for removing these compounds from samples. Benzene has been used to extract tetramethyllead and tetraethyllead from fish homogenates suspended in aqueous EDTA solution (*7*). Quantitative recoveries for both compounds were reported. Ionic forms of lead such as Pb(II), diethyllead dichloride, and trimethyllead acetate were not extracted in the benzene phase. However, the possibility of extraction of other non-ionic forms of organolead into the benzene phase was not extensively investigated by these workers. Their method, therefore, determines any lead compounds that distribute into the benzene phase as tet-

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Table I. Extraction of Tetraalkyllead Compounds from Fish Tissue by Different Solvents[a]

solvent	averaged recovery, %
hexane	80.0
cyclohexane	54.0
octanol	90.0
butyl acetate	55.0
methylisobutyl ketone	30.0
chloroform	57.0
benzene	78.0

[a] Fish homogenate 2 g; EDTA, 5 mL; solvent, 5 mL.

raalkyllead. It has been found in this laboratory that there are other forms of organolead compounds extracted into the organic phase but they were not volatile enough to be analyzed by the GC-AAS techniques. A speciation-specific detection system is therefore necessary for the analysis of tetraalkyllead compounds.

Experiments were carried out to investigate the optimum solvent system for extraction. Fish homogenate, 2 g, spiked with approximately 10 μg each of the five tetraalkyllead compounds, Me_4Pb, Me_3EtPb, Me_2Et_2Pb, $MeEt_3Pb$, Et_4Pb, was suspended in 5 mL of EDTA reagent and extracted with 5 mL of each of the following solvents: hexane, cyclohexane, octanol, butyl acetate, methylisobutyl ketone, chloroform, or benzene. Hexane, benzene, and octanol gave the most satisfactory recovery of the tetraalkyllead compounds (Table I). There were only traces of tetraalkyllead compounds recovered in a second extraction which did not contribute significantly to the overall recovery. Such practice was therefore not considered necessary. Hexane was considered more suitable for extraction and for gas chromatographic analysis because of its relative insolubility, lower boiling point, and lower viscosity. Benzene produced an emulsified layer between the phases which may affect the distribution of the lead compounds in the organic extract. The resultant extract of octanol was too viscous to be suitable for gas chromatographic injection.

The use of tetramethylammonium hydroxide (*12*) to dissolve fish tissue prior to solvent extraction was also investigated. It was found that the resultant solution was a thick gel and the organic layer after extraction became very viscous. Its use was not investigated further.

The use of EDTA in the extraction served to disperse the sediment and fish homogenate in a suspension to provide better extraction and to produce a clarified organic phase and cleaner boundary between the aqueous and organic phases. It has no effect on the recovery of the tetraalkyllead compounds.

Calibration of the Method. When an extraction procedure is used to remove certain compounds from a sample, the solvent after extraction must either be separated and adjusted to its original volume, or its volume must be known in order to calculate the quantity of the analytes contained in the original sample. Unfortunately, in spite of the relative insolubility of hexane, the volume after extraction still varies and depends on the components in the sample. In addition, with biological samples, quantitative phase separation after extraction often presents difficulties. In the method presented here, phase separation after extraction is avoided through use of the standard addition method. After injection of an aliquot of the extract, a known amount of a standard (volume less than 50 μL) is added to the hexane phase. The same aliquot of extract is withdrawn for analysis. The increase in peak area represents the amount of standard in the extract and is used to calculate the total quantity of the analyte in the original sample not requiring knowing the volume of the extract.

Recovery of Tetraalkyllead Compounds from Environmental Samples. The recoveries of the alkyllead compounds from lake water, sediment, and fish samples were evaluated by adding a mixture of five tetraalkyllead compounds to respectively 200 mL of lake water, 5 g of sediment, and 2 g of fish homogenate. The spiked samples were equilibrated for approximately 1 h and processed as described in the procedures.

The recoveries of five tetraalkyllead compounds added to environmental samples are summarized in Table II. For water, the recoveries averaged about 89%. Addition of 5 g of sodium chloride to the water sample for "salting out" effect did not improve recovery to any significant extent. Sediment is a much more complex matrix and the recoveries of the five compounds ranged 81–85% at the concentration level of 2–3 ppm. The sediment used in this experiment was taken from Hamilton Harbor, Ontario, and was fine and silty, and high in organic matter. It is not known whether the loss of spiked compounds is due to adsorption or interactions with some components of the sediment.

There are several limitations in the evaluation of recovery of lead alkyls from fish tissues. It is difficult to assure that the spiked compounds are completely incorporated into the fish tissues. Another difficulty arises from the nonhomogeneous distribution of lipid and protein in different organs and tissues which exhibit variation in solubilization of the lead alkyl compounds. For accurate calculations of the concentration of these compounds in fish, assessment of extraction efficiency from a batch of similar samples should be made by adding a known amount of a standard to a separate aliquot of fish sample and analyzing in parallel with the other samples.

The recovery of the five alkylated lead from fish tissue averaged 74%. The reproducibility of the procedure was evaluated by analyzing 11 replicates of a fish homogenate, 1 g, each spiked with 5 μg of tetramethyllead. The coefficient of variation was 7.3%.

The detection limits based on the given procedures are 0.50 μg/L, 0.01 μg/g and 0.025 μg/g, respectively, for water, sediment, and fish.

Treatment and Storage of Samples. Tetraalkyllead compounds have high vapor pressures and are not stable in water. It is observed that water containing 4.2 μg/L Me_4Pb decreased to 2.8 and 3.9 μg/L when stored respectively at room temperature and at 4 °C overnight. For this reason, water samples should not be filtered by suction but should be extracted with hexane immediately after collection. It was

Table II. Recovery of Tetraalkyllead Compounds from Water, Sediment and Fish Samples[a]

		water		sediment		fish	
compound	added, μg	found, μg	recovery, %	found, μg	recovery, %	found, μg	recovery, %
Me_4Pb	10.00	8.78	87.8 ± 3	8.27	82.7 ± 9	7.22	72.2 ± 8
Me_3EtPb	13.15	11.80	89.7 ± 4	10.65	81.0 ± 5	9.15	72.3 ± 5
Me_2Et_2Pb	14.30	12.50	87.4 ± 3	11.68	81.0 ± 7	10.26	76.2 ± 5
$MeEt_3Pb$	10.15	9.08	89.5 ± 4	8.32	82.0 ± 2	7.22	75.2 ± 9
Et_4Pb	14.20	12.82	90.3 ± 7	12.09	85.2 ± 6	10.69	75.3 ± 8
		average	88.9 ± 7		83.7 ± 9		74.2 ± 9

[a] Four determinations for each sample.

Table III. Accumulation of Tetramethyllead in Rainbow Trout

exposure, day	wt. of fish, g	fish, alive or dead	concn of Me_4Pb in water averaged, μg/L	concn of Me_4Pb in fish, μg/g wet wt.	concn factors[a]
1	0.1211	dead	3.46	0.43	124
2	0.3661	dead		1.08	312
	0.7982	dead		2.00	578
3	0.4116	dead		1.32	382
	0.6300	dead		2.09	604
7	1.3045	alive		2.94	850
	1.5466	alive		3.23	934
	0.8100	alive		2.25	650
	0.4926	alive		1.73	500

[a] Concentration factor = Concentration of Me_4Pb in fish/concentration of Me_4Pb in water.

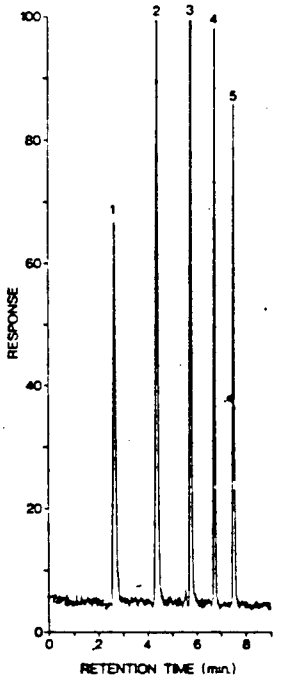

Figure 1. Recorder tracings of five tetraalkyllead compounds analyzed by the GC-AAS system. Each peak represents approximately 5 ng of the compound expressed as Pb. (1) Me_4Pb, (2) $MeEt_3Pb$, (3) Me_2Et_2Pb, (4) Me_3EtPb, (5) Et_4Pb

found convenient to add 5-mL hexane to the water sample (200 mL) and to shake the mixture briefly for 5 min. The sample can then be stored for at least up to one week for further process in the laboratory.

Similar practice is recommended for sediment samples. After collection, the sediment is weighed (5 g) and shaken with 5 mL of EDTA and 5 mL hexane for 5 min in a 25-mL stoppered tube. The treated samples can be stored for at least up to one week for further analysis.

Fish samples should be frozen immediately after collection. Extraction should be carried out immediately after homogenization.

Environmental Samples. Experiments were carried out to establish that tetramethyllead can be taken up by fish and can be recovered with hexane in its authentic form. Rainbow trout after exposure to water containing 3.5 μg/L Me_4Pb for different periods of time were found to contain tetramethyllead, see Table III. Preliminary results show that this compound was mainly concentrated in the lipid layer of the tissues.

Many environmental samples, including water, sediment, and fish from high lead areas, have been examined for the presence of tetraalkyllead compounds. Of some 50 fish samples analyzed, only one sample (Ganaraska River, Ontario) so far was found to contain detectable amounts (0.26 μg/g) of Me_4Pb in the fillet. Since there is no known tetraalkyllead industry and tetramethyllead is not used in gasoline in this area, the source of Me_4Pb is not yet known. The possibility that Me_4Pb comes from in-vivo lead methylation in the sediment or in the fish cannot be totally disregarded. Analysis of more environmental samples for the occurrence of these compounds is now underway. Figure 1 illustrates the recording tracings of the tetraalkyllead compounds analyzed by the GC-AAS system operated according to the parameters described in a previous study (*10*).

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Try 0, 1, 5, 10, 50, 100 ppb Pb stds.

$\left(X \text{ mLs} \times \frac{500 \text{ ng}}{\text{mL}} \times \frac{1}{100 \text{ mL}}\right) = \frac{10 \text{ ng Pb}}{\text{mL Constant}}$ $\quad X = 2 \text{ mLs}$

Dilute 10 mLs of the 10 ppm Pb to 100 mLs to yield 1 μg Pb.

(over)

GUIDELINES FOR SAMPLE BOTTLES AND PRESERVATIVES

D = DISSOLVED (FILTERED) T = TOTAL (UNFILTERED)

Number	Parameters	Container	Preservatives
1D	Cl, Cl_2, F, Tot. Alk., CO_3 Alk., HCO_3 Alk., OH Alk., pH, Sp. Cond., TDS, Ortho-PO_4, SiO_2, Br, Cr+6, NO_2, SO_3, MBAS, Color, SO_4, Ion Balance	500 mL poly	4°C
1T	pH, TSS, TS, TVS, BOD, Residual Cl_2, Turbidity, MBAS	500 mL poly	4°C
2	Tot. P, COD, TOC, NH_3, TKN, TON Phenolics, NO_3+NO_2, Ion Balance	16 oz. glass	2 mL 50% Sul. Acid, 4°
3	Oil & Grease	1 L glass	4 mL 50% Sul. Acid, 4°
4T	Metals in wastewater, Hardness	500 mL poly	5 mL 50% Nitric Acid
4D	Metals in groundwater, Ion Balance, Hardness	500 mL poly	5 mL 50% Nitric Acid
5	Alpha, Beta, Ra226, Ra228, U	1 L poly (no Ra228) 1/2 gal. poly (with Ra228)	10 mL 50% Nitric Acid 20 mL 50% Nitric Acid
6	Free CN, Total CN	500 mL poly	2 mL 50% NaOH, 4°C
7	Sulfide	250 mL poly	1 mL 1N zinc acetate 1 mL 50% NaOH, 4°C
8	Fecal or Total Coliform	4 1/2 oz. Sterile poly	4°C
10	THM	Three 40 mL glass vials	100 uL Sodium thiosulfate, 4°C
11	VOA, Purgeable Organics (may use Bottle #33)	Three 40 mL glass vials	4°C
12	Base Neutral/Acid Compounds	Two 1 L glass	4°C
13	Pesticides/PCBs	Two 1 L glass	4°C
14	Herbicides	1 L glass	4°C
15	TOX	1 L glass-quad 8 oz. glass-single	4°C
21	Bulk Water Analysis	1/2	4°C
	Wastes, Sludges, Soils	16 oz. widemouth glass jar	4°C
31	Wastes, Sludges, Soils	32 oz. widemouth glass jar	4°C
32	Soils for Metals, Inorganics	4 oz. widemouth plastic	4°C
33	VOA in Soils, Sludges	7 oz. glass jar	4°C
34	Soils for Metals, Inorganics	16 oz. widemouth plastic	4°C

INSTRUCTIONS

Safety:

BE CAREFUL! Preservatives are highly corrosive. Do not wash bottles. To avoid contamination, do not mix contents of bottles or interchange caps.

Filtering:

Groundwaters
Filter for the following bottles: 1, 2, 4, 5, 6, 7, 15

Surface Waters and Industrial Waste Waters
DO NOT FILTER unless Dissolved Parameters are specifically requested.

Bulk Water
RMAL will filter and preserve if requested.

Bottle Codes:

T=Total (unfiltered). D=Dissolved (filtered).

Notes:

1) Use a separate sample label for each individual bottle.

2) Do not use dry ice for preservative. Place ice in plastic bag provided or use Blue-Ice packs.

3) Fill #11 bottles (vials) completely. Leave no air bubbles. To check, turn upside down. Label each vial.

4) Samples must arrive at the lab within 24 hours of sampling for the following parameters:

Total Coliform
Fecal Coliform
pH
Specific Conductivity
Hexavalent Chromium
Residual Chlorine
Sulfite
BOD
Color
MBAS
Nitrate
Nitrite
Ortho-Phosphate
Turbidity

Rocky Mountain
Analytical Laboratory

Enseco Incorporated

Enseco

ANALYTICAL RESULTS

FOR

DAMES AND MOORE

DECEMBER 23, 1987

Reviewed by: Jeanne B. Howbert
Jeanne B. Howbert

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303/421-6611

Facsimile: 303/431-7171

I. OVERVIEW

Between November 21 and 27, 1987, Enseco-Rocky Mountain Analytical Laboratory received 11 samples from Dames and Moore.

The #1 bottle for sample MW-10 contained a considerable amount of solids. The total alkalinity result shown in the report was analyzed using the unfiltered sample; however, for the ion balance, a filtered aliquot was used. Copies of the ion balance calculations are included.

SAMPLE DESCRIPTION INFORMATION

for

DAMES AND MOORE

RMAL Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
65039-001	R. BALL WELL	Water	11/20/87	11/21/87
65039-002	MW-9	Water	11/23/87	11/24/87
65039-003	V-MURRAY	Water	11/23/87	11/24/87
65039-004	EQUIP BLK	Water	11/23/87	11/24/87
65039-005	MW-10	Water	11/23/87	11/24/87
65039-006	MW-8	Water	11/23/87	11/24/87
65039-007	TRIP BLANK	Water	11/23/87	11/24/87
65039-008	MW-12	Water	11/27/87	11/28/87
65039-009	W-3	Water	11/27/87	11/27/87
65039-010	STAINLESS WELL POINT	Water	11/27/87	11/27/87
65039-011	COMP. MW-11,12	Solid	11/27/87	11/27/87

IV. ANALYTICAL RESULTS

The analytical results for this project are presented in the following data tables. The results are presented by sample, by test, with tests reported in the following order: GC/MS, Chromatography, Metals and Inorganics.

Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed. The authorization data is the date when the project was defined by the client such that laboratory work could begin.

Data sheets contain a listing of the parameters measured in each test, the analytical results 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. All data is "blank corrected", i.e. the level of contamination, if any, found in the laboratory blank is subtracted from the analytical result before it is reported.

In addition, surrogate recovery data is presented for all GC/MS analyses. The surrogate recovery is an indication of the affect of the sample matrix on the performance of the method. The results from the Standard Enseco QA/QC Program, which generates data which are independent of matrix effects, is given in Section V.

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: W-3

Laboratory ID: 65039-009 Enseco ID: 65039-009

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87 Analyzed: 12/04/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

Enseco

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: W-3

Laboratory ID: 65039-009 Enseco ID: 65039-009

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87 Analyzed: 12/04/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	1.3	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	2.6	ug/L	0.50
o & p-Xylene(s)	3.2	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: STAINLESS WELL POINT

Laboratory ID: 65039-010 Enseco ID: 65039-010

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87 Analyzed: 11/30/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

Enseco

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: STAINLESS WELL POINT

Laboratory ID: 65039-010 Enseco ID: 65039-010

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87 Analyzed: 12/04/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	0.54	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	1.4	ug/L	0.50
o & p-Xylene(s)	0.83	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: STAINLESS WELL POINT

Laboratory ID: 65039-010 Enseco ID: 65039-010

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	364	mg/L	0.1	200.7	12/10/87
Iron	0.39	mg/L	0.05	200.7	12/10/87
Magnesium	105	mg/L	0.1	200.7	12/10/87
Potassium	24	mg/L	5	200.7	12/10/87
Sodium	666	mg/L	0.05	200.7	12/10/87
Total Organic Lead	N.D.	mg/L	0.01	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: STAINLESS WELL POINT

Laboratory ID: 65039-010 Enseco ID: 65039-010

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.89	units	0.01	150.1	11/28/87
Specific Conductance @ 25C	4300	umhos/cm	1	120.1/9050	11/28/87
Total Dissolved Solids	3700	mg/L	10	160.1	12/04/87
Fluoride	1.0	mg/L	0.1	340.2	12/03/87
Chloride	257	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	0.3	mg/L	0.2	353.2	12/07/87
Sulfate	1980	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	419	mg/L	5	310.1/403	11/28/87
Ammonia as N	0.5	mg/L	0.1	350.1	12/04/87
Total Cations	56.4	meq/L	0.1	104C	12/17/87
Total Anions	56.9	meq/L	0.3	104C	12/17/87
% Difference	0.4	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

Sample: 65039-010

METALS PARAMETERS
EPI TOXICITY METALS

Client Name: DAMES AND MOORE

Client ID: COMP. MW-11,12

Laboratory ID: 65039-011 Enseco ID: 65039-011

Matrix: Solid Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Arsenic	N.D.	mg/L	0.1	200.7	12/14/87
Barium	0.94	mg/L	0.005	200.7	12/14/87
Cadmium	N.D.	mg/L	0.005	200.7	12/14/87
Chromium	N.D.	mg/L	0.01	200.7	12/14/87
Lead	N.D.	mg/L	0.05	200.7	12/14/87
Mercury	N.D.	mg/L	0.001	245.1	12/09/87
Selenium	N.D.	mg/L	0.02	7740	12/14/87
Silver	N.D.	mg/L	0.005	200.7	12/14/87

N.D. = Not detected

Approved by: Will Pratt

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: COMP. MW-11,12

Laboratory ID: 65039-011 Enseco ID: 65039-011

Matrix: Solid Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87

Parameter	Result	Units (as received)	Reporting Limit	Analytical Method	Analyzed
Reactive Sulfide	N.D.	mg/kg	0.5	EPA/OSW	12/03/87
Reactive Cyanide	N.D.	mg/kg	0.1	EPA/OSW	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: R. BALL WELL

Laboratory ID: 65039-001 Enseco ID: 65039-001

Matrix: Water Sampled: 11/20/87 Received: 11/21/87

Authorized: 11/21/87 Analyzed: 11/30/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: R. BALL WELL

Laboratory ID: 65039-001 Enseco ID: 65039-001

Matrix: Water Sampled: 11/20/87 Received: 11/21/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	0.89	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: R. BALL WELL

Laboratory ID: 65039-001 Enseco ID: 65039-001

Matrix: Water Sampled: 11/20/87 Received: 11/21/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	25	mg/L	0.2	200.7	12/08/87
Iron	N.D.	mg/L	0.1	200.7	12/08/87
Magnesium	3.8	mg/L	0.2	200.7	12/08/87
Potassium	N.D.	mg/L	10	200.7	12/08/87
Sodium	1020	mg/L	0.1	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 65039-001

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: R. BALL WELL

Laboratory ID: 65039-001 Enseco ID: 65039-001

Matrix: Water Sampled: 11/20/87 Received: 11/21/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	8.38	units	0.01	150.1	11/21/87
Specific Conductance @ 25C	4520	umhos/cm	1	120.1/9050	11/21/87
Total Dissolved Solids	2300	mg/L	10	160.1	11/23/87
Fluoride	1.0	mg/L	0.1	340.2	11/25/87
Chloride	1170	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	433	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	221	mg/L	5	310.1/403	11/21/87
Ammonia as N	0.3	mg/L	0.1	350.1	12/01/87
Total Cations	46.0	meq/L	0.1	104C	12/17/87
Total Anions	46.5	meq/L	0.3	104C	12/17/87
% Difference	0.5	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-9

Laboratory ID: 65039-002 Enseco ID: 65039-002

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Bromoform	N.D.	ug/L	5.0
Carbon tetrachloride	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	2.0
Chloroethane	N.D.	ug/L	5.0
Chloroform	N.D.	ug/L	0.50
Dibromochloromethane	N.D.	ug/L	1.0
Bromodichloromethane	N.D.	ug/L	1.0
1,1-Dichloroethane	N.D.	ug/L	0.50
1,2-Dichloroethane	8.3	ug/L	1.0
1,1-Dichloroethene	N.D.	ug/L	0.50
1,2-Dichloropropane	N.D.	ug/L	1.0
cis-1,3-Dichloropropene	N.D.	ug/L	2.0
trans-1,3-Dichloropropene	N.D.	ug/L	0.50
Bromomethane	N.D.	ug/L	5.0
Chloromethane	N.D.	ug/L	5.0
Methylene chloride	N.D.	ug/L	5.0
1,1,2,2-Tetrachloroethane	N.D.	ug/L	1.0
Tetrachloroethene	N.D.	ug/L	0.50
trans-1,2-Dichloroethene	N.D.	ug/L	0.50
1,1,1-Trichloroethane	N.D.	ug/L	0.50
1,1,2-Trichloroethane	N.D.	ug/L	1.0
Trichloroethene	N.D.	ug/L	1.0
Vinyl chloride	N.D.	ug/L	1.0
1,1,2-Trichloro-2,2,1-trifluoroethane	N.D.	ug/L	1.0
1,2-Dibromoethane (EDB)	N.D.	ug/L	2.0

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-9

Laboratory ID: 65039-002 Enseco ID: 65039-002

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-9

Laboratory ID: 65039-002 Enseco ID: 65039-002

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	324	mg/L	0.1	200.7	12/08/87
Iron	N.D.	mg/L	0.05	200.7	12/08/87
Magnesium	29	mg/L	0.1	200.7	12/08/87
Potassium	N.D.	mg/L	5	200.7	12/08/87
Sodium	146	mg/L	0.05	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.01	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-9

Laboratory ID: 65039-002 Enseco ID: 65039-002

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.59	units	0.01	150.1	11/24/87
Specific Conductance @ 25C	1850	umhos/cm	1	120.1/9050	11/24/87
Total Dissolved Solids	1520	mg/L	10	160.1	11/29/87
Fluoride	1.0	mg/L	0.1	340.2	12/03/87
Chloride	43	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	863	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	372	mg/L	5	310.1/403	11/24/87
Ammonia as N	N.D.	mg/L	0.1	350.1	12/01/87
Total Cations	24.9	meq/L	0.1	104C	12/17/87
Total Anions	26.7	meq/L	0.3	104C	12/17/87
% Difference	3.4	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: V-MURRAY

Laboratory ID: 65039-003 Enseco ID: 65039-003

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: V-MURRAY

Laboratory ID: 65039-003 Enseco ID: 65039-003

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	1.0	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: V-MURRAY

Laboratory ID: 65039-003 Enseco ID: 65039-003

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	42	mg/L	0.1	200.7	12/08/87
Iron	0.31	mg/L	0.05	200.7	12/08/87
Magnesium	28	mg/L	0.1	200.7	12/08/87
Potassium	13	mg/L	5	200.7	12/08/87
Sodium	147	mg/L	0.05	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.01	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: V-MURRAY

Laboratory ID: 65039-003 Enseco ID: 65039-003

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	8.24	units	0.01	150.1	11/24/87
Specific Conductance @ 25C	895	umhos/cm	1	120.1/9050	11/24/87
Total Dissolved Solids	600	mg/L	10	160.1	11/29/87
Fluoride	0.4	mg/L	0.1	340.2	12/03/87
Chloride	43	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	114	mg/L	5	300.0	12/17/87
Total Alkalinity as CaCO3	368	mg/L	5	310.1/403	11/24/87
Ammonia as N	0.9	mg/L	0.1	350.1	12/01/87
Total Cations	11.2	meq/L	0.1	104C	12/17/87
Total Anions	11.0	meq/L	0.3	104C	12/17/87
% Difference	1.1	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: EQUIP BLK

Laboratory ID: 65039-004 Enseco ID: 65039-004

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

Enseco

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: EQUIP BLK

Laboratory ID: 65039-004 Enseco ID: 65039-004

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: EQUIP BLK

Laboratory ID: 65039-004 Enseco ID: 65039-004

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	5.5	mg/L	0.1	200.7	12/08/87
Iron	N.D.	mg/L	0.05	200.7	12/08/87
Magnesium	0.5	mg/L	0.1	200.7	12/08/87
Potassium	N.D.	mg/L	5	200.7	12/08/87
Sodium	2.5	mg/L	0.05	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: EQUIP BLK

Laboratory ID: 65039-004 Enseco ID: 65039-004

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	5.17	units	0.01	150.1	11/24/87
Specific Conductance @ 25C	2	umhos/cm	1	120.1/9050	11/24/87
Total Dissolved Solids	N.D.	mg/L	10	160.1	11/29/87
Fluoride	N.D.	mg/L	0.1	340.2	12/03/87
Chloride	N.D.	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	N.D.	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/24/87
Ammonia as N	N.D.	mg/L	0.1	350.1	12/01/87
Total Cations	0.4	meq/L	0.1	104C	12/17/87
Total Anions	N.D.	meq/L	0.3	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-10

Laboratory ID: 65039-005 Enseco ID: 65039-005

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Bromoform	N.D.	ug/L	5.0
Carbon tetrachloride	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	2.0
Chloroethane	N.D.	ug/L	5.0
Chloroform	N.D.	ug/L	0.50
Dibromochloromethane	N.D.	ug/L	1.0
Bromodichloromethane	N.D.	ug/L	1.0
1,1-Dichloroethane	N.D.	ug/L	0.50
1,2-Dichloroethane	3.2	ug/L	1.0
1,1-Dichloroethene	N.D.	ug/L	0.50
1,2-Dichloropropane	N.D.	ug/L	1.0
cis-1,3-Dichloropropene	N.D.	ug/L	2.0
trans-1,3-Dichloropropene	N.D.	ug/L	0.50
Bromomethane	N.D.	ug/L	5.0
Chloromethane	N.D.	ug/L	5.0
Methylene chloride	N.D.	ug/L	5.0
1,1,2,2-Tetrachloroethane	N.D.	ug/L	1.0
Tetrachloroethene	N.D.	ug/L	0.50
trans-1,2-Dichloroethene	N.D.	ug/L	0.50
1,1,1-Trichloroethane	N.D.	ug/L	0.50
1,1,2-Trichloroethane	N.D.	ug/L	1.0
Trichloroethene	N.D.	ug/L	1.0
Vinyl chloride	N.D.	ug/L	1.0
1,1,2-Trichloro-2,2,1-trifluoroethane	N.D.	ug/L	1.0
1,2-Dibromoethane (EDB)	N.D.	ug/L	2.0

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-10

Laboratory ID: 65039-005 Enseco ID: 65039-005

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-10

Laboratory ID: 65039-005 Enseco ID: 65039-005

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	126	mg/L	0.1	200.7	12/08/87
Iron	N.D.	mg/L	0.05	200.7	12/08/87
Magnesium	22	mg/L	0.1	200.7	12/08/87
Potassium	N.D.	mg/L	5	200.7	12/08/87
Sodium	250	mg/L	0.05	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-10

Laboratory ID: 65039-005 Enseco ID: 65039-005

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.74	units	0.01	150.1	11/24/87
Specific Conductance @ 25C	1640	umhos/cm	1	120.1/9050	11/24/87
Total Dissolved Solids	1240	mg/L	10	160.1	11/29/87
Fluoride	0.8	mg/L	0.1	340.2	12/03/87
Chloride	46	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	568	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	669	mg/L	5	310.1/403	11/24/87
Ammonia as N	N.D.	mg/L	0.1	350.1	12/01/87
Total Cations	19.0	meq/L	0.1	104C	12/17/87
Total Anions	18.3	meq/L	0.3	104C	12/17/87
% Difference	1.9	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

Enseco

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-8

Laboratory ID: 65039-006 Enseco ID: 65039-006

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

Enseco

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-8

Laboratory ID: 65039-006 Enseco ID: 65039-006

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-8

Laboratory ID: 65039-006 Enseco ID: 65039-006

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	159	mg/L	0.1	200.7	12/08/87
Iron	N.D.	mg/L	0.05	200.7	12/08/87
Magnesium	21	mg/L	0.1	200.7	12/08/87
Potassium	N.D.	mg/L	5	200.7	12/08/87
Sodium	166	mg/L	0.05	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-8

Laboratory ID: 65039-006 Enseco ID: 65039-006

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.52	units	0.01	150.1	11/24/87
Specific Conductance @ 25C	1500	umhos/cm	1	120.1/9050	11/24/87
Total Dissolved Solids	950	mg/L	10	160.1	11/29/87
Fluoride	0.7	mg/L	0.1	340.2	12/03/87
Chloride	67	mg/L	3	300.0	12/17/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	401	mg/L	5	300.0	12/17/87
Total Alkalinity as CaCO3	273	mg/L	5	310.1/403	11/24/87
Ammonia as N	N.D.	mg/L	0.1	350.1	12/01/87
Total Cations	16.9	meq/L	0.1	104C	12/17/87
Total Anions	15.7	meq/L	0.3	104C	12/17/87
% Difference	3.5	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: TRIP BLANK

Laboratory ID: 65039-007 Enseco ID: 65039-007

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Bromoform	N.D.	ug/L	5.0
Carbon tetrachloride	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	2.0
Chloroethane	N.D.	ug/L	5.0
Chloroform	N.D.	ug/L	0.50
Dibromochloromethane	N.D.	ug/L	1.0
Bromodichloromethane	N.D.	ug/L	1.0
1,1-Dichloroethane	N.D.	ug/L	0.50
1,2-Dichloroethane	N.D.	ug/L	1.0
1,1-Dichloroethene	N.D.	ug/L	0.50
1,2-Dichloropropane	N.D.	ug/L	1.0
cis-1,3-Dichloropropene	N.D.	ug/L	2.0
trans-1,3-Dichloropropene	N.D.	ug/L	0.50
Bromomethane	N.D.	ug/L	5.0
Chloromethane	N.D.	ug/L	5.0
Methylene chloride	11	ug/L	5.0
1,1,2,2-Tetrachloroethane	N.D.	ug/L	1.0
Tetrachloroethene	N.D.	ug/L	0.50
trans-1,2-Dichloroethene	N.D.	ug/L	0.50
1,1,1-Trichloroethane	N.D.	ug/L	0.50
1,1,2-Trichloroethane	N.D.	ug/L	1.0
Trichloroethene	N.D.	ug/L	1.0
Vinyl chloride	N.D.	ug/L	1.0
1,1,2-Trichloro-2,2,1-trifluoroethane	N.D.	ug/L	1.0
1,2-Dibromoethane (EDB)	N.D.	ug/L	2.0

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: TRIP BLANK

Laboratory ID: 65039-007 Enseco ID: 65039-007

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

HAZARDOUS SUBSTANCE LIST (HSL)
VOLATILE ORGANICS
EPA METHOD 624

Client Name: DAMES AND MOORE

Client ID: MW-12

Laboratory ID: 65039-008 Enseco ID: 65039-008

Matrix: Water Sampled: 11/27/87 Received: 11/28/87

Authorized: 11/21/87 Analyzed: 12/04/87

Parameter	Result	Units	Reporting Limit
Acetone	N.D.	ug/L	500
Benzene	19000	ug/L	100
Bromoform	N.D.	ug/L	100
Bromomethane	N.D.	ug/L	200
2-Butanone	N.D.	ug/L	500
Carbon disulfide	N.D.	ug/L	100
Carbon tetrachloride	N.D.	ug/L	100
Chlorobenzene	N.D.	ug/L	100
Dibromochloromethane	N.D.	ug/L	100
Chloroethane	N.D.	ug/L	200
2-Chloroethyl vinyl ether	N.D.	ug/L	200
Chloroform	N.D.	ug/L	100
Chloromethane	N.D.	ug/L	200
Bromodichloromethane	N.D.	ug/L	100
1,1-Dichloroethane	N.D.	ug/L	100
1,2-Dichloroethane	450	ug/L	100
1,1-Dichloroethene	N.D.	ug/L	100
1,2-Dichloropropane	N.D.	ug/L	100
cis-1,3-Dichloropropene	N.D.	ug/L	100
trans-1,3-Dichloropropene	N.D.	ug/L	100
Ethylbenzene	1300	ug/L	100
2-Hexanone	N.D.	ug/L	200
Methylene chloride	N.D.	ug/L	500
4-Methyl-2-pentanone	N.D.	ug/L	200
Styrene	N.D.	ug/L	100
1,1,2,2-Tetrachloroethane	N.D.	ug/L	100
Tetrachloroethene	N.D.	ug/L	100
Toluene	2000	ug/L	100
trans-1,2-Dichloroethene	N.D.	ug/L	100
1,1,1-Trichloroethane	N.D.	ug/L	100
1,1,2-Trichloroethane	N.D.	ug/L	100

N.D. = Not detected

HAZARDOUS SUBSTANCE LIST (HSL)
VOLATILE ORGANICS (CONT.)
EPA METHOD 624

Client Name: DAMES AND MOORE

Client ID: MW-12

Laboratory ID: 65039-008 Enseco ID: 65039-008

Matrix: Water Sampled: 11/27/87 Received: 11/28/87

Authorized: 11/21/87 Analyzed: 12/04/87

Parameter	Result	Units	Reporting Limit
Trichloroethene	N.D.	ug/L	100
Vinyl acetate	N.D.	ug/L	200
Vinyl chloride	N.D.	ug/L	200
Total Xylenes	3000	ug/L	100
Surrogate			
Toluene-D8	99	%	-
Bromofluorobenzene(BFB)	100	%	-
1,2-Dichloroethane-D4	98	%	-

N.D. = Not detected

Reported by: Jenifer Tavernier Approved by: Jeffrey Lowry

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-12

Laboratory ID: 65039-008 Enseco ID: 65039-008

Matrix: Water Sampled: 11/27/87 Received: 11/28/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	148	mg/L	0.1	200.7	12/10/87
Iron	0.13	mg/L	0.05	200.7	12/10/87
Magnesium	42	mg/L	0.1	200.7	12/10/87
Potassium	N.D.	mg/L	5	200.7	12/10/87
Sodium	222	mg/L	0.05	200.7	12/10/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-12

Laboratory ID: 65039-008 Enseco ID: 65039-008

Matrix: Water Sampled: 11/27/87 Received: 11/28/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	6.99	units	0.01	150.1	11/28/87
Specific Conductance @ 25C	1930	umhos/cm	1	120.1/9050	11/28/87
Total Dissolved Solids	1200	mg/L	10	160.1	12/04/87
Fluoride	0.3	mg/L	0.1	340.2	12/03/87
Chloride	321	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/07/87
Sulfate	16	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	508	mg/L	5	310.1/403	11/28/87
Ammonia as N	N.D.	mg/L	0.1	350.1	12/04/87
Total Cations	20.5	meq/L	0.1	104C	12/17/87
Total Anions	19.6	meq/L	0.3	104C	12/17/87
% Difference	2.4	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-12

Laboratory ID: 65039-008 Enseco ID: 65039-008

Matrix: Water Sampled: 11/27/87 Received: 11/28/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	6.99	units	0.01	150.1	11/28/87
Specific Conductance @ 25C	1930	umhos/cm	1	120.1/9050	11/28/87
Total Dissolved Solids	1200	mg/L	10	160.1	12/04/87
Fluoride	0.3	mg/L	0.1	340.2	12/03/87
Chloride	321	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/07/87
Sulfate	16	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	508	mg/L	5	310.1/403	11/28/87
Ammonia as N	N.D.	mg/L	0.1	350.1	12/04/87
Total Cations	20.5	meq/L	0.1	104C	12/17/87
Total Anions	19.6	meq/L	0.3	104C	12/17/87
% Difference	2.4	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-12

Laboratory ID: 65039-008 Enseco ID: 65039-008

Matrix: Water Sampled: 11/27/87 Received: 11/28/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	148	mg/L	0.1	200.7	12/10/87
Iron	0.13	mg/L	0.05	200.7	12/10/87
Magnesium	42	mg/L	0.1	200.7	12/10/87
Potassium	N.D.	mg/L	5	200.7	12/10/87
Sodium	222	mg/L	0.05	200.7	12/10/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

HAZARDOUS SUBSTANCE LIST (HSL)
VOLATILE ORGANICS (CONT.)
EPA METHOD 624

Client Name: DAMES AND MOORE

Client ID: MW-12

Laboratory ID: 65039-008 Enseco ID: 65039-008

Matrix: Water Sampled: 11/27/87 Received: 11/28/87

Authorized: 11/21/87 Analyzed: 12/04/87

Parameter	Result	Units	Reporting Limit
Trichloroethene	N.D.	ug/L	100
Vinyl acetate	N.D.	ug/L	200
Vinyl chloride	N.D.	ug/L	200
Total Xylenes	3000	ug/L	100
Surrogate			
Toluene-D8	99	%	-
Bromofluorobenzene(BFB)	100	%	-
1,2-Dichloroethane-D4	98	%	-

N.D. = Not detected

Reported by: Jenifer Tavernier Approved by: Jeffrey Lowry

HAZARDOUS SUBSTANCE LIST (HSL)
VOLATILE ORGANICS
EPA METHOD 624

Client Name: DAMES AND MOORE

Client ID: MW-12

Laboratory ID: 65039-008 Enseco ID: 65039-008

Matrix: Water Sampled: 11/27/87 Received: 11/28/87

Authorized: 11/21/87 Analyzed: 12/04/87

Parameter	Result	Units	Reporting Limit
Acetone	N.D.	ug/L	500
Benzene	19000	ug/L	100
Bromoform	N.D.	ug/L	100
Bromomethane	N.D.	ug/L	200
2-Butanone	N.D.	ug/L	500
Carbon disulfide	N.D.	ug/L	100
Carbon tetrachloride	N.D.	ug/L	100
Chlorobenzene	N.D.	ug/L	100
Dibromochloromethane	N.D.	ug/L	100
Chloroethane	N.D.	ug/L	200
2-Chloroethyl vinyl ether	N.D.	ug/L	200
Chloroform	N.D.	ug/L	100
Chloromethane	N.D.	ug/L	200
Bromodichloromethane	N.D.	ug/L	100
1,1-Dichloroethane	N.D.	ug/L	100
1,2-Dichloroethane	450	ug/L	100
1,1-Dichloroethene	N.D.	ug/L	100
1,2-Dichloropropane	N.D.	ug/L	100
cis-1,3-Dichloropropene	N.D.	ug/L	100
trans-1,3-Dichloropropene	N.D.	ug/L	100
Ethylbenzene	1300	ug/L	100
2-Hexanone	N.D.	ug/L	200
Methylene chloride	N.D.	ug/L	500
4-Methyl-2-pentanone	N.D.	ug/L	200
Styrene	N.D.	ug/L	100
1,1,2,2-Tetrachloroethane	N.D.	ug/L	100
Tetrachloroethene	N.D.	ug/L	100
Toluene	2000	ug/L	100
trans-1,2-Dichloroethene	N.D.	ug/L	100
1,1,1-Trichloroethane	N.D.	ug/L	100
1,1,2-Trichloroethane	N.D.	ug/L	100

N.D. = Not detected

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: TRIP BLANK

Laboratory ID: 65039-007 Enseco ID: 65039-007

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

Enseco

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: TRIP BLANK

Laboratory ID: 65039-007 Enseco ID: 65039-007

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Bromoform	N.D.	ug/L	5.0
Carbon tetrachloride	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	2.0
Chloroethane	N.D.	ug/L	5.0
Chloroform	N.D.	ug/L	0.50
Dibromochloromethane	N.D.	ug/L	1.0
Bromodichloromethane	N.D.	ug/L	1.0
1,1-Dichloroethane	N.D.	ug/L	0.50
1,2-Dichloroethane	N.D.	ug/L	1.0
1,1-Dichloroethene	N.D.	ug/L	0.50
1,2-Dichloropropane	N.D.	ug/L	1.0
cis-1,3-Dichloropropene	N.D.	ug/L	2.0
trans-1,3-Dichloropropene	N.D.	ug/L	0.50
Bromomethane	N.D.	ug/L	5.0
Chloromethane	N.D.	ug/L	5.0
Methylene chloride	11	ug/L	5.0
1,1,2,2-Tetrachloroethane	N.D.	ug/L	1.0
Tetrachloroethene	N.D.	ug/L	0.50
trans-1,2-Dichloroethene	N.D.	ug/L	0.50
1,1,1-Trichloroethane	N.D.	ug/L	0.50
1,1,2-Trichloroethane	N.D.	ug/L	1.0
Trichloroethene	N.D.	ug/L	1.0
Vinyl chloride	N.D.	ug/L	1.0
1,1,2-Trichloro-2,2,1-trifluoroethane	N.D.	ug/L	1.0
1,2-Dibromoethane (EDB)	N.D.	ug/L	2.0

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-8

Laboratory ID: 65039-006 Enseco ID: 65039-006

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.52	units	0.01	150.1	11/24/87
Specific Conductance @ 25C	1500	umhos/cm	1	120.1/9050	11/24/87
Total Dissolved Solids	950	mg/L	10	160.1	11/29/87
Fluoride	0.7	mg/L	0.1	340.2	12/03/87
Chloride	67	mg/L	3	300.0	12/17/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	401	mg/L	5	300.0	12/17/87
Total Alkalinity as CaCO3	273	mg/L	5	310.1/403	11/24/87
Ammonia as N	N.D.	mg/L	0.1	350.1	12/01/87
Total Cations	16.9	meq/L	0.1	104C	12/17/87
Total Anions	15.7	meq/L	0.3	104C	12/17/87
% Difference	3.5	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-8

Laboratory ID: 65039-006 Enseco ID: 65039-006

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	159	mg/L	0.1	200.7	12/08/87
Iron	N.D.	mg/L	0.05	200.7	12/08/87
Magnesium	21	mg/L	0.1	200.7	12/08/87
Potassium	N.D.	mg/L	5	200.7	12/08/87
Sodium	166	mg/L	0.05	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 65039-006

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-8

Laboratory ID: 65039-006 Enseco ID: 65039-006

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-8

Laboratory ID: 65039-006 Enseco ID: 65039-006

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-10

Laboratory ID: 65039-005 Enseco ID: 65039-005

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.74	units	0.01	150.1	11/24/87
Specific Conductance @ 25C	1640	umhos/cm	1	120.1/9050	11/24/87
Total Dissolved Solids	1240	mg/L	10	160.1	11/29/87
Fluoride	0.8	mg/L	0.1	340.2	12/03/87
Chloride	46	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	568	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	669	mg/L	5	310.1/403	11/24/87
Ammonia as N	N.D.	mg/L	0.1	350.1	12/01/87
Total Cations	19.0	meq/L	0.1	104C	12/17/87
Total Anions	18.3	meq/L	0.3	104C	12/17/87
% Difference	1.9	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-10

Laboratory ID: 65039-005 Enseco ID: 65039-005

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	126	mg/L	0.1	200.7	12/08/87
Iron	N.D.	mg/L	0.05	200.7	12/08/87
Magnesium	22	mg/L	0.1	200.7	12/08/87
Potassium	N.D.	mg/L	5	200.7	12/08/87
Sodium	250	mg/L	0.05	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-10

Laboratory ID: 65039-005 Enseco ID: 65039-005

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

Enseco

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-10

Laboratory ID: 65039-005 Enseco ID: 65039-005

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Bromoform	N.D.	ug/L	5.0
Carbon tetrachloride	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	2.0
Chloroethane	N.D.	ug/L	5.0
Chloroform	N.D.	ug/L	0.50
Dibromochloromethane	N.D.	ug/L	1.0
Bromodichloromethane	N.D.	ug/L	1.0
1,1-Dichloroethane	N.D.	ug/L	0.50
1,2-Dichloroethane	3.2	ug/L	1.0
1,1-Dichloroethene	N.D.	ug/L	0.50
1,2-Dichloropropane	N.D.	ug/L	1.0
cis-1,3-Dichloropropene	N.D.	ug/L	2.0
trans-1,3-Dichloropropene	N.D.	ug/L	0.50
Bromomethane	N.D.	ug/L	5.0
Chloromethane	N.D.	ug/L	5.0
Methylene chloride	N.D.	ug/L	5.0
1,1,2,2-Tetrachloroethane	N.D.	ug/L	1.0
Tetrachloroethene	N.D.	ug/L	0.50
trans-1,2-Dichloroethene	N.D.	ug/L	0.50
1,1,1-Trichloroethane	N.D.	ug/L	0.50
1,1,2-Trichloroethane	N.D.	ug/L	1.0
Trichloroethene	N.D.	ug/L	1.0
Vinyl chloride	N.D.	ug/L	1.0
1,1,2-Trichloro-2,2,1-trifluoroethane	N.D.	ug/L	1.0
1,2-Dibromoethane (EDB)	N.D.	ug/L	2.0

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: EQUIP BLK

Laboratory ID: 65039-004 Enseco ID: 65039-004

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	5.17	units	0.01	150.1	11/24/87
Specific Conductance @ 25C	2	umhos/cm	1	120.1/9050	11/24/87
Total Dissolved Solids	N.D.	mg/L	10	160.1	11/29/87
Fluoride	N.D.	mg/L	0.1	340.2	12/03/87
Chloride	N.D.	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	N.D.	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	N.D.	mg/L	5	310.1/403	11/24/87
Ammonia as N	N.D.	mg/L	0.1	350.1	12/01/87
Total Cations	0.4	meq/L	0.1	104C	12/17/87
Total Anions	N.D.	meq/L	0.3	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: EQUIP BLK

Laboratory ID: 65039-004 Enseco ID: 65039-004

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	5.5	mg/L	0.1	200.7	12/08/87
Iron	N.D.	mg/L	0.05	200.7	12/08/87
Magnesium	0.5	mg/L	0.1	200.7	12/08/87
Potassium	N.D.	mg/L	5	200.7	12/08/87
Sodium	2.5	mg/L	0.05	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: EQUIP BLK

Laboratory ID: 65039-004 Enseco ID: 65039-004

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

Enseco

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: EQUIP BLK

Laboratory ID: 65039-004 Enseco ID: 65039-004

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: V-MURRAY

Laboratory ID: 65039-003 Enseco ID: 65039-003

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	8.24	units	0.01	150.1	11/24/87
Specific Conductance @ 25C	895	umhos/cm	1	120.1/9050	11/24/87
Total Dissolved Solids	600	mg/L	10	160.1	11/29/87
Fluoride	0.4	mg/L	0.1	340.2	12/03/87
Chloride	43	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	114	mg/L	5	300.0	12/17/87
Total Alkalinity as CaCO3	368	mg/L	5	310.1/403	11/24/87
Ammonia as N	0.9	mg/L	0.1	350.1	12/01/87
Total Cations	11.2	meq/L	0.1	104C	12/17/87
Total Anions	11.0	meq/L	0.3	104C	12/17/87
% Difference	1.1	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: V-MURRAY

Laboratory ID: 65039-003 Enseco ID: 65039-003

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	42	mg/L	0.1	200.7	12/08/87
Iron	0.31	mg/L	0.05	200.7	12/08/87
Magnesium	28	mg/L	0.1	200.7	12/08/87
Potassium	13	mg/L	5	200.7	12/08/87
Sodium	147	mg/L	0.05	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.01	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 65039-003

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: V-MURRAY

Laboratory ID: 65039-003 Enseco ID: 65039-003

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	1.0	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: V-MURRAY

Laboratory ID: 65039-003 Enseco ID: 65039-003

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-9

Laboratory ID: 65039-002 Enseco ID: 65039-002

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.59	units	0.01	150.1	11/24/87
Specific Conductance @ 25C	1850	umhos/cm	1	120.1/9050	11/24/87
Total Dissolved Solids	1520	mg/L	10	160.1	11/29/87
Fluoride	1.0	mg/L	0.1	340.2	12/03/87
Chloride	43	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	863	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	372	mg/L	5	310.1/403	11/24/87
Ammonia as N	N.D.	mg/L	0.1	350.1	12/01/87
Total Cations	24.9	meq/L	0.1	104C	12/17/87
Total Anions	26.7	meq/L	0.3	104C	12/17/87
% Difference	3.4	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: MW-9

Laboratory ID: 65039-002 Enseco ID: 65039-002

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	324	mg/L	0.1	200.7	12/08/87
Iron	N.D.	mg/L	0.05	200.7	12/08/87
Magnesium	29	mg/L	0.1	200.7	12/08/87
Potassium	N.D.	mg/L	5	200.7	12/08/87
Sodium	146	mg/L	0.05	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.01	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: MW-9

Laboratory ID: 65039-002 Enseco ID: 65039-002

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	N.D.	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

Enseco

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: MW-9

Laboratory ID: 65039-002 Enseco ID: 65039-002

Matrix: Water Sampled: 11/23/87 Received: 11/24/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Bromoform	N.D.	ug/L	5.0
Carbon tetrachloride	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	2.0
Chloroethane	N.D.	ug/L	5.0
Chloroform	N.D.	ug/L	0.50
Dibromochloromethane	N.D.	ug/L	1.0
Bromodichloromethane	N.D.	ug/L	1.0
1,1-Dichloroethane	N.D.	ug/L	0.50
1,2-Dichloroethane	8.3	ug/L	1.0
1,1-Dichloroethene	N.D.	ug/L	0.50
1,2-Dichloropropane	N.D.	ug/L	1.0
cis-1,3-Dichloropropene	N.D.	ug/L	2.0
trans-1,3-Dichloropropene	N.D.	ug/L	0.50
Bromomethane	N.D.	ug/L	5.0
Chloromethane	N.D.	ug/L	5.0
Methylene chloride	N.D.	ug/L	5.0
1,1,2,2-Tetrachloroethane	N.D.	ug/L	1.0
Tetrachloroethene	N.D.	ug/L	0.50
trans-1,2-Dichloroethene	N.D.	ug/L	0.50
1,1,1-Trichloroethane	N.D.	ug/L	0.50
1,1,2-Trichloroethane	N.D.	ug/L	1.0
Trichloroethene	N.D.	ug/L	1.0
Vinyl chloride	N.D.	ug/L	1.0
1,1,2-Trichloro-2,2,1-trifluoroethane	N.D.	ug/L	1.0
1,2-Dibromoethane (EDB)	N.D.	ug/L	2.0

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: R. BALL WELL

Laboratory ID: 65039-001 Enseco ID: 65039-001

Matrix: Water Sampled: 11/20/87 Received: 11/21/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	8.38	units	0.01	150.1	11/21/87
Specific Conductance @ 25C	4520	umhos/cm	1	120.1/9050	11/21/87
Total Dissolved Solids	2300	mg/L	10	160.1	11/23/87
Fluoride	1.0	mg/L	0.1	340.2	11/25/87
Chloride	1170	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	N.D.	mg/L	0.1	353.2	12/01/87
Sulfate	433	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	221	mg/L	5	310.1/403	11/21/87
Ammonia as N	0.3	mg/L	0.1	350.1	12/01/87
Total Cations	46.0	meq/L	0.1	104C	12/17/87
Total Anions	46.5	meq/L	0.3	104C	12/17/87
% Difference	0.5	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

Sample: 65039-001

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: R. BALL WELL

Laboratory ID: 65039-001 Enseco ID: 65039-001

Matrix: Water Sampled: 11/20/87 Received: 11/21/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	25	mg/L	0.2	200.7	12/08/87
Iron	N.D.	mg/L	0.1	200.7	12/08/87
Magnesium	3.8	mg/L	0.2	200.7	12/08/87
Potassium	N.D.	mg/L	10	200.7	12/08/87
Sodium	1020	mg/L	0.1	200.7	12/08/87
Total Organic Lead	N.D.	mg/L	0.02	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

Sample: 65039-001

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: R. BALL WELL

Laboratory ID: 65039-001 Enseco ID: 65039-001

Matrix: Water Sampled: 11/20/87 Received: 11/21/87

Authorized: 11/21/87 Analyzed: 11/30/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	0.89	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	N.D.	ug/L	0.50
o & p-Xylene(s)	N.D.	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

Enseco

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: R. BALL WELL

Laboratory ID: 65039-001 Enseco ID: 65039-001

Matrix: Water Sampled: 11/20/87 Received: 11/21/87

Authorized: 11/21/87 Analyzed: 11/30/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: COMP. MW-11,12

Laboratory ID: 65039-011 Enseco ID: 65039-011

Matrix: Solid Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87

Parameter	Result	Units (as received)	Reporting Limit	Analytical Method	Analyzed
Reactive Sulfide	N.D.	mg/kg	0.5	EPA/OSW	12/03/87
Reactive Cyanide	N.D.	mg/kg	0.1	EPA/OSW	12/02/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS
EPI TOXICITY METALS

Client Name: DAMES AND MOORE

Client ID: COMP. MW-11,12

Laboratory ID: 65039-011 Enseco ID: 65039-011

Matrix: Solid Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Arsenic	N.D.	mg/L	0.1	200.7	12/14/87
Barium	0.94	mg/L	0.005	200.7	12/14/87
Cadmium	N.D.	mg/L	0.005	200.7	12/14/87
Chromium	N.D.	mg/L	0.01	200.7	12/14/87
Lead	N.D.	mg/L	0.05	200.7	12/14/87
Mercury	N.D.	mg/L	0.001	245.1	12/09/87
Selenium	N.D.	mg/L	0.02	7740	12/14/87
Silver	N.D.	mg/L	0.005	200.7	12/14/87

N.D. = Not detected

Approved by: Will Pratt

INORGANIC PARAMETERS

Client Name: DAMES AND MOORE

Client ID: STAINLESS WELL POINT

Laboratory ID: 65039-010 Enseco ID: 65039-010

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
pH	7.89	units	0.01	150.1	11/28/87
Specific Conductance @ 25C	4300	umhos/cm	1	120.1/9050	11/28/87
Total Dissolved Solids	3700	mg/L	10	160.1	12/04/87
Fluoride	1.0	mg/L	0.1	340.2	12/03/87
Chloride	257	mg/L	3	300.0	12/15/87
Nitrate + Nitrite as N	0.3	mg/L	0.2	353.2	12/07/87
Sulfate	1980	mg/L	5	300.0	12/15/87
Total Alkalinity as CaCO3	419	mg/L	5	310.1/403	11/28/87
Ammonia as N	0.5	mg/L	0.1	350.1	12/04/87
Total Cations	56.4	meq/L	0.1	104C	12/17/87
Total Anions	56.9	meq/L	0.3	104C	12/17/87
% Difference	0.4	%	0.1	104C	12/17/87

N.D. = Not detected

Approved by: Lindsay Breyer

METALS PARAMETERS

Client Name: DAMES AND MOORE

Client ID: STAINLESS WELL POINT

Laboratory ID: 65039-010 Enseco ID: 65039-010

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed
Calcium	364	mg/L	0.1	200.7	12/10/87
Iron	0.39	mg/L	0.05	200.7	12/10/87
Magnesium	105	mg/L	0.1	200.7	12/10/87
Potassium	24	mg/L	5	200.7	12/10/87
Sodium	666	mg/L	0.05	200.7	12/10/87
Total Organic Lead	N.D.	mg/L	0.01	Enseco	12/22/87

N.D. = Not detected

Approved by: Will Pratt

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: STAINLESS WELL POINT

Laboratory ID: 65039-010 Enseco ID: 65039-010

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87 Analyzed: 12/04/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	0.54	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	1.4	ug/L	0.50
o & p-Xylene(s)	0.83	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: STAINLESS WELL POINT

Laboratory ID: 65039-010 Enseco ID: 65039-010

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87 Analyzed: 11/30/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

AROMATIC VOLATILE ORGANICS

EPA METHOD 602

Client Name: DAMES AND MOORE

Client ID: W-3

Laboratory ID: 65039-009 Enseco ID: 65039-009

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87 Analyzed: 12/04/87

Parameter	Result	Units	Reporting Limit
Benzene	N.D.	ug/L	0.50
Chlorobenzene	N.D.	ug/L	0.50
Ethylbenzene	1.3	ug/L	0.50
Toluene	N.D.	ug/L	0.50
1,2-Dichlorobenzene	N.D.	ug/L	0.50
1,3-Dichlorobenzene	N.D.	ug/L	0.50
1,4-Dichlorobenzene	N.D.	ug/L	0.50
m-Xylene	2.6	ug/L	0.50
o & p-Xylene(s)	3.2	ug/L	0.50

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

Enseco

HALOGENATED VOLATILE ORGANICS

EPA METHOD 601

Client Name: DAMES AND MOORE

Client ID: W-3

Laboratory ID: 65039-009 Enseco ID: 65039-009

Matrix: Water Sampled: 11/27/87 Received: 11/27/87

Authorized: 11/21/87 Analyzed: 12/04/87

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

N.D. = Not detected

Reported by: Helmer Morse Approved by: Robert Keck

LABORATORY CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Analyte	Concentration Spiking	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: VOA on Reagent Water								
QC Lot: VOA 059AK								
Concentration Units: (ug/L)								
1,1-Dichloroethene	50.0	68.7	73.4	137	147#	61-145	6.6	14
Trichloroethene	50.0	49.2	50.3	98	101	71-120	2.2	14
Chlorobenzene	50.0	55.1	58.2	110	116	75-130	5.5	13
Toluene	50.0	54.7	58.2	109	116	76-125	6.2	13
Benzene	50.0	52.8	59.1	106	118	76-127	11.3*	11

= Recovery outside standard QC limits.
* = RPD outside standard QC limits.

SURROGATE CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Analyte	Concentration Spiking	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Test: VOA on Reagent Water				
QC Lot: VOA 059AK				
Concentration Units: (ug/L)				
Toluene-D8	50.0	49.7	99	88-110
Bromofluorobenzene (BFB)	50.0	50.9	102	86-115
1,2-Dichloroethane-D4	50.0	48.0	96	76-114

QC LOT ASSIGNMENT REPORT
GAS CHROMATOGRAPHY

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS	QC Lot Number SCS
65039-001-00	Reagent Water	601	601 114AW	601 114AW
65039-001-00	Reagent Water	602	602 116AW	602 116AW
65039-002-00	Reagent Water	601	601 114AW	601 114AW
65039-002-00	Reagent Water	602	602 116AW	602 116AW
65039-003-00	Reagent Water	601	601 114AW	601 114AW
65039-003-00	Reagent Water	602	602 116AW	602 116AW
65039-004-00	Reagent Water	601	601 114AW	601 114AW
65039-004-00	Reagent Water	602	602 116AW	602 116AW
65039-005-00	Reagent Water	601	601 114AW	601 114AW
65039-005-00	Reagent Water	602	602 116AW	602 116AW
65039-006-00	Reagent Water	601	601 114AW	601 114AW
65039-006-00	Reagent Water	602	602 116AW	602 116AW
65039-007-00	Reagent Water	601	601 114AW	601 114AW
65039-007-00	Reagent Water	602	602 116AW	602 116AW
65039-009-00	Reagent Water	601	601 117AW	601 117AW
65039-009-00	Reagent Water	602	602 117AW	602 117AW
65039-010-00	Reagent Water	601	601 117AW	601 117AW
65039-010-00	Reagent Water	602	602 117AW	602 117AW

LABORATORY CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: 601 on Reagent Water								
QC Lot: 601 114AW								
Concentration Units: (ug/L)								
Chloromethane	20	12.3	12.9	62	65	59-140	4.8	25
Bromomethane	20	9.50	9.47	48#	47#	58-141	0.3	25
Vinyl chloride	20	13.4	13.1	67#	66#	68-132	2.3	25
Chloroethane	20	14.7	15.2	74#	76#	77-123	3.3	25
Methylene chloride	20	18.0	18.8	90	94	77-123	4.3	20
Trichlorofluoromethane	20	17.4	18.1	87	91	66-134	3.9	25
1,1-Dichloroethene	20	17.5	17.5	88	88	63-137	0.0	20
1,1-Dichloroethane	20	20.7	20.8	103	104	84-116	0.5	20
trans-1,2-Dichloroethene	20	18.8	18.7	94	93	64-136	0.5	20
Chloroform	20	20.6	20.8	103	104	75-125	1.0	20
1,1,2-Trichloro-2,2,1-trifluoroethane	20	15.8	16.1	79	81	67-134	1.9	20
1,2-Dichloroethane	20	20.5	21.1	103	106	72-129	2.9	20
1,1,1-Trichloroethane	20	15.4	15.9	77	80	71-129	3.2	20
Carbon tetrachloride	20	18.5	18.5	93	93	68-131	0.0	20
Bromodichloromethane	20	19.9	20.4	99	102	76-124	2.5	20
1,2-Dichloropropane	20	19.2	19.7	96	98	74-126	2.6	20
trans-1,3-Dichloropropene	20	20.7	20.5	103	103	64-136	1.0	20
Trichloroethene	20	23.9	24.2	119	121	77-123	1.2	20
1,1,2-Trichloroethane	60	71.9	74.5	120	124	69-132	3.6	20
Dibromochloromethane	60	71.9	74.5	120	124	69-132	3.6	20
cis-1,3-Dichloropropene	60	71.9	74.5	120	124	69-132	3.6	20
1,2-Dibromoethane (EDB)	20	13.5	14.0	68#	70#	74-127	3.6	20
Bromoform	20	20.2	20.9	101	104	74-127	3.4	20
1,1,2,2-Tetrachloroethane	40	35.0	35.2	88	88	60-140	0.6	20
Tetrachloroethene	40	35.0	35.2	88	88	60-140	0.6	20
Chlorobenzene	20	19.6	19.8	98	99	72-128	1.0	20
1,3-Dichlorobenzene	20	23.2	22.1	116	111	50-150	4.9	20
1,2-Dichlorobenzene	20	23.8	21.9	119	109	70-130	8.3	20
1,4-Dichlorobenzene	20	25.7	23.5	128	118	70-130	8.9	20
Test: 601 on Reagent Water								
QC Lot: 601 117AW								
Concentration Units: (ug/L)								
Chloromethane	20	9.80	10.3	49#	52#	59-140	5.0	25
Bromomethane	20	10.0	10.4	50#	52#	58-141	3.9	25
Vinyl chloride	20	12.9	13.4	65#	67#	68-132	3.8	25
Chloroethane	20	14.9	15.7	75#	79	77-123	5.2	25

= Recovery outside standard QC limits.

LABORATORY CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: 601 on Reagent Water QC Lot: 601 117AW Concentration Units: (ug/L)								
Methylene chloride	20	18.1	19.3	91	97	77-123	6.4	20
Trichlorofluoromethane	20	17.9	19.3	89	97	66-134	7.5	25
1,1-Dichloroethene	20	20.8	21.8	104	109	63-137	4.7	20
1,1-Dichloroethane	20	23.5	24.6	118#	123#	84-116	4.6	20
trans-1,2-Dichloroethene	20	20.6	21.4	103	107	64-136	3.8	20
Chloroform	20	23.1	23.8	116	119	75-125	3.0	20
1,1,2-Trichloro-2,2,1-trifluoroethane	20	16.0	16.3	80	82	67-134	1.9	20
1,2-Dichloroethane	20	21.0	21.3	105	107	72-129	1.4	20
1,1,1-Trichloroethane	20	18.0	18.9	90	94	71-129	4.9	20
Carbon tetrachloride	20	19.1	19.5	96	98	68-131	2.1	20
Bromodichloromethane	20	19.8	20.4	99	102	76-124	3.0	20
1,2-Dichloropropane	20	20.7	21.4	103	107	74-126	3.3	20
trans-1,3-Dichloropropene	20	20.5	20.5	103	103	64-136	0.0	20
Trichloroethene	20	25.0	25.3	125#	127#	77-123	1.2	20
1,1,2-Trichloroethane	60	70.0	69.6	117	116	69-132	0.6	20
Dibromochloromethane	60	70.0	69.6	117	116	69-132	0.6	20
cis-1,3-Dichloropropene	60	70.0	69.6	117	116	69-132	0.6	20
1,2-Dibromoethane (EDB)	20	14.1	14.5	71#	73#	74-127	2.8	20
Bromoform	20	18.3	18.7	92	93	74-127	2.2	20
1,1,2,2-Tetrachloroethane	40	32.3	32.1	81	80	60-140	0.6	20
Tetrachloroethene	40	32.3	32.1	81	80	60-140	0.6	20
Chlorobenzene	20	21.1	21.7	106	108	72-128	2.8	20
1,3-Dichlorobenzene	20	23.4	23.5	117	118	50-150	0.4	20
1,2-Dichlorobenzene	20	23.8	23.7	119	118	70-130	0.4	20
1,4-Dichlorobenzene	20	26.3	26.1	132#	131#	70-130	0.8	20
Test: 602 on Reagent Water QC Lot: 602 116AW Concentration Units: (ug/L)								
Benzene	20	18.4	18.4	92	92	77-123	0.0	20
Toluene	20	18.9	18.7	94	93	77-123	1.1	20
Chlorobenzene	20	18.1	17.9	91	89	81-119	1.1	20
Ethylbenzene	20	18.5	18.2	93	91	63-137	1.6	20
m-Xylene	20	18.5	18.4	93	92	77-123	0.5	20
o & p-Xylene(s)	40	38.3	38.7	96	97	77-123	1.0	20
1,3-Dichlorobenzene	20	19.9	18.6	99	93	77-123	6.8	20
1,2-Dichlorobenzene	20	24.7	18.3	123	92	63-137	29.8*	20

= Recovery outside standard QC limits.
* = RPD outside standard QC limits.

LABORATORY CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: 602 on Reagent Water QC Lot: 602 116AW Concentration Units: (ug/L)								
1,4-Dichlorobenzene	20	22.1	19.0	111	95	70-130	15.1	20
Test: 602 on Reagent Water QC Lot: 602 117AW Concentration Units: (ug/L)								
Benzene	20	19.3	20.1	97	101	77-123	4.1	20
Toluene	20	19.7	20.3	98	102	77-123	3.0	20
Chlorobenzene	20	18.4	19.0	92	95	81-119	3.2	20
Ethylbenzene	20	19.0	19.5	95	98	63-137	2.6	20
m-Xylene	20	18.9	19.3	94	97	77-123	2.1	20
o & p-Xylene(s)	40	39.0	39.9	98	100	77-123	2.3	20
1,3-Dichlorobenzene	20	18.3	18.4	92	92	77-123	0.5	20
1,2-Dichlorobenzene	20	18.4	18.3	92	92	63-137	0.5	20
1,4-Dichlorobenzene	20	19.2	19.6	96	98	70-130	2.1	20

SURROGATE CONTROL SAMPLE REPORT
GAS CHROMATOGRAPHY

Analyte	Concentration Spiking	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Test: 601 on Reagent Water QC Lot: 601 114AW Concentration Units: (ug/L)				
Bromochloromethane	30	25.7	86	20-160
Test: 601 on Reagent Water QC Lot: 601 117AW Concentration Units: (ug/L)				
Bromochloromethane	30	26.3	88	20-160
Test: 602 on Reagent Water QC Lot: 602 116AW Concentration Units: (ug/L)				
a,a,a-Trifluorotoluene	30	30.1	100	20-160
Test: 602 on Reagent Water QC Lot: 602 117AW Concentration Units: (ug/L)				
a,a,a-Trifluorotoluene	30	30.8	103	20-160

QC LOT ASSIGNMENT REPORT
INORGANICS - METALS

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
65039-001-00	Reagent Water	ICPD	ICPD179AA
65039-002-00	Reagent Water	ICPD	ICPD179AA
65039-003-00	Reagent Water	ICPD	ICPD179AA
65039-004-00	Reagent Water	ICPD	ICPD179AA
65039-005-00	Reagent Water	ICPD	ICPD179AA
65039-006-00	Reagent Water	ICPD	ICPD179AA
65039-008-00	Reagent Water	ICPD	ICPD183AA
65039-010-00	Reagent Water	ICPD	ICPD183AA
65039-011-00	Reagent Water	EP1P	EP1P095AA
65039-011-00	Reagent Water	EPSE	EPSE103AA
65039-011-00	Reagent Water	HGT	HGT 235AB

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - METALS

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: EP1P on Reagent Water QC Lot: EP1P095AA Concentration Units: (mg/L)								
Aluminum	2.0	2.04	2.08	102	104	75-125	1.9	20
Antimony	0.5	0.56	0.57	112	114	75-125	1.8	20
Arsenic	0.5	0.48	0.48	96	96	75-125	0.0	20
Barium	2.0	2.00	2.03	100	101	75-125	1.5	20
Beryllium	0.05	0.047	0.048	94	96	75-125	2.1	20
Cadmium	0.05	0.047	0.046	94	92	75-125	2.2	20
Calcium	100	104	106	104	106	75-125	1.9	20
Chromium	0.2	0.20	0.21	100	105	75-125	4.9	20
Cobalt	0.5	0.49	0.50	98	100	75-125	2.0	20
Copper	0.25	0.26	0.27	104	108	75-125	3.8	20
Iron	1.0	1.02	1.03	102	103	75-125	1.0	20
Lead	0.5	0.50	0.49	100	98	75-125	2.0	20
Magnesium	50	47.8	48.9	96	98	75-125	2.3	20
Manganese	0.2	0.21	0.21	105	105	75-125	0.0	20
Nickel	0.4	0.40	0.41	100	103	75-125	2.5	20
Potassium	50	54.5	55.4	109	111	75-125	1.6	20
Silver	0.05	0.053	0.052	106	104	75-125	1.9	20
Sodium	100	99.4	101	99	101	75-125	1.6	20
Tin	0.4	0.41	0.42	103	105	75-125	2.4	20
Vanadium	0.5	0.50	0.51	100	102	75-125	2.0	20
Zinc	0.2	0.21	0.21	105	105	75-125	0.0	20
Test: EPSE on Reagent Water QC Lot: EPSE103AA Concentration Units: (mg/L)								
Selenium	0.01	0.010	0.010	100	100	75-125	0.0	20
Test: HGT on Reagent Water QC Lot: HGT 235AB Concentration Units: (ug/L)								
Mercury	1.0	1.06	1.12	106	112	75-125	5.5	20

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - METALS

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: ICPD on Reagent Water QC Lot: ICPD179AA Concentration Units: (mg/L)								
Aluminum	2.0	2.09	2.09	105	105	75-125	0.0	20
Antimony	0.5	0.54	0.54	108	108	75-125	0.0	20
Arsenic	0.5	0.48	0.48	96	96	75-125	0.0	20
Barium	2.0	2.04	2.04	102	102	75-125	0.0	20
Beryllium	0.05	0.049	0.049	98	98	75-125	0.0	20
Cadmium	0.05	0.047	0.047	94	94	75-125	0.0	20
Calcium	100	108	108	108	108	75-125	0.0	20
Chromium	0.2	0.21	0.21	105	105	75-125	0.0	20
Cobalt	0.5	0.51	0.50	102	100	75-125	2.0	20
Copper	0.25	0.27	0.27	108	108	75-125	0.0	20
Iron	1.0	1.04	1.04	104	104	75-125	0.0	20
Lead	0.5	0.51	0.52	102	104	75-125	1.9	20
Magnesium	50	50	50	100	100	75-125	0.0	20
Manganese	0.2	0.21	0.21	105	105	75-125	0.0	20
Nickel	0.4	0.41	0.41	103	103	75-125	0.0	20
Potassium	50	55	55	110	110	75-125	0.0	20
Silver	0.05	0.050	0.051	100	102	75-125	2.0	20
Sodium	100	103	103	103	103	75-125	0.0	20
Tin	0.4	0.41	0.42	103	105	75-125	2.4	20
Vanadium	0.5	0.50	0.51	100	102	75-125	2.0	20
Zinc	0.2	0.21	0.21	105	105	75-125	0.0	20
Test: ICPD on Reagent Water QC Lot: ICPD183AA Concentration Units: (mg/L)								
Aluminum	2.0	2.04	2.05	102	103	75-125	0.5	20
Antimony	0.5	0.55	0.54	110	108	75-125	1.8	20
Arsenic	0.5	0.46	0.46	92	92	75-125	0.0	20
Barium	2.0	2.01	2.01	101	101	75-125	0.0	20
Beryllium	0.05	0.046	0.047	92	94	75-125	2.2	20
Cadmium	0.05	0.051	0.049	102	98	75-125	4.0	20
Calcium	100	104	105	104	105	75-125	1.0	20
Chromium	0.2	0.20	0.20	100	100	75-125	0.0	20
Cobalt	0.5	0.49	0.49	98	98	75-125	0.0	20
Copper	0.25	0.26	0.27	104	108	75-125	3.8	20
Iron	1.0	1.00	1.00	100	100	75-125	0.0	20
Lead	0.5	0.48	0.51	96	102	75-125	6.1	20
Magnesium	50	52.9	53.1	106	106	75-125	0.4	20

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - METALS

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: ICPD on Reagent Water								
QC Lot: ICPD183AA								
Concentration Units: (mg/L)								
Manganese	0.2	0.20	0.21	100	105	75-125	4.9	20
Nickel	0.4	0.40	0.40	100	100	75-125	0.0	20
Potassium	50	53.8	53.9	108	108	75-125	0.2	20
Silver	0.05	0.053	0.053	106	106	75-125	0.0	20
Sodium	100	99.1	99.3	99	99	75-125	0.2	20
Tin	0.4	0.43	0.44	108	110	75-125	2.3	20
Vanadium	0.5	0.50	0.50	100	100	75-125	0.0	20
Zinc	0.2	0.21	0.21	105	105	75-125	0.0	20

QC LOT ASSIGNMENT REPORT
INORGANICS - NON-METALS

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
65039-001-00	Reagent Water	ALK	ALK 200AA
65039-001-00	Reagent Water	CL	CL 180AA
65039-001-00	Reagent Water	COND	COND198AA
65039-001-00	Reagent Water	F	F 113AA
65039-001-00	Reagent Water	NH3	NH3 120AC
65039-001-00	Reagent Water	NO3	NO3 161AF
65039-001-00	Reagent Water	PH	PH 247AA
65039-001-00	Reagent Water	SO4	SO4 171AA
65039-001-00	Reagent Water	TDS	TDS 097AA
65039-002-00	Reagent Water	ALK	ALK 205AA
65039-002-00	Reagent Water	CL	CL 180AA
65039-002-00	Reagent Water	COND	COND201AA
65039-002-00	Reagent Water	F	F 114AA
65039-002-00	Reagent Water	NH3	NH3 120AC
65039-002-00	Reagent Water	NO3	NO3 161AF
65039-002-00	Reagent Water	PH	PH 250AA
65039-002-00	Reagent Water	SO4	SO4 171AA
65039-002-00	Reagent Water	TDS	TDS 099AA
65039-003-00	Reagent Water	ALK	ALK 205AA
65039-003-00	Reagent Water	CL	CL 180AA
65039-003-00	Reagent Water	COND	COND201AA
65039-003-00	Reagent Water	F	F 114AA
65039-003-00	Reagent Water	NH3	NH3 120AC
65039-003-00	Reagent Water	NO3	NO3 161AF
65039-003-00	Reagent Water	PH	PH 250AA
65039-003-00	Reagent Water	SO4	SO4 173AA
65039-003-00	Reagent Water	TDS	TDS 099AA
65039-004-00	Reagent Water	ALK	ALK 205AA
65039-004-00	Reagent Water	CL	CL 180AA
65039-004-00	Reagent Water	COND	COND201AA
65039-004-00	Reagent Water	F	F 114AA
65039-004-00	Reagent Water	NH3	NH3 120AC
65039-004-00	Reagent Water	NO3	NO3 161AF
65039-004-00	Reagent Water	PH	PH 250AA
65039-004-00	Reagent Water	SO4	SO4 171AA
65039-004-00	Reagent Water	TDS	TDS 099AA
65039-005-00	Reagent Water	ALK	ALK 205AA
65039-005-00	Reagent Water	CL	CL 180AA
65039-005-00	Reagent Water	COND	COND201AA
65039-005-00	Reagent Water	F	F 114AA
65039-005-00	Reagent Water	NH3	NH3 120AC
65039-005-00	Reagent Water	NO3	NO3 161AF

QC LOT ASSIGNMENT REPORT

INORGANICS - NON-METALS (cont.)

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
65039-005-00	Reagent Water	PH	PH 250AA
65039-005-00	Reagent Water	SO4	SO4 171AA
65039-005-00	Reagent Water	TDS	TDS 099AA
65039-006-00	Reagent Water	ALK	ALK 205AA
65039-006-00	Reagent Water	CL	CL 182AA
65039-006-00	Reagent Water	COND	COND201AA
65039-006-00	Reagent Water	F	F 114AA
65039-006-00	Reagent Water	NH3	NH3 120AC
65039-006-00	Reagent Water	NO3	NO3 161AF
65039-006-00	Reagent Water	PH	PH 250AA
65039-006-00	Reagent Water	SO4	SO4 173AA
65039-006-00	Reagent Water	TDS	TDS 099AA
65039-008-00	Reagent Water	ALK	ALK 206AA
65039-008-00	Reagent Water	CL	CL 180AA
65039-008-00	Reagent Water	COND	COND202AA
65039-008-00	Reagent Water	F	F 114AA
65039-008-00	Reagent Water	NH3	NH3 122AC
65039-008-00	Reagent Water	NO3	NO3 167AC
65039-008-00	Reagent Water	PH	PH 251AA
65039-008-00	Reagent Water	SO4	SO4 171AA
65039-008-00	Reagent Water	TDS	TDS 101AA
65039-010-00	Reagent Water	ALK	ALK 206AA
65039-010-00	Reagent Water	CL	CL 180AA
65039-010-00	Reagent Water	COND	COND202AA
65039-010-00	Reagent Water	F	F 114AA
65039-010-00	Reagent Water	NH3	NH3 122AC
65039-010-00	Reagent Water	NO3	NO3 167AC
65039-010-00	Reagent Water	PH	PH 251AA
65039-010-00	Reagent Water	SO4	SO4 171AA
65039-010-00	Reagent Water	TDS	TDS 101AA
65039-011-00	Standard Soil	CNR	CNR 035AB
65039-011-00	Standard Soil	SR	SR 039AA

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - NON-METALS

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Limits	Precision(RPD) LCS	Limits
Test: ALK on Reagent Water QC Lot: ALK 200AA Concentration Units: (mg/L)								
Total Alkalinity as CaCO3	134	141	141	105	105	90-110	0.0	20
Test: ALK on Reagent Water QC Lot: ALK 205AA Concentration Units: (mg/L)								
Total Alkalinity as CaCO3	134	139	139	104	104	90-110	0.0	20
Test: ALK on Reagent Water QC Lot: ALK 206AA Concentration Units: (mg/L)								
Total Alkalinity as CaCO3	134	140	139	104	104	90-110	0.7	20
Test: CL on Reagent Water QC Lot: CL 180AA Concentration Units: (mg/L)								
Chloride	20	18.6	18.6	93	93	92-108	0.0	10
Test: CL on Reagent Water QC Lot: CL 182AA Concentration Units: (mg/L)								
Chloride	20	21.6	21.4	108	107	92-108	0.9	10
Test: COND on Reagent Water QC Lot: COND198AA Concentration Units: (umhos/cm)								
Specific Conductance @ 25C	1290	1280	1290	99	100	95-105	0.8	5

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - NON-METALS

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: COND on Reagent Water QC Lot: COND201AA Concentration Units: (umhos/cm)								
Specific Conductance @ 25C	1290	1270	1280	98	99	95-105	0.8	5
Test: COND on Reagent Water QC Lot: COND202AA Concentration Units: (umhos/cm)								
Specific Conductance @ 25C	1290	1270	1270	98	98	95-105	0.0	5
Test: F on Reagent Water QC Lot: F 113AA Concentration Units: (mg/L)								
Fluoride	6.5	6.53	6.59	100	101	88-112	0.9	15
Test: F on Reagent Water QC Lot: F 114AA Concentration Units: (mg/L)								
Fluoride	6.5	7.29	7.29	112	112	88-112	0.0	15
Test: NH3 on Reagent Water QC Lot: NH3 120AC Concentration Units: (mg/L)								
Ammonia as N	4.1	4.06	4.06	99	99	93-107	0.0	10
Test: NH3 on Reagent Water QC Lot: NH3 122AC Concentration Units: (mg/L)								
Ammonia as N	4.5	4.57	4.68	102	104	93-107	2.4	10

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - NON-METALS

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: NO3 on Reagent Water QC Lot: NO3 161AF Concentration Units: (mg/L)								
Nitrate as N	3.5	3.47	3.54	99	101	91-109	2.0	20
Test: NO3 on Reagent Water QC Lot: NO3 167AC Concentration Units: (mg/L)								
Nitrate as N	3.5	3.48	3.42	99	98	91-109	1.7	20
Test: PH on Reagent Water QC Lot: PH 247AA Concentration Units: (Units)								
pH	9.06	9.03	9.03	100	100	98-102	0.0	5
Test: PH on Reagent Water QC Lot: PH 250AA Concentration Units: (Units)								
pH	9.06	9.04	8.98	100	99	98-102	0.7	5
Test: PH on Reagent Water QC Lot: PH 251AA Concentration Units: (Units)								
pH	9.06	8.98	8.98	99	99	98-102	0.0	5
Test: SO4 on Reagent Water QC Lot: SO4 171AA Concentration Units: (mg/L)								
Sulfate	100	105	105	105	105	93-107	0.0	15

LABORATORY CONTROL SAMPLE REPORT
INORGANICS - NON-METALS

Analyte	Concentration Spiking	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Test: SO4 on Reagent Water QC Lot: SO4 173AA Concentration Units: (mg/L)								
Sulfate	100	107	107	107	107	93-107	0.0	15
Test: TDS on Reagent Water QC Lot: TDS 097AA Concentration Units: (mg/L)								
Total Dissolved Solids	940	944	967	100	103	90-110	2.4	10
Test: TDS on Reagent Water QC Lot: TDS 099AA Concentration Units: (mg/L)								
Total Dissolved Solids	940	908	938	97	100	90-110	3.3	10
Test: TDS on Reagent Water QC Lot: TDS 101AA Concentration Units: (mg/L)								
Total Dissolved Solids	940	972	928	103	99	90-110	4.6	10
Test: CNR on Standard Soil QC Lot: CNR 035AB Concentration Units: (mg/kg)								
Reactive Cyanide	1.0	0.15	ND	15	ND	0-100	200	200
Test: SR on Standard Soil QC Lot: SR 039AA Concentration Units: (mg/kg)								
Reactive Sulfide	5.0	ND	ND	NC	NC	0-200	NC	200

ND = Not detected
NC = Not calculated

ION BALANCE RESULTS
for sample #65039-01

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	25.000	1.2475
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	3.800	0.3127
K	ND	0.0000
Na	1020.000	44.3700
NH4	0.300	0.0214
TOTAL	1049.100	45.9517

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	1170.000	32.9940
F	1.000	0.0526
SO4	433.000	9.0064
Alk	132.600	4.4200
NO2+NO3	ND	0.0000
TOTAL	1736.600	46.4730

SUMMARY

% DIFFERENCE =-0.564
CATIONS + ANIONS (mg/L) =2785.700
TDS =%2300.000
HARDNESS = 78.080
CALCULATED THEORETICAL CONDUCTIVITY =5750.2191
MEASURED CONDUCTIVITY =4520.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.272
MEASURED CONDUCTIVITY/TDS RATIO = 1.965

ND - Not Detected

ION BALANCE RESULTS
for sample #65039-02

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	324.000	16.1676
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	29.000	2.3867
K	ND	0.0000
Na	146.000	6.3510
NH4	ND	0.0000
TOTAL	499.000	24.9053

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	43.000	1.2126
F	1.000	0.0526
SO4	863.000	17.9504
Alk	223.200	7.4400
NO2+NO3	ND	0.0000
TOTAL	1130.200	26.6556

SUMMARY

% DIFFERENCE =-3.395
CATIONS + ANIONS (mg/L) =1629.200
TDS =%1520.000
HARDNESS = 928.900
CALCULATED THEORETICAL CONDUCTIVITY =3266.3859
MEASURED CONDUCTIVITY =1850.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.766
MEASURED CONDUCTIVITY/TDS RATIO = 1.217

ND - Not Detected

ION BALANCE RESULTS
for sample #65039-03

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	42.000	2.0958
Fe+2	ND	0.0000
Fe+3	0.310	0.0166
Mg	28.000	2.3044
K	13.000	0.3328
Na	147.000	6.3945
NH4	0.900	0.0643
TOTAL	231.210	11.2084

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	43.000	1.2126
F	0.400	0.0210
SO4	114.000	2.3712
Alk	220.800	7.3600
NO2+NO3	ND	0.0000
TOTAL	378.200	10.9648

SUMMARY

% DIFFERENCE = 1.098
CATIONS + ANIONS (mg/L) = 609.410
TDS =600.000
HARDNESS = 219.800
CALCULATED THEORETICAL CONDUCTIVITY =1206.6280
MEASURED CONDUCTIVITY = 895.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.348
MEASURED CONDUCTIVITY/TDS RATIO = 1.492

ND - Not Detected

ION BALANCE RESULTS
for sample #65039-04

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	5.500	0.2745
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	0.500	0.0412
K	ND	0.0000
Na	2.500	0.1088
NH4	ND	0.0000
TOTAL	8.500	0.4244

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	ND	0.0000
F	ND	0.0000
SO4	ND	0.0000
Alk	ND	0.0000
NO2+NO3	ND	0.0000
TOTAL	0.000	0.0000*

SUMMARY

% DIFFERENCE =%100.000*
CATIONS + ANIONS (mg/L) = 8.500
TDS = 0.000
HARDNESS = 15.800
CALCULATED THEORETICAL CONDUCTIVITY = 26.3352
MEASURED CONDUCTIVITY = 2.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO =13.168
MEASURED CONDUCTIVITY/TDS RATIO =
DIVISION BY ZERO ERROR IN 1000

ION BALANCE RESULTS
for sample #65039-05

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	126.000	6.2874
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	22.000	1.8106
K	ND	0.0000
Na	250.000	10.8750
NH4	ND	0.0000
TOTAL	398.000	18.9730

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	46.000	1.2972
F	0.800	0.0421
SO4	568.000	11.8144
Alk	153.000	5.1000
NO2+NO3	ND	0.0000
TOTAL	767.800	18.2537

SUMMARY

% DIFFERENCE = 1.932
CATIONS + ANIONS (mg/L) =1165.800
TDS =%1240.000
HARDNESS = 405.200
CALCULATED THEORETICAL CONDUCTIVITY =2286.5250
MEASURED CONDUCTIVITY =1640.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.394
MEASURED CONDUCTIVITY/TDS RATIO = 1.323

ND - Not Detected

ION BALANCE RESULTS
for sample #65039-06

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	159.000	7.9341
Fe+2	ND	0.0000
Fe+3	ND	0.0000
Mg	21.000	1.7283
K	ND	0.0000
Na	166.000	7.2210
NH4	ND	0.0000
TOTAL	346.000	16.8834

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	67.000	1.8894
F	0.700	0.0368
SO4	401.000	8.3408
Alk	163.800	5.4600
NO2+NO3	ND	0.0000
TOTAL	632.500	15.7270

SUMMARY

% DIFFERENCE = 3.546
CATIONS + ANIONS (mg/L) = 978.500
TDS =950.000
HARDNESS = 483.600
CALCULATED THEORETICAL CONDUCTIVITY =1980.6660
MEASURED CONDUCTIVITY =1500.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.320
MEASURED CONDUCTIVITY/TDS RATIO = 1.579

ND - Not Detected

ION BALANCE RESULTS
for sample #65039-08

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	148.000	7.3852
Fe+2	ND	0.0000
Fe+3	0.130	0.0070
Mg	42.000	3.4566
K	ND	0.0000
Na	222.000	9.6570
NH4	ND	0.0000
TOTAL	412.130	20.5058

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	321.000	9.0522
F	0.300	0.0158
SO4	16.000	0.3328
Alk	304.800	10.1600
NO2+NO3	ND	0.0000
TOTAL	642.100	19.5608

SUMMARY

% DIFFERENCE = 2.359
CATIONS + ANIONS (mg/L) =1054.230
TDS =%1200.000
HARDNESS = 542.200
CALCULATED THEORETICAL CONDUCTIVITY =%352076.7600
MEASURED CONDUCTIVITY =1930.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO =%182.423
MEASURED CONDUCTIVITY/TDS RATIO = 1.608

ND - Not Detected

ION BALANCE RESULTS
for sample #65039-10

CATION ANALYSIS

ELEMENT	mg/L	meq/L
Ca	364.000	18.1636
Fe+2	ND	0.0000
Fe+3	0.390	0.0209
Mg	105.000	8.6415
K	24.000	0.6144
Na	666.000	28.9710
NH4	0.500	0.0357
TOTAL	1159.890	56.4471

ANION ANALYSIS

ELEMENT	mg/L	meq/L
Cl	257.000	7.2474
F	1.000	0.0526
SO4	1980.000	41.1840
Alk	251.400	8.3800
NO2+NO3	0.300	0.0214
TOTAL	2489.700	56.8854

SUMMARY

% DIFFERENCE =-0.387
CATIONS + ANIONS (mg/L) =3649.590
TDS =%3700.000
HARDNESS =1340.500
CALCULATED THEORETICAL CONDUCTIVITY =7256.3460
MEASURED CONDUCTIVITY =4300.0000
THEORETICAL/MEASURED CONDUCTIVITY RATIO = 1.688
MEASURED CONDUCTIVITY/TDS RATIO = 1.162

ND - Not Detected

Rocky Mountain Analytical Laboratory

4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF ENSECO INCORPORATED

CHAIN OF CUSTODY

65039

RMAL Client Caribou 4 Corners Maverick Country Store, Kirtland N.M. RMAL Project No.

Sampling Co. Davis & Moore Sampling Personnel L. Bardwell

Project Name/No. Sampling Site Maverick Refinery

Date	Time	Sample ID/Description	Type	No. Containers	Parameters	Remarks
11/20/87	1500	R. Ball Well	Groundwater	7	VOA's Lead, Ion Balance	01
11/20	~~1520~~	~~R. Gateway Well~~	"	"	"	
		Sample Not collected J. Bardwell				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Larry Bardwell	11/21/87 1700	C. Delvo	11/20 1700				
Method of Shipment: Fed-X		Shipped by: (Signature) C.D. 49799		Delivered by: (Signature)		Received for Laboratory by: (Signature) Bill Eckert	Date / Time 11/21 9:00

White Copy to Lab Pink Copy to Client Yellow Copy to Sampler SS - 001

Rocky Mountain Analytical Laboratory

4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF ENSECO INCORPORATED

CHAIN OF CUSTODY

RMAL Client Caribou 4 Corners Kirtland N.M. RMAL Project No. 65039 ADD ON

Sampling Co. Dames & Moore SLC, Ut. Sampling Personnel Larry Bardwell

Project Name/No. _____ Sampling Site _____

Date	Time	Sample ID/Description	Type	No. Containers	Parameters	Remarks
11/23/87	1000	MW-9	Groundwater	7	VOA's organics Bad In Blank	02
	1100	V. Murray	"	7	"	03
	1200	Equipment Blank	D-I water	7	"	04
	1300	MW-10	Groundwater	7	"	05
	1400	MW-8	"	7	"	06
		TRIP BLANK				07

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Larry Bardwell	11/23/87 1700	C. DeWees	11/23/1700				
Method of Shipment: Fed-X		Shipped by: (Signature) C.D 49799		Delivered by: (Signature)		Received for Laboratory by: (Signature) Bill Chisel	Date / Time 11/24 12:00 H

White Copy to Lab Pink Copy to Client Yellow Copy to Sampler SS - 001

Rocky Mountain Analytical Laboratory

4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF ENSECO INCORPORATED

CHAIN OF CUSTODY

RMAL Client: Caribou 4 Corners Kirtland N.M. RMAL Project No.: 65039

Sampling Co.: Dames & Moore SLC Sampling Personnel: Larry Bodwell

Project Name/No.: Sampling Site:

Date	Time	Sample ID/Description	Type	No. Containers	Parameters	Remarks
11/27/87	1330	MW-12	Groundwater	7	VOA's Ion Balance, Metals	08
11/27/87	1500	MW-13 (Large steel well)	"	3	VOA's only	09
11/27/87	1600	Stainless Well Point	"	7	VOA's Ion Balance, Metals	10
11/27/87	1400	Cuttings Composite MW-11 & 12	Solid	2	will call	11
11/27/87	1430	Cuttings from MW-10	Solid	2	" cancel	12
					EP TOX 8 RCRA	
					Reac. S, CN	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Larry Bodwell	11/27/87 1700	J. Kroutty	11/27/87 1705				
Method of Shipment: Fed X		Shipped by: (Signature) Fed-X		Delivered by: (Signature)		Received for Laboratory by: (Signature) Bill Edmond	Date / Time 11/28 8:15 am

White Copy to Lab — Pink Copy to Client — Yellow Copy to Sampler

SS - 001

APPENDIX F

EID PRIVATE WELL WATER QUALITY SAMPLING REPORT
FOR APRIL AND MAY 1987

APPENDIX F

EID PRIVATE WELL WATER QUALITY SAMPLING REPORT
(For April and May 1987)

The New Mexico EID collected water quality samples at selected sites near the Maverik Kirtland Refinery site, in December of 1985 and in April and May of 1987.

The results of the April and May 1987 sampling are included herein. The results are summarized in Table F-1 and the sample site locations are shown on Plate F-1. The EID sample sheets and results are also included.

As indicated in Table F-1 and as shown on Plate F-1, the only two private wells that showed any elevated levels of DCA were the Miller-Jackson well #1 (site 4), and the Walker well (site 11). However, the concentrations are very low and are still below New Mexico EID Drinking Water Standards. Trace levels of tetrachloroethene were found in three private wells (sites 15, 18 and 19) located about 0.3, 1.2 and 1.5 miles west of the refinery site and trace levels of trichloroethene were also found at site 15. It is doubtful that these three private wells (sites 15, 18 and 19) were impacted by the refinery because of their distances from the site and the fact that none of the other closer private wells sampled showed any contamination from DCA or any of the other more mobile constituents.

TABLE F-1

SUMMARY OF NMEID PRIVATE WELL ANALYSES

(April and May 1987)

Reference No. on Map[1]	Owner	Analytical Results[2]
1	P. Pickard	ND
2	J. Frasure	ND
3	C. Christensen	ND
4	Miller- Jackson #1	1,2-dichloroethane = 8 ug/l
5	J. Bloomfield	ND
6	Ed. Clark	ND
7	C. Hill	ND
8	G. Nelson	ND
9	C. Brimhall (city water)[6]	ND
10	J. Davis	ND
11	W. Walker	1,2-dichloroethane = 1 ug/l[3]
12	D. Pilcher	ND
13	D. Howell	ND
14	R. Tracey	ND
15	H. Caston	(4,5)
16	J. Fleming	ND
17	T. Reynold	ND
18	B. Laudenslager	(5)
19	K. Decker	(5)
20	C. Grubb	ND
21	K. Sweek	ND
22	V. Lucero	ND
23	G. Bloomfield	ND
24	T. Guillory	ND

Footnotes:

(1) Approximate sample site locations shown on Plate F-1

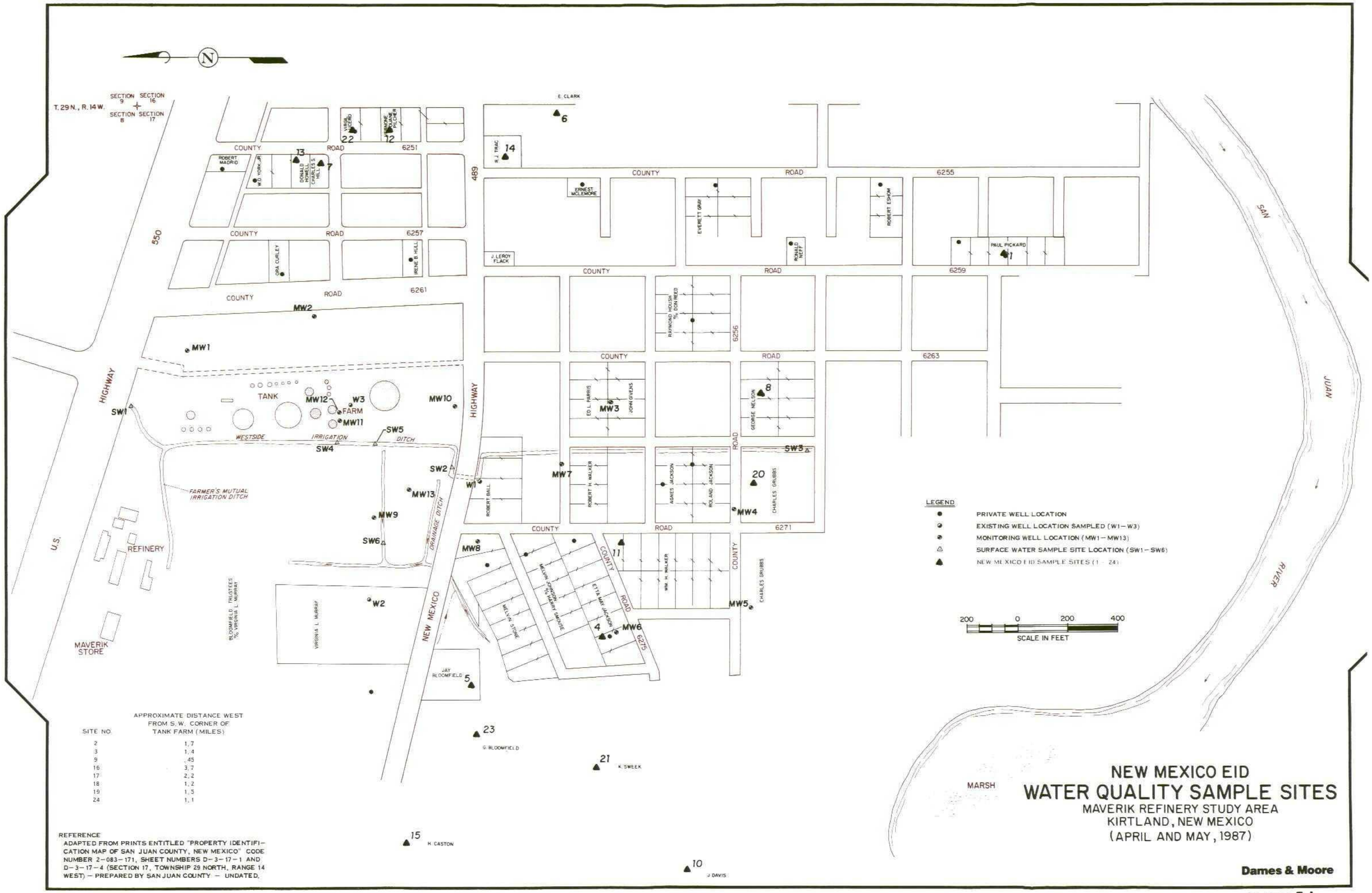
(2) ND = No specific aromatic or halogenated purgeable organics found above detection limits of 1 ug/l for aromatics and 0.5 ug/l for halogenated compounds.

(3) Sample taken 12/12/85 by the New Mexico EID indicated presence of this compound at 9 ug/l.

(4) Trace of trichloroethane found.

(5) Trace of tetrachloroethene found.

(6) As per discussion with Len Murray, New Mexico EID Farmington, New Mexico, C. Brimhall's water line was connected to city water at the time of sampling.



SITE NO.	APPROXIMATE DISTANCE WEST FROM S.W. CORNER OF TANK FARM (MILES)
2	1.7
3	1.4
9	.45
16	3.7
17	2.2
18	1.2
19	1.5
24	1.1

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.

NEW MEXICO EID
WATER QUALITY SAMPLE SITES
MAVERIK REFINERY STUDY AREA
KIRTLAND, NEW MEXICO
(APRIL AND MAY, 1987)

Dames & Moore

PLATE F-1

NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

Post Office Box 968
Santa Fe, New Mexico 87504-0968

ENVIRONMENTAL IMPROVEMENT DIVISION

Michael J. Burkhart
Director

GARREY CARRUTHERS
Governor

LARRY GORDON
Secretary

CARLA L. MUTH
Deputy Secretary

October 7, 1987

William Call, President
Caribou Four Corners, Inc.
Post Office Box 457
Afton, Wyoming 83110

Re Kirtland Refinery

Dear Mr. Call:

Please find enclosed the results of our private well sampling program in Kirtland, N.M. The residences are identified by County Road and lot numbers.

Mr. Stuart Castle with the Division's Drinking Water Section will furnish you with information on the households that need to be hooked up to public water or need to be reimbursed for hooking up within the next week.

I realize that you are somewhat behind on the site investigation schedule originally proposed by Dames and Moore. Please send me a revised schedule.

If there is anything else that I can do to assist you or your consultant, please let me know.

Sincerely,

Dennis McQuillan

Dennis McQuillan, Geologist
Ground Water Bureau

c.c. w/enc.
Pete Olsen, Dames and Moore, Salt Lake City office
c.c. w/o enc.
Stuart Castle, Drinking Water Section
Steve Cary, CERCLA Section
David Tomko, EID Farmington Office
Dave Boyer, OCD
Jennifer Pruett, Office of General Counsel

87-0775-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

REC

REPORT TO: David Tomko
EID
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 779
DATE REC. 5-1-87
PRIORITY 2
PHONE(S): 327-9851

COLLECTION CITY: Kirtland ; COUNTY: San Juan

COLLECTION DATE/TIME CODE: (Year-Month-Day-Hour-Minute) | 8 | 7 | 0 | 5 | 0 | 4 | 1 | 1 | 5 | 0 |

LOCATION CODE: (Township-Range-Section-Tracts) | 2 | 9 | N | + | 1 | 4 | W | + | 1 | 7 | + | | | | (10N06E24342)

USER CODE: | 5 | 9 | 3 | 0 | 0 | SUBMITTER: Len Murray CODE: | | | |

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER: _____

This form accompanies 2 Septum Vials, _____ Glass Jugs, and/or _____ _____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [X] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Headspace (1-5 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: vials; PP-1 & PP-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water uk ft.; Depth of well uk ft.; Perforation Interval ____-____ft.; Casing: uk

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Paul Pickard wellhouse tap, CR 6259 #52

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Len Murray Method of Shipment to the Lab: Courier

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] OR Seals Intact: Yes [ ] No [ ]

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 779

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	N.D.		
halogenated purgeables	N.D.		
* DETECTION LIMIT * ✳	1 µg/L	+ DETECTION LIMIT - +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☑ Seal(s) broken by: not sealed date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 5/12/87. Analyst's signature: Larry C Eden

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this block.

Reviewers signature: Richard Wright-Lee

87-0700-C

ENVIRONMENT

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

RECEIVED

37

REPORT TO: David Tonko
EID
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 710
DATE REC. 5-7-87
PRIORITY 2
PHONE(S): 327-5851

COLLECTION CITY: Farmington ; COUNTY: San Juan

COLLECTION DATE/TIME CODE: (Year-Month-Day-Hour-Minute) 87|05|04|09|00

LOCATION CODE: (Township-Range-Section-Tracts) 29N+13W+16+ (10N06E24342)

USER CODE: 520111 SUBMITTER: Lew Murray CODE:

SAMPLE TYPE: WATER [X] SOIL [ ], FOOD [ ], OTHER:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [X] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Headspace (1-5 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ]
- [ ]
- [ ]
- [ ]

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: Vials: Blank-1 & Blank-2, distilled water

FIELD DATA:

pH=____; Conductivity=____umho/cm at ____°C; Chlorine Residual=____mg/l

Dissolved Oxygen=____mg/l; Alkalinity=____mg/l; Flow Rate____ ____/____

Depth to water ____ft.; Depth of well____ft.; Perforation Interval ____-____ft.; Casing:____

Sampling Location, Methods and Remarks (i.e. odors, etc.)

EID Field Office, 724 W. Animas

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab: Private

CHAIN OF CUSTODY

I certify that this sample was transferred from ____ to ____

at (location) ____ on ____/____/____ - ____ ____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] OR Seals Intact: Yes [ ] No [ ]

Signatures ____ ____

ANALYSES PERFORMED

LAB. No.: OR- 780

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
Aromatic purgeables	N.D.		
Halogenated Purgeables	N.D.		
* DETECTION LIMIT *	1 µg/L	+ DETECTION LIMIT +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒ Seal(s) broken by: not sealed date: _____

I certify that I followed standard laboratory procedures for handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 5/12/87 Analyst's signature: Gary C. Edens

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this block.

Reviewers signature: Richard Meyerson MAY 22 1987

87-0781-C

ENVIRONMENT

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

REC

REPORT TO: David Tonko
EID
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 781
DATE REC. 5-7-87
PRIORITY 2
PHONE(S): 327-9851

COLLECTION CITY: Kirtland ; COUNTY: San Juan

COLLECTION DATE/TIME CODE: (Year-Month-Day-Hour-Minute) 87|05|04|10|46

LOCATION CODE: (Township-Range-Section-Tracts) 29N+14W+18+ | | (10N06E24342)

USER CODE: 5201 SUBMITTER: Lew Murray CODE:

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____ ____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [X] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Headspace (1-5 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ]
- [ ]
- [ ]
- [ ]

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: Vials: JF-1 & JF-2

FIELD DATA:

pH=____; Conductivity=____umho/cm at ____°C; Chlorine Residual=____mg/l

Dissolved Oxygen=____mg/l; Alkalinity=____mg/l; Flow Rate____ ____/____

Depth to water UK ft.; Depth of well UK ft.; Perforation Interval ____-____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

James Fossure wellhouse tap, CR 6332, #44

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab: Purolator

CHAIN OF CUSTODY

I certify that this sample was transferred from ____ to ____

at (location) ____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] OR Seals Intact: Yes [ ] No [ ]

Signatures ____ ____

ANALYSES PERFORMED

LAB. No.: OR- 781

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Headspace (1-5 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	N.D.		
halogenated purgeables	N.D.		
* DETECTION LIMIT *	1 ppb/L	+ DETECTION LIMIT -	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Not Sealed ☐ Intact: Yes ☐ No ☐ Seal(s) broken by: not sealed date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 5/12/87 Analyst's signature: Mary C Edson

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this block.

Reviewers signature: K Meyer Edson MAY 22 1987

87-0782-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

754 - 4 pH

REPORT TO: David Tomko
EID
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR-782
DATE REC. 5-7-87
PRIORITY 2
PHONE(S): 327-9851

COLLECTION CITY: Kirtland ; COUNTY: San Juan

COLLECTION DATE/TIME CODE: (Year-Month-Day-Hour-Minute) 87|05|04|11|35

LOCATION CODE: (Township-Range-Section-Tracts) 29N+14W+18+ (10N06E24342)

USER CODE: 52011 SUBMITTER: Len Murray CODE:

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Headspace (1-5 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ]
- [ ]
- [ ]
- [ ]

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: Vials: CC-1 & CC-2

FIELD DATA:

pH=____; Conductivity=____umho/cm at ____°C; Chlorine Residual=____mg/l

Dissolved Oxygen=____mg/l; Alkalinity=____mg/l; Flow Rate____ ____/____

Depth to water UK ft.; Depth of well UK ft.; Perforation Interval ____-____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Charlotte Christensen wellhouse tap, CR 6330, #26

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Len Murray Method of Shipment to the Lab: Parcelator

CHAIN OF CUSTODY

I certify that this sample was transferred from ____ to ____

at (location) ____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] OR Seals Intact: Yes [ ] No [ ]

Signatures ____ ____

ANALYSES PERFORMED

LAB. No.: OR- 782

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	N.D.		
halogenated purgeables	N.D.		
* DETECTION LIMIT *	1 µg/L	+ DETECTION LIMIT +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☑ Seal(s) broken by: not sealed date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 5/12/87 . Analyst's signature: Henry C. Edens

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this block.

Reviewers signature: K Meyer MAY 22 1987

87-0561-C

mail ✓

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO — HEALTH ENVIRONMENT

754

REPORT TO: Dave Tomko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 561 A+B
DATE REC. 4-8-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 59300

SUBMITTER: Lew Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870406/1053/EM

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N/14W+/17+ (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: M-J-1 and M-J-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water 6 ft.; Depth of well 45 ft.; Perforation Interval ____-____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Miller-Jackson well #1, wellhouse Tap, no observable odor or color
CR 6271

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

RECEIVED
MAY 2 1987
LIQUID WASTE/GROUND WATER SURVEILLANCE

CHAIN OF CUSTODY

I certify that this sample was transferred from to

at (location) on ____/____/____ - ____:____ and

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures

ANALYSES PERFORMED

LAB. No.: OR- 561

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☐ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
halogenated purgables	N D		
aromatic purgables	N.D		
1,2 dichloroethane	8		
* DETECTION LIMIT * ✳	1ppb	+ DETECTION LIMIT + +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☑ Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4/20/87 Analyst's signature: Jeanne Barera

I certify that I have reviewed and concur with the analytical results for this sample and with the statements on this page.

Reviewers signature: K Meyer Lin

87-0564-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Tomko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 564 A+B
DATE REC. 4-8-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 519301

SUBMITTER: Len Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870406/545LEM

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N+/14W+/7+ (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials; JB-1 and JB-2

FIELD DATA:

pH= ; Conductivity= umho/cm at °C; Chlorine Residual= mg/l

Dissolved Oxygen= mg/l; Alkalinity= mg/l; Flow Rate /

Depth to water 3 ft.; Depth of well 30 ft.; Perforation Interval - ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Jay Bloomfield wellhouse tap, CR 6100, #333

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Len Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, Glass Jugs, and/or

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from to

at (location) on / / - : and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures

ANALYSES PERFORMED

LAB. No.: OR- 564

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☑ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
Aromatic purgeables	N D		
halogenated purgeables	N D		
1,2 Dichloroethane	T.R.		
* DETECTION LIMIT * ✳	1 ppb	+ DETECTION LIMIT + +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☑. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4/20/87. Analyst's signature: Jeanne Barrera

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this

Reviewers signature: R Meyerhein

87-0566-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Tomko
Environmental Improvement Div
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 566 A+B
DATE REC. 4-8-87
PRIORITY 2

PHONE(S): 327-4961
USER CODE: 593000
SUBMITTER: Len Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870406161545EM

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N+14W+17+ (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Purgeables (1-3 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ]
- [ ]
- [ ]
- [ ]

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (760) Organochlorine Pesticides
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: Vials: EC-1 and EC-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ _____/_____

Depth to water UK ft.; Depth of well UK ft.; Perforation Interval _____-_____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

E. Clark well tap, CR 6100, #293. No observable odor or color

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Len Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____ _____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] Seals Intact: Yes [ ] No [ ]

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 566

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☑ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
Aromatic purgeables	ND		
Halogenated purgeables	ND		
1,2 Dichloroethane	ND		
* DETECTION LIMIT *	1 ppb	+ DETECTION LIMIT +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☑. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4/20/87 . Analyst's signature: Joanne Barrera

I certify that I have reviewed and concur with the analytical results for this sample and with the statements on this page.

Reviewer's signature: L. Meyer Lilly

87-0560-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

RECEIVED APR - 8 1987 STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Tomko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR-560 A+B

DATE REC. 4-8-87

PRIORITY 2

PHONE(S): 327-9851

USER CODE: 5 9 3 0 0

SUBMITTER: Lew Murray

CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8 7 0 4 0 6 / 1 4 2 5 L E M

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 2 9 N + / 1 4 W + / 1 7 + (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: vials: CH-1 and CH-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water 4 ft.; Depth of well 32 ft.; Perforation Interval ____-____ft.; Casing: 20 ft.

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Charles Hill wellhouse Tap, CR 6251, #17. No observable odor or color

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____ ____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from to

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 560

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☑ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
halogenated purgables	N.D		
aromatic purgables	N.D		
1,2 Dichloroethane	N.D		
* DETECTION LIMIT * ✳	1 ppb	+ DETECTION LIMIT + +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☑ Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4/20/87 Analyst's signature: Joanne Barrera

I certify that I have reviewed and concur with the analytical results for this sample and with the statements on this page.

Reviewer signature: K Meyerhen

87-0562-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO ENVIRONMENT

754

REPORT TO: David Tomko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 562 A+B
DATE REC. 4-8-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 5 9 3 0 0

SUBMITTER: John Nelson
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8 7 0 4 0 6 1 4 3 0 J S N

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 2 9 N + 1 4 W + 1 7 + (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: N-1 and N-2. Bubbles in vials.

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water uk ft.; Depth of well uk ft.; Perforation Interval ____-____ft.; Casing: uk

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Nelson wellhouse Tap, CR 6263 . No observable odor or color

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Mike E. Nelson Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 562

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☑ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatics purgables	ND		
halogenated purgables	ND		
1,2 Dichloroethane	N.D		
* DETECTION LIMIT * ✳	1 ppb	+ DETECTION LIMIT + +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☑ Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4/20/87 . Analyst's signature: Jeanne Barresi

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this block.

Reviewers signature: K Meyerhein

87-0563-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

HEALTH ENVIRONMENT — STATE OF NEW MEXICO

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 563 A+B

DATE REC. 4-8-87

PRIORITY 2

PHONE(S): 327-9851

USER CODE: 5 9 3 0 0

SUBMITTER: Lew Murray

CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8 7 0 4 0 6 / 1 6 0 0 / E M

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 2 9 N + / 1 4 W + / 1 7 + (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: CB-1 and CB-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water 12 ft.; Depth of well 60 ft.; Perforation Interval ____-____ft.; Casing: 30 ft.

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Cleo Brimhall house tap, CR 6100, # 336. No observable odor or color

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 563

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☑ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND		
halogenated purgeables	ND		
1,2 Dichloroethane	ND		
* DETECTION LIMIT * ✳	1 ppb	+ DETECTION LIMIT + +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☐ Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4/20/87 Analyst's signature: Jeanne Barrera

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this

Reviewers signature: [illegible]

87-0567-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Tomko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 567 A+B
DATE REC. 4-8-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 5 9 3 0 0

SUBMITTER: Lew Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8 7 0 4 0 7 1 0 0 5 L E M

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 2 9 N + 1 4 W + 1 7 + (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: JD-1 and JD-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water 20 ft.; Depth of well 43 ft.; Perforation Interval ____-____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

John Davis house Tap, CR 6295, #7, No observable odor or color

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____ _____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 567

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☑ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
Aromatic purgeables	ND		
halogenated purgeables	ND		
1,2 Dichloroethane	ND		
* DETECTION LIMIT * ✳	1ppb	+ DETECTION LIMIT + †	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☑ Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4/20/87 Analyst's signature: Jeanne Barrera

I certify that I have reviewed and concur with the analytical results for this sample and with the statements on this

Reviewers signature: K. Mayerhofer

87-0631-C

RECEIVED MAY 2

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Tomko
Environmental Improvement Div
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 87.631
DATE REC. 4-16-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 593000
SUBMITTER: Len Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870413/1205EM

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N+14W+17+ (10N06E24312)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: EW-1 & EW-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ _____/_____

Depth to water UK ft.; Depth of well UK ft.; Perforation Interval _____-_____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Bill & Ellen Walker well house tap, County Road 6271

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Len Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, _____ Glass Jugs, and/or _____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 631

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND		
1,2-dichloroethane	1 ppb		
aromatic* DETECTION LIMIT * *	1 ppb	halogenated + DETECTION LIMIT + +	0.5 ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒ Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4-22-87 Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this page.

Reviewers signature: _____ MAY 18 1987

RECEIVED MAY 14 1987

SCIENTIFIC LABORATORY DIVISION

87-0628-C

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

NEW MEXICO ENVIRONMENT

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 628 A&B
DATE REC. 4-16-87
PRIORITY 2

PHONE(S): 327-5851
USER CODE: 519300

SUBMITTER: Len Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870413104512EM

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N+14W+17+ (10N06E21342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Purgeables (1-3 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ]
- [ ]
- [ ]
- [ ]

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (760) Organochlorine Pesticides
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: Vials: DP-1 & DP-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water UK ft.; Depth of well UK ft.; Perforation Interval ____-____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Duane Pilcher wellhouse tap, CR 6251, #2

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Len Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] Seals Intact: Yes [ ] No [ ]

Signatures _____ _____

need better 5-15-87

ANALYSES PERFORMED

LAB. No.: OR- 626

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND*		
halogenated purgeables	ND+		
* DETECTION LIMIT *	1ppb	+ DETECTION LIMIT +	0.5ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4-22-87. Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this

Reviewers signature: _____ MAY 8 1987

RECEIVED MAY 14 1987

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

87-0632-C

NEW MEXICO ENVIRONMENT

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 632 #46
DATE REC. 4-16-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 519300

SUBMITTER: Lew Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870413083024EM

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:

COUNTY: San Juan ; CITY: Farmington

LOCATION CODE: (Township-Range-Section-Tracts) 29N+13W+16+ (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Purgeables (1-3 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ]
- [ ]
- [ ]
- [ ]

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (760) Organochlorine Pesticides
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: Vials: Blanks 1 & 2 - Distilled Water
1 vial broken in transit

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water _____ft.; Depth of well_____ft.; Perforation Interval _____-_____ft.; Casing:_____

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Farmington Field Office

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities. (Signature collector) Lew Murray Method of Shipment to the Lab:_____

This box accompanies 2 Septum Vials, _____ Glass Jugs, and/or _____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed: [ ] Seals Intact: Yes [ ] No [ ]

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 632

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	N.D		
halogenated purgeables	N.D		
aromatic • DETECTION LIMIT • *	1 ppb	halogenated + DETECTION LIMIT + +	0.5 ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4-22-87. Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this block

Reviewers signature: _____ MAY 8 1987

mail

RECEIVED APR 14 1987 ENVIRONMENT

SCIENTIFIC LABORATORY DIVISION

87-0629-C NEW MEXICO

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 629 A413

DATE REC. 4-16-87

PRIORITY 2

PHONE(S): 327-9851

USER CODE: 5 9 3 0 0

SUBMITTER: Lew Murray

CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8 7 0 4 1 3 1 0 0 5 2 E M

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 2 9 N + 1 4 W + 1 7 + (10N06E24312)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: DH-1 & DH-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water 7 ft.; Depth of well 20 ft.; Perforation Interval ____-____ft.; Casing: 20'

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Donald Howell wellhouse tap, CR 6255, #44

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐, Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 629

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND *		
halogenated purgeables	ND +		
* DETECTION LIMIT *	1ppb	+ DETECTION LIMIT +	0.5ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4-22-87. Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this

Reviewers signature: K Meyerhofer MAY 8 1987

mail RECEIVED 1 + 1987 87-0627-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

ENVIRONMENT

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 627 A4L3
DATE REC. 4-16-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 519300

SUBMITTER: Lew Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870413095041EM

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N+14W+17+ (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: RT-1 & RT-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water UK ft.; Depth of well UK ft.; Perforation Interval ____-____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Ruth Tracy wellhouse tap, CR 6255, #2

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 627

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
Aromatic Purgeables	ND *		
halogenated purgeables	ND +		
* DETECTION LIMIT *	* 1 ppb	+ DETECTION LIMIT +	+ 0.5 ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: Three or four other compounds were detected by the halogenated screen in one of the duplicate samples that were not identified, because the sample was improperly i.e. the septum was upside down. One other compound was detected by the halogenated screen that was not identified that appears to be lab contamination, i.e. from the other duplicate sample.

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 21 & 24 Apr 87 Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this book.

Reviewers signature: _____

no mail

RECEIVED MAY 14 1987

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

87-0630-C

NEW MEXICO ENVIRONMENT

REPORT TO: David Tomko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 630 A+B
DATE REC. 4-16-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 59300

SUBMITTER: Len Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870413113135LEM

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N+14W+17+ (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Purgeables (1-3 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ]
- [ ]
- [ ]
- [ ]

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (760) Organochlorine Pesticides
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: vials; HC-1 & HC-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water 18 ft.; Depth of well 40 ft.; Perforation Interval ____-____ft.; Casing: 40 ft.

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Henry Caston Wellhouse tap, CR 6100, #351

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Len Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [X], Seals Intact: Yes [ ] No [ ]

Signatures _____

ANALYSES PERFORMED

LAB. No.: OR- 630

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND *		
Trichloroethene	TR		
Tetrachloroethene	TR		
aromatic* DETECTION LIMIT * *	1 ppb	halogenated+ DETECTION LIMIT + +	0.5 ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4-22-87. Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this

Reviewers signature: R Meyerhus MAY 8 1987

87-0683-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Bonko
Environmental Improvement Div.
724 N. Animas
Farmington, NM 87401

S.L.D. No. OR- 615.683
DATE REC. 4-24-87
PRIORITY 2

PHONE(S): 327-5351
USER CODE: 520111
SUBMITTER: Lew Murray
CODE:
SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870420083OLEM
SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:
COUNTY: San Juan ; CITY: Farmington
LOCATION CODE: (Township-Range-Section-Tracts) (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Purgeables (1-3 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ]
- [ ]
- [ ]
- [ ]

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (760) Organochlorine Pesticides
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: Vials: B-1 & B-2 Blank

FIELD DATA:

pH=____; Conductivity=____umho/cm at ____°C; Chlorine Residual=____mg/l

Dissolved Oxygen=____mg/l; Alkalinity=____mg/l; Flow Rate____ ____/____

Depth to water NA ft.; Depth of well NA ft.; Perforation Interval ____-____ft.; Casing: NA

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Farmington Field Office Distilled water

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from ____ to

at (location) ____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] Seals Intact: Yes [ ] No [ ]

Signatures ____

ANALYSES PERFORMED

LAB. No.: OR- 683

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND		
halogenated purgeables	ND		
aromatic* DETECTION LIMIT *	1ppb	halogenated+ DETECTION LIMIT +	0.5ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒ Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4-24-87 Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this block

Reviewers signature: _____ MAY 8 1987

87-0682-C

NC mail ✓

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

RECEIVED ... STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Tomko
Environmental Improvement Div
724 W. Aztec
Farmington, NM 87401

S.L.D. No. OR: Wg. 682
DATE REC. 4-24-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 5201111
SUBMITTER: Lew Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8704201041040LEM

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Fruitland

LOCATION CODE: (Township-Range-Section-Tracts) 29N+15W+12+ (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Trinzines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: JF-1 & JF-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water 3 ft.; Depth of well 33 ft.; Perforation Interval ____-____ft.; Casing: 33'

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Jeff Fleming wellhouse tap, #34 CR 6675

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 682

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND		
halogenated purgeables	ND		
aromatic * DETECTION LIMIT *	1ppb	halogenated DETECTION LIMIT +	.5ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4-24-87. Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this report.

Reviewers signature: _____ MAY 8 1987

87-0681-C 754 no mil

RECEIVED MAY 14 1987

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 87.681
DATE REC. 4-24-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 5201 1 1

SUBMITTER: Lew Murray
CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8704201 1 0 0 4 E M

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:

COUNTY: San Juan; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N + 15W + 13 + (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Purgeables (1-3 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ]
- [ ]
- [ ]
- [ ]

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (760) Organochlorine Pesticides
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: Vials: CR-1 & CR-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ _____/_____

Depth to water 7 ft.; Depth of well 30 ft.; Perforation Interval _____-_____ft.; Casing: 25'

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Tom & Chris Reynold wellhouse tap, #8 CR6553

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, _____ Glass Jugs, and/or _____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] Seals Intact: Yes [ ] No [ ]

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 681

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND		
halogenated purgeables	ND		
aromatic DETECTION LIMIT *	1 ppb	halogenated DETECTION LIMIT +	0.5 ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4-24-87. Analyst's signature: M. Turner

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in the

Reviewers signature: K Meyaher

87-0678-C

RECEIVED MAY 14 1987

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Tomko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 6275.673
DATE REC. 4-24-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 5201 / / /

SUBMITTER: Lew Murray
CODE: / / /

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870420 / 2 / 5 LEM

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER: ____

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N+ / 14W+ / 8+ / / / (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Purgeables (1-3 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ] ____
- [ ] ____
- [ ] ____
- [ ] ____

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (760) Organochlorine Pesticides
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: Vials: BL-1 & BL-2

FIELD DATA:

pH=____; Conductivity=____umho/cm at ____°C; Chlorine Residual=____mg/l

Dissolved Oxygen=____mg/l; Alkalinity=____mg/l; Flow Rate____ ____/____

Depth to water UK ft.; Depth of well 30 ft.; Perforation Interval ____-____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Bernard Laudenslager wellhouse tap, #23 CR 6319

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab: ____

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____ ____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from ____ to ____

at (location) ____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] Seals Intact: Yes [ ] No [ ]

Signatures ____ ____

ANALYSES PERFORMED

LAB. No.: OR- 678

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND		
Tetrachloroethene	TR		
aromatic* DETECTION LIMIT *	* 1ppb	halogenated+ DETECTION LIMIT +	+ 0.5ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 6/21-27. Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this report.

Reviewers signature: K Meyerhen

87-0680-C 754 mail

RECEIVED MAY 14 1987

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 87,612
DATE REC. 4-24-87
PRIORITY 2
PHONE(S): 327-9851
USER CODE: 52011
SUBMITTER: Lea Murray
CODE:
SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870420114045M
SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:
COUNTY: San Juan ; CITY: Kirtland
LOCATION CODE: (Township-Range-Section-Tracts) 29N+14W+07+ (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Purgeables (1-3 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes

Other Specific Compounds or Classes

- [X] 1,2-Dichloroethane
- [ ]
- [ ]
- [ ]
- [ ]

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (760) Organochlorine Pesticides
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks: Vials: KD-1 & KD-2

FIELD DATA:

pH= ; Conductivity= umho/cm at °C; Chlorine Residual= mg/l

Dissolved Oxygen= mg/l; Alkalinity= mg/l; Flow Rate /

Depth to water UK ft.; Depth of well 25 ft.; Perforation Interval - ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Kenneye Decker wellhouse tap, #20 CR 6353

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities (signature collector): Lea Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, Glass Jugs, and/or

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from to

at (location) on / / - : and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] Seals Intact: Yes [ ] No [ ]

Signatures

mail Contract 5-19-87

ANALYSES PERFORMED

LAB. No.: OR- 680

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND		
tetrachloroethene	TR		
aromatic* DETECTION LIMIT *	* 1ppb	halogenated+ DETECTION LIMIT +	+ 0.5 ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: There is a possible trace amount of one of the compound that was detected by the halogenated screen that was not identified

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4-24-87. Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this

Reviewers signature: _____

87-0565-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO ENVIRONMENT

REPORT TO: David Tomko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 565 A+B
DATE REC. 4-8-87
PRIORITY 2

PHONE(S): 327-9851

USER CODE: 5 9 3 0 0

SUBMITTER: Lew Murray

CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8 7 0 4 0 6 1 4 4 0 L E M

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 2 9 N + 1 4 W + 1 7 + (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: CG-1 and CG-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water uk ft.; Depth of well uk ft.; Perforation Interval ____-____ft.; Casing: uk

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Charles Grubbs wellhouse tap, CR 6271. No observable odor or color

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____ _____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 565

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☑ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
Aromatic purgeables	ND		
halogenated purgeables	ND		
1,2 Dichloroethane	ND		
* DETECTION LIMIT *	* 1 ppb	+ DETECTION LIMIT +	+

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☑. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4/30/87. Analyst's signature: Jeanne Barrera

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in

Reviewers signature: K Mayer Hibbs

87-0559-C

RECEIVED MAY - 4 1987 by

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

754

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 559 A+B
DATE REC. 4-8-87
PRIORITY 2

PHONE(S): 327-9851
USER CODE: 5 9 3 0 0
SUBMITTER: Len Murray
CODE:
SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8 7 0 4 0 6 / 5 / 5 < E M
SAMPLE TYPE: WATER ☒ SOIL ☐, FOOD ☐, OTHER:
COUNTY: San Juan ; CITY: Kirtland
LOCATION CODE: (Township-Range-Section-Tracts) 2 9 N+ / 1 4 W+ / 1 7 + (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: KS-1 and KS-2

FIELD DATA:

pH=_____; Conductivity=_____ mmho/cm at _____ °C; Chlorine Residual=_____ mg/l

Dissolved Oxygen=_____ mg/l; Alkalinity=_____ mg/l; Flow Rate_____ _____/_____

Depth to water 3 ft.; Depth of well 30 ft.; Perforation Interval _____-_____ ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Ken Sweek wellhouse tap, CR 6291, #7. No observable odor or color.

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Len Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, _____ Glass Jugs, and/or _____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice: Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$: Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 559

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☑ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
halogenated purgables	N.D		
aromatic purgables	N.D		
1,2 dichloroethane	N.D		
* DETECTION LIMIT *	* 1 ppb	+ DETECTION LIMIT +	+

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) ~~Intact~~: Yes ☐ No ☐. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4/20/87. Analyst's signature: Jeanne Barrera

I certify that I have reviewed and concur with the analytical results for this sample and with the statements on

Reviewers signature: K Meyerhofer

mail RECEIVED MAY 14 1987 87-0624-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

HEALTH & ENVIRONMENT — STATE OF NEW MEXICO

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 624 A 4 13

DATE REC.

PRIORITY 2

PHONE(S): 327-9851

USER CODE: 59300

SUBMITTER: Len Murray

CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870413/0251EM

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N+14W+17+ (10N06E21312)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: VL-1 & VL-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water 2' ft.; Depth of well 40 ft.; Perforation Interval ____-____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Virgil Lucero wellhouse tap, CR 625/, #14

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Len Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 624

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND *		
halogenated purgeables	ND +		
* DETECTION LIMIT *	1 ppb	+ DETECTION LIMIT +	.5 ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 21-24 Apr 87. Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this

Reviewers signature: _____ MAY 8 1987

RECEIVED MAY 1 4 1987

SCIENTIFIC LABORATORY DIVISION

87-0626-C

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

ENVIRONMENT

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 6-26 A+B

DATE REC.

PRIORITY 2

PHONE(S): 327-9851

USER CODE: 5 9 3 0 0

SUBMITTER: Lew Murray

CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8 7 0 4 1 3 1 1 0 5 L E M

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 2 9 N + 1 4 W + 1 7 + (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials: GB-1 & GB-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water UK ft.; Depth of well 27 ft.; Perforation Interval ____-____ft.; Casing: 27'

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Glenn Bloomfield wellhouse tap, CR 6100, #337

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____ ____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 626

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND *		
halogenated purgeables	ND +		
* DETECTION LIMIT *	1 ppb	+ DETECTION LIMIT +	0.5 ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: Cyc Other compounds detected by the halogenated screen that has not been identified that appear to be lab contamination.

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 2/12/84 2/13/84 Analyst's signature: _____

I certify that I have reviewed and concur with the analytical results for this sample and with the statements on

Reviewers signature: _____

87-0679-C 154 WP9

RECEIVED MAY 14 1987

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE
Albuquerque, NM 87106 841-2570

STATE OF NEW MEXICO HEALTH ENVIRONMENT

REPORT TO: David Tonko
Environmental Improvement Div.
724 W. Animas
Farmington, NM 87401

S.L.D. No. OR- 87.679

DATE REC. 4-24-87

PRIORITY 2

PHONE(S): 327-9851

USER CODE: 5201111

SUBMITTER: Lew Murray

CODE:

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 870420 1155 EM

SAMPLE TYPE: WATER ☒, SOIL ☐, FOOD ☐, OTHER:

COUNTY: San Juan ; CITY: Kirtland

LOCATION CODE: (Township-Range-Section-Tracts) 29N+ 14W+ 07+ (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☒ 1,2-Dichloroethane
- ☐
- ☐
- ☐
- ☐

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

Remarks: Vials; TG-1 & TG-2

FIELD DATA:

pH=_____; Conductivity=_____umho/cm at _____°C; Chlorine Residual=_____mg/l

Dissolved Oxygen=_____mg/l; Alkalinity=_____mg/l; Flow Rate_____ ____/____

Depth to water 8 ft.; Depth of well 31 ft.; Perforation Interval ____-____ft.; Casing: UK

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Troy & Margie Guillory wellhouse tap, #11 CR 6345

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): Lew Murray Method of Shipment to the Lab:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- ☐ NP: No Preservation; Sample stored at room temperature.
- ☒ P-Ice Sample stored in an ice bath (Not Frozen).
- ☐ P-$Na_2S_2O_3$ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____

at (location) _____ on ____/____/____ - ____:____ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed ☐ Seals Intact: Yes ☐ No ☐

Signatures _____ _____

ANALYSES PERFORMED

LAB. No.: OR- 679

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Purgeables (1-3 Carbons)
- ☒ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes

Other Specific Compounds or Classes

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (760) Organochlorine Pesticides
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND		
halogenated purgeables	ND		
aromatic * DETECTION LIMIT *	1ppb	halogenated DETECTION LIMIT +	0.5ppb

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes ☐ No ☒. Seal(s) broken by: _____ date: _____

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 4-21-87. Analyst's signature: A. Finney

I certify that I have reviewed and concur with the analytical results for this sample and with the statements on this page.

Reviewers signature: K Meyerhen