Harding Lawson Associates

Engineering and Environmental Services

RCRA FACILITY INVESTIGATION

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

DECEMBER 1990 VOLUME I

SPARTON

SPARTON TECHNOLOGY

December 14, 1990

Mr. Guy L. Tidmore, Chief
Technical Section (6H-CX)
U.S. EPA, Region VI
1445 Ross Avenue
Dallas, Texas 75202-2733

Reference: Draft RFI Report
Sparton Technology, Inc.

Dear Mr. Tidmore:

In accordance with the provisions of the Consent Order, as amended, enclosed are six copies of the Draft RFI report for the Sparton Technology Coors Road facility located in Albuquerque, New Mexico.

SPARTON TECHNOLOGY, INC.

for Richard D. Mico
Vice President/General Manager

A Report Prepared for:

Sparton Technology, Inc.
4901 Rockaway Boulevard, SE
Rio Rancho, New Mexico

RCRA FACILITY INVESTIGATION
Sparton Technology, Inc.
Coors Road Facility
Albuquerque, New Mexico

HLA Job No. 06310,039.12

by

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December 14, 1990

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I INTRODUCTION

This report presents the findings of a RCRA Facility Investigation (RFI) conducted at the Sparton Technology, Inc. (Sparton) facility located at 9621 Coors Road, NW, in Albuquerque, New Mexico.

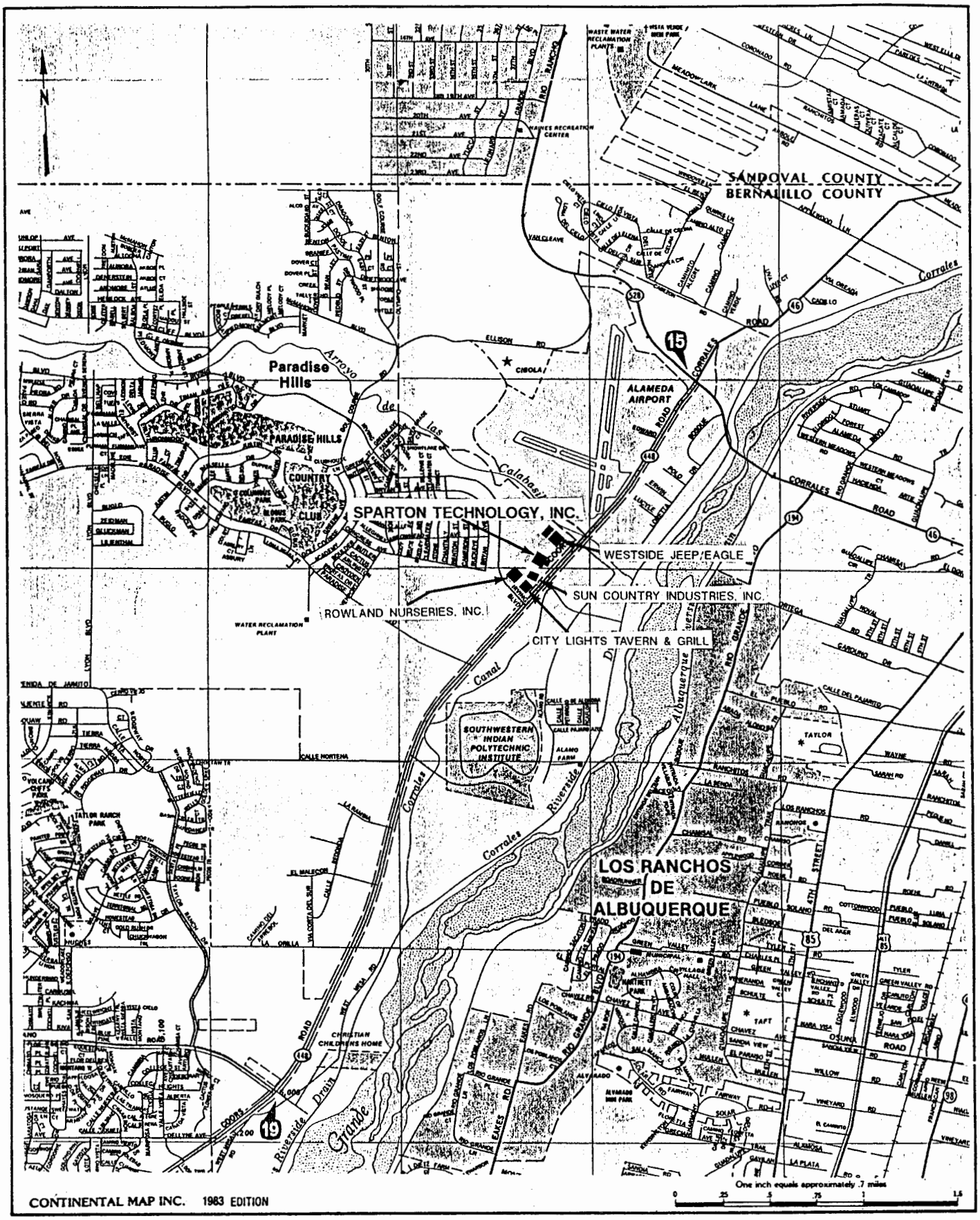
This RFI was conducted under the conditions of an Administrative Order on Consent entered into by Sparton and the U.S. Environmental Protection Agency (EPA) which became effective October 1, 1988. This report is being submitted in accordance with the provisions of that Consent Order.

II BACKGROUND

The Sparton facility is sited on an approximate 12-acre parcel of land located on the northwest side of Albuquerque, on State Highway 448, known locally as Coors Road, approximately 0.75 miles north of the intersection of Coors Road and Paseo del Norte (See Figure 1).

The Sparton facility began operation in 1961, and since that time has been engaged in the manufacture of electronic components, including printed circuit boards. The manufacturing process generates two waste streams which are managed as hazardous wastes: an aqueous metal plating waste, and a solvent waste stream. The plating wastes were stored in an in-ground concrete basin until approximately 1975. This basin was replaced by a lined surface impoundment in 1975, termed the "West Pond". A second lined surface impoundment was installed circa 1977. This pond was termed the "East Pond". Accumulated wastewater was periodically removed from the ponds via vacuum truck for off-site disposal at a permitted facility. Figure 2 shows the facility layout.

After the installation of the East Pond, the West Pond was not used again until January 1981. At that time, the West Pond was refurbished by providing a new liner and by constructing concrete sidewalls for liner support. From 1981 through August 1983, use of the two ponds was alternated so that each pond could be regularly inspected. No significant liner damage was identified during any



CONTINENTAL MAP INC. 1983 EDITION

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LOCATION MAP

SPARTON TECHNOLOGY, INC.
9621 COORS ROAD NW
ALBUQUERQUE, NEW MEXICO

FIGURE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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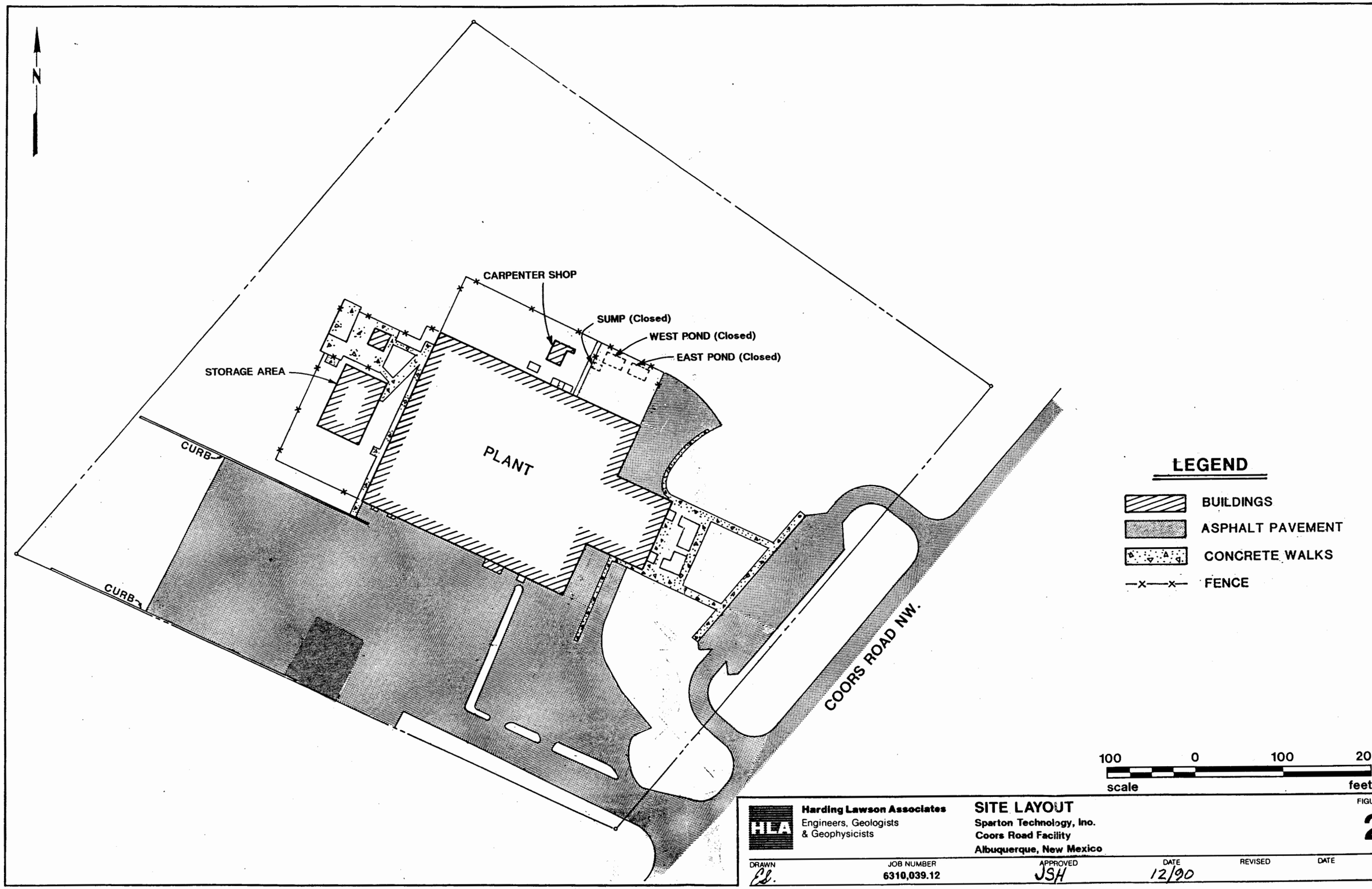

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SITE LAYOUT
Sparton Technology, Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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of these inspections. In August 1983, Sparton ceased discharging to either pond and removed the plating wastes which were in the ponds at that time. The ponds have not been used since that time. Plating wastes are currently stored in drums in an on-site "less than 90 day" storage facility prior to shipment to a permitted off-site disposal facility.

Waste solvents were accumulated in an on-site concrete sump and allowed to evaporate. Use of this sump was discontinued in 1980, at which time Sparton began to store the waste solvents in drums prior to off-site disposal at a permitted facility.

In 1983, several groundwater monitoring wells were installed around the pond and sump area to determine whether there had been a release of hazardous constituents from the ponds or the sump. Analytical results from groundwater samples taken from these wells indicated concentrations of several constituents above state standards.

Since this initial finding in 1983, investigation of the nature and extent of the contamination continued through 1987. During this period, Sparton worked closely with the New Mexico Environmental Improvement Division (EID). Also during this period, the ponds were closed, and the entire pond and sump area was capped under a state-approved closure plan. In 1987, when it became apparent that contaminants had migrated beyond facility boundaries, the EPA commenced negotiations with Sparton to develop an Administrative Order on Consent. This Order was signed and became

effective on October 1, 1988. Under the provisions of this order, in early 1989 Sparton completed the installation and startup of an interim groundwater recovery well system to begin removal of contaminants from the more concentrated areas of the contaminant plume in the upper flow zone.

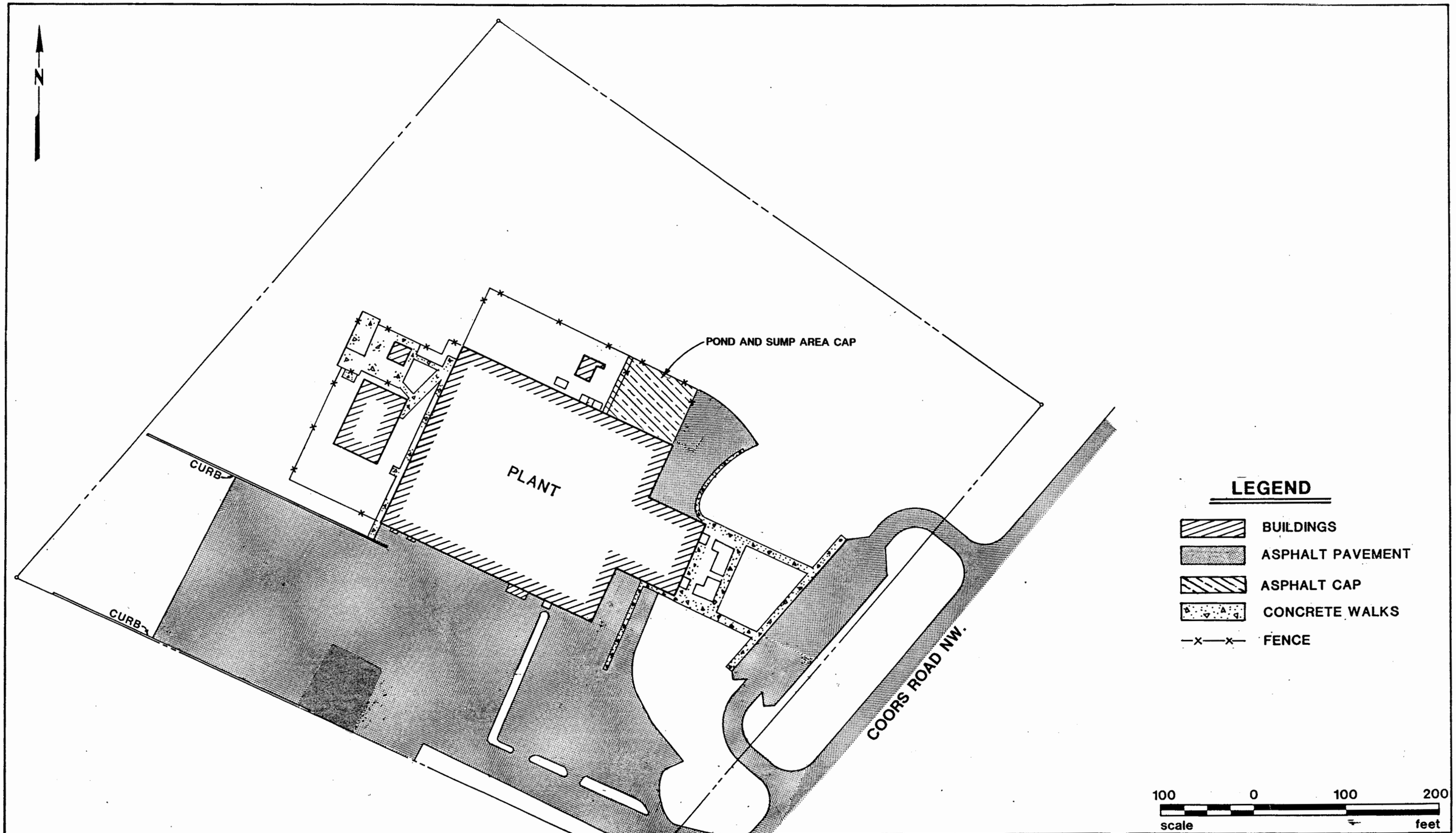
Since 1983, the results of the ongoing investigation have been published in a number of reports, copies of which have been previously furnished to EPA and EID. A list of these reports is included in Figure 3.

The remainder of this RFI report will summarize the findings of the RCRA Facility Investigation, drawing on information from previous reports where appropriate for needed detail. The purpose of the RCRA Facility Investigation is to develop the information needed to support a Corrective Measures Study.

FIGURE 3

SUMMARY OF PREVIOUSLY PUBLISHED REPORTS

Date of Publication	Report Title
6/29/83	Groundwater Monitoring Program, Sparton Southwest, Inc., 9261 Coors Road, Northwest, Albuquerque, New Mexico 87114; Harding Lawson Associates
3/19/84	Investigation of Soil and Groundwater Contamination, Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico; Harding Lawson Associates
3/13/85	Hydrogeologic Characterization and Remedial Investigation, Sparton Technology, Inc., 9621 Coors Road, Northwest, Albuquerque, New Mexico 87114 Harding Lawson Associates
6/30/86	Soil Investigation of the Unsaturated and Upper Saturated Zones, Sparton Technology, Inc., Coors Road Plant, Albuquerque, New Mexico; Harding Lawson Associates
7/15/86 Rev. 9/22/86 Rev. 10/3/86	Vertical Profiling Program, Sparton Technology, Inc., Albuquerque, New Mexico; Harding Lawson Associates
4/87	Aquifer Testing, Sparton Technology, Inc., Coors Road Plant, Albuquerque, New Mexico; Metric Corporation
7/23/87	Corrective Measures Study Report, Sparton Technology, Inc., Coors Road Plant, Albuquerque, New Mexico; Harding Lawson Associates
10/19/87	Off-Site Investigation, Sparton Technology, Inc., Coors Road Plant, Albuquerque, New Mexico; Harding Lawson Associates



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CAP AREA
Sparton Technology, Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE
4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE

III SOURCE CHARACTERIZATION

A. Description of Ponds and Sump

The pond and sump area at the Coors Road facility is believed to be the source of soil and groundwater contamination at the site. The pond and sump area is located on the north side of the main building (See Figure 2).

The East and West ponds were used to store aqueous plating wastes from the process areas. Some evaporation took place from the ponds, but the aqueous wastes were routinely removed on an approximate monthly basis and shipped off-site to a permitted disposal facility.

The location of the ponds, or surface impoundments, is shown in Figure 2. Each of these two adjacent ponds was approximately 19 feet by 28 feet in surface dimension, and approximately 5 to 6 feet deep. The top of each pond was flush with the ground surface. The ponds had vertical concrete walls and a natural sand bottom. The ponds and the area between the ponds were lined with a 30-mil, two-ply Hypalon^{R} membrane, and a one-ply, polyester, scrim liner. A sloped sand backfill within the concrete walls provided support for the liner.

The solvent storage sump was located near the ponds (See Figure 2). The sump was constructed of concrete blocks, and measured approximately 5 feet by 5 feet in surface dimension by 2

feet deep. This sump was used for storage of waste chlorinated and nonchlorinated solvents.

As described earlier, the ponds were used from approximately 1961 until August 1983, at which time discharge to the ponds ceased, and the ponds were emptied. The sump was originally closed in October 1980 by removing the remaining wastes and filling the sump with sand. Final pond and sump area closure was conducted in December 1986 under a State-approved closure plan. This closure consisted of backfilling the ponds, and the construction of an asphaltic concrete cap over the entire area to divert rainfall and surface water runon, thus minimizing infiltration of surface water into the ground in this area (See Figure 4).

B. Waste Description

The wastes which were stored in the pond and sump area are typical of electronic manufacturing facilities. The waste stream stored in the ponds was an aqueous stream from the metal plating process which contained a variety of metal ions. The sump was used to store a mixture of waste solvents from process and degreasing operations. Historical analyses of the contents of either the ponds or sump are not available, however the predominant constituents can be inferred from the groundwater analyses. Groundwater analyses were first conducted in 1983, and in 1985, routine quarterly analyses were instituted under a State-approved

program for a number of on-site monitoring wells. Results from these analyses are summarized in Attachment 1.

Based on these historical groundwater analyses, the primary hazardous constituents appear to include trichloroethylene (TCE) and 1,1,1-trichloroethane (TCA), with lesser amounts of methylene chloride (MeCl) and 1,1-dichloroethylene (DCE). Physical, chemical, and toxicological characteristics of these chemicals are presented in Attachment 2. Based on these analytical results from groundwater samples taken from on-site monitoring wells, it is apparent that the contaminant release originated primarily from the solvent storage sump.

No evidence of free-phase solvents has been found at the Sparton site. Chlorinated organic compounds are generally denser than water, and, in free phase, will sink to the bottom of a water column. Each of the compounds mentioned above found in the groundwater at the Sparton facility exhibits a specific gravity greater than 1.0. However, based on a comparison of the concentrations of these chemicals found in the groundwater and their respective solubilities, it is unlikely that any of these chemicals exist in free phase in the groundwater around the Sparton site. If any of these compounds did exist in a free phase, one would expect to see groundwater concentrations which approach the solubility limit for that compound. Figure 5 shows solubility data from several sources for the compounds of interest, along with the historical maximum concentration of each compound which has been

FIGURE 5

SOLUBILITY DATA

[---------- Solubility, mg/l ----------]				
Parameter	Hazardline	MSDSs	Lange's Handbook of Chemistry	Historical Maximum Concentration @ MW-16, mg/l
TCE	1000 @ 68°F	1100 @ 77°F	1000 @ 77°F	37
TCA	700 @ 68°F	900 @ 68°F	----	30
MeCl	----	13,800 @ 68°F	20,000 @ 68°F	49
DCE	2250 @ 77°F	----	----	3.5

detected at the Sparton site. As can be seen from these data, the maximum concentrations detected are, at most, less than five percent of the solubility limits.

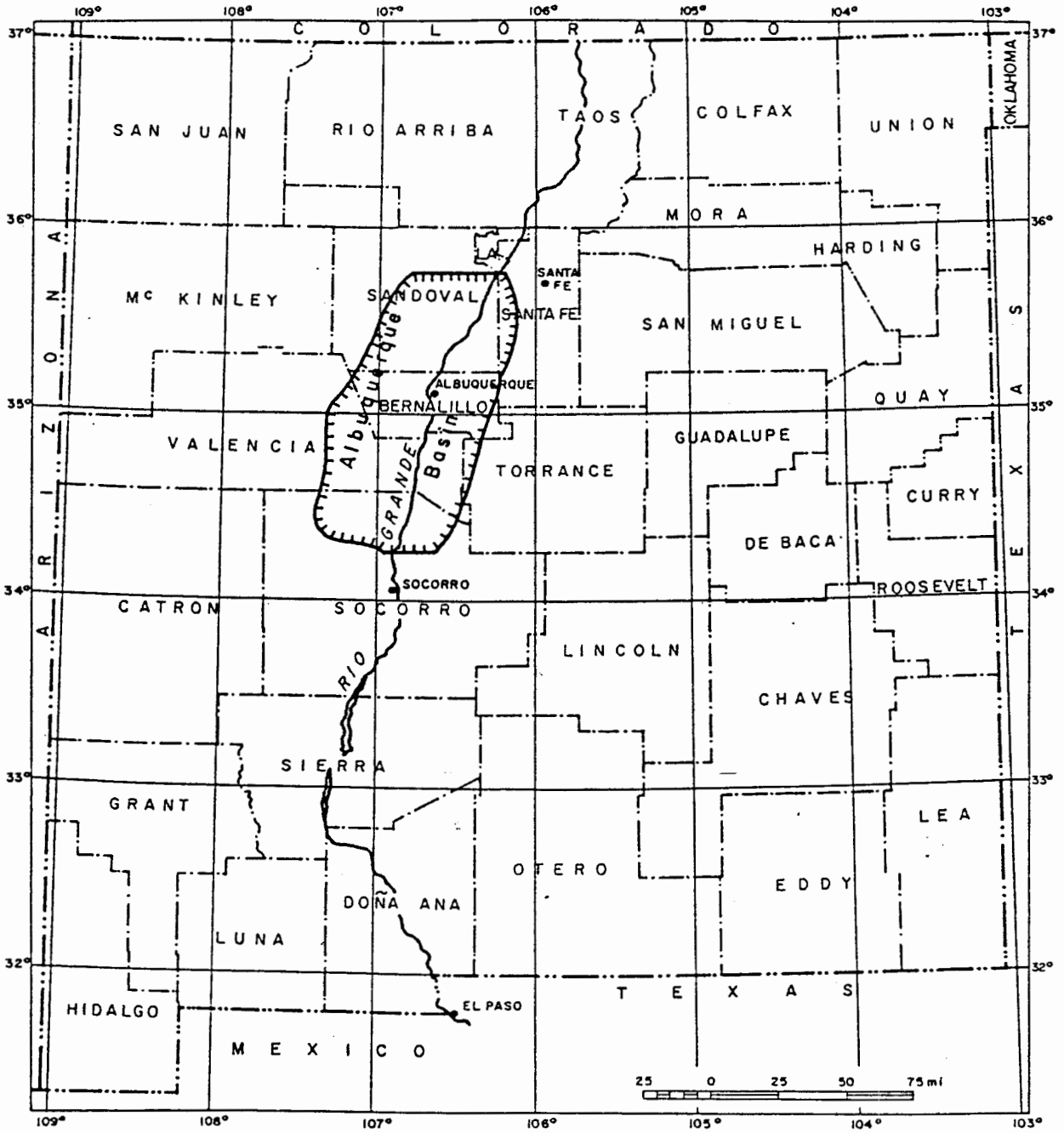
IV ENVIRONMENTAL SETTING

A. Regional

1. Physiography

The Sparton Technology facility is centrally located within the Albuquerque Basin of central New Mexico. The basin is approximately 102 miles long (north-south) and 25 to 40 miles wide (east-west). The Albuquerque Basin is in the middle part of the Rio Grande Valley which extends through the length of New Mexico (see Figure 6).

On the east flank of the Rio Grande are the Sandia and Manzano Mountains. Sandia Peak has an approximate elevation of 10,700 feet mean sea level (MSL). Sloping westward towards the river, pediments, bajada deposits, and terraces are located at the base of the mountain ranges. The elevation of the Rio Grande is approximately 4990 feet MSL in the vicinity of the site. The site is situated on the edge of a terrace next to the river flood plain at about elevation 5050 feet MSL. West of the facility, the elevation increases to about 5300 feet MSL. Southwest of this mesa-like topography are gentle, even slopes which are remnant volcanic flow areas.



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LOCATION OF ALBUQUERQUE BASIN

Sparton Technology Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE
6

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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2. Geology/Hydrogeology

a. Stratigraphy

The basin fill is estimated to be approximately 12,000 feet thick along the axis with sediment thickness varying throughout the basin boundaries. A generalized description of the sediments in the basin is presented in ascending order by age as follows:

(1) The Precambrian bedrock is overlain by Paleozoic and Mesozoic age sedimentary rocks which are comprised primarily of sandstones, shales, and marine limestones. The upper section consists mainly of continental and marine shale, and of sandstone with some gypsum, coal, and conglomerate. Both Paleozoic and Mesozoic rocks outcrop east of Albuquerque in the Sandia and Manzano Mountains. Only Mesozoic age rocks outcrop to the west in the Rio Puerco Valley.

(2) Sedimentary rocks of the Tertiary and Quaternary age sequence unconformably overlie the rocks of pre-Tertiary age. They are generally composed of unconsolidated to loosely consolidated fluvial deposits of gravel, sand, and silt interbedded with some volcanic basalts and tuffs.

(3) The Galisteo Formation consists of Eocene and Oligocene(?) age beds of variegated sandstone, sand, clay, shale, minor amounts of conglomerate, tuff, and limestone.

(4) The Miocene-Pliocene basin fill consists of up to 12,000 feet of sandstone, mudstone, and gravel of the Sante Fe Formation or Group. Facies changes of the Santa Fe occur throughout the area and are, in some cases, divided into different units within the Santa Fe Formation. The Santa Fe Group is divided into two formations, both of which underlie the surficial deposits in the Rio Grande Valley. Before the Santa Fe was raised from

> formation to group status, Bryan and McCann (1937) had divided it into three members -- the Lower Gray, the Middle Red, and the Upper Buff. The units within the Santa Fe Formation were later reclassified as the Ceja Member (upper Pliocene), Middle Red Member (Pliocene), and the Zia Member (Miocene). All units are overlain by the Pleistocene age Ortiz gravel, (Kelly 1977).

The units of the Santa Fe Group in the Albuquerque area are lenticular, faulted, folded, and generally discontinuous in outcrops. Therefore, it is difficult to correlate these units with recognized units of the Santa Fe Group in other areas. The lithology of the Santa Fe Group can be described as unconsolidated to loosely consolidated sediments and interbedded volcanic rocks ranging in size from boulders to clay particles. In the Albuquerque area, the Santa Fe Group east of the Rio Grande Valley and adjacent to the Sandia and Manzano Mountains consists of feldspar and quartz fragments eroded from these mountains. West of the Rio Grande Valley in the Albuquerque area, sediments consist chiefly of fine-grained sand, silt, and clay. The central portion of Albuquerque Basin consists of sediments derived from the Sandia and Manzano Mountains, western highlands, and erosion of the highlands farther north.

On the eastern edge of the Rio Grande Valley in the Albuquerque Basin, the series of confluent alluvial fans at the base of the mountain range, also known as bajada deposits, are derived from the Sandia and Manzano Mountains and unconformably

overlie the Santa Fe Group. These sediments are of Recent age and range from poorly sorted mud flow material to well sorted stream gravel. The bajada deposits can be lithologically described as mostly arkosic derived from granite rocks in the mountains. The bajada deposits in this area range in thickness from 0 - 200 feet and are thickest toward the east edge of the Albuquerque Basin.

Recent age alluvial sediments underlie the Rio Grande floodplain and its tributaries. The Recent age alluvium and the sediments of the underlying Santa Fe Group can be differentiated in well cuttings. The unit contact usually occurs approximately 80 to 120 feet below the land surface. A change in lithology and unit consolidation is a major indication of the top of the Santa Fe Group and the bottom of the alluvium which is estimated to be considerably less than 200 feet thick. The thickest accumulations of alluvium occur in fans extending from tributary valleys into the main valley. Thinner accumulations are found in the tributary valleys.

b. Structural

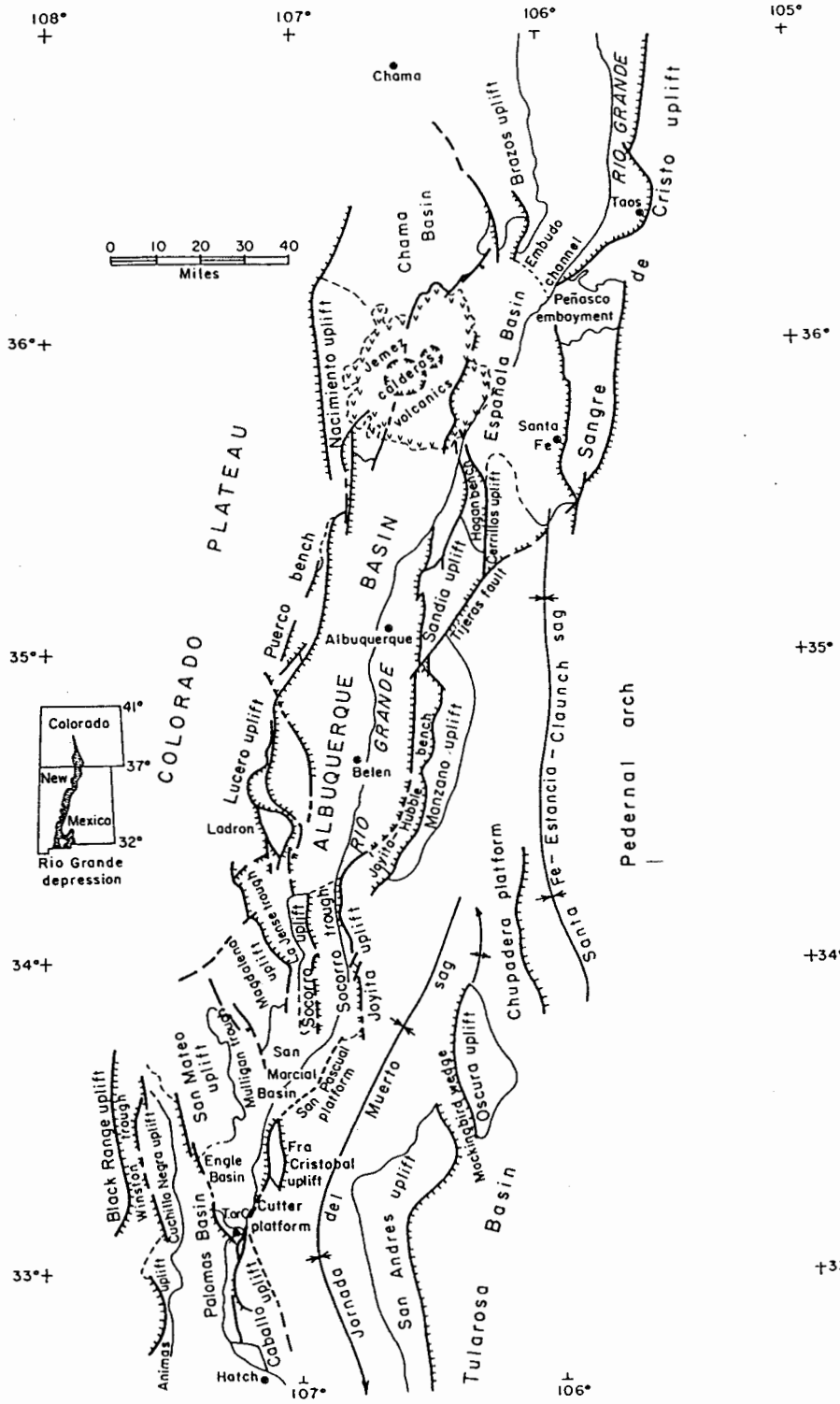
The Sparton facility is located in the Rio Grande Rift system. This system trends north-south and is comprised of a series of fault blocked horst and graben structures. The Albuquerque Basin is situated in the Rio Grande Valley and is formed by a compound graben. The eastern border of the depression is formed by the upfaulted blocks of the Sandia and Manzano

Mountains. The Albuquerque Basin is bounded on the west by the Colorado Plateau and the southern end of the Nacimiento uplift (see Figure 7). Rocks of the Santa Fe Group cover most the exposed faults. Some exposed faults appear to be en echelon but cannot be determined with certainty in some areas. Approximately 2.5 miles northwest of the Sparton facility is a fault scarp in the rocks of the Santa Fe Group that can be traced to within approximately one mile north of Arroyo de las Calabacillas. The fault does not displace a basalt flow southwest of the arroyo. The downthrown side of the fault is located on the west side of the scarp. Other indications of faults, active or inactive, are not evident at this time.

c. Depositional History

The sedimentary rocks of the Rio Grande Valley area are of marine and continental origin and are underlain by crystalline rocks which were intruded, deformed, and eroded before Cambrian time. This region was reduced to a nearly flat broad undulating plain in the late Precambrian and early Paleozoic. This allowed the transgression of the epicontinental seas. From early Pennsylvanian to late Permian, alternating transgressions and regressions of shallow seas deposited 2,000 to 5,000 feet of sandstone, siltstone, limestone, and evaporites.

A major regression during most of the Mesozoic Era formed erosional sediments of continental origin. Sediments consisting of continental sandstones and shales were deposited



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TECTONIC MAP OF RIO GRANDE RIFT SYSTEM

Sparton Technology Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE **7**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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during the Triassic, Jurassic, and early Cretaceous. During the late Cretaceous period, a major transgression covered the region and marine sandstone and shale were deposited. This was followed by uplift and erosion of the region in the early Tertiary period. During the early Tertiary and Eocene time, local basins in the Albuquerque area were filled with sandstone and shale creating the Galisteo Formation.

The Santa Fe Group which overlies the Galisteo Formation and underlies bajada deposits and Recent alluvium, was initially formed in the middle Miocene. Subsidence of the Rio Grande depression was simultaneously occurring with the formation of the Santa Fe Group, uplift of the western highlands, and the Sandia and Manzano Mountains. Tectonic activity in this area increased erosional activity and filled the Rio Grande depression with sediments.

Drainage during most of the Miocene probable was into a closed basin (Wright, 1956, p. 390). By the close of the Miocene, drainage had become integrated and the ancestral Rio Grande developed as a through flowing stream. By the end of Pleistocene time, the Rio Grande was established near its present course but several hundred feet higher. Rejuvenation of the river in Pleistocene time resulted in downcutting to a depth about 120 feet below the present valley floor. Several cut terraces were developed on the valley fill above the present valley floor.

Aggradation, which began after downcutting, has partially refilled the inner valley and is continuing today.

d. Water Levels/Seasonal Changes

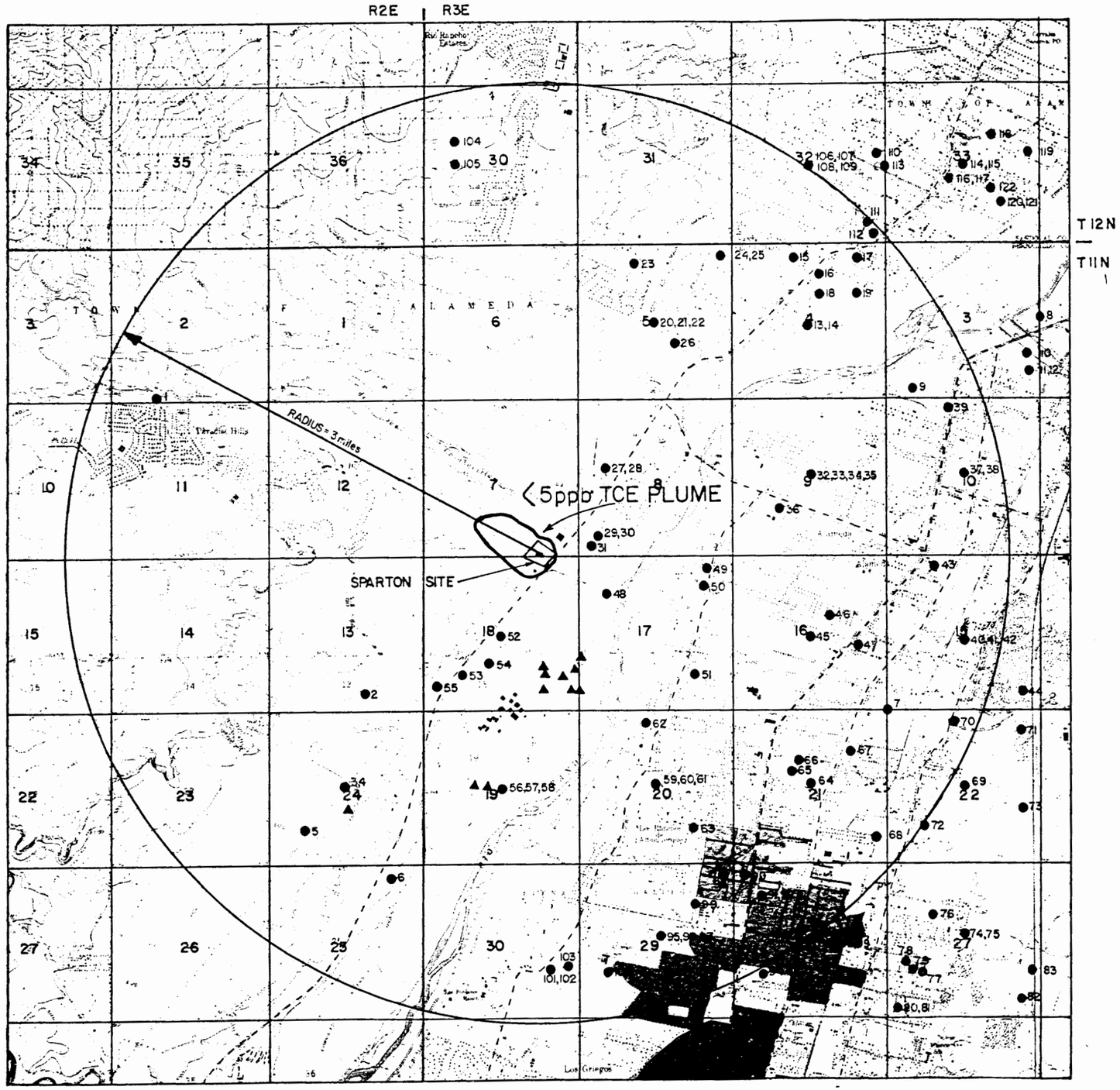
Regional water table fluctuations occur as water is added to or withdrawn from the groundwater reservoir in the Albuquerque area. Long term water level declines may be attributed to heavy pumping from industrial and municipal wells in the Albuquerque area. The water table in the Albuquerque area will maintain a consistently lower level than the surrounding water table as long as the water demand remains the same. Deficient rainfall for long periods of time will also affect the water level on a long term basis.

Seasonal fluctuations are due to heavy precipitation and irrigation by surface water diverted from streams which tends to raise the water table. High water levels occur during the summer months in the inner valley when land is irrigated by water diverted from the Rio Grande or where inundation by flood runoff is common. The lowest water levels in the area typically occur in the early spring before the first application of irrigation water. Fluctuations of water levels are quite consistent from year to year in areas where diverted river water is used for irrigation and where drains have been constructed.

e. Groundwater Flow Direction

The shape and slope of the water table throughout the valley fill, in most instances, is not uniformly planate. The irregularities in the surface occur as a result of lithologic facies changes which directly affect permeabilities and saturated thickness. This may cause mounding, coning, or troughing with the addition or withdrawal of water. The shape and slope of the groundwater is also affected by groundwater pumping in limited areas. The numerous water wells located at the intersection of Interstates 25 and 40 in Albuquerque and within 5 miles north and south of this location have a significant affect on the groundwater table. It is estimated that the water table has declined 40 feet in the last 50 years in this area. However, the influence that these wells have on the water table does not extend to the region around the Sparton facility. Groundwater pumping does not affect the water table in this area because the wells are infrequent and widely spaced as seen on Figure 8.

The water table within the valley fill generally slopes southwestward at a low gradient diagonally down valley from the western bases of the Sandia and Manzano Mountains. This southwestward slope is approximately 5 to 20 feet per mile with an increasingly steeper gradient near the mountain fronts. The water table becomes almost flat where the base of the Sandia and Manzano Mountains is 5 to 10 miles from the valley floor.



LEGEND

- ●15 WELL CONFIRMED BY STATE RECORDS
- ▲ WELL VISUALLY OBSERVED
- — PLUME LIMIT AT <5ppb TCE

METRIC Corporation HORIZONTAL PLUME LIMIT

SPARTON TECHNOLOGY, INC.
Albuquerque, New Mexico

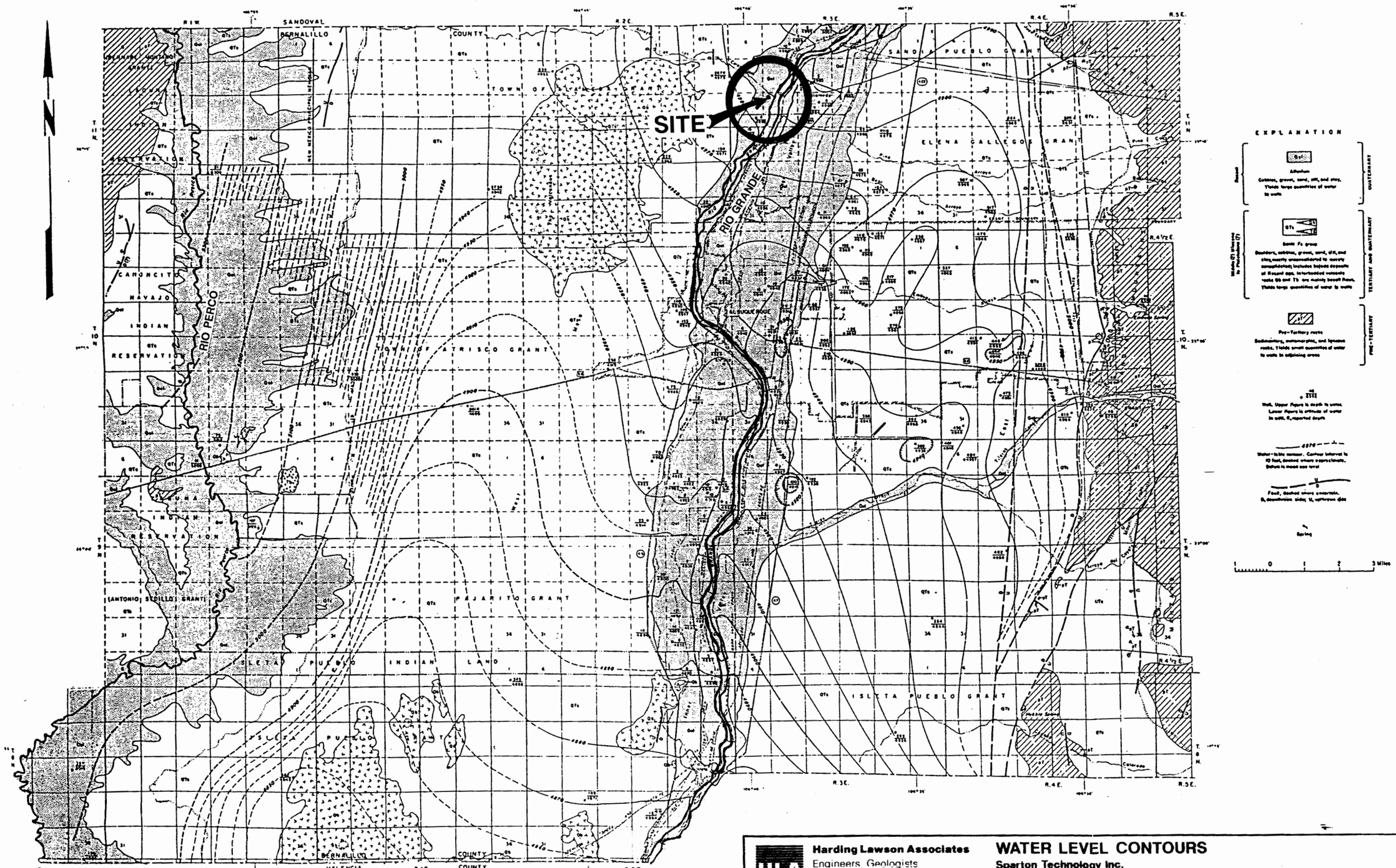
Date 7/30/91

FIGURE 79

From the eastern side of the Rio Puerco, west of the Rio Grande, there is a southward trending zone approximately 8 miles wide, where the water table is lower than the water surface of the Rio Grande as shown on Figure 9. This zone hereafter will be referred to as the "groundwater trough" or simply "the trough." It extends from north to south, through the western half of the Albuquerque Metropolitan area, and coincides with the Rio Grande at some point downstream in Valencia County (F.B. Titus, U.S. Geological Survey, Oral Communication, 1960).

The regional groundwater movement is generally to the southwest. Groundwater movement from the Sandia and Manzano Mountains moves in a southwesterly direction and groundwater movement east of the groundwater trough and west of the Rio Grande is also in the southwestward direction. Groundwater flow between the groundwater trough and the Rio Puerco is eastward to southeastward.

The water table beneath the floor of the inner valley slopes approximately the same as the downstream slope of the Rio Grande. The water table is at or very close to the surface under the river channel. Near the Rio Grande, the water table slopes sharply toward drains excavated on both sides of the river which are designed to lower groundwater levels so that adjacent acreage can be farmed. Water table levels associated with these drains are about 8 feet below average land levels nearby. Drains



Base compiled from U.S. Geological Survey Topographic maps, 1959

PLATE 1a

Map showing general geology and water-table contours in the southern half of the Albuquerque area, Bernalillo County, New Mexico.

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WATER LEVEL CONTOURS

Sparton Technology Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE **9**

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also steeply sharpen the slope of the water table beneath most of the inner valley.

The contour lines in Figure 9 show the configuration of the water table and the direction of movement of groundwater. The groundwater moves generally downgradient at right angles to these lines. The steeper slopes indicated by the contour lines on the map show a greater resistance to the movement of water within the aquifer or, in some places, a greater amount of recharge. The greater resistance probably is caused by a reduction in the thickness of the water bearing materials, as the sediments are similar to those in other areas to the south where the transmissivity is known to be high. Cones of depression are evident on the water table and are caused by pumping large quantities of water from municipal water supply wells in the area.

f. Regional Groundwater Volumes and Velocities

The groundwater gradient in the valley is approximately equal to that of the Rio Grande. If the average coefficient of transmissibility of the valley fill - which includes the Santa Fe Group and the Alluvium - is about 200,000 gallons per day (gpd) per foot, and if the permeable part of the fill is 20 miles wide, the quantity of groundwater moving into the area would be about 26,000,000 gpd, 41 cubic feet per second (cfs), or 18,000 gallons per minute (gpm). This figure is only approximate and does not indicate more than the general order of magnitude, because the

value of the coefficient of transmissibility is an estimate based on a number of scattered pumping tests and may be considerably different from the true average (L.J. Bjorklund, B. W. Maxwell, Technical Report No. 21).

g. Groundwater Recharge

The groundwater reservoir in the Albuquerque area is recharged from many sources which include precipitation, underflow of groundwater from adjacent areas, applied irrigation water, seepage from streams, springs, seeps, drains, and canals.

The ephemeral streams such as Rio Puerco, Jemez River, arroyos, and canyons contribute a large amount of recharge water to the groundwater reservoir.

Some of the water from most of the ephemeral streams is evaporated after the flow ceases, but much of it seeps into the underlying alluvium and Santa Fe Group. Small floods in the arroyos usually fail to reach the inner valley because the flow is lost to the underlying sediments.

The only perennial stream flow in the basin is that of the Rio Grande. Infiltration of water diverted from the Rio Grande for irrigation is the greatest source of recharge. Recharge from this source is limited to the valley floor. Water diverted from the Rio Grande seeps to the groundwater reservoir from canals, ditches, and fields, and usually causes the water levels in wells in the irrigated area to rise during the irrigation season.

Discharge from the groundwater reservoir in the Albuquerque area occurs by means of evapotranspiration, springs and seeps, drains, water wells, and as base flow of the Rio Grande. In the Albuquerque area, the Rio Grande generally loses, rather than gains, water. The net effect of all of these discharge phenomena over a period of years on groundwater storage is negligible, and recharge is approximately equal to discharge under natural conditions.

B. Site-Specific

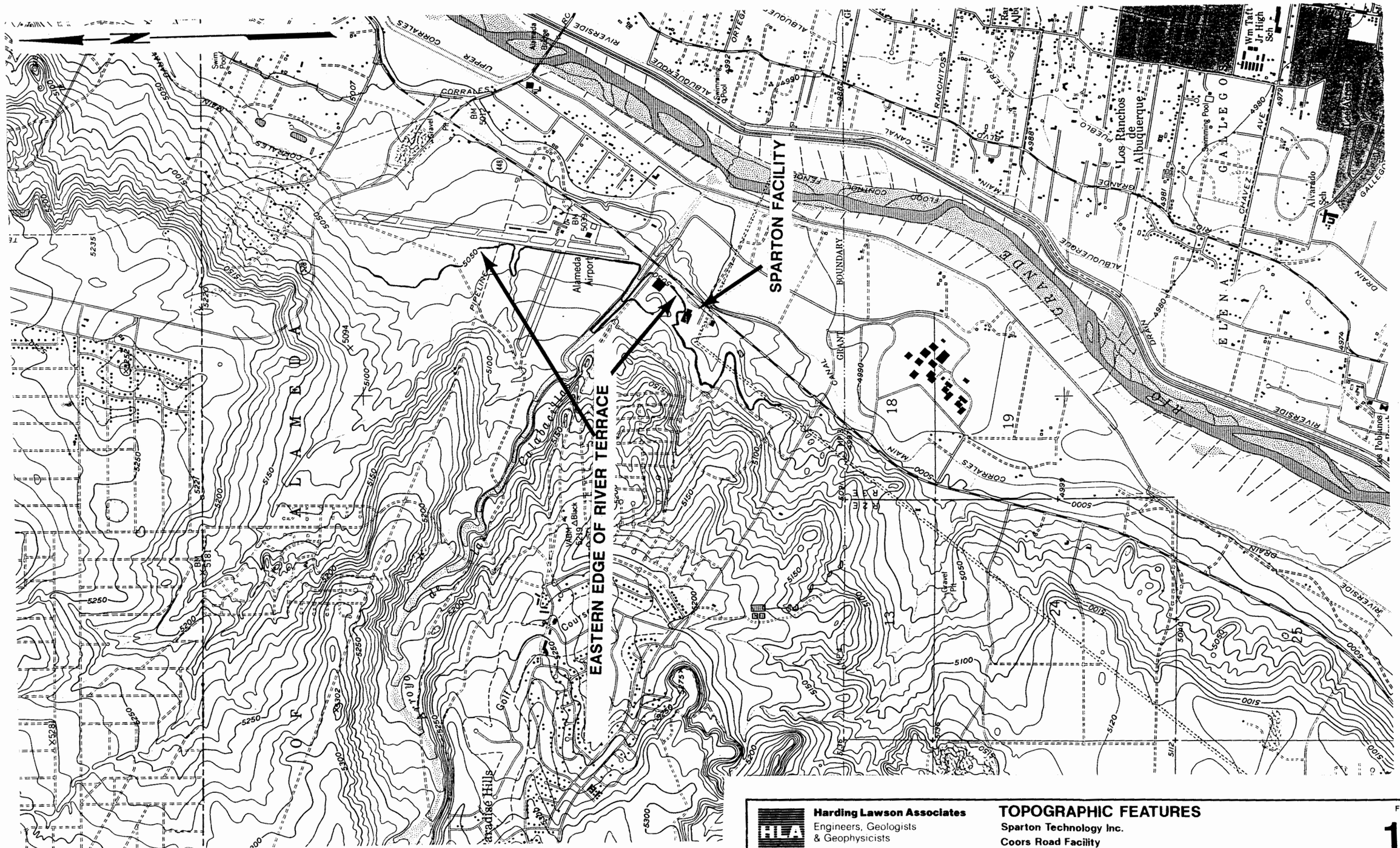
1. Site Topography

Numerous terraces were formed along the sides of the Rio Grande, Rio Puerco, and some of the larger tributary valleys during Quaternary channelling of the basin. Some terraces extend up to nearly 20 miles, whereas others are short and quite local. The Sparton facility is constructed on the eastern edge of a terrace approximately 60 feet (5050 MSL) above and 3,000 feet west of the Rio Grande (see Figure 10).

2. Geology/Hydrogeology

a. General

Several reports have been issued since 1983 describing various aspects of the site geologic and hydrogeologic regimes. Figure 3 lists the reports that contain logs of soil boring and well installation diagrams for soil borings and



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TOPOGRAPHIC FEATURES

Sparton Technology Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE
10

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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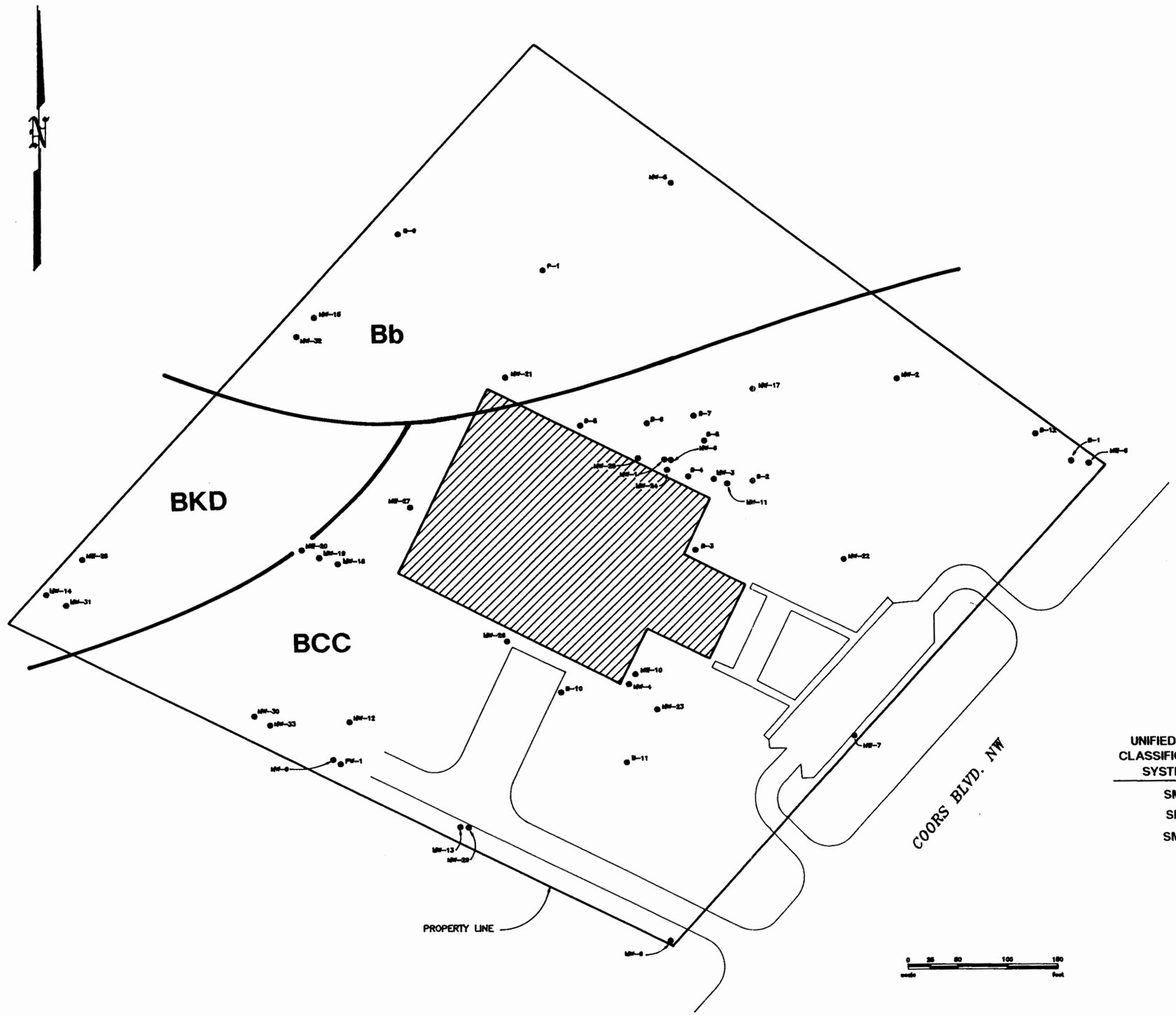
monitoring wells MW-1 through MW-33. Copies of these reports have been previously furnished to EPA. Figure 11 shows the locations of all on- and off-site groundwater monitoring wells. Attachment 4 includes copies of the logs of borings and well installation diagrams for wells completed after MW-33; specifically, MW-34 through MW-64 and PZ-1.

b. Soil Characterization

The representative surface soil series at the Sparton facility is the Bluepoint Series. It is classified as belonging to the Family Mixed Thermic, the Subgroup Topic Torripsamments, and the Order Entisols. A combination of the Blue-point Series converges (see Figure 12) at the Sparton facility and includes the Bluepoint loamy fine sand (BCC), the Bluepoint fine sand, hummocky (Bb), and the Bluepoint-Kokan Association, hilly (BKD). These soils are described as SM and SM/SP, respectively, within the Unified Soil Classification System. This system further describes these soils as well to poorly graded gravelly sands, with little or no fines. A wide range in grain size and a substantial amount of all intermediate particle sizes can be found in most SW soils, whereas predominantly one size or a range of sizes with some intermediate sizes missing can be found in the SP soils.

In a representative profile of the Bluepoint series, the surface layer is pale brown loamy fine sand about 8 inches



LEGEND

MW-1 MONITORING WELL LOCATION AND NUMBER

B-1 BORING LOCATION AND NUMBER

NOTE

UNIFIED SOIL CLASSIFICATION SYSTEM

SM = Bb - BLUE POINT FINE SAND

SP = BKD - BLUE POINT-KOKAN ASSOCIATION

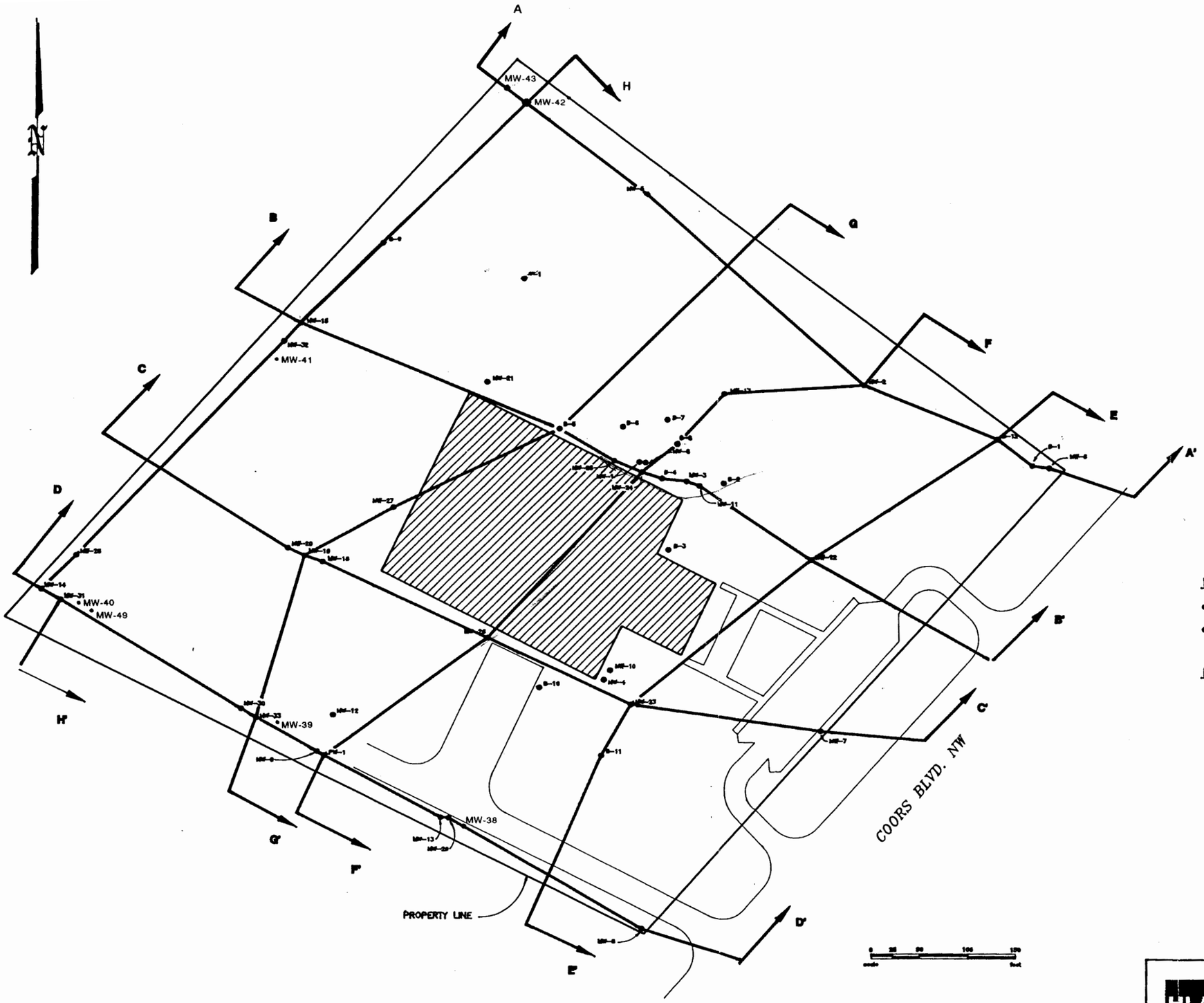
SM = BCC - BLUE POINT LOAMY FINE SAND

HLA Harding Lawson Associates Engineers, Geologists & Geophysicists

SOIL TYPES MAP

Sperton Technology, Incorporated
Coors Road Facility
Albuquerque, New Mexico

SIGNATURES		DATE	PROJECT NO.	FIGURE 12
DR.	DRN.		06310,068.12	
CK.	APPR. JH	12-90		
REVISIONS	DATE		DESCRIPTION	



LEGEND

- MW-1 MONITORING WELL LOCATION AND NUMBER
- B-1 BORING LOCATION AND NUMBER

NOTE

1. SEDIMENT GROUPS 1, 2, & 3 (ZORLP) AND HIGHER PERMABILITY GROUPS 4 & 5 HAVE BEEN COMBINED ON CROSS-SECTIONS FOR GREATER CLARITY AND INTERPRETATION

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CROSS-SECTION IDENTIFICATIONS

Sperlan Technology, Incorporated
Coors Road Facility
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SIGNATURES		DATE	PROJECT NO.	FIGURE 13
DR.	DES.		08010,068.02	
CK.	APPR. J.H.	12-'90		

REVISIONS	DATE	DESCRIPTION

thick. The underlying material to a depth of 60 inches or more is pale brown and light yellowish brown loamy sand. The soil is slightly calcareous and mildly to moderately alkaline. Permeability is high and infiltration is rapid.

Effective rooting depth is 60 inches or more. Bluepoint soils are used for range, irrigated crops, watershed, wildlife habitat, and community development.

A representative soil profile of the Sparton facility is presented in the "Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico." The three soil types which converge at the Sparton site can be described as follows.

The Bluepoint fine sand, hummocky (Bb), occurs near basalt flows on the piedmont, east of the Rio Puerco, and is a gently-rolling to rolling soil. The soil forms dunes of reworked sand 8 to 50 feet high with 5 to 15 percent slopes. The windward side is generally a deflation basin, and the leeward side is a low dune. The soil profile is similar to that described as the representative series, however, the surface texture differs.

The Bluepoint loamy fine sand, (BCC) is level to moderately sloping at 1 to 9 percent slopes. The soil profile is similar to that described as the representative series, however, about 10 percent of the surface layer acreage is sand.

The Bluepoint-Kokan Association, hilly (BKD) is composed of about 50 percent Bluepoint loamy fine sand that has 5

to 15 percent slopes and 40 percent Kokan gravelly sand that has 15 to 40 percent slopes. The Bluepoint soils are on fans between gravelly ridges of the hilly to steep Kokan soils that formed in old alluvial sand and gravel channels. The Kokan soil is found to have a high lime layer in the substratum.

Other characteristics used to further describe these soils include the relative permeability which ranges from 6.0 to greater than 40.0 inches per hour, and storage and available water capacity ranging from 0.03 to 0.09 inches per inch of soil. The pH of the soil ranges from 7.4 to 8.4 and has a salinity of 0-1 millimhos per centimeter at 25^0 C. Particle size distribution ranges from 0.074 mm to 2.0 mm with the greater size distribution falling within the 2.0 mm to the 0.42 mm range. The Bluepoint soils are predominantly sandy with little or no clay fines and a low organic content. Therefore, the cation exchange capacity (CEC) is low.

c. Summary of Site Stratigraphy

The Sparton facility is located approximately 3,000 feet west of the Rio Grande within the Rio Grande Valley. The site is built over recently deposited alluvium which overlies the Santa Fe Group. Bedding normally dips down in the direction of the axis of the Albuquerque Basin, but is nearly horizontal at the Sparton Facility. The sediments underlying the site are alluvium from the Rio Grande and the Western Highlands. They are comprised of sand

with varying amounts of gravel to sandy-gravel. The sandy gravels are present at depth while loose sands are present near the surface. Occasional clay lenses are interbedded in the sand. The sand ranges in texture from fine- to coarse-grained and gravel ranges from coarse pebble to cobble-sized gravel. Stratigraphic contacts of the Santa Fe Group and overlying alluvium can be observed on the east and west side of the Rio Grande Valley.

Details from logs of borings made prior to the installation of monitor wells and piezometers have provided data for the construction of Geologic cross-sections. Cross-section identification is presented in Figure 13. Figure 14 is a legend of geologic symbols which identify sediment types. Cross-sections A-A' through H-H' are presented in Figures 15 - 23. The cross-sections also characterize the individual permeable zones underlying the Sparton facility.

d. Project Hydrogeology

Based upon well installation data collected in the area of the site, three flow zones have been identified. These flow zones are identified as the upper, lower, and third flow zones. The lower flow zone has been divided into two members; the upper lower flow zone and the lower lower flow zone. This division of the lower flow zone was done to facilitate vertical profiling of this zone due to the thickness of the water-bearing unit which is

MAJOR DIVISIONS					TYPICAL NAMES	
COARSE-GRAINED SOILS MORE THAN HALF IS LARGER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN No. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES	5
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES	5
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES	4
			GC		CLAYEY GRAVELS, POORLY GRADED GRAVEL SAND-CLAY MIXTURES	4
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL-GRADED SANDS, GRAVELLY SANDS	4
			SP		POORLY GRADED SANDS, GRAVELLY SANDS	4
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES	3
			SC		CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES	2
FINE-GRAINED SOILS MORE THAN HALF IS SMALLER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY	2
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	2
			OL		ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	2
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	1
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	1
			OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	1
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS	

CLASSIFICATION OF SOILS - ASTM D2487-85

5 = HIGHEST RELATIVE PERMEABILITY

1 = LOWEST RELATIVE PERMEABILITY

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RELATIVE PERMEABILITY/SOIL CLASSIFICATION

SPARTON TECHNOLOGY, INC.

ALBEQUERQUE, NEW MEXICO

FIGURE 14

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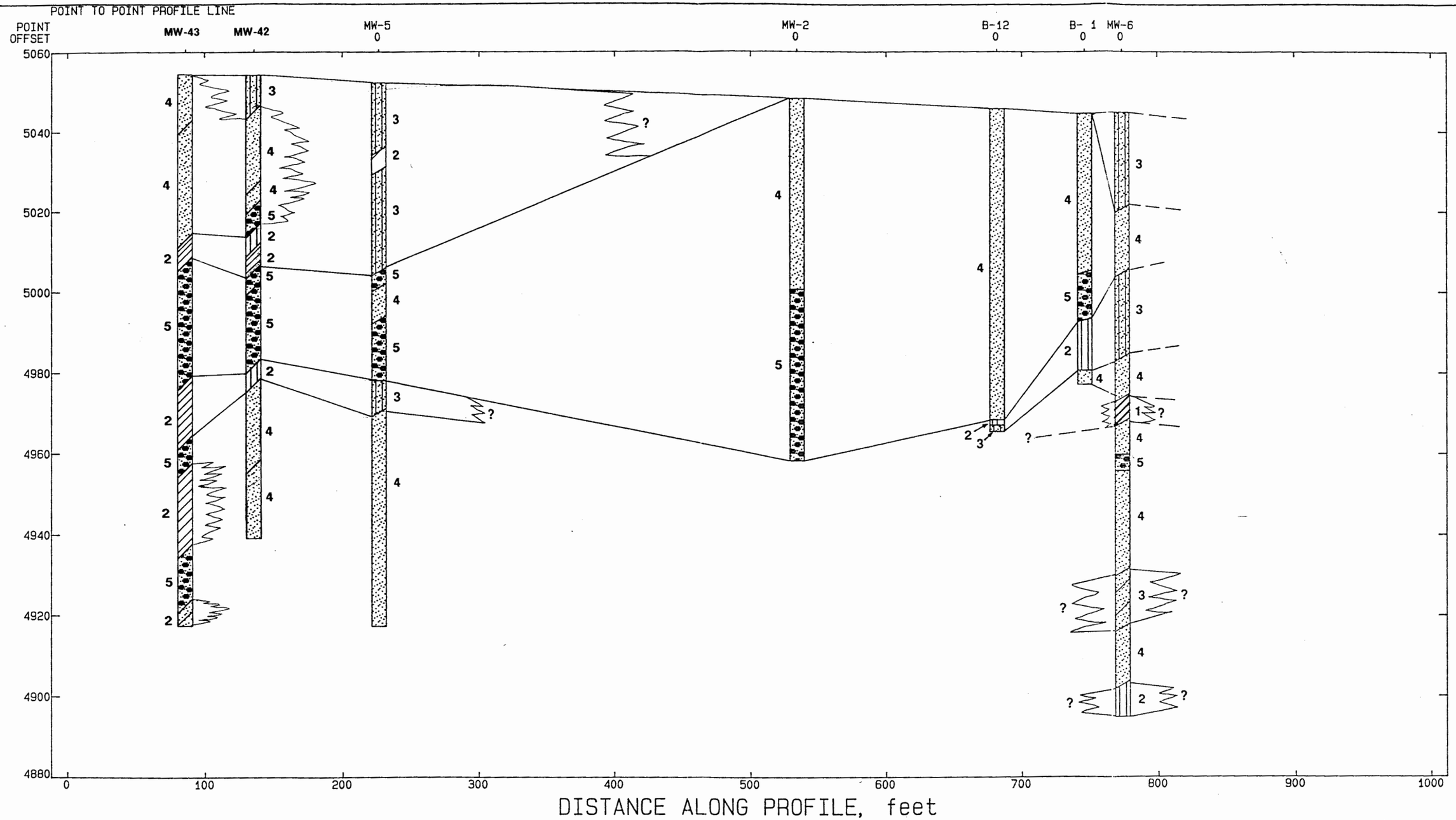
EZ	6310,039.12	JH	12-90		



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SUBSURFACE PROFILE A-A'

FIGURE 15

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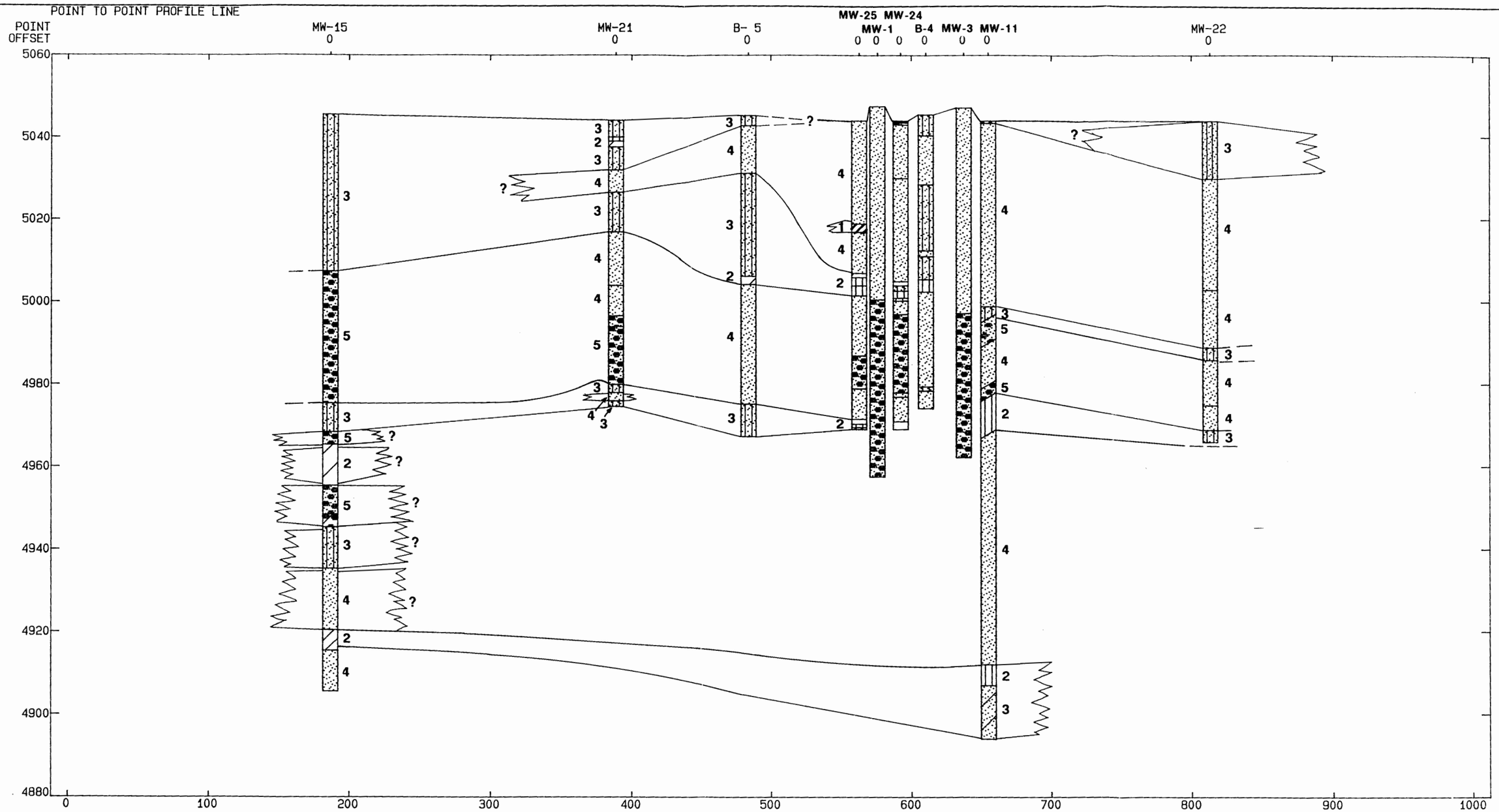

NOTES: 1) SEDIMENT GROUPS 1,2 AND 3 (ZORLP) AND HIGHER PERMEABILITY GROUPS 4 AND 5 HAVE BEEN COMBINED ON CROSS-SECTIONS FOR GREATER CLARITY AND INTERPRETATION.

2) FIGURE 2 ALSO HAS AN ENLARGED DETAIL FOR GREATER CLARITY AND INTERPRETATION.

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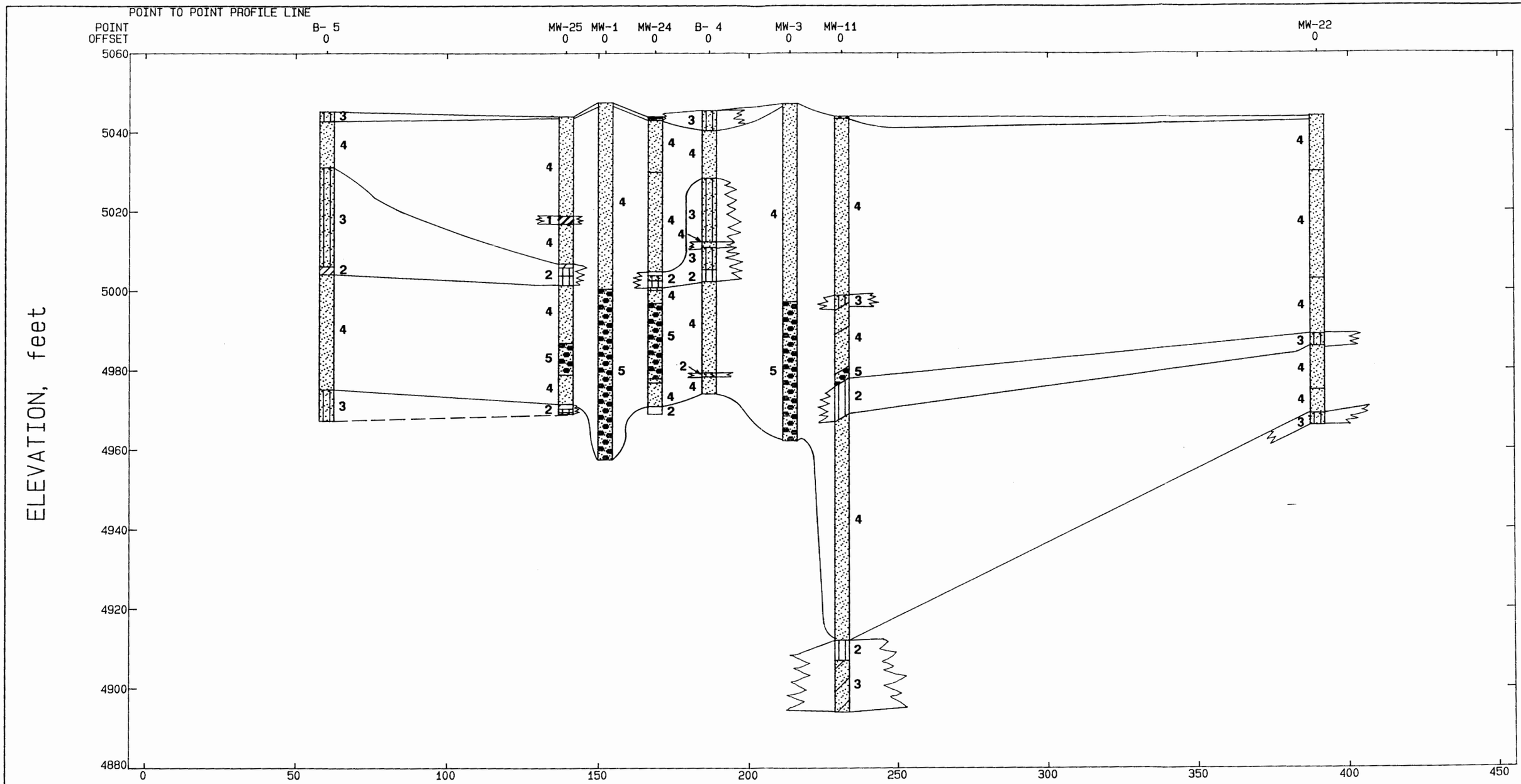
SUBSURFACE PROFILE B-B'

FIGURE 16

HARDING LAWSON ASSOCIATES - Houston, Texas



NOTES: 1) SEDIMENT GROUPS 1,2 AND 3 (ZORLP) AND HIGHER PERMEABILITY GROUPS 4 AND 5 HAVE BEEN COMBINED ON CROSS-SECTIONS FOR GREATER CLARITY AND INTERPRETATION.

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SUBSURFACE PROFILE B-B' (EXPLODED VIEW)

FIGURE 17

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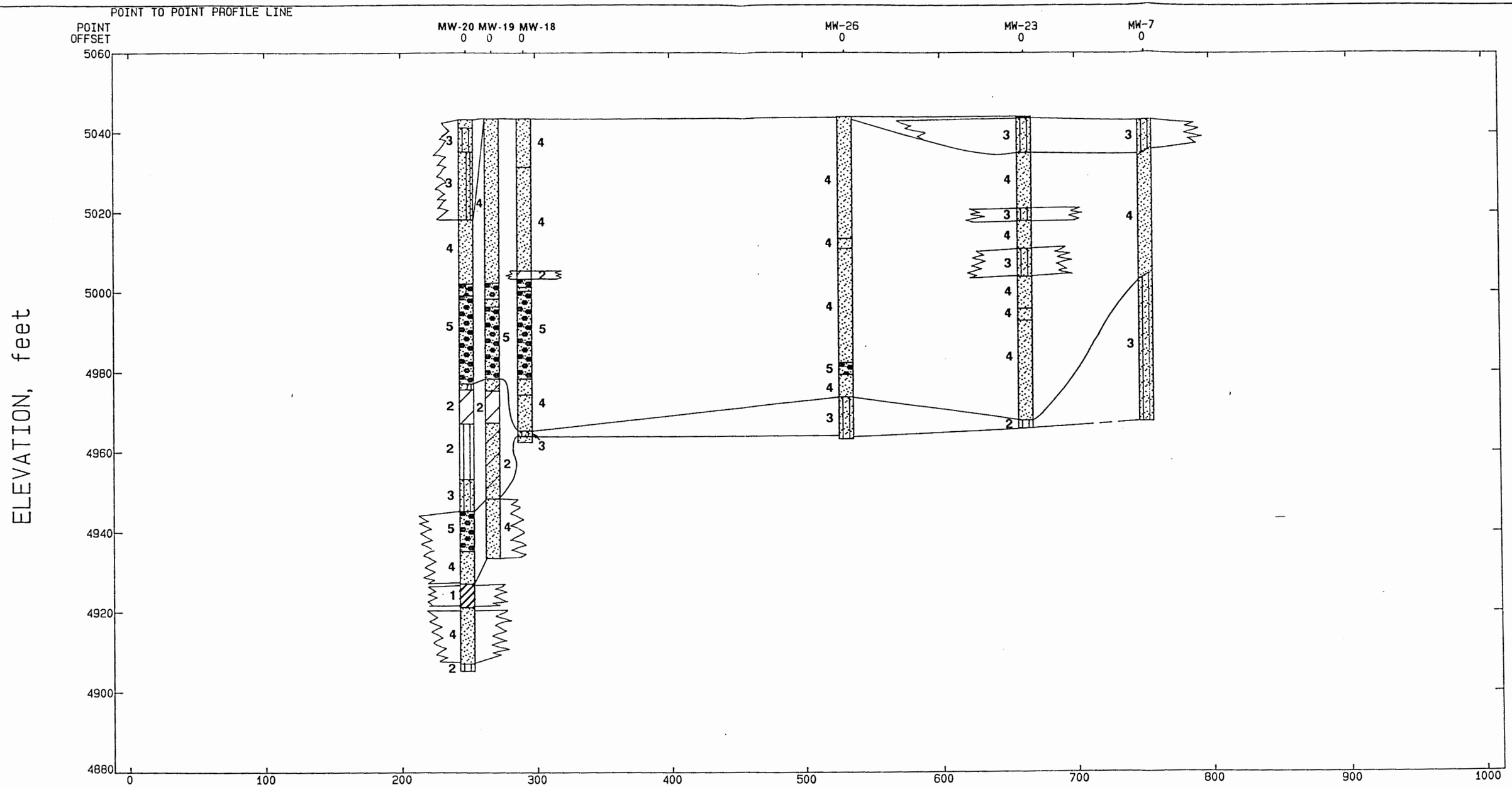

NOTES: 1) SEDIMENT GROUPS 1,2 AND 3 (ZORLP) AND HIGHER PERMEABILITY GROUPS 4 AND 5 HAVE BEEN COMBINED ON CROSS-SECTIONS FOR GREATER CLARITY AND INTERPRETATION.

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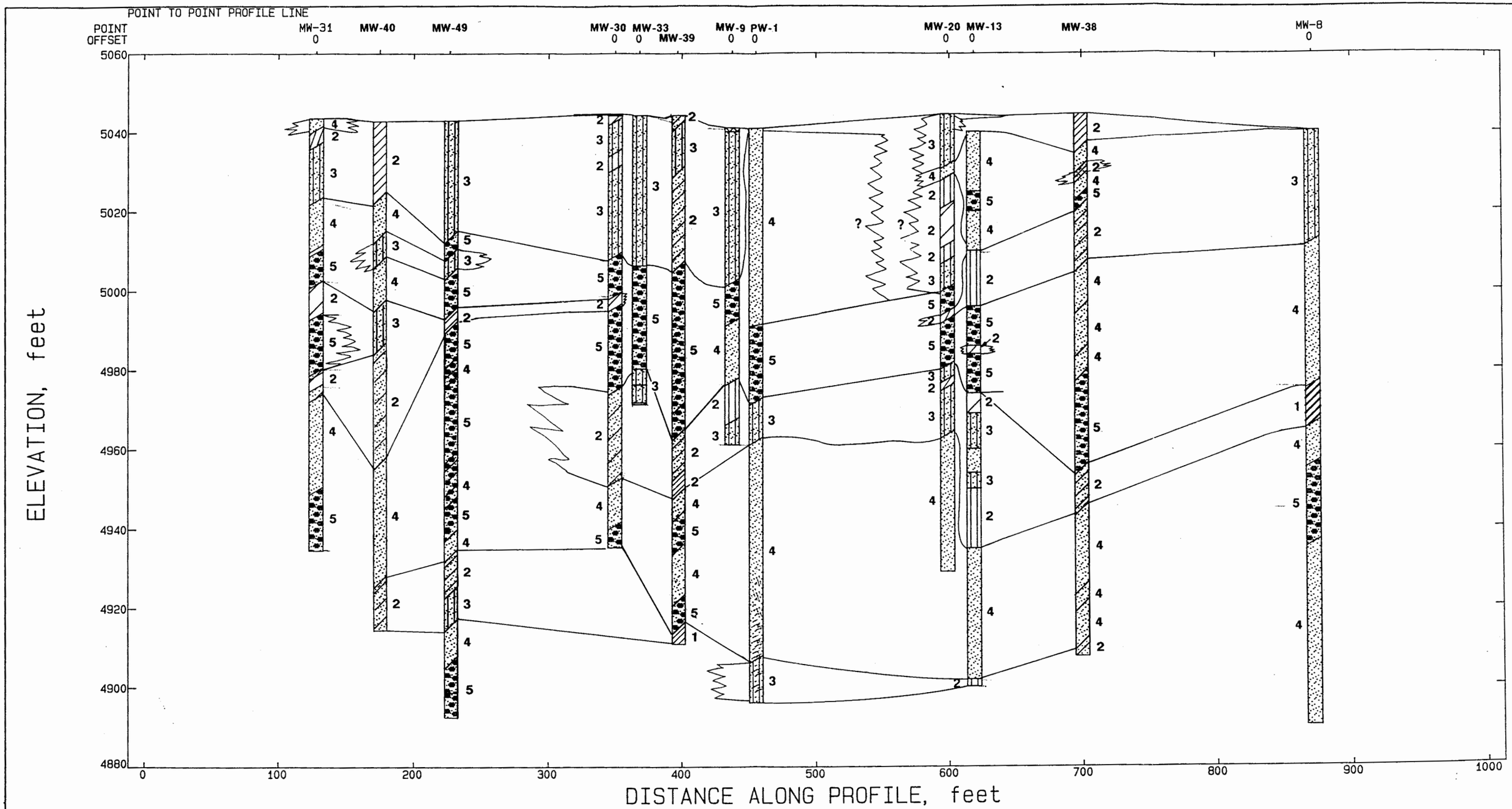
SUBSURFACE PROFILE C-C'

FIGURE 18

HARDING LAWSON ASSOCIATES - Houston, Texas



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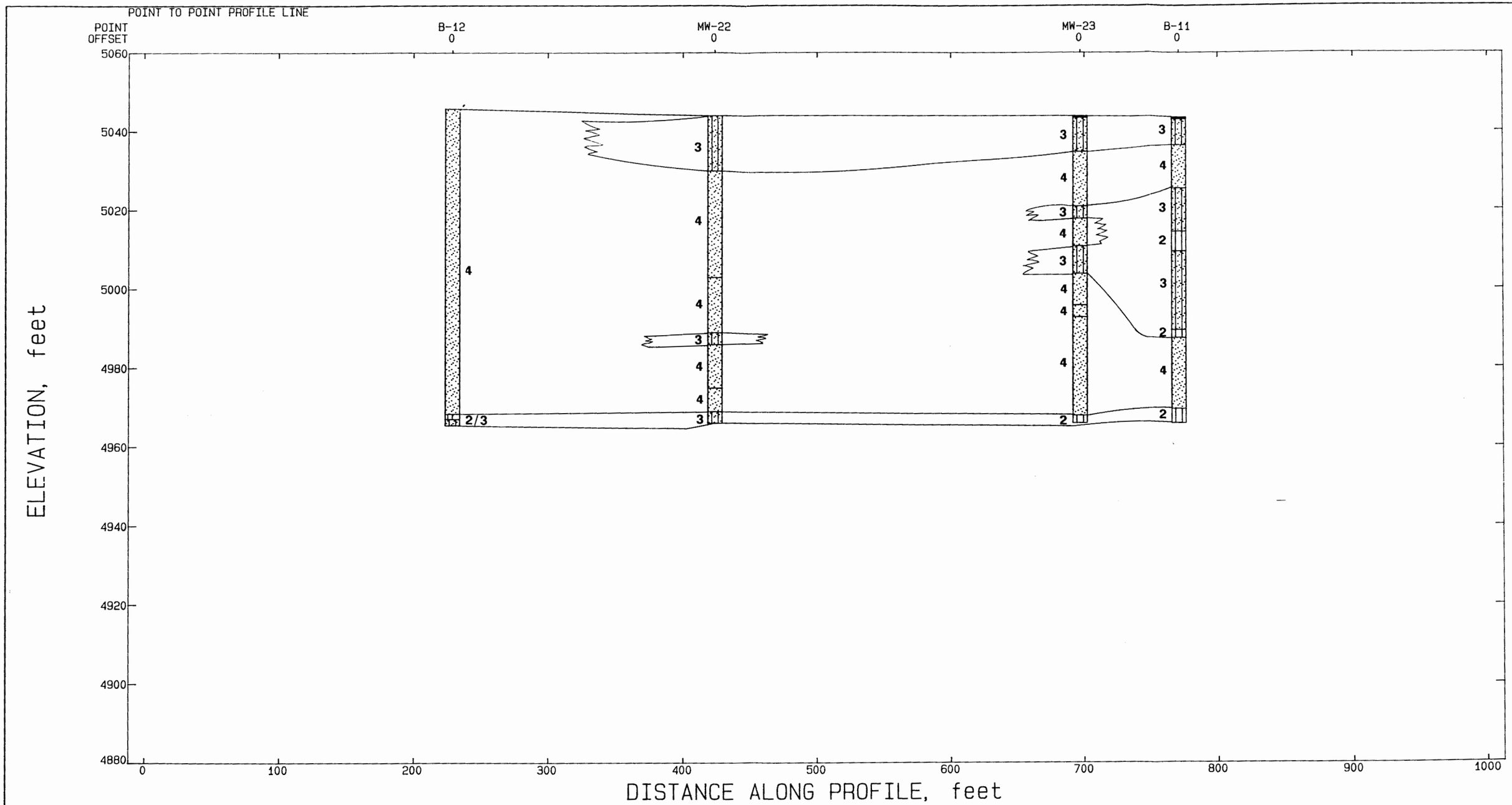
SUBSURFACE PROFILE D-D'

FIGURE 19

HARDING LAWSON ASSOCIATES - Houston, Texas



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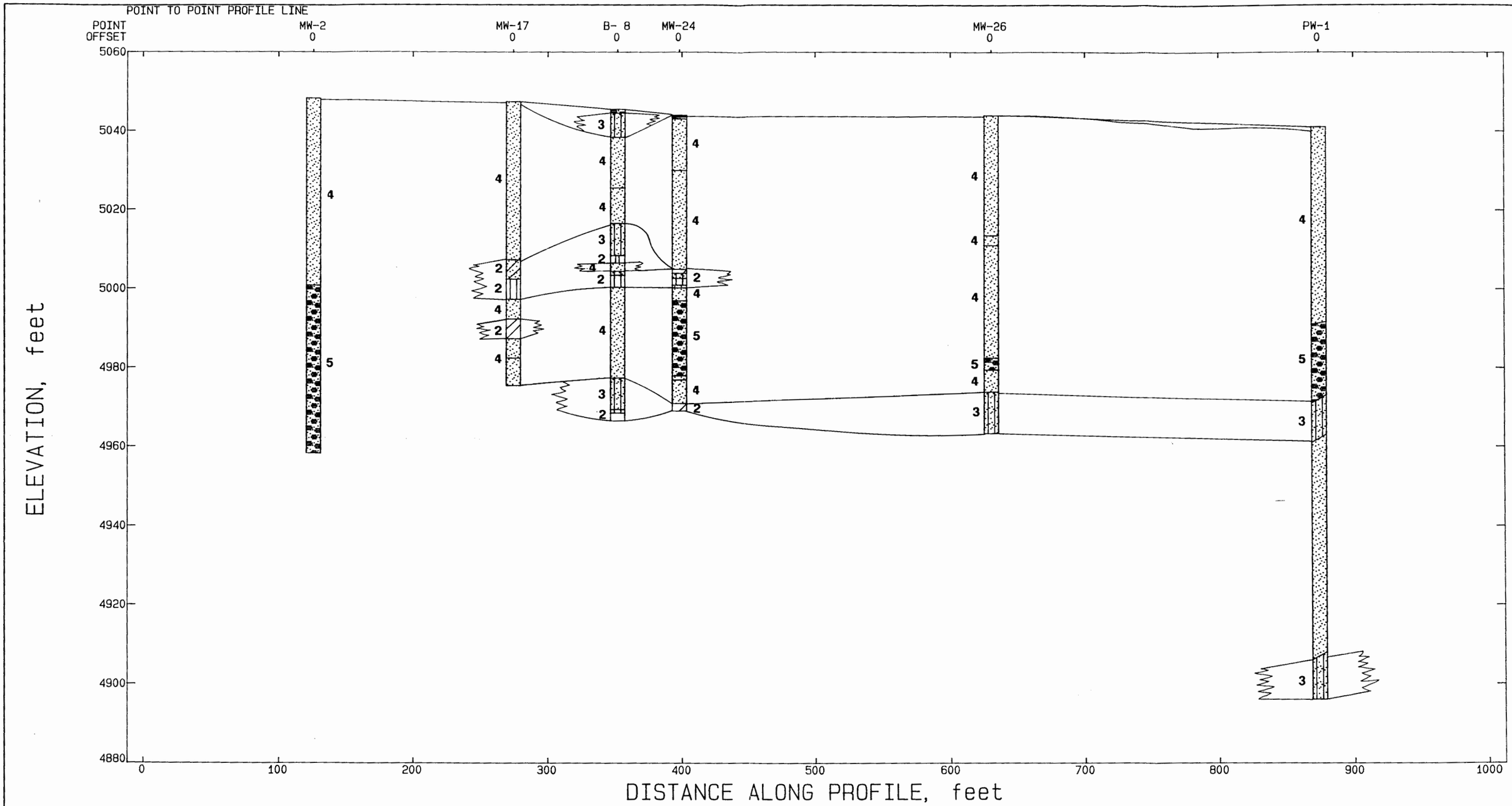
SUBSURFACE PROFILE E-E'

FIGURE 20

HARDING LAWSON ASSOCIATES - Houston, Texas



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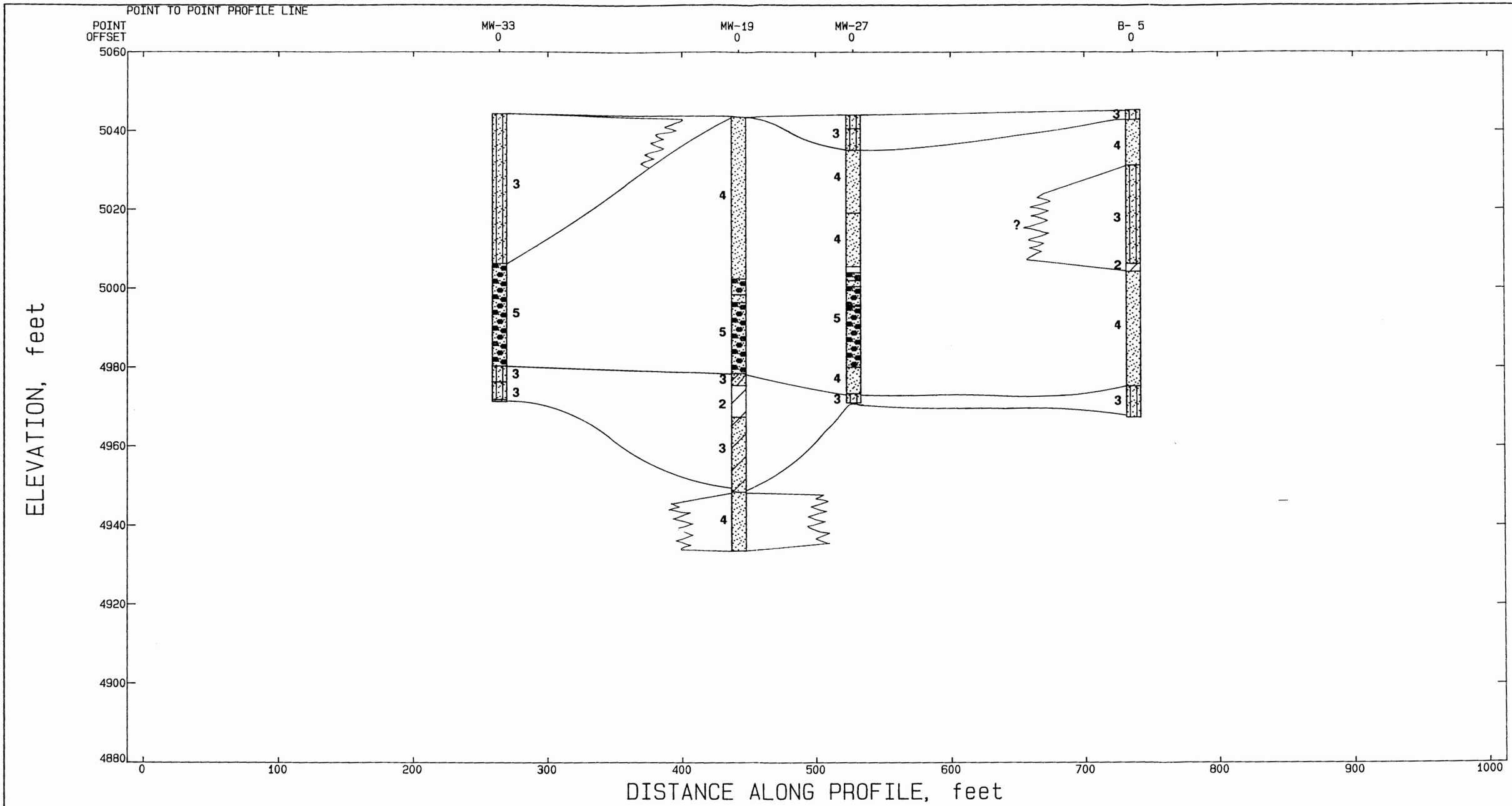
SUBSURFACE PROFILE F-F'

HARDING LAWSON ASSOCIATES - Houston, Texas

FIGURE 21



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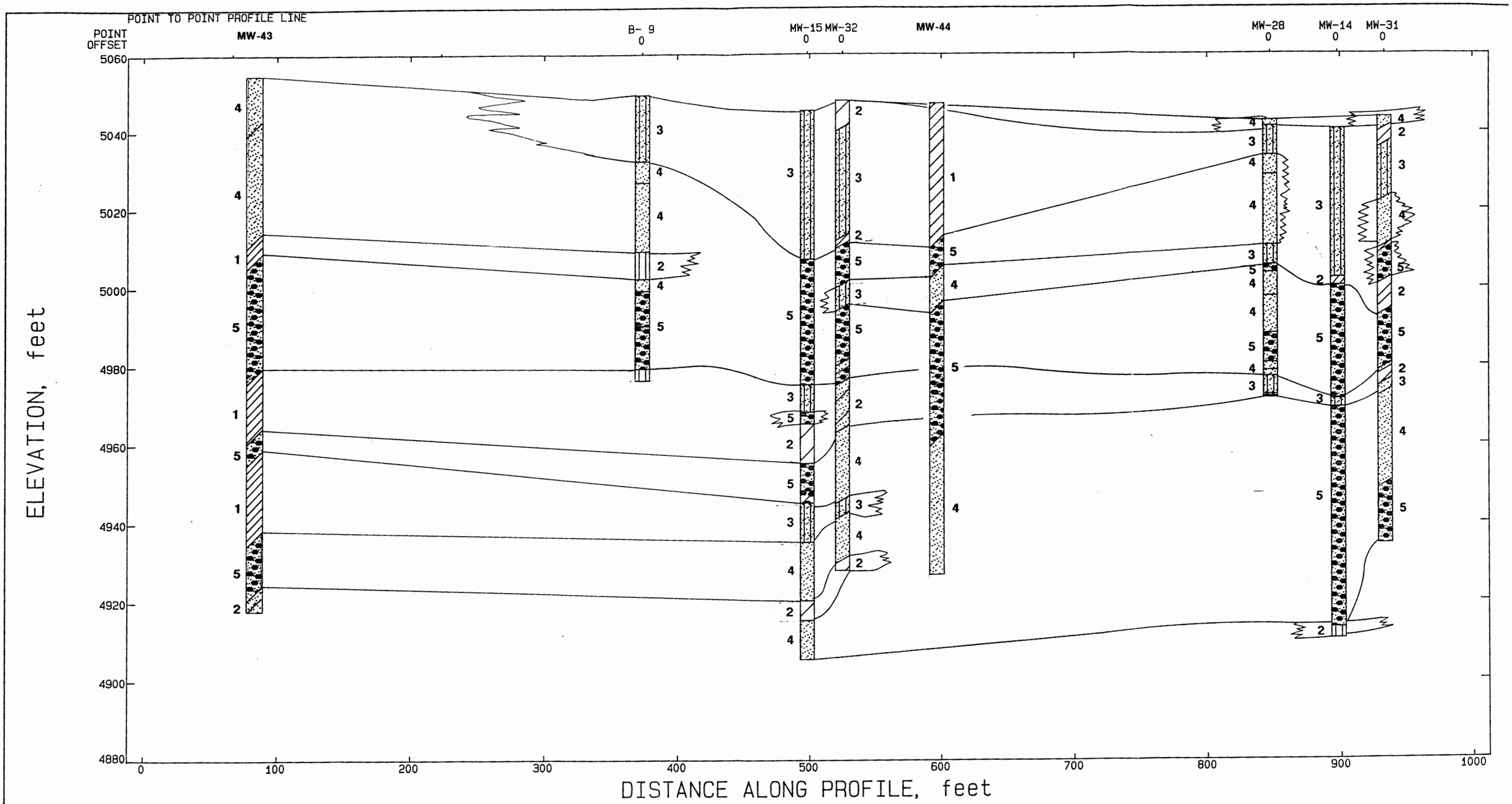
SUBSURFACE PROFILE G-G'

FIGURE 22

HARDING LAWSON ASSOCIATES - Houston, Texas



← July 24, 1989

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SUBSURFACE PROFILE H-H'

FIGURE 23

HARDING LAWSON ASSOCIATES - Houston, Texas

TO VIEW THE MAP AND/OR MAPS WITH THIS DOCUMENT, PLEASE CALL THE HAZARDOUS WASTE BUREAU AT 505-476-6000 TO MAKE AN APPOINTMENT

approximately 70 feet. Each zone or subzone consists of varying percentages of silts, clays, sands, and gravels as described in Section IV.A.2.a.

An evaluation of the extent of interconnection of the upper and lower flow zones was conducted in late 1989 and the results were issued in a report titled "Areal Extent of the Zones of Relatively Lower Permeability" (included as Attachment 5). This report evaluated the presence of various fine-grained layers at the facility. Review of well installations indicated that there was a noticeable potentiometric difference between wells set in the upper flow zone and the upper lower flow zone. A review of the logs of borings showed that the fine-grained layers or aquitards between these zones were composed of sediments ranging from clays to compacted silty sands, the latter of which is not typically thought of as an aquitard. Therefore, the term "zones of relatively lower permeability" (ZORLP) was used in place of the word "aquitard". The scale for classifying sediments or sediment groups was subjective and not based upon laboratory permeability tests. The nomenclature was used in an attempt to group sediment types for clearer understanding of a complex subsurface regime. The ZORLP acronym is not intended to imply any level of effectiveness that a fine-grained layer may have to serve as a hydraulic barrier.

Conclusions of this report state that approximately 94% of the site is underlain by the ZORLP. Areas where this unit is not present represent direct communication or interconnection of

the flow zones. Additional details can be found in the ZORLP report (Attachment 5).

The depth to groundwater at the site is approximately 65 feet. The hydraulic gradient of the upper flow zone is generally flat across the site, but varies in the eastern and western portions of the site. From the western boundary and following downgradient along the axis in the direction of groundwater flow to the northwest, the average gradient is 1:320 (Figure 24), however, under the building, the gradient appears to steepen. A noticeable hydraulic gradient difference in the west corner of the Sparton facility indicates a channeling effect on the groundwater through the underlying unconsolidated sediments. These anomalies could be the result of a breach in the ZORLP or a reduction in its effectiveness, allowing water in the upper flow zone to equilibrate with water in lower flow zone, and thus lowering the potentiometric surface. Approximations of the hydraulic gradient, based on Figure 25 for the upper lower flow zone and Figure 26 for the lower flow zone, are also equal to 1:320 when measured along the axis of flow between water level contours 4971 feet MSL and 4976 feet MSL.

Based on the results of field work and interpretations of pumping tests and water level data, the

following aquifer parameters have been calculated for the upper and lower flow zones at the Sparton site:

Upper Zone	Lower Zone
T = 5,000-10,000 gpd/ft	T = 60,000-70,000 gpd/ft
K = 0.005 cm/sec 100 gpd/ft^2	K = 0.0472 cm/sec 1,000 gpd/ft^2
S = 0.10	S = 0.002
N = 0.25-0.40	N = 0.25-0.40

T = Transmissivity
K = Hydraulic Conductivity
S = Storativity (dimensionless)
N = Porosity (dimensionless)

The Leakage Coefficient of the semiconfining layer (ZORLP) between the two flow zones is approximately 0.02 feet/day, and the hydraulic conductivity is estimated to be 0.75 gpd/ft^2. No pump test data exist for the third flow zone.

Two major sediment types were encountered in borings at the Sparton facility from the upper zone and the lower zone. The lithology of the upper zone is described as a brown sand (SP) which is comprised of a medium dense, fine-grained sand with a trace of silt. It is poorly graded, unconsolidated, and has grain sizes ranging from 0.0029 inches to 0.187 inches. The lower zone is a brown sandy gravel (GP) which is composed of a very dense, cobble to coarse sand with interbedded sand and clay layers. It is unconsolidated, poorly graded, and has grain sizes ranging from

0.0029 inches to greater than 0.187 inches. These sediment types are found in every boring, however, correlation from boring to boring is not consistent because the depositional environment changes vertically as well as horizontally.

The third flow zone on-site has been encountered at the southwest corner of the facility in well boring MW-49. Between the lower flow zone and the third flow zone, a stratum of clayey sand is present from a depth of 120 feet to 129 feet. Silty sands with clay laminations underlie this confining layer to a depth of 138 feet. Below 138 feet are medium- to coarse-grained sands and sandy gravels to a depth of 148 feet. Monitoring well MW-49 is screened from 138 to 148 feet. The difference in potentiometric head between the lower portion of the lower flow zone and the third flow zone is 0.42 feet with a downward flow component. MW-49 is the only third flow zone well on- or off-site.

Off-site well locations are presented in Figure 11. Monitoring wells MW-34, 35, 36, 37, 47, 48, 50, 51, 52, 53, 54, 57, 58, 61, 62, 63, and PZ-1 are screened in the upper flow zone. Monitoring wells MW-44, 45, 46, 56, 59, 60 and 64 are screened in the upper lower flow zone. Monitoring well MW-55 is the only off-site well screened in the lower lower flow zone. No off-site wells are screened in the third flow zone. Logs of borings for these wells are presented in Attachment 4. Sediments encountered in all bore holes are consistent with regional descriptions. Of the five off-site well clusters that monitor the upper flow zone and the

upper part of the lower flow zone, only cluster MW-37/45 had a clay layer correlatable to an on-site clay layer at a depth of 137 feet to 138 feet. This suggests that while distinct flow zones are present on-site, the flow zones merge off-site and downgradient as clay layers pinch out. Groundwater level contour maps and flow directions are presented in Section IV.B.2.e.

Interpretations of hydraulic interconnections between saturated zones are shown in cross-sections. These cross-sections also include zones of relatively lower permeabilities. These zones are numbered one through five and indicate a relative permeability; one, being the least permeable and five being the most permeable. This is a subjective scale, and is not based upon laboratory permeability data.

Based on field studies and analysis of samples collected from borings at the Sparton facility, detailed interpretive north-south and east-west oriented geologic structure and hydrologic cross sections have been constructed. These interpretive logs also indicate the zones of higher and lower permeability which may direct or restrict the flow of the contaminants. Contaminant migration pathways, thickness, lateral extent and depth can also be determined from the interpretive cross sections (see Figures 15 - 23). Hydraulic gradient differences in the west corner of the Sparton facility indicate channeling in the unconsolidated underlying sediments.

e. Summary of Recent Groundwater Levels and Flow Direction

Attachment 6 contains recent groundwater level data for the upper, lower, and third flow zones. Plate A is a water table contour map for the upper flow zone based on data taken June 27, 1990. The groundwater flow direction in the upper flow zone is to the southwest as it passes the facility's western boundary. Between the facility boundary and Irving Boulevard, it turns to the northwest. From there, it arcs back to the west and finally again to the southwest. It is apparently coming back to the direction of regional groundwater flow at the western limit of this investigation. Figure 24 is a water table contour map for the upper flow zone based upon October 31, 1990 data. The direction of groundwater flow during this time period is similar to the above referenced description.

Groundwater flow in the upper portion of the lower flow zone is generally to the north-northwest as indicted by the groundwater contour maps in Attachment 6, Plates B through G. Figure 25 presents the groundwater elevation contours and direction of groundwater flow for the month of October, 1990. This flow parallels the upper flow zone. These zones apparently coalesce as they come under the influence of regional groundwater flow. This conclusion is based upon the following factors:

(1) Clay layers are not present, or marginal at best (e.g., 1-foot layer between wells 37 and 45) in the downgradient direction,

(2) The TCE concentration detected along the plume axis at well locations MW-37/MW-45 are basically equal for the two flow zones, and

(3) Water level elevations in the downgradient direction (e.g., MWs-60,61) are within 0.1 feet of each other.

The direction of groundwater flow and water level contours for the lower lower flow zone are presented in Figure 26. The direction of flow is to the northwest.

No flow direction can be determined for the third flow zone as only one well has been set in that zone.

C. Surface Waters

Surface waters in the vicinity of the Sparton facility include the Rio Grande, Las Calabacillas Arroyo, and Corrales Main Canal. The Rio Grande is located approximately 3,000 feet east of the Sparton facility. Las Calabacillas Arroyo located approximately 2,800 feet north of the site is an intermittent stream. The Corrales Main Canal, a manmade hydraulic structure, is located approximately 300 feet east of the site and contains flowing water (Rio Grande source water) eight months out of the year. The canal is used primarily for irrigation. It is put into operation about March 1, and taken out of operation about October 31. During the winter months, the canal is dry and only receives water from precipitation or snowfall.

The level of the Rio Grande through most of the Albuquerque area is controlled by levees which maintain the river level above

the level of the inner valley floor and the surrounding water table. The natural buildup of sediment which raises the river level allows recharge of the water table through a downward movement. As the water table rises under the riverbed, the water spreads out to the surrounding water table.

The chemical quality of the Rio Grande is good. A typical analysis of surface water of the Rio Grande from samples taken at the Albuquerque gauging station located on the downstream side of the Central Avenue Bridge, made by the U.S.G.S., is shown on Figure 27.

The average annual suspended sediment load for the Rio Grande in water year October 1988 to September 1989 was approximately 454 tons per day, with a maximum daily load of 13,900 tons on August 2 and a minimum daily of 7.9 tons on June 9.

The Rio Grande serves as the source water for the Corrales Main Canal. Therefore, the water quality of the Canal should be similar to that of the Rio Grande.

FIGURE 27

RIO GRANDE CHEMICAL QUALITY ANALYSIS[1]

Dissolved Constituent	Concentration mg/L[2]
Calcium (Ca)	53.0
Magnesium (Mg)	9.7
Sodium (Na)	33.0
Potassium (K)	3.8
Sulfate (SO_4)	73.0
Chloride (Cl)	13.0
Fluoride (F)	0.40
Silica (Sio_2)	22.0
Total Dissolved Solid (TDS)	298
Nitrogen NO2+NO3 (N)	<0.100
Phosphorous (P)	0.020
Boron (B)	0.080
Iron (Fe)	0.010
Arsenic (As)	0.004
Cadmium (Cd)	0.001
Chromium (Cr)	<0.001
Copper (Cu)	0.004
Lead (Pb)	<0.005
Mercury (Hg)	<0.0001
Selenium (Se)	<0.0001
Zinc (Zn)	0.005

Figure 27

Rio Grande Chemical Quality Analysis(1)
(continued)

Chemical Quality Indicators	Concentrations
Specific Conductance	470 us/cm(3)
pH	8.46 standard units
Temperatures	16.0 °C(4)
Dissolved Oxygen	8.3 mg/l
Total Hardness ($CaCO_3$)	170 mg/l

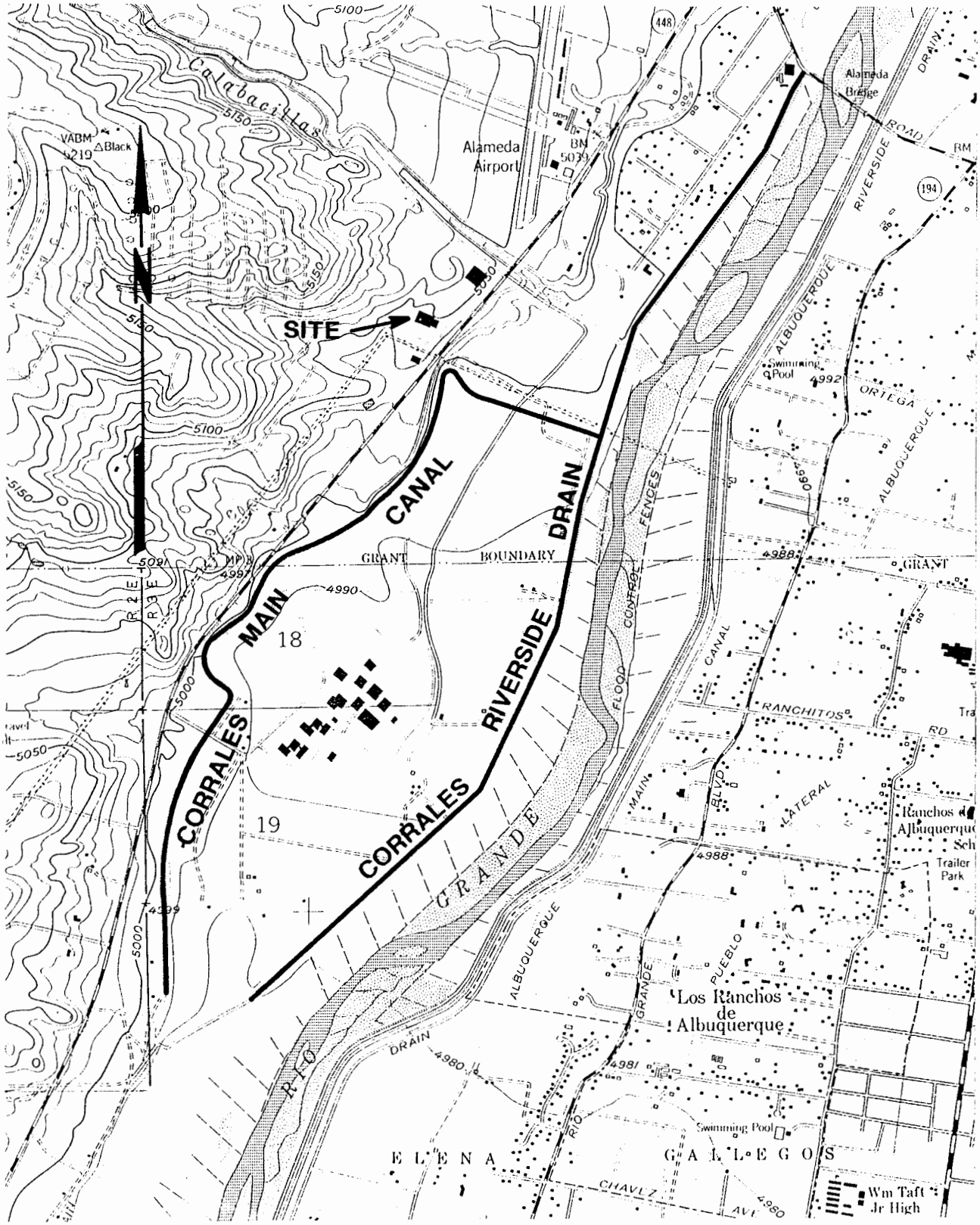
(1) Analysis performed for samples taken on November 7, 1988
(2) mg/L = milligrams per liter
(3) us/cm = microsiemers per centimeter
(4) °C = degrees celsius

The Corrales Riverside Drain is constructed approximately 200 feet west of the Rio Grande and approximately 2,800 feet east of the Sparton facility. The Corrales Main Canal is located approximately 300 feet east of the Sparton facility. The Corrales Riverside Drain was constructed to lower the water table in the marshy areas adjacent to the river so that they could be farmed. A section of the topographic map locating these features is shown in Figure 28.

D. Climate

Albuquerque is located in Bernalillo County. The Rio Grande flows southward through the county, which is in the central part of New Mexico. The land rises on both sides of the river and forms mesas that have elevations of about 5,000 feet. To the east, the mesa is narrow and is just beyond the Sandia and Manzano Mountains. The valley and mesa areas are arid, having average annual precipitation near eight inches.

Summer is the rainy season. Half the annual precipitation falls during the period from July to October, typically as brief but often heavy thunderstorms. An average of 44 such storms occur each year, mostly during this period. Moisture is supplied by the generally southeasterly circulation of moist air over the Gulf of Mexico from the Bermuda high pressure area, which shifts westward in summer. Winter precipitation is light because much of the



Harding Lawson Associates
Engineering and Environmental Services

MAN-MADE HYDRAULIC STRUCTURES

Sparton Technology Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE **28**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	6310,039.12	JSH	7/90		

moisture from storms over the Pacific Ocean falls over the mountains west of New Mexico as the storms move eastward.

There is considerable variation in precipitation from year to year and from month to month. The average number of days having 0.10 inch or more precipitation is 22.

The average annual temperature in Albuquerque is 57°F. The highest recorded temperature is 104°F, and the lowest recorded temperature is -17°F. The temperature reaches 90 on an average of 75 days a year, and freezing temperatures occur on an average of 105 days a year. The average frost-free season at Albuquerque is 190 days, from mid-April to late October.

Average annual relative humidity in Albuquerque is 43 percent, but ranges from near 60 percent early in the morning to nearly 30 percent in the afternoon. Sunshine occurs more than 75 percent of the possible hours, and is fairly evenly distributed in all seasons.

The average annual windspeed is 9 miles per hour. Spring is the windy season. Winds blow most frequently from the north in winter, and from the south along the river valley in summer. In Tijeras Canyon, the heavy cold air held back by the Sandia and Manzano Mountains finds access to the basin area and literally pours through the Canyon, spreading out on the mesa and valley below in gusts of up to 50 miles per hour.

Figure 29 shows annual patterns of precipitation, temperature, and wind speed and direction in Albuquerque.

FIGURE 29

ALBUQUERQUE CLIMATOLOGICAL PATTERNS

Month	Temperature, degree F			avg. total precipitation inches	avg. speed m.p.h.	Prevailing Direction
	avg. daily max	avg. daily min	daily mean			
January	47	24	35	0.31	8.0	N
February	53	27	40	0.40	8.8	N
March	59	32	46	0.47	10.1	SE
April	70	41	56	0.47	11.0	S
May	80	51	65	0.56	10.5	S
June	89	60	75	0.53	10.0	S
July	92	65	79	1.37	9.1	SE
August	90	63	77	1.38	8.2	SE
September	83	57	70	0.83	8.6	SE
October	72	45	58	0.78	8.3	SE
November	57	32	44	0.34	7.9	N
December	48	25	37	0.52	7.7	N

V CONTAMINATION CHARACTERIZATION

A. Soil Contamination

1. Vadose Zone Investigation

An investigation of the vadose zone beneath the pond and sump area was conducted in September 1985. The results of this investigation were published in a report titled "Soil Investigation of the Unsaturated and Upper Saturated Zones, Sparton Technology, Inc., Coors Road Plant, Albuquerque, New Mexico" dated June 30, 1986. A copy of this report is included in Attachment 7.

This report concluded that contaminants had migrated downward from the ponds and the sump. They then spread laterally, in a somewhat radial pattern from the source, and ultimately had reached the water table. Residual levels of several VOCs were detected in the soil in only three of the borings. Acetone was detected in three borings in concentrations generally in the 14 to 44 microgram/kilogram (ug/kg) range, although one sample showed 1200 ug/kg. 1,1,2,2- tetrachloroethane was detected in two borings at concentrations ranging from 7 to 20 ug/kg. 1,1-DCE, 1,1,1-TCA, TCE, and toluene were each detected in one sample. Concentrations of these compounds were 9, 50, 80, and 5 ug/kg, respectively. Twenty-one of thirty samples taken from the eight borings showed no detectable levels of VOCs.

Based on these results, the report concluded that the bulk of the contaminant release had completed its migration to the

water table, leaving behind only scattered residual levels in the vadose zone in the pond and sump area.

2. Soil Gas Investigations

Two soil gas investigations have been conducted at the Sparton facility. The first soil gas investigation was conducted in 1984, and involved primarily on-site locations. The second investigation was conducted in 1987, and involved both on-site and off-site locations for soil gas measurements. The investigations were conducted by Tracer Research Corporation using the same techniques and equipment for both. The results of these investigations were published in a report dated October 19, 1987 and titled "Off-Site Investigation, Sparton Technology, Inc., Coors Road Plant, Albuquerque, New Mexico", a copy of which is included in Attachment 8.

The purpose of these investigations was to obtain an estimate of the lateral extent of the contaminant plume. All soil gas samples were taken in the shallow subsurface, approximately five to six feet below ground surface.

Based on these soil gas surveys, it appeared that the contaminant plume had moved a short distance beyond the facility boundaries. The shape of the soil gas plumes also seem to suggest dispersion as the predominant plume transport mechanism with a lesser advection influence. Finally, a comparison of the plumes from 1984 to 1987 show that there was a decrease in TCA soil gas

concentrations during this period of approximately one order of magnitude (e.g., from 300 ug/l to 30 ug/l in the central site area). This decrease in concentration with time was also reflected in the quarterly groundwater monitoring results which were collected under the state program.

B. Surface Water and Sediment Contamination

There are three surface water bodies in the vicinity of the Sparton facility. The Rio Grande is located approximately 3,000 feet east of the Sparton facility and is considered a permanent surface water body. The river flows from northeast to southwest in the vicinity of the Sparton facility. The Las Calabacillas Arroyo located approximately 2800 feet north of the facility is an intermittent stream used for area precipitation runoff control. The Corrales Main Canal, an irrigation channel, is located approximately 300 feet east of the facility, across Coors Road, and runs southwest from there. This irrigation canal is generally used from March through October, and, except for precipitation, is dry from November through February.

Based on regional and site-specific groundwater gradients, each of these surface water bodies is either upgradient or cross-gradient from the source area at the Sparton facility, and hence would not be expected to be affected by the contaminant plume.

C. Air Contamination

Since the contaminant release occurred in the subsurface soils and has subsequently migrated to the groundwater, the only ongoing release of constituents to the atmosphere from the release is by volatilization of the constituents from the groundwater and subsequent movement of these vapors through the vadose zone and ultimately to the ground surface where they are released into the atmosphere. Soil gas concentrations measured in 1987, approximately 5 to 6 feet below ground surface, indicated TCE and TCA soil gas concentrations of about 30 micrograms per liter (ug/l) on-site at the Sparton facility, tapering off to 0.01 ug/l approximately 1/2 mile away. The mass flux rate of these constituents into the atmosphere, while not measured, is felt to be minimal due to the low concentrations of soil gas measured during the 1987 survey.

An additional source of air emissions is associated with the interim groundwater recovery system. The air stripper, which strips the volatile organic contaminants from the groundwater, releases these contaminants into the atmosphere. These emissions are permitted by the City Albuquerque Environmental Health Department (Air Quality Permit Number 187).

D. Groundwater Contamination

1. Definition of Plume

A total of 56 groundwater monitoring wells have been installed to determine groundwater elevations and to collect representative samples for chemical analyses in an effort to define the horizontal and vertical limits of the contaminant plume. Figure 30 presents pertinent well screen data for the wells. For the purposes of the investigation, TCE and TCA concentration values have been plotted to define the plume configuration. These two compounds are the major constituents of the groundwater contamination as they are found to be prevalent in almost all groundwater sample analyses. DCE and MeCl have also been detected, but are not as prevalent as TCE and TCA. Scattered concentrations of manganese and chromium above groundwater standards were found in the study area. Most such occurrences were in off-site wells, and none were in the pond and sump area on the Sparton site.

Groundwater quality data for wells located in the Rio Grande Valley north of Albuquerque, obtained from a 1987 joint study conducted by the New Mexico Environmental Improvement Division and the New Mexico Health and Environment Department, indicate manganese concentrations that exceeded state standards in eleven out of twenty-one samples[1]. We feel that the manganese

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(1) Gallaher, McQuillan, Chavez, Hull, Eidson; "Groundwater Quality and Public Health, Alburqureque South Valley"; New Mexico Health and Environment Department, Environmental Improvement Division; May 1987.

FIGURE 30
WELL SUMMARY

WELL NUMBER	ZONE *	MEASURING POINT ELEVATION	DEPTH TO TOP OF SCREEN (FT.)	DEPTH TO BOTTOM OF SCREEN (FT.)	ELEVATION AT TOP OF SCREEN (FT.,MSL)	ELEVATION AT BOTTOM OF SCREEN (FT.,MSL)	LENGTH OF SCREEN (FT.)
PW-1	UFZ	5044.54	60.0	70.0	4984.54	4974.54	10.0
7	UFZ	5044.80	63.5	68.5	4981.30	4976.30	5.0
9	UFZ	5044.11	62.5	67.5	4981.61	4976.61	5.0
12	UFZ	5042.58	64.0	74.0	4978.58	4968.58	10.0
13	UFZ	5043.25	60.0	70.0	4983.25	4973.25	10.0
14	UFZ	5041.91	61.5	71.5	4980.41	4970.41	10.0
15	UFZ	5047.49	60.0	70.0	4987.49	4977.49	10.0
16	UFZ	5047.50	68.0	73.0	4979.50	4974.50	5.0
17	UFZ	5049.28	67.0	72.0	4982.28	4977.28	5.0
18	UFZ	5045.58	68.0	78.0	4977.58	4967.58	10.0
19	ULFZ	5046.25	97.0	107.0	4949.25	4939.25	10.0
20	LLFZ	5045.79	125.0	138.0	4920.79	4907.79	13.0
21	UFZ	5048.36	64.5	69.5	4983.86	4978.86	5.0
22	UFZ	5048.06	72.0	77.0	4976.06	4971.06	5.0
23	UFZ	5048.51	72.0	77.0	4976.51	4971.51	5.0
24	UFZ	5048.70	68.4	73.4	4980.30	4975.30	5.0
25	UFZ	5049.00	67.7	72.7	4981.30	4976.30	5.0
26	UFZ	5045.71	73.0	78.0	4972.71	4967.71	5.0
27	UFZ	5045.50	67.0	72.0	4978.50	4973.50	5.0
28	UFZ	5042.69	65.0	70.0	4977.69	4972.69	5.0
29	ULFZ	5044.51	103.0	113.0	4941.51	4931.51	10.0
30	ULFZ	5044.70	97.0	107.0	4947.70	4937.70	10.0
31	ULFZ	5043.53	96.0	106.0	4947.53	4937.53	10.0
32	LLFZ	5048.05	108.0	118.0	4940.05	4930.05	10.0
33	UFZ	5044.29	63.0	73.0	4981.29	4971.29	10.0
34	UFZ	5034.49	56.5	66.5	4977.99	4967.99	10.0
35	UFZ	5042.50	63.2	73.2	4979.30	4969.30	10.0
36	UFZ	5059.35	82.3	92.3	4977.05	4967.05	10.0
37	UFZ	5091.66	115.0	125.0	4976.66	4966.66	10.0
38	LLFZ	5044.32	126.5	136.5	4917.82	4907.82	10.0
39	LLFZ	5044.06	123.0	133.0	4921.06	4911.06	10.0
40	LLFZ	5043.35	117.0	127.0	4926.35	4916.35	10.0
41	ULFZ	5046.77	92.0	97.0	4954.77	4949.77	5.0
42	ULFZ	5057.33	105.0	115.0	4952.33	4942.33	10.0
43	LLFZ	5057.74	127.0	137.0	4930.74	4920.74	10.0
44	ULFZ	5058.71	106.0	116.0	4952.71	4942.71	10.0
45	ULFZ	5090.11	143.0	153.0	4947.11	4937.11	10.0
46	ULFZ	5118.98	170.0	180.0	4948.98	4938.98	10.0
47	UFZ	5155.83	180.0	195.0	4975.83	4960.83	15.0
48	UFZ	5168.31	192.0	207.0	4976.31	4961.31	15.0
49	3rdFZ	5043.67	137.7	147.7	4905.97	4895.97	10.0
50	UFZ	5211.51	235.0	250.0	4976.51	4961.51	15.0
51	UFZ	5058.86	75.0	85.0	4983.86	4973.86	10.0
52	UFZ	5165.81	190.8	206.0	4975.01	4959.81	15.2
53	UFZ	5164.24	189.8	204.0	4974.44	4960.24	14.2
(**) 54	UFZ	5097.64	117.0	132.0	4980.64	4965.64	15.0
55	LLFZ	5168.61	255.0	265.0	4913.61	4903.61	10.0
56	ULFZ	5168.61	220.0	230.0	4948.61	4938.61	10.0
57	UFZ	5103.54	126.0	141.0	4977.54	4962.54	15.0
58	UFZ	5168.89	194.0	209.0	4974.89	4959.89	15.0

FIGURE 30 (continued)

WELL NUMBER	ZONE *	MEASURING POINT ELEVATION	DEPTH TO TOP OF SCREEN (FT.)	DEPTH TO BOTTOM OF SCREEN (FT.)	ELEVATION AT TOP OF SCREEN (FT.,MSL)	ELEVATION AT BOTTOM OF SCREEN (FT.,MSL)	LENGTH SCREEN (FT.)
59	ULFZ	5059.18	104.5	115.0	4954.68	4944.18	10.5
60	ULFZ	5133.62	185.0	195.0	4948.62	4938.62	10.0
61	UFZ	5133.98	158.0	173.0	4975.98	4960.98	15.0
62	UFZ	5075.00	95.0	110.0	4980.00	4965.00	15.0
63	UFZ	5065.74	83.0	98.0	4982.74	4967.74	15.0
64	ULFZ	5097.84	138.8	149.0	4959.04	4948.84	10.2
PZ-1	UFZ	5144.22	182.7	198.0	4961.52	4946.22	15.3

(*) UFZ = UPPER FLOW ZONE
ULFZ = UPPER LOWER FLOW ZONE
LLFZ = LOWER LOWER FLOW ZONE
3rdFZ = THIRD FLOW ZONE

(**) WELL # 54 IS NONFUNCTIONAL

concentrations found in the study area are either naturally occurring or are due to an outside source beyond the scope of this study.

There is no discernable pattern to the concentrations of either of these elements that would indicate that they originated at the Sparton site or are part of the contaminant plume. All other constituents detected in groundwater sample analyses are presented in Attachments 1 and 3.

2. Horizontal Extent of Contamination

a. Upper Flow Zone

(1) Groundwater Flow Direction

Groundwater elevation measurements were taken in 27 wells set in the upper flow zone. Figure 24 presents the interpretation of the upper flow zone groundwater surface contours based on these data points. The direction of groundwater flow at the facility is from the northeast and moves towards the southwest. From the southwest property line, the direction arcs back to the westnorthwest towards Irving Boulevard. Groundwater continues generally in a westward direction near Chantilly Road and then begins to head in a westsouthwest direction past that point.

(2) TCE Plume Configuration

The general configuration of the contaminant plume is based on TCE concentrations as presented in Figure 31.

This interpretation is based upon analytical results of groundwater samples from 23 wells screened in the upper flow zone. The less than 5 ppb line in Figure 31 represents the approximate limit of the leading edge of the plume. Beyond this boundary, TCE concentrations are less than 5 parts per billion (ppb). The distance along the axis of the plume from the facility's western boundary to the less than 5 ppb TCE contour is approximately 2100 feet. The maximum plume width is approximately 1300 feet. The general plume configuration appears to be in the direction of groundwater flow as presented in Figure 24.

(3) TCA Plume Configuration

Figure 32 presents the general plume configuration based upon TCA concentrations (22 wells). The TCA plume has the same basic configuration as that of the TCE plume. Within the plume boundaries, TCA appears to have lower off-site concentrations than TCE.

b. Upper Lower Flow Zone

(1) Groundwater Flow Direction

Groundwater elevation measurements were taken in 13 wells set in the upper lower flow zone. Figure 25 presents the interpretation of the upper lower flow zone groundwater surface contours based on these data points. The direction of groundwater flow from the facility's southwestern boundary is to the

northnorthwest. The apparent direction of flow is towards the northwest past well No. 46 on Irving Boulevard.

(2) TCE Plume Configuration

Figure 33 presents the general configuration of the TCE plume based on analytical results of groundwater samples taken from 13 wells screened in the upper lower flow zone. The distance along the axis of the plume from the facility's western boundary to the less than 5 ppb contour is approximately 1900 feet, with a maximum width of approximately 1300 feet. The interpretation of the 3000 ppb contour around well No. 46 would suggest that TCE has moved as a slug in this flow zone. A possible cause for this might be the presence of a less permeable barrier which could divert or dissect the plume as it migrates to the northwest.

(3) TCA Plume Configuration

Figure 34 presents the general plume configuration based on TCA results. The TCA interior contour configuration is not like the TCE slug-like feature. This may be a more accurate representation of the plume in view of the apparent lack of clay layers on the west side of the facility. Off-site TCA concentrations in the central portion of the plume and near well No. 46 are an order of magnitude less than TCE concentrations in the upper lower flow zone.

c. Lower Lower Flow Zone

(1) Groundwater Flow Direction

Groundwater elevation measurements were taken in 7 wells set in the lower lower flow zone. Figure 26 presents the interpretation of the lower lower flow zone groundwater surface contours based on these data points. Groundwater flow is to the northwest as it leaves the western boundary of the site.

(2) TCE Plume Configuration

Figure 35 presents the general plume configuration based on TCE results. The distance along the axis of the plume from the western boundary to the less than 5 ppb TCE contour is approximately 1800 feet with a maximum width of approximately 900 feet.

(3) TCA Plume Configuration

Figure 36 presents the general plume configuration based upon TCA concentrations. The TCA plume has the same basic configuration and direction as the TCE plume, however, the TCA plume is smaller.

d. Third Flow Zone

Only one well has been constructed in the third flow zone, therefore no direction of groundwater flow can be determined. Analytical results from this well (MW-49) indicate no detectable

levels of any of the contaminants associated with the Sparton facility. Trichlorofluoromethane was noted at concentrations slightly above detection limits. We feel that this result is either anomolous or due to statistical variation inherent in the analytical procedures as a laboratory artifact.

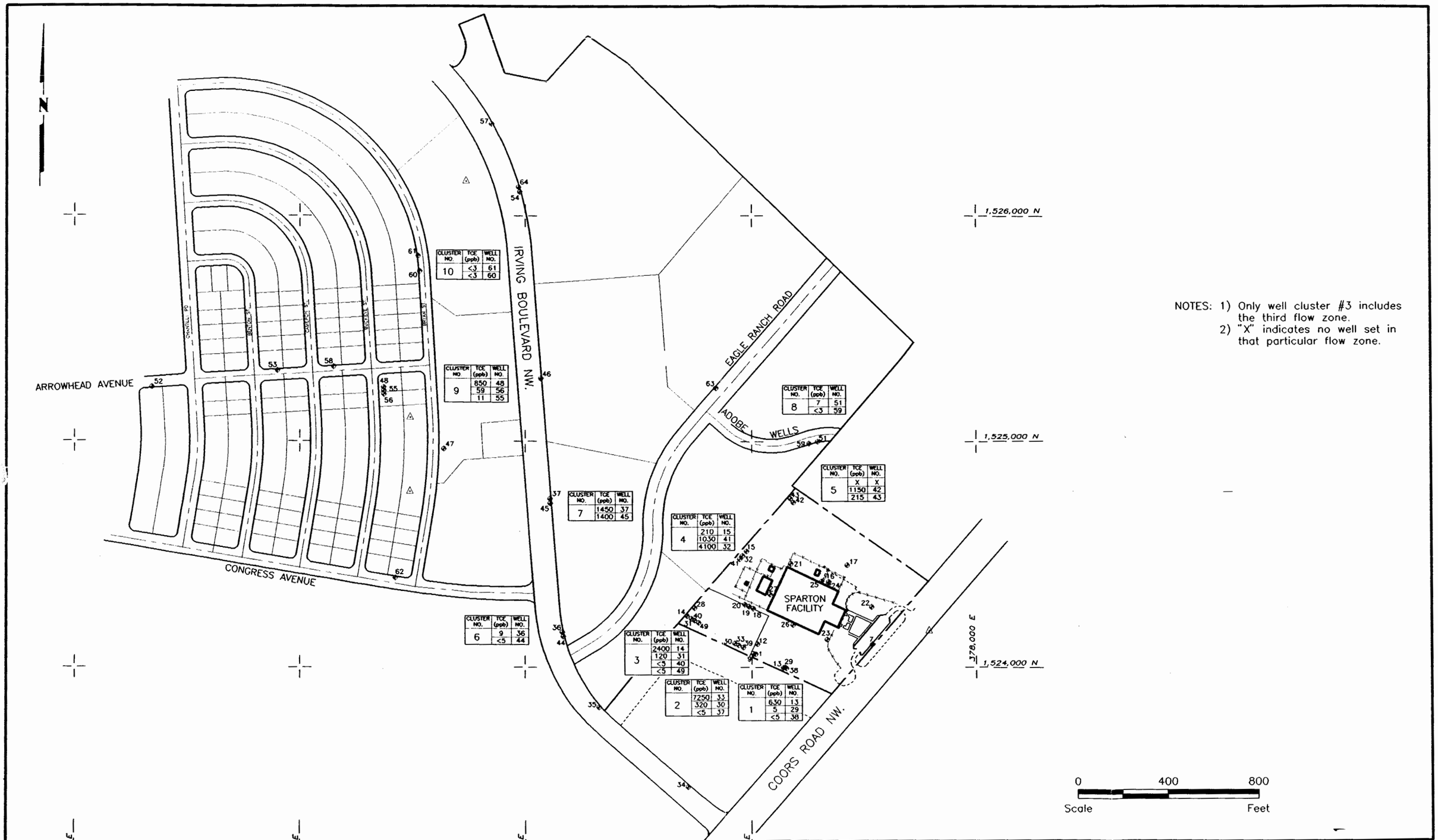
3. Vertical Extent of Contamination

a. Cluster Locations

The vertical limit of the plume has been determined using the results of groundwater sample analyses at ten well clusters. The location of the ten well clusters (five on-site, five off-site) is presented in Figures 37 (TCE) and 38 (TCA). Figure 39 is a table identifying the wells, screen elevations, and flow zones monitored at each well cluster. TCE and TCA values from the laboratory data presented in Attachment 3 were used to examine the vertical profile of the contamination. Analytical results for all constituents can also be found in Attachment 3.

b. TCE Vertical Profile Trends

Of the ten well clusters, eight clusters show decreasing TCE concentration with depth (clusters 1, 2, 3, 5, 6, 7, 8 and 9). Of these eight, three clusters (clusters 6, 7, and 8) show decreases of less than 50 ppb between flow zones. Only one



NOTES: 1) Only well cluster #3 includes the third flow zone.
2) "X" indicates no well set in that particular flow zone.

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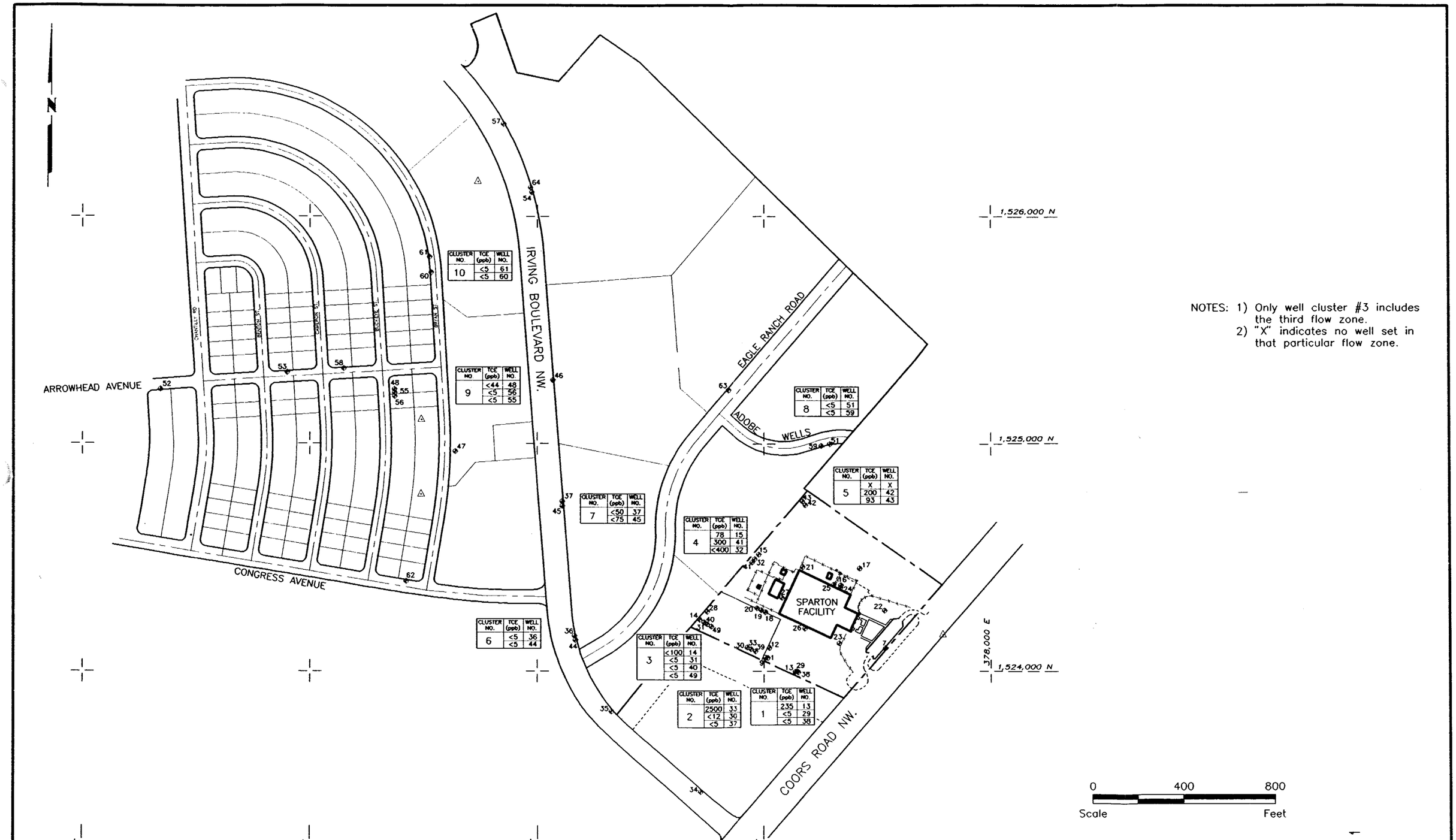
TCE CONCENTRATION–VERTICAL PROFILE

Sparton Tecnology, Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE 37

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
DC					

0631014B



CLUSTER NO.	TCE (ppb)	WELL NO.
10	<5	61
	<5	60

CLUSTER NO.	TCE (ppb)	WELL NO.
9	<44	48
	<5	56
	<5	55

CLUSTER NO.	TCE (ppb)	WELL NO.
8	<5	51
	<5	59

CLUSTER NO.	TCE (ppb)	WELL NO.
5	X	X
	200	42
	93	43

CLUSTER NO.	TCE (ppb)	WELL NO.
7	<50	37
	<75	45

CLUSTER NO.	TCE (ppb)	WELL NO.
4	78	15
	300	41
	<400	32

CLUSTER NO.	TCE (ppb)	WELL NO.
6	<5	36
	<5	44

CLUSTER NO.	TCE (ppb)	WELL NO.
3	<100	14
	<5	31
	<5	40
	<5	49

CLUSTER NO.	TCE (ppb)	WELL NO.
2	2500	33
	<12	30
	<5	37

CLUSTER NO.	TCE (ppb)	WELL NO.
1	235	13
	<5	29
	<5	38

NOTES: 1) Only well cluster #3 includes the third flow zone.
2) "X" indicates no well set in that particular flow zone.

HARDING LAWSON ASSOCIATES
Engineering and Environmental Services

TCA CONCENTRATION–VERTICAL PROFILE

Sparton Tecnology, Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE 38

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	31015B				

FIGURE 39

WELL CLUSTER SUMMARY			
Well Cluster No.	Well No.	Screened Interval Elevation, Ft (MSL)	Flow Zone
1	13	4983.35 - 4978.35	UFZ
	29	4941.57 - 4931.57	ULFZ
	38	4917.85 - 4907.85	LLFZ
2	33	4981.36 - 4971.36	UFZ
	30	4947.70 - 4937.70	ULFZ
	39	4921.07 - 4911.07	LLFZ
3	14	4980.94 - 4970.94	UFZ
	31	4947.57 - 4937.57	ULFZ
	40	4926.46 - 4916.26	LLFZ
	49	4905.88 - 4895.88	TFZ
4	15	4987.51 - 4977.51	UFZ
	41	4954.79 - 4949.79	ULFZ
	32	4940.08 - 4930.08	LLFZ
5	42	4952.28 - 4942.28	ULFZ
	43	4930.69 - 4920.69	LLFZ
6	36	4977.0 - 4967.0	UFZ
	44	4954.68 - 4944.68	ULFZ
7	37	4976.66 - 4966.66	UFZ
	45	4949.35 - 4939.35	ULFZ
8	51	4983.86 - 4973.86	UFZ
	59	4954.68 - 4944.18	ULFZ
9	48	4976.31 - 4961.31	UFZ
	56	4948.61 - 4938.61	ULFZ
	55	4913.61 - 4903.61	LLFZ
10	61	4975.98 - 4960.98	UFZ
	60	4948.62 - 4938.62	ULFZ

NOTE:
UFZ = UPPER FLOW ZONE
ULFZ = UPPER LOWER FLOW ZONE
LLFZ = LOWER LOWER FLOW ZONE
TFZ = THIRD FLOW ZONE

cluster (cluster 4) showed increasing TCE concentration with depth. One cluster (cluster 10) had analyses below detection limits for both samples.

c. TCA Vertical Profile Trends

Of the ten well clusters, three clusters show decreasing TCA concentrations with depth (clusters 1, 2, and 5), one cluster showed increasing concentration with depth (cluster 4), and the remaining six clusters were below detectable limits.

d. Comparison of Trends

For TCE and TCA, where concentrations above detection limits were found, the concentrations decreased with depth in all but one case. The one location where the concentrations increase with depth could possibly be explained by a subsurface channel parallel to the direction of groundwater flow which may allow downward migration of chemical constituents.

4. Rate of Groundwater Flow

The groundwater velocity in the vicinity of the site, based on the stated assumptions and hydraulic conductivity values reported in the HLA report titled "Off-site Investigation"; (October, 1987; pgs. 10-11), ranges between approximately 6 feet and 83 feet per year. The facility has been in operation for 29 years. If an assumed time of 25 years is used to denote the time

chemicals have been in the groundwater, and using a rate of migration of 83 feet per year, then the total distance traveled would be on the order of 2100 feet. This distance is very close to the limits of the contaminant plume determined by TCE concentrations in groundwater samples.

5. Profiles of Appendix IX Constituents

The predominant Appendix IX constituents found consistently throughout the study area are TCE and TCA. DCE and MeCl were detected on a less frequent or consistent basis, but still with some regularity. Occurrences of other Appendix IX constituents were random and inconsistent. A complete listing of all analytical results for wells installed pursuant to the RFI is provided in Attachment 3.

Due to elevated levels of TCE in many of the samples, dilution of the samples prior to analysis was necessary to lower the TCE concentration to within the limits of the analytical instrument. Because of this dilution, the detection limits for other VOC compounds included in the analytical suite were raised to levels which in most cases, exceeded either federal or state standards. All such instances occurred in wells which are inside the plume boundaries and which are therefore considered to be contaminated.

6. Factors Influencing Plume Movement

Factors that influence plume movement include variations in stratigraphy, changes in hydraulic gradient, infiltration, and recharge areas.

As groundwater flow proceeds, variation of sediment types in the saturated zone will impact the direction and velocity of the plume. Fine-grained silts and clays will tend to impede flow and may redirect, on a small local scale, the hydraulic flow pattern. Within the area of the project, logs of borings document the wide range of sediments encountered which range from clays and fine-grained sand to gravels and cobbles.

Changes in the hydraulic gradient will affect plume migration. The depositional environment and energy are quite variable depending on which section of the valley is being investigated. In areas where the gradient is flat, the plume's flow rate would decrease and possibly allow for increased lateral dispersion. Conversely, a steeper gradient would tend to make the plume move through advective forces. This would tend to make the plume more elongated and would also place it further downgradient versus migration over a flatter gradient.

Infiltration of surface water may affect the plume movement. This effect is probably minimal unless the rate is very high due to, for example, flooding conditions or torrential precipitation. A potential location for this would be the inundation of the Calabacillas Arroyo north of the project area.

If the plume encounters recharge boundaries, its migration pathway will be altered. Evidence of recharge influence can be seen at the Sparton site in the alteration of the localized groundwater flow direction caused by recharge from the Corrales Main Canal and the irrigated fields located just east and southeast of the facility site.

7. Future Contaminant Movement

Figure 24 presents the direction of groundwater flow in the upper flow zone. It is anticipated that the contaminant plume will migrate with the direction of groundwater flow as presented in Figure 24 at a rate of approximately 83 feet per year under current conditions.

8. Effectiveness of Interim Recovery Well System

Under the provisions of the Consent Order, an interim groundwater recovery well system was installed in the upper flow zone. An evaluation of the effectiveness of this groundwater recovery well system was conducted in early 1990. This evaluation used a statistical analysis approach based on four years of quarterly groundwater monitoring data gathered under a state-approved alternate groundwater monitoring program.

The summary report of this evaluation submitted to EPA in February, 1990, concluded that the recovery system is accomplishing

or exceeding the goals for which it was designed. A copy of this report is included in Attachment 9.

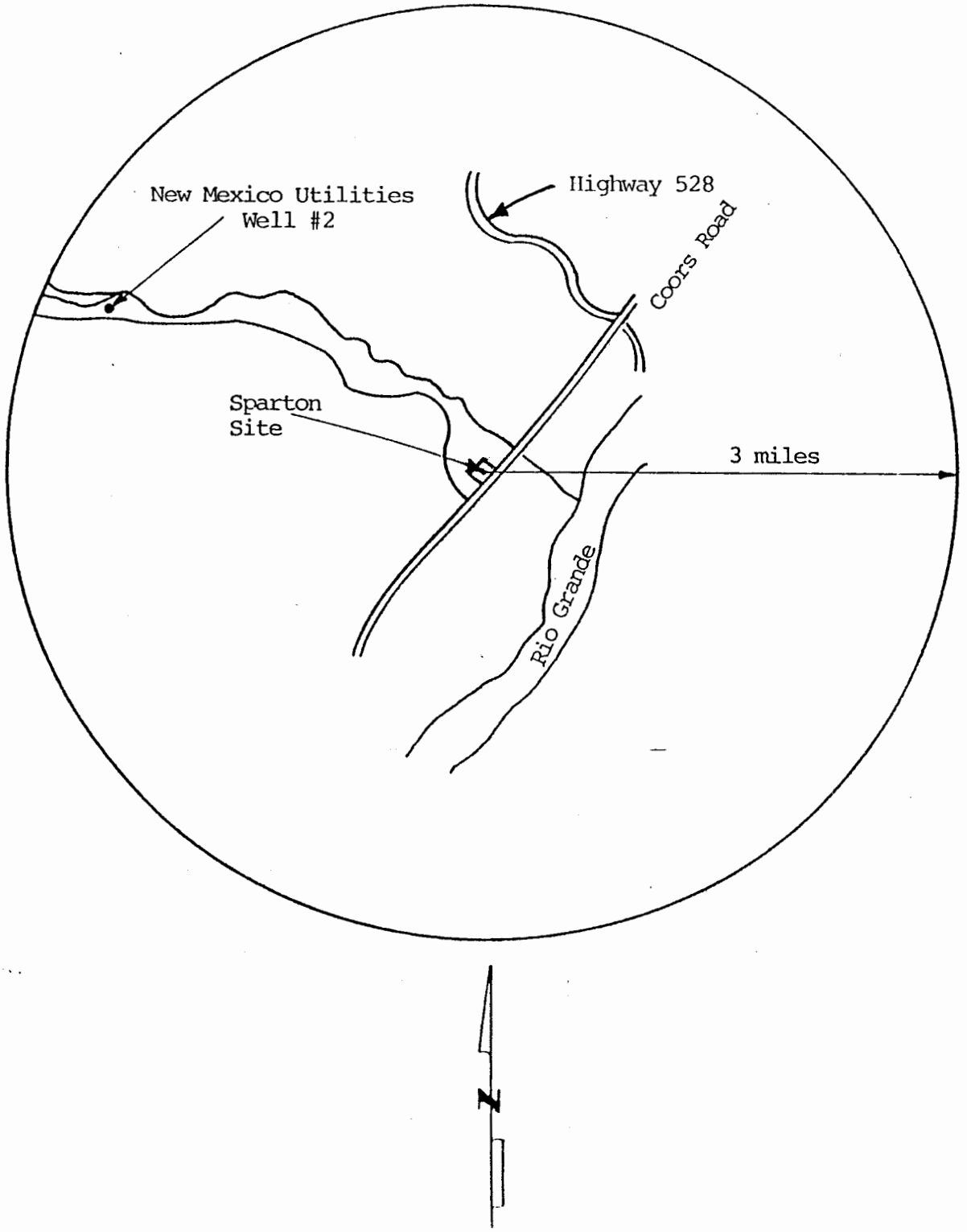
VI POTENTIAL RECEPTORS

A. Groundwater

Figure 8 shows the locations of non-monitor wells in the vicinity of the Sparton site. The wells designated as "wells confirmed by state records" are described in Attachment 10. The information was obtained from New Mexico State Engineer Office records. The wells designated as "wells visually observed" were located by field reconnaissance. Records are not available to determine the type or use for these wells, or if they are even in use.

Figure 40 shows the location of the nearest municipal well to be approximately 2.5 miles westnorthwest of the Sparton facility. This is the only existing municipal well known to exist on the west side of the Rio Grande within a three-mile radius of the Sparton site.

Figure 41 shows the locations of planned future wells in the vicinity of the Sparton facility. This information was extracted from the "Water Systems Master Plan for the City of Albuquerque" updated in 1982. None of these wells have been installed at this time. In a personal communication with Mr. Norman Gaume, Operations Manager for the City of Albuquerque Water Utility, Mr. Gaume stated that there are no plans to install municipal wells in this area before the limit of their planning horizon, currently the year 2000.



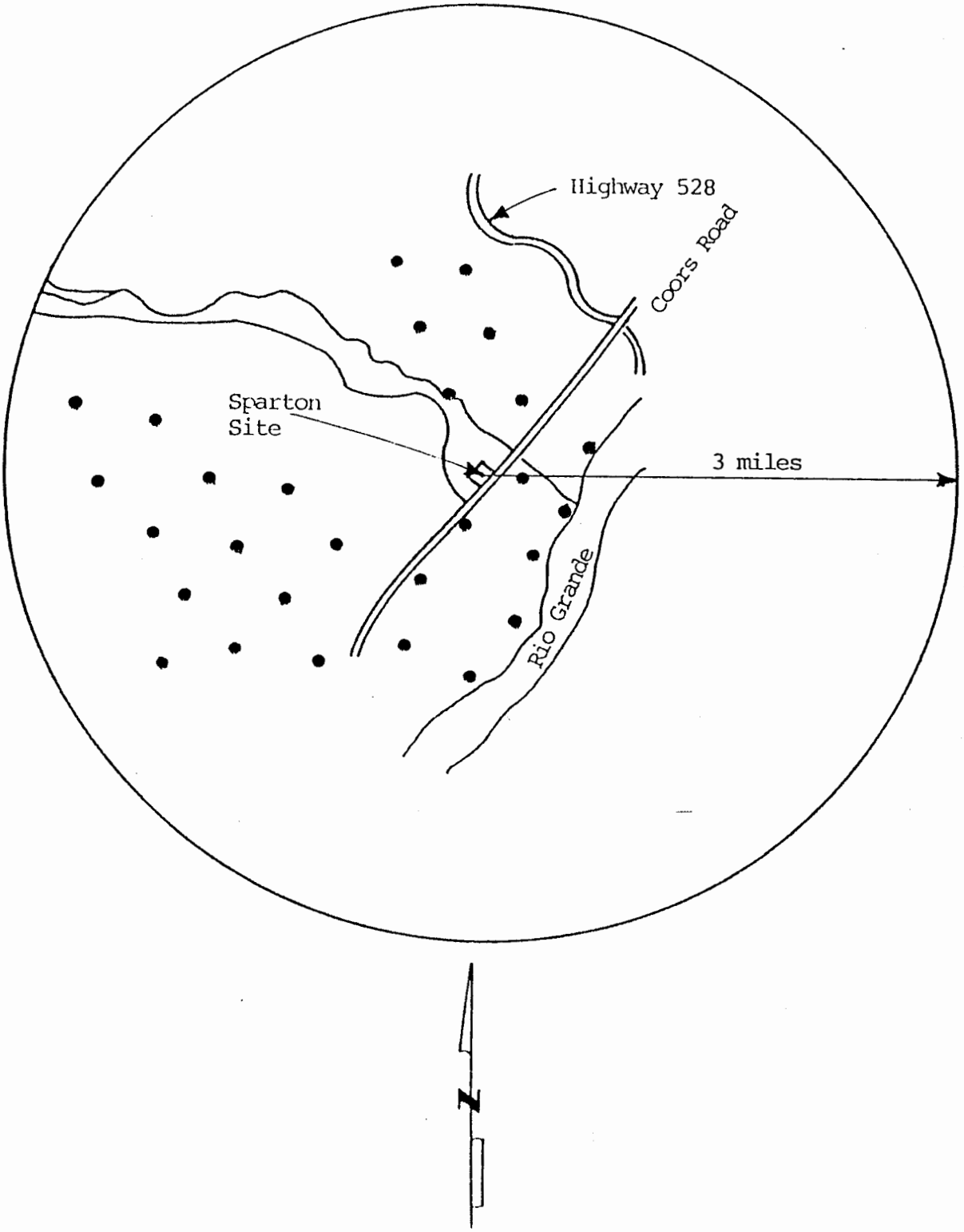
Scale 1" = 1 mile

Harding Lawson Associates
Engineers and
Environmental Services

MUNICIPAL WELL LOCATION
Sparton Technology Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE
40

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	6310,039.12	JH	12-90		



Scale 1" = 1 mile

● Planned municipal wells

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Engineers and
Environmental Services

PLANNED MUNICIPAL WELLS
Sparton Technology Inc.
Coors Road Facility
Albuquerque, New Mexico

FIGURE
41

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	6310,039.12	JH	12-90		

B. Surface Waters

No domestic or municipal surface water sources exist within a 1.5-mile radius of the Sparton facility. Irrigation at residential, commercial, and industrial establishments is principally derived from municipal water systems. No future development of surface water for domestic or municipal uses is anticipated for the area.

Some limited fishing is currently available in the Corrales Riverside Drain and Rio Grande east of the Sparton site. No expansion of fishing opportunities is expected in the future in the area (New Mexico Game and Fish Department, Operations Plan, Aquatic Management of N.M. Wildlife 1987 to 1995, and J. Maracchini, N.M. Area Fisheries Manager, oral communication).

Local surface water sources are the Corrales Main Canal, the Corrales Riverside Drain, and the Rio Grande which provide water for irrigated agriculture to the east of the Sparton site. No expansion of this agricultural use is contemplated.

No current industrial uses of surface waters are known in the local area, and no future surface water use is anticipated.

Surface water in the Corrales Main Canal, the Corrales Riverside Drain, and the Rio Grande supports vegetative habitats and associated wildlife. No expansion of this function is planned.

C. Human Use or Access

There are no existing or planned recreational facilities adjacent to the Sparton facility. Neither are there any existing or planned hunting facilities or opportunities adjacent to the Sparton facility.

There are no existing or planned residential uses of land adjacent to the facility. Current zoning restricts development of residential land uses in proximity to the facility. Commercial land use is currently established on adjacent lands to the north and south of the plant site. Commercial land use is also planned to the west of the facility.

The Sparton facility is located within an area zoned for manufacturing. Adjacent land to the north is also zoned for manufacturing. To the west and south of the facility, zoning is for commercial development. Lands to the east of the facility are zoned for agriculture. These current zone designations for lands adjacent to the facility are supported and recommended to be maintained in the future by the Coors Corridor Plan (April 1984).

Prevailing winds in the area of the Sparton facility are shown in Figure 42. Winds blow most frequently from the north in winter, and from the south along the Rio Grande Valley in summer. Existing and planned residential areas are located to the west of the facility.

FIGURE 42

PREVAILING WINDS AND AVERAGE MONTHLY WIND SPEEDS		
Month	**Average Speed m.p.h.**	**Prevailing Direction**
January	8.0	N
February	8.8	N
March	10.1	SE
April	11.0	S
May	10.5	S
June	10.0	S
July	9.1	SE
August	8.2	SE
September	8.6	SE
October	8.3	SE
November	7.9	N
December	7.7	N

Source: National Oceanic and Atmospheric Administration, Local Climatological Data, Albuquerque, New Mexico, 1978

D. Surface Water Biota

There are no known surface water bodies on, adjacent to, or affected by the Sparton facility.

E. Ecology

The vegetation in the area of the Sparton facility has been altered through development. The facility site exhibits landscaping comprised of lawn, shrubs, and trees (cottonwood and conifers). The principal plant community in adjacent areas is grassland or shrubland. Dominant grasses include burro grass, gramma grasses, fluffgrass, dropseeds, galleta, alkali socaton, needle and thread, western wheatgrass, three-awn, bottlebrush, and squirreltail. Shrubs and forbs include sagebrush, snakeweed, Morman tea, locust, fourwing saltbrush, indigo bush, yucca, prickly pear, peppergrass, stickleaf, and spectacle pod. Where the grassland or shrubland community is disturbed, there is a decrease in black gramma and bush muckly, and an increase in galleta, sand dropseed, and annual plants.

Wildlife resources in the facility area have been significantly affected by increased urbanization. Much of the original grassland has been replaced by less palatable species as well as shrubs such as snakeweed. Other than acting as a soil stabilizer, many of the shrubs and grasses are of little value to wildlife.

Representative wildlife species inhabiting the vicinity of the Sparton facility include the black-tailed jackrabbit, desert cottontail rabbit, kangaroo rats, pocket mouse, white-footed mouse, ground squirrel, northern grasshopper mouse, horned lark, mourning dove, scaled quail, mockingbird, several species of sparrows, prairie falcon, collard lizard, roundtailed horned lizard, and roadrunner.

F. Demographic Profile

Demographic data for the vicinity are based on information in the Census of Population and Housing: Census Tracts, Albuquerque, New Mexico, Standard Metropolitan Statistical Area and the 1980 Census of Population and Housing Tape File 1 and 3, U.S. Department of Commerce, Bureau of Census, Washington, D.C., 1980, as summarized in the Northwest Area Plan. The Sparton facility area is contained in Census Tract 47.3. Information for this tract is, in some instances, presented by block which describes a larger area than just the immediate facility vicinity.

The population of the greater area of the facility vicinity is just over 24,000 persons with the largest number of people in the 20-to-64 age group. The school age group, 5-to-19, is approximately half the size of the 20-to-64 age group. The pre-school age group, 0-to-4, outnumbers the over-65 age group. The population is distributed in approximately 8,352 households.

The area population is 47% Spanish ethnicity. There is less than 2% Black, approximately 4% American Indian, and less than 1% Asian. The area population is relatively stable, with 44% maintaining a minimum five-year residency in the same house and 54% having been born in New Mexico.

G. Endangered or Threatened Species

Eight species of plants are currently listed as endangered or threatened in New Mexico by the U.S. Fish and Wildlife Service and the New Mexico Heritage Program, but none of the habitats for these plants occur in the vicinity of the Sparton facility.

Of the seven bird species and one mammal specie listed as endangered in New Mexico by the New Mexico Department of Fish and Game as of 1983, four bird species were recorded as having been sighted in or near the facility area in 1984. The birds were McCown Lingspurs, Bell Vieros, Peregrine Falcons, and Mississippi Kites. Certain federal endangered species, such as the Whooping Crane and Bald Eagle, may fly over the Rio Grande during migration and may land locally to feed.

VII GROUNDWATER PROTECTION STANDARDS

A. Maximum Concentration Limits (MCLs)

Maximum concentration limits (MCLs) for groundwater protection have been established by EPA and are found in 40 CFR 264.94. These MCLs are shown in Figure 43.

B. Maximum Contaminant Levels (MCLs)

Under the provisions of the proposed Subpart S regulations to 40 CFR Part 264, regarding corrective actions for solid waste management units, maximum contaminant levels (MCLs) promulgated under the Safe Drinking Water Act and found in 40 CFR 141 Subpart B, may be considered as appropriate standards for groundwater protection.

C. New Mexico Groundwater Standards

The New Mexico Water Quality Control Commission (WQCC) Human Health Standards for groundwater quality, as defined in Part 3-103 of the WQCC regulations, are shown in Figure 44.

D. Background Concentrations

Monitor well MW-6 was located upgradient of the source area in the northern corner of the facility property. Historical analyses of groundwater samples from this well showed elevated concentrations of the principal parameters found in the Sparton

FIGURE 43

MAXIMUM CONCENTRATION OF CONSTITUENTS FOR GROUNDWATER PROTECTION	
Constituent	**Maximum Concentration mg/l**
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Lead	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05
Endrin	0.0002
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005
2,4-D	0.1
2,4,5- P Silvex	0.01

Source: 40 CFR 264.94

FIGURE 44

NEW MEXICO GROUNDWATER STANDARDS	
Parameter	**Maximum Allowable Concentration**
Arsenic	100 ug/l
Barium	1000 ug/l
Cadmium	10 ug/l
Chromium	50 ug/l
Cyanide	200 ug/l
Fluoride	1600 ug/l
Lead	50 ug/l
Total Mercury	2 ug/l
Nitrate as N	10000 ug/l
Selenium	50 ug/l
Silver	50 ug/l
Uranium	5000 ug/l
Radioactivity: Combined Radium-226 and Radium-228	30.0 pCi/l
Benzene	10 ug/l
Polychlorinated Biphenyls	1 ug/l
Toluene	750 ug/l
Carbon Tetrachloride	10 ug/l
1,2-Dichloroethane	10 ug/l
1,1-Dichloroethylene	5 ug/l
1,1,2,2-Tetrachloroethylene	20 ug/l
1,1,2-Trichloroethylene	100 ug/l
Ethylbenzene	750 ug/l
Total Xylenes	620 ug/l
Methylene Chloride	100 ug/l

FIGURE 44
(continued)

NEW MEXICO GROUNDWATER STANDARDS	
Parameter	**Maximum Allowable Concentration**
Chloroform	100 ug/l
1,1-Dichloroethane	25 ug/l
Ethylene Dibromide	0.1 ug/l
1,1,1-Trichloroethane	60 ug/l
1,1,2-Trichloroethane	10 ug/l
1,1,2,2-Tetrachloroethane	10 ug/l
Vinyl Chloride	1 ug/l
PAHs: total naphthalene plus monomethylnaphthalenes	30 ug/l
Benzo-a-pyrene	0.7 ug/l

plume (see Attachment 1). Because of the complex stratigraphy underlying the Sparton facility, it is uncertain whether these elevated concentrations represent a portion of the Sparton plume or a release from an off-site upgradient source. This well was plugged and abandoned in early 1989 under the provisions of the Consent Order.

Monitor well MW-51 was installed in April 1990. This well is located north of the Sparton facility, west of the car dealership which is adjacent to Sparton's northeastern boundary. Analyses of groundwater samples from this well show slightly elevated concentrations of TCE.

A preliminary environmental assessment of properties surrounding the Sparton facility indicate that there is a potential that past uses of the property currently occupied by the car dealership and possibly the old Alameda airport, located north of the Calabacillas Arroyo, may have resulted in a release of chemical constituents to the subsurface environment. Analytical results from well MW-6 and MW-51 may be indicative of this, however the results are inconclusive. A copy of the environmental assessment is included in Attachment 11.

DISTRIBUTION

1 copy to:	Sparton Corporation 2400 East Ganson Street Jackson, Michigan 49202 Attn: Mr. Blair H. Thompson
1 copy to:	Sparton Technology, Inc. 4901 Rockaway Boulevard, SE Rio Rancho, New Mexico 87124 Attn: Mr. Richard D. Mico
1 copy to:	Varnum, Riddering, Schmidt, & Howlett 171 Monroe Avenue, NW Grand Rapids, Michigan 49503 Attn: Mr. Jon F. DeWitt
1 copy to:	Metric Corporation 8429 Washington Place, NE Suite A Albuquerque, New Mexico 87109 Attn: Mr. Gary L. Richardson
1 copy to:	New Mexico Environmental Improvement Division
6 copies to:	U.S. EPA Region VI Dallas, Texas

JSH/JEM:cfa:ejg

QUALITY CONTROL REVIEWER:

_____

Charles R. Glore, C.E.G.
Principal Hydrogeologist

501.S3
12/12/90

LIST OF ATTACHMENTS

1. Alternate Groundwater Monitoring Database
2. Contaminant Properties
3. Plume Delineation Database
4. Boring Logs and Well Completion Diagrams
5. Areal Extent of Zones of Relatively Lower Permeability
6. Groundwater Flow
7. Soil Investigation of the Unsaturated and Upper Saturated Zoned
8. Off-Site Investigation
9. Effectiveness of the Groundwater Recovery Well System
10. Description of Vicinity Wells
11. Environmental Assessment of Properties Surrounding Sparton Facility

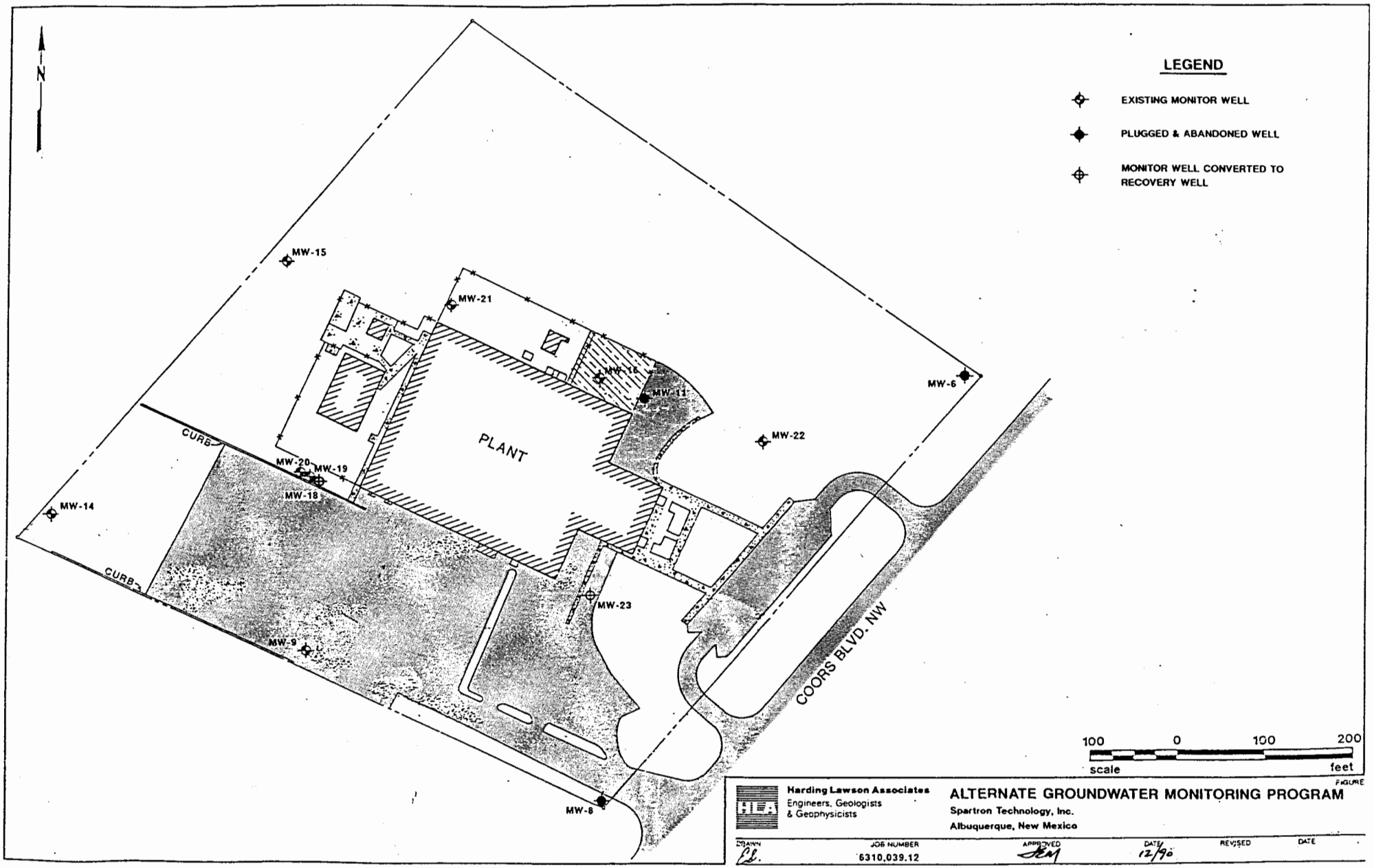
SPARTON TECHNOLOGY, INC.

Coors Road Facility
Albuquerque, New Mexico

ALTERNATE GROUNDWATER MONITORING PROGRAM

ANALYTICAL RESULTS

DECEMBER 1990



Harding Lawson Associates
Engineers, Geologists & Geophysicists

FIGURE

ALTERNATE GROUNDWATER MONITORING PROGRAM
Spartron Technology, Inc.
Albuquerque, New Mexico

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
CL.	6310,039.12	JEM	12/90		

ALTERNATE GROUNDWATER MONITORING PROGRAM WELL SUMMARY

WELL NUMBER	ZONE *	MEASURING PT. ELEVATION	DEPTH TO TOP OF SCREEN (FT.)	DEPTH TO BOTTOM OF SCREEN (FT.)	ELEVATION AT TOP OF SCREEN (FT.,MSL)	ELEVATION AT BOTTOM OF SCREEN (FT.,MSL)	LENGTH OF SCREEN (FT.)
6	UFZ	5046.39	61.5	66.5	4984.89	4979.89	5.0
8	UFZ	5042.62	58.0	63.0	4984.62	4979.62	5.0
9	UFZ	5044.11	62.5	67.5	4981.61	4976.61	5.0
11	LLFZ	5046.31	134.0	139.0	4912.31	4907.31	5.0
14	UFZ	5041.91	61.5	71.5	4980.41	4970.41	10.0
15	UFZ	5047.49	60.0	70.0	4987.49	4977.49	10.0
16	UFZ	5047.50	68.0	73.0	4979.50	4974.50	5.0
18	UFZ	5045.58	68.0	78.0	4977.58	4967.58	10.0
19	ULFZ	5046.25	97.0	107.0	4949.25	4939.25	10.0
20	LLFZ	5045.79	125.0	138.0	4920.79	4907.79	13.0
21	UFZ	5048.36	64.5	69.5	4983.86	4978.86	5.0
22	UFZ	5048.06	72.0	77.0	4976.06	4971.06	5.0
23	UFZ	5048.51	72.0	77.0	4976.51	4971.51	5.0

(*) UFZ = UPPER FLOW ZONE
ULFZ = UPPER LOWER FLOW ZONE
LLFZ = LOWER LOWER FLOW ZONE

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 05 (UPPER FLOW ZONE) ********* >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																	
1983	4	8.00	688	22	0.9	81	21	---	---	---	---	< 0.1	---	---	0.37	---	---
1984	4	7.64	721	---	1.8	112	3.8	0.22	0.6	< 0.01	< 0.01	---	0.12	< 0.01	0.68	< 0.006	---
1985	1	8.09	711	---	---	---	0.9	0.21	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	8.07	640	27	0.8	91	2	0.04	0.5	< 0.01	0.01	0.2	0.14	0.01	0.34	< 0.04	54
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

NOTES : 1) WHERE STATE STANDARDS EXIST, THEY ARE SHOWN IN PARENTHESES IMMEDIATELY BELOW THE CHEMICAL NAME.
2) IF A COMPOUND WAS NOT DETECTED, THE METHOD DETECTION LIMIT IS SHOWN, PRECEEDED BY A "<" (less than sign).
3) --- = NOT TESTED.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 06 (UPPER FLOW ZONE) ********* >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																	
1983	4	7.97	821	38	10	95	7.8	---	---	---	---	< 0.1	---	---	0.032	---	---
1984	4	7.50	866	---	16	120	6.1	0.45	0.1	< 0.01	< 0.01	---	0.25	< 0.01	0.34	0.005	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	7.89	871	---	---	---	1.7	0.31	---	---	---	---	---	---	---	---	---
1985	3	7.46	833	38	15	140	1.4	0.4	< 0.1	< 0.01	< 0.01	---	0.33	< 0.005	0.23	< 0.01	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	7.43	810	---	---	---	12	0.32	---	---	---	---	---	---	---	---	---
1986	2	7.34	821	---	---	---	1.9	1.4	---	---	---	---	---	---	---	---	---
1986	3	7.77	831	---	---	---	6.3	0.59	---	---	---	---	---	---	---	---	---
1986	4	7.72	846	28	14	142	4.4	0.421	< 0.1	< 0.01	< 0.01	---	0.3	< 0.005	---	< 0.01	79
1987	1	8.03	886	---	---	---	3.7	0.26	---	---	---	---	---	---	---	---	---
1987	2	7.61	879	---	---	---	1.2	0.18	---	---	---	---	---	---	---	---	---
1987	3	7.61	784	27	14	12	3.3	0.35	< 0.1	< 0.01	< 0.01	0.2	0.34	< 0.01	0.066	< 0.04	79
1987	4	7.55	832	---	---	---	0.4	0.3	---	---	---	---	---	---	---	---	---
1988	1	7.62	885	---	---	---	1.1	0.19	---	---	---	---	---	---	---	---	---
1988	2	7.61	880	---	---	---	1.5	0.15	---	---	---	---	---	---	---	---	---
1988	3	7.60	812	23	20	118	2.3	0.120	< 0.1	0.01	< 0.01	< 0.1	0.31	< 0.01	0.042	< 0.04	76
1988	4	7.80	775	---	---	---	1.6	0.100	---	---	---	---	---	---	---	---	---
1989	1	7.40	675	---	---	---	2.1	0.039	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[mg/l]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 07 (UPPER FLOW ZONE) *********																	
1983	4	7.94	507	116	0.4	39	80	---	---	---	---	< 0.1	---	---	0.089	---	---
1984	4	7.43	692	---	3.3	85	3.6	0.85	0.2	0.02	< 0.01	---	0.11	0.021	0.03	< 0.006	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	8.12	693	23	3	103	0.6	0.21	< 0.1	< 0.01	< 0.01	< 0.1	0.18	< 0.01	0.032	< 0.04	55
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 08 (UPPER FLOW ZONE) *********							>>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<										
1983	4	8.05	579	18	1.7	65	15	---	---	---	---	< 0.1	---	---	0.098	---	---
1984	4	7.50	763	---	7.4	80	5.5	0.18	0.4	< 0.01	< 0.01	---	0.37	< 0.01	< 0.006	< 0.006	---
1985	1	7.96	735	---	---	---	2.1	0.088	---	---	---	---	---	---	---	---	---
1985	2	7.78	741	---	---	---	1.3	0.15	---	---	---	---	---	---	---	---	---
1985	3	7.42	715	33	5.5	69	1.8	0.38	< 0.1	< 0.01	< 0.01	---	0.31	< 0.005	< 0.005	< 0.01	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	7.40	708	---	---	---	16	0.098	---	---	---	---	---	---	---	---	---
1986	2	7.27	764	---	---	---	2	0.18	---	---	---	---	---	---	---	---	---
1986	3	7.68	754	---	---	---	14	0.37	---	---	---	---	---	---	---	---	---
1986	4	7.48	784	37	2.1	74	1.3	0.233	< 0.1	< 0.01	< 0.01	---	0.52	< 0.005	---	< 0.01	64
1987	1	8.22	754	---	---	---	2	0.069	---	---	---	---	---	---	---	---	---
1987	2	7.78	772	---	---	---	3.3	0.054	---	---	---	---	---	---	---	---	---
1987	3	7.61	705	37	3	53	3.2	0.15	0.2	< 0.01	< 0.01	0.1	0.38	< 0.01	0.22	< 0.04	61
1987	4	7.59	703	---	---	---	3	0.07	---	---	---	---	---	---	---	---	---
1988	1	7.82	782	---	---	---	3.7	0.042	---	---	---	---	---	---	---	---	---
1988	2	7.56	799	---	---	---	1.5	0.052	---	---	---	---	---	---	---	---	---
1988	3	7.60	737	23	1.7	71	2.5	0.070	0.1	< 0.01	0.01	< 0.1	0.57	0.01	0.18	< 0.04	99
1988	4	6.60	717	---	---	---	2.2	0.093	---	---	---	---	---	---	---	---	---
1989	1	7.50	771	---	---	---	3.4	4.080	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[mg/l]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 09 (UPPER FLOW ZONE) *********																	
1983	4	7.36	2320	400	< 0.1	340	29	---	---	---	---	< 0.1	---	---	3.4	---	---
1984	4	6.70	2350	---	< 0.1	372	14	21	1.7	< 0.01	< 0.01	---	13	< 0.01	1.9	0.19	---
1985	1	7.00	2040	---	---	---	6.1	15	---	---	---	---	---	---	---	---	---
1985	2	7.31	1770	---	---	---	7.2	9.1	---	---	---	---	---	---	---	---	---
1985	3	6.92	1590	210	< 0.1	300	4.6	6.9	0.9	< 0.01	< 0.01	---	7.9	< 0.005	1.1	0.11	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	6.96	1340	---	---	---	20	6.7	---	---	---	---	---	---	---	---	---
1986	2	7.02	1380	---	---	---	3	5	---	---	---	---	---	---	---	---	---
1986	3	7.46	1480	---	---	---	3.1	6.3	---	---	---	---	---	---	---	---	---
1986	4	7.71	1470	138	< 0.1	226	1.4	5.08	5.1	< 0.01	< 0.01	---	5.5	< 0.005	---	0.081	110
1987	1	8.03	1440	---	---	---	3	3.2	---	---	---	---	---	---	---	---	---
1987	2	7.66	1370	---	---	---	2.1	4.0	---	---	---	---	---	---	---	---	---
1987	3	7.87	1300	116	< 0.1	203	2	4.4	2.6	< 0.01	< 0.01	2.2	4	< 0.01	0.24	0.06	103
1987	4	7.39	1220	---	---	---	2.8	2.6	---	---	---	---	---	---	---	---	---
1988	1	8.29	1210	---	---	---	1.7	2.5	---	---	---	---	---	---	---	---	---
1988	2	7.26	1130	---	---	---	2.7	3.6	---	---	---	---	---	---	---	---	---
1988	3	7.30	1040	66	< 0.1	182	3.8	2.870	1.7	< 0.01	0.01	1.1	3.5	0.01	1.3	< 0.04	94
1988	4	7.60	1080	---	---	---	1.9	2.580	---	---	---	---	---	---	---	---	---
1989	1	7.10	1080	---	---	---	1.5	5.180	---	---	---	---	---	---	---	---	---
1989	2	7.50	981	---	---	---	0.7	2.110	---	---	---	---	---	---	---	---	---
1989	3	7.70	992	69	< 0.1	225	1.8	2.390	1.5	< 0.01	< 0.01	---	2.9	< 0.01	0.11	< 0.04	89
1989	4	7.5	962	---	---	---	3.2	1.99	---	---	---	---	---	---	---	---	---
1990	1	7.4	911	---	---	---	1.4	2.470	---	---	---	---	---	---	---	---	---
1990	2	7.4	969	69.4	< 0.10	208	3.0	2.300	0.60	< 0.010	0.011	---	2.1	0.011	0.026	0.21	88.2
1990	3	7.4	977	---	---	---	1.5	1.730	---	---	---	---	---	---	---	---	---
1990	4	7.6	1080	---	---	---	1.9	1.530	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
PART 1 of 4

[mg/l]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 10 (LOWER FLOW ZONE) *********							>>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<										
1983	4	8.03	694	26	0.1	95	7.6	---	---	---	---	0.1	---	---	0.75	---	---
1984	4	7.74	702	---	0.2	119	3	0.04	0.4	< 0.01	< 0.01	---	< 0.05	0.01	0.93	0.02	---
1985	1	7.73	689	---	---	---	1.7	0.013	---	---	---	---	---	---	---	---	---
1985	2	7.94	702	---	---	---	1.6	0.013	---	---	---	---	---	---	---	---	---
1985	3	7.39	694	28	< 0.1	125	9	0.05	< 0.1	< 0.01	< 0.01	---	0.15	< 0.005	1	< 0.01	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	7.49	678	---	---	---	8.8	0.076	---	---	---	---	---	---	---	---	---
1986	2	7.30	673	---	---	---	10	0.14	---	---	---	---	---	---	---	---	---
1986	3	7.86	681	---	---	---	2.1	0.13	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	7.71	679	44	< 0.1	102	4.7	1.8	0.1	< 0.01	< 0.01	0.1	0.5	< 0.01	1.2	< 0.04	42
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
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[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 11 (LOWER FLOW ZONE) *********							>>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<										
1983	4	7.89	741	30	< 0.1	97	18	---	---	---	---	< 0.1	---	---	0.76	---	---
1984	4	7.76	699	---	0.5	118	2.2	0.006	0.6	< 0.01	< 0.01	---	< 0.05	0.01	0.78	0.006	---
1985	1	8.01	733	---	---	---	1.7	0.032	---	---	---	---	---	---	---	---	---
1985	2	7.95	752	---	---	---	1.7	0.01	---	---	---	---	---	---	---	---	---
1985	3	7.57	697	29	< 0.1	130	1.7	0.01	< 0.1	< 0.01	< 0.01	---	0.12	< 0.005	0.98	< 0.01	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	7.53	717	---	---	---	4.2	0.014	---	---	---	---	---	---	---	---	---
1986	2	7.38	679	---	---	---	11	0.19	---	---	---	---	---	---	---	---	---
1986	3	7.87	683	---	---	---	2.4	0.058	---	---	---	---	---	---	---	---	---
1986	4	7.76	696	28	< 0.1	110	1.3	0.010	< 0.1	< 0.01	< 0.01	---	0.1	< 0.005	---	< 0.01	43
1987	1	8.18	692	---	---	---	8.5	0.011	---	---	---	---	---	---	---	---	---
1987	2	7.69	660	---	---	---	1.7	< 0.005	---	---	---	---	---	---	---	---	---
1987	3	7.65	639	22	< 0.1	77	3.2	0.038	0.3	< 0.01	< 0.01	0.1	0.14	< 0.01	0.98	< 0.04	42
1987	4	7.55	832	---	---	---	0.4	0.3	---	---	---	---	---	---	---	---	---
1988	1	7.84	666	---	---	---	1.1	0.012	---	---	---	---	---	---	---	---	---
1988	2	7.69	611	---	---	---	1.9	0.021	---	---	---	---	---	---	---	---	---
1988	3	7.60	580	18	< 0.1	85	2.0	0.010	0.4	< 0.01	< 0.01	< 0.1	0.12	< 0.01	0.75	< 0.04	36
1988	4	7.90	597	---	---	---	2.0	< 0.02	---	---	---	---	---	---	---	---	---
1989	1	7.40	605	---	---	---	1.7	< 0.005	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
PART 1 of 4

[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 12 (UPPER FLOW ZONE) *********																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	3	7.65	769	23	1.32	136	1.7	0.074	---	< 0.005	< 0.005	< 0.1	0.12	< 0.005	0.98	< 0.01	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	7.91	1050	139	1.7	195	6.3	3.6	0.5	< 0.01	< 0.01	0.4	2.7	< 0.01	0.82	< 0.04	80
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 13 (UPPER FLOW ZONE) *********																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	7.43	1090	---	0.6	148	5.2	3.6	3.1	< 0.01	---	---	2.6	0.038	2	0.04	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	7.73	955	35	4.1	128	3.7	0.79	< 0.1	< 0.01	< 0.01	< 0.1	0.8	< 0.01	0.37	< 0.04	67
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[mg/l]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 14 (UPPER FLOW ZONE) *********																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	7.61	1290	---	1	192	5.9	3.7	1	0.6	---	---	2	0.58	0.76	0.04	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	7.76	1200	34	3.1	175	3.8	2.3	< 0.1	1.1	< 0.01	---	1.8	1.1	---	0.03	77
1987	1	7.89	1190	---	---	---	2.6	3.5	---	---	---	---	---	---	---	---	---
1987	2	7.43	995	---	---	---	1.7	0.53	---	---	---	---	---	---	---	---	---
1987	3	7.58	877	64	2.7	132	2.7	1	0.1	0.41	0.54	< 0.1	0.82	0.95	0.017	< 0.04	68
1987	4	7.52	991	---	---	---	0.8	1.7	---	---	---	---	---	---	---	---	---
1988	1	12.17	5000	---	---	---	3.1	2.6	---	---	---	---	---	---	---	---	---
1988	2	7.40	3030	---	---	---	3.2	3.8	---	---	---	---	---	---	---	---	---
1988	3	11.90	3410	97	10	66	3.5	3.500	< 0.1	0.70	< 0.01	< 0.1	0.30	0.55	0.014	< 0.04	99
1988	4	12.40	2950	---	---	---	2.5	1.870	---	---	---	---	---	---	---	---	---
1989	1	11.70	3700	---	---	---	2.5	2.420	---	---	---	---	---	---	---	---	---
1989	2	10.50	934	---	---	---	1.6	1.800	---	---	---	---	---	---	---	---	---
1989	3	11.00	1010	92	23	172	2.4	2.170	< 0.5	1.0	< 0.01	---	1.2	0.96	< 0.01	< 0.04	68
1989	4	11.5	1400	---	---	---	2.0	1.270	---	---	---	---	---	---	---	---	---
1990	1	11.4	1080	---	---	---	1.7	1.830	---	---	---	---	---	---	---	---	---
1990	2	11.3	1080	63.5	22.3	167	2.6	1.360	< 0.50	0.90	< 0.10	---	0.87	0.80	< 0.010	< 0.040	59.6
1990	3	11.1	1040	---	---	---	1.8	1.170	---	---	---	---	---	---	---	---	---
1990	4	10.9	957	---	---	---	2.6	1.210	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 15 (UPPER FLOW ZONE) *********																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	7.68	885	---	4.4	146	2.7	1.1	0.5	< 0.01	---	---	0.16	< 0.005	0.06	< 0.01	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	7.99	853	53	5.6	126	1.3	1.1	< 0.1	< 0.01	< 0.01	---	0.13	< 0.005	---	< 0.01	60
1987	1	8.32	801	---	---	---	1.3	0.42	---	---	---	---	---	---	---	---	---
1987	2	7.60	764	---	---	---	1.1	0.43	---	---	---	---	---	---	---	---	---
1987	3	8.01	812	41	4.7	135	2.4	0.49	< 0.1	< 0.01	< 0.01	< 0.1	0.14	< 0.01	< 0.005	< 0.04	58
1987	4	7.65	790	---	---	---	0.9	0.45	---	---	---	---	---	---	---	---	---
1988	1	8.20	819	---	---	---	1.1	0.29	---	---	---	---	---	---	---	---	---
1988	2	7.78	871	---	---	---	27	0.28	---	---	---	---	---	---	---	---	---
1988	3	7.70	827	63	6.2	122	2.5	0.290	< 0.1	< 0.01	< 0.01	< 0.1	0.12	< 0.01	0.034	< 0.04	61
1988	4	8.30	808	---	---	---	1.6	0.170	---	---	---	---	---	---	---	---	---
1989	1	7.70	874	---	---	---	1.2	0.925	---	---	---	---	---	---	---	---	---
1989	2	7.60	656	---	---	---	0.5	0.220	---	---	---	---	---	---	---	---	---
1989	3	7.70	652	32	4.7	114	1.2	0.270	< 0.5	< 0.01	< 0.01	---	0.15	< 0.01	< 0.01	< 0.04	54
1989	4	7.90	710	---	---	---	1.0	0.180	---	---	---	---	---	---	---	---	---
1990	1	7.8	624	---	---	---	0.9	0.170	---	---	---	---	---	---	---	---	---
1990	2	7.8	653	27.1	4.8	98.8	1.9	0.113	< 0.50	< 0.010	< 0.010	---	0.12	< 0.010	< 0.010	< 0.040	49.2
1990	3	7.8	683	---	---	---		0.152	---	---	---	---	---	---	---	---	---
1990	4	7.8	807	---	---	---	1.5	0.151	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 16 (UPPER FLOW ZONE) *********																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	7.17	5300	---	< 0.1	2180	54	15	310	< 0.01	---	---	14	0.75	17	0.4	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	7.30	2930	---	---	---	140	23.3	---	---	---	---	---	---	---	---	---
1986	4	7.02	4920	364	1.4	1610	25	29.3	390	< 0.02	< 0.02	---	18	0.017	---	0.35	220
1987	1	7.61	4530	---	---	---	0.019	31	---	---	---	---	---	---	---	---	---
1987	2	7.15	4040	---	---	---	14	27	---	---	---	---	---	---	---	---	---
1987	3	7.24	3330	231	3.5	1370	14	27	250	< 0.01	< 0.01	230	12	< 0.01	4.1	0.25	188
1987	4	7.27	3700	---	---	---	17	25	---	---	---	---	---	---	---	---	---
1988	1	7.52	3800	---	---	---	10	15	---	---	---	---	---	---	---	---	---
1988	2	7.70	611	---	---	---	13	27	---	---	---	---	---	---	---	---	---
1988	3	7.30	2510	239	6.6	500	19	29.8	107	< 0.01	0.04	90	9.1	0.04	1.6	0.23	160
1988	4	7.50	2340	---	---	---	6.4	18.200	---	---	---	---	---	---	---	---	---
1989	1	7.20	1740	---	---	---	4.4	7.960	---	---	---	---	---	---	---	---	---
1989	2	7.40	1370	---	---	---	8.1	15.300	---	---	---	---	---	---	---	---	---
1989	3	7.70	1420	85	1.2	193	4.2	20.500	86	0.03	0.02	---	3.0	0.05	0.46	0.06	89
1989	4	7.4	1700	---	---	---	5.8	16.7	---	---	---	---	---	---	---	---	---
1990	1	7.4	1430	---	---	---	3.8	16.200	---	---	---	---	---	---	---	---	---
1990	2	7.6	1340	92.3	1.7	189	5.2	10.100	94.3	< 0.010	0.035	---	1.7	0.041	0.088	0.049	83.9
1990	3	7.5	1510	---	---	---	3.6	17.100	---	---	---	---	---	---	---	---	---
1990	4	7.4	1750	---	---	---	4.3	15.6	---	---	---	---	---	---	---	---	---

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PART 1 of 4

[mg/l]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 17 (UPPER FLOW ZONE) *********																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	7.90	695	---	< 0.1	98	5.1	3.1	1.5	< 0.01	---	---	0.19	0.27	4.1	0.11	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	7.37	743	32	2.7	116	4.7	2.9	0.8	< 0.01	0.32	0.2	0.12	0.32	2.8	0.13	58
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
PART 1 of 4

[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 18 (UPPER FLOW ZONE) ********* >>>>> WELL CONVERTED TO RECOVERY WELL IN 1989 <<<<<																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	7.54	760	---	---	---	6.2	4.9	---	---	---	---	---	---	---	---	---
1986	4	7.25	782	31	2.7	129	0.5	6.02	< 0.1	< 0.01	< 0.01	---	0.13	< 0.005	---	< 0.01	57
1987	1	8.24	793	---	---	---	2.4	4.4	---	---	---	---	---	---	---	---	---
1987	2	7.36	798	---	---	---	1.1	1.8	---	---	---	---	---	---	---	---	---
1987	3	7.37	797	33	2.6	108	50	1.9	0.4	< 0.01	0.01	< 0.1	0.15	< 0.01	< 0.005	< 0.04	56
1987	4	7.50	740	---	---	---	2.1	3.2	---	---	---	---	---	---	---	---	---
1988	1	7.55	739	---	---	---	0.8	2.4	---	---	---	---	---	---	---	---	---
1988	2	12.03	7440	---	---	---	2.7	3.6	---	---	---	---	---	---	---	---	---
1988	3	7.50	774	31	3.1	122	3.4	3.780	< 0.1	< 0.01	< 0.01	< 0.1	0.12	< 0.01	0.009	< 0.04	55
1988	4	7.60	637	---	---	---	1.6	2.780	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

NOTES : 1) WHERE STATE STANDARDS EXIST, THEY ARE SHOWN IN PARENTHESES IMMEDIATELY BELOW THE CHEMICAL NAME.
2) IF A COMPOUND WAS NOT DETECTED, THE METHOD DETECTION LIMIT IS SHOWN, PRECEEDED BY A "<" (less than sign).
3) --- = NOT TESTED.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
				[mg/l													]
********** WELL NO. 19 (LOWER FLOW ZONE) *********																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	7.20	934	58	2.2	145	1.1	3.4	< 0.1	< 0.01	0.043	---	0.3	0.043	---	0.01	92
1987	1	8.18	915	---	---	---	1.7	2.6	---	---	---	---	---	---	---	---	---
1987	2	7.40	884	---	---	---	1.2	1.1	---	---	---	---	---	---	---	---	---
1987	3	7.45	842	54	0.9	110	1.9	2.7	0.2	0.02	0.01	< 0.1	0.33	0.03	0.11	< 0.04	76
1987	4	7.48	870	---	---	---	2	2.7	---	---	---	---	---	---	---	---	---
1988	1	7.56	946	---	---	---	1	1.6	---	---	---	---	---	---	---	---	---
1988	2	7.71	902	---	---	---	1.7	2.7	---	---	---	---	---	---	---	---	---
1988	3	7.50	869	65	1.1	131	3.4	3.830	0.4	0.02	< 0.01	< 0.1	0.33	0.02	0.11	< 0.04	69
1988	4	7.60	753	---	---	---	1.3	1.920	---	---	---	---	---	---	---	---	---
1989	1	7.10	856	---	---	---	1.2	1.920	---	---	---	---	---	---	---	---	---
1989	2	7.70	732	---	---	---	1.1	2.070	---	---	---	---	---	---	---	---	---
1989	3	7.70	745	44	2.0	130	1.4	2.890	< 5.0	< 0.01	0.02	---	0.05	0.02	0.04	< 0.04	61
1989	4	7.5	689	---	---	---	1.5	1.64	---	---	---	---	---	---	---	---	---
1990	1	7.5	644	---	---	---	0.9	1.140	---	---	---	---	---	---	---	---	---
1990	2	7.5	690	30.5	1.9	121	2.3	1.300	< 0.50	< 0.010	< 0.010	---	0.24	< 0.010	0.032	< 0.040	56.4
1990	3	7.5	676	---	---	---		0.770	---	---	---	---	---	---	---	---	---
1990	4	7.5	712	---	---	---	1.1	0.514	---	---	---	---	---	---	---	---	---

NOTES : 1) WHERE STATE STANDARDS EXIST, THEY ARE SHOWN IN PARENTHESES IMMEDIATELY BELOW THE CHEMICAL NAME.
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3) --- = NOT TESTED.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 20 (LOWER FLOW ZONE) *********																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	7.48	804	30	0.3	144	1.3	0.19	< 0.1	< 0.01	< 0.01	---	0.15	< 0.005	---	< 0.01	100
1987	1	8.33	789	---	---	---	2.7	0.02	---	---	---	---	---	---	---	---	---
1987	2	7.63	770	---	---	---	1.5	0.43	---	---	---	---	---	---	---	---	---
1987	3	7.76	687	27	0.5	11	1.8	0.04	0.1	< 0.01	< 0.01	< 0.1	0.16	< 0.01	0.35	< 0.04	63
1987	4	7.74	720	---	---	---	1.9	< 0.005	---	---	---	---	---	---	---	---	---
1988	1	7.77	784	---	---	---	1.1	0.02	---	---	---	---	---	---	---	---	---
1988	2	7.76	753	---	---	---	1.5	0.023	---	---	---	---	---	---	---	---	---
1988	3	7.70	704	24	0.4	116	2.6	0.026	< 0.1	< 0.01	< 0.01	< 0.1	0.13	< 0.01	0.31	< 0.04	55
1988	4	7.80	721	---	---	---	1.6	< 0.02	---	---	---	---	---	---	---	---	---
1989	1	7.40	695	---	---	---	1.5	0.027	---	---	---	---	---	---	---	---	---
1989	2	7.60	638	---	---	---	0.9	0.015	---	---	---	---	---	---	---	---	---
1989	3	7.90	717	23	1.0	110	1.7	0.043	< 0.5	< 0.01	< 0.01	---	0.05	< 0.01	< 0.01	< 0.04	< 5
1989	4	8.1	654	---	---	---	1.5	< 0.030	---	---	---	---	---	---	---	---	---
1990	1	8.1	637	---	---	---	1.6	< 0.030	---	---	---	---	---	---	---	---	---
1990	2	7.7	660	21.4	1.1	104	3.1	< 0.030	< 0.50	< 0.010	< 0.010	---	0.13	< 0.010	0.58	< 0.040	48.2
1990	3	7.7	664	---	---	---	1.4	< 0.030	---	---	---	---	---	---	---	---	---
1990	4	7.7	717	---	---	---	1.6	< 0.030	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[---------- mg/l ----------]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 21 (UPPER FLOW ZONE) *********																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	7.26	796	30	2.2	141	1	3.5	< 0.1	< 0.01	< 0.01	---	0.12	0.006	---	< 0.01	58
1987	1	8.05	753	---	---	---	1.1	1.8	---	---	---	---	---	---	---	---	---
1987	2	7.56	744	---	---	---	0.9	1.4	---	---	---	---	---	---	---	---	---
1987	3	7.80	746	19	2.8	106	3.2	1.9	< 0.1	< 0.01	< 0.01	0.1	0.14	< 0.01	0.15	< 0.04	54
1987	4	7.61	753	---	---	---	0.2	1.9	---	---	---	---	---	---	---	---	---
1988	1	7.67	729	---	---	---	0.9	1.4	---	---	---	---	---	---	---	---	---
1988	2	7.65	749	---	---	---	0.7	1.3	---	---	---	---	---	---	---	---	---
1988	3	7.60	666	22	2.6	110	2.1	0.910	< 0.1	< 0.01	< 0.01	< 0.1	0.12	< 0.01	0.14	< 0.04	53
1988	4	7.80	682	---	---	---	1.1	1.300	---	---	---	---	---	---	---	---	---
1989	1	7.50	670	---	---	---	0.7	0.202	---	---	---	---	---	---	---	---	---
1989	2	7.60	585	---	---	---	0.9	0.680	---	---	---	---	---	---	---	---	---
1989	3	7.90	587	23	2.7	104	1.4	0.150	< 0.5	< 0.01	0.01	---	0.14	0.01	0.19	< 0.04	49
1989	4	7.7	665	---	---	---	1.3	1.58	---	---	---	---	---	---	---	---	---
1990	1	7.8	581	---	---	---	0.7	1.450	---	---	---	---	---	---	---	---	---
1990	2	7.9	591	19.0	3.1	85.7	1.2	0.677	< 0.50	< 0.010	< 0.010	---	0.17	< 0.010	< 0.010	< 0.040	48.6
1990	3	7.8	620	---	---	---		0.722	---	---	---	---	---	---	---	---	---
1990	4	7.8	679	---	---	---	1.2	1.090	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[mg/l]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 22 (UPPER FLOW ZONE) *********																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	7.79	741	30	2.1	114	1.6	0.773	0.1	< 0.01	< 0.01	---	0.17	< 0.005	---	0.01	54
1987	1	8.26	743	---	---	---	2.6	0.68	---	---	---	---	---	---	---	---	---
1987	2	7.71	736	---	---	---	1	0.44	---	---	---	---	---	---	---	---	---
1987	3	7.69	678	31	2.4	89	3	0.22	0.2	< 0.01	< 0.01	< 0.1	0.16	< 0.01	0.2	< 0.04	51
1987	4	7.75	718	---	---	---	1.2	0.37	---	---	---	---	---	---	---	---	---
1988	1	7.83	783	---	---	---	0.9	0.43	---	---	---	---	---	---	---	---	---
1988	2	7.65	750	---	---	---	1.3	0.36	---	---	---	---	---	---	---	---	---
1988	3	7.70	702	30	2.9	96	1.7	0.310	0.3	< 0.01	0.04	< 0.1	0.33	0.04	1.9	0.08	121
1988	4	7.90	673	---	---	---	1.8	0.250	---	---	---	---	---	---	---	---	---
1989	1	7.50	653	---	---	---	1.1	0.323	---	---	---	---	---	---	---	---	---
1989	2	7.70	604	---	---	---	1.3	0.230	---	---	---	---	---	---	---	---	---
1989	3	7.90	615	25	4.0	92	1.4	0.034	< 0.5	< 0.01	0.01	---	0.17	0.01	0.03	< 0.04	48
1989	4	7.8	650	---	---	---	1.5	0.265	---	---	---	---	---	---	---	---	---
1990	1	7.7	601	---	---	---	1.4	0.360	---	---	---	---	---	---	---	---	---
1990	2	7.8	633	20.5	2.5	83.0	1.5	0.300	< 0.50	< 0.010	< 0.010	---	0.17	< 0.010	0.024	< 0.040	46.5
1990	3	7.7	655	---	---	---	1.2	0.232	---	---	---	---	---	---	---	---	---
1990	4	7.7	705	---	---	---	1.7	0.206	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 1 of 4

[mg/l]

YEAR	QUARTER NO.	pH units (6-9)	SPECIFIC CONDUC-TANCE umhos/cm	CHLORIDE (250)	NITRATE AS N (10.0)	SULFATE (600)	TOTAL ORGANIC CARBON	TOTAL ORGANIC HALOGEN as Cl	TOTAL KJELDAHL NITROGEN as N	HEXA-VALENT CHROMIUM	TRI-VALENT CHROMIUM	AMMONIA NITROGEN as N	BORON (0.75)	TOTAL CHROMIUM (0.05)	MANGANESE (0.2)	NICKEL (0.2)	SODIUM
********** WELL NO. 23 (UPPER FLOW ZONE) ********* >>>>> WELL CONVERTED TO RECOVERY WELL IN 1989 <<<<<																	
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	6.96	1030	56	2.8	132	1.3	9.3	0.2	0.07	< 0.01	---	0.65	0.072	---	0.03	64
1987	1	7.92	994	---	---	---	11	3.6	---	---	---	---	---	---	---	---	---
1987	2	7.45	860	---	---	---	1	4.2	---	---	---	---	---	---	---	---	---
1987	3	7.53	792	40	2.8	98	2.1	0.74	0.4	< 0.01	< 0.01	0.2	0.58	0.02	0.015	< 0.04	56
1987	4	7.42	1440	---	---	---	4.9	12	---	---	---	---	---	---	---	---	---
1988	1	7.39	1480	---	---	---	2.0	9.8	---	---	---	---	---	---	---	---	---
1988	2	7.37	1220	---	---	---	2.7	4.03	---	---	---	---	---	---	---	---	---
1988	3	7.60	1080	110	2.6	115	6.7	8.420	0.5	0.06	0.55	< 0.1	1.5	0.61	0.097	0.23	65
1988	4	7.40	1110	---	---	---	3.0	7.040	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

NOTES : 1) WHERE STATE STANDARDS EXIST, THEY ARE SHOWN IN PARENTHESES IMMEDIATELY BELOW THE CHEMICAL NAME.
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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
PART 2 of 4

[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 05 (UPPER FLOW ZONE) ********** >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																			
1983	4	160	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1984	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 25	---	---	---	---	< 5	< 5	< 5	< 10	< 5	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
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[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 06 (UPPER FLOW ZONE) **********											>>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<								
1983	4	< 10	---	< 1000	< 1000	---	< 50	< 50	< 50	< 100	---	< 50	< 50	---	< 100	< 50	< 50	< 100	---
1984	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 300	< 300	---	< 15	< 15	< 15	< 30	---	< 15	< 15	---	< 30	< 15	< 15	< 30	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 120	---	---	---	---	< 25	< 25	< 25	< 50	< 25	< 25	< 25	---	< 50	< 25	< 25	< 50	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 35	---	---	---	---	< 7	< 7	< 7	< 14	< 7	< 7	< 7	---	< 14	< 7	< 7	< 14	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
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YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 07 (UPPER FLOW ZONE) **********																			
1983	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1984	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 50	---	---	---	---	< 10	< 10	< 10	< 20	< 10	< 10	< 10	---	< 20	< 10	< 10	< 20	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
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YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 08 (UPPER FLOW ZONE) **********											>>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<								
1983	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1984	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 83	---	---	---	---	< 17	< 17	< 17	< 33	< 17	< 17	< 17	---	< 33	< 17	< 17	< 33	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 25	---	---	---	---	< 5	< 5	< 5	< 10	< 5	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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ug/l

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 09 (UPPER FLOW ZONE) **********																			
1983	4	2300	---	< 100	< 100	---	20	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1984	4	33	---	< 100	< 100	---	16	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	57	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	7	< 5	< 5	< 10	---	< 5	< 5	---	< 5	< 5	28	< 10	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 3600	< 3600	---	< 180	< 180	< 180	< 360	---	< 180	< 180	---	< 360	< 180	< 180	< 360	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 1200	---	---	---	---	< 250	< 250	< 250	< 500	< 250	< 250	< 250	---	< 500	< 250	< 250	< 500	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 880	---	---	---	---	< 180	< 180	< 180	< 350	< 180	< 180	< 180	---	< 350	< 180	< 180	< 350	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	< 250	< 2500	< 2500	< 2500	< 120	< 120	< 120	< 120	< 250	< 120	< 120	< 120	< 120	< 250	< 120	< 120	< 250	< 120
1989	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	2	< 250	< 2500	< 2500	< 2500	< 120	< 120	< 120	< 120	< 250	< 120	< 120	< 120	< 120	< 250	< 120	< 120	< 250	< 120
1990	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 10 (LOWER FLOW ZONE) ********** >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																			
1983	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1984	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	16000	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	590	---	---	---	---	< 100	< 100	< 100	< 200	< 100	< 100	< 100	---	< 200	< 100	< 100	< 200	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
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ug/l

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 11 (LOWER FLOW ZONE) ********** >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																			
1983	4	< 10	---	< 1000	< 1000	---	< 50	< 50	< 50	< 100	---	< 50	< 50	---	< 100	< 50	< 50	< 100	---
1984	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 25	---	---	---	---	< 5	< 5	< 5	< 10	< 5	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 25	---	---	---	---	< 5	< 5	< 5	< 10	< 5	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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PART 2 of 4

[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 12 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	3	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 850	---	---	---	---	< 170	< 170	< 170	< 340	< 170	< 170	< 170	---	< 340	< 170	< 170	< 340	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
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[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 13 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	15	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 250	---	---	---	---	< 50	< 50	< 50	< 100	< 50	< 50	< 50	---	< 100	< 50	< 50	< 100	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
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[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 14 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	< 10	---	< 100	< 100	---	9	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	34	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 620	---	---	---	---	< 120	< 120	< 50	< 250	< 120	< 50	< 50	---	< 250	< 120	< 120	< 250	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 1200	---	---	---	---	< 250	< 250	< 250	< 500	< 250	< 250	< 250	---	< 500	< 250	< 250	< 500	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	< 250	< 2500	< 2500	< 2500	< 120	< 120	< 120	< 120	< 250	< 120	< 120	< 120	< 120	< 250	< 120	< 120	< 250	< 120
1989	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	2	< 200	< 2000	< 2000	< 2000	< 100	< 100	< 100	< 100	< 200	< 100	< 100	< 100	< 100	< 200	< 100	< 100	< 200	< 100
1990	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 15 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	< 10	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 600	< 600	---	< 30	< 30	< 30	< 60	---	< 30	< 30	---	< 60	< 30	< 30	< 60	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 120	---	---	---	---	< 25	< 25	< 25	< 50	< 25	< 25	< 25	---	< 50	< 25	< 25	< 50	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 75	---	---	---	---	< 15	< 15	< 15	< 30	< 15	< 15	< 15	---	< 30	< 15	< 15	< 30	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	< 20	< 200	< 200	< 200	< 10	< 10	< 10	< 10	< 20	< 10	< 10	< 10	< 10	< 20	< 10	< 10	< 20	< 10
1989	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	2	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
1990	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 16 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	17000	---	< 100	< 100	---	58	< 5	< 5	< 10	---	< 5	16	---	45	< 5	25	70	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 25000	< 25000	---	< 1300	< 1300	< 1300	< 2500	---	< 1300	< 1300	---	< 2500	< 1300	< 1300	< 2500	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 6200	---	---	---	---	< 1200	< 1200	< 1200	< 2500	< 1200	< 1200	< 1200	---	< 2500	< 1200	< 1200	< 2500	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 7800	---	---	---	---	< 1600	< 1600	< 1600	< 3100	< 1600	< 1600	< 1600	---	< 3100	< 1600	< 1600	< 3100	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	< 500	< 5000	< 5000	< 5000	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 500	< 250
1989	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	2	7900	<20000	< 20000	< 20000	< 1000	< 1000	< 1000	< 1000	< 2000	< 1000	< 1000	< 1000	< 1000	< 2000	< 1000	< 1000	< 2000	< 1000
1990	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 17 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	28	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 420	---	---	---	---	< 85	< 85	< 85	< 170	< 85	< 85	< 85	---	< 170	< 85	< 85	< 170	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 18 (UPPER FLOW ZONE) ********** >>>>> WELL CONVERTED TO RECOVERY WELL IN 1989 <<<<<																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 4000	< 4000	---	< 200	< 200	< 200	< 400	---	< 200	< 200	---	< 400	< 200	< 200	< 400	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 1200	---	---	---	---	< 250	< 250	< 250	< 500	< 250	< 250	< 250	---	< 500	< 250	< 250	< 500	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 1200	---	---	---	---	< 250	< 250	< 250	< 500	< 250	< 250	< 250	---	< 500	< 250	< 250	< 500	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

NOTES : 1) WHERE STATE STANDARDS EXIST, THEY ARE SHOWN IN PARENTHESES IMMEDIATELY BELOW THE CHEMICAL NAME.
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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
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[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 19 (LOWER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 4000	< 4000	---	< 200	< 200	< 200	< 400	---	< 200	< 200	---	< 400	< 200	< 200	< 400	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 1200	---	---	---	---	< 250	< 250	< 250	< 500	< 250	< 250	< 250	---	< 500	< 250	< 250	< 500	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 880	---	---	---	---	< 180	< 180	< 180	< 350	< 180	< 180	< 180	---	< 350	< 180	< 180	< 350	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	< 250	< 2500	< 2500	< 2500	< 120	< 120	< 120	< 120	< 250	< 120	< 120	< 120	< 120	< 250	< 120	< 120	< 250	< 120
1989	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	2	< 100	< 1000	< 1000	< 1000	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 50
1990	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
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ug/l

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 20 (LOWER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 100	< 100	---	< 5	< 5	< 5	< 10	---	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 25	---	---	---	---	< 5	< 5	< 5	< 10	< 5	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 25	---	---	---	---	< 5	< 5	< 5	< 10	< 5	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
1989	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	2	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
1990	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 21 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 4000	< 4000	---	< 200	< 200	< 200	< 400	---	< 200	< 200	---	< 400	< 200	< 200	< 400	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 500	---	---	---	---	< 100	< 100	< 100	< 200	< 100	< 100	< 100	---	< 200	< 100	< 100	< 200	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 25	---	---	---	---	< 5	< 5	< 5	< 10	< 5	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	< 50	< 500	< 500	< 500	< 25	< 25	< 25	< 25	< 50	< 25	< 25	< 25	< 25	< 50	< 25	< 25	< 50	< 25
1989	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	2	< 70	< 700	< 700	< 700	< 35	< 35	< 35	< 35	< 70	< 35	< 35	< 35	< 35	< 70	< 35	< 35	< 70	< 35
1990	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 22 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 800	< 800	---	< 40	< 40	< 40	< 80	---	< 40	< 40	---	< 80	< 40	< 40	< 80	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 120	---	---	---	---	< 25	< 25	< 25	< 50	< 25	< 25	< 25	---	< 50	< 25	< 25	< 50	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 25	---	---	---	---	< 5	< 5	< 5	< 10	< 5	< 5	< 5	---	< 10	< 5	< 5	< 10	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	< 20	< 200	< 200	< 200	< 10	< 10	< 10	< 10	< 20	< 10	< 10	< 10	< 10	< 20	< 10	< 10	< 20	< 10
1989	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	2	< 25	< 250	< 250	< 250	< 12	< 12	< 12	< 12	< 25	< 12	< 12	< 12	< 12	< 25	< 12	< 12	< 25	< 12
1990	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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ug/l

YEAR	QUARTER NO.	Acetone	Aceto-nitrile	Acrolein	Acrylo-nitrile	Allyl chloride	Benzene (10)	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon disulfide	Carbon tetra-chloride (10)	Chloro-benzene	Chloro-prene	Chloro-ethane	Chloro-dibromo methane	Chloro-form (100)	Chloro-methane	(DBCP) 1,2-Dibromo-3-chloro-propane
********** WELL NO. 23 (UPPER FLOW ZONE) ********** >>>>> WELL CONVERTED TO RECOVERY WELL IN 1989 <<<<<																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	< 8000	< 8000	---	< 400	< 400	< 400	< 800	---	< 400	< 400	---	< 800	< 400	< 400	< 800	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 850	---	---	---	---	< 170	< 170	< 170	< 340	< 170	< 170	< 170	---	< 340	< 170	< 170	< 340	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	< 1800	---	---	---	---	< 350	< 350	< 350	< 700	< 350	< 350	< 350	---	< 700	< 350	< 350	< 700	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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PART 3 of 4

[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 05 (UPPER FLOW ZONE) ********** >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																			
1983	4	---	---	---	< 10	7	< 5	< 5	18	< 10	< 5	< 5	---	< 5	---	< 10	---	---	---
1984	4	---	---	---	< 10	< 5	< 5	< 5	7	< 10	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 5	< 5	< 5	< 5	< 25	< 5	< 5	---	< 5	---	< 10	---	---	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromoethane (0.1)	Dibromomethane	trans-1,4-Dichloro-2-butene	Dichlorodifluoromethane	1,1-Dichloroethane (25)	1,2-Dichloroethane (10)	trans-1,2-Dichloroethene	1,1-Dichloroethene (5)	Dichloromethane (Methylene chloride) (100)	1,2-Dichloropropane	1,3-Dichloropropene	1,4-Dioxane	Ethylbenzene (750)	Ethylcyanide	2-Hexanone	Iodomethane	Isobutyl alcohol	Methacrylonitrile
********** WELL NO. 06 (UPPER FLOW ZONE) ********** >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																			
1983	4	---	---	---	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	---	< 50	---	< 10	---	---	---
1984	4	---	---	---	< 10	< 5	< 5	< 5	28	< 10	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	< 5	< 5	< 5	27	< 10	< 5	< 5	---	< 5	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	35	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	14	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	46	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 15	< 15	< 15	33	< 30	< 15	< 15	---	< 15	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	27	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	28	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 25	< 25	< 25	40	< 120	< 25	< 25	---	< 25	---	< 50	---	---	---
1987	4	---	---	---	---	---	---	---	40	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	21	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	11	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 7	< 7	< 7	7.9	< 35	< 7	< 7	---	< 7	---	< 14	---	---	---
1988	4	---	---	---	---	---	---	---	11	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	5.1	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
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[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromoethane (0.1)	Dibromomethane	trans-1,4-Dichloro-2-butene	Dichlorodifluoromethane	1,1-Dichloroethane (25)	1,2-Dichloroethane (10)	trans-1,2-Dichloroethene	1,1-Dichloroethene (5)	Dichloromethane (Methylene chloride) (100)	1,2-Dichloropropane	1,3-Dichloropropene	1,4-Dioxane	Ethylbenzene (750)	Ethylcyanide	2-Hexanone	Iodomethane	Isobutyl alcohol	Methacrylonitrile
********** WELL NO. 07 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	< 10	< 5	< 5	< 5	17	< 10	< 5	< 5	---	< 5	---	< 10	---	---	---
1984	4	---	---	---	< 10	< 5	< 5	< 5	110	< 10	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 10	< 10	< 10	34	< 50	< 10	< 10	---	< 10	---	< 20	---	---	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 08 (UPPER FLOW ZONE) ********** >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																			
1983	4	---	---	---	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	---	< 5	---	< 10	---	---	---
1984	4	---	---	---	< 10	< 5	< 5	< 5	22000	< 10	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	< 5	< 5	< 5	13	< 10	< 5	< 5	---	< 5	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	8.4	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	13	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	10	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 5	< 5	< 5	9	< 10	< 5	< 5	---	< 5	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	4.2	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 17	< 17	< 17	< 17	< 83	< 17	< 17	---	< 17	---	< 33	---	---	---
1987	4	---	---	---	---	---	---	---	< 7	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 5	< 5	< 5	11	< 25	< 5	< 5	---	< 5	---	< 10	---	---	---
1988	4	---	---	---	---	---	---	---	6.7	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
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[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 09 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	< 10	130	< 5	< 5	2500	9100	< 5	< 5	---	13	---	170	---	---	---
1984	4	---	---	---	< 10	120	< 5	11	1200	5200	< 5	< 5	---	13	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	35	< 5	< 5	1300	1200	< 5	< 5	---	< 5	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	1300	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	1200	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	740	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 180	< 180	< 180	400	< 360	< 180	< 180	---	< 180	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	310	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	260	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 250	< 250	< 250	600	< 1200	< 250	< 250	---	< 250	---	< 500	---	---	---
1987	4	---	---	---	---	---	---	---	590	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	490	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	350	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 180	< 180	< 180	660	< 880	< 180	< 180	---	< 180	---	< 350	---	---	---
1988	4	---	---	---	---	---	---	---	410	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	340	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	320	---	---	---	---	---	---	---	---	---	---
1989	3	< 120	---	< 120	< 250	< 120	< 120	< 120	220	< 120	< 120	< 120	< 2500	< 120	< 120	< 250	< 120	< 2500	< 120
1989	4	---	---	---	---	---	---	---	200	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	180	---	---	---	---	---	---	---	---	---	---
1990	2	< 120	---	< 120	< 250	< 120	< 120	< 120	260	< 120	< 120	< 120	< 2500	< 120	< 120	< 250	< 120	< 2500	< 120
1990	3	---	---	---	---	---	---	---	190	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	120	---	---	---	---	---	---	---	---	---	---

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GROUNDWATER MONITORING RESULTS
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[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 10 (LOWER FLOW ZONE) ********** >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																			
1983	4	---	---	---	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	---	< 5	---	< 10	---	---	---
1984	4	---	---	---	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	< 5	< 5	< 5	5	< 10	< 5	< 5	---	< 5	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	7	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	46	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	9.3	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 100	< 100	< 100	190	1900	< 100	< 100	---	< 100	---	< 200	---	---	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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[---------- ug/l ----------]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 11 (LOWER FLOW ZONE) ********** >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																			
1983	4	---	---	---	< 100	< 50	< 50	< 50	< 50	420	< 50	< 50	---	< 50	---	< 10	---	---	---
1984	4	---	---	---	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	< 5	< 5	< 5	< 5	< 10	< 5	< 5	---	< 5	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	< 1	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	< 1	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	< 1	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 5	< 5	< 5	< 5	< 10	< 5	< 5	---	< 5	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	< 1	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	< 0.5	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 5	< 5	< 5	< 5	< 25	< 5	< 5	---	< 5	---	< 10	---	---	---
1987	4	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	< 16	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 5	< 5	< 5	< 5	< 25	< 5	< 5	---	< 5	---	< 10	---	---	---
1988	4	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromoethane (0.1)	Dibromomethane	trans-1,4-Dichloro-2-butene	Dichlorodifluoromethane	1,1-Dichloroethane (25)	1,2-Dichloroethane (10)	trans-1,2-Dichloroethene	1,1-Dichloroethene (5)	Dichloromethane (Methylene chloride) (100)	1,2-Dichloropropane	1,3-Dichloropropene	1,4-Dioxane	Ethylbenzene (750)	Ethylcyanide	2-Hexanone	Iodomethane	Isobutyl alcohol	Methacrylonitrile
********** WELL NO. 12 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	3	---	---	---	< 10	< 5	< 5	< 5	< 5	20	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 170	< 170	< 170	380	850	< 170	< 170	---	< 170	---	< 340	---	---	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 13 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	< 10	13	< 5	< 5	820	1700	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 50	< 50	< 50	120	< 250	< 50	< 50	---	< 50	---	< 100	---	---	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 14 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	< 10	17	< 5	< 5	1000	3600	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 5	< 5	< 5	310	< 10	< 5	5	---	< 5	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	230	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	65	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 120	< 120	< 120	< 120	< 620	< 120	< 120	---	< 120	---	< 250	---	---	---
1987	4	---	---	---	---	---	---	---	130	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	< 250	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	< 500	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 250	< 250	< 250	< 250	< 1200	< 250	< 250	---	< 250	---	< 500	---	---	---
1988	4	---	---	---	---	---	---	---	< 250	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	120	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	190	---	---	---	---	---	---	---	---	---	---
1989	3	< 120	---	< 120	< 250	< 120	< 120	< 120	160	< 120	< 120	< 120	< 2500	< 120	< 120	< 250	< 120	< 2500	< 120
1989	4	---	---	---	---	---	---	---	94	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	< 120	---	---	---	---	---	---	---	---	---	---
1990	2	< 100	---	< 100	< 200	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 2000	< 100	< 100	< 200	< 100	< 2000	< 100
1990	3	---	---	---	---	---	---	---	81	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	56	---	---	---	---	---	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 15 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	< 10	< 5	< 5	< 5	85	11	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 30	< 30	< 30	46	< 60	< 30	< 30	---	< 30	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	< 100	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	21	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 25	< 25	< 25	30	< 120	< 25	< 25	---	< 25	---	< 50	---	---	---
1987	4	---	---	---	---	---	---	---	28	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	16	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	< 10	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 15	< 15	< 15	< 15	< 75	< 15	< 15	---	< 15	---	< 30	---	---	---
1988	4	---	---	---	---	---	---	---	< 10	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	6.9	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	< 10	---	---	---	---	---	---	---	---	---	---
1989	3	< 10	---	< 10	< 20	< 10	< 10	< 10	11	< 10	< 10	< 10	< 200	< 10	< 10	< 20	< 10	< 200	< 10
1989	4	---	---	---	---	---	---	---	< 50	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	13	---	---	---	---	---	---	---	---	---	---
1990	2	< 5	---	< 5	< 10	< 5	< 5	< 5	11	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100	< 5
1990	3	---	---	---	---	---	---	---	< 25	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	< 8.5	---	---	---	---	---	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 16 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	< 10	3200	< 5	200	3100	49000	< 5	< 5	---	63	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	2200	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 1300	< 1300	< 1300	3500	16000	< 1300	< 1300	---	< 1300	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	2200	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	1900	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 1200	< 1200	< 1200	2200	< 6200	< 1200	< 1200	---	< 1200	---	< 2500	---	---	---
1987	4	---	---	---	---	---	---	---	1600	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	1400	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	1400	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 1600	< 1600	< 1600	1900	< 7800	< 1600	< 1600	---	< 1600	---	< 3100	---	---	---
1988	4	---	---	---	---	---	---	---	1600	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	1200	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	1000	---	---	---	---	---	---	---	---	---	---
1989	3	< 250	---	< 250	< 500	< 250	< 250	< 250	960	1100	< 250	< 250	< 5000	< 250	< 250	< 500	< 250	< 5000	< 250
1989	4	---	---	---	---	---	---	---	< 1200	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	< 1000	---	---	---	---	---	---	---	---	---	---
1990	2	< 1000	---	< 1000	< 2000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	<20000	< 1000	< 1000	< 2000	< 1000	<20000	< 1000
1990	3	---	---	---	---	---	---	---	1200	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	< 1000	---	---	---	---	---	---	---	---	---	---

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PART 3 of 4

[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromoethane (0.1)	Dibromomethane	trans-1,4-Dichloro-2-butene	Dichlorodifluoromethane	1,1-Dichloroethane (25)	1,2-Dichloroethane (10)	trans-1,2-Dichloroethene	1,1-Dichloroethene (5)	Dichloromethane (Methylene chloride) (100)	1,2-Dichloropropane	1,3-Dichloropropene	1,4-Dioxane	Ethylbenzene (750)	Ethylcyanide	2-Hexanone	Iodomethane	Isobutyl alcohol	Methacrylonitrile
********** WELL NO. 17 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	< 10	1900	< 5	19	260	17	< 5	< 5	---	< 5	---	< 10	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 85	< 85	< 85	430	< 420	< 85	< 85	---	< 85	---	< 170	---	---	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

NOTES : 1) WHERE STATE STANDARDS EXIST, THEY ARE SHOWN IN PARENTHESES IMMEDIATELY BELOW THE CHEMICAL NAME.
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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 3 of 4

[---------- ug/l ----------]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 18 (UPPER FLOW ZONE) ********** >>>>> WELL CONVERTED TO RECOVERY WELL IN 1989 <<<<<																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	650	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 200	< 200	< 200	390	< 400	< 200	< 200	---	< 200	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	400	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	290	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 250	< 250	< 250	480	< 1200	< 250	< 250	---	< 250	---	< 500	---	---	---
1987	4	---	---	---	---	---	---	---	340	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	320	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	< 500	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 250	< 250	< 250	770	< 1200	< 250	< 250	---	< 250	---	< 500	---	---	---
1988	4	---	---	---	---	---	---	---	360	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

NOTES : 1) WHERE STATE STANDARDS EXIST, THEY ARE SHOWN IN PARENTHESES IMMEDIATELY BELOW THE CHEMICAL NAME.
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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 3 of 4

[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromoethane (0.1)	Dibromomethane	trans-1,4-Dichloro-2-butene	Dichlorodifluoromethane	1,1-Dichloroethane (25)	1,2-Dichloroethane (10)	trans-1,2-Dichloroethene	1,1-Dichloroethene (5)	Dichloromethane (Methylene chloride) (100)	1,2-Dichloropropane	1,3-Dichloropropene	1,4-Dioxane	Ethylbenzene (750)	Ethylcyanide	2-Hexanone	Iodomethane	Isobutyl alcohol	Methacrylonitrile
********** WELL NO. 19 (LOWER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 200	< 200	< 200	320	5000	< 200	< 200	---	< 200	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	200	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	190	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 250	< 250	< 250	360	3100	< 250	< 250	---	< 250	---	< 500	---	---	---
1987	4	---	---	---	---	---	---	---	330	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	260	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 180	< 180	< 180	790	2700	< 180	< 180	---	< 180	---	< 350	---	---	---
1988	4	---	---	---	---	---	---	---	310	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	370	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	410	---	---	---	---	---	---	---	---	---	---
1989	3	< 120	---	< 120	< 250	< 120	< 120	< 120	300	1800	< 120	< 120	< 2500	< 120	< 120	< 250	< 120	< 2500	< 120
1989	4	---	---	---	---	---	---	---	150	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	89	---	---	---	---	---	---	---	---	---	---
1990	2	< 50	---	< 50	< 100	< 50	< 50	< 50	100	320	< 50	< 50	< 1000	< 50	< 50	< 100	< 50	< 1000	< 50
1990	3	---	---	---	---	---	---	---	68	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	48	---	---	---	---	---	---	---	--	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
PART 3 of 4

[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromo-ethane (0.1)	Dibromo-methane	trans-1,4-Dichloro-2-butene	Dichloro-difluoro-methane	1,1-Dichloro-ethane (25)	1,2-Dichloro-ethane (10)	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene (5)	Dichloro-methane (Methylene chloride) (100)	1,2-Dichloro-propane	1,3-Dichloro-propene	1,4-Dioxane	Ethyl-benzene (750)	Ethyl-cyanide	2-Hexanone	Iodo-methane	Isobutyl alcohol	Meth-acrylo-nitrile
********** WELL NO. 20 (LOWER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 5	< 5	< 5	< 5	< 10	< 5	< 5	---	< 5	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	< 1	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	1.8	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 5	< 5	< 5	< 5	< 25	< 5	< 5	---	< 5	---	< 10	---	---	---
1987	4	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 5	< 5	< 5	< 5	< 25	< 5	< 5	---	< 5	---	< 10	---	---	---
1988	4	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1989	3	< 5	---	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100	< 5
1989	4	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1990	2	< 5	---	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100	< 5
1990	3	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	< 5	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 3 of 4

[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromoethane (0.1)	Dibromomethane	trans-1,4-Dichloro-2-butene	Dichlorodifluoromethane	1,1-Dichloroethane (25)	1,2-Dichloroethane (10)	trans-1,2-Dichloroethene	1,1-Dichloroethene (5)	Dichloromethane (Methylene chloride) (100)	1,2-Dichloropropane	1,3-Dichloropropene	1,4-Dioxane	Ethylbenzene (750)	Ethylcyanide	2-Hexanone	Iodomethane	Isobutyl alcohol	Methacrylonitrile
********** WELL NO. 21 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 200	< 200	< 200	300	< 400	< 200	< 200	---	< 200	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	130	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	84	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 100	< 100	< 100	250	< 500	< 100	< 100	---	< 100	---	< 200	---	---	---
1987	4	---	---	---	---	---	---	---	200	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	150	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	88	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 5	< 5	< 5	100	< 25	< 5	< 5	---	< 5	---	< 10	---	---	---
1988	4	---	---	---	---	---	---	---	140	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	71	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	< 50	---	---	---	---	---	---	---	---	---	---
1989	3	< 25	---	< 25	< 50	< 25	< 25	< 25	37	< 25	< 25	< 25	< 500	< 25	< 25	< 50	< 25	< 500	< 25
1989	4	---	---	---	---	---	---	---	< 120	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	88	---	---	---	---	---	---	---	---	---	---
1990	2	< 35	---	< 35	< 70	< 35	< 35	< 35	< 35	< 35	< 35	< 35	< 700	< 35	< 35	< 70	< 35	< 700	< 35
1990	3	---	---	---	---	---	---	---	80	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	61	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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PART 3 of 4

[ug/l]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromoethane (0.1)	Dibromomethane	trans-1,4-Dichloro-2-butene	Dichlorodifluoromethane	1,1-Dichloroethane (25)	1,2-Dichloroethane (10)	trans-1,2-Dichloroethene	1,1-Dichloroethene (5)	Dichloromethane (Methylene chloride) (100)	1,2-Dichloropropane	1,3-Dichloropropene	1,4-Dioxane	Ethylbenzene (750)	Ethylcyanide	2-Hexanone	Iodomethane	Isobutyl alcohol	Methacrylonitrile
********** WELL NO. 22 (UPPER FLOW ZONE) **********																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 40	< 40	< 40	200	< 80	< 40	< 40	---	< 40	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	110	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	100	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 25	< 25	< 25	78	< 120	< 25	< 25	---	< 25	---	< 50	---	---	---
1987	4	---	---	---	---	---	---	---	120	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	98	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	67	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 5	< 5	< 5	110	< 25	< 5	< 5	---	< 5	---	< 10	---	---	---
1988	4	---	---	---	---	---	---	---	62	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	50	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	42	---	---	---	---	---	---	---	---	---	---
1989	3	< 10	---	< 10	< 20	< 10	< 10	< 10	38	< 10	< 10	< 10	< 200	< 10	< 10	< 20	< 10	< 200	< 10
1989	4	---	---	---	---	---	---	---	49	---	---	---	---	---	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	45	---	---	---	---	---	---	---	---	---	---
1990	2	< 12	---	< 12	< 12	< 12	< 12	< 12	40	< 12	< 12	< 12	< 250	< 12	< 12	< 25	< 12	< 250	< 12
1990	3	---	---	---	---	---	---	---	50	---	---	---	---	---	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	38	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 3 of 4

[---------- ug/l ----------]

YEAR	QUARTER NO.	(EDB) 1,2-Dibromoethane (0.1)	Dibromomethane	trans-1,4-Dichloro-2-butene	Dichlorodifluoromethane	1,1-Dichloroethane (25)	1,2-Dichloroethane (10)	trans-1,2-Dichloroethene	1,1-Dichloroethene (5)	Dichloromethane (Methylene chloride) (100)	1,2-Dichloropropane	1,3-Dichloropropene	1,4-Dioxane	Ethylbenzene (750)	Ethylcyanide	2-Hexanone	Iodomethane	Isobutyl alcohol	Methacrylonitrile
********** WELL NO. 23 (UPPER FLOW ZONE) ********** >>>>> WELL CONVERTED TO RECOVERY WELL IN 1989 <<<<<																			
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 400	< 400	< 400	1200	< 800	< 400	< 400	---	< 400	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	1000	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	620	---	---	---	---	---	---	---	---	---	---
1987	3	---	---	---	---	< 170	< 170	< 170	610	< 850	< 170	< 170	---	< 170	---	< 340	---	---	---
1987	4	---	---	---	---	---	---	---	1400	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	1800	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	1600	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	< 350	< 350	< 350	2400	< 1800	< 350	< 350	---	< 350	---	< 700	---	---	---
1988	4	---	---	---	---	---	---	---	900	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
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[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetra-chloro-ethane	1,1,2,2-Tetra-chloro-ethane (10)	Tetra-chloro-ethene (20)	Toluene (750)	1,1,1-Tri-chloro-ethane (60)	1,1,2-Tri-chloro-ethane (10)	Tri-chloro-ethene (100)	Tri-chloro-fluoro-methane	1,2,3-Tri-chloro-propane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 05 (UPPER FLOW ZONE) **********								>>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<								
1983	4	< 10	---	---	---	< 5	< 5	45	79	< 5	170	< 10	---	---	< 10	< 5
1984	4	---	---	---	---	< 5	< 5	< 5	70	< 5	140	< 10	---	---	< 10	< 5
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 25	< 10	< 5	---	< 5	< 5	< 5	15	< 5	39	---	---	< 10	< 10	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 06 (UPPER FLOW ZONE) **********											>>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<					
1983	4	< 10	---	---	---	< 50	< 50	< 50	< 50	< 50	560	< 100	---	---	< 100	< 5
1984	4	---	---	---	---	< 5	< 5	< 5	81	< 5	310	< 10	---	---	< 10	< 5
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	< 5	< 5	< 5	62	< 5	300	---	---	---	< 10	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	310	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	110	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	420	---	---	---	---	---
1986	4	---	---	---	---	< 15	< 15	< 15	140	< 15	390	---	---	---	< 30	---
1987	1	---	---	---	---	---	---	---	---	---	300	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	320	---	---	---	---	---
1987	3	< 120	< 50	< 25	---	< 25	< 25	< 25	130	< 25	540	---	---	< 50	< 50	---
1987	4	---	---	---	---	---	---	---	---	---	360	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	280	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	170	---	---	---	---	---
1988	3	< 35	< 14	< 7	---	< 7	< 7	< 7	21	< 7	52	---	---	< 14	< 14	< 7
1988	4	---	---	---	---	---	---	---	---	---	99	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	55	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
PART 4 of 4

[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetra-chloro-ethane	1,1,2,2-Tetra-chloro-ethane (10)	Tetra-chloro-ethene (20)	Toluene (750)	1,1,1-Tri-chloro-ethane (60)	1,1,2-Tri-chloro-ethane (10)	Tri-chloro-ethene (100)	Tri-chloro-fluoro-methane	1,2,3-Tri-chloro-propane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 07 (UPPER FLOW ZONE) **********																
1983	4	< 10	---	---	---	< 5	< 5	5	14	< 5	83	< 10	---	---	< 10	< 5
1984	4	---	---	---	---	< 5	< 5	< 5	180	< 5	530	< 10	---	---	< 10	< 5
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 50	< 20	< 10	---	< 10	< 10	< 10	110	< 10	370	---	---	< 20	< 20	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 08 (UPPER FLOW ZONE) **********										>>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<						
1983	4	< 10	---	---	---	< 5	< 5	< 5	7	< 5	42	< 10	---	---	< 10	< 5
1984	4	---	---	---	---	< 5	< 5	< 5	82	< 5	250	< 10	---	---	< 10	< 5
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	< 5	< 5	< 5	39	< 5	190	---	---	---	< 10	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	100	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	160	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	150	---	---	---	---	---
1986	4	---	---	---	---	< 5	< 5	< 5	39	< 5	190	---	---	---	< 10	---
1987	1	---	---	---	---	---	---	---	---	---	84	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	69	---	---	---	---	---
1987	3	< 83	< 33	< 17	---	< 17	< 17	< 17	33	< 17	300	---	---	< 33	< 33	---
1987	4	---	---	---	---	---	---	---	---	---	150	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	45	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	93	---	---	---	---	---
1988	3	< 25	< 10	< 5	---	< 5	< 5	< 5		< 5	66	---	---	< 10	< 10	< 5
1988	4	---	---	---	---	---	---	---	---	---	190	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	82	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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PART 4 of 4

[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetra-chloro-ethane	1,1,2,2-Tetra-chloro-ethane (10)	Tetra-chloro-ethene (20)	Toluene (750)	1,1,1-Tri-chloro-ethane (60)	1,1,2-Tri-chloro-ethane (10)	Tri-chloro-ethene (100)	Tri-chloro-fluoro-methane	1,2,3-Tri-chloro-propane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 09 (UPPER FLOW ZONE) **********																
1983	4	< 10	---	---	---	< 5	54	1200	15000	< 5	21000	< 10	---	---	< 10	31
1984	4	---	---	---	---	< 5	60	290	6900	110	9600	< 10	---	---	< 10	22
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	< 5	28	23	6300	49	7300	---	---	---	< 10	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	6100	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	8300	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	5000	---	---	---	---	---
1986	4	---	---	---	---	< 180	< 180	< 180	2700	< 180	5000	---	---	---	< 360	---
1987	1	---	---	---	---	---	---	---	---	---	4500	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	3600	---	---	---	---	---
1987	3	< 1200	< 500	< 250	---	< 250	< 250	< 250	3300	< 250	6400	---	---	< 500	< 500	---
1987	4	---	---	---	---	---	---	---	---	---	7100	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	5500	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	4800	---	---	---	---	---
1988	3	< 880	< 350	< 180	---	< 180	< 180	< 180	1800	< 180	3300	---	---	< 350	< 350	< 180
1988	4	---	---	---	---	---	---	---	---	---	4200	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	4000	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	4400	---	---	---	---	---
1989	3	< 250	< 250	< 120	< 120	< 120	< 120	< 120	910	< 120	2500	< 120	< 120	< 250	< 250	< 120
1989	4	---	---	---	---	---	---	---	---	---	2300	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	2800	---	---	---	---	---
1990	2	< 250	< 250	< 120	< 120	< 120	< 120	< 120	890	< 120	2400	< 120	< 120	< 250	< 250	< 120
1990	3	---	---	---	---	---	---	---	---	---	2200	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	1600	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 4 of 4

[---------- ug/l ----------]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 10 (LOWER FLOW ZONE) ********** >>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<																
1983	4	< 10	---	---	---	< 5	< 5	< 5	8	< 5	27	< 10	---	---	< 10	< 5
1984	4	---	---	---	---	< 5	< 5	< 5	5	< 5	12	< 10	---	---	< 10	< 5
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	< 5	< 5	< 5	13	< 5	41	---	---	---	< 10	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	42	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	190	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	54	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 500	< 200	< 100	---	< 100	< 100	< 100	250	< 100	1400	---	---	< 200	< 200	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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GROUNDWATER MONITORING RESULTS
PART 4 of 4

[---------- ug/l ----------]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 11 (LOWER FLOW ZONE) **********								>>>>> WELL PLUGGED & ABANDONED IN 1989 <<<<<								
1983	4	< 10	---	---	---	< 50	< 50	91	130	< 50	840	< 100	---	---	< 100	< 5
1984	4	---	---	---	---	< 5	< 5	< 5	< 5	< 5	< 5	< 10	---	---	< 10	< 5
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	< 5	< 5	< 5	< 5	< 5	7	---	---	---	< 10	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---		---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	12	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---		---	---	---	---	---
1986	4	---	---	---	---	< 5	< 5	< 5	< 5	< 5	< 5	---	---	---	< 10	---
1987	1	---	---	---	---	---	---	---	---	---		---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	< 1	---	---	---	---	---
1987	3	< 25	< 10	< 5	---	< 5	< 5	< 5	< 5	< 5	< 5	---	---	< 10	< 10	---
1987	4	---	---	---	---	---	---	---	---	---	< 5	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	< 5	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	< 16	---	---	---	---	---
1988	3	< 25	< 10	< 5	---	< 5	< 5	< 5	< 5	< 5	< 5	---	---	< 10	< 10	< 5
1988	4	---	---	---	---	---	---	---	---	---	< 5	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	< 5	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 12 (UPPER FLOW ZONE) **********																
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	3	---	---	---	---	< 5	< 5	< 5	< 5	< 5	61	< 10	---	---	< 10	< 5
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 850	< 340	< 170	---	< 170	< 170	< 170	1700	< 170	3700	---	---	< 340	< 340	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetra-chloro-ethane	1,1,2,2-Tetra-chloro-ethane (10)	Tetra-chloro-ethene (20)	Toluene (750)	1,1,1-Tri-chloro-ethane (60)	1,1,2-Tri-chloro-ethane (10)	Tri-chloro-ethene (100)	Tri-chloro-fluoro-methane	1,2,3-Tri-chloro-propane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 13 (UPPER FLOW ZONE) **********																
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	< 5	17	45	4600	< 5	6900	< 10	---	---	< 10	< 5
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1987	3	< 250	< 100	< 50	---	< 50	< 50	< 50	520	< 50	1300	---	---	< 100	< 100	---
1987	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1988	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetra-chloro-ethane	1,1,2,2-Tetra-chloro-ethane (10)	Tetra-chloro-ethene (20)	Toluene (750)	1,1,1-Tri-chloro-ethane (60)	1,1,2-Tri-chloro-ethane (10)	Tri-chloro-ethene (100)	Tri-chloro-fluoro-methane	1,2,3-Tri-chloro-propane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 14 (UPPER FLOW ZONE) **********																
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	< 5	25	6	4100	< 5	12000	< 10	---	---	< 10	< 5
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 5	< 5	< 5	630	< 5	4900	---	---	---	< 10	---
1987	1	---	---	---	---	---	---	---	---	---	5000	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	1800	---	---	---	---	---
1987	3	< 620	< 250	< 120	---	< 120	< 120	< 120	170	< 120	2100	---	---	< 250	< 250	---
1987	4	---	---	---	---	---	---	---	---	---	2700	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	6200	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	5000	---	---	---	---	---
1988	3	< 1200	< 500	< 250	---	< 250	< 250	< 250	< 250	< 250	5200	---	---	< 500	< 500	< 250
1988	4	---	---	---	---	---	---	---	---	---	5600	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	3300	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	4900	---	---	---	---	---
1989	3	< 250	< 250	< 120	< 120	< 120	< 120	< 120	130	< 120	3000	< 120	< 120	< 250	< 250	< 120
1989	4	---	---	---	---	---	---	---	---	---	2200	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	2100	---	---	---	---	---
1990	2	< 200	< 200	< 100	< 100	< 100	< 100	< 100	< 100	< 100	1800	< 100	< 100	< 200	< 200	< 100
1990	3	---	---	---	---	---	---	---	---	---	2100	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	1500	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 15 (UPPER FLOW ZONE) **********																
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	< 5	34	< 5	2200	< 5	4400	< 10	---	---	< 10	< 5
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 30	< 30	< 30	390	< 30	940	---	---	---	< 60	---
1987	1	---	---	---	---	---	---	---	---	---	630	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	580	---	---	---	---	---
1987	3	< 120	< 50	< 25	---	< 25	< 25	< 25	250	< 25	650	---	---	< 50	< 50	---
1987	4	---	---	---	---	---	---	---	---	---	480	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	370	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	< 10	---	---	---	---	---
1988	3	< 75	< 30	< 15	---	< 15	< 15	< 15	150	< 15	380	---	---	< 30	< 30	< 15
1988	4	---	---	---	---	---	---	---	---	---	250	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	180	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	200	---	---	---	---	---
1989	3	< 20	< 20	< 10	< 10	< 10	< 10	< 10	77	< 10	200	< 10	< 10	< 20	< 20	< 10
1989	4	---	---	---	---	---	---	---	---	---	260	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	190	---	---	---	---	---
1990	2	< 10	< 10	< 5	< 5	< 5	< 5	< 5	73	< 5	160	< 5	< 5	< 10	< 10	< 5
1990	3	---	---	---	---	---	---	---	---	---	230	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	140	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 16 (UPPER FLOW ZONE) **********																
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	< 5	140	1600	5500	< 5	37000	< 10	---	---	< 10	116
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	20000	---	---	---	---	---
1986	4	---	---	---	---	< 1300	< 1300	< 1300	30000	< 1300	36000	---	---	---	< 2500	---
1987	1	---	---	---	---	---	---	---	---	---	21000	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	23000	---	---	---	---	---
1987	3	< 6200	< 2500	< 1200	---	< 1200	< 1200	< 1200	21000	< 1200	25000	---	---	< 2500	< 2500	---
1987	4	---	---	---	---	---	---	---	---	---	28000	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	26000	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	25000	---	---	---	---	---
1988	3	< 7800	< 3100	< 1600	---	< 1600	< 1600	< 1600	24000	< 1600	26000	---	---	< 3100	< 3100	< 1600
1988	4	---	---	---	---	---	---	---	---	---	22000	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	16000	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	14000	---	---	---	---	---
1989	3	< 500	< 500	< 250	< 250	< 250	< 250	< 250	10000	< 250	13000	< 250	< 250	< 500	< 500	< 250
1989	4	---	---	---	---	---	---	---	---	---	16000	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	13000	---	---	---	---	---
1990	2	< 2000	< 2000	< 1000	< 1000	< 1000	< 1000	< 1000	16000	< 1000	20000	< 1000	< 1000	< 2000	< 2000	< 1000
1990	3	---	---	---	---	---	---	---	---	---	19000	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	16000	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetra-chloro-ethane	1,1,2,2-Tetra-chloro-ethane (10)	Tetra-chloro-ethene (20)	Toluene (750)	1,1,1-Tri-chloro-ethane (60)	1,1,2-Tri-chloro-ethane (10)	Tri-chloro-ethene (100)	Tri-chloro-fluoro-methane	1,2,3-Tri-chloro-propane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 19 (LOWER FLOW ZONE) **********																
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 200	< 200	< 200	280	< 200	3600	---	---	---	< 400	---
1987	1	---	---	---	---	---	---	---	---	---	2700	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	2900	---	---	---	---	---
1987	3	< 1200	< 500	< 250	---	< 250	< 250	< 250	340	< 250	4600	---	---	< 500	< 500	---
1987	4	---	---	---	---	---	---	---	---	---	3400	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	2900	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	< 5	---	---	---	---	---
1988	3	< 880	< 350	< 180	---	< 180	< 180	< 180	180	< 180	1800	---	---	< 350	< 350	< 180
1988	4	---	---	---	---	---	---	---	---	---	3600	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	3200	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	3700	---	---	---	---	---
1989	3	< 250	< 250	< 120	< 120	< 120	< 120	< 120	180	< 120	2400	< 120	< 120	< 250	< 250	< 120
1989	4	---	---	---	---	---	---	---	---	---	1500	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	880	---	---	---	---	---
1990	2	< 100	< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	1000	< 50	< 50	< 100	< 100	< 50
1990	3	---	---	---	---	---	---	---	---	---	850	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	590	---	---	---	---	---

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[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 20 (LOWER FLOW ZONE) **********																
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 5	< 5	< 5	< 5	< 5	17	---	---	---	< 10	---
1987	1	---	---	---	---	---	---	---	---	---	12	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	32	---	---	---	---	---
1987	3	< 25	< 10	< 5	---	< 5	< 5	< 5	< 5	< 5	35	---	---	< 10	< 10	---
1987	4	---	---	---	---	---	---	---	---	---	25	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	10	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	28	---	---	---	---	---
1988	3	< 25	< 10	< 5	---	< 5	< 5	< 5	< 5	< 5	19	---	---	< 10	< 10	< 5
1988	4	---	---	---	---	---	---	---	---	---	15	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	12	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	14	---	---	---	---	---
1989	3	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	20	< 5	< 5	< 10	< 10	< 5
1989	4	---	---	---	---	---	---	---	---	---	< 5	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	17	---	---	---	---	---
1990	2	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	21	< 5	< 5	< 10	< 10	< 5
1990	3	---	---	---	---	---	---	---	---	---	15	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	10	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 4 of 4

[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 21 (UPPER FLOW ZONE) **********																
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 200	< 200	< 200	3300	< 200	2300	---	---	---	< 400	---
1987	1	---	---	---	---	---	---	---	---	---	1700	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	1400	---	---	---	---	---
1987	3	< 500	< 200	< 100	---	< 100	< 100	< 100	2800	< 100	2100	---	---	< 200	< 200	---
1987	4	---	---	---	---	---	---	---	---	---	2000	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	1800	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	1100	---	---	---	---	---
1988	3	< 25	< 10	< 5	---	< 5	< 5	< 5	1900	< 5	1500	---	---	< 10	< 10	< 5
1988	4	---	---	---	---	---	---	---	---	---	1300	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	900	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	520	---	---	---	---	---
1989	3	< 50	< 50	< 25	< 25	< 25	< 25	< 25	450	< 25	460	< 25	< 25	< 50	< 50	< 25
1989	4	---	---	---	---	---	---	---	---	---	1100	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	1000	---	---	---	---	---
1990	2	< 70	< 70	< 35	< 35	< 35	< 35	< 35	370	< 35	400	< 35	< 35	< 70	< 70	< 35
1990	3	---	---	---	---	---	---	---	---	---	670	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	850	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 4 of 4

[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 22 (UPPER FLOW ZONE) **********																
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 40	< 40	< 40	950	< 40	230	---	---	---	< 80	---
1987	1	---	---	---	---	---	---	---	---	---	170	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	270	---	---	---	---	---
1987	3	< 120	< 50	< 75	---	< 25	< 25	< 25	510	< 25	370	---	---	< 50	< 50	---
1987	4	---	---	---	---	---	---	---	---	---	240	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	150	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	230	---	---	---	---	---
1988	3	< 25	< 10	< 5	---	< 5	< 5	< 5	140	< 5	63	---	---	< 10	< 10	< 5
1988	4	---	---	---	---	---	---	---	---	---	120	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	110	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	150	---	---	---	---	---
1989	3	< 20	< 20	< 10	< 10	< 10	< 10	< 10	190	< 10	120	< 10	< 10	< 20	< 20	< 10
1989	4	---	---	---	---	---	---	---	---	---	91	---	---	---	---	---
1990	1	---	---	---	---	---	---	---	---	---	110	---	---	---	---	---
1990	2	< 25	< 25	< 12	< 12	< 12	< 12	< 12	210	< 12	130	< 12	< 12	< 25	< 25	< 12
1990	3	---	---	---	---	---	---	---	---	---	140	---	---	---	---	---
1990	4	---	---	---	---	---	---	---	---	---	83	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
GROUNDWATER MONITORING RESULTS
PART 4 of 4

[ug/l]

YEAR	QUARTER NO.	Methyl ethyl ketone	4-Methyl-2-pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (10)	Tetrachloroethene (20)	Toluene (750)	1,1,1-Trichloroethane (60)	1,1,2-Trichloroethane (10)	Trichloroethene (100)	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl acetate	Vinyl chloride (1)	Total xylenes (620)
********** WELL NO. 23 (UPPER FLOW ZONE) ********** >>>>> WELL CONVERTED TO RECOVERY WELL IN 1989 <<<<<																
1983	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1984	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1985	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1986	4	---	---	---	---	< 400	< 400	< 400	7300	< 400	7500	---	---	---	< 800	---
1987	1	---	---	---	---	---	---	---	---	---	6500	---	---	---	---	---
1987	2	---	---	---	---	---	---	---	---	---	3700	---	---	---	---	---
1987	3	< 850	< 340	< 170	---	< 170	< 170	< 170	3500	< 170	3900	---	---	< 340	< 340	---
1987	4	---	---	---	---	---	---	---	---	---	13000	---	---	---	---	---
1988	1	---	---	---	---	---	---	---	---	---	13000	---	---	---	---	---
1988	2	---	---	---	---	---	---	---	---	---	11000	---	---	---	---	---
1988	3	< 1800	< 700	< 350	---	< 350	< 350	< 350	3200	< 350	3900	---	---	< 700	< 700	< 350
1988	4	---	---	---	---	---	---	---	---	---	8000	---	---	---	---	---
1989	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1989	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

NOTES : 1) WHERE STATE STANDARDS EXIST, THEY ARE SHOWN IN PARENTHESES IMMEDIATELY BELOW THE CHEMICAL NAME.
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CHEMICAL NAME
TRICHLOROETHYLENE

FORMULA
C2HCL3

SYNONYMS
TRICHLOROETHENE
DOW-TRI
NCI-C04546
CHLORYLEN
CECOLENE
TRILENE
TCE
UN 1710
ETHYLENE, TRICHLORO-
1-CHLORO-2,2-DICHLOROETHYLENE
1,1-DICHLORO-2-CHLOROETHYLENE
1,1,2-TRICHLOROETHYLENE
1,2,2-TRICHLOROETHYLENE
ETHYLENE TRICHLORIDE
ETHINYL TRICHLORIDE
TRICHLORETHYLENE
TRIAD
THRETHYLENE
TRETHYLENE
RCRA U228
OHS23850

PERMISSIBLE EXPOSURE LIMIT
50 PPM OSHA TWA; 200 PPM OSHA STEL
50 PPM ACGIH TWA: 200 PPM ACGIH STEL
25 PPM NIOSH RECOMMENDED 10 HR TWA
HUMAN INADEQUATE EVIDENCE FOR CARCINOGENICITY (IARC)
ANIMAL LIMITED EVIDENCE FOR CARCINOGENICITY (IARC)
PROBABLE HUMAN CARCINOGEN (EPA - CATEGORY B)
POSITIVE CARCINOGEN IN MICE; NEGATIVE CARCINOGEN IN RATS (NCI, 1976)
POSITIVE CARCINOGEN IN MICE; INADEQUATE STUDY IN RATS (NCI, 1984)
TERATOGENIC DATA (RTEC); MUTAGENIC DATA (RTEC)
AQUATIC TOXICITY RATING 1/Z (TLM96 100 - 1000 PPM)
LC RANGE, 96H (IN SEA WATER) - PLAICE 15 PPM
CERCLA HAZARD RATINGS - TOXICITY 1 - IGNITABILITY 1 - REACTIVITY 0 -
PERSISTENCE 2

TOXICOLOGY: TRICHLOROETHYLENE IS AN EYE, MUCOUS MEMBRANE, AND PRIMARY SKIN IRRITANT AND CENTRAL NERVOUS SYSTEM DEPRESSANT.
ACUTE EXPOSURE DEPRESSES THE NERVOUS SYSTEM, AND MAY DAMAGE THE GASTRO-INTESTINAL TRACT, LIVER AND KIDNEYS. THE PRESENCE OF TETRACHLOROETHANE INCREASES IN COMMERCIAL GRADES INCREASES THE CELLULAR TOXICITY.
CHRONIC INHALATION OR ABSORPTION CAUSES CENTRAL NERVOUS SYSTEM EFFECTS, JOINT PAIN, DERMATITIS, AND POSSIBLY JAUNDICE. INGESTION OF ALCOHOL MAY INCREASE THE TOXICITY OF TRICHLOROETHYLENE.
TRICHLOROETHYLENE IS A MILD RESPIRATORY IRRITANT.
THE THRESHOLD LIMIT VALUE WAS ESTABLISHED TO PREVENT TOXIC EFFECTS.
IHL-HMN TCLO: 6900 MG/M3/10 MIN
IHL-HMN TCLO: 160 PPM/83 MIN
IHL-HMN TDLO: 812 MG/KG
IHL-MAN TCLO: 110 PPM/8 HR
IHL-MAN LCLO: 2900 PPM

ORL-HMN LDLO: 7 GM/KG

ORL-RAT LD50: 4920 MG/KG
ORL-MUS LD50: 2402 MG/KG
IHL-RAT LCLO: 8000 PPM/4 HR
IHL-CAT LCLO:32500 MG/M3/2 HR

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
POTENTIAL CARCINOGEN
NIOSH

PHYSICAL DESCRIPTION
COLORLESS MOBILE LIQUID: CHLOROFORM-LIKE ODOR; PHOTOREACTIVE.

CHEMICAL AND PHYSICAL PROPERTIES
MOLECULAR WEIGHT: 131
BOILING POINT AT 1 ATM, F: 189 F
SOLUBILITY IN WATER, G/100 G WATER AT 20C: 0.1%
FLASH POINT, CLOSED CUP, F (OR OPEN CUP IF OC): 90 F *
VAPOR PRESSURE @ 20 C, MMHG: 58 MM
MELTING POINT, F: -99 F
UPPER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 90%
LOWER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 12.5%
AUTOIGNITION TEMPERATURE: 788 F
SPECIFIC GRAVITY: 1.4642
VAPOR DENSITY (AIR=1): 4.5
ODOR THRESHOLD: 20 PPM

INCOMPATIBILITIES
ACTIVE METALS
BARIUM
LITHIUM
SODIUM
MAGNESIUM
TITANIUM

PERSONAL PROTECTIVE EQUIPMENT
EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT NECESSARY TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE. FACE SHIELDS SHALL COMPLY WITH 29CFR1910.133(A)(2), (A)(4), (A)(5), AND (A)(6).

-- --- --

ACGIH "GUIDELINES FOR THE SELECTION OF CHEMICAL PROTECTIVE CLOTHING" INDICATED THE FOLLOWING PROTECTIVE RATINGS FOR MATERIALS COMMONLY USED FOR PROTECTIVE CLOTHING. THESE RATINGS ARE BASED PRIMARILY ON QUANTITATIVE TEST RESULTS AND QUALITATIVE RESISTENCE INFORMATION. (THE RECOMMENDATIONS APPLY TO THE PURE SUBSTANCE ONLY: BREAKTHROUGH-TIME MAY VARY FOR MIXTURES.) (A "+" DESIGNATES A BLEND OF MATERIAL, WHILE A "/" DESIGNATES A COATED OR LAMINATED MATERIAL.)

TRICHLOROETHYLENE:

EXCELLENT/GOOD:
TEFLON

GOOD/FAIR:
CHLOROBUTYL
SILVERSHIELD

POOR/FAIR:
CHLORINATED POLYETHYLENE
VITON
NEOPRENE+STYRENE-BUTADIENE RUBBER

STYRENE-BUTADIENE RUBBER/NEOPRENE

POOR:
BUTYL RUBBER
NATURAL RUBBER
NEOPRENE
NITRILE + POLYVINYL CHLORIDE
NITRILE
POLYETHYLENE
POLYVINYL ALCOHOL
POLYVINYL CHLORIDE
NEOPRENE+NATURAL RUBBER
SARANEX
STYRENE-BUTADIENE RUBBER
NEOPRENE/NATURAL RUBBER

GOGGLES
EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE SPLASH-PROOF SAFETY GOGGLES WHICH COMPLY WITH 29CFR1910.133(A)(2)-(A)(6) WHERE THIS LIQUID MAY CONTACT THE EYES.

WASHING CHEMICALS FROM THE SKIN
EMPLOYERS SHALL ENSURE THAT EMPLOYEES WHOSE SKIN BECOMES WET WITH THIS SUBSTANCE PROMPTLY WASH OR SHOWER WITH SOAP OR MILD DETERGENT AND WATER TO REMOVE ANY CONTAMINANT FROM THE SKIN.

ROUTINE CHANGING OF WORK CLOTHING
NOT REQUIRED

CLOTHING REMOVAL FOLLOWING ACCIDENTAL CONTAMINATION
EMPLOYERS SHALL ENSURE THAT NON-IMPERVIOUS CLOTHING WHICH BECOMES WET WITH THIS SUBSTANCE BE REMOVED PROMPTLY AND NOT REWORN UNTIL THE SUBSTANCE IS REMOVED FROM THE CLOTHING.

SPECIFIC EMERGENCY PROVISIONS
NONE REQUIRED

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED)

ANY DETECTABLE CONC
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WITH AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN POSITIVE PRESSURE MODE

ESCAPE
- GAS MASK WITH AN ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER)
- APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS

FIREFIGHTING
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

ROUTE OF ENTRY INTO BODY
- INHALATION
- INGESTION
- SKIN OR EYE CONTACT

SYMPTOMS
- HEADACHE
- VERTIGO
- VISUAL DISTURBANCE
- TREMORS
- SOMNOLENCE
- DERMATITIS
- NAUSEA
- VOMITING
- CARDIAC ARRHYTHMIA
- PARESTHESIA
- NARCOSIS
- ANESTHESIA
- LIVER DAMAGE
- IRRITABILITY
- CENTRAL NERVOUS SYSTEM DEPRESSION
- VENTRICULAR FIBRILLATION
- CARDIAC DEGENERATION
- CENTRAL NERVOUS SYSTEM DEGENERATION
- KIDNEY DAMAGE
- UNCONSCIOUSNESS
- JAUNDICE
- WHEEZING
- UNCONSCIOUSNESS
- DIZZINESS
- EXCITATION
- IRREGULAR PULSE
- ARTHRALGIA
- RESPIRATORY EDEMA
- WHEEZING
- WEIGHT LOSS
- ANOREXIA
- FATIGUE
- REPRODUCTIVE EFFECTS IN EXPERIMENTAL ANIMALS

FIRST AID PROCEDURES FOLLOWING EXPOSURE

IF THIS CHEMICAL GETS INTO THE EYES, WASH THE EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL GETS ON THE SKIN, REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL HAS BEEN INHALED, REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

WHEN THIS CHEMICAL HAS BEEN SWALLOWED AND PERSON IS CONSCIOUS, IMMEDIATELY GIVE PERSON LARGE QUANTITIES OF WATER. AFTER WATER HAS BEEN SWALLOWED, TRY TO GET THE PERSON TO VOMIT BY HAVING HIM TOUCH THE BACK OF HIS THROAT WITH HIS FINGER. DO NOT MAKE AN UNCONSCIOUS PERSON VOMIT. GET MEDICAL ATTENTION IMMEDIATELY.

VOLATILE AND GASEOUS ANESTHETICS:

EMERGENCY TREATMENT - ESTABLISH AIRWAY AND MAINTAIN RESPIRATION. REMOVE ANESTHETIC BY FORCED VENTILATION.

FURTHER TREATMENT - MAINTAIN BLOOD PRESSURE BY INTRAVENOUS SALINE OR BLOOD TRANSFUSION. MAINTAIN BODY WARMTH. MAINTAIN ADEQUATE AIRWAY BY REMOVING SECRETIONS FROM TRACHEA BY CATHETER SUCTION. PREVENT HYPOXIA. IF HYPERTHERMIA OCCURS, LOWER BODY TEMPERATURE BY APPLICATION OF WET TOWELS. FOR MALIGNANT HYPERTHERMIA, GIVE DANTROLENE SODIUM, 1 MG/KG, EVERY FIFTEEN MINUTES, INTRAVENOUSLY TO A TOTAL OF 10 MG/KG, AND PROCAINAMIDE, 15 MG/KG, INTRAVENOUSLY, OVER TEN MINUTES. GIVE ICED NORMAL SALINE INTRAVENOUSLY AT A RATE OF 1 LITER EVERY TEN MINUTES FOR THIRTY MINUTES. LAVAGE STOMACH, URINARY BLADDER, RECTUM, AND PERITONEUM WITH ICED SALINE. TREAT ACIDOSIS WITH INTRAVENOUS SODIUM BICARBONATE. MONITOR SERUM TOTAL BASE, SERUM POTASSIUM, AND ARTERIAL PH AND TREAT APPROPIATELY. MAINTAIN URINE OUTPUT AT 1-2 LITERS DAILY WITH FUROSEMIDE AND MANNITOL. AFTER FIRST DAY, GIVE DANTROLENE, 1 MG/KG ORALY DAILY, FOR THREE DAYS.
(MEDICATION MUST BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL)
SPECIAL TREATMENT - TREAT LIVER DAMAGE.
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

GASTRIC LAVAGE - GIVE PATIENT GLASS OF WATER PRIOR TO PASSING OF STOMACH TUBE. LAY PATIENT ON ONE SIDE, WITH HEAD LOWER THAN WAIST. IMMOBILIZE A STRUGGLING PATIENT WITH A SHEET OR BLANKET. MEASURE DISTANCE ON TUBE FROM MOUTH TO EPIGASTRIUM, MARK TUBE WITH INDELIBLE MARKING OR TAPE. REMOVE DENTURES AND OTHER FOREIGN OBJECTS FROM THE MOUTH. OPEN MOUTH, USE GAG IF NECESSARY. EXTEND HEAD BY LIFTING CHIN. PASS TUBE OVER TONGUE AND TOWARD BACK OF THROAT WITHOUT EXTENDING HEAD OR NECK. IF OBSTRUCTION IS MET BEFORE THE MARK ON TUBE REACHES LEVELS OF THE TEETH, DO NOT FORCE, BUT REMOVE TUBE AND REPEAT PROCEDURE UNTIL TUBE PASSES TO MARK. PLACE END OF TUBE IN GLASS OF WATER. IF TUBE IS OBSTRUCTED WHEN INTRODUCED ABOUT HALFWAY TO THE MARK, IT MAY HAVE ENTERED TRACHEA.

AFTER TUBE IS PLACED IN STOMACH, ASPIRATE FIRST TO REMOVE STOMACH CONTENTS BY IRRIGATION SYRINGE. SAVE STOMACH CONTENTS FOR EXAMINATION, AND REPEAT INTRODUCTION AND WITHDRAWL OF 100-300 ML WARM WATER UNTIL AT LEAST 3 LITERS OF CLEAR RETURN ARE OBTAINED. USE ACTIVATED CHARCOAL AT BEGINNING OF LAVAGE TO AID IN POISON INACTIVATION. LEAVE 50 GRAMS OF CHARCOAL SUSPENDED IN WATER IN THE STOMACH. IF INTRODUCTION AND REMOVAL OF LAVAGE FLUID BY GRAVITY REQUIRES MORE THAN FIVE MINUTES, ASSIST WITH ASEPTO SYRINGE. PREVENT ASPIRATION WITH CUFFED ENDOTRACHEAL TUBE. AVOID GIVING LARGE QUANTITIES OF WATER.

IF PATIENT COMATOSE, INTUBATE TRACHEA WITH CUFFED ENDOTRACHEAL TUBE. SUCCINYLCHLORINE MAY BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL TO EASE INSERTION OF TRACHEAL CATHETER PRIOR TO PASSAGE OF STOMACH TUBE. PROCEDURE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

PULMONAY EDEMA - RELIEVE ANXIETY. GIVE MORPHINE SULFATE, 10 MG, TO DECREASE RATE OF RAPID, INEFFICIENT RESPIRATION. GIVE 40% OXYGEN BY FACE MASK. USE INTERMITTENT POSITIVE-PRESSURE OXYGEN RESUSCITATOR FOR

ASSOCIATED BRONCHIAL CONSTRICTION. TREAT EDEMA CAUSED BY MORPHINE OR MORPHINE ANALOGS BY GIVING NALOXONE AND OXYGEN.
GENERAL MEASURES - DIURESIS WITH ETHACRYNIC ACID (EDECRIN), 25 MG ORALLY OR INTRAVENOUSLY, OR FLUROSEMIDE, 20-80 MG ORALLY OR INTRAVENOUSLY, IS HELPFUL BECAUSE IT REDUCES FLUID VOLUME. DO NOT INJECT AT A RATE FASTER THAN 10 MG/MIN. GIVE CORTICOSTEROID ANTI-INFLAMMATORY AGENT IN MAXIMUM DOSES. IF PULMONARY EDEMA IS THE RESULT OF HEART FAILURE, DIGITALIZE THE PATIENT.
PROCEDURE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

LIVER DAMAGE - DISCONTINUE ALL DRUGS AND CHEMICALS. MAINTAIN COMPLETE BED REST. AVOID ANESTHESIA OR SURGICAL PROCEDURES. AVOID DEHYDRATION OR OVERHYDRATION. IF VOMITING IS SEVERE AND ORAL FLUIDS ARE NOT RETAINED, REPLACE VOMITUS WITH AN EQUAL QUANTITY OF 5-10% DEXTROSE IN 0.3-0.5 N SALINE. ADMINISTER MAINTENANCE FLUIDS AND ELECTROLYTES AS NECESSARY, DEPENDING ON RENAL FUNCTION. RESUME ORAL FEEDINGS AS SOON AS THE PATIENT CAN TOLERATE THEM. CONTROL THE AMOUNT OF PROTEIN IN THE DIET IN ORDER TO CORRECT THE SERUM PROTEIN LEVEL. GIVE VITAMIN K, PHYTONADIONE, 2.5 MG DAILY. IF ANEMIA IS SEVERE, CONSIDER A BLOOD TRANSFUSION.
PROCEDURE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

ORGANS
RESPIRATORY SYSTEM
SKIN
HEART
LIVER
KIDNEYS
CENTRAL NERVOUS SYSTEM

STATUS OF REGULATORY ENFORCEMENT
OSHA STANDARD 29CFR1910.1200 HAZARD COMMUNICATION
REQUIRES CHEMICAL MANUFACTURERS AND IMPORTERS TO ASSESS THE HAZARDS OF CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS TO PROVIDE INFORMATION TO THEIR EMPLOYEES CONCERNING HAZARDOUS CHEMICALS BY MEANS OF A HAZARD COMMUNICATION PROGRAM, LABELS AND OTHER FORMS OF WARNING, MATERIAL SAFETY DATA SHEETS, AND INFORMATION AND TRAINING. REQUIRES DISTRIBUTORS TO TRANSMIT REQUIRED INFORMATION TO EMPLOYERS.
52FR31852 8/24/87

OSHA STANDARD 29CFR1910.1000 AIR CONTAMINANTS
TABLE Z-2

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND MEDICAL RECORDS

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY A SUBSTANCE OR MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECORDS.
48FR38178 08/22/83

OSHA STANDARD 29CFR1910.106 FLAMMABLE AND COMBUSTIBLE LIQUIDS
APPLIES TO THE HANDLING, STORAGE, AND USE OF FLAMMABLE AND COMBUSTIBLE LIQUIDS WITH A FLASH POINT BELOW 200 F

SUBSTANCE LISTED TOXIC SUBSTANCES CONTROL ACT INVENTORY

SUBSTANCE LISTED AS TOXIC POLLUTANT UNDER CLEAN WATER ACT (CWA) SECTION 307(A)

40CFR116 DESIGNATION OF HAZARDOUS SUBSTANCE
DESIGNATED AS HAZARDOUS SUSBSTANCE IN ACCORDANCE WITH SECTION 311(B)(2)(A) OF THE CLEAN WATER ACT. INCLUDES ANY ISOMERS AND HYDRATES, AS WELL AS ANY SOLUTIONS AND MIXTURES CONTAINING THIS SUBSTANCE.

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTES

49CFR172.101 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN HAZARDOUS MATERIALS TABLES AS HAZARDOUS MATERIAL FOR THE PURPOSE OF TRANSPORTATION.

49CFR172.102 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN OPTIONAL HAZARDOUS MATERIALS TABLE WITH ALTERNATIVES TO CORRESPONDING REQUIREMENTS IN 49CFR172.101 FOR INTERNATIONAL SHIPMENTS AS AUTHORIZED BY 49CFR171.12.

SOURCE/EXPOSURE ASSESSMENT COMPLETED/PUBLISHED CLEAN AIR ACT (CAA)

CONTROL TECHNOLOGY DEVELOPMENT COMPLETED/PUBLISHED SAFE DRINKING WATER ACT (SDWA)

SOURCE/EXPOSURE ASSESSMENT COMPLETED/PUBLISHED CLEAN AIR ACT (CAA)

TEST METHOD DEVELOPMENT COMPLETED/PUBLISHED SAFE DRINKING WATER ACT (SDWA)

RISK ASSESSMENT IN DEVELOPMENT/PROGRESS SAFE DRINKING WATER ACT (SDWA)

REGULATION PROMULGATED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR260

TECHNICAL ASSISTANCE DATA COMPLETED/PUBLISHED CLEAN WATER ACT (CWA) SECTION 311

PREREGULATORY ASSESSMENT COMPLETED/PUBLISHED CLEAN WATER ACT (CWA)

40CFR117 DETERMINATION OF REPORTABLE QUANTITIES FOR HAZARDOUS SUBSTANCES
QUANTITIES, AS LISTED IN TABLE 302.4 40CFR302, THAT MAY BE HARMFUL AND WHICH THE DISCHARGE IS A VIOLATION OF THE CLEAN WATER ACT SECTION 311(B)(3) AND REQUIRES NOTICE AS SET FORTH IN SECTIONS 103(A) AND 103(B) OF CERCLA.

SUBSTANCE LISTED HAZARDOUS
STATE OF CALIFORNIA ADMINISTRATIVE CODE
TITLE 22. SOCIAL SECURITY
DIVISION 4. ENVIRONMENTAL HEALTH
CHAPTER 30. MINIMUM STANDARDS FOR MANAGEMENT OF HAZARDOUS AND EXTREMELY HAZARDOUS WASTES

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.31 EPA HAZARDOUS WASTE NO. F001: SPENT HALOGENATED SOLVENTS USED IN DEGREASING AND STILL BOTTOMS FROM THE RECOVERY OF SPENT SOLVENTS AND SPENT SOLVENT MIXTURES. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.31 EPA HAZARDOUS WASTE NO. F002: SPENT HALOGENATED SOLVENT AND STILL BOTTOMS FROM RECOVERY OF THIS SPENT SOLVENT OR SOLVENT MIXTURE. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
CFR261.32 EPA HAZARDOUS WASTE NO. K030: COLUMN BOTTOMS OR HEAVY ENDS FROM THE COMBINED PRODUCTION OF TRICHLOROETHYLENE AND PERCHLOROETHYLENE. (T)

NATIONAL TOXICOLOGY PROGRAM (NTP) DATA INADEQUATE TO DETERMINE CARCINOGENICITY OF THIS SUBSTANCE IN MALE F344/N RATS

NATIONAL TOXICOLOGY PROGRAM (NTP) HAS DETERMINED THIS SUBSTANCE NOT CARCINOGENIC FOR FEMALE F344/N RATS

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.31 EPA HAZARDOUS WASTE NO. F024: WASTES, INCLUDING BUT NOT LIMITED TO, DISTILLATION RESIDUES, HEAVY ENDS, TARS, AND REACTOR CLEAN-OUT WASTES FROM THE PRODUCTION OF CHLORINATED ALIPHATIC HYDROCARBONS, HAVING CARBON CONTENT FROM 1-5, UTILIZING FREE RADICAL CATALYZED PROCESSES. (THIS LISTING DOES NOT INCLUDE LIGHT ENDS, SPENT FILTERS AND FILTER AIDS, SPENT DESSICANTS, WASTEWATER, WASTEWATER TREATMENT SLUDGES, SPENT CATALYSTS, AND WASTES LISTED IN 40CFR261.32). (T)

NATIONAL TOXICOLOGY PROGRAM (NTP) HAS DETERMINED THIS SUBSTANCE CARCINOGENIC FOR B6C3F1 MICE OF EITHER SEX

40CFR122, APPENDIX D - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION TESTING REQUIREMENTS
TABLE II - ORGANIC TOXIC POLLUTANTS IN EACH OF FOUR FRACTIONS IN ANALYSIS BY GAS CHROMATOGRAPHY/MASS SPECTROSCOPY (GS/MS)
48FR14153 04/01/83

40CFR372 SARA TITLE III SECTION 313 TOXIC CHEMICAL RELEASE REPORTING:

40CFR141.50 NATIONAL PRIMARY DRINKING WATER REGULATIONS
MAXIMUM CONTAMINANT LEVEL FOR TRICHLOROETHYLENE: 0.005 MG/L
EFFECTIVE DATE: 01/09/89
52FR25691 07/08/87

SUBSTANCE LISTED BY THE NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW ACT, P.L. 1983, CHAPTER 315, N.J.S.A. 34: A-1. EMPLOYERS COVERED: SIC CODES 20-39, 46-49, 51, 75, 76, 80, 82, AND 84.

SUBSTANCE LISTED UNDER THE STATE OF FLORIDA TOXIC SUBSTANCES IN THE WORKPLACE RIGHT TO KNOW LAW, CHAPTER 442 OF THE FLORIDA STATUTES.

SUBSTANCE LISTED UNDER THE STATE OF WEST VIRGINIA DIRECTOR OF HEALTH LEGISLATIVE RULES FOR HAZARDOUS SUBSTANCES, CHAPTER16, ARTICLE 31, SECTION 4(A).

SUBSTANCE LISTED UNDER THE STATE OF CALIFORNIA HAZARDOUS SUBSTANCES INFORMATION AND TRAINING ACT, CALIFORNIA LABOR CODE, DIVISION 5, CHAPTER 2.5

SUBSTANCE LISTED UNDER THE STATE OF PENNSYLVANIA WORKER AND COMMUNITY RIGHT TO KNOW ACT, P.L. 734, NO. 159.

SUBSTANCE LISTED UNDER THE STATE OF ILLINOIS TOXIC SUBSTANCES DISCLOSURE TO EMPLOYEES ACT, TITLE 56, CHAPTER I, SUBCHAPTER B, SECTION 205.

THIS SUBSTANCE TESTED FOR MUTAGENESIS/GENETIC TOXICITY BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

THIS SUBSTANCE TESTED FOR CARCINOGENESIS BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA)

THIS SUBSTANCE TESTED FOR REPRODUCTIVE/DEVELOPMENTAL TOXICITY BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

SUBJECT TO ENVIRONMENTAL PROTECTION AGENCY (EPA) RULE ON FIRST THIRD WASTES LAND DISPOSAL RESTRICTIONS.
EFFECTIVE DATE: 8/8/88
53FR31138 8/17/88
40CFR268.33

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.32 EPA HAZARDOUS WASTE NO. K086: SOLVENT WASHES AND SLUDGES, CAUSTIC WASHES AND SLUDGES, OR WATER WASHES AND SLUDGES FROM CLEANING TUBS AND EQUIPMENT USED IN THE FORMULATON OF INK FROM PIGMENTS, DRIERS, SOAPS, AND STABILIZERS CONTAINING CHROMIUM AND LEAD.(T)

SUBJECT TO ENVIRONMENTAL PROTECTION AGENCY (EPA) RULE PROHIBITING UNDERGROUND INJECTION OF SPENT SOLVENT WASTE UNLESS THE SOLVENT WASTE IS A SOLVENT-WATER MIXTURE OR SOLVENT-CONTAINING SLUDGE CONTAINING <1% OF TOTAL HAZARDOUS WASTES NUMBERS F001-F005.
EFFECTIVE DATE: 8/8/88
ALL SPENT WASTES NUMBERS F001-F005 CONTAINING <1% TOTAL F001-F005 SOLVENT CONSTITUENTS ARE PROHIBITED FROM UNDERGROUND INJECTION.
EFFECTIVE DATE: 8/8/90
53FR30908
40CFR148.10

UNDER THE CALIFORNIA AIR TOXICS HOT SPOTS INFORMATION AND ASSESSMENT ACT OF 1987, OPERATORS OF FACILITIES WHICH RELEASE, OR HAVE THE POTENTIAL TO RELEASE, SPECIFIED QUANTITIES OF THIS SUBSTANCE MUST SUBMIT TO THE APPROPRIATE LOCAL AIR POLLUTION CONTROL DISTRICTS, OR AIR QUALITY MANAGEMENT DISTRICTS, COMPREHENSIVE EMISSIONS INVENTORY PLANS AND HEALTH RISK ASSESSMENTS ADOPTED BY THE CALIFORNIA AIR RESOURCES BOARD (ARB).
EFFECTIVE DATE: 1/1/88
AB 2588, CHAPTER 1252

THIS SUBSTANCE LISTED IN CALIFORNIA AS A CARCINOGEN UNDER PROPOSITION 65, THE SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986. REGULATION REQUIRES EMPLOYERS BEGINNING APRIL 1, 1989, TO WARN WORKERS, CONSUMERS AND THE PUBLIC WHEN THEY ARE EXPOSED TO THIS CHEMICAL AT A LEVEL DEEMED BY THE STATE TO POSE A SIGNIFICANT RISK. WARNING METHODS MAY INCLUDE PRODUCT OR SHELF LABELS, SIGNS OR MEDIA ANNOUNCEMENTS. BEGINNING DECEMBER 1, 1989, THIS CHEMICAL CANNOT BE DISCHARGED OR RELEASED INTO ANY KNOWN SOURCE OF DRINKING WATER.

THIS SUBSTANCE SUBJECT TO REQUIREMENTS OF CANADA'S WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS). THE REGULATIONS REQUIRE SUPPLIERS OF HAZARDOUS MATERIALS TO PROVIDE ADEQUATE LABELS AND MATERIAL SAFETY DATA SHEETS (MSDS'S) AS CONDITIONS OF SALE AND IMPORTATION. EMPLOYERS MUST PROVIDE LABELS, MSDS'S AND WORKER EDUCATION PROGRAMS IN THE WORKPLACE.
EFFECTIVE DATE: 10/31/88

CERCLA PRIORITY GROUP I SUBSTANCE
53FR41280

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) - TABLE 2-14 DANGEROUS GOODS LIST; THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING AND OTHER REQUIREMENTS.
DESIGNATED AS A DANGEROUS GOOD FOR THE PURPOSE OF AIR TRANSPORATION.

THIS SUBSTANCE TESTED FOR REPRODUCTIVE/DEVELOPMENTAL TOXICITY BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

40CFR370 SARA TITLE III SECTION 311 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART B - REPORTING REQUIREMENTS

40CFR370 SARA TITLE III SECTION 312 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART D - INVENTORY FORMS

40CFR60.488 SUBSTANCE LISTED AS CHEMICAL PRODUCED BY AFFECTED FACILITIES UNDER THE CLEAN AIR ACT (CAA) SECTION 111.

40CFR148 SUBJECT TO EPA RULE PROHIBITING UNDERGROUND INJECTION OF THIS HAZARDOUS WASTE.
EFFECTIVE DATE: 6/7/89
54FR25416 6/14/89

40CFR148 SUBJECT TO EPA RULE PROHIBITING UNDERGROUND INJECTION OF THIS HAZARDOUS WASTE.
EFFECTIVE DATE: 6/8/89
54FR26594 6/23/89

EFFECTIVE DATE: 6/8/89
53FR26594 6/23/89

29CFR1910.1450 SUBJECT TO OSHA STANDARD REGULATING OCCUPATIONAL EXPOSURE TO HAZARDOUS CHEMICALS IN LABORATORIES.
EFFECTIVE DATE: 5/1/90
55FR3300 1/31/90

33CFR160.211 AND 213 U.S. COAST GUARD REQUIRES 24 HOURS ADVANCE NOTICE TO CAPTAIN OF THE PORT WHEN THIS SUBSTANCE IS SCHEDULED TO ARRIVE AT OR DEPART FROM PORT.

46CFR151.01-10(B) CARGOES REGULATED BY THE COAST GUARD UNDER SUBCHAPTER O - CERTAIN BULK DANGEROUS CARGOES

40CFR61.01(B) NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS SUBPART A - GENERAL PROVISIONS

40CFR302 CERCLA SECTION 102 DESIGNATION, REPORTABLE QUANTITIES AND NOTIFICATION
REPORTABLE QUANTITY (RQ): 100 LB. (45.4 KG)

40CFR268 LAND DISPOSAL RESTRICTIONS

MEDICAL SURVEILLANCE REQUIRED
GENERAL MEDICAL HISTORY
40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS
48FR38187 08/22/83
48FR39225 08/30/83 (EFFECTIVE DATE CORRECTION)
RESPIRATORY HISTORY
PRE-PLACEMENT AND ANNUAL EXAMS
WITH EMPHASIS ON:
RENAL AND LIVER FUNCTIONS
BLOOD CHEMISTRY
COMPLETE BLOOD COUNT
WITH EMPHASIS ON:
PULMONARY FUNCTIONS
WITH EMPHASIS ON:
CENTRAL NERVOUS SYSTEM TESTS, PERIPHERAL NEUROPATHY
WITH EMPHASIS ON:
ELECTROCARDIOGRAM
WITH EMPHASIS ON:
SKIN EXAM
VISION TEST
URINALYSIS
ATTENTION TO SMOKING, ALCOHOL, MEDICATION, AND EXPOSURE TO CARCINOGENS

WITH EMPHASIS ON:
14 BY 17 CHEST P.A. X-RAY
ACGIH BIOLOGICAL EXPOSURE INDICES FOR TRICHLOROETHYLENE:

300 MG/L TRICHLOROACETIC ACID AND TRICHLOROETHANOL IN URINE / TIMING -- END OF WORKWEEK AND END OF SHIFT
320 MG/G CREAT. TRICHLOROACETIC ACID AND TRICHLOROETHANOL IN URINE/ TIMING -- END OF WORKWEEK AND END OF SHIFT
4 MG/L FREE TRICHLOROETHANOL IN BLOOD / TIMING -- END OF SHIFT AND END OF WORKWEEK
0.5 PPM TRICHLOROETHYLENE IN END-EXHALED AIR / TIMING -- PRIOR TO SHIFT AND END OF WORKWEEK

CERTIFICATIONS
HEALTH STATUS CLASSIFICATION

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

NUCLEAR REG. 0041

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS. CONTACT: CHARLES L. ELKINS, OFFICE OF TOXIC SUBSTANCES, EPA (202) 382-3813.

MEDICAL WARNING REQUIRED FOR MEDICAL EXAM REFUSAL SIGNED BY EMPLOYEE

SPECIAL DIAGNOSTIC TESTS
URINE TRICHLOROETHYLENE METABOLITES >20 MG/DAY

LEAKS AND SPILL PROCEDURES
REPORTABLE QUANTITY (RQ) 100 LB. (45.4 KG)
A REPORTABLE QUANTITY OF ONE HUNDRED POUNDS APPLIES TO THIS SUBSTANCE ESTABLISHED BY SECTIONS 101(14) AND 102(B) OR ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA). SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THAT SUBSTANCE IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER (800) 424-8802; IN THE WASHINGTON, D.C. METROPOLITAN AREA (202) 426-2675.
40CFR302

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DEPARTMENT OF TRANSPORTATION HAZARD CLASS
49CFR172.101 HAZARDOUS MATERIALS TABLE

ORM-A

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS
49CFR172.101 AND 49CFR172 SUBPART E:

NONE

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INTERNATIONAL MARITIME ORGANIZATION HAZARD CLASS
49CFR172.102 OPTIONAL HAZARDOUS MATERIALS TABLE

CLASS 6.1-POISONOUS (TOXIC) SUBSTANCE

INTERNATIONAL MARITIME ORGANIZATION LABELING SPECIFICATIONS FOR
DOMESTIC AND EXPORT SHIPMENTS
49CFR172.102

ST. ANDREWS CROSS

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FOLLOWING INFORMATION RECOMMENDED FOR THE EMERGENCY HANDLING OF
HAZARDOUS MATERIALS

IF MATERIAL ON FIRE OR INVOLVED IN FIRE:
* USE SUITABLE AGENT FOR TYPE OF SURROUNDING FIRE TO EXTINGUISH FIRE
(MATERIAL ITSELF DOES NOT BURN OR BURNS WITH DIFFICULTY)

IF MATERIAL IS NOT ON FIRE AND IS NOT INVOLVED IN FIRE:
* DO NOT ALLOW MATERIAL TO CONTAMINATE WATER SOURCES AND SEWERS
* CONTAIN FLOW WITH DIKES AS NECESSARY

PERSONNEL PROTECTION:
* KEEP UPWIND
* WEAR BOOTS, PROTECTIVE GLOVES AND GAS TIGHT GOGGLES
* WASH CONTAMINATED SKIN WITH COPIOUS AMOUNTS OF WATER OR SOAP AND
WATER
* AVOID BREATHING DUST/VAPORS/FUMES FROM MATERIAL

LAND SPILL:
* DIG A HOLDING AREA SUCH AS A PIT, POND, OR LAGOON TO CONTAIN LIQUID
OR SOLID MATERIAL
* AVOID SKIN CONTACT WITH MATERIAL
* USE CEMENT POWDER OR FLY ASH TO ABSORB LIQUID MASS

WATER SPILL:
* IF DISSOLVED, APPLY ACTIVATED CARBON AT 10 TIMES SPILLED AMOUNT
IN THE REGION OF 10 PPM OR GREATER CONCENTRATION
* USE SUCTION HOSES TO REMOVE TRAPPED MATERIAL
* REMOVE IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES WITH
MECHANICAL DREDGES OR LIFTS

AIR SPILL:
* KNOCK DOWN VAPORS WITH WATER SPRAY
* COMBUSTION PRODUCTS INCLUDE CORROSIVE OR TOXIC VAPORS

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FOLLWING INFORMATION FROM DEPARTMENT OF TRANSPORTATION/U.S. COAST GUARD
"CHEMICAL RESPONSE INFORMATION SYSTEM", REGARDING WATER SPILLS:

PORT WHEN THIS SUBSTANCE IS SCHEDULED TO ARRIVE AT PORT WHEN TRANSPORTED IN BULK QUANTITY

* SUBSTANCE SINKS IN WATER
* RESTRICT ACCESS OF GENERAL PUBLIC WHEN APPRECIABLE DANGER ARISES FROM SPILL
* RESTRICT HUMAN USE WHEN SUBSTANCE INVOLVED
* RESTRICT FARM USE WHEN SUBSTANCE SPILLED IN WATER USED FOR IRRIGATION OR ANIMALS
* CONTAIN SURFACE SLICKS
* PUMP SINKING LIQUID OR FINELY DIVIDED SOLIDS
* HIGHLY VOLATILE, AVOID INHALATION, VAPORS OR DUST ARE IRRITATING OR TOXIC
* HIGHLY CORROSIVE, AVOID DIRECT CONTACT, CONTACT WITH SKIN OR EYES CAN CAUSE IRRITATION OR BURNS
* BURNING NOT RECOMMENDED, FIRE DIFFICULT TO CONTROL AND/OR POISONOUS GAS IS FORMED

THIS SUBSTANCE LISTED IN CALIFORNIA AS A CARCINOGEN UNDER PROPOSITION 65, THE SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986. LISTED CHEMICALS CANNOT BE DISCHARGED OR RELEASED INTO WATER OR ONTO OR INTO LAND WHERE THERE IS ANY POSSIBILITY OF PASSING INTO ANY SOURCE OF DRINKING WATER.

WASTE

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OBSERVE ALL FEDERAL, STATE OR LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. CONTACT LOCAL AND/OR STATE ENVIRONMENTAL AUTHORITIES TO INSURE PROPER COMPLIANCE.

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THIS SUBSTANCE MEETS THE DEFINITION OF A HAZARDOUS WASTE AS DEFINED BY THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) (40CFR260) AND IS SUBJECT TO THE FOLLOWING CONSIDERATIONS:

40CFR260 HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

PROVIDES DEFINITIONS OF TERMS, GENERAL STANDARDS, AND OVERVIEW INFORMATION APPLICABLE TO 40CFR PARTS 260-265

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IDENTIFIES THOSE SOLID WASTES WHICH ARE SUBJECT TO REGULATION AS HAZARDOUS WASTES UNDER 40CFR PARTS 262-265, 270, 271, AND 124 AND WHICH ARE SUBJECT TO THE NOTIFICATION REQUIREMENTS OF SECTION 3010 OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND IDENTIFIES ONLY SOME OF THE MATERIALS WHICH ARE HAZARDOUS WASTES UNDER SECTIONS 3007 AND 7003 OF RCRA

THIS COMPOUND, DEPENDING ON THE CHARACTERISTIC, CONCENTRATION
AND/OR SOURCE OF THE WASTE, MAY BE REGULATED UNDER THE FOLLOW-

REPORTABLE QUANTITY (RQ) (IF APPLICABLE):
40CFR261.24 TOXICITY CHARACTERISTIC
EPA HAZARDOUS WASTE NUMBER D040
TRICHLOROETHYLENE
MAXIMUM CONCENTRAION 0.5 MG/L

40CFR261.31 HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER F001
40CFR261.31 HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER F002
REPORTABLE QUANTITY (RQ) : 10 LBS.
A REPORTABLE QUANTITY OF 10 LBS. APPLIES TO THIS HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.31. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR261.31 HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER F024
REPORTABLE QUANTITY (RQ) : 1 LB.
A REPORTABLE QUANTITY OF 1 LB. APPLIES TO THIS HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.31. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K018
40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K019
40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K020
REPORTABLE QUANTITY (RQ) : 1 LB.
A REPORTABLE QUANTITY OF 1 LB. APPLIES TO THIS HAZARDOUS WASTE FROM SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.32. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OR A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR261.33 DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUES, AND SPILL RESIDUES THEREOF
EPA HAZARDOUS WASTE NUMBER U228
TRICHLOROETHYLENE

40CFR262 STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

40CFR263 STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS WHICH APPLY TO PERSONS TRANSPORTING HAZARDOUS WASTE WITHIN THE UNITED STATES IF THE TRANSPORTATION REQUIRES A MANIFEST UNDER 40CFR262

40CFR264 STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE

40CFR265 INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE DURING THE PERIOD OF INTERIM STATUS

40CFR267 INTERIM STANDARDS FOR OWNERS AND OPERATORS OF NEW HAZARDOUS WASTE LAND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS THAT DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE FOR NEW LAND DISPOSAL FACILITIES

40CFR270 EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

ESTABLISHES PROVISIONS FOR THE HAZARDOUS WASTE PERMIT PROGRAM UNDER SUBTITLE C OF THE SOLID WASTE DISPOSAL ACT, AS AMENDED BY THE RESOURCE CONSERVATION AND RECOVERY ACT

40CFR271 REQUIREMENT FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

SPECIFIES THE PROCEDURES EPA WILL FOLLOW IN APPROVING, REVISING, AND WITHDRAWING APPROVAL OF STATE PROGRAMS AND THE REQUIREMENTS STATE PROGRAMS MUST MEET TO BE APPROVED BY THE ADMINISTRATION UNDER SECTION 3006(B) OF RCRA

40CFR268 LAND DISPOSAL RESTRICTIONS

IDENTIFIES HAZARDOUS WASTES THAT ARE RESTRICTED FROM LAND DISPOSAL AND DEFINES THOSE LIMITED CIRCUMSTANCES UNDER WHICH AN OTHERWISE PROHIBITED WASTE MAY CONTINUE TO BE LAND DISPOSED.

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 8/8/88
53FR30908 8/16/88

EFFECTIVE DATE: 8/8/90
53FR30908 8/16/88

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 6/7/89
54FR25416 6/14/89

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 6/8/89
54FR26594 6/23/89

CAS NUMBER
79-01-6

REGISTRY TOXIC CHEMICALS NUMBER
KX4550000

BULLETINS
NEGATIVE RESULTS FOR CARCINOGENICITY OF TRICHLOROETHYLENE IN MICE.
J. CANCER RES. CLIN. ONCOL. 1984, 107(3), 149-156.

SPECIAL INFORMATION
* TRICHLOROETHYLENE IS PRACTICALLY NONFLAMMABLE; IGNITION WILL OCCUR ONLY UNDER SPECIAL CONDITIONS.

TYPE WHAT INFORMATION YOU REQUIRE
/ALL/, SPECIFIC INFORMATION (BY 4-LETTER COMMAND, /HELP/, OR /NONE/.

TRICHLORETHYLENE - NO MORE HITS IN DATABASE.

ENTER NAME, KEYWORD, SYMPTOM, STLA, NAMELIST, HELP, OR QUIT.

ENTER WHICH OHS SERVICE YOU WISH TO ACCESS:
> TO ACCESS HAZARDLINE, TYPE /HAZARD/
> TO ACCESS ENVIRONMENTAL HEALTH NEWS, TYPE /EHN/
> TO ACCESS MATERIAL SAFETY DATA SHEET, TYPE /MSDS/
> TO EXIT THE SYSTEM, TYPE /LOGOFF/
PRESS RETURN KEY AFTER ENTERING COMMAND.

LOGGED OFF LINE # 01 DATE = 07/02/90 TIME = 13-55-23
LOGOFF COMPLETED - GOODBYE FOR NOW!!!!

1,1,1-TRICHLOROETHANE IS A SYNONYM OF METHYL CHLOROFORM
TYPE WHAT INFORMATION YOU REQUIRE
/ALL/, SPECIFIC INFORMATION (BY 4-LETTER COMMAND, /HELP/, OR /NONE/.

CHEMICAL NAME
METHYL CHLOROFORM

FORMULA
C2H3CL3

SYNONYMS
1,1,1-TRICHLOROETHANE
AEROTHENE TT
NCI-C04626
SOLVENT 111
CHLOROETHENE NU
CHLOROTHENE
INHIBISOL
UN 2831
ETHANE, 1,1,1-TRICHLORO-
CHLOROETHENE
CHLOROFORM, METHYL
CHLOROTHANE NU
METHYLTRICHLOROMETHANE
METHYLCHLOROFORM
TRICHLOROMETHYLMETHANE
TRICHLOROETHANE
CHLOROTHENE VG
RCRA U266
STCC 4941176
OHS14370

PERMISSIBLE EXPOSURE LIMIT
350 PPM OSHA TWA; 450 PPM OSHA STEL
350 PPM ACGIH TWA; 450 PPM ACGIH STEL
350 PPM NIOSH RECOMMENDED 15 MIN CEILING
REPRODUCTIVE EFFECTS DATA (RTECS)
MUTAGENIC DATA (RTECS)
AQUATIC TOXICITY RATING 2 (TLM96 10-100 MG/L)
FATHEAD MINNOW 52.8 MG/L
CERCLA HAZARD RATINGS - TOXICITY 2 - IGNITABILITY 1 - REACTIVITY 0
PERSISTENCE 3

TOXICOLOGY: METHYL CHLOROFORM IS A SKIN, EYE AND MUCOUS MEMBRANE IRRITANT. IT IS SLIGHTLY TOXIC BY INHALATION, SKIN ABSORPTION AND INGESTION. METHYL CHLOROFORM IS A CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY ALSO AFFECT THE HEART AND POSSIBLY THE LIVER AND KIDNEYS. EXCESSIVE CONCENTRATIONS OF 10,000 PPM MAY CAUSE DEATH DUE TO RESPIRATORY OR CARDIAC FAILURE. ASPIRATION MAY RESULT IN PULMONARY EDEMA OR CHEMICAL PNEUMONITIS.

THE ODOR OF METHYL CHLOROFORM CAN BE DETECTED BETWEEN 44 AND 100 PPM, THIS IS CONSIDERED TO BE AN ADEQUATE WARNING PROPERTY. THE THRESHOLD LIMIT VALUE WAS SET TO PREVENT ANESTHETIC EFFECTS AND OBJECTIONS TO ODOR.

PERSONS WITH PRE-EXISTING SKIN DISORDERS, LIVER DISEASE OR CARDIOVASCULAR DISEASE MAY BE AT INCREASED RISK FROM EXPOSURE. ALCOHOL MAY ENHANCE BOTH CARDIAC AND HEPATIC TOXICITY. EPINEPHRINE

IHL-MAN	LCLO: 27 GM/M3/10M	IHL-MAN	TCLO: 350 PPM
IHL-MAN	TCLO: 200 PPM/4H	IHL-HMN	TCLO: 920 PPM
ORL-HMN	TDLO: 670 MG/KG	ORL-RAT	LD50: 10,300 MG/KG
ORL-MUS	LD50: 11,240 MG/KG	ORL-RBT	LD50: 5660 MG/KG
ORL-DOG	LD50: 750 MG/KG	ORL-GPG	LD50: 9470 MG/KG
IHL-RAT	LC50: 18,000 PPM/4H	IHL-MUS	LC50: 3911 PPM/2H
IHL-CAT	LC50: 24,400 MG/M3	SKN-RBT	LD50: 15,800 MG/KG(EPA,1984)

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
1000 PPM
OSHA/NIOSH

PHYSICAL DESCRIPTION
CLEAR, COLORLESS LIQUID WITH A MILD CHLOROFORM LIKE ODOR.

CHEMICAL AND PHYSICAL PROPERTIES
MOLECULAR WEIGHT: 133.4
BOILING POINT AT 1 ATM, F: 165 F (74 C)
SOLUBILITY IN WATER, G/100 G WATER AT 20C: 0.078 @ 25 C
FLASH POINT, CLOSED CUP, F (OR OPEN CUP IF OC): NOT AVAILABLE
VAPOR PRESSURE @ 20 C, MMHG: 100 MMHG
MELTING POINT, F: -26 F (-32 C)
UPPER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 12.5%
LOWER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 7.5%
AUTOIGNITION TEMPERATURE: 998 F (537 C)
SPECIFIC GRAVITY: 1.3390
VAPOR DENSITY (AIR=1): 4.55
ODOR THRESHOLD: 44-100 PPM

INCOMPATIBILITIES
METHYL CHLOROFORM (1,1,1-TRICHLOROETHANE)
ACETONE: EXOTHERMIC REACTION
ALKALI (STRONG): POSSIBLE VIOLENT REACTION
ALUMINUM AND ALLOYS: MAY DECOMPOSE VIOLENTLY
BARIUM: FIRE AND EXPLOSION HAZARD
MAGNESIUM: VIOLENT DECOMPOSITION WITH EVOLUTION OF HYDROGEN CHLORIDE
METALS (POWDERED): FIRE AND EXPLOSION HAZARD
NITROGEN TETROXIDE: FORMS EXPLOSIVE MIXTURE
OXIDIZERS (STRONG): POSSIBLE VIOLENT REACTION
OXYGEN (GAS): POSSIBLE EXPLOSION WHEN HEATED @ 100 C
OXYGEN (LIQUID): POSSIBLE VIOLENT EXPLOSION
POTASH: FORMS FLAMMABLE OR EXPLOSIVE PRODUCT
POTASSIUM AND ALLOYS: FORMS SHOCK SENSITIVE MIXTURE
POTASSIUM HYDROXIDE: FORMATION OF SPONTANEOUSLY FLAMMABLE PRODUCT
RUBBER, PLASTICS AND COATINGS: MAY BE ATTACKED
SODIUM AND ALLOYS: FIRE AND EXPLOSION HAZARD
SODIUM HYDROXIDE: FORMS SPONTANEOUSLY FLAMMABLE PRODUCT
SODIUM-POTASSIUM ALLOY: POSSIBLE EXPLOSION
TIN AND ALLOYS: INCOMPATIBLE
ZINC AND ALLOYS: INCOMPATIBLE

PERSONAL PROTECTIVE EQUIPMENT
FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT NECESSARY TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE. FACE SHIELDS SHALL COMPLY WITH 29CFR1910.133(A)(2), (A)(4), (A)(5), AND (A)(6).

GOGGLES

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE SPLASH-PROOF SAFETY GOGGLES WHICH COMPLY WITH 29CFR1910.133(A)(2)_(A)(6) WHERE THIS LIQUID MAY CONTACT THE EYES.

WASHING CHEMICALS FROM THE SKIN

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT EMPLOYEES WHOSE SKIN BECOMES WET WITH THIS SUBSTANCE PROPMTLY WASH OR SHOWER TO REMOVE ANY CONTAMINANT FROM THE SKIN.

ROUTINE CHANGING OF WORK CLOTHING

NO SPECIFIC REQUIREMENT. IF INDICATED BY THE NATURE OF THE CONTAMINANT AND THE EXTENT OF EXPOSURE, CHANGE INTO UNCONTAMINATED CLOTHING BEFORE LEAVING THE WORK PREMISES.

CLOTHING REMOVAL FOLLOWING ACCIDENTAL CONTAMINATION

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT NON-IMPERVIOUS CLOTHING WHICH BECOMES CONTAMINATED WITH THIS SUBSTANCE BE REMOVED PROMPTLY AND NOT REWORN UNTIL THE SUBSTANCE IS REMOVED FROM THE CLOTHING.

SPECIFIC EMERGENCY PROVISIONS

NO SPECIFIC REQUIREMENT. IF INDICATED BY THE NATURE OF THE SUBSTANCE AND THE PROBABILITY OF EXPOSURE, PROVIDE AN EYE WASH AND FACILITIES FOR QUICK DRENCHING OF THE BODY WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED)

1000 PPM

- SUPPLIED-AIR RESPIRATOR
- SELF-CONTAINED BREATHING APPARATUS

ESCAPE

- GAS MASK WITH AN ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER)
- APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS

FIREFIGHTING

- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WITH AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN POSITIVE PRESSURE MODE

ROUTE OF ENTRY INTO BODY

- INHALATION
- SKIN ABSORPTION
- INGESTION
- SKIN OR EYE CONTACT

SYMPTOMS

- SKIN IRRITATION
- EYE IRRITATION
- MUCOUS MEMBRANE IRRITATION
- RESPIRATORY IRRITATION
- HEADACHE
- INCOORDINATION
- LASSITUDE
- ATAXIA
- ANESTHESIA
- UNCONSCIOUSNESS
- NAUSEA
- VOMITING
- DROWSINESS
- CONVULSIONS
- CONJUNCTIVITIS
- DERMATITIS
- HYPOTENSION
- BRADYCARDIA
- CENTRAL NERVOUS SYSTEM DEPRESSION
- DIARRHEA
- GASTROINTESTINAL DISTURBANCES
- ABDOMINAL PAIN
- DIZZINESS
- MENTAL DULLNESS
- MYOCARDIAL SENSITIZATION
- PULMONARY EDEMA
- PNEUMONITIS
- KIDNEY DAMAGE
- LIVER DAMAGE
- COMA
- RESPIRATORY FAILURE
- CARDIAC FAILURE
- REPRODUCTIVE EFFECTS IN EXPERIMENTAL ANIMALS

FIRST AID PROCEDURES FOLLOWING EXPOSURE

IF THIS CHEMICAL GETS INTO THE EYES, WASH THE EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL GETS ON THE SKIN, REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL HAS BEEN INHALED, REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

ACTIVATED CHARCOAL. DO NOT PERFORM GASTRIC LAVAGE OR EMESIS ON AN UNCONSCIOUS PERSON. MAINTAIN BLOOD PRESSURE AND RESPIRATION. GIVE OXYGEN IF RESPIRATION IS DEPRESSED. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.) TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. MEDICAL TREATMENT SHOULD BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.

ORGANS
EYES
SKIN
CENTRAL NERVOUS SYSTEM
CARDIOVASCULAR SYSTEM
KIDNEYS
LIVER

STATUS OF REGULATORY ENFORCEMENT

****

FEDERAL REGULATIONS

****

OSHA STANDARD 29CFR1910.1200 HAZARD COMMUNICATION
REQUIRES CHEMICAL MANUFACTURERS AND IMPORTERS TO ASSESS THE HAZARDS OF CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS TO PROVIDE INFORMATION TO THEIR EMPLOYEES CONCERNING HAZARDOUS CHEMICALS BY MEANS OF A HAZARD COMMUNICATION PROGRAM, LABELS AND OTHER FORMS OF WARNING, MATERIAL SAFETY DATA SHEETS, AND INFORMATION AND TRAINING. REQUIRES DISTRIBUTORS TO TRANSMIT REQUIRED INFORMATION TO EMPLOYERS.
52FR31852 8/24/87

OSHA STANDARD 29CFR1910.1000 AIR CONTAMINANTS
TABLE Z-1

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND MEDICAL RECORDS

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

OSHA STANDARD 29CFR1910.133 EYE AND FACE PROTECTION

29CFR1910.1450 SUBJECT TO OSHA STANDARD REGULATING OCCUPATIONAL EXPOSURE TO HAZARDOUS CHEMICALS IN LABORATORIES.
EFFECTIVE DATE: 5/1/90
55FR3300 1/31/90

40CFR60.488 SUBSTANCE LISTED AS CHEMICAL PRODUCED BY AFFECTED FACILITIES UNDER THE CLEAN AIR ACT (CAA) SECTION 111.

40CFR61.01(B) NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS
SUBPART A - GENERAL PROVISIONS

40CFR116 DESIGNATION OF HAZARDOUS SUBSTANCE
DESIGNATED AS HAZARDOUS SUSBSTANCE IN ACCORDANCE WITH SECTION 311(B)(2)(A) OF THE CLEAN WATER ACT. INCLUDES ANY ISOMERS AND HYDRATES, AS WELL AS ANY SOLUTIONS AND MIXTURES CONTAINING THIS SUBSTANCE.

40CFR122, APPENDIX D - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION TESTING REQUIREMENTS
TABLE II - ORGANIC TOXIC POLLUTANTS IN EACH OF FOUR FRACTIONS IN ANALYSIS BY GAS CHROMATOGRAPHY/MASS SPECTROSCOPY (GS/MS)
48FR14153 04/01/83

40CFR141.50 NATIONAL PRIMARY DRINKING WATER REGULATIONS
MAXIMUM CONTAMINANT LEVEL FOR METHYL CHLOROFORM: 0.20 MG/L
EFFECTIVE DATE: 01/09/89
52FR25691 07/08/87

SUBJECT TO ENVIRONMENTAL PROTECTION AGENCY (EPA) RULE PROHIBITING UNDERGROUND INJECTION OF SPENT SOLVENT WASTE UNLESS THE SOLVENT WASTE IS A SOLVENT-WATER MIXTURE OR SOLVENT-CONTAINING SLUDGE CONTAINING <1% OF TOTAL HAZARDOUS WASTES NUMBERS F001-F005.
EFFECTIVE DATE: 8/8/88
ALL SPENT WASTES NUMBERS F001-F005 CONTAINING <1% TOTAL F001-F005 SOLVENT CONSTITUENTS ARE PROHIBITED FROM UNDERGROUND INJECTION.
EFFECTIVE DATE: 8/8/90
53FR30908
40CFR148.10

SUBJECT TO ENVIRONMENTAL PROTECTION AGENCY (EPA) RULE PROHIBITING UNDERGROUND INJECTION OF HALOGENATED ORGANIC COMPOUNDS AT CONCENTRATIONS GREATER THAN OR EQUAL TO 10,000 MG/KG.
EFFECTIVE DATE: 8/8/88
53FR30908 8/16/88
40CFR148.12

40CFR148 SUBJECT TO EPA RULE PROHIBITING UNDERGROUND INJECTION OF THIS HAZARDOUS WASTE.
EFFECTIVE DATE: 6/7/89
54FR25416 6/14/89

40CFR148 SUBJECT TO EPA RULE PROHIBITING UNDERGROUND INJECTION OF THIS HAZARDOUS WASTE.
EFFECTIVE DATE: 6/8/89
54FR26594 6/23/89

REGULATION PROMULGATED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR260

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.31 EPA HAZARDOUS WASTE NO. F024: WASTES, INCLUDING BUT NOT LIMITED TO, DISTILLATION RESIDUES, HEAVY ENDS, TARS, AND REACTOR CLEAN-OUT WASTES FROM THE PRODUCTION OF CHLORINATED ALIPHATIC HYDROCARBONS, HAVING CARBON CONTENT FROM 1-5, UTILIZING FREE RADICAL CATALYZED PROCESSES. (THIS LISTING DOES NOT INCLUDE LIGHT ENDS, SPENT FILTERS AND FILTER AIDS, SPENT DESSICANTS, WASTEWATER, WASTEWATER TREATMENT SLUDGES, SPENT CATALYSTS, AND WASTES LISTED IN 40CFR261.32). (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.31 EPA HAZARDOUS WASTE NO. F001: SPENT HALOGENATED

OF SPENT SOLVENTS AND SPENT SOLVENT MIXTURES. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.31 EPA HAZARDOUS WASTE NO. F002: SPENT HALOGENATED SOLVENT AND STILL BOTTOMS FROM RECOVERY OF THIS SPENT SOLVENT OR SOLVENT MIXTURE. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.31 EPA HAZARDOUS WASTE NO. F025: CONDENSED LIGHT ENDS, SPENT FILTERS AND FILTER AIDS, AND SPENT DESICCANT WASTES FROM THE PRODUCTION OF CERTAIN CHLORINATED ALIPHATIC HYDROCARBONS, BY FREE RADICAL CATALYZED PROCESS. THESE CHLORINATED ALIPHATIC HYDROCARBONS ARE THOSE HAVING CARBON CHAIN LENGTHS RANGING FROM ONE TO AND INCLUDING FIVE, WITH VARYING AMOUNTS AND POSITIONS OF CHLORINE SUBSTITUTION. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.32 EPA HAZARDOUS WASTE NO. K028: SPENT CATALYST FROM THE HYDROCHLORINATOR REACTOR IN THE PRODUCTION OF 1,1,1-TRI-CHLOROETHANE. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.32 EPA HAZARDOUS WASTE NO. K018: HEAVY ENDS FROM THE FRACTIONATION COLUMN IN ETHYL CHLORIDE PRODUCTON. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.32 EPA HAZARDOUS WASTE NO. K029: WASTE FROM THE PRODUCT STEAM STRIPPER IN THE PRODUCTION OF 1,1,1-TRICHLOROETHANE. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.32 EPA HAZARDOUS WASTE NO. K019: HEAVY ENDS FROM THE DISTILLATION OF ETHYLENE DICHLORIDE IN ETHYLENE CHLORIDE PRODUCTION. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.32 EPA HAZARDOUS WASTE NO. K086: SOLVENT WASHES AND SLUDGES, CAUSTIC WASHES AND SLUDGES, OR WATER WASHES AND SLUDGES FROM CLEANING TUBS AND EQUIPMENT USED IN THE FORMULATON OF INK FROM PIGMENTS, DRIERS, SOAPS, AND STABILIZERS CONTAINING CHROM-IUM AND LEAD.(T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.32 EPA HAZARDOUS WASTE NO. K095: DISTILLATION BOTTOMS FROM THE PRODUCTION OF 1,1,1-TRICHLOROETHANE.

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.32 EPA HAZARDOUS WASTE NO. K096: HEAVY ENDS FROM THE HEAVY ENDS COLUMN FROM THE PRODUCTION OF 1,1,1-TRICHLOROETHANE.

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTES

40CFR268 LAND DISPOSAL RESTRICTIONS

SUBJECT TO ENVIRONMENTAL PROTECTION AGENCY (EPA) RULE ON FIRST THIRD WASTES LAND DISPOSAL RESTRICTIONS.
EFFECTIVE DATE: 8/8/88
53FR31138 8/17/88
40CFR268.33

40CFR302 CERCLA SECTION 102 DESIGNATION, REPORTABLE QUANTITIES AND

NOTIFICATION

REPORTABLE QUANTITY (RQ): 1000 LB. (454 KG)

40CFR370 SARA TITLE III SECTION 311 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART B - REPORTING REQUIREMENTS

40CFR370 SARA TITLE III SECTION 312 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART D - INVENTORY FORMS

40CFR372 SARA TITLE III SECTION 313 TOXIC CHEMICAL RELEASE REPORTING: COMMUNITY RIGHT-TO-KNOW

40CFR712 THIS SUBSTANCE IDENTIFIED IN THE PRELIMINARY ASSESSMENT INFORMATION RULE (PAIR). MANUFACTURERS AND IMPORTERS WHO PRODUCE THIS SUBSTANCE ARE REQUIRED TO SUBMIT PRODUCTION VOLUME, END USE AND EXPOSURE DATA TO THE ENVIRONMENTAL PROTECTION AGENCY (EPA).

40CFR716 THIS SUBSTANCE LISTED IN THE HEALTH AND SAFETY DATA REPORTING RULE UNDER SECTION 8(D) OF THE TOXIC SUBSTANCES CONTROL ACT (TSCA) REQUIRING PAST, CURRENT AND PROSPECTIVE MANUFACTURERS, IMPORTERS AND PROCESSORS TO SUBMIT TO EPA COPIES AND LISTS OF UNPUBLISHED HEALTH AND SAFETY STUDIES ON THE LISTED CHEMICALS THAT THEY MANUFACTURE, IMPORT OR PROCESS.

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY A SUBSTANCE OR MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECORDS.
48FR38178 08/22/83

40CFR799 SUBPART B SUBJECT TO SPECIFIC CHEMICAL TEST RULES.

40CFR799.5000 SUBJECT TO TESTING CONSENT ORDERS

49CFR172.101 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN HAZARDOUS MATERIALS TABLES AS HAZARDOUS MATERIAL FOR THE PURPOSE OF TRANSPORTATION.

49CFR172.102 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN OPTIONAL HAZARDOUS MATERIALS TABLE WITH ALTERNATIVES TO CORRESPONDING REQUIREMENTS IN 49CFR172.101 FOR INTERNATIONAL SHIPMENTS AS AUTHORIZED BY 49CFR171.12.

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) - TABLE 2-14 DANGEROUS GOODS LIST; THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING AND OTHER REQUIREMENTS.
DESIGNATED AS A DANGEROUS GOOD FOR THE PURPOSE OF AIR TRANSPORATION.

33CFR160.211 AND 213 U.S. COAST GUARD REQUIRES 24 HOURS ADVANCE NOTICE TO CAPTAIN OF THE PORT WHEN THIS SUBSTANCE IS SCHEDULED TO ARRIVE AT OR DEPART FROM PORT.

WATER QUALITY CRITERIA COMPLETED/PUBLISHED CLEAN WATER ACT

SUBSTANCE LISTED TOXIC SUBSTANCES CONTROL ACT INVENTORY

SUBSTANCE LISTED AS TOXIC POLLUTANT UNDER CLEAN WATER ACT (CWA) SECTION 307(A)

THE ENVIRONMENTAL PROTECTION AGENCY HAS ISSUED A FINAL RULE PROMULGATING REGULATIONS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), AS AMENDED BY THE HAZARDOUS AND SOLID WASTES AMENDMENTS OF 1984, RESTRICTING LAND DISPOSAL OF CERTAIN "CALIFORNIA LIST" WASTES. HAZARDOUS WASTES CONTAINING HALOGENATED ORGANIC COMPOUNDS IN TOTAL CONCENTRATIONS GREATER THAN OR EQUAL TO 1000 MG/KG ARE PROHIBITED FROM LAND DISPOSAL.
EFFECTIVE DATE: 7/8/87
(52FR25760 7/8/87)

LIST "C" CHEMICAL
FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) REGISTERED ACTIVE INGREDIENT WHICH MUST BE REREGISTERED IN ACCORDANCE WITH NEW STANDARDS FOR REGISTRATION.
54FR30847 7/24/89

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STATE REGULATIONS

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UNDER THE CALIFORNIA AIR TOXICS HOT SPOTS INFORMATION AND ASSESSMENT ACT OF 1987, OPERATORS OF FACILITIES WHICH RELEASE, OR HAVE THE POTENTIAL TO RELEASE, SPECIFIED QUANTITIES OF THIS SUBSTANCE MUST SUBMIT TO THE APPROPRIATE LOCAL AIR POLLUTION CONTROL DISTRICTS, OR AIR QUALITY MANAGEMENT DISTRICTS, COMPREHENSIVE EMISSIONS INVENTORY PLANS AND HEALTH RISK ASSESSMENTS ADOPTED BY THE CALIFORNIA AIR RESOURCES BOARD (ARB).
EFFECTIVE DATE: 1/1/88
AB 2588, CHAPTER 1252

SUBSTANCE LISTED UNDER THE STATE OF CALIFORNIA HAZARDOUS SUBSTANCES INFORMATION AND TRAINING ACT, CALIFORNIA LABOR CODE, DIVISION 5, CHAPTER 2.5

SUBSTANCE LISTED BY THE NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW ACT, P.L. 1983, CHAPTER 315, N.J.S.A. 34: A-1. EMPLOYERS COVERED: SIC CODES 20-39, 46-49, 51, 75, 76, 80, 82, AND 84.

SUBSTANCE LISTED UNDER THE STATE OF FLORIDA TOXIC SUBSTANCES IN THE WORKPLACE RIGHT TO KNOW LAW, CHAPTER 442 OF THE FLORIDA STATUTES.

SUBSTANCE LISTED UNDER THE STATE OF WEST VIRGINIA DIRECTOR OF HEALTH LEGISLATIVE RULES FOR HAZARDOUS SUBSTANCES, CHAPTER16, ARTICLE 31, SECTION 4(A).

SUBSTANCE LISTED UNDER THE STATE OF PENNSYLVANIA WORKER AND COMMUNITY RIGHT TO KNOW ACT, P.L. 734, NO. 159.

SUBSTANCE LISTED UNDER THE STATE OF ILLINOIS TOXIC SUBSTANCES DISCLOSURE TO EMPLOYEES ACT, TITLE 56, CHAPTER I, SUBCHAPTER B, SECTION 205.

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INTERNATIONAL REGULATIONS

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THIS SUBSTANCE SUBJECT TO REQUIREMENTS OF CANADA'S WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS). THE REGULATIONS REQUIRE SUPPLIERS OF HAZARDOUS MATERIALS TO PROVIDE ADEQUATE LABELS AND MATERIAL SAFETY DATA SHEETS (MSDS'S) AS CONDITIONS OF SALE AND IMPORTATION. EMPLOYERS MUST PROVIDE LABELS, MSDS'S AND WORKER EDUCATION PROGRAMS IN THE WORKPLACE.
EFFECTIVE DATE: 10/31/88

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ADDITIONAL INFORMATION
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CERCLA PRIORITY GROUP III SUBSTANCE
53FR41280

THIS SUBSTANCE TESTED FOR CARCINOGENESIS BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

THIS SUBSTANCE TESTED FOR SUBCHRONIC TOXICITY BY THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR)

TECHNICAL REPORTS ON HOLD BY THE NATIONAL TOXICOLOGY PROGRAM (NTP).

CHEMICAL ASSIGNED TO LABORATORY FOR TOXICOLOGY STUDY BY THE NATIONAL TOXICOLOGY PROGRAM (NTP).

40CFR268 LAND DISPOSAL RESTRICTIONS

MEDICAL SURVEILLANCE REQUIRED
EKG RECOMMENDED IF EMPLOYEE TO WEAR FULL-FACE RESPIRATOR
GENERAL MEDICAL HISTORY
40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS
48FR38187 08/22/83
48FR39225 08/30/83 (EFFECTIVE DATE CORRECTION)
PHYSICIAN EXAMINATION
INDUSTRIAL EXPOSURE HISTORY
PRE-PLACEMENT AND ANNUAL EXAMS
MEDICAL WARNING FOR REFUSAL OF MEDICAL EXAMINATION

OSHA:
SKIN EXAM
LIVER FUNCTION
CARDIOVASCULAR DISEASE

OTHER MEDICAL SURVEILLANCE RECOMMENDED:

CENTRAL NERVOUS SYSTEM EXAMINATION
ACGIH BIOLOGICAL EXPOSURE INDICES FOR METHYL CHLOROFORM:
40 PPM METHYL CHLOROFORM IN END-EXHALED AIR / TIMING -- PRIOR TO LAST

SHIFT OF WORKWEEK

10 MG/L TRICHLOROACETIC ACID IN URINE / TIMING -- END OF WORKWEEK
30 MG/L TOTAL TRICHLOROETHANOL IN URINE / TIMING -- END OF SHIFT AT END OF WORKWEEK
1 MG/L TOTAL TRICHLOROETHANOL IN BLOOD / TIMING -- END OF SHIFT AT END OF WORKWEEK

CERTIFICATIONS

HEALTH STATUS CLASSIFICATION

NO FEDERAL AGENCY REQUIREMENT, BUT DUE TO HAZARDOUS NATURE OF SUBSTANCE, ADVISE FOLLOWING:

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS. CONTACT: CHARLES L. ELKINS, OFFICE OF TOXIC SUBSTANCES, EPA (202) 382-3813.

MEDICAL WARNING REQUIRED FOR MEDICAL EXAM REFUSAL SIGNED BY EMPLOYEE

SPECIAL DIAGNOSTIC TESTS

IF SYMPTOMS OF CENTRAL NERVOUS SYSTEM OCCUR, OBTAIN BLOOD GLUCOSE AND RECTAL TEMPERATURE. PERFORM COMPLETE NEUROLOGIC EXAMINATION AND ANY OTHER SPECIFIC NEUROLOGIC TESTS AS APPLICABLE
SERUM GLUTAMIC-PYRUVIC TRANSAMINASE (SGPT)
SERUM GLUTAMIC-OXALOACETIC TRANSAMINASE (SGOT)
INFRARED SPECTROSCOPY OR GAS CHROMATOGRAPHY TO TEST EXPIRED AIR.
URINARY UROBILINOGEN

LEAKS AND SPILL PROCEDURES

REPORTABLE QUANTITY (RQ) 1000 LB. (454 KG)
A REPORTABLE QUANTITY OF ONE THOUSAND POUNDS APPLIES TO THIS SUBSTANCE ESTABLISHED BY SECTIONS 101(14) AND 102(B) OR ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESOPNSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA). SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OF FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THAT SUBSTANCE IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER (800) 424-8802; IN THE WASHINGTON, D.C. METROPOLITAN AREA (202) 426-2675.
40CFR302

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DEPARTMENT OF TRANSPORTATION HAZARD CLASS
49CFR172.101 HAZARDOUS MATERIALS TABLE

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS
49CFR172.101 AND 49CFR172 SUBPART E:

NONE

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INTERNATIONAL MARITIME ORGANIZATION HAZARD CLASS
49CFR172.102 OPTIONAL HAZARDOUS MATERIALS TABLE

CLASS 6.1-POISONOUS (TOXIC) SUBSTANCE

INTERNATIONAL MARITIME ORGANIZATION LABELING SPECIFICATIONS FOR
DOMESTIC AND EXPORT SHIPMENTS
49CFR172.102

ST. ANDREWS CROSS

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FOLLOWING INFORMATION RECOMMENDED FOR THE EMERGENCY HANDLING OF
HAZARDOUS MATERIALS

IF MATERIAL ON FIRE OR INVOLVED IN FIRE:
* USE FLOODING QUANTITIES OF WATER TO COOL ALL AFFECTED CONTAINERS
* WATER SHOULD BE APPLIED FROM AS FAR A DISTANCE AS POSSIBLE
* USE SUITABLE AGENT FOR TYPE OF SURROUNDING FIRE TO EXTINGUISH FIRE (MATERIAL ITSELF DOES NOT BURN OR BURNS WITH DIFFICULTY)
* CONTAIN RUN-OFF WATER TO AVOID CONTAMINATION OF SEWERS AND WATER SOURCES

IF MATERIAL IS NOT ON FIRE AND IS NOT INVOLVED IN FIRE:
* DO NOT ALLOW MATERIAL TO CONTAMINATE WATER SOURCES AND SEWERS
* ATTEMPT TO STOP LEAK IF WITHOUT HAZARD
* CONTROL VAPORS WITH WATER SPRAY

PERSONNEL PROTECTION:
* AVOID BREATHING DUST/VAPORS/FUMES FROM MATERIAL
* WEAR FULL PROTECTIVE CLOTHING (FIREMANS GEAR INADEQUATE)
* WEAR SELF-CONTAINED BREATHING APPARATUS WHEN FIGHTING FIRES INVOLVING THIS MATERIAL
* WASH CONTAMINATED SKIN WITH COPIOUS AMOUNTS OF WATER OR SOAP AND WATER
* AVOID SKIN CONTACT WITH MATERIAL

LAND SPILL:
* DIG A HOLDING AREA SUCH AS A PIT, POND, OR LAGOON TO CONTAIN LIQUID OR SOLID MATERIAL
* DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE
* USE CEMENT POWDER OR FLY ASH TO ABSORB LIQUID MASS

WATER SPILL:
* LIMIT SPILL MOTION WITH NATURAL BARRIERS OR OIL SPILL CONTROL BOOMS
* USE NATURAL DEEP WATER POCKETS, EXCAVATED LAGOONS, OR SAND BAG BARRIERS TO TRAP MATERIAL AT BOTTOM

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FOLLWING INFORMATION FROM DEPARTMENT OF TRANSPORTATION/U.S. COAST GUARD "CHEMICAL RESPONSE INFORMATION SYSTEM", REGARDING WATER SPILLS:

* RESTRICT ACCESS OF GENERAL PUBLIC WHEN APPRECIABLE DANGER ARISES FROM SPILL
* CONTAIN SURFACE SLICKS
* PUMP SINKING LIQUID OR FINELY DIVIDED SOLIDS
* HIGHLY VOLATILE, AVOID INHALATION, VAPORS OR DUST ARE IRRITATING OR TOXIC
* HIGHLY CORROSIVE, AVOID DIRECT CONTACT, CONTACT WITH SKIN OR EYES CAN CAUSE IRRITATION OR BURNS
* BURNING NOT RECOMMENDED, FIRE DIFFICULT TO CONTROL AND/OR POISONOUS GAS IS FORMED

* U.S. COAST GUARD REQUIRES 24 HOUR ADVANCE NOTICE TO CAPTAIN OF THE PORT WHEN THIS SUBSTANCE IS SCHEDULED TO ARRIVE AT PORT WHEN TRANSPORTED IN BULK QUANTITY

LISTED BY U.S. COAST GUARD UNDER CARGO COMPATIBILITY GROUP HALOGENATED HYDROCARBONS, INCOMPATIBLE WITH CAUSTICS

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL LIQUID SPILLS, TAKE UP WITH SAND, EARTH OR OTHER ABSORBANT MATERIAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY.

WASTE

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OBSERVE ALL FEDERAL, STATE OR LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. CONTACT LOCAL AND/OR STATE ENVIRONMENTAL AUTHORITIES TO INSURE PROPER COMPLIANCE.

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THIS SUBSTANCE MEETS THE DEFINITION OF A HAZARDOUS WASTE AS DEFINED BY THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) (40CFR260) AND IS SUBJECT TO THE FOLLOWING CONSIDERATIONS:

40CFR260 HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

PROVIDES DEFINITIONS OF TERMS, GENERAL STANDARDS, AND OVERVIEW INFORMATION APPLICABLE TO 40CFR PARTS 260-265

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IDENTIFIES THOSE SOLID WASTES WHICH ARE SUBJECT TO REGULATION AS HAZARDOUS WASTES UNDER 40CFR PARTS 262-265, 270, 271, AND 124 AND WHICH ARE SUBJECT TO THE NOTIFICATION REQUIREMENTS OF SECTION 3010 OF THE

OF RCRA

40CFR261.33 DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUES, AND SPILL RESIDUES THEREOF
EPA HAZARDOUS WASTE NUMBER U226
1,1,1-TRICHLOROETHANE

40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K096
REPORTABLE QUANTITY (RQ) : 100 LBS.
A REPORTABLE QUANTITY OF 100 LBS. APPLIES TO THIS HAZARDOUS WASTE FROM SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.32. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (200) 426-2675.

40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K073
REPORTABLE QUANTITY (RQ) : 10 LBS.
A REPORTABLE QUANTITY OF 10 LBS. APPLIES TO THIS HAZARDOUS WASTE FROM SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.32. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K019
40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K020
40CFFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K028
40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K029
REPORTABLE QUANTITY (RQ) : 1 LB.
A REPORTABLE QUANTITY OF 1 LB. APPLIES TO THIS HAZARDOUS WASTE FROM SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.32. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OR A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR261.31 HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER F001
40CFR261.31 HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES

REPORTABLE QUANTITY (RQ) : 1000 LBS.
A REPORTABLE QUANTITY OR 1000 LBS. APPLIES TO THIS HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.31. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR261.31 HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER F024
REPORTABLE QUANTITY (RQ) : 1 LB.
A REPORTABLE QUANTITY OF 1 LB. APPLIES TO THIS HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.31. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR262 STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS FOR GENERATORS OF HAZARDOUS WASTE

40CFR263 STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS WHICH APPLY TO PERSONS TRANSPORTING HAZARDOUS WASTE WITHIN THE UNITED STATES IF THE TRANSPORTATION REQUIRES A MANIFEST UNDER 40CFR262

40CFR264 STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE

40CFR265 INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE DURING THE PERIOD OF INTERIM STATUS

40CFR267 INTERIM STANDARDS FOR OWNERS AND OPERATORS OF NEW HAZARDOUS WASTE LAND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS THAT DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE FOR NEW LAND DISPOSAL FACILITIES

40CFR270 EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

ESTABLISHES PROVISIONS FOR THE HAZARDOUS WASTE PERMIT PROGRAM UNDER SUBTITLE C OF THE SOLID WASTE DISPOSAL ACT, AS AMENDED BY THE RESOURCE CONSERVATION AND RECOVERY ACT

40CFR271 REQUIREMENT FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

SPECIFIES THE PROCEDURES EPA WILL FOLLOW IN APPROVING, REVISING, AND WITHDRAWING APPROVAL OF STATE PROGRAMS AND THE REQUIREMENTS STATE PROGRAMS MUST MEET TO BE APPROVED BY THE ADMINISTRATION UNDER SECTION 3006(B) OF RCRA

40CFR268 LAND DISPOSAL RESTRICTIONS

IDENTIFIES HAZARDOUS WASTES THAT ARE RESTRICTED FROM LAND DISPOSAL AND DEFINES THOSE LIMITED CIRCUMSTANCES UNDER WHICH AN OTHERWISE PROHIBITED WASTE MAY CONTINUE TO BE LAND DISPOSED.

THE ENVIRONMENTAL PROTECTION AGENCY HAS ISSUED A FINAL RULE PROMULGATING REGULATIONS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), AS AMENDED BY THE HAZARDOUS AND SOLID WASTES AMENDMENTS OF 1984, RESTRICTING LAND DISPOSAL OF CERTAIN "CALIFORNIA LIST" WASTES. HAZARDOUS WASTES CONTAINING HALOGENATED ORGANIC COMPOUNDS IN TOTAL CONCENTRATIONS GREATER THAN OR EQUAL TO 1000 MG/KG ARE PROHIBITED FROM LAND DISPOSAL.
EFFECTIVE DATE: 7/8/87
(52FR25760 7/8/87)

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 8/8/88
53FR30908 8/16/88

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 8/8/90
53FR30908 8/16/88

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 6/7/89
54FR25416 6/14/89

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 6/8/89
54FR26594 6/23/89

CAS NUMBER
71-55-6

REGISTRY TOXIC CHEMICALS NUMBER
KJ2975000

BULLETINS
EPA IS PUTTING CURRENT USERS OF METHYL CHLOROFORM ON NOTICE THAT A FREEZE AND/OR REDUCTION IN THE PRODUCTION AND CONSUMPTION OF THE SUBSTANCE IMPLEMENTED BY THE MONTREAL PROTOCOL MAY BE FORTHCOMING.
54FR15228 4/17/89

SPECIAL INFORMATION

HYDROGEN CHLORIDE).
TYPE WHAT INFORMATION YOU REQUIRE
/ALL/, SPECIFIC INFORMATION (BY 4-LETTER COMMAND, /HELP/, OR /NONE/.

1,1,1-TRICHLOROETHANE - NO MORE HITS IN DATABASE.

ENTER NAME, KEYWORD, SYMPTOM, STLA, NAMELIST, HELP, OR QUIT.

ENTER WHICH OHS SERVICE YOU WISH TO ACCESS:
> TO ACCESS HAZARDLINE, TYPE /HAZARD/
> TO ACCESS ENVIRONMENTAL HEALTH NEWS, TYPE /EHN/
> TO ACCESS MATERIAL SAFETY DATA SHEET, TYPE /MSDS/
> TO EXIT THE SYSTEM, TYPE /LOGOFF/
PRESS RETURN KEY AFTER ENTERING COMMAND.

LOGGED OFF LINE # 01 DATE = 07/02/90 TIME = 16-56-04
LOGOFF COMPLETED - G

UNSUPPORTED FUNCTION

UNSUPPORTED FUNCTION
** Inactivity Timeout - Disconnected. **

CHEMICAL NAME
METHYLENE CHLORIDE

FORMULA
CH2CL2

SYNONYMS
DICHLOROMETHANE
METHYLENE DICHLORIDE
NCI-C50102
SOLAESTHIN
R 30
UN 1593
METHANE, DICHLORO-
AEROTHENE MM
DCM
FREON 30
METHANE DICHLORIDE
METHYLENE BICHLORIDE
NARKOTIL
SOLMETHINE
RCRA U080
OHS14930

PERMISSIBLE EXPOSURE LIMIT
500 PPM OSHA TWA: 1000 PPM OSHA CEILING: 2000 PPM OSHA 5 MINUTE PEAK
50 PPM ACGIH TWA
ACGIH A2-SUSPECT HUMAN CARCINOGEN
LOWEST FEASIBLE LIMIT NIOSH RECOMMENDEC EXPOSURE CRITERIA
HUMAN INADEQUATE EVIDENCE FOR CARCINOGENICITY (IARC)
ANIMAL SUFFICIENT EVIDENCE FOR CARCINOGENICITY (IARC)
ANTICIPATED HUMAN CARCINOGEN (NTP)
PROBABLE HUMAN CARCINOGEN (EPA - CATEGORY B)
MUTAGENIC DATA (RTECS)
AQUATIC TOXICITY RATING 1/Z (TLM96 100 - 1000 PPM)
LC RANGE, 96H - PLAICE >120 PPM
CERCLA HAZARD RATINGS - TOXICITY 2 - IGNITABILITY 0 - REACTIVITY 1 - PERSISTENCE 2

TOXICOLOGY: ACUTE INHALATION OR INGESTION CAUSES MILD CENTRAL NERVOUS SYSTEM DEPRESSION. THE PRIMARY TOXIC EFFECT IS NARCOSIS. OTHER TOXIC EFFECTS ARE PULMONARY EDEMA, ENCEPHALOPATHY AND HEMOLYSIS. METHYLENE CHLORIDE IRRITATES THE EYES, SKIN AND RESPIRATORY TRACT. NO SYSTEMIC EFFECTS HAVE BEEN REPORTED IN HUMANS, ALTHOUGH EXCESSIVE CONCENTRATIONS HAVE CAUSED LIVER AND KIDNEY DAMAGE IN ANIMALS.
THE THRESHOLD LIMIT VALUE WAS ESTABLISHED TO PREVENT CARBOXYHEMOGLOBIN FORMATION.

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
POTENTIAL CARCINOGEN
NIOSH

PHYSICAL DESCRIPTION
COLORLESS, VOLATILE LIQUID; PENETRATING ETHER-LIKE ODOR.

CHEMICAL AND PHYSICAL PROPERTIES
MOLECULAR WEIGHT: 85
BOILING POINT AT 1 ATM, F: 104F
SOLUBILITY IN WATER, G/100 G WATER AT 20C: SLIGHT

VAPOR PRESSURE @ 20 C, MMHG: 350MM
MELTING POINT, F: -142F
UPPER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: UNAVAILABLE
LOWER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 12%
AUTOIGNITION TEMPERATURE: 1033 F
SPECIFIC GRAVITY: 1.335
VAPOR DENSITY (AIR=1): 2.9
ODOR THRESHOLD: 200 PPM

INCOMPATIBILITIES
STRONG OXIDIZERS
CAUSTICS
ACTIVE METALS
SODIUM
POTASSIUM
MAGNESIUM
ALUMINUM POWDER
NITRIC ACID
LITHIUM
METALS
POTASSIUM TERT-BUTOXIDE
SODIUM-POTASSIUM ALLOY
DINITROGEN PENTAOXIDE
DINITROGEN TETRAOXIDE

PERSONAL PROTECTIVE EQUIPMENT
FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT NECESSARY TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE. FACE SHIELDS SHALL COMPLY WITH 29CFR1910.133(A)(2), (A)(4), (A)(5), AND (A)(6).

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ACGIH "GUIDELINES FOR THE SELECTION OF CHEMICAL PROTECTIVE CLOTHING" INDICATED THE FOLLOWING PROTECTIVE RATINGS FOR MATERIALS COMMONLY USED FOR PROTECTIVE CLOTHING. THESE RATINGS ARE BASED PRIMARILY ON QUANTITATIVE TEST RESULTS AND QUALITATIVE RESISTENCE INFORMATION. (THE RECOMMENDATIONS APPLY TO THE PURE SUBSTANCE ONLY; BREAKTHROUGH-TIME MAY VARY FOR MIXTURES.) (A "+" DESIGNATES A BLEND OF MATERIAL, WHILE A "/" DESIGNATES A COATED OR LAMINATED MATERIAL.)

METHYLENE CHLORIDE:

EXCELLENT/GOOD:
NONE INDICATED

GOOD/FAIR:
VITON
NEOPRENE
SILVERSHIELD

POOR/FAIR:
CHLORINATED POLYETHYLENE
NITRILE+POLYVINYL CHLORIDE
TEFLON
POLYVINYL ALCOHOL
VITON
BUTYL NEOPRENE

POOR:

BUTYL RUBBER

NATURAL RUBBER
NEOPRENE
NITRILE
POLYETHYLENE
POLYVINYL CHLORIDE
NEOPRENE+NATURAL RUBBER
VITON/CHLOROBUTYL
NEOPRENE/NATURAL RUBBER

GOGGLES
FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

WASHING CHEMICALS FROM THE SKIN
FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT EMPLOYEES WHOSE SKIN BECOMES WET WITH THIS SUBSTANCE PROMPTLY WASH OR SHOWER WITH SOAP OR MILD DETERGENT AND WATER TO REMOVE ANY CONTAMINANT FROM THE SKIN.

ROUTINE CHANGING OF WORK CLOTHING
NOT REQUIRED

CLOTHING REMOVAL FOLLOWING ACCIDENTAL CONTAMINATION
FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT NON-IMPERVIOUS CLOTHING WHICH BECOMES WET WITH THIS SUBSTANCE BE REMOVED PROMPTLY AND NOT REWORN UNTIL THE SUBSTANCE IS REMOVED FROM THE CLOTHING.

SPECIFIC EMERGENCY PROVISIONS
NONE REQUIRED

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED)

ANY DETECTABLE CONC
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WITH AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN POSITIVE PRESSURE MODE

ESCAPE
- GAS MASK WITH AN ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER)
- APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS

FIREFIGHTING
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

ROUTE OF ENTRY INTO BODY
- INHALATION
- INGESTION
- SKIN OR EYE CONTACT

SYMPTOMS
- FATIGUE
- WEAKNESS
- SLEEPINESS
- LIGHTHEADEDNESS
- NUMBNESS EXTREMITIES
- HEADACHE
- EYE IRRITATION
- SKIN IRRITATION
- NAUSEA
- ANGINA
- CENTRAL NERVOUS SYSTEM DEPRESSION
- PERIPHERAL NEUROPATHY
- ERYTHEMA
- NARCOSIS
- ACIDOSIS
- HEMOLYSIS
- UNCONSCIOUSNESS
- RESPIRATORY EDEMA
- HEMATURIA
- ENCEPHALOPATHY
- INCOORDINATION
- PNEUMONIA
- COMATOSE
- HYPOTHERMIA
- LIVER DAMAGE IN EXPERIMENTAL ANIMALS
- KIDNEY DAMAGE IN EXPERIMENTAL ANIMALS

FIRST AID PROCEDURES FOLLOWING EXPOSURE

INHALATION OF METHYLENE CHLORIDE:

EMERGENCY TREATMENT - REMOVE FROM EXPOSURE. GIVE ARTIFICIAL RESPIRATION. REMOVE CONTAMINATED CLOTHING. DO NOT GIVE STIMULANTS.

FURTHER TREATMENT - TREAT PULMONARY EDEMA.
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

PULMONAY EDEMA - RELIEVE ANXIETY. GIVE MORPHINE SULFATE, 10 MG, TO DECREASE RATE OF RAPID, INEFFICIENT RESPIRATION. GIVE 40% OXYGEN BY FACE MASK. USE INTERMITTENT POSITIVE-PRESSURE OXYGEN RESUSCITATOR FOR SHORT PERIODS. GIVE AMINOPHYLLINE, 0.5 G, INTRAVENOUSLY, TO RELIEVE ASSOCIATED BRONCHIAL CONSTRICTION. TREAT EDEMA CAUSED BY MORPHINE OR MORPHINE ANALOGS BY GIVING NALOXONE AND OXYGEN.
GENERAL MEASURES - DIURESIS WITH ETHACRYNIC ACID (EDECRIN), 25 MG ORALLY OR INTRAVENOUSLY, OR FLUROSEMIDE, 20-80 MG ORALLY OR INTRAVENOUSLY, IS HELPFUL BECAUSE IT REDUCES FLUID VOLUME. DO NOT INJECT AT A RATE FASTER THAN 10 MG/MIN. GIVE CORTICOSTEROID ANTI-INFLAMMATORY AGENT IN MAXIMUM DOSES. IF PULMONARY EDEMA IS THE RESULT OF HEART FAILURE, DIGITALIZE THE PATIENT.
PROCEDURE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

IMMEDIATELY GIVE PERSON LARGE QUANTITIES OF WATER. AFTER WATER HAS BEEN SWALLOWED, TRY TO GET THE PERSON TO VOMIT BY HAVING HIM TOUCH THE BACK OF HIS THROAT WITH HIS FINGER. DO NOT MAKE AN UNCONSCIOUS PERSON VOMIT. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTED METHYLENE CHLORIDE:
EMERGENCY TREATMENT - REMOVE BY GASTRIC LAVAGE OR EMESIS USING ACTIVATED CHARCOAL.
FURTHER TREATMENT - TREAT HEMOLYTIC REACTION. GIVE HYDROCORTISON, 200 MG, EVERY FOUR HOURS.
SPECIAL TREATMENT - TREAT ASPIRATION PNEUMONIA WITH ANTIBIOTICS. GIVE BLOOD TRANSFUSIONS IF GASTROINTESTINAL HEMORRHAGE IS EXCESSIVE. TREAT ACIDOSIS AND PULMONARY EDEMA.
(MEDICATION MUST BE GIVEN BY QUALIFIED MEDICAL PERSONNEL)
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

GASTRIC LAVAGE - GIVE PATIENT GLASS OF WATER PRIOR TO PASSING OF STOMACH TUBE. LAY PATIENT ON ONE SIDE, WITH HEAD LOWER THAN WAIST. IMMOBILIZE A STRUGGLING PATIENT WITH A SHEET OR BLANKET. MEASURE DISTANCE ON TUBE FROM MOUTH TO EPIGASTRIUM, MARK TUBE WITH INDELIBLE MARKING OR TAPE. REMOVE DENTURES AND OTHER FOREIGN OBJECTS FROM THE MOUTH. OPEN MOUTH, USE GAG IF NECESSARY. EXTEND HEAD BY LIFTING CHIN. PASS TUBE OVER TONGUE AND TOWARD BACK OF THROAT WITHOUT EXTENDING HEAD OR NECK. IF OBSTRUCTION IS MET BEFORE THE MARK ON TUBE REACHES LEVELS OF THE TEETH, DO NOT FORCE, BUT REMOVE TUBE AND REPEAT PROCEDURE UNTIL TUBE PASSES TO MARK. PLACE END OF TUBE IN GLASS OF WATER. IF TUBE IS OBSTRUCTED WHEN INTRODUCED ABOUT HALFWAY TO THE MARK, IT MAY HAVE ENTERED TRACHEA.
AFTER TUBE IS PLACED IN STOMACH, ASPIRATE FIRST TO REMOVE STOMACH CONTENTS BY IRRIGATION SYRINGE. SAVE STOMACH CONTENTS FOR EXAMINATION, AND REPEAT INTRODUCTION AND WITHDRAWL OF 100-300 ML WARM WATER UNTIL AT LEAST 3 LITERS OF CLEAR RETURN ARE OBTAINED. USE ACTIVATED CHARCOAL AT BEGINNING OF LAVAGE TO AID IN POISON INACTIVATION. LEAVE 50 GRAMS OF CHARCOAL SUSPENDED IN WATER IN THE STOMACH. IF INTRODUCTION AND REMOVAL OF LAVAGE FLUID BY GRAVITY REQUIRES MORE THAN FIVE MINUTES, ASSIST WITH ASEPTO SYRINGE. PREVENT ASPIRATION WITH CUFFED ENDOTRACHEAL TUBE. AVOID GIVING LARGE QUANTITIES OF WATER.
IF PATIENT COMATOSE, INTUBATE TRACHEA WITH CUFFED ENDOTRACHEAL TUBE. SUCCINYLCHLORINE MAY BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL TO EASE INSERTION OF TRACHEAL CATHETER PRIOR TO PASSAGE OF STOMACH TUBE. PROCEDURE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

ACTIVATED CHARCOAL - GIVE ACTIVATED CHARCOAL WITHIN THE FIRST FEW MINUTES OF POISONING. GIVE PORTIONS EQUIVALENT TO ABOUT 5 ML FOR EACH KILOGRAM OF BODY WEIGHT, ORALLY OR BY GASTRIC LAVAGE. REMOVE BY SUCTION OR EMESIS, AND REPEAT THE PROCEDURE UNTIL A TOTAL OF 100 GM OF CHARCOAL HAS BEEN INTRODUCED AND RECOVERED. EACH GRAM OF ACTIVATED CHARCOAL WILL ADSORB 100-1000 MG OF POISON. DO NOT MIX CHARCOAL WITH OTHER AGENTS TO INCREASE PALATABILITY.
GASTRIC LAVAGE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

HEMOLYTIC REACTION - IN THE PRESENCE OF HEMOGLOBINURIA WITH NORMAL KIDNEY FUNCTION, MAINTAIN URINE OUTPUT AT 2-3 ML/KG/HOUR. FUROSEMIDE, 20-80 MG ORALLY OR INTRAVENOUSLY EVERY 4-8 HOURS, MAY BE HELPFUL. ALKALINIZE THE URINE BY GIVING SODIUM BICARBONATE, 1-2 MEQ/KG EVERY 12 HOURS. MONITOR CENTRAL VENOUS PRESSURE AND ELECTROLYTES. MANNITOL ADMINISTRATION HAS BEEN USED TO MAINTAIN URINE OUTPUT.

MAY PREVENT RENAL FAILURE.
IN THE PRESENCE OF METHEMOGLOBINEMIA WITH HEMOLYSIS, TREAT METHEMOGLOBINEMIA BY GIVING METHYLENE BLUE, 1 MG/KG.
PROCEDURE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

ACIDOSIS - MAINTAIN ADEQUATE AIRWAY; GIVE ARTIFICIAL RESPIRATION; TREAT ANURIA.
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

ACUTE RENAL FAILURE - TREAT SHOCK. FOR HEMOLYTIC REACTIONS, GIVE SODIUM BICARBONATE, 5 G EVERY 1-2 HOURS AS NECESSARY TO MAINTAIN AN ALKALINE URINE.GET MEDICAL ATTENTION IMMEDIATELY.
(MEDICATION MUST BE GIVEN BY QUALIFIED MEDICAL PERSONNEL)
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.)

PULMONAY EDEMA - RELIEVE ANXIETY. GIVE MORPHINE SULFATE, 10 MG, TO DECREASE RATE OF RAPID, INEFFICIENT RESPIRATION. GIVE 40% OXYGEN BY FACE MASK. USE INTERMITTENT POSITIVE-PRESSURE OXYGEN RESUSCITATOR FOR SHORT PERIODS. GIVE AMINOPHYLLINE, 0.5 G, INTRAVENOUSLY, TO RELIEVE ASSOCIATED BRONCHIAL CONSTRICTION. TREAT EDEMA CAUSED BY MORPHINE OR MORPHINE ANALOGS BY GIVING NALOXONE AND OXYGEN.
GENERAL MEASURES - DIURESIS WITH ETHACRYNIC ACID (EDECRIN), 25 MG ORALLY OR INTRAVENOUSLY, OR FLUROSEMIDE, 20-80 MG ORALLY OR INTRAVENOUSLY, IS HELPFUL BECAUSE IT REDUCES FLUID VOLUME. DO NOT INJECT AT A RATE FASTER THAN 10 MG/MIN. GIVE CORTICOSTEROID ANTI-INFLAMMATORY AGENT IN MAXIMUM DOSES. IF PULMONARY EDEMA IS THE RESULT OF HEART FAILURE, DIGITALIZE THE PATIENT.
PROCEDURE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

ORGANS
CENTRAL NERVOUS SYSTEM
CARDIOVASCULAR SYSTEM
SKIN
RESPIRATORY SYSTEM
EYES

STATUS OF REGULATORY ENFORCEMENT
OSHA STANDARD 29CFR1910.1200 HAZARD COMMUNICATION
REQUIRES CHEMICAL MANUFACTURERS AND IMPORTERS TO ASSESS THE HAZARDS OF CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS TO PROVIDE INFORMATION TO THEIR EMPLOYEES CONCERNING HAZARDOUS CHEMICALS BY MEANS OF A HAZARD COMMUNICATION PROGRAM, LABELS AND OTHER FORMS OF WARNING, MATERIAL SAFETY DATA SHEETS, AND INFORMATION AND TRAINING. REQUIRES DISTRIBUTORS TO TRANSMIT REQUIRED INFORMATION TO EMPLOYERS.
52FR31852 8/24/87

OSHA STANDARD 29CFR1910.1000 AIR CONTAMINANTS
TABLE Z-2

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND MEDICAL RECORDS

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

OSHA STANDARD 29CFR1910.133 EYE AND FACE PROTECTION

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY A SUBSTANCE OR MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECORDS.
48FR38178 08/22/83

SUBSTANCE LISTED TOXIC SUBSTANCES CONTROL ACT INVENTORY

SUBSTANCE LISTED AS TOXIC POLLUTANT UNDER CLEAN WATER ACT (CWA) SECTION 307(A)

40CFR116 DESIGNATION OF HAZARDOUS SUBSTANCE
DESIGNATED AS HAZARDOUS SUSBSTANCE IN ACCORDANCE WITH SECTION 311(B)(2)(A) OF THE CLEAN WATER ACT. INCLUDES ANY ISOMERS AND HYDRATES, AS WELL AS ANY SOLUTIONS AND MIXTURES CONTAINING THIS SUBSTANCE.

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTES

49CFR172.101 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN HAZARDOUS MATERIALS TABLES AS HAZARDOUS MATERIAL FOR THE PURPOSE OF TRANSPORTATION.

49CFR172.102 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN OPTIONAL HAZARDOUS MATERIALS TABLE WITH ALTERNATIVES TO CORRESPONDING REQUIREMENTS IN 49CFR172.101 FOR INTERNATIONAL SHIPMENTS AS AUTHORIZED BY 49CFR171.12.

TOXIC SUBSTANCE CONTROL ACT (TSCA) SECTION 8(E) INITIAL EVALUATION OF SUBSTANTIAL RISK SUBMITTED TO EPA

TECHNICAL ASSISTANCE DATA COMPLETED/PUBLISHED CLEAN WATER ACT (CWA) SECTION 311

TECHNICAL ASSISTANCE DATA COMPLETED/PUBLISHED FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT (FIFRA)

REGULATION PROMULGATED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR260

CONTROL TECHNOLOGY DEVELOPMENT COMPLETED/PUBLISHED CLEAN WATER ACT (CWA)

SUMMARY REVIEW COMPLETED/PUBLISHED TOXIC SUBSTANCES CONTROL ACT (TSCA)

PREREGULATORY ASSESSMENT IN DEVELOPMENT/PROGRESS SAFE DRINKING WATER ACT (SWDA)

SOURCE/EXPOSURE ASSESSMENT COMPLETED/PUBLISHED CLEAN AIR ACT (CAA)

ANALYTICAL METHODS DEVELOPMENT COMPLETED/PUBLISHED CLEAN AIR ACT (CAA)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.31 EPA HAZARDOUS WASTE NO. F001: SPENT HALOGENATED SOLVENTS USED IN DEGREASING AND STILL BOTTOMS FROM THE RECOVERY OF SPENT SOLVENTS AND SPENT SOLVENT MIXTURES. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.31 EPA HAZARDOUS WASTE NO. F002: SPENT HALOGENATED SOLVENT AND STILL BOTTOMS FROM RECOVERY OF THIS SPENT SOLVENT OR SOLVENT MIXTURE. (T)

WATER QUALITY CRITERIA COMPLETED/PUBLISHED CLEAN WATER ACT (CWA) SECTION 304(A) 45CFR231

WATER QUALITY CRITERIA DOCUMENT COMPLETED/PUBLISHED CLEAN WATER ACT (CWA) SECTION 304(A)

REGULATION IN DEVELOPMENT/PROGRESS COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) SECTION 101

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K009: DISTILLATION BOTTOMS FROM THE PRODUCTION OF ACETALDEHYDE FROM ETHYLENE. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K010: DISTILLATION SIDE CUTS FROM THE PRODUCTION OF ACETALDEHYDE FROM ETHYLENE. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.31 EPA HAZARDOUS WASTE NO. F024: WASTES, INCLUDING BUT NOT LIMITED TO, DISTILLATION RESIDUES, HEAVY ENDS, TARS, AND REACTOR CLEAN-OUT WASTES FROM THE PRODUCTION OF CHLORINATED ALIPHATIC HYDROCARBONS, HAVING CARBON CONTENT FROM 1-5, UTILIZING FREE RADICAL CATALYZED PROCESSES. (THIS LISTING DOES NOT INCLUDE LIGHT ENDS, SPENT FILTERS AND FILTER AIDS, SPENT DESSICANTS, WASTEWATER, WASTEWATER TREATMENT SLUDGES, SPENT CATALYSTS, AND WASTES LISTED IN 40CFR261.32). (T)

15CFR399.2, SUPPLEMENT 1 - COMMODITY INTERPRETATION 24: CHEMICALS VALIDATED LICENSE REQUIRED FOR EXPORT TO LIBIA, NORTH KOREA, VIETNAM, KAMPUCHEA, OR CUBA

EPA HAS PROPOSED THAT MANUFACTURERS AND PROCESSORS OF DICHLOROMETHANE TEST THE CHEMICAL FOR HEALTH AND ENVIRONMENTAL EFFECTS 46FR30300 06/05/81

40CFR122, APPENDIX D - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION TESTING REQUIREMENTS
TABLE II - ORGANIC TOXIC POLLUTANTS IN EACH OF FOUR FRACTIONS IN ANALYSIS BY GAS CHROMATOGRAPHY/MASS SPECTROSCOPY (GS/MS)
48FR14153 04/01/83

40CFR372 SARA TITLE III SECTION 313 TOXIC CHEMICAL RELEASE REPORTING: COMMUNITY RIGHT-TO-KNOW

ALL COMMUNITY AND NON-TRANSIENT, NON-COMMUNITY WATER SYSTEMS SHALL MONITOR THE LEVEL OF CONTAMINATION BY THIS SUBSTANCE.

POPULATION SERVED:	MONITORING MUST BEGIN BY:
>10,000	JANUARY 1, 1988
3300-10,000	JANUARY 1, 1989
<3300	JANUARY 1, 1991

52FR25715 7/8/87

THE ENVIRONMENTAL PROTECTION AGENCY HAS ISSUED A FINAL RULE PROMULGATING REGULATIONS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), AS AMENDED BY THE HAZARDOUS AND SOLID WASTES AMENDMENTS OF 1984, RESTRICTING LAND DISPOSAL OF CERTAIN "CALIFORNIA LIST" WASTES. HAZARDOUS WASTES CONTAINING HALOGENATED ORGANIC COMPOUNDS IN TOTAL CONCENTRATIONS GREATER THAN OR EQUAL TO 1000 MG/KG ARE PROHIBITED FROM LAND DISPOSAL.
EFFECTIVE DATE: 7/8/87
(52FR25760 7/8/87)

SUBSTANCE LISTED BY THE NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW ACT, P.L. 1983, CHAPTER 315, N.J.S.A. 34: A-1. EMPLOYERS COVERED: SIC CODES 20-39, 46-49, 51, 75, 76, 80, 82, AND 84.

THE CONSUMER PRODUCT SAFETY COMMISSION HAS ISSUED A STATEMENT OF INTERPRETATION AND ENFORCEMENT POLICY REGARDING LABELING REQUIREMENTS FOR THE FOLLOWING CLASSES OF HOUSEHOLD PRODUCTS WHICH CONTAIN METHYLENE CHLORIDE. THESE PRODUCTS MAY EXPOSE CONSUMERS TO SIGNIFICANT AMOUNTS OF METHYLENE CHLORIDE VAPOR, A LIKELY HUMAN CARCINOGEN, AND ARE THUS CONSIDERED HAZARDOUS SUBSTANCES.

(1). PAINT STRIPPERS
(2). ADHESIVE REMOVERS
(3). SPRAY SHOE POLISH
(4). ADHESIVES AND GLUES
(5). PAINT THINNERS
(6). GLASS FROSTING AND ARTIFICIAL SNOW
(7). WATER REPELLANTS
(8). WOOD STAINS AND VARNISHES
(9). SPRAY PAINTS
(10). CLEANING FLUIDS AND DEGREASERS
(11). AEROSOL SPRAY PAINT FOR AUTOMOBILES
(12). AUTOMOBILE SPRAY PRIMERS
(13). PRODUCTS SOLD AS METHYLENE CHLORIDE

SUBSTANCE LISTED UNDER THE STATE OF FLORIDA TOXIC SUBSTANCES IN THE WORKPLACE RIGHT TO KNOW LAW, CHAPTER 442 OF THE FLORIDA STATUTES.

SUBSTANCE LISTED UNDER THE STATE OF WEST VIRGINIA DIRECTOR OF HEALTH LEGISLATIVE RULES FOR HAZARDOUS SUBSTANCES, CHAPTER16, ARTICLE 31, SECTION 4(A).

SUBSTANCE LISTED UNDER THE STATE OF PENNSYLVANIA WORKER AND COMMUNITY RIGHT TO KNOW ACT, P.L. 734, NO. 159.

SUBSTANCE LISTED UNDER THE STATE OF ILLINOIS TOXIC SUBSTANCES DISCLOSURE TO EMPLOYEES ACT, TITLE 56, CHAPTER I, SUBCHAPTER B, SECTION 205.

THIS SUBSTANCE TESTED FOR MUTAGENESIS/GENETIC TOXICITY BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

40CFR712 THIS SUBSTANCE IDENTIFIED IN THE PRELIMINARY ASSESSMENT INFORMATION RULE (PAIR). MANUFACTURERS AND IMPORTERS WHO PRODUCE THIS SUBSTANCE ARE REQUIRED TO SUBMIT PRODUCTION VOLUME, END USE AND EXPOSURE

TWO YEAR STUDIES: QUALITY ASSESSMENT IN PROGRESS BY THE NATIONAL TOXICOLOGY PROGRAM (NTP).

SUBJECT TO ENVIRONMENTAL PROTECTION AGENCY (EPA) RULE ON FIRST THIRD WASTES LAND DISPOSAL RESTRICTIONS.
EFFECTIVE DATE: 8/8/88
53FR31138 8/17/88
40CFR268.33

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K086: SOLVENT WASHES AND SLUDGES, CAUSTIC WASHES AND SLUDGES, OR WATER WASHES AND SLUDGES FROM CLEANING TUBS AND EQUIPMENT USED IN THE FORMULATON OF INK FROM PIGMENTS, DRIERS, SOAPS, AND STABILIZERS CONTAINING CHROMIUM AND LEAD.(T)

SUBJECT TO ENVIRONMENTAL PROTECTION AGENCY (EPA) RULE PROHIBITING UNDERGROUND INJECTION OF SPENT SOLVENT WASTE UNLESS THE SOLVENT WASTE IS A SOLVENT-WATER MIXTURE OR SOLVENT-CONTAINING SLUDGE CONTAINING <1% OF TOTAL HAZARDOUS WASTES NUMBERS F001-F005.
EFFECTIVE DATE: 8/8/88
ALL SPENT WASTES NUMBERS F001-F005 CONTAINING <1% TOTAL F001-F005 SOLVENT CONSTITUENTS ARE PROHIBITED FROM UNDERGROUND INJECTION.
EFFECTIVE DATE: 8/8/90
53FR30908
40CFR148.10

SUBJECT TO ENVIRONMENTAL PROTECTION AGENCY (EPA) RULE PROHIBITING UNDERGROUND INJECTION OF HALOGENATED ORGANIC COMPOUNDS AT CONCENTRATIONS GREATER THAN OR EQUAL TO 10,000 MG/KG.
EFFECTIVE DATE: 8/8/88
53FR30908 8/16/88
40CFR148.12

UNDER THE CALIFORNIA AIR TOXICS HOT SPOTS INFORMATION AND ASSESSMENT ACT OF 1987, OPERATORS OF FACILITIES WHICH RELEASE, OR HAVE THE POTENTIAL TO RELEASE, SPECIFIED QUANTITIES OF THIS SUBSTANCE MUST SUBMIT TO THE APPROPRIATE LOCAL AIR POLLUTION CONTROL DISTRICTS, OR AIR QUALITY MANAGEMENT DISTRICTS, COMPREHENSIVE EMISSIONS INVENTORY PLANS AND HEALTH RISK ASSESSMENTS ADOPTED BY THE CALIFORNIA AIR RESOURCES BOARD (ARB).
EFFECTIVE DATE: 1/1/88
AB 2588, CHAPTER 1252

THIS SUBSTANCE LISTED IN CALIFORNIA AS A CARCINOGEN UNDER PROPOSITION 65, THE SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986. REGULATION REQUIRES EMPLOYERS BEGINNING APRIL 1, 1989, TO WARN WORKERS, CONSUMERS AND THE PUBLIC WHEN THEY ARE EXPOSED TO THIS CHEMICAL AT A LEVEL DEEMED BY THE STATE TO POSE A SIGNIFICANT RISK. WARNING METHODS MAY INCLUDE PRODUCT OR SHELF LABELS, SIGNS OR MEDIA ANNOUNCEMENTS. BEGINNING DECEMBER 1, 1989, THIS CHEMICAL CANNOT BE DISCHARGED OR RELEASED INTO ANY KNOWN SOURCE OF DRINKING WATER.

THIS SUBSTANCE SUBJECT TO REQUIREMENTS OF CANADA'S WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS). THE REGULATIONS REQUIRE SUPPLIERS OF HAZARDOUS MATERIALS TO PROVIDE ADEQUATE LABELS AND MATERIAL SAFETY DATA SHEETS (MSDS'S) AS CONDITIONS OF SALE AND IMPORTATION. EMPLOYERS

WORKPLACE.
EFFECTIVE DATE: 10/31/88

CERCLA PRIORITY GROUP I SUBSTANCE
53FR41280

40CFR716 THIS SUBSTANCE LISTED IN THE HEALTH AND SAFETY DATA REPORTING RULE UNDER SECTION 8(D) OF THE TOXIC SUBSTANCES CONTROL ACT (TSCA) REQUIRING PAST, CURRENT AND PROSPECTIVE MANUFACTURERS, IMPORTERS AND PROCESSORS TO SUBMIT TO EPA COPIES AND LISTS OF UNPUBLISHED HEALTH AND SAFETY STUDIES ON THE LISTED CHEMICALS THAT THEY MANUFACTURE, IMPORT OR PROCESS.

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) - TABLE 2-14
DANGEROUS GOODS LIST; THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING AND OTHER REQUIREMENTS.
DESIGNATED AS A DANGEROUS GOOD FOR THE PURPOSE OF AIR TRANSPORATION.

THIS SUBSTANCE TESTED FOR BIOCHEMICAL/CELLULAR/TISSUE EFFECTS BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA)

THIS SUBSTANCE TESTED FOR CARCINOGENESIS BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

40CFR370 SARA TITLE III SECTION 311 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART B - REPORTING REQUIREMENTS

40CFR370 SARA TITLE III SECTION 312 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART D - INVENTORY FORMS

40CFR60.488 SUBSTANCE LISTED AS CHEMICAL PRODUCED BY AFFECTED FACILITIES UNDER THE CLEAN AIR ACT (CAA) SECTION 111.

40CFR148 SUBJECT TO EPA RULE PROHIBITING UNDERGROUND INJECTION OF THIS HAZARDOUS WASTE.
EFFECTIVE DATE: 6/8/89
54FR26594 6/23/89

40CFR268 SUBJECT TO EPA LAND DISPOSAL RESTRICTIONS
EFFECTIVE DATE: 6/8/89
53FR26594 6/23/89

40CFR268 SUBJECT TO EPA LAND DISPOSAL RESTRICTIONS EXCEPT WHEN INJECTED UNDERGROUND.
EFFECTIVE DATE: 6/8/89
54FR26594 6/23/89

40CFR148 SUBJECT TO EPA RULE PROHIBITING UNDERGROUND INJECTION OF THIS HAZARDOUS WASTE.
EFFECTIVE DATE: 6/8/91
54FR26594 6/23/89

LIST "C" CHEMICAL
FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) REGISTERED ACTIVE INGREDIENT WHICH MUST BE REREGISTERED IN ACCORDANCE WITH NEW STANDARDS FOR REGISTRATION.
54FR30847 7/24/89

29CFR1910.1450 SUBJECT TO OSHA STANDARD REGULATING OCCUPATIONAL EXPOSURE TO HAZARDOUS CHEMICALS IN LABORATORIES.
EFFECTIVE DATE: 5/1/90
55FR3300 1/31/90

33CFR160.211 AND 213 U.S. COAST GUARD REQUIRES 24 HOURS ADVANCE NOTICE TO CAPTAIN OF THE PORT WHEN THIS SUBSTANCE IS SCHEDULED TO ARRIVE AT OR DEPART FROM PORT.

46CFR151.01-10(B) CARGOES REGULATED BY THE COAST GUARD UNDER SUBCHAPTER O - CERTAIN BULK DANGEROUS CARGOES

THIS SUBSTANCE TESTED FOR MUTAGENESIS/GENETIC TOXICITY BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA)

THIS SUBSTANCE TESTED FOR SYSTEMIC/ORGAN TOXICITY BY THE ENVIRNMENTAL PROTECTION AGENCY (EPA)

40CFR61.01(B) NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS SUBPART A - GENERAL PROVISIONS

40CFR268 LAND DISPOSAL RESTRICTIONS

MEDICAL SURVEILLANCE REQUIRED
EKG RECOMMENDED IF EMPLOYEE TO WEAR FULL-FACE RESPIRATOR
GENERAL MEDICAL HISTORY
40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS
48FR38187 08/22/83
48FR39225 08/30/83 (EFFECTIVE DATE CORRECTION)
PHYSICIAN EXAMINATION
INDUSTRIAL EXPOSURE HISTORY
PRE-PLACEMENT AND ANNUAL EXAMS
MEDICAL WARNING FOR REFUSAL OF MEDICAL EXAMINATION
RESPIRATORY HISTORY
COMPLETE BLOOD COUNT
BLOOD CHEMISTRY
14 BY 17 CHEST P.A. X-RAY
URINALYSIS
VISION TEST
SPECIAL ATTENTION TO SKIN
LIVER FUNCTION
KIDNEY FUNCTION
CARDIOVASCULAR DISEASE
DIFFERENTIAL BLOOD CELL MORPHOLOGY
CARBOXYHEMOGLOBIN DETERMINATION WHEN EXPOSED
CENTRAL NERVOUS SYSTEM EXAMINATION
PULMONARY FUNCTIONS
CHRONIC RESPIRATORY DISEASE
COMPLETE BLOOD COUNT
RENAL AND LIVER FUNCTIONS
MEDICAL WARNING FOR REFUSAL OF MEDICAL EXAMINATION

CERTIFICATIONS

HEALTH STATUS CLASSIFICATION

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

NUCLEAR REG. 0041

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS. CONTACT: CHARLES L. ELKINS, OFFICE OF TOXIC SUBSTANCES, EPA (202) 382-3813.

MEDICAL WARNING REQUIRED FOR MEDICAL EXAM REFUSAL SIGNED BY EMPLOYEE

SPECIAL DIAGNOSTIC TESTS

BLOOD CHEMISTRY

IF SYMPTOMS OF CENTRAL NERVOUS SYSTEM OCCUR, OBTAIN BLOOD GLUCOSE AND RECTAL TEMPERATURE. PERFORM COMPLETE NEUROLOGIC EXAMINATION AND ANY OTHER SPECIFIC NEUROLOGIC TESTS AS APPLICABLE

URINE HEMOGLOBIN

PLASMA BICARBONATE

BLOOD LACTIC ACID

LEAKS AND SPILL PROCEDURES

REPORTABLE QUANTITY (RQ) 1000 LB. (454 KG)

A REPORTABLE QUANTITY OF ONE THOUSAND POUNDS APPLIES TO THIS SUBSTANCE ESTABLISHED BY SECTIONS 101(14) AND 102(B) OR ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESOPNSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA). SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OF FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THAT SUBSTANCE IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER (800) 424-8802; IN THE WASHINGTON, D.C. METROPOLITAN AREA (202) 426-2675.

40CFR302

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DEPARTMENT OF TRANSPORTATION HAZARD CLASS
49CFR172.101 HAZARDOUS MATERIALS TABLE

ORM-A

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS
49CFR172.101 AND 49CFR172 SUBPART E:

NONE

INTERNATIONAL MARITIME ORGANIZATION HAZARD CLASS
49CFR172.102 OPTIONAL HAZARDOUS MATERIALS TABLE

CLASS 6.1-POISONOUS (TOXIC) SUBSTANCE

INTERNATIONAL MARITIME ORGANIZATION LABELING SPECIFICATIONS FOR
DOMESTIC AND EXPORT SHIPMENTS
49CFR172.102

ST. ANDREWS CROSS

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FOLLOWING INFORMATION RECOMMENDED FOR THE EMERGENCY HANDLING OF
HAZARDOUS MATERIALS

IF MATERIAL ON FIRE OR INVOLVED IN FIRE:
* USE SUITABLE AGENT FOR TYPE OF SURROUNDING FIRE TO EXTINGUISH FIRE (MATERIAL ITSELF DOES NOT BURN OR BURNS WITH DIFFICULTY)
* APPLY FLOODING QUANTITIES OF WATER AS FOG
* USE ALCOHOL FOAM OR CO2 OR DRY CHEMICAL EXTINGUISHERS

IF MATERIAL IS NOT ON FIRE AND IS NOT INVOLVED IN FIRE:
* KEEP AWAY FROM SPARKS, FLAMES AND OTHER SOURCES OF IGNITION
* DO NOT ALLOW MATERIAL TO CONTAMINATE WATER SOURCES AND SEWERS

PERSONNEL PROTECTION:
* AVOID BREATHING DUST/VAPORS/FUMES FROM MATERIAL
* KEEP UPWIND
* AVOID SKIN CONTACT WITH MATERIAL
* WEAR BOOTS, PROTECTIVE GLOVES AND GAS TIGHT GOGGLES
* DO NOT HANDLE BROKEN PACKAGES WITHOUT PROTECTIVE EQUIPMENT
* WASH CONTAMINATED SKIN WITH COPIOUS AMOUNTS OF WATER OR SOAP AND WATER
* WEAR SELF-CONTAINED BREATHING APPARATUS WHEN FIGHTING FIRES INVOLVING THIS MATERIAL
* IF CONTACT WITH MATERIAL ANTICIPATED, WEAR FULL PROTECTIVE CLOTHING

THIS SUBSTANCE LISTED IN CALIFORNIA AS A CARCINOGEN UNDER PROPOSITION 65, THE SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986. LISTED CHEMICALS CANNOT BE DISCHARGED OR RELEASED INTO WATER OR ONTO OR INTO LAND WHERE THERE IS ANY POSSIBILITY OF PASSING INTO ANY SOURCE OF DRINKING WATER.

WASTE

****

OBSERVE ALL FEDERAL, STATE OR LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. CONTACT LOCAL AND/OR STATE ENVIRONMENTAL AUTHORITIES TO INSURE PROPER COMPLIANCE.

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EPA HAZARDOUS WASTE NUMBER U080
DICHLOROMETHANE

THIS SUBSTANCE MEETS THE DEFINITION OF A HAZARDOUS WASTE AS DEFINED BY THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) (40CFR260) AND IS SUBJECT TO THE FOLLOWING CONSIDERATIONS:

40CFR260 HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

PROVIDES DEFINITIONS OF TERMS, GENERAL STANDARDS, AND OVERVIEW INFORMATION APPLICABLE TO 40CFR PARTS 260-265

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IDENTIFIES THOSE SOLID WASTES WHICH ARE SUBJECT TO REGULATION AS HAZARDOUS WASTES UNDER 40CFR PARTS 262-265, 270, 271, AND 124 AND WHICH ARE SUBJECT TO THE NOTIFICATION REQUIREMENTS OF SECTION 3010 OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND IDENTIFIES ONLY SOME OF THE MATERIALS WHICH ARE HAZARDOUS WASTES UNDER SECTIONS 3007 AND 7003 OF RCRA

THIS COMPOUND, DEPENDING ON THE CHARACTERISTIC, CONCENTRATION
AND/OR SOURCE OF THE WASTE, MAY BE REGULATED UNDER THE FOLLOW-
ING WASTE NUMBER(S) AND, IN TURN, SUBJECT TO THE CORRESPONDING
REPORTABLE QUANTITY (RQ) (IF APPLICABLE):
40CFR261.31 HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER F001
40CFR261.31 HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER F002
REPORTABLE QUANTITY (RQ) : 10 LBS.
A REPORTABLE QUANTITY OF 10 LBS. APPLIES TO THIS HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.31. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K009
40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K010
REPORTABLE QUANTITY (RQ) : 10 LBS.
A REPORTABLE QUANTITY OF 10 LBS. APPLIES TO THIS HAZARDOUS WASTE FROM SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.32. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR262 STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

40CFR263 STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS WHICH APPLY TO PERSONS TRANSPORTING HAZARDOUS WASTE WITHIN THE UNITED STATES IF THE TRANSPORTATION REQUIRES A MANIFEST UNDER 40CFR262

40CFR264 STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE

40CFR265 INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE DURING THE PERIOD OF INTERIM STATUS

40CFR267 INTERIM STANDARDS FOR OWNERS AND OPERATORS OF NEW HAZARDOUS WASTE LAND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS THAT DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE FOR NEW LAND DISPOSAL FACILITIES

40CFR270 EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

ESTABLISHES PROVISIONS FOR THE HAZARDOUS WASTE PERMIT PROGRAM UNDER SUBTITLE C OF THE SOLID WASTE DISPOSAL ACT, AS AMENDED BY THE RESOURCE CONSERVATION AND RECOVERY ACT

40CFR271 REQUIREMENT FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

SPECIFIES THE PROCEDURES EPA WILL FOLLOW IN APPROVING, REVISING, AND WITHDRAWING APPROVAL OF STATE PROGRAMS AND THE REQUIREMENTS STATE PROGRAMS MUST MEET TO BE APPROVED BY THE ADMINISTRATION UNDER SECTION 3006(B) OF RCRA

40CFR268 LAND DISPOSAL RESTRICTIONS

IDENTIFIES HAZARDOUS WASTES THAT ARE RESTRICTED FROM LAND DISPOSAL AND DEFINES THOSE LIMITED CIRCUMSTANCES UNDER WHICH AN OTHERWISE PROHIBITED WASTE MAY CONTINUE TO BE LAND DISPOSED.

THE ENVIRONMENTAL PROTECTION AGENCY HAS ISSUED A FINAL RULE PROMULGATING REGULATIONS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), AS AMENDED BY THE HAZARDOUS AND SOLID WASTES AMENDMENTS OF 1984, RESTRICTING LAND DISPOSAL OF CERTAIN "CALIFORNIA LIST" WASTES. HAZARDOUS WASTES CONTAINING HALOGENATED ORGANIC COMPOUNDS IN TOTAL CONCENTRATIONS

EFFECTIVE DATE: 7/8/87
(52FR25760 7/8/87)

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 8/8/88
53FR30908 8/16/88

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 8/8/90
53FR30908 8/16/88

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 6/8/89
54FR26594 6/23/89

CAS NUMBER
75-09-2

REGISTRY TOXIC CHEMICALS NUMBER
PA8050000

BULLETINS

SPECIAL INFORMATION
TYPE WHAT INFORMATION YOU REQUIRE
/ALL/, SPECIFIC INFORMATION (BY 4-LETTER COMMAND, /HELP/, OR /NONE/.

METHYLENE CHLORIDE - NO MORE HITS IN DATABASE.

ENTER NAME, KEYWORD, SYMPTOM, STLA, NAMELIST, HELP, OR QUIT.

ENTER WHICH OHS SERVICE YOU WISH TO ACCESS:
> TO ACCESS HAZARDLINE, TYPE /HAZARD/
> TO ACCESS ENVIRONMENTAL HEALTH NEWS, TYPE /EHN/
> TO ACCESS MATERIAL SAFETY DATA SHEET, TYPE /MSDS/
> TO EXIT THE SYSTEM, TYPE /LOGOFF/
PRESS RETURN KEY AFTER ENTERING COMMAND.

LOGGED OFF LINE # 01 DATE = 07/02/90 TIME = 16-13-19
** Inactivity Timeout - Disconnected. **
** Connect Pending, Please Wait... (or Hit <Return> Key to Abort.) **
CONNECTED TO HAZARDLINE 07/02/90 16:15:24
ENTER)LOGON COMMAND AND** Inactivity Timeout - Disconnected. **

VINYLIDENE CHLORIDE

FORMULA
C2H2CL2

SYNONYMS
1,1-DICHLOROETHYLENE
1,1-DCE
SCONATEX
VDC
NCI-C54262
VINYLIDINE CHLORIDE
UN 1303
1,1-DICHLOROETHENE
ETHYLENE, 1,1-DICHLORO-
ETHENE, 1,1-DICHLORO-
VINYLIDENE CHLORIDE(II)
RCRA U078
OHS25070

PERMISSIBLE EXPOSURE LIMIT
1 PPM OSHA TWA
5 PPM ACGIH TWA; 20 PPM ACGIH STEL
HUMAN INADEQUATE EVIDENCE FOR CARCINOGENICITY (IARC)
ANIMAL LIMITED EVIDENCE FOR CARCINOGENICITY (IARC)
POSSIBLE HUMAN CARCINOGEN (EPA - CATEGORY C)
REPRODUCTIVE EFFECTS DATA (RTEC)
MUTAGENIC DATA (RTEC)
AQUATIC TOXICITY RATING 1/Z (TLM96 100 - 1000 PPM)
NO DATA LOCATED - RATED BY THE NATIONAL ACADEMY OF SCIENCES
CERCLA HAZARD RATINGS - TOXICITY 3 - IGNITABILITY 3 - REACTIVITY 2 -
PERSISTANCE 1

TOXICOLOGY: VINYLIDINE CHLORIDE IS A TOXIC EYE, SKIN, AND MUCOUS MEMBRANE IRRITANT, CENTRAL NERVOUS SYSTEM DEPRESSANT, NEPHROTOXIN, AND HEPATOXIN.

INGESTION OR INHALATION CAUSES COUGHING, DIZZINESS, DROWSINESS, AND UNCONSCIOUSNESS. ALCOHOLIC BEVERAGES ENHANCE THE TOXIC EFFECTS.

VINYLIDENE CHLORIDE PRODUCES MALIGNANT TUMORS IN MICE AND RATS, SOME OF WHICH ARE SIMILAR TO THOSE PRODUCED BY VINYL CHLORIDE.

THE THRESHOLD LIMIT VALUE IS BELIEVED LOW ENOUGH TO PREVENT OVERT TOXICITY IN EXPOSED WORKERS.

IHL-HMN TCLO: 25 PPM
IHL-RAT LCLO:10000 PPM/24 HR
IHL-MUS LC50: 98 PPM/22 HR
ORL-RAT LD50: 200 MG/KG
ORL-DOG LDLO: 5750 MG/KG
IVN-DOG LDLO: 225 MG/KG
SCU-RBT LDLO: 3700 MG/KG

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
NONE SPECIFIED

PHYSICAL DESCRIPTION
COLORLESS LIQUID. MILD, SWEET ODOR RESEMBLING THAT OF CHLOROFORM.

CHEMICAL AND PHYSICAL PROPERTIES
MOLECULAR WEIGHT: 97
BOILING POINT AT 1 ATM, F: 89 F

FLASH POINT, CLOSED CUP, F (OR OPEN CUP IF OC): 3 F
VAPOR PRESSURE @ 20 C, MMHG: 591 MM @ 25 C
MELTING POINT, F: -188 F
UPPER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 16.0%
LOWER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 7.3%
AUTOIGNITION TEMPERATURE: 1058 F
VAPOR DENSITY (AIR=1): 3.4

INCOMPATIBILITIES
STRONG OXIDIZERS
STRONG ACIDS
STRONG BASES

PERSONAL PROTECTIVE EQUIPMENT
EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT NECESSARY TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE. FACE SHIELDS SHALL COMPLY WITH 29CFR1910.133(A)(2), (A)(4), (A)(5), AND (A)(6).

EMPLOYERS SHALL ENSURE THAT CLOTHING WET WITH THIS SUBSTANCE IS PLACED IN CLOSED CONTAINERS FOR STORAGE UNTIL IT CAN BE DISCARDED OR UNTIL THE EMPLOYER PROVIDES FOR THE REMOVAL OF THE CONTAMINANT FROM THE CLOTHING. IF THE CLOTHING IS TO BE LAUNDERED OR OTHERWISE CLEANED TO REMOVE THE CONTAMINANT, THE EMPLOYER SHALL INFORM THE PERSON PERFORMING THE CLEANING OPERATION OF THE HAZARDOUS PROPERTIES OF THE SUBSTANCE.

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ACGIH "GUIDELINES FOR THE SELECTION OF CHEMICAL PROTECTIVE CLOTHING" INDICATED THE FOLLOWING PROTECTIVE RATINGS FOR MATERIALS COMMONLY USED FOR PROTECTIVE CLOTHING. THESE RATINGS ARE BASED PRIMARILY ON QUANTITATIVE TEST RESULTS AND QUALITATIVE RESISTENCE INFORMATION. (THE RECOMMENDATIONS APPLY TO THE PURE SUBSTANCE ONLY; BREAKTHROUGH-TIME MAY VARY FOR MIXTURES.) (A "+" DESIGNATES A BLEND OF MATERIAL, WHILE A "/" DESIGNATES A COATED OR LAMINATED MATERIAL.)
VINYLIDENE CHLORIDE:
EXCELLENT/GOOD:
NONE INDICATED

FAIR/GOOD:
CHLORINATED POLYETHYLENE

GOGGLES
EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE SPLASH-PROOF SAFETY GOGGLES WHICH COMPLY WITH 29CFR1910.133(A)(2)-(A)(6) WHERE THIS LIQUID MAY CONTACT THE EYES.

WASHING CHEMICALS FROM THE SKIN
EMPLOYERS SHALL ENSURE THAT EMPLOYEES WHOSE SKIN BECOMES WET WITH THIS SUBSTANCE PROPMTLY WASH OR SHOWER TO REMOVE ANY CONTAMINANT FROM THE SKIN.

ROUTINE CHANGING OF WORK CLOTHING
NOT REQUIRED

CLOTHING REMOVAL FOLLOWING ACCIDENTAL CONTAMINATION
EMPLOYERS SHALL ENSURE THAT ANY CLOTHING WHICH BECOMES WET WITH THIS FLAMMABLE LIQUID BE REMOVED IMMEDIATELY AND NOT REWORN UNTIL THE SUBSTANCE IS REMOVED FROM THE CLOTHING.

EMPLOYERS SHALL ENSURE THAT EMPLOYEES DO NOT EAT OR SMOKE IN AREAS WHERE THIS SUBSTANCE IS HANDLED, PROCESSED OR STORED.

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED)

10 PPM
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR
  WITH HALF-MASK
  OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- AUXILIARY SELF-CONTAINED BREATHING APPARATUS
- CHEMICAL CARTRIDGE RESPIRATOR
  WITH AN ORGANIC VAPOR CANISTER
  PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN

25 PPM
- POWERED AIR-PURIFYING RESPIRATOR
  WITH A FULL FACE-PIECE, HELMENT, OR HOOD
  PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN
- GAS MASK
  (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER)
  PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN

100 PPM
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR
  WITH A FULL FACE-PIECE
- AUXILIARY SELF-CONTAINED BREATHING APPARATUS
- SELF-CONTAINED BREATHING APPARATUS
  WITH A FULL FACE-PIECE
  OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR
  WITH A FULL FACE-PIECE
  OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

1000 PPM
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR
  WITH A FULL FACE-PIECE
- AUXILIARY SELF-CONTAINED BREATHING APPARATUS
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR
  WITH HALF-MASK
- AUXILIARY SELF-CONTAINED BREATHING APPARATUS

>3600 PPM
- SELF-CONTAINED BREATHING APPARATUS
  WITH A FULL FACE-PIECE
  OPERATED IN PRESSURE-DEMAND, POSITIVE-PRESSURE, OR CONTINUOUS-FLOW MODE

FIREIFGHTING

WITH A FULL FACE-PIECE
OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

ROUTE OF ENTRY INTO BODY
- INHALATION
- INGESTION
- SKIN OR EYE CONTACT

SYMPTOMS
- SKIN IRRITATION
- MUCOUS MEMBRANE IRRITATION
- CONJUNCTIVITIS
- WEIGHT LOSS
- NARCOSIS
- CENTRAL NERVOUS SYSTEM DEPRESSION
- MAMMARY ADENOCARCINOMA
- DERMATITIS
- CARDIAC ARRHYTHMIA
- RESPIRATORY EDEMA
- LIVER DAMAGE
- KIDNEY DAMAGE
- EYE IRRITATION
- SKIN IRRITATION
- REPRODUCTIVE EFFECTS IN EXPERIMENTAL ANIMALS

FIRST AID PROCEDURES FOLLOWING EXPOSURE

IF THIS CHEMICAL GETS INTO THE EYES, WASH THE EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL GETS ON THE SKIN, REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL HAS BEEN INHALED, REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTED HALOGENATED HYDROCARBONS:
IF THE PERSON IS CONSCIOUS AND NOT CONVULSING, INDUCE EMESIS BY GIVING SYRUP OF IPECAC (KEEPING THE HEAD BELOW THE HIPS TO PREVENT ASPIRATION), FOLLOWED BY WATER. REPEAT IN 20 MINUTES IF NOT EFFECTIVE INITIALLY. IN PATIENTS WITH DEPRESSED RESPIRATION OR IF EMESIS IS NOT PRODUCED, PERFORM GASTRIC LAVAGE CAUTIOUSLY. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GASTRIC LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

ORGANS
- EYES
- SKIN

RESPIRATORY SYSTEM
CENTRAL NERVOUS SYSTEM
RESPIRATORY SYSTEM
KIDNEYS
LIVER

STATUS OF REGULATORY ENFORCEMENT

OSHA STANDARD 29CFR1910.1200 HAZARD COMMUNICATION
REQUIRES CHEMICAL MANUFACTURERS AND IMPORTERS TO ASSESS THE HAZARDS OF CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS TO PROVIDE INFORMATION TO THEIR EMPLOYEES CONCERNING HAZARDOUS CHEMICALS BY MEANS OF A HAZARD COMMUNICATION PROGRAM, LABELS AND OTHER FORMS OF WARNING, MATERIAL SAFETY DATA SHEETS, AND INFORMATION AND TRAINING. REQUIRES DISTRIBUTORS TO TRANSMIT REQUIRED INFORMATION TO EMPLOYERS.
52FR31852 8/24/87

OSHA STANDARD 29CFR1910.1000 AIR CONTAMINANTS
TABLE Z-1

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND MEDICAL RECORDS

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

OSHA STANDARD 29CFR1910.133 EYE AND FACE PROTECTION

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY A SUBSTANCE OR MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECORDS.
48FR38178 08/22/83

SUBSTANCE LISTED TOXIC SUBSTANCES CONTROL ACT INVENTORY

40CFR116 DESIGNATION OF HAZARDOUS SUBSTANCE
DESIGNATED AS HAZARDOUS SUSBSTANCE IN ACCORDANCE WITH SECTION 311(B)(2)(A) OF THE CLEAN WATER ACT. INCLUDES ANY ISOMERS AND HYDRATES, AS WELL AS ANY SOLUTIONS AND MIXTURES CONTAINING THIS SUBSTANCE.

49CFR172.101 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN HAZARDOUS MATERIALS TABLES AS HAZARDOUS MATERIAL FOR THE PURPOSE OF TRANSPORTATION.

49CFR172.102 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN OPTIONAL HAZARDOUS MATERIALS TABLE (UNDER N.O.S.

49CFR172.101 FOR INTERNATIONAL SHIPMENTS.

TECHNICAL ASSISTANCE DATA COMPLETED/PUBLISHED CLEAN WATER ACT (CWA) SECTION 311

40CFR117 DETERMINATION OF REPORTABLE QUANTITIES FOR HAZARDOUS SUBSTANCES
QUANTITIES, AS LISTED IN TABLE 302.4 40CFR302, THAT MAY BE HARMFUL AND WHICH THE DISCHARGE IS A VIOLATION OF THE CLEAN WATER ACT SECTION 311(B)(3) AND REQUIRES NOTICE AS SET FORTH IN SECTIONS 103(A) AND 103(B) OF CERCLA.

SOURCE/EXPOSURE ASSESSMENT COMPLETED/PUBLISHED CLEAN AIR ACT (CAA)

REGULATION PROMULGATED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR260

SUBSTANCE LISTED HAZARDOUS
STATE OF CALIFORNIA ADMINISTRATIVE CODE
TITLE 22. SOCIAL SECURITY
DIVISION 4. ENVIRONMENTAL HEALTH
CHAPTER 30. MINIMUM STANDARDS FOR MANAGEMENT OF HAZARDOUS AND EXTREMELY HAZARDOUS WASTES

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K020: HEAVY ENDS FROM THE DISTILLATION OF VINYL DICHLORIDE IN VINYL CHLORIDE MONOMER PRODUCTION. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K019: HEAVY ENDS FROM THE DISTILLATION OF ETHYLENE DICHLORIDE IN ETHYLENE CHLORIDE PRODUCTION. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K029: WASTE FROM THE PRODUCT STEAM STRIPPER IN THE PRODUCTION OF 1,1,1-TRICHLOROETHANE. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K073: CHLORINATED HYDRO-CARBON WASTE FROM THE PURIFICATION STEP OF THE DIAPHRAM CELL PROCESS USING GRAPHITE ANODES IN CHLORINE PRODUCTION. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.31 EPA HAZARDOUS WASTE NO. F024: WASTES, INCLUDING BUT NOT LIMITED TO, DISTILLATION RESIDUES, HEAVY ENDS, TARS, AND REACTOR CLEAN-OUT WASTES FROM THE PRODUCTION OF CHLORINATED ALIPHATIC HYDROCARBONS, HAVING CARBON CONTENT FROM 1-5, UTILIZING FREE RADICAL CATALYZED PROCESSES. (THIS LISTING DOES NOT INCLUDE LIGHT ENDS, SPENT FILTERS AND FILTER AIDS, SPENT DESSICANTS, WASTEWATER, WASTEWATER TREATMENT SLUDGES, SPENT CATALYSTS, AND WASTES LISTED IN 40CFR261.32). (T)

15CFR399.2, SUPPLEMENT 1 - COMMODITY INTERPRETATION 24: CHEMICALS VALIDATED LICENSE REQUIRED FOR EXPORT TO LIBIA, NORTH KOREA, VIETNAM, KAMPUCHEA, OR CUBA

TOXIC SUBSTANCE CONTROL ACT (TSCA) SECTION 8(E) INITIAL

40CFR372 SARA TITLE III SECTION 313 TOXIC CHEMICAL RELEASE REPORTING: COMMUNITY RIGHT-TO-KNOW

40CFR141.50 NATIONAL PRIMARY DRINKING WATER REGULATIONS
MAXIMUM CONTAMINANT LEVEL FOR VINYLIDENE CHLORIDE: 0.007 MG/L
EFFECTIVE DATE: 01/09/89
52FR25691 07/08/87

THE ENVIRONMENTAL PROTECTION AGENCY HAS ISSUED A FINAL RULE PROMULGATING REGULATIONS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), AS AMENDED BY THE HAZARDOUS AND SOLID WASTES AMENDMENTS OF 1984, RESTRICTING LAND DISPOSAL OF CERTAIN "CALIFORNIA LIST" WASTES. HAZARDOUS WASTES CONTAINING HALOGENATED ORGANIC COMPOUNDS IN TOTAL CONCENTRATIONS GREATER THAN OR EQUAL TO 1000 MG/KG ARE PROHIBITED FROM LAND DISPOSAL.
EFFECTIVE DATE: 7/8/87
(52FR25760 7/8/87)

SUBSTANCE LISTED BY THE NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW ACT, P.L. 1983, CHAPTER 315, N.J.S.A. 34: A-1. EMPLOYERS COVERED: SIC CODES 20-39, 46-49, 51, 75, 76, 80, 82, AND 84.

SUBSTANCE LISTED UNDER THE STATE OF FLORIDA TOXIC SUBSTANCES IN THE WORKPLACE RIGHT TO KNOW LAW, CHAPTER 442 OF THE FLORIDA STATUTES.

SUBSTANCE LISTED UNDER THE STATE OF WEST VIRGINIA DIRECTOR OF HEALTH LEGISLATIVE RULES FOR HAZARDOUS SUBSTANCES, CHAPTER16, ARTICLE 31, SECTION 4(A).

SUBSTANCE LISTED UNDER THE STATE OF CALIFORNIA HAZARDOUS SUBSTANCES INFORMATION AND TRAINING ACT, CALIFORNIA LABOR CODE, DIVISION 5, CHAPTER 2.5

SUBSTANCE LISTED UNDER THE STATE OF PENNSYLVANIA WORKER AND COMMUNITY RIGHT TO KNOW ACT, P.L. 734, NO. 159.

SUBSTANCE LISTED UNDER THE STATE OF ILLINOIS TOXIC SUBSTANCES DISCLOSURE TO EMPLOYEES ACT, TITLE 56, CHAPTER I, SUBCHAPTER B, SECTION 205.

THIS SUBSTANCE TESTED FOR MUTAGENESIS/GENETIC TOXICITY BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

THIS SUBSTANCE TESTED FOR SYSTEMIC/ORGAN TOXICITY BY THE NATIONAL INSTITUTE OF DIABETES AND DIGESTIVE AND KIDNEY DISEASES (NIDDKD)

SUBJECT TO ENVIRONMENTAL PROTECTION AGENCY (EPA) RULE PROHIBITING UNDERGROUND INJECTION OF HALOGENATED ORGANIC COMPOUNDS AT CONCENTRATIONS GREATER THAN OR EQUAL TO 10,000 MG/KG.
EFFECTIVE DATE: 8/8/88
53FR30908 8/16/88
40CFR148.12

UNDER THE CALIFORNIA AIR TOXICS HOT SPOTS INFORMATION AND ASSESSMENT ACT OF 1987, OPERATORS OF FACILITIES WHICH RELEASE, OR HAVE THE POTENTIAL TO RELEASE, SPECIFIED QUANTITIES OF THIS SUBSTANCE MUST SUBMIT TO THE APPROPRIATE LOCAL AIR POLLUTION CONTROL DISTRICTS, OR AIR QUALITY MANAGEMENT DISTRICTS, COMPREHENSIVE EMISSIONS INVENTORY PLANS AND HEALTH RISK ASSESSMENTS ADOPTED BY THE CALIFORNIA AIR RESOURCES BOARD (ARB).

AB 2588, CHAPTER 1252

THIS SUBSTANCE SUBJECT TO REQUIREMENTS OF CANADA'S WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS). THE REGULATIONS REQUIRE SUPPLIERS OF HAZARDOUS MATERIALS TO PROVIDE ADEQUATE LABELS AND MATERIAL SAFETY DATA SHEETS (MSDS'S) AS CONDITIONS OF SALE AND IMPORTATION. EMPLOYERS MUST PROVIDE LABELS, MSDS'S AND WORKER EDUCATION PROGRAMS IN THE WORKPLACE.
EFFECTIVE DATE: 10/31/88

CERCLA PRIORITY GROUP II SUBSTANCE
53FR41280

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) - TABLE 2-14 DANGEROUS GOODS LIST; THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING AND OTHER REQUIREMENTS.
DESIGNATED AS A DANGEROUS GOOD FOR THE PURPOSE OF AIR TRANSPORATION.

40CFR370 SARA TITLE III SECTION 311 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART B - REPORTING REQUIREMENTS

40CFR370 SARA TITLE III SECTION 312 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART D - INVENTORY FORMS

40CFR60.488 SUBSTANCE LISTED AS CHEMICAL PRODUCED BY AFFECTED FACILITIES UNDER THE CLEAN AIR ACT (CAA) SECTION 111.

40CFR148 SUBJECT TO EPA RULE PROHIBITING UNDERGROUND INJECTION OF THIS HAZARDOUS WASTE.
EFFECTIVE DATE: 6/7/89
54FR25416 6/14/89

40CFR148 SUBJECT TO EPA RULE PROHIBITING UNDERGROUND INJECTION OF THIS HAZARDOUS WASTE.
EFFECTIVE DATE: 6/8/89
54FR26594 6/23/89

40CFR268 SUBJECT TO EPA LAND DISPOSAL RESTRICTIONS
EFFECTIVE DATE: 6/8/89
53FR26594 6/23/89

29CFR1910.1450 SUBJECT TO OSHA STANDARD REGULATING OCCUPATIONAL EXPOSURE TO HAZARDOUS CHEMICALS IN LABORATORIES.
EFFECTIVE DATE: 5/1/90
55FR3300 1/31/90

33CFR160.211 AND 213 U.S. COAST GUARD REQUIRES 24 HOURS ADVANCE NOTICE TO CAPTAIN OF THE PORT WHEN THIS SUBSTANCE IS SCHEDULED TO ARRIVE AT OR DEPART FROM PORT.

46CFR151.01-10(B) CARGOES REGULATED BY THE COAST GUARD UNDER
SUBCHAPTER O - CERTAIN BULK DANGEROUS CARGOES

40CFR61.01(B) NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS
SUBPART A - GENERAL PROVISIONS

40CFR302 CERCLA SECTION 102 DESIGNATION, REPORTABLE QUANTITIES AND

REPORTABLE QUANTITY (RQ): 100 LB. (45.4 KG)

40CFR268 LAND DISPOSAL RESTRICTIONS

MEDICAL SURVEILLANCE REQUIRED

NO EXAM REQUIRED UNLESS EMPLOYEE TO WEAR FULL FACE-PIECE RESPIRATOR
ATTENTION TO SMOKING, ALCOHOL, MEDICATION, AND EXPOSURE TO CARCINOGENS
GENERAL MEDICAL HISTORY
40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS
48FR38187 08/22/83
48FR39225 08/30/83 (EFFECTIVE DATE CORRECTION)
RESPIRATORY HISTORY
PRE-PLACEMENT AND ANNUAL EXAMS
PHYSICIAN EXAMINATION
INDUSTRIAL EXPOSURE HISTORY
VISION TEST

HISTORY OF HEPATITIS, BLOOD TRANSFUSIONS, HOSPITALIZATION
BLOOD CHEMISTRY
COMPLETE BLOOD COUNT
CHRONIC RESPIRATORY DISEASE
LIVER FUNCTION
ELECTROCARDIOGRAM
URINALYSIS

14 BY 17 CHEST P.A. X-RAY
ALKALINE PHOSPHATASE
GGTP
SGOT
SGPT
DIRECT BILIRUBIN
DIRECT BILIRUBIN
LDH

CERTIFICATIONS

NUCLEAR REG. 0041

HEALTH STATUS CLASSIFICATION

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO

TOXIC SUBSTANCES, EPA (202) 382-3813.

MEDICAL WARNING REQUIRED FOR MEDICAL EXAM REFUSAL SIGNED
BY EMPLOYEE

SPECIAL DIAGNOSTIC TESTS
NONE IN COMMON USE

LEAKS AND SPILL PROCEDURES
REPORTABLE QUANTITY (RQ) 100 LB. (45.4 KG)
A REPORTABLE QUANTITY OF ONE HUNDRED POUNDS APPLIES TO THIS SUBSTANCE ESTABLISHED BY SECTIONS 101(14) AND 102(B) OR ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA). SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THAT SUBSTANCE IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER (800) 424-8802; IN THE WASHINGTON, D.C. METROPOLITAN AREA (202) 426-2675.
40CFR302

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DEPARTMENT OF TRANSPORTATION HAZARD CLASS
49CFR172.101 HAZARDOUS MATERIALS TABLE

FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS
49CFR172.101 AND 49CFR172 SUBPART E:

FLAMMABLE LIQUID

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INTERNATIONAL MARITIME ORGANIZATION HAZARD CLASS
49CFR172.102 OPTIONAL HAZARDOUS MATERIALS TABLE

(INHIBITED)
CLASS 3.1-INFLAMMABLE LIQUIDS

INTERNATIONAL MARITIME ORGANIZATION LABELING SPECIFICATIONS FOR
DOMESTIC AND EXPORT SHIPMENTS
49CFR172.102

FLAMMABLE LIQUID

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FOLLOWING INFORMATION RECOMMENDED FOR THE EMERGENCY HANDLING OF
HAZARDOUS MATERIALS

IF MATERIAL ON FIRE OR INVOLVED IN FIRE:
* EXTINGUISH FIRE ONLY IF FLOW CAN BE STOPPED
* APPLY FLOODING QUANTITIES OF WATER AS FOG

* USE FLOODING QUANTITIES OF WATER TO COOL ALL AFFECTED CONTAINERS
* WATER SHOULD BE APPLIED FROM AS FAR A DISTANCE AS POSSIBLE
* USE ALCOHOL FOAM OR CO2 OR DRY CHEMICAL EXTINGUISHERS

IF MATERIAL IS NOT ON FIRE AND IS NOT INVOLVED IN FIRE:
* KEEP AWAY FROM SPARKS, FLAMES AND OTHER SOURCES OF IGNITION
* DO NOT ALLOW MATERIAL TO CONTAMINATE WATER SOURCES AND SEWERS
* CONTAIN FLOW WITH DIKES AS NECESSARY
* ATTEMPT TO STOP LEAK IF WITHOUT HAZARD
* CONTROL VAPORS WITH WATER SPRAY

PERSONNEL PROTECTION:
* AVOID BREATHING DUST/VAPORS/FUMES FROM MATERIAL
* KEEP UPWIND
* AVOID SKIN CONTACT WITH MATERIAL
* WEAR BOOTS, PROTECTIVE GLOVES AND GAS TIGHT GOGGLES
* WASH CONTAMINATED SKIN WITH COPIOUS AMOUNTS OF WATER OR SOAP AND WATER
* DO NOT HANDLE BROKEN PACKAGES WITHOUT PROTECTIVE EQUIPMENT

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FOLLWING INFORMATION FROM DEPARTMENT OF TRANSPORTATION/U.S. COAST GUARD "CHEMICAL RESPONSE INFORMATION SYSTEM", REGARDING WATER SPILLS:

* U.S. COAST GUARD REQUIRES 24 HOUR ADVANCE NOTICE TO CAPTAIN OF THE PORT WHEN THIS SUBSTANCE IS SCHEDULED TO ARRIVE AT PORT WHEN TRANSPORTED IN BULK QUANTITY
* SUBSTANCE SINKS IN WATER
* RESTRICT ACCESS OF GENERAL PUBLIC WHEN APPRECIABLE DANGER ARISES FROM SPILL
* RESTRICT IGNITION SOURCES WHEN SUBSTANCE INVOLVED
* RESTRICT HUMAN USE WHEN SUBSTANCE INVOLVED
* PUMP SINKING LIQUID OR FINELY DIVIDED SOLIDS
* REMOVE IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES WITH MECHANICAL DREDGES OR LIFTS
* HIGHLY VOLATILE, AVOID INHALATION, VAPORS OR DUST ARE IRRITATING OR TOXIC
* HIGHLY CORROSIVE, AVOID DIRECT CONTACT, CONTACT WITH SKIN OR EYES CAN CAUSE IRRITATION OR BURNS
* BURNING NOT RECOMMENDED, FIRE DIFFICULT TO CONTROL AND/OR POISONOUS GAS IS FORMED

LISTED BY U.S. COAST GUARD UNDER CARGO COMPATIBILITY GROUP VINYL HALIDES, INCOMPATIBLE WITH ORGANIC ACIDS AND CAPROLACTAM SOLUTION

WASTE

****

OBSERVE ALL FEDERAL, STATE OR LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. CONTACT LOCAL AND/OR STATE ENVIRONMENTAL AUTHORITIES TO INSURE PROPER COMPLIANCE.

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SUBSTANCE IS GAS AT NORMAL PRESSURE AND TEMPERATURE BELOW 95 F. CLASSIFIED AS SOLID AND/OR HAZARDOUS WASTE ONLY IF CONTAINED.

THIS SUBSTANCE MEETS THE DEFINITION OF A HAZARDOUS WASTE AS DEFINED BY

SUBJECT TO THE FOLLOWING CONSIDERATIONS:

40CFR260 HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

PROVIDES DEFINITIONS OF TERMS, GENERAL STANDARDS, AND OVERVIEW INFORMATION APPLICABLE TO 40CFR PARTS 260-265

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IDENTIFIES THOSE SOLID WASTES WHICH ARE SUBJECT TO REGULATION AS HAZARDOUS WASTES UNDER 40CFR PARTS 262-265, 270, 271, AND 124 AND WHICH ARE SUBJECT TO THE NOTIFICATION REQUIREMENTS OF SECTION 3010 OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND IDENTIFIES ONLY SOME OF THE MATERIALS WHICH ARE HAZARDOUS WASTES UNDER SECTIONS 3007 AND 7003 OF RCRA

THIS COMPOUND, DEPENDING ON THE CHARACTERISTIC, CONCENTRATION
AND/OR SOURCE OF THE WASTE, MAY BE REGULATED UNDER THE FOLLOW-
ING WASTE NUMBER(S) AND, IN TURN, SUBJECT TO THE CORRESPONDING
REPORTABLE QUANTITY (RQ) (IF APPLICABLE):

40CFR261.24 TOXICITY CHARACTERISTIC
EPA HAZARDOUS WASTE NUMBER D029
1,1-DICHLOROETHYLENE
MAXIMUM CONCENTRATION 0.7 MG/L

40CFR261.31 HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER F024
REPORTABLE QUANTITY (RQ) : 1 LB.
A REPORTABLE QUANTITY OF 1 LB. APPLIES TO THIS HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.31. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K019
40CFR261.31 HAZARDOUS WASTES FROM NON-SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER F020
40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NUMBER K029
REPORTABLE QUANTITY (RQ) : 1 LB.
A REPORTABLE QUANTITY OF 1 LB. APPLIES TO THIS HAZARDOUS WASTE FROM SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.32. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OR A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202)

40CFR261.33 DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUES, AND SPILL RESIDUES THEREOF
EPA HAZARDOUS WASTE NUMBER U078
1,1-DICHLOROETHYLENE

40CFR262 STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS FOR GENERATORS OF HAZARDOUS WASTE

40CFR263 STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS WHICH APPLY TO PERSONS TRANSPORTING HAZARDOUS WASTE WITHIN THE UNITED STATES IF THE TRANSPORTATION REQUIRES A MANIFEST UNDER 40CFR262

40CFR264 STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE

40CFR265 INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE DURING THE PERIOD OF INTERIM STATUS

40CFR267 INTERIM STANDARDS FOR OWNERS AND OPERATORS OF NEW HAZARDOUS WASTE LAND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS THAT DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE FOR NEW LAND DISPOSAL FACILITIES

40CFR270 EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

ESTABLISHES PROVISIONS FOR THE HAZARDOUS WASTE PERMIT PROGRAM UNDER SUBTITLE C OF THE SOLID WASTE DISPOSAL ACT, AS AMENDED BY THE RESOURCE CONSERVATION AND RECOVERY ACT

40CFR271 REQUIREMENT FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

SPECIFIES THE PROCEDURES EPA WILL FOLLOW IN APPROVING, REVISING, AND WITHDRAWING APPROVAL OF STATE PROGRAMS AND THE REQUIREMENTS STATE PROGRAMS MUST MEET TO BE APPROVED BY THE ADMINISTRATION UNDER SECTION 3006(B) OF RCRA

THE ENVIRONMENTAL PROTECTION AGENCY HAS ISSUED A FINAL RULE PROMULGATING REGULATIONS UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), AS

RESTRICTING LAND DISPOSAL OF CERTAIN "CALIFORNIA LIST" WASTES. HAZARDOUS WASTES CONTAINING HALOGENATED ORGANIC COMPOUNDS IN TOTAL CONCENTRATIONS GREATER THAN OR EQUAL TO 1000 MG/KG ARE PROHIBITED FROM LAND DISPOSAL.
EFFECTIVE DATE: 7/8/87
(52FR25760 7/8/87)

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 8/8/88
53FR30908 8/16/88

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 8/8/90
53FR30908 8/16/88

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 6/7/89
54FR25416 6/14/89

40CFR148 UNDERGROUND INJECTION RESTRICTIONS
EFFECTIVE DATE: 6/8/89
54FR26594 6/23/89

CAS NUMBER
75-35-4

REGISTRY TOXIC CHEMICALS NUMBER
KV9275000

BULLETINS

SPECIAL INFORMATION
TYPE WHAT INFORMATION YOU REQUIRE
/ALL/, SPECIFIC INFORMATION (BY 4-LETTER COMMAND, /HELP/, OR /NONE/.

VINYLIDENE CHLORIDE - NO MORE HITS IN DATABASE.

ENTER NAME, KEYWORD, SYMPTOM, STLA, NAMELIST, HELP, OR QUIT.

ENTER WHICH OHS SERVICE YOU WISH TO ACCESS:
> TO ACCESS HAZARDLINE, TYPE /HAZARD/
> TO ACCESS ENVIRONMENTAL HEALTH NEWS, TYPE /EHN/
> TO ACCESS MATERIAL SAFETY DATA SHEET, TYPE /MSDS/
> TO EXIT THE SYSTEM, TYPE /LOGOFF/
PRESS RETURN KEY AFTER ENTERING COMMAND.

LOGGED OFF LINE # 01 DATE = 07/02/90 TIME = 17-25-50
LOGOFF COMPLETED - GOODBYE FOR NOW!!!!
** Inactivity Timeout - Disconnected. **
** Connect Pending, Please Wait... (or Hit <Return> Key to Abort.) **
CONNECTED TO HAZARDLINE 07/02/90 17:27:55
ENTER)LOGON COMMAND AND AC** Inactivity Timeout - Disconnected. **
** Connect Pending, Please Wait... (or Hit <Return> Key to Abort.) **
CONNECTED TO HAZARDLINE 07/02/90 17:29:59
ENTER)LOGON COMMAND AND ACCOUNT NUMBER, PRESS /RETURN/
** Inactivity Timeout - Disconnected. **
** Connect Pending, Please Wait... (or Hit <Return> Key to Abort.) **
CONNECTED TO HAZARDLINE 07/02/90 17:32:05
ENTER)LOGON COMMAND AND ACCOUNT NUMBER, PRESS /RETURN/

SPARTON TECHNOLOGY, INC.

Coors Road Facility
Albuquerque, New Mexico

RCRA FACILITY INVESTIGATION

GROUNDWATER MONITORING

ANALYTICAL RESULTS

DECEMBER 1990

RFI MONITORING WELL SUMMARY

WELL NUMBER	ZONE *	MEASURING PT. ELEVATION	DEPTH TO TOP OF SCREEN (FT.)	DEPTH TO BOTTOM OF SCREEN (FT.)	ELEVATION TO TOP OF SCREEN (FT.,MSL)	ELEVATION TO BOTTOM OF SCREEN (FT.,MSL)	LENGTH OF SCREEN (FT.)
9	UFZ	5044.11	62.5	67.5	4981.61	4976.61	5.0
13	UFZ	5043.25	60.0	70.0	4983.25	4973.25	10.0
14	UFZ	5041.91	61.5	71.5	4980.41	4970.41	10.0
15	UFZ	5047.49	60.0	70.0	4987.49	4977.49	10.0
29	ULFZ	5044.51	103.0	113.0	4941.51	4931.51	10.0
30	ULFZ	5044.70	97.0	107.0	4947.70	4937.70	10.0
31	ULFZ	5043.53	96.0	106.0	4947.53	4937.53	10.0
32	LLFZ	5048.05	108.0	118.0	4940.05	4930.05	10.0
33	UFZ	5044.29	63.0	73.0	4981.29	4971.29	10.0
34	UFZ	5034.49	56.5	66.5	4977.99	4967.99	10.0
35	UFZ	5042.50	63.2	73.2	4979.30	4969.30	10.0
36	UFZ	5059.35	82.3	92.3	4977.05	4967.05	10.0
37	UFZ	5091.66	115.0	125.0	4976.66	4966.66	10.0
38	LLFZ	5044.32	126.5	136.5	4917.82	4907.82	10.0
39	LLFZ	5044.06	123.0	133.0	4921.06	4911.06	10.0
40	LLFZ	5043.35	117.0	127.0	4926.35	4916.35	10.0
41	ULFZ	5046.77	92.0	97.0	4954.77	4949.77	5.0
42	ULFZ	5057.33	105.0	115.0	4952.33	4942.33	10.0
43	LLFZ	5057.74	127.0	137.0	4930.74	4920.74	10.0
44	ULFZ	5058.71	106.0	116.0	4952.71	4942.71	10.0
45	ULFZ	5090.11	143.0	153.0	4947.11	4937.11	10.0
46	ULFZ	5118.98	170.0	180.0	4948.98	4938.98	10.0
47	UFZ	5155.83	180.0	195.0	4975.83	4960.83	15.0
48	UFZ	5168.31	192.0	207.0	4976.31	4961.31	15.0
49	3rdFZ	5043.67	137.7	147.7	4905.97	4895.97	10.0
50	UFZ	5211.51	235.0	250.0	4976.51	4961.51	15.0
51	UFZ	5058.86	75.0	85.0	4983.86	4973.86	10.0
52	UFZ	5165.81	190.8	206.0	4975.01	4959.81	15.2
53	UFZ	5164.24	189.8	204.0	4974.44	4960.24	14.2
55	LLFZ	5168.61	255.0	265.0	4913.61	4903.61	10.0
56	ULFZ	5168.61	220.0	230.0	4948.61	4938.61	10.0
57	UFZ	5103.54	126.0	141.0	4977.54	4962.54	15.0
58	UFZ	5168.89	194.0	209.0	4974.89	4959.89	15.0
59	ULFZ	5059.18	104.5	115.0	4954.68	4944.18	10.5
60	ULFZ	5133.62	185.0	195.0	4948.62	4938.62	10.0
61	UFZ	5133.98	158.0	173.0	4975.98	4960.98	15.0
62	UFZ	5075.00	95.0	110.0	4980.00	4965.00	15.0
63	UFZ	5065.74	83.0	98.0	4982.74	4967.74	15.0
64	ULFZ	5097.84	138.8	149.0	4959.04	4948.84	10.2
PZ-1	UFZ	5144.22	182.7	198.0	4961.52	4946.22	15.3

(*) UFZ = UPPER FLOW ZONE
ULFZ = UPPER LOWER FLOW ZONE
LLFZ = LOWER LOWER FLOW ZONE
3rdFZ = THIRD FLOW ZONE

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

SUMMARY OF GENERAL INORGANIC ANALYSES

SAMPLE ID	DATE SAMPLED	CHLORIDE mg/l (250)	FLUORIDE mg/l (1.6)	AMMONIA as N mg/l (---)	NITRATE as N mg/l (10)	SULFATE mg/l (600)	TOTAL KJELDAHL NITROGEN as N mg/l (---)
MW-13	02/14/89	24	0.3	0.1	2.2	104	0.3
MW-13	03/13/89	25	0.4	< 0.1	2.6	100	< 0.1
MW-14	02/15/89	91	0.2	< 0.1	18	124	0.4
MW-14	03/14/89	94	0.3	< 0.1	22	133	< 0.1
MW-15	02/16/89	48	0.4	< 0.1	5.2	122	0.4
MW-15	03/15/89	36	0.4	< 0.1	4.5	120	< 0.1
MW-29	02/15/89	26	0.3	< 0.1	2.0	107	0.2
MW-29	03/13/89	25	0.3	< 0.1	1.9	106	< 0.1
MW-30	02/14/89	28	0.3	< 0.1	4.6	122	< 0.1
MW-30	03/14/89	28	0.4	< 0.1	4.4	120	< 0.1
MW-31	02/13/89	31	0.3	< 0.1	3.5	133	< 0.1
MW-31	03/15/89	31	0.3	< 0.1	3.3	126	< 0.1
MW-32	02/16/89	107	< 0.1	< 0.1	0.7	127	0.3
MW-32	03/16/89	88	0.3	< 0.1	0.7	121	< 0.1
MW-33	02/14/89	177	0.9	3.5	< 0.1	263	4.7
MW-33	03/14/89	176	1.1	6.2	< 0.1	261	6.5
MW-34	08/16/89	11	0.5	< 0.1	1.1	105	< 0.5
MW-34	08/28/89	12	0.4	< 0.1	12	130	< 0.5
MW-34	08/28/89	12	0.4	< 0.1	12	130	< 0.5
MW-35	08/15/89	24	0.6	< 0.1	68	204	< 0.5
MW-35	08/28/89	25	0.3	< 0.1	24	220	< 0.5
MW-36	08/15/89	19	0.4	< 0.1	22	171	< 0.5
MW-36	08/28/89	23	0.3	< 0.1	13	111	< 0.5

NOTE : State Standards, where they exist, are shown in parentheses.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

SUMMARY OF GENERAL INORGANIC ANALYSES

SAMPLE ID	DATE SAMPLED	CHLORIDE mg/l (250)	FLUORIDE mg/l (1.6)	AMMONIA as N mg/l (---)	NITRATE as N mg/l (10)	SULFATE mg/l (600)	TOTAL KJELDAHL NITROGEN as N mg/l (---)
MW-37	08/15/89	23	0.6	< 0.1	1.2	122	0.8
MW-37	08/28/89	21	0.9	< 0.1	1.5	140	< 0.5
MW-38	11/06/89	12	0.3	< 0.1	0.4	71	< 0.5
MW-38	11/20/89	12	0.4	< 0.1	0.3	71	< 0.5
MW-39	11/06/89	25	0.3	< 0.1	0.3	106	< 0.5
MW-39	11/20/89	21	0.3	< 0.1	< 0.1	93	< 0.5
MW-40	11/07/89	24	0.3	< 0.1	0.9	119	< 0.5
MW-40	11/21/89	24	0.3	< 0.1	0.8	120	< 0.5
MW-41	11/07/89	54	0.2	< 0.1	3.2	128	< 0.5
MW-41	11/20/89	44	0.2	< 0.1	3.3	122	< 0.5
MW-42	12/12/89	22	0.3	< 0.1	2.5	96	< 0.5
MW-42	12/21/89	20	0.3	< 0.1	2.5	92	< 0.5
MW-43	12/12/89	28	0.2	< 0.1	0.6	110	< 0.5
MW-43	12/21/89	26	0.2	< 0.1	0.6	105	< 0.5
MW-44	01/04/90	9	0.4	< 0.1	1.9	71	< 0.5
MW-44	01/16/90	9	0.3	< 0.1	1.9	72	< 0.5

NOTE : State Standards, where they exist, are shown in parentheses.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

SUMMARY OF GENERAL INORGANIC ANALYSES

SAMPLE ID	DATE SAMPLED	CHLORIDE mg/l (250)	FLUORIDE mg/l (1.6)	AMMONIA as N mg/l (---)	NITRATE as N mg/l (10)	SULFATE mg/l (600)	TOTAL KJELDAHL NITROGEN as N mg/l (---)
MW-45	01/04/90	39	0.3	< 0.1	3.9	120	< 0.5
MW-45	01/17/90	41	0.2	< 0.1	4.0	119	< 0.5
MW-46	01/04/90	31	0.4	< 0.1	2.2	102	< 0.5
MW-46	01/17/90	31	0.4	< 0.1	2.3	100	< 0.5
MW-47	01/03/90	27	0.4	< 0.1	4.0	116	< 0.5
MW-47	01/16/90	27	0.3	< 0.1	3.8	115	< 0.5
MW-48	01/03/90	32	0.4	< 0.1	2.5	120	< 0.5
MW-48	01/16/90	32	0.3	< 0.1	2.5	123	< 0.5
MW-48	08/20/90	38.0	0.28	< 0.10	2.3	130	< 0.50
MW-48	09/04/90	37.0	0.29	< 0.10	2.3	128	< 0.50
MW-49	01/25/90	19	0.3	< 0.1	0.7	107	< 0.5
MW-49	01/31/90	19.7	0.25	< 0.1	0.62	103	< 0.5
MW-51	04/25/90	19.7	0.35	< 0.1	4.0	87.3	< 0.5
MW-51	05/07/90	19.9	0.37	< 0.1	3.7	88.1	< 0.5
MW-55	08/21/90	19.5	0.36	< 0.10	1.9	81.2	< 0.50
MW-55	09/04/90	20.1	0.39	< 0.10	2.0	82.7	< 0.50

NOTE : State Standards, where they exist, are shown in parentheses.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

SUMMARY OF GENERAL INORGANIC ANALYSES

SAMPLE ID	DATE SAMPLED	CHLORIDE mg/l (250)	FLUORIDE mg/l (1.6)	AMMONIA as N mg/l (---)	NITRATE as N mg/l (10)	SULFATE mg/l (600)	TOTAL KJELDAHL NITROGEN as N mg/l (---)
MW-56	08/20/90	22.5	0.55	< 0.10	2.1	102	< 0.50
MW-56	09/05/90	23.8	< 0.10	< 0.10	2.1	96.8	< 0.50
MW-58	10/05/90	19.0	0.33	0.11	2.4	87.9	< 0.50
MW-58	10/15/90	19.9	0.36	< 0.10	2.4	93.8	< 0.50
MW-59	10/04/90	18.7	0.27	< 0.10	3.9	106	< 0.50
MW-59	10/15/90	18.4	0.25	< 0.10	3.1	106	< 0.50
MW-60	10/04/90	18.4	0.47	< 0.10	1.5	95.2	3.9
MW-60	10/15/90	19.6	0.47	< 0.10	1.4	96.9	< 0.50
MW-61	10/04/90	21.0	0.27	< 0.10	2.5	115	< 0.50
MW-61	10/15/90	21.6	0.35	< 0.10	1.8	120	< 0.50
MW-62	10/04/90	7.8	0.23	< 0.10	0.49	84.2	< 0.50
MW-62	10/15/90	8.1	0.22	< 0.10	2.6	88.5	< 0.50
MW-63	10/04/90	15.2	0.26	< 0.10	2.8	117	< 0.50
MW-63	10/15/90	15.7	0.29	< 0.10	2.7	119	< 0.50
MW-64	10/08/90	19.6	0.25	< 0.10	3.3	122	< 0.50
MW-64	10/15/90	20.2	0.29	< 0.10	3.2	126	< 0.50

NOTE : State Standards, where they exist, are shown in parentheses.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

SUMMARY OF METALS ANALYSES

SAMPLE ID	DATE SAMPLED	ANTIMONY (---)	ARSENIC (0.1)	BARIUM (1)	BERYLLIUM (---)	BORON (0.75)	CADMIUM (0.01)	CHROMIUM (0.05)	COBALT (---)	COPPER (---)	LEAD (0.05)	MANGANESE (0.2)	MERCURY (0.002)	NICKEL (---)	SELENIUM (0.05)	SILVER (0.05)	THALLIUM (---)	TIN (---)	VANADIUM (---)	ZINC (---)
		[mg/l																		]
MW-13	02/14/89	< 0.05	< 0.003	0.067	< 0.001	0.78	< 0.005	< 0.01	< 0.01	< 0.006	0.003	0.19	< 0.0001	< 0.04	0.005	< 0.005	< 0.02	< 0.03	< 0.01	0.07
MW-13	03/13/89	< 0.05	< 0.006	0.054	< 0.001	0.64	< 0.005	< 0.01	< 0.01	0.008	< 0.002	0.15	< 0.0001	< 0.04	0.006	< 0.005	< 0.004	< 0.04	< 0.01	0.02
MW-14	02/15/89	< 0.05	< 0.003	0.23	< 0.001	0.95	< 0.005	0.75	< 0.01	< 0.006	< 0.002	< 0.005	< 0.0001	< 0.04	0.005	< 0.005	< 0.08	< 0.03	< 0.01	< 0.01
MW-14	03/14/89	< 0.05	< 0.003	0.17	< 0.001	1.2	< 0.005	0.90	< 0.01	< 0.006	< 0.002	0.008	< 0.0001	< 0.04	0.008	< 0.005	< 0.08	< 0.03	< 0.01	< 0.01
MW-15	02/16/89	< 0.05	0.006	0.11	< 0.001	0.12	< 0.005	< 0.01	< 0.01	< 0.006	< 0.004	< 0.005	< 0.0001	< 0.04	< 0.002	< 0.005	< 0.04	< 0.03	< 0.01	< 0.01
MW-15	03/15/89	< 0.05	0.007	0.097	< 0.001	0.12	0.007	< 0.01	< 0.01	< 0.006	< 0.002	< 0.005	< 0.0001	< 0.04	< 0.002	< 0.005	< 0.008	< 0.03	< 0.01	< 0.01
MW-29	02/15/89	< 0.05	0.006	0.18	< 0.001	0.13	< 0.005	< 0.01	< 0.01	< 0.006	< 0.004	0.81	< 0.0001	< 0.04	< 0.002	< 0.005	< 0.02	< 0.03	< 0.01	< 0.01
MW-29	03/13/89	< 0.05	0.008	0.16	< 0.001	0.13	< 0.005	< 0.01	< 0.01	0.019	< 0.002	0.74	< 0.0001	< 0.04	< 0.002	< 0.005	< 0.004	< 0.04	< 0.01	0.01
MW-30	02/14/89	< 0.05	0.005	0.079	< 0.001	0.20	< 0.005	0.09	< 0.01	< 0.006	< 0.004	0.15	< 0.0001	< 0.04	< 0.002	< 0.005	< 0.02	< 0.03	< 0.01	0.01
MW-30	03/14/89	< 0.05	0.004	0.086	< 0.001	0.18	< 0.005	0.06	< 0.01	< 0.006	< 0.002	0.21	< 0.0001	< 0.04	< 0.002	< 0.005	< 0.04	< 0.03	< 0.01	< 0.01
MW-31	02/13/89	< 0.05	< 0.006	0.065	< 0.001	0.17	< 0.005	< 0.01	< 0.001	< 0.006	< 0.002	0.017	< 0.0001	< 0.04	< 0.002	< 0.005	< 0.02	< 0.03	< 0.01	< 0.01
MW-31	03/15/89	< 0.05	< 0.003	0.057	< 0.001	0.16	0.006	< 0.01	< 0.01	< 0.006	< 0.002	0.011	< 0.0001	< 0.04	< 0.002	< 0.005	< 0.008	< 0.03	< 0.01	< 0.01
MW-32	02/16/89	< 0.05	0.004	0.18	< 0.001	0.51	< 0.005	0.02	< 0.01	< 0.006	< 0.004	1.3	0.0002	< 0.04	< 0.002	< 0.005	< 0.04	< 0.03	< 0.01	< 0.01
MW-32	03/16/89	< 0.05	< 0.003	0.15	< 0.001	0.46	0.006	0.03	< 0.01	< 0.006	< 0.002	1.1	< 0.0001	< 0.04	< 0.002	< 0.005	< 0.008	< 0.03	< 0.01	< 0.01
MW-33	02/14/89	< 0.05	0.004	0.062	< 0.001	7.7	< 0.005	0.14	0.01	< 0.006	< 0.002	2.4	< 0.0001	0.62	< 0.002	< 0.005	< 0.04	< 0.03	< 0.01	0.02
MW-33	03/14/89	< 0.05	0.004	0.061	< 0.001	7.1	< 0.005	< 0.01	0.01	< 0.006	< 0.002	2.3	< 0.0001	0.51	0.003	< 0.005	< 0.08	< 0.03	< 0.01	< 0.01
MW-34	08/16/89	< 0.05	0.014	3.0	0.005	0.13	< 0.005	0.55	0.05	0.08	0.062	8.5	< 0.0002	0.23	< 0.01	< 0.01	< 0.01	< 0.07	0.16	0.48
MW-34	08/28/89	< 0.05	< 0.005	0.28	< 0.002	0.16	< 0.005	0.09	< 0.01	0.02	0.007	1.4	< 0.0002	0.04	< 0.005	< 0.01	< 0.005	< 0.005	0.01	0.14
MW-35	08/15/89	< 0.05	0.010	0.64	< 0.002	0.22	< 0.005	0.25	0.02	0.05	0.033	3.3	< 0.0002	0.14	< 0.01	< 0.01	< 0.05	< 0.07	0.05	0.32
MW-35	08/28/89	< 0.05	< 0.005	0.15	< 0.002	0.23	< 0.005	0.02	< 0.01	0.01	0.005	0.42	0.0007	< 0.04	0.019	0.01	< 0.01	< 0.05	0.01	0.09
MW-36	08/15/89	< 0.05	0.031	1.2	0.008	0.21	< 0.005	0.26	0.02	0.07	0.37	3.9	< 0.0002	0.15	< 0.02	< 0.01	< 0.05	< 0.07	0.09	0.50
MW-36	08/28/89	< 0.05	< 0.005	0.10	< 0.002	0.20	< 0.005	0.07	< 0.01	< 0.01	0.009	0.07	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	0.10

NOTE : Values below detection limits, where they exist, are shown in parenthesis.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

SUMMARY OF METALS ANALYSES

mg/l

SAMPLE ID	DATE SAMPLED	ANTIMONY (---)	ARSENIC (0.1)	BARIUM (1)	BERYLLIUM (---)	BORON (0.75)	CADMIUM (0.01)	CHROMIUM (0.05)	COBALT (---)	COPPER (---)	LEAD (0.05)	MANGANESE (0.2)	MERCURY (0.002)	NICKEL (---)	SELENIUM (0.05)	SILVER (0.05)	THALLIUM (---)	TIN (---)	VANADIUM (---)	ZINC (---)
MW-37	08/15/89	< 0.05	0.034	0.54	0.007	0.23	< 0.005	0.23	0.01	0.06	0.15	2.0	< 0.0002	0.14	< 0.02	< 0.01	< 0.05	< 0.07	0.11	0.67
MW-37	08/28/89	< 0.05	0.012	0.03	< 0.002	0.17	0.006	0.05	< 0.01	< 0.01	< 0.01	0.05	< 0.0002	< 0.04	< 0.005	0.01	< 0.005	< 0.05	0.06	0.07
MW-38	11/06/89	< 0.05	< 0.005	0.13	< 0.002	0.13	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	0.27	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	0.76
MW-38	11/20/89	< 0.05	< 0.005	0.12	< 0.002	0.11	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	0.42	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	0.54
MW-39	11/06/89	< 0.05	< 0.005	0.14	< 0.002	0.12	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	0.38	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	0.35
MW-39	11/20/89	< 0.05	< 0.005	0.14	< 0.002	0.12	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	0.64	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.02	< 0.05	< 0.01	0.15
MW-40	11/07/89	< 0.05	< 0.01	0.12	< 0.002	0.14	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	0.02	< 0.0002	< 0.04	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	0.66
MW-40	11/21/89	< 0.05	< 0.01	0.12	< 0.002	0.15	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	0.01	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	0.37
MW-41	11/07/89	< 0.05	< 0.005	0.06	< 0.002	0.14	< 0.005	0.02	< 0.01	< 0.01	< 0.005	0.13	< 0.0002	< 0.04	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	0.03
MW-41	11/20/89	< 0.05	< 0.005	0.06	< 0.002	0.14	< 0.005	0.02	< 0.01	< 0.01	< 0.005	0.14	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.05	< 0.05	< 0.01	0.02
MW-42	12/12/89	< 0.05	< 0.005	0.07	< 0.002	0.10	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01
MW-42	12/21/89	< 0.05	< 0.01	0.07	< 0.002	0.11	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.0002	< 0.04	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01
MW-43	12/12/89	< 0.05	< 0.005	0.17	< 0.002	0.11	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	0.45	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	0.15
MW-43	12/21/89	< 0.05	0.008	0.16	< 0.002	0.12	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	0.48	< 0.0002	< 0.04	< 0.01	< 0.01	< 0.02	< 0.05	< 0.01	< 0.01
MW-44	01/04/90	< 0.05	< 0.005	0.09	< 0.002	0.10	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	0.01	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.05	< 0.01	0.01
MW-44	01/16/90	< 0.05	< 0.01	0.10	< 0.002	0.11	< 0.005	0.27	< 0.01	< 0.01	< 0.005	0.02	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01
MW-45	01/04/90	< 0.05	< 0.005	0.06	< 0.002	0.33	< 0.005	0.53	< 0.01	< 0.01	< 0.01	0.01	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	0.06

NOTE : State standards, where they exist, are shown in parentheses.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

SUMMARY OF METALS ANALYSES

mg/l

SAMPLE ID	DATE SAMPLED	ANTIMONY (---)	ARSENIC (0.1)	BARIUM (1)	BERYLLIUM (---)	BORON (0.75)	CADMIUM (0.01)	CHROMIUM (0.05)	COBALT (---)	COPPER (---)	LEAD (0.05)	MANGANESE (0.2)	MERCURY (0.002)	NICKEL (---)	SELENIUM (0.05)	SILVER (0.05)	THALLIUM (---)	TIN (---)	VANADIUM (---)	ZINC (---)
MW-45	01/17/90	< 0.05	< 0.005	0.06	< 0.002	0.36	< 0.005	0.57	< 0.01	0.02	0.024	0.01	< 0.0002	< 0.04	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	0.05
MW-46	01/04/90	< 0.05	0.005	0.11	< 0.002	0.10	< 0.005	0.11	< 0.01	0.07	< 0.005	0.21	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	1.2
MW-46	01/17/90	< 0.05	< 0.005	0.15	< 0.002	0.13	< 0.005	0.17	< 0.01	0.13	0.024	0.08	< 0.0002	< 0.04	< 0.01	< 0.01	< 0.005	< 0.05	0.01	0.43
MW-47	01/03/90	< 0.05	0.006	0.06	< 0.002	0.09	< 0.005	0.25	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.05	< 0.01	< 0.01
MW-47	01/16/90	< 0.05	0.006	0.05	< 0.002	0.11	< 0.005	0.27	< 0.01	< 0.01	< 0.005	< 0.01	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01
MW-48	01/03/90	< 0.05	0.006	0.07	< 0.002	0.08	< 0.005	0.14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	0.01
MW-48	01/16/90	< 0.05	< 0.01	0.06	< 0.002	0.36	< 0.005	0.16	< 0.01	< 0.01	< 0.005	< 0.01	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	0.01
MW-48	08/20/90	< 0.060	< 0.010	0.060	< 0.002	0.11	< 0.005	0.32	< 0.010	< 0.020	< 0.010	< 0.010	< 0.0002	< 0.040	< 0.005	< 0.010	< 0.010	< 0.10	< 0.010	< 0.020
MW-48	09/04/90	< 0.060	< 0.005	0.043	< 0.002	< 0.10	< 0.005	0.26	< 0.010	< 0.020	< 0.005	< 0.010	< 0.0002	< 0.040	< 0.005	< 0.010	< 0.005	< 0.10	< 0.010	< 0.020
MW-49	01/25/90	< 0.05	< 0.005	0.13	< 0.002	0.14	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	0.08	< 0.0002	< 0.04	< 0.01	< 0.01	< 0.005	< 0.05	< 0.01	0.02
MW-49	01/31/90	< 0.05	0.0058	0.14	< 0.002	0.13	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	0.086	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.05	< 0.01	0.012
MW-51	04/25/90	< 0.05	< 0.005	0.071	< 0.002	0.11	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	0.15	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01
MW-51	05/07/90	< 0.05	< 0.01	0.079	< 0.002	0.14	< 0.005	0.062	< 0.01	< 0.01	< 0.005	0.41	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.05	< 0.01	< 0.01
MW-55	08/21/90	< 0.060	< 0.010	0.062	< 0.002	< 0.10	< 0.005	< 0.010	< 0.010	< 0.020	< 0.005	< 0.010	< 0.0002	< 0.040	< 0.005	< 0.010	< 0.010	< 0.10	< 0.010	0.079
MW-55	09/04/90	< 0.060	< 0.005	0.049	< 0.002	< 0.10	< 0.005	< 0.010	< 0.010	< 0.020	0.0072	< 0.010	< 0.0002	< 0.040	< 0.005	< 0.010	< 0.005	< 0.10	< 0.010	0.033
MW-56	08/20/90	< 0.060	< 0.010	0.039	< 0.002	0.13	< 0.005	0.028	< 0.010	< 0.020	< 0.005	< 0.010	< 0.0002	< 0.040	< 0.005	< 0.010	< 0.010	< 0.10	0.020	0.076
MW-56	09/05/90	< 0.060	< 0.005	0.030	< 0.002	< 0.10	< 0.005	0.049	< 0.010	< 0.020	0.0091	< 0.010	< 0.0002	< 0.040	< 0.005	< 0.010	< 0.005	< 0.10	0.014	0.027

NOTE : State standards, where they exist, are shown in parentheses.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

SUMMARY OF METALS ANALYSES

mg/l

SAMPLE ID	DATE SAMPLED	ANTIMONY (---)	ARSENIC (0.1)	BARIUM (1)	BERYLLIUM (---)	BORON (0.75)	CADMIUM (0.01)	CHROMIUM (0.05)	COBALT (---)	COPPER (---)	LEAD (0.05)	MANGANESE (0.2)	MERCURY (0.002)	NICKEL (---)	SELENIUM (0.05)	SILVER (0.05)	THALLIUM (---)	TIN (---)	VANADIUM (---)	ZINC (---)
MW-58	10/05/90	< 0.06	< 0.005	0.081	< 0.002	< 0.10	< 0.005	< 0.01	< 0.010	< 0.02	< 0.005	< 0.01	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.10	0.011	< 0.02
MW-58	10/15/90	< 0.06	< 0.01	0.058	< 0.002	< 0.10	< 0.005	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	< 0.0002	< 0.04	< 0.01	< 0.01	< 0.005	< 0.10	< 0.01	< 0.025
MW-59	10/04/90	< 0.06	< 0.005	0.086	< 0.002	0.12	< 0.005	< 0.01	< 0.010	< 0.02	< 0.005	0.014	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.10	< 0.01	< 0.02
MW-59	10/15/90	< 0.06	< 0.01	0.082	< 0.002	0.11	< 0.005	< 0.01	< 0.01	< 0.02	< 0.01	0.011	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.10	< 0.10	< 0.01	0.025
MW-60	10/04/90	< 0.06	< 0.005	0.067	< 0.002	0.15	< 0.005	< 0.01	< 0.010	< 0.02	0.0072	0.029	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.10	< 0.01	0.090
MW-60	10/15/90	< 0.06	< 0.01	0.068	< 0.002	< 0.10	< 0.005	< 0.01	< 0.01	< 0.02	< 0.01	0.029	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.01	< 0.10	< 0.01	0.042
MW-61	10/04/90	< 0.06	0.012	0.058	< 0.002	0.11	< 0.005	< 0.01	< 0.010	< 0.02	< 0.005	0.013	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.10	< 0.01	0.020
MW-61	10/15/90	< 0.06	< 0.01	0.051	< 0.002	0.10	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	< 0.01	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.05	< 0.10	< 0.01	< 0.025
MW-62	10/04/90	< 0.06	< 0.005	0.069	< 0.002	0.14	< 0.005	0.012	< 0.010	< 0.02	< 0.005	0.11	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.01	< 0.01	< 0.02
MW-62	10/15/90	< 0.06	< 0.01	0.071	< 0.002	0.13	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	0.074	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.10	< 0.10	< 0.01	< 0.025
MW-63	10/04/90	< 0.06	0.005	0.077	< 0.002	0.12	< 0.005	< 0.01	< 0.010	< 0.02	< 0.005	0.049	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.10	< 0.01	0.026
MW-63	10/15/90	< 0.06	0.0075	0.057	< 0.002	0.11	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	0.026	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.05	< 0.10	< 0.01	< 0.025
MW-64	10/08/90	< 0.06	< 0.005	0.080	< 0.002	0.12	< 0.005	< 0.01	< 0.010	< 0.02	0.0053	0.024	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.10	< 0.01	< 0.02
MW-64	10/15/90	< 0.06	< 0.01	0.076	< 0.002	0.11	< 0.005	< 0.01	< 0.01	< 0.02	< 0.005	0.029	< 0.0002	< 0.04	< 0.005	< 0.01	< 0.005	< 0.10	< 0.01	< 0.025

NOTE : State standards, where they exist, are shown in parentheses.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

APPENDIX IX VOLATILE ORGANIC ANALYSES SUMMARY
Part 1 of 3

(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	ACETONE (---)	ACETO-NITRILE (---)	ACROLEIN (---)	ACRYLO-NITRILE (---)	ALLYL CHLORIDE (---)	BENZENE (10)	BROMO-DICHLORO-METHANE (---)	BROMO-FORM (---)	BROMO-METHANE (---)	CARBON DISULFIDE (---)	CARBON TETRA-CHLORIDE (10)	CHLORO-BENZENE (---)	CHLORO-PRENE (---)	CHLORO-ETHANE (---)	CHLORO-DIBROMO-METHANE (---)	CHLORO-FORM (100)	CHLORO-METHANE (---)	1,2-DIBROMO-3-CHLORO-PROPANE (---)
MW-13	02/14/89	< 75	< 300	< 300	< 300	< 15	< 15	< 15	< 15	< 30	< 15	< 15	< 15	< 15	< 30	< 15	< 15	< 30	< 15
MW-13	03/13/89	< 82	< 330	< 330	< 330	< 16	< 16	< 16	< 16	< 33	< 16	< 16	< 16	< 16	< 33	< 16	< 16	< 33	< 16
MW-14	02/15/89	< 250	<1000	<1000	<1000	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 50
MW-14	03/14/89	< 420	<1700	<1700	<1700	< 85	< 85	< 85	< 85	< 170	< 85	< 85	< 85	< 85	< 170	< 85	< 85	< 170	< 85
MW-15	02/16/89	< 42	< 170	< 170	< 170	< 8.5	< 8.5	< 8.5	< 8.5	< 17	< 8.5	< 8.5	< 8.5	< 8.5	< 17	< 8.5	< 8.5	< 17	< 8.5
MW-15	03/15/89	< 25	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-29	02/22/89	< 25	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-29	03/13/89	< 25	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-30	02/14/89	< 50	< 200	< 200	< 200	< 10	< 10	< 10	< 10	< 20	< 10	< 10	< 10	< 10	< 20	< 10	< 10	< 20	< 10
MW-30	03/14/89	< 62	< 250	< 250	< 250	< 12	< 12	< 12	< 12	< 25	< 12	< 12	< 12	< 12	< 25	< 12	< 12	< 25	< 12
MW-31	02/13/89	< 25	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-31	03/15/89	< 25	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-32	02/16/89	<2500	<10000	<10000	<10000	< 500	< 500	< 500	< 500	<1000	< 500	< 500	< 500	< 500	<1000	< 500	< 500	<1000	< 500
MW-32	03/16/89	140	< 100	< 100	< 100	< 5.0	9.1	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	35	< 10	< 5.0
MW-33	02/14/89	<1200	<5000	<5000	<5000	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 500	< 250
MW-33	03/14/89	<1200	<5000	<5000	<5000	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 500	< 250
MW-34	08/16/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-34	08/28/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-35	08/15/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-35	08/28/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-36	08/15/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-36	08/28/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

APPENDIX IX VOLATILE ORGANIC ANALYSES SUMMARY
Part 1 of 3

(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	ACETONE (---)	ACETO-NITRILE (---)	ACROLEIN (---)	ACRYLO-NITRILE (---)	ALLYL CHLORIDE (---)	BENZENE (10)	BROMO-DICHLORO-METHANE (---)	BROMO-FORM (---)	BROMO-METHANE (---)	CARBON DISULFIDE (---)	CARBON TETRA-CHLORIDE (10)	CHLORO-BENZENE (---)	CHLORO-PRENE (---)	CHLORO-ETHANE (---)	CHLORO-DIBROMO-METHANE (---)	CHLORO-FORM (100)	CHLORO-METHANE (---)	1,2-DIBROMO-3-CHLORO-PROPANE (---)
MW-13	02/14/89	< 75	< 300	< 300	< 300	< 15	< 15	< 15	< 15	< 30	< 15	< 15	< 15	< 15	< 30	< 15	< 15	< 30	< 15
MW-13	03/13/89	< 82	< 330	< 330	< 330	< 16	< 16	< 16	< 16	< 33	< 16	< 16	< 16	< 16	< 33	< 16	< 16	< 33	< 16
MW-14	02/15/89	< 250	<1000	<1000	<1000	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 50
MW-14	03/14/89	< 420	<1700	<1700	<1700	< 85	< 85	< 85	< 85	< 170	< 85	< 85	< 85	< 85	< 170	< 85	< 85	< 170	< 85
MW-15	02/16/89	< 42	< 170	< 170	< 170	< 8.5	< 8.5	< 8.5	< 8.5	< 17	< 8.5	< 8.5	< 8.5	< 8.5	< 17	< 8.5	< 8.5	< 17	< 8.5
MW-15	03/15/89	< 25	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-29	02/22/89	< 25	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-29	03/13/89	< 25	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-30	02/14/89	< 50	< 200	< 200	< 200	< 10	< 10	< 10	< 10	< 20	< 10	< 10	< 10	< 10	< 20	< 10	< 10	< 20	< 10
MW-30	03/14/89	< 62	< 250	< 250	< 250	< 12	< 12	< 12	< 12	< 25	< 12	< 12	< 12	< 12	< 25	< 12	< 12	< 25	< 12
MW-31	02/13/89	< 25	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-31	03/15/89	< 25	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-32	02/16/89	<2500	<10000	<10000	<10000	< 500	< 500	< 500	< 500	<1000	< 500	< 500	< 500	< 500	<1000	< 500	< 500	<1000	< 500
MW-32	03/16/89	140	< 100	< 100	< 100	< 5.0	9.1	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	35	< 10	< 5.0
MW-33	02/14/89	<1200	<5000	<5000	<5000	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 500	< 250
MW-33	03/14/89	<1200	<5000	<5000	<5000	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 500	< 250
MW-34	08/16/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-34	08/28/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-35	08/15/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-35	08/28/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-36	08/15/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0
MW-36	08/28/89	< 10	< 100	< 100	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 10	< 5.0

SPARTON TECHNOLOGY, INC.
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ALBUQUERQUE, NEW MEXICO

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(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	ACETONE (---)	ACETO-NITRILE (---)	ACROLEIN (---)	ACRYLO-NITRILE (---)	ALLYL CHLORIDE (---)	BENZENE (10)	BROMO-DICHLORO-METHANE (---)	BROMO-FORM (---)	BROMO-METHANE (---)	CARBON DISULFIDE (---)	CARBON TETRA-CHLORIDE (10)	CHLORO-BENZENE (---)	CHLORO-PRENE (---)	CHLORO-ETHANE (---)	CHLORO-DIBROMO-METHANE (---)	CHLORO-FORM (100)	CHLORO-METHANE (---)	1,2-DIBROMO-3-CHLORO-PROPANE (---)
MW-37	08/15/89	< 100	<1000	<1000	<1000	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 50
MW-37	08/28/89	< 100	<1000	<1000	<1000	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 50
MW-38	11/06/89	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
MW-38	11/20/89	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
MW-39	11/06/89	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
MW-39	11/20/89	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
MW-40	11/07/89	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
MW-40	11/21/89	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
MW-41	11/07/89	< 100	<1000	<1000	<1000	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 50
MW-41	11/20/89	< 100	<1000	<1000	<1000	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 50
MW-42	12/12/89	< 100	<1000	<1000	<1000	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 50
MW-42	12/21/89	< 120	<1200	<1200	<1200	< 60	< 60	< 60	< 60	< 120	< 60	< 60	< 60	< 60	< 120	< 60	< 60	< 120	< 60
MW-43	12/12/89	< 25	< 250	< 250	< 250	< 12	< 12	< 12	< 12	< 25	< 12	< 12	< 12	< 12	< 25	< 12	< 12	< 25	< 12
MW-43	12/21/89	< 20	< 200	< 200	< 200	< 10	< 10	< 10	< 10	< 20	< 10	< 10	< 10	< 10	< 20	< 10	< 10	< 20	< 10
MW-44	01/04/90	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
MW-44	01/16/90	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5

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(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	ACETONE (---)	ACETO-NITRILE (---)	ACROLEIN (---)	ACRYLO-NITRILE (---)	ALLYL CHLORIDE (---)	BENZENE (10)	BROMO-DICHLORO-METHANE (---)	BROMO-FORM (---)	BROMO-METHANE (---)	CARBON DISULFIDE (---)	CARBON TETRA-CHLORIDE (10)	CHLORO-BENZENE (---)	CHLORO-PRENE (---)	CHLORO-ETHANE (---)	CHLORO-DIBROMO-METHANE (---)	CHLORO-FORM (100)	CHLORO-METHANE (---)	1,2-DIBROMO-3-CHLORO-PROPANE (---)
MW-45	01/04/90	< 200	<2000	<2000	<2000	< 100	< 100	< 100	< 100	< 200	< 100	< 100	< 100	< 100	< 200	< 100	< 100	< 200	< 100
MW-45	01/17/90	< 100	<1000	<1000	<1000	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 50
MW-46	01/04/90	< 500	<5000	<5000	<5000	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 250	< 250	< 500	< 250	< 250	< 500	< 250
MW-46	01/17/90	< 200	<2000	<2000	<2000	< 100	< 100	< 100	< 100	< 200	< 100	< 100	< 100	< 100	< 200	< 100	< 100	< 200	< 100
MW-47	01/03/90	< 50	< 500	< 500	< 500	< 25	< 25	< 25	< 25	< 50	< 25	< 25	< 25	< 25	< 50	< 25	< 25	< 50	< 25
MW-47	01/16/90	29	< 250	< 250	< 250	< 12	< 12	< 12	< 12	< 25	< 12	< 12	< 12	< 12	< 25	< 12	< 12	< 25	< 12
MW-47	06/20/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-48	01/03/90	< 100	<1000	<1000	<1000	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 50
MW-48	01/16/90	50	< 500	< 500	< 500	< 25	< 25	< 25	< 25	< 50	< 25	< 25	< 25	< 25	< 50	< 25	< 25	< 50	< 25
MW-48	06/20/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-48	08/20/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-48	08/20/90	110	<2000	<1000	<1000	< 100	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 100
MW-48	09/04/90	< 100	<2000	<1000	<1000	< 100	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 100	< 100
MW-49	01/25/90	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
MW-49	01/31/90	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
MW-50	04/18/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-51	04/25/90	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5

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(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	ACETONE (---)	ACETO-NITRILE (---)	ACROLEIN (---)	ACRYLO-NITRILE (---)	ALLYL CHLORIDE (---)	BENZENE (10)	BROMO-DICHLORO-METHANE (---)	BROMO-FORM (---)	BROMO-METHANE (---)	CARBON DISULFIDE (---)	CARBON TETRA-CHLORIDE (10)	CHLORO-BENZENE (---)	CHLORO-PRENE (---)	CHLORO-ETHANE (---)	CHLORO-DIBROMO-METHANE (---)	CHLORO-FORM (100)	CHLORO-METHANE (---)	1,2-DIBROMO-3-CHLORO-PROPANE (---)
MW-51	04/27/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-51	05/07/90	< 10	< 100	< 100	< 100	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 5
MW-52	06/05/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-52	06/07/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-53	06/20/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-55	08/21/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-55	08/21/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-55	09/04/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-56	08/20/90	23	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-56	08/20/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-56	09/05/90	18	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-57	08/31/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-58	09/13/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-58	10/05/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-58	10/15/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-59	09/21/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-59	10/04/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10

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(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	ACETONE (---)	ACETO-NITRILE (---)	ACROLEIN (---)	ACRYLO-NITRILE (---)	ALLYL CHLORIDE (---)	BENZENE (10)	BROMO-DICHLORO-METHANE (---)	BROMO-FORM (---)	BROMO-METHANE (---)	CARBON DISULFIDE (---)	CARBON TETRA-CHLORIDE (10)	CHLORO-BENZENE (---)	CHLORO-PRENE (---)	CHLORO-ETHANE (---)	CHLORO-DIBROMO-METHANE (---)	CHLORO-FORM (100)	CHLORO-METHANE (---)	1,2-DIBROMO-3-CHLORO-PROPANE (---)
MW-59	10/15/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-60	10/01/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-60	10/04/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-60	10/15/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-61	10/04/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-61	10/04/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-61	10/15/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-62	10/04/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-62	10/04/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-62	10/15/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-63	10/04/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-63	10/04/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-63	10/15/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-64	10/08/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
MW-64	10/08/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-64	10/15/90	< 10	< 200	< 100	< 100	< 10	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 10	< 10
PZ-1	04/25/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	1,2-DIBROMO-METHANE (---)	DIBROMO-METHANE (---)	TRANS-1,4-DICHLORO-2-BUTENE (---)	DICHLORO-DI-FLOURO-METHANE (---)	1,1-DI-CHLORO-ETHANE (25)	1,2-DI-CHLORO-ETHANE (10)	TRANS-1,2-DICHLORO-ETHENE (---)	1,1-DI-CHLORO-ETHENE (5)	METHYLENE CHLORIDE (100)	1,2-DI-CHLORO PROPANE (---)	CIS-1,3-DI-CHLORO-PROPENE (---)	TRANS-1,3-DI-CHLORO-PROPENE (---)	1,4-DIOXANE (---)	ETHYL BENZENE (750)	ETHYL CYANIDE (---)	2-HEXANONE (100)	IODO-METHANE (---)	ISOBUTYL ALCOHOL (---)
MW-13	02/14/89	< 15	< 15	< 15	< 30	< 15	< 15	< 15	47	< 75	< 15	< 15	< 15	< 300	< 15	< 15	< 30	< 15	< 300
MW-13	03/13/89	< 16	< 16	< 16	< 33	< 16	< 16	< 16	48	< 82	< 16	< 16	< 16	< 330	< 16	< 16	< 33	< 16	< 330
MW-14	02/15/89	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 250	< 50	< 50	< 50	<1000	< 50	< 50	< 100	< 50	<1000
MW-14	03/14/89	< 85	< 85	< 85	< 170	< 85	< 85	< 85	150	< 420	< 85	< 85	< 85	<1700	< 85	< 85	< 170	< 85	<1700
MW-15	02/16/89	< 8.5	< 8.5	< 8.5	< 17	< 8.5	< 8.5	< 8.5	10	< 42	< 8.5	< 8.5	< 8.5	< 170	< 8.5	< 8.5	< 17	< 8.5	< 170
MW-15	03/15/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	11	< 25	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-29	02/22/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 25	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-29	03/13/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 25	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-30	02/14/89	< 10	< 10	< 10	< 20	< 10	< 10	< 10	19	100	< 10	< 10	< 10	< 200	< 10	< 10	< 20	< 10	< 200
MW-30	03/14/89	< 12	< 12	< 12	< 25	< 12	< 12	< 12	19	110	< 12	< 12	< 12	< 250	< 12	< 12	< 25	< 12	< 250
MW-31	02/13/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 25	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-31	03/15/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 25	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-32	02/16/89	< 500	< 500	< 500	<1000	< 500	< 500	< 500	< 500	12000	< 500	< 500	< 500	<10000	< 500	< 500	<1000	< 500	<10000
MW-32	03/16/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	340	8600	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-33	02/14/89	< 250	< 250	< 250	< 500	< 250	< 250	< 250	750	<1200	< 250	< 250	< 250	<5000	< 250	< 250	< 500	< 250	<5000
MW-33	03/14/89	< 250	< 250	< 250	< 500	< 250	< 250	< 250	730	<1200	< 250	< 250	< 250	<5000	< 250	< 250	< 500	< 250	<5000
MW-34	08/16/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	6.6	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-34	08/28/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-35	08/15/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	5.9	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-35	08/28/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-36	08/15/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	5.3	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100
MW-36	08/28/89	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 100	< 5.0	< 5.0	< 10	< 5.0	< 100

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

APPENDIX IX VOLATILE ORGANIC ANALYSES SUMMARY
Part 2 of 3

(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	1,2-DIBROMO-METHANE (---)	DIBROMO-METHANE (---)	TRANS-1,4-DICHLORO-2-BUTENE (---)	DICHLORO-DI-FLOURO-METHANE (---)	1,1-DI-CHLORO-ETHANE (25)	1,2-DI-CHLORO-ETHANE (10)	TRANS-1,2-DICHLORO-ETHENE (---)	1,1-DI-CHLORO-ETHENE (5)	METHYLENE CHLORIDE (100)	1,2-DI-CHLORO PROPANE (---)	CIS-1,3-DI-CHLORO-PROPENE (---)	TRANS-1,3-DI-CHLORO-PROPENE (---)	1,4-DIOXANE (---)	ETHYL BENZENE (750)	ETHYL CYANIDE (---)	2-HEXANONE (100)	IODO-METHANE (---)	ISOBUTYL ALCOHOL (---)
MW-37	08/15/89	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	61	< 50	< 50	< 50	<1000	< 50	< 50	< 100	< 50	<1000
MW-37	08/28/89	< 50	< 50	< 50	< 100	< 50	< 50	< 50	67	< 50	< 50	< 50	< 50	<1000	< 50	< 50	< 100	< 50	<1000
MW-38	11/06/89	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100
MW-38	11/20/89	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100
MW-39	11/06/89	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100
MW-39	11/20/89	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100
MW-40	11/07/89	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100
MW-40	11/21/89	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100
MW-41	11/07/89	< 50	< 50	< 50	< 100	< 50	< 50	< 50	150	< 50	< 50	< 50	< 50	<1000	< 50	< 50	< 100	< 50	<1000
MW-41	11/20/89	< 50	< 50	< 50	< 100	< 50	< 50	< 50	110	< 50	< 50	< 50	< 50	<1000	< 50	< 50	< 100	< 50	<1000
MW-42	12/12/89	< 50	< 50	< 50	< 100	< 50	< 50	< 50	140	< 50	< 50	< 50	< 50	<1000	< 50	< 50	< 100	< 50	<1000
MW-42	12/21/89	< 60	< 60	< 60	< 120	< 60	< 60	< 60	130	< 60	< 60	< 60	< 60	<1200	< 60	< 60	< 120	< 60	<1200
MW-43	12/12/89	< 12	< 12	< 12	< 25	< 12	< 12	< 12	55	< 12	< 12	< 12	< 12	< 250	< 12	< 12	< 25	< 12	< 250
MW-43	12/21/89	< 10	< 10	< 10	< 20	< 10	< 10	< 10	46	< 10	< 10	< 10	< 10	< 200	< 10	< 10	< 20	< 10	< 200
MW-44	01/04/90	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100
MW-44	01/16/90	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

APPENDIX IX VOLATILE ORGANIC ANALYSES SUMMARY
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(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	1,2-DIBROMO-METHANE (---)	DIBROMO-METHANE (---)	TRANS-1,4-DICHLORO-2-BUTENE (---)	DICHLORO-DI-FLOURO-METHANE (---)	1,1-DI-CHLORO-ETHANE (25)	1,2-DI-CHLORO-ETHANE (10)	TRANS-1,2-DICHLORO-ETHENE (---)	1,1-DI-CHLORO-ETHENE (5)	METHYLENE CHLORIDE (100)	1,2-DI-CHLORO PROPANE (---)	CIS-1,3-DI-CHLORO-PROPENE (---)	TRANS-1,3-DI-CHLORO-PROPENE (---)	1,4-DIOXANE (---)	ETHYL BENZENE (750)	ETHYL CYANIDE (---)	2-HEXANONE (100)	IODO-METHANE (---)	ISOBUTYL ALCOHOL (---)
MW-45	01/04/90	< 100	< 100	< 100	< 200	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	<2000	< 100	< 100	< 200	< 100	<2000
MW-45	01/17/90	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	<1000	< 50	< 50	< 100	< 50	<1000
MW-46	01/04/90	< 250	< 250	< 250	< 500	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 250	<5000	< 250	< 250	< 500	< 250	<5000
MW-46	01/17/90	< 100	< 100	< 100	< 200	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	<2000	< 100	< 100	< 200	< 100	<2000
MW-47	01/03/90	< 25	< 25	< 25	< 50	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 500	< 25	< 25	< 50	< 25	< 500
MW-47	01/16/90	< 12	< 12	< 12	< 25	< 12	< 12	< 12	< 12	< 12	< 12	< 12	< 12	< 250	< 12	< 12	< 25	< 12	< 250
MW-47	06/20/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-48	01/03/90	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	70	< 50	< 50	< 50	<1000	< 50	< 50	< 100	< 50	<1000
MW-48	01/16/90	< 25	< 25	< 25	< 50	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 500	< 25	< 25	< 50	< 25	< 500
MW-48	06/20/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-48	08/20/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-48	08/20/90	< 100	< 50	< 50	< 200	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	<5000	< 50	< 50	< 100	< 50	<2000
MW-48	09/04/90	< 100	< 50	< 50	< 200	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	<5000	< 50	< 50	< 100	< 50	<2000
MW-49	01/25/90	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100
MW-49	01/31/90	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100
MW-50	04/18/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-51	04/25/90	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100

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SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

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(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	1,2-DIBROMO-METHANE (---)	DIBROMO-METHANE (---)	TRANS-1,4-DICHLORO-2-BUTENE (---)	DICHLORO-DI-FLOURO-METHANE (---)	1,1-DI-CHLORO-ETHANE (25)	1,2-DI-CHLORO-ETHANE (10)	TRANS-1,2-DICHLORO-ETHENE (---)	1,1-DI-CHLORO-ETHENE (5)	METHYLENE CHLORIDE (100)	1,2-DI-CHLORO PROPANE (---)	CIS-1,3-DI-CHLORO-PROPENE (---)	TRANS-1,3-DI-CHLORO-PROPENE (---)	1,4-DIOXANE (---)	ETHYL BENZENE (750)	ETHYL CYANIDE (---)	2-HEXANONE (100)	IODO-METHANE (---)	ISOBUTYL ALCOHOL (---)
MW-51	04/27/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-51	05/07/90	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 100	< 5	< 5	< 10	< 5	< 100
MW-52	06/05/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-52	06/07/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-53	06/20/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-55	08/21/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-55	08/21/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-55	09/04/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-56	08/20/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-56	08/20/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-56	09/05/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-57	08/31/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-58	09/13/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-58	10/05/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-58	10/15/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-59	09/21/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-59	10/04/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200

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SPARTON TECHNOLOGY, INC.
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ALBUQUERQUE, NEW MEXICO

APPENDIX IX VOLATILE ORGANIC ANALYSES SUMMARY
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(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	1,2-DIBROMO-METHANE (---)	DIBROMO-METHANE (---)	TRANS-1,4-DICHLORO-2-BUTENE (---)	DICHLORO-DI-FLOURO-METHANE (---)	1,1-DI-CHLORO-ETHANE (25)	1,2-DI-CHLORO-ETHANE (10)	TRANS-1,2-DICHLORO-ETHENE (---)	1,1-DI-CHLORO-ETHENE (5)	METHYLENE CHLORIDE (100)	1,2-DI-CHLORO PROPANE (---)	CIS-1,3-DI-CHLORO-PROPENE (---)	TRANS-1,3-DI-CHLORO-PROPENE (---)	1,4-DIOXANE (---)	ETHYL BENZENE (750)	ETHYL CYANIDE (---)	2-HEXANONE (100)	IODO-METHANE (---)	ISOBUTYL ALCOHOL (---)
MW-59	10/15/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-60	10/01/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-60	10/04/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-60	10/15/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-61	10/04/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-61	10/04/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-61	10/15/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-62	10/04/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	6.8	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-62	10/04/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-62	10/15/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	7.2	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-63	10/04/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-63	10/04/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-63	10/15/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-64	10/08/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
MW-64	10/08/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-64	10/15/90	< 10	< 5	< 5	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 500	< 5	< 5	< 10	< 5	< 200
PZ-1	04/25/90	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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SPARTON TECHNOLOGY, INC.
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(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	METH-ACRYLO-NITRILE (---)	METHYL ETHYL KETONE (---)	4-METHYL-2-PENTANONE (---)	STYRENE (---)	1,1,1,2-TETRA-CHLORO-ETHANE (---)	1,1,2,2-TETRA-CHLORO-ETHANE (10)	TETRA-CHLORO-ETHENE (20)	TOLUENE (750)	1,1,1-TRI-CHLORO-ETHANE (60)	1,1,2-TRI-CHLORO-ETHANE (10)	TRI-CHLORO-ETHENE (100)	TRI-CHLORO-FLUORO-METHANE (---)	1,2,3-TRI-CHLORO-PROPANE (---)	VINYL ACETATE (---)	VINYL CHLORIDE (1)	TOTAL XYLENES (620)
MW-13	02/14/89	< 15	< 75	< 30	< 15	< 15	< 15	< 15	< 15	250	< 15	610	< 15	< 15	< 30	< 30	< 15
MW-13	03/13/89	< 16	< 82	< 33	< 16	< 16	< 16	< 16	< 16	220	< 16	650	< 16	< 16	< 33	< 33	< 16
MW-14	02/15/89	< 50	< 250	< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	1100	< 50	< 50	< 100	< 100	< 50
MW-14	03/14/89	< 85	< 420	< 170	< 85	< 85	< 85	< 85	< 85	150	< 85	3700	< 85	< 85	< 170	< 170	< 85
MW-15	02/16/89	< 8.5	< 42	< 17	< 8.5	< 8.5	< 8.5	< 8.5	< 8.5	80	< 8.5	210	< 8.5	< 8.5	< 17	< 17	< 8.5
MW-15	03/15/89	< 5.0	< 25	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	75	< 5.0	210	< 5.0	< 5.0	< 10	< 10	< 5.0
MW-29	02/22/89	< 5.0	< 25	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.7	< 5.0	< 5.0	< 10	< 10	< 5.0
MW-29	03/13/89	< 5.0	< 25	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.4	< 5.0	< 5.0	< 10	< 10	< 5.0
MW-30	02/14/89	< 10	< 50	< 20	< 10	< 10	< 10	< 10	< 10	11	< 10	320	< 10	< 10	< 20	< 20	< 10
MW-30	03/14/89	< 12	< 62	< 25	< 12	< 12	< 12	< 12	< 12	< 12	< 12	320	< 12	< 12	< 25	< 25	< 12
MW-31	02/13/89	< 5.0	< 25	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	120	< 5.0	< 5.0	< 10	< 10	< 5.0
MW-31	03/15/89	< 5.0	< 25	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	120	< 5.0	< 5.0	< 10	< 10	< 5.0
MW-32	02/16/89	< 500	<2500	<1000	< 500	< 500	< 500	< 500	< 500	< 500	< 500	4800	< 500	< 500	<1000	<1000	< 500
MW-32	03/16/89	< 5.0	< 25	< 10	< 5.0	< 5.0	< 5.0	20	33	300	< 5.0	3400	< 5.0	< 5.0	< 10	< 10	9.6
MW-33	02/14/89	< 250	<1200	< 500	< 250	< 250	< 250	< 250	< 250	2500	< 250	7500	< 250	< 250	< 500	< 500	< 250
MW-33	03/14/89	< 250	<1200	< 500	< 250	< 250	< 250	< 250	< 250	2500	< 250	7000	< 250	< 250	< 500	< 500	< 250
MW-34	08/16/89	< 5.0	< 10	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	< 5.0
MW-34	08/28/89	< 5.0	< 10	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	< 5.0
MW-35	08/15/89	< 5.0	< 10	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	< 5.0
MW-35	08/28/89	< 5.0	< 10	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	< 5.0
MW-36	08/15/89	< 5.0	< 10	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	7.9	< 5.0	< 5.0	< 10	< 10	< 5.0
MW-36	08/28/89	< 5.0	< 10	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	11	< 5.0	< 5.0	< 10	< 10	< 5.0

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
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(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	METH-ACRYLO-NITRILE (---)	METHYL ETHYL KETONE (---)	4-METHYL-2-PENTANONE (---)	STYRENE (---)	1,1,1,2-TETRA-CHLORO-ETHANE (---)	1,1,2,2-TETRA-CHLORO-ETHANE (10)	TETRA-CHLORO-ETHENE (20)	TOLUENE (750)	1,1,1-TRI-CHLORO-ETHANE (60)	1,1,2-TRI-CHLORO-ETHANE (10)	TRI-CHLORO-ETHENE (100)	TRI-CHLORO-FLUORO-METHANE (---)	1,2,3-TRI-CHLORO-PROPANE (---)	VINYL ACETATE (---)	VINYL CHLORIDE (1)	TOTAL XYLENES (620)
MW-37	08/15/89	< 50	< 100	< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	1100	< 50	< 50	< 100	< 100	< 50
MW-37	08/28/89	< 50	< 100	< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	1800	< 50	< 50	< 100	< 100	< 50
MW-38	11/06/89	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-38	11/20/89	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	5.7	< 5	< 10	< 10	< 5
MW-39	11/06/89	< 5	< 10	< 10	< 5	< 5	< 5	< 5	5.3	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-39	11/20/89	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-40	11/07/89	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	5.4	< 5	< 10	< 10	< 5
MW-40	11/21/89	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-41	11/07/89	< 50	< 100	< 100	< 50	< 50	< 50	< 50	< 50	310	< 50	1100	< 50	< 50	< 100	< 100	< 50
MW-41	11/20/89	< 50	< 100	< 100	< 50	< 50	< 50	< 50	< 50	290	< 50	960	< 50	< 50	< 100	< 100	< 50
MW-42	12/12/89	< 50	< 100	< 100	< 50	< 50	< 50	< 50	< 50	200	< 50	1100	< 50	< 50	< 100	< 100	< 50
MW-42	12/21/89	< 60	< 120	< 120	< 60	< 60	< 60	< 60	< 60	200	< 60	1200	< 60	< 60	< 120	< 120	< 60
MW-43	12/12/89	< 12	< 25	< 25	< 12	< 12	< 12	< 12	< 12	100	< 12	270	< 12	< 12	< 25	< 25	< 12
MW-43	12/21/89	< 10	< 20	< 20	< 10	< 10	< 10	< 10	< 10	86	< 10	160	< 10	< 10	< 20	< 20	< 10
MW-44	01/04/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-44	01/16/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5

NOTE : State standards, where they exist, are shown in parentheses.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

APPENDIX IX VOLATILE ORGANIC ANALYSES SUMMARY
Part 3 of 3

(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	METH-ACRYLO-NITRILE (---)	METHYL ETHYL KETONE (---)	4-METHYL-2-PENTANONE (---)	STYRENE (---)	1,1,1,2-TETRA-CHLORO-ETHANE (---)	1,1,2,2-TETRA-CHLORO-ETHANE (10)	TETRA-CHLORO-ETHENE (20)	TOLUENE (750)	1,1,1-TRI-CHLORO-ETHANE (60)	1,1,2-TRI-CHLORO-ETHANE (10)	TRI-CHLORO-ETHENE (100)	TRI-CHLORO-FLUORO-METHANE (---)	1,2,3-TRI-CHLORO-PROPANE (---)	VINYL ACETATE (---)	VINYL CHLORIDE (1)	TOTAL XYLENES (620)
MW-45	01/04/90	< 100	< 200	< 200	< 100	< 100	< 100	< 100	< 100	< 100	< 100	1400	< 100	< 100	< 200	< 200	< 100
MW-45	01/17/90	< 50	< 100	< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	1400	< 50	< 50	< 100	< 100	< 50
MW-46	01/04/90	< 250	< 500	< 500	< 250	< 250	< 250	< 250	< 250	< 250	< 250	4200	< 250	< 250	< 500	< 500	< 250
MW-46	01/17/90	< 100	< 200	< 200	< 100	< 100	< 100	< 100	< 100	100	< 100	2300	< 100	< 100	< 200	< 200	< 100
MW-47	01/03/90	< 25	< 50	< 50	< 25	< 25	< 25	< 25	< 25	< 25	< 25	310	< 25	< 25	< 50	< 50	< 25
MW-47	01/16/90	< 12	< 25	< 25	< 12	< 12	< 12	< 12	< 12	< 12	< 12	330	< 12	< 12	< 25	< 25	< 12
MW-47	06/20/90	---	---	---	---	---	---	---	---	---	---	220	---	---	---	---	---
MW-48	01/03/90	< 50	< 100	< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	820	< 50	< 50	< 100	< 100	< 50
MW-48	01/16/90	< 25	< 50	< 50	< 25	< 25	< 25	< 25	< 25	< 25	< 25	830	< 25	< 25	< 50	< 50	< 25
MW-48	06/20/90	---	---	---	---	---	---	---	---	---	---	820	---	---	---	---	---
MW-48	08/20/90	---	---	---	---	---	---	---	---	---	---	600	---	---	---	---	---
MW-48	08/20/90	< 50	< 100	< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	1100	< 50	< 50	< 100	< 100	< 50
MW-48	09/04/90	< 50	< 100	< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	930	< 50	< 50	< 100	< 100	< 50
MW-49	01/25/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	12	< 5	< 10	< 10	< 5
MW-49	01/31/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	6.9	< 5	< 10	< 10	< 5
MW-50	04/18/90	---	---	---	---	---	---	---	---	---	---	< 1	---	---	---	---	---
MW-51	04/25/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	8.5	< 5	< 5	< 10	< 10	< 5

NOTE : State standards, where they exist, are shown in parentheses.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

APPENDIX IX VOLATILE ORGANIC ANALYSES SUMMARY
Part 3 of 3

(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	METH-ACRYLO-NITRILE (---)	METHYL ETHYL KETONE (---)	4-METHYL-2-PENTANONE (---)	STYRENE (---)	1,1,1,2-TETRA-CHLORO-ETHANE (---)	1,1,2,2-TETRA-CHLORO-ETHANE (10)	TETRA-CHLORO-ETHENE (20)	TOLUENE (750)	1,1,1-TRI-CHLORO-ETHANE (60)	1,1,2-TRI-CHLORO-ETHANE (10)	TRI-CHLORO-ETHENE (100)	TRI-CHLORO-FLUORO-METHANE (---)	1,2,3-TRI-CHLORO-PROPANE (---)	VINYL ACETATE (---)	VINYL CHLORIDE (1)	TOTAL XYLENES (620)
MW-51	04/27/90	---	---	---	---	---	---	---	---	---	---	6.2	---	---	---	---	---
MW-51	05/07/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	6.7	< 5	< 5	< 10	< 10	< 5
MW-52	06/05/90	---	---	---	---	---	---	---	---	---	---	< 1	---	---	---	---	---
MW-52	06/07/90	---	---	---	---	---	---	---	---	---	---	< 1	---	---	---	---	---
MW-53	06/20/90	---	---	---	---	---	---	---	---	---	---	< 1	---	---	---	---	---
MW-55	08/21/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	13	< 5	< 5	< 10	< 10	< 5
MW-55	08/21/90	---	---	---	---	---	---	---	---	---	---	9.2	---	---	---	---	---
MW-55	09/04/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	12	< 5	< 5	< 10	< 10	< 5
MW-56	08/20/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	50	< 5	< 5	< 10	< 10	< 5
MW-56	08/20/90	---	---	---	---	---	---	---	---	---	---	29	---	---	---	---	---
MW-56	09/05/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	98	< 5	< 5	< 10	< 10	< 5
MW-57	08/31/90	---	---	---	---	---	---	---	---	---	---	< 1	---	---	---	---	---
MW-58	09/13/90	---	---	---	---	---	---	---	---	---	---	20	---	---	---	---	---
MW-58	10/05/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	22	< 5	< 5	< 10	< 10	< 5
MW-58	10/15/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	22	< 5	< 5	< 10	< 10	< 5
MW-59	09/21/90	---	---	---	---	---	---	---	---	---	---	< 1	---	---	---	---	---
MW-59	10/04/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5

NOTE : State standards, where they exist, are shown in parentheses.

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

APPENDIX IX VOLATILE ORGANIC ANALYSES SUMMARY
Part 3 of 3

(all concentrations in micrograms per liter (ug/l))

SAMPLE ID	DATE SAMPLED	METH-ACRYLO-NITRILE (---)	METHYL ETHYL KETONE (---)	4-METHYL-2-PENTANONE (---)	STYRENE (---)	1,1,1,2-TETRA-CHLORO-ETHANE (---)	1,1,2,2-TETRA-CHLORO-ETHANE (10)	TETRA-CHLORO-ETHENE (20)	TOLUENE (750)	1,1,1-TRI-CHLORO-ETHANE (60)	1,1,2-TRI-CHLORO-ETHANE (10)	TRI-CHLORO-ETHENE (100)	TRI-CHLORO-FLUORO-METHANE (---)	1,2,3-TRI-CHLORO-PROPANE (---)	VINYL ACETATE (---)	VINYL CHLORIDE (1)	TOTAL XYLENES (620)
MW-59	10/15/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-60	10/01/90	---	---	---	---	---	---	---	---	---	---	< 1	---	---	---	---	---
MW-60	10/04/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-60	10/15/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-61	10/04/90	---	---	---	---	---	---	---	---	---	---	< 1.0	---	---	---	---	---
MW-61	10/04/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-61	10/15/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-62	10/04/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	11	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-62	10/04/90	---	---	---	---	---	---	---	---	---	---	2.2	---	---	---	---	---
MW-62	10/15/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	12	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-63	10/04/90	---	---	---	---	---	---	---	---	---	---	< 1.0	---	---	---	---	---
MW-63	10/04/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-63	10/15/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-64	10/08/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
MW-64	10/08/90	---	---	---	---	---	---	---	---	---	---	< 1.0	---	---	---	---	---
MW-64	10/15/90	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 5
PZ-1	04/25/90	---	---	---	---	---	---	---	---	---	---	< 1	---	---	---	---	---

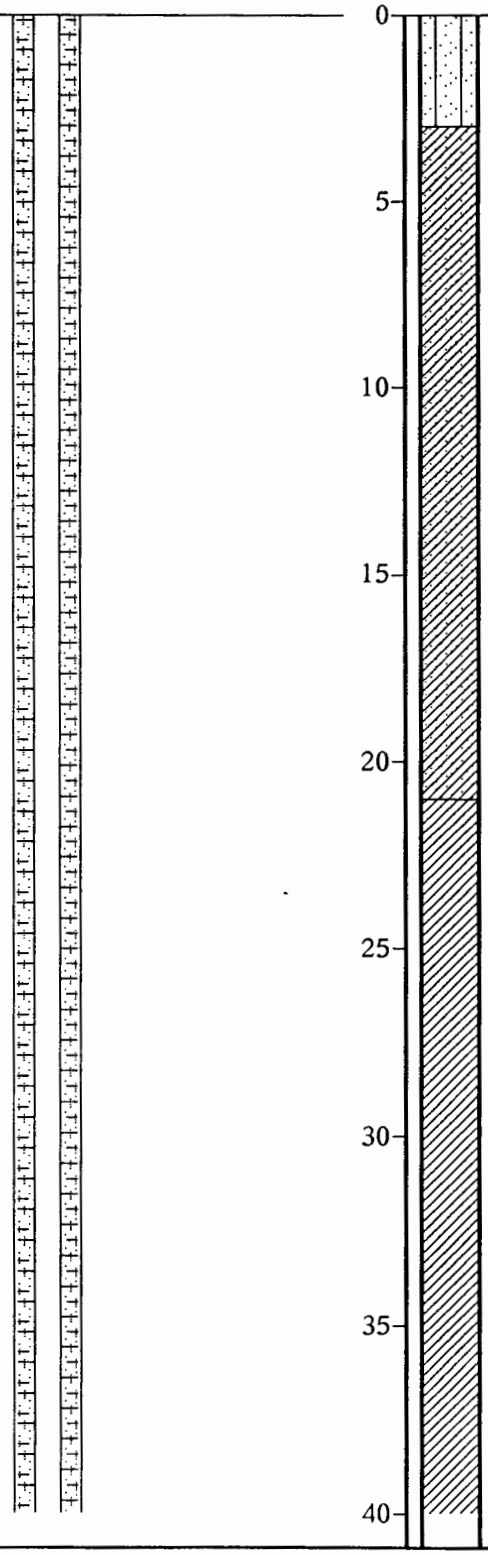
NOTE : State standards, where they exist, are shown in parentheses.

Top of PVC Casing Elevation 5142.22

Equipment GD-1500

Elevation ft **Date** 4/13/90

GROUND SURFACE



TAN SILTY FINE TO MEDIUM SAND (SM)

TAN & BROWN CLAYEY MEDIUM TO COARSE SAND (SC)

TAN SILTY CLAY (CL) with fine sand

Cement/Bentonite Grout

2" PVC Casing to 173 feet

6-3/4" Borehole to 206 feet

Harding Lawson Associates Engineers and Environmental Services

MONITORING WELL DETAIL PZ-1

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

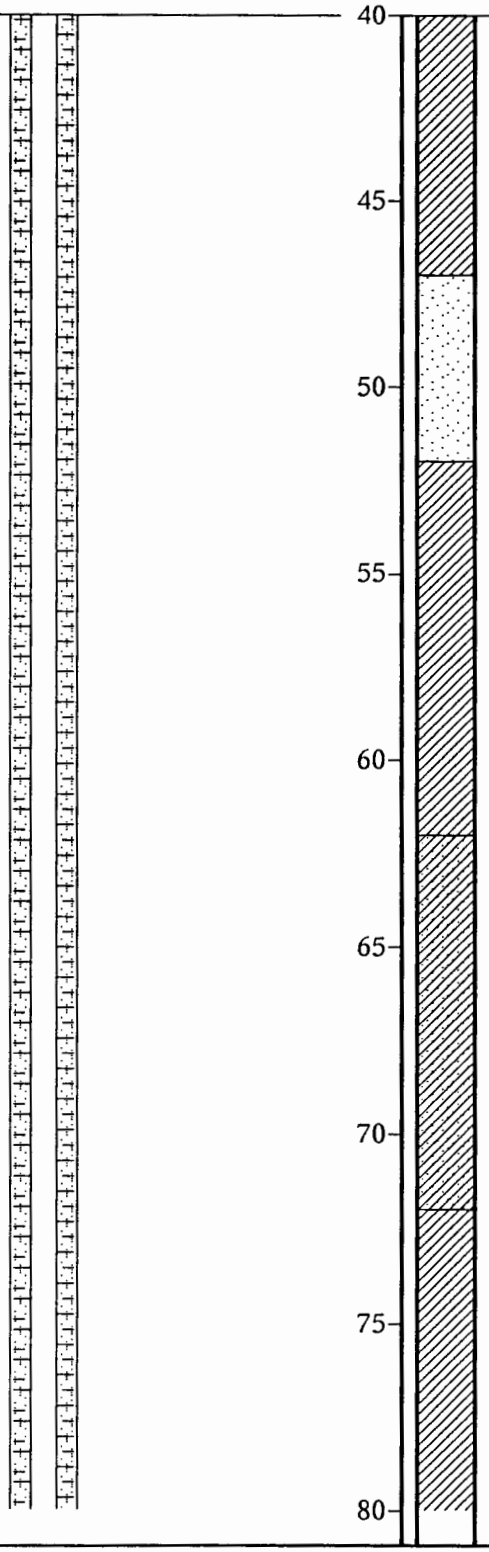
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5142.22

Equipment GD-1500

Elevation ft Date 4/13/90

GROUND SURFACE



TAN, BROWN & BLACK MEDIUM TO COARSE SAND (SP)

TAN SILTY CLAY (CL)
with sand

-with medium grained sand seam from 57 to 59 feet

TAN, BROWN & BLACK MEDIUM TO COARSE SAND (SC)

TAN SILTY CLAY (CL)
with sand

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL PZ-1

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

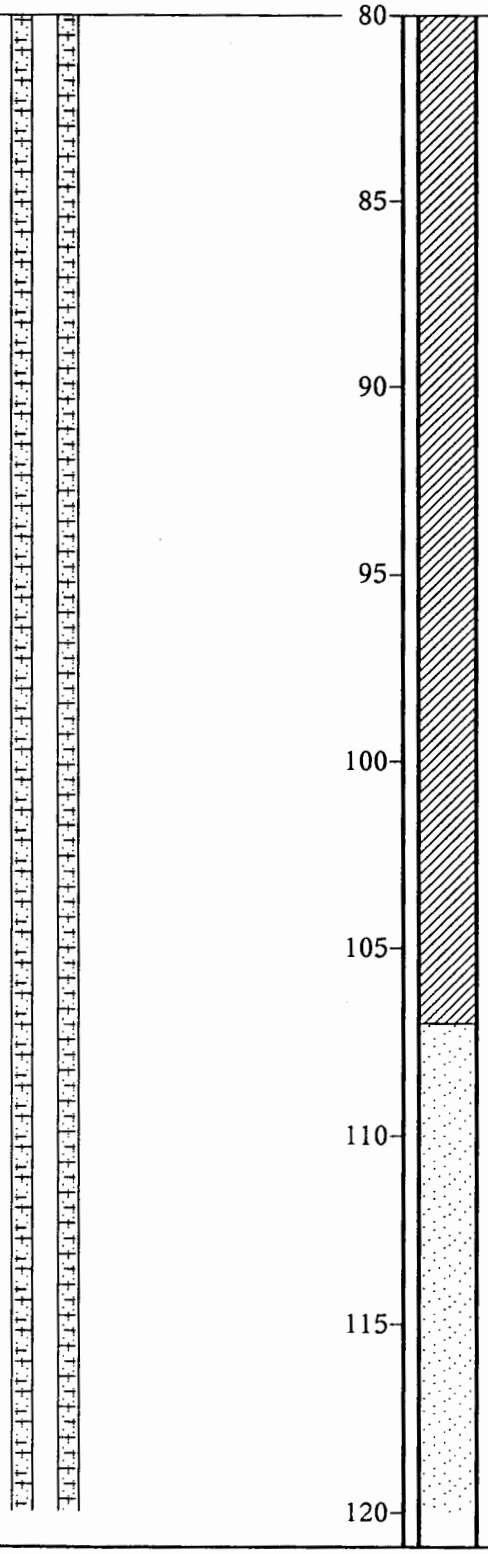
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5142.22

Equipment GD-1500

Elevation ft **Date** 4/13/90

GROUND SURFACE



BROWN, TAN & BLACK MEDIUM TO COARSE SAND (SP)
with occasional gravel and sandy clay pockets

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL PZ-1

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

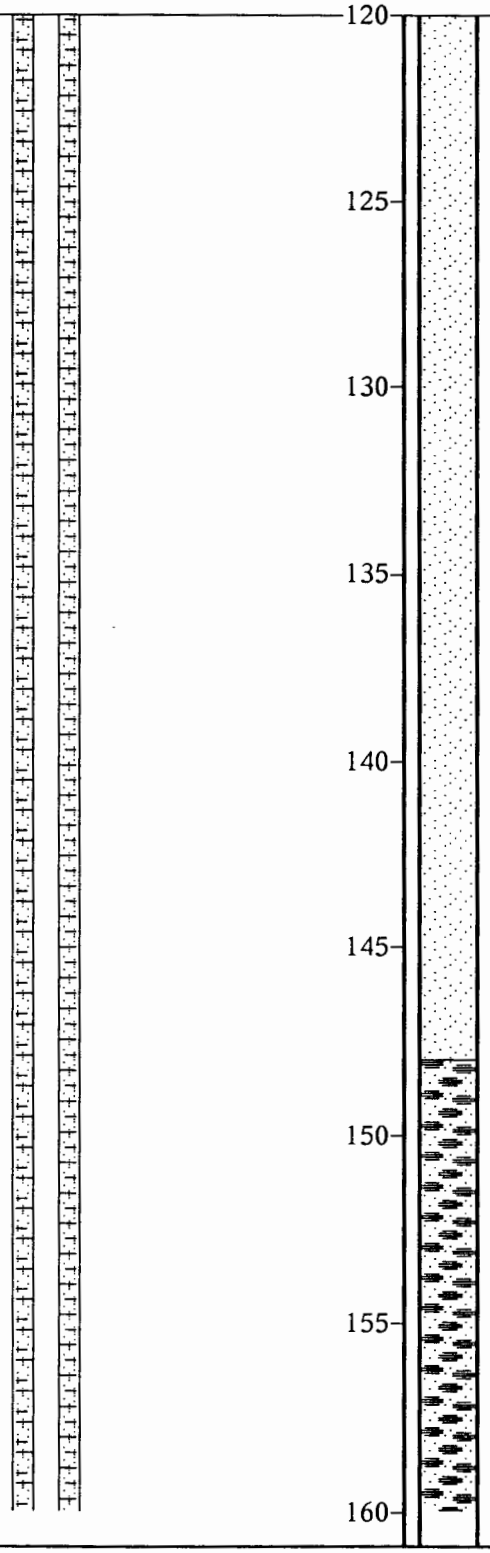
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5142.22

Equipment GD-1500

Elevation ft **Date** 4/13/90

GROUND SURFACE



TAN, BROWN & BLACK SANDY GRAVEL (GP)

Harding Lawson Associates Engineers and Environmental Services

MONITORING WELL DETAIL PZ-1

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

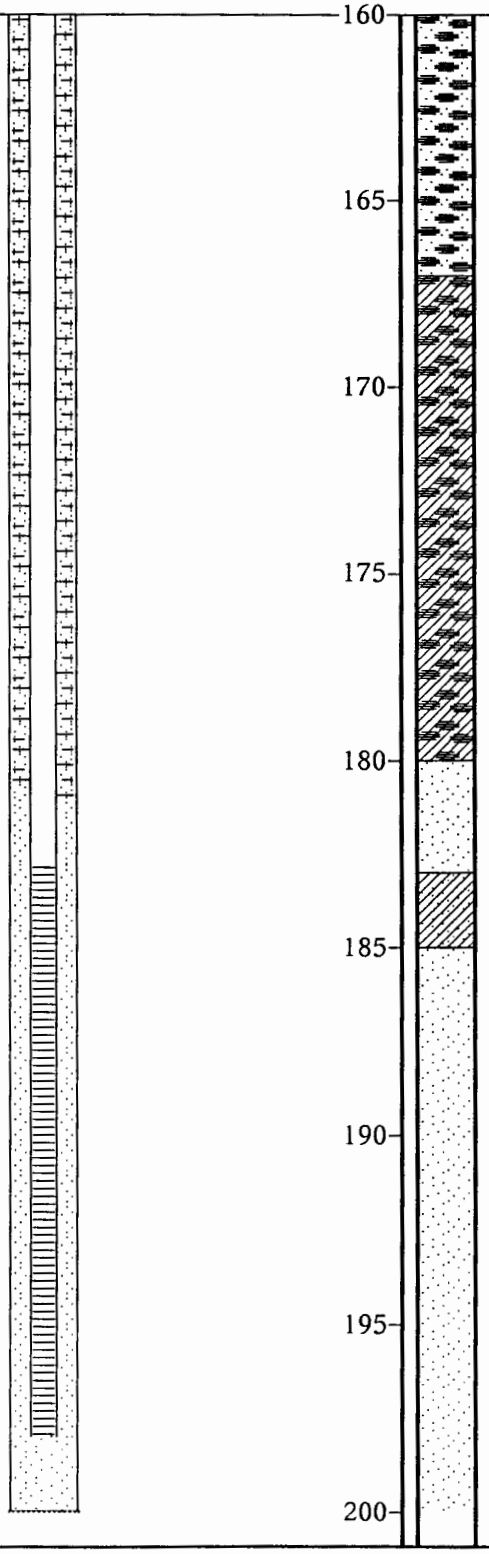
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5142.22

Equipment GD-1500

Elevation ft **Date** 4/13/90

GROUND SURFACE



TAN, BROWN & BLACK CLAYEY GRAVEL (GC)

Stainless Steel casing from 173 to 182.8 feet

TAN, BROWN & BLACK FINE TO COARSE SAND (SW)
with gravel

TAN, BROWN & BLACK CLAYEY FINE TO MEDIUM SAND (SC)

TAN, BROWN & BLACK MEDIUM TO COARSE SAND (SP)
with gravel

Sandpack:
20x40 sand
(180'-181')
10x20 sand
(181'-206')

-with .2' clay seam at 190 feet

2" Stainless Steel Screen (Slot size 0.02") from 138.8 to 149 feet

Bottom Cap

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL PZ-1

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

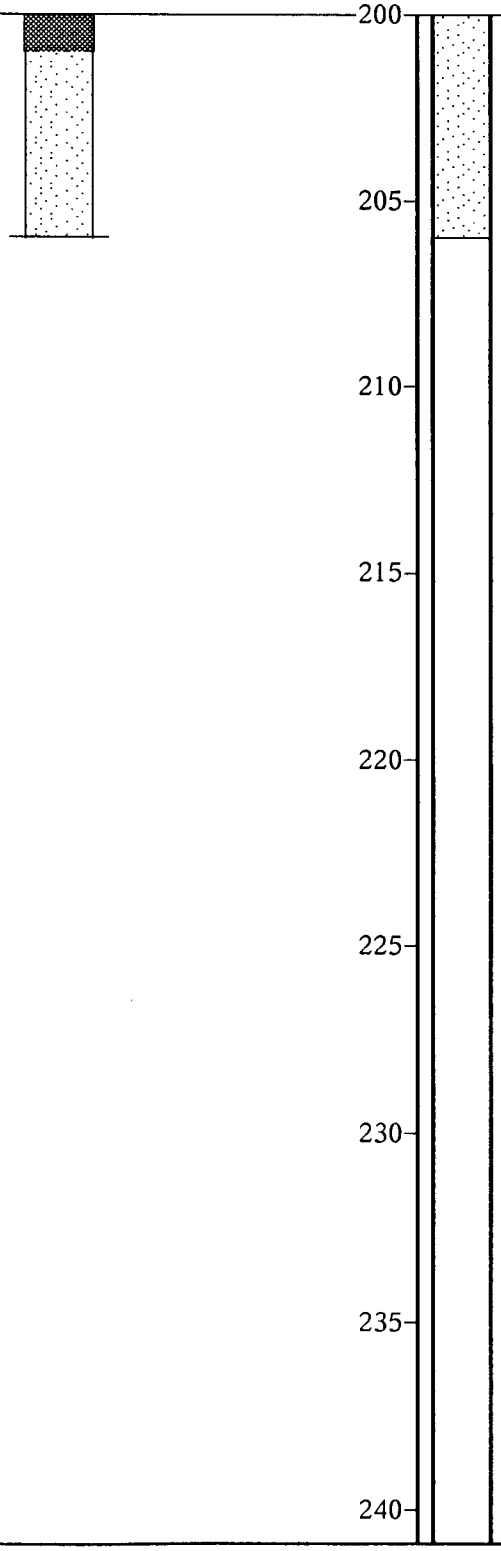
Top of PVC Casing Elevation 5142.22

Equipment GD-1500

Elevation ft **Date** 4/13/90

GROUND SURFACE

Bentonite pellet seal



End of Boring at 206 feet.

Harding Lawson Associates Engineers and Environmental Services

MONITORING WELL DETAIL PZ-1

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

METRIC
Corporation

SAMPLE LOG

Well Number MW-34 (OS) Well Location Off site along Irving Blvd.

Well Owner Sparton Technology, Inc.

Sample Logger Peter H. Metzner, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow-stem augers

Date of Completion 6-2-89 Ground Elev. 5034.52

Depth (feet)	Thickness (feet)	Stratigraphic Description
0-5	5	Moderate yellowish brown (10 YR 5/4), poorly sorted fine to very coarse-grained sand with some pebbles (SP)
5-10	5	Moderate yellowish brown (10 YR 5/4), well sorted medium-grained sand with some large pebbles (SW)
10-15	5	Moderate yellowish brown (10 YR 5/4), well sorted medium-grained sand with some granular gravel (SW)
15-20	5	Moderate yellowish brown (10 YR 5/4), well sorted medium-grained sand with pebbles to 10mm (SW)
20-30	10	Moderate yellowish brown (10YR 5/4), well sorted fine-grained sand with some granular gravel (SW)
30-35	5	Moderate yellowish brown (10 YR 5/4), well sorted fine-grained sand (SW)
35-40	5	Moderate yellowish brown (10 YR 5/4), well sorted fine-grained sand with some pebbles from 10 to 20mm (SW)
40-45	5	Moderate yellowish brown (10 YR 5/4), well sorted fine-grained sand with pebbles from 10 to 40mm (SW)

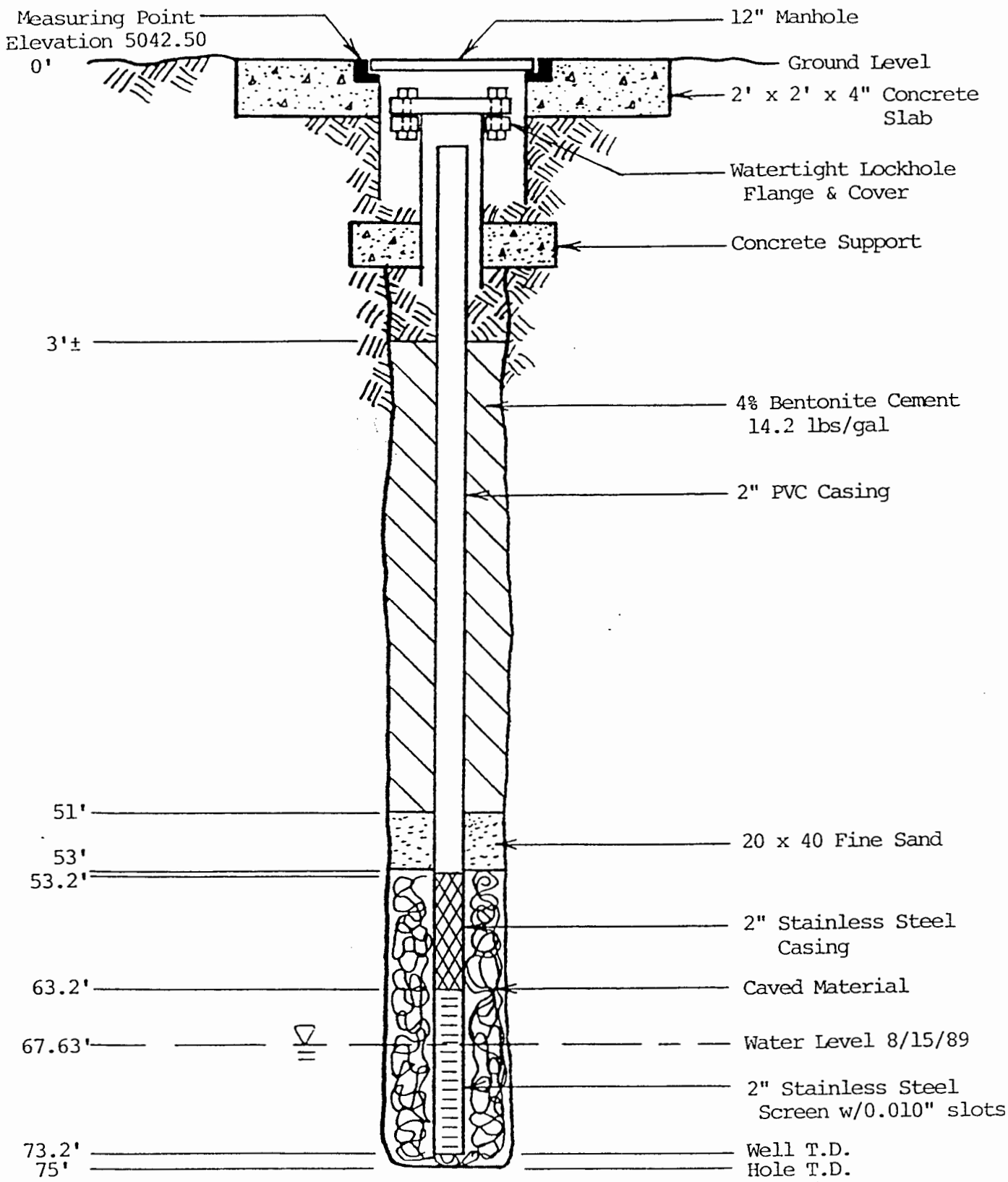
METRIC
Corporation

SAMPLE LOG
Continued

Well Number MW-34 (OS) Well Location Off site along Irving Blvd.

(Continued from Previous Page)

Depth (feet)	Thickness (feet)	Stratigraphic Description
45-55	10	Moderate yellowish brown (10 YR 5/4), fine-grained sand with pebbles from 10 to 50mm (SP)
55-59	4	Moderate yellowish brown (10 YR 5/4), fine-grained sand with pebbles from 4 to 70mm (SW)
59-66	7	Pale yellowish brown (10 YR 6/2), fine to medium-grained sand (SP)
60-66.5	.5	Moderate yellowish brown (10 YR 5/4), very fine-grained clayey sand (SC)



CONSTRUCTION DIAGRAM
MW-35-OS

METRIC
Corporation

SAMPLE LOG

Well Number MW-35 (OS) Well Location Off site along Irving Blvd.

Well Owner Sparton Technology, Inc.

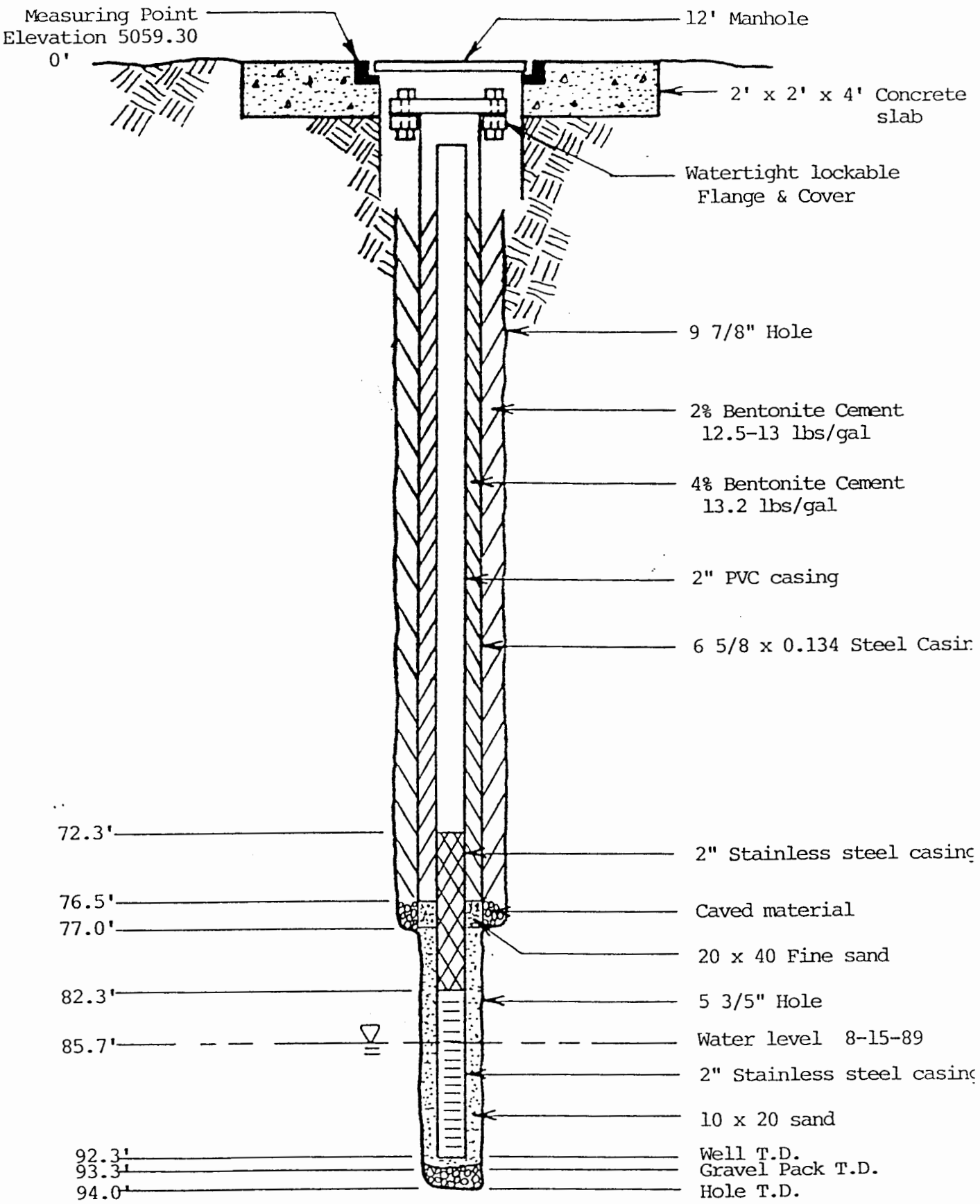
Sample Logger Peter H. Metzner, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow-stem augers

Date of Completion 6-9-89 Ground Elev. 5042.50

Depth (feet)	Thickness (feet)	Stratigraphic Description
0-5	5	Moderate yellowish brown (10 YR 5/4), well sorted fine-grained sand (SW)
5-10	5	Moderate yellowish brown (10 YR 5/4), well sorted fine-grained sand to silt (SM)
10-20	10	Moderate yellowish brown (10 YR 5/4), well sorted very fine-grained sand (SW)
20-25	5	Moderate yellowish brown (10 YR 5/4), well sorted very fine-grained sand with some pebbles (SW)
25-35	10	Dark yellowish brown (10 YR 4/2), well sorted fine-grained sand to silt (SM)
35-45	10	Dark yellowish brown (10 YR 4/2), fine sandy clay (CL)
45-51	6	Dark yellowish brown (10 YR 4/2), clayey fine sand (SC)
51-55	4	Dark yellowish brown (10 YR 4/2), fine-grained sand with pebbles from 5 to 30mm (SP)
55-68	13	Moderate yellowish brown (10 YR 5/4), fine to very fine-grained sand interbedded with pebbles from 10 to 70mm (SP)
68-75.5	7.5	Light brown (5 YR 6/4), fine to very fine sand (SP)



CONSTRUCTION DIAGRAM
MW-36-OS

METRIC
Corporation

SAMPLE LOG

Well Number MW-36 (OS) Well Location Off site along Irving Blvd.

Well Owner Sparton Technology, Inc.

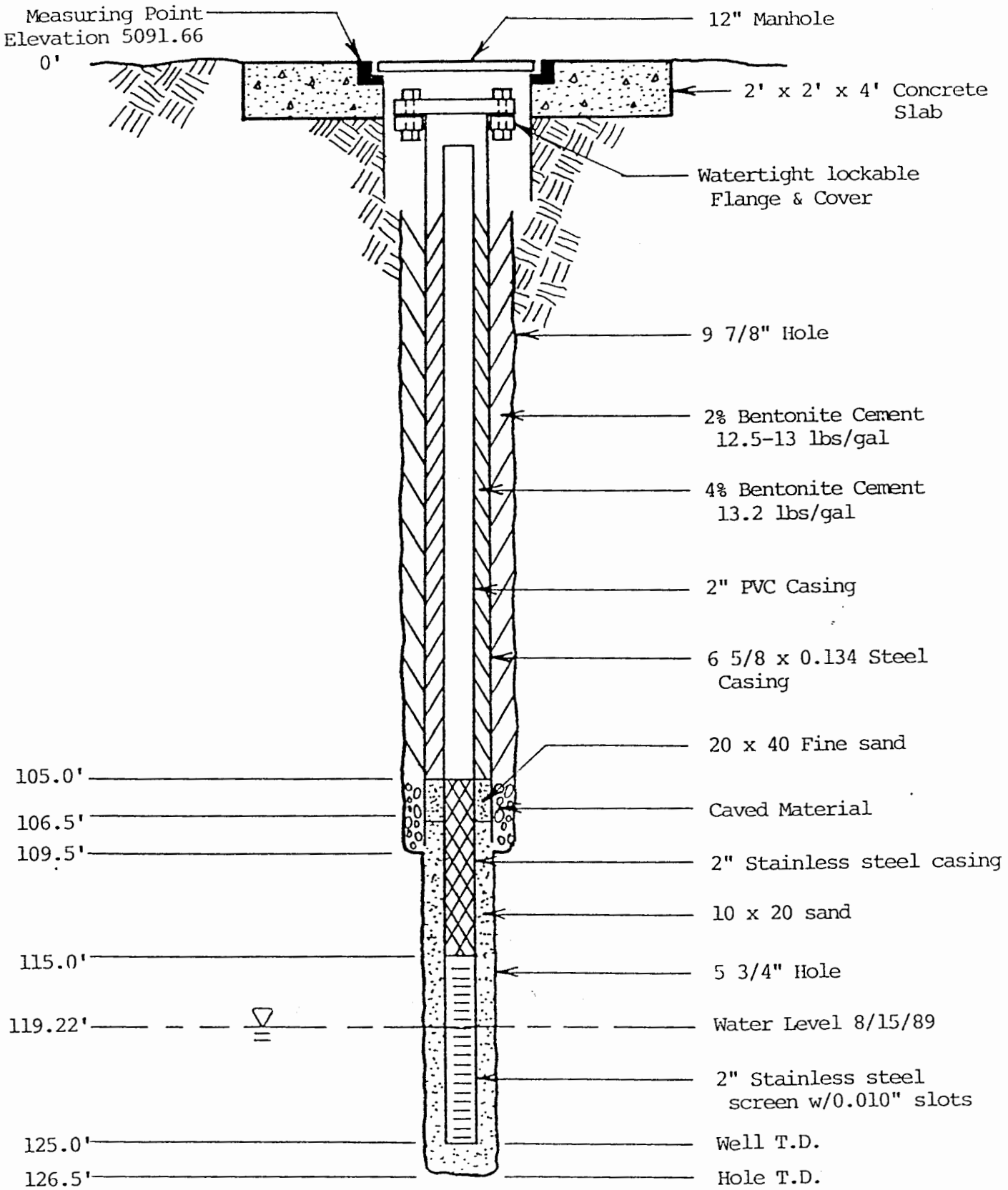
Sample Logger Peter H. Metzner, METRIC Corporation

Driller Rodgers & Company

Drilling Medium Mud rotary

Date of Completion 6-22-89 Ground Elev. 5059.30

Depth (feet)	Thickness (feet)	Stratigraphic Description
0-5	5	Moderate yellowish brown (10 YR 5/4), poorly sorted medium to very fine sand (SP)
5-11	6	Moderate yellowish brown (10 YR 5/4), slightly clayey fine sand with some granular gravel (SM)
11-55	44	Moderate yellowish brown (10 YR 5/4), sandy clay with some granular gravel (CL)
55-57	2	Moderate yellowish brown (10 YR 5/4), clay with granular gravel (CH)
57-65	8	Moderate yellowish brown (10 YR 5/4), slightly clayey very coarse sand with granular gravel (SP)
65-80	15	Medium gray (N5), medium-sorted very coarse sand to pebble gravel (SP)
80-85	5	Medium gray (N5), medium sorted coarse sand to pebble gravel (SP)
85-94	9	Pale yellowish brown (10 YR 6/2), well sorted very coarse sand to granular gravel (SW)



CONSTRUCTION DIAGRAM

MW-37-OS

METRIC
Corporation

SAMPLE LOG

Well Number MW-37 (OS) Well Location Off site along Irving Blvd.

Well Owner Sparton Technology, Inc.

Sample Logger Peter H. Metzner, METRIC Corporation

Driller Rodgers & Company

Drilling Medium Mud rotary

Date of Completion 7-1-89 Ground Elev. 5091.66

Depth (feet)	Thickness (feet)	Stratigraphic Description
0-5	5	Moderate yellowish brown (10 YR 5/4), very fine sand (SW)
5-10	5	Moderate yellowish brown (10 YR 5/4), fine sand (SW)
10-14	4	Moderate yellowish brown (10 YR 5/4), clayey fine sand (SC)
14-35	21	Pale yellowish brown (10 YR 6/2), slightly clayey well sorted medium to coarse sand (SP)
35-45	10	Moderate yellowish brown (10 YR 5/4), clayey fine sand (SC)
45-55	10	Moderate yellowish brown (10 YR 5/4), fine sandy clay (CL)
55-65	10	Moderate yellowish brown (10 YR 5/4), medium to coarse sand (SP)
65-85	20	Pale yellowish brown (10 YR 6/2), medium sorted medium to very coarse sand (SD)
85-95	10	Moderate yellowish brown (10 YR 5/4), well sorted medium to coarse-grained sand (SW)
95-100	5	Moderate yellowish brown (10 YR 5/4), slightly clayey medium-grained sand (SW)

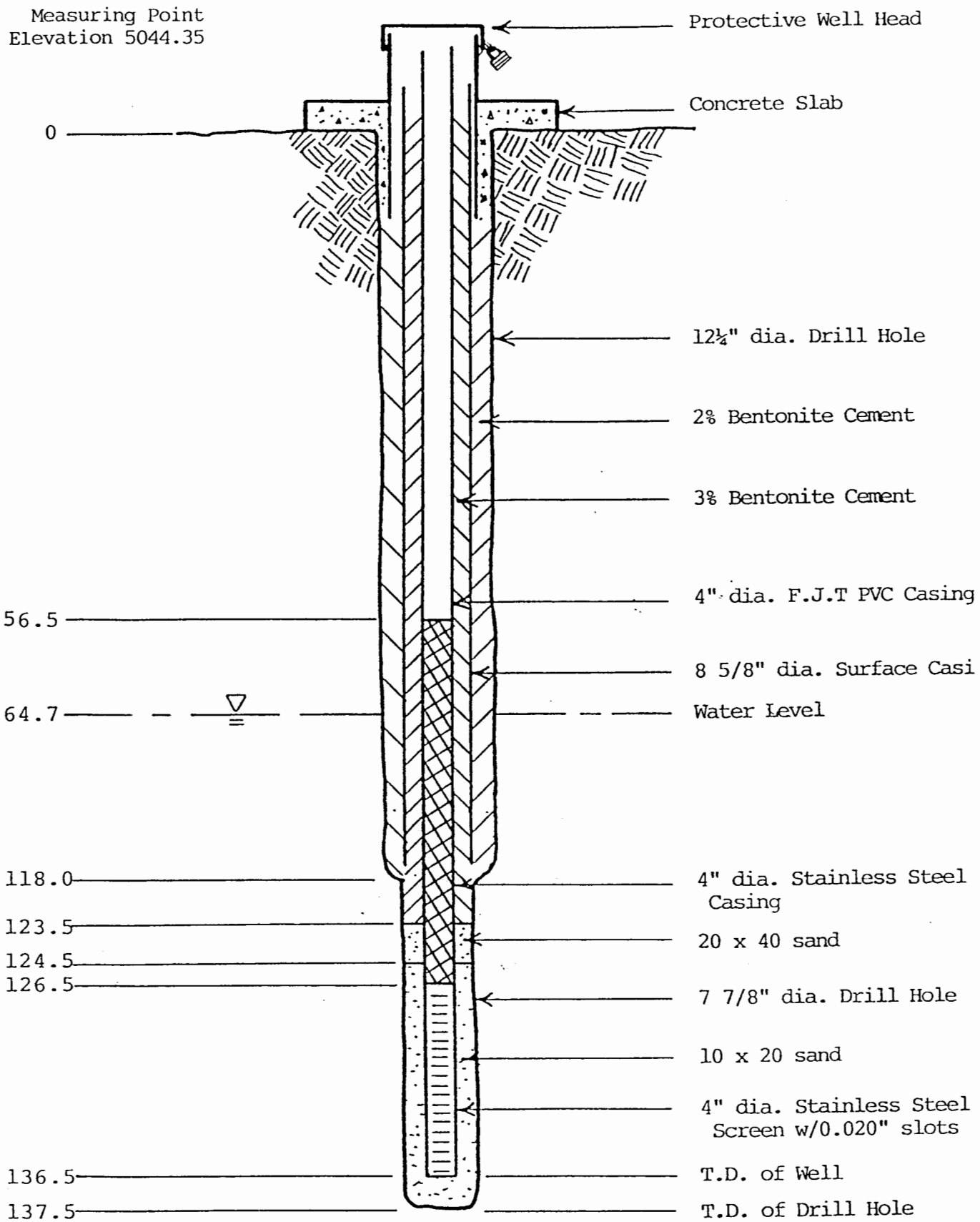
METRIC
Corporation

SAMPLE LOG
Continued

Well Number MW-37 (OS) Well Location Off site along Irving Blvd.

(Continued from Previous Page)

Depth (feet)	Thickness (feet)	Stratigraphic Description
100-111	11	Pale yellowish brown (10 YR 6/2), coarse sand to granular gravel (SP)
111-117	6	Medium gray (N5), pebble gravel (GP)
117-126.5	9.5	Medium gray (N5) very coarse sand to granular gravel (SP)



Construction Diagram
MW-38

METRIC
Corporation

SAMPLE LOG

Well Number MW-38 Well Location On site, South

Well Owner Sparton Technology, Inc.

Sample Logger Peter H. Metzner, METRIC Corporation

Driller Rodgers & Company

Drilling Medium Mud rotary

Date of Completion _____ Ground Elev. 5045'

Depth (feet)	Thickness (feet)	Stratigraphic Description
0-8	8	Moderate yellowish brown (10YR 5/4) fine sandy clay (CL)
8-13	5	Light brown (5YR 6/4) very coarse sand to granule gravel (SP)
13-15	2	Moderate yellowish brown (10YR 5/4) fine sandy clay and very coarse sand to granular gravel (SC)
15-20	5	Light brown (5YR 6/4) very poorly sorted coarse sand to granule gravel (SP)
20-22	2	Light brown (5YR 6/4) very coarse sand to granule gravel (GP)
22-38	16	Light brown (5YR 6/4) fine to medium clayey sand with granule and pebble gravel (SC)
38-48	10	Light brown (5YR 6/4) very fine to medium sand with some granule fragments (SP)
48-50	2	Light brown (5YR 6/4) fine to coarse sand (SP)
50-60	10	Medium gray (N5) very coarse sand to pebble gravel (SW)
60-66	6	Medium gray (N5) coarse sand to pebble gravel (SP)
66-90	24	Medium gray (N5) pebble gravel with fine clayey sand (GM)

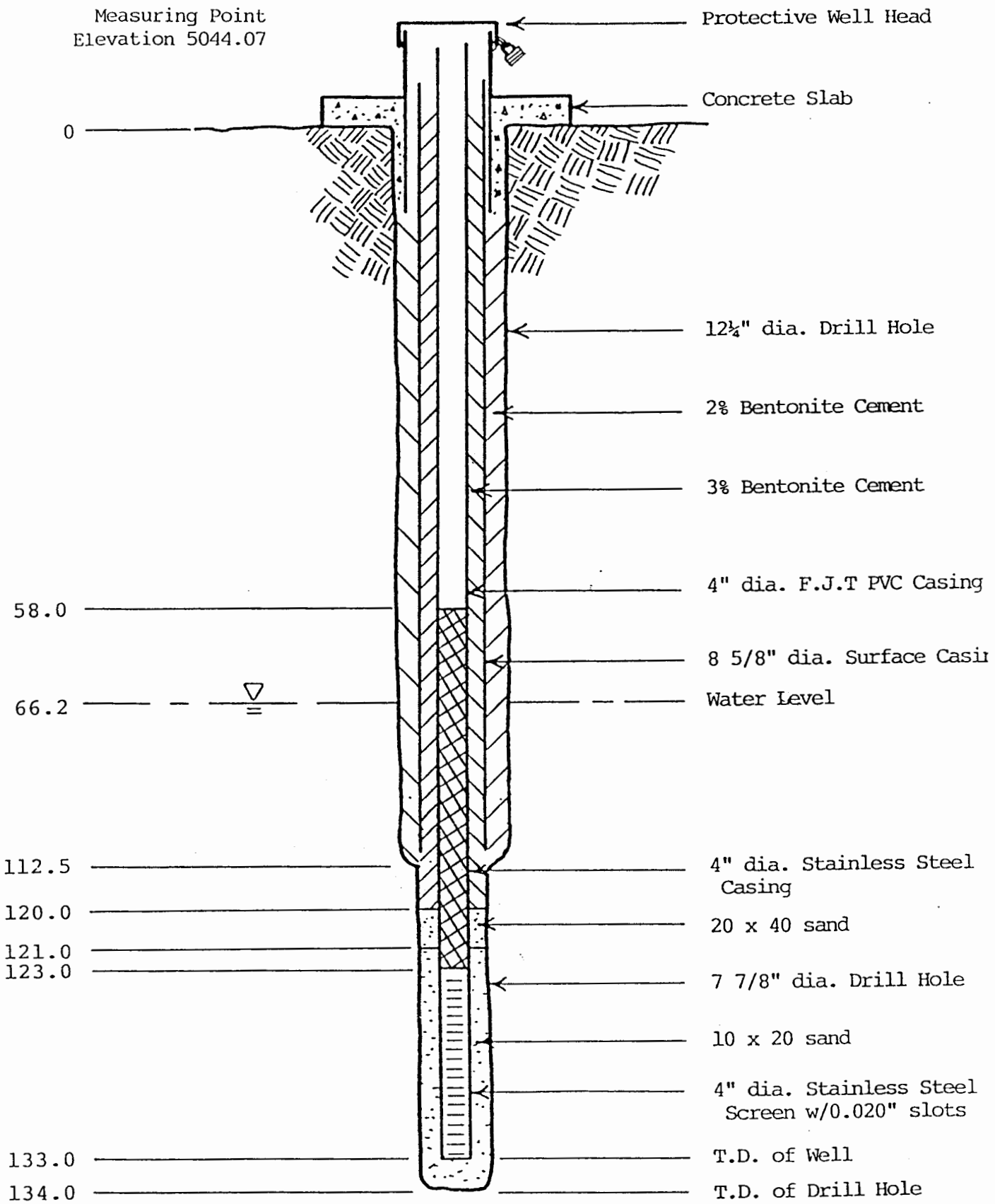
METRIC
Corporation

SAMPLE LOG
Continued

Well Number MW-38 Well Location _____

(Continued from Previous Page)

Depth (feet)	Thickness (feet)	Stratigraphic Description
90-101	11	Light brown (5YR 6/4) fine clayey sand with granule gravel (SC)
101-118	17	Light brown (5YR 6/4) and medium brown (N5) poorly sorted medium sand to pebble gravel (SP)
118-121	3	Light olive gray (5Y 6/1) fine to medium sand (SP)
121-126	5	Light olive gray (5Y 6/1) medium sand (SW)
126-136	10	Light olive gray (5Y 6/1) medium to coarse sand (SP)
136-137	11	Light brown (5YR 6/4) very coarse sand to granule gravel with some fine sandy clay (SC)



Construction Diagram
MW-39

METRIC
Corporation

SAMPLE LOG

Well Number MW-39 Well Location On site, South

Well Owner Sparton Technology, Inc.

Sample Logger Peter H. Metzner - METRIC Corporation

Driller Rodgers & Company

Drilling Medium Mud rotary

Date of Completion _____ Ground Elev. 5044'

Depth (feet)	Thickness (feet)	Stratigraphic Description
0-2	2	Light brown (5YR 6/4) clayey fine to coarse sand (SC)
2-15	13	Light brown (5YR 6/4) slightly clayey, silty very coarse sand to granule gravel (SM)
15-40	25	Moderate yellowish brown (10YR 5/4) clayey very fine sand (SC)
40-43	3	Pale yellowish brown (10YR 6/2) and medium gray (N5) pebble gravel (GW)
43-78	35	Pale yellowish brown (10YR 6/2) and medium gray (N5) slightly cemented pebble gravel (GW)
78-83	5	Pale yellowish brown (10YR 6/2) and medium gray (N5) slightly cemented pebble gravel with alternating clayey fine sand layers (GP)
83-93	10	Light brown (5YR 6/4) clayey very fine sand with pebble gravel (SC)
93-98	5	Light brown (5YR 6/4) fine sandy clay with pebble gravel (CL)
98-103	5	Light brown (5YR 6/4) fine sand to medium gray (N5) granule and pebble gravel (SP)
103-112	9	Medium gray (N5) light brown (5YR 6/4) and grayish orange pink (5YR 7/2) granule and pebble gravel (GP)

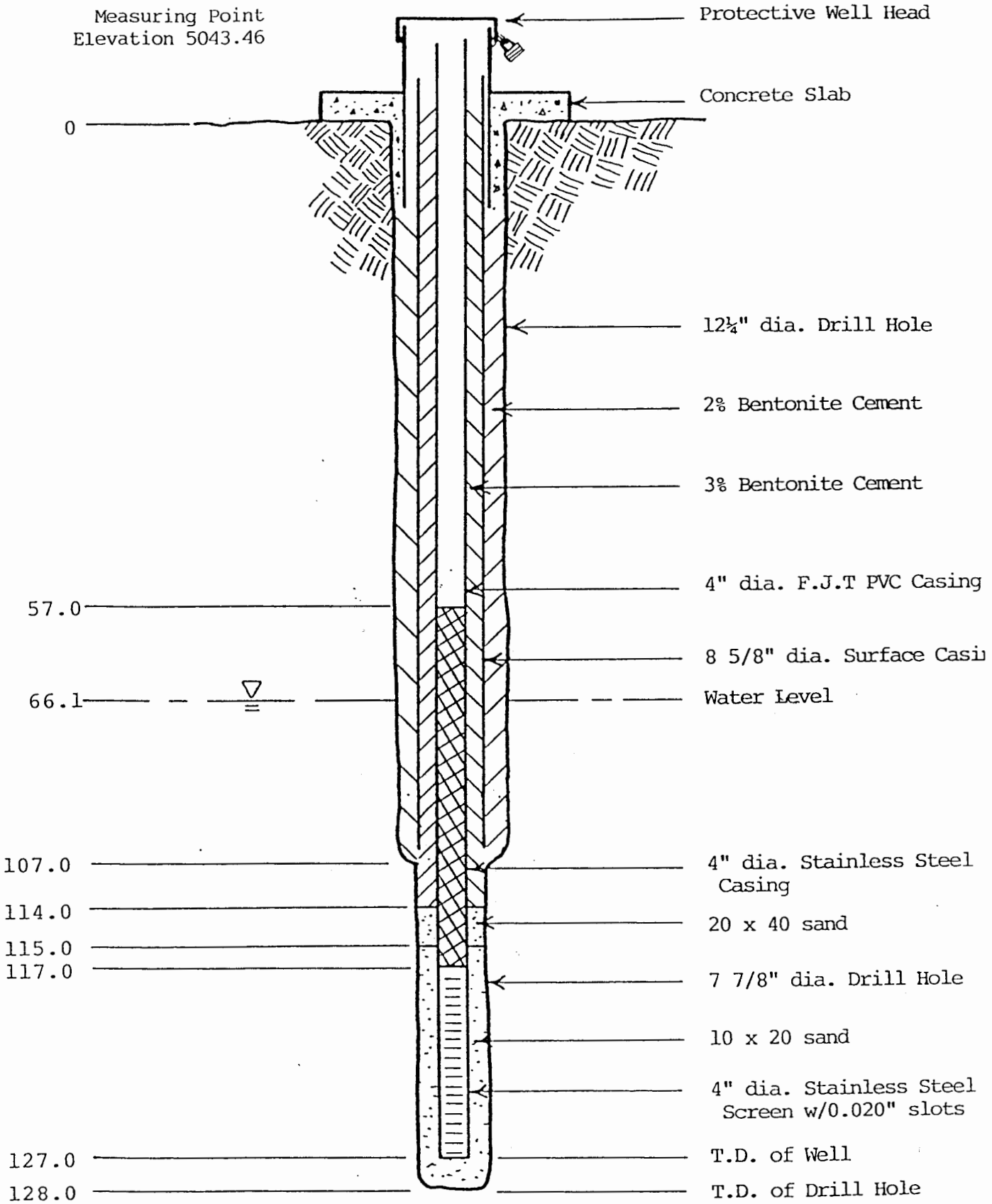
METRIC
Corporation

SAMPLE LOG
Continued

Well Number MW-39 Well Location

(Continued from Previous Page)

Depth (feet)	Thickness (feet)	Stratigraphic Description
112-127	13	Pale yellowish brown (10YR 6/2) poorly sorted fine to very coarse sand (SP)
127-133	6	Medium gray (N5), light brown (5YR 6/4), and grayish orange pink (5YR 7/2) pebble gravel (GP)
133-134	1	Light brown (5YR 6/4) silty clay (CL)



Construction Diagram
MW-40

METRIC
Corporation

SAMPLE LOG

Well Number MW-40 Well Location On site, SW

Well Owner Sparton Technology, Inc.

Sample Logger Peter H. Metzner - METRIC Corporation

Driller Rodgers & Company

Drilling Medium Mud rotary

Date of Completion _____ Ground Elev. 5044'

Depth (feet)	Thickness (feet)	Stratigraphic Description
0-21	21	Light brown (5YR 6/4) silty clay (CL)
21-31	10	Light brown (5YR 6/4) slightly clayey very fine to coarse sand (SP)
31-38	7	Light brown (5YR 6/4) slightly clayey fine sand (SM)
38-50	12	Light brown (5YR 6/4) slightly clayey, very poorly sorted, fine sand to granule gravel (SW)
50-54	4	Light brown (5YR 6/4) slightly clayey very fine to coarse sand (SM)
54-61	7	Light brown (5YR 6/4) slightly clayey medium to very coarse sand (SM)
61-90	29	Light brown (5YR 6/4) clayey fine to coarse sand (SC)
90-107	17	Light brown (5YR 6/4) medium to very coarse sand (SP)
107-111	4	Light olive gray (5YR 6/1) fine to medium sand (SP)
111-116	5	Light brown (5YR 6/4) to light olive gray (5Y 6/1) medium to very coarse sand (SP)

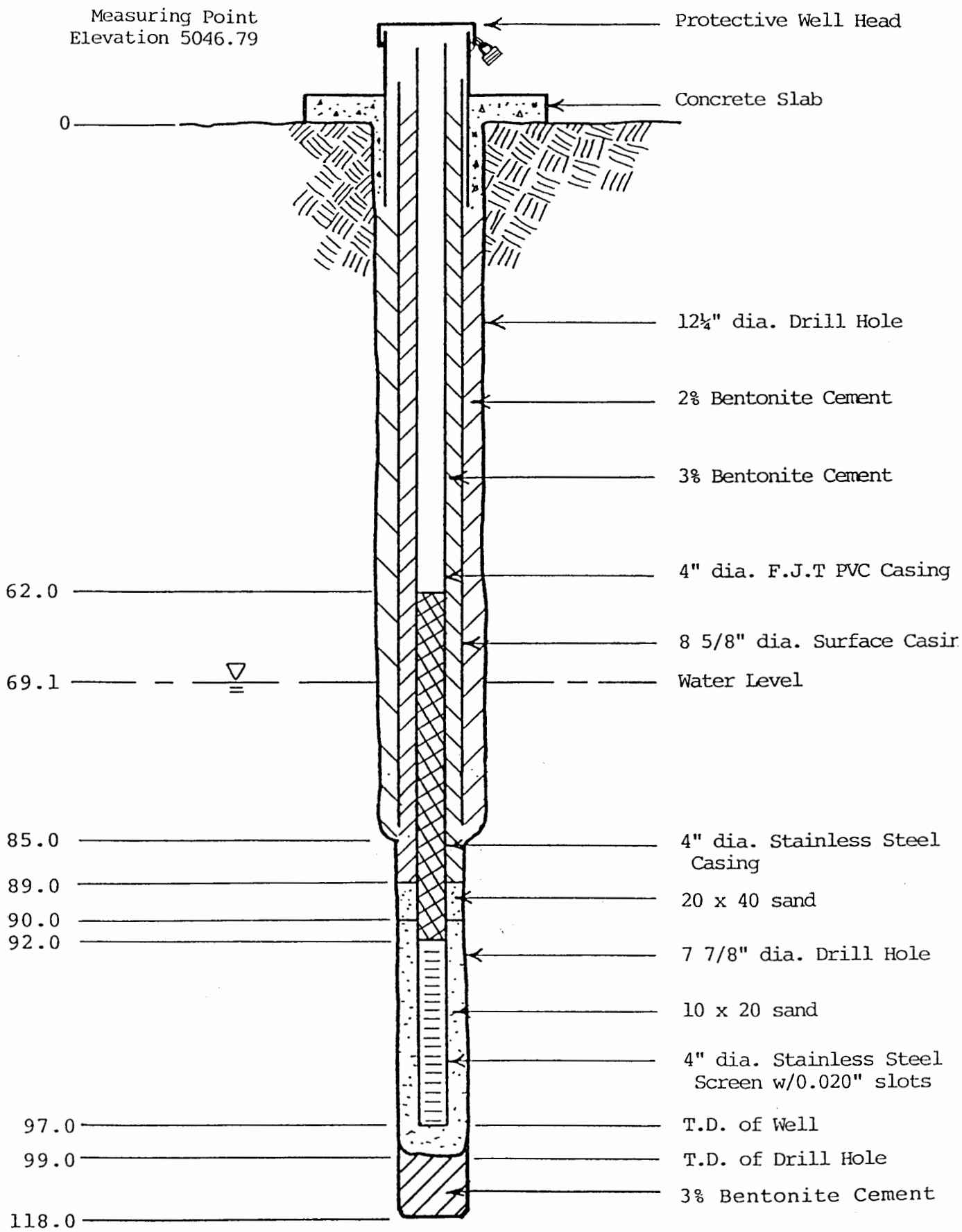
METRIC
Corporation

SAMPLE LOG
Continued

Well Number MW-40 Well Location _____

(Continued from Previous Page)

Depth (feet)	Thickness (feet)	Stratigraphic Description
116-121	5	Light brown (5YR 6/4) to light olive gray (5Y 6/1) fine to very coarse sand (SP)
121-128	7	Light brown (5YR 6/4) poorly sorted clayey, very fine to very coarse sand (SC)



Construction Diagram
MW-41

METRIC
Corporation

SAMPLE LOG

Well Number MW-41 Well Location On site, West

Well Owner Sparton Technology, Inc.

Sample Logger Peter H. Metzner - METRIC Corporation

Driller Rodgers & Company

Drilling Medium Mud rotary

Date of Completion _____ Ground Elev. 5047'

Depth (feet)	Thickness (feet)	Stratigraphic Description
0-35	35	Light brown (5YR 6/4) silty clay (CL)
35-42	7	Medium gray (N5) slightly cemented granule and pebble gravel (GP)
42-47	5	Light brown (5YR 6/4) medium to very coarse sand (SP)
47-51	4	Light brown (5YR 6/4) slightly cemented fine to coarse sand (SP)
51-77	26	Medium gray (N5) and light brown (5YR 6/4) pebble gravel (GP)
77-85	8	Medium gray (N5) slightly cemented pebble gravel (GP)
85-96	11	Pale yellowish brown (10YR 6/2) medium to coarse sand (SP)
96-106	10	Light brown (5YR 6/4) medium to coarse sand (SP)
106-116	10	Light brown (5YR 6/4) to pale wellowish brown (10YR 6/2) fine to very coarse sand (SP)
116-117	1	Light brown (5YR 6/4) to pale yellowish brown (10YR 6/2) coarse sand to granule gravel (SP)

METRIC
Corporation

SAMPLE LOG
Continued

Well Number MW-41 Well Location _____

(Continued from Previous Page)

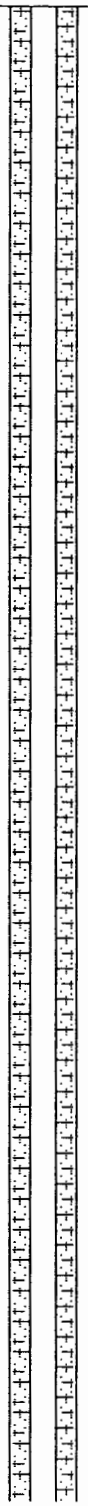
Depth (feet)	Thickness (feet)	Stratigraphic Description
117-118	1	Light brown (5YR 6/4) very coarse sand and medium gray (N5) granule gravel (SP)

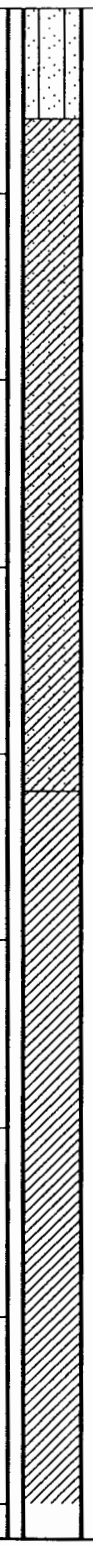
Top of PVC Casing Elevation 5142.22

Equipment GD-1500

Elevation ft **Date** 4/13/90

GROUND SURFACE





0

TAN SILTY FINE TO MEDIUM SAND (SM)

TAN & BROWN CLAYEY MEDIUM TO COARSE SAND (SC)

5

10

Cement/Bentonite Grout

15

20

TAN SILTY CLAY (CL) with fine sand

2" PVC Casing to 173 feet

25

30

6-3/4" Borehole to 206 feet

35

40

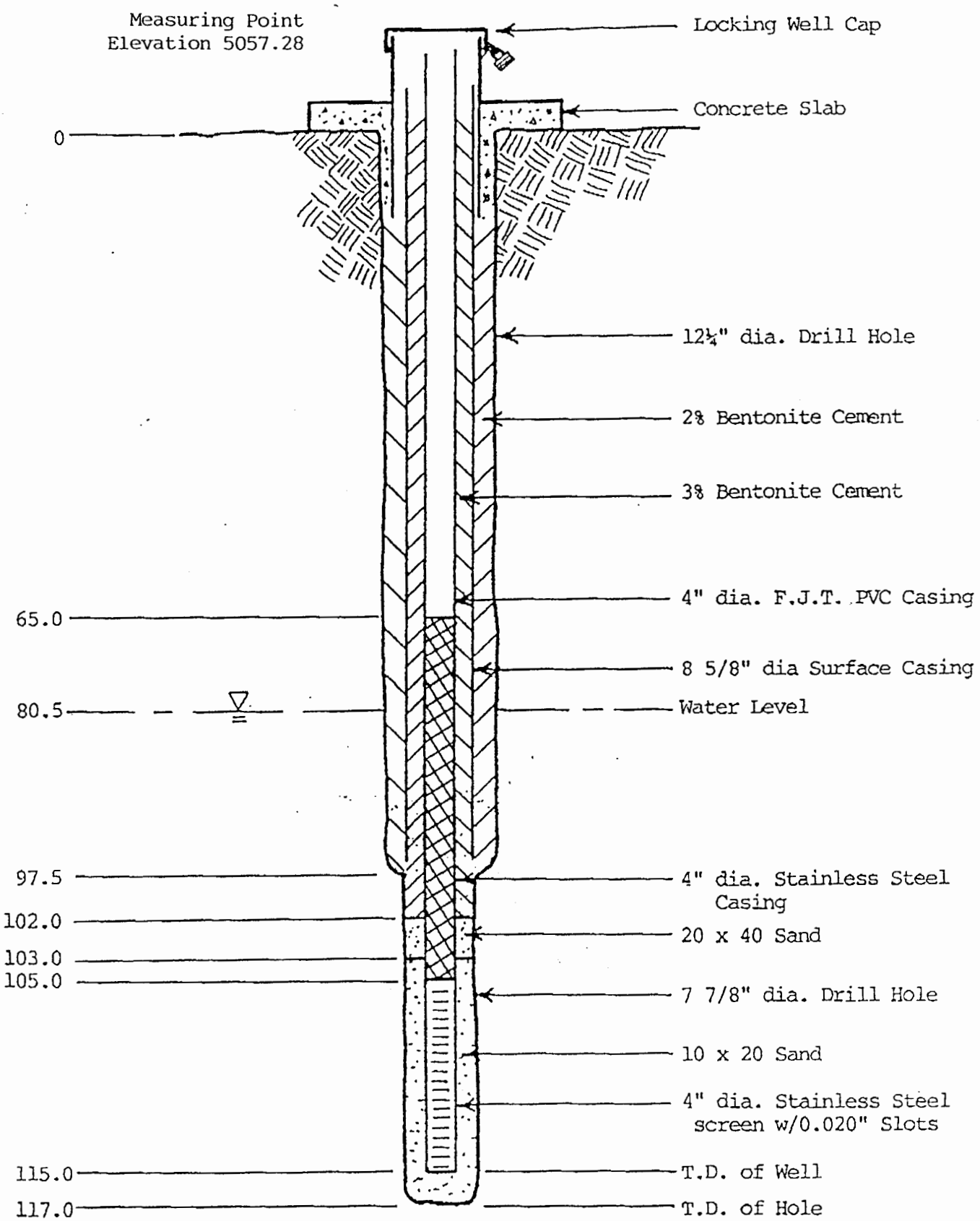
Harding Lawson Associates Engineers and Environmental Services

MONITORING WELL DETAIL PZ-1

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		



MW-42
CONSTRUCTION DIAGRAM

METRIC
Corporation

SAMPLE LOG

Well Number MW-42 Well Location On site, NW

Well Owner Sparton Technology, Inc.

Sample Logger METRIC Corporation, Peter H. Metzner

Driller Rodgers & Company, Inc.

Drilling Medium Mud rotary

Date of Completion 10-31-89 Ground Elev. 5055'

Depth (feet)	Thickness (feet)	Stratigraphic Description
0-10	10	Pale yellowish brown (10 YR 6/2) silt to very fine sand with some very coarse sand
10-30	20	Pale yellowish brown (10 YR 6/2) very fine to medium sand with some granule gravel
30-35	5	Pale yellowish brown (10 YR 6/2) poorly sorted, fine sand to granule gravel
35-40	5	Pale yellowish brown (10 YR 6/2) poorly sorted, medium sand to small pebble gravel
40-45	5	Moderate yellowish brown (10 YR 5/4) silt
45-50	5	Moderate yellowish brown (10 YR 5/4) silty clay
50-55	5	Medium gray (N5) to yellowish gray (5 Y 8/1) granule gravel to small pebble gravel
55-75	20	Medium gray (N5) to yellowish gray (5 Y 8/1) large pebble gravel
75-80	5	Medium gray (N5) to yellowish gray (5 Y 8/1) pebble gravel with pale yellowish brown (10 YR 6/2) clayey silt
80-95	15	Pale yellowish brown (10 YR 6/2) poorly sorted clayey very fine sand to very coarse sand, with some granule gravel

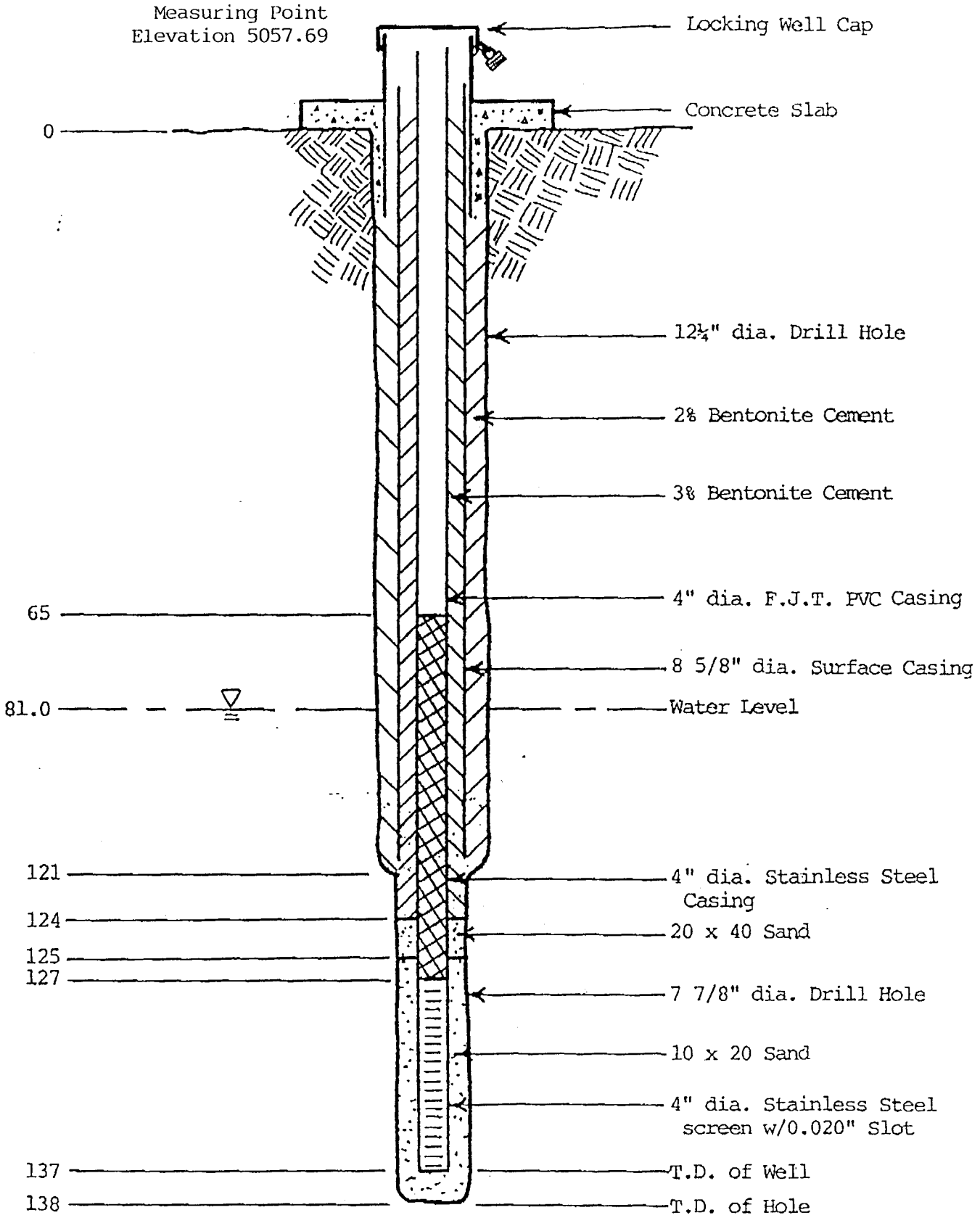
METRIC
Corporation

SAMPLE LOG
Continued

Well Number MW-42 Well Location On site, NW

(Continued from Previous Page)

Depth (feet)	Thickness (feet)	Stratigraphic Description
95-97	2	Pale yellowish brown (10 YR 6/2) coarse sand to pebble gravel
97-105	8	Pale yellowish brown (10 YR 6/2) coarse to very coarse sand
105-115	10	Pale yellowish brown (10 YR 6/2) coarse sand
115-117	2	Pale yellowish brown (10 YR 6/2) medium to very coarse sand



MW-43
CONSTRUCTION DIAGRAM

METRIC
Corporation

SAMPLE LOG

Well Number MW-43 Well Location On site, NW

Well Owner Sparton Technology, Inc.

Sample Logger METRIC Corporation, Peter H. Metzner

Driller Rodgers & Company, Inc.

Drilling Medium Mud rotary

Date of Completion 11-9-89 Ground Elev. 5056'

Depth (feet)	Thickness (feet)	Stratigraphic Description
0-15	15	Pale yellowish brown (10 YR 6/2) poorly sorted very fine to very coarse sand
15-35	20	Pale yellowish brown (10 YR 6/2) fine to medium sand
35-45	10	Pale yellowish brown (10 YR 6/2) very fine to fine sand
45-50	5	Moderate yellowish brown (10 YR 5/4) silty clay
50-75	25	Medium gray (N5) to yellowish gray (5 Y 8/1) pebble gravel
75-80	5	Medium gray (N5) to yellowish gray (5 Y 8/1) very coarse sand to pebble gravel
80-85	5	Pale yellowish brown (10 YR 6/2) clay with some small pebble gravel
85-90	5	Pale yellowish brown (10 YR 6/2) fine sandy clay
90-95	5	Pale yellowish brown (10 YR 6/2) fine sandy clay and medium gray (N5) to yellowish gray (5 Y 8/1) small pebble gravel
95-100	5	Medium gray (N5) to yellowish gray (5 Y 8/1) small pebble gravel

METRIC
Corporation

SAMPLE LOG
Continued

Well Number MW-43 Well Location On site, NW

(Continued from Previous Page)

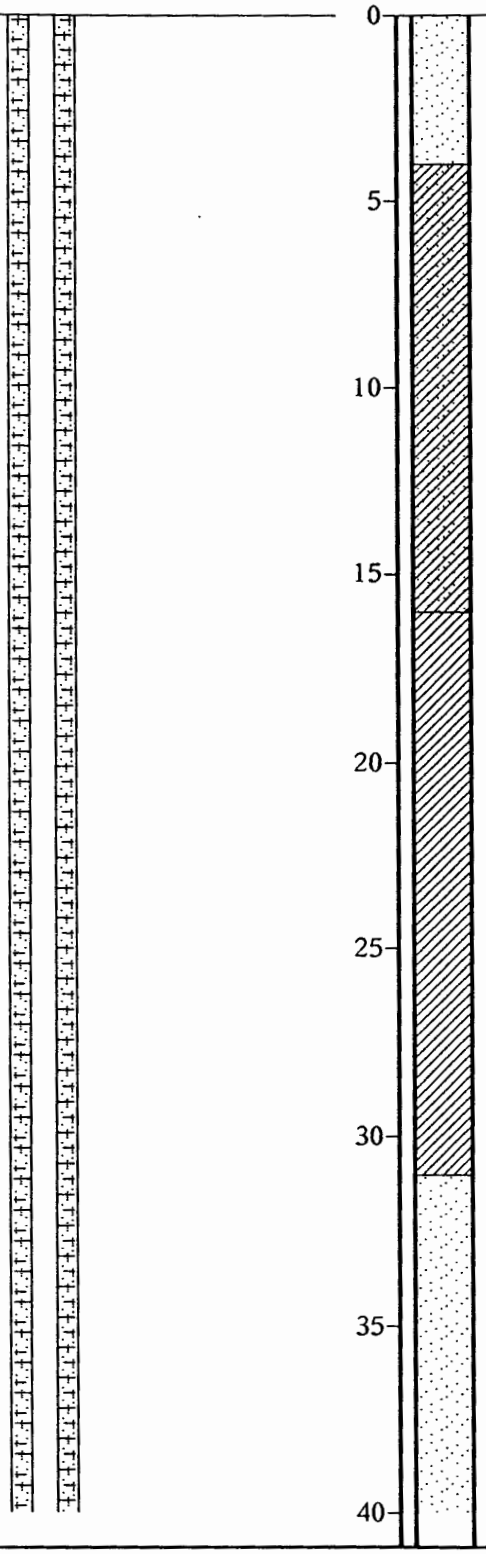
Depth (feet)	Thickness (feet)	Stratigraphic Description
100-120	20	Pale yellowish brown (10 YR 6/2) fine sandy clay with granule to pebble gravel
120-124	4	Very light gray (N8) granule gravel
124-130	6	Very light gray (N8) small pebble gravel
130-136	6	Pale yellowish brown (10 YR 6/2) well sorted, coarse sand to granule gravel
136-138	2	Pale yellowish brown (10 YR 6/2) well sorted, clayey coarse sand to granule gravel

Top of PVC Casing
Elevation 5060.68

Equipment GD-1500

Elevation ft Date 11/18/89

GROUND SURFACE



YELLOWISH-BROWN FINE TO MEDIUM SAND (SP)

YELLOWISH-BROWN CLAYEY FINE TO MEDIUM SAND (SC)

YELLOWISH-BROWN SANDY CLAY (CL)
with coarse sand

YELLOWISH-BROWN FINE TO COARSE SAND (SW)
with gravel

Cement/Bentonite Grout

4" PVC Casing to 70 feet

12-1/4" Borehole to 103 feet

8-5/8" steel casing to 102 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-44

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

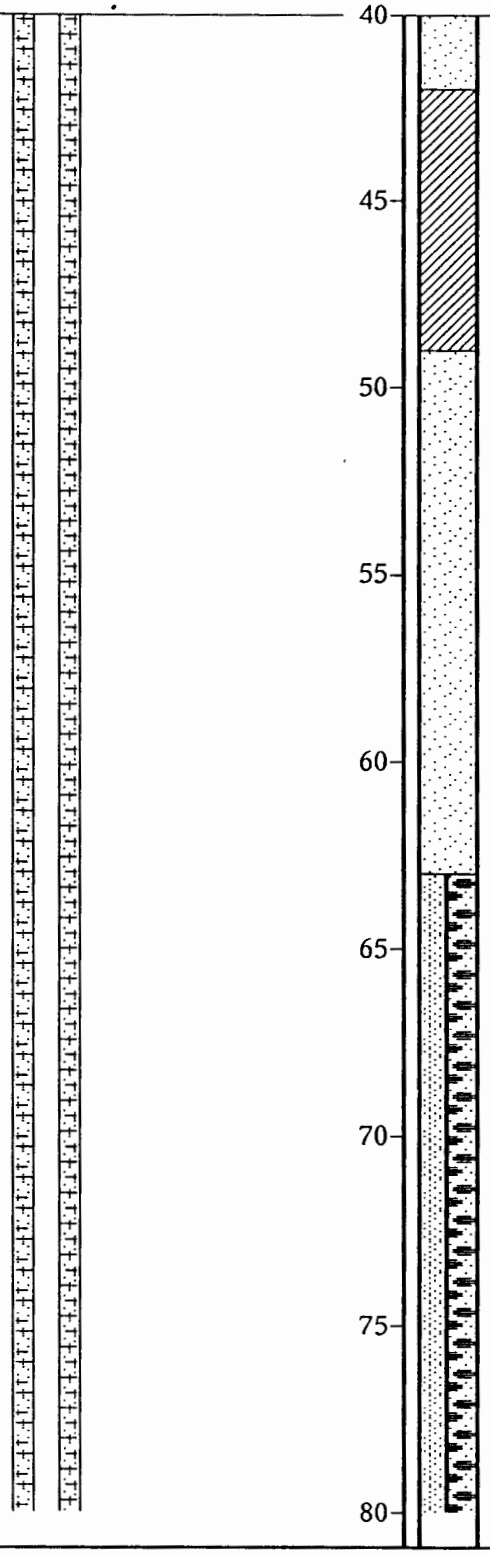
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5060.68

Equipment GD-1500

Elevation ft Date 11/18/89

GROUND SURFACE



BROWN SILTY CLAY (CL)
with sand

BROWN FINE TO COARSE
SAND (SW)

BROWN & GRAY COARSE
SAND (SP-GP)
with gravel

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-44

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

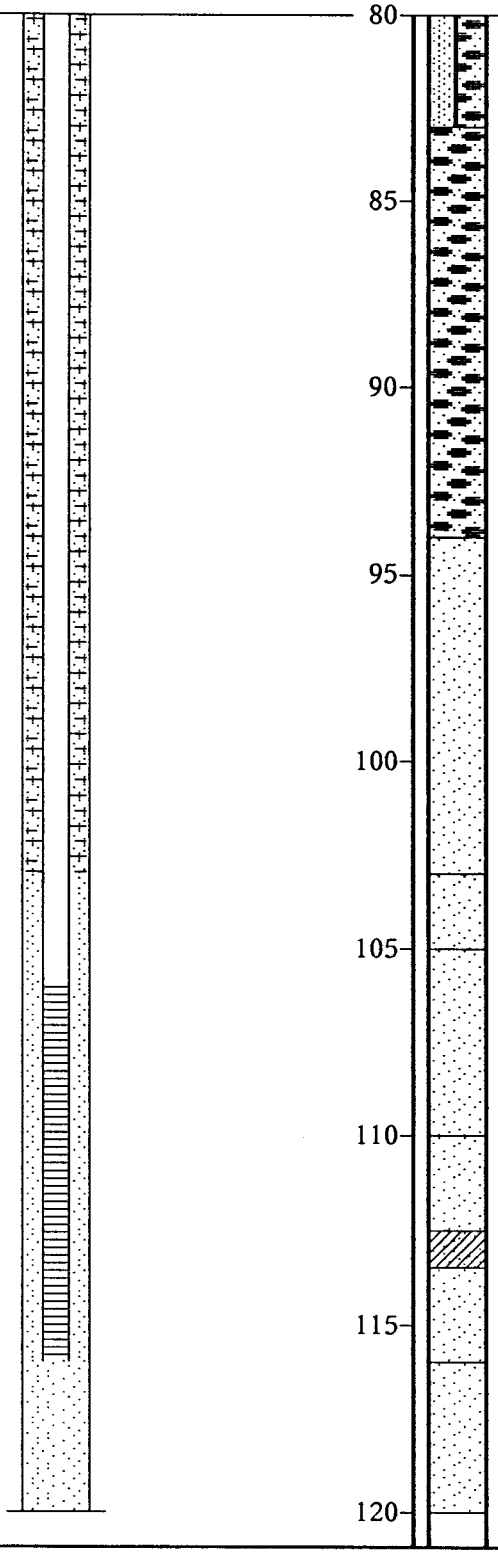
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5060.68

Equipment GD-1500

Elevation ft Date 11/18/89

GROUND SURFACE



Stainless Steel casing
from 70-106 feet

Sandpack:
20x40 sand (103-104)
10x20 sand (104-120)

7-7/8" Borehole
102-120 feet

4" Stainless Steel
Screen (Slot size 0.02")
from 106 to 116 feet

Bottom Cap

80
85
90
95
100
105
110
115
120

BROWN & GRAY GRAVEL (GP)
with coarse sand

BROWN & GRAY COARSE
SAND (SP)
with fine gravel

BROWN FINE SAND (SP)
with silt

BROWN & GRAY FINE TO
COARSE SAND (SW)

BROWN & GRAY COARSE
SAND (SP)
with fines

BROWN MEDIUM SAND (SP)
with clay

BROWN & GRAY MEDIUM TO
COARSE SAND (SP)

BROWN FINE SAND (SP)
with silt

End of Boring at 120 feet.

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-44

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

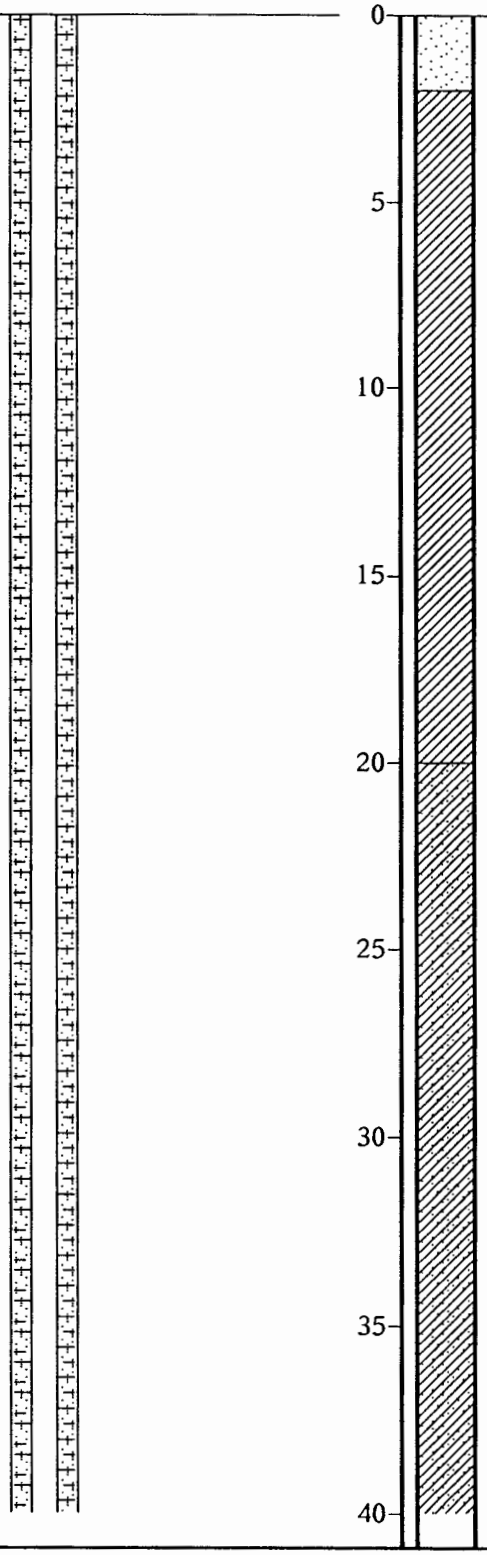
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5092.35

Equipment GD-1500

Elevation ft **Date** 11/24/89

GROUND SURFACE



YELLOWISH-BROWN FINE SAND (SP)

YELLOWISH-BROWN SANDY CLAY (CL)

Cement/Bentonite Grout

-with medium coarse sand below 15 feet

4" PVC Casing to 71 feet

YELLOWISH-BROWN CLAYEY MEDIUM TO COARSE SAND (SC)

12-1/4" Borehole to 136 feet

8-5/8" steel casing to 135.25 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-45

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

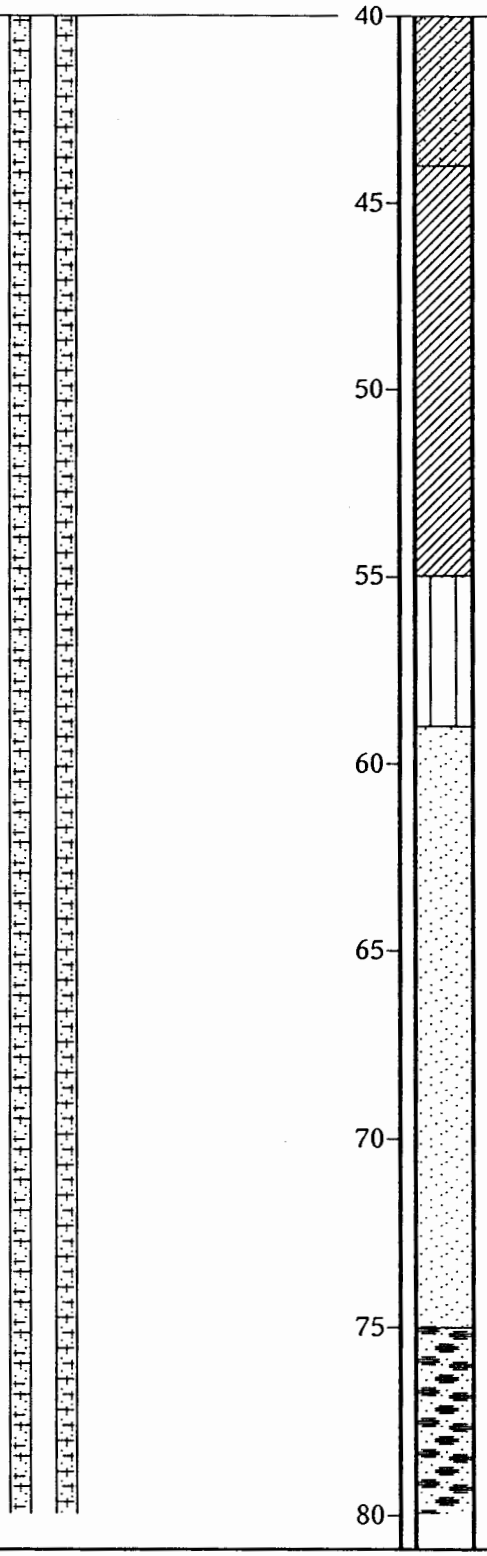
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5092.35

Equipment GD-1500

Elevation ft Date 11/24/89

GROUND SURFACE



YELLOWISH-BROWN SANDY CLAY (CL)

BROWN CLAYEY SILT (ML)

BROWN & GRAY MEDIUM TO COARSE SAND (SP)

BROWN & GRAY SANDY GRAVEL (GP)

-with clay from 78 to 83 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-45

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

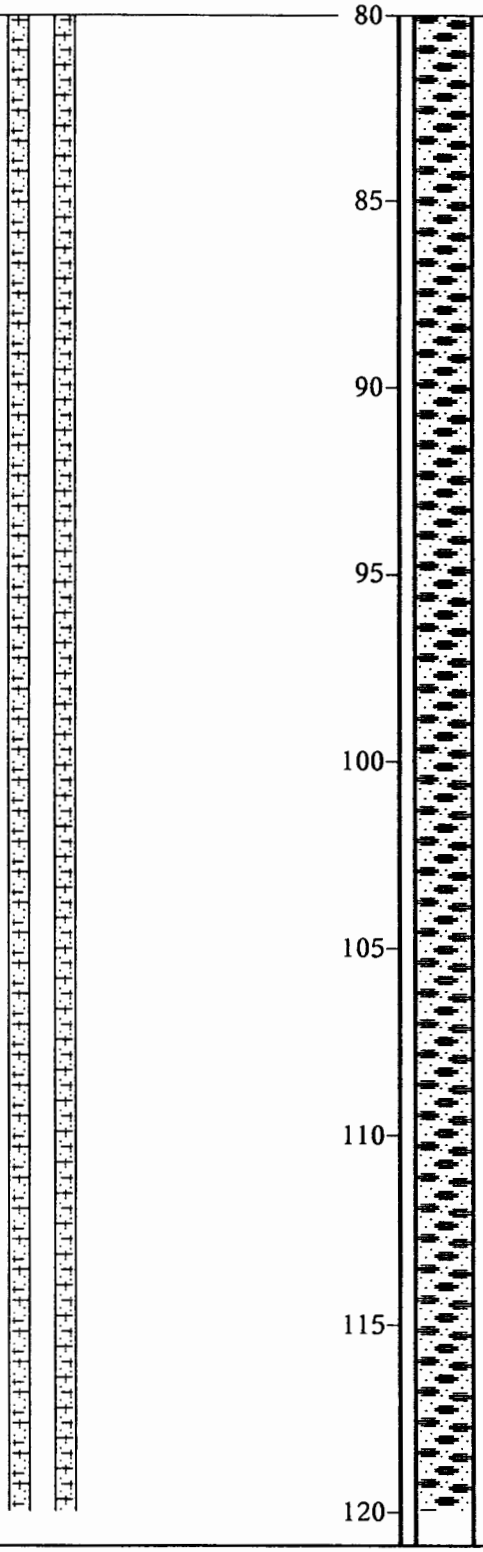
Top of PVC Casing Elevation 5092.35

Equipment GD-1500

Elevation ft **Date** 11/24/89

GROUND SURFACE

Stainless Steel casing from 71-143 feet



-gray below 95 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-45

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

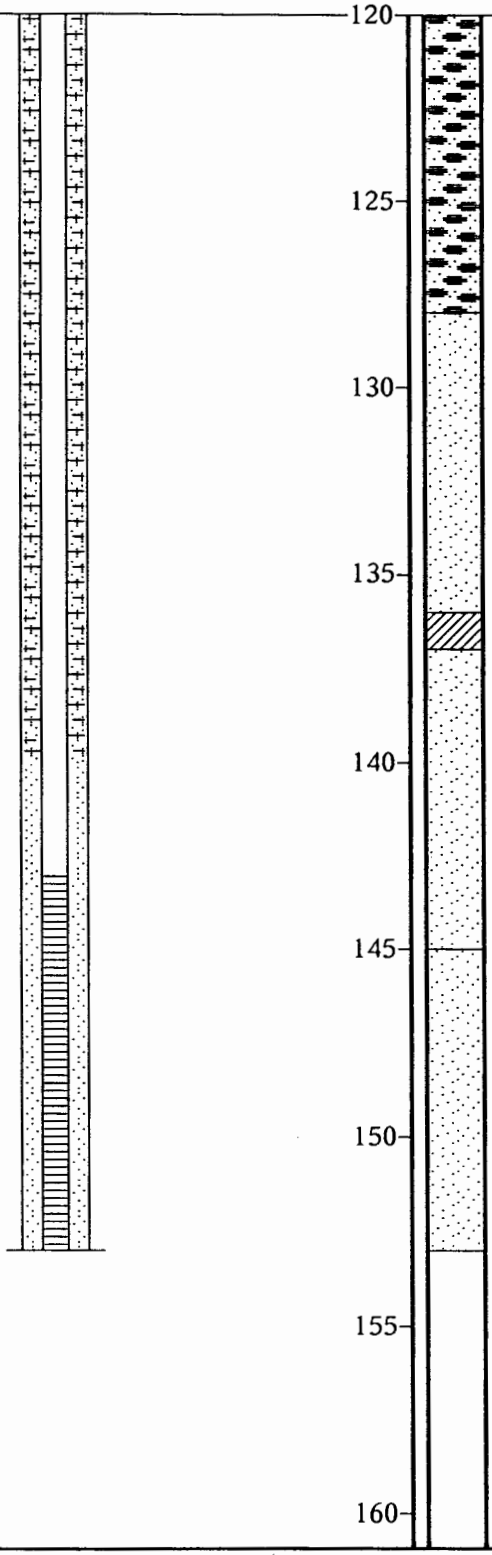
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5092.35

Equipment GD-1500

Elevation ft **Date** 11/24/89

GROUND SURFACE



BROWN & GRAY MEDIUM TO COARSE SAND (SP)
with gravel
-no gravel below 130 feet

7-7/8" Borehole
136-153 feet

LIGHT BROWN SILTY CLAY (CL)
BROWN & GRAY MEDIUM TO COARSE SAND (SP)

Sandpack:
20x40 sand (140-141)
10x20 sand (141-153)

-with 3-inch clay layer from 141.5 to 141.8 feet

BROWN & GRAY FINE TO COARSE SAND (SW)

4" Stainless Steel Screen (Slot size 0.02") from 143 to 153 feet

Bottom Cap

End of Boring at 153 feet.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-45

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

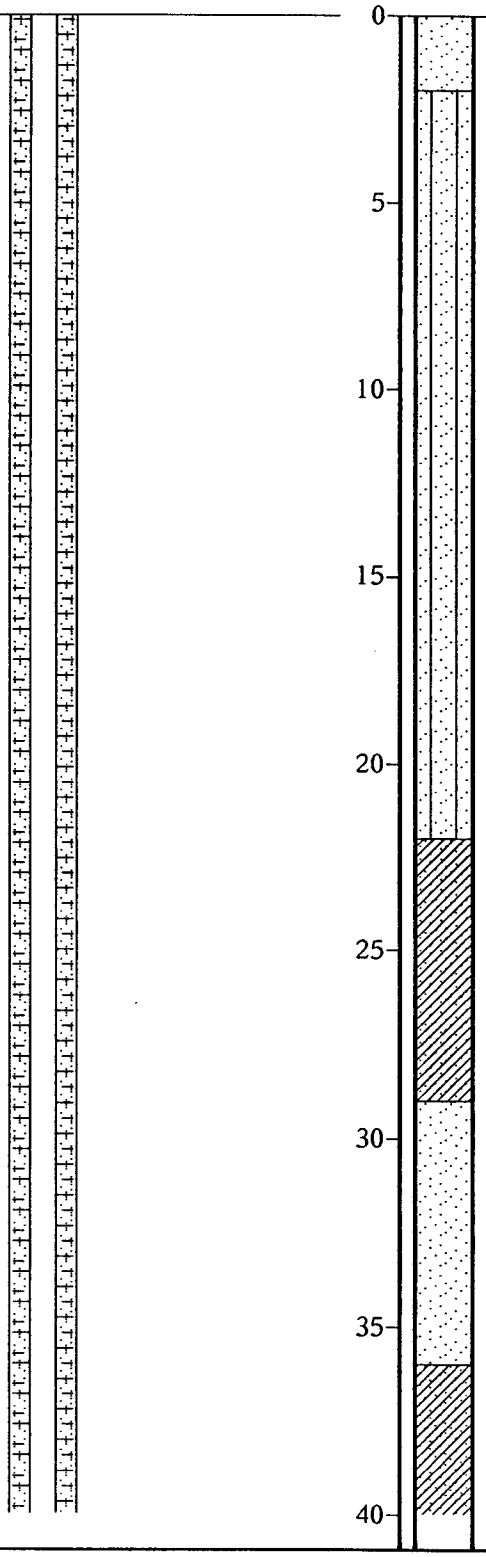
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5118.95

Equipment GD-1500

Elevation ft **Date** 11/30/89

GROUND SURFACE



YELLOWISH-BROWN FINE SAND (SP)

YELLOWISH-BROWN SILTY FINE SAND (SM)

Cement/Bentonite Grout

4" PVC Casing to 125 feet

YELLOWISH-BROWN CLAYEY FINE SAND (SC)

-with medium sand below 27 feet

12-1/4" Borehole to 165 feet

BROWN FINE TO COARSE SAND (SW)
with clay

8-5/8" steel casing to 164.25 feet

BROWN CLAYEY FINE TO MEDIUM SAND (SC)
with occasional sandy clay

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-46

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

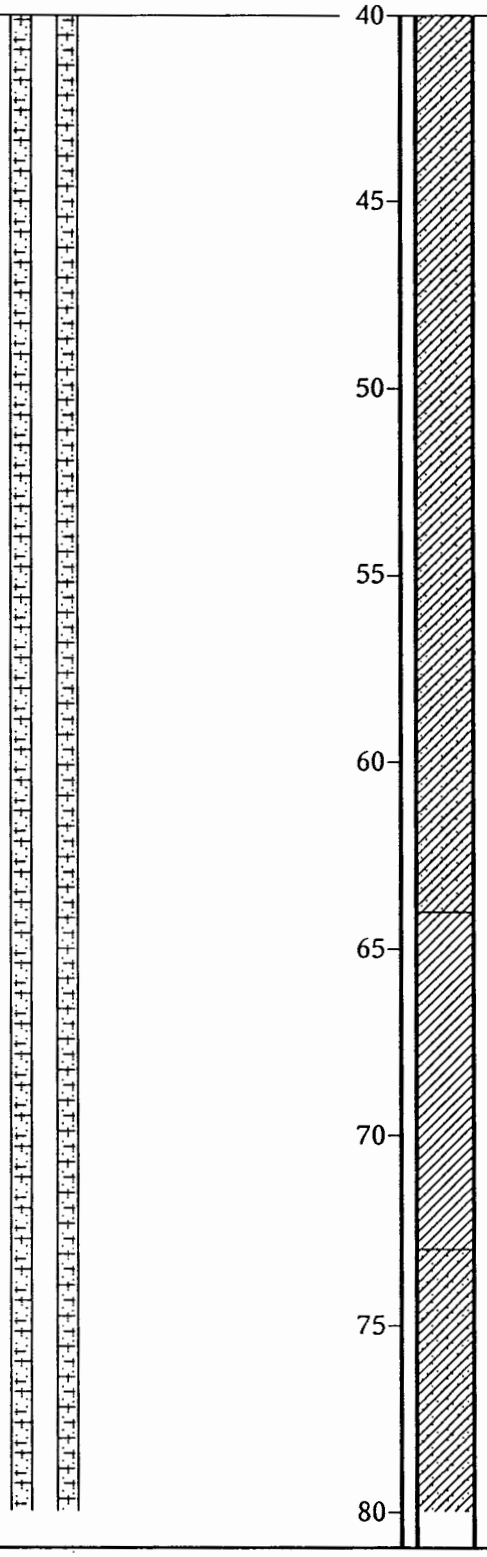
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5118.95

Equipment GD-1500

Elevation ft Date 11/30/89

GROUND SURFACE



BROWN SANDY CLAY (CL)

BROWN CLAYEY FINE TO MEDIUM SAND (SC)
with occasional sandy clay

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-46

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

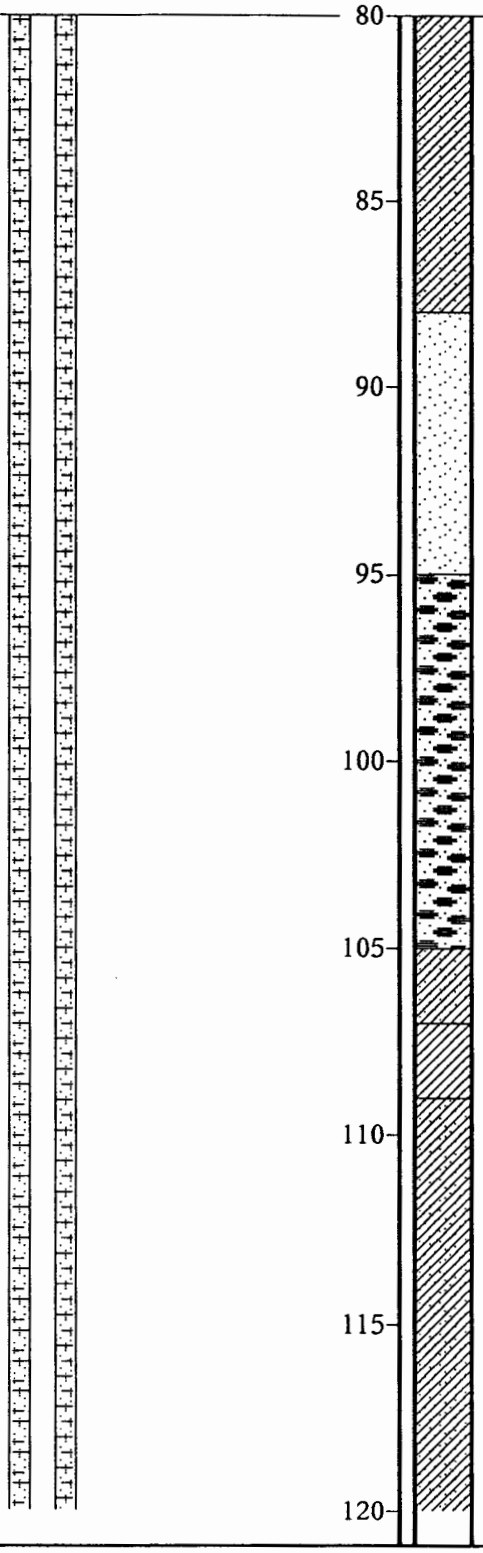
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5118.95

Equipment GD-1500

Elevation ft Date 11/30/89

GROUND SURFACE



BROWN FINE TO COARSE SAND (SW)
with gravel

BROWN & GRAY SANDY GRAVEL (GP)

BROWN CLAYEY MEDIUM TO COARSE SAND (SC)

YELLOWISH-BROWN SANDY CLAY (CL)

BROWN CLAYEY COARSE SAND (SC)

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Environmental Services

MONITORING WELL DETAIL MW-46

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

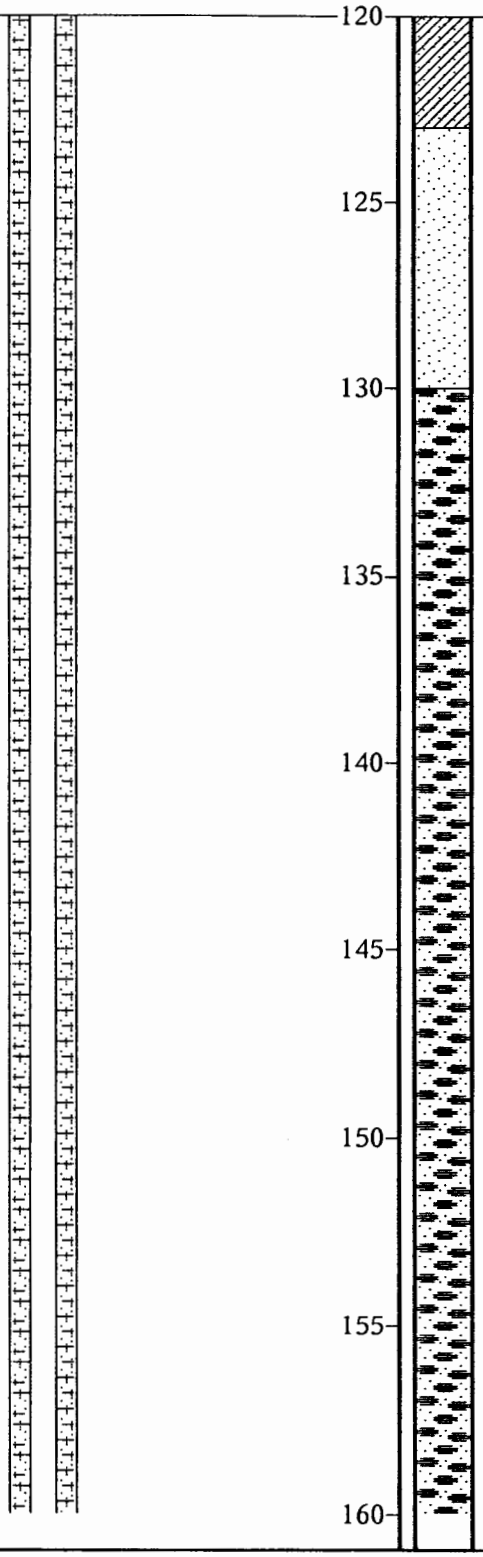
Top of PVC Casing Elevation 5118.95

Equipment GD-1500

Elevation ft **Date** 11/30/89

GROUND SURFACE

Stainless Steel casing from 125-170 feet



BROWN MEDIUM TO COARSE SAND (SP)

with gravel and cobbles below 128.5 feet

BROWN & GRAY SANDY GRAVEL (GP)

-slightly clayey below 150 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-46

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

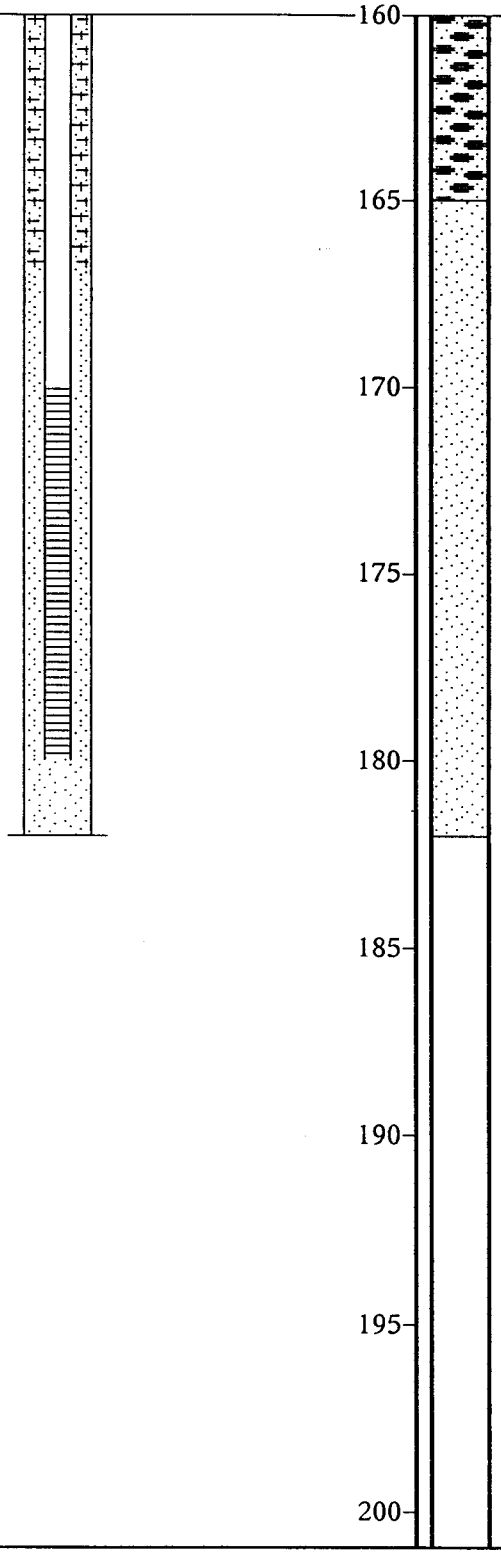
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5118.95

Equipment GD-1500

Elevation ft Date 11/30/89

GROUND SURFACE



Sandpack:
20x40 sand (167-168)
10x20 sand (168-180)

7-7/8" Borehole
165-182 feet

4" Stainless Steel
Screen (Slot size 0.02")
from 170 to 180 feet

Bottom Cap

BROWN FINE TO COARSE
SAND (SW)

-with gravel from 179 to 182 feet

End of Boring at 182 feet.

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-46

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5155.84

Equipment GD-1500

Elevation ft Date 12/7/89

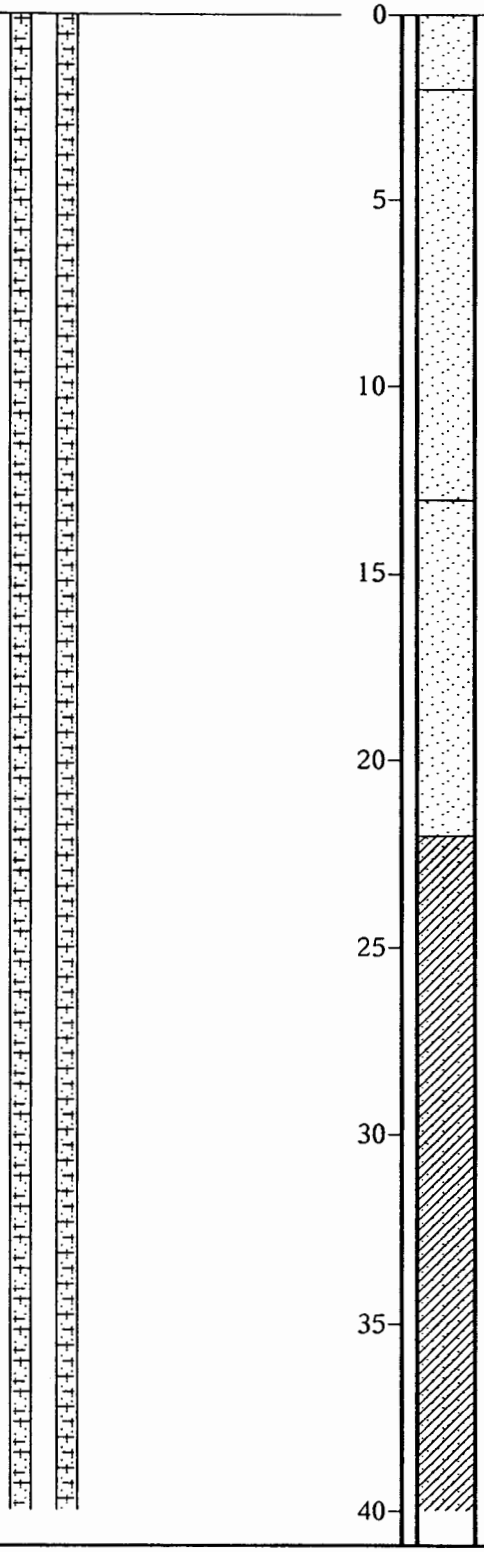
GROUND SURFACE

Cement/Bentonite Grout

4" PVC Casing to 164.6 feet

12-1/4" Borehole to 175 feet

8-5/8" steel casing to 174 feet



LIGHT BROWN FINE SAND (SP)

BROWN & GRAY FINE TO COARSE SAND (SW)

-with sandy clay pockets below 7 feet

BROWN FINE TO MEDIUM SAND (SP)

YELLOWISH-BROWN CLAYEY FINE SAND (SC)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-47

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

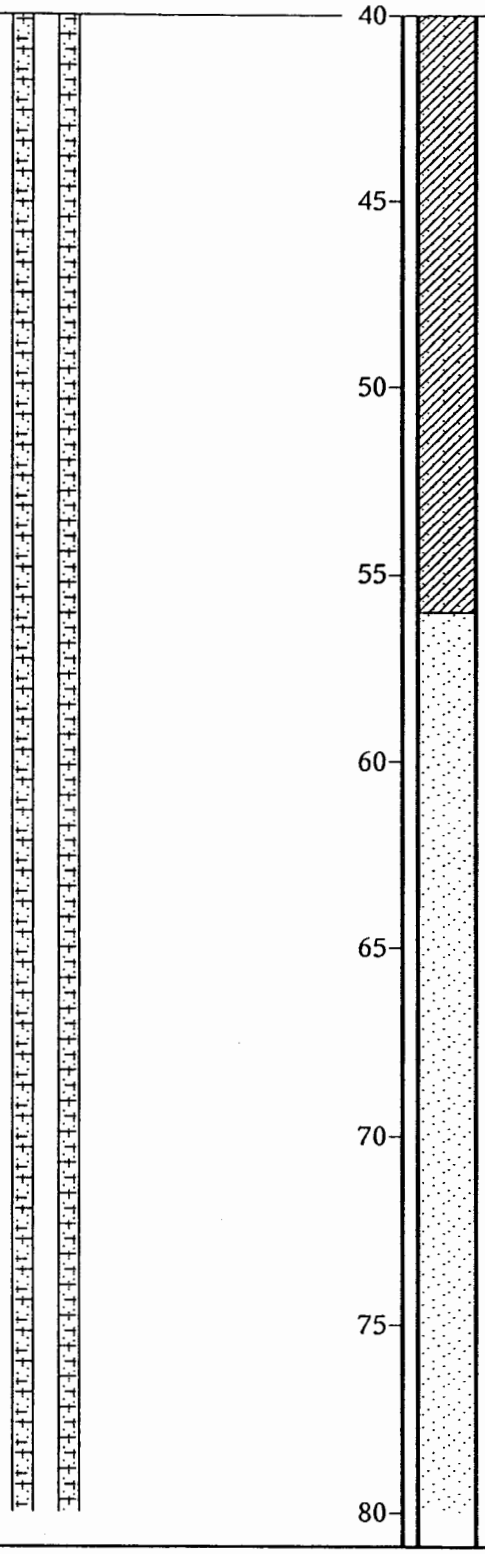
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5155.84

Equipment GD-1500

Elevation ft Date 12/7/89

GROUND SURFACE



-with medium sand below 42 feet

BROWN & GRAY MEDIUM TO COARSE SAND (SP)
with gravel

-with occasional sandy clay pockets from 66 to 68 feet

-with occasional sandy clay pockets from 72 to 82 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-47

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

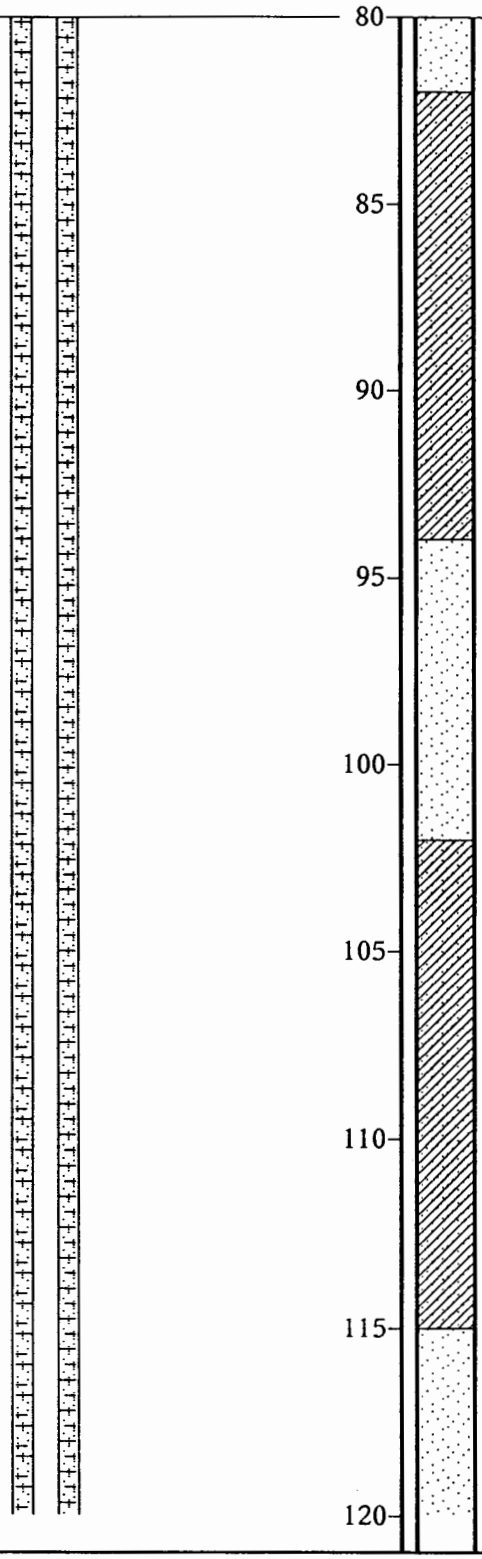
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5155.84

Equipment GD-1500

Elevation ft Date 12/7/89

GROUND SURFACE



BROWN CLAYEY MEDIUM TO COARSE SAND (SC)

BROWN MEDIUM TO COARSE SAND (SP)
with gravel, occasional clay pockets

BROWN CLAYEY MEDIUM TO COARSE SAND (SC)

BROWN & GRAY FINE TO COARSE SAND (SW)
with occasional clay

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-47

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

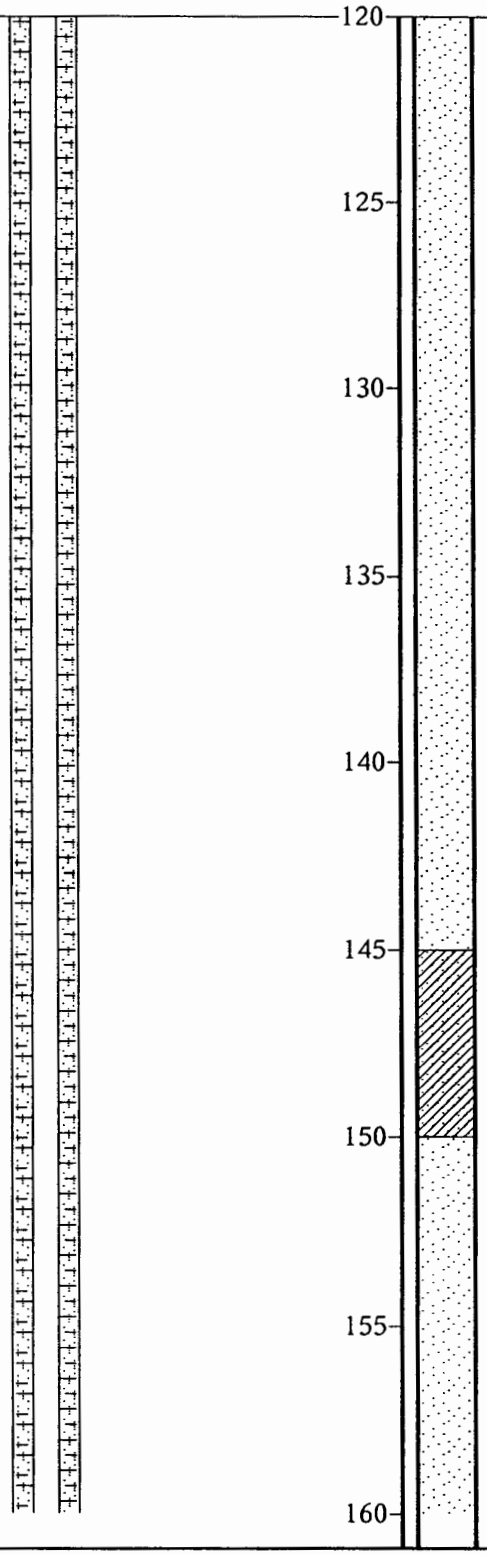
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5155.84

Equipment GD-1500

Elevation ft Date 12/7/89

GROUND SURFACE



BROWN CLAYEY FINE SAND (SC)

BROWN & GRAY MEDIUM TO COARSE SAND (SP)
with occasional gravel

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-47

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

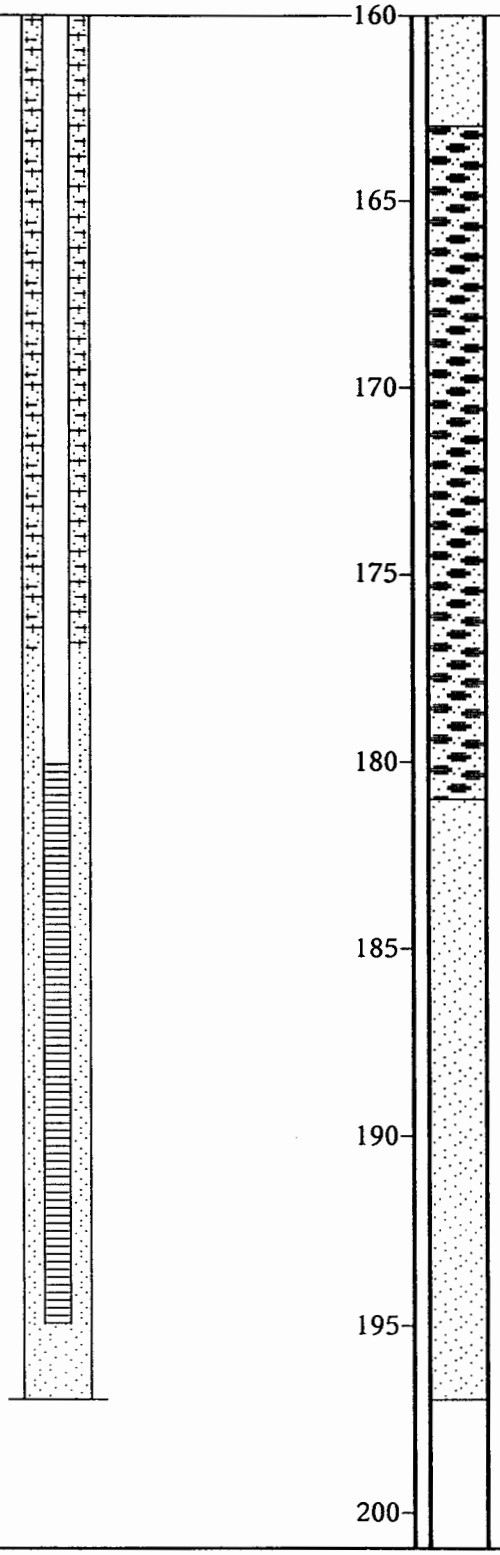
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5155.84

Equipment GD-1500

Elevation ft Date 12/7/89

GROUND SURFACE



Stainless Steel casing
from 164.6-180 feet

Sandpack:
20x40 sand (177-178)
10x20 sand (178-197)

7-7/8" Borehole
174-197 feet

4" Stainless Steel
Screen (Slot size 0.02")
from 180 to 195 feet

Bottom Cap

BROWN, GRAY, & BLACK
GRAVEL (GP)

BROWN, GRAY, & BLACK
GRAVELLY SAND (SP)

End of Boring at 197 feet.

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-47

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

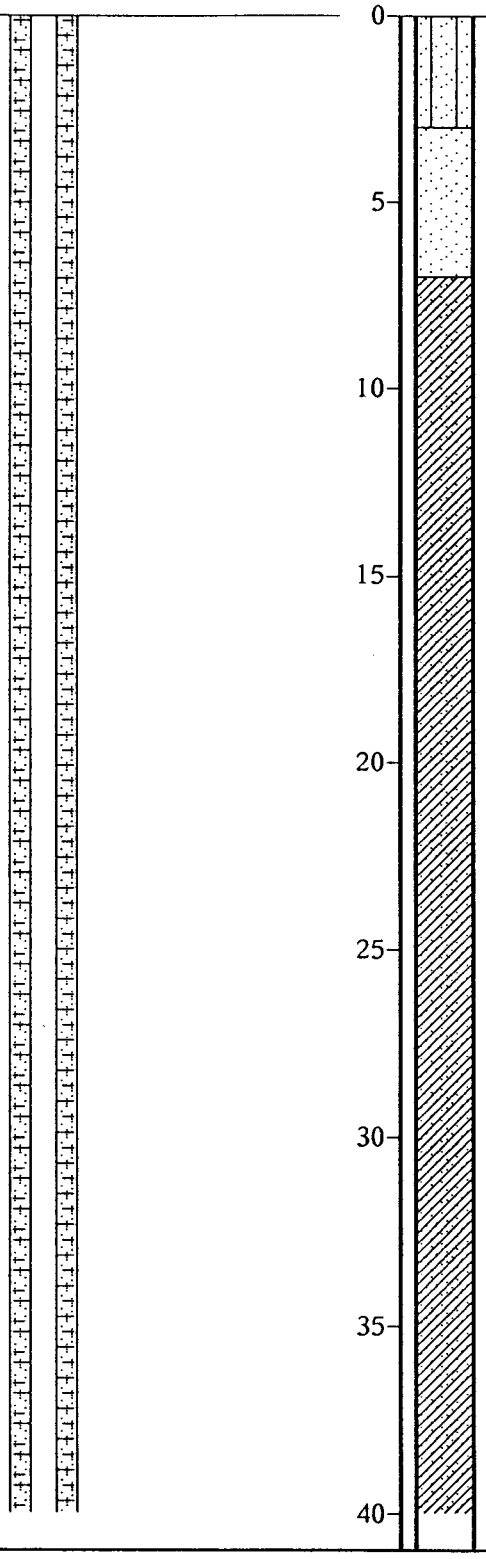
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.33

Equipment GD-1500

Elevation ft Date 12/15/89

GROUND SURFACE



YELLOW-BROWN FINE TO MEDIUM SAND (SM)

BROWN FINE TO COARSE SAND (SW)
with occasional clay, gravel

YELLOW-BROWN CLAYEY FINE TO MEDIUM SAND (SC)

Cement/Bentonite Grout

4" PVC Casing to 180.0 feet

12-1/4" Borehole to 188 feet

8-5/8" steel casing to 187 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-48

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

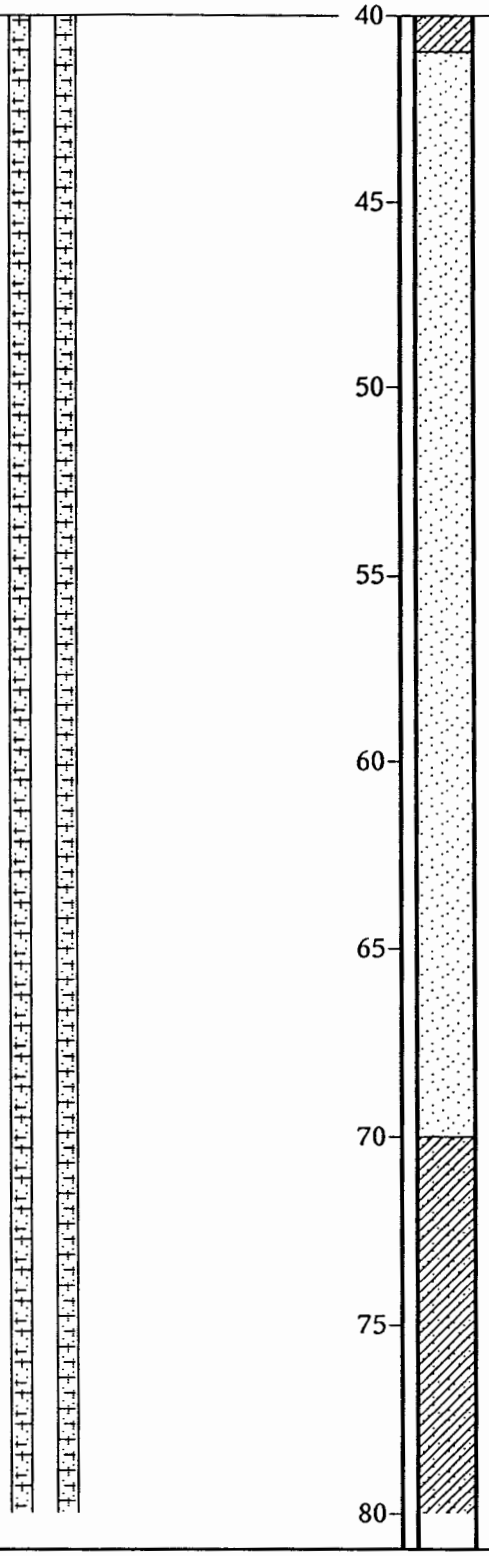
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.33

Equipment GD-1500

Elevation ft Date 12/15/89

GROUND SURFACE



BROWN & GRAY FINE TO COARSE SAND (SW)
with occasional clay

-with gravel from 67 to 69 feet

BROWN CLAYEY SAND (SC)

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Engineers and Environmental Services

MONITORING WELL DETAIL MW-48

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

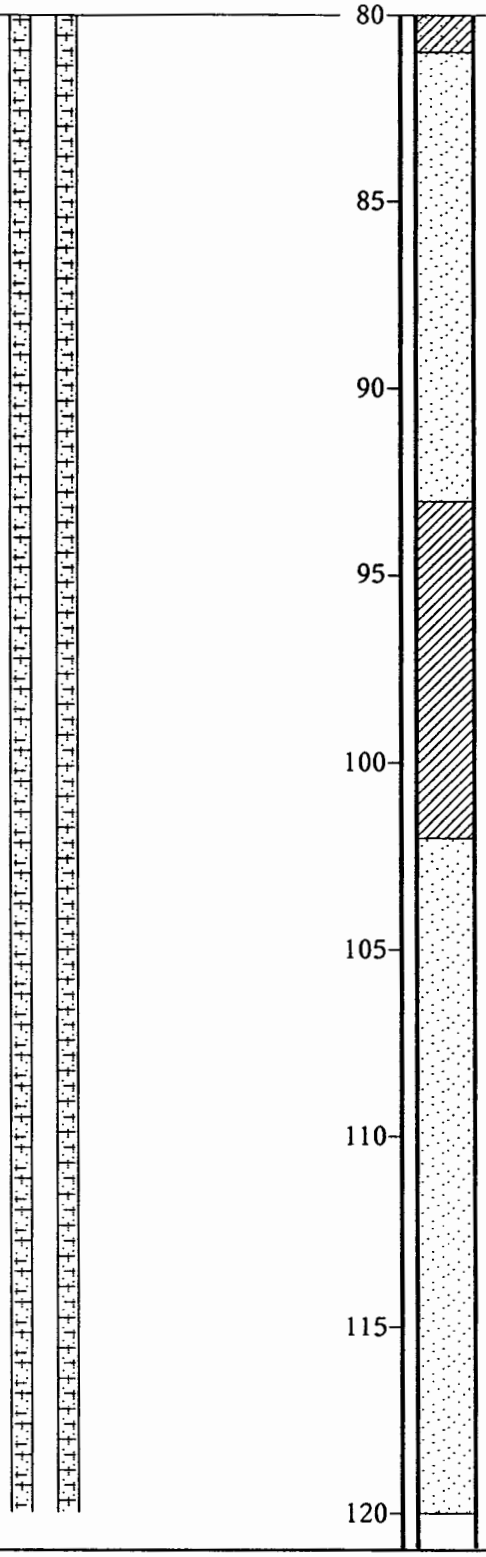
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.33

Equipment GD-1500

Elevation ft Date 12/15/89

GROUND SURFACE



BROWN & GRAY FINE TO COARSE SAND (SW)
with occasional clay and gravel

BROWN SANDY CLAY (CL)

BROWN & GRAY FINE TO COARSE SAND (SW)
with occasional clay and gravel

-loss of gravel and clay below 115 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-48

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

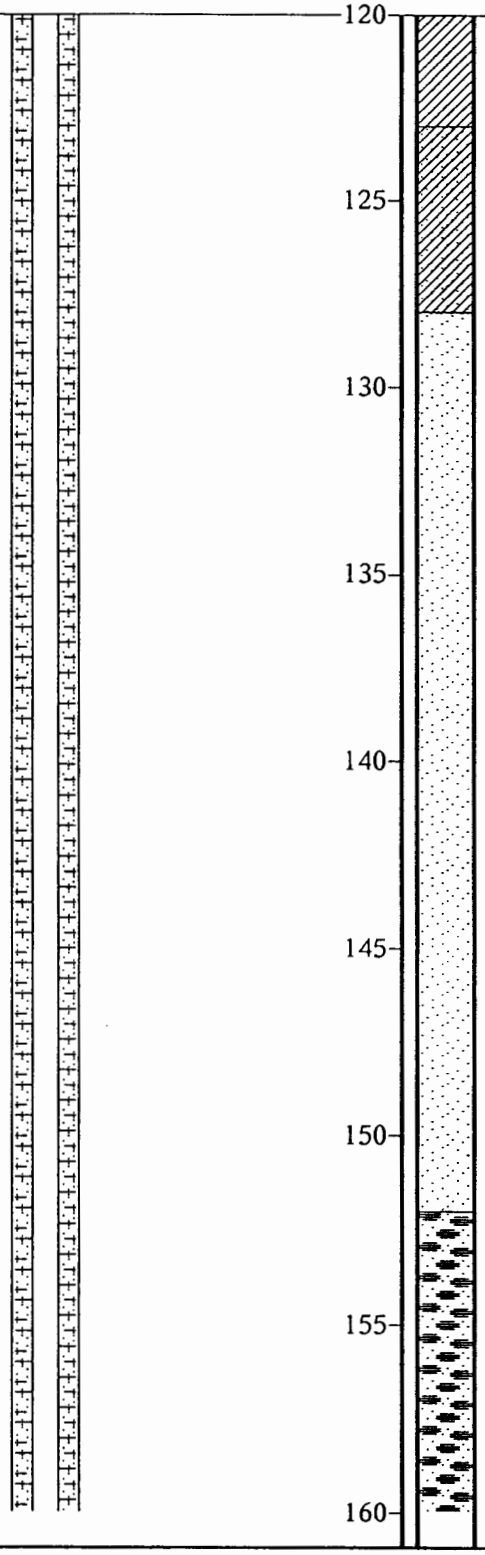
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.33

Equipment GD-1500

Elevation ft Date 12/15/89

GROUND SURFACE



BROWN SANDY CLAY (CL)

BROWN & GRAY CLAYEY MEDIUM TO COARSE SAND (SC)

BROWN & GRAY MEDIUM TO COARSE SAND (SP)
with gravel

BROWN & GRAY SANDY GRAVEL (GP)
with cobbles

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-48

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

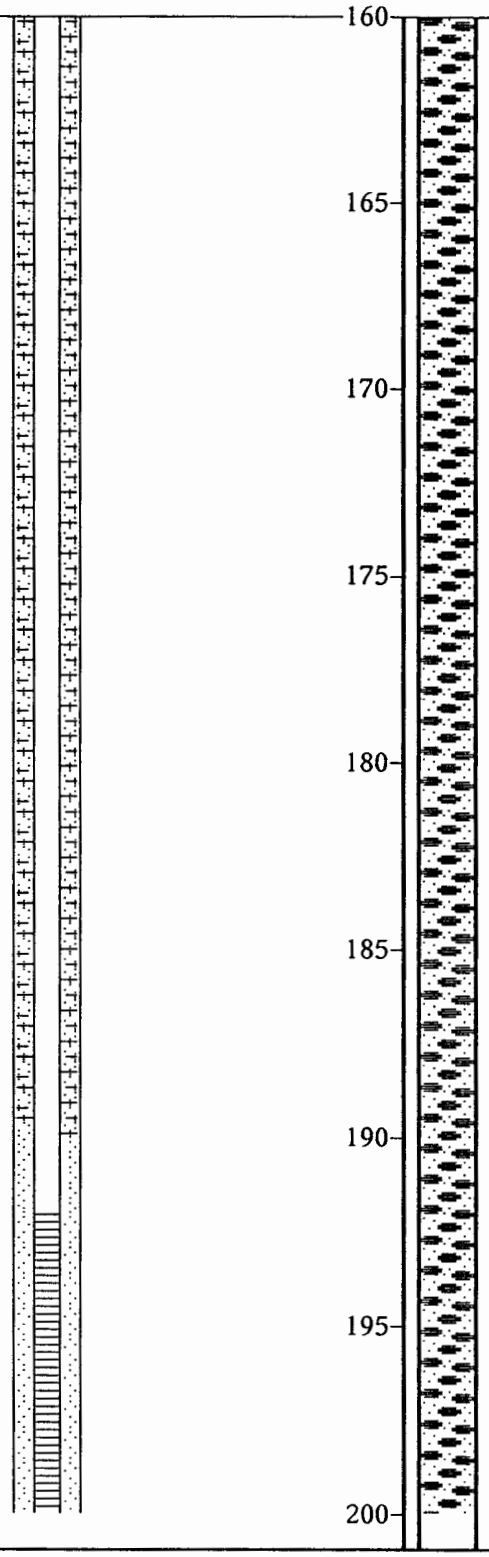
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.33

Equipment GD-1500

Elevation ft Date 12/15/89

GROUND SURFACE



Stainless Steel casing
from 180-192 feet

7-7/8" Borehole
188-209 feet

Sandpack:
20x40 sand (189-190)
10x20 sand (190-207)

4" Stainless Steel
Screen (Slot size 0.02")
from 192 to 207 feet

Harding Lawson Associates
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Environmental Services

MONITORING WELL DETAIL MW-48

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

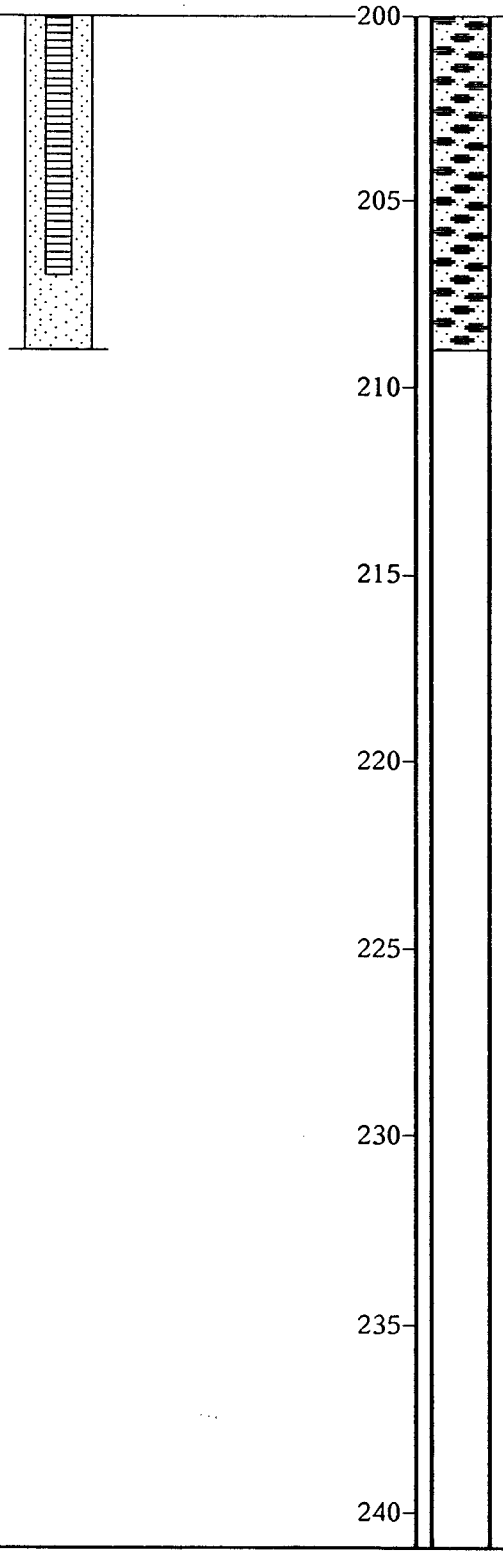
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.33

Equipment GD-1500

Elevation ft Date 12/15/89

GROUND SURFACE



Bottom Cap

End of Boring at 209.0 feet.

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Environmental Services

MONITORING WELL DETAIL MW-48

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

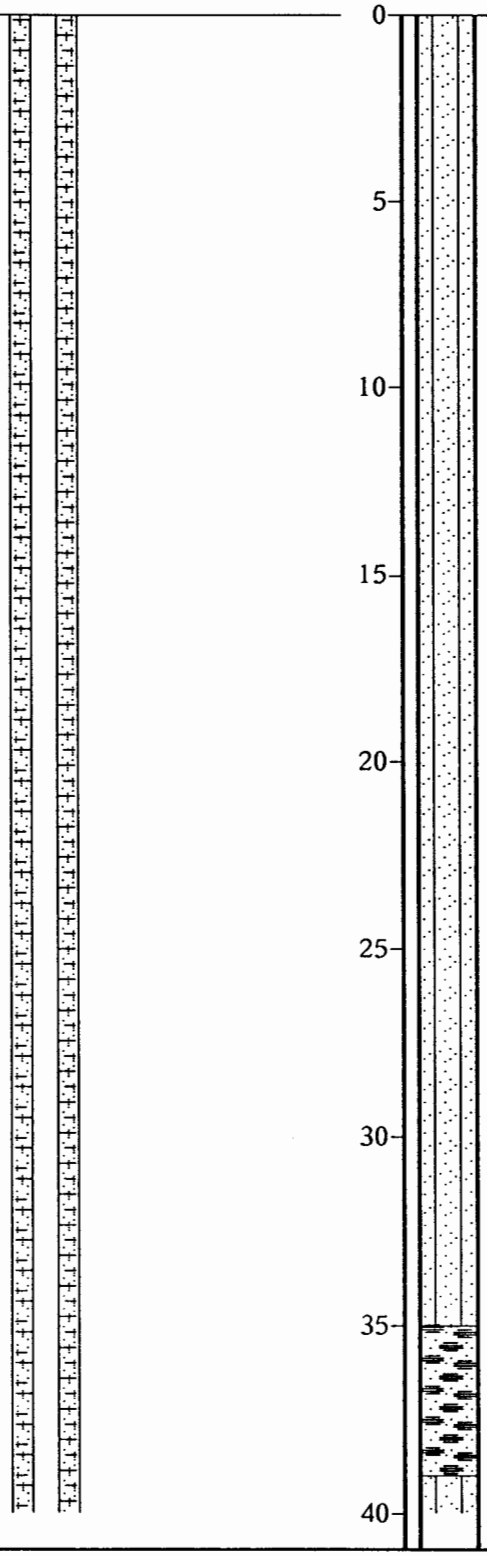
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5043.68

Equipment GD-1500

Elevation ft Date 1/11/90

GROUND SURFACE



LIGHT BROWN SILTY FINE TO MEDIUM SAND (SM)

Cement/Bentonite Grout

4" PVC Casing to 56.4 feet

12-1/4" Borehole to 128 feet

8-5/8" steel casing to 127.7 feet

BROWN & GRAY SANDY GRAVEL (GP)

LIGHT BROWN SILTY FINE TO

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Engineers and Environmental Services

MONITORING WELL DETAIL MW-49

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

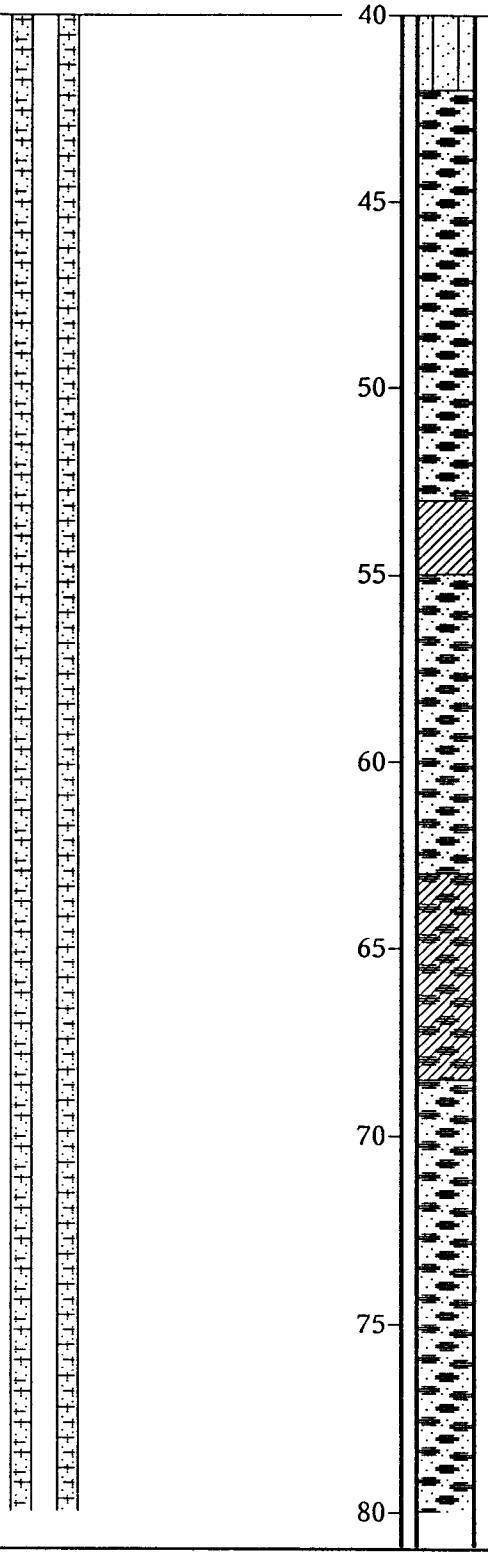
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5043.68

Equipment GD-1500

Elevation ft Date 1/11/90

GROUND SURFACE



MEDIUM SAND (SM)

BROWN & GRAY SANDY GRAVEL (GP)

LIGHT BROWN SANDY CLAY (CL)

BROWN, GRAY, & BLACK GRAVEL (GP)

LIGHT BROWN CLAYEY GRAVEL (GC)

BROWN, GRAY, & BLACK SANDY GRAVEL (GP)

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MONITORING WELL DETAIL MW-49

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

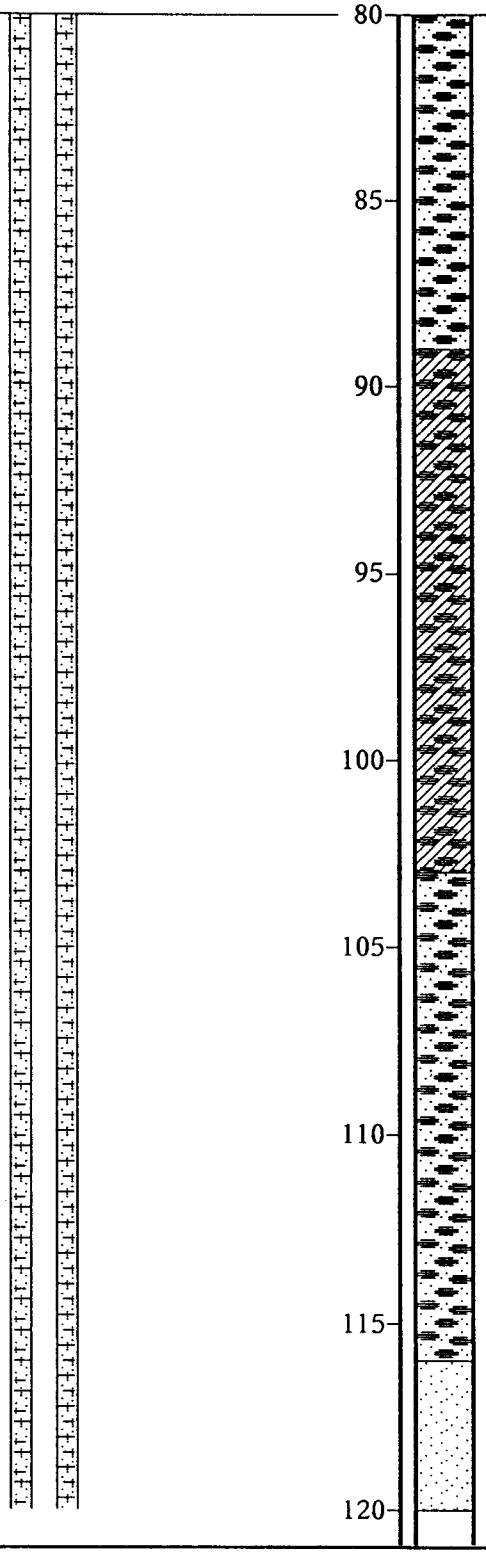
Top of PVC Casing
Elevation 5043.68

Equipment GD-1500

Elevation ft Date 1/11/90

GROUND SURFACE

Stainless Steel casing
from 56.4-137.8 feet



BROWN CLAYEY GRAVEL (GC)

BROWN, GRAY, & BLACK SANDY GRAVEL (GP)

BROWN & GRAY MEDIUM TO COARSE SAND (SP)
with gravel

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Environmental Services

MONITORING WELL DETAIL MW-49

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

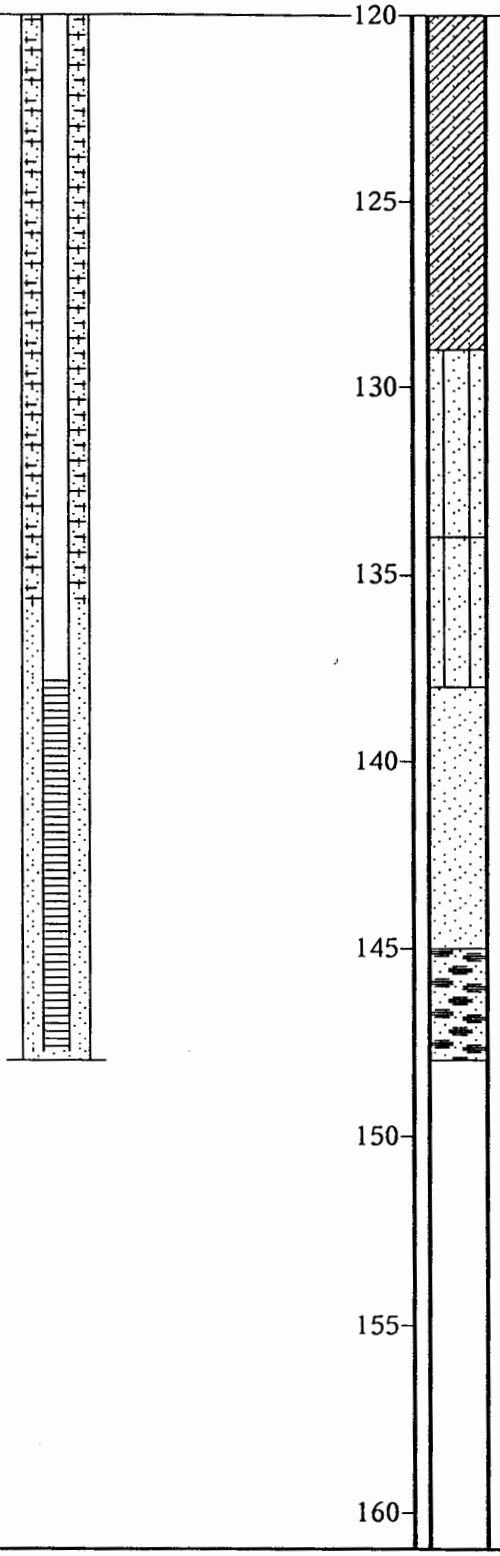
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5043.68

Equipment GD-1500

Elevation ft **Date** 1/11/90

GROUND SURFACE



Sandpack:
20x40 sand
(134.7-135.8)
10x20 sand
(135.8-147.9)

7-7/8" Borehole
from 128-148 feet

4" Stainless Steel
Screen (Slot size 0.02")
from 137.7 to 147.7
feet

Bottom Cap

120 — LIGHT BROWN CLAYEY FINE TO COARSE SAND (SC)

125 — -loss of coarse sand from 126 to 128 feet

130 — BROWN SILTY FINE SAND (SM)

135 — BROWN SILTY FINE SAND (SM)
with clay laminations and
embedded gravel

140 — BROWN & GRAY MEDIUM TO COARSE SAND (SP)
with gravel

145 — BROWN, GRAY, & BLACK COARSE SANDY GRAVEL (GP)
with occasional sandy clay

End of Boring at 148.00 feet.

150

155

160

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-49

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

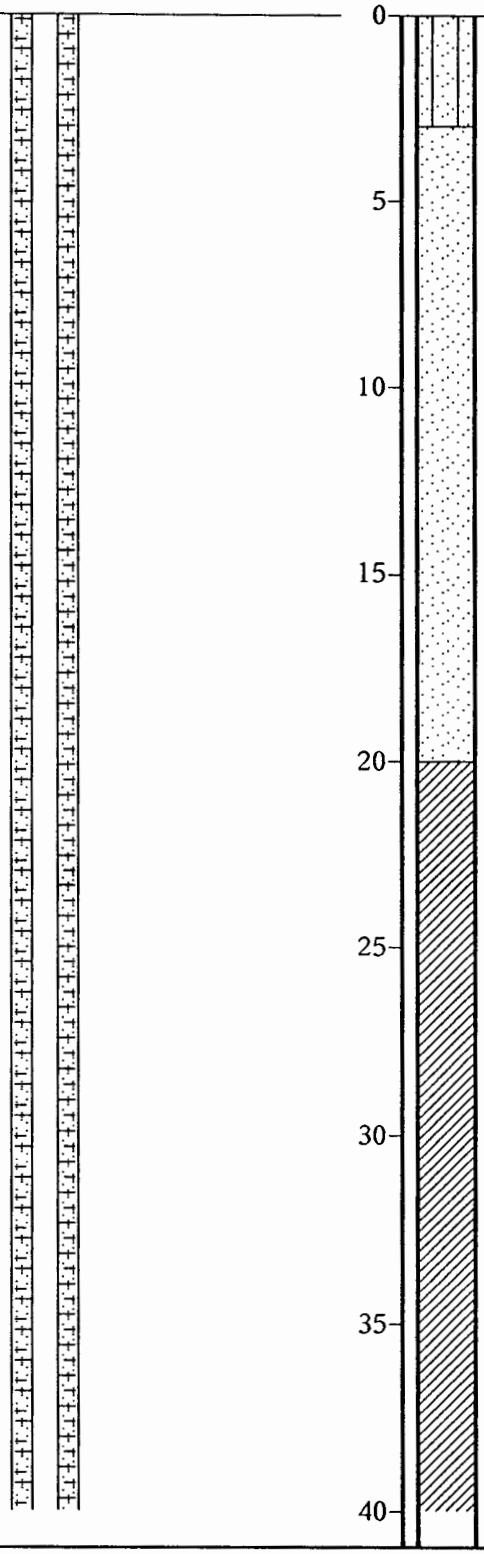
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5211.51

Equipment GD-1500

Elevation ft **Date** 4/2/90

GROUND SURFACE



YELLOWISH-BROWN SILTY FINE TO MEDIUM SAND (SM)

YELLOWISH-BROWN SILTY FINE TO COARSE SAND (SW)

TAN SILTY CLAY (CL) with sand

-with pumice (low density), vesicular from 31 to 40 feet

Cement/Bentonite Grout

4" PVC Casing to 225 feet

12-1/4" Borehole to 235 feet

8-5/8" steel casing to 234 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-50

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

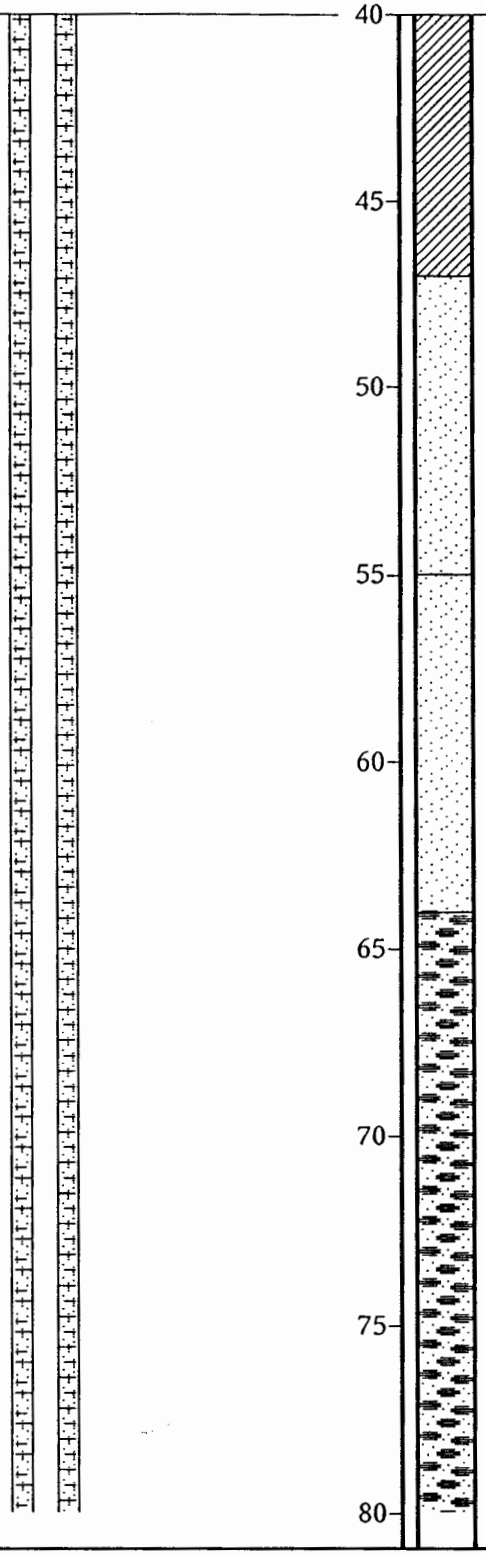
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5211.51

Equipment GD-1500

Elevation ft Date 4/2/90

GROUND SURFACE



-with gray gravel from 42 to 45 feet

TAN, BROWN & GRAY FINE TO COARSE SAND (SW)
with sandy clay pockets

TAN, BROWN & GRAY MEDIUM TO COARSE SAND (SP)
with gravel

TAN, GRAY, BROWN & BLACK GRAVEL (GP)
basaltic, with sand (slow penetration)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-50

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

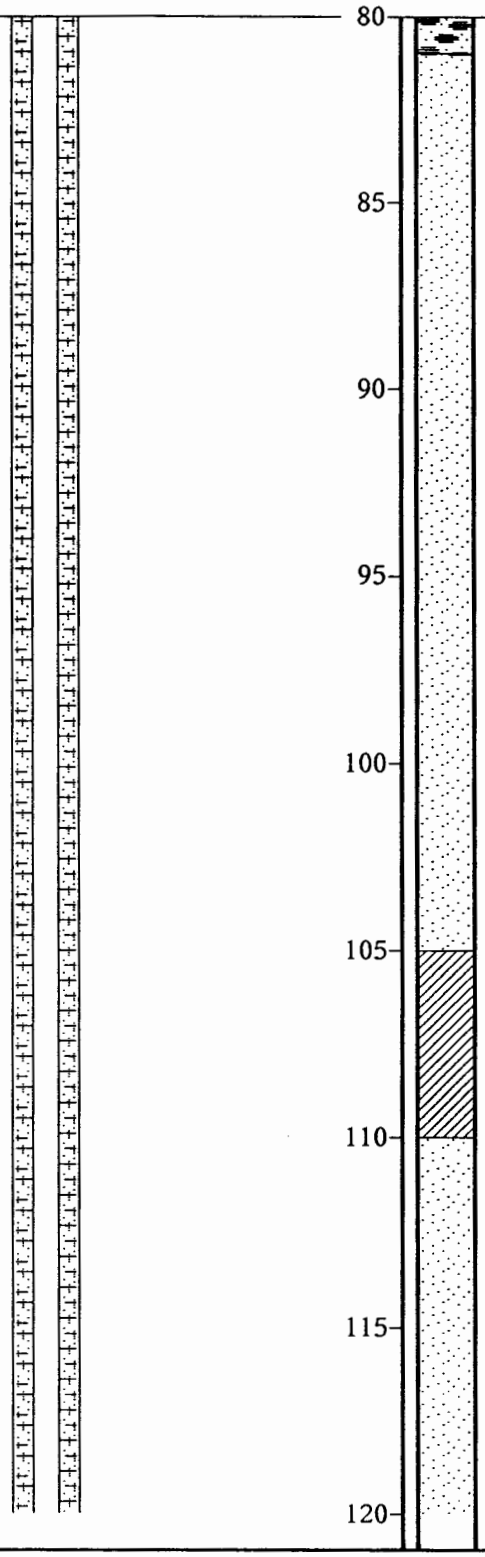
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5211.51

Equipment GD-1500

Elevation ft Date 4/2/90

GROUND SURFACE



TAN, GRAY, BROWN & BLACK GRAVELLY SAND (SP)

TAN SANDY CLAY (CL)

TAN, GRAY, BROWN & BLACK MEDIUM TO COARSE SAND (SP)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-50

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

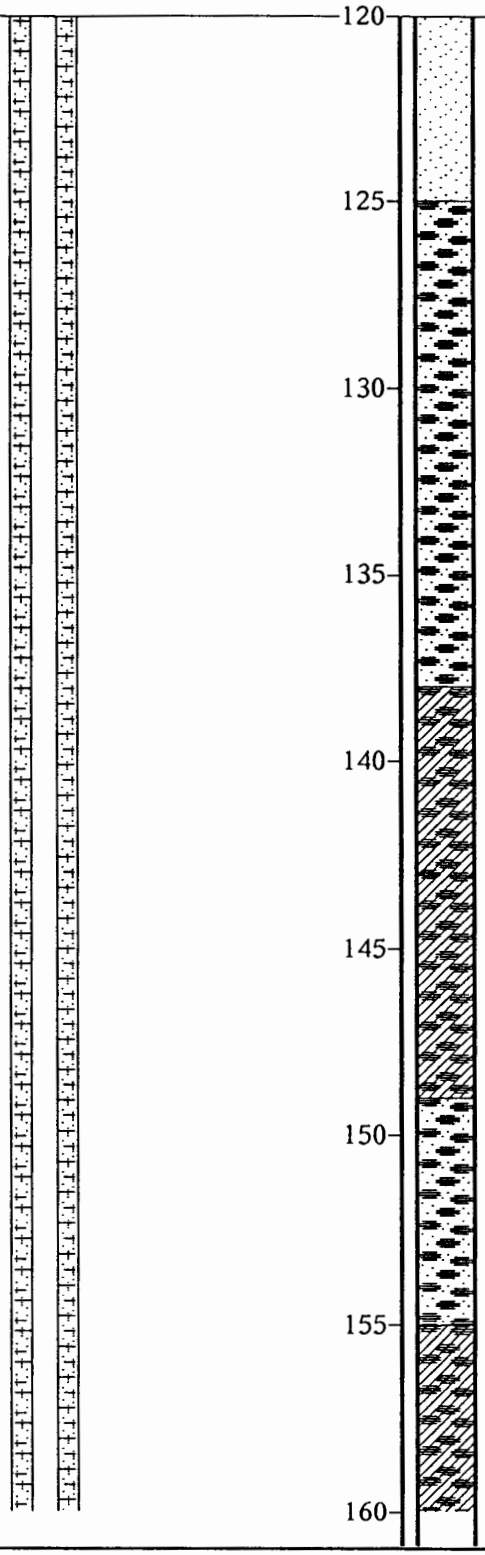
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5211.51

Equipment GD-1500

Elevation ft Date 4/2/90

GROUND SURFACE



TAN, BROWN, BLACK & GRAY
SANDY GRAVEL (GP)

-with occasional silty clay seams
from 136 to 137 feet
TAN CLAYEY GRAVEL (GC)

TAN, GRAY, BROWN & BLACK
SANDY GRAVEL (GP)
with occasional clay
-with boulders from 151 to 153 feet

TAN, BROWN, GRAY & BLACK
CLAYEY GRAVEL (GC)

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-50

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

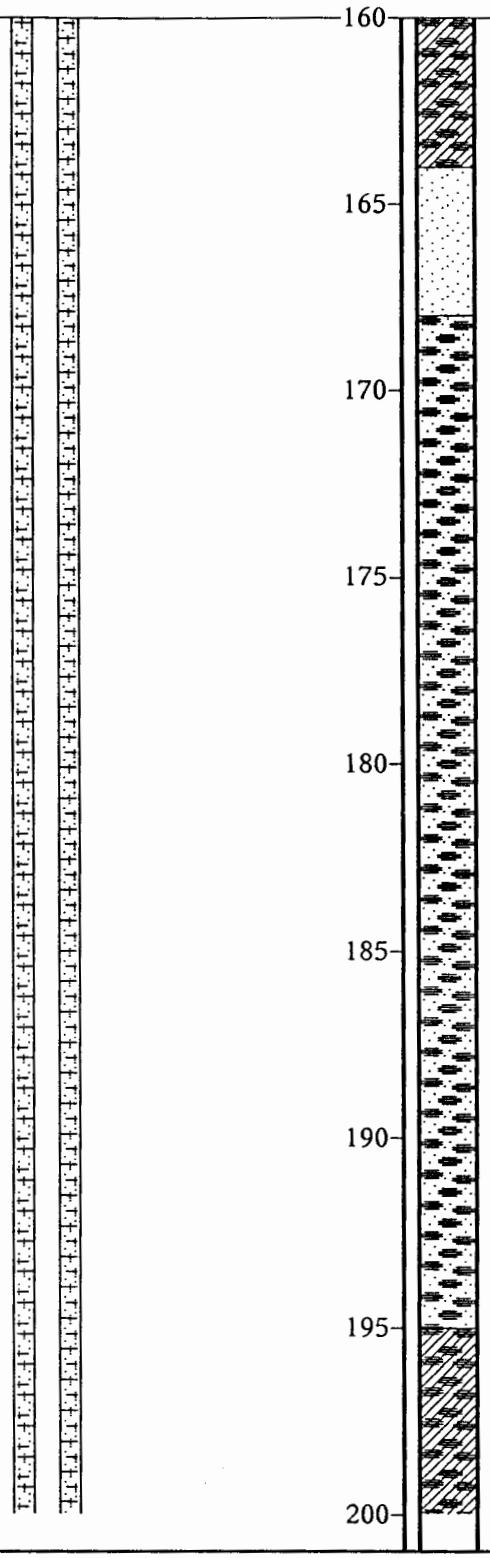
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5211.51

Equipment GD-1500

Elevation ft Date 4/2/90

GROUND SURFACE



TAN, GRAY, BROWN & BLACK FINE TO COARSE SAND (SW)

TAN, GRAY, BROWN & BLACK SANDY GRAVEL (GP)

-with boulders from 184 to 195 feet

TAN, BROWN & BLACK CLAYEY GRAVEL (GC)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-50

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

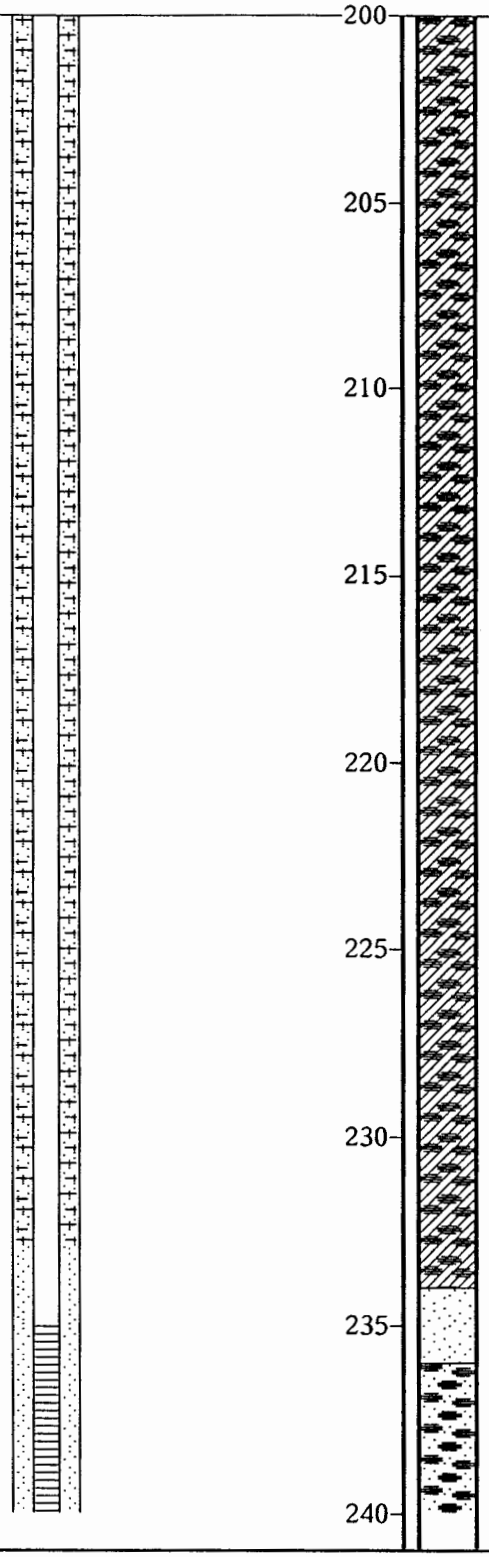
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5211.51

Equipment GD-1500

Elevation ft Date 4/2/90

GROUND SURFACE



4" Stainless Steel
casing
from 225 to 235 feet

7-7/8" Borehole
from 234-260 feet

BROWN, GRAY & BLACK MEDIUM TO COARSE SAND (SP)
with gravel
BROWN, GRAY & BLACK SANDY GRAVEL (GP)
with fine sand seams

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-50

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5211.51

Equipment GD-1500

Elevation ft **Date** 4/2/90

GROUND SURFACE

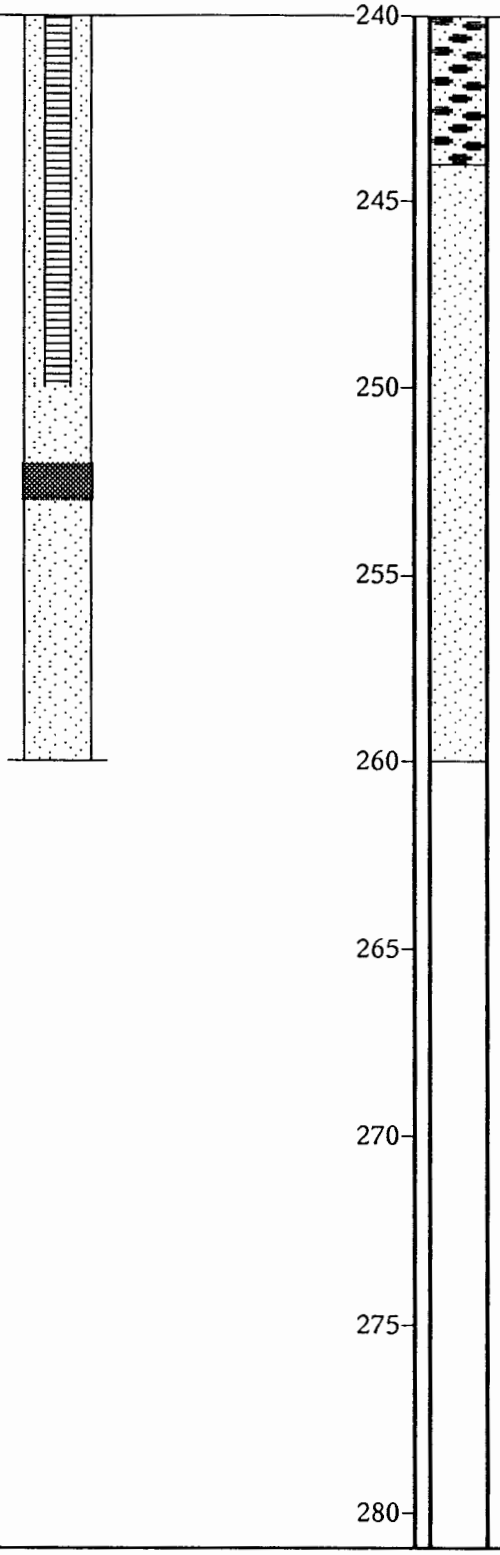
4" Stainless Steel Screen (Slot size 0.02") from 235 to 250 feet

Sandpack:
20x40 sand (232-233)
10x20 sand (233-252)

Bottom Cap

Bentonite seal (252-253)

Sandpack:
10x20 sand (253-260)



-tan sandy clay pockets from 243 to 244 feet

BROWN, GRAY & BLACK GRAVELLY SAND (SP)

End of Boring at 260 feet.

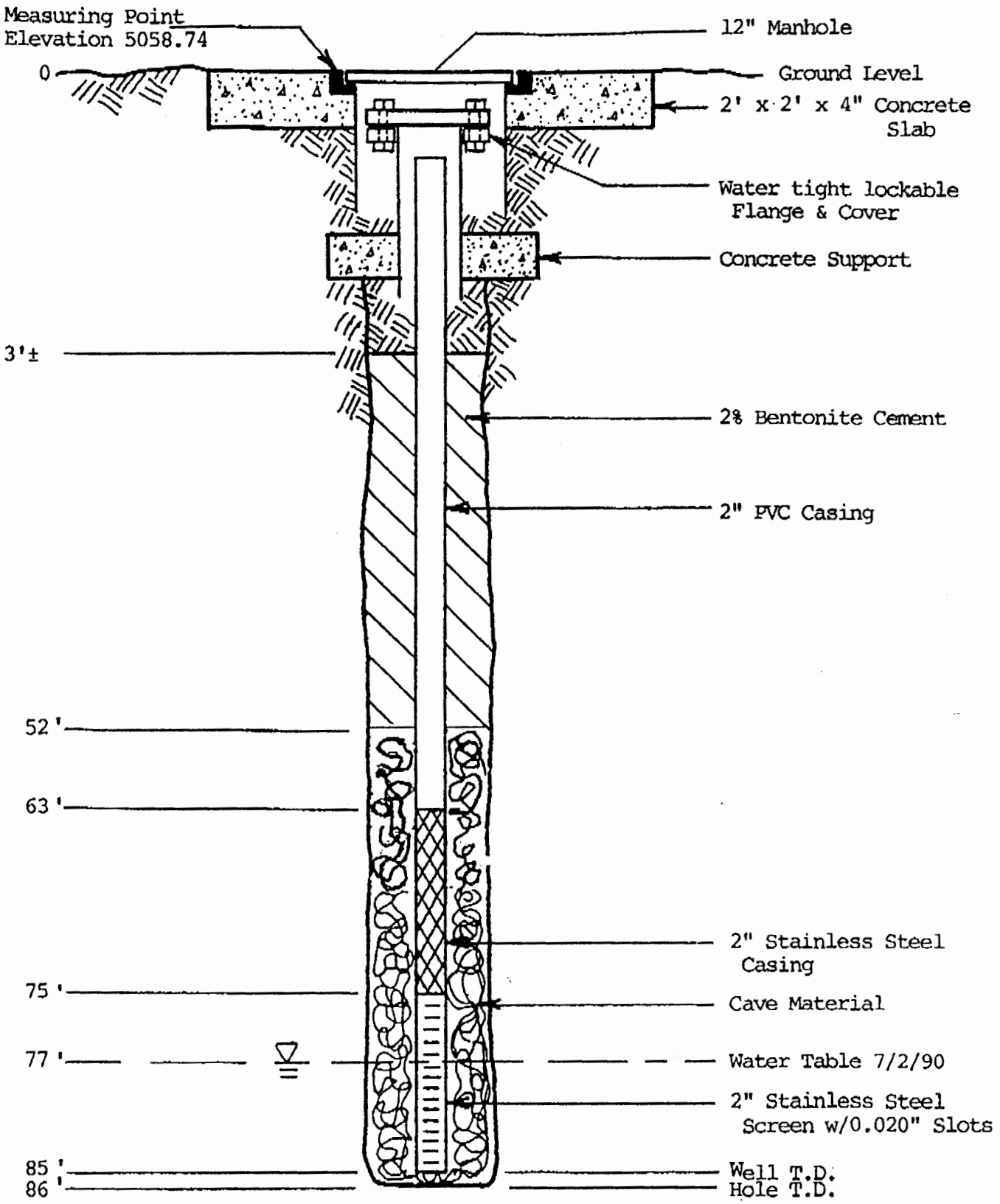
Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-50

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		



COMPLETION DIAGRAM
MW-51

METRIC
Corporation

SAMPLE LOG

Well Number MW-51 Well Location

Well Owner Sparton Technology, Inc.

Sample Logger Peter H. Metzner, METRIC Corporation

Driller Rodgers & Company, Inc.

Drilling Medium Hollow Stem Auger

Date of Completion 5-11-90 Ground Elev. 5058.5

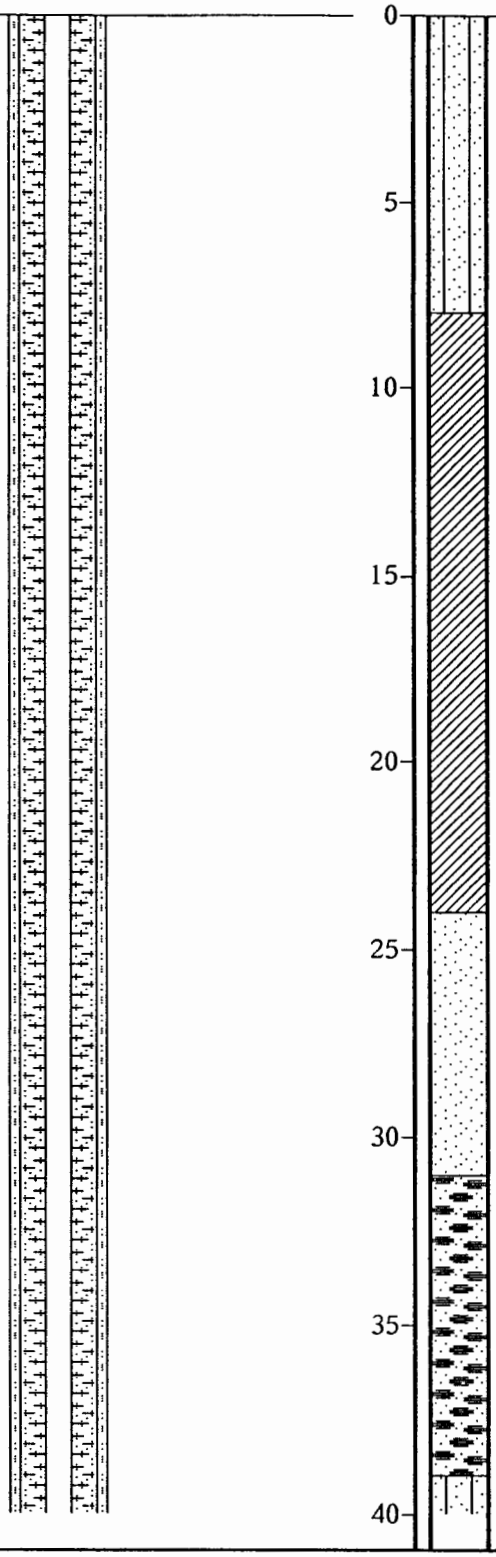
Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 20	20	Pale yellowish brown (10YR6/2) medium-sorted very fine to medium fine sand with some coarse and granule gravel
20 - 70	50	Moderate yellowish brown (10YR5/4) well-sorted very fine to fine sand
70 - 86	16	Pale yellowish brown (10YR6/2) fine to coarse sand with subangular to rounded granule to cobble gravel

Top of PVC Casing
Elevation 5165.41

Equipment GD-1500

Elevation ft Date 6/4/90

GROUND SURFACE



LIGHT TAN SILTY FINE TO MEDIUM SAND (SM)
slightly clayey

TAN SANDY CLAY (CL)

Cement/Bentonite Grout

4" PVC Casing to 177 feet

BROWN, BLACK, WHITE, GRAY, & TAN FINE TO COARSE SAND (SW)
with occasional gravel

12-1/4" Borehole to 188 feet

BROWN, BLACK, GRAY, TAN, & WHITE SANDY GRAVEL (GP)

BROWN, BLACK, GRAY, & TAN

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-52

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

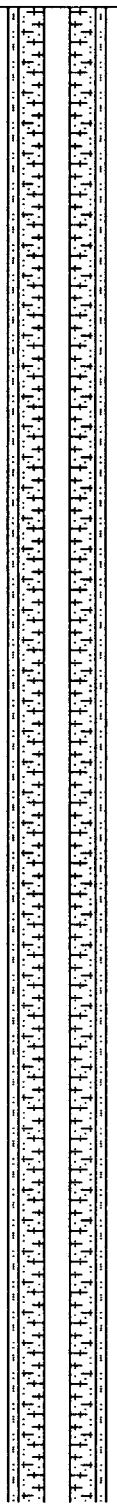
Top of PVC Casing
Elevation 5165.41

Equipment GD-1500

Elevation ft Date 6/4/90

GROUND SURFACE

8-5/8"
Steel casing
from 0 to 186.8 feet



40 SILTY FINE TO MEDIUM SAND (SM)
-slightly clayey

-with occasional coarse sand

45

50

BROWN, BLACK, TAN, GRAY, & WHITE MEDIUM TO COARSE SAND (SP)

55

TAN SILTY FINE TO COARSE SAND (SW)
with clay

60

TAN, BROWN, & BLACK MEDIUM TO COARSE SAND (SP)

65

TAN, BROWN, & BLACK SILTY FINE TO COARSE SAND (SW)

70

75

80 -with clay below 79 feet

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-52

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

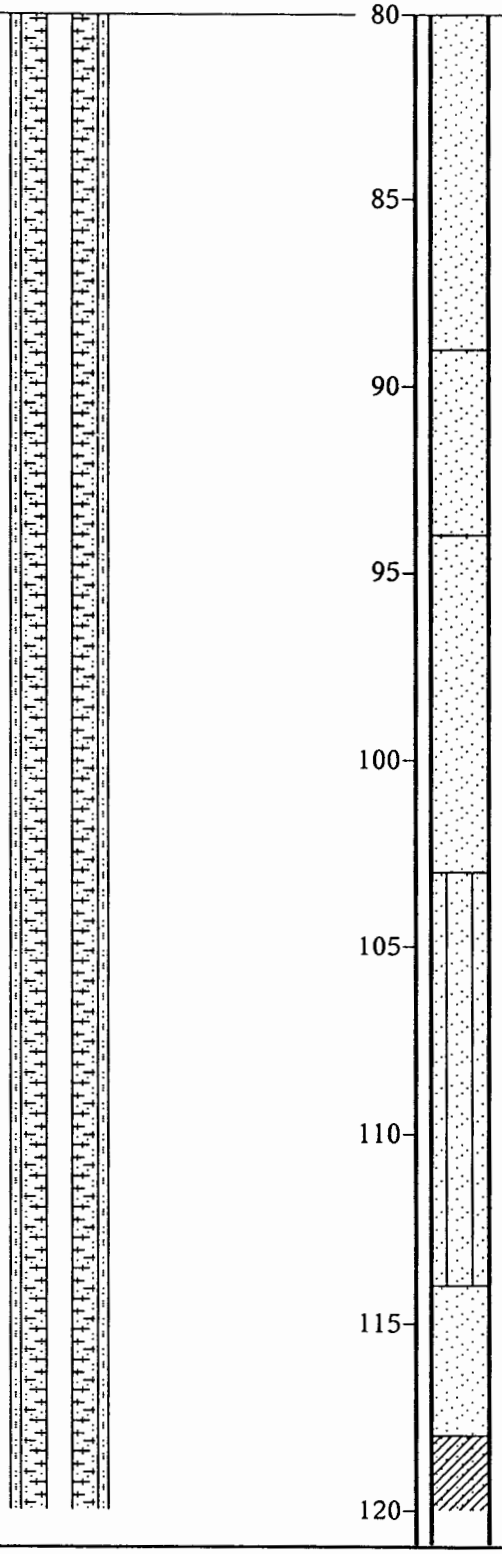
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5165.41

Equipment GD-1500

Elevation ft Date 6/4/90

GROUND SURFACE



BROWN, BLACK, TAN, & GRAY MEDIUM TO COARSE SAND (SP)

TAN, BROWN, & BLACK FINE TO COARSE SAND (SW)

TAN, BROWN, & BLACK SILTY FINE TO MEDIUM SAND (SM)

BROWN, BLACK, TAN, WHITE, & GRAY FINE TO MEDIUM SAND (SP) with coarse sand

BROWN & TAN CLAYEY MEDIUM TO COARSE SAND (SC)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-52

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

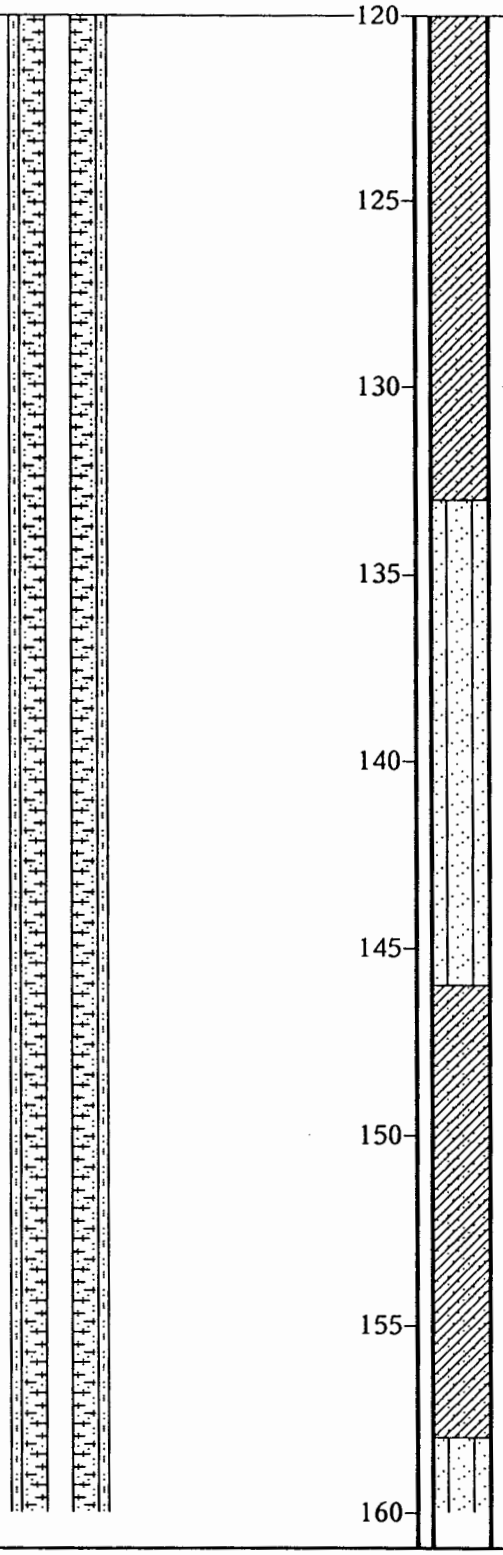
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5165.41

Equipment GD-1500

Elevation ft Date 6/4/90

GROUND SURFACE



BROWN, TAN, & BLACK SILTY FINE TO MEDIUM SAND (SM)

-with coarse sand below 137 feet

TAN & BROWN CLAYEY FINE TO MEDIUM SAND (SC)

BROWN, TAN, & BLACK SILTY FINE TO MEDIUM SAND (SM)

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-52

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

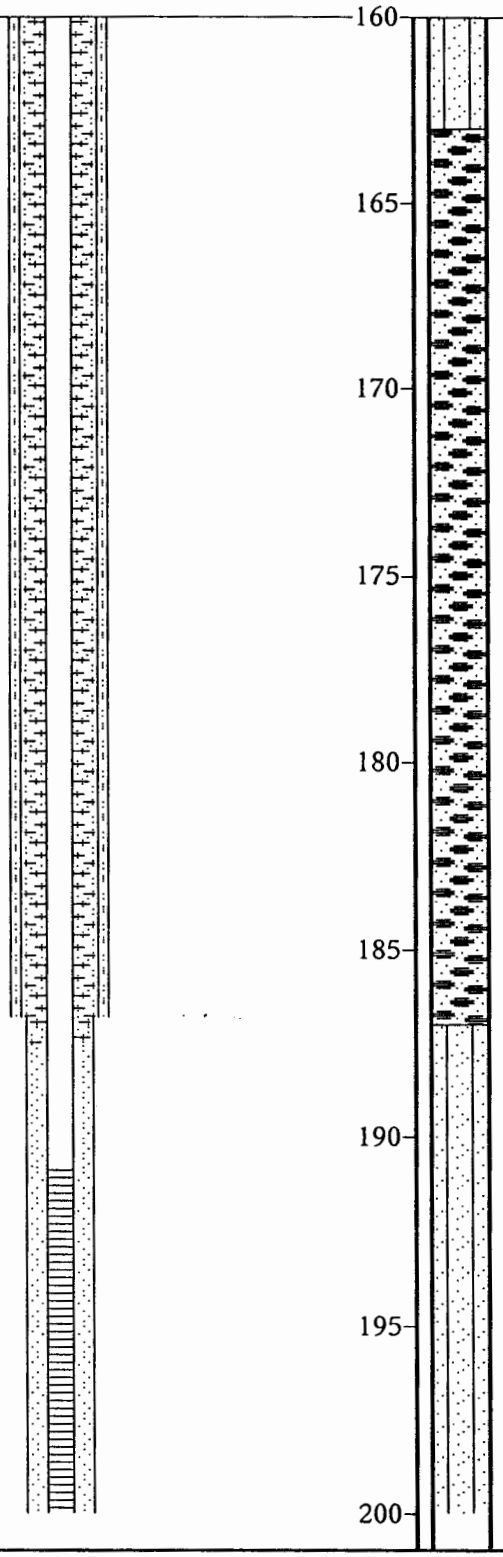
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5165.41

Equipment GD-1500

Elevation ft Date 6/4/90

GROUND SURFACE



BROWN, BLACK, GRAY, WHITE, & SANDY GRAVEL (GP)

-with decreasing sand content

Stainless Steel casing from 177 to 190.8 feet

Sandpack:
20x40 sand (187.6'-188.9')
10x20 sand (188.9'-206.5')

TAN SILTY FINE TO MEDIUM SAND (SM)

7-7/8" Borehole from 187 to 208 feet

4" Stainless Steel Screen (Slot size 0.02") from 190.8 to 206 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-52

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

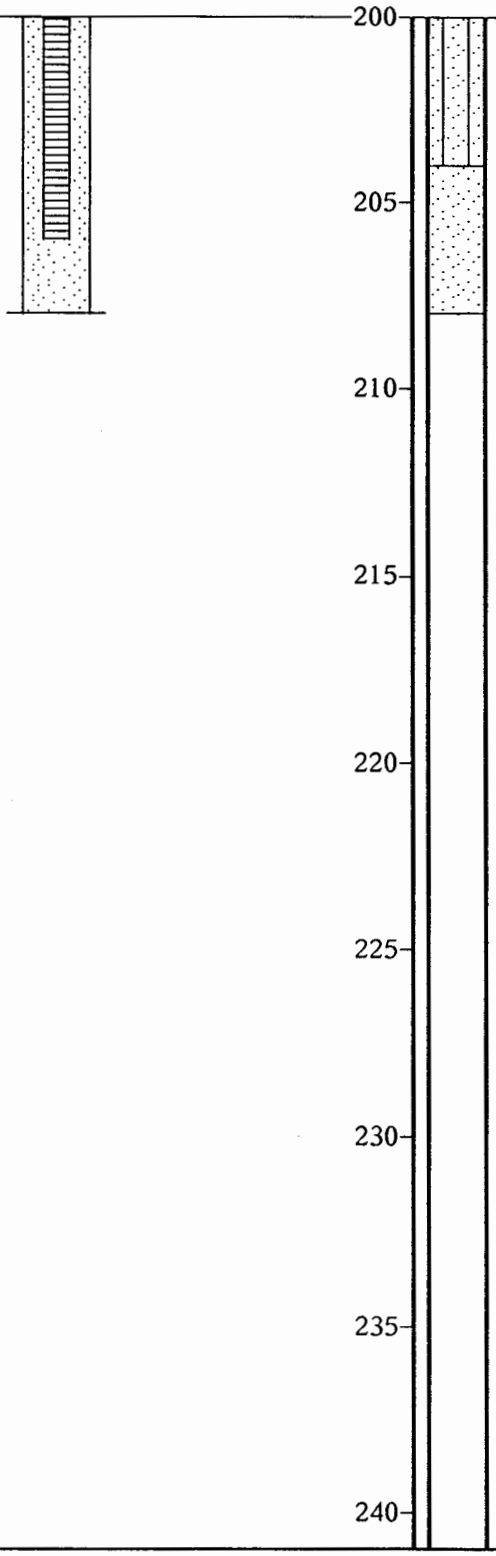
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5165.41

Equipment GD-1500

Elevation ft **Date** 6/4/90

GROUND SURFACE



Bottom Cap

TAN, BROWN, & BLACK FINE TO COARSE SAND (SW)

End of boring at 208 feet.

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-52

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

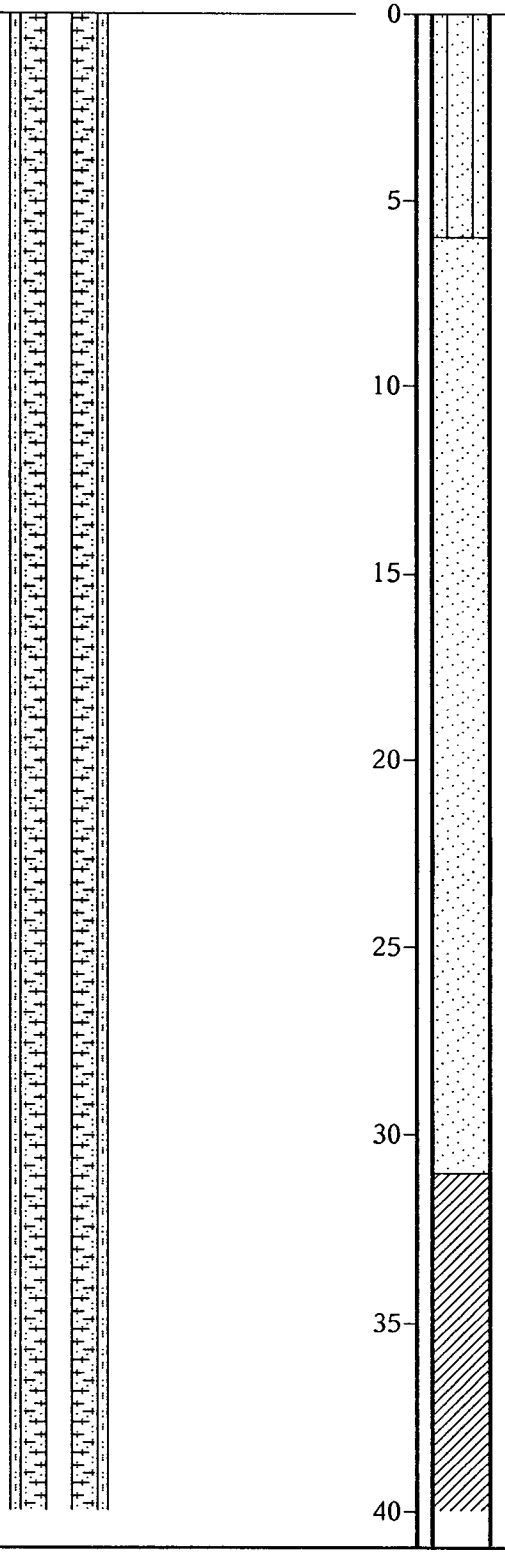
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5163.96

Equipment GD-1500

Elevation ft Date 6/14/90

GROUND SURFACE



TAN SILTY FINE TO MEDIUM SAND (SM)

TAN, BROWN, & BLACK MEDIUM TO COARSE SAND (SP)

TAN SANDY CLAY (CL)

Cement/Bentonite Grout

4" PVC Casing to 175 feet

12-1/4" Borehole to 186 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-53

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

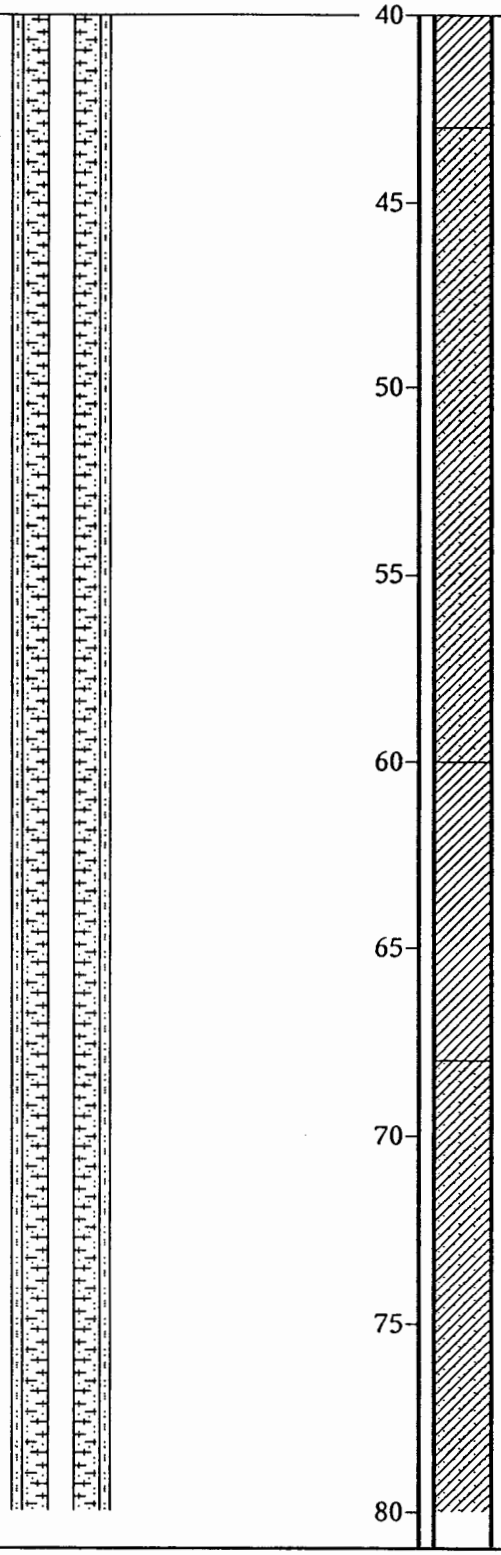
Top of PVC Casing
Elevation 5163.96

Equipment GD-1500

Elevation ft Date 6/14/90

GROUND SURFACE

8-5/8" Steel casing
from 0 to 183.8 feet



TAN CLAYEY MEDIUM TO COARSE SAND (SC)

TAN SANDY CLAY (CL)

TAN CLAYEY MEDIUM SAND (SC)

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-53

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

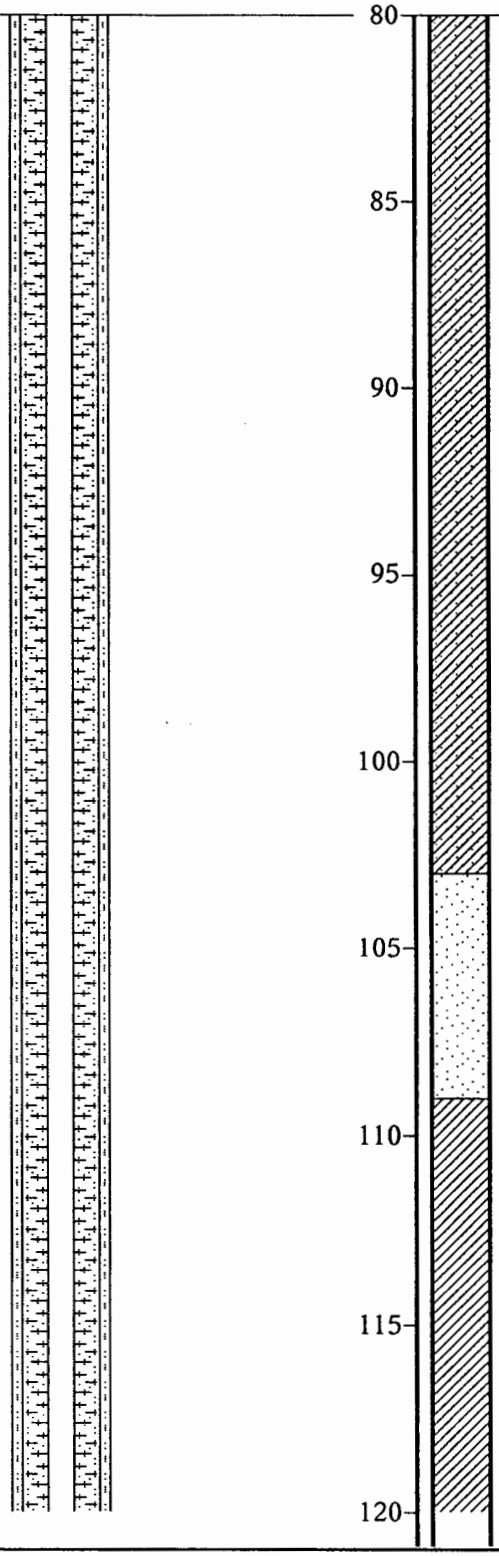
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5163.96

Equipment GD-1500

Elevation ft **Date** 6/14/90

GROUND SURFACE



-with clayey gravel from 80 to 84 feet

TAN, BROWN, BLACK, & GRAY MEDIUM TO COARSE SAND (SP) with gravel

TAN & BROWN SANDY CLAY (CL)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-53

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

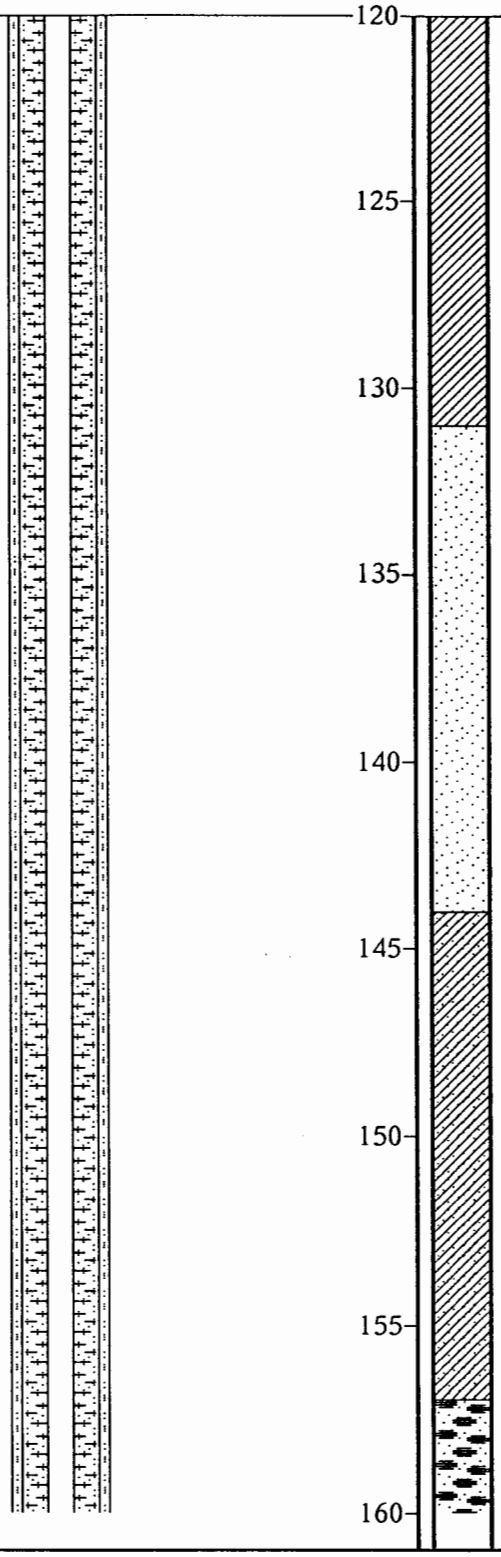
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5163.96

Equipment GD-1500

Elevation ft Date 6/14/90

GROUND SURFACE



TAN, BROWN, BLACK, & GRAY FINE TO COARSE SAND (SW)
with occasional gravel

TAN & BROWN CLAYEY FINE SAND (SC)

BROWN, TAN, BLACK, & GRAY SANDY GRAVEL (GP)

- with cobbles at 159 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-53

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

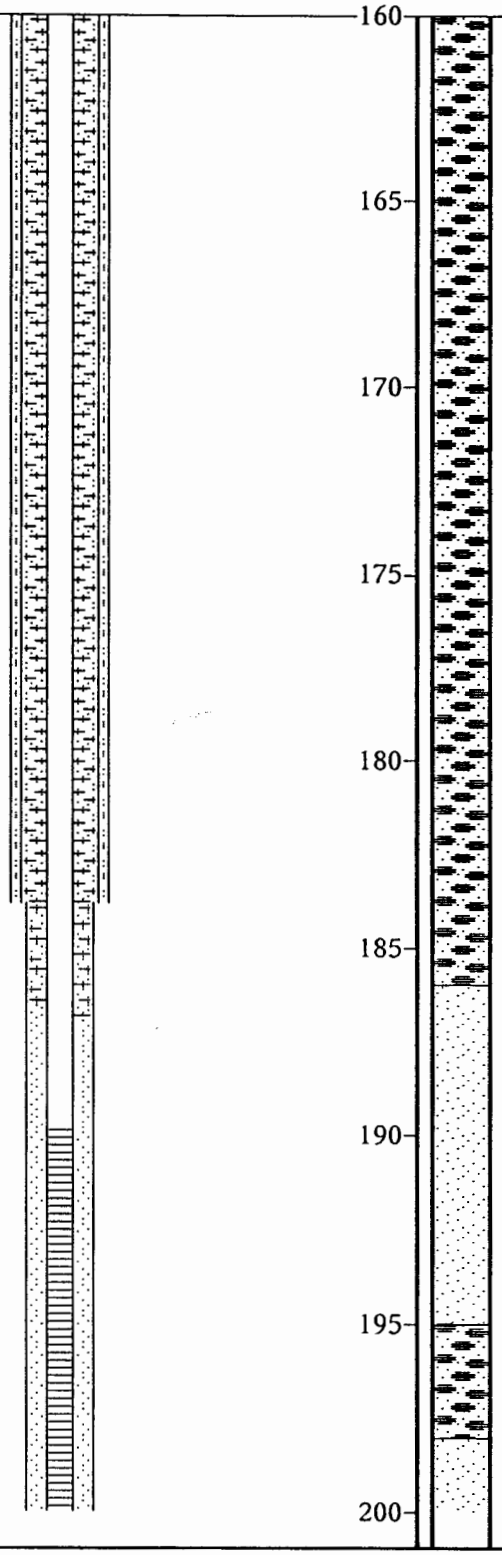
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5163.96

Equipment GD-1500

Elevation ft Date 6/14/90

GROUND SURFACE



Stainless Steel casing from 175 to 189.8 feet

7-7/8" Borehole from 184 to 206 feet

Sandpack:
20x40 sand (186.8'-187.8')
10x20 sand (187.8'-205')

4" Stainless Steel Screen (Slot size 0.02") from 189.8 to 204 feet

BROWN, BLACK, GRAY, TAN, & WHITE MEDIUM TO COARSE SAND (SP)
with gravel

-with increasing gravel to 195 feet

BROWN, GRAY, BLACK, & TAN SANDY GRAVEL (GP)

BROWN FINE TO MEDIUM SAND (SP)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-53

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

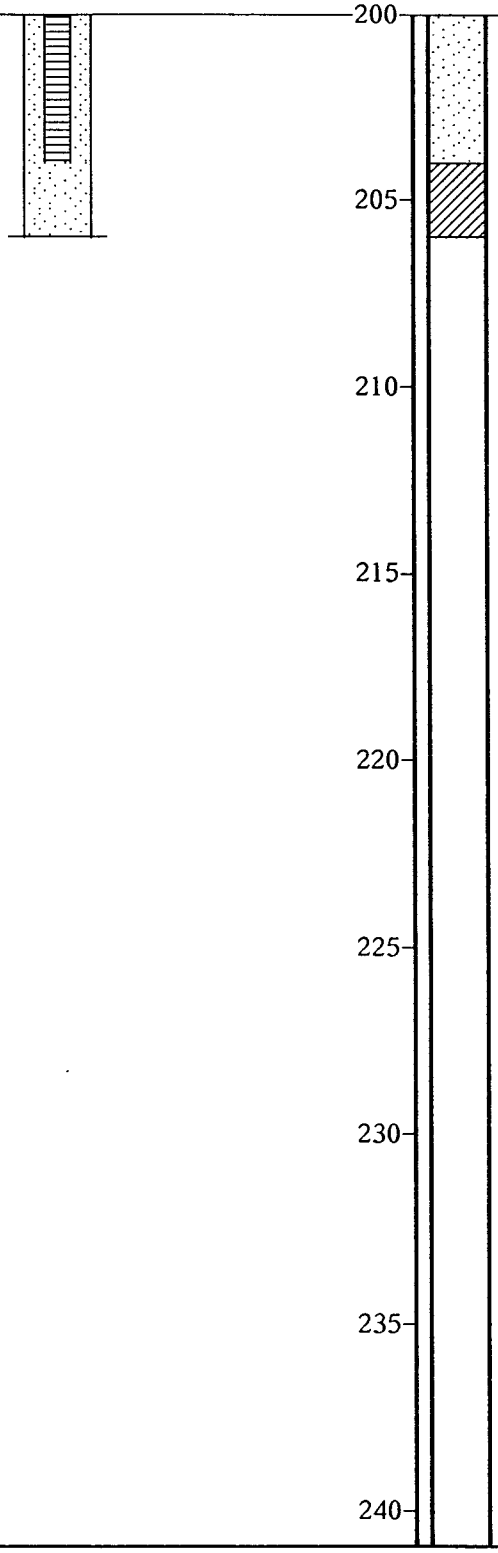
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5163.96

Equipment GD-1500

Elevation ft Date 6/14/90

GROUND SURFACE



TAN SANDY CLAY (CL)

End of boring at 206 feet.

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-53

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

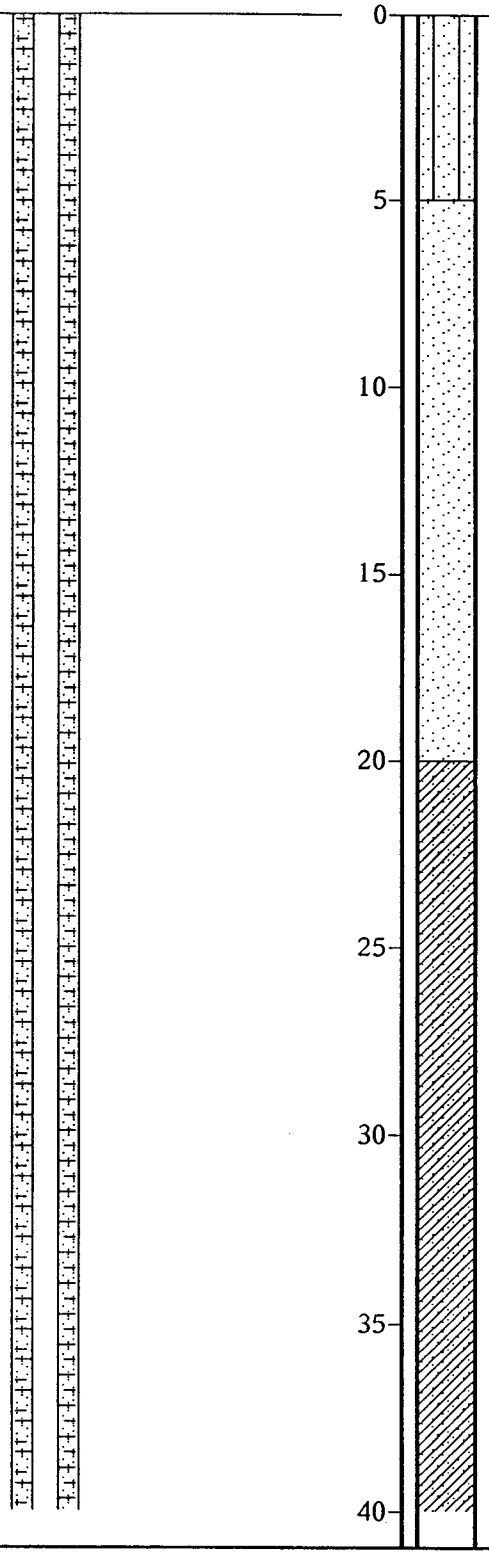
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5097.64

Equipment GD-1500

Elevation 5097.64 ft **Date** 7/26/90

GROUND SURFACE



TAN SILTY SAND (SM)
with occasional clay

TAN, BROWN & BLACK MEDIUM TO COARSE SAND (SP)
with occasional clay

TAN, BROWN & BLACK CLAYEY MEDIUM TO COARSE SAND (SC)
with silty seams below 57 feet

4" PVC Casing to 107 feet

8-5/8" Steel casing from 0 to 112 feet

12-1/4" Borehole to 112 feet

Cement/Bentonite Grout

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-54

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

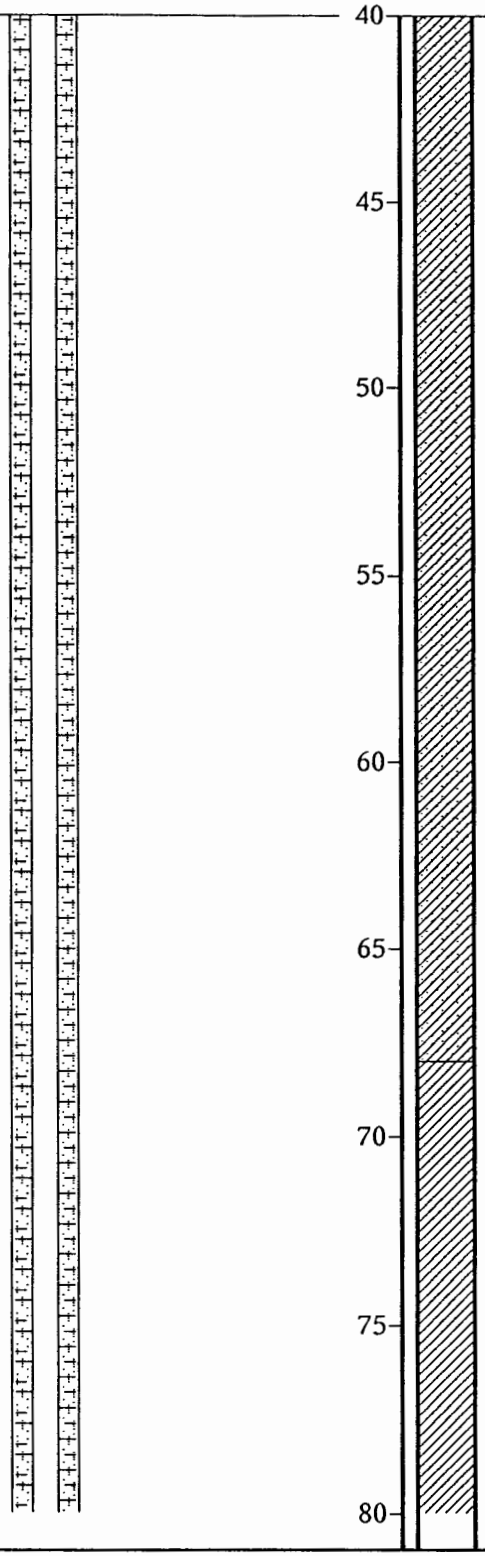
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5097.64

Equipment GD-1500

Elevation 5097.64 ft Date 7/26/90

GROUND SURFACE



TAN & BROWN SILTY CLAY (CL)
with some sand

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-54

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

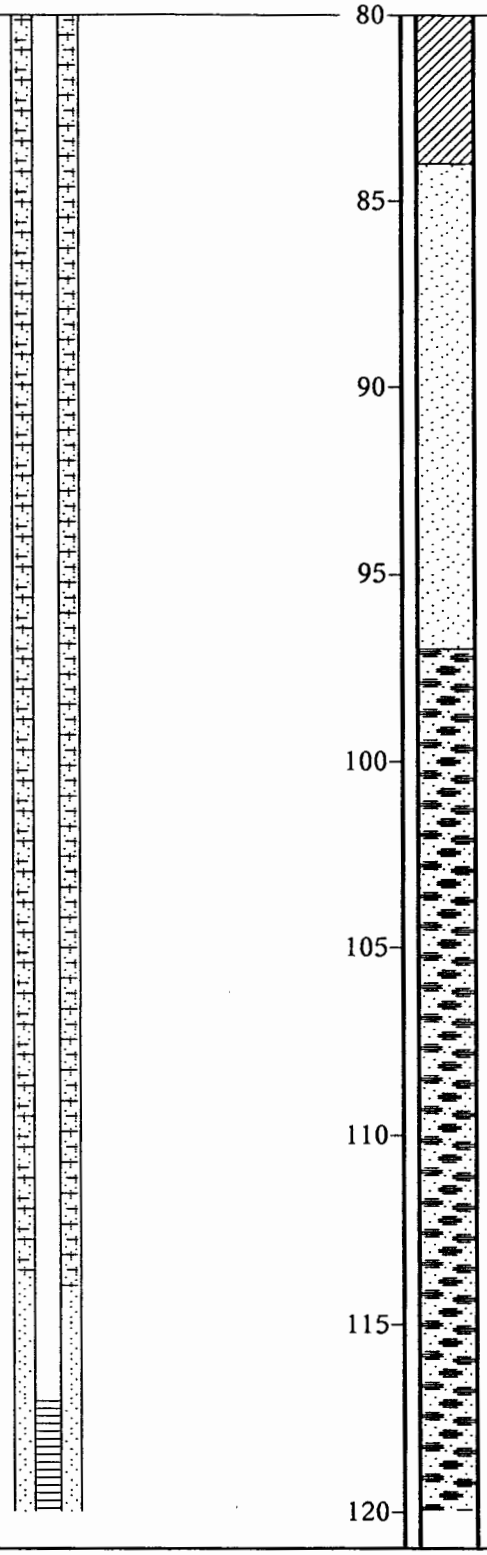
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5097.64

Equipment GD-1500

Elevation 5097.64 ft Date 7/26/90

GROUND SURFACE



TAN, BROWN & BLACK MEDIUM TO COARSE SAND (SP)
with occasional gravel

-increasing gravel below 95.0 feet

TAN, BROWN & BLACK SANDY GRAVEL (GP)
with cobbles

4" Stainless Steel casing from 107 to 117 feet

Sandpack:
20x40 sand
(114 to 115 feet)
10x20 sand
(115 to 132 feet)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-54

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5097.64

Equipment GD-1500

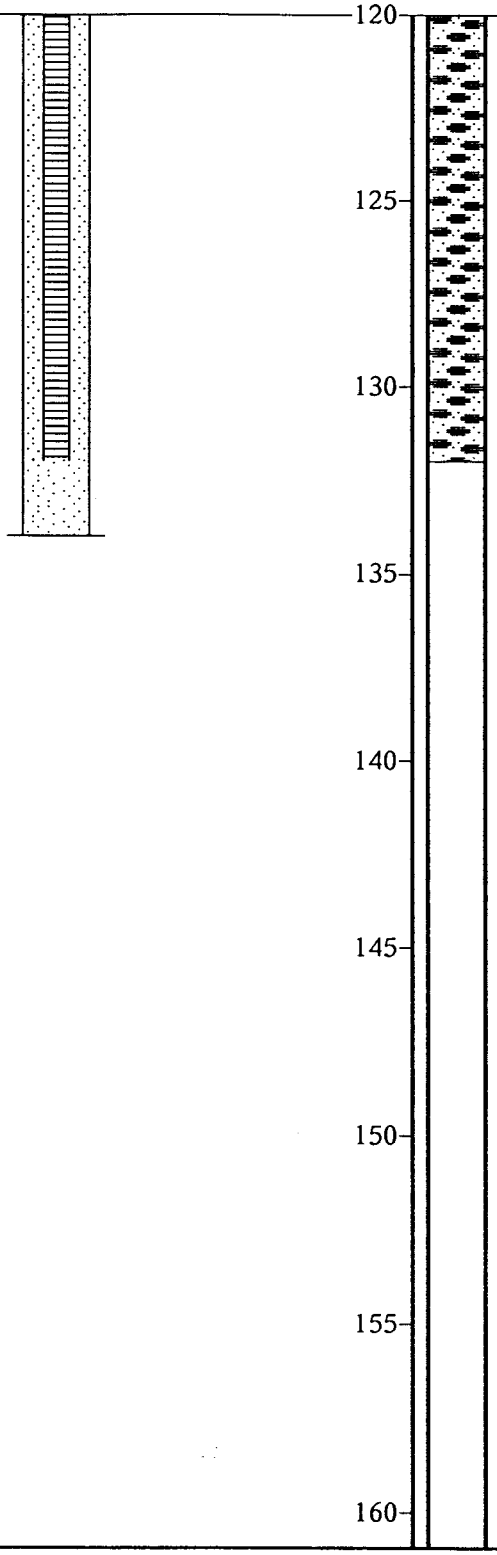
Elevation 5097.64 ft **Date** 7/26/90

GROUND SURFACE

7-7/8" borehole from 112 to 134 feet

4" Stainless Steel Screen (slot size 0.02") from 117 to 132 feet

Bottom Cap



End of Boring at 132.00 feet.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-54

PLATE

Sparton Technology Inc.
Albuquerque, New Mexico

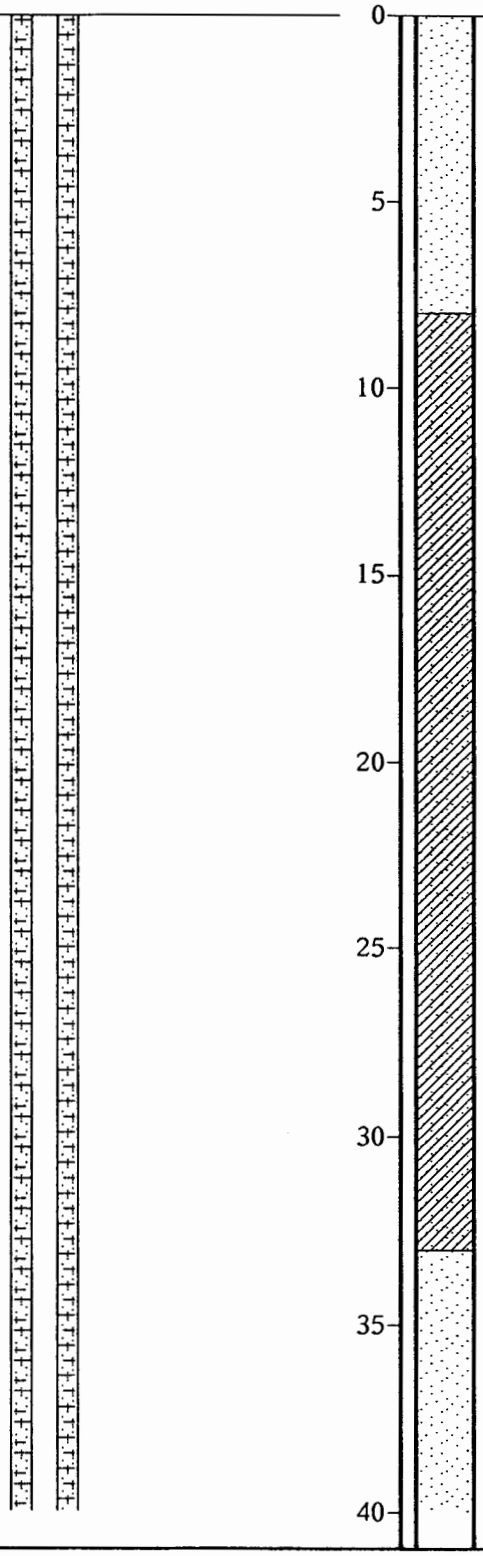
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft **Date** 8/5/90

GROUND SURFACE



BROWN FINE TO COARSE SAND (SW)
with occasional clay and small gravel

YELLOW-BROWN CLAYEY FINE TO MEDIUM SAND (SC)

BROWN & GRAY FINE TO COARSE SAND (SW)
with occasional clay

4" PVC Casing to 171.6 feet

8-5/8" Steel casing from 0 to 243 feet

12-1/4" Borehole to 244.5 feet

Cement/Bentonite Grout

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-55

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

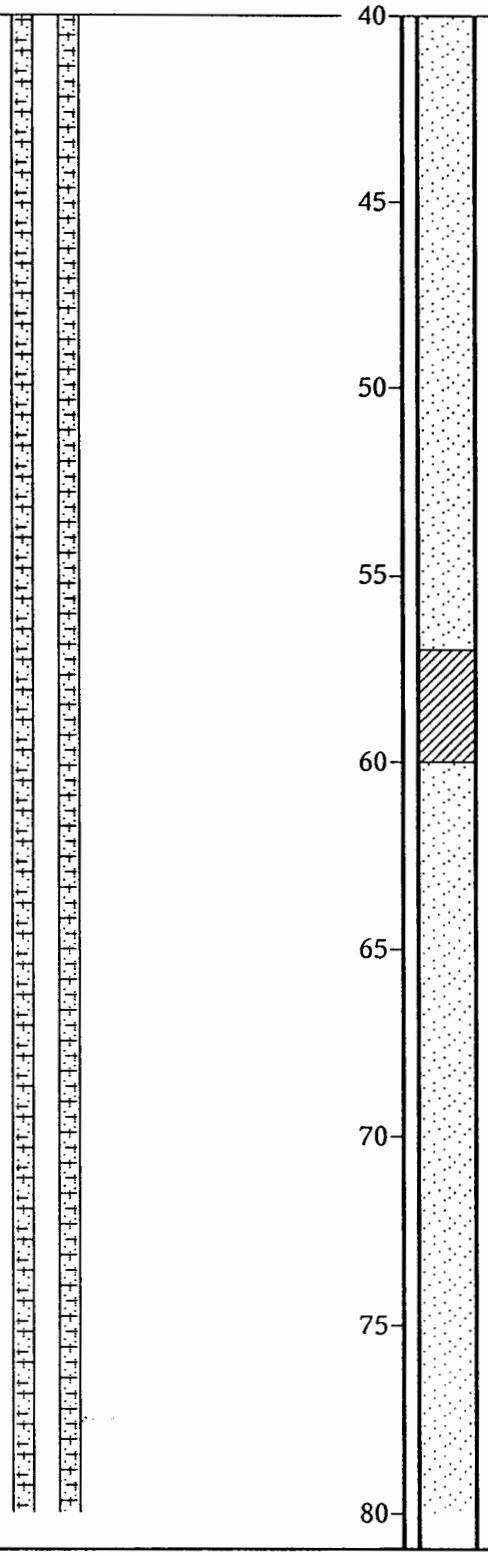
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft Date 8/5/90

GROUND SURFACE



TAN & BROWN SANDY CLAY (CL)

BROWN FINE TO COARSE SAND (SW)
with occasional clay

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-55

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

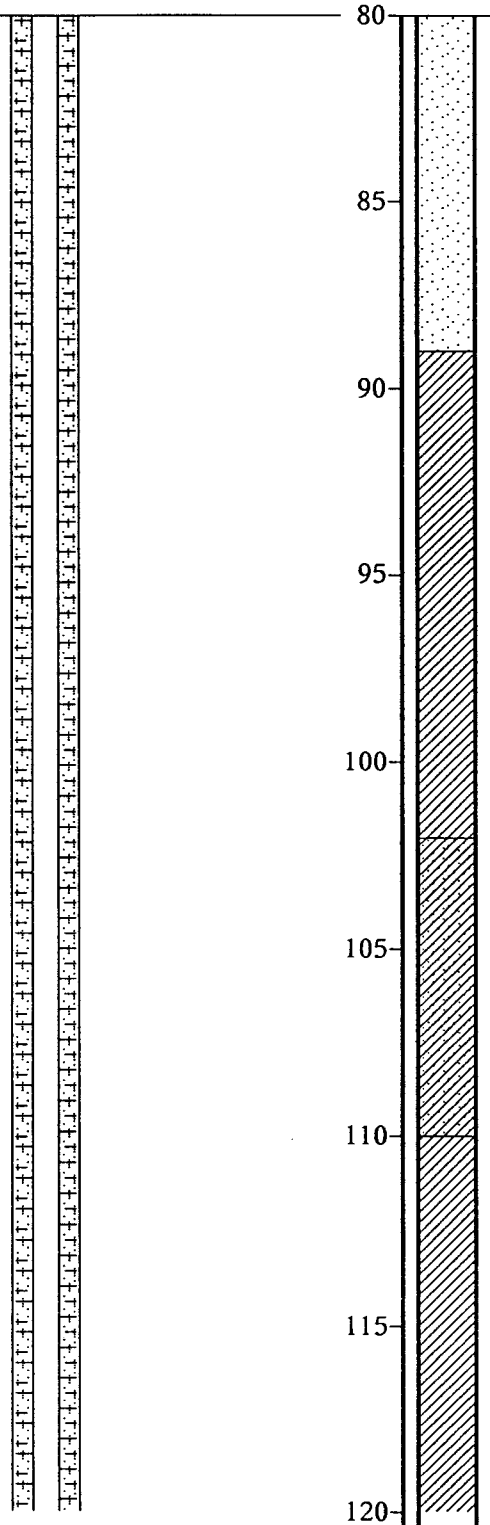
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft Date 8/5/90

GROUND SURFACE



BROWN SANDY CLAY (CL)

BROWN & GRAY CLAYEY FINE TO MEDIUM SAND (SC)

BROWN SANDY CLAY (CL)

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-55

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

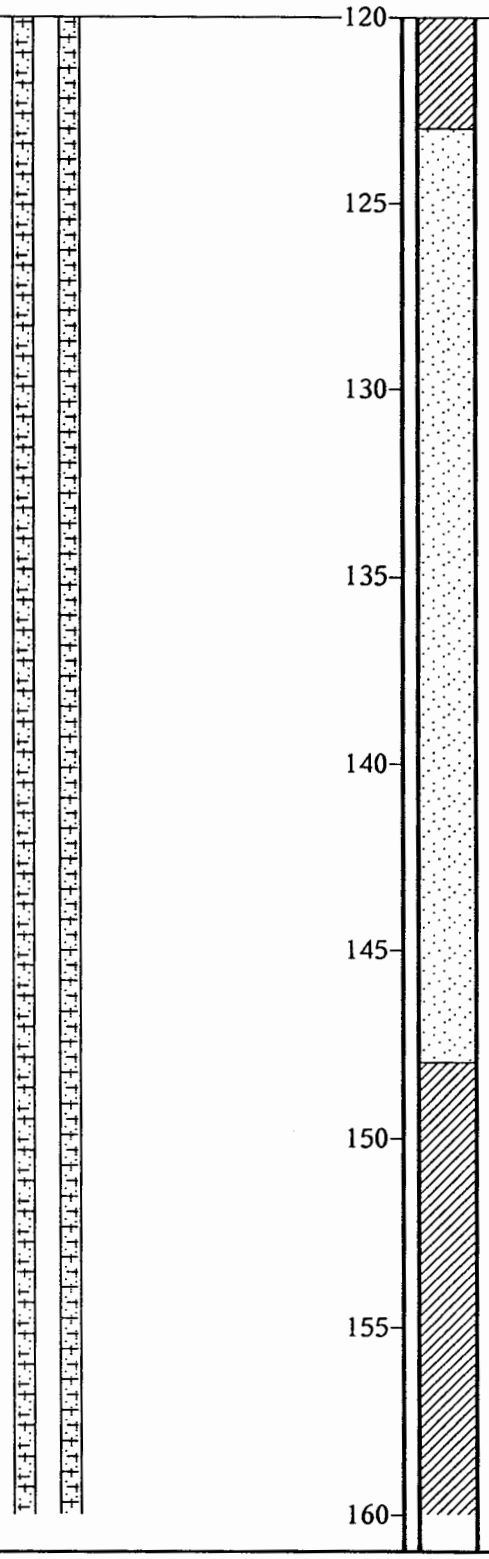
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft Date 8/5/90

GROUND SURFACE



BROWN & GRAY MEDIUM TO COARSE SAND (SW) with occasional gravel

BROWN SANDY CLAY (CL)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-55

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

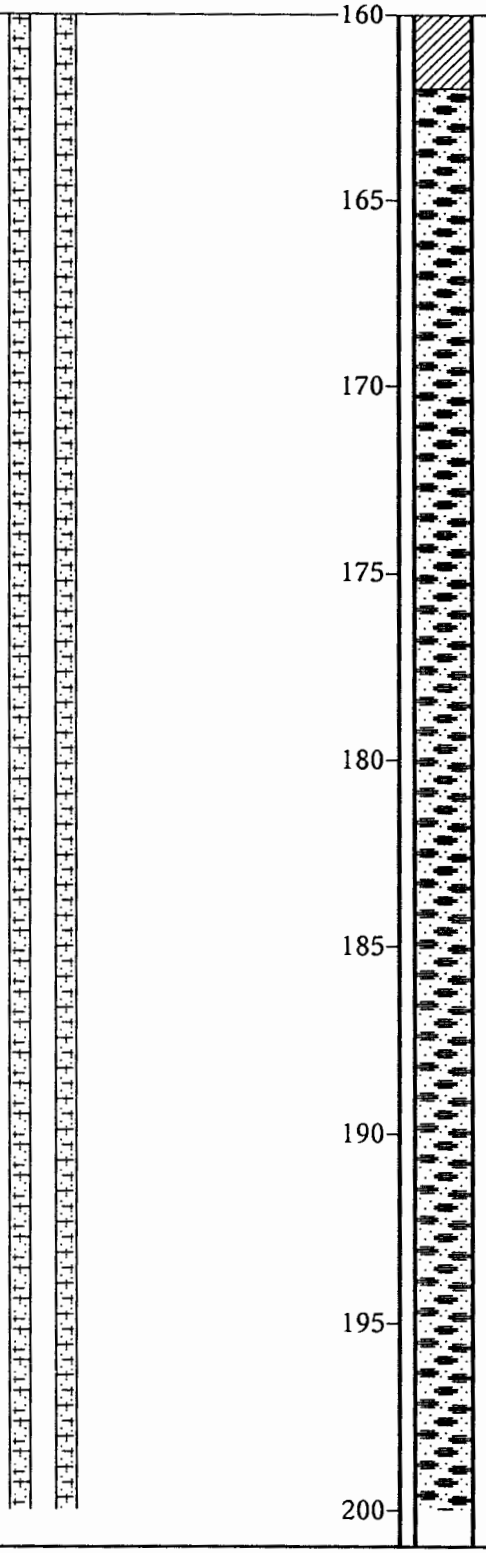
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft Date 8/5/90

GROUND SURFACE



BROWN & GRAY SANDY GRAVEL (GP)

4" Stainless Steel casing from 171.6 to 255 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-55

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

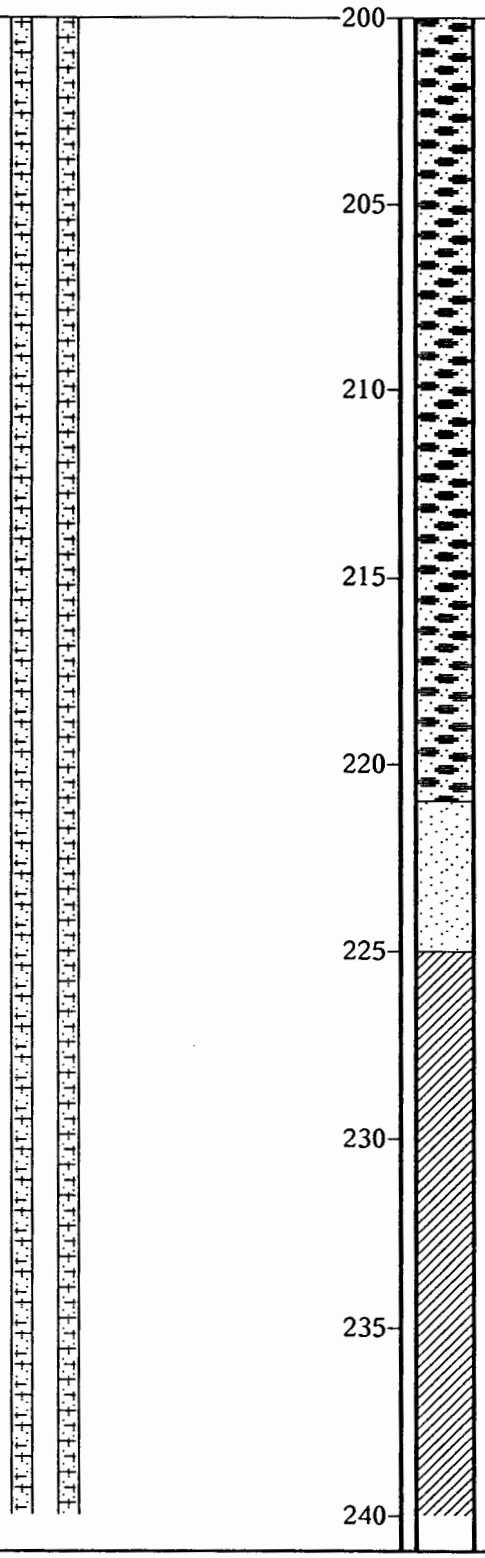
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft Date 8/5/90

GROUND SURFACE



BROWN MEDIUM TO COARSE SAND (SW)
with occasional clay and gravel

BROWN SANDY CLAY (CL)
with some silt

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-55

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

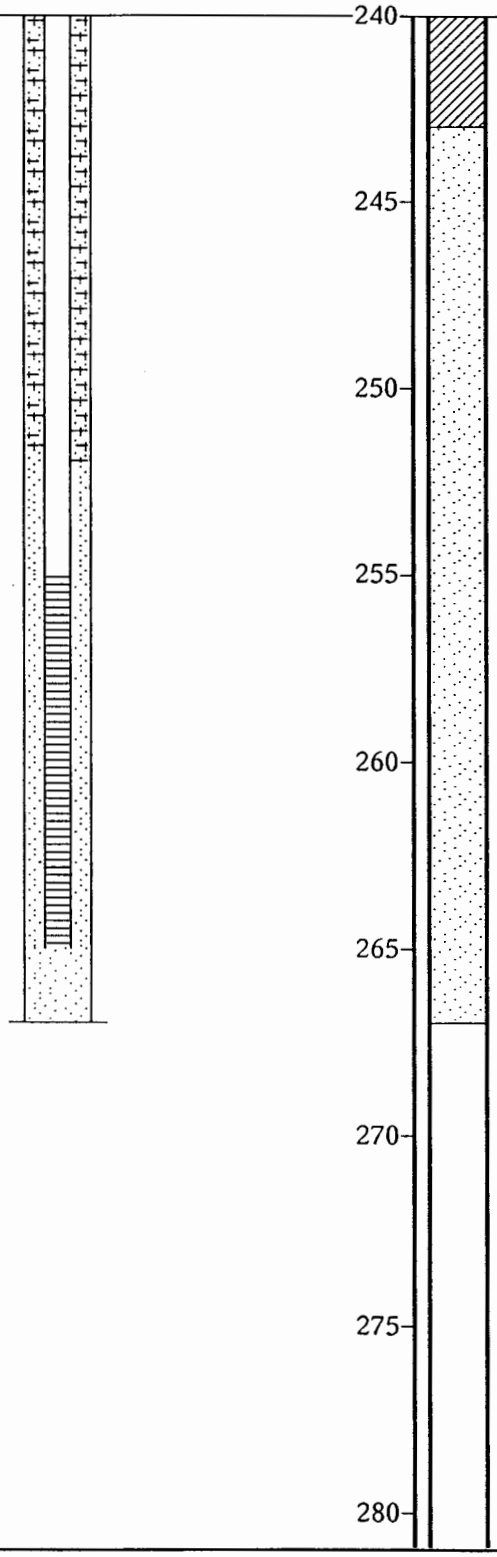
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft **Date** 8/5/90

GROUND SURFACE



7-7/8" borehole from 243 to 267 feet

Sandpack:
20x40 sand
(252 to 253 feet)
10x20 sand
(253 to 267 feet)

4" Stainless Steel Screen (slot size 0.02") from 255 to 265 feet

Bottom Cap

BROWN & GRAY FINE TO COARSE SAND (SW)

End of boring at 267.0 feet.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-55

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

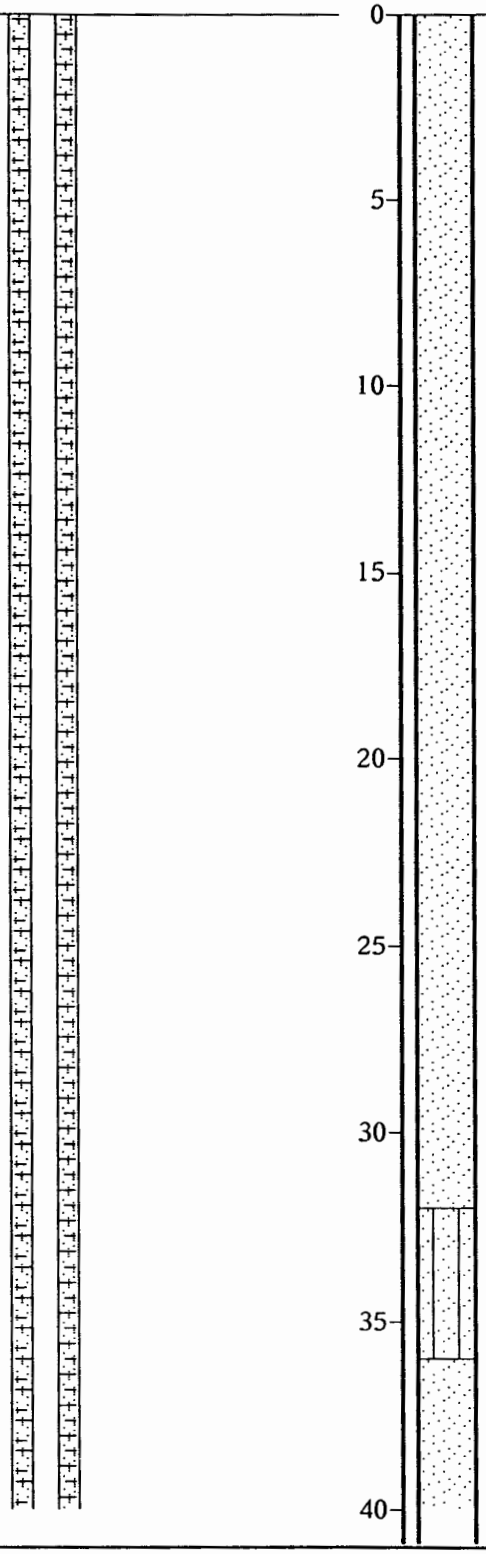
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft **Date** 8/13/90

GROUND SURFACE



BROWN MEDIUM TO COARSE SAND (SW)
with occasional silt

-fine to medium sand below 10.0 feet

4" PVC Casing to 190 feet

8-5/8" Steel casing from 0 to 210 feet

12-1/4" Borehole to 212 feet

Cement/Bentonite Grout

BROWN FINE SILTY SAND (SM)

BROWN FINE TO MEDIUM SAND (SP)

-with silt from 38 to 48 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-56

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

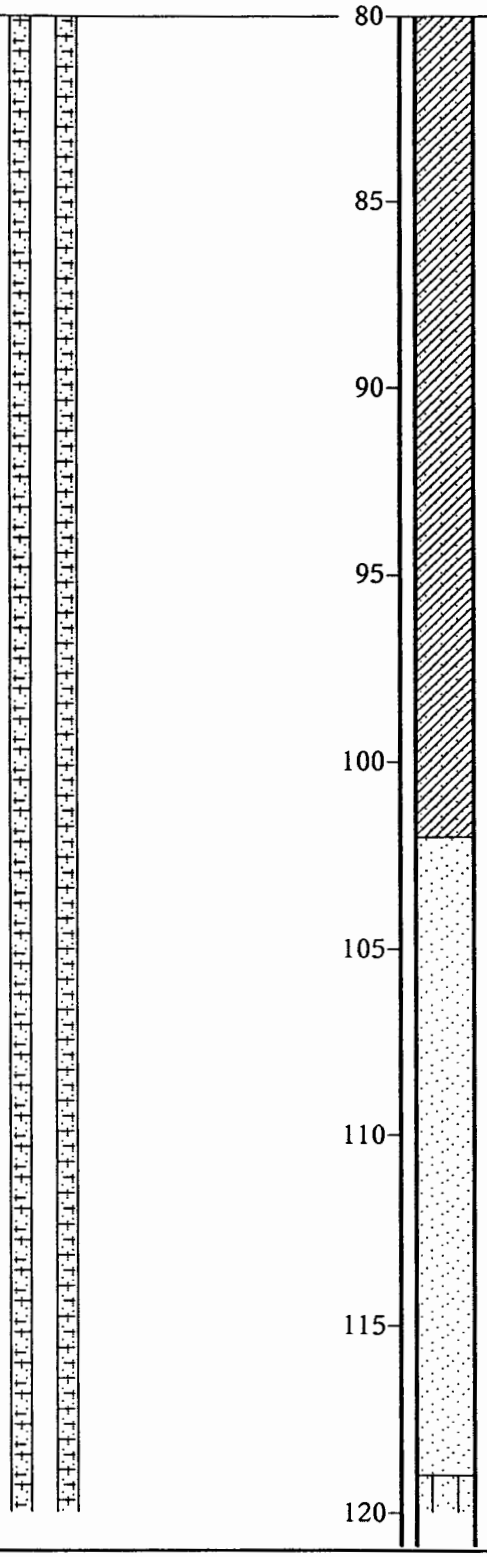
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft Date 8/13/90

GROUND SURFACE



BROWN & GRAY FINE SAND (SP)
with some silt

BROWN FINE SILTY SAND (SM)

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-56

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

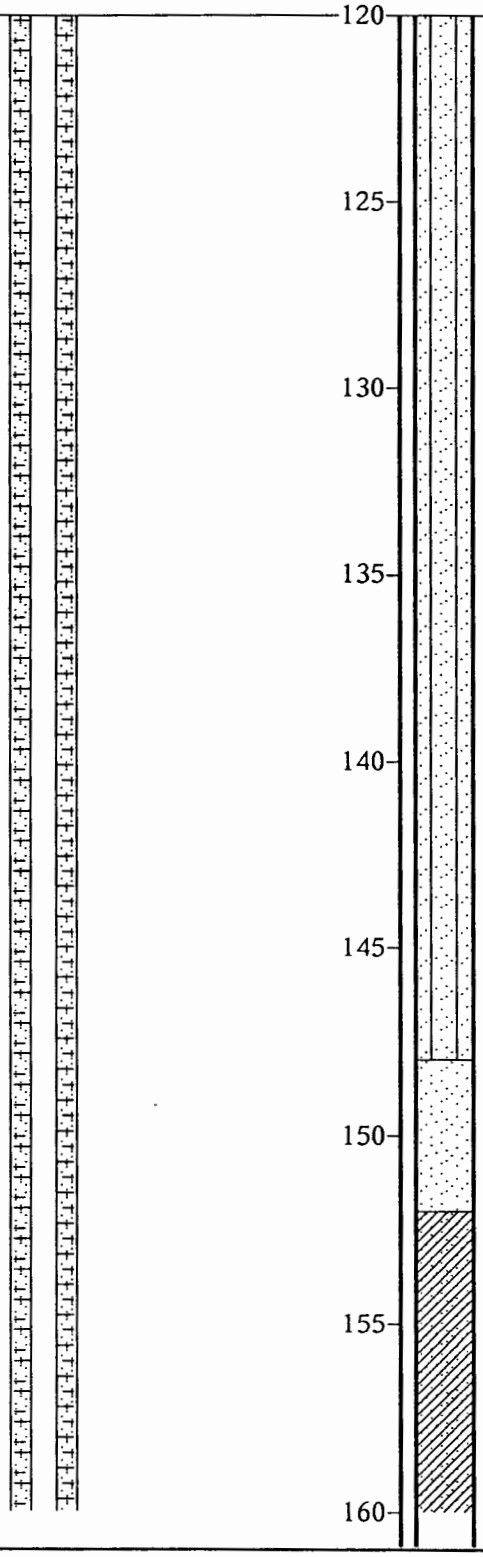
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft Date 8/13/90

GROUND SURFACE



-occasional small gravel at 145 feet

BROWN & GRAY MEDIUM TO COARSE SAND (SW)

BROWN & GRAY CLAYEY SAND (SC) with some silt

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-56

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

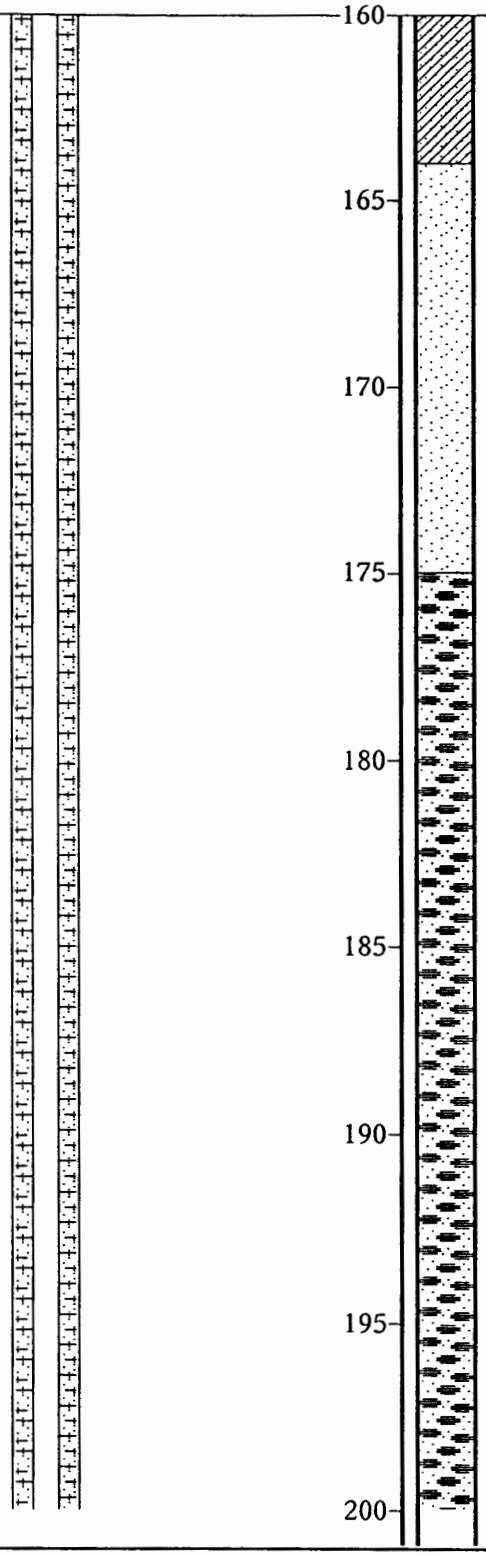
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft Date 8/13/90

GROUND SURFACE



BROWN FINE TO COARSE SAND (SW) with occasional gravel, increased fine sand, decreased gravel below 165 feet

-occasional clay below 168 feet

BLACK & GRAY SANDY GRAVEL (GW)

4" Stainless Steel casing from 190 to 220 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-56

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

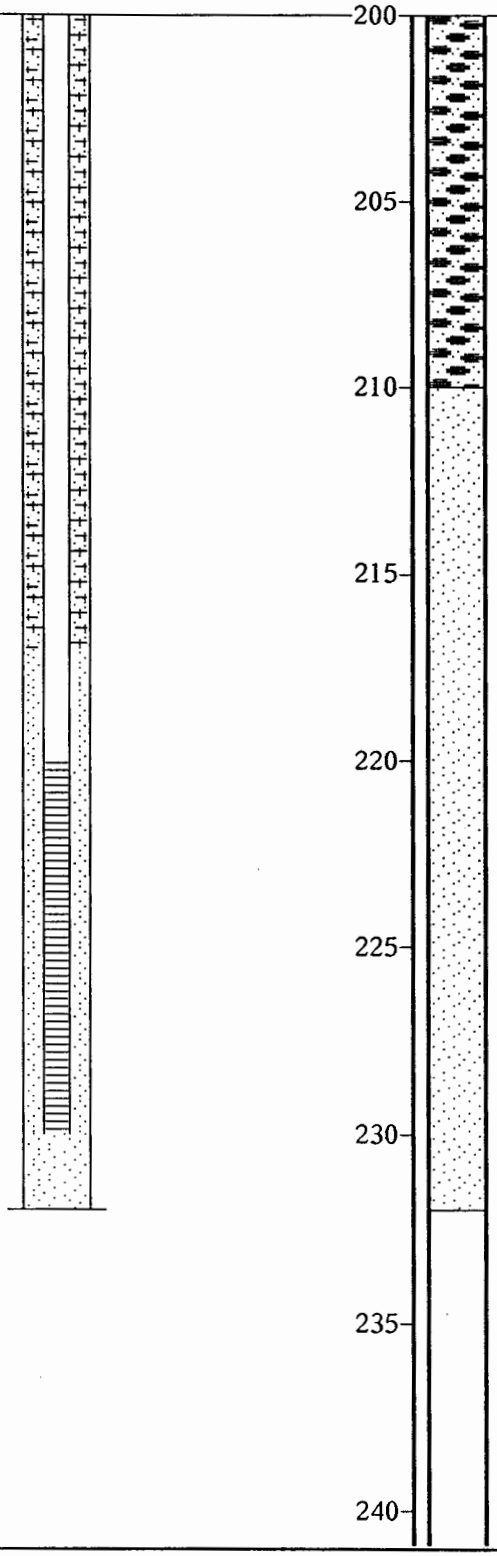
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.61

Equipment GD-1500

Elevation 5168.61 ft Date 8/13/90

GROUND SURFACE



7-7/8" borehole from 210 to 232 feet

Sandpack:
20x40 sand
(217 to 218 feet)
10x20 sand
(218 to 232 feet)

4" Stainless Steel Screen (slot size 0.02") from 220 to 230 feet

Bottom Cap

BROWN & BLACK FINE TO COARSE SAND (SW)

End of boring at 232.0 feet.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-56

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

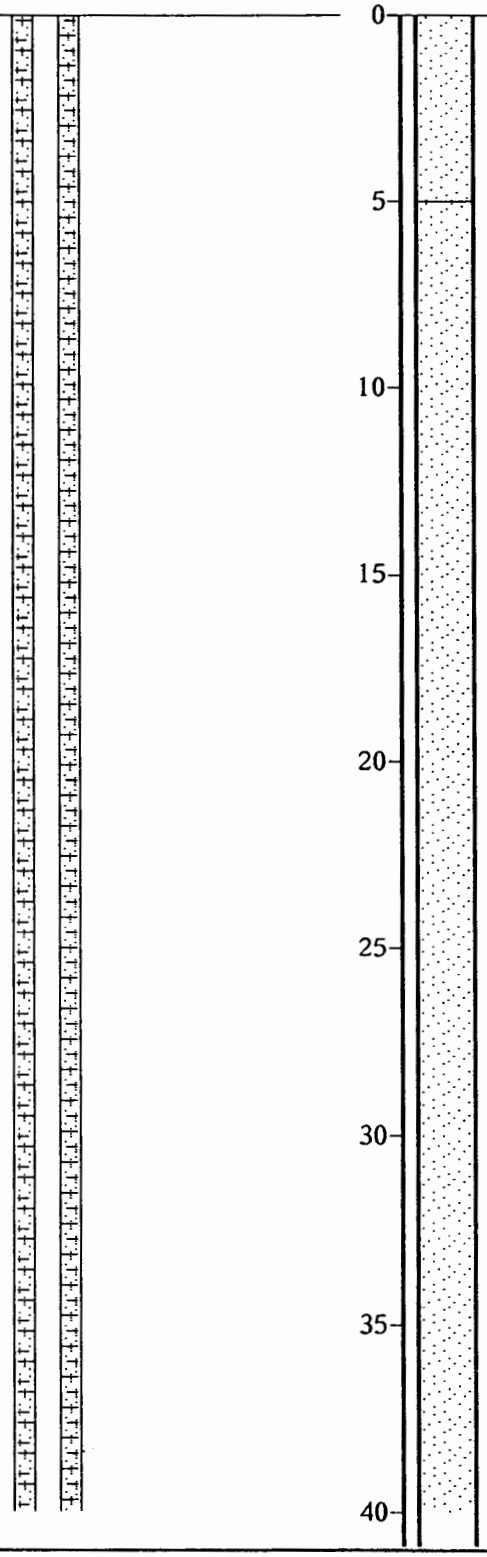
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5103.54

Equipment GD-1500

Elevation 5103.54 ft Date 8/29/90

GROUND SURFACE



TAN FINE SAND (SP)
with silt

BROWN FINE TO COARSE SAND (SW)
with occasional clay

4" PVC Casing
to 116 feet

8-5/8" Steel casing
from 0 to 121 feet

12-1/4" Borehole
to 122 feet

Cement/Bentonite
Grout

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-57

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

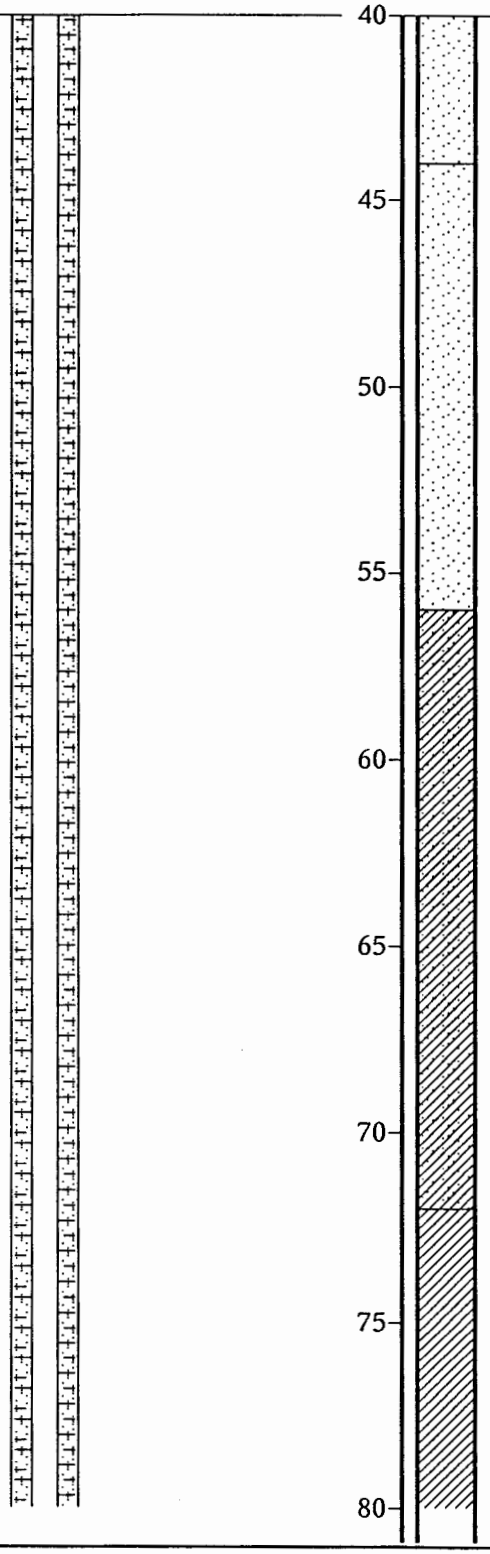
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5103.54

Equipment GD-1500

Elevation 5103.54 ft Date 8/29/90

GROUND SURFACE



DARK BROWN & BLACK FINE SAND (SP)

BROWN CLAYEY MEDIUM SAND (SC)

LIGHT BROWN TO BROWN SILTY CLAY (CL)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-57

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

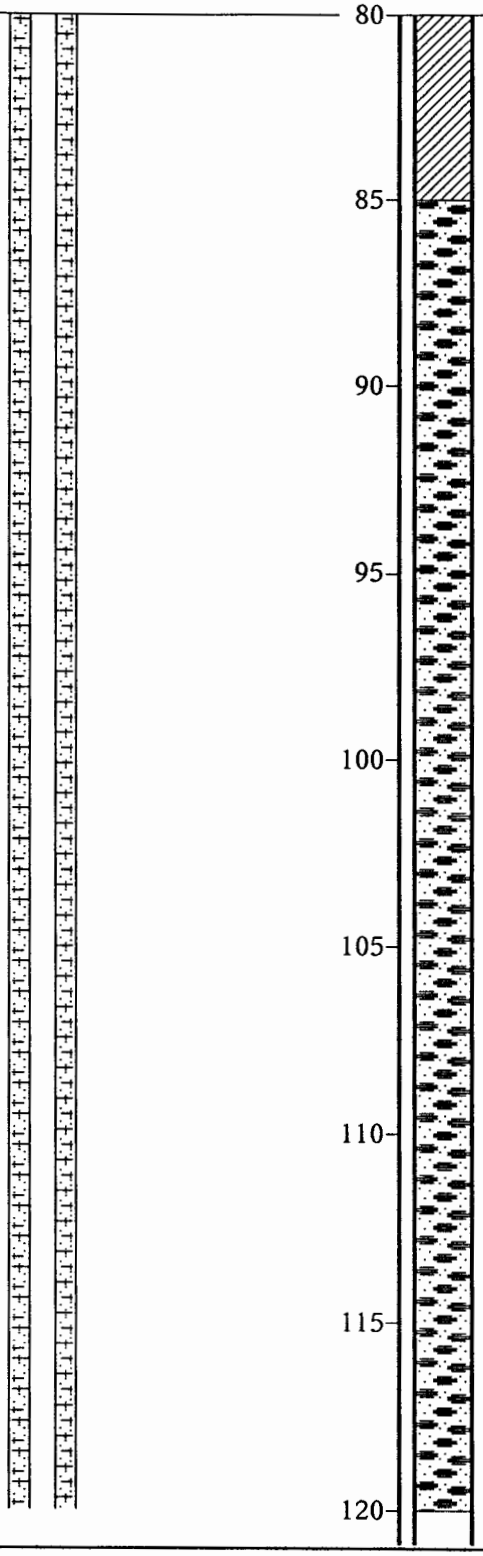
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5103.54

Equipment GD-1500

Elevation 5103.54 ft Date 8/29/90

GROUND SURFACE



-occasional sand below 80 feet

BROWN & BLACK COARSE SANDY GRAVEL (GW)

4" Stainless Steel casing from 116 to 126 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-57

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5103.54

Equipment GD-1500

Elevation 5103.54 ft **Date** 8/29/90

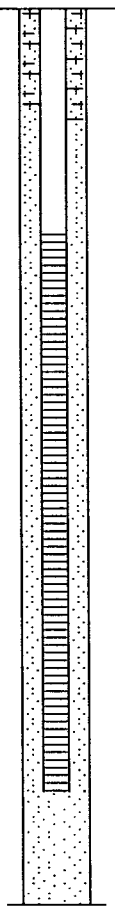
GROUND SURFACE

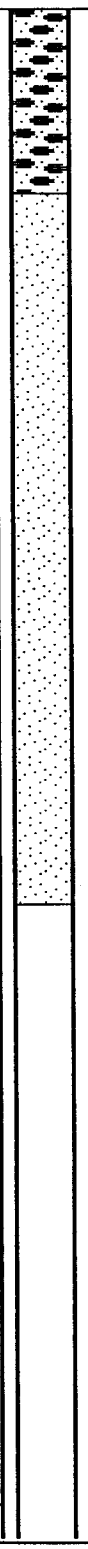
Sandpack:
20x40 sand
(123 to 124 feet)
10x20 sand
(124 to 144 feet)

7-7/8" borehole from
121 to 144 feet

4" Stainless Steel
Screen (slot size 0.02")
from 126 to 141 feet

Bottom Cap





120 — BROWN & BLACK GRAVEL (GP)
cobble size

125 — BLACK & GRAY FINE TO MEDIUM SAND (SP)

130

135

140

145 — End of boring at 144.0 feet.

150

155

160

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-57

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

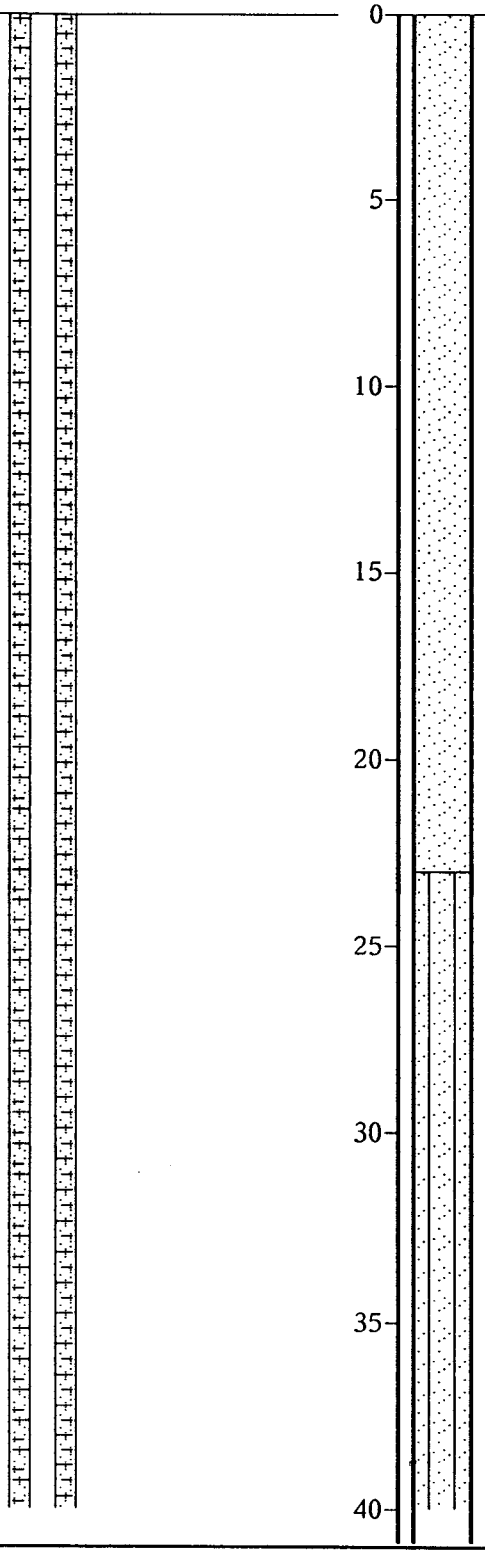
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.89

Equipment GD-1500

Elevation 5168.89 ft Date 9/10/90

GROUND SURFACE



TAN & BROWN FINE TO COARSE SAND (SW)
with occasional clay

BROWN & GRAY SILTY SAND (SM)

4" PVC Casing
to 182.5 feet

8-5/8" Steel casing
from 0 to 189 feet

12-1/4" Borehole
to 190 feet

Cement/Bentonite
Grout

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-58

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

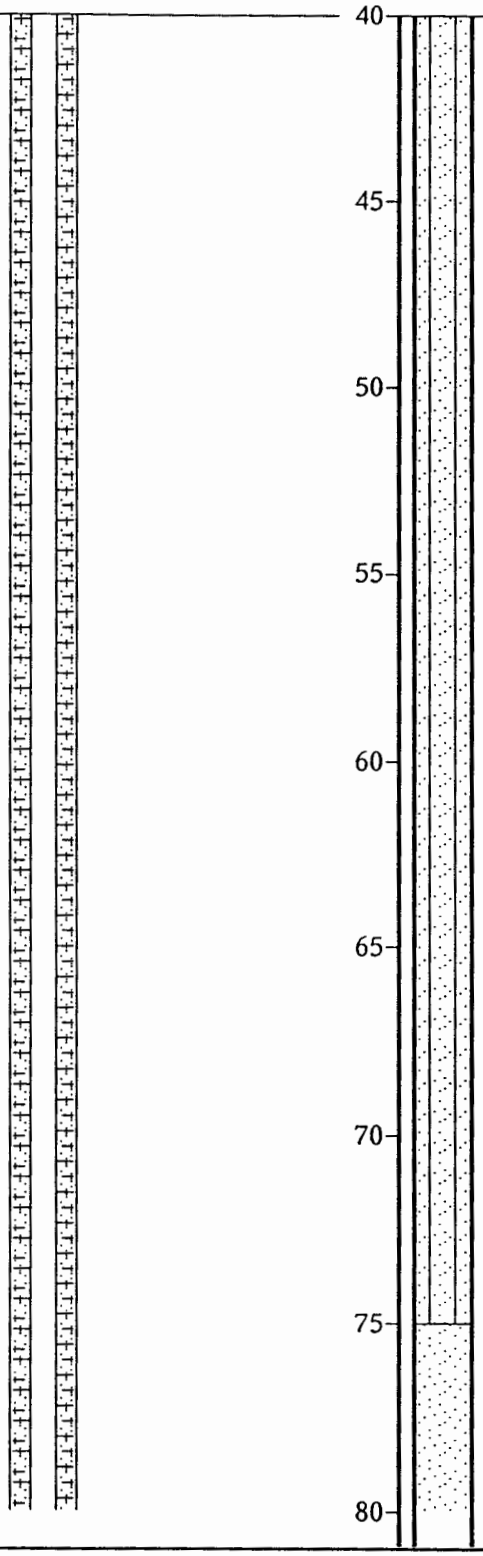
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.89

Equipment GD-1500

Elevation 5168.89 ft Date 9/10/90

GROUND SURFACE



-increasing silt at 44 feet

-occasional clay at 55 feet

DARK BROWN FINE TO MEDIUM SAND (SP)
with some clay

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-58

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

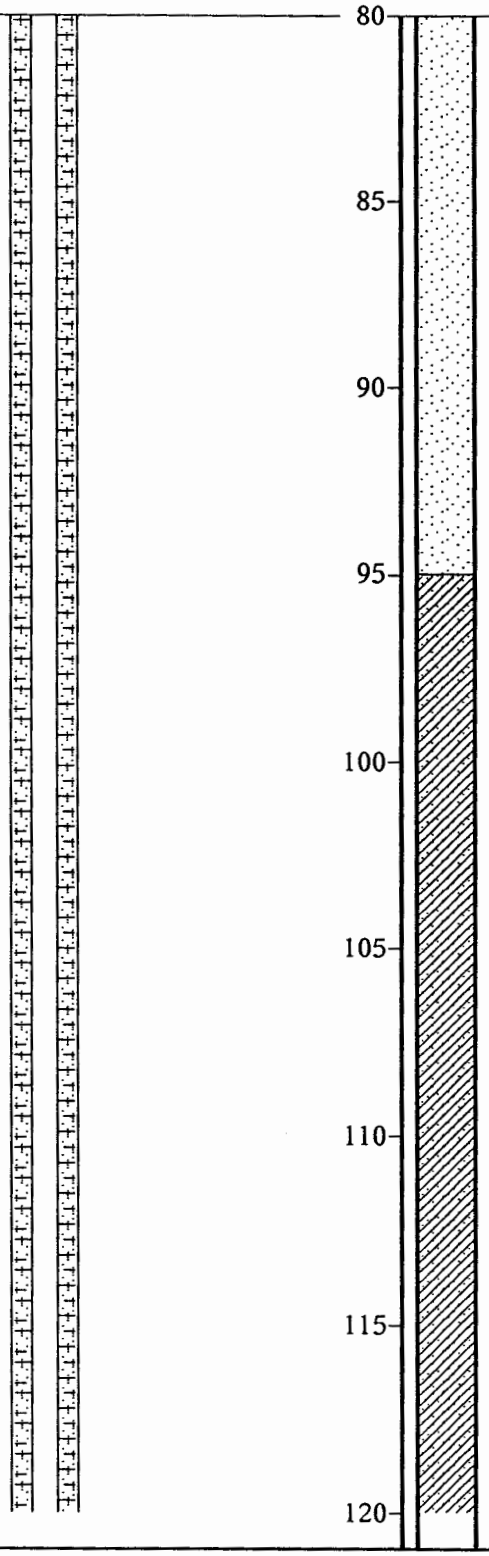
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.89

Equipment GD-1500

Elevation 5168.89 ft Date 9/10/90

GROUND SURFACE



TAN & BROWN FINE CLAYEY SAND (SC)

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-58

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

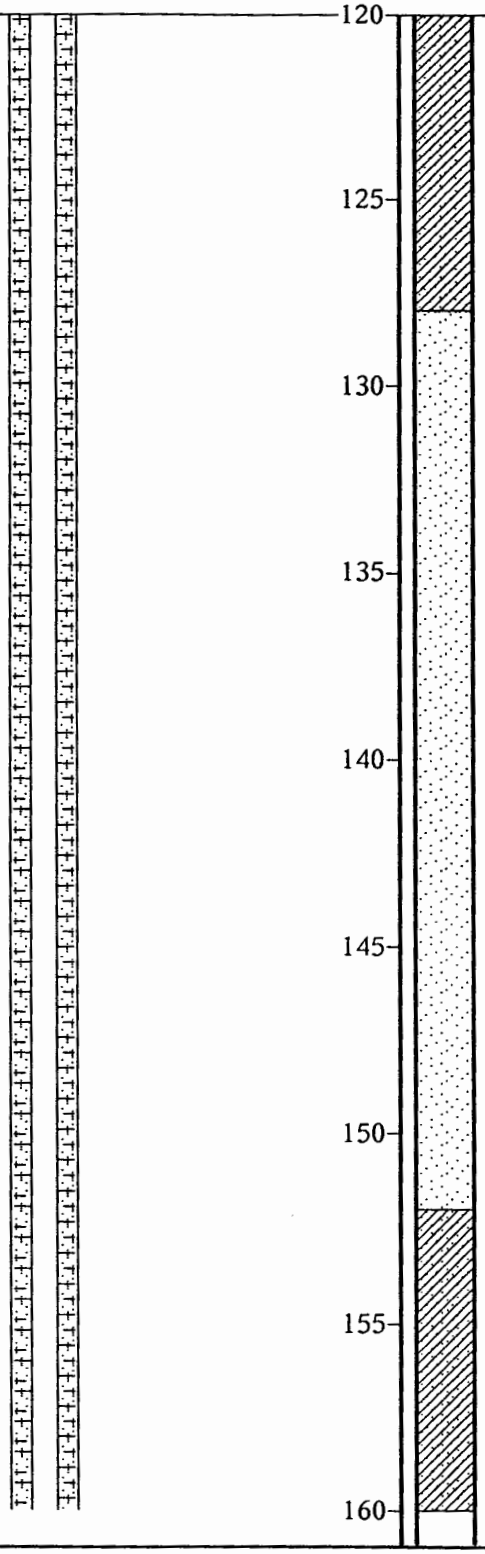
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.89

Equipment GD-1500

Elevation 5168.89 ft Date 9/10/90

GROUND SURFACE



TAN & BROWN FINE TO MEDIUM SAND (SP)
with occasional clay

-little to no clay below 135 feet

TAN, BROWN & GRAY CLAYEY SAND (SC)

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-58

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

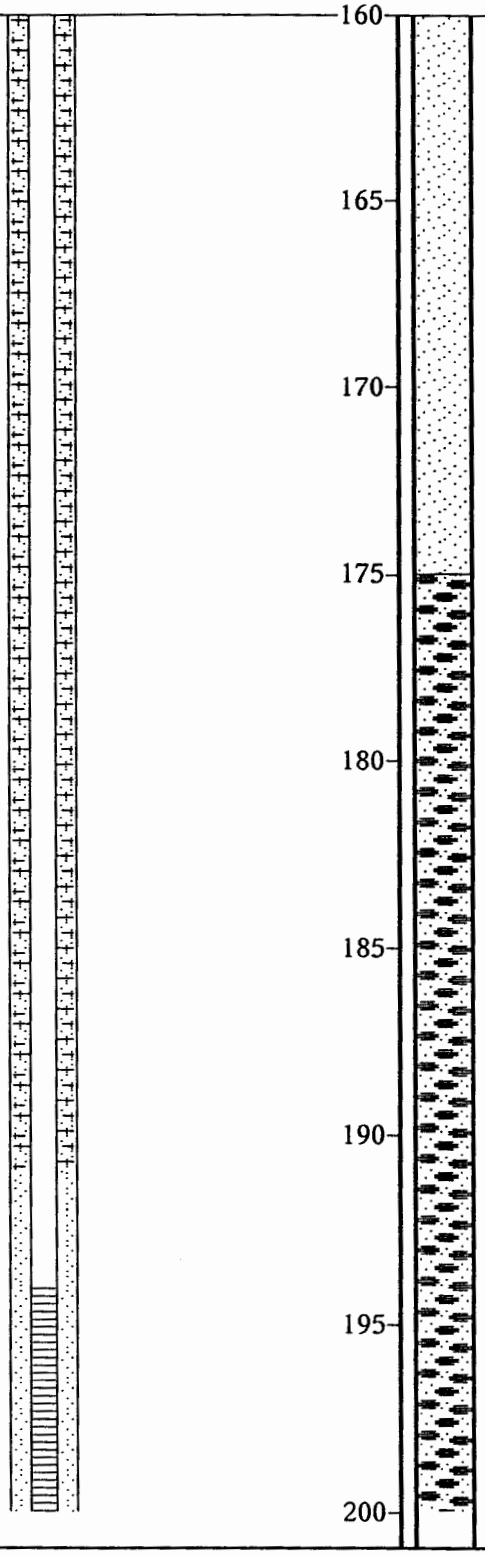
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.89

Equipment GD-1500

Elevation 5168.89 ft Date 9/10/90

GROUND SURFACE



BROWN TO DARK BROWN FINE TO MEDIUM SAND (SC)

-tan clay below 168 feet

BROWN, GRAY & BLACK SANDY GRAVEL (GP)

4" Stainless Steel casing from 182.5 to 194 feet

Sandpack:
20x40 sand
(191 to 192 feet)
10x20 sand
(192 to 211 feet)

7-7/8" borehole from 189 to 211 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-58

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

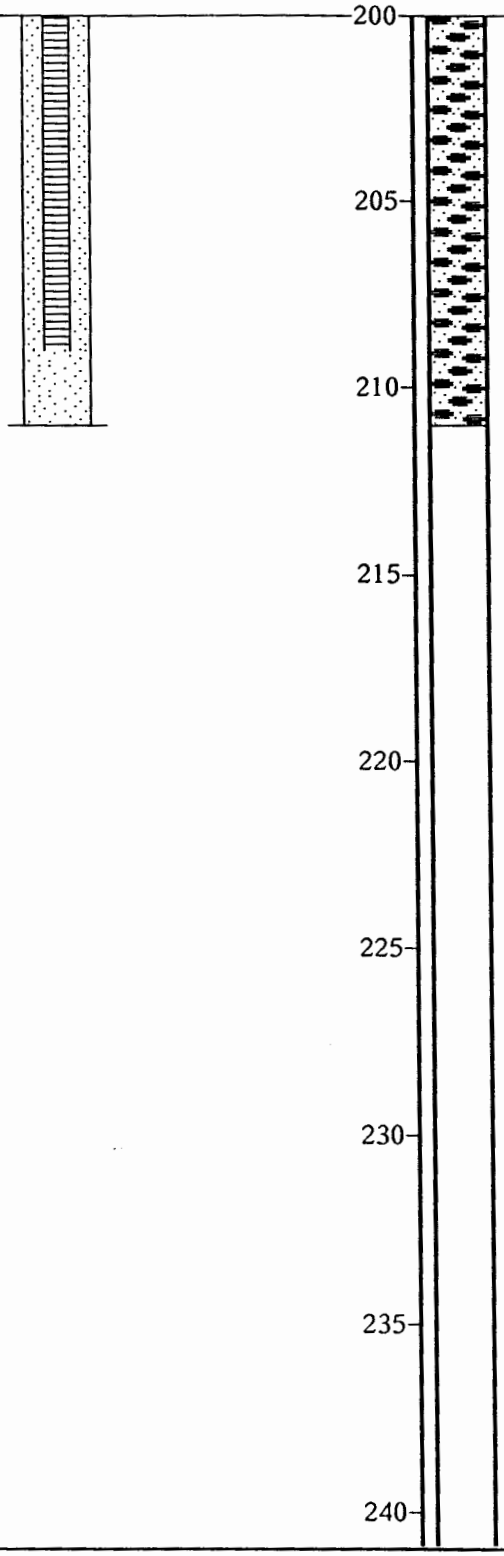
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5168.89

Equipment GD-1500

Elevation 5168.89 ft Date 9/10/90

GROUND SURFACE



4" Stainless Steel
Screen (slot size 0.02")
from 194 to 209 feet

Bottom Cap

End of boring at 211.0 feet.

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-58

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

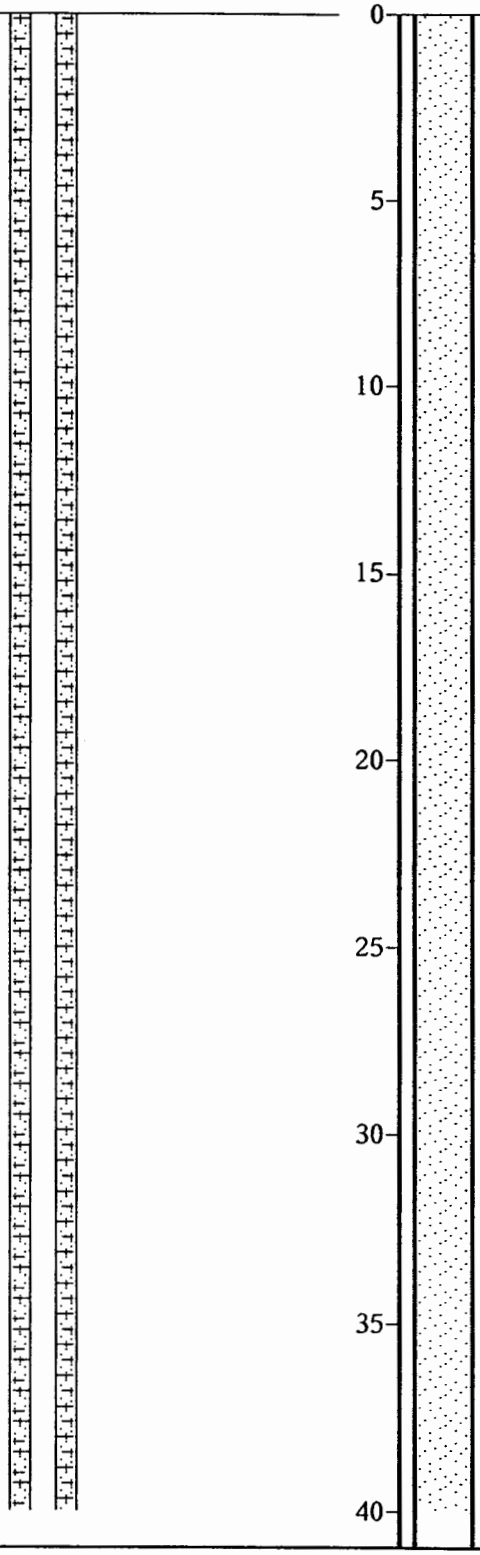
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5059.18

Equipment GD-1500

Elevation 5059.18 ft **Date** 9/17/90

GROUND SURFACE



TAN & BROWN FINE TO COARSE SAND (SW)

4" PVC Casing to 88.9 feet

8-5/8" Steel casing from 0 to 95 feet

12-1/4" Borehole to 97 feet

Cement/Bentonite Grout

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-59

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

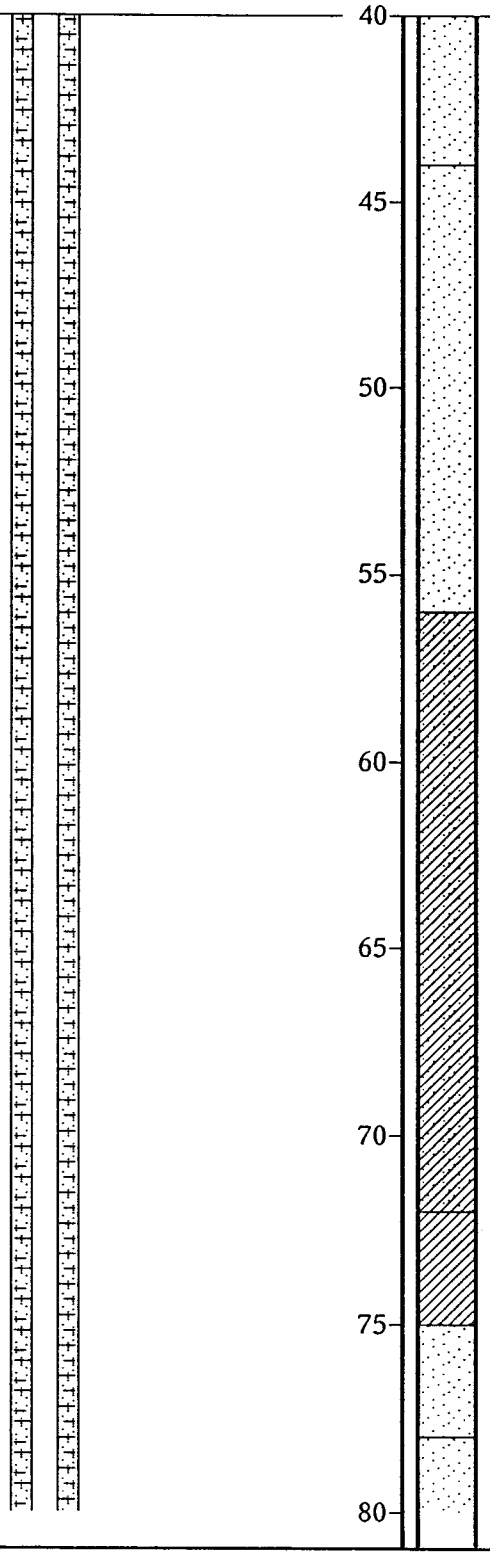
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5059.18

Equipment GD-1500

Elevation 5059.18 ft Date 9/17/90

GROUND SURFACE



BROWN FINE TO MEDIUM SAND (SP)

TAN & BROWN FINE CLAYEY SAND (SC)

TAN SANDY CLAY (CL)

BROWN MEDIUM TO COARSE SAND (SW)

BROWN FINE SAND (SP) with occasional tan clay

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-59

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

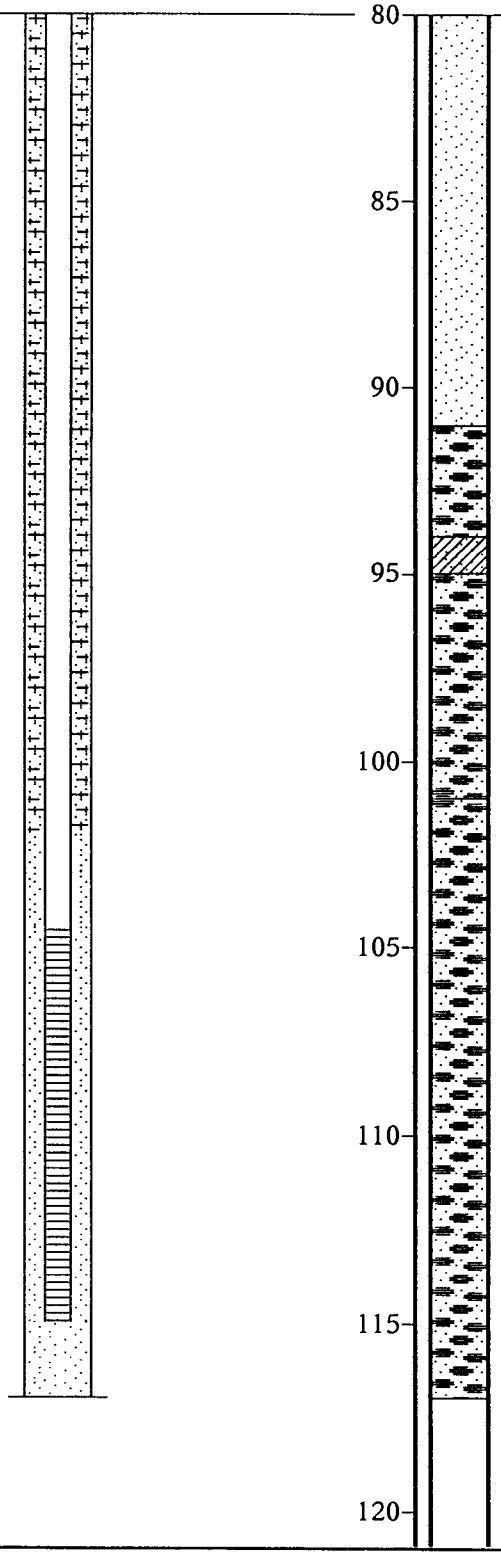
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5059.18

Equipment GD-1500

Elevation 5059.18 ft Date 9/17/90

GROUND SURFACE



4" Stainless Steel casing from 88.9 to 104.6 feet

7-7/8" borehole from 95 to 117 feet

Sandpack:
20x40 sand
(102 to 103 feet)
10x20 sand
(103 to 117 feet)

4" Stainless Steel Screen (slot size 0.02") from 104.5 to 115 feet

Bottom Cap

BROWN, GRAY & BLACK SANDY GRAVEL (GP)

TAN CLAYEY SAND (SC)

BROWN, GRAY & BLACK SANDY GRAVEL (GP)
occasional clayey sand from 96 to 98 feet and from 99 to 100 feet

BROWN & BLACK GRAVEL (GW)
cobble size

End of boring at 117.0 feet.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-59

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

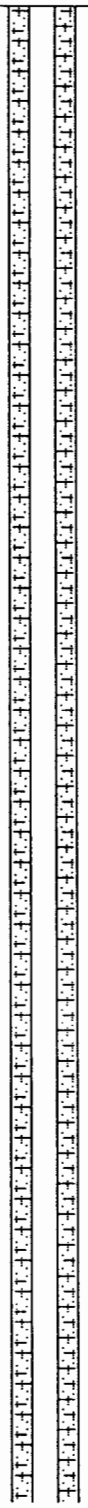
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5133.62

Equipment GD-1500

Elevation 5133.62 ft Date 9/26/90

GROUND SURFACE

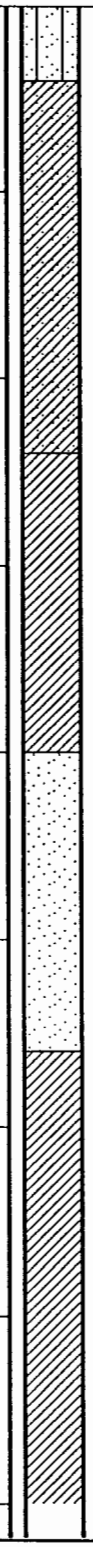


4" PVC Casing to 155 feet

8-5/8" Steel casing from 0 to 175 feet

12-1/4" Borehole to 176 feet

Cement/Bentonite Grout



BROWN & TAN SILTY FINE TO MEDIUM SAND (SM)
BROWN & TAN CLAYEY MEDIUM SAND (SC)

BROWN & GRAY SANDY CLAY (CL)

BROWN & GRAY MEDIUM TO COARSE SAND (SP)
with occasional fine gravel

TAN & BROWN SILTY CLAY (CL)
with occasional sand and some embedded gravel

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-60

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

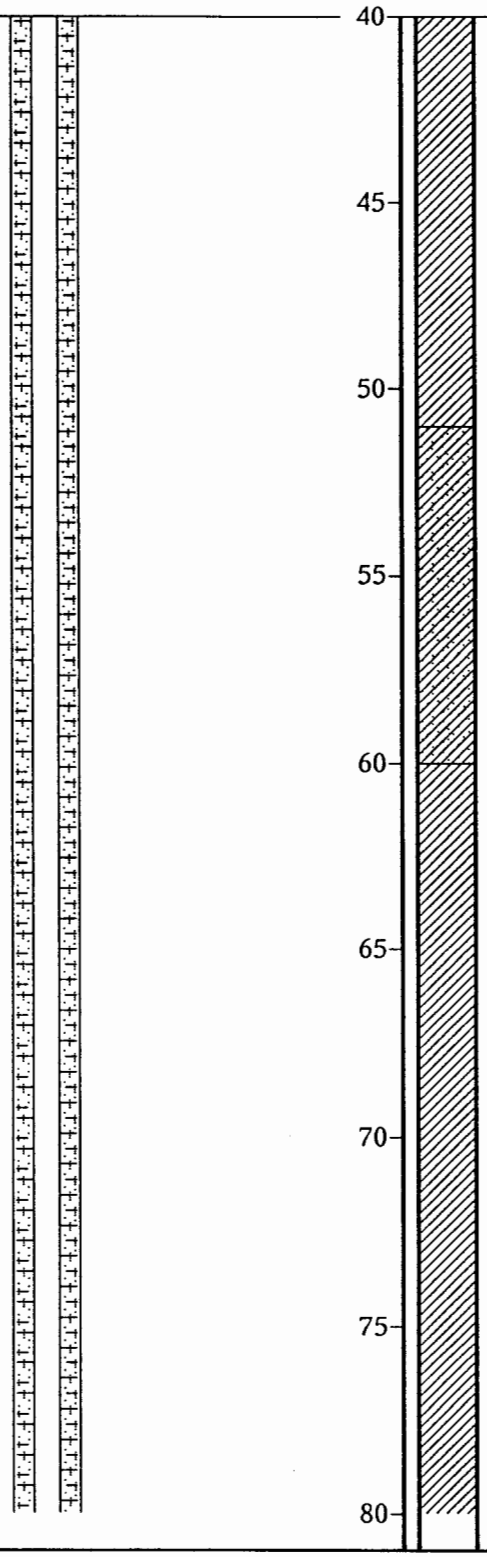
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5133.62

Equipment GD-1500

Elevation 5133.62 ft Date 9/26/90

GROUND SURFACE



BROWN & GRAY CLAYEY MEDIUM SAND (SC)

TAN & BROWN SANDY CLAY (CL)

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-60

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

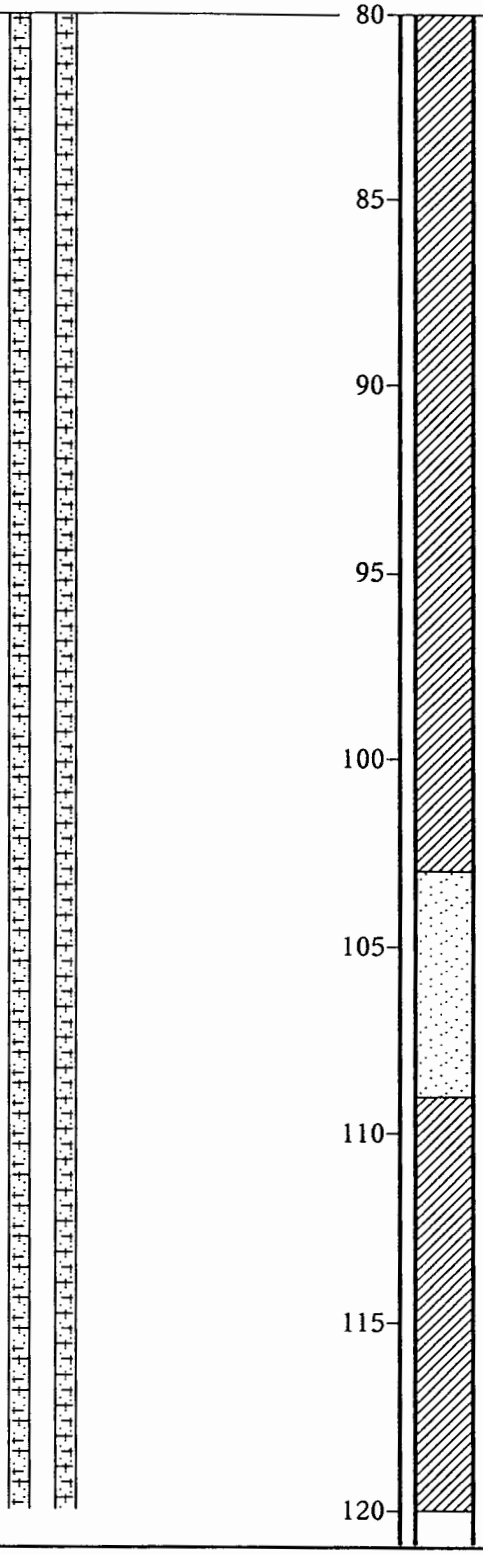
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5133.62

Equipment GD-1500

Elevation 5133.62 ft Date 9/26/90

GROUND SURFACE



BROWN & GRAY FINE TO COARSE SAND (SW)

BROWN & GRAY SILTY CLAY (CL) with sand

-occasional coarse sand and gravel below 116 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-60

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

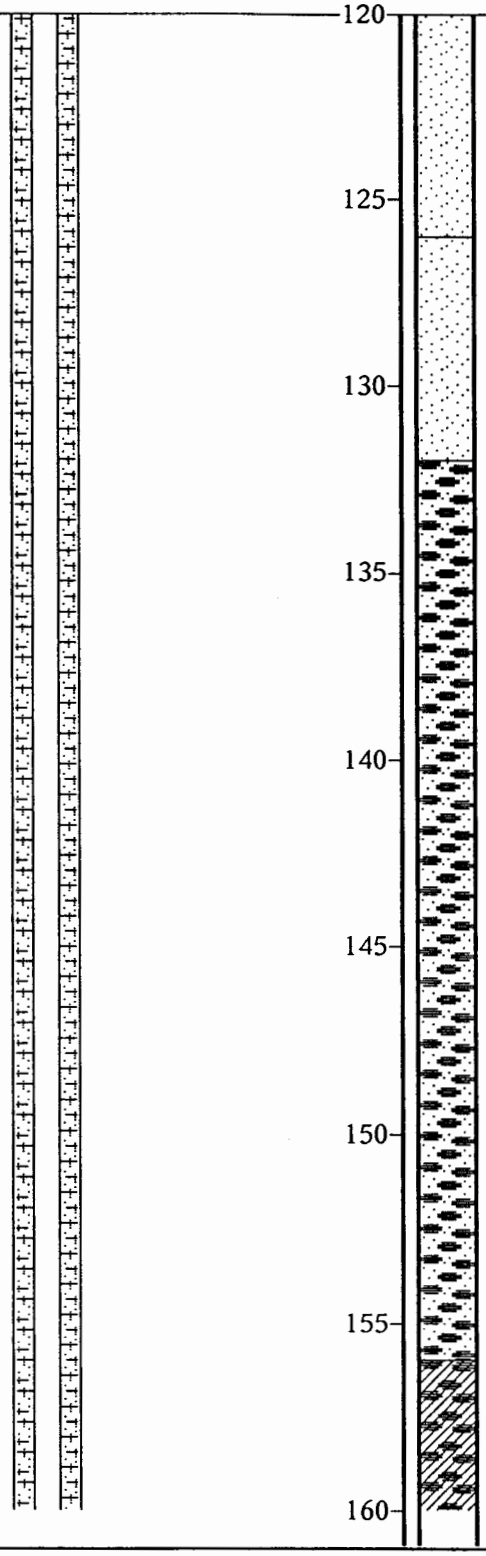
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5133.62

Equipment GD-1500

Elevation 5133.62 ft Date 9/26/90

GROUND SURFACE



BROWN & GRAY FINE TO COARSE SAND (SW)
with some gravel

BROWN & GRAY GRAVELLY SAND (SP)

BROWN & GRAY SANDY GRAVEL (GP)

BROWN & GRAY CLAYEY GRAVEL (GC)

4" Stainless Steel casing from 155 to 175 feet

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Engineers and Environmental Services

MONITORING WELL DETAIL MW-60

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

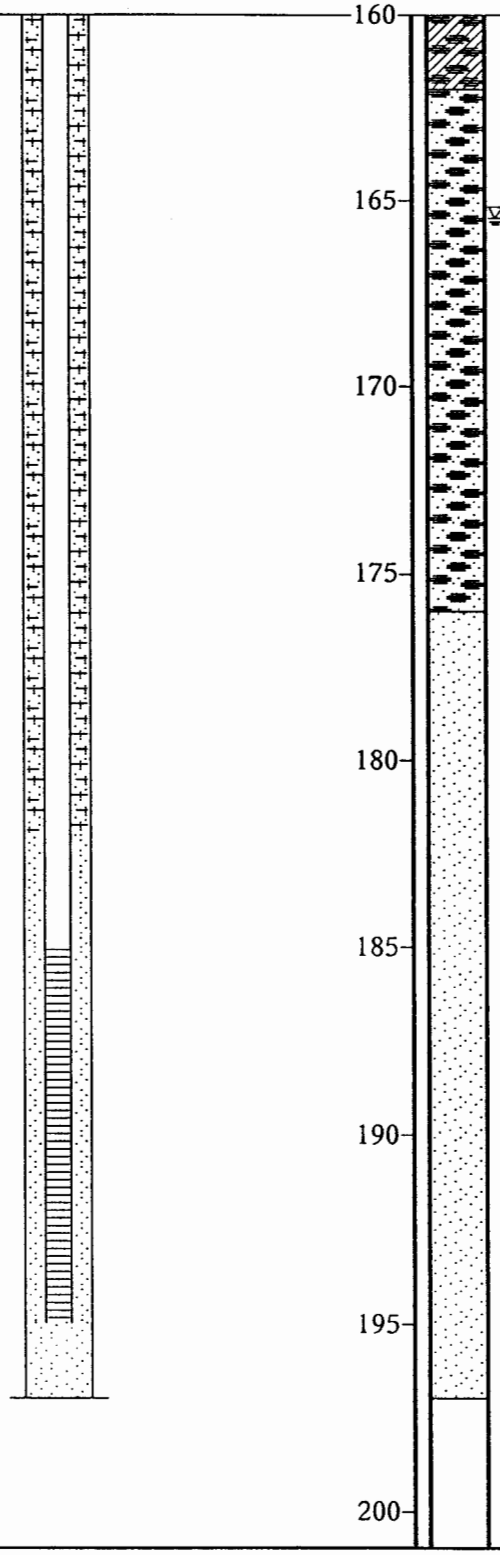
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5133.62

Equipment GD-1500

Elevation 5133.62 ft Date 9/26/90

GROUND SURFACE



BROWN & GRAY GRAVEL (GP)
with occasional clay

DARK BROWN & BLACK FINE SAND (SP)

7-7/8" borehole from 175 to 197 feet

Sandpack:
20x40 sand
(182 to 183 feet)

10x20 sand
(183 to 197 feet)

4" Stainless Steel Screen (slot size 0.02") from 185 to 195 feet

Bottom Cap

End of boring at 197.00 feet.
Groundwater encountered at 165.48 feet during drilling.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-60

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

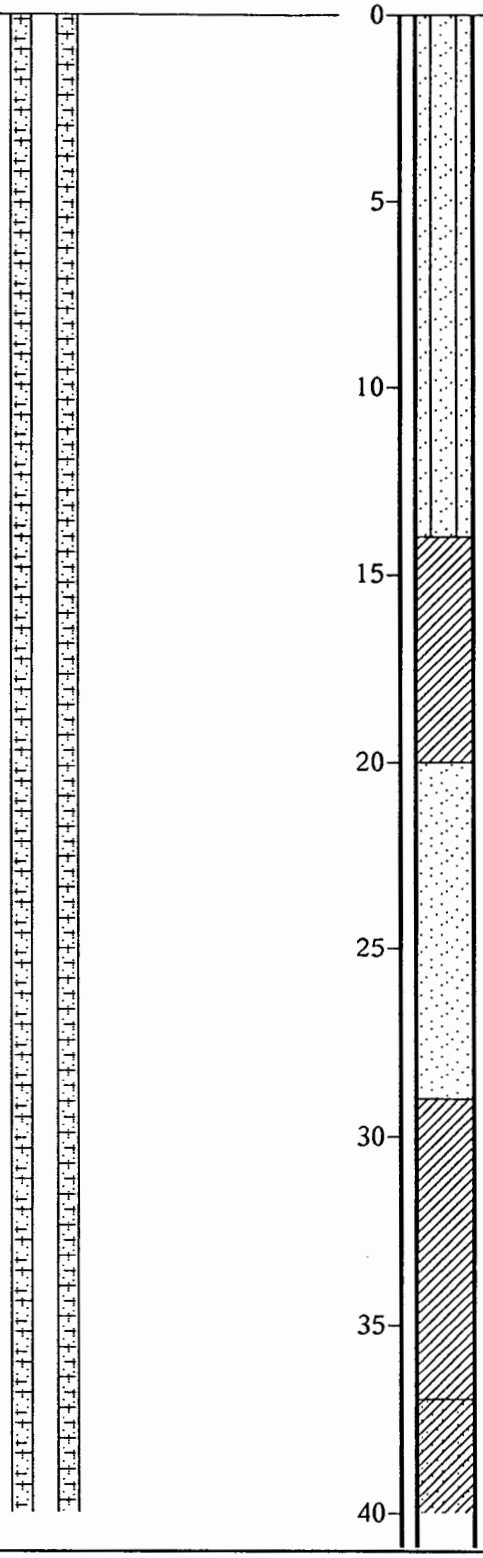
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5133.98

Equipment GD-1500

Elevation 5133.98 ft Date 9/28/90

GROUND SURFACE



TAN SILTY FINE SAND (SM)

BROWN & TAN SANDY CLAY (CL) with some seams of clayey sand

BROWN & GRAY GRAVELLY SAND (SP)

TAN & BROWN SILTY CLAY (CL) with some sand

TAN & BROWN CLAYEY SAND (SC)

4" PVC Casing to 148 feet

8-5/8" Steel casing from 0 to 153 feet

12-1/4" Borehole to 154 feet

Cement/Bentonite Grout

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-61

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

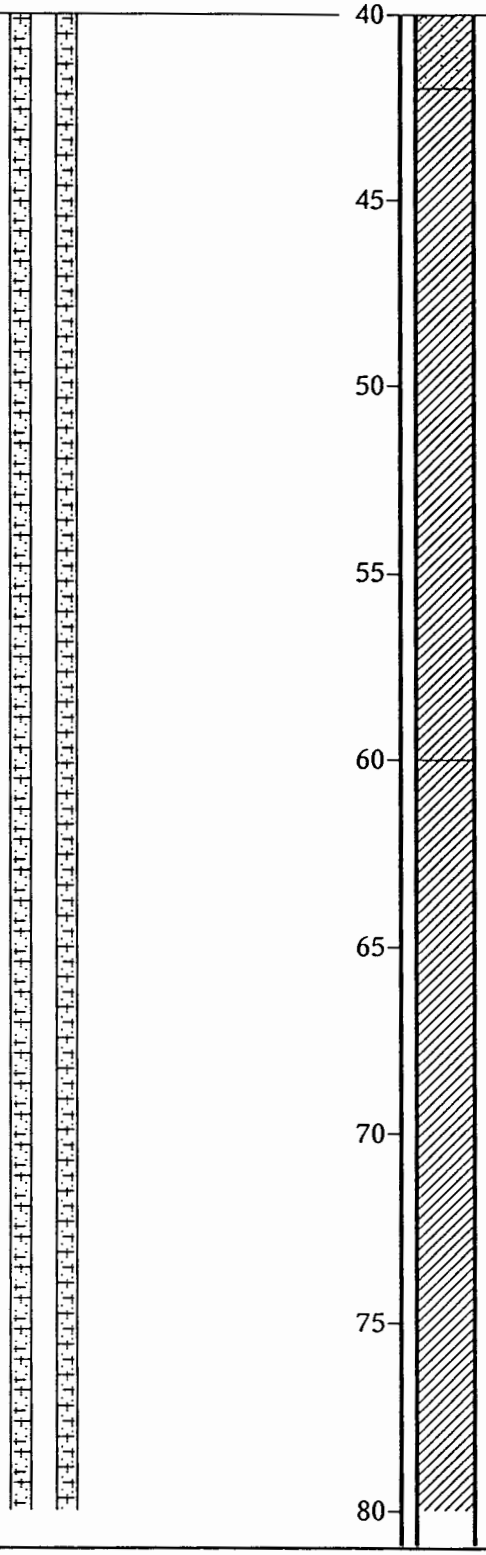
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5133.98

Equipment GD-1500

Elevation 5133.98 ft Date 9/28/90

GROUND SURFACE



TAN & BROWN SILTY CLAY (CL)
with occasional sand

TAN & BROWN SANDY CLAY (CL)

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-61

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

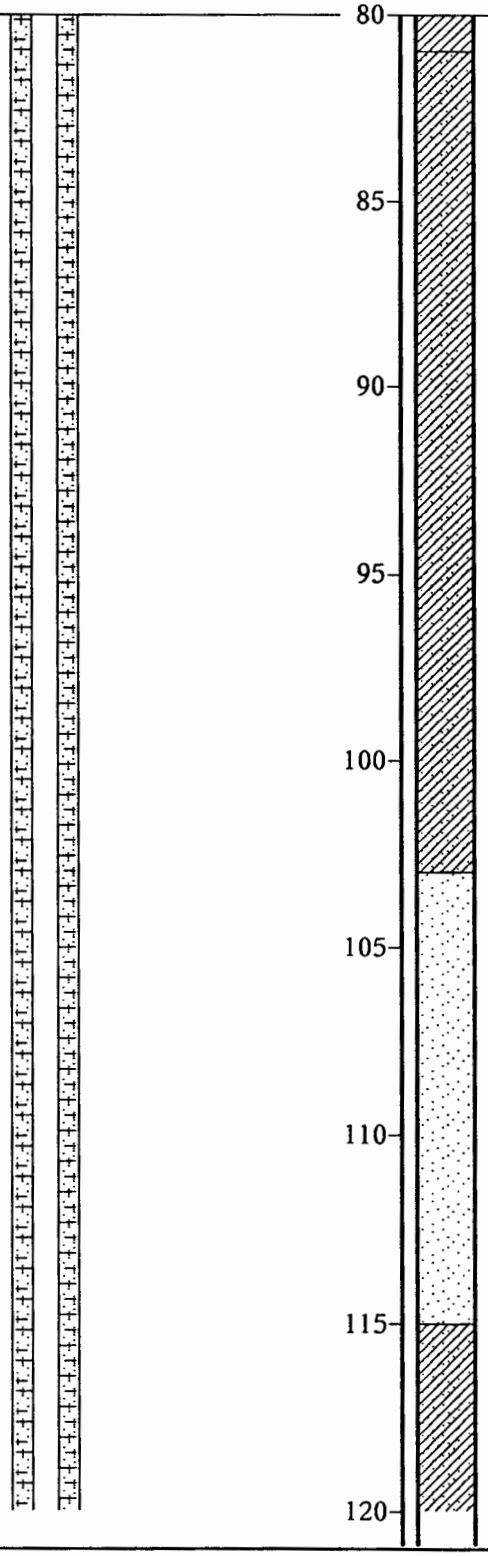
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5133.98

Equipment GD-1500

Elevation 5133.98 ft Date 9/28/90

GROUND SURFACE



TAN & BROWN CLAYEY SAND (SC)

BROWN & GRAY MEDIUM TO COARSE SAND (SP)

TAN & DARK BROWN CLAYEY SAND (SC)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-61

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

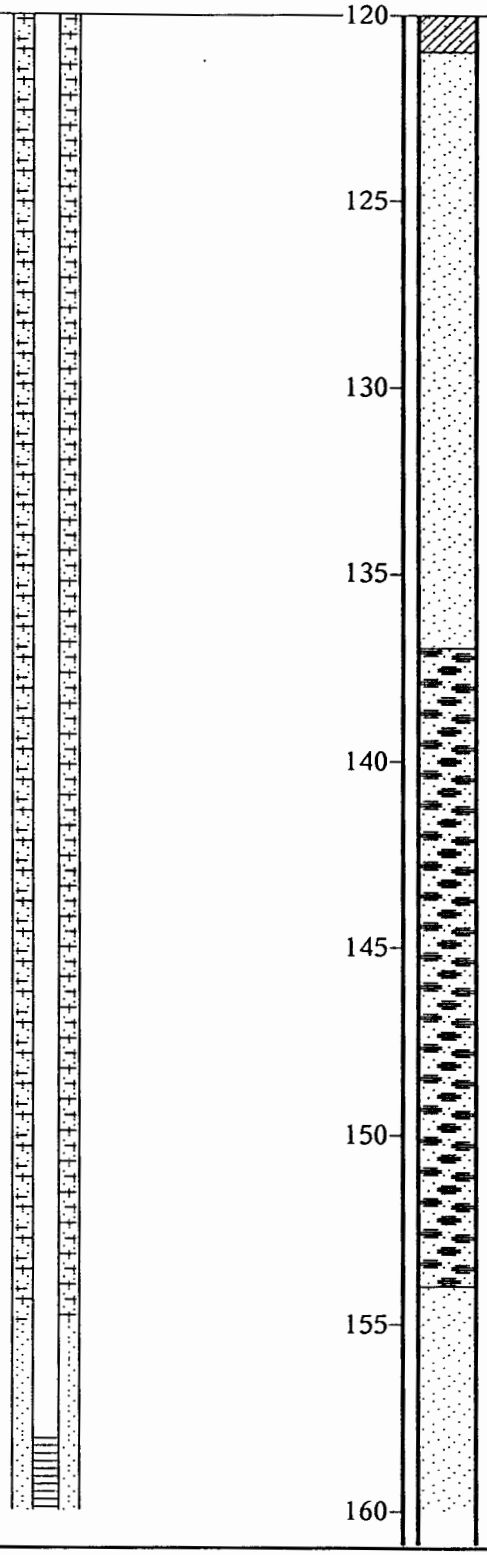
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5133.98

Equipment GD-1500

Elevation 5133.98 ft Date 9/28/90

GROUND SURFACE



BROWN & BLACK MEDIUM TO COARSE SAND (SP)

BROWN & GRAY SANDY GRAVEL (GP)

DARK BROWN FINE TO MEDIUM SAND (SP)

4" Stainless Steel casing from 148 to 158 feet

Sandpack:
20x40 sand
(155 to 156 feet)
10x20 sand
(156 to 177 feet)

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-61

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5133.98

Equipment GD-1500

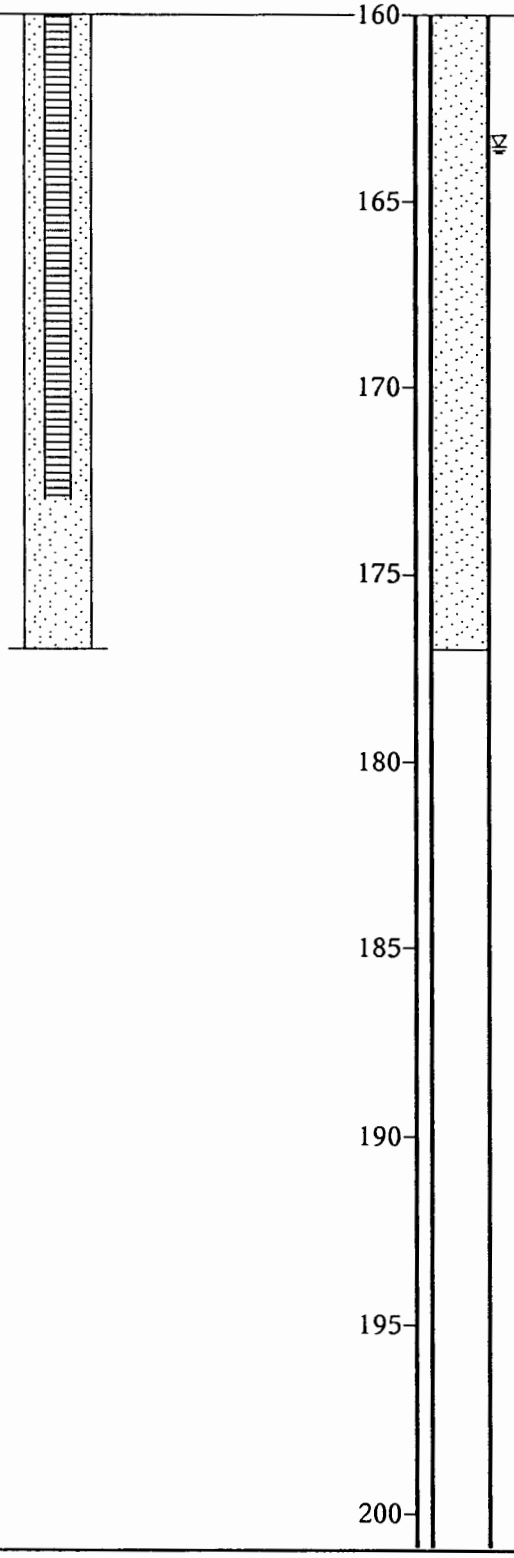
Elevation 5133.98 ft Date 9/28/90

GROUND SURFACE

7-7/8" borehole from 154 to 177 feet

4" Stainless Steel Screen (slot size 0.02") from 158 to 173 feet

Bottom Cap



End of boring at 177.00 feet.
Groundwater encountered at 163.55 feet during drilling.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-61

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5075.00

Equipment GD-1500

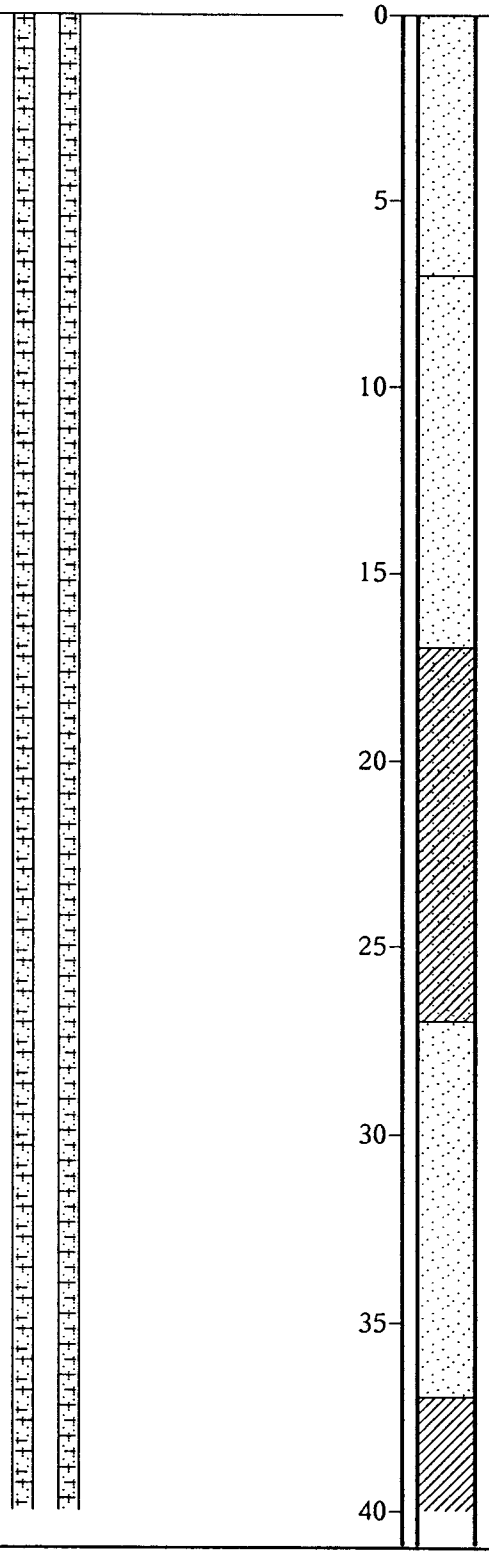
Elevation 5075.00 ft Date 9/28/90

GROUND SURFACE

2" PVC Casing
to 85 feet

Cement/Bentonite
Grout to 44 feet

6-1/4" Borehole
to 115 feet



TAN FINE SAND (SP)

LIGHT BROWN FINE TO
MEDIUM SAND (SP)

LIGHT BROWN CLAYEY FINE
SAND (SC)

LIGHT BROWN FINE SAND (SP)

LIGHT BROWN FINE SANDY
CLAY (CL)

Harding Lawson Associates
Engineers and
Environmental Services

MONITORING WELL DETAIL MW-62

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

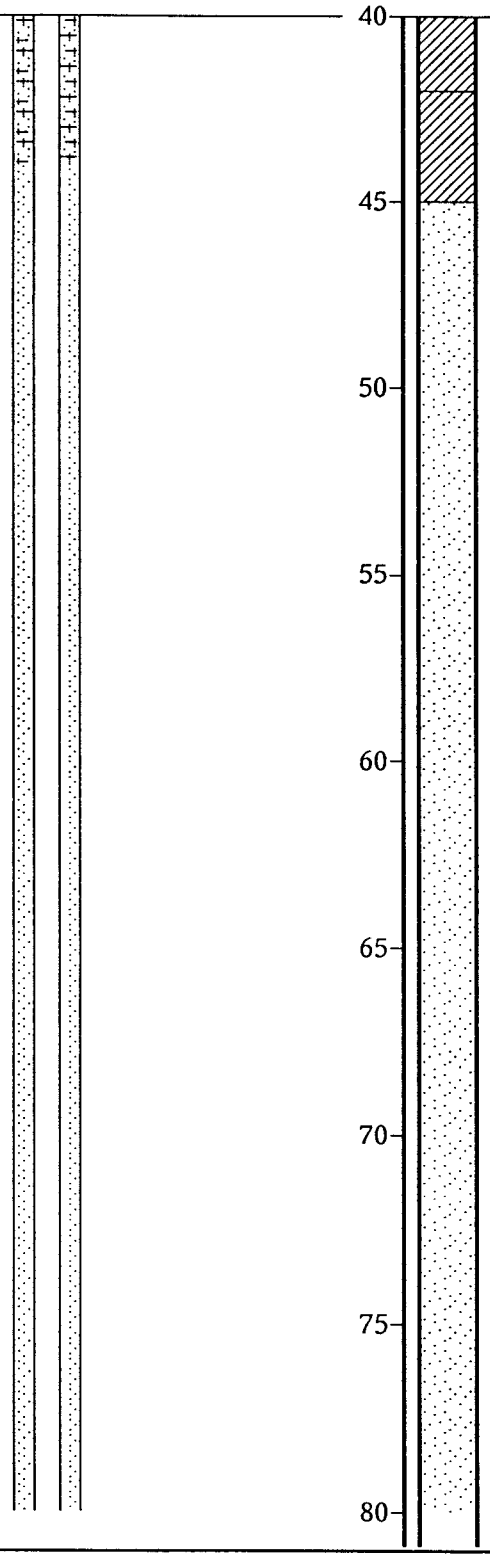
Top of PVC Casing Elevation 5075.00

Equipment GD-1500

Elevation 5075.00 ft Date 9/28/90

GROUND SURFACE

Borehole allowed to cave-in from 44 to 115 feet



LIGHT BROWN CLAY (CL)

TAN MEDIUM TO COARSE SAND (SW)

-granular gravel at 52 feet

-1/4" to 1-1/2" pebbly gravel at 67 feet

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MONITORING WELL DETAIL MW-62

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

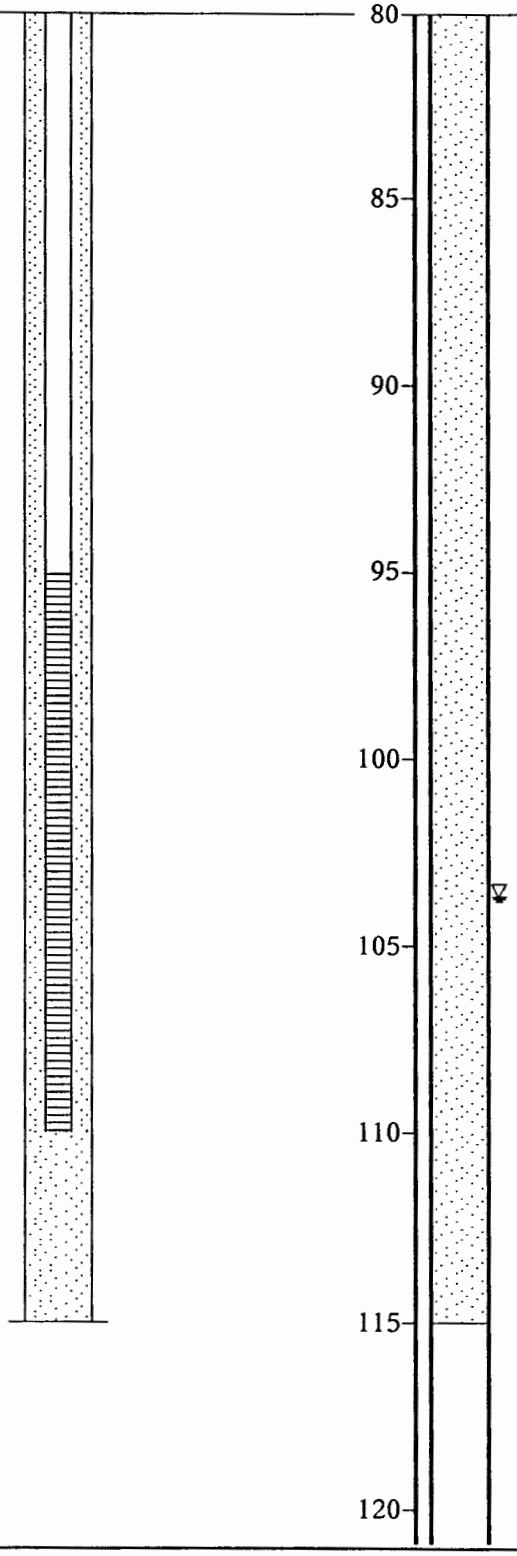
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5075.00

Equipment GD-1500

Elevation 5075.00 ft Date 9/28/90

GROUND SURFACE



2" Stainless Steel Casing from 85 to 95 feet

2" Stainless Steel Screen (slot size 0.01") from 95 to 110 feet

-occasional gravel at 85 feet

-1/2" gravel at 98 feet

-2" gravel at 100 feet

End of boring at 115.00 feet.
Groundwater encountered at 103.66 feet during drilling.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-62

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

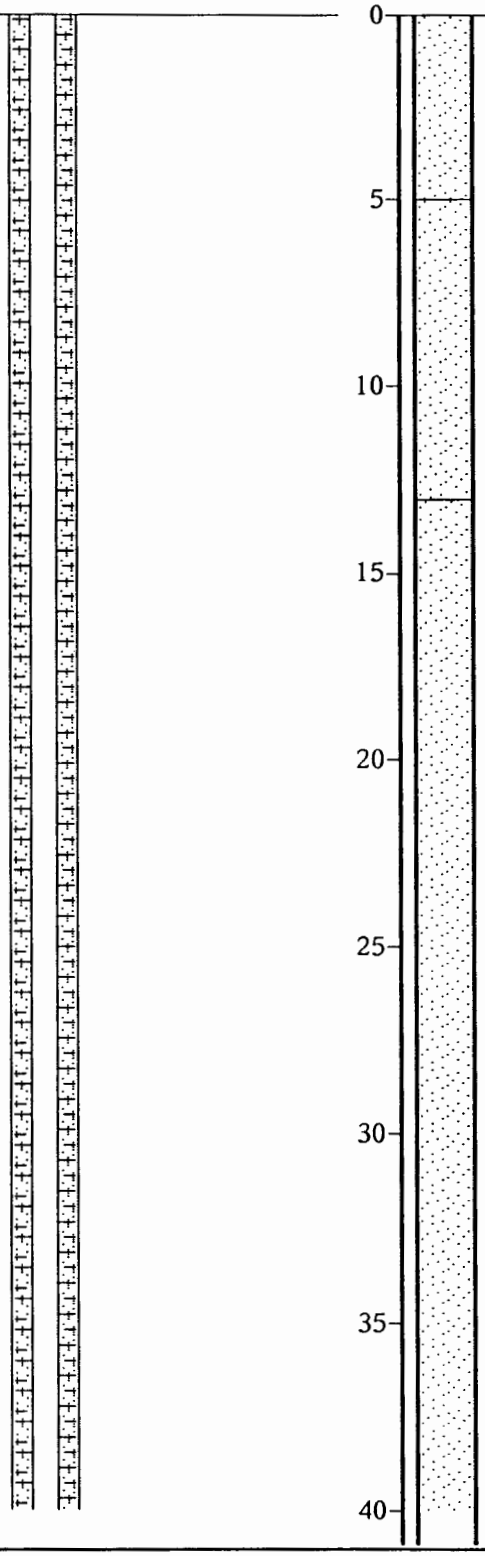
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5065.74

Equipment GD-1500

Elevation 5065.74 ft Date 10/1/90

GROUND SURFACE



TAN FINE SAND (SP)

TAN TO BROWN FINE TO MEDIUM SAND (SW)

YELLOW, BROWN & TAN FINE SAND (SP)

2" PVC Casing to 73 feet

6-1/4" Borehole to 98 feet

Cement/Bentonite Grout

-increased medium sand with occasional gravel from 38 to 42 feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-63

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

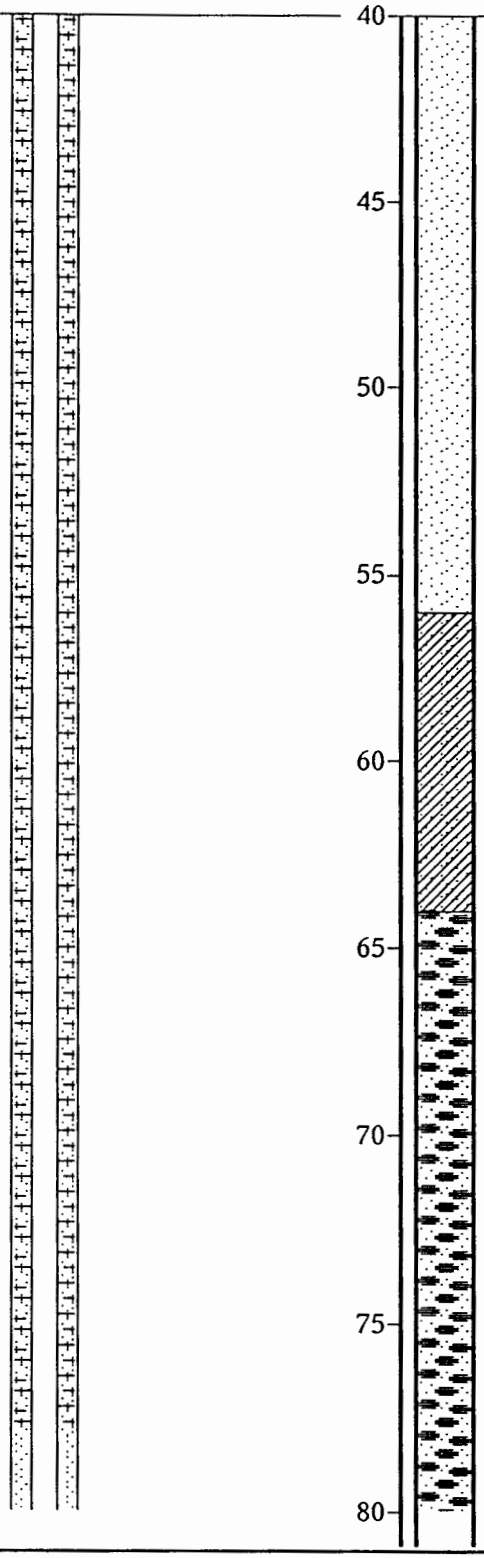
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing
Elevation 5065.74

Equipment GD-1500

Elevation 5065.74 ft Date 10/1/90

GROUND SURFACE



-occasional gravel from 44 to 50 feet

BROWN CLAYEY SAND (SC)
occasional coarse sand and small gravel

BROWN SANDY GRAVEL (GP)
gravel size increases with depth

2" Stainless Steel casing from 73 to 83 feet

Harding Lawson Associates
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MONITORING WELL DETAIL MW-63

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

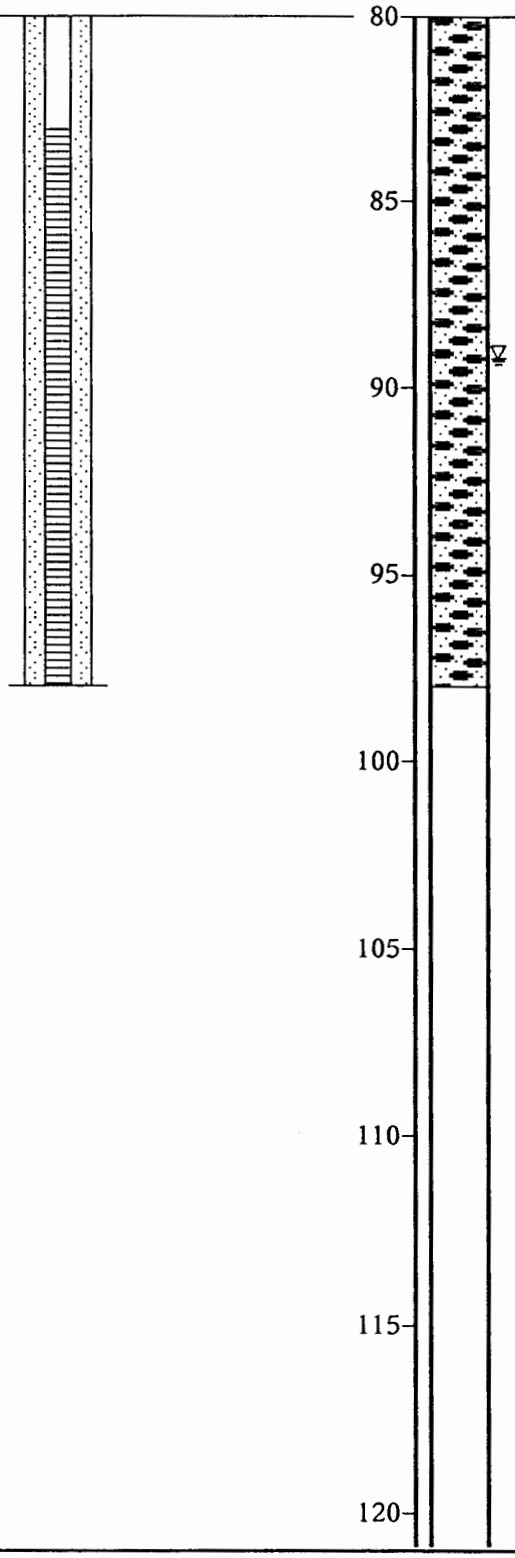
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5065.74

Equipment GD-1500

Elevation 5065.74 ft **Date** 10/1/90

GROUND SURFACE



2" Stainless Steel Screen (slot size 0.01") from 83 to 98 feet

Natural sand formation allowed to collapse around screen

Bottom Cap

End of boring at 98.00 feet.
Groundwater encountered at 89.20 feet during drilling.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-63

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

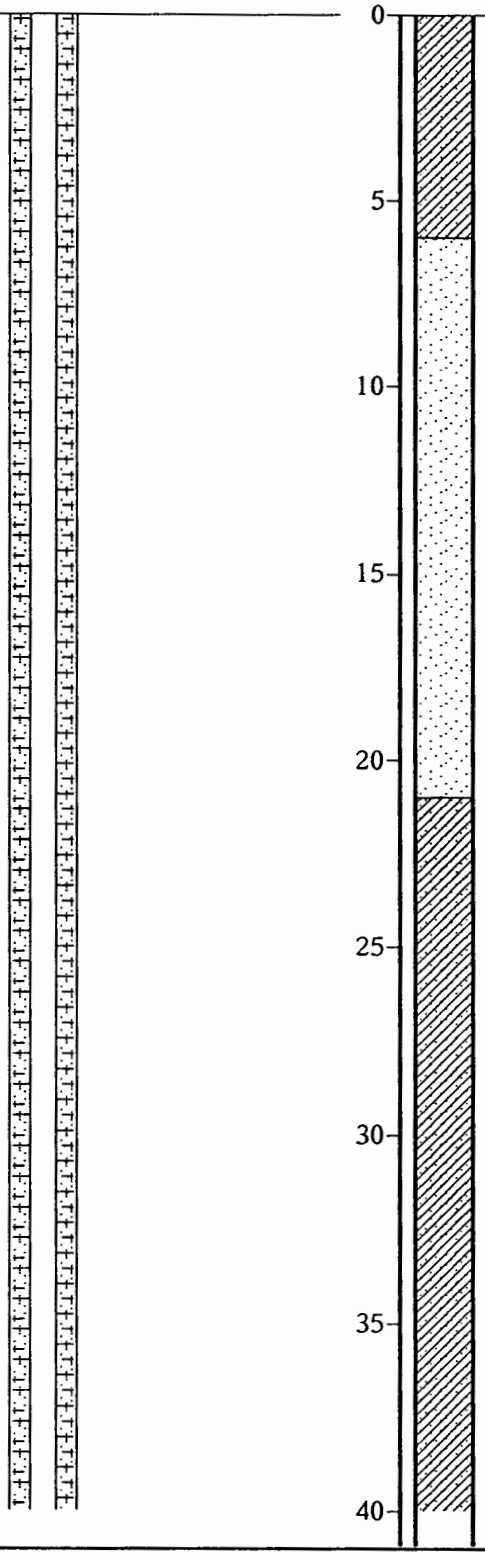
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5097.84

Equipment GD-1500

Elevation 5097.84 ft **Date** 10/3/90

GROUND SURFACE



0

TAN & BROWN CLAYEY FINE SAND (SC)

5

-medium to coarse sand below 4 feet

BROWN & GRAY MEDIUM TO COARSE SAND (SP) with occasional gravel

10

15

20

TAN & BROWN CLAYEY FINE SAND (SC)

25

30

-with medium sand below 32 feet

35

40

4" PVC Casing to 113 feet

8-5/8" Steel casing from 0 to 134 feet

12-1/4" Borehole to 136 feet

Cement/Bentonite Grout

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MONITORING WELL DETAIL MW-64

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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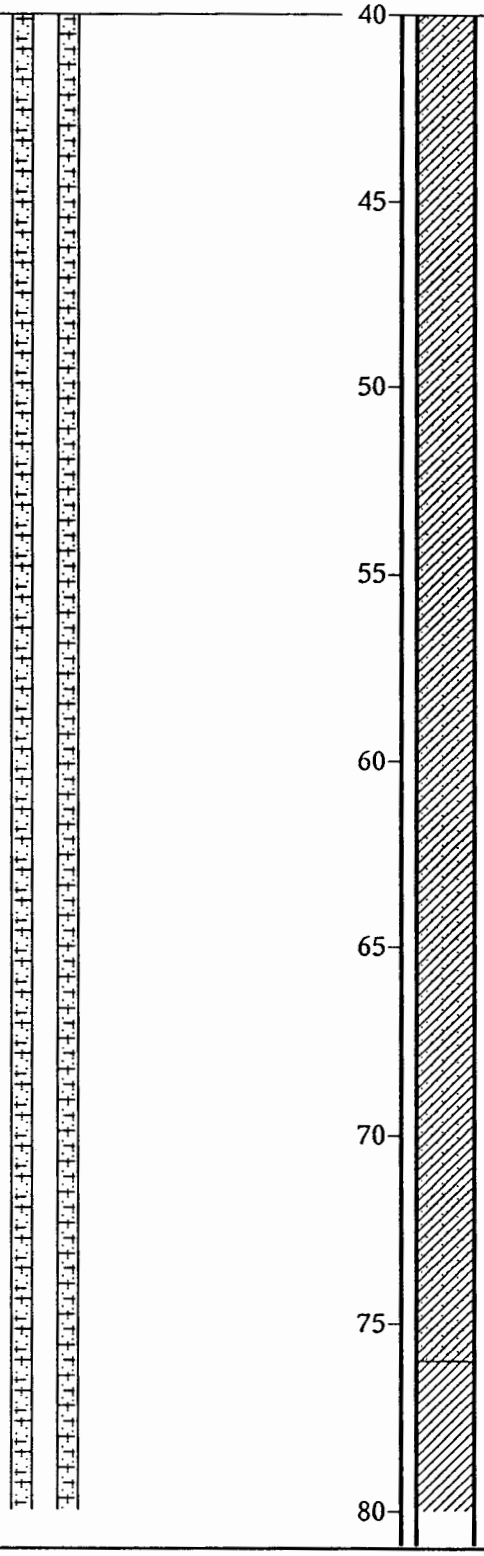
Top of PVC Casing
Elevation 5097.84

Equipment GD-1500

Elevation 5097.84 ft Date 10/3/90

GROUND SURFACE



-interbedded with occasional sandy clay seams below 74 feet

TAN SANDY CLAY (CL)

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Albuquerque, New Mexico

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Top of PVC Casing
Elevation 5097.84

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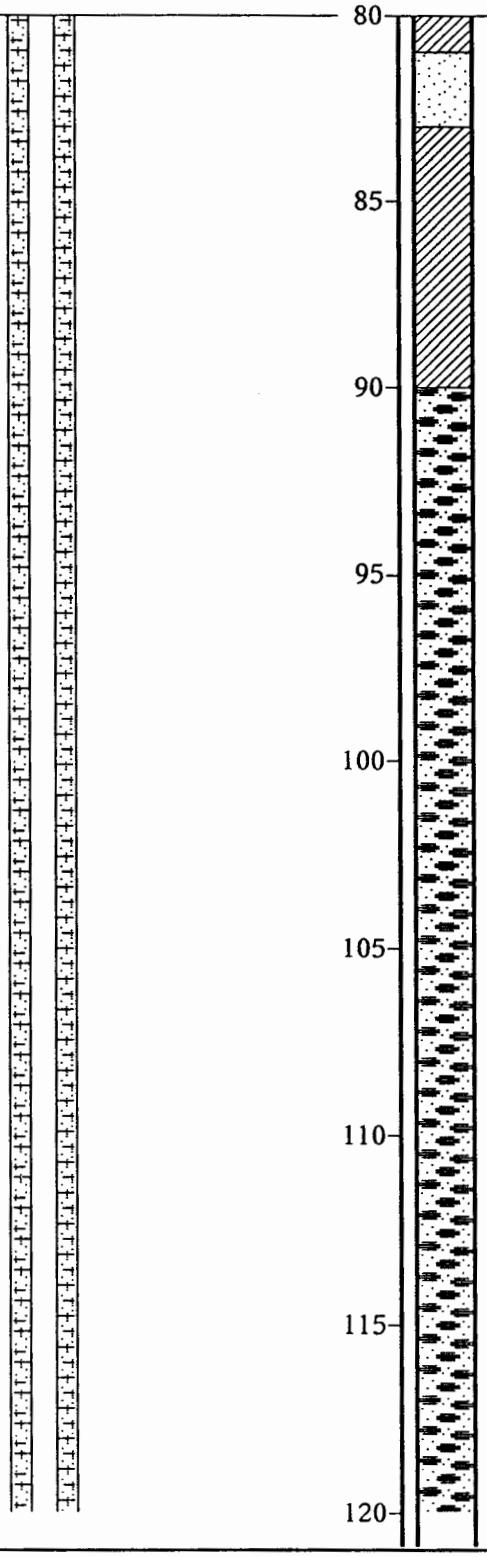
Elevation 5097.84 ft Date 10/3/90

GROUND SURFACE



BROWN & GRAY MEDIUM TO COARSE SAND (SP)
TAN SANDY CLAY (CL)

BROWN & GRAY SANDY GRAVEL (GP)

4" Stainless Steel casing from 113 to 138'10" feet

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-64

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

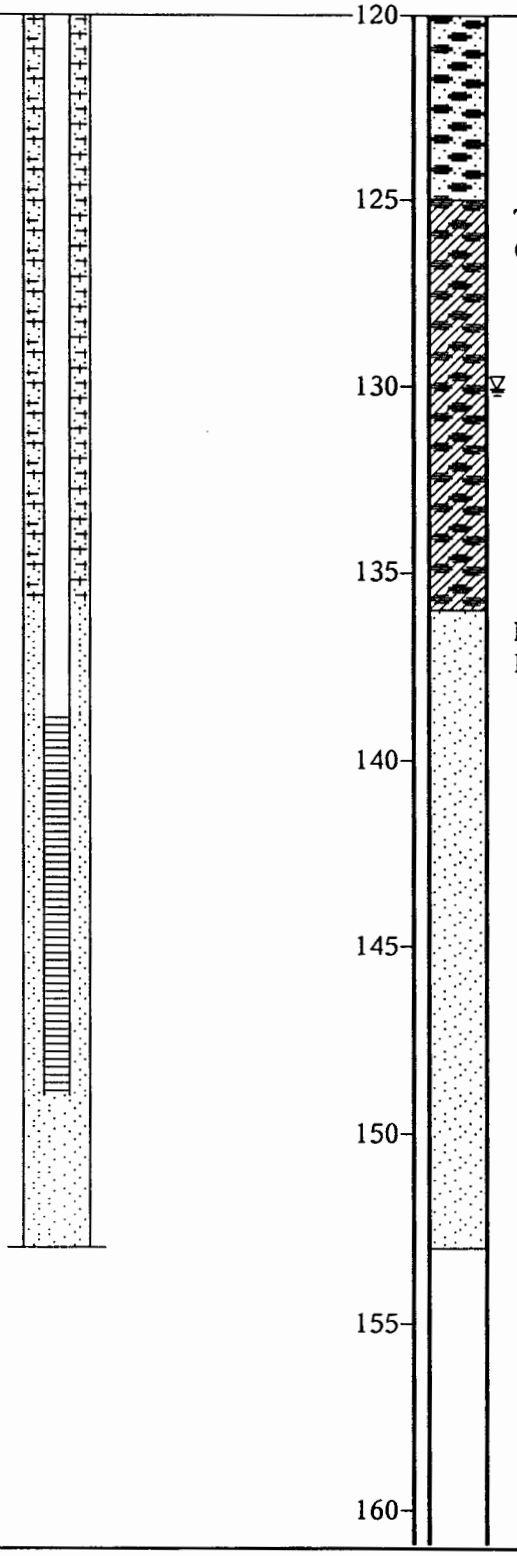
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

Top of PVC Casing Elevation 5097.84

Equipment GD-1500

Elevation 5097.84 ft **Date** 10/3/90

GROUND SURFACE



TAN, BROWN & GRAY CLAYEY GRAVEL (GC)

DARK BROWN & BLACK FINE TO MEDIUM SAND (SP)

Sandpack:
20x40 sand
(136 to 137 feet)

10x20 sand
(137 to 152 feet)

7-7/8" borehole from 136 to 152 feet

4" Stainless Steel Screen (slot size 0.02") from 138.8 to 149 feet

Bottom Cap

End of boring at 153.00 feet.
Groundwater encountered at 130.05 feet during drilling.

Harding Lawson Associates
Engineers and Environmental Services

MONITORING WELL DETAIL MW-64

Sparton Technology Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12		12/90		

A Report Prepared for:

Sparton Technology, Inc.
9621 Coors Road NW
Albuquerque, New Mexico

Areal Extent of the Zones of Relatively Lower Permeability

HLA Job No. 6310,039.12

by

Jeffrey S. Haag, C.P.G
Associate Hydrogeologist

Charles R. Glore C.E.G.
Principal Hydrogeologist

Harding Lawson Associates
9800 Richmond Avenue, Suite 150
Houston, Texas 77042
Telephone: (713) 789-8050

July 6, 1990

TABLE OF CONTENTS

I	INTRODUCTION	1
II	OBJECTIVE	2
III	DATA COMPILATION AND REDUCTION	4
IV	SUMMARY OF DATA INTERPRETATION	13
V	CONCLUSION	15

I INTRODUCTION

This report presents Harding Lawson Associates' (HLA) evaluation of the areal extent of the aquitard that exists between the upper and lower flow zones beneath the Sparton Technology, Inc. (Sparton) facility located on Coors Road in Albuquerque, New Mexico. The data used for the generation of this report was complied from the on-going investigation program at the facility.

II OBJECTIVE

The objective of this report is to define the percentage of the site that is underlain by the zone of relatively lower permeability, hereafter termed the "ZORLP", or "aquitard". The effective portion of the aquitard is actually composed of three various sediment types. Each individual sediment type has a different permeability, and each type may exist alone or in combination with other lower permeability zones.

Table 1 is based upon the Unified Soil Classification System and has been modified to include a subjective permeability rating scale. For the purposes of this report, the aquitard in this report is defined as the as the sediments in groups 1, 2, and 3 of Table 1.

TABLE 1

RELATIVE PERMEABILITY AND SOIL CLASSIFICATIONS

MAJOR DIVISIONS				TYPICAL NAMES	
COARSE-GRAINED SOILS MORE THAN HALF IS LARGER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN No. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES	5
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES	5
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES	4
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES	4
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, GRAVELLY SANDS	4
			SP	POORLY GRADED SANDS, GRAVELLY SANDS	4
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES	3
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES	2
FINE-GRAINED SOILS MORE THAN HALF IS SMALLER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY	2
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	2
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	2
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	1
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	1
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	1
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS	

CLASSIFICATION OF SOILS - ASTM D2487-85

5 = Highest Relative Permeability

1 = Lowest Relative Permeability

III DATA COMPILATION AND REDUCTION

The data assembled for defining the percentage of the ZORLP beneath the site are as follows:

Item	Reference
	HLA REPORTS
• Logs of Borings	- "Groundwater Monitoring Program," (6310,004.12); June 29, 1983
	- "Investigation of Soil and Groundwater Contamination," (6310,008.12); March 19, 1984
	- "Hydrogeologic Characterization and Remedial Investigation", (6310,013.12); March 13, 1985
	- "Soil Investigation of the Unsaturated and Upper Saturated Zones", (6310,023.12); June 30, 1986
	- "Additional Monitoring Well Completion Report", (6310,033.12); November 18, 1986
	- Groundwater Recovery for Reclamation of the Upper Flow Zone at Coors Road Plant", (6310,035.12); July 17, 1987
	- Interim Measures Work Plan", (6310,039.12); January 12, 1989
• Base Facility Map	- DTM & Associates, Scale: 1" = 50 10/84 Survey
• Ground Surface Elevation	- DTM & Associates - Metric Corporation (5/89) Correspondence to HLA

These data have been reduced to produce three maps, eight geologic cross-sections, and two tables. These illustrations and tables are a ZORLP surface contour map (Plate 1), a ZORLP isopach (Plate 2), and axionometric map for all sediment types (Plate 3), a cross-section identification plan (Plate 4), and eight geologic cross-sections (Plates 5 through 12). Table 2 is a summary table of "Data for Zones of Relatively Lower Permeability". Table 3 is the "Summary of Sample Distribution in the Boring Profile".

TABLE 2

Data for Zones of Relatively Lower Permeability

Data Location	Surface Elevation[1] (ft, msl)	Depth to ZORLP (feet)	Elevation of ZORLP Surface (ft,msl)	ZORLP Interval (feet)	Boring Depth (feet)	ZORLP[2] USCS	ZORLP[3] Rating
B 1	5044.6	52.0	4992.6	52.0-64.0	67.5	ML	2
B 2	5044.0	69.0	4975.0	69.0-83.0	83.2	SM/CL[4]	3-2
B 3	5046.0	74.0	4972.0	74.0-78.0	78.0	SM/ML	3-2
B 4	5045.3	66.0	4979.3	66.0-68.0	71.4	SM	3
B 5	5045.3	70.0	4975.3	70.0-78.0	78.0	SM	3
B 6	5045.4	66.0	4979.4	66.0-78.0	78.0	SM	3
B 7	5045.3	67.0	4978.3	67.0-83.0	83.0	SM	3
B 8	5045.2	68.0	4977.2	68.0-79.0	79.0	SM/CL/ML	3-2-2
B 9	5049.6	69.0	4980.6	69.0-73.0	73.0	ML	2
B 10	5043.5	65.0	4978.5	65.0-68.0	68.3	ML/CL	2
B 11	5043.5	74.0	4969.5	74.0-77.0	77.7	ML	2
B 12	5045.8	77.5	4968.3	77.5-80.5	80.5	SM/CL/ML	3-2-2
P 1	NA[5]	NA[6]	--	--	90.0	--	--
PW1	5043.1	70.0	4973.1	70.0-80.0	145.0	SM	3
MW 1	NA	NP[7]	--	--	90.0	--	--
MW 2	NA	NS	--	--	90.0	--	--
MW 3	NA	NS	--	--	90.0	--	--
MW 4	NA	NS	--	--	90.0	--	--

TABLE 2
(continued)

Data Location	Surface Elevation[1] (ft, msl)	Depth to ZORLP (feet)	Elevation of ZORLP Surface (ft,msl)	ZORLP Interval (feet)	Boring Depth (feet)	ZORLP[2] USCS	ZORLP[3] Rating
MW5	5052.2	73.0	4979.2	73.0-83.0	135.0	SM	3
MW6	5044.6	71.0	4973.6	71.0-76.0	150.0	CH/CL[4]	1
MW7	5046.0	74.0	4972.0	74.0-78.0	78.0	SM/ML	3-2
MW8	5040.4	65.0	4975.4	65.0-75.0	75.5	SM	3
MW10	5045.3	NP.0	--	--	150.5	--	--
MW11	5044.7	68.0	5976.7	68.0-77.0	150.0	ML	2
MW12	5042.2	69.0	4971.2	69.0-71.0	130.0	SM	3
MW13	5041.6	66.0	4975.6	66.0-80.0	140.0	SM/CL	3
MW14	5042.2	69.0	4971.2	69.0-71.0	130.0	SM	3
MW15	5045.7	70.0	4975.7	70.0-77.0	140.0	SM/CL	3
MW16	5046.2	NP	--	--	73.0	SM	3
MW17	5047.6	NP	--	--	73.0	--	--
MW18	5043.1	65.0	4965.3	78.0-79.5	81.0	SM	3
MW19	5043.1	65.0	4978.1	69.0-96.0	110.0	SC/CL	2-2
MW20	5042.9	68.0	5974.9	68.0-98.0	138.0	CL/ML/SM	2-2-3
MW21	5044.8	64.0	4980.8	64.0-65.0	69.5	SM	3
MW23	5045.4	76.0[7]	4969.4	76.0-78.0	78.0	SM	3
MW24	5046.0	72.5	4973.5	72.5-75.0	75.0	CL/ML/SM	2-2-3
MW25	5046.0	72.5	4973.5	72.5-75.0	75.0	CL/ML/SM	2-2-3
MW26	5043.8	70.0	4973.8	70.0-81.0	81.0	SM	3

TABLE 2
(continued)

Data Location	Surface Elevation(1) (ft, msl)	Depth to ZORLP (feet)	Elevation of ZORLP Surface (ft,msl)	ZORLP Interval (feet)	Boring Depth (feet)	ZORLP(2) USCS	ZORLP(3) Rating
MW27	5043.8	71.0	4972.8	71.0-73.0	73.0	SM	3
MW28	5040.9	66.5	4974.4	65.5-70.5	71.0	SM	3
MW29	5041.7	65.0	4976.0	65.0-82.0(9)	11.5	SM/CL/SM	3-3-3
MW30	5042.0	71.0	4971.0	71.0-94.0	109.5	SC	2
MW31	5040.7	65.0	4975.7	65.0-72.0	109.0	CL/SC	2-2
MW32	5045.2	73.0	4972.2	73.0-85.0	120.0	SC	2
MW33	5042.2	64.0	4978.2	64.0-73.0	73.0	SM/SC	3-2

NOTES:
(1) Mean sea level (Rounded to First Decimal)
(2) Unified Soil Classification
(3) See Table 1 for Key
(4) Indicates major/minor component(s), respectively
(5) NA - Not Available
(6) NP - Not Present
(7) NS - No samples taken; ZORLP may exist, but was not observed due to drilling technique (HSA). This applies to wells MW-1 through MW-4.
(8) SM has interbedded clays from 70-75.5 feet which may be the actual effective ZORLP.
(9) Visual log only, no samples taken

TABLE 3

Summary of Sample Distribution in Boring Profile

ZORLP (ft) Thickness	Location	Interval (feet)	Sample Intervals	Number of Samples Per Interval	Number of Samples Taken in ZORLP
12	B 1	52.0-64.0	0.00-45.0	0	3
			45.0-52.0	0	
			52.0-67.5	3	
14	B 2	69.0-83.0	0.0-83.0	19	5
			occassional refusals	0	
4	B 3	74.0-78.0	0.0-20.0	1	1
			20.0-50.0	8	
			50.0-68.0	0	
			68.0-78.0	2	
2	B 4	66.0-68.0	0.0-71.4	25	1
8	B 5	70.0-78.0	0.0-78.0	15	1
12	B 6	66.0-78.0	0.0-78.0	16	3
16	B 7	67.0-83.0	0.0-83.0	14	3
11	B 8	68.0-79.0	0.0-79.0	14	3
4	B 9	69.0-73.0(1)	0.0-73.0	14	1
3	B 10	65.0-68.0	0.0-68.3	13	1
3.7	B 11	74.0-77.7	0.0-77.7	15	1
3	B 12	77.5-80.5	0.0-67.5	0	1
			67.5-80.5	3	1
(--)	P 1	NP(2)	NS(3)	NA(4)	--
10	PW 1	70.0-80.0	NS	NA	--

TABLE 3
(continued)

ZORLP (ft) Thickness	Location	Interval (feet)	Sample Intervals	Number of Samples Per Interval	Number of Samples Taken in ZORLP
--	MW 1	NP	@ 10', 20' 30', 40' 70'	--	--
--	MW 2	NP	NS	NA	--
--	MW 3	NP	NS	NA	--
--	MW 4	NP	NS	NA	--
10	MW 5	73.0-83.0	0.0-70.0	14	1
			70.0-75.0	1	
			75.0-109.0	0	
			109.0-135.0	3	
5	MW 6	71.0-76.0	0.0-70.0	14	1
			70.0-75.0	1	
			75.0-109.0	0	
			109.0-135.0	3	
5.5	MW 7	40.0-75.5(1)	0.0-40.0	8	1
			40.0-75.5	6	
10	MW 8	65.0-75.0	0.0-64.0	12	3
			88.0-150.0	5	
14	MW 9	64.0-80.0	0.0-64.0	12	3
			64.0-8.0	3	
--	MW 10	NP	0.0-65.0	13	--
			65.0-91.0	1	
			91.0-150	7	

TABLE 3
(continued)

ZORLP (ft) Thickness	Location	Interval (feet)	Sample Intervals	Number of Samples Per Interval	Number of Samples Taken in ZORLP
4	MW 12	74.0-78.0	0.0-51.0	0	1
		1	51.0-82.0	7	
			82.0-140.0	0	
12	MW 13	66.0-80.0	0.0-140.0	0	0
2	MW 14	69.0-71.0	0.0-69.0	0	1
			69.0-71.0	1	
			72.0-128.0	0	
			128.0-130.0	1	
7	MW 15	70.0-77.0	0.0-70.0	0	1
			70.0-77.0	1	
			77.0-140.0	0	
--	MW 16	NP	0.0-73.0	14	--
--	MW 17	NP	0.0-72.0	14	--
1.5	MW 18	78.0-79.5	0.0-81.0	19	1
30	MW 19	65.0-95.0	0.0-110.0	0	0
			68.0-98.0	2	
			98.0-138.0	3	
1	MW 21	64.0-65.0	0.0-69.5	15	0
4	MW 22	74.0-78.0	0.0-78.0	15	1
2	MW 23	76.0-78.0	0.0-78.0	16	1
1.5	MW 24	73.5-75.0	0.0-39.0	0	1
			39.0-44.0	3	
			44.0-78.0	4	

TABLE 3
(continued)

ZORLP (ft) Thickness	Location	Interval (feet)	Sample Intervals	Number of Samples Per Interval	Number of Samples Taken in ZORLP
10	MW 26	70.0-80.0	0.0-68.0	0	5
			68.0-80.0	cont.(6)	
2	MW 27	71.0-73.0	0.0-68.0	0	1
			68.0-73.0	cont.	
4	MW 28	66.5-70.5	0.0-63.0	0	3
			63.0-71.0	cont.	
17	MW 29	65.0-82.0	0.0-115.5	0	0
23	MW 30	71.0-94.0	0.0-109.5		0
				0	
7	MW 31	65.0-72.0	0.0-109.0	0	0
12	MW 32	73.0-85.0	0.0-120.0	0	0
9	MW 33	64.0-73.0			0
			0.0-73.0	0	

Notes:
(1) Sample tool barely penetrated ZORLP
(2) NP - Not present on Boring Log
(3) NS - No samples taken
(4) NA - Not Applicable
(5) (SM) interbedded with (CL) from 70-75.5, which may be actual effective ZORLP.
(6) Continuous samples.

IV SUMMARY OF DATA INTERPRETATION

Various assumptions and observations have been made prior to establishing the areal extent of the ZORLP. These are:

1) The contoured surface may reflect three different depositional environments, and consequently, the ZORLP contour map may exhibit discontinuities.

2) Since the borings and monitoring wells from which the data is Table 3 was taken were not installed to measure the ZORLP, a limited number of samples were taken. We feel however that this data is adequate to determine a reasonable estimate of the profile of the ZORLP.

3) The lack of a ZORLP at a given boring would serve as a basis for the "zero contour".

4) To provide a conservative estimate of the area where the ZORLP is absent, the area measured includes the area inside the zero contour plus any areas where the ZORLP is less than six inches thick.

The first assumption is necessary because of the multi-layering of material that comprises the ZORLP. For example, the depositional environment, or energy level, associated with a clay is significantly lower than that of a silty sand mixture. Therefore, it must be anticipated that a contour map of multiple depositional sediments would not be as "smooth" as a contour surface of homogeneous material.

The second assumption/observation is noted after reviewing Table 3. This table

illustrates that in some borings the presence or absence of the ZORLP can not be ensured based upon the type of sample intervals, (intermittent) or no samples at all. It must be assumed that, even if borings were only visually logged, the logs represent the presence or absence of the ZORLP.

Assumption three was made due to the variability of contouring distinct and separate sediment types. Comparison of the ZORLP surface contour and isopach (Plates 1 and 2) indicates that the two maps do mirror each other in many respects. There are apparently two flow paths as indicated by the two scour zones. These scour zones are separated by a ridge that extends from the central portion of the site (the pond and sump area) to the south. A broader, fan-like feature to the west, as well as a deep ravine cut, are also evident on both maps. The fan-like structure may be a remnant colluvial fan which, like the alluvial channels in the south central portion of the site, has caused a scouring of the ZORLP.

The final assumption was made as a conservative measure due to the subjective nature of this evaluation.

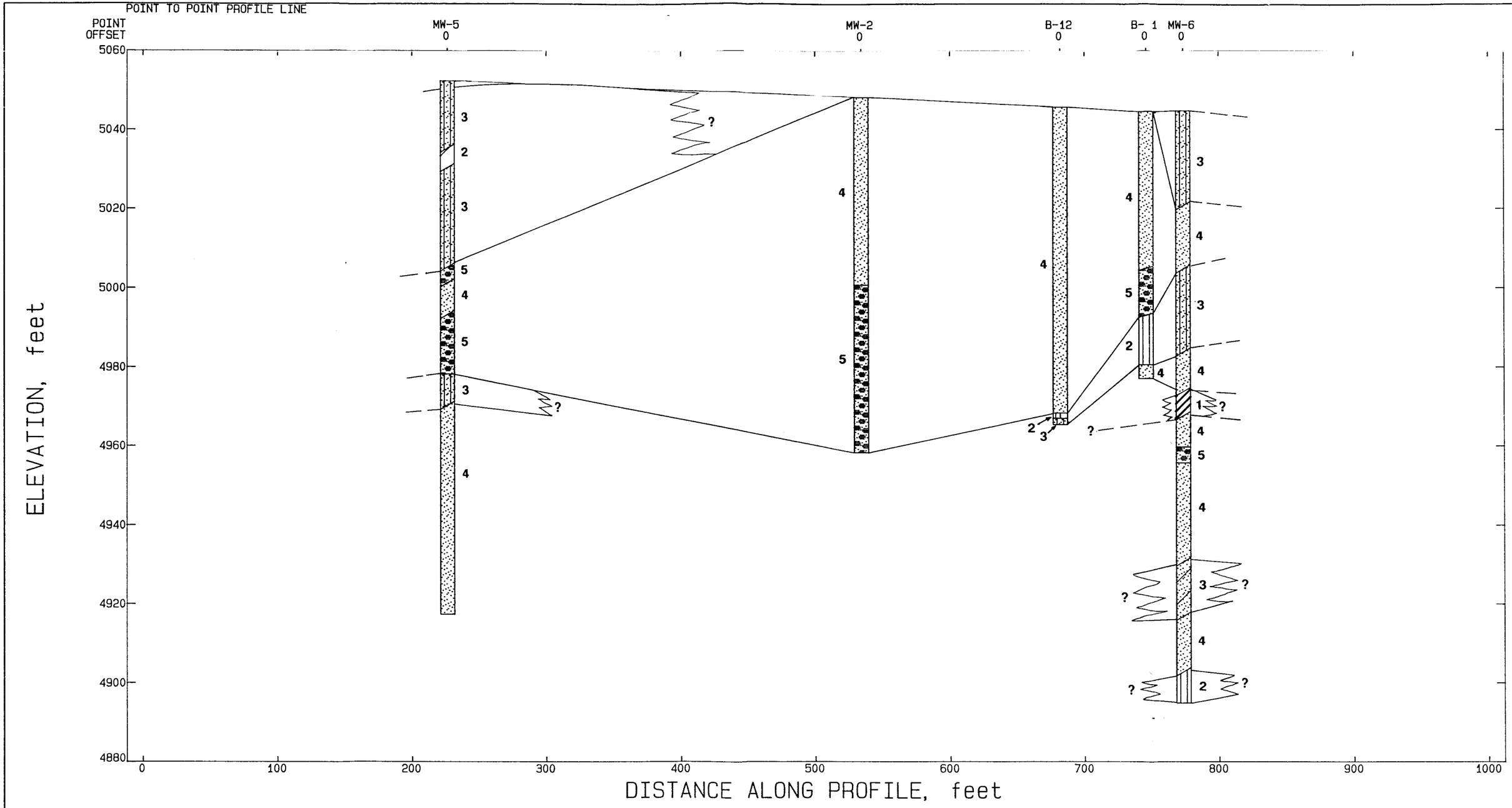
V CONCLUSION

Plate 2 is an interpretation of the area where the ZORLP does not exist beneath the site. This area is equal to 35,313 square feet (ft^2). The total area of the site is 603,250 ft^2. This indicates that approximately 94 percent of the site is underlain by the ZORLP.

JEM:nkm
315.S3

QUALITY CONTROL REVIEWER:

J. E. Mabrey, P.E.
Associate Engineer



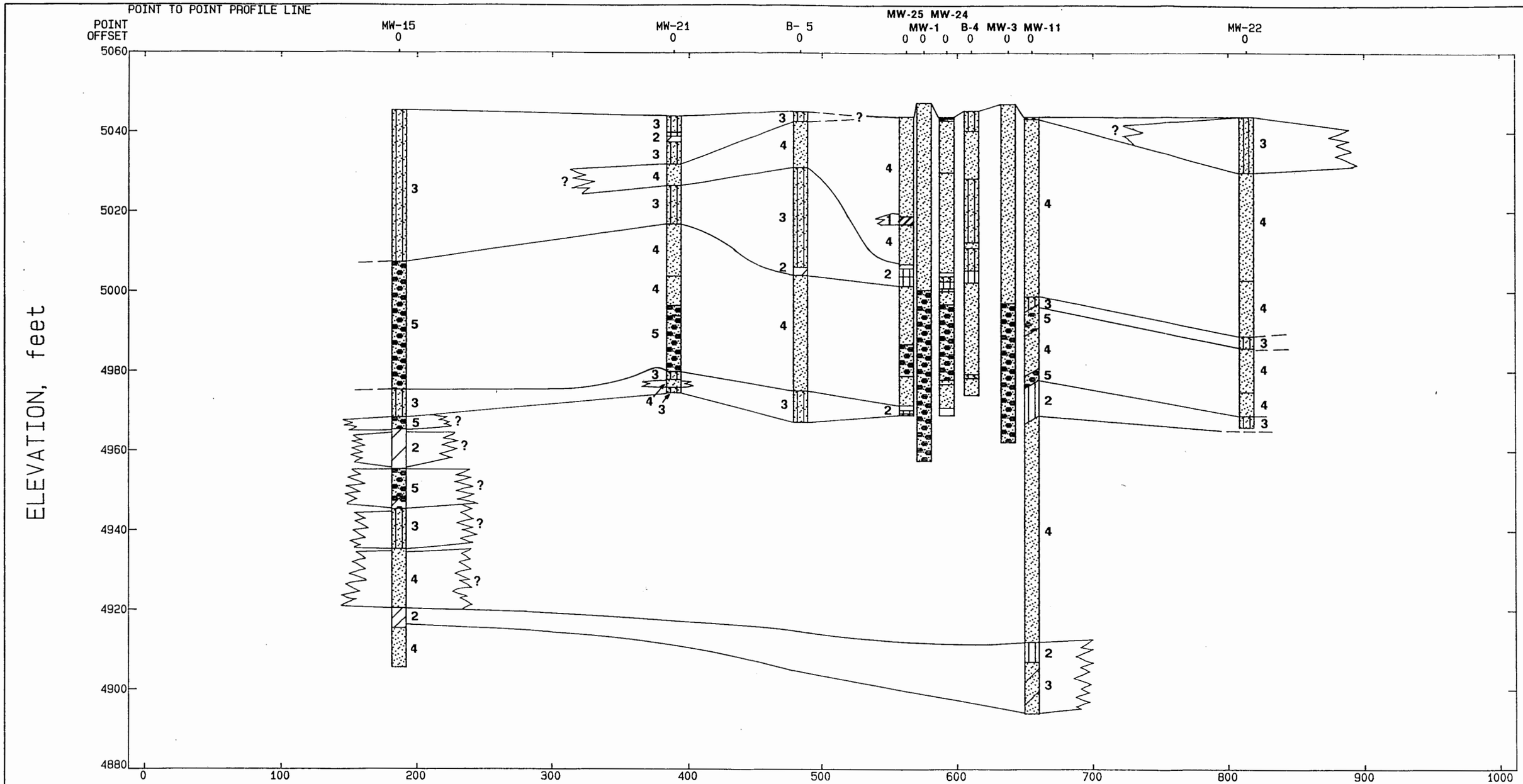
July 24, 1989

Sparton Technology Inc. - Albuquerque, New Mexico

SUBSURFACE PROFILE A-A'

HARDING LAWSON ASSOCIATES - Houston, Texas

PLATE 5



NOTES: 1) SEDIMENT GROUPS 1,2 AND 3 (ZORLP) AND HIGHER PERMEABILITY GROUPS 4 AND 5 HAVE BEEN COMBINED ON CROSS-SECTIONS FOR GREATER CLARITY AND INTERPRETATION.

2) FIGURE 2 ALSO HAS AN ENLARGED DETAIL FOR GREATER CLARITY AND INTERPRETATION.

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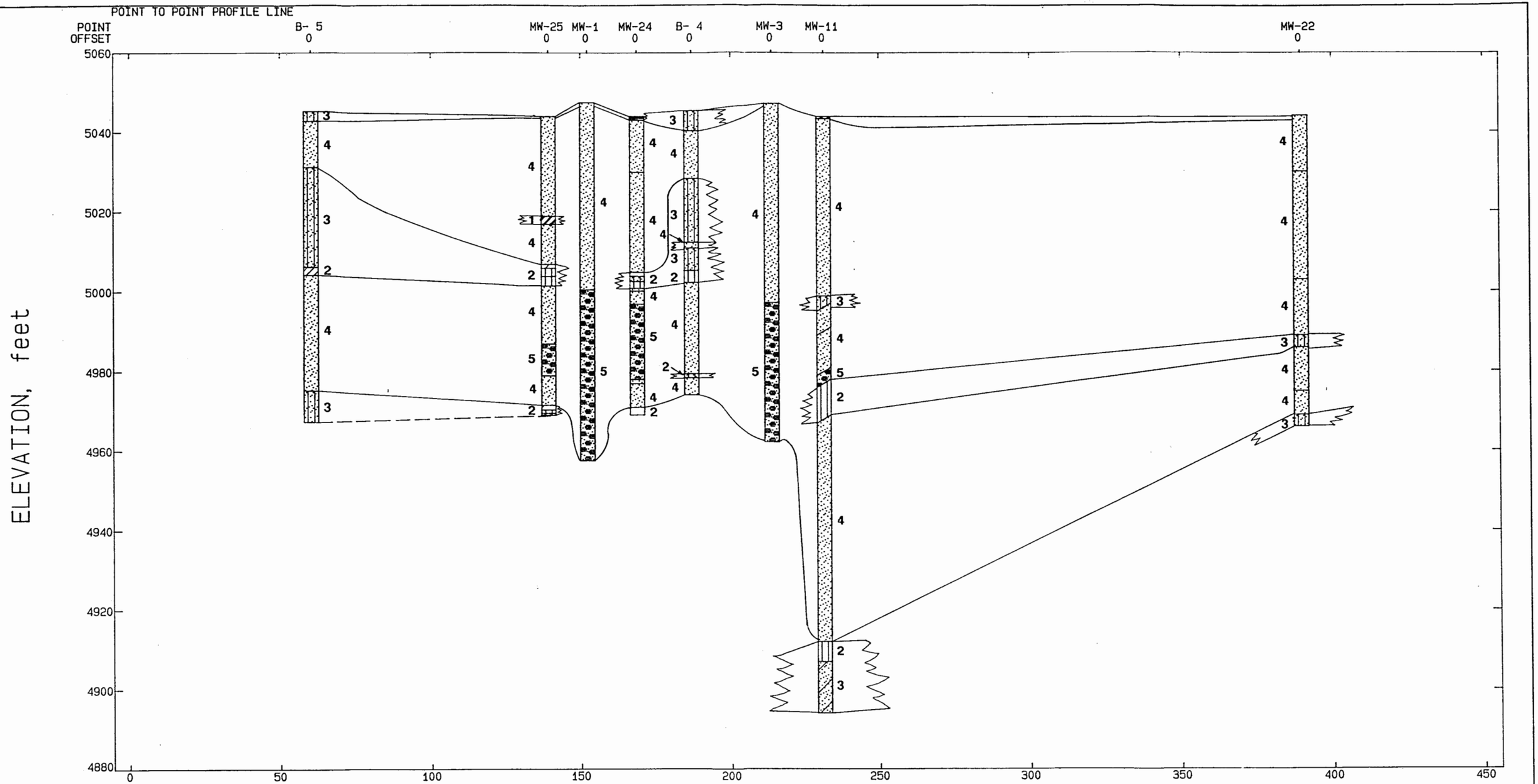
SUBSURFACE PROFILE B-B'

HARDING LAWSON ASSOCIATES - Houston, Texas

PLATE 6



NOTES: 1) SEDIMENT GROUPS 1,2 AND 3 (ZORLP) AND HIGHER PERMEABILITY GROUPS 4 AND 5 HAVE BEEN COMBINED ON CROSS-SECTIONS FOR GREATER CLARITY AND INTERPRETATION.

July 24, 1989

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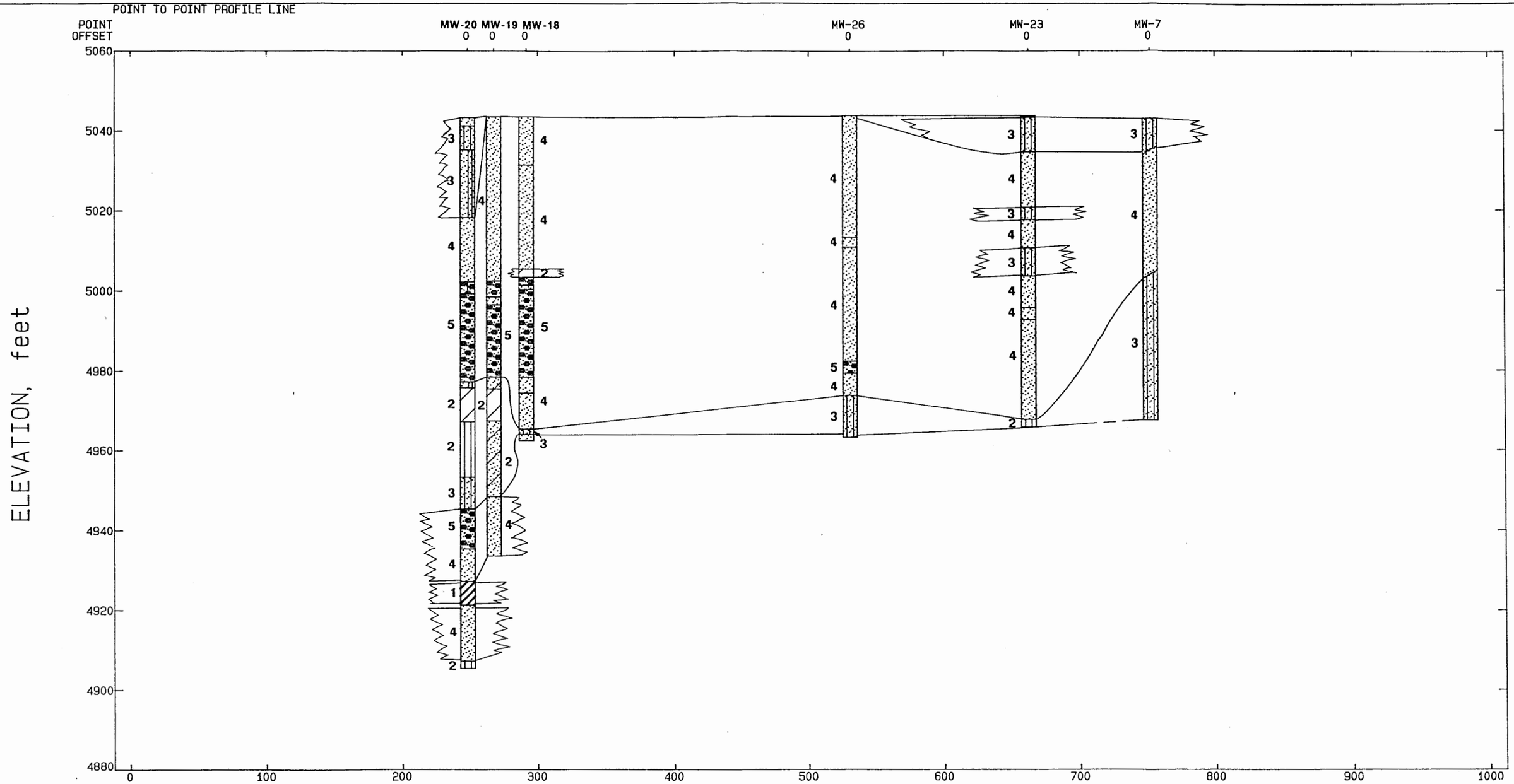
SUBSURFACE PROFILE B-B' (EXPLODED VIEW)

PLATE 6A

HARDING LAWSON ASSOCIATES - Houston, Texas



NOTES: 1) SEDIMENT GROUPS 1,2 AND 3 (ZORLP) AND HIGHER PERMEABILITY GROUPS 4 AND 5 HAVE BEEN COMBINED ON CROSS-SECTIONS FOR GREATER CLARITY AND INTERPRETATION.

July 24, 1989

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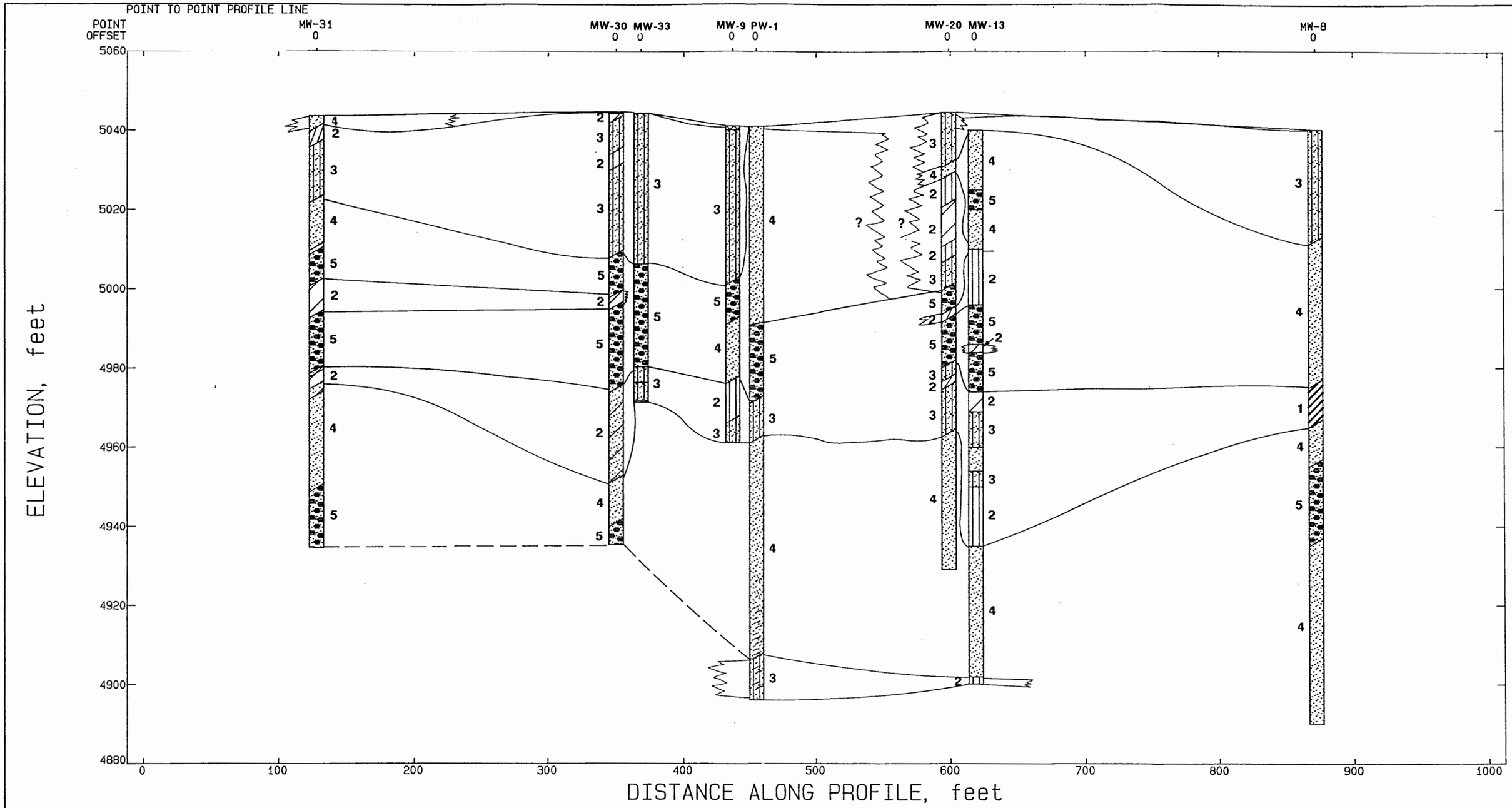
SUBSURFACE PROFILE C-C'

HARDING LAWSON ASSOCIATES - Houston, Texas

PLATE 7



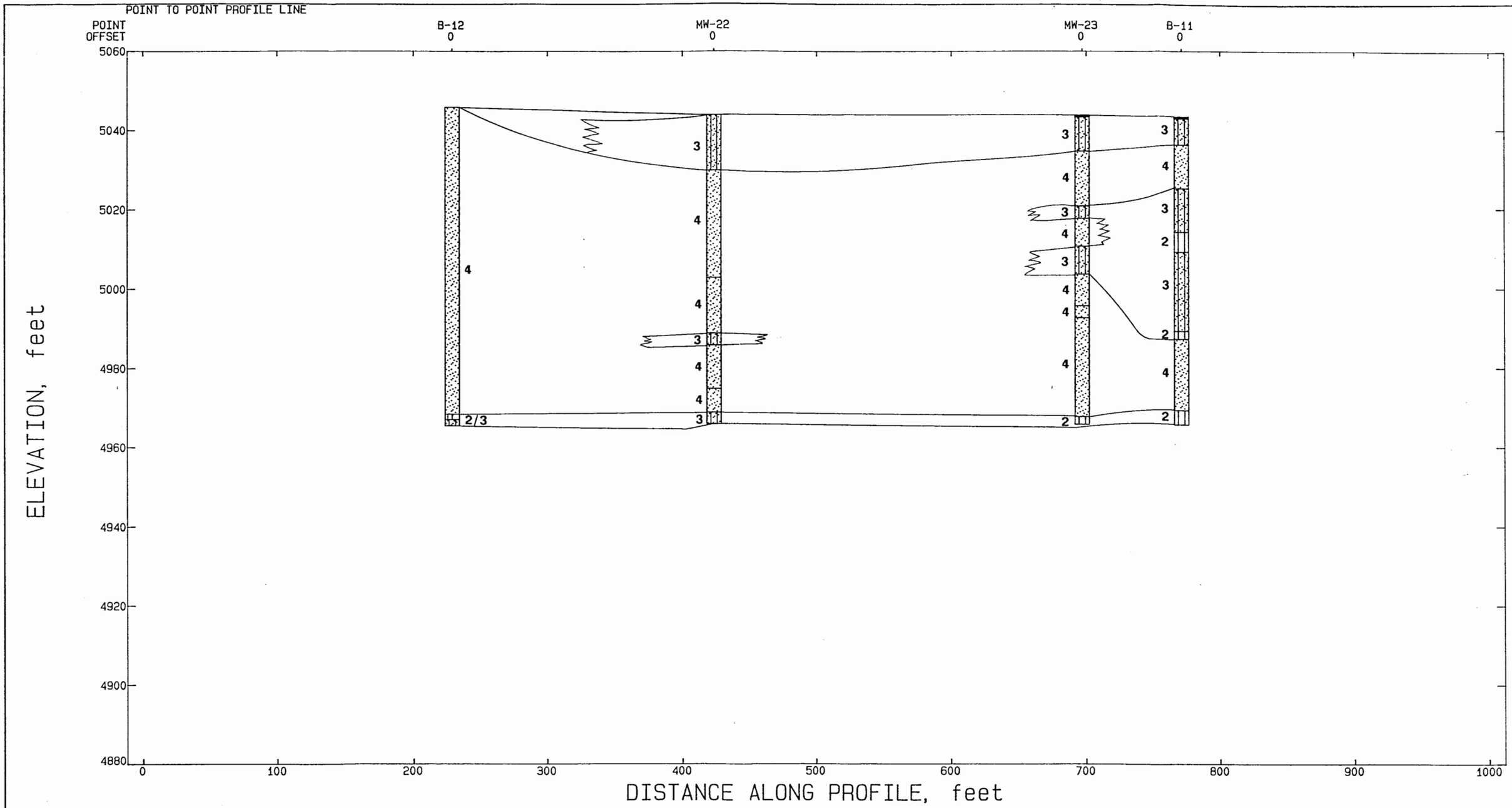
July 24, 1989

Sparton Technology Inc. - Albuquerque, New Mexico

SUBSURFACE PROFILE D-D'

PLATE **8**

HARDING LAWSON ASSOCIATES - Houston, Texas



July 24, 1989

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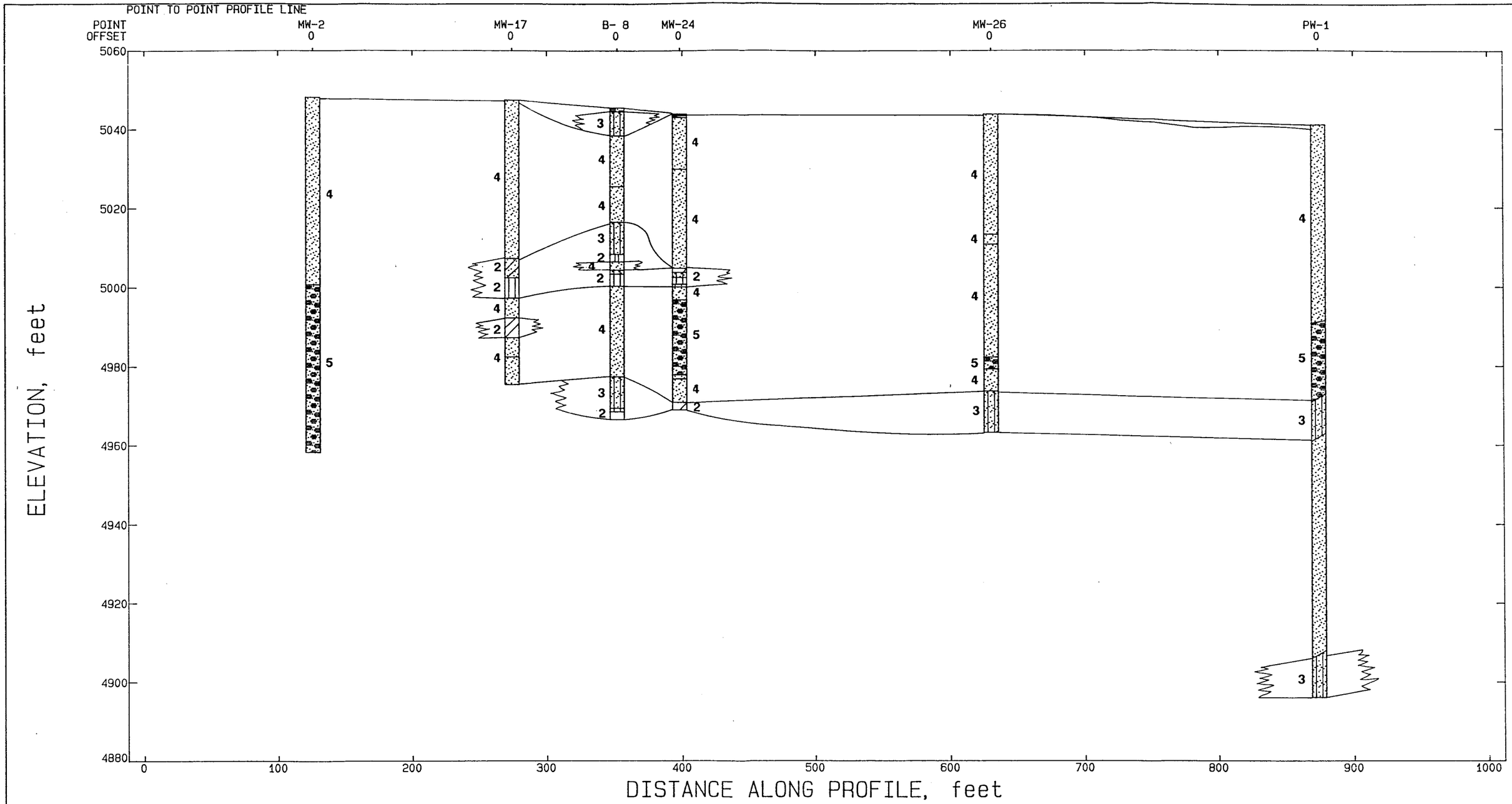
SUBSURFACE PROFILE E-E'

HARDING LAWSON ASSOCIATES - Houston, Texas

PLATE 9



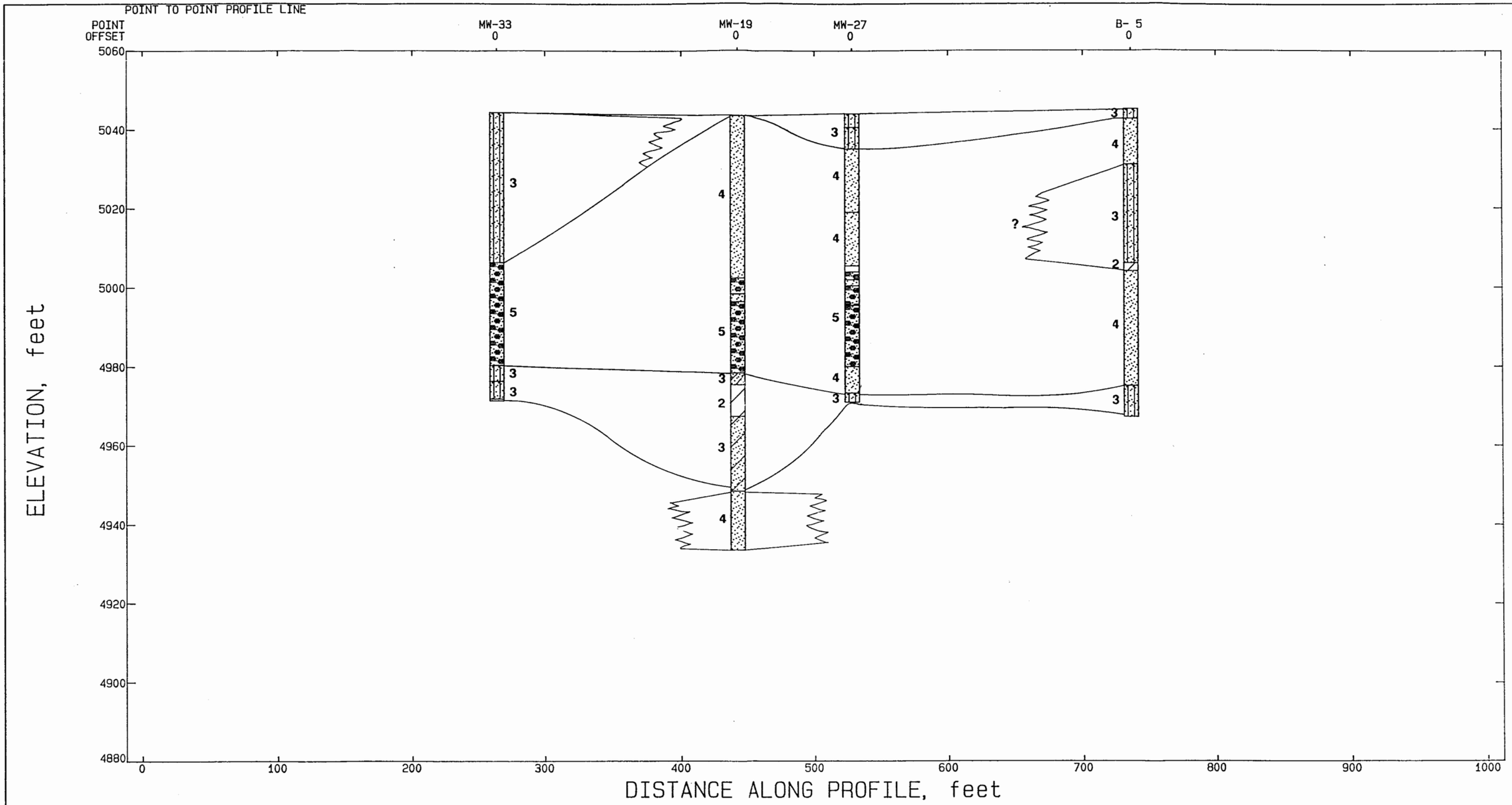
July 24, 1989

Sparton Technology Inc. - Albuquerque, New Mexico

SUBSURFACE PROFILE F-F'

HARDING LAWSON ASSOCIATES - Houston, Texas

PLATE **10**



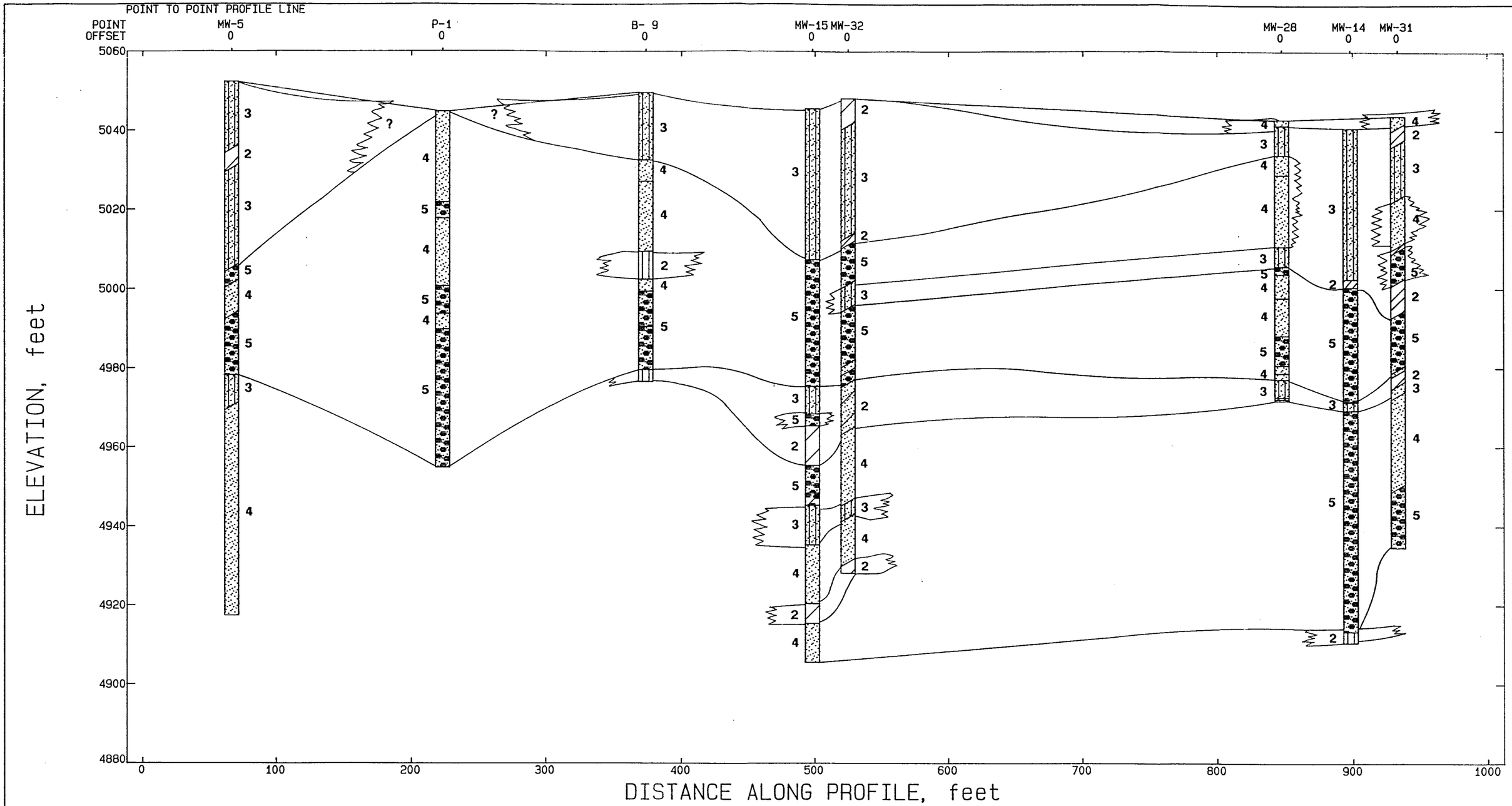
July 24, 1989

Sparton Technology Inc. - Albuquerque, New Mexico

SUBSURFACE PROFILE G-G'

PLATE 11

HARDING LAWSON ASSOCIATES - Houston, Texas



July 24, 1989

Sparton Technology Inc. - Albuquerque, New Mexico

SUBSURFACE PROFILE H-H'

HARDING LAWSON ASSOCIATES - Houston, Texas

PLATE **12**

Harding Lawson Associates

Engineering and Environmental Services

RCRA FACILITY INVESTIGATION

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
ALBUQUERQUE, NEW MEXICO

DECEMBER 1990 VOLUME II

DATE 1/24/90

SPARTON TECHNOLOGIES
MONITOR WELL
BI-WEEKLY WATER LEVEL DATA

MONITOR WELL	MEASURING POINT ELEVATION	TOTAL DEPTH ELEVATION	AIR LINE CALIBRATION ELEVATION	AIR LINE OR SOUNDER READING	WATER LEVEL ELEVATION
MW-7	5044.80	-	4970.48	102.0	4978.98
MW-9	5044.13	4965.84	4974.60	15.0	4975.85
MW-12	5041.81	-	4968.40	85.0	4975.48
MW-13	5043.35	4971.69	4972.18	51.0	4976.43
MW-14	5041.94	4970.04	4970.32	43.0	4973.90
MW-15	5047.51	4974.40	4974.60	25.0	4976.68
MW-16	5047.53	4975.53	4977.50	33.0	4980.25
MW-17	5049.30	-	4978.41	21.0	4980.16
MW-19	5046.27	4934.85	4968.90	74.0	4975.07
MW-20	5045.81	4906.61	4968.50	75.0	4974.75
MW-21	5048.41	4977.61	4978.00	25.0	4980.08
MW-22	5048.08	4972.28	4975.80	45.0	4979.55
MW-29	5044.57	4926.72	4970.36	67.0	4975.94
MW-30	5044.70	4932.44	4969.10	71.0	4975.02
MW-31	5043.57	4932.74	4967.95	76.0	4974.28
MW-32	5048.08	4925.21	4968.71	69.0	4974.46
MW-33	5044.36	4969.11	4972.56	31.0	4975.14
MW-34	5034.52	4968.07	-	58.68	4975.84
MW-35	5042.50	4969.39	-	68.46	4974.04
MW-36	5059.30	4967.00	-	86.29	4973.01
MW-37	5091.66	4966.65	-	119.56	4972.10
MW-38	5044.35	4905.06	4969.24	80.0	4975.91
MW-39	5044.07	4908.74	4969.05	70.0	4974.88
MW-40	5043.46	4914.18	4968.47	69.0	4974.22
MW-41	5046.79	4942.11	4968.49	70.0	4974.32
MW-42	5057.28	4939.29	4970.50	47.0	4974.42
MW-43	5057.69	4917.85	4970.67	42.0	4974.17
MW-44	5060.68	4944.97	-	85.63	4975.05
MW-45	5092.35	4941.30	-	118.04	4974.31
MW-46	5118.95	-	-	147.6	4971.35
MW-47	5155.84	-	-	184.6	4971.20
MW-48	5168.33	-	-	197.7	4970.67
MW-49	5043.68	-	-	70.1	4973.58

REVISED MW-42 AND 43 AIRLINE CALIBRATION ELEVATION 7/3/90

ATE 2/21/90

SPARTON TECHNOLOGIES
MONITOR WELL
BI-WEEKLY WATER LEVEL DATA

MONITOR WELL	MEASURING POINT ELEVATION	TOTAL DEPTH ELEVATION	AIR LINE CALIBRATION ELEVATION	AIR LINE OR SOUNDER READING	WATER LEVEL ELEVATION
MW-7	5044.80	4969.68	4970.48	100.0	4978.81
MW-9	5044.13	4965.84	4974.60	11.0	4975.52
MW-12	5041.81	4966.63	4968.40	83.0	4975.32
MW-13	5043.35	4971.69	4972.18	50.0	4976.35
MW-14	5041.94	4970.04	4970.32	40.0	4973.65
MW-15	5047.51	4974.40	4974.60	21.0	4976.35
MW-16	5047.53	4975.53	4977.50	29.0	4979.92
MW-17	5049.30	4977.25	4978.41	20.0	4980.08
MW-19	5046.27	4934.85	4968.90	70.0	4974.73
MW-20	5045.81	4906.61	4968.50	74.0	4974.67
MW-21	5048.41	4977.61	4978.00	24.0	4980.00
MW-22	5048.08	4972.28	4975.80	40.0	4979.13
MW-29	5044.57	4926.72	4970.36	64.5	4975.74
MW-30	5044.70	4932.44	4969.10	70.0	4974.93
MW-31	5043.57	4932.74	4967.95	75.0	4974.20
MW-32	5048.08	4925.21	4968.71	66.0	4974.21
MW-33	5044.36	4969.11	4972.56	30.0	4975.06
MW-34	5034.52	4968.07	-	59.00	4975.52
MW-35	5042.50	4969.39	-	68.62	4973.88
MW-36	5059.30	4967.00	-	86.36	4972.94
MW-37	5091.66	4966.65	-	119.67	4971.99
MW-38	5044.35	4905.06	4969.24	77.0	4975.66
MW-39	5044.07	4908.74	4969.05	69.0	4974.80
MW-40	5043.46	4914.18	4968.47	69.0	4974.22
MW-41	5046.79	4942.11	4968.49	67.0	4974.07
MW-42	5057.28	4939.29	4970.50	45.0	4974.25
MW-43	5057.69	4917.85	4970.67	40.0	4974.01
MW-44	5060.68	4944.97	-	85.71	4974.97
MW-45	5092.35	4941.30	-	118.05	4974.30
MW-46	5118.95	4939.36	-	145.20	4973.75*
MW-47	5155.84	4961.43	-	184.10	4971.74
MW-48	5168.33	4961.99	-	197.54	4970.79
MW-49	5043.68	4893.26	-	70.14	4973.54

REVISED MW-42 AND 43 AIRLINE CALIBRATION ELEVATION 7/3/90

* data misentry; should read 4971.35

TE 3/21/90

SPARTON TECHNOLOGIES
MONITOR WELL
BI-WEEKLY WATER LEVEL DATA

MONITOR WELL	MEASURING POINT ELEVATION	TOTAL DEPTH ELEVATION	AIR LINE CALIBRATION ELEVATION	AIR LINE OR SOUNDER READING	WATER LEVEL ELEVATION
MW-7	5044.80	4969.68	4970.48	100.0	4978.81
MW-9	5044.13	4965.84	4974.60	10.0	4975.43
MW-12	5041.81	4966.63	4968.40	80.0	4975.07
MW-13	5043.35	4971.69	4972.18	49.0	4976.26
MW-14	5041.94	4970.04	4970.32	40.0	4973.65
MW-15	5047.51	4974.40	4974.60	16.0	4975.93
MW-16	5047.53	4975.53	4977.50	29.0	4979.92
MW-17	5049.30	4977.25	4978.41	20.0	4980.08
MW-19	5046.27	4934.85	4968.90	70.0	4974.73
MW-20	5045.81	4906.61	4968.50	74.0	4974.67
MW-21	5048.41	4977.61	4978.00	21.0	4979.75
MW-22	5048.08	4972.28	4975.80	40.0	4979.13
MW-29	5044.57	4926.72	4970.36	65.0	4975.78
MW-30	5044.70	4932.44	4969.10	70.0	4974.93
MW-31	5043.57	4932.74	4967.95	75.0	4974.20
MW-32	5048.08	4925.21	4968.71	65.0	4974.13
MW-33	5044.36	4969.11	4972.56	30.0	4975.06
MW-34	5034.52	4968.07	-	58.85	4975.67
MW-35	5042.50	4969.39	-	68.53	4973.97
MW-36	5059.30	4967.00	-	86.23	4973.07
MW-37	5091.66	4966.65	-	119.53	4972.13
MW-38	5044.35	4905.06	4969.24	77.0	4975.66
MW-39	5044.07	4908.74	4969.05	70.0	4974.88
MW-40	5043.46	4914.18	4968.47	66.0	4973.97
MW-41	5046.79	4942.11	4968.49	66.0	4973.99
MW-42	5057.28	4939.29	4970.50	45.0	4974.25
MW-43	5057.69	4917.85	4970.67	40.0	4974.01
MW-44	5060.68	4944.97	-	85.60	4975.08
MW-45	5092.35	4941.30	-	117.85	4974.50
MW-46	5118.95	4939.36	-	147.30	4971.65
MW-47	5155.84	4961.43	-	184.52	4971.32
MW-48	5168.33	4961.99	-	197.38	4970.95
MW-49	5043.68	4893.26	-	70.00	4973.68

REVISED MW-42 AND 43 AIRLINE CALIBRATION ELEVATION 7/3/90

E 4/18/90

SPARTON TECHNOLOGIES
MONITOR WELL
BI-WEEKLY WATER LEVEL DATA

MONITOR WELL	MEASURING POINT ELEVATION	TOTAL DEPTH ELEVATION	AIR LINE CALIBRATION ELEVATION	AIR LINE OR SOUNDER READING	WATER LEVEL ELEVATION
MW-7	5044.80	4969.68	4970.48	108.0	4979.48
MW-9	5044.13	4965.84	4974.60	20.0	4976.27
MW-12	5041.81	4966.63	4968.40	89.0	4975.82
MW-13	5043.35	4971.69	4972.18	59.0	4977.10
MW-14	5041.94	4970.04	4970.32	45.0	4974.07
MW-15	5047.51	4974.40	4974.60	20.0	4976.27
MW-16	5047.53	4975.53	4977.50	30.0	4980.00
MW-17	5049.30	4977.25	4978.41	21.0	4980.16
MW-19	5046.27	4934.85	4968.90	75.0	4975.15
MW-20	5045.81	4906.61	4968.50	80.0	4975.17
MW-21	5048.41	4977.61	4978.00	22.0	4979.83
MW-22	5048.08	4972.28	4975.80	45.0	4979.55
MW-29	5044.57	4926.72	4970.36	73.0	4976.44
MW-30	5044.70	4932.44	4969.10	75.0	4975.35
MW-31	5043.57	4932.74	4967.95	80.0	4974.62
MW-32	5048.08	4925.21	4968.71	70.0	4974.54
MW-33	5044.36	4969.11	4972.56	35.0	4975.48
MW-34	5034.52	4968.07	-	58.25	4976.27
MW-35	5042.50	4969.39	-	68.75	4973.75
MW-36	5059.30	4967.00	-	86.75	4972.55
MW-37	5091.66	4966.65	-	119.38	4972.28
MW-38	5044.35	4905.06	4969.24	85.0	4976.32
MW-39	5044.07	4908.74	4969.05	75.0	4975.30
MW-40	5043.46	4914.18	4968.47	71.0	4974.39
MW-41	5046.79	4942.11	4968.49	71.0	4974.41
MW-42	5057.28	4939.29	4970.50	50.0	4974.67
MW-43	5057.69	4917.85	4970.67	45.0	4974.42
MW-44	5060.68	4944.97	-	85.40	4975.28
MW-45	5092.35	4941.30	-	117.85	4974.50
MW-46	5118.95	4939.36	-	147.40	4971.55
MW-47	5155.84	4961.43	-	184.60	4971.24
MW-48	5168.33	4961.99	-	197.60	4970.73
MW-49	5043.68	4893.26	-	69.60	4974.08
MW-50	5211.51		-		
MW-51	5058.74		-		
PZ-1	5142.22		-		

REVISED MW-42 AND 43 AIRLINE CALIBRATION ELEVATION 7/3/90

TE 5/16/90

SPARTON TECHNOLOGIES
MONITOR WELL
BI-WEEKLY WATER LEVEL DATA

MONITOR WELL	MEASURING POINT ELEVATION	TOTAL DEPTH ELEVATION	AIR LINE CALIBRATION ELEVATION	AIR LINE OR SOUNDER READING	WATER LEVEL ELEVATION
MW-7	5044.80	4969.68	4970.48	110.0	4979.65
MW-9	5044.13	4965.84	4974.60	20.0	4976.27
MW-12	5041.81	4966.63	4968.40	90.0	4975.90
MW-13	5043.35	4971.69	4972.18	60.0	4977.18
MW-14	5041.94	4970.04	4970.32	46.0	4974.15
MW-15	5047.51	4974.40	4974.60	21.0	4976.35
MW-16	5047.53	4975.53	4977.50	30.0	4980.00
MW-17	5049.30	4977.25	4978.41	22.0	4980.24
MW-19	5046.27	4934.85	4968.90	75.0	4975.15
MW-20	5045.81	4906.61	4968.50	79.0	4975.08
MW-21	5048.41	4977.61	4978.00	25.0	4980.08
MW-22	5048.08	4972.28	4975.80	46.0	4979.63
MW-29	5044.57	4926.72	4970.36	70.0	4976.19
MW-30	5044.70	4932.44	4969.10	75.0	4975.35
MW-31	5043.57	4932.74	4967.95	80.0	4974.62
MW-32	5048.08	4925.21	4968.71	72.0	4974.71
MW-33	5044.36	4969.11	4972.56	35.0	4975.48
MW-34	5034.52	4968.07	-	58.50	4976.02
MW-35	5042.50	4969.39	-	67.98	4974.52
MW-36	5059.30	4967.00	-	85.98	4973.32
MW-37	5091.66	4966.65	-	119.31	4972.35
MW-38	5044.35	4905.06	4969.24	85.0	4976.32
MW-39	5044.07	4908.74	4969.05	75.0	4975.30
MW-40	5043.46	4914.18	4968.47	71.0	4974.39
MW-41	5046.79	4942.11	4968.49	70.0	4974.32
MW-42	5057.28	4939.29	4970.50	49.0	4974.58
MW-43	5057.69	4917.85	4970.67	42.0	4974.17
MW-44	5060.68	4944.97	-	85.28	4975.40
MW-45	5092.35	4941.30	-	117.80	4974.55
MW-46	5118.95	4939.36	-	147.40	4971.55
MW-47	5155.84	4961.43	-	184.60	4971.24
MW-48	5168.33	4961.99	-	197.60	4970.73
MW-49	5043.68	4893.26	-	69.65	4974.03
MW-50	5211.51		-	244.82	4966.69
MW-51	5058.74		-	77.76	4980.98
PZ-1	5142.22		-	178.45	4963.77

REVISED MW-42 AND 43 AIRLINE CALIBRATION ELEVATION 7/3/90

\TE 6/13/90

SPARTON TECHNOLOGIES
MONITOR WELL
BI-WEEKLY WATER LEVEL DATA

MONITOR WELL	MEASURING POINT ELEVATION	TOTAL DEPTH ELEVATION	AIR LINE CALIBRATION ELEVATION	AIR LINE OR SOUNDER READING	WATER LEVEL ELEVATION
MW-7	5044.80	4969.68	4970.48	113.0	4979.90
MW-9	5044.13	4965.84	4974.60	25.0	4976.68
MW-12	5041.81	4966.63	4968.40	94.0	4976.23
MW-13	5043.35	4971.69	4972.18	64.0	4977.51
MW-14	5041.94	4970.04	4970.32	49.0	4974.40
MW-15	5047.51	4974.40	4974.60	24.0	4976.60
MW-16	5047.53	4975.53	4977.50	35.0	4980.42
MW-17	5049.30	4977.25	4978.41	25.0	4980.49
MW-19	5046.27	4934.85	4968.90	80.0	4975.57
MW-20	5045.81	4906.61	4968.50	83.0	4975.42
MW-21	5048.41	4977.61	4978.00	25.0	4980.08
MW-22	5048.08	4972.28	4975.80	50.0	4979.97
MW-29	5044.57	4926.72	4970.36	80.0	4977.03
MW-30	5044.70	4932.44	4969.10	80.0	4975.77
MW-31	5043.57	4932.74	4967.95	84.0	4974.95
MW-32	5048.08	4925.21	4968.71	75.0	4974.96
MW-33	5044.36	4969.11	4972.56	40.0	4975.89
MW-34	5034.52	4968.07	-	57.54	4976.98
MW-35	5042.50	4969.39	-	67.81	4974.69
MW-36	5059.30	4967.00	-	85.91	4973.39
MW-37	5091.66	4966.65	-	119.37	4972.29
MW-38	5044.35	4905.06	4969.24	90.0	4976.74
MW-39	5044.07	4908.74	4969.05	80.0	4975.72
MW-40	5043.46	4914.18	4968.47	75.0	4974.72
MW-41	5046.79	4942.11	4968.49	75.0	4974.74
MW-42	5057.28	4939.29	4970.50	50.0	4974.67
MW-43	5057.69	4917.85	4970.67	45.0	4974.42
MW-44	5060.68	4944.97	-	85.25	4975.43
MW-45	5092.35	4941.30	-	117.77	4974.58
MW-46	5118.95	4939.36	-	147.41	4971.54
MW-47	5155.84	4961.43	-	184.60	4971.24
MW-48	5168.33	4961.99	-	197.64	4970.69
MW-49	5043.68	4893.26	-	69.37	4974.31
MW-50	5211.51		-	244.70	4966.81
MW-51	5058.74		-	77.76	4980.98
MW-52	5165.84			196.90	4968.94
PZ-1	5142.22		-	178.67	4963.55

REVISED MW-42 AND 43 AIRLINE CALIBRATION ELEVATION 7/3/90

ATE 6/27/90

SPARTON TECHNOLOGIES
MONITOR WELL
BI-WEEKLY WATER LEVEL DATA

MONITOR WELL	MEASURING POINT ELEVATION	TOTAL DEPTH ELEVATION	AIR LINE CALIBRATION ELEVATION	AIR LINE OR SOUNDER READING	WATER LEVEL ELEVATION
MW-7	5044.80	4969.68	4970.48	115.0	4980.06
MW-9	5044.13	4965.84	4974.60	25.0	4976.68
MW-12	5041.81	4966.63	4968.40	95.0	4976.32
MW-13	5043.35	4971.69	4972.18	65.0	4977.60
MW-14	5041.94	4970.04	4970.32	50.0	4974.49
MW-15	5047.51	4974.40	4974.60	25.0	4976.68
MW-16	5047.53	4975.53	4977.50	35.0	4980.42
MW-17	5049.30	4977.25	4978.41	25.0	4980.49
MW-19	5046.27	4934.85	4968.90	80.0	4975.57
MW-20	5045.81	4906.61	4968.50	85.0	4975.58
MW-21	5048.41	4977.61	4978.00	25.0	4980.08
MW-22	5048.08	4972.28	4975.80	52.0	4980.13
MW-29	5044.57	4926.72	4970.36	79.0	4976.94
MW-30	5044.70	4932.44	4969.10	80.0	4975.77
MW-31	5043.57	4932.74	4967.95	85.0	4975.03
MW-32	5048.08	4925.21	4968.71	75.0	4974.96
MW-33	5044.36	4969.11	4972.56	40.0	4975.89
MW-34	5034.52	4968.07	-	57.32	4977.20
MW-35	5042.50	4969.39	-	67.64	4974.86
MW-36	5059.30	4967.00	-	85.80	4973.50
MW-37	5091.66	4966.65	-	119.31	4972.35
MW-38	5044.35	4905.06	4969.24	90.0	4976.74
MW-39	5044.07	4908.74	4969.05	80.0	4975.72
MW-40	5043.46	4914.18	4968.47	76.0	4974.80
MW-41	5046.79	4942.11	4968.49	75.0	4974.74
MW-42	5057.28	4939.29	4970.50	50.0	4974.67
MW-43	5057.69	4917.85	4970.67	45.0	4974.42
MW-44	5060.68	4944.97	-	85.13	4975.55
MW-45	5092.35	4941.30	-	117.74	4974.61
MW-46	5118.95	4939.36	-	147.42	4971.53
MW-47	5155.84	4961.43	-	184.57	4971.27
MW-48	5168.33	4961.99	-	197.60	4970.73
MW-49	5043.68	4893.26	-	69.36	4974.32
MW-50	5211.51		-	244.76	4966.75
MW-51	5058.74		-	77.73	4981.01
MW-52	5165.84		-	196.95	4968.89
MW-53	5164.27		-	194.08	4970.19
PZ-1	5142.22		-	178.89	4963.33

REVISED MW-42 AND 43 AIRLINE CALIBRATION ELEVATION 7/3/90

A Report Prepared for

Sparton Technology, Inc.
4901 Rockaway Boulevard, S.E.
Rio Rancho, New Mexico 87124

SOIL INVESTIGATION OF THE UNSATURATED AND UPPER SATURATED ZONES SPARTON TECHNOLOGY, INC. COORS ROAD PLANT ALBUQUERQUE, NEW MEXICO

HLA Job No. 6310,023.12

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A-18 Particle Size Analysis

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A. Field Investigation
1. Geologic Logs
2. Construction of MW-18
3. Particle Size Analysis

B. Chemical Laboratory Investigation
1. Sample Identification
2. Analytical Results

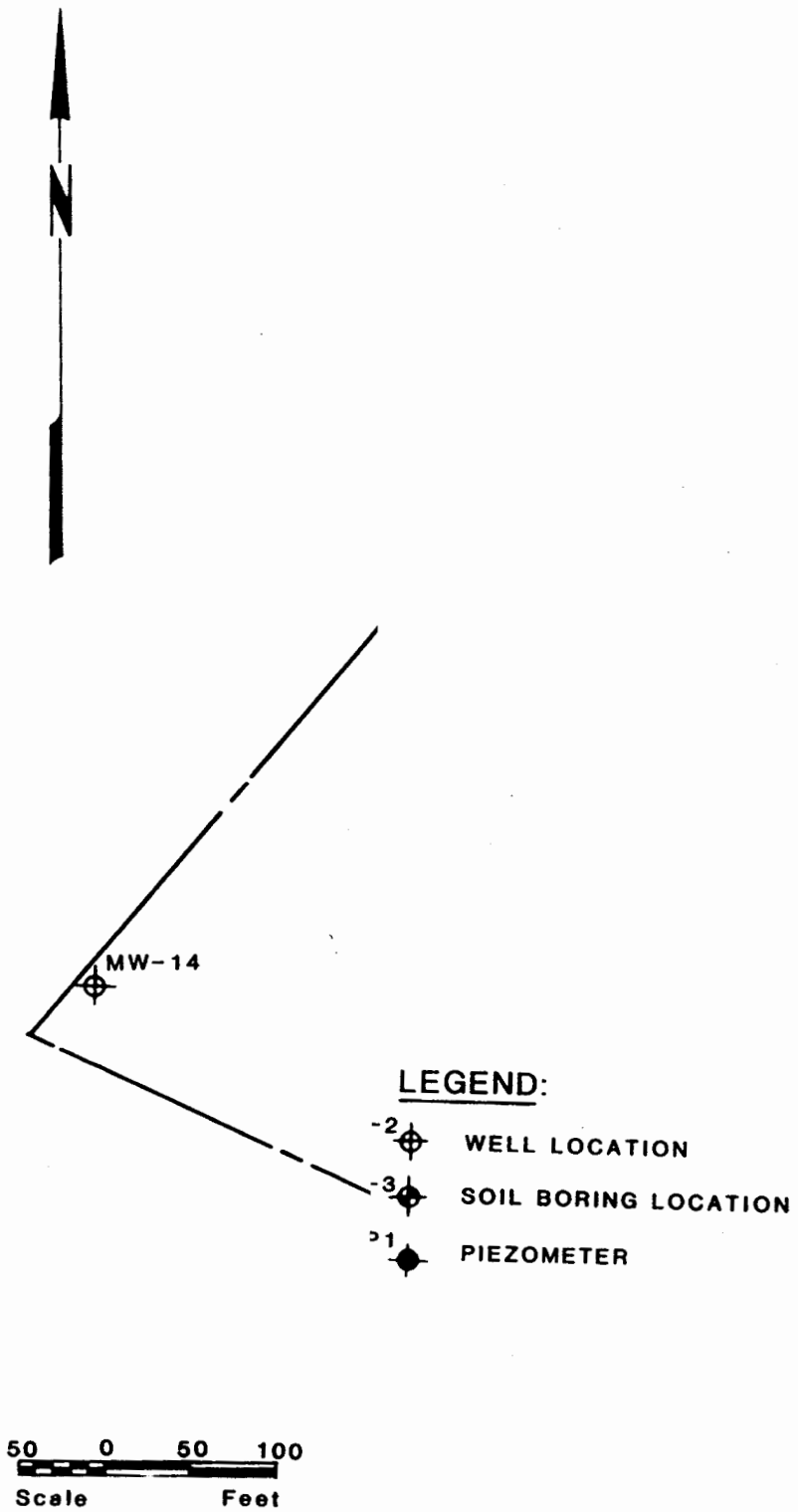
I INTRODUCTION

Sparton Technology, Inc. (Sparton) operates an electronics manufacturing facility at 9621 Coors Road, N.W., in Albuquerque, New Mexico. Past waste management practices in an area northeast of the plant may have resulted in contamination of groundwater beneath the site. Waste solvents were stored in a concrete block sump prior to 1980. Aqueous plating wastes were stored in two lined surface impoundments which are now inactive. The ponds and the sump have likely leaked in the past. The extent and rate of contaminants migration in the vadose zone and in the underlying aquifer are the subject of a series of ongoing investigations, of which this investigation is one.

This investigation was undertaken at the direction of Sparton in order to determine the extent of contamination in soils of the vadose zone underlying the presumed source in the pond and sump area described above. Interpretation of geologic and chemical data collected during this investigation has led to the estimation of contaminant migration pathways through the vadose zone and the upper saturated zone.

Seven borings were performed in the pond and sump area, and four additional borings were performed at other locations to establish background levels of contaminant parameters and to further define the geology of the vadose zone and the unsaturated zone. Although the primary purpose of each of the borings was to evaluate soils of the unsaturated zone, each boring was extended in order to encounter the aquitard known to exist from five to ten feet below the water table throughout most of the site.

Additional geologic information was obtained from the boring performed during the installation of MW-18 in May 1986. Information about the aquitard obtained from the soil borings and from MW-18 is evaluated in this report with respect to potential contaminant migration pathways within the upper flow zone of the aquifer which underlies the site. The location of the borings and MW-18 are shown in Plate 1.



REFERENCE: SPARTON TECH. INC.

)RING LOCATION PLAN

ırton Technology, Inc.

ɔuquerque, New Mexico

PLATE

1

OVED	DATE	REVISED	DATE

II FIELD INVESTIGATION

A. Field Procedures

1. Drilling and Soil Sample Collection

During September 1985, HLA conducted a vadose zone investigation for the Hazardous Waste Facility Closure Plan. Twelve borings were drilled to evaluate hydrogeologic conditions in the vadose zone. Eight borings (B001 through B008) were drilled at locations approved by the State of New Mexico (see Plates 1 and 2). An additional four borings (B009 through B012) were drilled to define more completely geologic conditions and contaminant plume boundaries. All underground utilities were located prior to drilling, and borings were located at least eight feet from building walls for safe operation of the rig.

A Central Mining Equipment (CME) 55 hollow stem auger drilling rig was used for the investigation. Soil samples were collected with a 60-inch continuous sampler (3-inch O.D., 2.75-inch I.D.) that extended below the drill bit and was driven downward by turning the auger. A few samples were collected with a 2-inch O.D. by 1.4-inch I.D. split spoon sampler 18 inches in length.

Samples were collected in duplicate at 5-foot intervals for chemical analysis from approximately five feet below grade to the water table. Samples for chemical testing were generally selected

MW-17

EXISTING DIRT ROAD

WATER METER

B-7

OLD GAS METER LOCATION

CARPENTER'S SHOP

B-6

6" WATER LINE

B-8

WEST POND

EAST POND

B-2

2" PVC DISCHARGE LINE

CLOSED SUMP

MW-3

MW-11

MW-16

MW-1

WALKWAY

CONCRETE ENCLOSURE

PAVED PARKING AREA

B-5

CUT-OFF SAW

HVAC TO BE (RELOCATED)

B-4

MANUFACTURING BUILDING

B-3

LEGEND:

- PVC Discharge Line
- Gas Line
- Water Line
- Chain Link Fencing (To be relocated in the area of the Ponds and Sump)
- Water Valve
- Monitor Well with 2-foot concrete pad
- B-8 Soil Boring

10 5 0 10 20

Scale feet

Harding Lawson Associates
Engineers, Geologists & Geophysicists

BORING LOCATION DETAIL IN THE POND AND SUMP AREA

SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

PLATE 2

Drawn	Job Number	Approved	Date
JD	8310,023.12		6/25/86

from six to 12 inches above the bottom of the recovered sample. Gravels and cobbles from the sample were discarded prior to packing in laboratory-cleaned sample jars. Care was taken to avoid air pockets within the sample jar. The jars were sealed with teflon lined caps after carefully removing any soil particles from the jar rim. The jars were then labelled with date, time, boring number, sample depth, and name of sample collector. The samples were then packaged inside a cooler containing ice packs. The coolers were sealed with evidence tape. The samples and chain-of-custody forms were then sent to the analytical laboratory by an overnight delivery service.

The boreholes were augered below the water table to the top of the aquitard at the base of the water table aquifer. Samples below the water table were visually inspected and logged. Where flowing sand conditions were encountered below the water table, tap water was poured into the augers to create a positive internal pressure to prevent sand from blocking the hollow stem. The flowing sand conditions encountered in B001 were too serious to control with positive pressure in the augers; therefore, B012 was later drilled to locate the top of the aquitard.

All samples collected were checked for volatile organic vapors with a photo-ionization detector (PID) manufactured by HNU Systems, Inc. (Model 101, benzene referenced). Readings were taken by cutting open a small crack or by making a hole in a sample and placing the intake tube in the opening. Several readings were taken on each sample. An 11.7 ev probe was normally used with a 10.2-ev probe as a back-up. The PID readings are presented in the Logs of Borings, Plates A-1 through A-14 (see Appendix A).

2. Grouting

To assure a good seal in the boreholes, grouting at each borehole began when the last sample was removed. Polymerized bentonite was thoroughly mixed with tap water to the maximum thickness that could be pumped through the grout pump. The bentonite grout was pumped down the hollow augers until the augers were filled. The augers were retreated up to 25 feet and the process repeated until all augers were out of the borehole. Grout was then pumped into the open borehole until filled.

The bentonite grout in the boreholes was allowed to settle for 24 hours, then more bentonite grout was added, as necessary, to raise the level of the grout to within ten feet of the ground surface. Each boring was capped with a cement-sand grout thickened with bentonite.

Two abandoned borings in the vicinity of B001, the boring sampled to determine background levels of contaminants at the site, were backfilled with cuttings. The borings were 23 and 53 feet below grade when abandoned due to a lost sampler and sampler shoe, respectively. Neither boring penetrated the water table.

3. Decontamination Procedures

Sampling equipment and augers were cleaned with a portable high-pressure steam cleaner prior to any field work and between borings to prevent cross-contamination between the boreholes. A decontamination area was constructed by nailing multiple layers of 6-mil plastic sheets over a 2 x 6 wooden box, with a frame measuring 12 feet by 12 feet. Augers and samplers were set on sawhorses to facilitate cleaning. Upper layers of the plastic were removed if very soiled or torn during decontamination after each boring was completed.

Liquinox, a laboratory-grade anionic detergent, was added to the water in the steam cleaner for cleaning the continuous sampler and split spoons. The 60-inch continuous sampler was then rinsed with distilled water, rinsed with reagent grade methanol, and rinsed a final time with distilled water.

Prior to leaving the work site, the augers and samplers were steam cleaned so that no contamination was carried off the site.

4. Handling of Drill Cuttings

The samples and drill cuttings were checked with the PID meter for traces of contamination throughout the field investigation. The meter is calibrated to read tenths of a part per million (ppm) against a benzene reference. As long as no contamination was detected, the drill cuttings were discarded on the surface. All contaminated soils were loaded into a front-end loader and stored in the unused west pond, which is lined with a 30-mil, two-ply hypalon liner with a polyester scrim.

To minimize loss of cuttings on the ground surface, a four-foot by eight-foot sheet of plywood with a hole cut in the center was laid over the borehole with a double sheet of 3-mil plastic underneath. During augering, cuttings stacked up on the plywood and plastic for ease of disposal. Plastic was also placed beneath the bucket of the front-end loader and beneath the sawhorses where the sampler was opened for sample inspection and collection. Plastic used to control potentially contaminated soil was stored in the unused west pond.

The discarded materials in the west pond are protected against wind dispersal by a 6-mil plastic sheet. The plastic sheet is weighted to prevent wind from uncovering the materials in the pond.

5. Installation of MW-18

In May 1986, HLA constructed MW-18 in a boring near the southwest corner of the main building (see Plate 1). The boring was drilled to define more completely the geologic conditions and contaminant plume characteristics southwest of the main waste ponds.

The boring was drilled and sampled with the same equipment used to drill borings B001 through B012. Samples were checked with a PID in the same manner as the soil boring samples. Soil samples were collected for visual inspection (see Plates A-15 and A-16, Appendix A) and particle size analysis (see Plate A-18).

After placing 1 foot of bentonite pellets in the borehole at 81 feet, MW-18 was installed in the boring using 4-inch diameter schedule 40 flush-jointed casing and screen. Ten feet of 0.020-inch slot well screen was installed from 68 to 78 feet below grade (4975 to 4965 feet MSL). The well was finished with an 8-inch steel protective casing with a locking cap. The well construction details are shown on Plate A-17.

B. Geologic Conditions

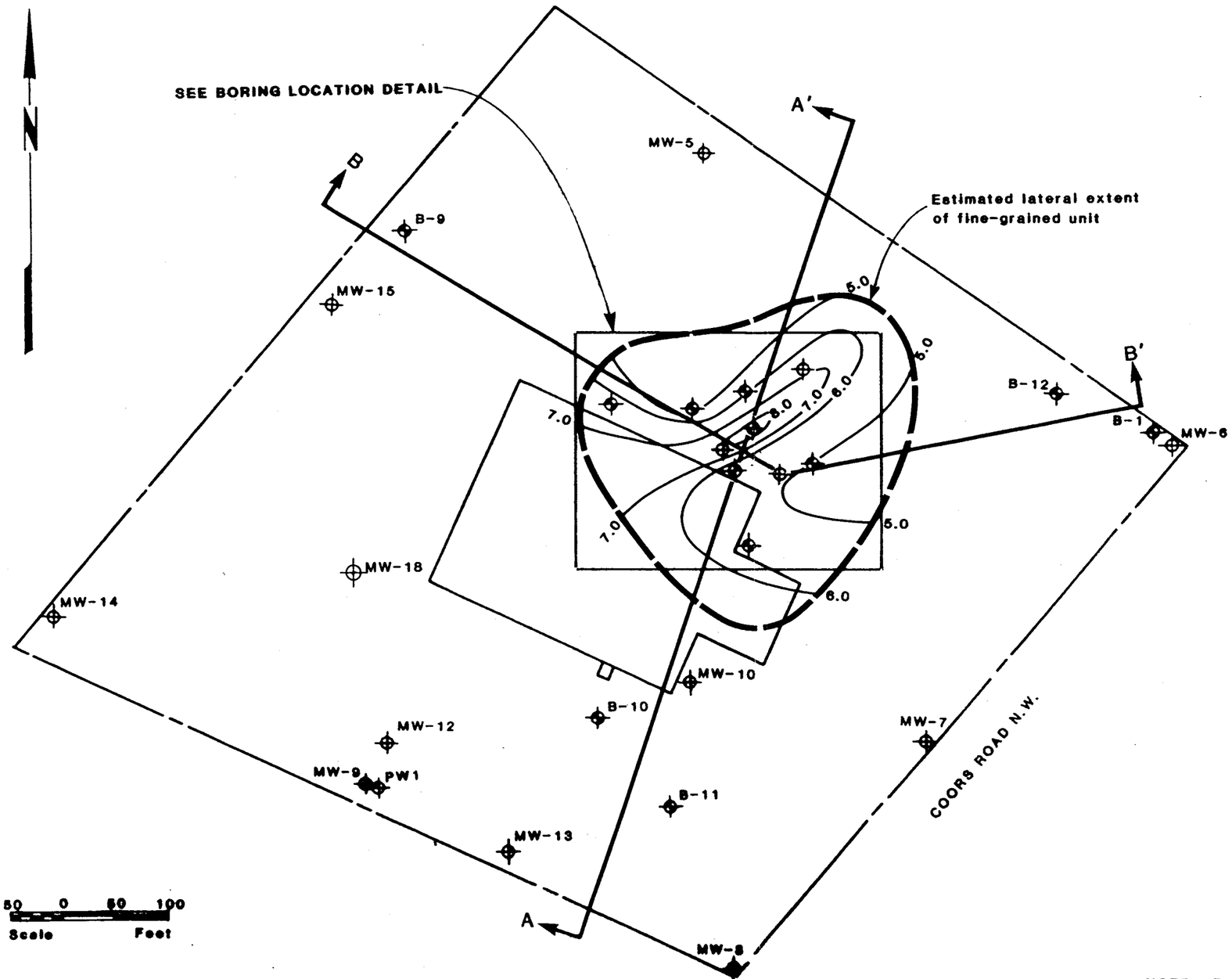
1. Pond and Sump Area

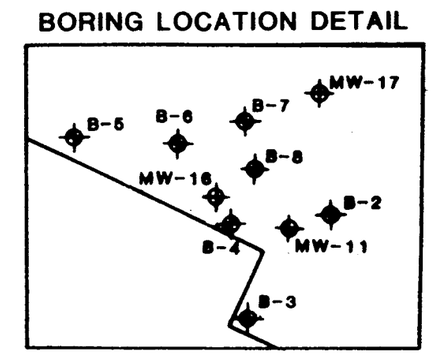
Seven borings (B002 through B008) were drilled in the pond and sump area, a presumed source of ground-water contamination at the site. Plate 2 shows the location of the borings relative to the inactive surface impoundments and the closed sump.

The geologic descriptions in the Logs of Borings (Plates A-1 through A-16) reveal that the vadose zone consists primarily of sand and gravel deposits with occasional fine-grained layers of silt and clay. Abundant gravel is rare in the upper 40 feet (5045 to 5005 feet MSL) of the borings except in B002, B003, and B007. These borings are characterized by gravelly sand and sandy gravel from 6 feet to a maximum of 27 feet below grade (5040 to 5020 feet MSL). Gravel is abundant in the vadose zone at depths greater than 45 to 50 feet below grade (below 5000 feet MSL).

Based on the geologic information from the seven borings plus the logs from MW-11, MW-16, and MW-17, three distinct zones of silt and clay deposits can be identified in the vadose zone underlying the pond and sump area. The uppermost silt and clay zone occurs between 23.5 and 26 feet below grade (approximately 5020 feet MSL) and likely consists of small lenses averaging 3 to 6 inches in thickness. Thickness of the middle zone ranges up to 6.5 feet, and covers a wide area. Plate 3 shows the contour of the upper surface and the approximate extent of this middle silt and clay deposit at approximately 5005 feet MSL. The lowermost silt and clay zone occurs approximately 50 feet below grade (4995 feet MSL). This zone was identified in B004, B007, B008, MW-11, and MW-17 and consists of isolated silt and clay lenses. This silt and clay deposit ranges from 0.5 to 1.5 feet in thickness beneath the pond and sump area. In MW-17, the lowermost silt and clay zone reaches a maximum thickness of 5 feet.

Upper Surface Elevation of Fine-grained Unit in Soil Samples	
Boring No.	Elevation (MSL)
B-2	5004.0
B-3	5005.5
B-4	5005.3
B-5	5006.3
B-6	5004.9
B-7	5005.8
B-8	5008.2
MW-11	5005.5
MW-16	5008.0
MW-17	5006.5





LEGEND:

- MW-2 — WELL LOCATION
- B-3 — SOIL BORING LOCATION
- GEOLOGIC SECTION LINE
- 5.0 — CONTOUR LINE OF EQUAL ELEVATION. INTERVAL IS 1.0 foot.

NOTE: Zero elevation datum is 5000' MSL.

REFERENCE: SPARTON TECH. INC. SURVEY BY DENNEY-GROSS & ASSOC., INC., DATED 10/5/84

HLA Harding Lawson Associates
Engineers, Geologists & Geophysicists

CONFIGURATION OF UPPER SURFACE OF THE FINE-GRAINED UNIT AT APPROXIMATELY 5005 FEET MSL
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE 3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
EB.	6310,023.12	TJB	1/25/84		

The aquitard between the water table aquifer and the lower aquifer was sampled in all of the borings in the pond and sump area. The aquitard consists of a light gray fine-grained silty sand and sandy silt with occasional thin silty clay deposits ranging from less than 0.25 to 3 inches in thickness. Faint horizontal bedding was noted in most of the aquitard samples. The top of the aquitard was normally encountered between 66 and 68 feet below grade (4980 to 4978 feet MSL). However, in Boring B003, approximately 25 feet of sand and gravel (probably a channel deposit) overlie the aquitard, which was encountered at 74 feet below grade (4972 feet MSL). The upper flow zone permeability is estimated to be approximately two orders of magnitude greater than the permeability in the aquitard (2×10^{-3} cm/sec versus 5×10^{-5} cm/sec).

In Boring B007, 13 feet of the aquitard were sampled below 4979 feet, but in Boring B004, only two feet of the aquitard were sampled below 4979 feet MSL before an underlying sand was encountered. Flowing sand conditions prevented further sampling in B004, but more of the aquitard material may be present if the underlying sand is merely an isolated lens.

2. Upgradient Borings

Two borings, B001 and B012, were drilled in the northeastern corner of the site. Boring B001 was used to collect uncontaminated samples for comparison with chemical analyses of samples from the pond and sump area. A total of four borings were drilled at the B001 location due to difficulties encountered during drilling. The boring log of B001 on Plate A-1 represents a composite of the geologic information gathered from the four borings. The sandy silt deposit with trace clay encountered at 52 feet below grade (approximately 4995 feet MSL) may be related to the lower silt and clay deposit beneath the pond and sump area. However, examination of the cuttings from Boring B012 indicate that sand and gravel deposits separate these two silt and clay deposits.

Flowing sand conditions prevented sampling of the aquitard at B001. Therefore, Boring B012 was drilled to investigate the aquitard below the water table. Sampling began just above the water table at 68 feet, and the top of the aquitard was encountered at 77.5 feet below grade (4968 feet MSL). The top 12 inches of the aquitard consist of interbedded clayey silt and silty clay. The rest of the aquitard sample consisted of silty fine sand with thin silty clay stringers below 4960 feet MSL.

3. Additional Borings

Three additional borings (B009 through B011) were drilled to further define the geology and contamination in the vadose zone. Boring B009 is located west of the pond and sump area near the property line. The silty clay and clayey silt deposit shown on Plate A-11 from 40 to 47 feet below grade (5009.5 to 5002.5 feet MSL) may be related to the extensive silt and clay deposit beneath the pond and sump area. However, the log of MW-5 indicates that sand and gravel deposits separate these two silt and clay deposits. The aquitard at B009 consists of a light gray clayey silt and was encountered at 69.3 feet below grade (4980 feet MSL).

Borings B010 and B011 were drilled in the parking lot south of the plant. Boring B010 consists primarily of sand and silty sand with a prominent clayey silt layer from 18 to 26 feet below grade (5025.5 to 5017.5 feet MSL). The aquitard below the water table aquifer was encountered at approximately 65.5 feet below grade (4978 feet MSL), and consists of a brown clayey silt underlain by a green gray silty clay. The log of B010 closely resembles that of MW-13. Boring B011, on the other hand, consists of sandy silt and silty sand to 55.5 feet below grade (4988 feet MSL). In Boring B011, the aquitard, encountered at 74 feet below grade (4969 feet MSL), consists of sandy clayey silt with gravel. The logs of MW-12 and Boring B003 show a

similar aquitard material at 74 feet (4972 feet MSL) that may also be present at the location of MW-4 and MW-10. No samples were recovered at that depth when MW-4 and MW-10 were installed.

4. MW-18

The boring at MW-18 (Plates A-15 and A-16) consists primarily of sand and sandy gravel deposits to 78 feet below grade (4965 feet MSL). From 38 to 40 feet below grade (5005 to 5003 feet MSL), the formation becomes very fine-grained with silty to sandy clay from 38.7 to 40 feet below grade. This unit is probably related to the extensive fine-grained deposit at approximately 5005 feet MSL below the pond and sump area. However, the unit is very thin at MW-18 and is therefore probably not continuous with the unit under the pond and sump area.

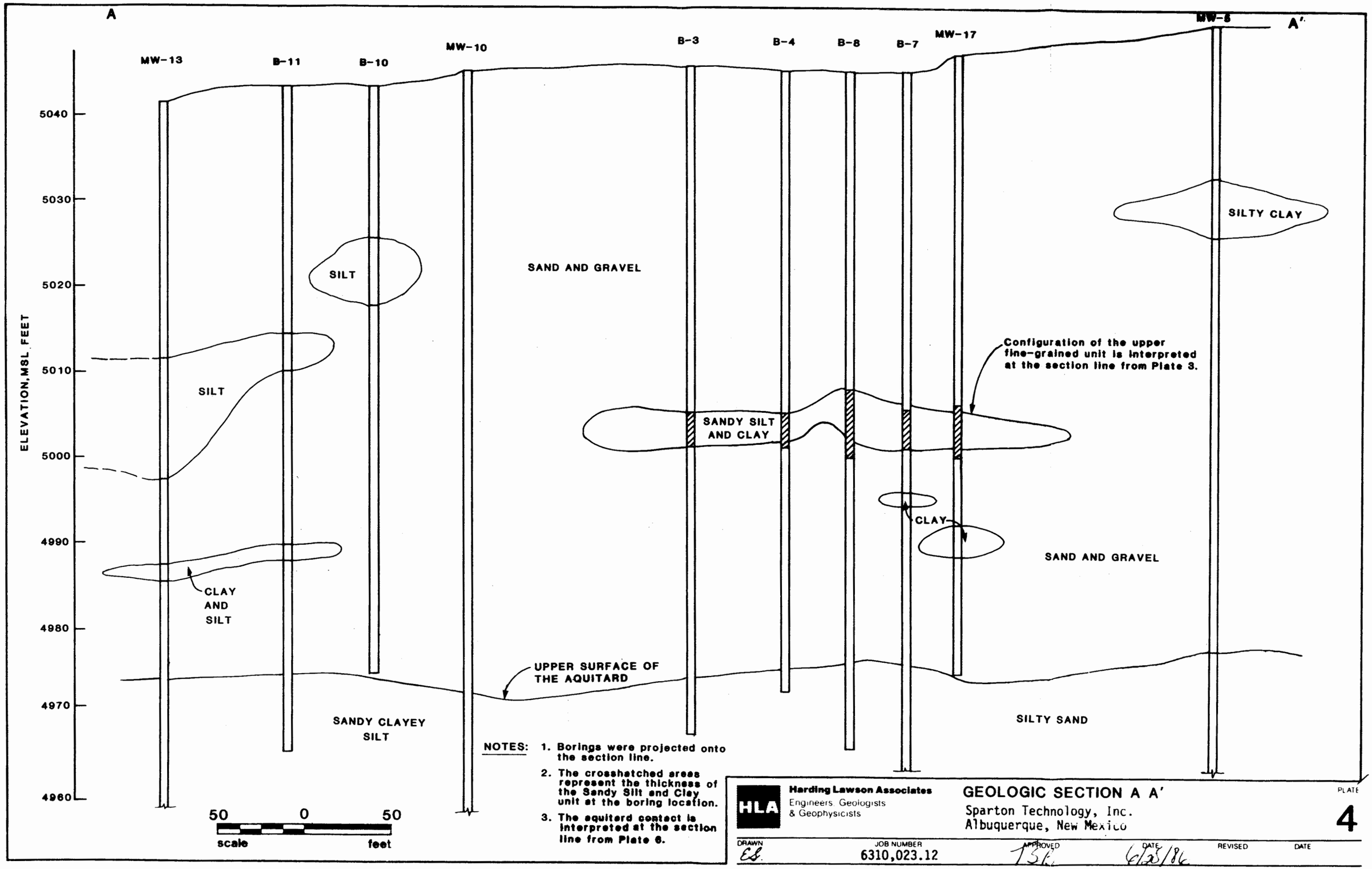
A very thin (0.3 feet thick) clayey silt layer was encountered at 69.2 feet below grade (4972.5 feet MSL), which is approximately the same level as the aquitard in MW-12 and MW-14. This layer was considered to be too thin to be significant, and the boring continued below 78 feet below grade (4967 feet MSL) where a gray silty sand was encountered. This silty sand is not the same aquitard as the one beneath the pond and sump area.

5. Summary of Geologic Conditions in the Vadose Zone

The subsurface conditions in the vadose zone and the upper aquifer are illustrated in geologic sections shown on Plates 4 and 5. The vadose zone and upper aquifer consist of unconsolidated sands and gravels with occasional fine-grained layers of silt and clay. The stratigraphy of these deposits is characteristic of the valley-fill alluvium and colluvium of the unconsolidated aquifer in the Rio Grande Valley. The rounded to subrounded gravels and associated sands were deposited by a meandering stream in and near the channel. The fine grained sediments were deposited on the floodplain to either side of the channel.

The continuous fine grained layer in the vadose zone at an elevation of approximately 5,005 feet and the aquitard below the vadose zone were deposited during periods of good floodplain development. The gravel and sand deposits immediately above the aquitard, and above and around the 5,005-foot fine-grained layer were deposited by channels that migrated across the site after deposition of these fine grained units.

Plate 3 shows the estimated configuration of the upper surface of the extensive fine-grained layer at 5005 feet in the vadose zone. The highest elevation along the upper surface of the 5005-foot fine-grained layer is beneath the pond and sump area along a line from



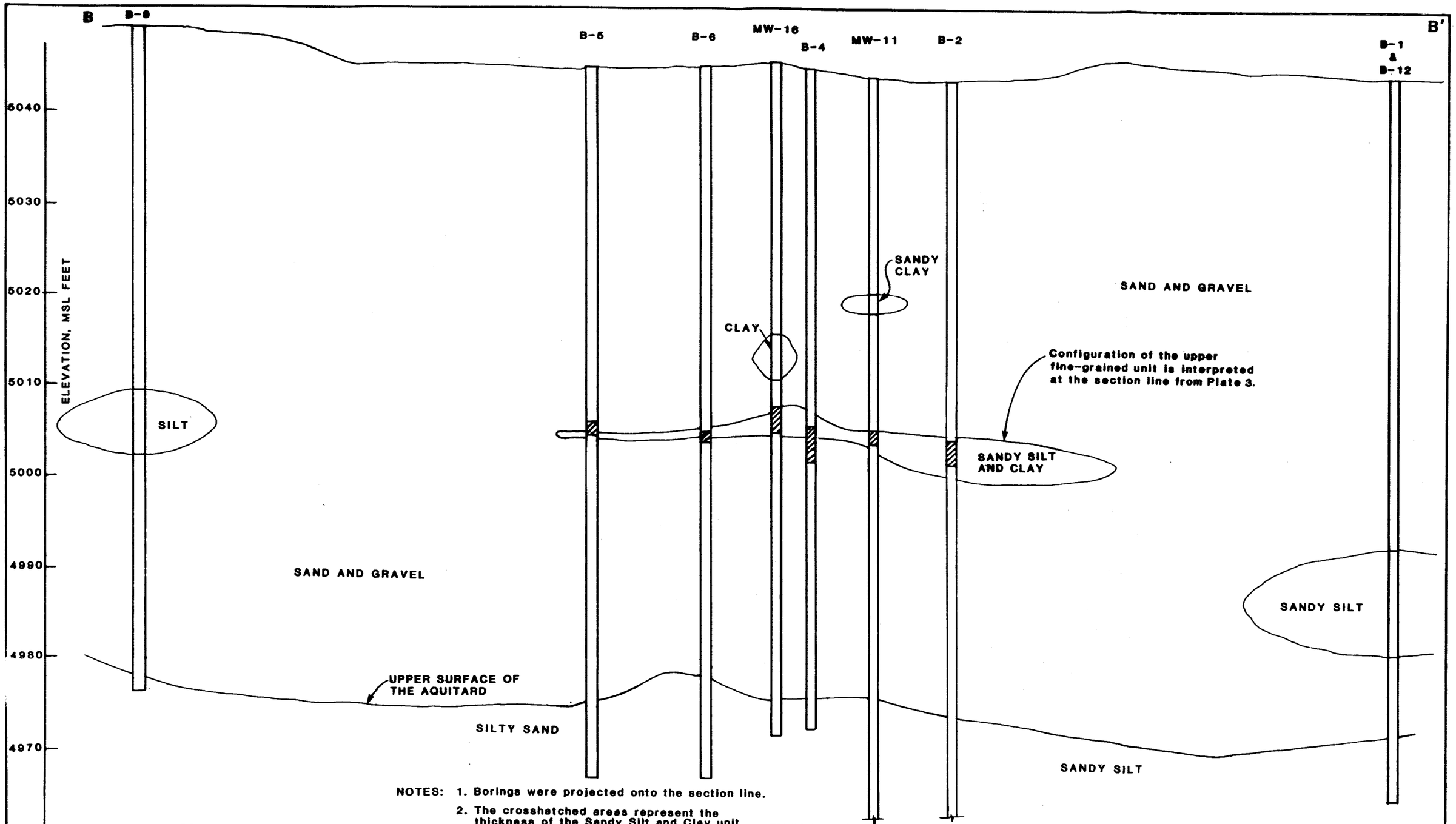
NOTES:
1. Borings were projected onto the section line.
2. The crosshatched areas represent the thickness of the Sandy Silt and Clay unit at the boring location.
3. The aquitard contact is interpreted at the section line from Plate 6.

HLA Harding Lawson Associates
Engineers, Geologists & Geophysicists

GEOLOGIC SECTION A A'
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE 4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ES	6310,023.12	TSK	6/23/86		



NOTES:
1. Borings were projected onto the section line.
2. The crosshatched areas represent the thickness of the Sandy Silt and Clay unit at the boring location.
3. The aquitard contact is interpreted at the section line from Plate 6.

Harding Lawson Associates
Engineers, Geologists & Geophysicists

GEOLOGIC SECTION B-B'
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE 5

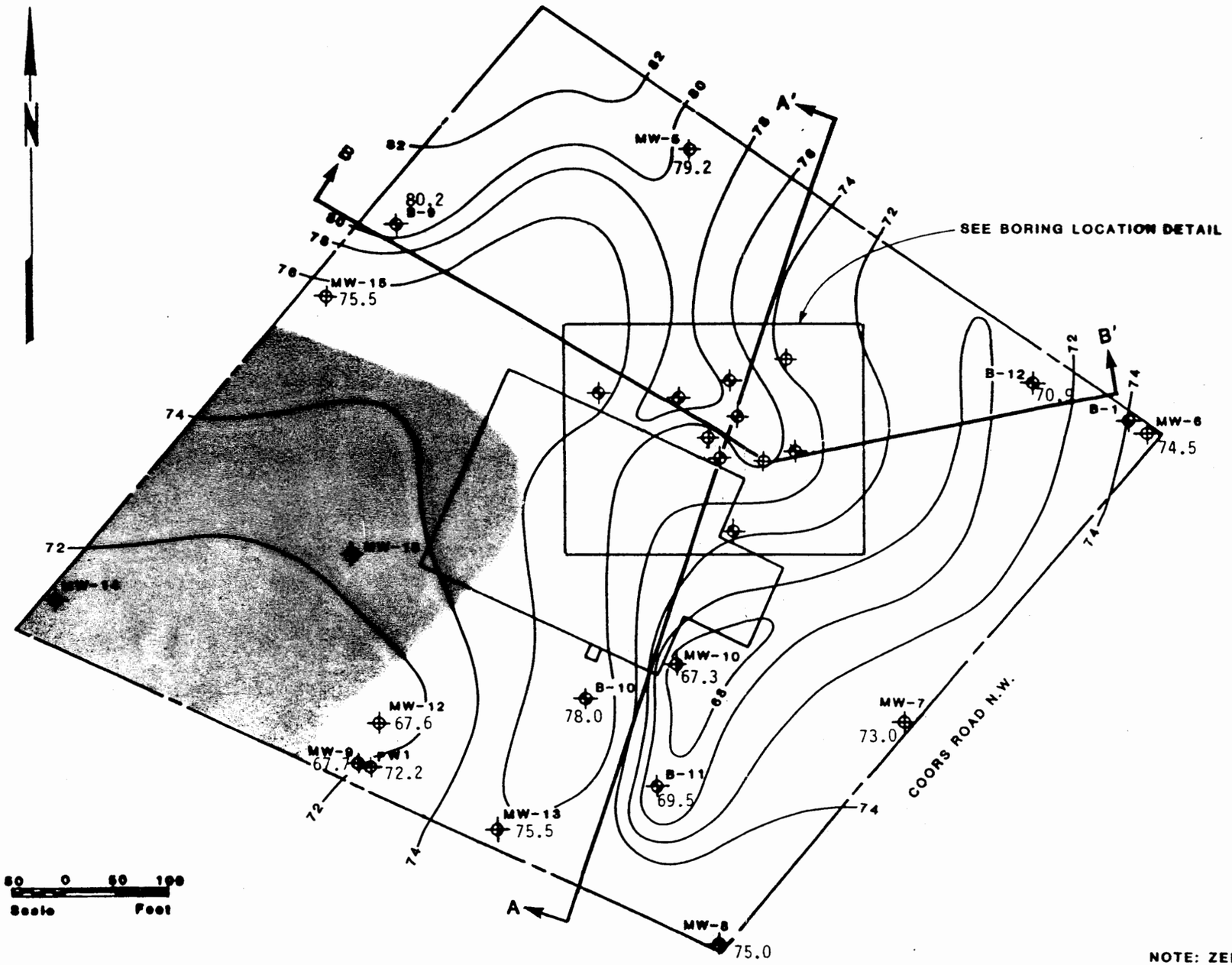
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ES.	6310,023.12	LB	4/1/86		

MW-16 toward B008 and MW-17. Depressions in the upper surface extend away from the high toward the east and northwest. A depression might also extend toward the south below the building where no subsurface data are available (see III.B.4.a.). The thinning near the margins of the fine-grained unit at 5005 feet was very probably produced by the erosional action of stream channels.

6. Summary of Geologic Conditions in the Upper Flow Zone

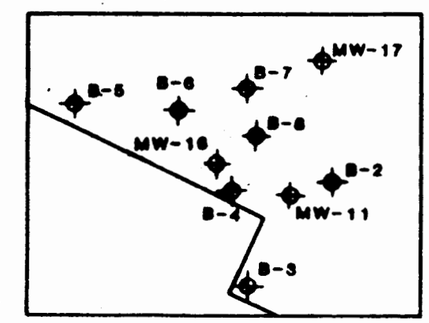
Plate 6 shows that the upper surface of the aquitard is highest in the northern corner of the plant property. Two distinct depressions in the upper surface are separated by a relatively higher "ridge" that is nearly north-south along a line from MW-13 to B006 to MW-5. The depression east of this ridge is lowest near MW-10 and B012. The upper surface gently slopes downward to the west and southwest of the "ridge" toward MW-12 and MW-14. These depressions indicate the presence of ancient downcutting channels that extended along these depressions in the upper surface.

The log of the boring at MW-18 indicates that the aquitard is only a few inches thick. Therefore, the ability of the aquitard to significantly deter downward migration of contaminants is strongly compromised in this area of the plant site. Stream channels may have completely penetrated the aquitard under the plant property in the southwestern corner of the site.



Aquitard Upper Surface Elevation in Detail	
Boring No.	Elevation (MSL)
B-2	4974.5
B-3	4972.0
B-4	<4973.9
B-5	4975.5
B-6	4979.6
B-7	4977.8
B-8	4977.4
MW-11	4976.4
MW-16	<4973.0
MW-17	4973.0

BORING LOCATION DETAIL



LEGEND:

MW-2 WELL LOCATION

B-3 SOIL BORING LOCATION

GEOLOGIC SECTION LINE

70 CONTOUR LINE OF EQUAL ELEVATION INTERVAL IS 2 FEET.

SHADED AREA REPRESENTS ZONE WHERE AQUITARD MAY BE THIN OR ABSENT.

NOTE: ZERO ELEVATION DATUM IS 4900 FEET MSL.

REFERENCE: SPARTON TECH. INC. SURVEY BY DENNEY-GROSS & ASSOC., INC., DATED 10/5/84

HLA Harding Lawson Associates Engineers, Geologists & Geophysicists

CONFIGURATION OF THE UPPER SURFACE OF THE AQUITARD
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE 6

DRAWN EB. JOB NUMBER 6310,023.12 APPROVED TSB DATE 6/25/86 REVISED DATE

III LABORATORY INVESTIGATION

A. Analytical Procedures

1. Protocol

During September 1985, HLA transmitted a total of 126 soil samples to Rocky Mountain Analytical Laboratory (RMAL) for the determination of various organic and inorganic parameters. RMAL's sample description tables, together with analytical results are presented in Appendix B.

The samples were initially screened by total organic halogen (TOX) analysis. Those samples which exhibited positive TOX results, were subsequently analyzed by gas chromatography (GC), utilizing an electrolytic conductivity detector operated in the halogen-specific mode. The purpose of this mode was the detection and quantification of four target parameters which have been previously identified as major contaminants of groundwater at the subject site: 1,1-dichloroethylene (1,1-DCE); 1,2-trans-dichloroethylene (1,2-DCE); 1,1,1-trichloroethane (TCA); and trichloroethylene (TCE).

Concurrent with the TOX and GC determinations, samples were analyzed for total metals. The specific metallic parameters of interest included cadmium, chromium, lead, and nickel.

After a review of the initial data, 70 samples were selected for generation of an extraction procedure toxicity characteristic (EP-TOX) leachate. The leachates were subsequently analyzed for cadmium, lead, nickel, and chromium (total, trivalent, and hexavalent). Forty-two of the duplicate samples were selected for a volatile organic scan by GC/MS and for percent moisture determination. The remainder of the duplicate samples were submitted for percent moisture determination.

The results of all laboratory analyses are presented in Appendix B. The methods utilized in these determinations are discussed below.

2. Analytical Methodology

a. TOX Method

The TOX determinations were accomplished using a modification of Method 9020 as published by the Environmental Protection Agency (EPA) in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846). The TOX modification was previously discussed with the New Mexico Environmental Improvement Division (EID) in the planning of this investigation. A 10-gram portion of each soil sample was extracted with 20 milliliters (ml) of methanol. A 1.0-ml aliquot of the methanol extract was subsequently diluted to 100 ml with deionized water. After mixing thoroughly, the diluted extract was analyzed according to the referenced method. This involved

passing the water through a column containing 40 milligrams (mg) of activated carbon. The carbon was washed to remove any trapped inorganic halides. The adsorbed organohalides were converted to a titratable species and measured by a microcoulometric detector.

The detection limit for the modified TOX procedure was 2.0 milligrams per kilogram (mg/kg). A number of samples which exhibited a positive TOX were found not to contain organic constituents, as determined by the more sensitive GC and GC/MS procedures used to confirm the TOX findings. These unconfirmed TOX values may be anomalous. This is discussed more fully below in Section B.1.

b. GC Analysis

The GC analysis utilized Methods 5030 and 8010 from SW-846. Method 5030 is a purge and trap procedure designed to isolate the components of interest from the soil matrix. A 0.5-gram (g) to 5.0 g portion of the soil was dispersed in 5.0 ml of organic-free water contained in a purging chamber. Helium was then bubbled through the solution at ambient temperature and bulk compounds were transferred from the aqueous phase to the vapor phase. The target compounds entrained in the vapor were subsequently trapped on a sorbent column. After purging was completed, the sorbent column was heated and backflushed with helium to desorb the components onto a GC column.

c. GC/MS Method

GC/MS analysis was conducted on 5.0-g portions of the duplicate soil sample. The soil was dispersed in 5.0 ml of reagent water and purged using Method 5030 as described above. Analysis was accomplished by mass spectrometry using Method 8240.

d. Total Metals

Samples analyzed for total metals were prepared using Method 3050. In this procedure, a 2.0-g sample is digested with nitric acid, followed by hydrochloric acid. The solution is then filtered and brought to a volume of 200 ml with deionized water. The diluted filtrate is then analyzed by inductively coupled plasma-atomic emission spectroscopy as described in Method 6010.

e. EP-TOX Metals

Samples analyzed for EP-TOX metals were extracted using a modification of Method 1310. A 20 g portion of a soil sample was extracted for 24 hours with 320 ml of deionized water. The pH was adjusted to 5.0 $\pm$ 0.2 with 0.5 N acetic acid and maintained throughout the 24-hour extraction. The final volume of the extract was adjusted to 400 ml with deionized water. After filtration, analysis of the extract was achieved using Method 6010.

Hexavalent chromium was determined on the EP-TOX leachates using Method 7196. This procedure is a colorimetric determination and is based on the reaction of hexavalent chromium with diphenylcarbazide in acid solution to produce a colored complex. The absorbance of the solution was measured at a wavelength of 540 nanometers using a Bausch and Lomb spectrophotometer. The results obtained from this measurement were subtracted from the total chromium value obtained from Method 6010 to yield the trivalent chromium concentration.

f. Percent Moisture

Percent moisture determinations were conducted by Method 335.2 as utilized in EPA's Contract Laboratory Program. In this method, a portion of the sample is dried in an oven at 103°C to 105°C (to a constant weight). The percent moisture is calculated from the initial and final weight values.

B. Discussion of Results

1. Evaluation of Data

Positive TOX values were obtained in 19 soil samples collected from a total of 7 borings (B002, B003, B005, B007, B008, B010, and B011). Each of these samples was submitted promptly for evaluation by the GC procedure for four target compounds known to be major groundwater contaminants. In only six of the samples, representing

three of the borings (B005, B007, and B008), were the positive TOX findings confirmed by the GC procedure. Because of the poor correlation between TOX values and GC values, 42 of the duplicate samples were submitted for analysis of volatile organics by GC/MS. No samples which were negative by the GC procedure yielded positive findings for chlorinated organic compounds by GC/MS. Three samples in B007 and B008, which had been negative by the GC method, yielded values for 1,1,2,2-tetrachloroethane by GC/MS. Nine samples in four borings (B005, B007, B008, and B010) yielded values for acetone by GC/MS. In four of these samples, acetone was the only organic parameter determined. One sample from B007 contained toluene.

The poor correlation between TOX and either GC or GC/MS suggests that results of the modified TOX procedure should be evaluated carefully. It is possible that a number of the samples yielding TOX contained organohalides other than the four target parameters used in the GC procedure. Furthermore, while the GC procedure was performed within 14 days of sample receipt, the GC/MS procedure was performed on the duplicate samples approximately 90 days after sample receipt. Although the duplicate sample containers were tightly sealed with teflon liners, the prolonged storage time may have allowed loss of the more volatile organic constituents.

In conclusion, although an unconfirmed TOX value may be anomolous, it may indicate the presence of an organohalide species other than the four target GC parameters. The unconfirmed TOX values were evaluated on a case-by-case basis, and are discussed below in Sections 2, 3, and 4.

An analytical tool, which was not part of the laboratory protocol, was the PID meter used in the field. Each soil sample was measured with the PID meter immediately upon collection. The PID values had been expected to provide a relative indication of the presence of free-phase volatile contaminants. However, many quite high PID values of soil samples collected from the vadose zone were not subsequently associated with free-phase organics as determined by laboratory analysis. The PID readings of samples from the vadose zone should therefore be interpreted as indicative of vapor phase organic constituents only. These vapors may have migrated a considerable distance from their source (see Section B.3.a.).

High PID readings were also obtained from some soil samples collected from the saturated zone. Organic vapors emanating from these soil samples would generally reflect constituents which were actively volatilizing from a free-phase state or a dissolved state within the groundwater. This issue is discussed more fully in the sections below.

2. Background Soil Samples

Background soil samples were obtained from two borings (B001 and B009). Organic vapors were undetectable by the PID meter in B001 until a depth of about 55 feet. Values below 55 feet were 2.0 parts per million (ppm) or less. Organic vapors measured by the PID meter were generally less than 1.0 ppm in B009 along the entire interval drilled. These low levels of vapor-phase organic constituents are reflective of trace organic contamination in groundwater. Cadmium was not detected in any soil sample from either B001 or B009. Total lead ranged from 3.0 to 7.4 milligrams per kilogram (mg/kg). Total nickel ranged from 1.6 to 7.0 mg/kg. Total chromium ranged from 1.3 to 6.0 mg/kg. In every case, the higher metallic values were obtained from B009. No evidence was found of free-phase organics in either of the background borings by TOX, GC, or GC/MS.

Very low values of leachable metals (as determined by the EP-TOX procedure) were found in one sample each from the two background borings. Hereinafter, leachable metals will be referred to by the prefix "EP-." The highest EP-metal values were obtained from B001. EP-cadmium was 0.005 mg/kg; EP-nickel was 0.063 mg/kg; and EP-chromium was 0.009 mg/kg.

3. Pond and Sump Area

a. Overview

A total of 75 soil samples were collected from borings within the pond and sump area. Of these, less than one-third were found to contain metallic or free phase organic contamination; and in many of these, contaminant levels were low (less than twice background).

Organic vapors (as measured by the PID meter) were detected in most soil samples from these borings. The organic vapor values generally increased with depth, indicating that the vapor source is at depth. This can be explained by evaporation of dissolved volatile organic constituents from the water table. Another source of the organic vapors is a few isolated zones of residual liquid organic contamination identified in association with the fine-grained soil units underlying the pond and sump area.

b. Boring B002

B002 was located approximately 55 feet east-southeast of B008. PID values of less than 5.0 ppm in samples above the water table indicate that vapor phase organic constituents are present in the soil gases. The PID values of 19 and 14 respectively in the saturated zone above the aquitard and approximately 3 feet below the surface of the aquitard indicate the presence of organic contamination at and near the top of the aquitard. Total metals are at or near the

background level in all samples from B002. However, some EP-metals (nickel and chromium) are present at approximately 35 feet and 40 feet, just above the extensive silt and clay unit at approximately elevation 5,005 MSL. This extensive fine-grained unit will hereinafter be referred to as the primary upper fine-grained unit (PUFGU).

c. Boring B003

B003 was located approximately 108 feet south of B008. Organic vapors measured by the PID meter fell generally below 20 ppm until a depth of 49 feet, which is beneath the PUFGU. Although no soil samples were recovered below this depth, increasing PID values obtained from within the hollow stem indicate the presence of organic contamination at depth. A soil sample recovered near 75 feet deep generated a PID value of 50 ppm, indicating the possible presence of free-phase organics. Although TOX values ranging from 2.0 to 3.0 mg/kg were generated from samples collected from 30 to 45 feet deep, these values were not confirmed by either GC or GC/MS. Total metals in B003 were generally below background levels.

The evidence indicates that the interval sampled by B003 is not an area of downward contamination through the vadose zone. However, contaminants may have migrated laterally from elsewhere within the saturated zone.

d. Boring B004

B004 was located approximately 42 feet south-southwest of B008. B004 is much closer to the presumed source of organic contamination (closed sump). High PID values (generally greater than 50 ppm) were found in samples below 14 feet deep. This indicates a high level of organic vapors within soil gases, which in turn is a reflection of the organic contamination at depth in this area. However, no free-phase organics were identified by TOX, GC, or GC/MS in samples collected from B004. Metals are well above background values in samples from 35 feet downwards. Just above the PUFGU, total nickel reaches 35 mg/kg and chromium reaches 3,000 mg/kg. In the same sample, EP-chromium is 8.4 mg/kg. These high levels of metallic contamination, together with the green discoloration of soils just above the PUFGU indicate that liquid contaminants have mounded above the PUFGU and likely have been shed laterally. Some liquid contamination has also seeped through the PUFGU as indicated by the lower, but still elevated, metallic values below 44 feet deep. Soil from just above the aquitard in the saturated zone generated a PID value of 30 ppm, while soil from 3 feet lower (just below the aquitard) yielded a PID value of 67 ppm. The aquitard is very thin in this area, and the evidence indicates that concentrated organic contamination has migrated downwards through it.

e. Boring B005

B005 was located approximately 128 feet west of B008. Typical soil gas contamination was measured with a PID meter, with an increase just above the PUFGU. This increase was consistent with the presence of free-phase organic contamination at the surface of the PUFGU, as disclosed by TOX, GC, and GC/MS. Metals were generally below background levels, except in the area of the PUFGU across the interval from 35 feet to 44 feet deep. The indication here is that organic and metallic contaminants entered the interval of B005 laterally along the surface of the PUFGU. Some chromium may have seeped through the fine-grained unit. Samples from 43 feet, 50 feet, and 59 feet deep indicate little to no organic or metallic contaminants. This indicates that the contaminant migration was mostly lateral above those samples.

f. Boring B006

B006 was located approximately 60 feet west of B008. High PID values (greater than 90 ppm) in the 10-foot interval above the PUFGU indicate the likely presence nearby of free-phase organic contamination. However, free-phase organic contamination was not disclosed by TOX, GC, or GC/MS. Total metals are slightly above background levels in the PUFGU, and some EP-chromium is present. The indication here is that contaminated liquids have migrated through or near the interval of B006.

PID values obtained from soil samples below the PUFGU and above the water table range from 20 ppm to 66 ppm. This is probably the result of volatilization of dissolved organic constituents from the water table. Much lower PID values (ranging from 2.2 to 6.0 ppm) were obtained from soil samples collected within the saturated zone just above and just below the surface of the aquitard. However, a PID value of 112 ppm was obtained at a depth of 73 feet, approximately 5 feet below the surface of the aquitard. This high PID value indicates the presence of free-phase organic contamination within the body of the aquitard. This is further evidence of the migration of organic contamination downward through the aquitard.

g. Boring B007

B007 was located approximately 30 feet north of B008. Extensive organic contamination has been disclosed by analysis of samples near the bottom of the PUFGU and in a thin clay deposit at 50 feet deep. Metals are also somewhat elevated in these samples, including lead, nickel, and chromium. EP-nickel, ranging up to 0.063 mg/kg, and EP-chromium, ranging up to 0.062 mg/kg, have been detected in these same soils. Additional evidence of organic contamination in the form of acetone has been noted at 25 feet and 39 feet deep. The presence of organic contamination is also indicated by PID values, which are generally higher in the area above the PUFGU than below.

PID values were less than 10 ppm in soil samples collected from the upper seven feet of the aquitard. However, a sample collected from nearly eight feet below the surface of the aquitard gave a PID value of 26 ppm, indicating that some organic contamination is migrating downward through the aquitard.

Generally, the soils intersected by B007 appear to have been part of, or very near, the downward migration pathway of contaminants in the pond and sump area. The orange-yellow pigmentation of soils from 57 feet down to the aquitard at 67 feet deep is abnormal for these soils. Although there is no analytical evidence of contamination in these soils, the discoloration probably marks the passage through this area laterally of some contamination.

h. Boring B008

B008 was located between the two inactive surface impoundments. Soil samples collected from this boring have shown the highest levels of contamination, as compared to the other soil borings. High PID values in near-surface soils indicate the presence of free-phase organic contamination below. Free-phase organic constituents (as indicated by TOX, GC, and GC/MS) have been detected above, within, and below the PUFGU, indicating that this is a likely

area of downward migration of organic contaminants. PID values of 38 and 72, respectively, were found 1 foot and 4 feet below the surface of the aquitard, indicating downward migration of organic contaminants through that unit in this area.

The pattern of organic contamination in the vadose zone is repeated by metallic constituents in B008. Total metals are found in increasingly higher levels down to the PUFGU. Total chromium reaches a level of 3300 mg/kg just above the PUFGU. EP-chromium is as high as 8.1 mg/kg. Beneath the PUFGU, levels of metallic constituents remain above background, but are well below the values obtained above the unit.

The evidence in B008 indicates that contaminated liquids were impeded in their downward migration and shed laterally. Some contaminants did eventually breach the PUFGU, migrate to the aquitard and enter it.

4. Additional Borings

a. Boring B010

B010 was located approximately 50 feet south of the manufacturing building from a point near the shipping and receiving area. Low PID values (ranging from 0.7 to 5.0 ppm) were generated from samples collected from 5 feet to 37 feet deep. Positive TOX

values were generated from 14 feet to 37 feet deep. However, no free-phase organohalides were detected by either GC or GC/MS. A trace of acetone was detected by GC/MS at 37 feet; however, acetone does not have a halogen moiety. Therefore, it would not register in the TOX procedure. The analytical evidence here is that the positive TOX values in B010 are anomalous.

A sample of the aquitard was collected at approximately 57 feet deep. The green discoloration of this sample indicated the possible presence of contamination. Metallic constituents in this soil sample were at or near background levels; however, the high PID value (52 ppm) indicates the presence of free-phase organic contamination. The only organic compound measured by either GC or GC/MS in this sample was acetone (500 ug/l).

The organic constituents identified at approximately 37 feet indicate the possibility that some contamination may have migrated laterally along the surface of the PUFGU or of some other fine-grained unit which may extend beneath the manufacturing building. The presence of high acetone within the aquitard may indicate that organic contamination has migrated to near the area of B010 laterally from some distant source.

b. Boring B011

B011 was located approximately 110 feet southeast of B010. PID values below 35 feet deep indicated trace levels of organic vapors. Low-level (2 to 4 ppm) TOX values were generated by occasional soil samples. However, these findings were not confirmed by either GC or GC/MS. Considering the low PID values, these TOX values are considered to be anomalous. Nickel and chromium are at or slightly above background levels at about 50 feet deep. However, these values are not considered to represent contamination at this location within the vadose zone. Organic contamination is not indicated by PID values of the soil samples collected within the aquitard.

IV CONTAMINANT MIGRATION PATHWAYS

A. Introduction

Prior to 1980, waste solvents and metals presumably entered the vadose zone beneath the pond and sump area on the north side of the plant building.

The liquid wastes infiltrated through the vadose zone to the water table and entered the ground water beneath the site. Along the migration path, the wastes encountered several types of sediments, which controlled the rate and direction of waste migration.

B. Sand and Gravel

The bulk of the material comprising the vadose zone is sand and gravel. This material is unconsolidated and exhibits a relatively high porosity and permeability. Liquid wastes entering such materials will migrate quickly as wetting of the soil increases to the point of saturation. Sand and gravel allows liquid wastes to migrate directly downward toward the water table with very minor lateral dispersion.

The sand is primarily composed of quartz, a mineral containing silicon and oxygen. Quartz is an inert mineral with minimal adsorption and ion-exchange capability. Dissolved metallic consitutents and solvents are not affected by quartz. The other

minerals in the sands are primarily plagioclase, feldpar, and hornblend, which have more adsorption and ion-exchange capability. However, the adsorption and ion-exchange capability of these minerals is limited compared to clay minerals.

The gravels on the site contain less quartz than the sand deposits. However, the surface area available for adsorption and ion-exchange processes is greatly reduced in a gravel deposit compared to an equal volume of sand. The permeability of gravel is greater than sand. Therefore, the gravelly strata encountered in the vadose zone induce a greater lateral dispersion of liquid wastes at the upper boundary of underlying sandy deposits.

C. Fine-Grained Materials

The silt and clay lenses and layers in the vadose zone are less permeable than the sand and gravel deposits. The fine grained units impede and divert the downward migration of the liquid wastes. Since the sands and gravels surrounding the fine grained units are more permeable, most of the liquid waste migrates around the fine grained unit. The principal upper fine-grained unit (PUFGU) shown on Plate 3 likely produced a great lateral dispersion of the liquid wastes above the water table. Some of the liquid wastes were likely diverted toward the northeast and northwest around PUFGU (hydraulically upgradient of the presumed source). The lateral dispersion caused by

this unit and other relatively fine-grained deposits in the vadose zone may account for the trace levels of organic solvent contamination noted in previous investigations in MW-2, MW-5, MW-6, and MW-17.

Some of the liquid wastes would have slowly seeped into the silts and clays. Although the permeability of fine grained materials is low, the porosity increases with decreasing grain size. In addition, silts and clays normally exhibit a relatively large ion-exchange capacity. Therefore, these materials can absorb and adsorb a large volume of liquids and metals. Long after the presumed primary contamination source was removed, the fine grained materials retained the contaminants despite the natural drainage of liquid wastes from the vadose zone into the water table. Chemical analysis of the fine grained soils indicate that most of the contamination retained in the vadose zone occurs in the silts and clays. This is discussed more fully in Section III.B.

D. Integrity of the Aquitard

Although this investigation concentrated on the vadose zone, samples for visual inspection were collected from the aquitard in nearly every boring. The aquitard is composed of silty sand and sandy silt over most of the site and is generally overlain by gravelly sand and sandy gravel. The overlying material exhibits a much greater

permeability, and the magnitude of flow of the ground water downward into the aquitard is minor compared to the magnitude of the horizontal flow parallel to the top of the aquitard.

Contaminated ground water and free-phase organic liquids which enter the aquitard are subject to the same absorption, adsorption, and ion-exchange processes described in Section III.C. However, the soil contaminant adsorption and absorption capacity is more limited under saturated conditions. Eventually, a contaminant saturation point is attained, and contaminated ground water can then exit beneath the aquitard. Where the aquitard is thin (e.g., 2 feet at MW-14), the contaminants would likely saturate and penetrate the unit more quickly than where the aquitard is thick (e.g., 13 feet in B-7).

The overlying gravel and sand indicates the presence of ancient river or stream channels above the aquitard material. Presently unidentified ancient stream channels would produce depressions in the contours of the upper surface of the aquitard, such as shown in Plate 6. A channel may have penetrated the aquitard in one or several areas on the site. The thick gravel above the aquitard encountered at B003 may be within, or in close proximity to, such a channel. Erosional channels would provide contaminant migration in pathways from the upper flow zone to the flow zone beneath the aquitard.

contamination has occurred at the this site. MW-5 is located north of the pond and sump area along a migration pathway suggested by the upper boundary contours of the PUFGU (see Plate 3). MW-6 is located hydraulically upgradient, west northwest of the pond and sump area. A northwestern migration pathway is also suggested by the upper boundary contours of the PUFGU. Our interpretation of the configuration of the PUFGU upper boundary is necessarily idealized and lacking in precision. However, it is a valid indication of the mechanisms which have caused the lateral spread of contamination within the vadose zone, both hydraulically upgradient of the presumed source and at right angles to the direction of groundwater flow.

Lateral migration of contamination within the vadose zone towards the southeast is also possible. This could explain the presence of high contaminant levels which have been noted in MW-4, and in MW-9 (which is hydraulically downgradient of MW-4).

Another explanation is possible for the high levels of organic contamination noted in MW-4 and MW-9. Free-phase organic contamination at this site contains a major chlorinated solvent component. Chlorinated solvents are generally denser than water. Therefore, any free-phase organic material which arrived at the water table would likely have settled to the surface of the aquitard. The presence of the aquitard would then have induced a lateral dispersion

of the free-phase organic material, which would act as a secondary source of groundwater contamination in the upper flow zone. This lateral dispersion would have been controlled by gravity and by the configuration of the aquitard surface. This phenomenon may have induced migration of concentrated organic contaminants some distance away from the original source. The interpretation of the aquitard surface, as presented in Plate 6, suggests a potential pathway for such organic contamination to migrate generally south along the east end of the manufacturing building.

In addition to the potential for lateral dispersion of free-phase organics along the surface of the aquitard, this material would also continue to seep downwards through the aquitard, although at a reduced rate. One of the findings of this investigation is that there is evidence of the downward migration of concentrated organic contamination within the aquitard.

The parameters of concern did not exceed background levels in two-thirds of the soil samples collected in the pond and sump area. This suggests that the bulk of liquid contamination which entered the vadose zone in that area has completed its migration to the water table. This hypothesis is consistent with preliminary results of a vadose zone flow model being prepared by Randall J. Charbeneau, Associate Professor, Department of Engineering, The University of Texas (Austin).

VI RECOMMENDATIONS

Sparton has proposed to close the pond and sump area by installing a cap. The extent of the cap should be optimized in order to protect the underlying aquifer, to the extent possible, from further contamination.

The size of the cap is related to groundwater protection in at least two ways. The cap will act as an impermeable barrier to water, both in the liquid state and the gaseous state. This in turn will effect the moisture content of soils in the vadose zone. The cap will also act as an impermeable barrier to the entry of air into the vadose zone and to the escape of soil gases.

Although the net rate downwards of liquid contaminant migration is slow, it is variable, depending upon the moisture content within the vadose zone. Unsaturated flow increases with permeability as moisture content (percent saturation) increases. Normally, soil moisture may be increased either by infiltration from the surface or by evaporation/condensation from the water table.

In the semi-arid climate of New Mexico, recharge of the aquifer from rainfall precipitation is negligible. Rainwater which does not run off tends to be held near the ground surface by capillarity until

it is drawn off by a wicking action induced by evapotranspiration. In contrast to the above, soil moisture tends to increase within the unsaturated zone beneath an impermeable barrier. This increase is due to the concentration and condensation of water vapor which evaporates from the water table and can not escape from the ground surface by evaporation. Therefore, the net effect of the cap in the pond and sump area may be an increase in soil moisture. This in turn may result in a slightly higher rate of net downward migration of any residual liquid contaminants in the vadose zone. Therefore, we recommend that the cap size be kept to a minimum.

Soil gas extraction is being considered as a remedial alternative to reduce residual volatile organic contamination in the vadose zone. Soil gas extration involves the withdrawal of air from wells screened above the water table. In order for this technique to be effective, the soils surrounding the well screen must be recharged by fresh air. It is preferable for fresh air to be recharged through the ground surface in order to affect the largest soil volume. The alternative is to replace air within the vadose zone via the use of air injection wells. This is less desirable, since the flow of air from recharge wells to withdrawal wells may tend to preferentially channelize through more permeable soils.

In order to increase the efficiency and optimize the results of a possible soil gas extraction program in the pond and sump area, we recommend that the size of the cap be kept to a minimum. The optimal size of the cap to be installed in the pond and sump area would be approximately the same size as the area presently occupied by the inactive surface impoundments. This is less than the capped area proposed in Sparton's closure plan.

MAJOR DIVISIONS				TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS LARGER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN No. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE-GRAINED SOILS MORE THAN HALF IS SMALLER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM

Perm	—	Permeability
Consol	—	Consolidation
LL	—	Liquid Limit (%)
PI	—	Plastic Index (%)
G_s	—	Specific Gravity
MA	—	Particle Size Analysis
■	—	"Undisturbed" Sample
⊠	—	Bulk or Classification Sample

	Shear Strength (psf)	Confining Pressure		
TxUU (FM) or (S)	3200	(2600)	—	Unconsolidated Undrained Triaxial Shear (field moisture or saturated)
TxCU (P)	3200	(2600)	—	Consolidated Undrained Triaxial Shear (with or without pore pressure measurement)
TxCD	3200	(2600)	—	Consolidated Drained Triaxial Shear
SSCU (P)	3200	(2600)	—	Simple Shear Consolidated Undrained (with or without pore pressure measurement)
SSCD	3200	(2600)	—	Simple Shear Consolidated Drained
DSCD	2700	(2000)	—	Consolidated Drained Direct Shear
UC	470		—	Unconfined Compression
LVS	700		—	Laboratory Vane Shear

KEY TO TEST DATA

Harding Lawson Associates
Engineers, Geologists & Geophysicists

SOIL CLASSIFICATION CHART AND KEY TO TEST DATA

Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ES.	6310,023.12				

Appendix A-1

Geologic Logs

Appendix A. Field Investigation

1. Geologic Logs
2. Construction of MW-18
3. Particle Size Analysis

Equipment Hollow-Stem Auger

Elevation 5044.6 Date 9/4/85 to 9/6/85

Depth (ft)	Description	PID Background (ppm)	PID Sample (ppm)
0	LIGHT BROWN FINE TO MEDIUM SAND (SP) dry, grains subangular to rounded, 95% quartz, 3% feldspar, 2% other concrete dust 3 to 3.5 feet tire fragments 4 to 6 feet Fill		
5	gravelly 7 to 26 feet, mainly igneous and metamorphic		
10	silty 9 to 10 feet		
15		0.0	2.0
	lost sampler at 18 feet, retrieve and start new boring	0.0	2.0
20	sandy gravel 22.3 to 23.7 feet		
25		0.0	1.5
	trace silt 28 to 40 feet		
30			
35			
40	LIGHT BROWN SANDY GRAVEL (GW) moist, gravel angular to rounded, mainly quartzite with some igneous gravel		

(Continuation of Log)

Depth (ft)	Description
40	
45	
50	lost sampler shoe at 52 feet, start new boring LIGHT BROWN FINE SANDY SILT (ML) moist, subangular grains, trace clay
55	very sandy 57.5 to 59 feet
60	
65	GRAY GRAVELLY COARSE SAND (SW) saturated, grains subangular to rounded, 80% quartz, 12% feldspar, 8% other End of Boring - 67.5 feet
70	Note: No PID readings were taken above 52.5 feet.
75	
80	

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LOG OF BORING B001
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE A1

DRAWN EB. | JOB NUMBER 6310,023.12 | APPROVED SB | DATE 6/25/86 | REVISED | DATE

Equipment Hollow-Stem Auger

Elevation 5044.04 **Date** 9/16/85 to 9/17/85

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		0	ASPHALT 2-INCHES THICK
0.0	0.4		LIGHT BROWN SILTY FINE TO COARSE SAND (SM) grains angular to rounded, 93% quartz, 6% feldspar, 1% other
		5	very silty 5.5 to 5.7 feet
			LIGHT BROWN GRAVELLY FINE TO COARSE SAND (SW) dry, gravel and grains subangular to rounded, 90% quartz, 8% feldspar, 2% other, partially caliche-cemented
0.0	0.2		
		10	
0.0	0.4		no gravel 14 to 15 feet
		15	
0.0	0.2		
		20	cobbles below 21 feet, angular to rounded, mainly vein quartz and quartzite
		25	LIGHT BROWN FINE TO MEDIUM SAND (SP) dry, grains subangular to rounded, 96% quartz, 2% feldspar, 2% other, frosted grains
0.0	2.2		
		30	
0.0	3.3		
		35	BROWN SILTY CLAYEY SAND (SC) moist, grains well rounded
0.0	3.0		
		40	BROWN CLAYEY SILT (ML) moist, trace sand

(Continuation of Log)

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		40	LIGHT GRAY FINE TO MEDIUM SAND (SP) dry, grains subangular to well rounded, 96% quartz, 2% feldspar, 2% other, faint horizontal bedding
0.0	5.0		
		45	
			BROWN & GRAY GRAVELLY CLAYEY SILTY SAND (SW) moist, grains angular to subrounded, 90% quartz, 3% feldspar, 7% other, rounded quartzite cobbles, quartzite and igneous gravel
0.0	4.5		
		50	
		55	
0.0	3.0		LIGHT BROWN FINE TO MEDIUM SAND (SP) moist, trace silt and gravel, grains rounded to well rounded, 95% quartz, 2% feldspar, 3% other, rounded quartzite and some igneous gravel, cross-bedded
		60	fish scale at 59.5 feet
0.0	5.2		sand and gravel 62 to 63 feet
		65	seepage encountered at 63 feet silty fine sand 64 to 65 feet
0.0	19.0		LIGHT BROWN SILTY FINE SAND (SM) saturated, grains angular to rounded, cross-bedded
		70	
0.0	14.0		
		75	gravel 75 to 75.2 feet, angular to rounded, igneous and quartzite
0.0	1.8		
0.0	2.4		faint horizontal bedding
		80	light green silty clay with minor carbonaceous pockets 80.3 to 80.5 feet

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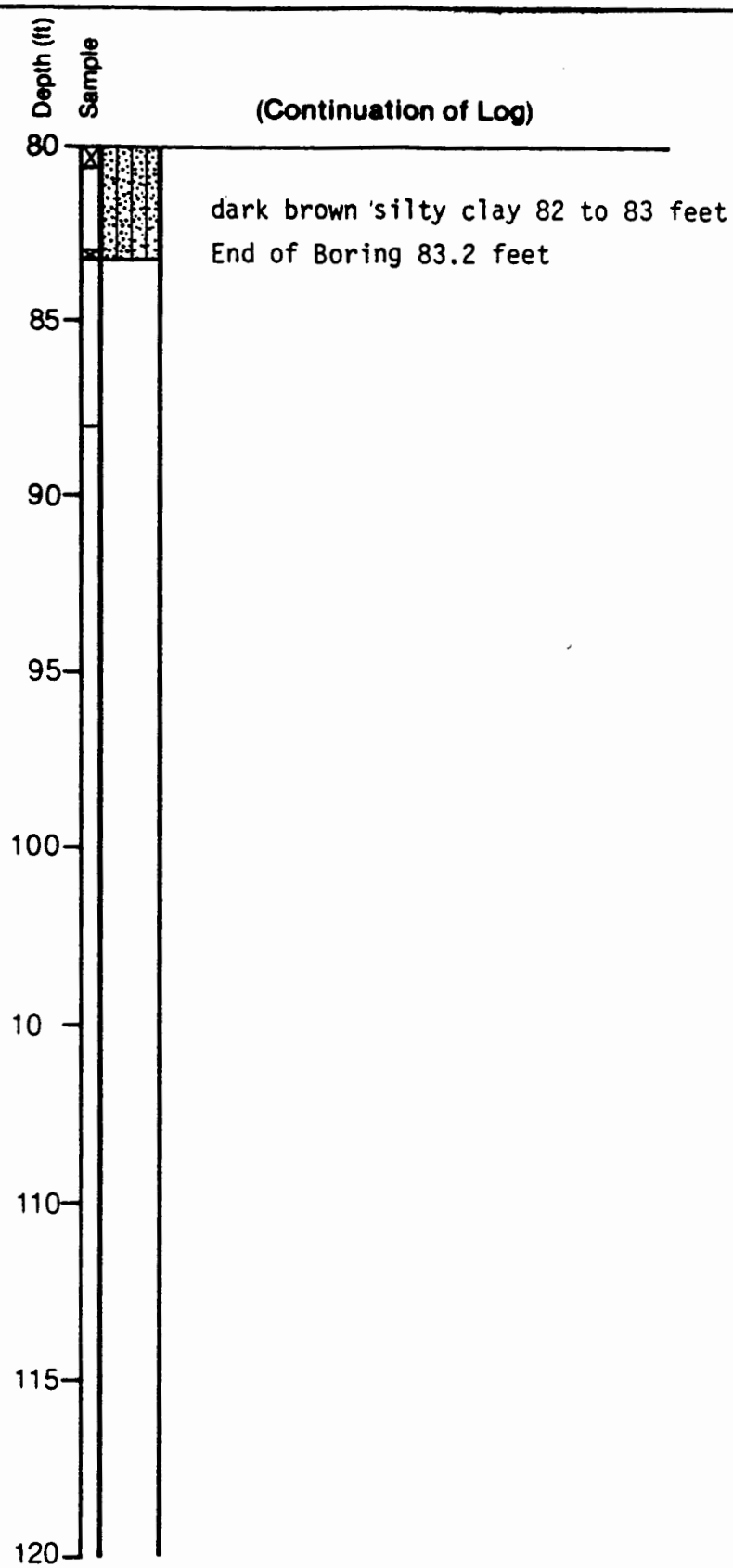
LOG OF BORING B002
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE **A2**

JOB NUMBER 6310,023.12 APPROVED TSB DATE 10/25/86 REVISED DATE



(Continuation of Log)

dark brown silty clay 82 to 83 feet

End of Boring 83.2 feet

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& Geophysicists

LOG OF BORING B002 (cont.)

Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE A3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	6310,023.12	TSB	6/25/86		

Equipment Hollow Stem Auger

Elevation 5045.98 Date 9/13/85 to 9/14/85

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		0	ASPHALT 2-INCHES THICK LIGHT BROWN SILTY FINE TO MEDIUM SAND (SM) moist LIGHT BROWN FINE TO COARSE SAND (SW) moist, subangular to rounded, 92% quartz, 5% feldspar, 3% other, trace silt 0.5-inch clay stringer at 5.5 feet
0.0	6.8	5	
		10	LIGHT BROWN SANDY GRAVEL (GW) moist, gravel rounded, mainly quartzite with some igneous, grains subangular to rounded, 92% quartz, 5% feldspar, 3% other, trace silt
		15	LIGHT BROWN SILTY FINE TO MEDIUM SAND (SM) moist, grains angular to well rounded, 92% quartz, 5% feldspar, 3% other
0.0	10.6	20	
0.0	14.8	25	LIGHT BROWN FINE TO MEDIUM SAND (SP) moist, grains subangular to rounded, 88% quartz, 7% feldspar, 5% other, trace silt
0.0	18.4	30	
0.0	6.2	35	silty 35.5 to 36 feet
0.0	3.2	40	

(Continuation of Log)

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
	1.4	40	BROWN CLAYEY SILT (ML) moist, trace sand with rounded grains, root marks, iron-stained in pockets sandy 44 to 44.5 feet purple 44.4 to 44.5 feet
0.0	5.2	45	LIGHT GRAY FINE TO MEDIUM SAND (SP) dry, grains angular to rounded, 93% quartz, 4% feldspar, 3% other, trace rounded quartzite gravel and silt, iron-stained 44.5 to 45 feet, some frosted grains, faint cross-bedding
0.0	49	50	LIGHT BROWN & GRAY SILTY GRAVELLY SAND (SW) moist, grains angular to rounded, 70% quartz, 20% feldspar, 10% other, quartzite and igneous gravel
0.0	20 *	55	no gravel 55 to 55.5 feet
0.0	120 *	60	
0.0	130 *	65	seepage encountered at 67 feet
0.0	50	70	LIGHT GRAY FINE SANDY SILT (ML) saturated
		75	LIGHT GRAY SILTY FINE SAND (SM) saturated, grains angular to rounded, 95% quartz, 2% feldspar, 3% other End of Boring - 78 feet
		80	* readings taken inside hollow stem

Harding Lawson Associates
Engineers Geologists & Geophysicists

LOG OF BORING B003
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE A4

DRAWN ES | JOB NUMBER 6310,023.12 | APPROVED TSB | DATE 6/25/86 | REVISED | DATE

Equipment Hollow-Stem Auger

Elevation 5045.3 Date 9/24/85 to 9/25/85

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		0	LIGHT BROWN SILTY FINE TO MEDIUM SAND (SM) moist, grains angular to rounded, 96% quartz, 2% feldspar, 2% other, horizontal bedding
		5	LIGHT GRAY AND BROWN FINE TO COARSE SAND (SW) moist, grains angular to well rounded, 92% quartz, 5% feldspar, 3% other, horizontal bedding silty fine sand 7.5 to 7.8 feet
0.0	15.0	10	
0.0	82	15	silty fine sand with trace clay 13.5 to 14.2 feet
0.0	138	20	LIGHT BROWN SILTY FINE SAND (SM) moist, grains angular to rounded, 97% quartz, 2% feldspar, 1% other, horizontal bedding
0.0	75	25	clayey 24.5 to 24.7 feet
0.0	84	30	clayey 28.7 to 29.1 feet
0.0	150	35	LIGHT GRAY FINE TO COARSE SAND (SW) moist, 92% quartz, 6% feldspar, 2% other LIGHT GREEN SILTY FINE SAND (SM) moist, grains subrounded to well rounded, 96% quartz, 2.5% feldspar, 1.5% other, faint horizontal bedding red stained 35 to 35.2 feet
0.0	64	40	clayey and very silty 38 to 38.3 feet

(Continuation of Log)

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		40	BROWN SANDY SILT (ML) moist, horizontal bedding, trace clay, clay layer 42.5 to 43 feet
0.0	80	45	LIGHT GRAY FINE TO COARSE SAND (SW) moist, grains angular to rounded, 94% quartz, 4% feldspar, 2% other, faint horizontal bedding, trace silt and gravel gravelly below 47.5 feet, quartzite and igneous, subangular to rounded brown silty clay layer with roots 48.7 to 49.2 feet
0.0	34	50	
0.0	88	55	no gravel 52.5 to 53.5 feet
0.0	1.4	60	ground-water seepage encountered at 62.2 feet sandy gravel 62.5 to 65.5 feet
0.0	30	65	GRAY SILTY FINE SAND (SM) saturated, grains angular to rounded, 97% quartz, 1% feldspar, 2% other, horizontal bedding thin silty clay stringers 66.8 to 67.2 feet
0.0	67	70	GRAY FINE TO COARSE SAND (SW) saturated, grains subangular to well rounded, 94% quartz, 4% feldspar, 2% other, faint horizontal bedding sandy gravel 68.5 to 69.3 feet
		75	End of Boring - 71.4 feet
		80	

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING B004
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE A5

DRAWN EB. | JOB NUMBER 6310,023.12 | APPROVED TSB | DATE 6/25/86 | REVISED | DATE

Equipment Hollow Stem Auger

Elevation 5045.3 Date 9/23/85

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		0	LIGHT BROWN SILTY FINE SAND (SM) moist, grains subangular to rounded, 96% quartz, 2% feldspar, 2% other
0.0	0.0	5	LIGHT GRAY & BROWN FINE TO COARSE SAND (SW) moist, grains subangular to well rounded, 93% quartz, 4% feldspar, 3% other, horizontal bedding, trace silt clayey 4.9 to 5.0 feet
0.0	2.9	10	
0.0	2.7	15	LIGHT GRAY SILTY FINE SAND (SM) moist, grains subrounded to well rounded, 95% quartz, 3% feldspar, 2% other
0.0	13.6	20	
0.0	2.9 11.6 26	25	sandy silty clay 23.6 to 24.2 feet brown below 24.2 feet
0.0	7.0	30	
0.0	8.9	35	very silty 33 to 33.5 feet
0.0	24	40	DARK BROWN SILTY CLAY (CL) saturated, trace sand

(Continuation of Log)

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
	9.0	40	LIGHT GRAY GRAVELLY FINE TO COARSE SAND (SW) moist, grains angular to rounded, 90% quartz, 6% feldspar, 4% other, gravel rounded, mainly quartzite with some igneous, trace silt
0.0	11.2	45	
		50	
0.0	60 40	55	no gravel 54.2 to 55.2 feet
0.0	6.8	60	
0.0	20	65	seepage encountered at 65 feet
0.0	10.4	70	trace clay 69.9 to 70.1 feet LIGHT GRAY SILTY FINE SAND (SM) saturated, grains angular to well rounded, 98% quartz, 2% other, trace clay 69.9 to 70.1 feet sandy silt 73 to 73.5 feet
		75	
		80	End of Boring - 78 feet

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LOG OF BORING B005
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE A6

DRAWN Ed. | JOB NUMBER 6310,023.12 | APPROVED SB | DATE 6/25/86 | REVISED | DATE

Equipment Hollow Stem Auger

Elevation 5045.38 **Date** 9/20/85 to 9/21/85

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		0	LIGHT BROWN FINE TO MEDIUM SAND (SP) moist, grains subangular to well rounded, 97% quartz, 2% feldspar, 1% other, trace silt
0.0	3.7		
		5	LIGHT GRAY-BROWN FINE TO COARSE SAND (SW) moist, grains angular to well rounded, 92% quartz, 5% feldspar 3% other, horizontal bedding
		10	silty 9.5 to 10.5 feet
		15	clayey and silty 15.5 to 15.6 feet gravelly 15.6 to 15.8 feet, mainly granite and quartzite, minor caliche cement below 15.6 feet LIGHT BROWN SILTY FINE SAND (SM) moist, grains angular to subrounded, 97% quartz, 2% feldspar, 1% other
		20	coarse sand 21.6 to 22.5 feet
0.0	47		clayey 24.4 to 24.6 feet
		25	
0.0	120	30	trace silt 29.5 to 30.8 feet
0.0	92	35	trace silt 34.2 to 35 feet silty clay stringers 36 to 36.2 feet
0.0	50	40	clayey 39.5 to 40.5 feet

(Continuation of Log)

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		40	BROWN SANDY SILTY CLAY (CL) moist BROWN CLAYEY SILTY FINE SAND (SM) moist, with gray coarse sand pockets with rounded to well rounded gains
0.0	24	45	LIGHT GRAY GRAVELLY FINE TO COARSE SAND (SW) moist, grains well rounded, 96% quartz, 2% feldspar, 2% other, cobbles and gravels rounded, mainly igneous with some quartzite, faint cross bedding
0.0	66		dark gray mottling below 44 feet
		50	
0.0	34	55	grains 90% quartz, 5% feldspar, 5% other below 53 feet
0.0	20	60	
0.0	6.0	65	seepage encountered at 65.5 feet MEDIUM GRAY SILTY FINE TO MEDIUM SAND (SM) saturated, grains subangular to well rounded, 96% quartz, 2% feldspar, 2% other, horizontal bedding
0.0	2.2	70	grains 90% quartz, 3% feldspar, 7% dark minerals 68 to 71 feet light gray below 71.3 feet
0.0	112	75	very silty with clay stringers below 73 feet
		80	End of Boring - 78 feet * HNU meter was not working properly 8 to 23 feet

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LOG OF BORING B006

Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE **A7**

DRAWN Eg. Kg. | JOB NUMBER 6310,023,12 | APPROVED TSB | DATE 6/25/86 | REVISED | DATE

Equipment Hollow-Stem Auger

Elevation 5045.26 **Date** 9/18/85 to 9/19/85

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Sample	Description
		0		LIGHT BROWN SILTY FINE SAND (SM) moist, grains angular to subrounded, 95% quartz, 3% feldspar, 2% other
0.0	1.3			brown sandy clay 3 to 4 feet
		5		BROWN FINE TO COARSE GRAVELLY SAND (SW) grains angular to subrounded, 70% quartz, 20% feldspar, 10% other, gravel mostly igneous, traces of caliche-cement
0.0	0.6	10		no gravel 8 to 15 feet
0.0	13.8	15		thin sandy silt layer at 15 feet horizontal bedding below 15 feet
0.0	9.0	20		
0.0	63	25		LIGHT BROWN FINE TO MEDIUM SAND (SP) moist, grains angular to rounded, 93% quartz, 2% feldspar, 5% other, trace silt clayey 24.6 to 24.9 feet
0.0	32	30		thin clayey layer at 30.5 feet thin caliche-cemented layer at 31 feet
0.0	38	35		thin clayey layers at 36.3 and 36.8 feet very silty with trace clay below 38 feet
0.0	11.8	40		INTERBEDDED BROWN SILTY CLAY (CL) & CLAYEY SILT (ML) moist, some orange iron staining

(Continuation of Log)

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Sample	Description
		40		
0.0	13.4 1.9	45		LIGHT GRAY & BROWN SILTY GRAVELLY SAND (SW) moist, grains angular to subrounded, 85% quartz, 5% feldspar, 10% other, gravels subangular to rounded, mainly quartzite with some igneous gravel, trace clay
0.0	4.2	50		RED CLAY (CH) moist, trace silt, minor calcite filled voids, worm burrows SANDY GRAVEL (GW) moist, mainly quartzite with some igneous
0.0	16.8 3.4	55		LIGHT GRAY FINE TO MEDIUM SAND (SP) moist, 96% quartz, 2% feldspar, 2% other silty clay 54.3 to 54.5 feet SILTY SANDY GRAVEL (GW) moist, angular to rounded, quartzite and igneous
0.0	8.8 15.0	60		ORANGE-YELLOW & LIGHT GRAY FINE TO COARSE SAND (SW) moist, grains subrounded to well rounded, 95% quartz, 2% feldspar, 3% other, faint cross-bedding ORANGE-YELLOW SANDY GRAVEL (GW) moist, grains subrounded to well rounded, 85% quartz, 5% feldspar, 10% other
		65		seepage encountered at 66 feet
0.0	8.6	70		GRAY SILTY FINE TO MEDIUM SAND (SM) saturated, grains angular to rounded, 98% quartz, 2% other, faint horizontal bedding gravelly 68.5 to 69.3 feet calcite-cemented 69.9 to 70.1 feet
0.0	5.4 26	75		calcite-cemented 74.4 to 74.6 feet
0.0	3.0	80		very silty 80.1 to 80.4 feet

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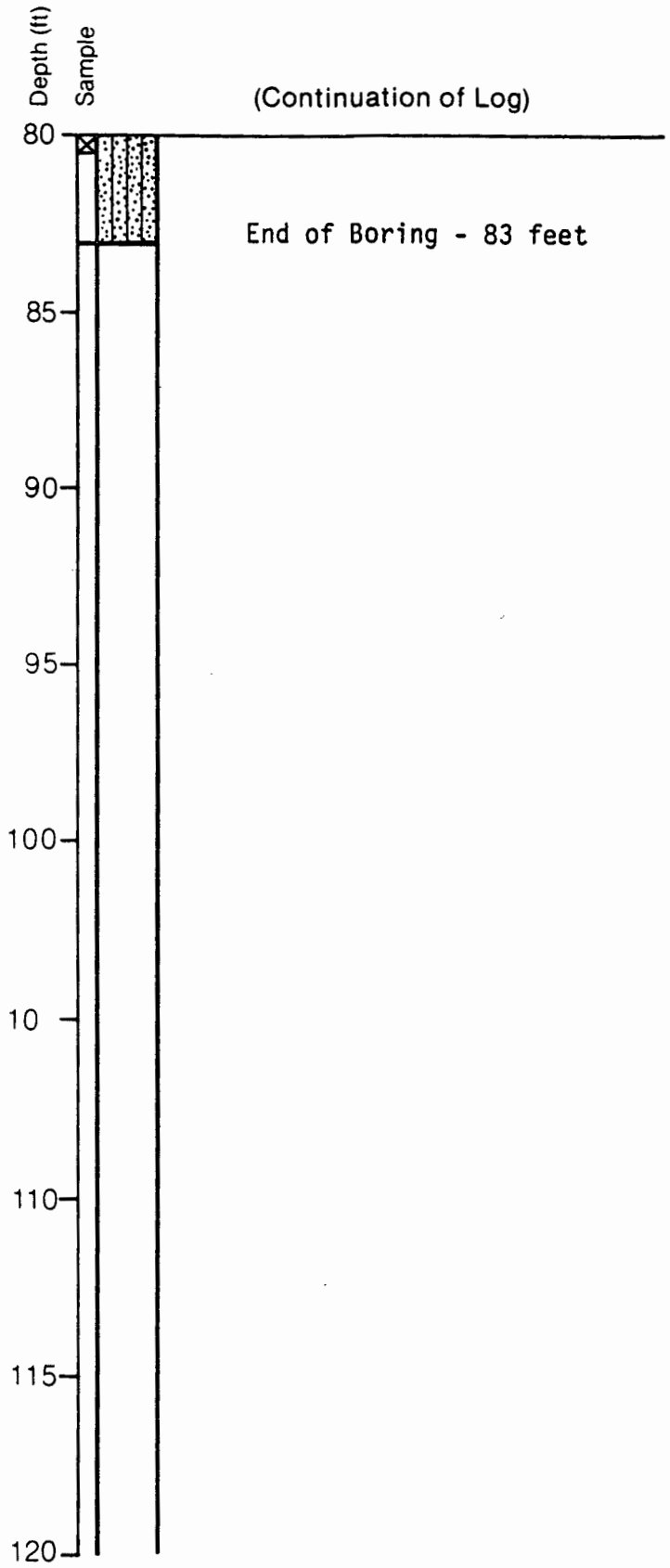
Engineers, Geologists & Geophysicists

LOG OF BORING B007

Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE **A8**

DRAWN ES. | JOB NUMBER 6310,023.12 | APPROVED TSB | DATE 6/25/86 | REVISED | DATE



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LOG OF BORING B007 (cont.)
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE
A9

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
EB.	6310,023.12	TSB	6/25/86		

Equipment Hollow Stem Auger

Elevation 5045.42 Date 9/25/85 to 9/26/85

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		0	SANDY GRAVEL (GW)
			LIGHT BROWN SILTY FINE TO MEDIUM SAND (SM) moist, grains subangular to rounded, 96% quartz, 2% feldspar, 2% other
0.0	7.8	5	
			LIGHT BROWN FINE TO COARSE SAND (SW) moist, grains angular to rounded, 93% quartz, 4% feldspar, 3% other, horizontal bedding
0.0	20	10	trace gravel 9.5 to 10.0 feet, subangular to subrounded
0.0	18.0	15	gravelly 15.2 to 15.3 feet trace gravel 16.8 to 17.5 feet
0.0	16.2 60	20	LIGHT BROWN FINE SAND (SP) moist, grains subrounded to rounded, 97% quartz, 2% feldspar, 1% other, horizontal bedding
		25	silty and clayey 25.3 to 25.8 feet
0.0	63		
			GREEN SILTY FINE SAND (SM) moist, grains angular to rounded, partially cemented by calcite very silty 30.5 to 30.8 feet
0.0	22	30	
0.0	95	35	
			BROWN SANDY SILTY CLAY (CL) moist with red and green staining LIGHT BROWN FINE SAND (SP) moist, grains angular to rounded, 98% quartz, 1.5% feldspar, 0.5% other
0.0	52	40	

(Continuation of Log)

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		40	LIGHT GREEN-BROWN SILTY FINE SAND (SM) moist, 95% quartz, 3% feldspar, 2% other RED-BROWN SANDY CLAYEY SILT (ML) moist, faint horizontal bedding
0.0	5.4	45	LIGHT GRAY FINE TO COARSE GRAVELLY SAND (SW) moist, grains subangular to well rounded, 92% quartz, 5% feldspar, 3% other, gravel angular to rounded, mainly quartzite and igneous
0.0	12.0	50	clayey 49 to 50 feet
		55	sandy gravel 54 to 58 feet
0.0	19.0	60	no gravel 58.3 to 59 feet
		65	seepage encountered at 66 feet
			LIGHT GRAY SILTY FINE SAND (SM) saturated, grains subangular to rounded, 97% quartz, 2% feldspar 1% other, horizontal bedding gravel 69 to 69.5 feet sandy clay 69.5 to 69.8 feet partially calcite-cemented 69.8 to 70.5 feet
0.0	38 72	70	
		75	gravelly 75.2 to 76.2 feet BROWN CLAYEY SILT (ML) saturated BROWN SILTY CLAY (CL) saturated End of Boring - 79 feet
		80	

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Engineers Geologists & Geophysicists

LOG OF BORING B008

Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE A10

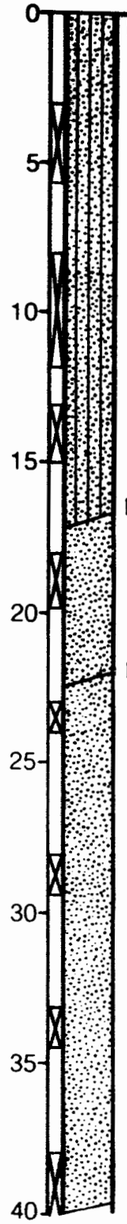
DRAWN Eg. Kg. | JOB NUMBER 6310,023.12 | APPROVED TSB | DATE 6/25/86 | REVISED | DATE

Equipment: Hollow Stem Auger

Elevation: 5049.6 Date: 9/9/85

PID Background (ppm)	PID Sample (ppm)
0.0	0.2
0.0	0.2
0.0	0.2
0.0	0.4
0.0	0.2
0.0	0.5
0.0	0.8
0.0	0.7

Depth (ft) / Sample



LIGHT BROWN SILTY FINE SAND (SM)
dry, grains subangular to subrounded, with roots

silty clay layer 10.7 to 11.0 feet

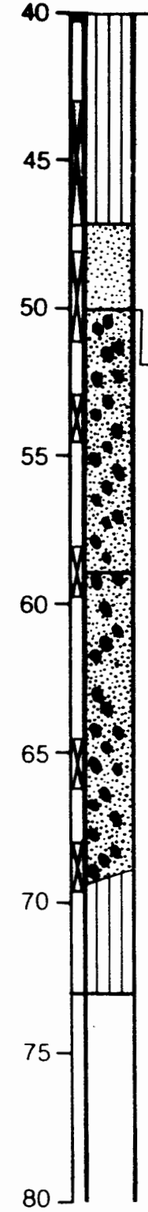
LIGHT BROWN FINE TO COARSE SAND (SW)
dry, grains subrounded to subangular

LIGHT BROWN FINE TO MEDIUM SAND (SP)
dry, grains subangular to subrounded
90% quartz, 5% feldspar, 5% other

(Continuation of Log)

PID Background (ppm)	PID Sample (ppm)
0.0	0.6
0.0	1.4
0.0	0.8
0.0	1.0
0.0	0.8

Depth (ft) / Sample



LIGHT GRAY SANDY SILT (ML)
dry

moist below 44 feet
silty clay layer 45 to 45.5 feet
clayey below 45.5 feet with red and black iron staining

LIGHT GRAY MEDIUM TO COARSE SAND (SP)
moist, grains subrounded to well rounded, 80% quartz, 15% feldspar and plagioclase, 5 % other
gravelly with trace silt 48 to 49 feet

LIGHT GRAY SANDY GRAVEL (GP)
moist, gravels subangular to rounded, mainly igneous with some quartzite, grains rounded to well rounded, 85% quartz, 8% plagioclase and feldspar, 7% other
trace silt and clay 50.1 to 51.5 feet
clay balls 58 to 59 feet

LIGHT GRAY SANDY GRAVEL (GW)
moist, gravels and cobbles rounded, mainly quartzite with some igneous, rounded medium sand grains, 95% quartz, 4% feldspar, 1% other

seepage encountered at 67.7 feet

LIGHT GRAY CLAYEY SILT (ML)
saturated

End of Boring - 73 feet

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LOG OF BORING B009
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE **A11**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
EB	6310,023.12	TSB	6/25/86		

Equipment Hollow Stem Auger

Elevation 5043.5 Date 9/10/85 to 9/11/85

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		0	LIGHT BROWN SILTY FINE TO MEDIUM SAND (SM) dry, grains subrounded to angular, 75% quartz, 20% feldspar, 5% other, trace gravel no gravel 2.5 to 4.0 feet
0.0	0.7	5	
0.0	1.0	10	coarse below 11 feet subrounded cobbles below 12 feet
0.0	1.0	15	driller's note: cobbles in 3-4" layers, penetrated several layers 13 to 18 feet SANDY CLAYEY SILT (ML) dry, grains rounded
0.0	10.0	20	
0.0	2.8	25	LIGHT BROWN FINE TO MEDIUM SAND (SP) dry, grains subangular to rounded, 90% quartz, 8% feldspar, 2% other
0.0	4.0	30	LIGHT BROWN SILTY SAND (SM) dry, grains subangular to rounded, 90% quartz, 8% feldspar, 2% other
0.0	5.0	35	
0.0	0.1 *	40	LIGHT GRAY FINE TO COARSE SAND (SW) dry, grains subangular to subrounded 80% quartz, 15% feldspar, 5% other

(Continuation of Log)

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		40	
0.0	0.4 *	45	
0.0	1.8	50	gravelly 47 to 48.5 feet LIGHT BROWN SILTY FINE SAND (SM) moist, grains angular to subangular, 80% quartz, 15% feldspar, 5% other, trace gravel
0.0	0.0	55	LIGHT BROWN GRAVELLY FINE TO COARSE SAND (SW) moist, grains subangular to rounded, 65% quartz, 25% feldspar and plagioclase, 10% other, gravel angular to rounded, mainly quartzite with some igneous trace silty clay and iron staining 54 to 54.4 feet seepage encountered at 60.5 feet
		60	
0.0	52	65	LIGHT BROWN CLAYEY SILT (ML) saturated, trace sand GREEN GRAY SILTY CLAY (CL) saturated, blocky
		70	End of Boring - 68.3 feet
		75	* HNU meter probably was not working properly. The intake fan was clogging.
		80	

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Engineers Geologists & Geophysicists

LOG OF BORING B010
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE A12

DRAWN EB | JOB NUMBER 6310,023.12 | APPROVED TSB | DATE 6/25/86 | REVISED | DATE

Equipment Hollow Stem Auger

Elevation 5043.49 Date 9/12/85

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		0	ASPHALT 2-INCHES THICK LIGHT BROWN SILTY FINE TO MEDIUM SAND (SM) dry, grains angular to subangular, 75% quartz, 20% feldspar, 5% other
0.0	0.0	5	
			LIGHT BROWN FINE TO COARSE SAND (SW) dry, grains subangular to subrounded, 85% quartz, 10% feldspar, 5% other, trace silt
0.0	0.0	10	thin caliche-cemented layer at 9 feet
0.0	0.0	15	gravelly 14 to 19 feet
0.0	0.0	20	LIGHT BROWN FINE TO MEDIUM SILTY SAND (SM) dry, grains subangular to subrounded, 85% quartz, 12% feldspar, 3% other clayey 22 to 22.9 feet
0.0	0.0	25	
			LIGHT BROWN & GRAY SANDY SILT (ML) dry, grains angular to subrounded
0.0	0.0	30	clayey 30.9 to 31.3 feet
0.0	0.2	35	LIGHT BROWN SILTY FINE TO MEDIUM SAND (SM) dry, grains angular to subrounded, 80% quartz, 18% feldspar, 2% other very silty 35.7 to 36.0 feet
0.0	0.1	40	

(Continuation of Log)

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Description
		40	
0.0	0.8	45	trace silt 43.5 to 45.5 feet
0.0	2.0	50	trace coarse sand grains 48 to 49.5 feet moist below 50.5 feet silty clay layer 51.5 to 51.7 feet
0.0	1.2	55	LIGHT BROWN SANDY SILT (ML) moist, grains angular to subrounded LIGHT GRAY MEDIUM TO COARSE SAND (SP) moist, grains subrounded to rounded, 92% quartz, 4% feldspar, 4% other
0.0	0.1	60	seepage encountered at 62.5 feet brown and trace silt below 62.5 feet
0.0	0.0	65	
0.0	0.0	70	
0.0	0.0	75	BROWN SANDY SILT (ML) saturated, grains angular to rounded, 90% quartz, 7% feldspar, 3% other, trace well rounded gravel clayey below 76.5 feet End of Boring - 77.7 feet
		80	

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LOG OF BORING B011
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE **A13**

DRAWN EB. | JOB NUMBER 6310,023.12 | APPROVED TSB | DATE 6/25/86 | REVISED | DATE

Equipment Hollow Stem Auger

Elevation 5045.8 Date 9/27/85

Depth (ft) | Sample

0

No samples taken above 67.5 feet
BROWN & GRAY SAND

5

10

15

20

25

30

35

sand and gravel below 35 feet

40

Depth (ft) | Sample

(Continuation of Log)

40

45

50

55

60

65

BROWN GRAVELLY FINE TO COARSE SAND (SW)
saturated, grains subangular to rounded,
88% quartz, 6% feldspar, 6% other, gravel
angular to rounded, mainly igneous with some
quartzite, trace silt

silty and clayey 73.3 to 73.5 feet

silty and clayey 74.9 to 75.3 feet

70

INTERBEDDED BROWN CLAYEY SILT (ML) & SILTY CLAY (CL)
saturated, horizontal bedding

75

LIGHT BROWN SILTY FINE SAND (SM)
saturated
thin caliche-cemented layers 79 to 79.5 feet
silty clay stringers 79.9 to 80.4 feet

driller's note: trace odor of solvents during grouting

80

End of Boring - 80.4 feet

HLA

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LOG OF BORING B012
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE A14

DRAWN EB. | JOB NUMBER 6310,023.12 | APPROVED TSB | DATE 6/25/86 | REVISED | DATE

Appendix A-2

Construction of MW-18

Equipment Hol

Elevation ____ of Log)

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Sample
		0	
0.4	0.4	5	
0.4	0.4	10	
0.4	0.4	15	
0.4	0.4	20	
0.4	0.4	25	
0.4	0.4	30	
0.4	0.4	35	
0.4	0.6	40	

LIGHT BROWN FI L (GW)
dry, trace s ded to rounded, mainly quartzite and
well rounded

RSE SAND (SW)
rounded to well rounded, 92% quartz,
% other, horizontal bedding

l (GW)
to coarse, grains subangular to rounded,
% feldspar, 4% other, cobbles and gravel
rounded, mainly quartzite and vein quartz
lt and granite

LIGHT GRAY FI ining at 53 feet
moist, grai
94% quartz,

gravel 15.5

trace silt

IUM SAND (SW)
ins subangular to rounded, 95% quartz,
% other, faint cross-bedding

below 28 fe
well rounde .2 to 69.5 feet
2% other SP)
ce silt, grains angular to rounded,
feldspar, 2% other, faint horizontal

-cemented layer at 74 feet

clayey and (SM)
BROWN SILTY C ains subangular to subrounded, 96% quartz,
saturated, 1% other

OF BORING MW-18

on Technology, Inc.
uerque, New Mexico

PLATE

A15

TSB DATE 6/25/86 REVISED DATE

PID Background (ppm)	PID Sample (ppm)	Depth (ft)	Sample	(Continuation of Log)
0.5	1.6	80		GRAY FINE TO MEDIUM SAND (SW) saturated, trace silt, grains subangular to rounded, 94% quartz, 4% feldspar, 2% other
				End of Boring 81 feet
				Note: Above 43 feet the 11.7 ev PID probe was used. Below 43 feet the 10.2 ev PID probe was used.
		85		
		90		
		95		
		100		
		10		
		110		
		115		
		120		

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Engineers, Geologists & Geophysicists

LOG OF BORING MW-18 (cont.)

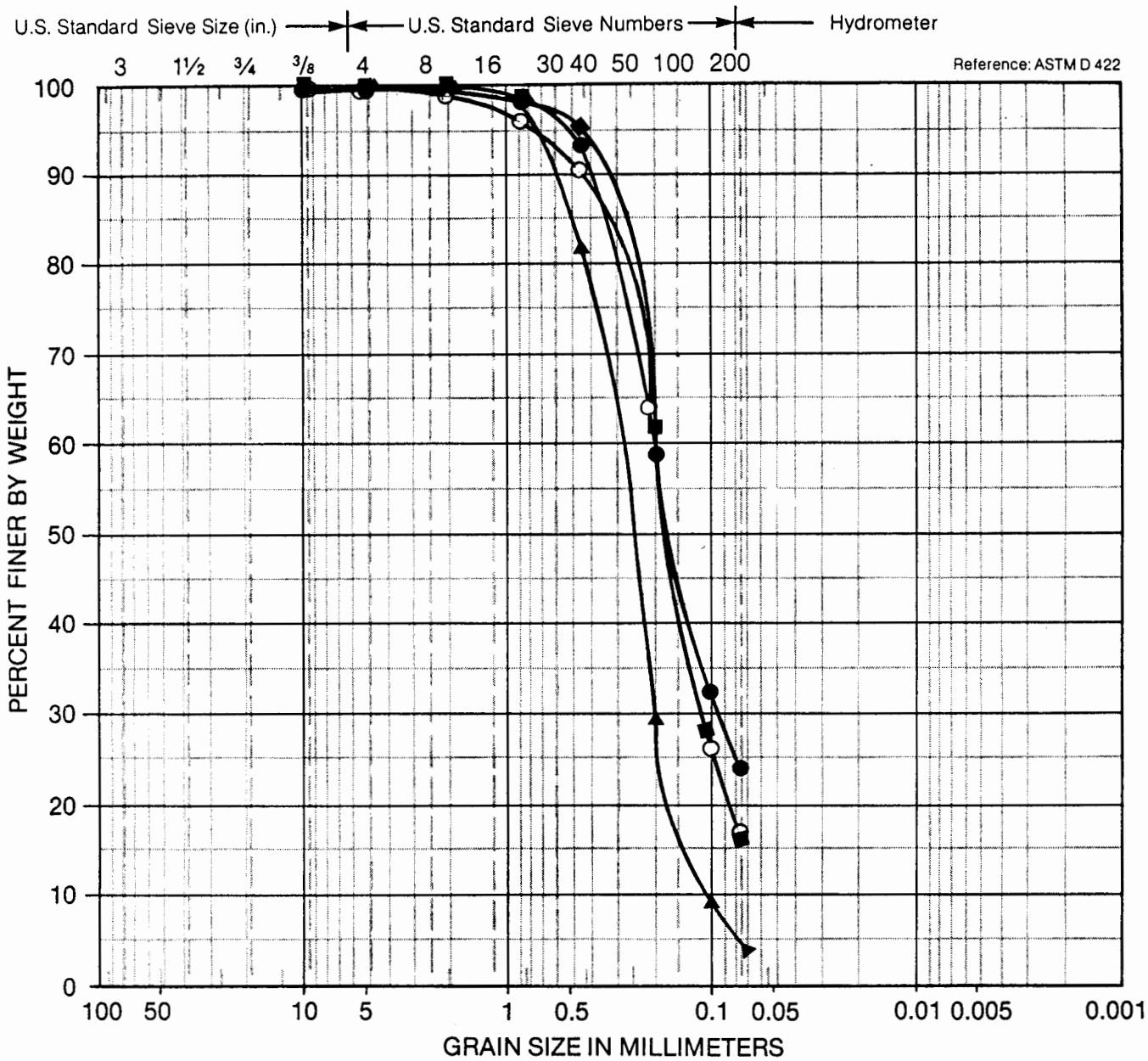
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE A16

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
EB	6310,031.12	TSB	6/25/86		

Appendix A-3

Particle Size Analysis



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
■	B-18 @ 16 - 16.8 feet	BROWN SILTY SAND (SM)
▲	B-18 @ 34 - 35.5 feet	TAN POORLY GRADED SAND (SP)
●	B-18 @ 65 - 65.8 feet	BROWN SILTY SAND (SM)
○	B-18 @ 74 - 75 feet	BROWN SILTY SAND (SM)

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Particle Size Analysis
Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE
A18

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
Eb.	6310,023.12	TSB	6/25/86		

Appendix B. Chemical Laboratory Investigation

1. Sample Identification
2. Analytical Results

Appendix B-1

Sample Identification

SAMPLE DESCRIPTION INFORMATION

for

Sparton Technology

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Receiv
51324-01	6310,023.12 4-5' A & B	Soil	9/4/85	9/5/85
51324-02	6310,023.12 9-10' A & B	Soil	9/4/85	9/5/85
51324-03	6310,023.12 14-15' A & B	Soil	9/4/85	9/5/85
51324-04	6310,023.12 18-18.5' A & B	Soil	9/4/85	9/5/85
51324-05	6310,023.12 24-25' A & B	Soil	9/4/85	9/5/85
51324-06	6310,023.12 30.5-31.5' A & B	Soil	9/4/85	9/5/85
51324-07	6310,023.12 35-36' A & B	Soil	9/4/85	9/5/85
51324-08	6310,023.12 39-40' A & B	Soil	9/5/85	9/6/85
51324-09	6310,023.12 44-45' A & B	Soil	9/5/85	9/6/85
51324-10	6310,023.12 47.5-52' A & B	Soil	9/5/85	9/6/85
51324-11	6310,023.12 54.5-55.5' A & B	Soil	9/5/85	9/6/85
51324-12	6310,023.12 58.5-59' A & B	Soil	9/5/85	9/6/85
51324-13	6310,023.12 63-64' A & B	Soil	9/5/85	9/6/85
51324-14	6310,023.12 37.3-52.3; 55.5-56.5'	Soil	9/5/85	9/6/85
51324-15	6310,023.12 5.0-5.5' A & B	Soil	9/9/85	9/10/85
51324-16	6310,023.12 11-11.5' A & B	Soil	9/9/85	9/10/85
51324-17	6310,023.12 13.5-14.5' A & B	Soil	9/9/85	9/10/85
51324-18	6310,023.12 18.5-19.5' A & B	Soil	9/9/85	9/10/85
51324-19	6310,023.12 23-24' A & B	Soil	9/9/85	9/10/85
51324-20	6310,023.12 28-33' A & B	Soil	9/9/85	9/10/85
51324-21	6310,023.12 33.5-34.5' A & B	Soil	9/9/85	9/10/85
51324-22	6310,023.12 39-39.5' A & B	Soil	9/9/85	9/10/85

SAMPLE DESCRIPTION INFORMATION

for

Sparton Technology

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
51324-23	6310,023.12 44-45' A & B	Soil	9/9/85	9/10/85
51324-24	6310,023.12 49-50' A & B	Soil	9/9/85	9/10/85
51324-25	6310,023.12 53-54.5' A & B	Soil	9/9/85	9/10/85
51324-26	6310,023.12 58-59' A & B	Soil	9/9/85	9/10/85
51324-27	6310,023.12 65-66' A & B	Soil	9/9/85	9/10/85
51324-28	6310,023.12 4.5-5.5' A & B	Soil	9/10/85	9/11/85
51324-29	6310,023.12 10-11' A & B	Soil	9/10/85	9/11/85
51324-30	6310,023.12 13.5-14.5' A & B	Soil	9/10/85	9/11/85
51324-31	6310,023.12 18.3-19' A & B	Soil	9/10/85	9/11/85
51324-32	6310,023.12 30.5-31.5' A & B	Soil	9/10/85	9/11/85
51324-33	6310,023.12 35.5-36.5' A & B	Soil	9/10/85	9/11/85
51324-34	6310,023.12 38.3-39' A & B	Soil	9/11/85	9/12/85
51324-35	6310,023.12 44.5-45.5' A & B	Soil	9/11/85	9/12/85
51324-36	6310,023.12 49-50' A & B	Soil	9/11/85	9/12/85
51324-37	6310,023.12 53.5-54.5' A & B	Soil	9/11/85	9/12/85
51324-38	6310,023.12 58.5-59.5' A & B	Soil	9/11/85	9/12/85
51324-39	6310,023.12 66.3-67' A & B	Soil	9/11/85	9/12/85
51324-40	6310,023.12 4.5-5.5' A & B	Soil	9/12/85	9/13/85
51324-41	6310,023.12 9-10' A & B	Soil	9/12/85	9/13/85
51324-42	6310,023.12 14-15' A & B	Soil	9/12/85	9/13/85
51324-43	6310,023.12 19.5-20.5' A & B	Soil	9/12/85	9/13/85
51324-44	6310,023.12 24.5-25.5' A & B	Soil	9/12/85	9/13/85

SAMPLE DESCRIPTION INFORMATION

for

Sparton Technology

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Receiv
51324-67	6310,023.12 44-44.5' A & B	Soil	9/17/85	9/18/85
51324-68	6310,023.12 49-50' A & B	Soil	9/17/85	9/18/85
51324-69	6310,023.12 59-59.5' A & B	Soil	9/17/85	9/18/85
51324-70	6310,023.12 4.5-5.5' A & B	Soil	9/18/85	9/19/85
51324-71	6310,023.12 10.5-11' A & B	Soil	9/18/85	9/19/85
51324-72	6310,023.12 15-16' A & B	Soil	9/18/85	9/19/85
51324-73	6310,023.12 18.2-18.8' A & B	Soil	9/18/85	9/19/85
51324-74	6310,023.12 25-26' A & B	Soil	9/18/85	9/19/85
51324-75	6310,023.12 30-31' A & B	Soil	9/18/85	9/19/85
51324-76	6310,023.12 35.5-36.5' A & B	Soil	9/18/85	9/19/85
51324-77	6310,023.12 39-40' A & B	Soil	9/19/85	9/20/85
51324-78	6310,023.12 43-44' A & B	Soil	9/19/85	9/20/85
51324-79	6310,023.12 49.5-50.5' A & B	Soil	9/19/85	9/20/85
51324-80	6310,023.12 57-57.5' A & B	Soil	9/19/85	9/20/85
51324-81	6310,023.12 58.5-59.5' A & B	Soil	9/19/85	9/20/85
51324-82	6310,023.12 5-6' A & B	Soil	9/20/85	9/21/85
51324-83	6310,023.12 9-10' A & B	Soil	9/20/85	9/21/85
51324-84	6310,023.12 14.5-15.5' A & B	Soil	9/20/85	9/21/85
51324-85	6310,023.12 20.5-21.5' A & B	Soil	9/20/85	9/21/85
51324-86	6310,023.12 24.5-25.5' A & B	Soil	9/21/85	9/23/85
51324-87	6310,023.12 30-31' A & B	Soil	9/21/85	9/23/85
51324-88	6310,023.12 35-36' A & B	Soil	9/21/85	9/23/85

SAMPLE DESCRIPTION INFORMATION

for

Sparton Technology

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Receive
51324-89	6310,023.12 40.5-41.5' A & B	Soil	9/21/85	9/23/85
51324-90	6310,023.12 44-44.5' A & B	Soil	9/21/85	9/23/85
51324-91	6310,023.12 48.3-49.3' A & B	Soil	9/21/85	9/23/85
51324-92	6310,023.12 53.5-55' A & B	Soil	9/21/85	9/23/85
51324-93	6310,023.12 58-59.2' A & B	Soil	9/21/85	9/23/85
51324-94	6310,023.12 4.5-5.5' A & B	Soil	9/23/85	9/24/85
51324-95	6310,023.12 10-11' A & B	Soil	9/23/85	9/24/85
51324-96	6310,023.12 15-15.5' A & B	Soil	9/23/85	9/24/85
51324-97	6310,023.12 20.5-21' A & B	Soil	9/23/85	9/24/85
51324-98	6310,023.12 25.5-26' A & B	Soil	9/23/85	9/24/85
51324-99	6310,023.12 30.5-31.5' A & B	Soil	9/23/85	9/24/85
51324-100	6310,023.12 35-36' A & B	Soil	9/23/85	9/24/85
51324-101	6310,023.12 39.5-40.5' A & B	Soil	9/23/85	9/24/85
51324-102	6310,023.12 43.1-44.2' A & B	Soil	9/23/85	9/24/85
51324-103	6310,023.12 54.2-54.7' A & B	Soil	9/23/85	9/24/85
51324-104	6310,023.12 58.2-59.4' A & B	Soil	9/23/85	9/24/85
51324-105*	6310,023.12 4-5' A & B	Soil	9/24/85	9/25/85
51324-106	6310,023.12 9-10' A & B	Soil	9/24/85	9/25/85
51324-107	6310,023.12 13.5-14' A & B	Soil	9/24/85	9/25/85
51324-108	6310,023.12 20-21' A & B	Soil	9/24/85	9/25/85
51324-109	6310,023.12 25.5-26' A & B	Soil	9/24/85	9/25/85
51324-110	6310,023.12 29-30' A & B	Soil	9/24/85	9/25/85

SAMPLE DESCRIPTION INFORMATION

for

Sparton Technology

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Receive
51324-111	6310,023.12 35-36' A & B	Soil	9/24/85	9/25/85
51324-112	6310,023.12 40-41' A & B	Soil	9/24/85	9/25/85
51324-113	6310,023.12 44-45' A & B	Soil	9/24/85	9/25/85
51324-114	6310,023.12 48.5-49' A & B	Soil	9/25/85	9/26/85
51324-115	6310,023.12 53-53.5' A & B	Soil	9/25/85	9/26/85
51324-116	6310,023.12 5.5-6.5' A & B	Soil	9/26/85	9/27/85
51324-117	6310,023.12 10.5-11.5' A & B	Soil	9/26/85	9/27/85
51324-118	6310,023.12 15.5-16.5' A & B	Soil	9/26/85	9/27/85
51324-119	6310,023.12 20.5-21' A & B	Soil	9/26/85	9/27/85
51324-120	6310,023.12 27-27.5' A & B	Soil	9/26/85	9/27/85
51324-121	6310,023.12 29.5-30.5' A & B	Soil	9/26/85	9/27/85
51324-122	6310,023.12 36.5-37.5' A & B	Soil	9/26/85	9/27/85
51324-123	6310,023.12 41.5-42.5' A & B	Soil	9/26/85	9/27/85
51324-124	6310,023.12 49-49.7' A & B	Soil	9/26/85	9/27/85
51324-125	6310,023.12 58.3-59' A & B	Soil	9/26/85	9/27/85
51324-126	6310,023.12 59.3-60.3' A & B	Soil	9/26/85	9/27/85
51324-127	6310,023.12 26-28', 29-30.5', 34-37.5' A & B	Soil	9/26/85	9/27/85

January 29, 1986

Appendix B-2

Analytical Results

REPORT OF ANALYTICAL DATA

FOR

HARDING LAWSON ASSOCIATES

Prepared by:

Rocky Mountain Analytical Laboratory
5530 Marshall Street
Arvada, Colorado 80002
(303) 421-6611

January 29, 1986

SPARTON TECHNOLOGY

BORE 001

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 001

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
4.0-5.0	2	ND
9.0-10.0	2	ND
14.0-15.0	2	ND
18.0-18.5	2	ND
24.0-25.0	2	ND
30.5-31.5	2	ND
35.0-36.0	2	ND
39.0-40.0	2	ND
44.0-45.0	2	ND
47.5-52.0	2	ND
52.5-53.0	2	NR
54.5-56.5	2	ND
58.0-59.0	2	ND
63.0-64.0	2	ND

ND = Not Detected. NR = Not Received.

TABLE 2. TOTAL METALS RESULTS - BORE 001

	Concentration (mg/kg)			
Bore Depth (ft.)	Cadmium	Chromium	Lead	Nickel
4.0-5.0	ND	1.8	4.0	2.1
9.0-10.0	ND	1.9	3.0	2.2
14.0-15.0	ND	1.8	3.0	1.6
18.0-18.5	ND	2.5	3.0	2.2
24.0-25.0	ND	1.6	4.0	2.0
30.5-31.5	ND	1.7	3.0	2.0
35.0-36.0	ND	2.2	4.0	2.3
39.0-40.0	ND	2.2	3.0	2.3
44.0-45.0	ND	1.6	3.0	2.7
47.5-52.0	ND	2.4	4.0	2.6
52.5-53.0	ND	NR	NR	NR
54.5-56.5	ND	2.4	4.0	2.8
58.0-59.0	ND	1.6	3.0	2.0
63.0-64.0	ND	1.3	3.0	2.0
Detection Limit	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NR = Not Received. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 3. EP TOXICITY RCRA METALS - BORE 001

Bore Depth (ft)	Concentration (mg/L)					
	Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
4.0-5.0	ND	ND	ND	ND	ND	ND
18.0-18.5	0.005	ND	ND	ND	ND	ND
47.5-52.0	0.005	0.009	ND	0.063	ND	ND
54.5-56.5	ND	ND	ND	ND	ND	ND
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 4. VOLATILE ORGANICS- BORE 001

Parameter	Concentration (ug/kg) Detection Limit	Bore Depth 58.9-59.0'
Acetone	10	BDL
Benzene	5	BDL
Bromoform	5	BDL
Methyl bromide	10	BDL
2-Butanone	10	BDL
Carbon disulfide	5	BDL
Carbon tetrachloride	5	BDL
Chlorobenzene	5	BDL
Chlorodibromomethane	5	BDL
Chloroethane	10	BDL
2-Chloroethylvinyl ether	10	BDL
Chloroform	5	BDL
Methyl chloride	10	BDL
Dichlorobromomethane	5	BDL
1,1-Dichloroethane	5	BDL
1,2-Dichloroethane	5	BDL
1,1-Dichloroethylene	5	BDL
1,2-Dichloropropane	5	BDL
cis-1,3-Dichloropropylene	5	BDL
trans-1,3-Dichloropropylene	5	BDL
Ethylbenzene	5	BDL
2-Hexanone	10	BDL
Methylene chloride	10	BDL
4-Methyl-2-pentanone	10	BDL
Styrene	5	BDL
1,1,2,2-Tetrachloroethane	5	BDL
Tetrachloroethylene	5	BDL
Toluene	5	BDL
1,2-trans-Dichloroethylene	5	BDL
1,1,1-Trichloroethane	5	BDL
1,1,2-Trichloroethane	5	BDL
Trichloroethylene	5	BDL
Vinyl acetate	10	BDL
Vinyl chloride	10	BDL
Total xylenes	5	BDL
Percent Moisture	0.1	6.2

BDL = Below Detection Limit

SPARTON TECHNOLOGY

BORE 002

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 002

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
4.5-5.5	2	ND
10.5-11.5	2	ND
14.5-15.5	2	ND
19.5-20.5	2	ND
30.0-31.0	2	ND
35.0-35.5	2	ND
40.0-41.0	2	ND
44.0-44.5	2	ND
49.0-50.0	2	ND
59.0-59.5	2	3

ND = Not Detected.

TABLE 2. PURGEABLE ORGANICS RESULTS - BORE 002

	Concentration (ug/kg)	
Parameter	Detection Limit	TOX 59.0-59.5'
1,1-Dichloroethylene	0.5	ND
1,2-trans-Dichloroethylene	0.5	ND
1,1,1-Trichloroethane	0.5	ND
Trichloroethylene	0.5	ND

ND = Not Detected.

TABLE 3. TOTAL METALS RESULTS - BORE 002

Bore Depth (ft)	Concentration (mg/kg) Cadmium	Chromium	Lead	Nickel
4.5-5.5	ND	2.8	3.0	2.0
10.0-11.5	ND	3.0	5.5	2.6
14.5-15.5	ND	2.9	4.0	2.0
19.5-20.5	ND	2.4	4.0	2.0
30.0-31.0	ND	2.6	ND	2.3
35.0-35.5	ND	6.6	5.7	5.3
40.0-41.0	ND	7.1	7.2	8.2
44.0-44.5	ND	2.2	ND	2.0
49.0-50.0	ND	4.9	4.0	5.3
59.0-59.5	ND	3.1	3.0	3.3
Detection Limits	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NR = Not Received. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 4. EP TOXICITY RCRA METALS - BORE 002

Bore Depth (ft)	Concentration (mg/L) Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
10.5-11.5	ND	0.026	ND	ND	ND	0.026
35.0-35.5	ND	0.088	ND	ND	0.02	0.068
40.0-41.0	ND	0.011	ND	0.028	ND	0.01
49.0-50.0	ND	0.012	ND	0.029	ND	0.01
59.0-59.5	ND	ND	ND	ND	ND	ND
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 5. VOLATILE ORGANICS- BORE 002

Parameter	Detection limit	Concentration (ug/kg) Bore Depth 35.0-35.5'	Bore Depth 40.0-41.0'	Bore Depth 44.0-44.5'
Acetone	10	BDL	BDL	BDL
Benzene	5	BDL	BDL	BDL
Bromoform	5	BDL	BDL	BDL
Methyl bromide	10	BDL	BDL	BDL
2-Butanone	10	BDL	BDL	BDL
Carbon disulfide	5	BDL	BDL	BDL
Carbon tetrachloride	5	BDL	BDL	BDL
Chlorobenzene	5	BDL	BDL	BDL
Chlorodibromomethane	5	BDL	BDL	BDL
Chloroethane	10	BDL	BDL	BDL
2-Chloroethylvinyl ether	10	BDL	BDL	BDL
Chloroform	5	BDL	BDL	BDL
Methyl chloride	10	BDL	BDL	BDL
Dichlorobromomethane	5	BDL	BDL	BDL
1,1-Dichloroethane	5	BDL	BDL	BDL
1,2-Dichloroethane	5	BDL	BDL	BDL
1,1-Dichloroethylene	5	BDL	BDL	BDL
1,2-Dichloropropane	5	BDL	BDL	BDL
cis-1,3-Dichloropropylene	5	BDL	BDL	BDL
trans-1,3-Dichloropropylene	5	BDL	BDL	BDL
Ethylbenzene	5	BDL	BDL	BDL
2-Hexanone	10	BDL	BDL	BDL
Methylene chloride	10	BDL	BDL	BDL
4-Methyl-2-pentanone	10	BDL	BDL	BDL
Styrene	5	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	5	BDL	BDL	BDL
Tetrachloroethylene	5	BDL	BDL	BDL
Toluene	5	BDL	BDL	BDL
1,2-trans-Dichloroethylene	5	BDL	BDL	BDL
1,1,1-Trichloroethane	5	BDL	BDL	BDL
1,1,2-Trichloroethane	5	BDL	BDL	BDL
Trichloroethylene	5	BDL	BDL	BDL
Vinyl acetate	10	BDL	BDL	BDL
Vinyl chloride	10	BDL	BDL	BDL
Total xylenes	5	BDL	BDL	BDL
Percent Moisture	0.1	12.0	15.5	2.7

BDL = Below Detection Limit

SPARTON TECHNOLOGY

BORE 003

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 003

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
4.5-5.5	2	2
20.5-21.5	2	ND
25.0-25.5	2	ND
30.0-31.0	2	3
35.5-36.0	2	3
39.4-40.5	2	3
44.0-45.0	2	4
48.5-49.5	2	ND

ND = Not Detected.

TABLE 2. PURGEABLE ORGANICS RESULTS - BORE 003

		Concentration (ug/kg)					
Parameter	Detection Limit	Bore Depth 4.5-5.5'	Bore Depth 30.0-31.0'	Bore Depth 35.5-36.0'	Bore Depth 39.0-39.4'	Bore Depth 44.0-45.0'	Bore Depth 48.5-49.5'
1,1-Dichloroethylene	1.0	ND	ND	ND	ND	ND	ND
1,2-trans-Dichloroethylene	0.5	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	2.0	ND	ND	ND	ND	ND	ND
Trichloroethylene	1.0	ND	ND	ND	ND	ND	ND

ND = Not Detected.

TABLE 3. TOTAL METALS RESULTS - BORE 003

Bore Depth (ft)	Concentration (mg/kg) Cadmium	Chromium	Lead	Nickel
4.5-5.5	ND	4.3	4.0	4.0
20.5-21.5	ND	2.6	3.0	2.8
25.0-25.5	ND	2.3	3.0	2.5
30.0-31.0	ND	2.6	ND	3.2
35.5-36.0	ND	2.8	3.0	2.7
39.4-40.5	ND	4.3	4.0	4.7
44.0-45.0	ND	4.2	4.0	4.7
48.5-49.5	ND	2.6	ND	2.3
Detection Limits	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 4. EP TOXICITY RCRA METALS - BORE 003

Bore Depth (ft)	Concentration (mg/L) Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
4.5-5.5	ND	0.005	ND	ND	ND	ND
35.5-36.0	ND	0.007	ND	ND	ND	ND
39.4-40.5	ND	ND	ND	ND	ND	ND
44.0-45.0	ND	ND	ND	0.02	ND	ND
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 5. VOLATILE ORGANICS- BORE 003

Parameter	Detection Limit	Concentration (ug/kg) Bore Depth 39.5-40.5'	Bore Depth 44.0-45.0'	Bore Dep 48.5-49.5
Acetone	10	BDL	BDL	BDL
Benzene	5	BDL	BDL	BDL
Bromoform	5	BDL	BDL	BDL
Methyl bromide	10	BDL	BDL	BDL
2-Butanone	10	BDL	BDL	BDL
Carbon disulfide	5	BDL	BDL	BDL
Carbon tetrachloride	5	BDL	BDL	BDL
Chlorobenzene	5	BDL	BDL	BDL
Chlorodibromomethane	5	BDL	BDL	BDL
Chloroethane	10	BDL	BDL	BDL
2-Chloroethylvinyl ether	10	BDL	BDL	BDL
Chloroform	5	BDL	BDL	BDL
Methyl chloride	10	BDL	BDL	BDL
Dichlorobromomethane	5	BDL	BDL	BDL
1,1-Dichloroethane	5	BDL	BDL	BDL
1,2-Dichloroethane	5	BDL	BDL	BDL
1,1-Dichloroethylene	5	BDL	BDL	BDL
1,2-Dichloropropane	5	BDL	BDL	BDL
cis-1,3-Dichloropropylene	5	BDL	BDL	BDL
trans-1,3-Dichloropropylene	5	BDL	BDL	BDL
Ethylbenzene	5	BDL	BDL	BDL
2-Hexanone	10	BDL	BDL	BDL
Methylene chloride	10	BDL	BDL	BDL
4-Methyl-2-pentanone	10	BDL	BDL	BDL
Styrene	5	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	5	BDL	BDL	BDL
Tetrachloroethylene	5	BDL	BDL	BDL
Toluene	5	BDL	BDL	BDL
1,2-trans-Dichloroethylene	5	BDL	BDL	BDL
1,1,1-Trichloroethane	5	BDL	BDL	BDL
1,1,2-Trichloroethane	5	BDL	BDL	BDL
Trichloroethylene	5	BDL	BDL	BDL
Vinyl acetate	10	BDL	BDL	BDL
Vinyl chloride	10	BDL	BDL	BDL
Total xylenes	5	BDL	BDL	BDL
Percent Moisture	0.1	2.8	8.8	1.8

BDL = Below Detection Limit

SPARTON TECHNOLOGY

BORE 004

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 004

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
5.0-6.0	2	ND
9.0-10.0	2	ND
13.5-14.0	2	ND
20.0-21.0	2	ND
25.5-26.0	2	ND
29.0-30.0	2	ND
35.0-36.0	2	ND
40.0-41.0	2	ND
44.0-45.0	2	ND
48.5-49.0	2	ND
53.0-53.5	2	ND

ND = Not Detected.

TABLE 2. TOTAL METALS RESULTS - BORE 004

	Concentration (mg/kg)			
Bore Depth (ft)	Cadmium	Chromium	Lead	Nickel
5.0-6.0	ND	4.5	5.0	3.6
9.0-10.0	ND	2.6	5.1	2.5
13.5-14.0	ND	4.0	4.0	3.9
20.0-21.0	ND	3.7	4.0	2.9
25.5-26.0	ND	7.8	7.3	6.0
29.0-30.0	ND	2.8	4.0	2.5
35.0-36.0	ND	3000	5.0	25
40.0-41.0	ND	58	10	9.4
44.0-45.0	ND	12	3.0	2.5
48.5-49.0	ND	40	14	14
53.0-53.5	ND	9.7	5.4	3.2
Detection Limit	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NR = Not Received. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 3. EP TOXICITY RCRA METALS - BORE 004

Bore Depth (ft)	Concentration (mg/L) Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
5.0-6.0	0.010	0.010	ND	ND	ND	0.01
9.0-10.0	0.004	ND	ND	ND	ND	ND
13.5-14.0	ND	ND	ND	ND	ND	ND
20.0-21.0	ND	ND	ND	ND	ND	ND
25.5-26.0	ND	ND	ND	ND	ND	ND
29.0-30.0	ND	ND	ND	ND	ND	ND
35.0-36.0	ND	8.4	ND	0.12	8.0	0.35
40.0-41.0	0.007	0.25	ND	0.025	ND	0.25
44.0-45.0	ND	0.008	ND	ND	ND	ND
48.5-49.0	0.005	0.059	ND	0.046	0.02	0.039
53.0-53.5	ND	ND	ND	ND	ND	ND
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 4. VOLATILE ORGANICS- BORE 004

Parameter	Detection Limit	Concentration (ug/kg) Bore Depth 20.0-21.0'	Bore Depth 35.0-36.0'	Bore Depth 40.0-41.0'	Bore Depth 44.0-45.0'	Bore Depth 53.0-53.5'
Acetone	10	BDL	BDL	BDL	BDL	BDL
Benzene	5	BDL	BDL	BDL	BDL	BDL
Bromoform	5	BDL	BDL	BDL	BDL	BDL
Methyl bromide	10	BDL	BDL	BDL	BDL	BDL
2-Butanone	10	BDL	BDL	BDL	BDL	BDL
Carbon disulfide	5	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride	5	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	5	BDL	BDL	BDL	BDL	BDL
Chlorodibromomethane	5	BDL	BDL	BDL	BDL	BDL
Chloroethane	10	BDL	BDL	BDL	BDL	BDL
2-Chloroethylvinyl ether	10	BDL	BDL	BDL	BDL	BDL
Chloroform	5	BDL	BDL	BDL	BDL	BDL
Methyl chloride	10	BDL	BDL	BDL	BDL	BDL
Dichlorobromomethane	5	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethane	5	BDL	BDL	BDL	BDL	BDL
1,2-Dichloroethane	5	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethylene	5	BDL	BDL	BDL	BDL	BDL
1,2-Dichloropropane	5	BDL	BDL	BDL	BDL	BDL
cis-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL	BDL
trans-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	5	BDL	BDL	BDL	BDL	BDL
2-Hexanone	10	BDL	BDL	BDL	BDL	BDL
Methylene chloride	10	BDL	BDL	BDL	BDL	BDL
4-Methyl-2-pentanone	10	BDL	BDL	BDL	BDL	BDL
Styrene	5	BDL	BDL	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	5	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	5	BDL	BDL	BDL	BDL	BDL
Toluene	5	BDL	BDL	BDL	BDL	BDL
1,2-trans-Dichloroethylene	5	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	5	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	5	BDL	BDL	BDL	BDL	BDL
Trichloroethylene	5	BDL	BDL	BDL	BDL	BDL
Vinyl acetate	10	BDL	BDL	BDL	BDL	BDL
Vinyl chloride	10	BDL	BDL	BDL	BDL	BDL
Total xylenes	5	BDL	BDL	BDL	BDL	BDL
Percent Moisture	0.1	6.4	8.5	15.7	2.9	3.7

BDL = Below Detection Limit

SPARTON TECHNOLOGY

BORE 005

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 005

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
4.5-5.5	2	ND
10.0-11.0	2	ND
15.0-15.5	2	ND
20.5-21.0	2	ND
25.5-26.0	2	ND
30.5-31.5	2	ND
35.0-36.0	2	8
39.5-40.0	2	ND
43.1-44.2	2	ND
54.2-54.7	2	ND
58.2-59.4	2	ND

ND = Not Detected.

TABLE 2. PURGEABLE ORGANICS RESULTS - BORE 005

	Concentration (ug/kg)	
Parameter	Detection Limit	Bore Depth 35.0-36.0'
1,1-Dichloroethylene	0.5	ND
1,2-trans-Dichloroethylene	0.5	ND
1,1,1-Trichloroethane	0.5	0.8
Trichloroethylene	0.5	1.5

ND = Not Detected.

TABLE 3. TOTAL METALS RESULTS - BORE 005

Bore Depth (ft)	Concentration (mg/kg) Cadmium	Chromium	Lead	Nickel
4.5-5.5	ND	2.8	5.1	2.8
10.0-11.0	ND	2.8	4.0	2.8
15.0-15.5	ND	2.4	4.0	2.4
20.5-21.0	ND	2.8	4.0	2.7
25.5-26.0	ND	3.1	4.0	3.1
30.5-31.5	ND	2.8	4.0	3.2
35.0-36.0	ND	3.0	8.9	3.3
39.5-40.0	ND	9.2	11	11
43.1-44.2	ND	15	4.0	4.9
54.2-54.7	ND	2.7	4.0	2.9
58.2-59.4	ND	7.7	3.0	3.0
Detection Limit	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 4. EP TOXICITY RCRA METALS - BORE 005

Bore Depth (ft)	Concentration (mg/L) Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
4.5-5.5	ND	ND	ND	ND	ND	ND
25.5-26.0	ND	ND	ND	ND	ND	ND
35.0-36.0	ND	ND	ND	ND	ND	ND
39.5-40.0	ND	ND	ND	0.022	ND	ND
43.1-44.2	ND	ND	ND	ND	ND	ND
58.2-59.4	ND	ND	ND	ND	ND	ND
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 5. VOLATILE ORGANICS- BORE 005

Parameter	Detection Limit	Concentration (ug/kg) Bore Depth 35.0-36.0'	Bore Depth 39.5-40.0'	Bore Depth 43.1-44.2'	Bore Depth 54.2 54.7'
Acetone	10	BDL	22	BDL	BDL
Benzene	5	BDL	BDL	BDL	BDL
Bromoform	5	BDL	BDL	BDL	BDL
Methyl bromide	10	BDL	BDL	BDL	BDL
2-Butanone	10	BDL	BDL	BDL	BDL
Carbon disulfide	5	BDL	BDL	BDL	BDL
Carbon tetrachloride	5	BDL	BDL	BDL	BDL
Chlorobenzene	5	BDL	BDL	BDL	BDL
Chlorodibromomethane	5	BDL	BDL	BDL	BDL
Chloroethane	10	BDL	BDL	BDL	BDL
2-Chloroethylvinyl ether	10	BDL	BDL	BDL	BDL
Chloroform	5	BDL	BDL	BDL	BDL
Methyl chloride	10	BDL	BDL	BDL	BDL
Dichlorobromomethane	5	BDL	BDL	BDL	BDL
1,1-Dichloroethane	5	BDL	BDL	BDL	BDL
1,2-Dichloroethane	5	BDL	BDL	BDL	BDL
1,1-Dichloroethylene	5	BDL	9	BDL	BDL
1,2-Dichloropropane	5	BDL	BDL	BDL	BDL
cis-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL
trans-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL
Ethylbenzene	5	BDL	BDL	BDL	BDL
2-Hexanone	10	BDL	BDL	BDL	BDL
Methylene chloride	10	BDL	BDL	BDL	BDL
4-Methyl-2-pentanone	10	BDL	BDL	BDL	BDL
Styrene	5	BDL	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	5	BDL	BDL	BDL	BDL
Tetrachloroethylene	5	BDL	BDL	BDL	BDL
Toluene	5	BDL	BDL	BDL	BDL
1,2-trans-Dichloroethylene	5	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	5	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	5	BDL	50	BDL	BDL
Trichloroethylene	5	BDL	80	BDL	BDL
Vinyl acetate	10	BDL	BDL	BDL	BDL
Vinyl chloride	10	BDL	BDL	BDL	BDL
Total xylenes	5	BDL	BDL	BDL	BDL
Percent Moisture	0.1	7.8	21.5	4.2	4.1

BDL = Below Detection Limit

SPARTON TECHNOLOGY

BORE 006

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 006

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
5.0-6.0	2	ND
9.0-10.0	2	ND
14.5-15.5	2	ND
20.5-21.5	2	ND
24.5-25.5	2	ND
30.0-31.0	2	ND
35.0-36.0	2	ND
40.5-41.5	2	ND
44.0-44.5	2	ND
48.3-49.3	2	ND
53.5-55.0	2	ND
58.0-59.2	2	ND

ND = Not Detected.

TABLE 2. TOTAL METALS RESULTS - BORE 006

	Concentration (mg/kg)			
Bore Depth (ft)	Cadmium	Chromium	Lead	Nickel
5.0-6.0	ND	4.8	5.0	3.7
9.0-10.0	ND	2.5	4.0	2.6
14.5-15.5	ND	1.9	4.0	2.2
20.5-21.5	ND	4.2	5.4	4.5
24.5-25.5	ND	5.1	7.3	5.4
30.0-31.0	ND	2.8	5.0	3.4
35.0-36.0	ND	2.7	5.0	2.7
40.5-41.5	ND	8.5	9.7	9.3
44.0-44.5	ND	2.4	4.0	2.7
48.3-49.3	ND	2.1	4.0	2.4
53.5-55.0	ND	3.4	4.0	3.0
58.0-59.2	ND	5.9	4.0	2.9
Detection Limit	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 3. EP TOXICITY RCRA METALS - BORE 006

Bore Depth (ft)	Concentration (mg/L)					
	Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
5.0-6.0	ND	0.011	ND	ND	ND	0.01
20.5-21.5	ND	ND	ND	ND	ND	ND
24.5-25.5	ND	ND	ND	ND	ND	ND
40.5-41.5	0.007	ND	ND	0.028	ND	ND
53.5-55.0	0.004	ND	ND	ND	ND	ND
58.0-59.2	0.004	ND	ND	0.042	ND	ND
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 4. VOLATILE ORGANICS- BORE 006

Parameter	Detection Limit	Concentration (ug/kg) Bore Depth 30.0-31.0'	Bore Depth 35.0-36.0'	Bore Depth 40.5-41.5'	Bore Depth 44.0-44.5'
Acetone	10	BDL	BDL	BDL	BDL
Benzene	5	BDL	BDL	BDL	BDL
Bromoform	5	BDL	BDL	BDL	BDL
Methyl bromide	10	BDL	BDL	BDL	BDL
2-Butanone	10	BDL	BDL	BDL	BDL
Carbon disulfide	5	BDL	BDL	BDL	BDL
Carbon tetrachloride	5	BDL	BDL	BDL	BDL
Chlorobenzene	5	BDL	BDL	BDL	BDL
Chlorodibromomethane	5	BDL	BDL	BDL	BDL
Chloroethane	10	BDL	BDL	BDL	BDL
2-Chloroethylvinyl ether	10	BDL	BDL	BDL	BDL
Chloroform	5	BDL	BDL	BDL	BDL
Methyl chloride	10	BDL	BDL	BDL	BDL
Dichlorobromomethane	5	BDL	BDL	BDL	BDL
1,1-Dichloroethane	5	BDL	BDL	BDL	BDL
1,2-Dichloroethane	5	BDL	BDL	BDL	BDL
1,1-Dichloroethylene	5	BDL	BDL	BDL	BDL
1,2-Dichloropropane	5	BDL	BDL	BDL	BDL
cis-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL
trans-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL
Ethylbenzene	5	BDL	BDL	BDL	BDL
2-Hexanone	10	BDL	BDL	BDL	BDL
Methylene chloride	10	BDL	BDL	BDL	BDL
4-Methyl-2-pentanone	10	BDL	BDL	BDL	BDL
Styrene	5	BDL	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	5	BDL	BDL	BDL	BDL
Tetrachloroethylene	5	BDL	BDL	BDL	BDL
Toluene	5	BDL	BDL	BDL	BDL
1,2-trans-Dichloroethylene	5	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	5	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	5	BDL	BDL	BDL	BDL
Trichloroethylene	5	BDL	BDL	BDL	BDL
Vinyl acetate	10	BDL	BDL	BDL	BDL
Vinyl chloride	10	BDL	BDL	BDL	BDL
Total xylenes	5	BDL	BDL	BDL	BDL
Percent Moisture	0.1	4.1	3.2	14.6	2.5

BDL = Below Detection Limit

SPARTON TECHNOLOGY

BORE 007

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 007

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
4.5-5.5	2	ND
10.5-11.0	2	ND
15.0-16.0	2	ND
18.2-18.8	2	ND
25.0-26.0	2	ND
30.0-31.0	2	ND
35.5-36.5	2	ND
39.0-40.0	2	ND
43.0-44.0	2	3
49.5-50.5	2	2
57.0-57.5	2	ND
58.5-59.5	2	ND

ND = Not Detected.

TABLE 2. PURGEABLE ORGANICS RESULTS - BORE 007

	Concentration (ug/kg)		
Parameter	Detection Limit	Bore Depth 43.0-44.0'	Bore Depth 49.5-50.5'
1,1-Dichloroethylene	6	ND	ND
1,2-trans-Dichloroethylene	6	ND	ND
1,1,1-Trichloroethane	6	140	530
Trichloroethylene	6	380	990

ND = Not Detected.

TABLE 3. TOTAL METALS RESULTS - BORE 007

Bore Depth (ft)	Concentration (mg/kg) Cadmium	Chromium	Lead	Nickel
4.5-5.5	ND	3.1	3.0	2.2
10.5-11.0	ND	2.2	ND	2.0
15.0-16.0	ND	2.7	ND	2.0
18.2-18.8	ND	1.8	ND	2.0
25.0-26.0	ND	3.2	5.0	3.7
30.0-31.0	ND	2.5	5.0	3.3
35.5-36.5	ND	3.6	5.0	4.6
39.0-40.0	ND	4.7	5.6	4.9
43.0-44.0	ND	21	12	13
49.5-50.5	ND	19	12	14
57.0-57.5	ND	4.2	4.0	3.5
58.5-59.5	ND	4.7	4.0	2.7
Detection Limit	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 4. EP TOXICITY RCRA METALS - BORE 007

Bore Depth (ft)	Concentration (mg/L) Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
4.5-5.5	ND	ND	ND	ND	ND	ND
35.5-36.5	ND	ND	ND	ND	ND	ND
39.0-40.0	ND	ND	ND	0.012	ND	ND
43.0-44.0	ND	ND	ND	0.060	ND	ND
49.5-50.5	ND	0.062	ND	0.063	0.03	0.032
57.0-57.5	ND	0.011	ND	ND	ND	0.01
58.5-59.5	ND	0.013	ND	ND	ND	0.01
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 5. VOLATILE ORGANICS- BORE 007

Parameter	Detection Limit	Concentration (ug/kg) Bore Depth 25.0-26.0'	Bore Depth 35.5-36.5'	Bore Depth 39.0-40.0'	Bore Depth 43.0-44.0'	Bore 49.5-
Acetone	10	22	BDL	14	17	BI
Benzene	5	BDL	BDL	BDL	BDL	BI
Bromoform	5	BDL	BDL	BDL	BDL	BI
Methyl bromide	10	BDL	BDL	BDL	BDL	BI
2-Butanone	10	BDL	BDL	BDL	BDL	BI
Carbon disulfide	5	BDL	BDL	BDL	BDL	BI
Carbon tetrachloride	5	BDL	BDL	BDL	BDL	BI
Chlorobenzene	5	BDL	BDL	BDL	BDL	BI
Chlorodibromomethane	5	BDL	BDL	BDL	BDL	BI
Chloroethane	10	BDL	BDL	BDL	BDL	BI
2-Chloroethylvinyl ether	10	BDL	BDL	BDL	BDL	BI
Chloroform	5	BDL	BDL	BDL	BDL	BI
Methyl chloride	10	BDL	BDL	BDL	BDL	BI
Dichlorobromomethane	5	BDL	BDL	BDL	BDL	BI
1,1-Dichloroethane	5	BDL	BDL	BDL	BDL	BI
1,2-Dichloroethane	5	BDL	BDL	BDL	BDL	BI
1,1-Dichloroethylene	5	BDL	BDL	BDL	BDL	BI
1,2-Dichloropropane	5	BDL	BDL	BDL	BDL	BI
cis-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL	BI
trans-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL	BI
Ethylbenzene	5	BDL	BDL	BDL	BDL	BI
2-Hexanone	10	BDL	BDL	BDL	BDL	BI
Methylene chloride	10	BDL	BDL	BDL	BDL	BI
4-Methyl-2-pentanone	10	BDL	BDL	BDL	BDL	BI
Styrene	5	BDL	BDL	BDL	BDL	BI
1,1,2,2-Tetrachloroethane	5	BDL	BDL	BDL	9	2
Tetrachloroethylene	5	BDL	BDL	BDL	BDL	BI
Toluene	5	BDL	BDL	BDL	BDL	5
1,2-trans-Dichloroethylene	5	BDL	BDL	BDL	BDL	BI
1,1,1-Trichloroethane	5	BDL	BDL	BDL	BDL	BI
1,1,2-Trichloroethane	5	BDL	BDL	BDL	BDL	BI
Trichloroethylene	5	BDL	BDL	BDL	BDL	BI
Vinyl acetate	10	BDL	BDL	BDL	BDL	BI
Vinyl chloride	10	BDL	BDL	BDL	BDL	BI
Total xylenes	5	BDL	BDL	BDL	BDL	BI
Percent Moisture	0.1	5.4	3.3	4.4	6.6	21.

BDL = Below Detection Limit

SPARTON TECHNOLOGY

BORE 008

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 008

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
5.5-6.5	2	ND
10.5-11.5	2	ND
15.5-16.5	2	ND
20.5-21.0	2	ND
27.0-27.5	2	ND
29.5-30.3	2	3
36.5-37.5	2	3
41.5-42.5	2	2
49.0-49.7	2	2
58.3-59.0	2	ND
59.3-60.3	2	ND

ND = Not Detected.

TABLE 2. PURGEABLE ORGANICS RESULTS - BORE 008

		Concentration (ug/kg)			
Parameter	Detection Limit	Bore Depth 29.5-30.3'	Bore Depth 36.5-37.5'	Bore Depth 41.5-42.5	Bore Depth 49.0-49.7'
1,1-Dichloroethylene	0.5	ND	ND	ND(2.5)	ND(2.0)
1,2-trans-Dichloroethylene	0.5	ND	ND	ND(2.5)	ND(2.0)
1,1,1-Trichloroethane	0.5	ND	1.1	22(2.5)	ND(10)
Trichloroethylene	0.5	ND	0.7	140(2.5)	21(2.0)

ND = Not Detected.
Values in parentheses represent adjusted detection limits.

TABLE 3. TOTAL METALS RESULTS - BORE 008

Bore Depth (ft)	Concentration (mg/kg) Cadmium	Chromium	Lead	Nickel
5.5-6.5	ND	3.7	4.0	2.1
10.5-11.5	ND	7.3	4.0	2.4
15.5-16.5	ND	15	5.7	5.0
20.5-21.5	ND	41	5.0	14
27.0-27.5	ND	44	6.6	6.4
29.5-30.3	ND	850	9.5	45
36.5-37.5	ND	3300	ND	9.6
41.5-42.5	4.0	100	12	62
49.0-49.7	ND	51	11	23
58.3-59.0	ND	29	4.0	5.0
59.3-60.3	ND	15	5.0	4.1
Detection Limit	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NA = Not Applicable. MCL = Maximum Contaminant Level.

TABLE 4. EP TOXICITY RCRA METALS - BORE 008

Bore Depth (ft)	Concentration (mg/L) Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
5.5-6.5	ND	0.008	ND	ND	ND	ND
10.5-11.5	ND	0.007	ND	ND	ND	ND
15.5-16.5	ND	0.055	ND	0.027	ND	0.055
20.5-21.0	0.006	0.32	ND	0.095	ND	0.32
27.0-27.5	ND	0.18	ND	0.069	0.02	0.16
29.5-30.3	0.018	8.1	ND	0.33	7.1	1.0
36.5-37.5	ND	4.2	ND	0.12	3.1	1.1
41.5-42.5	0.094	0.093	ND	0.33	0.06	0.033
49.0-49.7	ND	0.087	ND	0.17	ND	0.087
58.3-59.0	ND	0.018	ND	0.086	0.02	ND
59.3-60.3	ND	0.054	ND	0.025	0.03	0.024
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable. MCL = Maximum Contaminant Level.

TABLE 5. VOLATILE ORGANICS- BORE 008

Parameter	Detection Limit	Concentration (ug/kg) Bore Depth 27.0-27.5'	Bore Depth 36.5-37.5'	Bore Depth 41.5-42.5'	Bore Depth 49.0-49.7'	Bore Depth 59.3-60.3'
Acetone	10	BDL	44	1200	25	BDL
Benzene	5	BDL	BDL	BDL	BDL	BDL
Bromoform	5	BDL	BDL	BDL	BDL	BDL
Methyl bromide	10	BDL	BDL	BDL	BDL	BDL
2-Butanone	10	BDL	BDL	BDL	BDL	BDL
Carbon disulfide	5	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride	5	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	5	BDL	BDL	BDL	BDL	BDL
Chlorodibromomethane	5	BDL	BDL	BDL	BDL	BDL
Chloroethane	10	BDL	BDL	BDL	BDL	BDL
2-Chloroethylvinyl ether	10	BDL	BDL	BDL	BDL	BDL
Chloroform	5	BDL	BDL	BDL	BDL	BDL
Methyl chloride	10	BDL	BDL	BDL	BDL	BDL
Dichlorobromomethane	5	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethane	5	BDL	BDL	BDL	BDL	BDL
1,2-Dichloroethane	5	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethylene	5	BDL	BDL	BDL	BDL	BDL
1,2-Dichloropropane	5	BDL	BDL	BDL	BDL	BDL
cis-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL	BDL
trans-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	5	BDL	BDL	BDL	BDL	BDL
2-Hexanone	10	BDL	BDL	BDL	BDL	BDL
Methylene chloride	10	BDL	BDL	BDL	BDL	BDL
4-Methyl-2-pentanone	10	BDL	BDL	BDL	BDL	BDL
Styrene	5	BDL	BDL	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	5	BDL	BDL	BDL	7	BDL
Tetrachloroethylene	5	BDL	BDL	BDL	BDL	BDL
Toluene	5	BDL	BDL	BDL	BDL	BDL
1,2-trans-Dichloroethylene	5	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	5	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	5	BDL	BDL	BDL	BDL	BDL
Trichloroethylene	5	BDL	BDL	BDL	BDL	BDL
Vinyl acetate	10	BDL	BDL	BDL	BDL	BDL
Vinyl chloride	10	BDL	BDL	BDL	BDL	BDL
Total xylenes	5	BDL	BDL	BDL	BDL	BDL
Percent Moisture	0.1	7.1	9.5	15.4	22.2	3.0

BDL = Below Detection Limit

SPARTON TECHNOLOGY

BORE 009

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 009

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
5.0-5.5	2	ND
11.0-11.5	2	ND
13.5-14.5	2	ND
18.5-19.5	2	ND
23.0-24.0	2	ND
28.0-33.0	2	ND
33.5-34.5	2	ND
39.0-39.5	2	ND
44.0-45.0	2	ND
49.0-50.0	2	ND
53.0-54.5	2	ND
58.0-59.0	2	ND
65.0-66.0	2	ND

ND = Not Detected.

TABLE 2. TOTAL METALS RESULTS - BORE 009

	Concentration (mg/kg)			
Bore Depth (ft)	Cadmium	Chromium	Lead	Nickel
5.0-5.5	ND	4.1	5.6	4.9
11.0-11.5	ND	2.9	4.0	3.9
13.5-14.5	ND	1.9	4.0	2.6
18.5-19.5	ND	1.8	4.0	2.6
23.0-24.0	ND	2.6	5.0	3.3
28.0-33.0	ND	1.7	4.0	2.2
33.5-34.5	ND	1.6	3.0	2.1
39.0-39.5	ND	1.3	3.0	2.3
44.0-45.0	ND	6.0	7.4	7.0
49.0-50.0	ND	2.1	3.0	2.1
53.0-54.5	ND	1.8	4.0	2.0
58.0-59.0	ND	2.6	ND	2.6
65.0-66.0	ND	1.8	ND	2.4
Detection Limit	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NR = Not Received. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 3. EP TOXICITY RCRA METALS - BORE 009

Bore Depth (ft)	Concentration (mg/L)					
	Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
5.0-5.5	ND	ND	ND	ND	ND	ND
11.0-11.5	ND	ND	ND	ND	ND	ND
23.0-24.0	ND	ND	ND	ND	ND	ND
44.0-45.0	ND	ND	ND	ND	ND	ND
58.0-59.0	ND	ND	ND	0.044	ND	ND
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 4. VOLATILE ORGANICS- BORE 009

Parameter	Detection Limit	Concentration(ug/kg) Bore Depth 49.0-50.0'	Bore Depth 65.0-66.0'
Acetone	10	BDL	BDL
Benzene	5	BDL	BDL
Bromoform	5	BDL	BDL
Methyl bromide	10	BDL	BDL
2-Butanone	10	BDL	BDL
Carbon disulfide	5	BDL	BDL
Carbon tetrachloride	5	BDL	BDL
Chlorobenzene	5	BDL	BDL
Chlorodibromomethane	5	BDL	BDL
Chloroethane	10	BDL	BDL
2-Chloroethylvinyl ether	10	BDL	BDL
Chloroform	5	BDL	BDL
Methyl chloride	10	BDL	BDL
Dichlorobromomethane	5	BDL	BDL
1,1-Dichloroethane	5	BDL	BDL
1,2-Dichloroethane	5	BDL	BDL
1,1-Dichloroethylene	5	BDL	BDL
1,2-Dichloropropane	5	BDL	BDL
cis-1,3-Dichloropropylene	5	BDL	BDL
trans-1,3-Dichloropropylene	5	BDL	BDL
Ethylbenzene	5	BDL	BDL
2-Hexanone	10	BDL	BDL
Methylene chloride	10	BDL	BDL
4-Methyl-2-pentanone	10	BDL	BDL
Styrene	5	BDL	BDL
1,1,2,2-Tetrachloroethane	5	BDL	BDL
Tetrachloroethylene	5	BDL	BDL
Toluene	5	BDL	BDL
1,2-trans-Dichloroethylene	5	BDL	BDL
1,1,1-Trichloroethane	5	BDL	BDL
1,1,2-Trichloroethane	5	BDL	BDL
Trichloroethylene	5	BDL	BDL
Vinyl acetate	10	BDL	BDL
Vinyl chloride	10	BDL	BDL
Total xylenes	5	BDL	BDL
Percent Moisture	0.1	4.0	1.8

BDL = Below Detection Limit

SPARTON TECHNOLOGY

BORE 010

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 010

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
4.5-5.5	2	ND
10.0-11.0	2	ND
13.5-14.5	2	6
18.3-19.0	2	5
30.5-31.5	2	10
35.5-36.5	2	4
38.3-39.0	2	ND
44.5-45.5	2	ND
49.0-50.0	2	ND
53.5-54.5	2	ND
58.5-59.5	2	4
66.3-67.0	2	ND

ND = Not Detected.

Table 2. PURGEABLE ORGANICS RESULTS - BORE 010

		Concentration (ug/kg)				
Parameter	Detection Limit	Bore Depth 13.5-14.5'	Bore Depth 18.3-19.0'	Bore Depth 30.5-31.5'	Bore Depth 35.5-36.5'	Bore Depth 58.5-59.5'
1,1-Dichloroethylene	1.0	ND	ND	ND	ND	ND
1,2-trans-Dichloroethylene	0.5	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	2.0	ND	ND	ND	ND	ND
Trichloroethylene	1.0	ND	ND	ND	ND	ND

ND = Not Detected.

TABLE 3. TOTAL METALS RESULTS - BORE 010

Bore Depth (ft)	Concentration (mg/kg) Cadmium	Chromium	Lead	Nickel
4.5-5.5	ND	1.9	ND	2.0
10.0-11.0	ND	2.5	4.0	2.4
13.5-14.5	ND	1.6	4.0	2.0
18.3-19.0	ND	2.8	4.0	3.0
30.5-31.5	ND	1.8	3.0	2.0
35.5-36.5	ND	4.1	3.0	4.1
38.3-39.0	ND	2.8	3.0	2.8
44.5-45.5	ND	3.0	3.0	3.5
49.0-50.0	ND	2.0	3.0	2.9
53.5-54.5	ND	2.3	3.0	2.6
58.5-59.5	ND	2.8	ND	2.5
66.3-67.0	ND	7.0	5.9	5.3
Detection Limit	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 4. EP TOXICITY RCRA METALS - BORE 010

Bore Depth (ft)	Concentration (mg/L) Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
13.5-14.5	ND	ND	ND	ND	ND	ND
18.3-19.0	ND	ND	ND	ND	ND	ND
30.5-31.5	ND	ND	ND	ND	ND	ND
35.5-36.5	ND	ND	ND	ND	ND	ND
58.5-59.5	ND	ND	ND	ND	ND	ND
66.3-67.0	ND	ND	ND	ND	ND	ND
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 5. VOLATILE ORGANICS- BORE 010

Parameter	Detection Limit	Concentration (ug/kg) Bore Depth 13.5-14.5'	Bore Depth 18.3-19.0'	Bore Depth 30.5-31.5'	Bore Depth 35.5-36.5'	Bore Depth 58.5-59.5'	Bore Depth 66.3-67.0'
Acetone	10	BDL	BDL	BDL	3	BDL	500
Benzene	5	BDL	BDL	BDL	BDL	BDL	BDL
Bromoform	5	BDL	BDL	BDL	BDL	BDL	BDL
Methyl bromide	10	BDL	BDL	BDL	BDL	BDL	BDL
2-Butanone	10	BDL	BDL	BDL	BDL	BDL	BDL
Carbon disulfide	5	BDL	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride	5	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	5	BDL	BDL	BDL	BDL	BDL	BDL
Chlorodibromomethane	5	BDL	BDL	BDL	BDL	BDL	BDL
Chloroethane	10	BDL	BDL	BDL	BDL	BDL	BDL
2-Chloroethylvinyl ether	10	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	5	BDL	BDL	BDL	BDL	BDL	BDL
Methyl chloride	10	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorobromomethane	5	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethane	5	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichloroethane	5	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethylene	5	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichloropropane	5	BDL	BDL	BDL	BDL	BDL	BDL
cis-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL	BDL	BDL
trans-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	5	BDL	BDL	BDL	BDL	BDL	BDL
2-Hexanone	10	BDL	BDL	BDL	BDL	BDL	BDL
Methylene chloride	10	BDL	BDL	BDL	BDL	BDL	BDL
4-Methyl-2-pentanone	10	BDL	BDL	BDL	BDL	BDL	BDL
Styrene	5	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	5	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	5	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	5	BDL	BDL	BDL	BDL	BDL	BDL
1,2-trans-Dichloroethylene	5	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	5	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	5	BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethylene	5	BDL	BDL	BDL	BDL	BDL	BDL
Vinyl acetate	10	BDL	BDL	BDL	BDL	BDL	BDL
Vinyl chloride	10	BDL	BDL	BDL	BDL	BDL	BDL
Total xylenes	5	BDL	BDL	BDL	BDL	BDL	BDL
Percent Moisture	0.1	2.1	3.6	2.8	3.0	3.2	16.3

BDL = Below Detection Limit

SPARTON TECHNOLOGY

BORE 011

TABLE 1. TOTAL ORGANIC HALOGEN (TOX) RESULTS - BORE 011

Bore Depth (ft.)	Detection Limit (mg/kg)	TOX Conc. (mg/kg)
4.5-5.5	2	ND
9.0-10.0	2	ND
14.0-15.0	2	ND
19.5-20.5	2	2
24.5-25.5	2	ND
30.0-31.0	2	ND
35.0-36.0	2	ND
38.0-39.0	2	ND
45.0-46.0	2	ND
50.0-51.0	2	4
54.5-55.5	2	4
60.0-61.0	2	ND

ND = Not Detected.

TABLE 2. PURGEABLE ORGANICS RESULTS - BORE 011

	Concentration (ug/kg)			
Parameter	Detection Limit	Bore Depth 19.5-20.5'	Bore Depth 50.0-51.0'	Bore Depth 54.5-55.5'
1,1-Dichloroethylene	1.0	ND	ND	ND
1,2-trans-Dichloroethylene	0.5	ND	ND	ND
1,1,1-Trichloroethane	2.0	ND	ND	ND
Trichloroethylene	1.0	ND	ND	ND

ND = Not Detected.

TABLE 3. TOTAL METALS RESULTS - BORE 011

Bore Depth (ft)	Concentration (mg/kg) Cadmium	Chromium	Lead	Nickel
4.5-5.5	ND	3.8	5.0	3.8
9.0-10.0	ND	2.5	3.0	2.4
14.0-15.0	ND	2.3	5.4	4.0
19.5-20.5	ND	3.3	4.0	3.7
24.5-25.5	ND	2.5	4.0	2.8
30.0-31.0	ND	5.4	5.5	6.5
35.0-36.0	ND	3.7	5.0	4.2
38.0-39.0	ND	3.5	4.0	3.5
45.0-46.0	ND	3.0	5.0	3.0
50.0-51.0	ND	7.2	5.7	8.4
54.5-55.5	ND	3.7	3.0	3.7
60.0-61.0	ND	3.4	3.0	3.6
Detection Limit	1.0	0.5	2.5	1.0
RCRA MCL	1.0	5.0	5.0	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 4. EP TOXICITY RCRA METALS - BORE 011

Bore Depth (ft)	Concentration (mg/L) Cadmium	Chromium	Lead	Nickel	Hexavalent Chromium	Trivalent Chromium
19.5-20.5	ND	ND	ND	ND	ND	ND
30.0-31.0	ND	ND	ND	ND	ND	ND
35.0-36.0	ND	ND	ND	ND	ND	ND
50.0-51.0	ND	ND	ND	ND	ND	ND
54.5-55.5	ND	ND	ND	ND	ND	ND
Detection Limit	0.004	0.005	0.025	0.01	0.01	0.01
RCRA MCL	1.0	5.0	5.0	NA	NA	NA

ND = Not Detected. NA = Not Applicable.
MCL = Maximum Contaminant Level.

TABLE 5. VOLATILE ORGANICS- BORE 011

Parameter	Detection Limit	Concentration (ug/kg) Bore Depth 19.5-20.5'	Bore Depth 24.5-25.5'	Bore Depth 54.5-55.5'	Bore Depth 60.0-61.0'
Acetone	10	BDL	BDL	BDL	BDL
Benzene	5	BDL	BDL	BDL	BDL
Bromoform	5	BDL	BDL	BDL	BDL
Methyl bromide	10	BDL	BDL	BDL	BDL
2-Butanone	10	BDL	BDL	BDL	BDL
Carbon disulfide	5	BDL	BDL	BDL	BDL
Carbon tetrachloride	5	BDL	BDL	BDL	BDL
Chlorobenzene	5	BDL	BDL	BDL	BDL
Chlorodibromomethane	5	BDL	BDL	BDL	BDL
Chloroethane	10	BDL	BDL	BDL	BDL
2-Chloroethylvinyl ether	10	BDL	BDL	BDL	BDL
Chloroform	5	BDL	BDL	BDL	BDL
Methyl chloride	10	BDL	BDL	BDL	BDL
Dichlorobromomethane	5	BDL	BDL	BDL	BDL
1,1-Dichloroethane	5	BDL	BDL	BDL	BDL
1,2-Dichloroethane	5	BDL	BDL	BDL	BDL
1,1-Dichloroethylene	5	BDL	BDL	BDL	BDL
1,2-Dichloropropane	5	BDL	BDL	BDL	BDL
cis-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL
trans-1,3-Dichloropropylene	5	BDL	BDL	BDL	BDL
Ethylbenzene	5	BDL	BDL	BDL	BDL
2-Hexanone	10	BDL	BDL	BDL	BDL
Methylene chloride	10	BDL	BDL	BDL	BDL
4-Methyl-2-pentanone	10	BDL	BDL	BDL	BDL
Styrene	5	BDL	BDL	BDL	BDL
1,1,2,2-Tetrachloroethane	5	BDL	BDL	BDL	BDL
Tetrachloroethylene	5	BDL	BDL	BDL	BDL
Toluene	5	BDL	BDL	BDL	BDL
1,2-trans-Dichloroethylene	5	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	5	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	5	BDL	BDL	BDL	BDL
Trichloroethylene	5	BDL	BDL	BDL	BDL
Vinyl acetate	10	BDL	BDL	BDL	BDL
Vinyl chloride	10	BDL	BDL	BDL	BDL
Total xylenes	5	BDL	BDL	BDL	BDL
Percent Moisture	0.1	2.3	2.3	9.7	5.6

BDL = Below Detection Limit

REPORT OF ANALYTICAL DATA

FOR

HARDING LAWSON ASSOCIATES

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May 5, 1986

SPARTON TECHNOLOGY

BORE 001

TABLE 1. PERCENT MOISTURE RESULTS — BORE 001

Bore Depth (ft.)	Detection Limit (%)	Moisture Content (%)
4.0 - 5.0	0.1	0.7
9.0 - 10.0	0.1	0.9
14.0 - 15.0	0.1	0.9
18.0 - 18.5	0.1	1.1
24.0 - 25.0	0.1	0.9
30.5 - 31.5	0.1	2.1
35.0 - 36.0	0.1	0.8
39.0 - 40.0	0.1	1.8
44.0 - 45.0	0.1	1.0
47.5 - 52.0	0.1	1.7
54.5 - 55.5	0.1	4.0
63.0 - 64.0	0.1	10.6

SPARTON TECHNOLOGY

BORE 002

TABLE 2. PERCENT MOISTURE RESULTS — BORE 002

Bore Depth (ft.)	Detection Limit (%)	Moisture Content (%)
4.5 - 5.5	0.1	2.0
10.5 - 11.5	0.1	1.7
14.5 - 15.5	0.1	2.9
19.5 - 20.5	0.1	2.9
30.0 - 31.0	0.1	5.8
49.0 - 50.0	0.1	3.1
59.0 - 59.5	0.1	6.0

SPARTON TECHNOLOGY

BORE 003

TABLE 3. PERCENT MOISTURE RESULTS — BORE 003

Bore Depth (ft.)	Detection Limit (%)	Moisture Content (%)
4.5 - 5.5	0.1	3.4
20.5 - 21.5	0.1	3.7
25.0 - 25.5	0.1	3.4
30.0 - 31.0	0.1	3.9
35.5 - 36.0	0.1	3.7

SPARTON TECHNOLOGY

BORE 004

TABLE 4. PERCENT MOISTURE RESULTS — BORE 004

Bore Depth (ft.)	Detection Limit (%)	Moisture Content (%)
4.0 - 5.0	0.1	7.6
9.0 - 10.0	0.1	4.5
13.5 - 14.0	0.1	12.0
25.5 - 26.0	0.1	4.9
29.0 - 30.0	0.1	4.4
48.5 - 49.0	0.1	21.3

SPARTON TECHNOLOGY

BORE 005

TABLE 5. PERCENT MOISTURE RESULTS — BORE 005

Bore Depth (ft.)	Detection Limit (%)	Moisture Content (%)
4.5 - 5.5	0.1	5.4
10.0 - 11.0	0.1	3.5
15.0 - 15.5	0.1	3.7
20.5 - 21.0	0.1	4.8
25.5 - 26.0	0.1	5.3
30.5 - 31.5	0.1	6.3
58.2 - 59.4	0.1	3.0

SPARTON TECHNOLOGY

BORE 006

TABLE 6. PERCENT MOISTURE RESULTS — BORE 006

Bore Depth (ft.)	Detection Limit (%)	Moisture Content (%)
5.0 - 6.0	0.1	5.2
9.0 - 10.0	0.1	9.8
14.5 - 15.5	0.1	4.1
20.5 - 21.5	0.1	9.5
24.5 - 25.5	0.1	8.4
48.3 - 49.3	0.1	2.7
53.5 - 55.0	0.1	2.7
58.0 - 59.2	0.1	3.7

SPARTON TECHNOLOGY

BORE 007

TABLE 7. PERCENT MOISTURE RESULTS — BORE 007

Bore Depth (ft.)	Detection Limit (%)	Moisture Content (%)
4.5 - 5.5	0.1	3.7
10.5 - 11.0	0.1	2.6
15.0 - 16.0	0.1	4.4
18.2 - 18.8	0.1	5.0
30.0 - 31.0	0.1	5.0
57.0 - 57.5	0.1	4.5
58.5 - 59.5	0.1	3.4

SPARTON TECHNOLOGY

BORE 008

TABLE 8. PERCENT MOISTURE RESULTS — BORE 008

Bore Depth (ft.)	Detection Limit (%)	Moisture Content (%)
5.5 - 6.5	0.1	14.1
10.5 - 11.5	0.1	3.0
15.5 - 16.5	0.1	3.1
20.5 - 21.0	0.1	5.1
29.5 - 30.5	0.1	15.3
58.3 - 59.0	0.1	4.1

SPARTON TECHNOLOGY

BORE 009

TABLE 9. PERCENT MOISTURE RESULTS — BORE 009

Bore Depth (ft.)	Detection Limit (%)	Moisture Content (%)
5.0 - 5.5	0.1	3.2
11.0 - 11.5	0.1	3.0
13.5 - 14.5	0.1	1.1
18.5 - 19.5	0.1	0.9
23.0 - 24.0	0.1	0.8
28.0 - 33.0	0.1	0.7
33.5 - 34.5	0.1	0.9
39.0 - 39.5	0.1	0.3
44.0 - 45.0	0.1	12.9
53.0 - 54.5	0.1	2.2
58.0 - 59.0	0.1	16.0

SPARTON TECHNOLOGY

BORE 010

SPARTON TECHNOLOGY

BORE 011

TABLE 11. PERCENT MOISTURE RESULTS — BORE 011

Bore Depth (ft.)	Detection Limit (%)	Moisture Content (%)
4.5 - 5.5	0.1	3.0
9.0 - 10.0	0.1	1.3
14.0 - 15.0	0.1	1.7
30.0 - 31.0	0.1	5.5
35.0 - 36.0	0.1	2.6
38.0 - 39.0	0.1	3.3
45.0 - 46.0	0.1	1.3
50.0 - 51.0	0.1	12.8

Report Prepared for

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OFF-SITE INVESTIGATION
SPARTON TECHNOLOGY, INC.
COORS ROAD PLANT
ALBUQUERQUE, NEW MEXICO

HLA Job No. 6310,036.12

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October 19, 1987

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EXECUTIVE SUMMARY

This report presents an evaluation of contaminant magnitude and migration associated with Sparton Technology, Inc., at their Albuquerque, New Mexico facility and at designated surrounding off-site locations. This task was accomplished by conducting a soil gas study (July 20 to August 7, 1987) to determine the extent and magnitude of the contaminant plume using trichloroethane (TCA) and trichloroethylene (TCE) as indicator parameters. The collection of soil gas data was performed by Tracer Research Corporation (TRC) under subcontract to Harding Lawson Associates (HLA). Values obtained during the field effort were plotted and concentration isopleths were generated for the two constituents. The data from the 1987 study was compared to a soil gas study conducted at the facility by TRC in 1984.

Additional evaluations indicate that (1) there has been substantial decrease in contaminant levels from 1983 to 1987; (2) the groundwater velocity ranges between approximately 6 feet per year and 83 feet per year; (3) the dissemination of the plume appears to be primarily by dispersion with low velocity influence; and (4) that concentrations of TCA and TCE that are in excess of the state standards are in relatively close proximity to the site.

Based on the 1987 soil gas isopleths, and using the "worst case" TCA concentrations plotted to 0.01 micrograms per liter, the areal extent of the soil gas plume is approximately 100 feet east of Coors Road, 500 feet west of the facility's northwest corner, 900 feet west of the intersection of Eagle Ranch Road and Irving Boulevard, 2,000 feet south of the facility (downgradient), and 1,100 feet north of the site (upgradient).

I INTRODUCTION

A. Background

Sparton Technology, Inc. (Sparton) operates an electronics manufacturing facility at 9621 Coors Road, NW, in Albuquerque, New Mexico. Past waste management practices may have resulted in contamination of groundwater beneath the site. Subsequent contaminant migration to off-site areas via natural flow mechanisms was suspected. Sparton reached an agreement with the New Mexico Environmental Improvement Division (EID) for Sparton to authorize a soil gas investigation both on and off site to estimate the areal extent of the suspected plume (see Appendix A, Tracer Research Corporation Report, 1987). Harding Lawson Associates (HLA) was contracted and directed by Sparton to accomplish this task. HLA contracted Tracer Research Corporation (TRC) to conduct the nondestructive in situ testing program. Metric Corporation (Metric), a subconsultant to HLA, provided access clearance and utility location for off-site locations. Metric also assisted in the review and analysis of the resulting data and preparation of this report.

A limited soil gas study was conducted at the Sparton facility in 1984. The 1984 soil gas study was also performed by TRC under the supervision of HLA, and used soil gas values of trichloroethane (TCA)

and trichloroethylene (TCE) as indicator parameters of the suspected plume. A report describing the 1984 soil gas investigation is included as Appendix B.

B. Objectives

The objective of this study was to evaluate TCA and TCE contaminant magnitude and migration associated with the subsurface hydrologic regime at the Sparton facility. This goal was accomplished by completing the following tasks:

(1) Conducting a soil gas study, and from those results estimating:

- the lateral extent of the plume, and
- the upgradient and downgradient limit of the plume;

(2) Comparing the 1984 soil gas study to the 1987 study to identify any changes or trends with time;

(3) Reviewing various transport mechanisms with respect to site-specific hydrogeologic conditions and current mapping of soil gas contours (isopleths); and

(4) Reviewing existing quarterly chemical analyses for TCA and TCE from on-site monitoring wells to identify any changes or trends with time in the upper flow zone.

II 1987 SOIL GAS FIELD INVESTIGATION

A. Preinvestigation Plan

Prior to the field sampling activity, HLA presented a proposed location sampling plan (see Plate 1). This plan was composed of several longitudinal and latitudinal transects. Sample locations at the facility were spaced at 100-foot intervals; off-site locations were to be spaced at 200-foot intervals. With respect to off-site locations, interval spacing would increase or decrease as the data points were evaluated in the field. This flexibility was necessary to allow for maximum coverage of the area of investigation. Actual transects and spacing of data points for this investigation are presented on Plate 2.

B. Soil Gas Methodology (Refer to Appendix A)

The procedure used by TRC for the Sparton investigation involved gas chromatographic analysis of soil gas extracted from the ground. Prior to removal of the soil gas sample, the equipment was standardized with known pure laboratory samples, specifically, TCA, TCE, and perchloroethylene (PCE). Once the gas chromatograph was calibrated, a small diameter, hollow probe was either driven or hydraulically advanced into the soil at the designated sample location. This depth was usually between five and six feet below ground surface. A pump was used to draw soil gas into the probe. A syringe was placed into

the pump tubing and a small volume of soil gas was extracted. The gas sample was injected into the gas chromatograph and analyzed. Each value of TCA and TCE was plotted in the field on a 1-inch to 200-foot scale aerial photograph of the area provided by Metric.

PCE values were not plotted because PCE was not considered to be an indicator parameter for the contouring of the contaminant plume. PCE is an impurity related to the manufacturing of TCE. PCE was recorded by TRC because their computer analyzes certain chemicals in suites, and this portion of the computer program could not be deleted without deleting values of TCA and TCE. Recorded values of PCE were typically one to two orders of magnitude below measured values for TCA and TCE.

As a control check, ambient air samples were taken during the day. Generally, an early morning, a mid-day, and an end-of-shift sample were collected to serve as background quality samples. From July 20 to July 24, 1987, maximum values of ambient air samples for TCA and TCE ranged from 0.00007 to 0.00124 micrograms per liter (ug/l) and from less than 0.0001 to 0.00031 ug/l, respectively. Table 1 presents all ambient air sample values obtained during the referenced time period.

TRC advised HLA that based on their empirical experience with similar projects, the 0.01 ug/l contour would be the relevant limit of potential contamination attributable to a source. Although TRC has a

post-manufacturing modification (patent pending) which allows detection of volatile constituents to 0.0001 ug/l, according to TRC values below 0.01 ug/l could not unequivocally be interpreted as related to the source in question. HLA has presented TCA and TCE contours to 0.01 ug/l based on TRC's input. All data points have been reported, but the 0.01 contour limit was established as the lower limit of concern for the investigation. It should be noted that within the area of investigation, the maximum ground surface elevational difference is approximately 157 feet. Therefore, there is some potential for various data values to be masked or altered by excessive overburden or discontinuities within the overburden.

C. Field Procedure

The proposed transects for the project are presented on Plate 1. Plate 2 presents the actual transects and data collection points. The areal extent of this investigation was slightly under one square mile, and extends downgradient of the site approximately 3,200 feet. Data points were sampled from July 20 through July 24, 1987. Additional vertical profile data points were collected in the vicinity of SGB_2-07* on August 7, 1987. All data point values are included in Appendix A.

---

* SGB_2-07 = Soil Gas Transect B_2, sample location point No. 7.

Plates 1 through 4, and Figures 1 and 2 of Appendix A present a "true north" and a "facility north," which is actually to the northeast. For the purposes of this report, all directions stated are referenced to "facility north."

Data points for Transect A were collected on 100-foot intervals along the site boundaries from the southeast to northwest corners of the facility. From the northwest corner of the Sparton site, Transect A proceeded northward on 200-foot intervals and terminated at the edge of Calabacillas Arroyo. Data point SGA-17 was located on the east side of Coors Road in the right-of-way. Data point SGA-16 was located at the base of the hill at the bend in the canal east of Coors Road.

The western limit of the investigation for transects B, B_2, C, and C_2 was determined by either physical limits of accessible property or by soil gas limits at or below 10^{-3} ug/l, based on the advice of TRC. These transects generally arced eastward to Coors Road (Exception: Transect C_2 ended approximately 1,000 feet west of Coors Road due to 10^{-4} ug/l or below detection limit values). East of Coors Road, data collection points for each transect did not follow a spacing pattern due to the lack of right-of-way access or the inability of equipment to traverse rugged terrain. The major portion of Transect D was sampled at 400-foot intervals beginning approximately

800 feet west of Coors Road and continuing in a west-northwest arc to the western limit of accessible property. East of Coors Road, data points were collected where access was granted and where sample locations were accessible to the truck-mounted equipment.

Transect E extended at 200-foot intervals from the northwest (off site) to the northwest corner of the facility. Data points were collected at 100-foot intervals along the northern property line of the facility and east to Coors Road. At that point, the E Transect consisted of SGE-08 on the east side of Coors Road in the right-of-way and SGE-09, approximately midway between the northeast and southeast corners of the property.

Transect F consisted of three data points on the east side of Coors Road. They were collected at 200-foot intervals starting at approximately 200 feet north of SGE-08 and proceeding northward to the Calabacillas Arroyo.

Transect G consisted of four data points along the centerline of the Calabacillas Arroyo. These points began north of SGA-21 and proceeded in an easterly direction, terminating at the west edge of the culverts underlying Coors Road. Heavy rains and lightning curtailed any further study of the arroyo on July 24, 1987.

All data points collected during this investigation are contoured no lower than 0.01 ug/l for TCA and TCE on Plates 3 and 4, respectively. Specific values for TCA and TCE along the nine transects of this investigation are presented in the TRC report (see Appendix A).

All data collection points were staked, numbered, and flagged. Vertical and horizontal control was established by Metric. A copy of the sample location map with horizontal control was provided to TRC to plot the TCA and TCE contours (see Appendix A). Table 2 presents the ground levels elevations, referenced to mean sea level (MSL), for the data sampling points.

III DISCUSSION

In order to assess contaminant magnitude and migration at the Sparton facility, it is necessary to review existing data and evaluate the interrelationships of these data. Applicable information from various select and phased studies at and around the facility include:

- Evaluation of soil gas graphs and isopleths as an indication of the extent of groundwater contaminant migration (see Plates 5 through 8, and Appendix A, Figures 1 and 2);
- comparison of groundwater concentrations versus time from selected wells screened in the upper flow zone (see Plates 9 through 17);
- evaluation of plume velocity (see Plate 18, case 1 and 2); and
- Evaluation of plume transport mechanism(s) (see Plate 19, Figures A through E).

A. Soil Gas Concentration

Soil gas investigations were conducted at the facility in May 1984 and July 1987. Figures 1 and 2 of Appendix A (1987 study) present soil gas contour maps for TCA and TCE, respectively. Figures 1 and 2 of Appendix B (1984 study) present soil gas contour maps for TCE and TCA, respectively. Plates 5, 6, 7, and 8 present graphs of soil gas values along the south boundary of the facility and along Irving Boulevard for TCA and TCE, respectively. Each graph presents soil gas values collected during the 1984 and 1987 studies. Comparison of the

figures indicates that there has been a decrease in soil gas concentrations by approximately one order of magnitude from 1984 to 1987 for the constituents investigated, and there is a decrease in soil gas concentration levels with distance from the source.

B. Groundwater Concentration

Monitoring wells MW-6, MW-8, MW-9, MW-14, and MW-15 were chosen to assess groundwater concentration levels of TCA and TCE in the upper flow zone. Quarterly sampling data for these constituents are plotted for the years 1983 through 1987. The only exceptions to this are wells MW-14 and MW-15. These two wells only have data plotted after 1985 as it was not until that time that packers were installed to separate the upper and lower flow zones in the screened area.

Although all referenced wells currently exceed state standards as of the third sampling quarter of 1987, a review of the data indicates that most have displayed a decrease in constituent level with time.

C. Groundwater Velocity

To determine the rate of groundwater flow in the upper flow zone throughout the site, the particle velocity is calculated using the equation (Driscoll 1986, page 83):

$$V = \frac{cKi}{n}$$

Where: V = velocity, in feet/year
K = hydraulic conductivity, in feet/day
i = hydraulic gradient, in feet/foot
n = porosity, nondimensional
c = conversation factor, 365 days/year

Based on permeability data (Metric Corporation 1987, Table 1) obtained from monitoring wells MW-16, MW-18, and MW-24, a range of hydraulic conductivities (K) from 0.92 feet per day (feet/day) to 13.0 feet/day was used. The hydraulic gradient (i) was calculated as 0.007 based upon site-specific groundwater elevation data (HLA 1986), and represents a "worst case" condition as opposed to a regional hydraulic gradient of 0.0016. The porosity (n) of the formation was estimated as 0.40 (Todd 1959, Table 2-6).

Plate 18 presents the calculations for groundwater velocity for the given range of hydraulic conductivities. Based on these calculations, it appears that the groundwater velocity in the upper flow zone ranges between 5.88 feet/year and 83.04 feet/year.

It is important to note that previous calculations of groundwater velocity were based on an aquifer pump test of PW-1 at the facility. However, the well is constructed with 68 feet of screen in the lower

flow zone and 10 feet of screen in the upper flow zone. Therefore, a high velocity calculated from this pump test data is not indicative of the groundwater velocity in the upper flow zone where the bulk of the contamination is located.

D. Transport Mechanisms

The two major mechanisms of solute (dissolved substance) transport are advection and dispersion. Advection is the transportation of solutes by the flowing groundwater (Freeze and Cherry 1979, pages 75 and 76). Solutes typically move in a longitudinal direction and downgradient with the natural flow of groundwater. As solutes move longitudinally, there is also lateral spreading of contaminant concentration. This process is referred to as dispersion, and is a consequence of both mechanical fluid mixing and molecular diffusion (ibid). Longitudinal dispersion in the direction of bulk flow is more common than lateral, or transverse, dispersion except when the groundwater flow is very low. Some sources note that depending on the exact nature of the aquifer, the dispersion may be a greater influence than advection (Driscoll 1986, page 710).

The upgradient distance from the facility for the 0.01 contour for TCA and TCE is approximately 1,110 feet. The downgradient distance is approximately 2,000 feet. Review of the TCA and TCE soil gas contour

maps (see Appendix A, Figures 1 and 2) reflect a similar pattern as that of the dispersion pattern with low groundwater velocity influence as presented on Plate 19, Figure E.

Soil gas data taken in close proximity to on-site monitoring wells along the property line were compared to groundwater monitoring results from samples taken from those wells in the same time period as the soil gas survey was being conducted. For each well, the ratio of groundwater concentration/soil gas concentration was calculated, and these ratios were examined using standard statistical techniques.

The results of this analysis indicate that the worst case horizontal limits of the groundwater plume containing TCE concentrations at or above the state standard coincides approximately with the 0.1 ug/l soil gas contour. Similarly, using the worst case for TCA, the 0.01 ug/l soil gas contour is appropriate. This supports the premise that the plume is still in relatively close proximity to the Sparton site (see Appendix C for calculations).

The transport mechanism associated with soil gas movement is dispersion. Given that the groundwater velocity is low (see Section IV.C) and contaminant migration is dispersive, it would be reasonable to conclude that the soil gas isopleths reflect a general pattern for the lateral extent of TCA and TCE contamination in the groundwater.

E. Possible Outside Influences on 1987 Soil Gas Investigation

The area of the 1987 investigation has been subject to extensive earth-moving and road building activities. It is possible that some of the off-site soil gas values for TCA and TCE have been affected by (1) in-field repair of heavy equipment, (2) solvents used in transport vehicles hauling asphalt material, and (3) placement of asphalt pavement or asphalt stockpile areas.

Approximately 400 feet south of Irving Boulevard, on the east side of Eagle Ranch Road, is a localized increase of TCA values. In an attempt to further understand this apparent anomaly, a soil gas vertical profile was performed. Results indicate that the concentrations of TCA and TCE increase with depth; however, data collection did not extend to groundwater. It is not clear at this time if the pattern is attributable to upward movement of soil gases from the phreatic zone, or downward migration of an alternate surface source. An alternate surface source is highly suspect based on a review of an aerial photograph of the early construction phases of Eagle Ranch Road. In this photograph, there appears to be a tank structure in the exact location where the increased soil gas values were obtained.

IV CONCLUSIONS

In order to accurately access the current extent and magnitude of TCA and TCE concentration levels associated with the Sparton facility, an evaluation of several relevant factors has been completed. These data include the 1984 and 1987 soil gas investigation, the presentation of solute transport mechanisms and plume patterns, the review of concentration level trends for TCA and TCE at wells that monitor the upper flow zone at the facility, and the calculation of a probable range of groundwater velocities that exist in the vicinity of the facility.

Based on the evaluation of these data and HLA's understanding of the site, the following conclusions are warranted:

- Using the field criteria of 0.01 ug/l, the upgradient limit of the TCA soil gas plume appears to be at the edge of the Calabacillas Arroyo. The downgradient limit occurs about 2,000 feet south of the facility property. The upgradient limit of the TCE soil gas plume appears to be approximately 50 feet south of the Calabacillas Arroyo. The downgradient limit occurs about 2,000 feet south of the facility property;

- Using the same criteria as above, the basic lateral extent of the TCA soil gas plume is approximately 200 feet east of Coors Road, approximately 500 feet west of the northwest corner of the facility, and 900 feet west of the Irving Boulevard and Eagle Ranch Road intersection. The lateral extent of the TCE soil gas plume is approximately 30 feet east of Coors Road and 1,000 feet west of the facility's southwest corner;

- Correlation of soil gas and groundwater data tend to support the relative close proximity of the plume to the facility site;

- There has been a substantial decrease in concentration levels of TCA and TCE in the groundwater at monitoring wells MW-9, MW-14, and MW-15, from 1983 to 1987. There is a decrease in soil concentration levels with distance from the facility that reflects a dispersive pattern;

- The major solute transport mechanism appears to be that of dispersion with a minor component of advection from regional flow. This is evidenced by the presence of TCA and TCE soil gas values approximately 1,100 feet upgradient of the facility; and

- The probable range of groundwater velocities in the area of the facility is between 6 feet per year and 83 feet per year. This range is based upon site-specific pump test data, from the upper flow zone, and a higher hydraulic gradient than is found in the regional environment. Using the upper limit of this range and assuming a 20 year time frame, a "worst case" distance of contamination from the source would be approximately 1,660 feet. Other sources have previously suggested that the rate of migration may be two orders of magnitude or greater than this referenced upper limit based on data collected at well PW-1. This well, however, is screened primarily in the lower flow zone. This higher velocity is therefore not considered to be representative of upper flow zone conditions.

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Todd. Groundwater Hydrology. 1956, Table 2.6.

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1 copy to:	Mr. Richard Mico Sparton Technology, Inc. 4901 Rockaway Boulevard, SW Rio Rancho, New Mexico 87214
1 copy to:	Mr. Jon F. DeWitt Attorney at Law Varnum, Riddering, Schmidt & Howlett 174 Monroe Avenue, NW Grand Rapids, Michigan 49503
1 copy to:	Mr. Cleoves Martinez Sparton Technology, Inc. 9621 Coors Road, NW Albuquerque, New Mexico 87114
1 copy to:	Mr. Gary L. Richardson, P.E. Metric Corporation 8429 Washington Place, N.E., Suite A Albuquerque, New Mexico 87109

JSH/SDP:kmr/sve

QUALITY CONTROL REVIEWER:

Jay E. Mabrey, P.E.
Associate Engineer

TABLES

TABLE 1

Background Ambient Air Samples
for TCA and TCE

Date	Air Sample TCA (ug/l)	Air Sample TCE (ug/l)	Time
7/20/87	0.00078	0.00015	1043
	0.00124	0.00015	1305
	0.00067	0.00031	1613
	0.00082	0.00015	1719
7/21/87	0.00039	0.00015	0756
	0.00062	0.00015	1132
	0.00032	0.00015	1456
	0.00046	0.00015	1639
7/22/87	0.00031	0.00015	0838
	0.00065	0.00015	1141
	0.00034	0.00015	1259
	0.00007	0.00015	1619
	0.00007	0.00015	1708
7/23/87	0.00035	0.00016	0840
	0.00029	0.00016	1119
	0.00031	0.00016	1301
7/24/87	0.00026	0.00011	0815
	0.00021	0.00011	0920
	0.00050	0.00011	1112
	0.00025	0.00011	1532
	0.00031	0.00011	1647

TABLE 2

Ground Level (G.L.) Elevations for
Soil Gas Sampling Sites (Feet, MSL)

Site Label	G.L. Elevation
A- 1	5039
A- 2	5041
A- 3	5041
A- 4	5041
A- 5	5043
A- 6	5042
A- 7	5042
A- 8	5041
A- 9	5040
A-10	5042
A-11	5043
A-12	5045
A-13	5048
A-14	5045
A-15	5055
A-16	4996
A-17	5037
A-18	5059
A-19	5060
A-20	5060
A-21	5058
B- 1	5028
B- 2	5030
B- 3	5034
B- 4	5036
B- 5	5040
B- 6	5046
B- 7	5057
B- 8	5064
B- 9	5074
B-10	5085
B-11	5099
B-12	5110
B-13	5119

TABLE 2 (Continued)

Ground Level (G.L.) Elevations for
Soil Gas Sampling Sites (Feet, MSL)

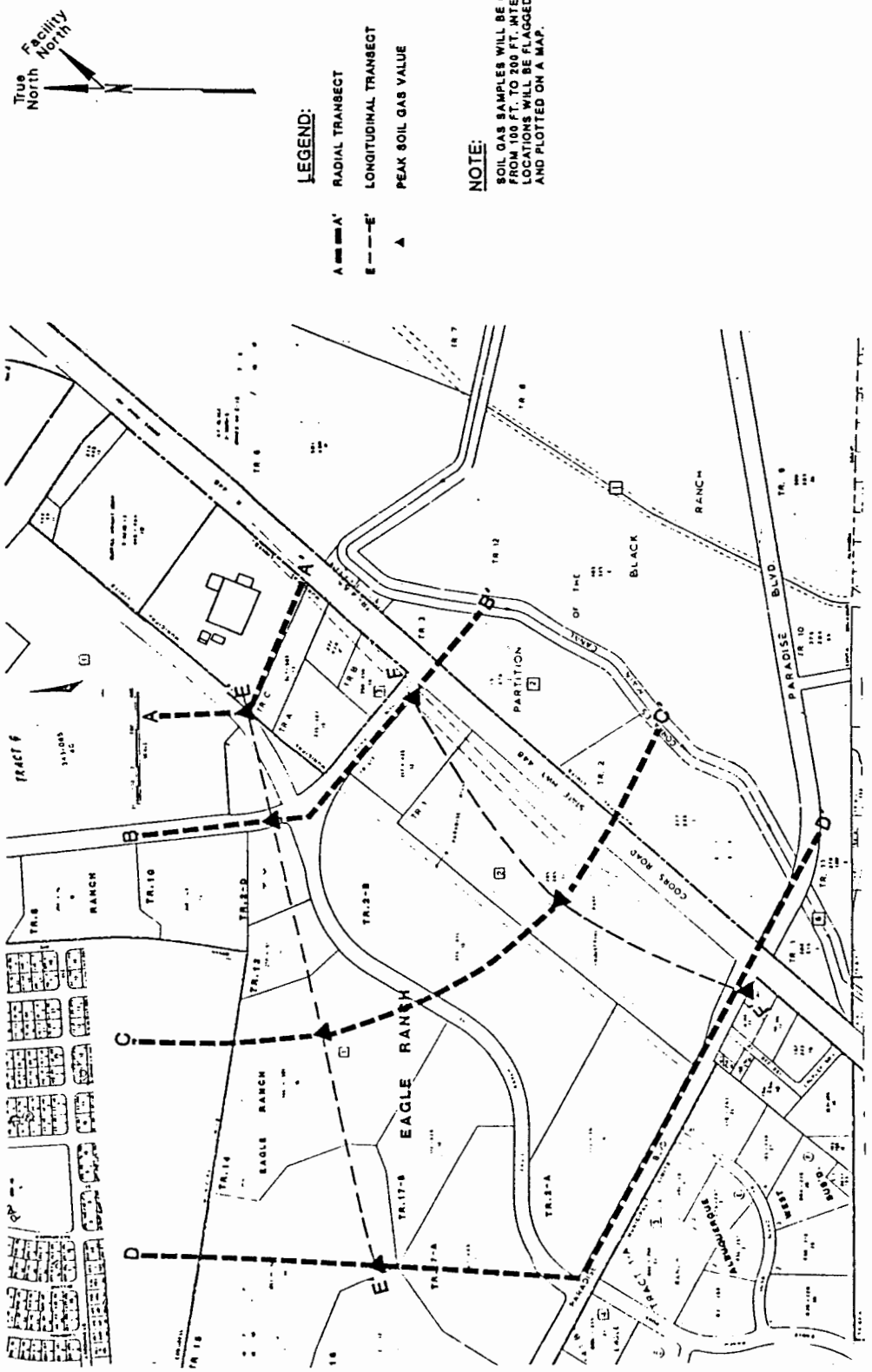
Site Label	G.L. Elevation
B2- 1	5150
B2- 2	5153
B2- 3	5088
B2- 4	5069
B2- 5	5065
B2- 6	5053
B2- 7	5047
B2- 8	5053
B2- 9	5064
B2-10	5042
B2-11	5028
B2-12	5023
B2-13	5025
B2-14	5024
C- 1	4999
C- 2	5069
C- 3	5064
C- 4	5042
C- 5	5032
C- 6	5017
C- 7	5011
C- 8	5011
C- 9	5075
C-10	5081
C-11	5085
C-12	5109
C-13	5094
C-14	5079
C-15	5088
C-16	5100
C2- 1	5060
C2- 2	5066
C2- 3	5082
C2- 4	5100
C2- 5	5123
C2- 6	5119
C2- 7	5108
C2- 8	5120

TABLE 2 (Continued)

Ground Level (G.L.) Elevations for
Soil Gas Sampling Sites (Feet, MSL)

Site Label	G.L. Elevation
C2- 9	5111
C2-10	5089
C2-11	5087
D- 1	4996
D- 2	4998
D- 3	5032
D- 4	5037
D- 5	5047
D- 6	5061
D- 7	5088
D- 8	5099
D- 9	5153
D-10	5155
D-11	5121
D-12	5108
E -1	5055
E- 2	5052
E- 3	5052
E- 4	5051
E- 5	5048
E- 6	5046
E- 7	5043
E- 8	5042
E- 9	5040
E-10	5059
E-11	5068
E-12	5061
E-13	5071
F- 1	5039
F- 2	5042
F- 3	5042
G- 1	5028
G- 2	5026
G- 3	5024
G- 4	5020

PLATES



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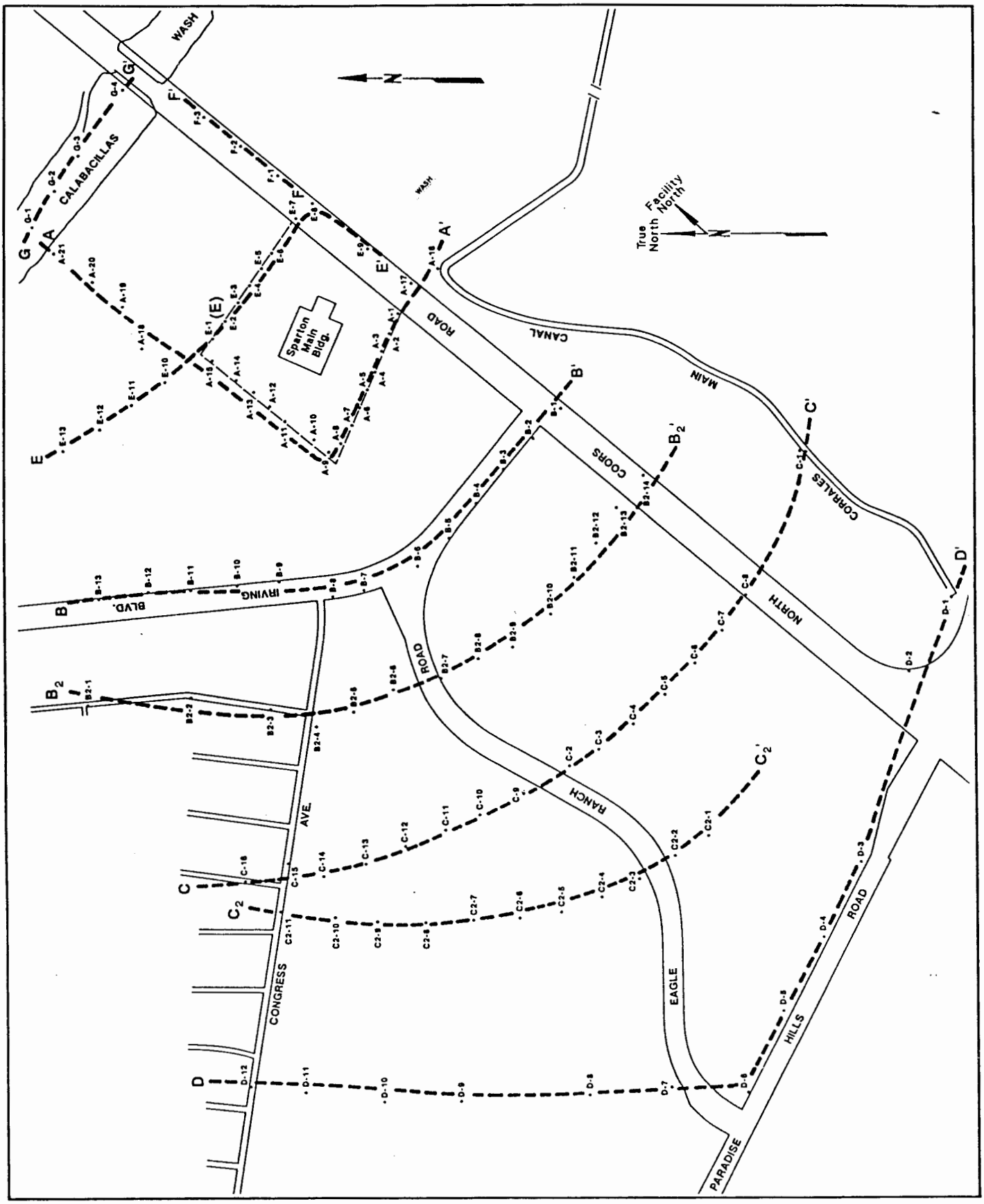
& Geophysicists

PROPOSED SAMPLING PLAN TRANSECTS

SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
S.K.	6310,036.12	J.S.H.	9/8/87		



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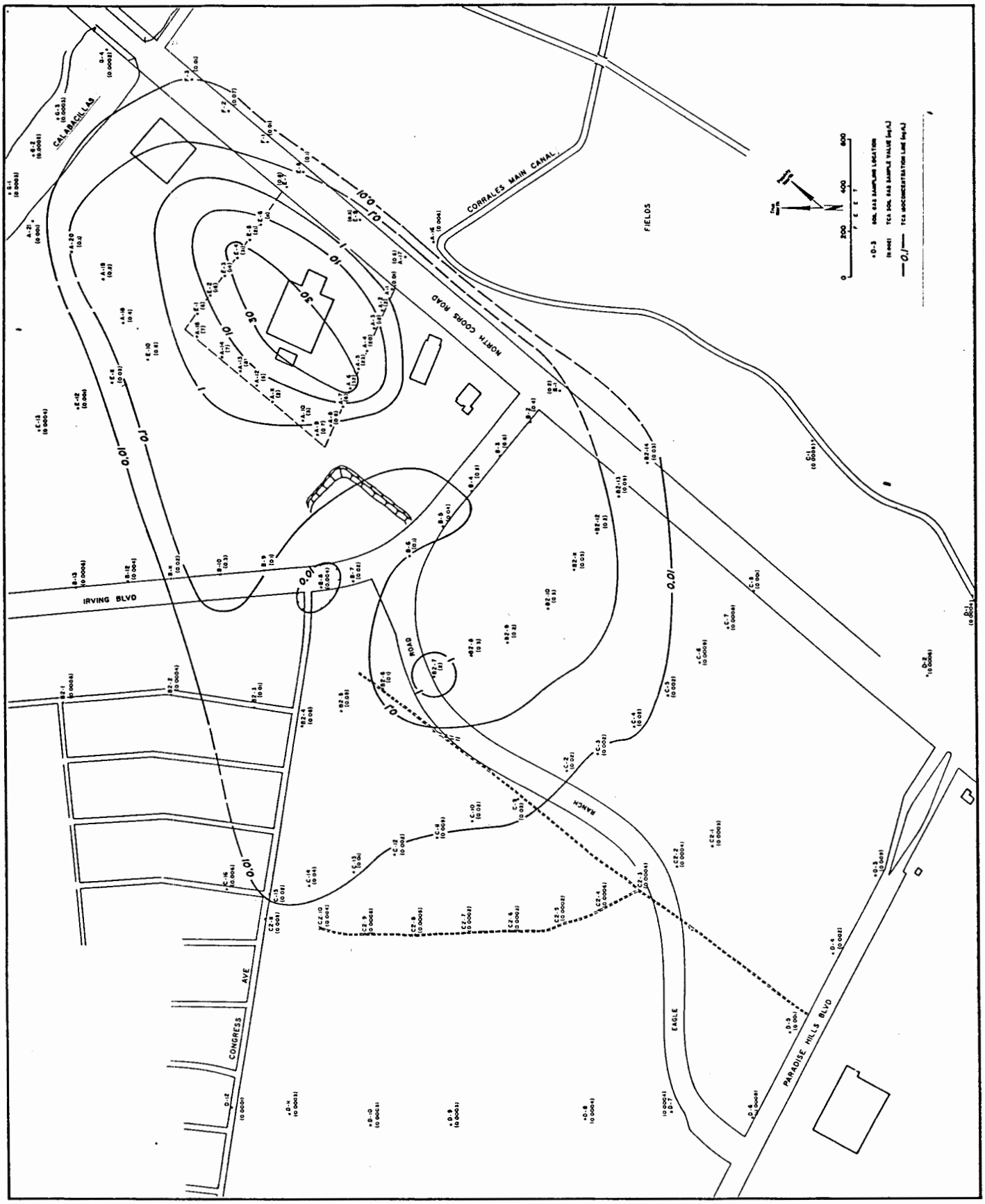
ACTUAL SAMPLING PLAN TRANSECTS

SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
S.K.	6310,036.12	J.S.H.	9/8/87		



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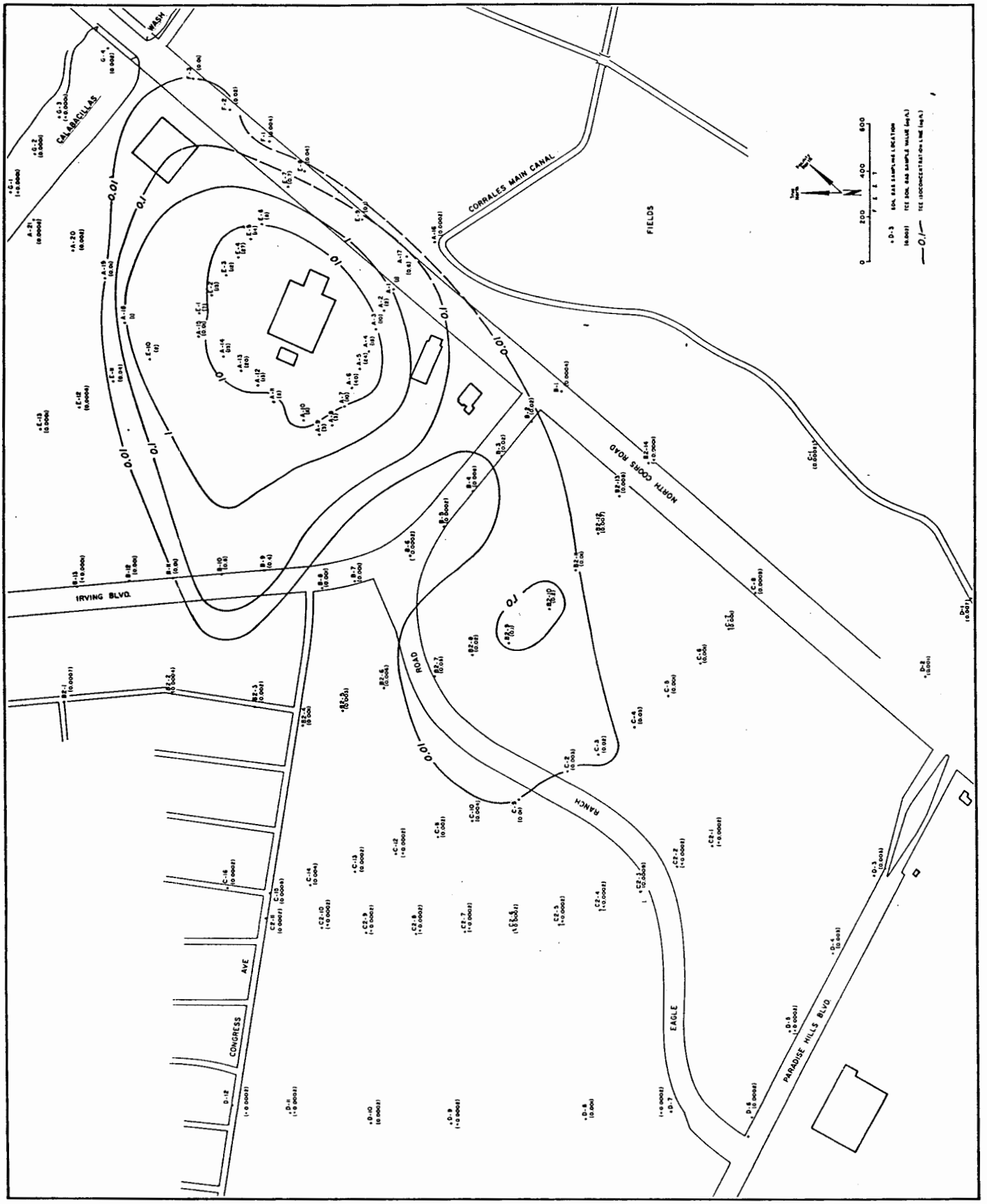
TCA CONCENTRATION CONTOURS

SPARTON TECHNOLOGY, INC.
ALBUQUERQUE, NEW MEXICO

PLATE
3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
S.K.	6310,036.12	J.S.H.	9/10/87		



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TCE CONCENTRATION CONTOURS

SPARTON TECHNOLOGY, INC.

ALBUQUERQUE, NEW MEXICO

PLATE **4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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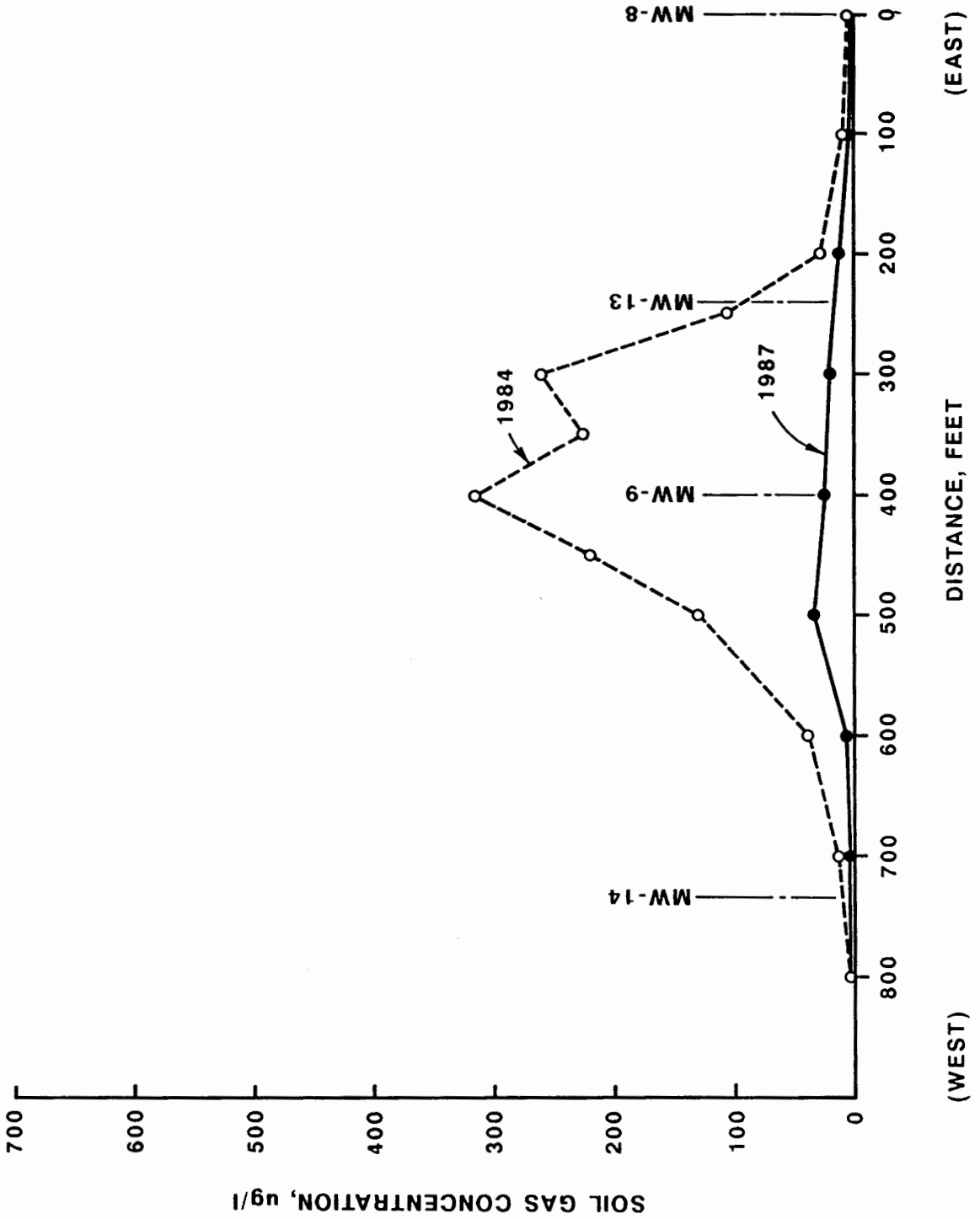

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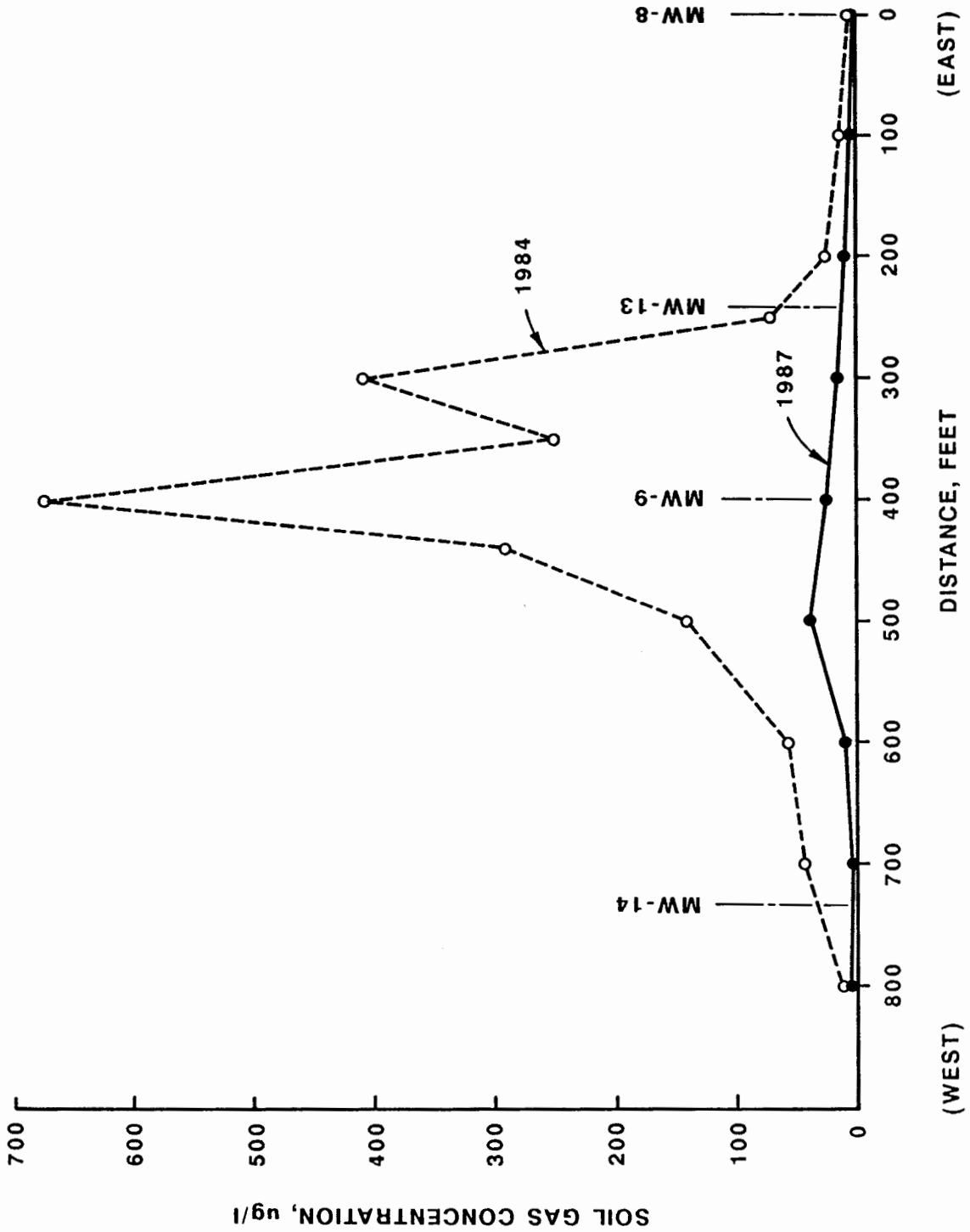
TCA SOIL GAS CONCENTRATIONS FACILITY SOUTH BOUNDARY

PLATE
5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
S.K.	06310,036.12				



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TCE SOIL GAS CONCENTRATIONS FACILITY SOUTH BOUNDARY

PLATE
6

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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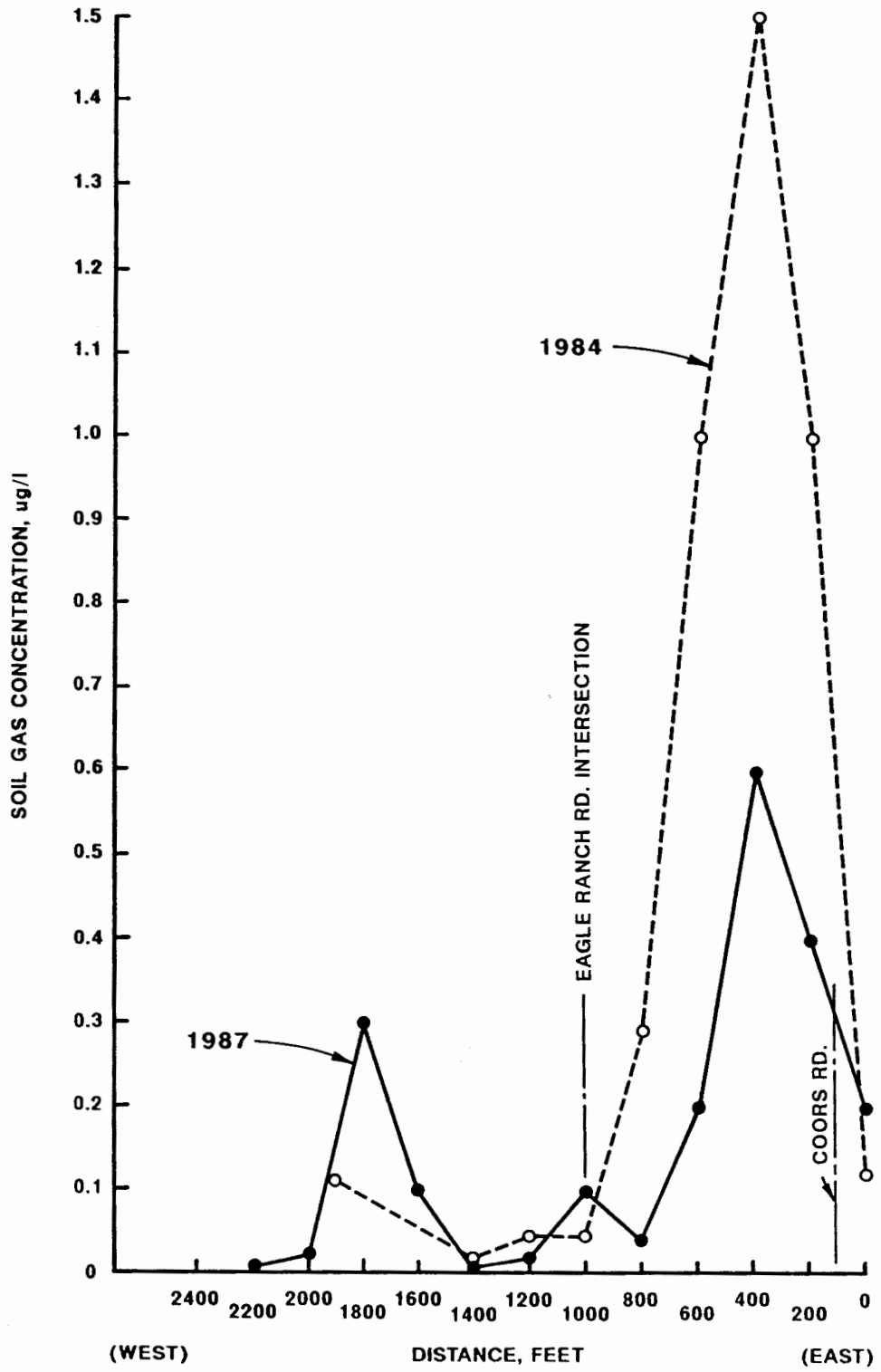

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TCA SOIL GAS CONCENTRATIONS IRVING BLVD.

PLATE
7

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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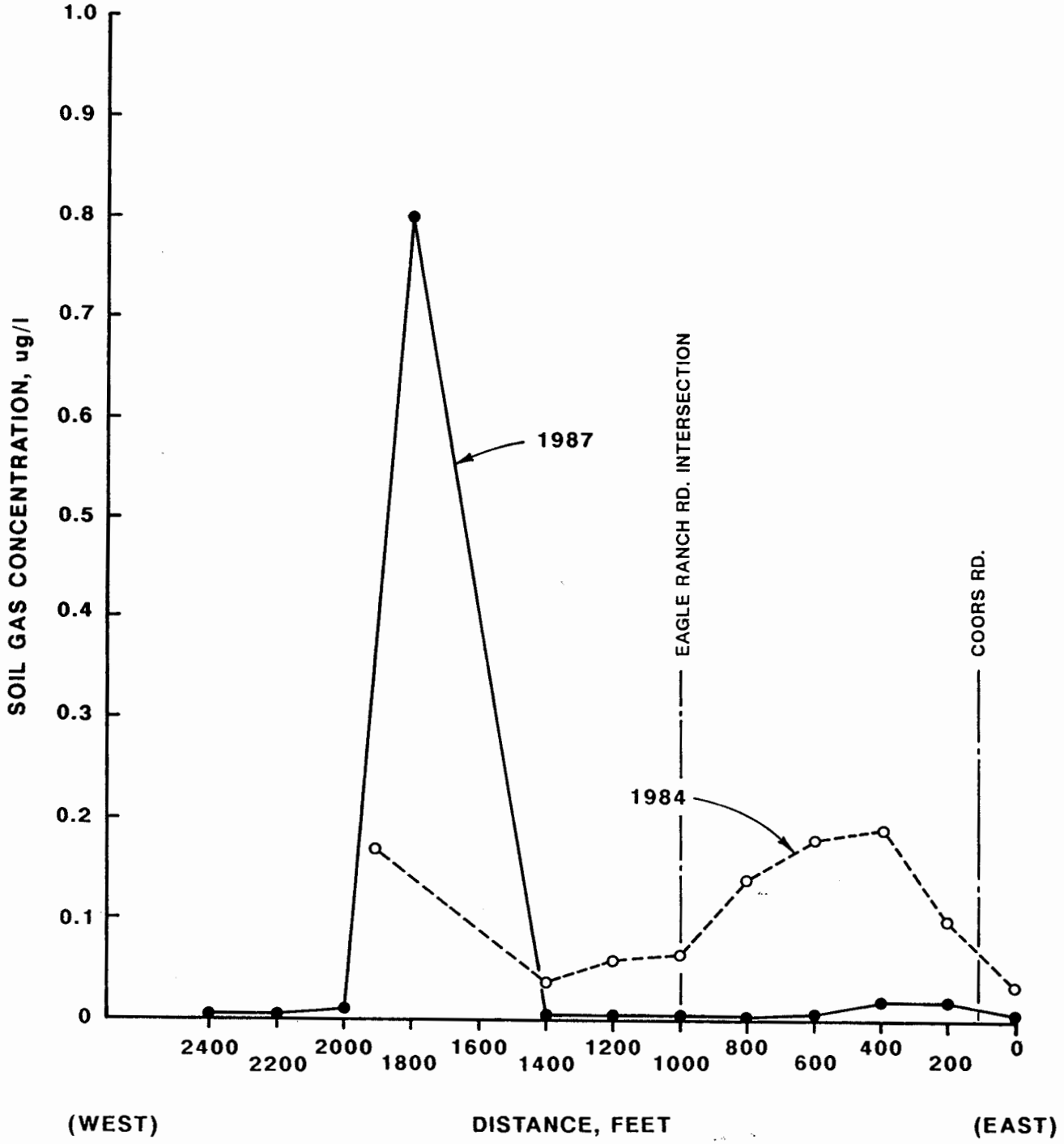

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TCE SOIL GAS CONCENTRATIONS
IRVING BLVD.

PLATE
8

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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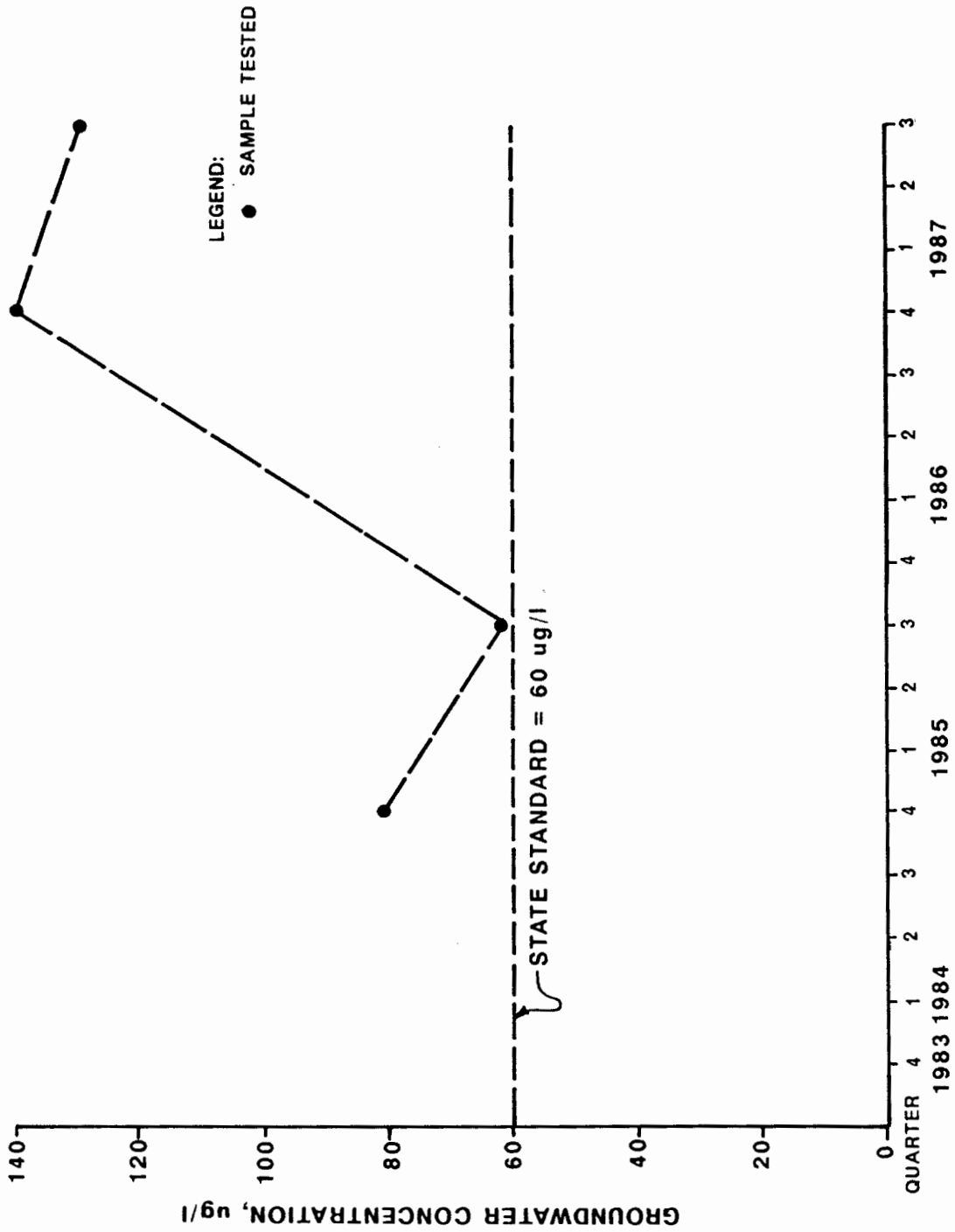

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TCA QUARTERLY SAMPLING 1983 TO 1987 : MW-6

PLATE
9

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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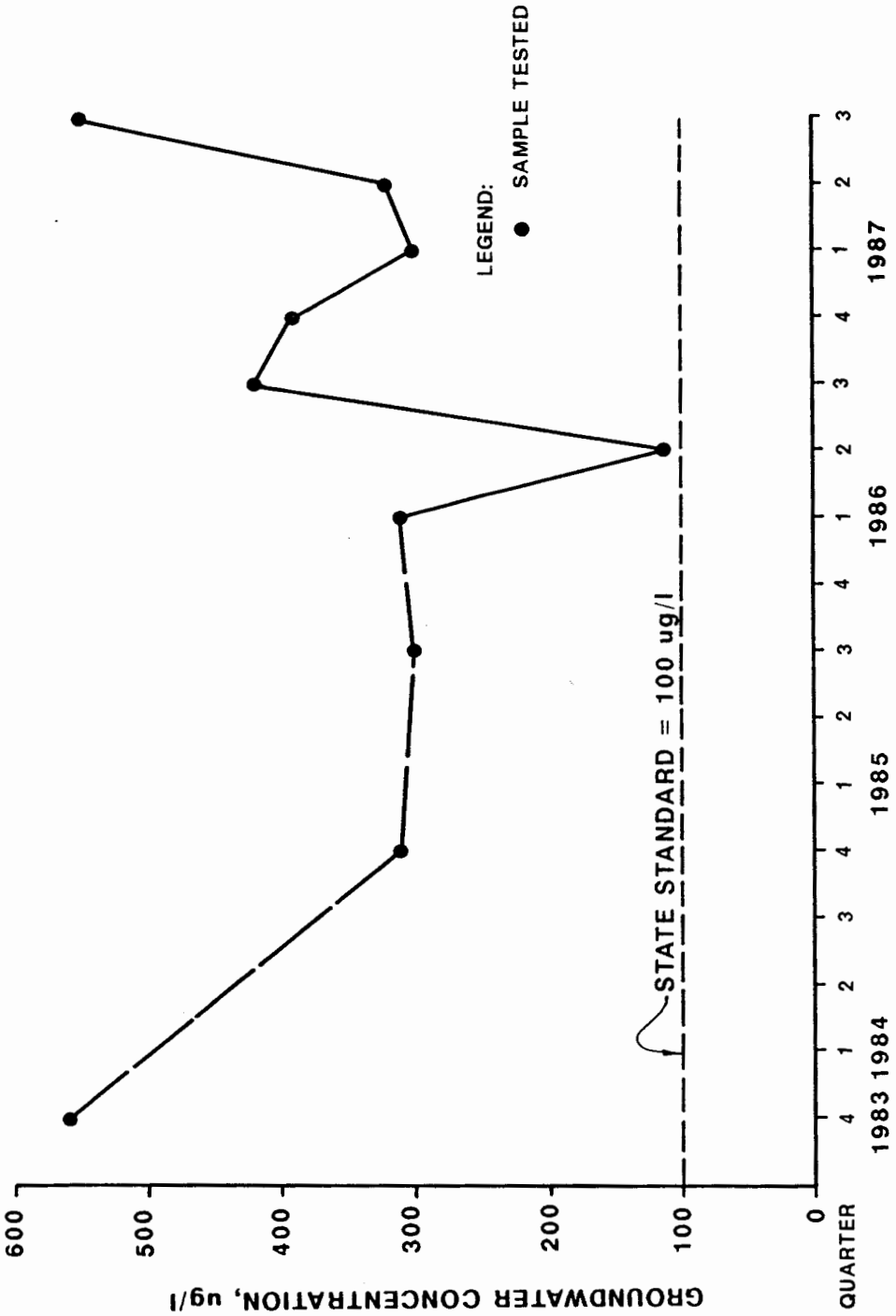

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TCE QUARTERLY SAMPLING
1983 TO 1987 : MW-6

PLATE
10

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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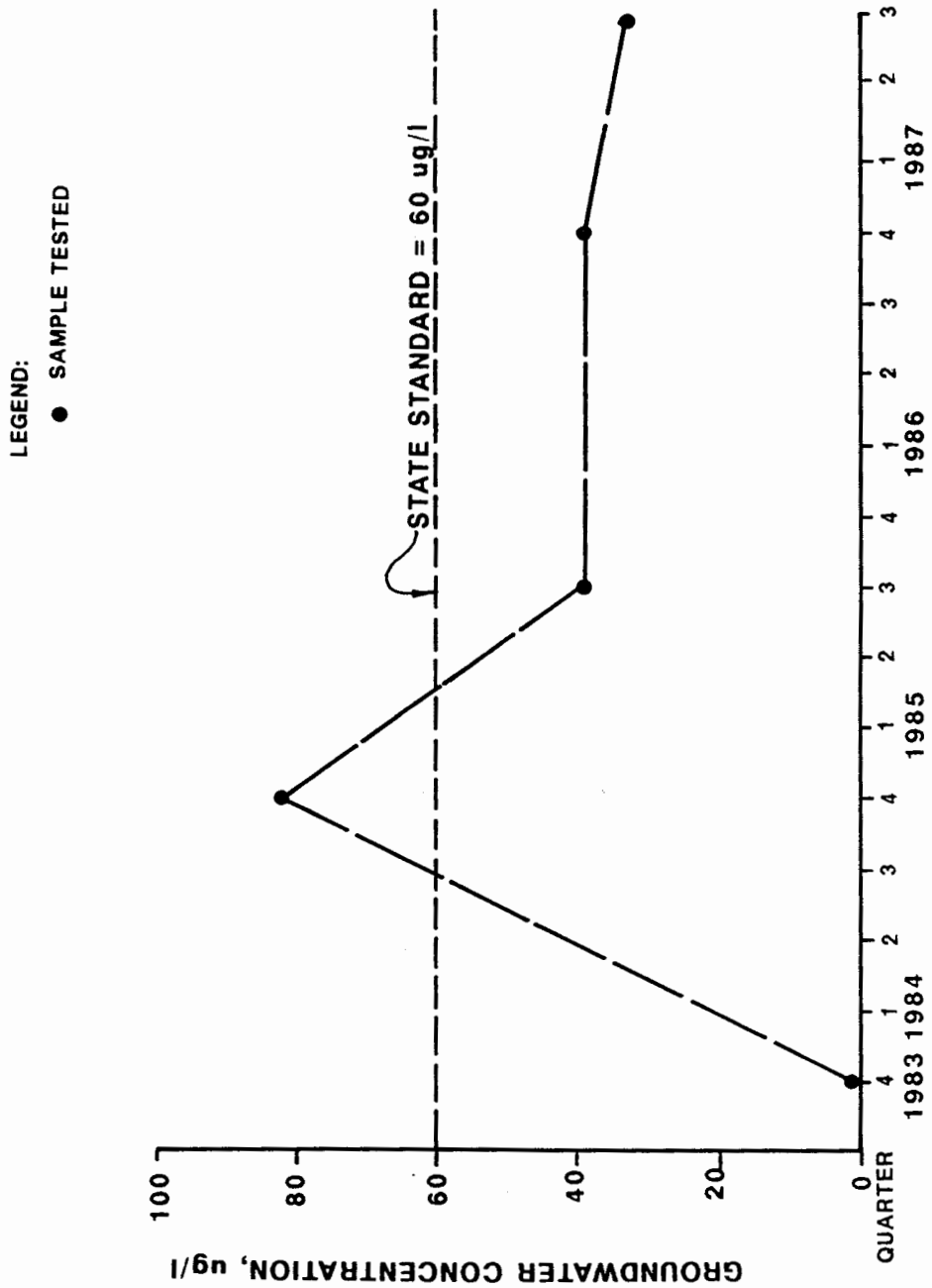

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TCA QUARTERLY SAMPLING 1983 TO 1987 : MW-8

PLATE **11**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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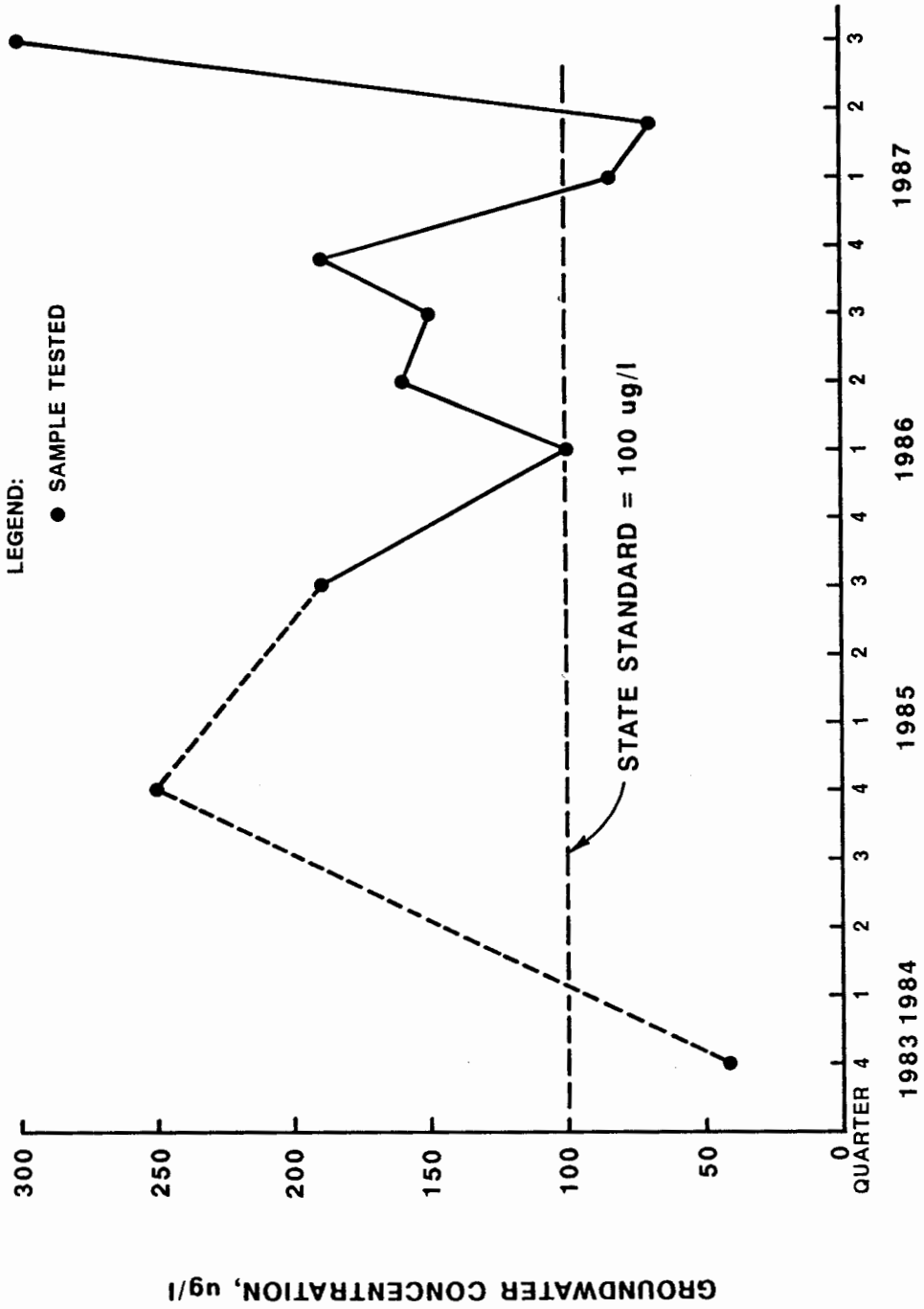

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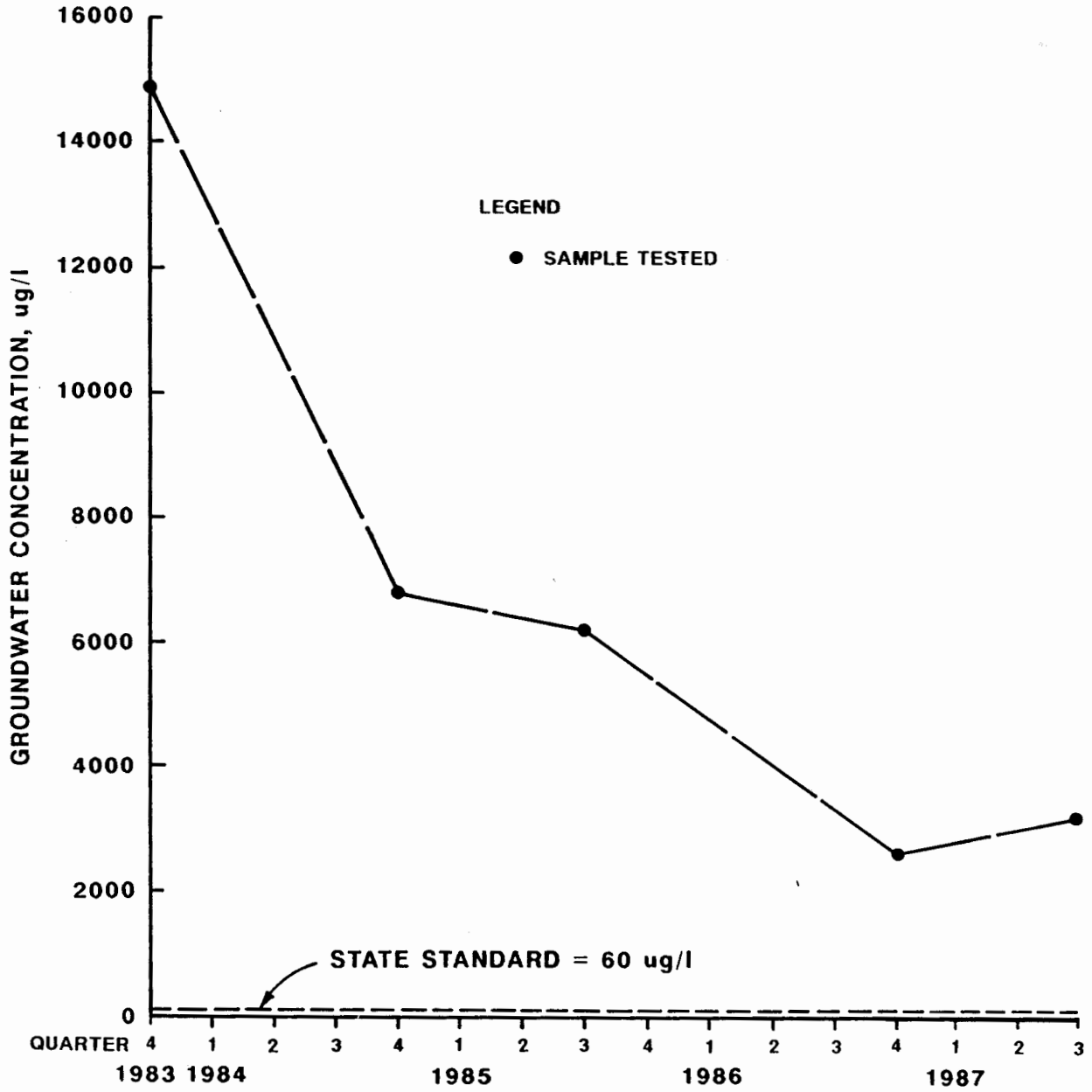
TCE QUARTERLY SAMPLING
1983 TO 1987 : MW-8

PLATE
12

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE



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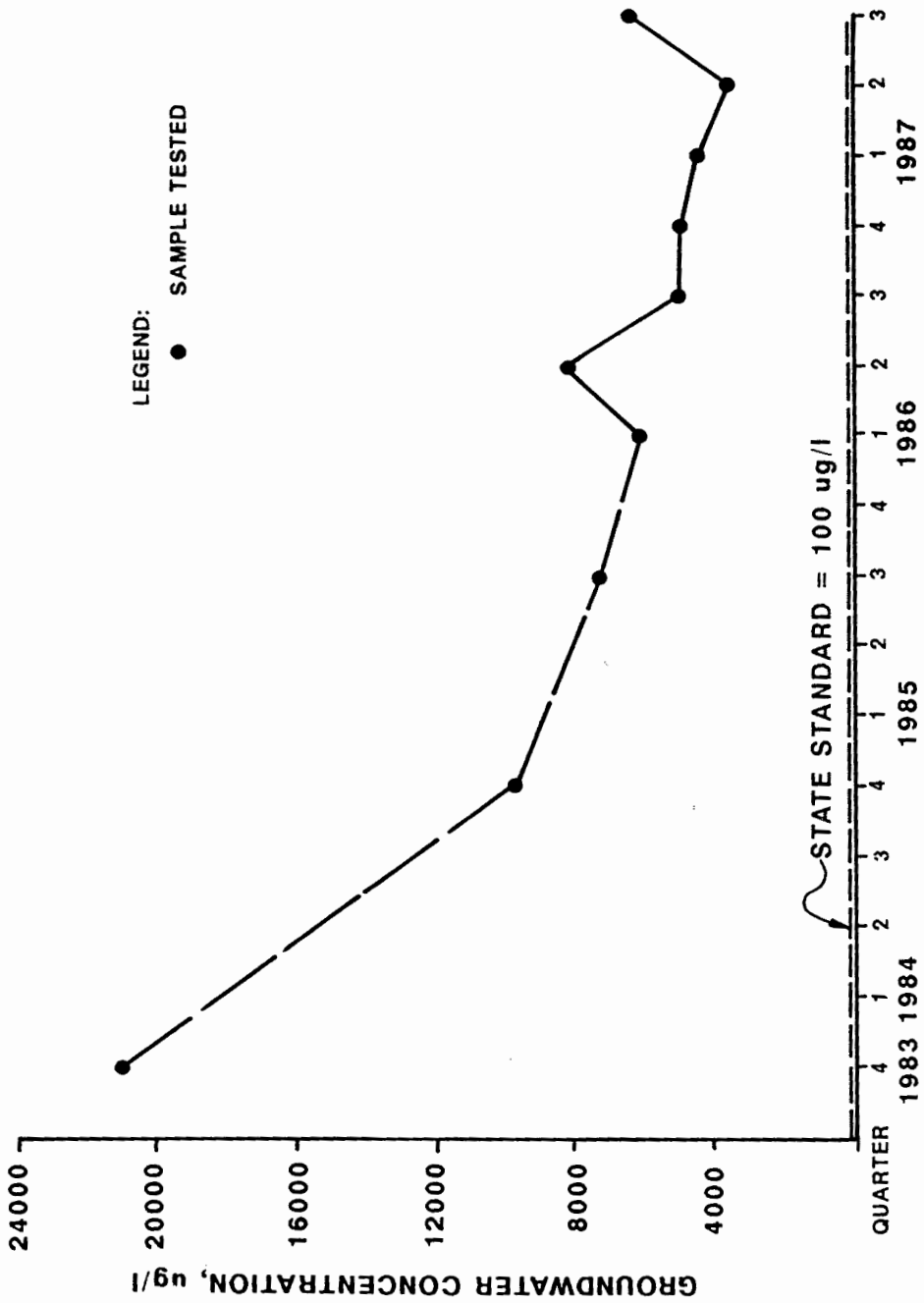
TCA QUARTERLY SAMPLING
1983 TO 1987 : MW-9

PLATE
13

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JLT	06310,036.12				



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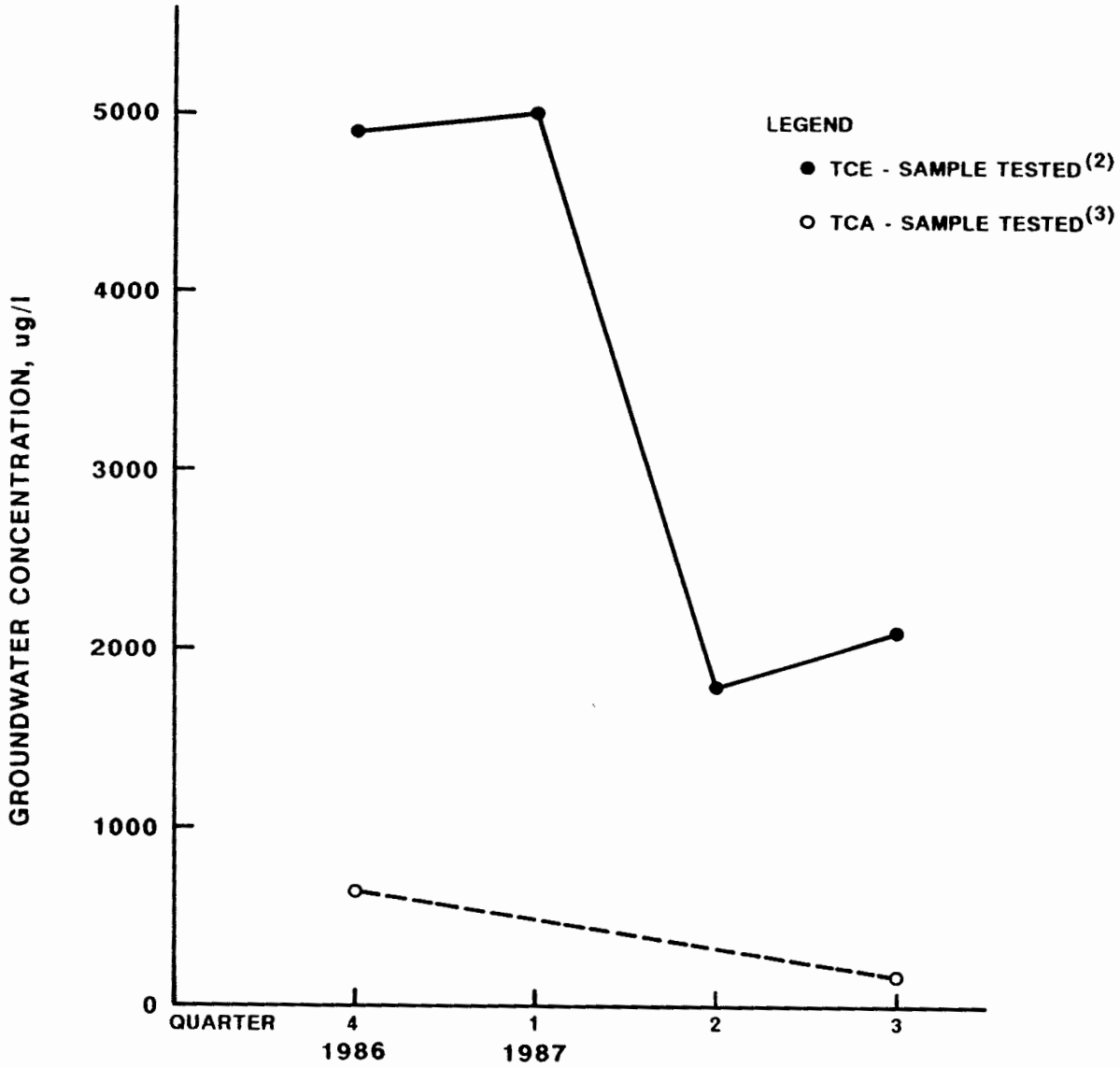
TCE QUARTERLY SAMPLING 1983 TO 1987 : MW-9

PLATE **14**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JLT	06310,036.12				



NOTES: 1.PACKER PLACED TO ISOLATE UPPER FLOW ZONE IN 1985.

2. STATE STANDARD (TCE) = 100 ug/l.

3. STATE STANDARD (TCA) = 60 ug/l.

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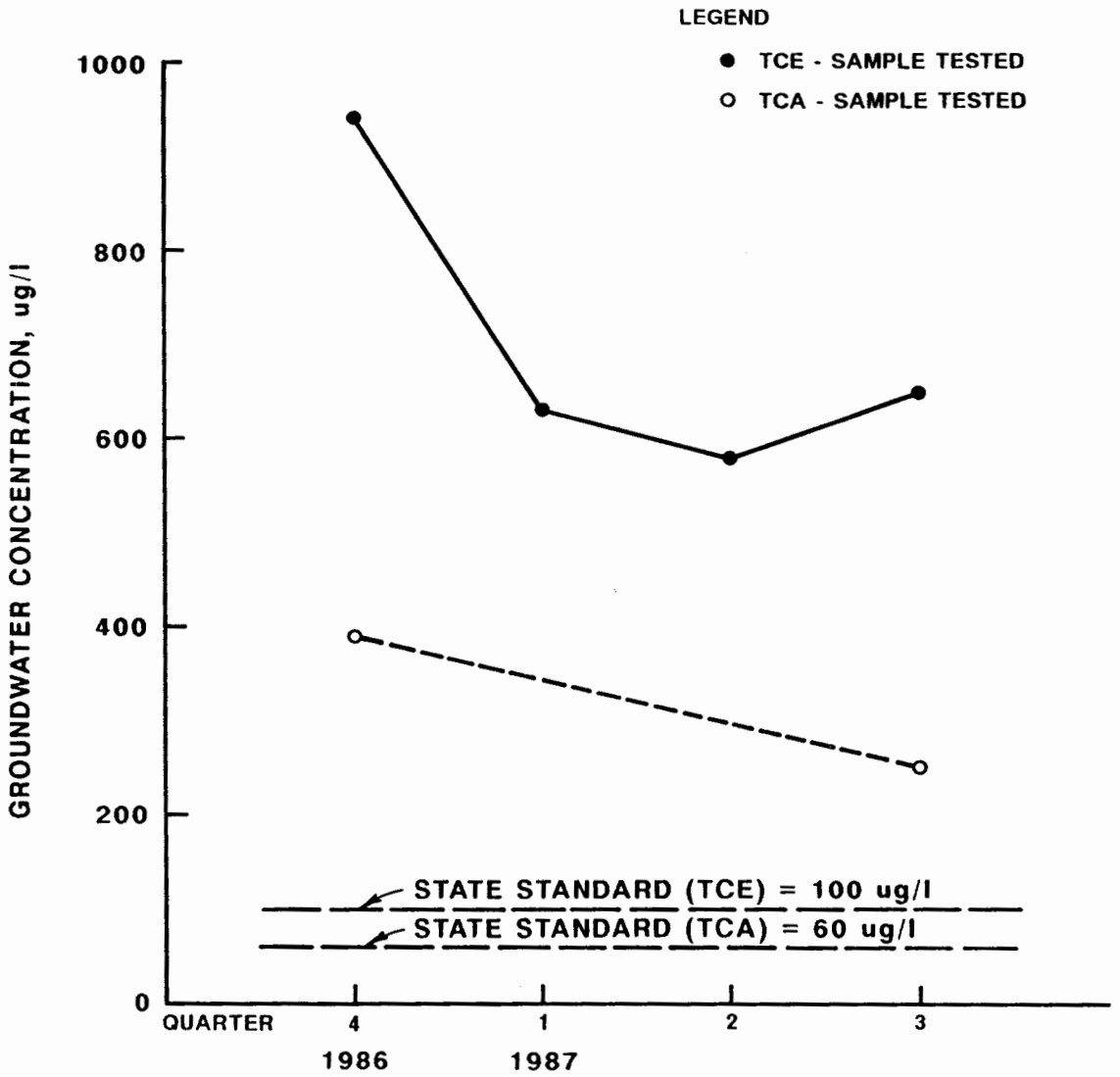
TCA AND TCE QUARTERLY SAMPLING(1)
1986 TO 1987 : MW-14

PLATE
15

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
S.K.	06310,036.12				



NOTE: 1. PACKER PLACED TO ISOLATE UPPER FLOW ZONE IN 1985.

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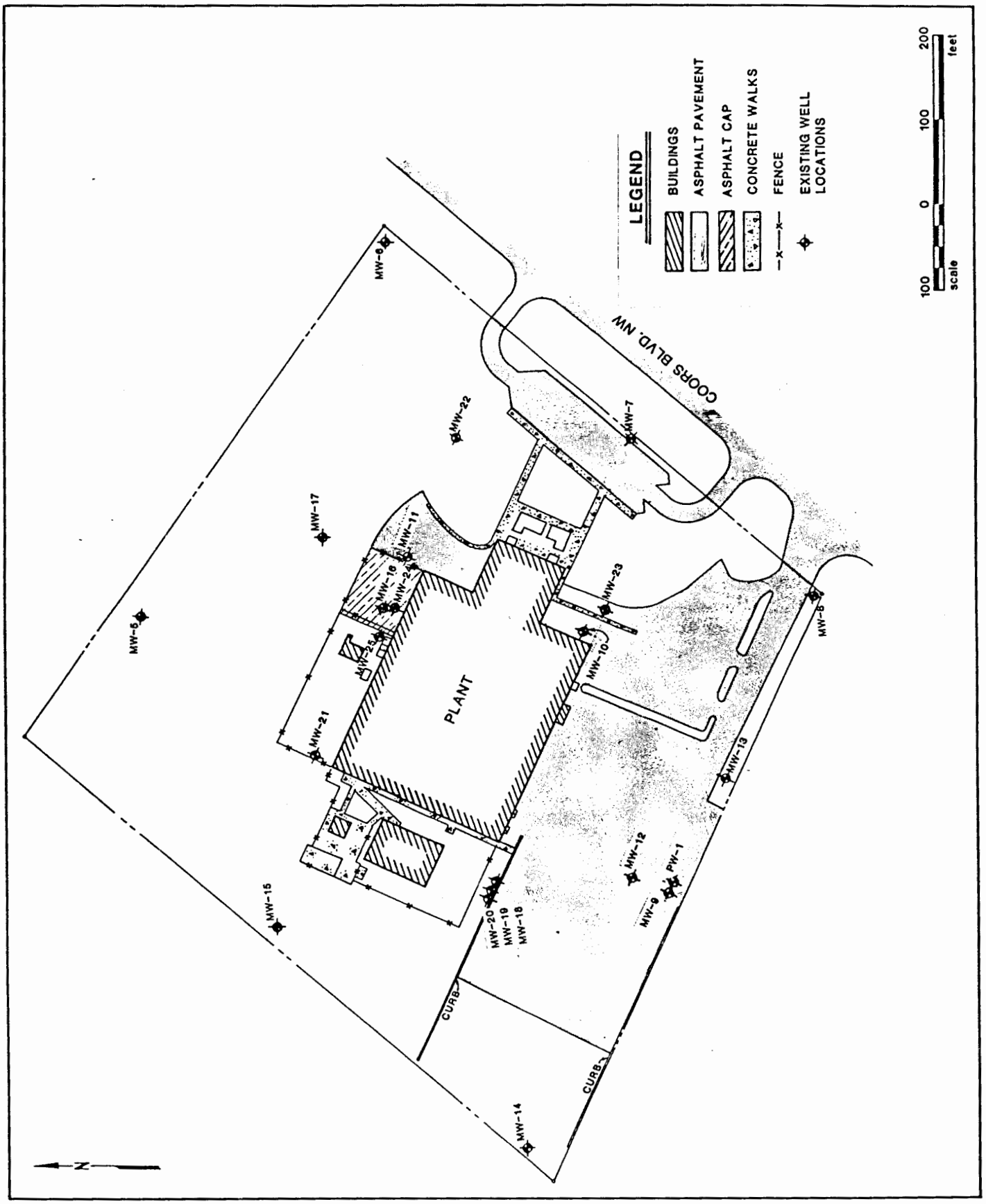
TCA AND TCE QUARTERLY SAMPLING[1]
1986 TO 1987 : MW-15

PLATE
16

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310.036.12				



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EXISTING WELLS

Sparton Technology, Inc.
Albuquerque, New Mexico

PLATE
17

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,036.12				

(1) $V = \frac{cKi}{n}$

where:
V = velocity, in feet/year
K = 0.92 feet/day
i = 0.007
n = 0.40
c = 365 days/year

$$V = \frac{(365 \text{ days/year})\ (0.92 \text{ feet/day})\ (0.007)}{0.40}$$

$$= 5.88 \text{ feet/year}$$

(2) $$V = \frac{(365 \text{ days/year})\ (13.0 \text{ feet/day})\ (0.007)}{0.40}$$

$$= 83.04 \text{ feet/year}$$

Figure (A) ADVECTION (with continous source)

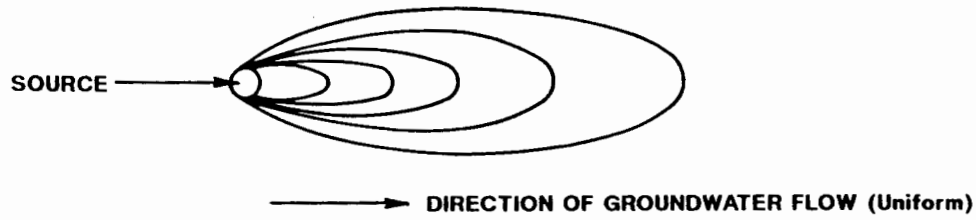


Figure (B) ADVECTION (with terminated source)

Figure (C) DISPERSION (with no advective influence)

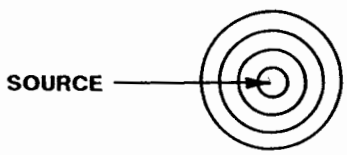


Figure (D) ADVECTION (with minor dispersion influence)

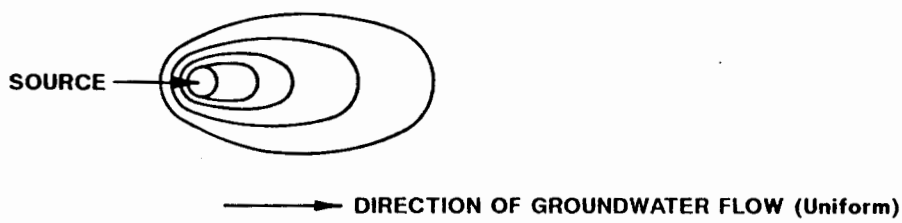
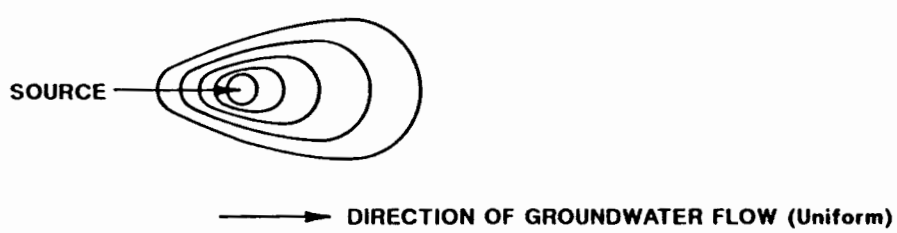


Figure (E) DISPERSION (with minor advection influence; i.e.: low groundwater velocity)



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IDEALIZED FLOW PATTERNS

PLATE
19

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
S.K.	06310,036.12				

APPENDIX A

TRC Report, 1987

Tracer Research Corporation

3855 North Business Center Drive Tucson, Arizona 85705 (602) 888-9400

SHALLOW SOIL GAS INVESTIGATION
AT THE
SPARTON FACILITY
ALBUQUERQUE, NEW MEXICO

AUGUST, 1987

PREPARED FOR:

HARDING LAWSON ASSOCIATES
6220 Westpark, Suite 100
Houston, Texas 77057

SUBMITTED BY:

Tracer Research Corporation

TABLE OF CONTENTS

INTRODUCTION..... 1

BACKGROUND ON THE METHODOLOGY..... 2

SAMPLING AND ANALYTIC PROCEDURES..... 3

QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES 5

APPENDIX A

CONDENSED DATA..... 7

FIGURES (MAPS)..... ATTACHED

INTRODUCTION

A shallow soil gas investigation was conducted by Tracer Research Corporation in the vicinity of the Sparton facility in Albuquerque, New Mexico. The investigation was conducted July 20-24, 1987. Additionally a depth profile consisting of 6 samples was taken on August 7, 1987. The main purpose was to delineate the sububsurface distribution of the following compounds:

1,1,1-Trichloroethane (TCA)
Trichloroethene (TCE)
Tetrachloroethene (PCE)

Analytical results are condensed in Appendix A. Maps of sampling locations and isoconcentration contours for TCA and TCE are attached.

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 ul to 2 ml, depending on the VOC concentration at any particular location.

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

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 0.00005 ug/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 ug/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.

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

Tracer Research Corp tion
3855 North Business Ce..er Drive
Tucson, Arizona 85705

HARDING LAWSON/SPARTON/ALBUQUERQUE, NEW MEXICO

Sample	Depth	Date	TCA (ug/l)	TCE (ug/l)	PCE (ug/l)
SGA-01	5.5'	07/20	0.01	1	0.007
SGA-02	5'	07/20	2	2	0.01
SGA-03	6'	07/20	12	10	0.1
SGA-04	6'	07/20	20	15	0.2
SGA-05	6'	07/20	23	24	0.4
SGA-06	6'	07/20	32	40	0.4
SGA-07	6'	07/20	6	10	0.2
SGA-08	5.5'	07/20	0.9	3	0.07
SGA-09	5.5'	07/20	0.7	3	0.09
SGA-10	5.5'	07/20	3	11	0.4
SGA-11	5.5'	07/20	2	5	0.2
SGA-12	5.5'	07/20	5	13	0.5
SGA-13	6'	07/20	8	20	0.7
SGA-14	6'	07/20	7	13	0.6
SGA-15	5.5'	07/20	7	0.01	0.4
SGA-16	6'	07/20	0.0006	0.0002	0.0006
SGA-17	5'	07/21	0.6	0.6	0.006
SGA-18	6'	07/24	0.4	1	0.05
SGA-19	5'	07/24	0.2	0.01	0.002
SGA-20	4.5'	07/24	0.1	0.002	0.0007
SGA-21	5'	07/24	0.001	0.0008	0.0006
SGB-01	6'	07/21	0.2	0.0004	0.01
SGB-02	5'	07/21	0.4	0.02	0.006
SGB-03	6'	07/21	0.6	0.02	0.001
SGB-04	6'	07/21	0.2	0.006	0.0004
SGB-05	5'	07/21	0.04	0.0002	0.0006
SGB-06	6'	07/21	0.1	<0.0002	0.0002
SGB-07	5'	07/21	0.02	0.001	0.0001
SGB-08	6'	07/21	0.004	0.001	0.0002
SGB-09	6'	07/21	0.1	0.4	0.007
SGB-10	6'	07/21	0.3	0.9	0.01
SGB-11	6'	07/21	0.02	0.01	0.0003
SGB-12	6'	07/21	0.004	0.001	0.0001

Notations:
1 interference with adjacent peaks
NR not analyzed

Analyzed by S. Cherba

Checked by M. Favero

Proofed by L. Laplander

Tracer Research Corporation
3855 North Business Center Drive
Tucson, Arizona 85705

HARDING LAWSON ASSOCIATES/SPARTON/ALBUQUERQUE, NEW MEXICO

Sample	Depth	Date	TCA (ug/l)	TCE (ug/l)	PCE (ug/l)
SGD-13	6'	07/24	0.0006	<0.0001	0.0001
SGC-01	6'	07/20	0.0005	0.0002	0.0001
SGC-02	6'	07/21	0.009	0.003	0.0001
SGC-03	5'	07/21	0.02	0.02	0.0002
SGC-04	6'	07/21	0.02	0.03	0.0002
SGC-05	6'	07/21	0.002	0.001	0.00009
SGC-06	5'	07/21	0.0009	0.001	0.00009
SGC-07	6'	07/21	0.0008	0.001	0.00009
SGC-08	6'	07/21	0.001	0.0009	0.0006
SGC-09	6'	07/21	0.03	0.01	0.00009
SGC-10	6'	07/21	0.02	0.004	0.00009
SGC-11	6'	07/22	0.009	0.002	0.0002
SGC-12	6'	07/22	0.002	<0.0002	0.00008
SGC-13	6'	07/22	0.01	0.0002	0.00008
SGC-14	6'	07/22	0.04	0.004	0.00008
SGC-15	6'	07/22	0.02	0.0009	0.00009
SGC-16	5'	07/22	0.006	0.0002	0.00005
SGD-01	6'	07/20	0.0004	0.007	0.0003
SGD-02	6'	07/21	0.0006	0.001	0.0001
SGD-03	6'	07/22	0.009	0.003	0.0002
SGD-04	6'	07/22	0.002	0.003	0.0002
SGD-05	6'	07/22	0.001	<0.0002	0.0002
SGD-06	6'	07/22	0.0008	0.0002	0.0002
SGD-07	5'	07/22	0.0004	<0.0002	0.00006
SGD-08	5.5	07/22	0.0004	0.001	0.00008
SGD-09	6'	07/22	0.0003	<0.0002	0.00006
SGD-10	6'	07/22	0.0003	<0.0002	0.00008
SGD-10A	6'	07/22	0.0003	0.0002	0.00008
SGD-11	6'	07/22	0.0002	<0.0002	0.00006
SGD-12	6'	07/22	0.0001	<0.0002	0.00006
SGE-01	6'	07/23	6	7	0.2
SGE-02	6'	07/23	16	13	0.4
SGE-03	6'	07/23	14	12	0.2

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by S. Cherba
Checked by M. Favero
Proofed by L. Laplander

Tracer Research Corporation
3855 North Business Center Drive
Tucson, Arizona 85705

HARDING LAWSON ASSOCIATES/SPARTON/ALBUQUERQUE, NEW MEXICO

Sample	Depth	Date	TCA (ug/l)	TCE (ug/l)	PCE (ug/l)
SGE-04	6'	07/23	31	27	0.5
SGE-05	6'	07/23	21	14	0.3
SGE-06	6'	07/23	11	8	0.1
SGE-07	6'	07/23	0.8	0.7	0.009
SGE-08	6'	07/23	0.1	0.04	0.0009
SGE-09	6'	07/23	0.3	0.1	0.001
SGE-10	6'	07/24	0.6	2	0.09
SGE-11	6'	07/24	0.03	0.04	0.003
SGE-12	6'	07/24	0.001	0.0008	0.00007
SGE-13	6'	07/24	0.0004	0.0001	0.00007
SGF-01	5'	07/24	0.01	0.004	0.0002
SGF-02	6'	07/24	0.07	0.02	0.00008
SGF-03	6'	07/24	0.01	0.01	0.0004
SGG-01	5'	07/24	0.0003	<0.0001	0.00009
SGG-02	6'	07/24	0.0005	0.0001	0.0002
SGG-03	6'	07/24	0.0003	<0.0001	0.0002
SGG-04	6'	07/24	0.0002	0.002	0.0008
SGD-01	6'	07/23	0.0008	0.0007	0.0002
SGB2-02	5'	07/23	0.0004	0.0004	0.0001
SGB2-03	5'	07/23	0.01	0.002	0.00005
SGB2-04	4.5'	07/23	0.06	0.001	0.0002
SGB2-05	6'	07/23	0.09	0.003	0.0001
SGB2-06	6'	07/23	0.1	0.006	0.0003
SGB2-07	6'	07/23	2	0.05	0.006
SGB2-08	6'	07/23	0.3	0.02	0.0002
SGB2-09	5'	07/23	0.2	0.1	0.0004
SGB2-10	6'	07/23	0.5	0.2	0.0007
SGB2-11	6'	07/23	0.03	0.01	0.0002

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by S. Cherba
Checked by M. Favero
Proofed by L. Laplander

Tracer Research Corp tion
3855 North Business Ce. ar Drive
Tucson, Arizona 85705

HARDING LAWSON/SPARTON/ALBUQUERQUE, NEW MEXICO

Sample	Depth	Date	TCA (ug/l)	TCE (ug/l)	PCE (ug/l)
SGB-12	6'	07/23	0.2	0.007	0.0006
SGB-13	6'	07/23	0.09	0.008	0.0002
SGB-14	6'	07/24	0.03	<0.0001	0.0001
SGC2-01	6'	07/22	0.0008	<0.0002	0.00007
SGC2-02	5'	07/22	0.0004	<0.0002	0.00008
SGC2-03	3.5'	07/22	0.0004	0.0009	0.0002
SGC2-04	5'	07/22	0.0006	<0.0002	0.00008
SGC2-05	6'	07/22	0.0002	<0.0002	0.00007
SGC2-06	6'	07/22	0.0003	<0.0002	0.00007
SGC2-07	6'	07/22	0.0002	<0.0002	0.00005
SGC2-08	6'	07/22	0.0006	<0.0002	0.00005
SGC2-09	6'	07/22	0.0008	<0.0002	0.00005
SGC2-10	6'	07/22	0.004	<0.0002	0.00005
SGC2-11	6'	07/22	0.005	0.0002	0.00008

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by S. Cherba
Checked by M. Favero
Proofed by L. Laplander

Tracer Research Corr ation
3855 North Business C cer Drive
Tucson, Arizona 85705

HARDING LAWSON/SPARTON/ALBUQUERQUE, NEW MEXICO

Sample	Date	TCA (ug/l)	TCE (ug/l)	PCE (ug/l)
DP-5.0 '	08/07	2	0.03	0.007
DP-10.3 '	08/07	3	0.2	<0.001
DP-15.7 '	08/07	8	0.8	4
DP-21.0 '	08/07	11	1	<0.02
DP-26.3 '	08/07	14	1	<0.02
DP-31.7 '	08/07	11	1	<0.02

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by T. Bode
Checked by T. Bode
Proofed by D. Evans

APPENDIX B
TRC Report, 1984

CONFIDENTIAL

CONSULTING REPORT

Harding Lawson Associates
6300 Westpark, Suite 100
Houston, Texas 77057

Soil gas investigation of volatile organic compounds at the Sparton Technology, Inc. site, 9621 Coors Road NW, Albuquerque, New Mexico 87114

By

Glenn M. Thompson Ph.D.
Tracer Research Corporation
1687 West Grant Road
Tucson, Arizona 85745

602-623-0200

May 25, 1984

-CONFIDENTIAL-

OBJECTIVES:

A soil gas survey was performed to determine to the extent of volatile contaminant migration off-site in the down-gradient direction from the Spartan property and to determine if there was a source of contamination up-gradient from the property that was contributing to ground water contamination in the area.

METHOD:

The soil gas survey is performed by collecting and analysing samples of shallow soil gas in transects across the property and in accessable down-gradient areas for the principal volatile constituents of the contamination. The soil gas is collected by driving a 3/4" steel pipe into the ground to a depth of five (5) feet. The pipe is closed at the tip with perforations for air entry several inches up from the tip. Soil gas is pumped from the ground through the probe at the rate of two (2) or three (3) liters per minute for a period of about three (3) minutes, the time required to obtain a representative sample. The sample is collected in a glass syringe and immediately injected into a gas chromatograph for analysis. The analysis is performed in the field in the TRC mobil laboratory. The analysis typically requires three (3) to four (4) minutes and is completed in about the same amount of time that is required to pull the sampling probe from the ground.

The results of the measurement are immediately available to be used in deciding where to place the next probe.

Blanks are periodically run to determine if the sampling system is contaminated. The blank is obtained by drawing air above ground through the probe, pump and syringe sampling system. Thus, an uncontaminated system should produce a gas sample that looks exactly like air above ground injected with a clean syringe.

SELECTION OF CONTAMINANTS FOR PLUME MAPPING:

Previous work at the site by HLA indicated that TCE, 1,1,1 TCA, 1,1 DCE, methylenechloride and PCE were present in the ground water. Of these contaminants, TCE and TCA were present in concentrations of at least a factor of ten (10) higher than all the rest. Accordingly, TCE and TCA were the two components of the contamination selected for use in the plume mapping effort. In addition to the fact that TCE and TCA were the major volatile contaminants, other factors reinforced the decision to monitor only the TCE and TCA. The detectability of TCE and TCA is at least fifty (50) times greater than the DCE and the methylenechloride at the same concentration. Thus it is impractical in measurements where speed is essential, to measure the minor components of the contaminant mixture in the presence of major components that may yield 500 times more signal.

The TCE and TCA are also believed to be as mobil or more mobil in ground water systems than the other volatile components. Thus the TCE and TCA are likely to represent the "worst case" situation for movement of contaminants off-site. PCE which is as detectable as TCE and TCA was present in much smaller concentrations and was of little significance in this investigation.

RESULTS:

The work consisted largely of soil gas measurements made in transects along the property boundaries, across the interior of the property on the north and west sides of the building and along a road approximately 800 feet southwest of the property. Soil gas measurements were also made at all of the existing shallow monitoring wells to determine how well soil gas concentrations would correlate with ground water concentrations. Several soil gas points were resampled on subsequent days to determine the reproducibility of the sampling technique.

The soil gas data are provided in Table 1 which consists of three (3) parts, each identified by date of collection. The results are tabulated in the order of collection. Sites that were sampled on a subsequent day by driving a probe within five (5) feet of the original spot, are indicated by a "B" after the number given to the site on the previous day. The replicate sample measurements are listed in Table 2. The samples collected adjacent to the existing monitoring wells are listed in Table 3 along with the measurements of the ground water collected from the wells. The results of the soil gas sampling are also plotted and contoured on plat maps of the site (Figs. 1 & 2).

The transects of the plume at the southwestern boundary and at the off-site location about 800 feet further down-gradient are shown in Figures 3 and 4. The location of the transects relative to the property and to the known contamination source is shown in Figure 5.

TABLE 1 - 5/8/84

SAMPLE	TCA Concentration ug/l	TCE Concentration ug/l
SG10 (MW-8)*	1.8	4.0
SG20	8.7	13
SG30	28	26
SG40	260	410
SG50 (MW-9)	310	670
SG60	130	141
SG70	39	56
SG80	13	43
SG90	2.0	11
SG55	220	290
SG45	220	240
SG35	105	71
SG100 (MW-7)	2.9	.85
SG110 (MW-6)	2.9	3.6
SG120 (MW-4)	330	560
SG130	1.0	0.10
SG140	1.5	.19
SG150	1.0	0.18
SG160	.29	0.14
SG170	.046	.064
SG180	.046	.059
SG190	.017	.038
SG200	.11	0.17
SG125	.12	.033
Blank	.003	.014

*Soil gas sample collected adjacent to MW-8.

TABLE 1 - 5/9/84

SAMPLE	TCA Concentration ug/l	TCE Concentration ug/l
SG10B	1.9	4.1
SG210	3.8	4.8
SG220	3.7	2.4
SG100B	3.2	0.99
SG230	1.3	0.72
SG240	2.8	3.0
SG250	3.5	4.1
MW7	150	600
SG110B	2.7	3.3
SG260	77	140
SG50B	198	360
MW7	148	600
SG45B	172	200
SG270	6	34
SG280	12	47
SG290	2.5	9.7
SG300	3.3	16
MW8	107	447
SG310	19	81
SG320	.36	1.8
SG330	17	53
SG340	13	37
SG350	21	33
SG360	32	52
SG370 (MW5)	40	80
MW9	17,000	22,000
SG380	27	39
SG390	42	93
SG400	42	79
MW6	200	17,000
SG410	13	11

TABLE 1 - 5/10/84

SAMPLE	TCA Concentration ug/l	TCE Concentration ug/l
SG420	11	7.6
SG430	59	28
SG440	140	59
SG450	440	720
SG460	150	61
SG470	78	61
SG480	19	32
SG490	53	140
SG500	28	48
MW5	170	400
SG510	32	43
SG520	56	102
MW4	5,600	11,000
SG530	45	32
SG540	41	27
SG550	26	25

Table 2 - Repeat sampling within five (5) foot radius of selected points to test reproducibility of sampling procedure.

5/8/84	TCA	TCE	5/9/84	TCA	TCE
SG10	1.8	4.0	SG10B	1.9	4.1
SG100	2.9	.85	SG100B	3.2	.99
SG110	2.9	3.6	SG110B	2.7	3.3
SG50	315	675	SG50B	200	360
SG45	220	240	SG45B	172	200

Table 3 - TCA and TCE soil gas concentration compared to ground water concentrations in the shallow aquifer.

Monitoring / Well	Soil Gas / Sampling Point	TCA ug/l water/ug/l SG	TCE ug/lwater/ug/l SG
MW8	SG10B	107/1.9 = 56	447/4.1 = 109
MW7	SG100B	85/3.2 = 27	380/.99 = 380
MW9	SG50B	17,000/198 = 85	22,000/364 = 60
MW6	SG110B	151/2.7 = 55	585/3.3 = 177
MW5	SG370	165/40 = 4.1	395/80 = 5
MW4	SG120	5,600/334 = 17	11,000/560 = 19

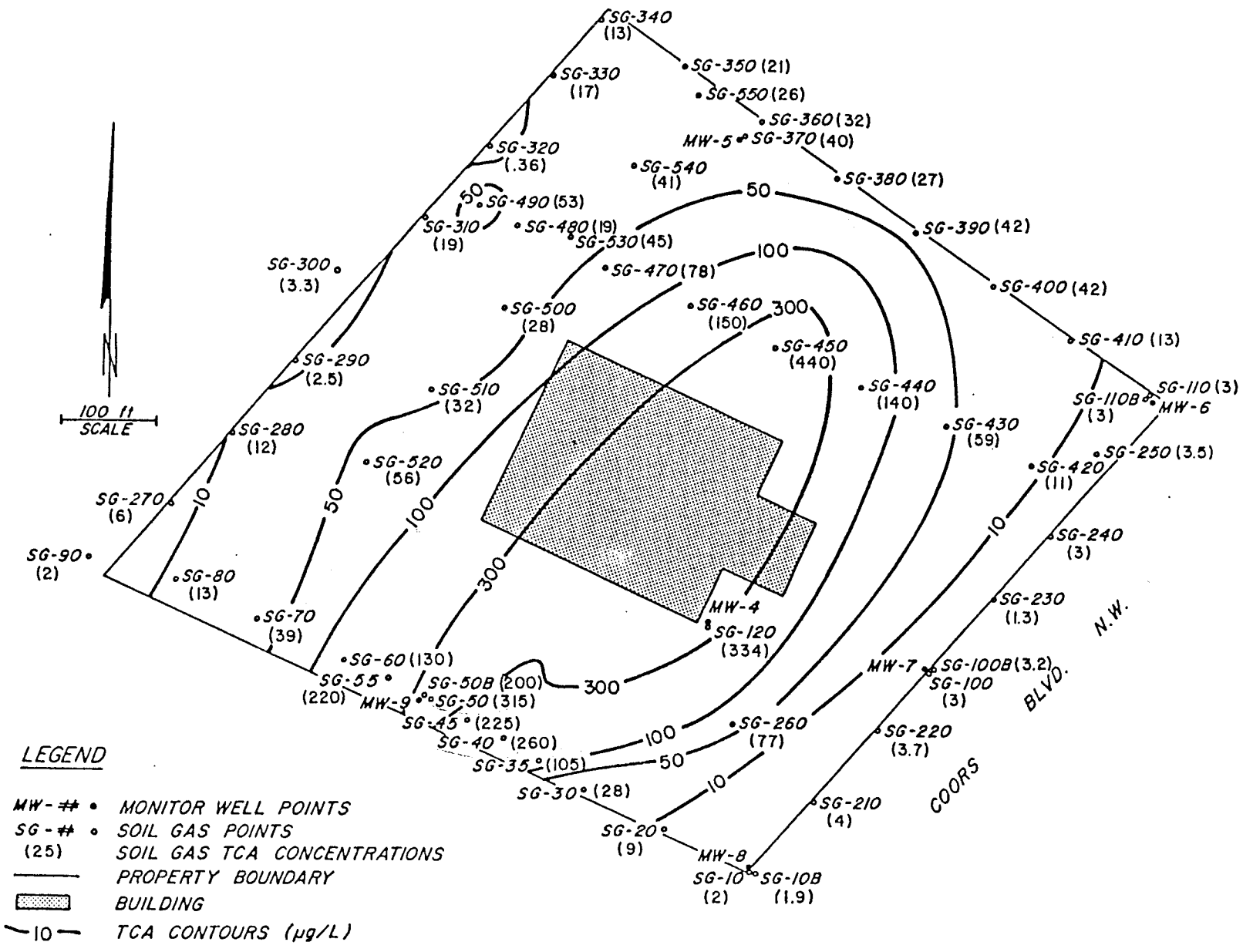

Figure 2. TCA in Soil-Gas Contour Map.

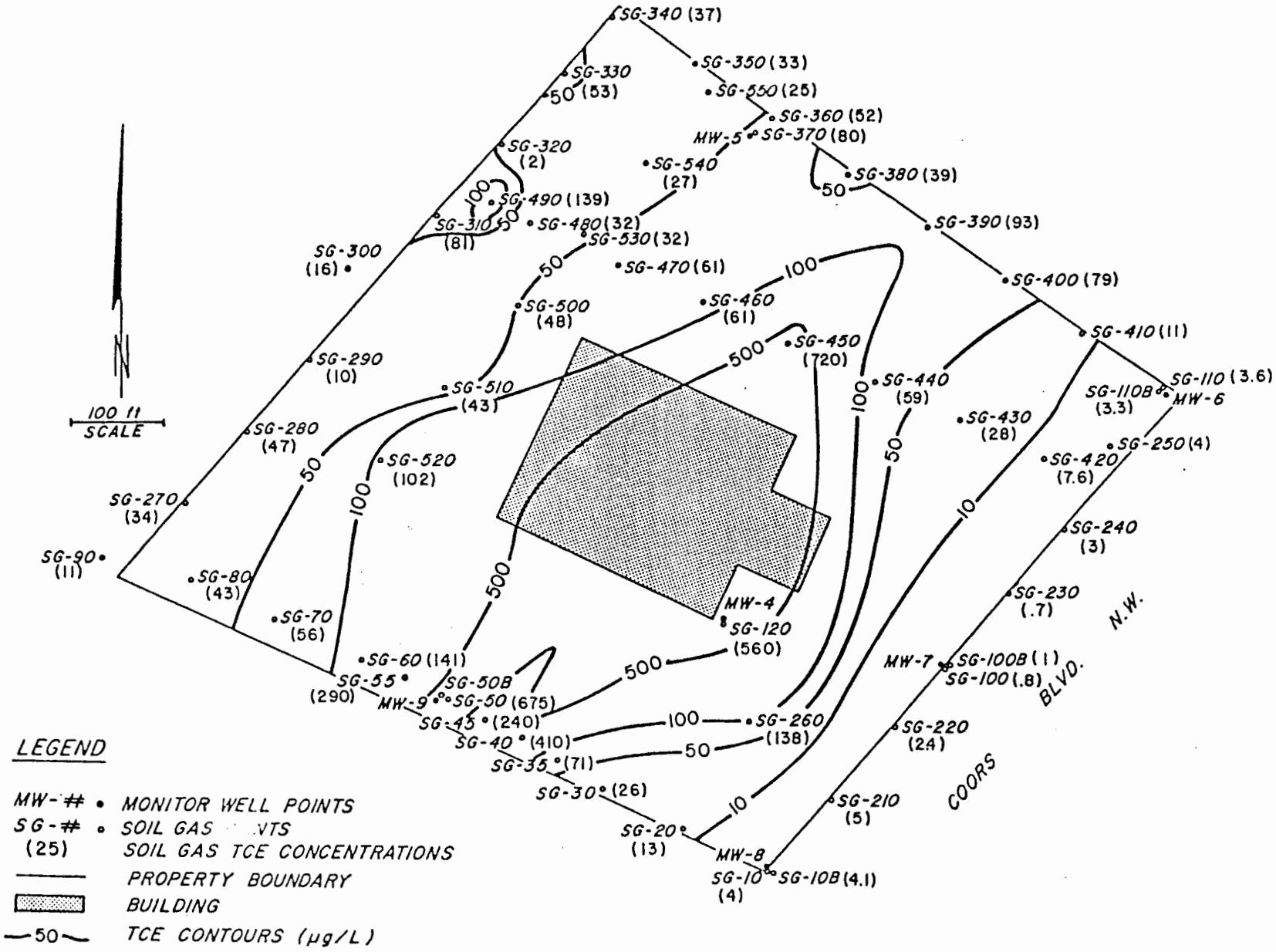

Figure 1. TCE in Soil-Gas Contour Map.

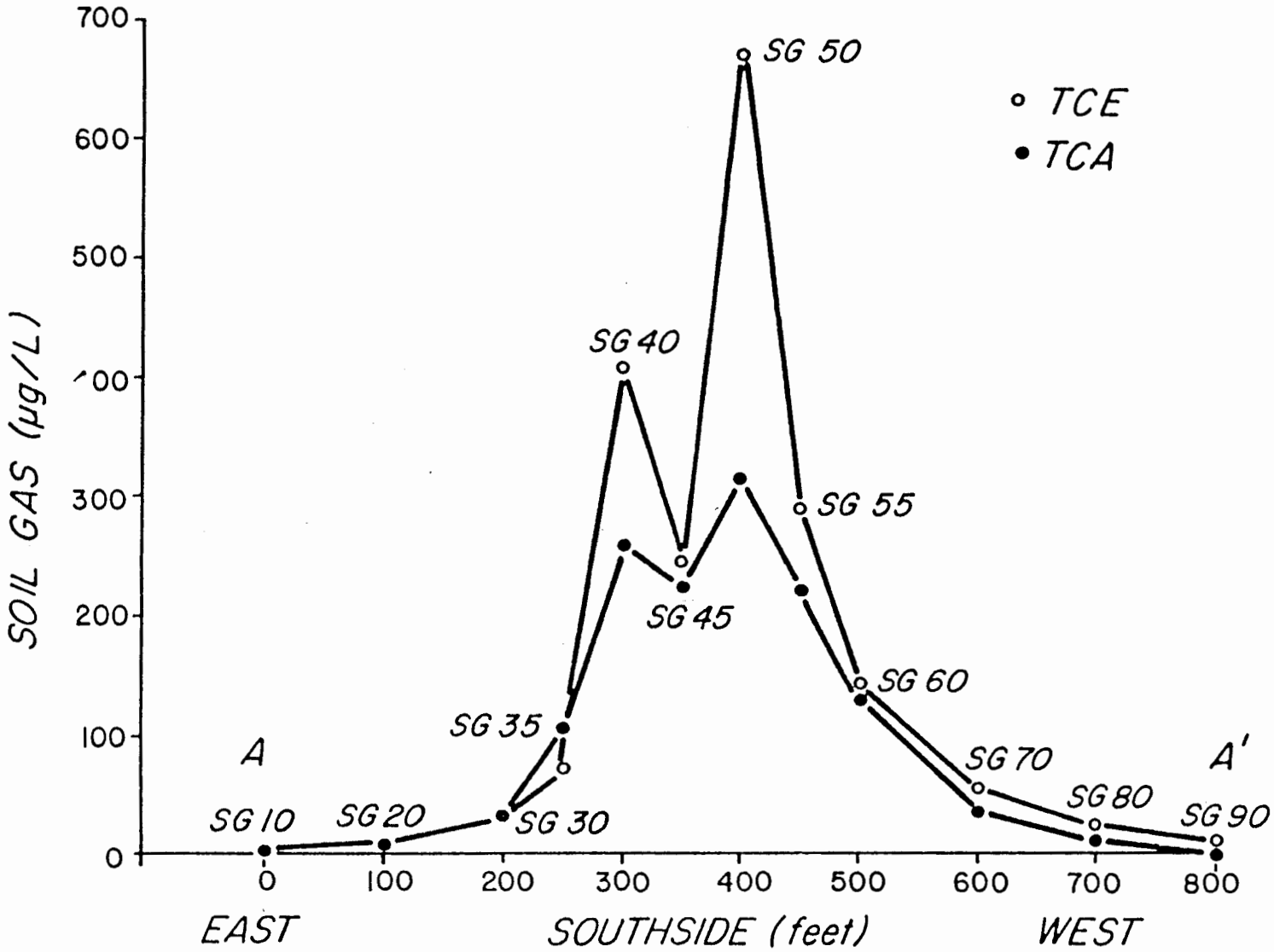

Figure 3 - Soil gas transect A-A' along southwestern property boundary.

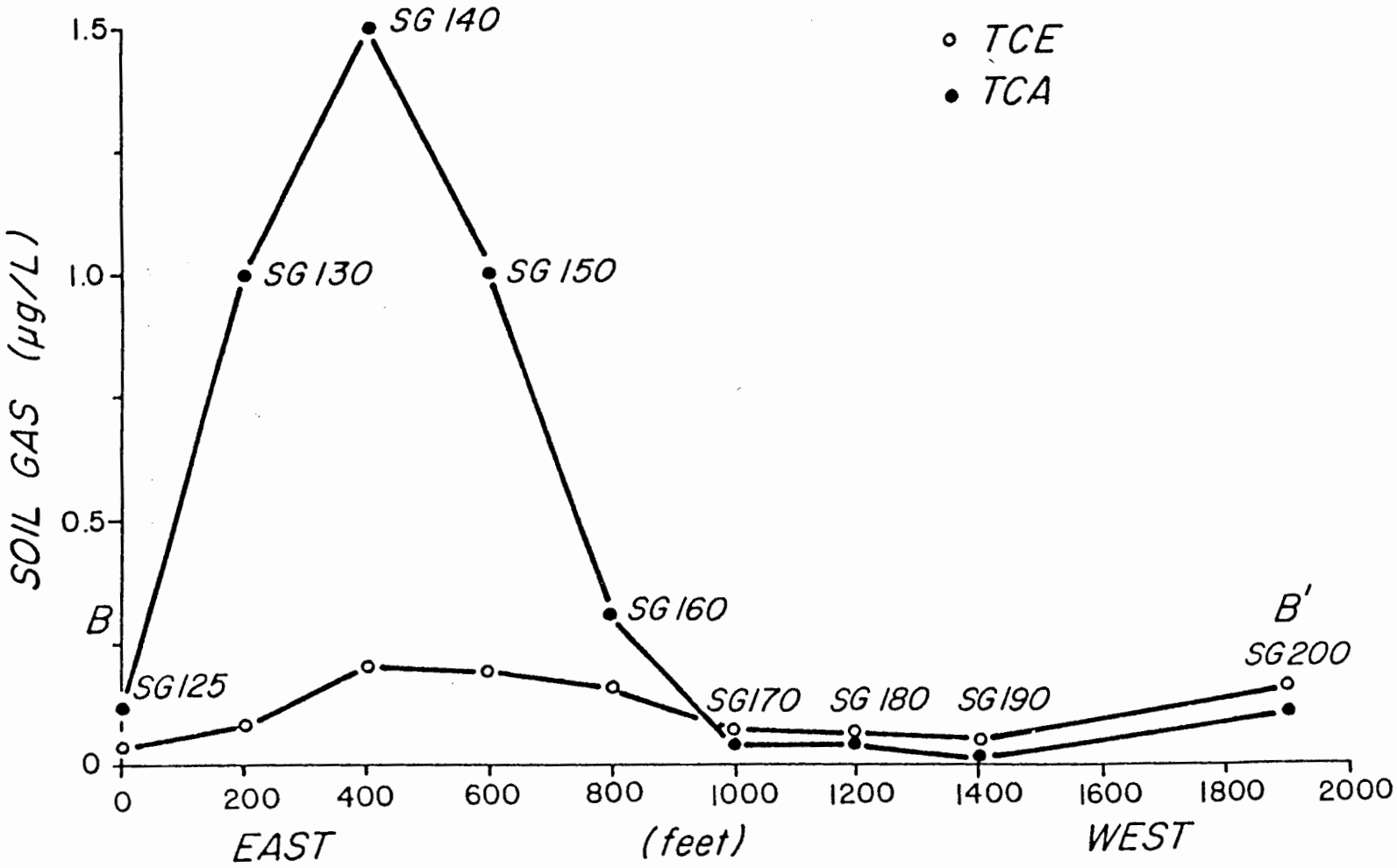

Figure 4 - Soil gas transect B-B' 800 feet southwest of the property down-gradient from transect A-A'.

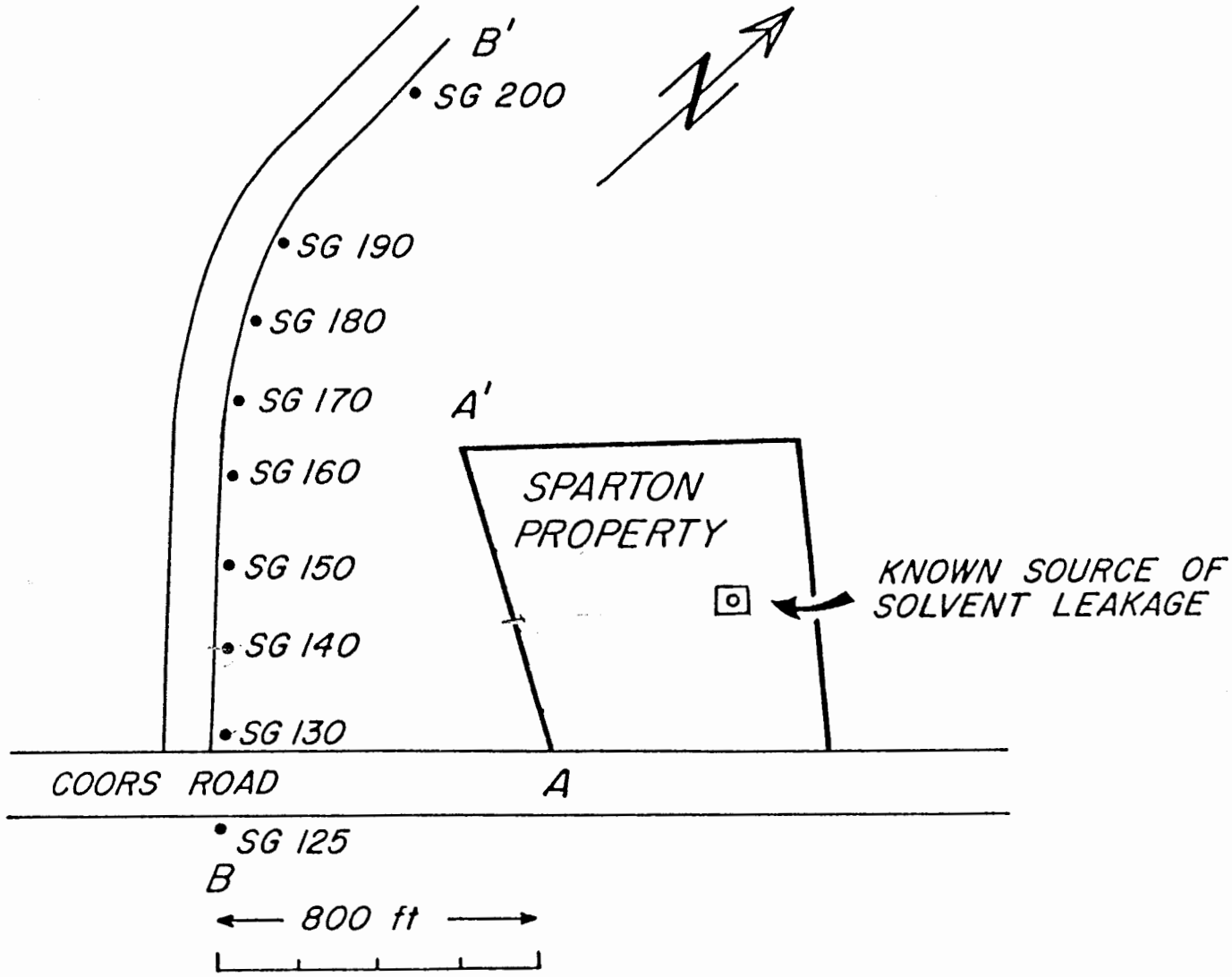

Figure 5 - Map showing location of transects A-A' and B-B' relative to to the property.

DISCUSSION OF RESULTS:

The soil gas sampling shows TCA and TCE decreasing in concentration radially in all directions from the known contamination source area on the northeast side of the building (Figs. 1 & 2). The contours are skewed to the southwest in the direction of ground water movement and indicate that contamination is moving off-site in the ground water. The contamination was observed again 800 feet further down-gradient in the second transect.

The off-site plume cross section showed TCA and TCE concentrations in the shallow soil gas of 1.5 ug/l and 0.19 ug/l respectively. The system blank analysed during this part of the work showed that the background for TCA in the system was 0.003 ug/l and 0.014 ug/l for TCE. Thus the TCA anamoly observed off-site was approximately 300 times greater than background and the TCE was 13 times greater than background. The TCE background represents a small amount of equipment contamination from the on-site work earlier that day. However, the TCA background represents primarily the ambient atmospheric levels of TCA.

The ability to predict the concentration of TCA in the ground water off-site is limited by the fact that the coupled ground water/soil gas measurements needed for prediction are made on-site in rather close proximity to the source. The on-site correlation measurements are less valuable for prediction of off-site ground water contamination because they are influenced by lateral diffusion of contaminants from the source in addition to upward diffusion of contaminants from the water table.

The highest ground water/soil gas ratios are probably the best to use for prediction of ground water contamination off-site because they are the least effected by lateral diffusion from the source (Table 3). The highest ratios observed were 85 and 380 for TCA and TCE respectively. Using these ground water to soil gas ratios to determine the level of off-site contamination in the ground water one calculates concentrations of 130 ug/l and 80 ug/l for TCA and TCE respectively at the high point indicated by the transect. No meaningful confidence interval can be attached to these estimates due to the lack of sufficient data for correlation off-site.

The estimates could be off by a considerable factor in either direction, but they appear plausible considerting the high concentrations measured 800 feet up-gradient in the ground water at MW9 (17,000 ug/l TCA and 22,000 ug/l TCE).

The ratio of contaminant concentration in the ground water to soil gas can be effected by a variety of variables and an attempt to evaluate and adjust for each of the variables would be a hopeless task. An empirical average obtained from several paired ground water - soil gas measurements is usually the best approach for predicting the amount of contaminant in the ground water and will probably give "order of magnitude" prediction accuracy. However, in this case, the problems related to the proximity of the source are thought to be significant enough to justify the slightly different approach used here.

Two soil gas transects were made across the north and west sides of the property in an attempt to determine if an up-gradient source of contamination existed. The only source evident in the soil gas survey however is on-site. With a minor exception on the northwest part of the property, soil gas TCE and TCA concentrations decrease away from the center of the Sparton property (Figs. 1 & 2). However, the magnitude of the on-site source would easily obscure a minor contribution to the soil gas made by an off-site source. A transect made 800 or 1,000 feet up-gradient would have been needed to clearly identify an up-gradient source.

APPENDIX C
Data Analysis

WELL NO.	TCE GROUNDWATER CONC.,ug/l	TCE SOIL GAS CONC.,ug/l	TCE GW/SG RATIO	TCA GROUNDWATER CONC.,ug/l	TCA SOIL GAS CONC.,ug/l	TCA GW/SG RATIO
5	39	13	3.0	15	16	0.9
6	540	0.7	771.4	130	0.8	162.5
8	300	1	300.0	33	0.01	3300.0
9	6400	24	266.7	3300	23	143.5
13	1300	12.5	104.0	520	16	32.5
14	2100	3	700.0	170	0.7	242.9
15	650	20	32.5	250	8	31.3
AVERAGE			311			559
STANDARD DEVIATION			311			1212

Harding Lawson Associates
Engineers
and
Geoscientists

SHEET 1 OF 3
JOB NO. 06310,036.12
DATE 10-9-87
PROJECT
COMPUTED BY SEM
SUBJECT
CHECKED BY

1) TCE

Using a t-statistic at the 95% confidence level, with 6 degrees of freedom;

$t_{.95,6} = 2.45$

The upper limit (worst case) of the 95% confidence interval is given by

$\bar{X} + 2.45(s)$

where $\bar{X}$ = average

s = standard deviation

so $\bar{X} + 2.45(s) = 311 + 2.45(311)$

$= 1073$

or, $\frac{GW}{SG} = 1073$

where GW = groundwater conc.

SG = soil gas conc.

AND, SOLVING FOR SG

$$SG = \frac{GW}{1073}$$

IF WE ARE LOOKING FOR GROUNDWATER CONCENTRATIONS EQUAL TO THE STATE STANDARD (100 ug/l), THE ESTIMATED SOIL GAS CONCENTRATION WOULD THEN BE

$$SG = \frac{100}{1073}$$

$$= \underline{0.09 \text{ ug/l}}$$

2) TCA

USING A SIMILAR ANALYSIS FOR THE TCA RATIOS,

THE UPPER LIMIT OF THE 95% CONFIDENCE INTERVAL = 3528

AND THE SOIL GAS CONCENTRATION CORRESPONDING TO THE STATE LIMIT OF 60 ug/l IS = 0.02 ug/l

A Report Prepared for:

Sparton Technology, Inc.
9621 Coors Road NW
Albuquerque, New Mexico

EFFECTIVENESS OF THE GROUNDWATER RECOVERY WELL SYSTEM
Coors Road Facility
Albuquerque, New Mexico

HLA Job No. 06310,039.12

by

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Senior Hydrogeologist

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October 20, 1989
February 23, 1990 - Revised

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DISTRIBUTION
ATTACHMENTS

I INTRODUCTION

In accordance with Section IV.A.1.(a) of the Consent Order, an Interim Measures groundwater recovery well system was installed at the Sparton Technology, Inc. (Sparton) facility located on Coors Road in Albuquerque, New Mexico. This report presents the results of an evaluation of the effectiveness of that recovery system pursuant to the requirements of Section IV.A.1.(a)ii of the Consent Order.

Sparton filed a report evaluating the effectiveness of this system in October, 1989. Both Sparton and U.S. EPA recognized that the October report was hastily prepared due to a misunderstanding of the due date. The October report was discussed in detail at a meeting with U.S. EPA in Dallas on January 10, 1990, at which time U.S. EPA staff provided written comments and made other requests for information associated with the groundwater recovery well system. The written comments were also furnished by U.S. EPA to Sparton by letter dated January 22, 1990.

Based on the constructive comments of U.S. EPA and further review of the October report, we have prepared what is virtually a new report in a different format, rather than simply attempt to revise, change or otherwise patch up the October report. In doing so, we have made every effort to address the substance of the concerns contained in the U.S. EPA written comments and to respond to the other U.S. EPA requests. This new report is submitted to entirely replace the October report.

II DESCRIPTION OF RECOVERY SYSTEM

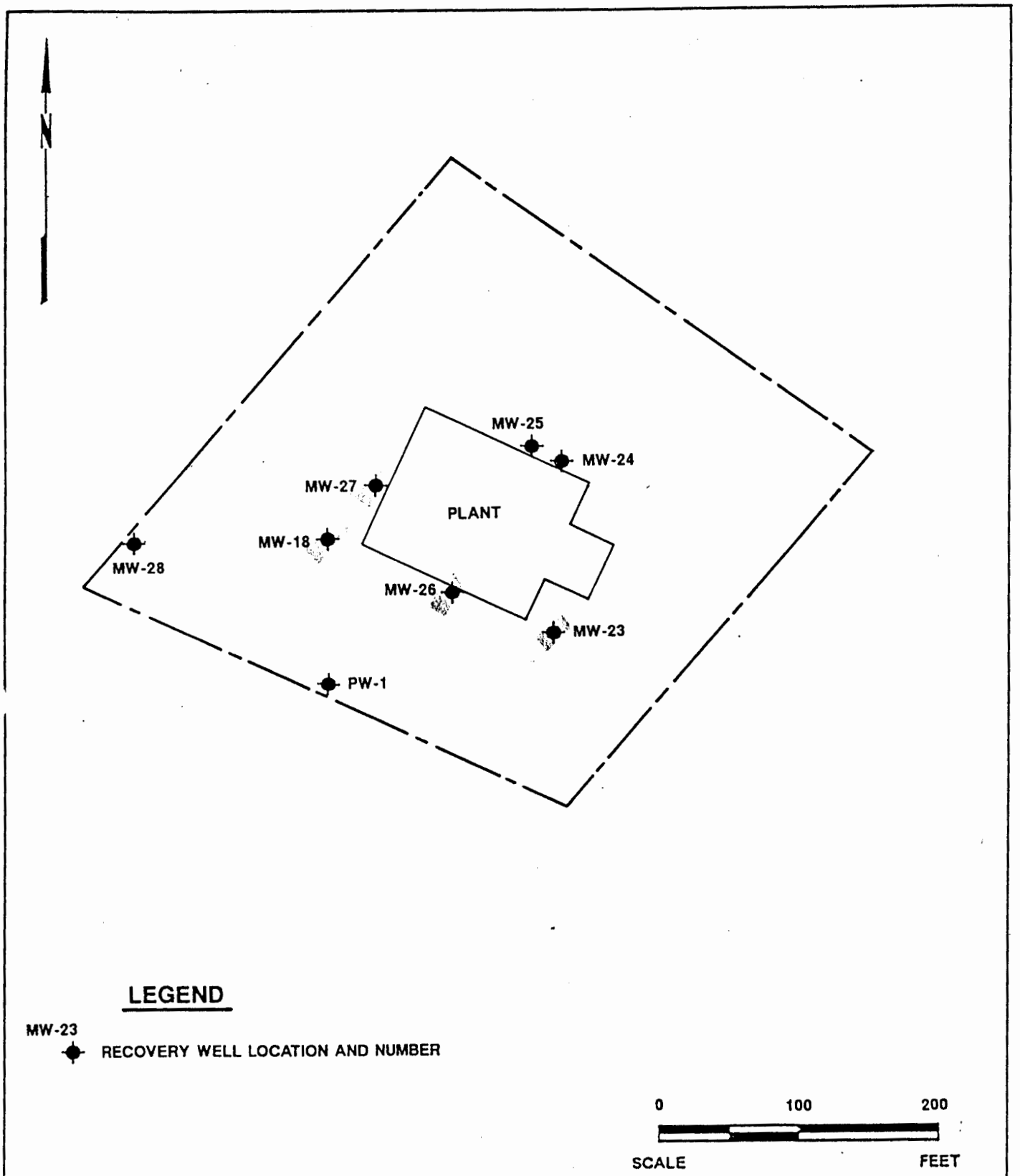
Pursuant to the requirements of the EPA Consent Order, a groundwater recovery system was installed in the upper flow zone as an interim measure. the purpose of this system is to retard the spread of the contaminant plume while the RCRA Facility Investigation (RFI) and the Corrective Measures Study (CMS) are being completed. The approach used to accomplish this goal was to locate a number of onsite recovery wells in the more contaminated portions of the contaminant plume in order to maximize the mass of contaminant removed. This system is not intended to serve as a final solution. The final solution will be determined upon completion of the RFI and CMS.

The recovery system was designed and constructed according to the provisions of the Interim Measures Workplan approved by EPA on March 1, 1989. The system became operational in January of 1989.

The system is comprised of eight wells (PW-1, MW-18, MW-23, MW-24, MW-25, MW-26, MW-27, and MW-28) installed in the upper flow zone of the site (see Figure 1). Compressed air operated pumps were installed in each well. Groundwater extracted at each of these locations is piped to an air stripper system for treatment and ultimate use in the Sparton facility.

The wells are set with the bottom of the well screen located at the top of the aquitard. The depth to the aquitard varies. The screened intervals generally fell within the interval of 60

to 78 feet in depth below ground surface. Construction of the wells varies because the designated wells used for the recovery system were constructed over a four year period. Figure 2 lists the pertinent construction details for each of the eight wells.



Harding Lawson Associates
Engineering and
Environmental Services

RECOVERY WELLS

Sparton Technology, Inc.

Albuquerque, New Mexico

FIGURE
1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	6310,039.12	JSH	2-5-90		

Figure 2

Recovery System Well Construction Details

Well No.	Well Diameter (inches)	Well Materials Screen	Well Materials Riser	Screened Interval (ft)	Construction Date
PW-1	10	PVC	PVC	60-70	9/84
MW-18	4	PVC	PVC	68-78	5/86
MW-23	2	PVC	PVC	72-77	8/86
MW-24	2	PVC	PVC	68.4-73.4	12/86
MW-25	2	PVC	PVC	67.7-72.7	12/86
MW-26	2	SS[1]	PVC	73-78	5/88
MW-27	2	SS	PVC	67-72	5/88
MW-28	2	SS	PVC	65-70	5/88

[1] Stainless Steel

III CONTAMINANT PLUME DESCRIPTION

Since trichloroethene (TCE) is the predominant contaminant, and since there is a more exhaustive historical database of TCE analyses, we have focused on this parameter for the purposes of this evaluation. We feel that this is a fair representation, and that any conclusions drawn from this evaluation would apply equally to other contaminants included in the plume.

Figure 3 shows the configuration of the TCE plume in the 3rd quarter of 1989. Data used to generate this map included both the quarterly groundwater analyses generated under the State (New Mexico) monitoring program (1986 - 1989), and the limited analyses of upper flow zone wells, both on-site and off-site, conducted under the terms of the Consent Order. Figure 3 also reflects our analysis of the direction of groundwater movement in the upper flow zone.

For the on-site wells included in the State program, the high degree of variation in the quarterly data was smoothed by using least squares regression analysis. The resulting regression equation was then used to calculate the "normalized" concentration of TCE in the 3rd quarter of 1989. This technique also allowed the use of historical data for wells which had been plugged and abandoned or had been converted to recovery wells. Based on the historical data, the regression analyses allowed for the calculation of a normalized TCE concentration for each of these wells in the 3rd quarter of 1989.

For wells MW-13 and MW-33 through MW-37, installed as part of the RFI effort, initial and confirmational analyses were averaged, and these averages were also included in the analysis.

Figure 4 shows the resulting TCE concentrations used for each well included in constructing the plume map shown in Figure 3.

Figure 4

TCE Values for 3rd Quarter 1989

WELL No.	TCE ug/l
6	99
8	104
9	3,302
14	3,844
15	131
16	16,908
18	3,384
21	788
22	105
23	9,922
13	630
33	7,250
34	0
35	0
36	9.5
37	1,450

IV BI-WEEKLY WATER LEVEL MEASUREMENTS

Figure 5 presents water level data taken on a bi-weekly monitoring schedule from February, 1989 to September, 1989. These data are used to establish groundwater level trends during the operation of the recovery system. Figure 6 is a summary of the net change in the groundwater table on a bi-weekly basis during that same time period.

While we would expect to see an overall decrease in water level trends as a consequence of the recovery system's effects, Figure 6 illustrates that the opposite has occurred. This reversal is probably attributable to the effects of recharge from the unlined irrigation canal east of Coors Road. The irrigation season typically extends from April through October.

FIGURE 5

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY
BIWEEKLY WATER LEVEL MEASUREMENTS

[---------- Water Level Elevation - Feet Above MSL ----------]

DATE	MW-7	MW-9	MW-12	MW-13	MW-14	MW-15	MW-16	MW-17	MW-19	MW-20	MW-21	MW-22	MW-29	MW-30	MW-31	MW-32	MW-33
02-23-89	4978.48	4975.57	4975.23	4976.51	4974.24	4976.45	4980.07	4980.08	4974.77	4974.47	4979.76	4979.23	4975.82	4974.98	4974.28	4974.37	4975.07
03-08-89	4978.40	4975.36	4975.15	4976.35	4974.15	4976.36	4979.87	4980.08	4974.61	4974.84	4979.64	4979.14	4975.82	4974.93	4974.24	4974.78	4974.90
03-21-89	4978.81	4975.65	4975.40	4976.76	4974.07	4976.36	4979.82	4980.08	4974.94	4975.05	4979.68	4979.35	4976.11	4975.18	4974.45	4974.99	4975.15
04-06-89	4979.15	4975.11	4975.65	4977.18	4974.24	4976.45	4980.10	4980.16	4975.02	4975.17	4979.68	4979.64	4976.28	4975.35	4974.62	4975.12	4975.40
04-21-89	4979.31	4975.95	4975.73	4977.18	4974.32	4976.45	4980.07	4980.16	4975.11	4975.26	4979.84	4979.77	4976.44	4975.43	4974.62	4975.12	4975.40
05-03-89	4979.40	4976.03	4975.82	4977.18	4974.49	4976.53	4980.07	4980.24	4975.19	4975.34	4979.84	4979.81	4976.44	4975.43	4974.65	4975.16	4975.48
05-17-89	4979.65	4976.15	4975.90	4977.26	4974.32	4976.53	4980.10	4980.33	4975.27	4975.34	4979.93	4979.98	4976.61	4975.60	4974.78	4975.20	4975.57
06-01-89	4979.73	4976.24	4975.90	4977.43	4974.49	4976.54	4980.07	4980.41	4975.32	4975.42	4980.01	4979.98	4976.69	4975.73	4974.83	4975.24	4975.48
06-13-89	4979.90	4976.40	4976.07	4977.64	4974.55	4976.70	4980.32	4980.49	4975.36	4975.51	4980.01	4980.06	4976.86	4975.77	4974.95	4975.37	4975.65
06-30-89	4980.06	4976.49	4976.15	4977.60	4974.53	4976.53	4980.16	4980.49	4975.40	4975.59	4979.93	4980.19	4976.94	4975.81	4975.03	4975.45	4975.57
07-12-89	4980.40	4976.82	4976.40	4978.01	4974.82	4976.78	4980.57	4980.74	4975.52	4975.76	4980.26	4980.48	4977.19	4976.02	4975.28	4975.62	4975.78
07-28-89	4980.40	4976.20	4976.40	4977.93	4974.82	4976.78	4980.82	4980.87	4975.77	4975.76	4980.18	4980.56	4977.07	4976.10	4975.20	4975.62	4975.82
08-10-89	4980.06	4976.40	4976.07	4977.60	4974.53	4976.74	4980.68	4980.83	4975.40	4975.59	4980.26	4980.39	4976.69	4975.77	4974.95	4975.45	4975.73
08-24-89	4980.48	4976.90	4976.65	4978.18	4974.90	4976.99	4980.74	4980.91	4975.86	4976.01	4980.30	4980.30	4977.44	4976.27	4975.41	4975.78	4976.04
09-07-89	4980.65	4977.07	4976.73	4978.43	4975.07	4977.11	4980.82	4981.08	4976.02	4976.09	4980.30	4980.89	4977.44	4976.35	4975.45	4975.87	4976.19
09-21-89	4980.90	4977.24	4976.90	4978.46	4975.16	4977.16	4980.91	4981.16	4976.11	4976.13	4980.47	4981.06	4977.61	4976.52	4975.53	4975.87	4976.23
10-05-89	4980.90	4977.24	4976.94	4978.47	4975.15	4977.03	4981.07	4981.24	4976.11	4976.13	4980.49	4981.06	4977.53	4976.43	4975.53	4975.91	4976.32

Figure 6

Net Change in Groundwater Elevations

February to September, 1989

Well No.	Net Gain (+) or Loss (-) in Groundwater Elevation, in feet
MW-7	+2.42
MW-9	+1.67
MW-12	+1.67
MW-13	+1.95
MW-14	+0.92
MW-15	+0.71
MW-16	+0.84
MW-17	+1.08
MW-21	+0.71
MW-22	+1.83

V EVALUATION OF RADII OF INFLUENCE

The evaluation of pumping test data is based upon the information presented in three reports commonly titled, "Aquifer Testing at the Sparton Technology, Inc., Coors Road Plant Facility, Albuquerque, New Mexico," by Metric Corporation dated April, 1987; May, 1988; and November, 1988 (see Attachment 1). These data were used to calculate an estimate of the radii of influence (capture zone) for all eight of the recovery system wells.

For wells PW-1, MW-18, MW-23, MW-26, MW-27, and MW-28, an assumed storage coefficient of 1×10^{-2} was used based upon published data for an unconfined aquifer[(1)]. For well MW-24, a storage coefficient of 2.5×10^{-2} was calculated from the distance-drawdown information available. This value was also applied to calculations for MW-25 due to its proximity (32 feet) to MW-24. An evaluation of the pumping test where the pumped well was MW-25 and the observation well was MW-24 was performed. The analysis was done using straight line approximations to determine the transmissivity and maximum radius of influence[(2)]. The maximum radius of influence calculated from this analysis was 130 feet.

The pumping tests in the eight wells yielded between 0.0189 and 0.317 gallons per minute during the various tests. This low range of yields indicates a relatively low transmissivity aquifer. The saturated thickness of the upper flow zone wells, typically 8 feet or less, also reduces the availability of water.

(1) Groundwater, Freeze, R.A. and Cherry, J.A.; pg 61; 1979
(2) Groundwater and Wells, Driscoll, F.G; pg 238 - 241, 1986

The radius of influence (r_0) for each well was calculated by using each transmissivity value from each slope of the time-drawdown and recovery data curves and applying this value to the following equation:

$$S = \frac{0.3\ Tt}{r^2_0}$$

Where: S = coefficient of storage (dimensionless)
T = coefficient of transmissivity, in gallons per day per foot, gpd/ft.
t = time since pumping started, in days
r_0 = intercept of straight line at zero drawdown, in feet.

Figure 7 presents the maximum values of the calculated radii of influence for the eight recovery wells. Typically, higher radii of influence occur after extended periods of time as reflected in the values used further on in the tests. Attachment 2 presents the calculations for each method of analysis.

The calculated radii of influence for the eight recovery system wells ranged from approximately 4 to 135 feet. This variable radii of influence indicate that there is no overlap of cones of depression. However, the interim recovery well system was not designed to provide a complete hydraulic barrier to contaminant flow, but rather to recover contaminants in the higher areas of concentration based upon our understanding of the plume.

Figure 7

Maximum Calculated Radii of Influence

Well No.	Radius of Influence (Ft.)
PW-1	21.8
MW-18	42.6
MW-23	98.4
MW-24	135.0
MW-25	48.4
MW-26	22.8
MW-27	4.35
MW-28	20.2

Operational pumping rates based on a field test conducted in July, 1989 are listed in Figure 8. The average operational pumping rate from Figure 8 is approximately 38% higher than the average pumping rate during the three various tests. This would suggest a somewhat higher radius of influence than the radius of influence calculated during the analyses of the pumping tests. Although there undoubtedly is some increased radius of influence, the low transmissivities calculated for the aquifer and the low average pumping rates indicate that they are not substantially larger.

Figure 8

Recovery System Discharge Rates

Well	Discharge Volume (ml)	Discharge Time (s)	Refill Time (s)	Discharge Rate (gpm)	Discharge Rate (gpd)	Percent Total Discharge
18	240	1.96	10.12	0.31	453.46	16.5%
23	455	2.52	7.92	0.69	994.74	36.2%
24	80	4.41	22.01	0.05	69.11	2.5%
25	190	4.41	22.01	0.11	164.14	6.0%
26	60	2.52	7.92	0.09	131.17	4.8%
27	260	1.96	10.12	0.34	491.25	17.9%
28	120	2.78	19.89	0.08	120.82	4.4%
PW-1	320	2.78	19.89	0.22	322.18	11.7%

TOTAL DISCHARGE 2746.87 (GPD)

Volumes and cycle times taken on 7/18/89
Volume for MW-23 is estimated based on airline reading of 9"

VI EVALUATION OF MASS REMOVAL

An evaluation of the mass of TCE removed by the recovery system was conducted by estimating the quantity of TCE removed and comparing that to an estimate of the quantity of TCE in the target impact area, that is, the more contaminated area of the contaminant plume.

The area encompassed by the 3,000 ug/l contour (see Figure 3) was selected as the evaluation area. This area represents the more concentrated area of the contaminant plume, and all eight recovery wells are within this contour. The evaluation is based on conditions prevailing during the 3rd quarter of 1989 since the most complete data set is available for that period.

We have assumed that the recovery wells are extracting water with the same TCE concentration as seen in the monitoring wells. Finally, we have assumed a porosity for the upper flow zone of 0.43 based on a fine sand aquifer (Todd, D.K., 1959, Ground Water Hydrology, Figure 2.6, p. 24).

The steps involved in this evaluation are all follows:

1) The average saturated thickness of the aquifer in the impact area was calculated from water level data for wells inside the 3,000 ug/l contour to be 7.6 feet. (See Figure 9).

Figure 9

Saturated Thickness Determination

Well No.	Water Table Elevation 8-24-89	Aquitard Elevation ft. msl	Saturated Thickness ft.
MW-9	4976.90	4968.00	8.9
MW-12	4976.65	4967.81	8.8
MW-14	4974.90	4967.94	7.0
MW-16	4980.74	4974.13	6.6
MW-33	4976.04	4969.11	6.9
		Average	7.6

2) The areas inside the 3,000 ug/l and the 10,000 ug/l contours were determined with a planimeter to be as follows:

Contour, ug/l	Area, sq.ft
3,000	228,480
10,000	78,720

Note that the area shown for the 3,000 ug/l contour is the area between the 3,000 and 10,000 ug/l contours.

3) The average concentration within each contour was calculated by averaging the extreme values for each area. Thus, for the area inside the 3,000 ug/l contour, 3,000 and 10,000 were averaged to yield 6,500 ug/l (6.5 ppm). For the area inside the 10,000 ug/l contour, 10,000 was averaged with the concentration at well MW-16, which was assumed to be the maximum, which was 16,900 ug/l. This average was 13,450 ug/l (13.5 ppm).

4) The total mass of TCE inside the 3,000 ug/l contour was then calculated as follows:

lbs TCE = (Area) x (Sat. thickness) x (Porosity)
x (62.4 lbs/cu. ft.) x (TCE, ppm/10^6)

Contour	Area, ft^2	Sat. Thickness ft.	Porosity	TCE,ppm	lbs. TCE
3,000	228,480	7.6	0.43	6.5	303
10,000	78,720	7.6	0.43	13.5	217
				Total	520

5) The average daily recovery rate for the system during 1989 was approximately 2,000 gallons per day (gpd). This is shown in Figure 10. During this first year of operation, the system was plagued with several problems which reduced this rate. We expect that this rate will increase to somewhere between 2,600 and 3,000 gpd once these problems are resolved. We have, however, used an average rate of 2,000 gpd for this evaluation.

6) The average TCE concentration at each well was estimated from the contour map (Figure 3) and is shown in Figure 11 along with the percent of total discharge for each well based on a field test conducted in mid-1989. Figure 11 also shows the mass of TCE removed, based on a total discharge rate of 2,000 gpd, to be 44.8 lbs/year.

7) Based on the mass removed (44.8 lbs/yr) and the total mass in the impact area (520 lbs.), the portion of the total mass removed is:

$$(44.8/520) \times 100 = 8.6\%$$

Had the recovery rate averaged 2,600 gpd (see Step 5), the mass recovered would have been 58.2 lbs. or 11.2%.

While we recognize that the mass recovered will diminish with time, we feel that this mass recovery rate represents a significant impact on the contaminant plume in the target area.

Figure 10
Groundwater Recovery Rates
1989

Month	Gallons Recovered
January	52,400
February	32,100
March	59,000
April	33,100
May	50,600
June	83,000
July	66,000
August	78,300
September	87,100
October	64.100
November	78,300
December	53,400
Average	61,450 gallons/month

$$\frac{61{,}450}{30 \text{ days/month}} = 2{,}048 \text{ gallons/day}$$

Figure 11

Mass of TCE Recovered

Recovery Well No.	TCE Concentration (ppm)	% of Total Discharge	Mass of TCE Removed lbs/yr
PW-1	3.3	11.7	2.4
MW-18	3.4	16.5	3.4
MW-23	9.9	36.2	21.8
MW-24	16.9	2.5	2.6
MW-25	16.9	6.0	6.2
MW-26	12.0	4.8	3.5
MW-27	3.8	17.9	4.1
MW-28	3.0	4.4	0.8
		100.0	44.8 lbs. TCE/yr

VII STATISTICAL ANALYSES OF HISTORICAL DATA

Statistical methods were applied to the historical groundwater concentration database generated under the quarterly New Mexico monitoring program. TCE was used as the indicator parameter for these statistical analyses since it is the predominant contaminant, and since there is a more detailed history of TCE concentrations in the database. A summary of these data, by well, is shown in Figure 12, and covers the period from 1986 through 1989.

Upon review of this data, two of the analytical results appeared to be anomalously low and were excluded from all statistical analyses performed. These two results included the 2nd quarter of 1988 for well MW-15 (shown in Figure 12 as "TCE15") and the 3rd quarter of 1988 for well number MW-22 ("TCE22").

The statistical methods employed included linear regression analysis, using the least squares method, and the determination of statistically significant differences between means, using a Student's t-test. A detailed discussion of these methods is beyond the scope of this report, but may be found in any Statistics textbook.

Linear regression was applied to the TCE data from each well in order to "smooth" the high degree of variation in the individual quarterly results and to show the general trend of TCE concentration over time. A sequential "period number" was used as the independent variable in all cases, which is standard practice in time series analysis.

FIGURE 12

SPARTON TECHNOLOGY, INC.
COORS ROAD FACILITY

HISTORICAL TCE CONCENTRATIONS FROM QUARTERLY GROUNDWATER MONITORING DATA

			[TCE, ug/l]									
PERIOD	YEAR	QTR	TCE6	TCE8	TCE9	TCE14	TCE15	TCE16	TCE18	TCE21	TCE22	TCE23
1	1986	1	310	100	6100							
2	1986	2	110	160	8300							
3	1986	3	420	150	5000			20000	5400			
4	1986	4	390	190	5000	4900	940	36000	3600	2300	230	7500
5	1987	1	300	84	4500	5000	630	21000	4000	1700	170	6500
6	1987	2	320	69	3600	1800	580	23000	3000	1400	270	3700
7	1987	3	540	300	6400	2100	650	25000	4800	2100	370	3900
8	1987	4	360	150	7100	2700	480	28000	4300	2000	240	13000
9	1988	1	280	45	5500	6200	370	26000	3500	1800	150	13000
10	1988	2	170	93	4800	5000	10	25000	3100	1100	230	11000
11	1988	3	52	66	3300	5200	380	26000	3800	1500	63	3900
12	1988	4	99	190	4200	5600	250	22000	4200	1300	120	8000
13	1989	1	55	82	4000	3300	180	16000		900	110	
14	1989	2			4400	4900	200	14000		520	150	
15	1989	3			2500	3000	200	13000		460	120	
16	1989	4			2300	2200	260	16000		1100	91	

Figures 13 through 22 show scatter plots of the data along with the regression line calculated over the entire range of data (1986-1989). As can be seen from these plots, in all cases except one the slope of the regression line is negative, that is to say, the concentrations are decreasing with time due to pumping and to natural dispersion and advection mechanisms. The one exception is found at well MW-23 which regression showed to have a positive slope, or increasing concentration with time through the end of 1988 when this well was converted to a recovery well. This may be due to a buried channelized flow from the source area, or may be the result of the unusually high variation in the data at well MW-23.

A summary of the regression equations for each well, along with the individual regression results is included in Attachment 3.

In order to evaluate the effects of the recovery system, only those wells with quarterly historical data extending through 1989 were selected so that a "before" (pre-recovery system) and "after" (post-recovery system) comparison could be made. These wells included MW-9, MW-14, MW-15, MW-16, MW-21, and MW-22 (see Figure 12).

Since the recovery system was started up in early January 1989, the pre-recovery period used was 1986 through 1988. For the post-recovery period, data from the 3rd quarter of 1988 through the 4th quarter of 1989 were used. The last two quarters of 1988 were included to avoid the potential for a step change in concentration to mask the results of an evaluation

FIGURE 13

MW-6

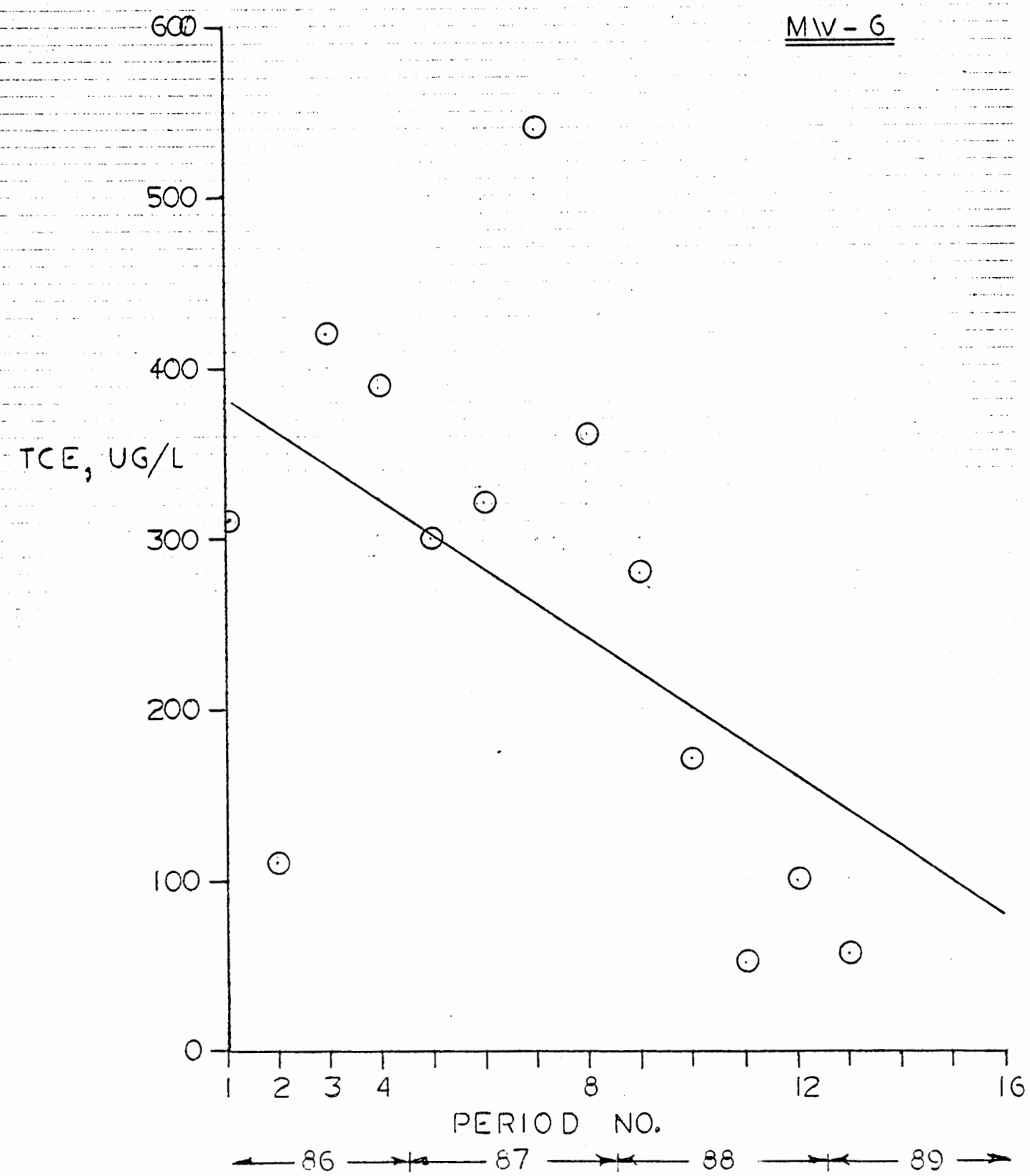
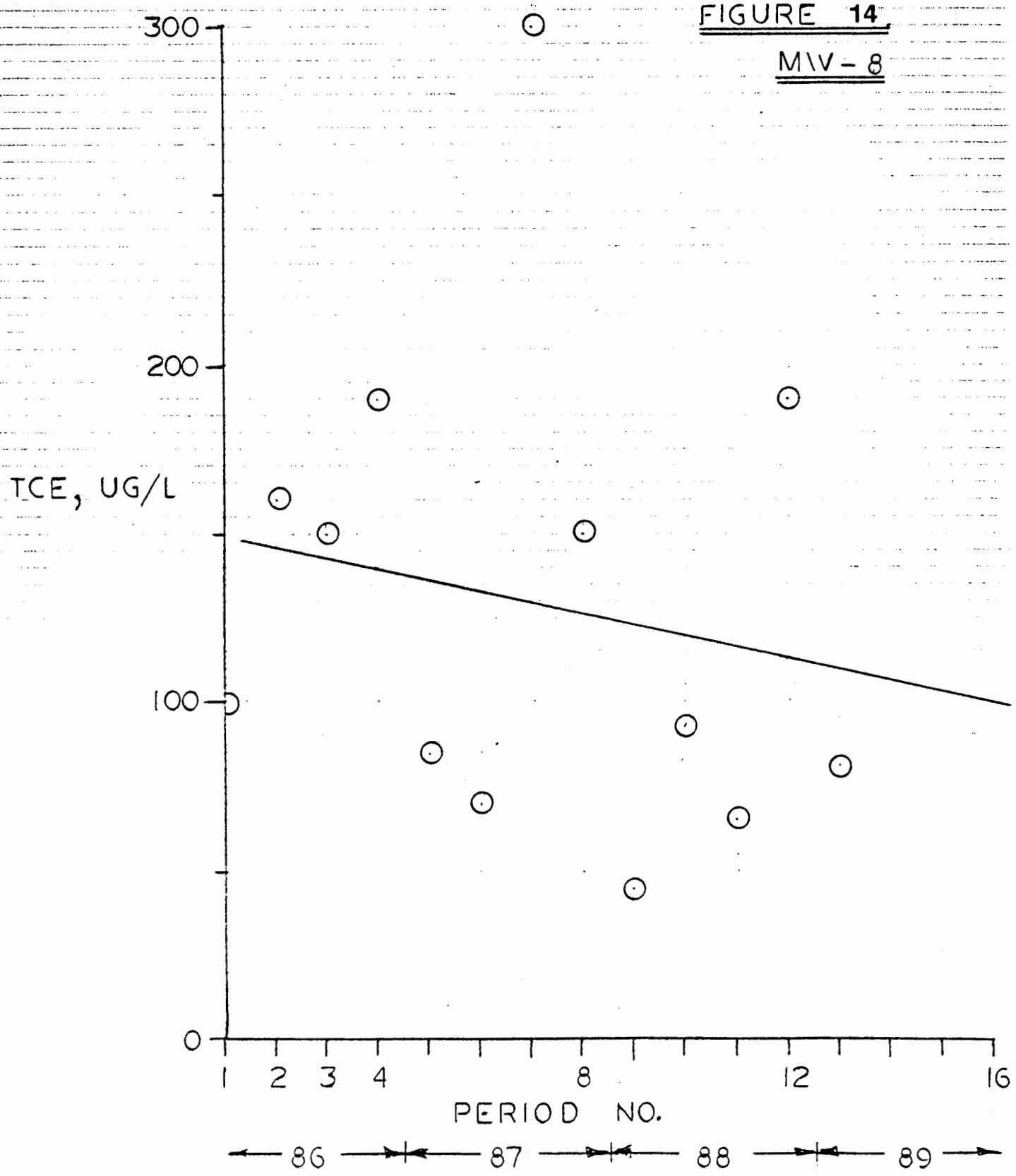


FIGURE 14

MW-8



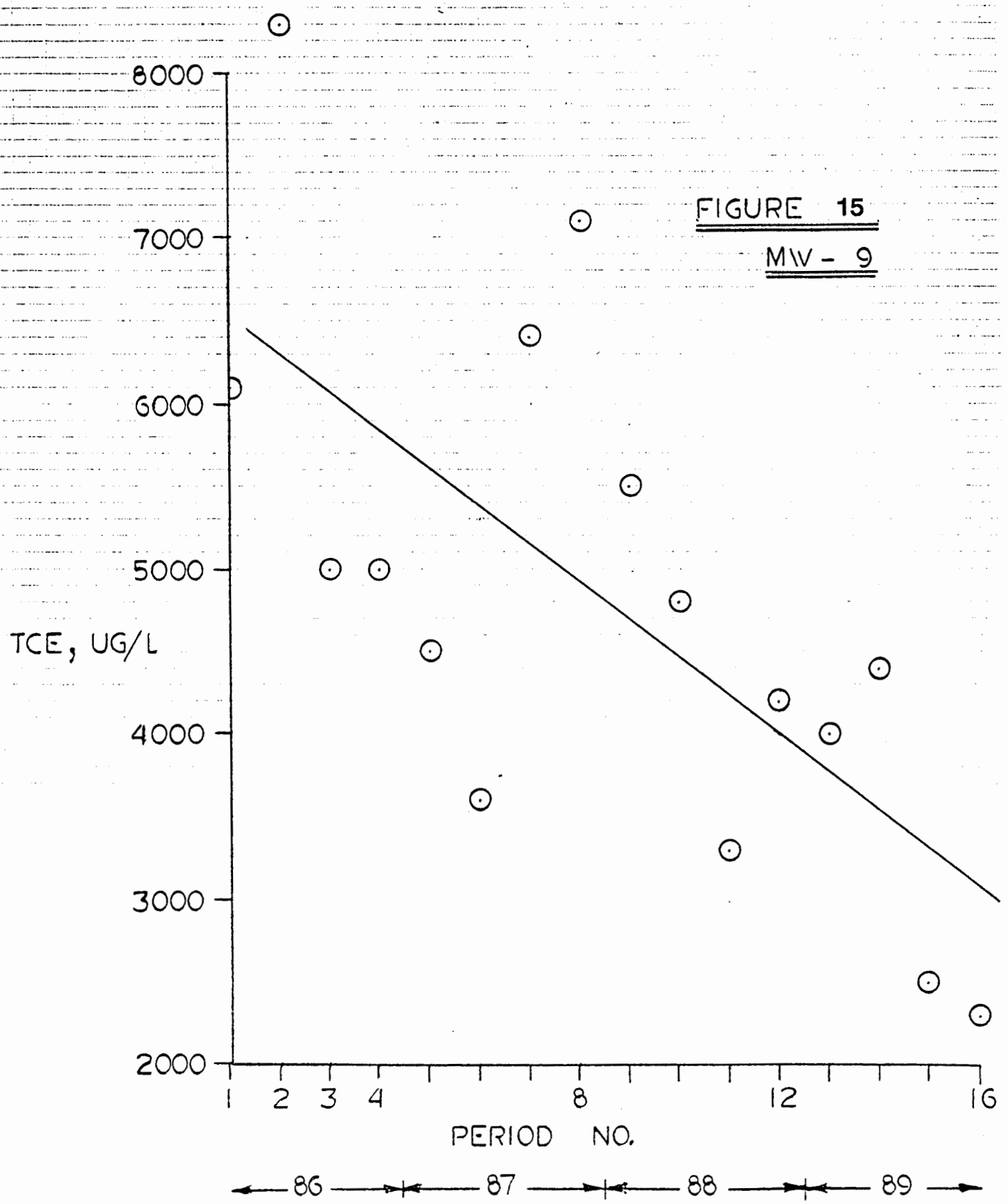


FIGURE 15

MW - 9

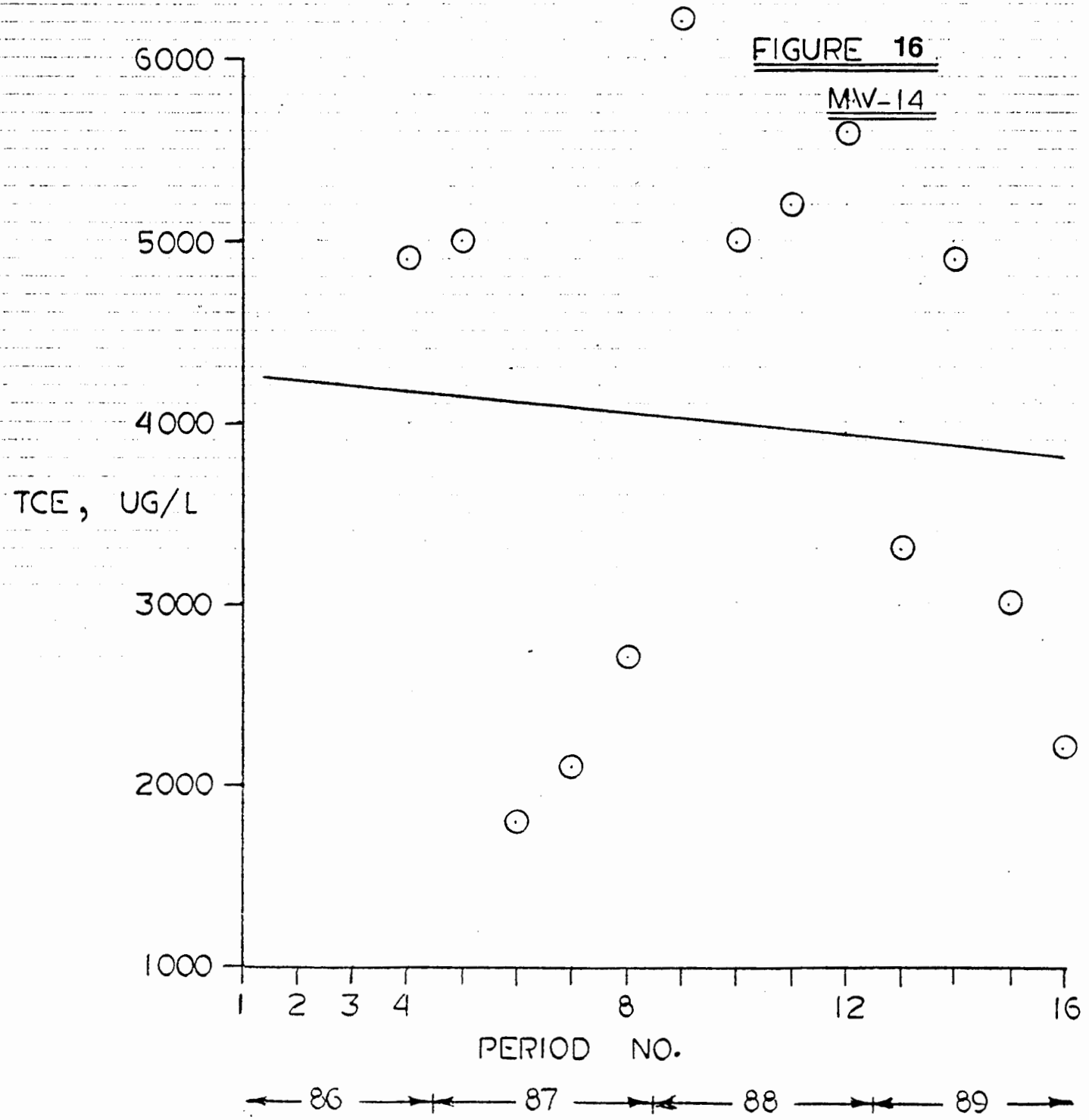


FIGURE 16
MW-14
6000
5000
4000
3000
2000
1000
TCE, UG/L
1
2
3
4
8
12
16
PERIOD NO.
86
87
88
89

FIGURE 17

MW-15

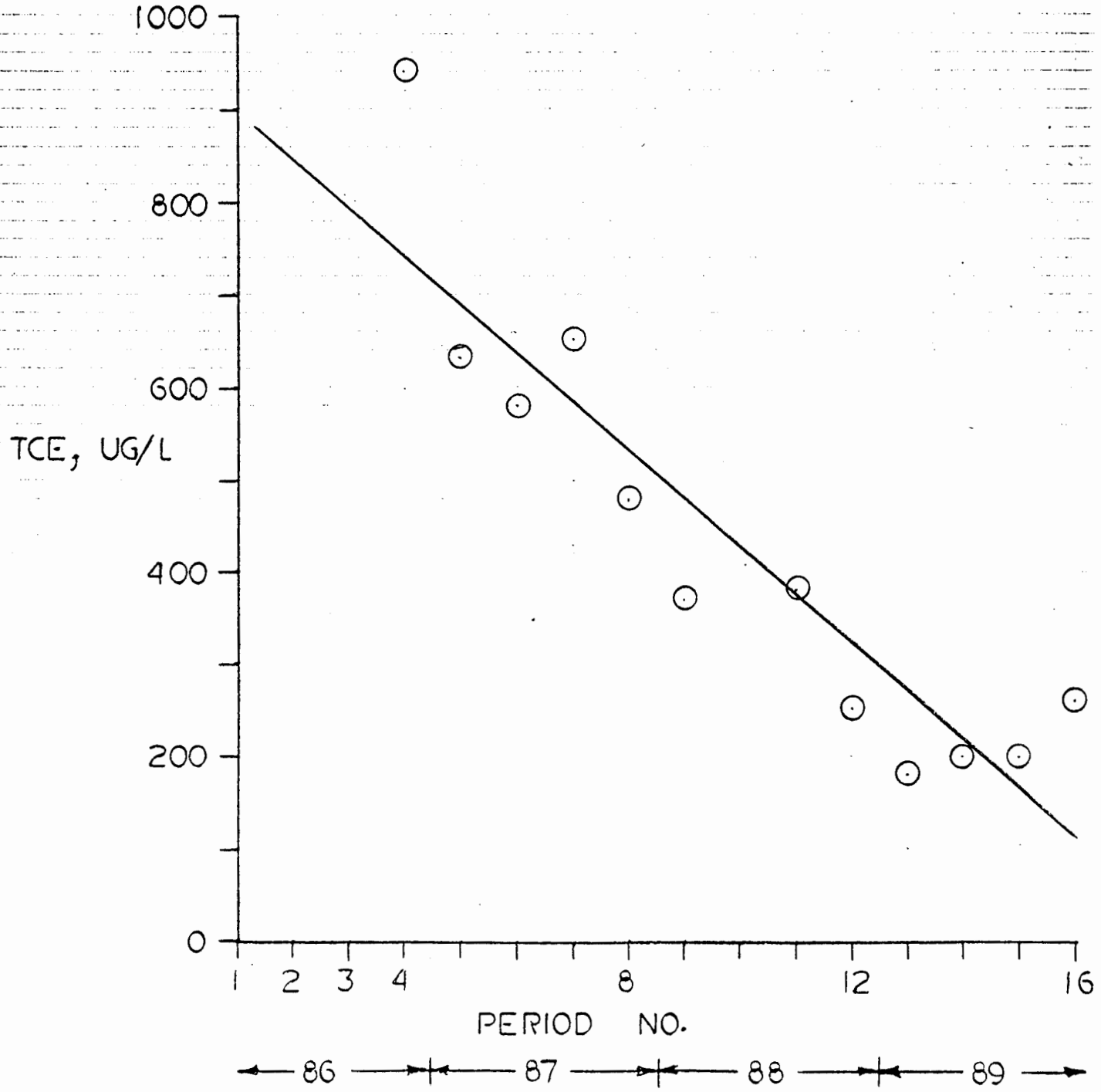


FIGURE 18

MW-16

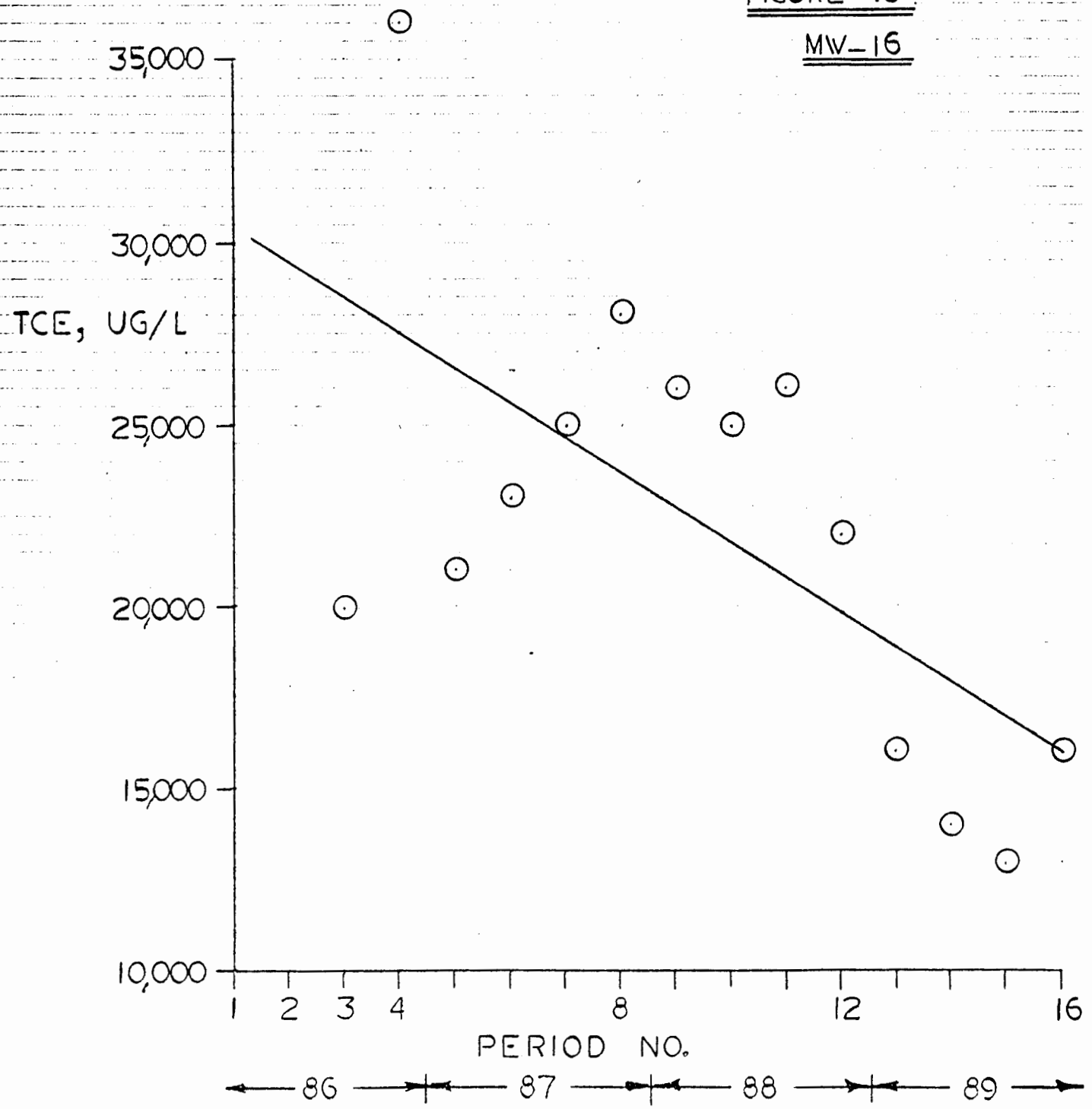


FIGURE 19

MW 18

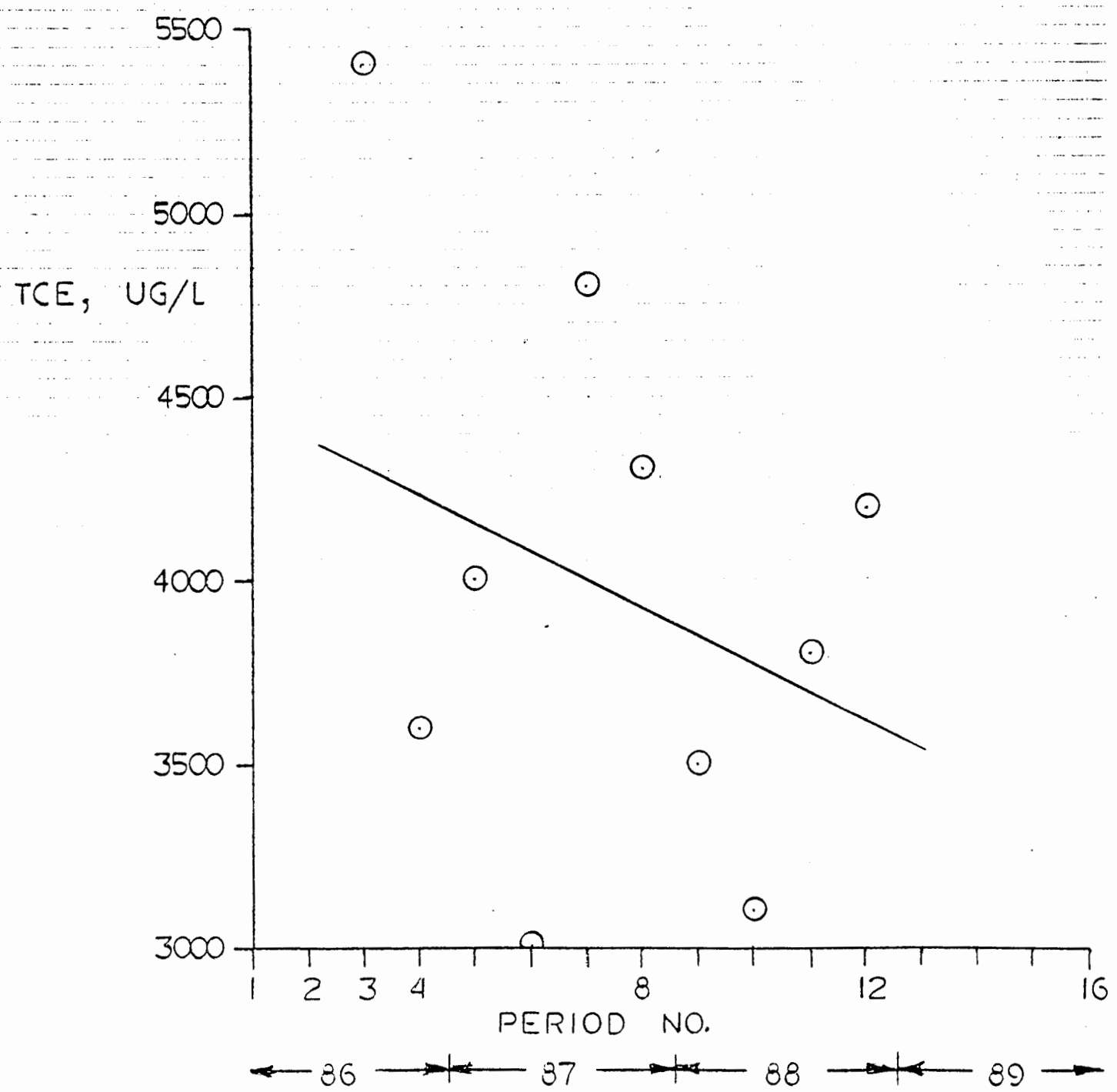


FIGURE 20

MW-21

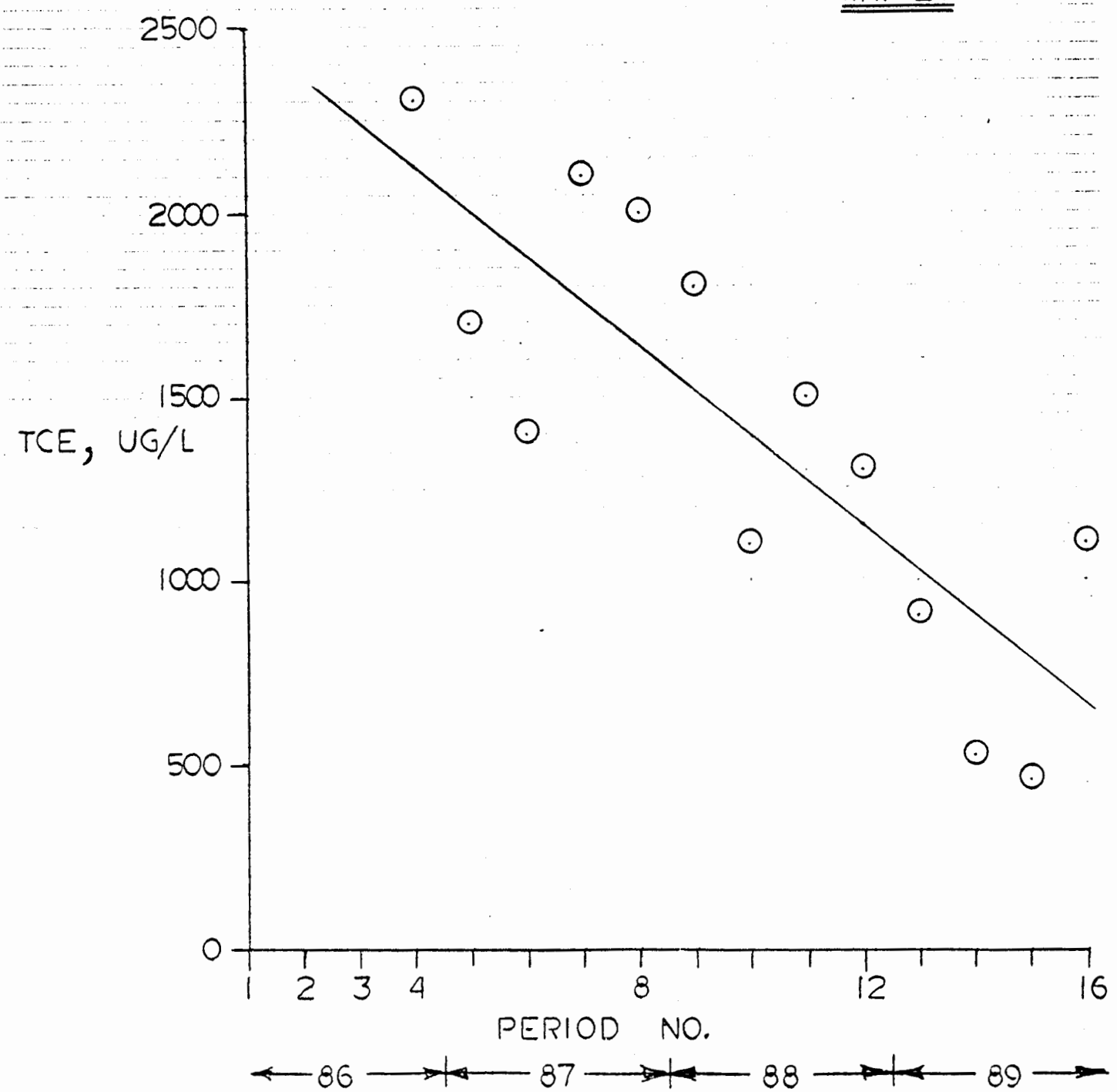


FIGURE 21

MW-22

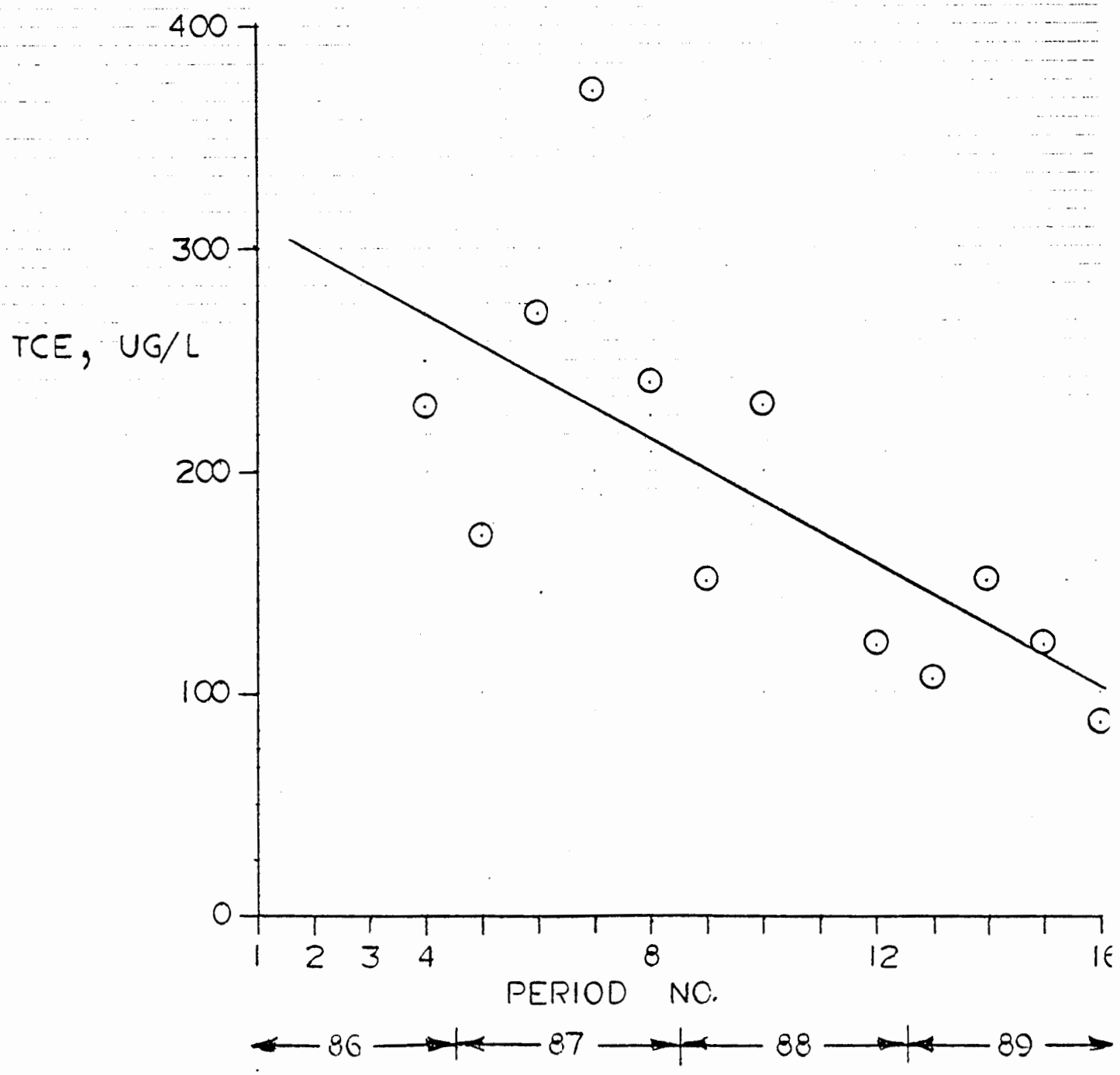
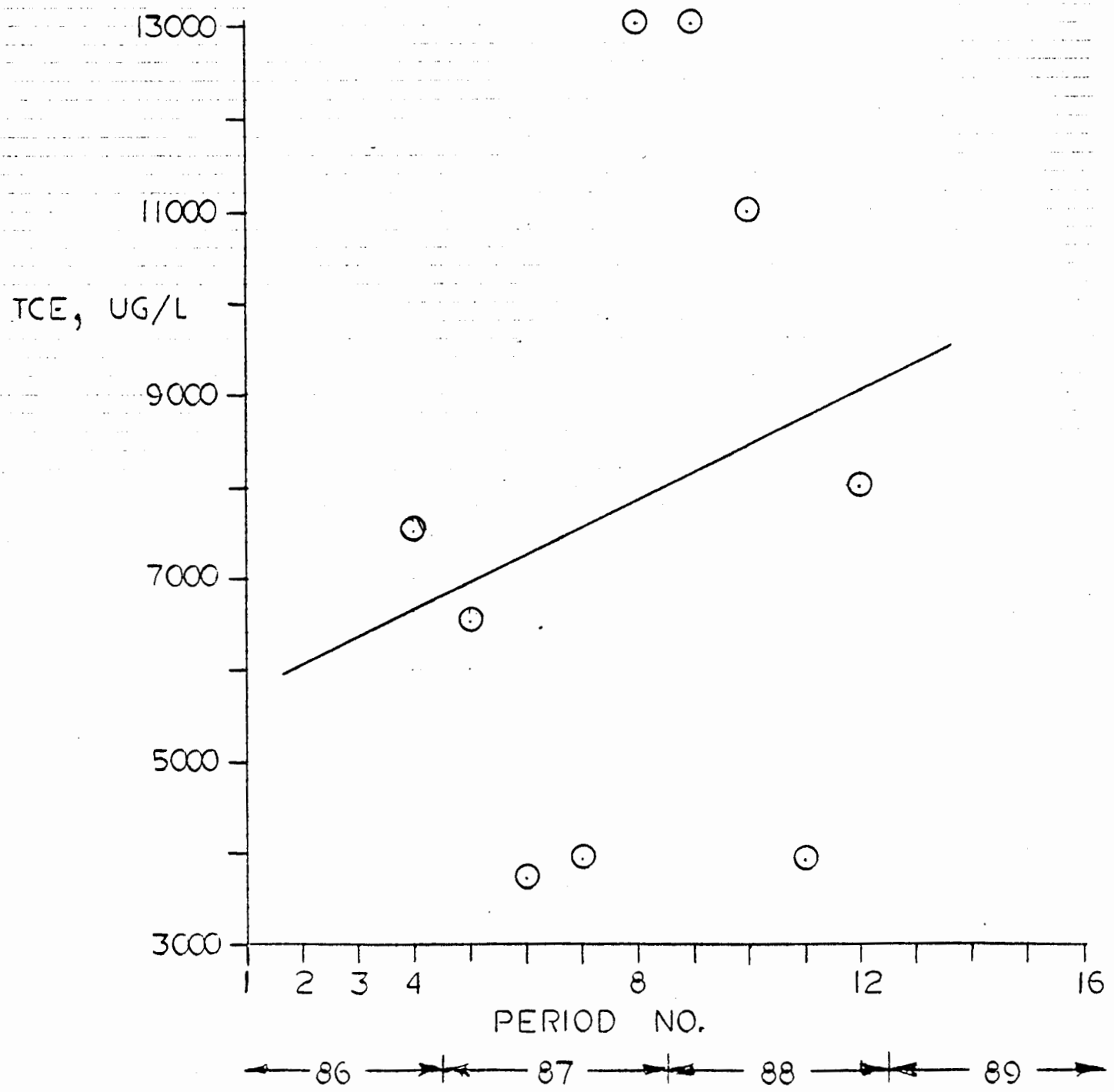


FIGURE 22

MW-23



based on a change in the slope of the regression. A step change is a sudden shift in the order to magnitude of the data, and may or may not be accompanied by a difference in the rate of change or slope of the data.

Using these two groups of data (pre- and post-recovery) for each well, linear regression was applied to each data group, and the resulting rates of change in TCE concentration (regression line slopes) were compared. The results indicate that for four of the six wells examined, the TCE concentration decreased at a faster rate during the post-recovery period. For one of these wells, MW-14, the rate changed from +232 ug/l/quarter during the pre-recovery period to a -606 ug/l/quarter during the post-recovery period; a 90 degree shift in slope. Another significant change in slope was noted at well MW-16 in the source area where the rate of TCE decrease changed from -121 ug/l/quarter in the pre-recovery period to -2257 ug/l/quarter in the post-recovery period.

The remaining two wells showed a slightly lower rate of decrease in the post-recovery period. These wells are MW-15 and MW-22. Neither of these wells is in the immediate vicinity of any recovery well, and well MW-22 is cross-gradient form the source area. Lack of proximity to a recovery well is the apparent reason that these two wells did not show the effects experienced in the other four wells, all of which are in close proximity to a recovery well. Figure 23 shows a comparison of the rates of contaminant decrease for the two periods for each of the six wells. Figures 24 through 29 show the regression lines for each well for both the pre-recovery and post-recovery periods.

FIGURE 23

COMPARISON OF RATES OF CONTAMINANT DECREASE

WELL NO.	RATE OF CHANGE IN TCE CONCENTRATION, ug/l/quarter * 86 - 88	3Q88 - 4Q89
9	- 190	- 277
14	+ 232	- 606
15	- 70	- 21
16	- 121	- 2257
21	- 92	- 140
22	- 12	- 5
AVERAGE	- 42.2	- 551.0

* As measured by the slope of the least squares regression line.

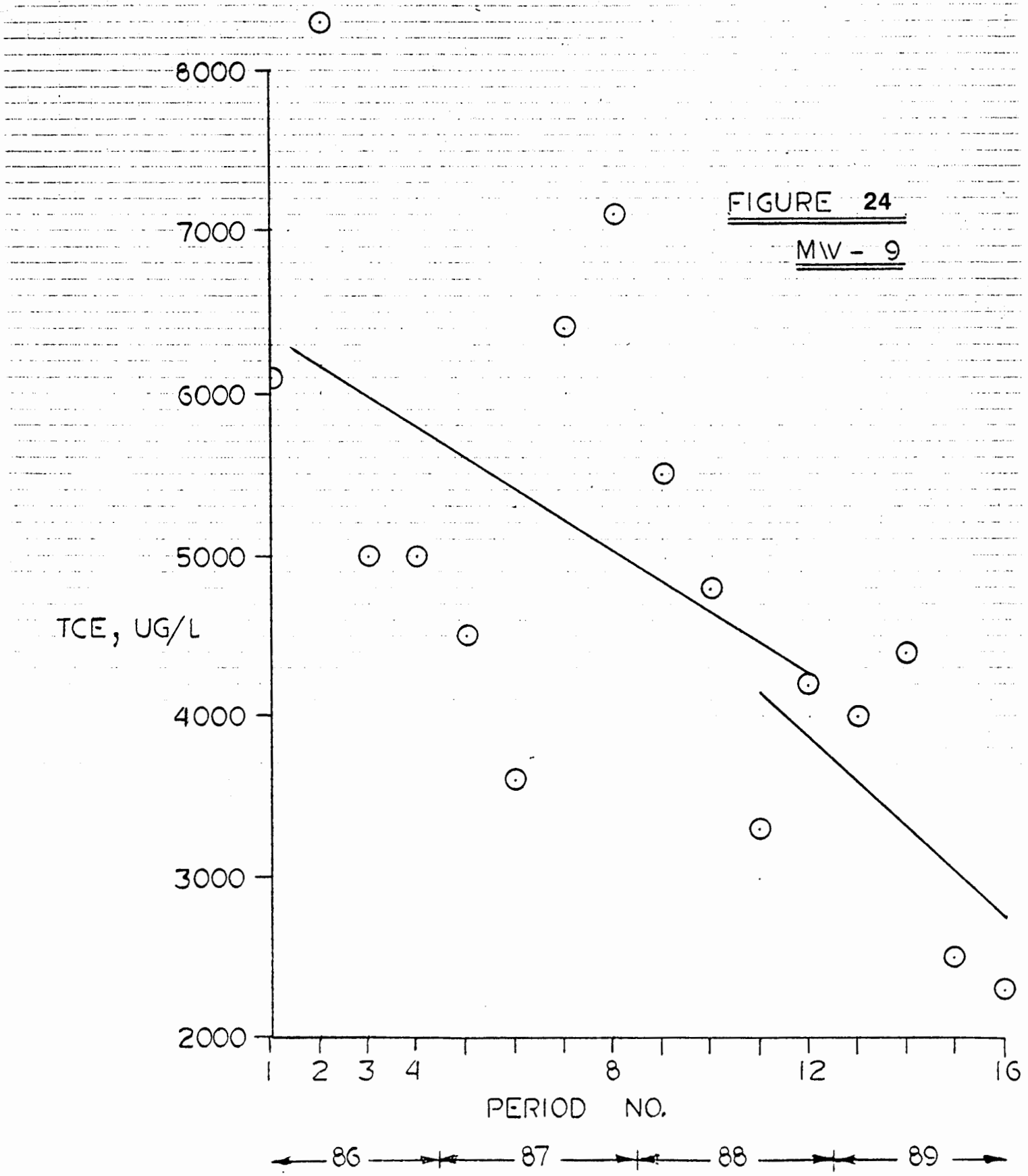


FIGURE 24
MW - 9
8000
7000
6000
5000
4000
3000
2000
TCE, UG/L
1
2
3
4
8
12
16
PERIOD NO.
86
87
88
89

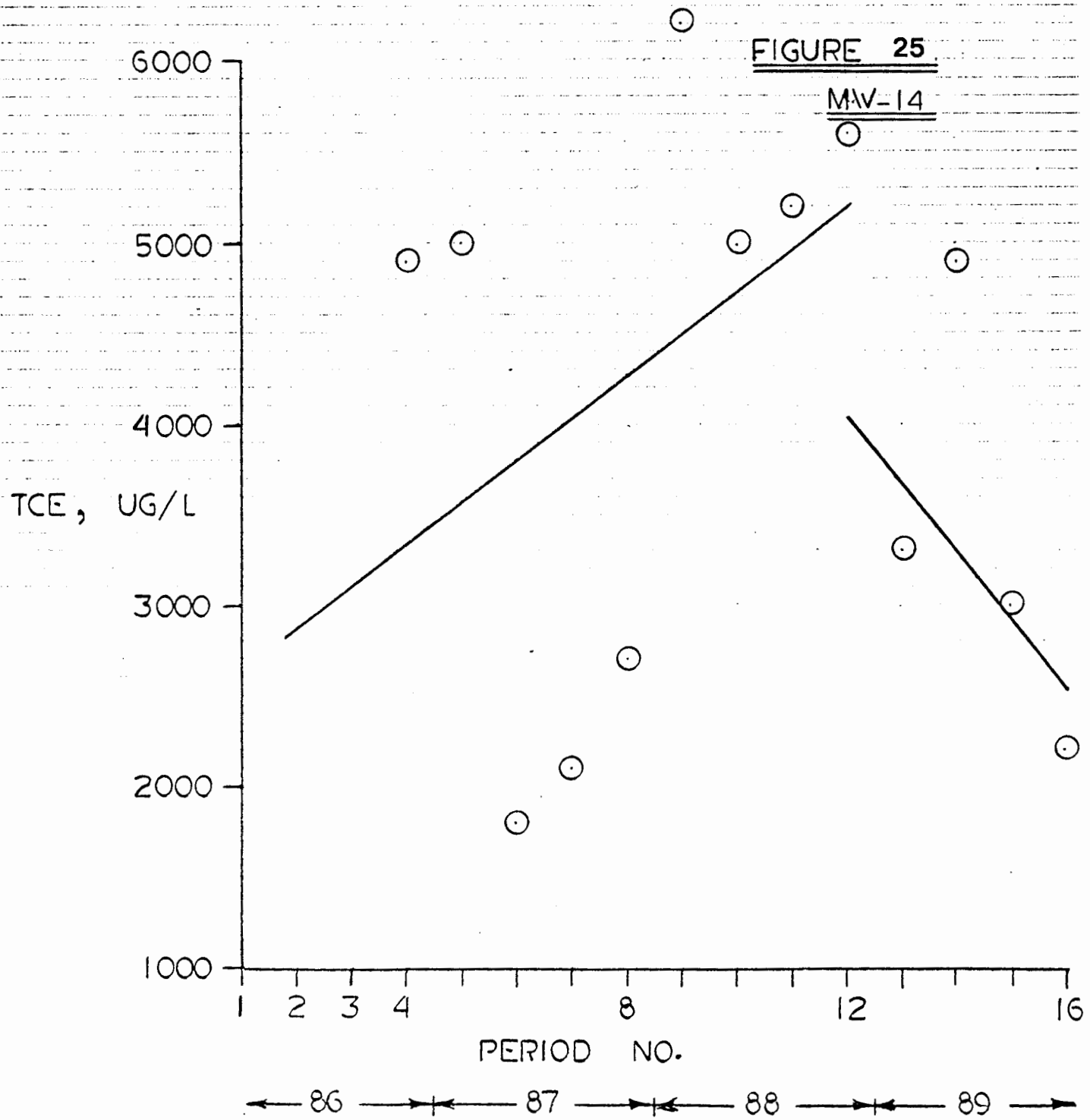


FIGURE 25
MW-14
6000
5000
4000
3000
2000
1000
TCE, UG/L
1
2
3
4
8
12
16
PERIOD NO.
86
87
88
89

FIGURE 26

MW-15

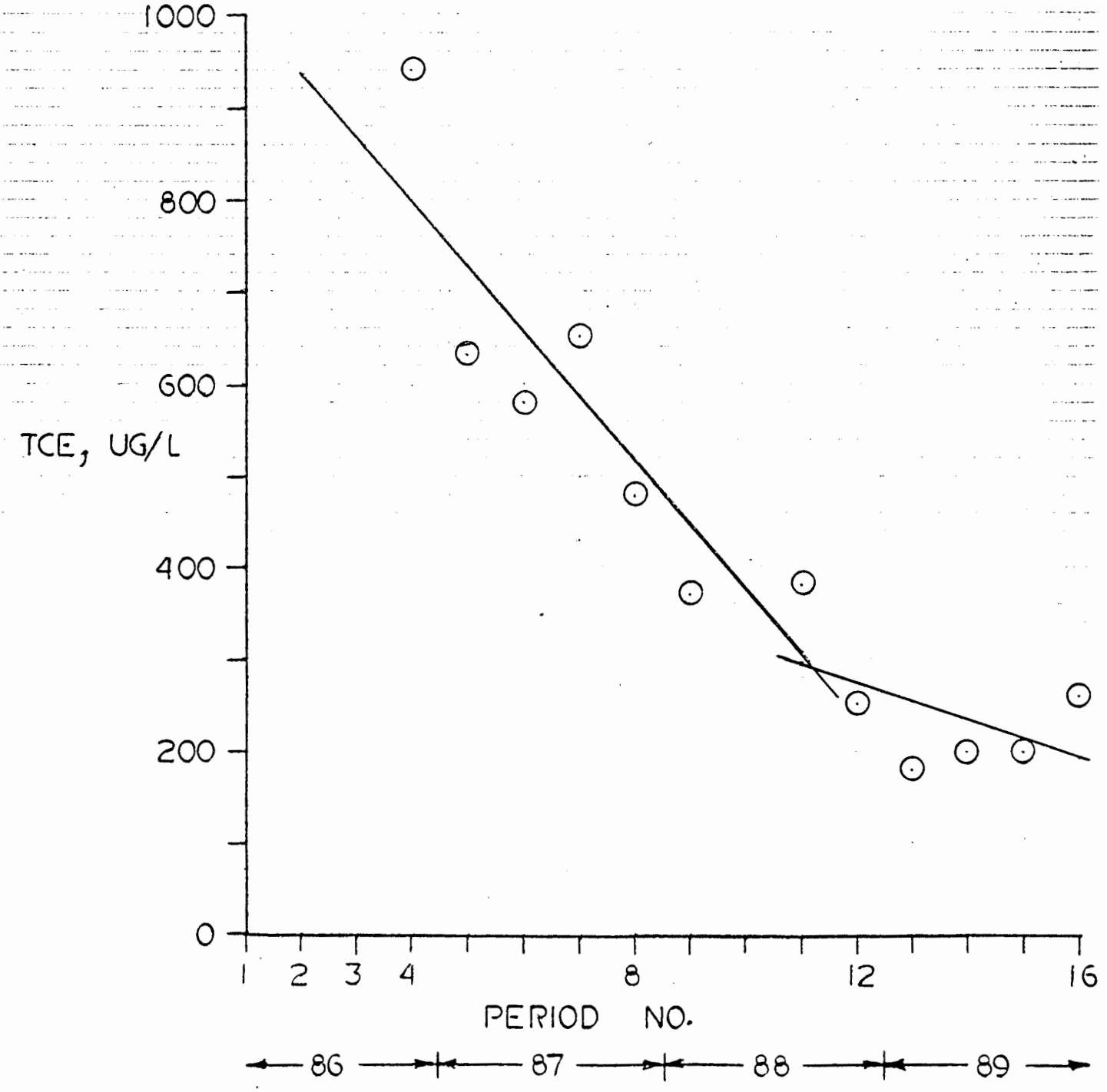


FIGURE 27

MW-16

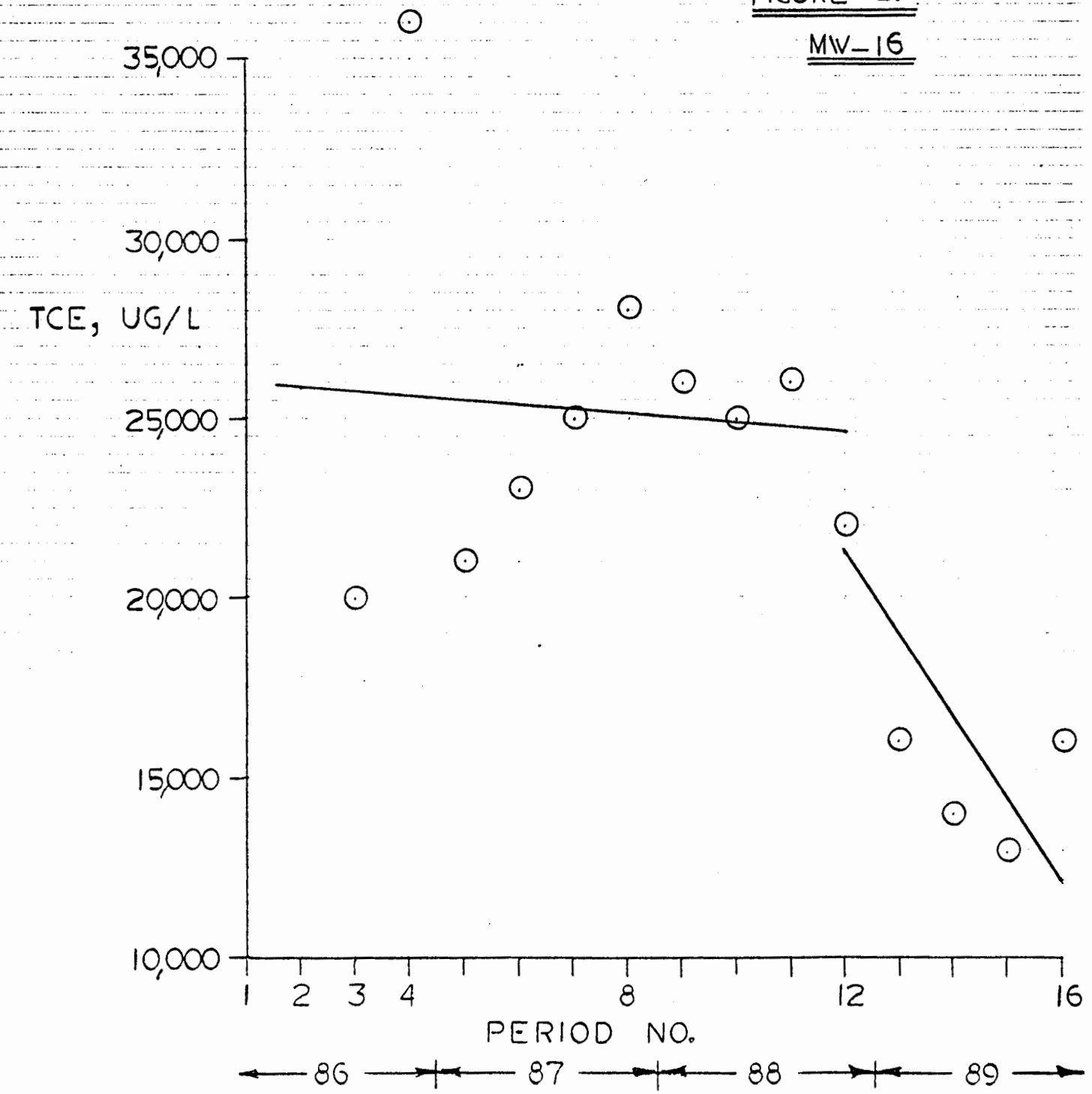


FIGURE 28

MW-21

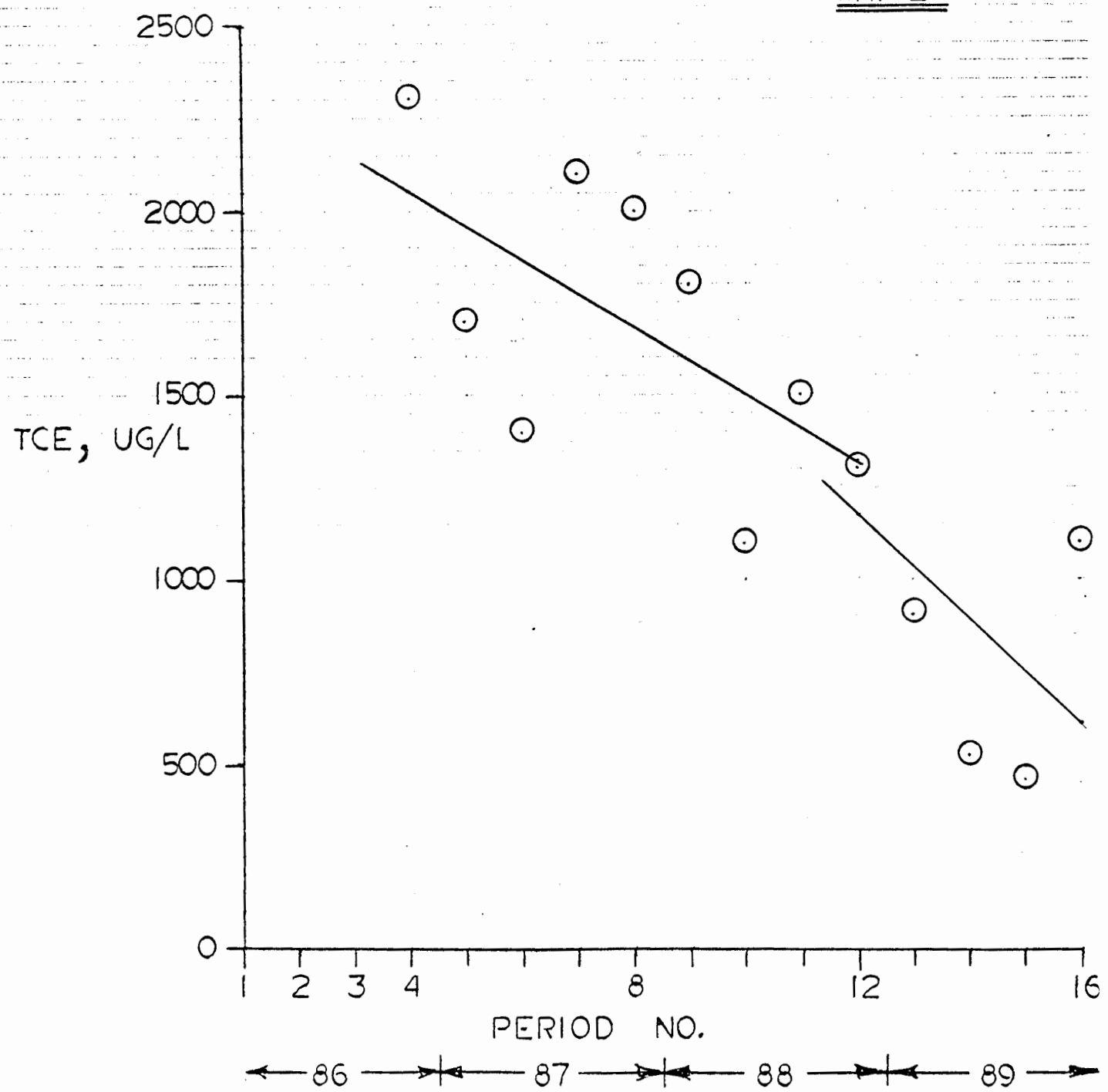
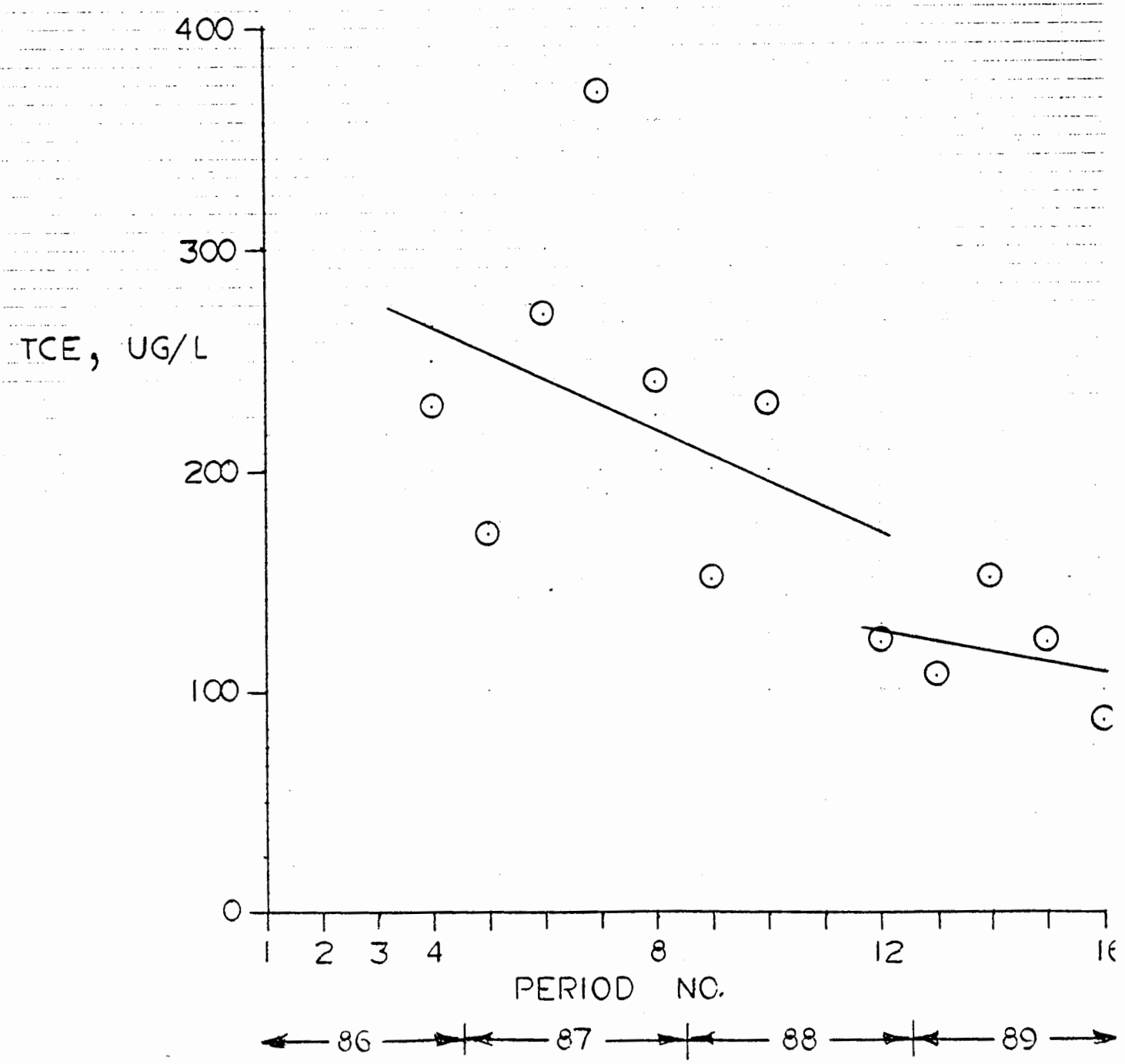


FIGURE 29.

MW-22



Attachment 4 includes the results of the regression analyses for each case.

As can be seen from Figure 23, the average rate of decrease in TCE concentration during the pre-recovery period was 42 ug/l/quarter. This average rate increased over tenfold to 551 ug/l/quarter, due to the effects of the recovery system.

The second statistical method applied to the historical data was the calculation and comparison of means (averages). For each well, a mean concentration was calculated for each of the two periods (pre- and post-recovery). In every case, the mean concentration was lower in the post-recovery period. The two means for each well were then compared, using a Student's t-test, to determine whether the difference between the means was statistically significant or due to the inherent variation in the data. In all but one case the difference was significant at the 95% confidence level. Well MW-14 was the only well where the difference was not significant at the 95% confidence level. This is probably due to the relatively high variance during the post-recovery period.

The average TCE concentration for all six wells during the pre-recovery period was 6,207 ug/l. This dropped to 3,745 ug/l during the post recovery period; a 39.7% decrease. Figure 30 shows this data.

FIGURE 30

STATISTICAL COMPARISON OF MEANS @ 95% CONFIDENCE LEVEL

Historical TCE Concentrations from Quarterly Groundwater Monitoring Data

PERIOD	YEAR	QTR	TCE6	TCE8	TCE9	TCE14	TCE15	TCE16	TCE18	TCE21	TCE22	TCE23
			[----------			TCE, ug/l				----------]		
1	1986	1	310	100	6100							
2	1986	2	110	160	8300							
3	1986	3	420	150	5000			20000	5400			
4	1986	4	390	190	5000	4900	940	36000	3600	2300	230	7500
5	1987	1	300	84	4500	5000	630	21000	4000	1700	170	6500
6	1987	2	320	69	3600	1800	580	23000	3000	1400	270	3700
7	1987	3	540	300	6400	2100	650	25000	4800	2100	370	3900
8	1987	4	360	150	7100	2700	480	28000	4300	2000	240	13000
9	1988	1	280	45	5500	6200	370	26000	3500	1800	150	13000
10	1988	2	170	93	4800	5000		25000	3100	1100	230	11000
11	1988	3	52	66	3300	5200	380	26000	3800	1500		3900
12	1988	4	99	190	4200	5600	250	22000	4200	1300	120	8000
13	1989	1	55	82	4000	3300	180	16000		900	110	
14	1989	2			4400	4900	200	14000		520	150	
15	1989	3			2500	3000	200	13000		460	120	
16	1989	4			2300	2200	260	16000		1100	91	

pre-recovery no. data points =	n1	12	9	8	10		9	8		
pre-recovery mean =	x1	5316.6	4277.7	535	25200		1688.8	222.5	=====>	6206.81 pre-rec. mean
pre-recovery std deviation =	s1	1455.2	1623.8	215.07	4541.1		398.26	78.330		
post-recovery no. data points =	n2	4	4	4	4		4	4		
post-recovery mean =	x2	3300	3350	210	14750		745	117.75	=====>	3745.46 post-rec. mean
post-recovery std deviation =	s2	1055.1	1132.8	34.641	1500		306.53	24.635		---
										39.66 % decrease
difference betweem means =	x1-x2	2016.6	927.77	325	10450		943.88	104.75		=========
	d1	1379.3	1505.9	180.94	4003.6		375.47	66.910		
	d2	0.5773	0.6009	0.6123	0.5916		0.6009	0.6123		
	d1*d2	796.37	904.94	110.80	2368.5		225.63	40.974		
(x1-x2)/(d1*d2) =	tc	2.5323	1.0252	2.9331	4.4119		4.1833	2.5564		
from table of t values @ n1+n2-2 degrees of freedom	t.95	2.14	2.20	2.23	2.18		2.20	2.23		

---

d1 = SQRT(((n1-1)*(s1^2)+(n2-1)*(s2^2))/(n1+n2-2))
d2 = SQRT((1/n1)+(1/n2))

IF tc > t.95 THEN THE DIFFERENCE BETWEEN THE MEANS IS SIGNIFICANT AT THE 95% CONFIDENCE LEVEL.

In summary, these statistical analyses show that since the recovery system was placed in operation, the average concentration of TCE in the groundwater has decreased approximately 40%. Additionally, the recovery system has accelerated the average rate of decrease of contaminant concentration form 42 ug/l/quarter to 551 ug/l/quarter.

VIII CONCLUSIONS

The intent of the recovery system is to retard the spread of the contaminant plume during the completion of the RFI and CMS, at which point a final solution may be determined and implemented. Although this evaluation has focused on TCE, it is clear that other contaminants included in the plume are in fact also being removed. This evaluation has shown that the recovery system has accomplished the following:

- reduction of contaminant mass in the target impact area of approximately 9% in one year;
- acceleration of the rate of decrease in contaminant concentration over tenfold;
- reduction of the average concentration of contaminant in the target impact area of approximately 40%.

It is readily apparent from these data the recovery system is accomplishing or exceeding the goals for which it was designed.

We recommend that operation of the current system be maintained until completion of the RFI and CMS, at which time a final solution encompassing the entire contaminant plume may be identified and implemented.

DISTRIBUTION

1 copy to: Sparton Corporation
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QUALITY CONTROL REVIEWER:

Charles R. Glore, C.E.G.
Principal Hydrogeologist

Attachments

1. Aquifer Testing Reports
2. Radii of Infulence Calculations
3. Regression Analyses: 1986 - 1989
4. Regression Analyses: Pre-recovery -vs- Post-recovery

Attachment 1

Aquifer Testing
at the
Sparton Technology, Inc.
Coors Road Plant
Albuquerque, New Mexico

Prepared by

METRIC Corporation
Albuquerque, New Mexico

APRIL 1987

AQUIFER TESTING
AT THE
SPARTON TECHNOLOGY, INC.
COORS ROAD PLANT

Aquifer tests were performed in three wells at the Sparton Technology, Inc., Coors Road Plant during March 1987. The purpose of the testing was to estimate the aquifer permeability of the "upper flow zone". The resulting information will be used in design of a pollution recovery well network, and possibly a recharge well network. The "upper flow zone" consists generally of the upper 5 to 10 feet of the saturated zone at the Coors Road site separated from the remainder of the saturated zone by a fine grained aquitard unit.

Pumping tests were conducted in three wells; MW-16 and MW-24 in the pond and sump area on the northwest side of the building, and in MW-18 located about 60 feet west of the west corner of the building.

The tests were conducted as follows:

Well: MW-16
Test Type: Constant Drawdown
Test Drawdown: 2.38 ft
Available Drawdown: 5.4 ft ±
Duration of Pumping: 4325 min ≃ 72 hr
Average Discharge: 0.145 gpm
Observations Taken in Wells: MW-16 (recovery), MW-24, MW-25, MW-17

Well: MW-24
Test Type: Constant Drawdown
Test Drawdown: 3.26 ft
Available Drawdown: 8.1 ft ±
Duration of Pumping: 4390 min ≃ 73 hr
Average Discharge: 0.205 gpm
Observations Taken in Wells: MW-24 (recovery), MW-16, MW-25, MW-17

Well: MW-18
Test Type: Constant Discharge
Maximum Drawdown: 5.02 ft
Available Drawdown: 12.6 ft ±
Duration of Pumping: 2940 min = 49 hr
Average Discharge: 0.264 gpm
Observations Taken in Wells: MW-18

Since wells MW-16 and MW-24 are 2-inch i.d. wells, the tests were conducted using a 1.67-inch o.d. positive displacement pump having a maximum capacity of about 2.5 gpm. The combination of small well diameter (making it difficult to obtain reliable water levels in the pumped well with small drawdowns, i.e., less than 3.5 feet) and low well capacities i.e., less than 0.25 gpm (making it difficult to maintain a constant discharge) resulted in the selection of a constant drawdown test for wells MW-16 and MW-24. Also significant is the fact that MW-16 and MW-24 are only 11.3 feet apart, providing a close observation well for each test.

Well MW-18 is a four-inch diameter well with no close observation wells available. As a result, a constant discharge test was performed on MW-18, with drawdown and recovery measurements taken in the pumped well.

All water level measurements were made with electronic sounders and are felt to be accurate to within ± 0.01 ft.

Volatile organic samples were collected periodically during each of the tests, and metal samples were collected near the end of each test.

The water level and discharge data collected during each test is presented in APPENDIX A.

The results of the aquifer testing are presented in TABLE 1. The constant drawdown data from the pumped wells (MW-16 and MW-24) were analyzed by Lohman, 1972. The residual-drawdown data from the pumped wells and the time-drawdown and residual-drawdown data from the observation wells were analyzed using Jacob plots (wells MW-16, and MW-24 tests) Lohman, 1972 suggests that the recovery method is strictly applicable only to tests of constant discharge and variable drawdown or recovery, however, recovery tests generally give values of T in close agreement with constant drawdown tests.

The testing performed on MW-18 consisted of a constant discharge test with measurements taken in the pumped well. The data were analyzed using Jacob plots.

All of the plots are presented in APPENDIX B.

The time drawdown plots were checked to ensure that $u < 0.05$ and, thus, validate the use of the Jacob solution.

The MW-18 data were checked using a procedure suggested by Schafer, 1978 to establish which portions of the data are casing storage affected.

Based on the previously described testing, it is felt that the best estimate for the permeability (hydraulic conductivity) of the upper flow zone in the pond and sump area is about 5×10^{-3} cm/sec. (see TABLE 1). Likewise, the best estimate for the permeability of the upper flow zone in the vicinity of MW-18 is about 3×10^{-4} cm/sec. (see TABLE 1).

The residual-drawdown curves (APPENDIX B) show some evidence that a "recharge effect" may be occurring during the pumping period. The residual drawdown curves generally show a t/t'

TABLE 1

Aquifer Testing

Sparton Technology, Inc. Coors Road Plant

Pumped Well	Observations at	Curve	Apparent T (gpd/ft)	b (ft)	Apparent K (ft/day)	Apparent K (cm/sec)	Comments
MW-16	MW-16	$\frac{s_w}{Q}$ vs $\frac{t}{r_w^2}$	57.3	5.4	1.41	5.000×10^{-4}	Represents Grouted Zone Near MW-16
		Early R-D	14.1	5.4	0.35	1.23×10^{-4}	Represents Grouted Zone Near MW-16
		Late R-D	49.1	5.4	1.22	4.29×10^{-4}	Represents Grouted Zone Near MW-16
MW-16	MW-24	Early T-D	479	5.4	11.9	4.18×10^{-3}	Selected Value
		Early R-D	2734	5.4	67.7	2.39×10^{-2}	"Recharge" Affected
		Late R-D	781	5.4	19.3	6.82×10^{-3}	Good Value
MW-24	MW-24	$\frac{s_w}{Q}$ vs $\frac{t}{r_w^2}$	275	8.05	4.57	1.61×10^{-3}	Well Loss Affected
		Early R-D	22.9	8.05	0.38	1.34×10^{-4}	Well Loss Affected
		Late R-D	846	8.05	14.0	4.96×10^{-3}	Selected Value
MW-24	MW-16	T-D	773	8.05	12.8	4.53×10^{-3}	Selected Value
		Early R-D	410	8.05	6.81	2.40×10^{-3}	Good Value
		Late R-D	1203	8.05	20.0	7.05×10^{-3}	"Recharge" Affected
MW-18	MW-18	Early T-D	29.0	12.6	0.31	1.09×10^{-4}	Casing Storage Affecte
		Late T-D	87.1	12.6	0.92	3.26×10^{-4}	Selected Value
		Early R-D	131	12.6	1.39	4.90×10^{-4}	Casing Storage and Recharge Affected
		Late R-D	15.2	12.6	0.16	5.69×10^{-5}	Casing Storage Affected

value greater than 2 at zero drawdown, suggesting a "recharge effect". Possible explanations of the apparent "recharge effect" include reduction or reversal of prevailing downward vertical leakage in the cone of depression during the tests or induced flow from a more permeable burried channel(s) existing within the upper flow zone. Evaluation of the analyses of volatile organic samples collected during the pumping tests (see APPENDIX C) indicates that if a "recharge effect" is occurring the recharge water has approximately the same organic contaminant levels as the water adjacent to the well.

APPENDIX A

PUMP TEST DATA

Date 3/3/87-3/07/87

CONSTANT DRAWDOWN AQUIFER TEST

WELL MW-16

DRAWDOWN 2.38'

Static Water Level 66.98'

time (h:m:s)	t (min)	t' (min)	t/t'	$\frac{t}{r_w^2}$ (m/ft^2)	Discharge (gpm)	Total Water Removed (gal)	$\frac{s_w}{Q}$ (ft-m/g
1:20:00	15			1532	0.251		9.5
1:28:00	23			2349	0.267		8.9
13:29:00	24			2451	0.198		12.0
13:33:30	28.5			2910	0.192		12.4
13:35:00	30			3063	0.195		12.2
3:40:00	35			3574	0.264		9.0
3:48:00	43			4391	0.227		10.5
3:51:00	46			4697	0.213		11.2
3:56:00	51			5208	0.231		10.3
4:09:00	64			6535	0.203		11.7
:19:55	75			7659	0.251		9.5
4:28:30	83.5			8527	0.240		9.9
4:38:25	93			9497	0.236		10.1
4:48:30	103.5			10569	0.243		9.8
4:59:40	114.5			11692	0.236		10.1
5:19:00	134			13684	0.229		10.4
5:38:00	153			15624	0.227		10.5
6:03:45	179			18279	0.216		11.0
6:33:45	209			21342	0.198		12.0
7:03:33	238.5			24355	0.190		12.5
8:04:30	299.5			30584	0.186	55 gal	12.8
9:03:34	358.5			36609	0.198		12.0
10:02:30	417.5			42634	0.195		12.2
:03:55	479			48914	0.189		12.6
12:04:18	539			55041	0.203		11.7
:03:30	598.5			61117	0.205		11.6
15:10	660			67397	0.193	110 gal	12.3
:09:12	784			80059	0.211		11.3
:08:13	903			92211	0.160		14.9
:12:15	1027			104873	0.165	165 gal	14.4

Date 3/3/87-3/07/87

CONSTANT DRAWDOWN AQUIFER TEST

WELL MW-16

DRAWDOWN 2.38'

Static Water Level 66.98'

time (h:m:s)	t (min)	t' (min)	t/t'	$\frac{t}{r_w^2}$ (m/ft^2)	Discharge (gpm)	Total Water Removed (gal)	$\frac{s_w}{Q}$ (ft·m/g
10:09:50	1265			129177	0.157	220 gal	15.2
13:02	1437			146741	0.176		13.5
14:00:00	1495			152664	0.156		15.3
15:03:00	1558			159097	0.160		14.9
16:17:00	1632			166654	0.166		14.3
17:07:00	1682			17160	0.151	275 gal	15.8
18:04:00	1739			177580	0.170		14.0
20:42:00	1897			193715	0.166		14.3
21:58:00	1973			201476	0.166		14.3
23:06:00	2041			208419	0.151		15.8
3:40	2075			-	-	330 gal	-
24:09:06	2104			214853	0.144		16.5
2:05:51	2221			226800	0.156		15.3
4:06:15	2341			239054	0.145		16.4
6:07:00	2462			251410	0.147	385 gal	16.2
8:07:14	2582			263664	0.147		16.2
10:44:41	2740			279799	0.145		16.4
12:06:00	2821			288070	0.145		16.3
14:04:28	2939.5			300171	0.140	440 gal	17.0
16:03:00	3058			312272	0.121		19.7
18:11:30	3186.5			325394	0.119		20.0
20:07:20	3302.5			337239	0.126		18.9
22:14:10	3429			350157	0.123	495 gal	19.4
24:9:00	3544			361900	0.122		19.5
1:57:36	3652.5			372980	0.132	535 gal	18.0
4:07:48	3783			386306	0.127		18.8
:08:00	3903			398560	0.117		20.4
8:09:00	4024			410916	0.117		20.3
10:07	4142			422966	0.118		20.2
11:00	4195			-	-	590 gal	-

Date 3/3/87-3/07/87

CONSTANT DRAWDOWN AQUIFER TEST

WELL MW-16

DRAWDOWN 2.38'

Static Water Level 66.98"

time (h:m:s)	t (min)	t' (min)	t/t'	$\frac{t}{r_w^2}$ (m/ft^2)	Discharge (gpm)	Total Water Removed (gal)	$\frac{s_w}{Q}$ (ft·m/g
12:40:00	4295			438590	0.115	590 gal	20.7
13:03:42	4319			441040	0.090	625	26.4

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-16

Pump Speed: - Q: - gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
13:10	4325	0			
13:17:30	4332.5	7.5	578	.83	Pump OFF ~~13:10:00~~
13:17:44	4332.7	7.7	563	.76	
13:17:56	4332.9	7.9	548	.73	
13:18:22	4333.4	8.4	516	.70	
13:18:34	4333.6	8.6	504	.68	
13:18:52	4333.9	8.9	487	.65	
13:20:00	4335	10	434	.55	
22:00	4337	12	361	.42	
24:00	4339	14	310	.31	
26:00	4341	16	271	.24	
28:00	4343	18	241	.21	
13:30:00	4345	20	217	.15	
35	4350	25	174	.09	
40	4355	30	145	.06	
45	4360	35	125	.04	
50	4365	40	109	.03	
14:00:00	4375	50	87.5	.03	
14:10:00	4385	60	73.1	.02	
14:20:00	4395	70	62.8	.02	
14:30:00	4405	80	55.1	.02	
14:40:00	4415	90	49.1	.02	
14:50:00	4425	100	44.25	.02	
15:00:00	4435	110	40.3	.01	
15:20:00	4455	130	34.3	.01	
15:40:00	4475	150	29.8	.01	
15:58	4493	168	26.7	0	
16:49:56	4545	220	20.7	.01	
18:16:09	4631	306	15.1	.01	
19:08:00	4683	358	13.1	.01	

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-16

Pump Speed: - Q: - gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
20:26:00	4761	436	10.9	.01	
22:22	4877	552	8.8	.01	
24:10	4985	660	7.6	0	
2:08	5103	778	6.6	0	
3:27	5182	857	6.0	.01	
6:11	5346	1021	5.2	0	
9:10	5525	1200	4.6	0	
					Test Terminated

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-24

Pump Speed: _____ Q: _____ gpm

Static Water Level 67.32'

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
13:05:00	0			0.00	Pump ON
13:06:15	1			0.00	
13:11:52	7			0.05	
13:18:09	13			0.06	
13:23:32	18.5			0.06	
13:26:54	22			0.06	
13:32:55	28			0.06	
13:38:03	33			0.07	
13:42:50	38			0.07	
13:48:07	43			0.07	
13:52:40	48			0.08	
13:57:55	53			0.08	
14:06:00	61			0.08	
14:17:10	72			0.10	
14:25:48	81			0.11	
14:35:30	90.5			0.11	
14:46:00	101			0.11	
14:56:57	112			0.11	
15:16:04	131			0.11	
15:35:41	151			0.12	
16:00:58	176			0.12	
16:31:03	206			0.12	
17:00:48	236			0.13	
18:01:00	296			0.14	
19:01:22	356.5			0.14	
19:59:20	414.5			0.15	
21:01:06	476			0.15	
22:01:38	536.5			0.15	
23:01:13	596			0.14	
24:05:09	660			0.14	

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-24

Pump Speed: _____ Q: _____ gpm

Static Water Level 67.32'

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
1	2:02:30	777.5			0.14	
	4:04:32	899.5			0.14	
	6:03:47	1019			0.14	
	9:00:46	1196			0.13	
	13:06:12	1441.0			0.12	
	13:55:33	1490.5			0.12	
	14:59:33	1555.5			0.13	
	16:13:59	1629			0.12	
	17:00:00	1675			0.13	
	18:01	1736			0.14	
	20:37:00	1892			0.14	
	21:55	1970			0.14	
	23:02	2037			0.13	
5	24:03:42	2099			0.12	
	2:01:13	2216			0.13	
	4:03:16	2338			0.13	
	6:04:30	2460			0.14	
	8:01:40	2577			0.13	
	10:00:00	2695			0.13	
	12:00:54	2816			0.12	
	14:07:28	2942.5			0.12	
	16:15:56	3071			0.12	
	18:14:40	3190			0.13	
	20:10:25	3305.5			0.13	
	22:17:00	3432			0.13	
6	24:03:49	3539			0.12	
	1:53:37	3648.5			0.13	
	4:02:30	3777.5			0.13	
	5:59:00	3894			0.13	
	8:00:00	4015			0.13	

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-24

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
10:02:00	4137			0.12	
12:25:30	4281			0.11	
13:10:00	4325	0	-	0.08	Pump OFF ~~Recovery Initiate~~
13:10:15	4325.25	0.25	17301	0.08	
13:10:30	4325.50	0.50	8651	0.085	
45	4325.75	0.75	5767	0.085	
11:00	4326.00	1.0	4326	0.085	
15	4326.25	1.25	3461	0.085	
30	4326.50	1.50	2904	0.085	
45	4326.75	1.75	2472	0.085	
13:12:00	4327.0	2.00	2163.5	0.085	
12:30	4327.5	2.50	1731	0.085	
13:00	4328.0	3.00	1443	0.08	
13:30	4328.5	3.50	1237	0.08	
14:00	4329.0	4.00	1082	0.08	
14:30	4329.5	4.50	962	0.075	
15:00	4330.0	5.00	866	0.075	
16:00	4331.0	6.00	722	0.075	
17:00	4332	7.00	619	0.075	
18:00	4333	8.00	542	0.075	
19:00	4334	9.00	482	0.075	
13:20:00	4335	10.00	434	0.075	
21:00	4336	11.00	394	0.075	
22:00	4337	12:00	361	0.075	
23:00	4338	13.00	334	0.07	
24:00	4339	14.00	310	0.07	
25:00	4340	15.00	289	0.07	
27:00	4342	17.00	255	0.07	
29:00	4344	19.00	229	0.07	
13:31:00	4346	21.00	207	0.07	

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-24

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
6	35:00	4350	25.00	174	0.065	
	13:40:00	4355	30.00	145	0.06	
	13:45:00	4360	35.00	125	0.06	
	13:50:00	4365	40.0	109	0.06	
	14:00:43	4376	51.0	85.8	0.06	
	14:11:05	4386	61.0	71.9	0.06	
	14:21:10	4396	71.0	61.9	0.05	
	14:31:30	4407	82.0	53.7	0.05	
	14:41:31	4417	92.0	48.0	0.045	
	14:51:20	4426	101.0	43.8	0.045	
	15:01:10	4436	111.0	40.0	0.045	
	15:20:53	4456	131.10	34.0	0.04	
	15:40:51	4476	151.10	29.6	0.04	
	15:55:04	4490	165.0	27.2	0.02	
	16:48:34	4544	219.0	20.7	0.02	
	18:15:00	4630	305.0	15.1	0.02	
	19:07:09	4682	357.0	13.1	0.02	
	20:25:11	4760	435.0	10.9	0.02	
	22:21	4876	551.0	8.95	0.02	
	24:09:00	4984	659.0	7.6	0.01	
	2:08	5103	778.0	7.6	0.01	
	3:28	5183	858	6.0	0.02	
	6:11	5346	1021	5.2	0.03	
	9:04	5519	1194	4.6	0.04	Test Terminated

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-25

Pump Speed: _____ Q: _____ gpm

Static Water Level 67.59

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
13:05:00				0.02	
13:07:53	8			0.02	
13:13:22	8.5			-.04	
13:20:49	16			0.00	
13:24:20	19.5			0.00	
13:30:36	26			0.00	
13:35:40	31			-0.01	
13:40:27	35.5			0.00	
13:45:23	40.5			-0.01	
13:50:24	45.5			-0.01	
13:55:40	51.0			0.00	
14:06:51	62			0.01	
14:18:03	73			0.01	
14:26:40	82			0.00	
14:36:15	91			0.00	
14:46:53	102			0.01	
14:57:46	113			0.01	
15:16:50	132			0.01	
15:36:20	151.5			0.01	
16:01:40	177			0.01	
16:31:40	207			0.01	
17:01:31	236.5			0.01	
18:02:00	297			0.03	
19:02:10	357			0.03	
20:00:12	415			0.03	
21:01:55	477			0.02	
22:02:24	537			0.02	
23:01:55	597			0.02	
24:06:07	661			0.03	
2:04:02	779			0.02	

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-25

Pump Speed: _____ Q: _____ gpm

Static Water Level 67.59

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
4:05:31	901			0.03	
6:06:13	1021			0.03	
9:01:47	1197			0.04	
13:06:46	1442			0.00	
13:56:12	1491			0.01	
15:00:15	1555			0.01	
16:15:00	1630			0.01	
17:01:12	1676			0.02	
18:01:30	1737			0.02	
20:38	1893			0.03	
21:55:30	1971			0.03	
23:03	2038			0.02	
24:04:43	2100			0.03	
2:01:59	2217			0.02	
4:05:15	2340			0.03	
6:06:16	2461			0.03	
8:02:18	2577			0.03	
10:40:00	2735			0.03	
12:01:25	2816			0.02	
14:06:45	2942			0.02	
16:14:00	3069			0.02	
18:13:50	3189			0.02	
20:09:05	3304			0.03	
22:16:00	3431			0.03	
24:05	3540			0.02	
1:54:18	3649			0.02	
4:03:30	3779			0.02	
6:00:00	3895			0.02	
8:02:00	4017			0.02	
10:03:00	4138			0.02	

Date: 3/3/87-3/07-87

Pumped Well MW-16

Measurements at Well MW-25

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
12:27:40	4283			0.01	
13:10:00	4325	0		0.00	Pump OFF
13:23:27	4338	13	333.7	-0.01	
13:27:26	4342	17	255.4	-0.01	
13:32:00	4347	22	197.6	-0.01	
13:35:40	4351	26	167.34	-0.01	
13:40:40	4356	31	140.5	-0.02	
13:45:45	4361	36	121.1	-0.02	
13:50	4365	40	109.1	-0.02	
14:01:25	4376	51	85.8	-0.02	
14:12:33	4388	63	69.7	-0.02	
14:21:50	4398	73	60.2	-0.02	
14:33:00	4409	84	52.5	-0.02	
14:42:25	4418	93	47.5	-0.02	
14:52:26	4428	103	43.0	-0.02	
15:01:41	4438	113	39.3	-0.02	
15:22:11	4458	133	33.5	-0.03	
15:41:40	4478	153	29.3	-0.02	
15:58:50	4495	170	26.4	-0.02	
16:50:07	4546	221	20.6	-0.02	
18:17:02	4633	308	15.0	-0.02	
19:09:00	4685	360	13.0	-0.02	
20:27	4763	438	10.9	-0.02	
22:23	4879	554	8.8	-0.02	
24:11	4987	662	7.5	-0.03	
2:09	5105	780	6.5	-0.03	
3:30	5186	861	6.0	-0.03	
6:12	5348	1023	5.2	-0.03	
9:12	5528	1203	4.6	-0.04	Test Terminated

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-17

Pump Speed: _____ Q: _____ gpm

Static Water Level 68.30

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
'3	13:05:00	0			0	
	13:09:29	4.			0	
	13:16:03	11			0	
	13:22:25	17			0	
	13:25:27	20			0	
	13:31:43	27			0	
	13:36:42	32			0	
	13:41:34	37			0	
	13:46:50	42			0	
	13:51:23	46			0	
	13:56:45	52			0	
	14:04:37	60			0	
	14:21:19	76			0	
	14:30:00	85			0	
	14L39:26	94			0	
	14:49:00	104			0	
	15:00:04	115			0	
	15:20:06	135			0	
	15:39:05	154			0	
	16:05:15	180			0	
	16:35:27	210			0.00	
	17:06:00	241			0.01	
	18:05:41	301			0.01	
	19:08:12	363			0.02	
	20:04:18	419			0.01	
	21:06:30	482			0	
	22:05:50	541			0	
	23:05:22	600			0	
4	0:06:18	661			0	

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-17

Pump Speed: _____ Q: _____ gpm

Static Water Level 68.30

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
2:05:15	780			0	
4:04:37	900			0	
9:03:37	1099			0.01	
13:04:56	1440			-0.01	
14:01:29	1496			-0.02	
15:04:24	1559			-0.02	
16:19:11	1634			-0.01	
17:08:30	1684			0.00	
18:05:00	1740			0.00	
20:43	1898			0.00	
21:59:00	1974			0.00	
23:07	2042			0.00	
24:06:03	2101			0.00	
2:05:14	2220			0.00	
4:00:15	2335			0.00	
6:03:17	2458			0.00	
8:03:40	2579			0.01	
10:41:11	2736			0.01	
12:02:35	2818			0.00	
14:08:55	2944			0.00	
16:17:16	3072			0.00	
18:16:30	3192			0.01	
20:13:00	3308			0.01	
22:18:00	3433			0.01	
24:15:00	3550			0.01	
1:59:00	3654			0.01	
4:09:00	3784			0.01	
6:10:00	3905			0.00	
8:10:00	4025			0.00	
12:28:40	4284			0.00	

Date: 3/3/87-3/07/87

Pumped Well MW-16

Measurements at Well MW-17

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
13:10:00	4325			0.00	
13:56:05	4371			0.00	
14:13:15	4388			0	
14:23:40	4399			0.01	
14:34:33	4410			0.01	
14:44:36	4420			0.01	
14:53:43	4429			0.01	
15:02:43	4438			0.01	
15:23:47	4459			0.0	
15:42:20	4477			0.01	
15:54:00	4489			0.0	
16:47:18	4542			0.0	
18:13:46	4629			0	
19:05:39	4681			0	
20:23:45	4759			0	
22:20:00	4875			0	
24:08:00	4983			0	
2:06	5101			0	
3:20	5175			0	
6:10	5345			-0.01	
9:33	5548			-0.02	Test Terminated

Date 3/10/87-3/13/87

CONSTANT DRAWDOWN AQUIFER TEST

WELL MW-24

DRAWDOWN 3.26' = S_w

Static Water Level: 68.40'

time (h:m:s)	t (min)	t' (min)	t/t'	$\frac{t}{r_w^2}$ (m/ft^2)	Discharge (gpm)	Total Water Removed (gal)	$\frac{s_w}{Q}$ (ft·m/ga
12:16	16			1634	0.258		12.6
12:22	22			2247	0.256		12.8
12:27	27			2757	0.251		13.0
12:31	31			3166	0.243		13.4
12:36	36			3676	-		-
12:40	40			4085	0.243		13.4
12:50	50			5106	0.235		13.9
13:01	61			6229	0.241		13.5
13:13	73			7454	0.246		13.3
13:18	78			7965	0.241		13.5
13:34	94	sampled		9599	0.263		12.4
14:25	145			14807	0.260		12.5
14:38	158			16134	0.270		12.1
15:01	181			18483	0.265		12.3
15:32	212			21649	0.257	50	12.7
16:04	244			24916	0.248		13.2
16:36	276			28184	0.242		13.5
17:03	303			30941	0.258		12.6
18:03	363			37068	0.255		12.8
19:03	423			43195	0.239	100	13.6
20:03	483			49322	0.273		11.9
21:03	543			55449	0.252		13.0
22:03	603			61576	0.252		13.0
23:03	663			67703	0.240	150	13.6
24:00	720	sampled		73524	0.231		14.1
1:00	780			79651	0.245		13.3
2:00	840			85778	0.239		13.6
3:00	900			91905	0.244	200	13.4
4:00	960			98032	0.243		13.4
5:00	1020			104159	0.239		13.6

Date 3/10/87-3/13/87

CONSTANT DRAWDOWN AQUIFER TEST

WELL MW-24

DRAWDOWN 3.26'

Static Water Level: 68.40'

time (h:m:s)	t (min)	t' (min)	t/t'	$\frac{t}{r_w^2}$ (m/ft^2)	Discharge (gpm)	Total Water Removed (gal)	$\frac{s_w}{Q}$ (ft·m/ga
6:00	1080	sampled		110286	0.242		13.5
7:00	1140			116413	0.247	250	13.2
8:00	1200			122540	0.233		14.0
9:00	1260			128667	0.236		13.8
10:00	1320			134794	0.235		13.9
11:00	1380			140921	0.239	300	13.6
12:00	1440			147048	0.240		13.6
13:00	1500			153175	0.235		13.9
14:00	1560			159301	0.236	350	13.8
15:00	1620			165428	0.233		14.0
16:00	1680			171555	0.231		14.1
17:00	1740			177682	0.246		13.3
18:00	1800			183809	0.238	400	13.7
19:00	1860			189936	0.244		13.4
20:00	1920			196063	0.243		13.4
21:00	1980			202190	0.243		13.4
22:00	2040			208317	0.241	450	13.5
23:00	2100			214444	0.239		13.6
24:00	2160			220571	0.225		14.5
1:00	2220			226698	0.223	500	14.7
2:00	2280			232825	0.218		15.0
3:00	2340			238952	0.223		14.7
4:00	2400			245079	0.222		14.7
5:00	2460			251206	0.219	525	14.9
6:08	2528			258150	0.214		15.2
7:05	2585			263971	0.218	545	15.0
[illegible]:07	2647			270302	0.256		12.8
9:05	2705			276225	0.253	585	12.9
10:06	2766			282454	0.251		13.0
11:00	2820			287968	0.254		[illegible]

Date 3/10/87-3/13/87

CONSTANT DRAWDOWN AQUIFER TEST

WELL MW-24

DRAWDOWN 3.26'

Static Water Level 68.40'

time (h:m:s)	t (min)	t' (min)	t/t'	$\frac{t}{r_w^2}$ (m/ft^2)	Discharge (gpm)	Total Water Removed (gal)	$\frac{s_w}{Q}$ (ft:m/ga
12:06	2886	sampled		294708	0.256	635 gal	12.8
13:04	2944			300631	0.258		12.6
14:03	3003			306655	0.249		13.1
15:06	3066			313089	0.236		13.8
16:03	3123			318909	0.231		14.1
17:04	3184			325138	0.233		14.0
18:04	3244			331265	0.227		14.3
19:01	3301			337086	0.232	685 gal	14.0
20:06	3366			343724	0.235		13.9
21:03	3423			349544	0.248		13.2
22:04	3484			355773	0.233		14.0
23:03	3543			361798	0.248	735	13.2
24:00	3600	sampled		367619	0.245		13.3
1:00	3660			373746	0.241		13.5
2:00	3720			379873	0.244		13.4
3:00	3780			386000	0.242	790	13.5
4:00	3840			392127	0.240		13.6
5:00	3900			398254	0.240		13.6
6:00	3960			404381	0.244		13.4
7:00	4020			410508	0.245	845	13.3
8:00	4080			416635	0.228		14.3
9:00	4140			422762	0.227		14.4
10:00	4200			428889	0.229		14.2
11:00	4260			-	0.507	Pump speed to 75	-
11:11	4271			436139	0.226		14.4
12:00	4320			441143	0.220		14.8
3:00	4380			447270	0.209		15.6
13:10	4390	0				900	Pump OFF

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-24

Pump Speed: - Q: - gpm

Static Water Level 68' 4 3/4"

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
13:15	4395	5	879	0.85	
13:17	4397	7	628	0.72	
13:17:30	4397.5	7.5	586	0.64	
13:18	4398	8	550	0.57	
13:18:30	4398.5	8.5	517	0.48	
13:19	4399	9	489	0.42	
13:19:30	4399.5	9.5	463	0.38	
13:20	4400	10	440	0.32	
13:20:30	4400.5	10.5	419	0.28	
13:21	4401	11	400	0.25	
13:21:30	4401.5	11.5	383	0.22	
13:22	4402	12	367	0.20	
13:22:30	4402.5	12.5	352	-	
13:23	4403	13	339	0.16	
13:23:30	4403.5	13.5	326	0.15	
13:24	4404	14	315	0.14	
13:24:30	4404.5	14.5	304	0.13	
13:25	4405	15	294	0.10	
13:25:30	4405.5	15.5	284	0.10	
13:26	4406	16	275	0.10	
13:26:30	4406.5	16.5	267	0.10	
13:27	4407	17	259	0.09	
13:28	4408	18	245	0.09	
13:29	4409	19	232	0.09	
13:30	4410	20	221	0.08	
13:31	4411	21	210	0.08	
13:32	4412	22	201	0.07	
13:33	4413	23	192	0.07	
13:34	4414	24	184	0.07	

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-24

Pump Speed: - Q: - gpm

Static Water Level 68' 4 3/4"

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
13:35:00	4415	25	177	0.06	
13:36	4416	26	170	0.06	
13:37	4417	27	164	0.05	
13:40:00	4420	30	147	0.05	
13:42	4422	32	138	0.05	
13:45	4425	35	126	0.05	
13:46	4426	36	123	0.05	
13:48	4428	38	117	0.05	
13:50	4430	40	111	0.05	
13:55:00	4435	45	99	0.05	
14:00:00	4440	50	89	0.04	
14:10:00	4450	60	74	0.04	
14:20:00	4460	70	64	0.04	
14:30:00	4470	80	56	0.03	
14:40	4480	90	50	0.02	
14:50	4490	100	45	0.02	
14:10	4510	120	38	0.02	
15:35	4535	145	31	0.01	
15:50	4550	160	28	0.01	
16:10	4570	180	25	0	
16:40	4600	210	22	0	
17:10	4630	240	19	0	
17:40	4660	270	17	0	
18:10	4690	300	16	0.01	
19:10	4750	360	13	0.02	

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-16

Pump Speed: - Q: - gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
12:00:00	0.25			0.00	Pump ON
	0.50			0.00	
	0.75			0.00	
	1.0			0.00	
	1.5			0.00	
	2.0			0.00	
	3.0			0.01	
	4.0			0.02	
	5.0			0.03	
	6.0			0.03	
	7.0			0.04	
	8.0			0.04	
	9.0			0.05	
	10.0			0.06	
	12.0			0.06	
	14.0			0.06	
	16.0			0.06	
	18.0			0.06	
	20.0			0.08	
	25.0			0.08	
12:30:00	30.0			0.08	
	35.0			0.08	
	42.0			0.08	
	45.0			0.08	
	50.0			0.08	
13:00:00	60.0			0.08	
	70.0			0.09	
	80.0			0.09	
13:30:00	90.0			0.10	
	100			0.11	

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-16

Pump Speed: - Q: - gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
	120			0.12	
14:20:00	140			0.12	
	160			0.12	
15:00:00	180			0.13	
	210			0.13	
16:00:00	240			0.14	
	270			0.14	
17:00:00	300			0.14	
18:00:00	360			0.15	
19:00	420			0.17	
20:00	480			0.17	
21:00	540			0.17	
22:00	600			0.18	
23:00	660			0.18	
24:00	720			0.18	
1:02	782			0.18	
2:02	842			0.17	
3:03	903			0.16	
4:02	962			0.18	
5:02	1022			0.18	
6:02	1082			0.18	
7:02	1144			0.18	
8:02	1202			0.19	
9:02	1262			0.18	
10:01	1321			0.17	
11:02	1382			0.18	
11:45	1425			0.14	Pump Speed to 40
12:00	1440			0.15	Pump Speed to 50
13:00	1500			0.16	@ 11:46
14:00	1560			0.15	

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-16

Pump Speed: - Q: - gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
1	15:00	1620			0.16	
	16:00	1680			0.16	
	17:00	1740			0.17	
	18:00	1800			0.18	
	19:00	1860			0.19	
	20:00	1920			0.19	
	21:00	1980			0.20	
	22:00	2040			0.20	
	23:00	2100			0.20	
	24:00	2160			0.20	
2	1:01	2221			0.20	
	2:01	2281			0.21	
	3:01	2341			0.20	
	4:01	2401			0.20	
	5:01	2461			0.20	
	6:10	2530			0.20	
	7:02	2582			0.20	
	8:04	2644			0.21	
	9:01	2701			0.22	
	10:01	2761			0.22	
	12:05	2885			0.20	
	13:00	2940			0.19	
	14:00	3000			0.19	
	15:02	3062			0.19	
	16:00	3120			0.19	
	17:03	3183			0.19	
	18:00	3240			0.21	
	19:00	3300			0.21	
	20:01	3361			0.22	
	21:00	3420			0.22	

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-16

Pump Speed: - Q: - gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
22:00	3480			0.21	
23:00	3540			0.22	
0:02	3602			0.22	
1:01	3661			0.22	
3:01	3781			0.22	
4:01	3841			0.22	
5:01	3901			0.22	
6:01	3961			0.23	
7:01	4021			0.23	
8:01	4081			0.23	
9:01	4141			0.22	
10:01	4201			0.20	
11:01	4261			0.19	
12:00	4320			0.19	
13:00	4380			0.16	
13:00	4390	0	-	0.16	Pump OFF
	4390.25	.25	17561	0.16	
	4390.50	.50	8781	0.16	
	4390.75	.75	5854	0.16	
13:11	4391.0	1.0	4391	0.16	
	4391.5	1.5	2928	0.16	
13:12	4392.0	2.0	2196	0.16	
	4392.5	2.5	1757	0.16	
13:13	4393.0	3.0	1464	0.16	
	4393.5	3.5	1255	0.16	
13:14	4394.0	4.0	1099	0.16	
	4394.5	4.5	977	0.155	
13:15	4395.0	5.0	879	0.155	
13:16	4396	6	733	0.15	
13:17	4397	7	628	0.15	

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-16

Pump Speed: - Q: - gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
13:18	4398	8	550	0.15	
13:19	4399	9	489	0.14	
13:20	4400	10	440	0.135	
	4401	11	400	0.13	
	4402	12	367	0.125	
	4404	14	315	0.115	
	4406	16	275	0.11	
13:30	4408	18	245	0.10	
13:20	4410	20	221	0.10	
	4415	25	177	0.085	
	4420	30	147	0.075	
	4425	35	126	0.065	
	4430	40	111	0.065	
	4435	45	99	0.065	
14:00	4440	50	89	0.065	
	4450	60	74	0.06	
	4460	70	64	0.06	
14:30	4470	80	56	0.06	
	4480	90	50	0.055	
15:00	4490	100	45	0.05	
	4510	120	38	0.05	
	4534	144	31	0.05	
	4550	160	28	0.04	
16:10	4570	180	25	0.04	
	4600	210	22	0.03	
17:10	4630	240	19	0.03	
	4660	270	17	0.03	
18:10	4690	300	16	0.05	
19:10	4750	360	13	0.06	End of Test

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-25

Pump Speed: - Q: - gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
12:04				0.00	
12:07				0.01	
12:09				0.01	
12:13				0.01	
12:17				0.01	
12:19				0.01	
12:26				0.02	
12:33				0.01	
12:51				0.01	
13:02				0.01	
13:08				0.01	
13:14				0.01	
13:30				0.01	
13:40				0.01	
14:01				0.02	
14:21				0.02	
14:38				0.02	
15:01				0.03	
15:31				0.03	
16:00				0.04	
16:33				0.04	
17:01				0.05	
18:03				0.05	
19:03				0.06	
20:02				0.06	
21:01				0.06	
22:01				0.07	
23:01				0.07	
24:01				0.07	
1:01				0.07	

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-25

Pump Speed: - Q: - gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
1	2:01				0.06	
	3:03				0.05	
	4:02				0.05	
	5:01				0.06	
	6:01				0.06	
	7:02				0.07	
	8:02				0.07	
	9:01				0.07	
	10:01				0.07	
	11:01				0.06	
	12:01	± 4320			0.04	
	13:01				0.05	
	14:01				0.04	
	15:01				0.05	
	16:01				0.05	
	17:01				0.06	
	18:01				0.07	
	19:01				0.08	
	20:01				0.08	
	21:01				0.09	
	22:01				0.08	
	23:01				0.08	
	24:01				0.09	
2	1:01				0.08	
	2:01				0.09	
	3:01				0.09	
	4:01				0.09	
	5:01				0.09	
	6:10				0.09	
	7:01				0.09	

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-25

Pump Speed: - Q: - gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
8:03				0.09	
9:00				0.09	
10:01				0.09	
12:04	2 days			0.07	
13:01				0.06	
14:01				0.06	
15:04				0.05	
16:01				0.07	
17:03				0.08	
18:01				0.06	
19:01				0.07	
20:01				0.07	
21:01				0.06	
22:01				0.07	
23:01				0.06	
24:01				0.06	
1:01				0.05	
2:01				0.07	
3:01				0.07	
4:01				0.09	
5:01				0.09	
6:00				0.09	
7:01				0.07	
8:01				0.06	
9:01				0.07	
10:01				0.06	
11:01				0.06	
12:01				0.05	
1:00	= 4320 + 60			0.05	
1:10	4380				Pump OFF

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-25

Pump Speed: - Q: - gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
13:44				-0.03	
13:48				-0.01	
13:56				-0.01	
14:01				-0.01	
14:06				-0.01	
14:16				-0.01	
14:31				-0.01	
14:41				-0.01	
14:51				-0.02	
15:11				-0.01	
15:37				-0.02	
15:51				-0.02	
16:11				-0.02	
16:41				-0.02	
17:11				-0.02	
17:41				-0.02	
18:11				-0.01	
19:11				0.00	End of test

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well W-17

Pump Speed: - Q: - gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
0	12:00				0.00	Pump ON
	12:11				0.00	
	12:21				0.00	
	12:31				-0.01	
	12:58				-0.01	
	13:16				0.00	
	13:32				0.00	
	14:02				0.00	
	14:36				0.00	
	15:03				0.00	
	15:44				0.00	
	16:35				0.00	
	17:04				0.02	
	18:04				0.02	
	19:05				0.03	
	20:06				0.02	
	21:04				0.03	
	22:05				0.03	
	23:03				0.03	
	24:07				0.03	
1	1:05				0.03	
	2:06				0.03	
	3:06				0.03	
	4:07				0.03	
	5:07				0.03	
	6:06				0.04	
	7:07				0.04	
	8:03				0.02	
	9:03				0.04	
	10:03				0.02	

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-17

Pump Speed: - Q: - gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
1	11:03				0.01	
	12:08				0.01	
	13:03				-0.01	
	14:03				-0.01	
	15:03				0.00	
	16:03				-0.01	
	17:03				0.00	
	18:03				0.01	
	19:03				0.02	
	20:02				0.02	
	21:02				0.03	
	22:03				0.02	
	23:04				0.02	
	24:04				0.03	
2	1:04				0.03	
	2:03				0.03	
	3:03				0.04	
	4:03				0.04	
	5:03				0.03	
	6:20				0.03	
	7:03				0.05	
	8:05				0.05	
	9:02				0.05	
	10:03				0.05	
	11:00				0.03	
	12:10				0.03	
	13:03				-0.01	
	14:03				0.00	
	15:05				0.01	
	16:05				0.01	

Date: 3/10/87-3/13/87

Pumped Well MW-24

Measurements at Well MW-17

Pump Speed: - Q: - gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
17:05				0.01	
18:03				0.03	
19:03				0.03	
20:03				0.05	
21:03				0.02	
22:03				0.03	
23:03				0.03	
24:03				0.03	
1:03				0.03	
2:03				0.03	
3:03				0.03	
4:03				0.03	
5:03				0.04	
6:03				0.04	
7:04				0.03	
8:03				0.02	
9:03				0.01	
10:03				0.00	
11:02				-0.01	
12:00				-0.01	
13:10					Pump OFF
14:03				-0.01	
14:22				-0.01	
15:39				0.00	
16:12				-0.01	
16:44				0.00	
17:05				0.00	
17:12				0.01	
18:12				0.01	
20:30				0.02	End of test

Date: 3/07/87-3/09-87

Pumped Well MW-18

Measurements at Well MW-18

Pump Speed: _____ Q: 0.25 gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
11:00	0			0	Speed 39
	.25			-	
	.5			0.20	
	.75			-	
11:01	1.0			0.35	
	1.5			0.55	
11:02	2.0			0.65	
	2.5			0.80	
11:03	3.0			0.90	
	3.5			1.00	
11:04	4.0			1.10	
	4.5			1.18	
11:05	5.0			1.25	
11:06	6.0			1.39	
11:07	7.0			1.51	
11:08	8.0			1.62	
11:09	9.0			1.74	
11:10	10.0			1.85	
11:11	11			1.96	1ℓ/51.04sec
11.14	14			2.30	Adj to 38
11.16	16			2.45	1ℓ/54.49
11.18	18			2.57	Adj to 37
11:20	20			2.69	1ℓ/57.30sec
11:25	25			2.85	1ℓ/60.70sec
11:30	30			3.06	
11:35	35			3.22	1ℓ/56.70
11:40	40			3.38	1ℓ/56.82
11:45	45			3.47	sampled
11:50	50			3.51	1ℓ/59.03sec
12:00	60			3.58	1ℓ/58.76sec

Date: 3/07/87-3/09/87

Pumped Well MW-18

Measurements at Well MW-18

Pump Speed: _____ Q: 0.25± gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
12:10	70			3.67	
12:20	80			3.73	1ℓ/60.61
12:30:00	90			3.83	1ℓ/56.74
12:40:00	100			3.87	1ℓ/57.83
13:00:00	120			3.89	1ℓ/58.09
13:20:00	140			3.90	1ℓ/58.45
13:40:00	160			3.96	1ℓ/58.23
14:00:00	180			4.19	1ℓ/57.48
14:30:00	210			4.19	1ℓ/56.41
15:00:00	240			4.30	1ℓ/57.03
15:47:00	287			4.20	1ℓ/60.92
16:00	300			4.24	
17:00	360			4.04	1ℓ/60.56
18:00	420			3.53	H_2O sample 66.8 taken
19:00	480			4.02	1ℓ/59.67
20:00	540			3.97	1ℓ/61.43
21:00	600			3.75	1ℓ/59.90
22:00	660			3.27	1ℓ/63.18
23:00	720			4.75	H_2O sample 61.80 taken
24:00	780			4.42	1ℓ/59.24
1:00	840			4.67	1ℓ/60.41
2:00	900			4.50	1ℓ/58.85
3:00	960			4.23	1ℓ/61.07
4:00	1020			4.20	1ℓ/63.46
5:00	1080			4.11	1ℓ/65.20
6:00	1140			4.55	1ℓ/57.15
7:00	1200			5.02	1ℓ/57.40
8:00	1260			6.56	1ℓ/49.55 Adj 61.87
9:00	1320			5.14	1ℓ/58.95 Adj 60.89
10:00	1380			4.48	57.90

Date: 3/07/87-3/09-87

Pumped Well MW-18

Measurements at Well MW-18

Pump Speed: _____ Q: 0.25 gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
11:00	1440			4.50	sampled 56.97 adj 61.36
12:00	1500			4.17	60.27
3 13:00	1560			4.10	1ℓ/60.71
14:00	1620			3.94	1ℓ/61.95
15:00	1680			4.15	1ℓ/58.43
16:00	1740			3.94	1ℓ/61.31
17:00	1800			4.08	1ℓ/60.46
18:00	1860			3.96	1ℓ/58.95 adj 60.06
19:00	1920			3.92	1ℓ/68.45 adj 60.30
20:00	1980			4.41	1ℓ/60.04
21:00	2040			4.06	1ℓ/59.26
22:00	2100			4.16	1ℓ/58.64
23:00	2160			4.21	H_2O sample taken 68.54 adj 62.64
24:00	2220			4.40	1ℓ/1:05:43 adj 59.
9 1:00	2280			4.11	61.01
2:00	2340			4.66	58.13
3:00	2400			5.09	60.58
4:00	2460			5.47	57.28 adj 60.06
5:00	2520			5.52	64.70 adj 58.67
6:00	2580			4.80	59.14
7:00	2640			4.88	60.04
8:00	2700			4.97	57.10 adj 61.39
9:00	2760			4.52	59.24
10:00	2820			5.04	58.80
11:00	2880			4.66	67.58 adj 58.95
12:00	2940			5.02	Pump OFF

Date: 3/7/87-3/9/87

Pumped Well MW-18

Measurements at Well MW-18

Pump Speed: _____ Q: 0.25± gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
12:00:15	2940.25	.25	11761	4.90	
	2940.5	.5	5881	4.81	
	2940.75	.75	3921	4.72	
12:01	2941	1.0	2941	4.63	
	2941.5	1.5	1961	4.44	
12:02	2942	2.0	1471	4.26	
	2942.5	2.5	1177	4.09	
12:03:00	2943	3.0	981	3.91	
	2943.5	3.5	841	3.74	
12:04:00	2944	4.0	736	3.57	
	2944.5	4.5	654	3.40	
12:05	2945	5.0	589	3.23	
	2946	6	491	2.89	
	2947	7	421	2.57	
	2948	8	369	2.27	
	2949	9	328	2.03	
12:10:00	2950	10	295	1.79	
	2952	12	246	1.44	
	2954	14	211	1.16	
	2956	16	185	.93	
	2958	18	164	.75	
12:20:00	2960	20	148	.60	
	2965	25	119	.35	
12:30:00	2970	30	99.0	.25	
	2975	35	85.0	.20	
	2980	40	74.5	.17	
	2985	45	66.3	.15	
	2990	50	59.8	.14	
	3000	60	50.0	.11	
	3010	70	43.0	.11	

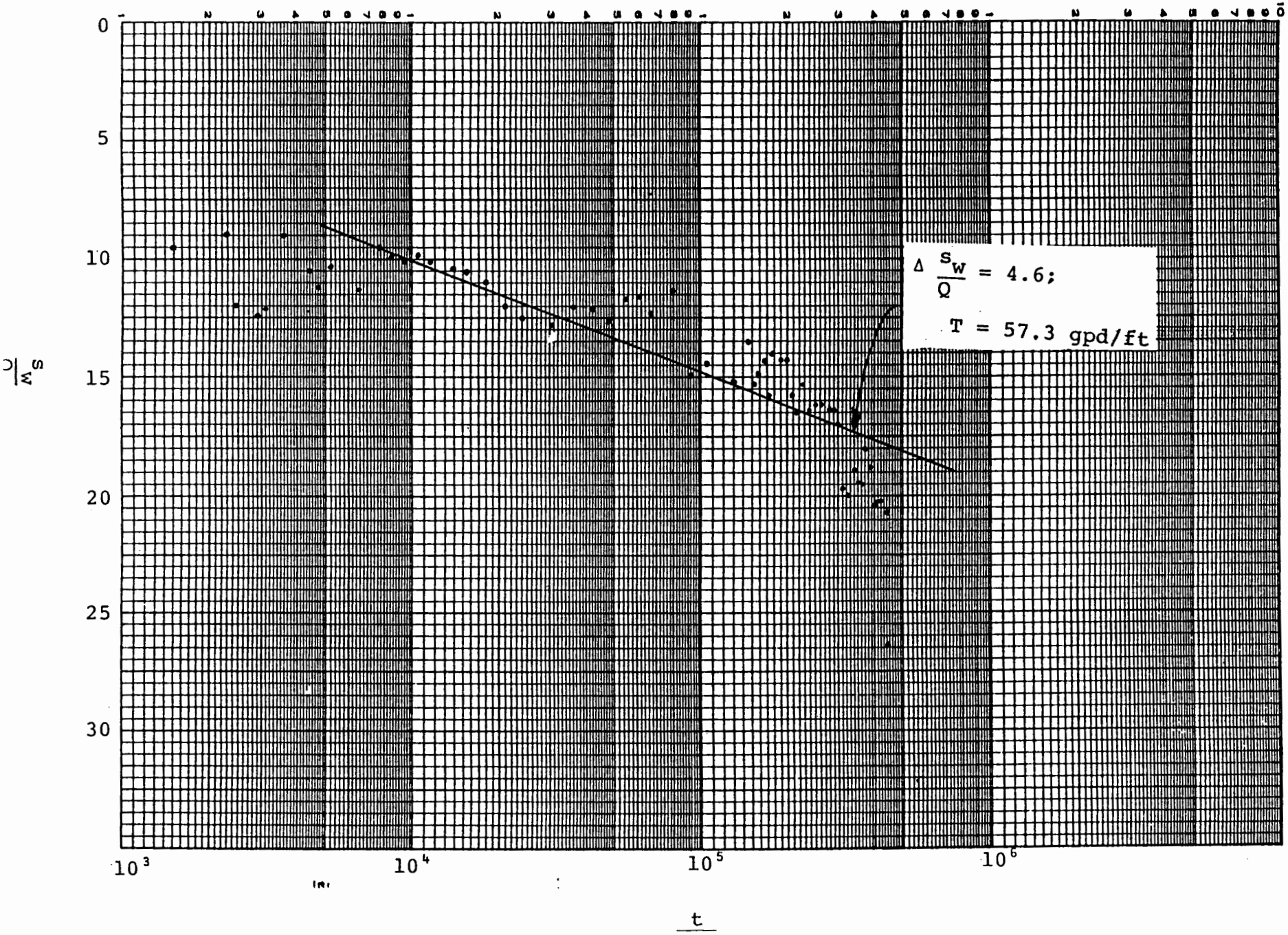
APPENDIX B

AQUIFER TEST DATA PLOTS

Pumped Well MW-16
Observations at Well MW-16

$\frac{s_w}{Q}$ vs $\frac{t}{r_w^2}$ d = 2 3/8"

METRIC Corporation
Date: 3-87



Pumped Well: MW-16
Observations at Well: MW-16

Residual-Drawdown
Q = 0.145

METRIC Corporation
Date: 3-87

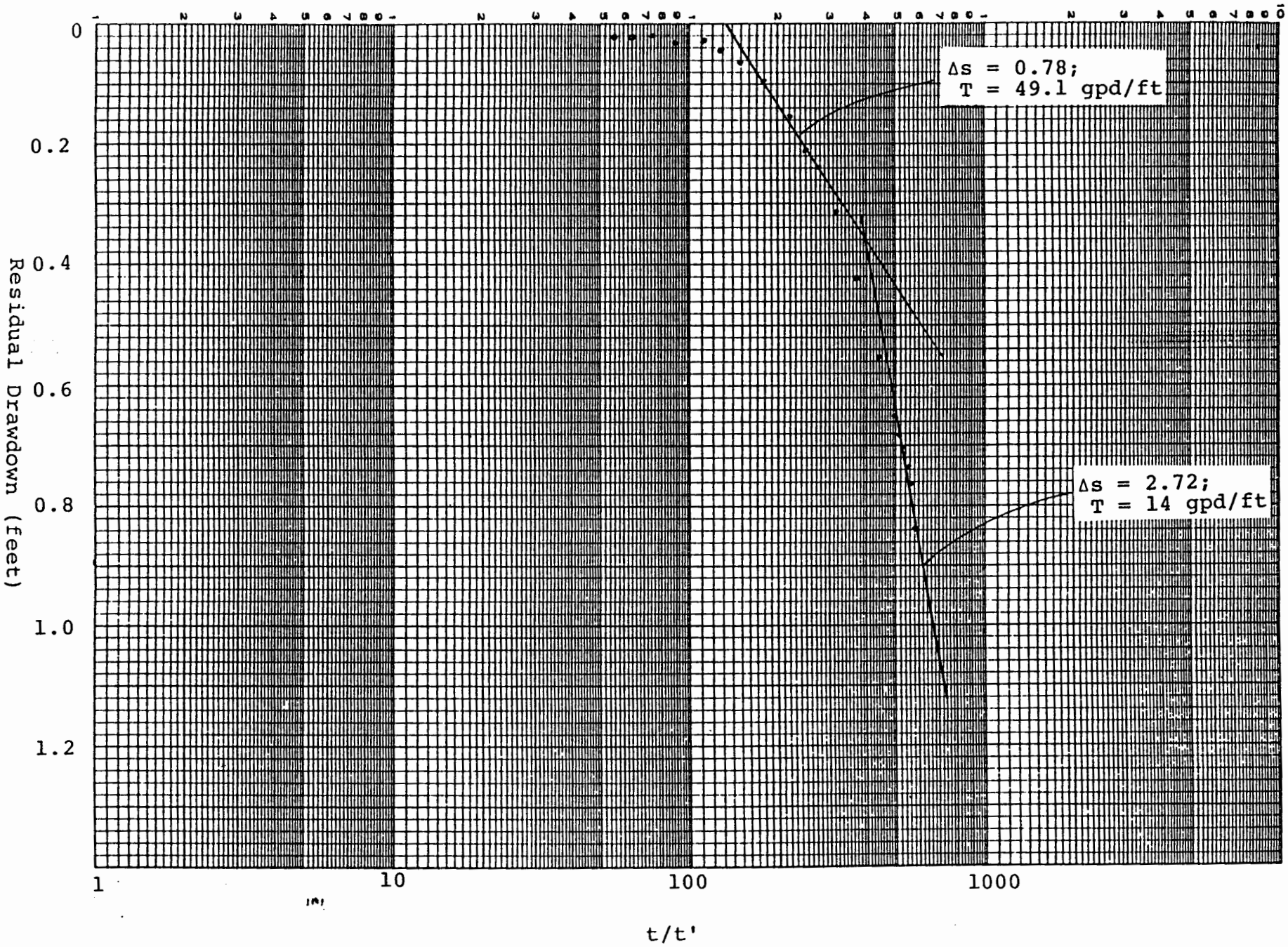


TABLE 4

SAMPLE ANALYSIS

MW-25

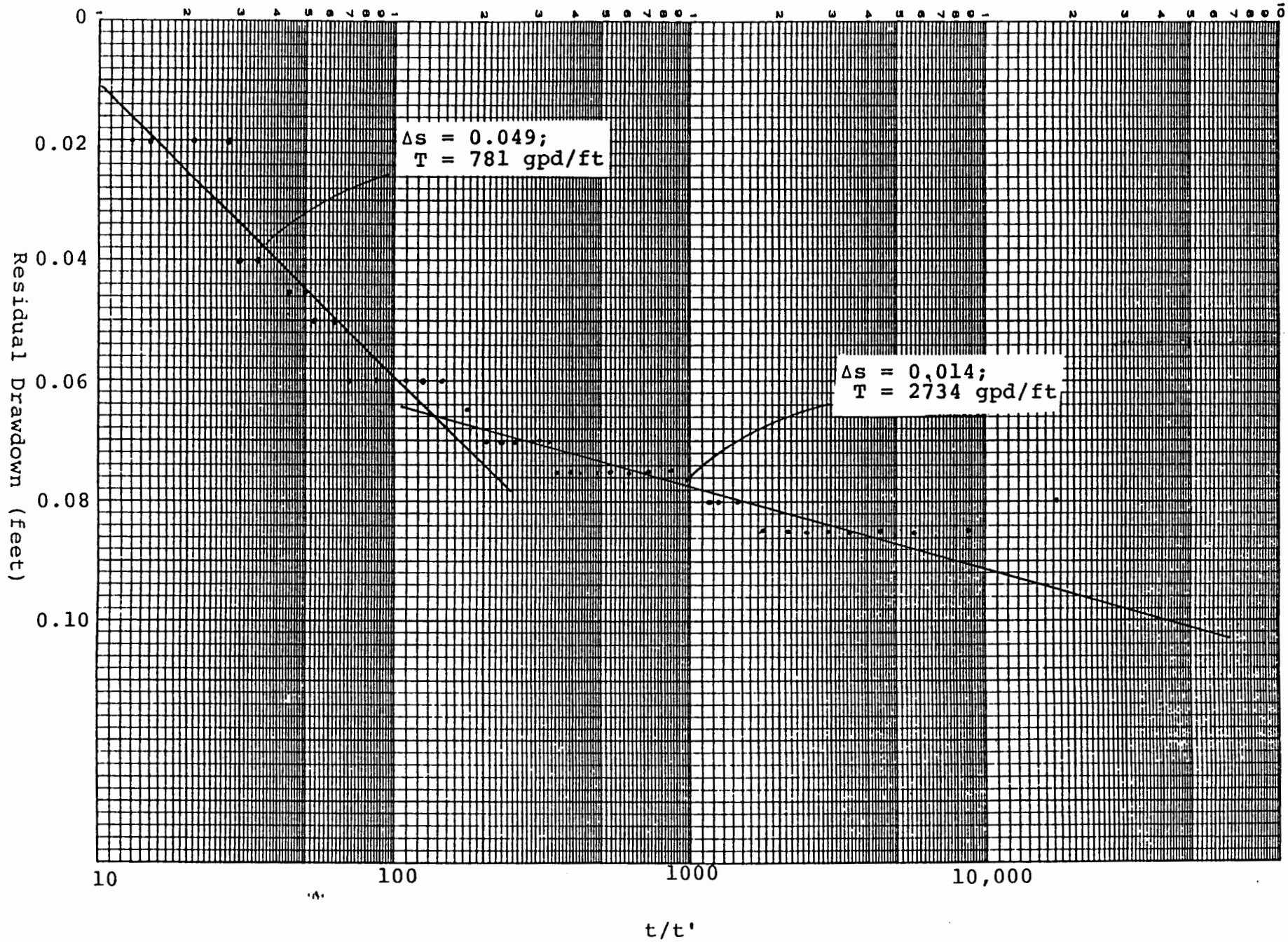
Parameter	Date Sampled 2-23-88	2-24-88	2-25-88	2-26-88	2-29-88
Cyanide (mg/ℓ)	ND	ND	ND	ND	ND
TDS (mg/ℓ)	820	960	900	900	860
Hardness (mg/ℓ)	132	253	828	288	288
pH (pH units)	7.4	7.5	7.4	7.4	7.4
Total Chromium (mg/ℓ)	0.036	ND	0.036	ND	0.027
Methylene Chloride (ug/ℓ)	3,800	9,400	2,800	2,700	4,200
1,1-Dichloroethylene (ug/ℓ)	1,500	3,400	1,900	2,200	2,100
1,1,1-Thrichloroethane (ug/ℓ)	24,000	39,000	37,000	35,000	42,000
Thrichloroethene (ug/ℓ)	32,000	54,000	46,000	43,000	47,000

ND - Not Detected

Pumped Well: MW-16
Observations at Well: MW-24

Residual-Drawdown
Q = 0.145

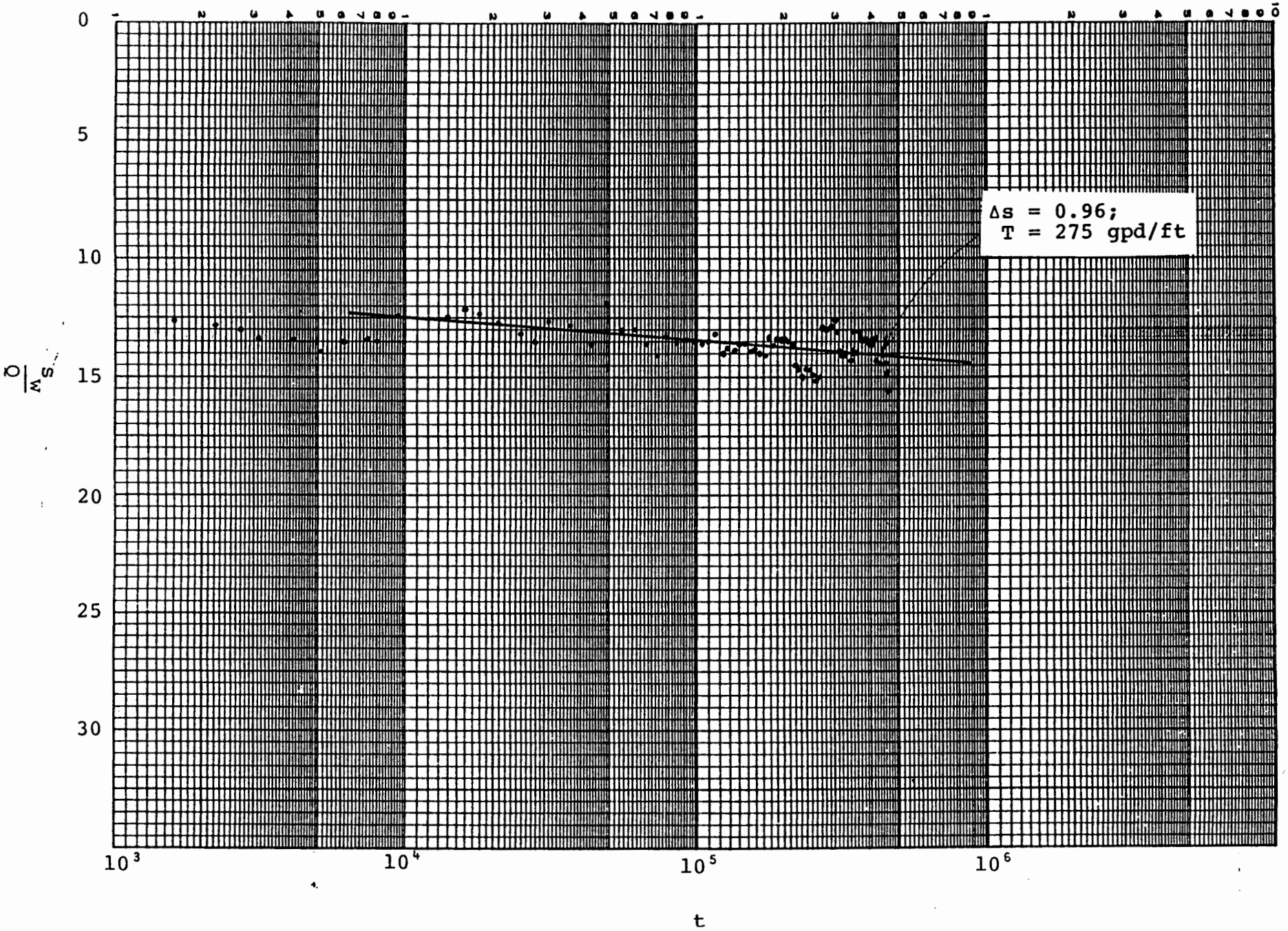
METRIC Corporation
Date: 3/87



Pumped Well MW-24
Observations at Well MW-24

$\frac{s_w}{Q}$ vs $\frac{t}{r_w^2}$ d = 2 3/8"

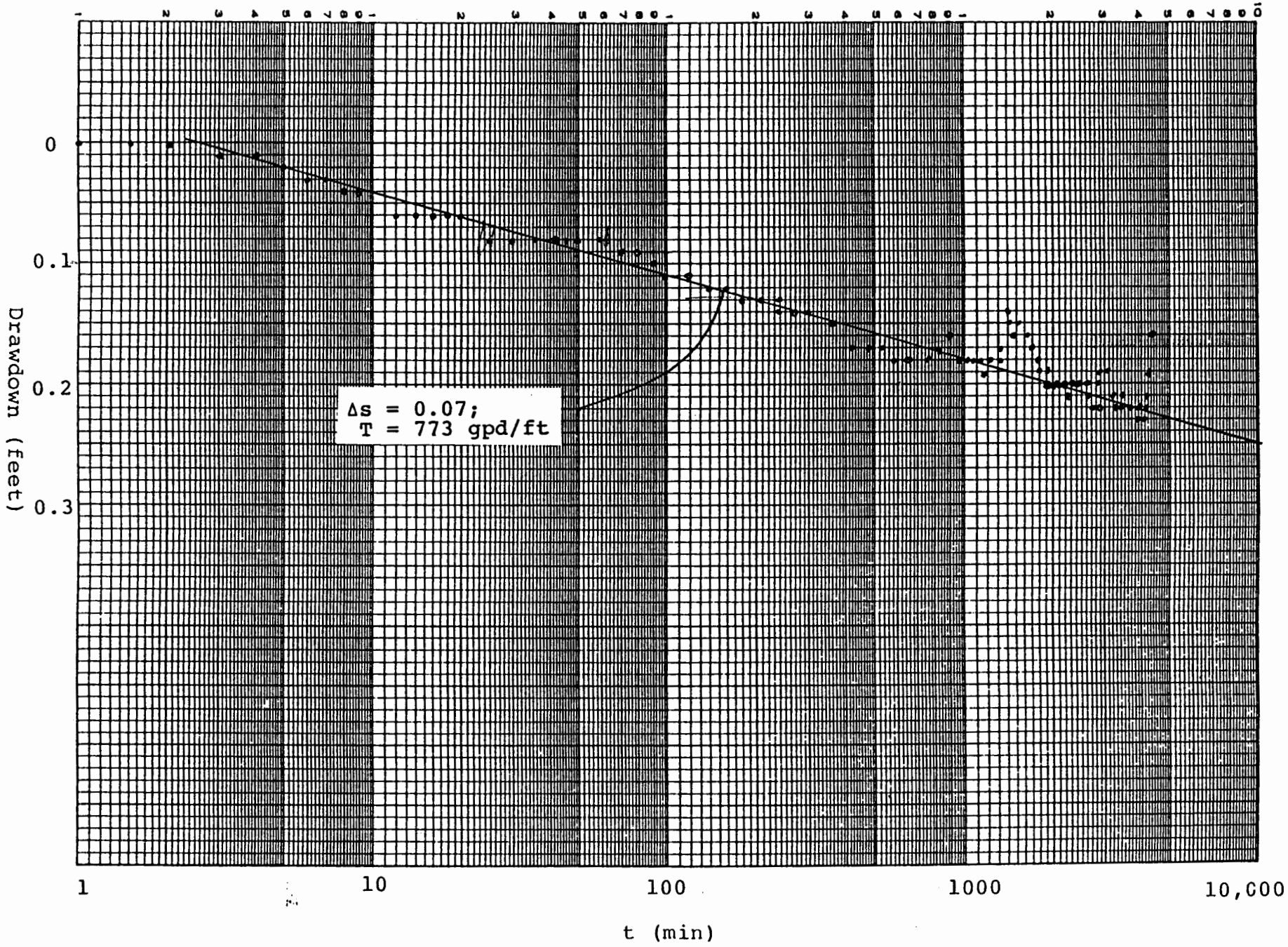
METRIC Corporation
Date: 3-87



Pumped Well: MW-24
Observations at Well : MW-16

Time-Drawdown
Q = 0.205

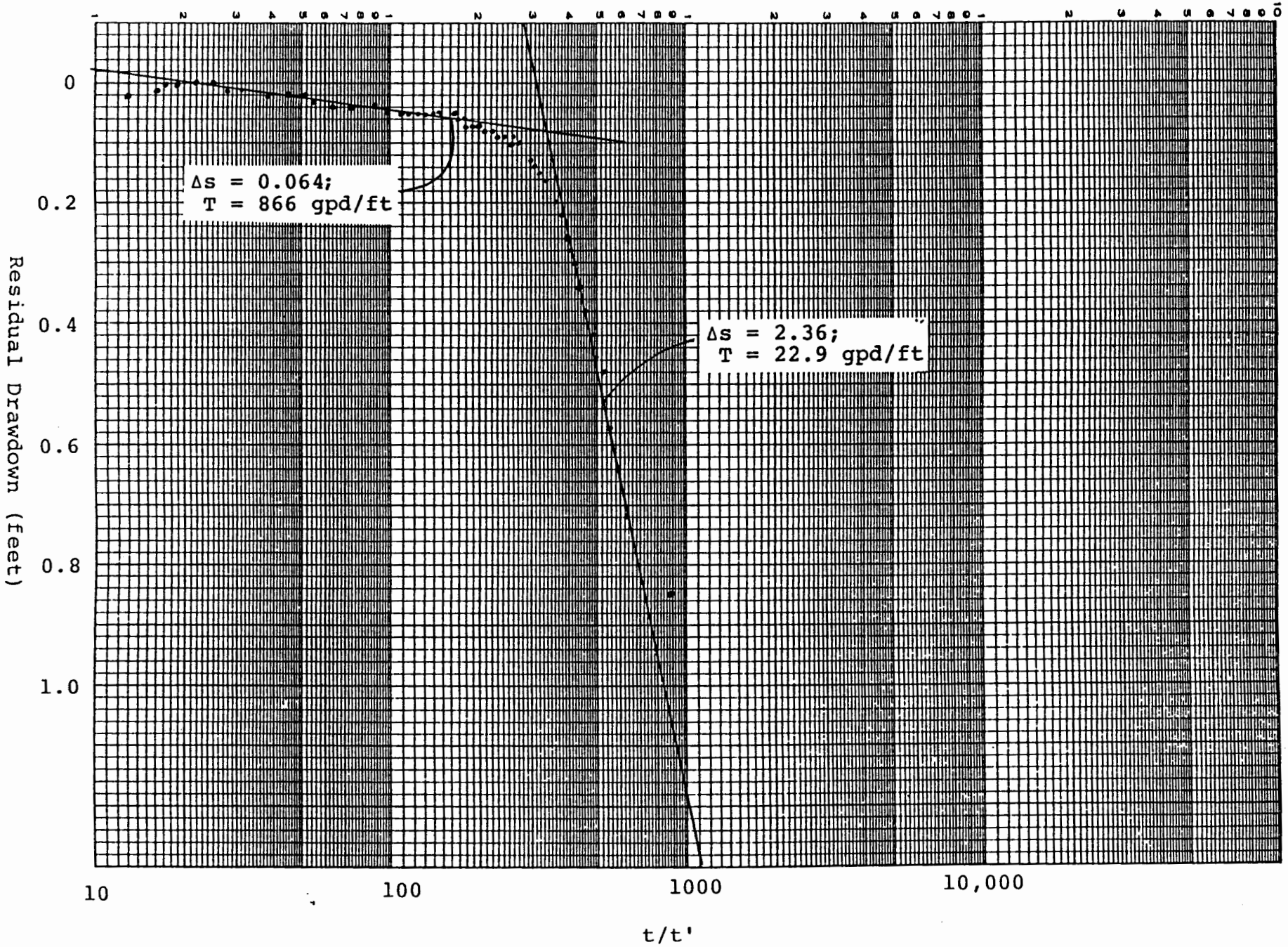
METRIC Corporation
Date: 3-87



Pumped Well: MW-24
Observations at Well: MW-24

Residual-Drawdown
Q = 0.205

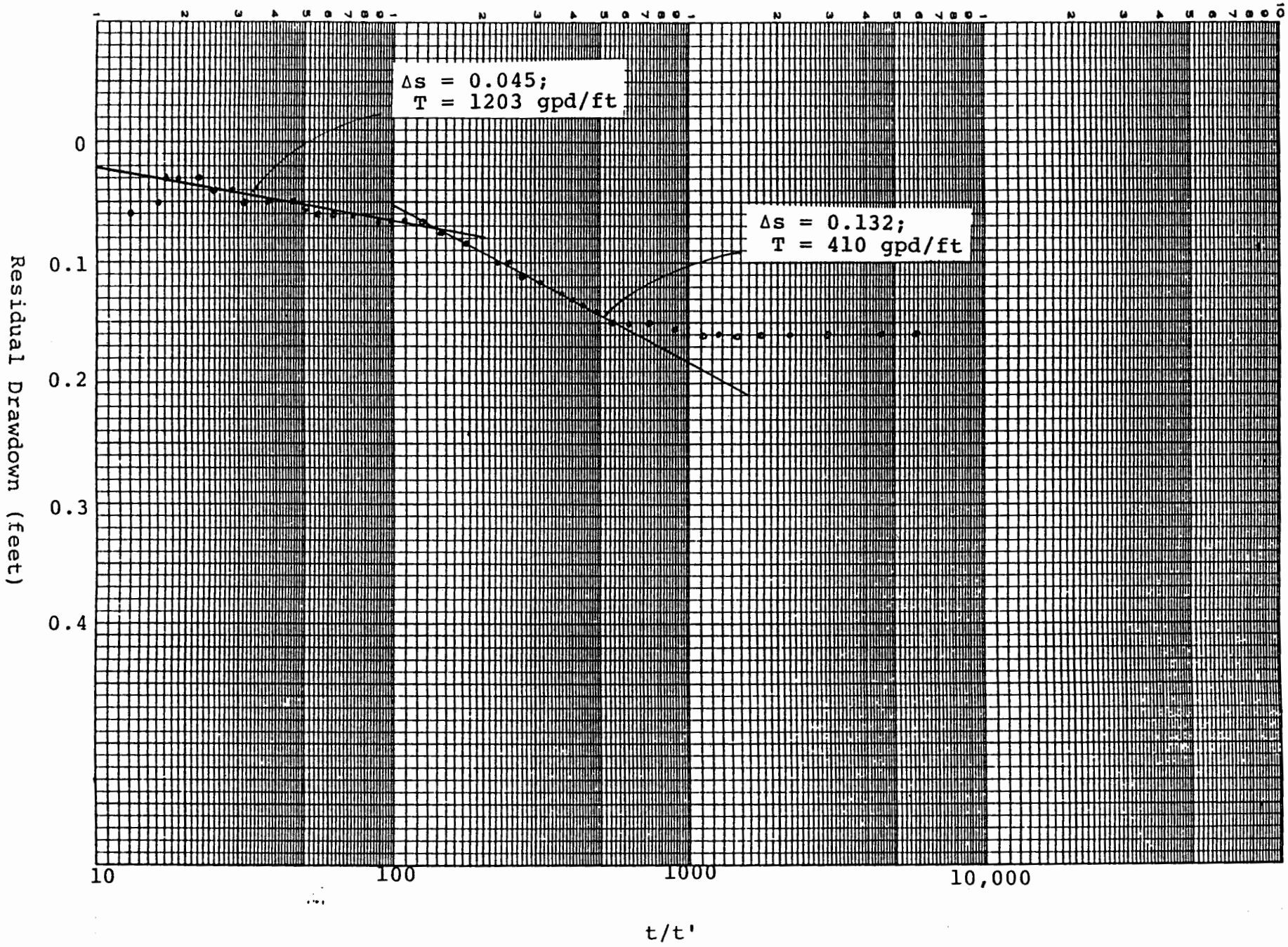
METRIC Corporation
Date: 3-87



Pumped Well: MW-24
Observations at Well: MW-16

Residual-Drawdown
Q = 0.205

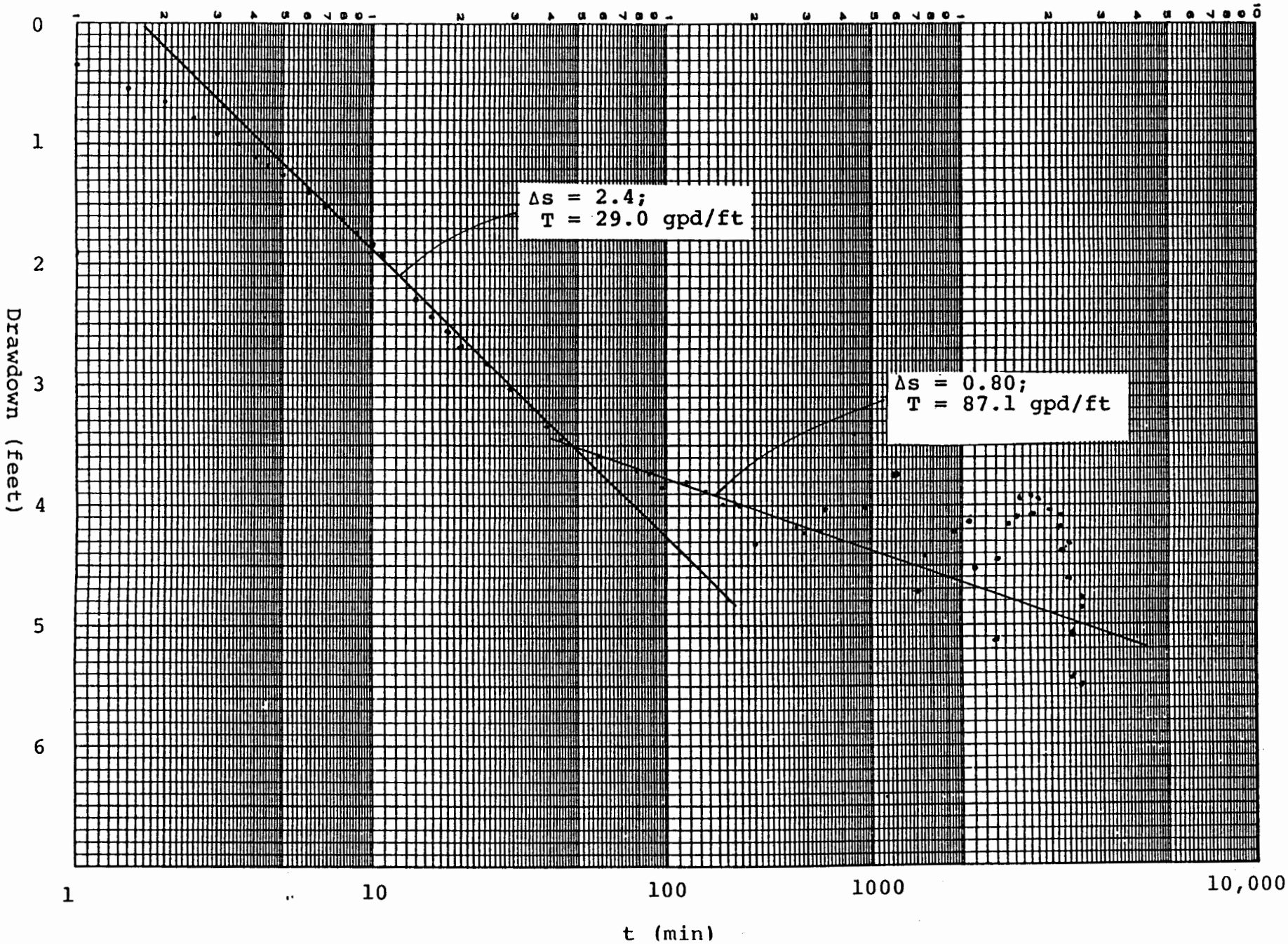
METRIC Corporation
Date: 3-87



Pumped Well: MW-18
Observations at Well: MW-18

Time-Drawdown
Q = 0.264

METRIC Corporation
Date: 3-87



APPENDIX C

WATER QUALITY ANALYSES

ASSAIGAI ANALYTICAL LABORATORIES

TO: Sparton Technology
ATTN: Clovis Martinez
9621 Coors Rd NW
Albuquerque, NM 87114

DATE: 15 April 1987
0428

ANALYTE	SAMPLE ID/ANALYTICAL RESULTS		
	MW-16 3/5/87 7:00 am	MW-16 3/6/87 1:00 am	MW-16 3/4/87 1:00 am
Methylene Chloride	23 mg/l	20 mg/l	23 mg/l
1,1 Dichloroethylene	0.92 mg/l	0.85 mg/l	1.1 mg/l
Trichloroethylene	13 mg/l	13 mg/l	14 mg/l
1,1,1-Trichloroethane	7.1 mg/l	11 mg/l	8.2 mg/l
	MW-18 3/8/87 11:00	MW-18 3/9/87 11:00	MW-18 3/6/87 10:01
Methylene Chloride	0.42 mg/l	0.11 mg/l	0.48 mg/l
1,1 Dichloroethylene	0.46 mg/l	0.88 mg/l	0.10 mg/l
Trichloroethylene	3.6 mg/l	6.6 mg/l	1.3 mg/l
1,1,1-Trichloroethane	3.5 mg/l	7.0 mg/l	0.79 mg/l
	MW-24 3/10/87 13:37	MW-24 3/12/87 12:04 pm	MW-24 3/13/87 0:00
Methylene Chloride	27 mg/l	42 mg/l	51 mg/l
1,1 Dichloroethylene	2.3 mg/l	2.0 mg/l	3.9 mg/l
Trichloroethylene	25 mg/l	22 mg/l	5.6 mg/l
1,1,1-Trichloroethane	4.3 mg/l	8.5 mg/l	14 mg/l

NOMINAL DETECTION LIMITS :

Methylene Chloride	0.1 mg/l
1,1 Dichloroethylene	0.1 mg/l
Trichloroethylene	0.1 mg/l
1,1,1-Trichloroethane	0.1 mg/l

ANALYTE	SAMPLE ID/ANALYTICAL RESULTS			NOMINAL DETECTION LIMITS		
	MW-16	MW-18	MW-24			
Cu	0.03 mg/l	0.03 mg/l	<0.01 mg/l	0.002 mg/l	.93	3.09
Cr	0.20 mg/l	<0.05 mg/l	<0.05 mg/l	0.05 mg/l	1.37	3.42
Ni	0.73 mg/l	0.57 mg/l	0.25 mg/l	0.01 mg/l	.9	.11
Mn	10.6 mg/l	6.75 mg/l	<0.01 mg/l	0.01 mg/l		
B	11.2 mg/l	<0.1 mg/l	15.7 mg/l	0.1 mg/l	–	–
Cd	<0.01 mg/l	<0.01 mg/l	<0.01 mg/l	0.01 mg/l	.21	.31

7300 Jefferson, N.E. • Albuquerque, New Mexico 87109 • (505) 345-8964

REFERENCE: "Test Methods for Evaluating Solid Waste, Physical/Chemic Methods", USEPA, SW 846, EMSL-Cincinnati, 1982.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerely,

Jennifer V. Smith

Jennifer V. Smith, Ph.D.
Laboratory Director

BIBLIOGRAPHY

Lohman, S.W., 1972. Ground Water Hydraulics, Geological Survey Professional Paper 708.

Schafer, D.C., 1978. Casing Storage Can Affect Pumping Test Data, The Johnson Drillers Journal.

Aquifer Testing
at the
Sparton Technology, Inc.
Coors Road Plant
Albuquerque, New Mexico

Prepared By

METRIC Corporation
Albuquerque, New Mexico

MAY 1988

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AQUIFER TESTING
AT THE
SPARTON TECHNOLOGY, INC.
COORS ROAD PLANT

Aquifer tests were performed in two wells at the Sparton Technology, Inc., Coors Road Plant during February, 1988. The purpose of the testing was to estimate the aquifer permeability of the "upper flow zone". The resulting information will be used in design of a groundwater recovery system. The "upper flow zone" consists generally of the upper 5 to 10 feet of the saturated zone at the Coors Road site separated from the remainder of the saturated zone by a fine grained aquitard unit.

Pumping tests were conducted in two wells, MW-25 in the pond and sump area on the northeast side of the building and in PW-1 located near the center of the southwest property line.

The tests were conducted as follows:

Well: MW-25
Test Type: Constant Discharge
Test Drawdown: 3.2 ft.
Available Drawdown: 7.3 ft. ±
Duration of Pumping: 4129 min ≈ 69 hr.
Average Discharge: 0.32 gpm
Observations Taken in Wells: MW-25, MW-24

Well: PW-1
Test Type: Constant Discharge
Test Drawdown: 2.26 ft.
Available Drawdown: 4.2 ft. ±
Duration of Pumping: 4174 min ≈ 70 hr.
Average Discharge: 0.13 gpm
Observations Taken in Wells: PW-1, MW-9

Well MW-25, a 2-inch i.d. PVC well with a wirewound stainless steel screen, was pumped with a 1.67-inch o.d. positive displacement pump having a maximum discharge of about 2.5 gpm. Water levels in the pumped well were monitored with an airline and a water monometer using a water/anitfreeze mixture (due to freezing weather) having a specific gravity of 1.06. Water levels in the observation well (MW-24) were monitored with an electronic sounder. All water level measurements were taken to the nearest 0.01 feet.

Well PW-1, a 10-inch i.d. PVC well, was pumped with a 1/2 hp submersible pump having a maximum discharge of about 10 gpm. Water levels in both the pumped well and the observation well (MW-9) were monitored with electronic sounders. All water level measurements were taken to the nearest 0.01 feet.

Water quality samples were collected once per day at a approximate 24 hour intervals, during the aquifer testing and three days after pumping ceased. Pumping tests for both wells were begun on February 23, 1988 and ended on February 26, 1988. The samples collected on February 23 were obtained about one hour after the pumping started. The samples collected on February 26 were obtained about one hour before the pumping was stopped. The February 29 samples were collected about one hour after the pumps were restarted. The purpose of the sampling was to determine whether or not water quality changes with time might be expected when the recovery system is put into operation.

The water level and discharge data collected during each test is presented in APPENDIX A. The results of the aquifer testing are summarized in TABLE 1. The data were analyzed using the Jacob solution (semi-log plots) to the Theis equation (see APPENDIX B).

TABLE 1

AQUIFER TESTING
SPARTON TECHNOLOGY, INC. COORS ROAD PLANT

Pumped Well	Observations At	Curve	Apparent T (gpd/ft)	Adjusted T (gpd/ft)	b (ft)	ft/day	cm/sec	Comments
MW-25	MW-25	Early T-D	56.3	-	7.3	1.03	3.64×10^{-4}	Near Well
		Late T-D	281.6	-	7.3	5.16	1.82×10^{-3}	Away from Well
		Early R-D	48.3	-	7.3	0.885	3.12×10^{-4}	Near Well
		Late R-D	337.9	-	7.3	6.19	2.18×10^{-3}	Away from Well Selected
PW-1	PW-1	Late T-D	22.8	-	4.3 1/	0.709	2.5×10^{-4}	Casing Storage Affected
		Late R-D	22.8	-	4.3 1/	0.709	2.5×10^{-4}	Casing Storage Affected
Adjusted for Casing Storage Effect				91.5	4.3 1/	2.84	1×10^{-3}	Selected Value

1/ PW-1 has 2' blank below aquifer

The time-drawdown data were checked to ensure that $u<0.05$ and, thus, validate the use of the Jacob solution. In the equation $u = \frac{1.87r^2S}{Tt}$, u was set equal to 0.05, and the time, t, was determined after which the Jacob solution is valid. TABLE 2 shows that the pumped well data are valid while the observation well data are not, and as a result, were not used in the analysis.

The data were also checked using a procedure suggested by Schafer, 1978 to determine which portions of the data might be casing storage affected. Only the first few minutes of the MW-25 data appear to be casing storage affected, while virtually all of the PW-1 data appears to be casing storage affected. As a result, the selected transmissivity value for PW-1 was adjusted (see TABLE 1) by a procedure also suggested by Schafer, 1978 assuming a well afficiency of 100%. This seems justified since only 0.13 gpm was being pumped from a 10-inch well screen with a substantial open area.

Based on the testing described above, it is felt that the best estimate for the permeability (hydraulic conductivity) of the upper flow zone in the vicinity of MW-25 is about 2×10^{-3} cm/sec. (see TABLE 1). Likewise, the best estimate for the permeability of the upper flow zone in the vicinity of PW-1 is about 1×10^{-3} cm/sec. (see TABLE 1).

The residual-drawdown curve (APPENDIX B) for PW-1 shows some evidence that a "recharge effect" may be occurring during the pumping period. The residual drawdown curve shows a t/t' value greater than 2 at zero drawdown, suggesting a "recharge effect". Possible explanations of the apparent "recharge effect" include reduction or reversal of prevailing downward vertical leakage in the cone of depression during the test or induced flow from a more permeable burried channel(s) existing within the upper flow zone.

TABLE 2

JACOB VALIDATION

Well	r (ft.)	T (gpd/ft.)	t (days)	t (min)
PW-1	0.63	91.5	0.03	46
MW-9	20.0	91.5	32.7	47,087
MW-25	0.29	56.3	0.011	16
MW-24	23.0	56.3	70.3	101,207

$$t = \frac{1.87\ r^2}{T}\ S$$

$S = 0.20$

$u = 0.05$

Estimated well capacities have been computed for each of the wells being considered for inclusion in the groundwater recovery system (see TABLE 3). The capacities were computed based on specific capacities observed in testing to date and assuming 100% drawdown. This would tend to yield conservatively high values, however, some of the wells might respond favorably to additional development which could increase the capacities beyond the values presented.

The results of the water quality sampling and analyses are summarized in TABLES 4 and 5 and include APPENDIX C. The solvent concentrations appear to have increased with time during the pumping test of MW-25. This possibly indicates that the area of maximum solvent concentration in the ground water is some short distance away from MW-25.

The elevated, and decreasing with time values of TDS, Hardness, and pH observed in PW-1 during the pumping test (see TABLE 5) are probably the result of the bottom portion of the well having recently been plugged with portland cement.

TABLE 3

ESTIMATED WELL CAPACITY

Well	Date	Q(gpm)	Drawdown ft.	Specific Capacity (gpm/ft.)	Pumping Time (min.)	Total Water Removed (gal.)	Available Drawdown (ft.)	Estimated Capacity (gpm)
MW-16	3/7/87	0.145	2.38	0.0609	4325	627	5.4	0.33
MW-18	3/9/87	0.264	5.02	0.0526	2940	776	12.6	0.66
MW-23	10/23/86	0.48	7.22	0.07	32	15	8.76	0.61
MW-24	3/13/87	0.205	3.26	0.0629	4390	900	8.1	0.51
MW-25	2/27/88	0.317	3.0	0.106	4129	1309	7.30	0.77
PW-1	2/27/88	0.13	2.12	0.06	4174	543	4.3	0.26
MW-14								0.75*
A								0.75*
B								0.75*

* Estimated

STOP

TABLE 5

SAMPLE ANALYSIS

PW-1

Parameter	Date Sampled 2-23-88	2-24-88	2-25-88	2-26-88	2-29-88
Cyanide (mg/ℓ)	ND	ND	ND	ND	ND
TDS (mg/ℓ)	1,200	1,000	840	650	680
Hardness (mg/ℓ)	469	352	321	196	179
pH (pH units)	12	11.7	11.3	10.1	11
Total Chromium (mg/ℓ)	0.033	0.029	0.031	0.026	0.029
Methylene Chloride (ug/ℓ)	16,000	16,000	11,000	10,000	10,000
1,1-Dichloroethylene (ug/ℓ)	980	990	560	670	610
1,1,1-Thrichloroethane (ug/ℓ)	2,100	2,100	1,700	1,700	1,400
Thrichloroethene (ug/ℓ)	8,000	9,000	7,200	7,400	6,200

*ND - Not Detected

BIBLIOGRAPHY

Schafer, David C., 1978, Casing Storage Can Affect Pump Testing Data, The Johnson Drillers Journal.

APPENDIX A

PUMP TEST DATA

2/23 - 2/27

Well MW-25

Q 50 sec/ℓ

Static Water Level

time (h:m:s)	t (min)	t' (min)	t/t'	Pressure (PSIG)	Drawdown (ft)	Meter (gal)	
16:11:00	0			1.85	0.000		Pump ON ~~pH & EC~~ sampled
16:11:30	.5			1.85	0.053		
16:12:00	1.0			1.90	0.032		
16:12:30	1.5			1.90	0.021		
16:13	2.0			1.90	-0.021		
16:14	3.0			1.80	0.329		
16:15	4.0			1.75	0.445		
16:16	5.0			1.65	0.594		
16:17	6.0			1.20	1.283		
16:19	8.0			--	2.915		
16:21	10.0			--	3.265		47sec/ℓ
16:26	15.0			--	3.710		
16:31	20.0				3.095		47sec/ℓ
16:34:30	23.5				2.533		
16:37:30	26.5				2.449		52sec/ℓ
16:41	30.0				--		
16:56	45.0				2.555		52sec/ℓ
17:01	50.0				--		
17:11	60.0				3.562		
17:21	70.0				3.042		
17:31	80.0				2.555		40sec/ℓ
17:41	90.0				3.074		49sec/ℓ
18:01	110.0				2.714		52sec/ℓ
18:21	130.0				2.544		52sec/ℓ
18:45	154.0				2.533		52sec/ℓ
19:20	189.0				2.745		52sec/ℓ
19:46	215.0				2.798		51sec/ℓ
21:46	335.0				2.618		
22:46	395.0				2.873		52sec/ℓ
23:42	451.0				2.565		52sec/ℓ
24:46	515.0				2.777		52sec/ℓ

2/23 - 2/27

Well MW-25

Q 50 sec/ℓ

Static Water Level

time (h:m:s)	t (min)	t' (min)	t/t'	Pressure (PSIG)	Drawdown (ft)	Meter (gal)	
1:47	576.0				2.777		52sec/ℓ
2:46	635.0				2.798		52sec/ℓ
3:47	696.0				2.841		52sec/ℓ
4:49	758.0				3.106		50sec/ℓ
5:47	816.0				2.915		50sec/ℓ
6:49	878.0				2.830		51sec/ℓ
7:46	935.0				2.798		52sec/ℓ
8:48	997.0				2.968		51sec/ℓ
9:43	1052.0				2.979		52sec/ℓ
10:55	1124.0				4.229		53sec/ℓ
11:03	1132.0				3.212		50sec/ℓ
11:54	1183.0				2.639		50sec/ℓ
13:00	1249.0				2.597		51sec/ℓ
13:57	1306.0				2.915		49sec/ℓ
14:51	1360.0				3.403		50sec/ℓ
15:58	1427.0				3.169		50sec/ℓ
16:53	1482.0				3.180		50sec/ℓ
17:48	1535.0				2.936		
19:40	1649.0				2.904		52sec/ℓ
20:31	1700.0				3.053		51sec/ℓ
21:46	1775.0				3.032		49sec/ℓ
22:46	1835.0				2.618		52sec/ℓ
23:44	1893.0				2.650		53sec/ℓ
24:46	1955.0				2.523		50sec/ℓ
1:45	2014.0				2.767		52sec/ℓ
2:45	2074.0				3.148		51sec/ℓ
3:47	2136.0				3.010		50sec/ℓ
4:46	2195.0				2.820		52sec/ℓ
5:41	2250.0				2.724		50sec/ℓ
6:47	2316.0				2.703		50sec/ℓ
7:41	2370.0				3.021		50sec/ℓ

2/23 - 2/27

Well MW-25

Q 50 sec/ℓ

Static Water Level

time (h:m:s)	t (min)	t' (min)	t/t'	Pressure (PSIG)	Drawdown (ft)	Meter (gal)	
8:41	2430.0				2.830		50sec/ℓ
9:45	2494.0				2.985		55sec/ℓ
10:48	2557.0						
11:41	2610.0				2.894		52sec/ℓ
13:20	2709.0				2.533		53sec/ℓ
14:50	2799.0				3.180		54sec/ℓ
15:59	2868.0				3.127		50sec/ℓ
17:49	2978.0				2.703		50sec/ℓ
18:46	3035.0				2.947		50sec/ℓ
19:54	3103.0				2.947		52sec/ℓ
21:55	3224.0				3.201		52sec/ℓ
22:56	3285.0				2.745		50sec/ℓ
24:43	3392.0				3.095		50sec/ℓ
2:40	3499.0				3.222		
4:50	3639.0				3.106		
6:11	3720.0				3.021		50sec/ℓ
6:48	3757.0				3.021		51sec/ℓ
8:45	3874.0				3.010		52sec/ℓ
10:42	3991.0				2.809		50sec/ℓ
13:00:00	4129.0	0			2.894		Pump Off
13:00:15	4129.25	0.25	16517.0		2.184		
13:00:30	4129.5	0.50	8259.0		1.664		
13:00:45	4129.75	0.75	5506.3		1.367		
13:01:00	4130.0	1.00	4130.0		1.134		
13:01:30	4130.5	1.5	2753.7		0.933		
13:02:00	4131.0	2.0	2065.5		0.763		
13:02:30	4131.5	2.5	1652.6		0.615		
13:03:00	4132.0	3.0	1377.3		0.562		
13:03:30	4132.5	3.5	1180.7		0.519		
13:04:00	4133.0	4.0	1033.3		0.466		
13:04:30	4133.5	4.5	918.6		0.424		

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Well MW-25

Q 50 sec/ℓ

Static Water Level

time (h:m:s)	t (min)	t' (min)	t/t'	Pressure (PSIG)	Drawdown (ft)	Meter (gal)	
13:05	4134.0	5.0	826.8		0.413		
13:06	4135.0	6.0	689.2		0.392		
13:07	4136.0	7.0	590.9		0.371		
13:08	4137.0	8.0	517.1		0.350		
13:09	4138.0	9.0	459.8		0.339		
13:10	4139.0	10.0	413.9		0.329		
13:12	4141.0	12.0	345.1		0.307		
13:14	4143.0	14.0	295.9		0.297		
13:16	4145.0	16.0	259.1		0.286		
13:18	4147.0	18.0	230.4		0.286		
13:20	4149.0	20.0	207.5		0.281		
13:25	4154.0	25.0	166.2		0.265		
13:30	4159.0	30.0	138.6		0.260		
13:35	4164.0	35.0	119.0		0.249		
13:40	4169.0	40.0	104.2		0.239		
13:45	4174.0	45.0	92.8		0.233		
13:50	4179.0	50.0	83.6		0.233		
13:55	4184.0	55.0	76.1		0.228		
14:00	4189.0	60.0	69.8		0.223		
14:20	4209.0	80.0	52.6		0.217		
14:40	4229.0	100.0	42.3		0.196		
15:10	4259.0	130.0	32.8		0.175		
15:40	4289.0	160.0	26.8		0.159		
16:10	4319.0	190.0	22.7		0.164		
16:40	4349.0	220.0	19.8		9.154		
17:00	4369.0	240.0	18.2		0.154		
18:00	4429.0	300.0	14.8		0.148		
19:00	4489.0	360.0	12.5		0.148		
20:00	4549.0	420.0	10.8		0.143		
21:00	4609.0	480.0	9.6		0.138		
22:00	4669.0	540.0	8.6		0.127		

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Well MW-25

Q 50sec/ℓ

Static Water Level

time (h:m:s)	t (min)	t' (min)	t/t'	Pressure (PSIG)	Drawdown (ft)	Meter (gal)	
23:00	4729.0	600.0	7.9		0.106		
24:00	4789.0	660.0	7.3		0.106		
1:00	4849.0	720.0	6.7		0.117		
2:00	4909.0	780.0	6.3		0.085		
3:00	4969.0	840.0	5.9		0.085		
4:00	5029.0	900.0	5.6		0.095		
5:00	5089.0	960.0	5.3		0.095		
6:00	5149.0	1020.0	5.0		0.085		
7:00	5209.0	1080.0	4.8		0.085		
8:00	5269.0	1140.0	4.6		0.085		
9:00	5329.0	1200.0	4.4		0.074		
9:50	5379.0	1250.0	4.3		0.053		
12:50	5559.0	1310.0	4.2		0.021		
15:19	5708.0	1459.0	3.9		0.021		
18:00	5869.0	1620.0	3.6		0.048		
21:00	6049.0	1800.0	3.4		0.074		End of Te

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METRIC Corporation

Pumped Well MW-25

Measurements at Well MW-24

Pump Speed: _____ Q: 50sec/ℓ

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
23	16:36	0.0			0.00	
	17:04	28.0			0.00	
	17:14	38.0			0.13	
	17:24	48.0			0.00	
	17:32	56.0			0.003	
	17:43	67.0			0.015	
	18:04	88.0			0.015	
	18:20	104.0			0.02	
	18:48	132.0			0.03	
	19:24	168.0			0.04	
	19:47	191.0			0.03	
	21:52	316.0			0.04	
	22:46	370.0			0.04	
	23:45	429.0			0.04	
4	24:46	490.0			0.04	
	1:47	551.0			0.05	
	2:46	610.0			0.05	
	3:47	671.0			0.055	
	4:50	734.0			0.06	
	5:49	793.0			0.07	
	6:51	855.0			0.07	
	7:46	910.0			0.08	
	8:48	972.0			0.07	
	9:42	1026.0			0.06	
	10:58	1102.0			0.07	
	11:48	1152.0			0.07	
	12:58	1222.0			0.10	
	13:57	1281.0			0.09	
	14:50	1334.0			0.06	
	15:55	1399.0			0.07	

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METRIC Corporation

Pumped Well MW-25

Measurements at Well MW-24

Pump Speed: _____ Q: 50sec/ℓ

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
16:51	1455.0			0.08	
17:49	1513.0			0.08	
19:45	1629.0			0.08	
20:32	1676.0			0.10	
21:46	1750.0			0.10	
22:44	1808.0			0.10	
23:44	1868.0			0.10	
24:43	1927.0			0.06	
1:42	1986.0			0.11	
2:43	2047.0			0.10	
3:43	2107.0			0.10	
4:45	2169.0			0.11	
5:40	2224.0			0.11	
6:46	2290.0			0.12	
7:42	2346.0			0.13	
8:40	2404.0			0.12	
9:47	2471.0			0.11	
10:48	2532.0			0.10	
11:43	2587.0			0.11	
13:22	2686.0			0.09	
14:52	2776.0			0.11	
15:58	2842.0			0.11	
17:48	2952.0			0.12	
18:48	3012.0			0.11	
19:53	3077.0			0.12	
21:58	3202.0			0.13	
22:57	3261.0			0.14	
24:43	3367.0			0.13	
2:41	3485.0			0.12	
4:50	3614.0			0.13	

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METRIC Corporation

Pumped Well MW-25

Measurements at Well MW-24

Pump Speed: _____ Q: 50sec/ℓ

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
6:12	3696.0			0.14	
6:48	3732.0			0.15	
8:44	3848.0			0.16	
10:40	3964.0			0.14	
13:00	4104.0	0	-	0.11	Pump Off (Recove
13:00:15	4104.25	0.25	16417.0	0.11	
13:00:30	4104.50	0.5	8209.0	0.11	
13:00:45	4104.75	0.75	5473.0	0.11	
13:01:00	4105.0	1.0	4105.0	0.11	
13:01:30	4105.50	1.5	2737.0	0.11	
13:02:00	4106.0	2.0	2053.0	0.11	
13:02:30	4106.50	2.5	1642.6	0.11	
13:03:00	4107.0	3.0	1369.0	0.11	
13:03:30	4107.50	3.5	1173.6	0.11	
13:04:00	4108.0	4.0	1027.0	0.11	
13:04:30	4108.5	4.5	913.0	0.11	
13:05	4109.0	5.0	821.8	0.11	
13:06	4110.0	6.0	685.0	0.11	
13:07	4111.0	7.0	587.3	0.11	
13:08	4112.0	8.0	514.0	0.11	
13:09	4113.0	9.0	457.0	0.105	
13:10	4114.0	10.0	411.4	0.103	
13:12	4116.0	12.0	343.0	0.102	
13:14	4118.0	14.0	294.1	0.10	
13:16	4120.0	16.0	257.5	0.10	
13:18	4122.0	18.0	229.0	0.10	
13:20	4124.0	20.0	206.2	0.095	
13:25	4129.0	25.0	165.2	0.09	
13:30	4134.0	30.0	137.8	0.088	
13:35	4139.0	35.0	118.3	0.085	

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METRIC Corporation

Pumped Well MW-25

Measurements at Well MW-24

Pump Speed: _____ Q: 50sec/ℓ

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
13:40	4144.0	40.0	103.6	0.085	
13:45	4149.0	45.0	92.2	0.085	
13:50	4154.0	50.0	83.1	0.083	
13:55	4159.0	55.0	75.6	0.082	
14:00	4164.0	60.0	69.4	0.082	
14:20	4184.0	80.0	52.3	0.072	
14:40	4204.0	100.0	42.0	0.073	
15:10	4234.0	130.0	32.6	0.070	
15:40	4264.0	160.0	26.7	0.062	
16:10	4294.0	190.0	22.6	0.070	
16:40	4324.0	220.0	19.7	0.075	
17:00	4344.0	240.0	18.1	0.070	
18:00	4404.0	300.0	14.7	0.070	
19:00	4464.0	360.0	12.4	0.070	
20:00	4524.0	420.0	10.8	0.070	
21:00	4584.0	480.0	9.6	0.060	
22:00	4644.0	540.0	8.6	0.050	
23:00	4704.0	600.0	7.8	0.050	
24:00	4764.0	660.0	7.2	0.070	
1:00	4824.0	720.0	6.7	0.070	
2:00	4884.0	780.0	6.3	0.070	
3:00	4944.0	840.0	5.9	0.070	
4:00	5004.0	900.0	5.6	0.070	
5:00	5064.0	960.0	5.3	0.070	
6:00	5124.0	1020.0	5.0	0.045	
7:00	5184.0	1080.0	4.8	0.038	
8:00	5244.0	1140.0	4.6	0.052	
9:00	5304.0	1200.0	4.4	0.040	
12:50	5534.0	1430.0	3.9	0.040	
15:20	5684.0	1580.0	3.6	0.015	

METRIC
Corporation

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Pumped Well MW-25

Measurements at Well MW-24

Pump Speed: _____ Q: 50sec/ℓ

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
18:00	5844.0	1740.0	3.4	0.015	End of Test

Date: 2/23 - 2/27

METRIC Corporation

Pumped Well PW-1

Measurements at Well PW-1

Pump Speed: _____ Q: 1ℓ/2min

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
23	17:11:00	0			0.00	Pump On
	17:11:30	0.5			0.00	
	17:17:00	6.0			0.12	
	17:20:00	9.0			0.17	1ℓ/2:00min
	17:24:00	13.0			0.19	1ℓ/2:00min
	17:34:00	23.0			0.31	
	17:48:00	37.0			0.39	
	17:58:00	47.0			0.43	
	18:06:00	55.0			0.42	
	18:28:00	77.0			0.33	1ℓ/1:48min
	18:56:00	105.0			0.14	1ℓ/2:02min
	19:33:00	142.0			0.66	1ℓ/1:98min
	20:16:00	185.0			0.75	1ℓ/2:00min
	20:54:00	223.0			0.92	1ℓ/2:00min
	22:03:00	292.0			1.13	1ℓ/2:00min
	22:52:00	341.0			1.19	1ℓ/2:02min
	23:53:00	402.0			1.33	1ℓ/2:01min
24	24:52:00	461.0			1.24	1ℓ/2:02min
	1:52:00	521.0			0.79	1ℓ/1:99min
	2:53:00	582.0			0.71	1ℓ/1:98min
	3:49:00	638.0			0.62	1ℓ/2:00min
	4:54:00	703.0			0.66	1ℓ/2:00min
	5:54:00	763.0			0.79	1ℓ/2:00min
	6:55:00	824.0			0.87	1ℓ/2:02min
	7:58:00	887.0			0.72	1ℓ/2:00min
	8:54:00	943.0			0.95	1ℓ/2:03min
	9:45:00	994.0			1.00	New valve installe
	10:38:00	1047.0			1.29	1ℓ/2:08min
	11:58:00	1127.0			0.86	1ℓ/2:06min
	13:03:00	1192.0			0.89	1ℓ/2:02min

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METRIC Corporation

Pumped Well PW-1

Measurements at Well PW-1

Pump Speed: _____ Q: 1ℓ/2min

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
14:03:00	1252.0			0.96	1ℓ/2:06min
14:55:00	1304.0			0.86	1ℓ/2:04min
15:43:00	1352.0			0.70	1ℓ/2:06min
16:57:00	1426.0			0.70	1ℓ/2:00min
17:58:00	1487.0			0.99	1ℓ/2:04min
19:50:00	1599.0			1.20	1ℓ/2:04min
20:39:00	1648.0			0.68	1ℓ/2:06min
21:53:00	1722.0			1.19	1ℓ/2:03min
22:52:00	1781.0			0.39	1ℓ/2:03min
23:52:00	1841.0			0.39	1ℓ/2:04min
24:53:00	1902.0			0.99	-
1:49:00	1958.0			0.64	1ℓ/2:00min
2:49:00	2018.0			0.62	1ℓ/2:02min
3:51:00	2080.0			0.61	1ℓ/2:04min
4:52:00	2141.0			0.67	1ℓ/2:00min
5:48:00	2197.0			0.39	1ℓ/2:02min
6:52:00	2261.0			0.62	1ℓ/2:04min
7:59:00	2328.0			0.88	1ℓ/2:04min
8:48:00	2377.0			1.01	1ℓ/2:00min
9:55:00	2444.0			0.84	1ℓ/2:08min
10:56:00	2505.0			0.88	1ℓ/2:22min
11:53:00	2562.0			1.34	1ℓ/1:55min
12:53:00	2622.0			1.60	1ℓ/1:58min
13:58:00	2687.0			1.67	1ℓ/1:57min
14:53:00	2742.0			1.78	1ℓ/2:00min
15:45:00	2794.0			1.83	1ℓ/2:02min
16:38:00	2847.0			1.86	1ℓ/2:00min
17:41:00	2910.0			1.86	1ℓ/2:00min
18:55:00	2984.0			1.80	1ℓ/2:00min
19:59:00	3048.0			1.86	1ℓ/2:02min

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METRIC Corporation

Pumped Well PW-1

Measurements at Well PW-1

Pump Speed: _____ Q: 1ℓ/2min

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
22:05:00	3174.0			1.88	1ℓ/2:00min
23:06:00	3235.0			1.88	1ℓ/2:00min
24:49:00	3338.0			1.92	1ℓ/2:00min
2:47:00	3456.0			1.86	1ℓ/2:00min
4:59:00	3588.0			1.72	
5:17:00	3606.0			1.94	1ℓ/2:02min
6:54:00	3703.0			2.00	1ℓ/2:00min
8:55:00	3824.0			2.26	1ℓ/2:00min
10:58:00	3947.0			2.01	1ℓ/2:00min
13:34:00	4103.0			2.12	
14:20:00	4149.0			2.07	
14:45:00	4174.0	0	--	1.98	Pump Off (Recover
14:45:15	4174.25	0.25	16697.0	1.96	
14:45:30	4174.50	0.50	8345.0	1.95	
14:45:45	4174.75	0.75	5566.3	1.94	
14:46:00	4175.0	1.0	4175.0	1.93	
14:46:30	4175.5	1.5	2783.7	1.91	
14:47:00	4176.0	2.0	2088.0	1.90	
14:47:30	4176.5	2.5	1670.6	1.88	
14:48:00	4177.0	3.0	1392.3	1.87	
14:48:30	4177.3	3.5	1193.5	1.86	
14:49:00	4178.0	4.0	1044.5	1.84	
14:49:30	4178.3	4.5	928.5	1.82	
14:50:00	4179.0	5.0	835.6	1.80	
14:51:00	4180.0	6.0	696.7	1.73	
14:52:00	4181.0	7.0	597.3	1.72	
14:53:00	4182.0	8.0	522.8	1.71	
14:54:00	4183.0	9.0	464.8	1.68	
14:55:00	4184.0	10.0	418.4	1.66	
14:57:00	4186.0	12.0	348.8	1.63	

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METRIC Corporation

Pumped Well PW-1

Measurements at Well PW-1

Pump Speed: _____ Q: 1ℓ/2min

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
14:59:00	4188.0	14.0	299.1	1.55	
15:01:00	4190.0	16.0	261.9	1.53	
15:03:00	4192.0	18.0	232.9	1.50	
15:05:00	4194.0	20.0	209.7	1.46	
15:10:00	4199.0	25.0	168.0	1.35	
15:15:00	4204.0	30.0	140.1	1.25	
15:20:00	4209.0	35.0	120.3	1.16	
15:25:00	4214.0	40.0	105.4	1.04	
15:30:00	4219.0	45.0	93.8	0.96	
15:35:00	4224.0	50.0	84.5	0.93	
15:45:00	4234.0	60.0	70.6	0.76	
16:05:00	4254.0	80.0	53.2	0.585	
16:25:00	4274.0	100.0	42.7	0.42	
16:55:00	4304.0	130.0	33.1	0.25	
17:25:00	4334.0	160.0	27.1	0.14	
17:55:00	4364.0	190.0	23.0	0.07	
18:25:00	4394.0	220.0	20.0	0.03	
18:45:00	4414.0	240.0	18.4	0.01	
19:45:00	4474.0	300.0	14.9	-0.02	
20:45:00	4534.0	360.0	12.6	-0.04	
21:45:00	4594.0	420.0	10.5	-0.05	
7 6:20:00	5109.0	935.0	5.5	-0.04	End of Test

Date: 2/23 - 2/27

METRIC
Corporation

Pumped Well PW-1

Measurements at Well MW-9

Pump Speed: _____ Q: 1ℓ/2.00 min

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
17:11	0.0			0.00	Pump On
17:23	12.0			0.00	
17:34	23.0			0.00	
17:49	38.0			0.01	
17:59	48.0			0.01	
18:10	59.0			0.01	
18:26	75.0			0.00	
18:58	107.0			-0.07	
19:35	144.0			-0.02	
20:14	183.0			-0.07	
20:50	219.0			-0.02	
22:00	289.0			0.03	
22:50	339.0			0.03	
23:51	400.0			0.04	
24:50	459.0			0.03	
1:51	520.0			0.03	
2:52	581.0			0.03	
3:48	637.0			0.03	
4:53	702.0			0.03	
5:53	762.0			0.08	
6:57	826.0			0.02	
7:59	888.0			0.03	
8:55	944.0			0.03	
9:45	994.0			0.01	
10:38	1047.0			0.01	
11:59	1128.0			-	
13:05	1194.0			0.02	
14:04	1253.0			0.01	
14:56	1305.0			0.00	
15:44	1353.0			0.01	

Date: 2/23 - 2/27

METRIC Corporation

Pumped Well PW-1

Measurements at Well MW-9

Pump Speed: _____ Q: 1ℓ/2.00 min

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
16:58	1427.0			0.02	
17:59	1488.0			0.03	
19:48	1597.0			0.08	
20:37	1646.0			0.06	
21:51	1720.0			0.02	
22:50	1779.0			0.01	
23:50	1839.0			0.03	
24:51	1900.0			0.03	
1:48	1957.0			0.03	
2:48	2017.0			0.03	
3:50	2079.0			0.03	
4:50	2139.0			0.03	
5:47	2196.0			0.03	
6:53	2262.0			0.03	
7:58	2327.0			0.03	
9:53	2442.0			0.03	
10:58	2507.0			0.02	
11:52	2561.0			0.02	
12:54	2623.0			0.02	
13:58	2687.0			0.03	
14:55	2744.0			0.03	
15:46	2795.0			0.02	
16:39	2848.0			0.02	
17:43	2912.0			0.04	
18:53	2982.0			0.03	
19:59	3048.0			0.05	
22:06	3175.0			0.05	
23:05	3234.0			0.05	
24:49	3338.0			0.05	
2:46	3455.0			0.04	

Date: 2/23 - 2/27

METRIC Corporation

Pumped Well PW-1

Measurements at Well MW-9

Pump Speed: _____ Q: 1ℓ/2.00 min

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
4:57	3586.0			0.04	
6:19	3668.0			0.04	
6:55	3704.0			0.04	
8:57	3826.0			0.05	
10:56	3945.0			0.04	
13:34	4103.0			0.03	
14:20	4149.0			-0.07	
14:45:00	4174.0	0		0.02	Pump Off (Recov
14:45:15	4174.25	0.25	16697.0	0.02	
14:45:30	4174.50	0.50	8345.0	0.02	
14:45:45	4174.75	0.75	5566.3	0.02	
14:46:00	4175.0	1.0	4175.0	0.02	
14:46:30	4175.5	1.5	2783.7	0.02	
14:47:00	4176.0	2.0	2088.0	0.02	
14:47:30	4176.5	2.5	1670.6	0.02	
14:48:00	4177.0	3.0	1392.3	0.02	
14:48:30	4177.5	3.5	1193.5	0.02	
14:49:00	4178.0	4.0	1044.5	0.02	
14:49:30	4178.5	4.5	928.5	0.02	
14:50	4179.0	5.0	835.6	0.02	
14:51	4180.0	6.0	696.7	0.02	
14:52	4181.0	7.0	597.3	0.02	
14:53	4182.0	8.0	522.8	0.02	
15:54	4183.0	9.0	464.8	0.02	
15:55	4184.0	10.0	418.4	0.02	
14:57	4186.0	12.0	348.8	0.02	
14:59	4188.0	14.0	299.1	0.02	
15:01	4190.0	16.0	261.9	0.02	
15:03	4192.0	18.0	232.9	0.02	
15:05	4194.0	20.0	209.7	0.02	

Date: 2/23 - 2/27

METRIC Corporation

Pumped Well PW-1

Measurements at Well MW-9

Pump Speed: _____ Q: 1ℓ/2.00 min

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Comments
15:10	4199.0	25.0	168.0	0.02	
15:15	4204.0	30.0	140.1	0.019	
15:20	4209.0	35.0	120.3	0.014	
15:25	4214.0	40.0	105.4	0.01	
15:30	4219.0	45.0	93.8	0.01	
15:35	4224.0	50.0	84.5	0.009	
15:40	4229.0	55.0	76.9	0.009	
15:45	4234.0	60.0	70.6	0.009	
16:05	4254.0	80.0	53.2	0.00	
16:25	4274.0	100.0	42.7	0.00	
16:55	4304.0	130.0	33.1	0.00	
17:25	4334.0	160.0	27.1	0.00	
17:55	4364.0	190.0	23.0	0.00	
18:15	4384.0	210.0	20.9	0.00	
19:15	4444.0	270.0	16.5	0.00	
20:15	4504.0	330.0	13.6	0.00	
21:45	4594.0	420.0	10.5	0.00	
7 6:20	5109.0	935.0	5.5	0.00	End of Test

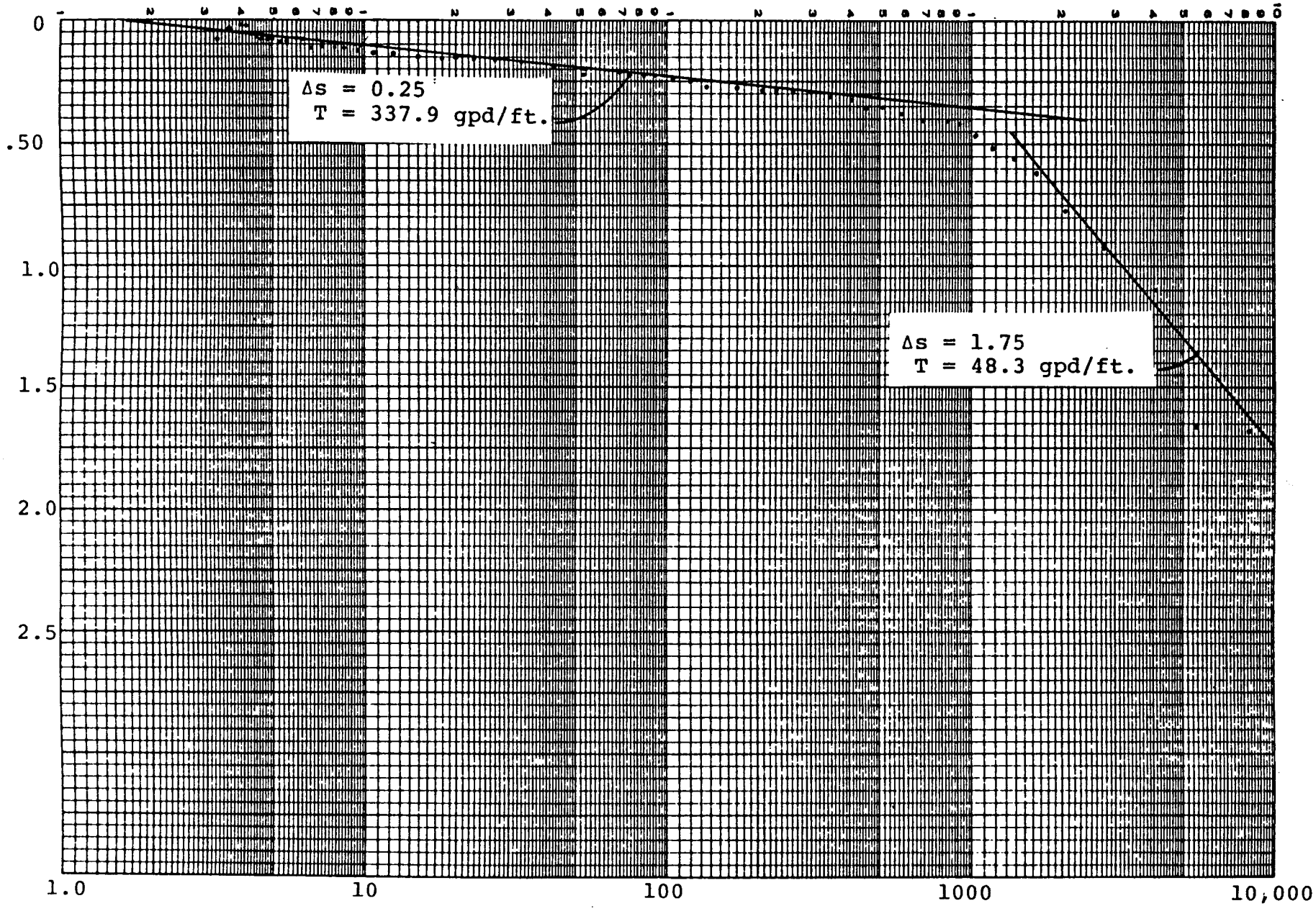
APPENDIX B

AQUIFER TEST DATA PLOTS

Pumped Well MW-25
Observations at Well MW-25

Residual-Drawdown
Q = 0.32 gpm

METRIC Corporation
Date: 2/88

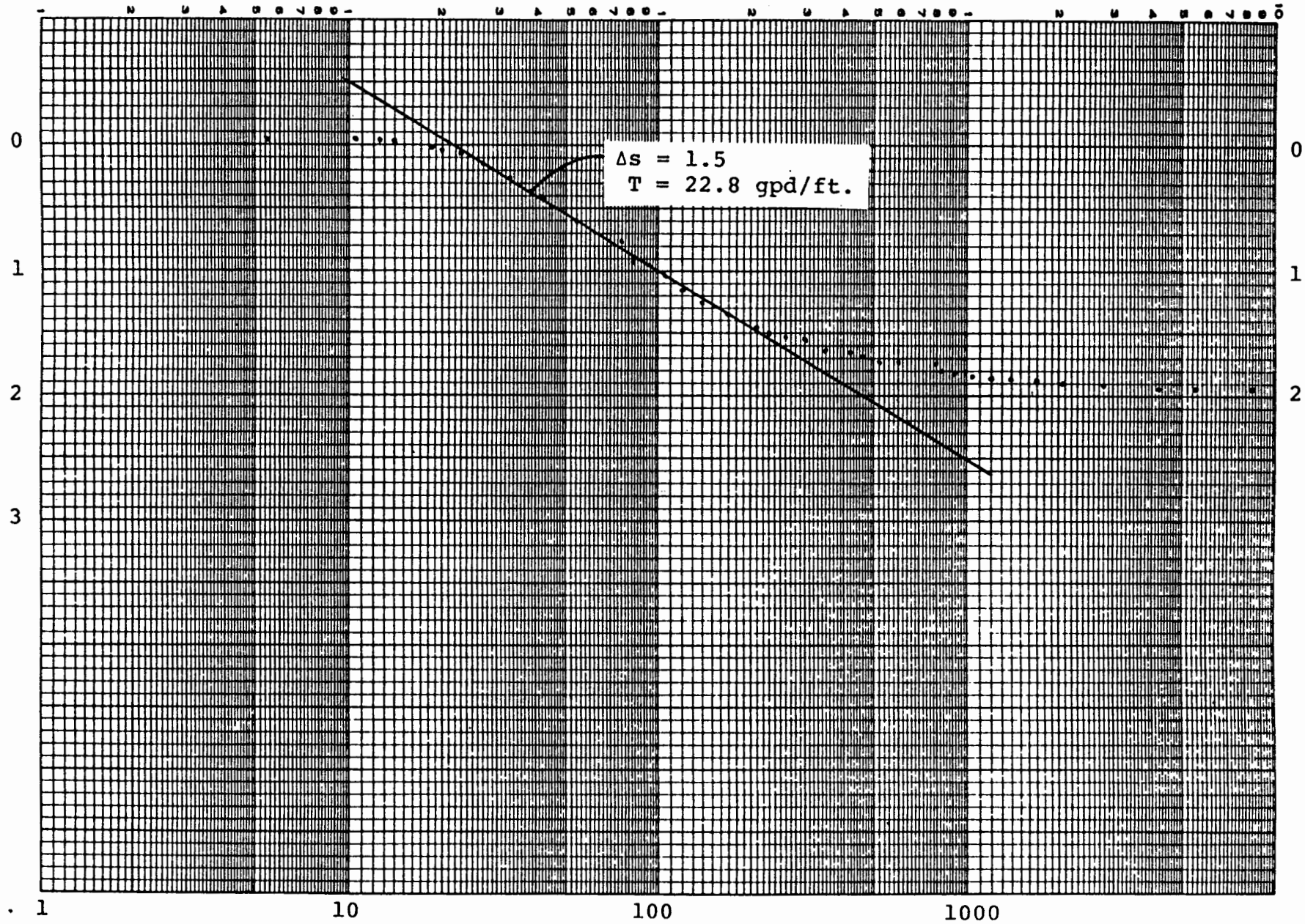


(2.184, 16,517)

Pumped Well PW-1
Observations at Well PW-1

Residual-Drawdown
Q = 0.13gpm

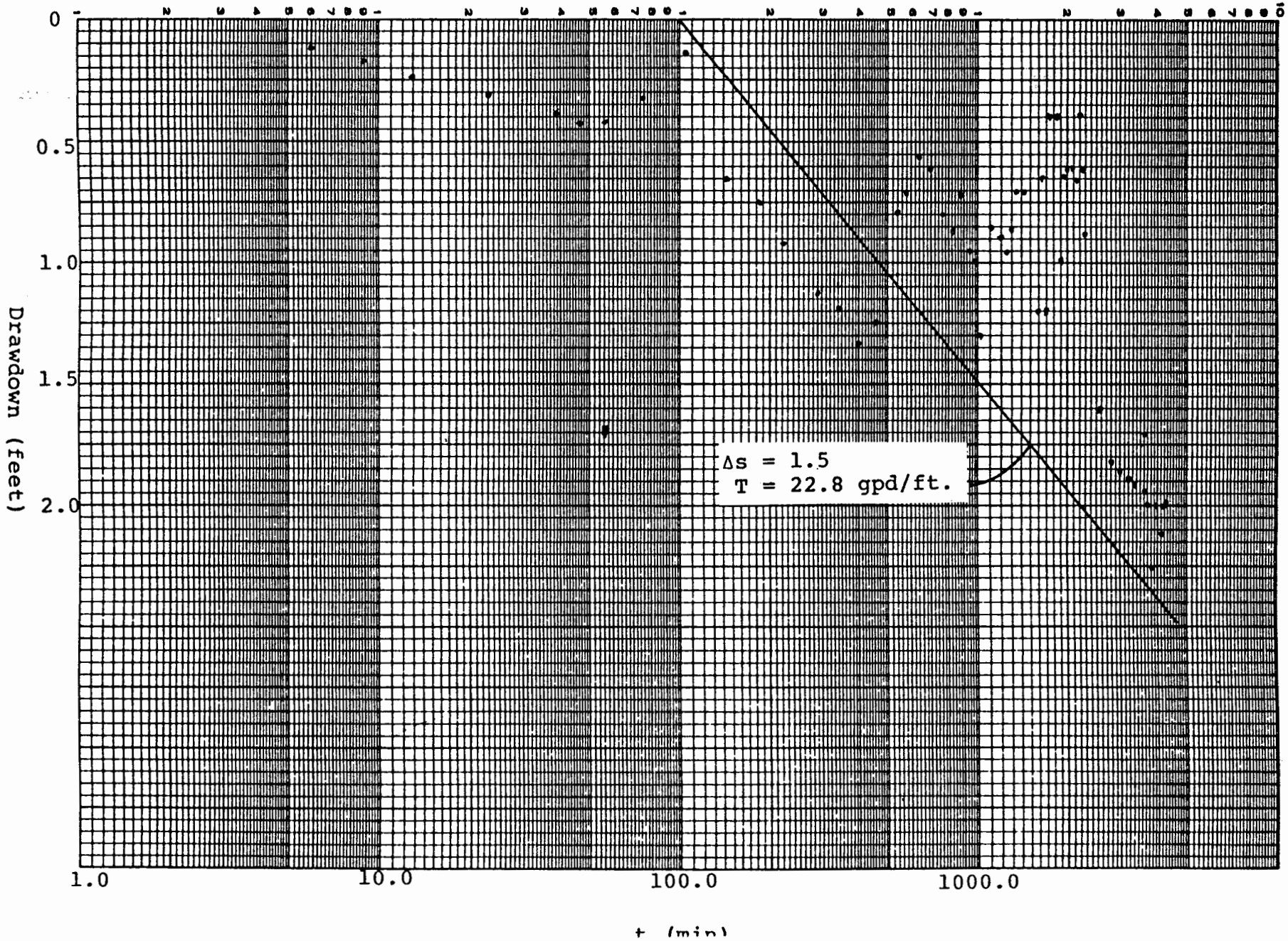
METRIC Corporation
Date: 2/23 - 2/27



Pumped Well PW-1
Observations at Well PW-1

Time-Drawdown
Q = 0.13gpm

METRIC Corporation
Date: 2/23 - 2/27



APPENDIX C

WATER QUALITY ANALYSES

Analytical Technologies, Inc.

MARCH 23, 1988

METRIC CORPORATION
8429 WASHINGTON
ALBUQUERQUE, NM 87111

Accession: 16002

Date Received: 2/24/88

Attention: GARY RICHARDSON

Project: SPARTON

Note: VERBALS CALLED TO PETER METZNER.

Michael G. Barry
Project Manager

Robert V. Woods
Laboratory Manager

RVW/jlf

Note: Samples will be disposed of within 30 days unless otherwise notified.

Analytical Technologies, Inc.

INDICATORS
PROJECT: SPARTON

SAMPLE DATE: 2/23/88
LAB RECEIPT DATE: 2/24/88
MATRIX: WATER

SAMPLE ID: WITH SODIUM HYDROXIDE MW-25
LOCATION:
LAB SAMPLE #: 16002-3
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/10/88	CYANIDE (CN)	1	0.01	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Feiig DATE: 3/23/88

Analytical Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE: 2/23/88
LAB RECEIPT DATE: 2/24/88
MATRIX: WATER

SAMPLE ID: WITH SODIUM HYDROXIDE PW-1
LOCATION:
LAB SAMPLE #: 16002-7
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/10/88	CYANIDE (CN)	1	0.01	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: K. Fairy DATE: 3/23/88

Analytical Technologies, Inc.

INDICATORS
PROJECT: SPARTON

SAMPLE DATE: 2/23/88
LAB RECEIPT DATE: 2/24/88
MATRIX: WATER

SAMPLE ID:RAW MW-25
LOCATION:
LAB SAMPLE #: 16002-1
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/07/88	TOTAL DISSOLVED SOLIDS	1	20	820
JH	3/15/88	HARDNESS	1	0.5	132
DW	3/14/88	CORROSIVITY (pH)	-	---	7.4

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Fabio DATE: 3/23/88

Analytical Technologies, Inc.

INDICATORS
PROJECT: SPARTON

SAMPLE DATE: 2/23/88
LAB RECEIPT DATE: 2/24/88
MATRIX: WATER

SAMPLE ID: RAW PW-1
LOCATION:
LAB SAMPLE #: 16002-5
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/07/88	TOTAL DISSOLVED SOLIDS	1	20	1200
JH	3/15/88	HARDNESS	1	0.5	469
DW	3/14/88	CORROSIVITY (pH)	-	---	12

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Bailey DATE: 3/23/88

Analytical Technologies, Inc.

METALS
PROJECT: SPARTON

SAMPLE DATE: 2/23/88
LAB RECEIPT DATE: 2/24/88
MATRIX: WATER

SAMPLE ID: MW-25
LOCATION:
LAB SAMPLE #: 16002-2
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
JH	3/07/88	CHROMIUM (Cr Tot)	1	0.020	0.036

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: T. Bailey DATE: 3/23/88

Analytical Technologies, Inc

METALS
PROJECT: SPARTON

SAMPLE DATE: 2/23/88
LAB RECEIPT DATE: 2/24/88
MATRIX: WATER

SAMPLE ID: PW-1
LOCATION:
LAB SAMPLE #: 16002-6
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
JH	3/07/88	CHROMIUM (Cr Tot)	1	0.020	0.033

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: Jill Bailey DATE: 3/23/88

Analytica Technologies, Inc

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE: 2/23/88
LAB RECEIPT DATE: 2/24/88
ANALYSIS DATE: 2/25/88
MATRIX: WATER
ANALYST: TMG

SAMPLE ID: MW-25
LOCATION:
LAB SAMPLE #: 16002-4
UNITS: ug/l
DILUTION FACTOR: 1000

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	200	ND
BROMOMETHANE	200	ND
DICHLORODIFLUOROMETHANE	200	ND
VINYL CHLORIDE	200	ND
CHLOROETHANE	200	ND
METHYLENE CHLORIDE	2000	3800
TRICHLOROFLUOROMETHANE	2000	ND
1,1-DICHLOROETHENE	200	1500
1,1-DICHLOROETHANE	200	ND
TRANS-1,2-DICHLOROETHENE	200	ND
CHLOROFORM	200	ND
1,2-DICHLOROETHANE	200	ND
1,1,1-TRICHLOROETHANE	200	24,000
CARBON TETRACHLORIDE	200	ND
BROMODICHLOROMETHANE	200	ND
1,2-DICHLOROPROPANE	200	ND
TRANS-1,3-DICHLOROPROPENE	200	ND
TRICHLOROETHENE	200	32,000
DIBROMOCHLOROMETHANE	200	ND
1,1,2-TRICHLOROETHANE	200	ND
CIS-1,3-DICHLOROPROPENE	200	ND
2-CHLOROETHYLVINYL ETHER	500	ND
BROMOFORM	500	ND
1,1,2,2-TETRACHLOROETHANE	200	ND
TETRACHLOROETHENE	200	ND
CHLOROBENZENE	500	ND
1,3-DICHLOROBENZENE	500	ND
1,2-DICHLOROBENZENE	500	ND
1,4-DICHLOROBENZENE	500	ND

% SURROGATE RECOVERY
80.2% BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGH LEVELS REQUIRED DILUTION.

PROJECT MANAGER: M. Bailey

DATE: 3/23/88

Analytical Technologies, Inc

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE: 2/23/88
LAB RECEIPT DATE: 2/24/88
ANALYSIS DATE: 2/25/88
MATRIX: WATER
ANALYST: TMG

SAMPLE ID: PW-1
LOCATION:
LAB SAMPLE #: 16002-8
UNITS: ug/l
DILUTION FACTOR: 500

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	100	ND
BROMOMETHANE	100	ND
DICHLORODIFLUOROMETHANE	100	ND
VINYL CHLORIDE	100	ND
CHLOROETHANE	100	ND
METHYLENE CHLORIDE	1000	16,000
TRICHLOROFLUOROMETHANE	1000	ND
1,1-DICHLOROETHENE	100	980
1,1-DICHLOROETHANE	100	ND
TRANS-1,2-DICHLOROETHENE	100	ND
CHLOROFORM	100	ND
1,2-DICHLOROETHANE	100	ND
1,1,1-TRICHLOROETHANE	100	2,100
CARBON TETRACHLORIDE	100	ND
BROMODICHLOROMETHANE	100	ND
1,2-DICHLOROPROPANE	100	ND
TRANS-1,3-DICHLOROPROPENE	100	ND
TRICHLOROETHENE	100	8,000
DIBROMOCHLOROMETHANE	100	ND
1,1,2-TRICHLOROETHANE	100	ND
CIS-1,3-DICHLOROPROPENE	100	ND
2-CHLOROETHYLVINYL ETHER	250	ND
BROMOFORM	250	ND
1,1,2,2-TETRACHLOROETHANE	100	ND
TETRACHLOROETHENE	100	ND
CHLOROBENZENE	250	ND
1,3-DICHLOROBENZENE	250	ND
1,2-DICHLOROBENZENE	250	ND
1,4-DICHLOROBENZENE	250	ND

% SURROGATE RECOVERY
101% BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGH LEVELS REQUIRED DILUTION.

PROJECT MANAGER: M. Baig

DATE: 3/23/88

Analytical Technologies, Inc.

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE: N/A
LAB RECEIPT DATE: 2/24/88
ANALYSIS DATE: 2/25/88
MATRIX: WATER
ANALYST: TMG

SAMPLE ID: TRIP BLANK
LOCATION:
LAB SAMPLE #: 16002
UNITS: ug/l
DILUTION FACTOR: 1

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	0.2	ND
BROMOMETHANE	0.2	ND
DICHLORODIFLUOROMETHANE	0.2	ND
VINYL CHLORIDE	0.2	ND
CHLOROETHANE	0.2	ND
METHYLENE CHLORIDE	2.0	3.4
TRICHLOROFLUOROMETHANE	2.0	ND
1,1-DICHLOROETHENE	0.2	ND
1,1-DICHLOROETHANE	0.2	ND
TRANS-1,2-DICHLOROETHENE	0.2	ND
CHLOROFORM	0.2	ND
1,2-DICHLOROETHANE	0.2	ND
1,1,1-TRICHLOROETHANE	0.2	ND
CARBON TETRACHLORIDE	0.2	ND
BROMODICHLOROMETHANE	0.2	ND
1,2-DICHLOROPROPANE	0.2	ND
TRANS-1,3-DICHLOROPROPENE	0.2	ND
TRICHLOROETHENE	0.2	ND
DIBROMOCHLOROMETHANE	0.2	ND
1,1,2-TRICHLOROETHANE	0.2	ND
CIS-1,3-DICHLOROPROPENE	0.2	ND
2-CHLOROETHYLVINYL ETHER	0.5	ND
BROMOFORM	0.5	ND
1,1,2,2-TETRACHLOROETHANE	0.2	ND
TETRACHLOROETHENE	0.2	ND
CHLOROBENZENE	0.5	ND
1,3-DICHLOROBENZENE	0.5	ND
1,2-DICHLOROBENZENE	0.5	ND
1,4-DICHLOROBENZENE	0.5	ND

COMMENTS: ND = NOT DETECTED

% SURROGATE RECOVERY
83.5% BROMOCHLOROMETHANE

PROJECT MANAGER: M Bailey

DATE: 3/23/88

Analytical Technologies, Inc.

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE: N/A
LAB RECEIPT DATE: N/A
ANALYSIS DATE: 2/25/88
MATRIX: WATER
ANALYST: TMG

SAMPLE ID: WATER BLANK
LOCATION:
LAB SAMPLE #: 16002
UNITS: ug/l
DILUTION FACTOR: 1

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	0.2	ND
BROMOMETHANE	0.2	ND
DICHLORODIFLUOROMETHANE	0.2	ND
VINYL CHLORIDE	0.2	ND
CHLOROETHANE	0.2	ND
METHYLENE CHLORIDE	2.0	4.1
TRICHLOROFLUOROMETHANE	2.0	ND
1,1-DICHLOROETHENE	0.2	ND
1,1-DICHLOROETHANE	0.2	ND
TRANS-1,2-DICHLOROETHENE	0.2	ND
CHLOROFORM	0.2	ND
1,2-DICHLOROETHANE	0.2	ND
1,1,1-TRICHLOROETHANE	0.2	ND
CARBON TETRACHLORIDE	0.2	ND
BROMODICHLOROMETHANE	0.2	ND
1,2-DICHLOROPROPANE	0.2	ND
TRANS-1,3-DICHLOROPROPENE	0.2	ND
TRICHLOROETHENE	0.2	ND
DIBROMOCHLOROMETHANE	0.2	ND
1,1,2-TRICHLOROETHANE	0.2	ND
CIS-1,3-DICHLOROPROPENE	0.2	ND
2-CHLOROETHYLVINYL ETHER	0.5	ND
BROMOFORM	0.5	ND
1,1,2,2-TETRACHLOROETHANE	0.2	ND
TETRACHLOROETHENE	0.2	ND
CHLOROBENZENE	0.5	ND
1,3-DICHLOROBENZENE	0.5	ND
1,2-DICHLOROBENZENE	0.5	ND
1,4-DICHLOROBENZENE	0.5	ND

COMMENTS: ND = NOT DETECTED

% SURROGATE RECOVERY
96.1% BROMOCHLOROMETHANE

PROJECT MANAGER: T. Bailey

DATE: 3/23/88

Analytical Technologies, Inc.

2-24

MARCH 24, 1988

METRIC CORPORATION
8429 WASHINGTON
ALBUQUERQUE, NM 87113

Accession: 16007

Date Received: 2/25/88

Attention: GARY RICHARDSON

Project: SPARTON

M. Barry

Mike Barry
Project Manager

Robert V. Woods
Laboratory Manager

RVW/jlf

Note: Samples will be disposed of within 30 days unless otherwise notified.

Analytical Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE: 2/24/88

LAB RECEIPT DATE: 2/25/88
MATRIX: H2O

SAMPLE ID: MW-25 WITH SODIUM HYDROXIDE
LOCATION:
LAB SAMPLE #: 16007-3
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/10/88	CYANIDE (CN)	1	0.01	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: EP

DATE: 3/24/88

Analytical Technologies, Inc.

INDICATORS
PROJECT: SPARTON

SAMPLE DATE: 2/24/88

LAB RECEIPT DATE: 2/25/88
MATRIX: H2O

SAMPLE ID: PW-1 WITH SODIUM HYDROXIDE
LOCATION:
LAB SAMPLE #: 16007-8
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/10/88	CYANIDE (CN)	1	0.01	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: [illegible] DATE: 3/24/88

Analytical Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE: 2/24/88
LAB RECEIPT DATE: 2/25/88
MATRIX: H2O

SAMPLE ID: RAW MW-25
LOCATION:
LAB SAMPLE #: 16007-1
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/07/88	TOTAL DISSOLVED SOLIDS (TDS)	1	20	960
JH	3/15/88	HARDNESS	1	0.5	253
DW	3/14/88	CORROSIVITY (pH)	-	----	7.5

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Bailey DATE: 3/24/88

Analytical Technologies, Inc.

INDICATORS
PROJECT: SPARTON

SAMPLE DATE: 2/24/88
LAB RECEIPT DATE: 2/25/88
MATRIX: H2O

SAMPLE ID: RAW PW-1
LOCATION:
LAB SAMPLE #: 16007-6
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/07/88	TOTAL DISSOLVED SOLIDS (TDS)	1	20	1000
JH	3/15/88	HARDNESS	1	0.5	352
DW	3/14/88	CORROSIVITY (pH)	-	----	11.7

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: QW DATE: 3/24/88

Analytical Technologies, inc

METALS
PROJECT: SPARTON

SAMPLE DATE: 2/24/88
LAB RECEIPT DATE: 2/25/88
MATRIX: H20

SAMPLE ID: MW-25
LOCATION:
LAB SAMPLE #: 16007-2
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
JH	3/07/88	CHROMIUM (Cr Tot)	1	0.020	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: Q.L. DATE: 3/24/88

Analytical Technologies, Inc

METALS
PROJECT: SPARTON

SAMPLE DATE: 2/24/88
LAB RECEIPT DATE: 2/25/88
MATRIX: H20

SAMPLE ID: PW-1
LOCATION:
LAB SAMPLE #: 16007-7
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
JH	3/07/88	CHROMIUM (Cr Tot)	1	0.020	0.029

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: [illegible] DATE: 3/24/88

AnalyticalTechnologies,Inc

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE: 2/24/88
LAB RECEIPT DATE: 2/25/88
ANALYSIS DATE: 3/23/88
MATRIX: H2O
ANALYST: TMG

SAMPLE ID: MW-25
LOCATION:
LAB SAMPLE #: 16007-4
UNITS: ug/l
DILUTION FACTOR: 100

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	20	ND
BROMOMETHANE	20	ND
DICHLORODIFLUOROMETHANE	20	ND
VINYL CHLORIDE	20	ND
CHLOROETHANE	20	ND
METHYLENE CHLORIDE	200	9,400
TRICHLOROFLUOROMETHANE	200	ND
1,1-DICHLOROETHENE	20	3,700
1,1-DICHLOROETHANE	20	ND
TRANS-1,2-DICHLOROETHENE	20	ND
CHLOROFORM	20	ND
1,2-DICHLOROETHANE	20	ND
1,1,1-TRICHLOROETHANE	20	39,000
CARBON TETRACHLORIDE	20	ND
BROMODICHLOROMETHANE	20	ND
1,2-DICHLOROPROPANE	20	ND
TRANS-1,3-DICHLOROPROPENE	20	ND
TRICHLOROETHENE	20	54,000
DIBROMOCHLOROMETHANE	20	ND
1,1,2-TRICHLOROETHANE	20	ND
CIS-1,3-DICHLOROPROPENE	20	ND
2-CHLOROETHYLVINYL ETHER	50	ND
BROMOFORM	50	ND
1,1,2,2-TETRACHLOROETHANE	20	ND
TETRACHLOROETHENE	20	ND
CHLOROBENZENE	50	ND
1,3-DICHLOROBENZENE	50	ND
1,2-DICHLOROBENZENE	50	ND
1,4-DICHLOROBENZENE	50	ND

% SURROGATE RECOVERY
97.7% BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGH LEVELS REQUIRED DILUTION

PROJECT MANAGER: EP

DATE: 3/24/88

Analytical Technologies, Inc

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE: 2/24/88
LAB RECEIPT DATE: 2/25/88
ANALYSIS DATE: 2/26/88
MATRIX: H2O
ANALYST: TMG

SAMPLE ID: PW-1
LOCATION:
LAB SAMPLE #: 16007-9
UNITS: ug/l
DILUTION FACTOR: 500

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	100	ND
BROMOMETHANE	100	ND
DICHLORODIFLUOROMETHANE	100	ND
VINYL CHLORIDE	100	ND
CHLOROETHANE	100	ND
METHYLENE CHLORIDE	1000	16000
TRICHLOROFLUOROMETHANE	1000	ND
1,1-DICHLOROETHENE	100	990
1,1-DICHLOROETHANE	100	ND
TRANS-1,2-DICHLOROETHENE	100	ND
CHLOROFORM	100	ND
1,2-DICHLOROETHANE	100	ND
1,1,1-TRICHLOROETHANE	100	2100
CARBON TETRACHLORIDE	100	ND
BROMODICHLOROMETHANE	100	ND
1,2-DICHLOROPROPANE	100	ND
TRANS-1,3-DICHLOROPROPENE	100	ND
TRICHLOROETHENE	100	9000
DIBROMOCHLOROMETHANE	100	ND
1,1,2-TRICHLOROETHANE	100	ND
CIS-1,3-DICHLOROPROPENE	100	ND
2-CHLOROETHYLVINYL ETHER	250	ND
BROMOFORM	250	ND
1,1,2,2-TETRACHLOROETHANE	100	ND
TETRACHLOROETHENE	100	ND
CHLOROBENZENE	250	ND
1,3-DICHLOROBENZENE	250	ND
1,2-DICHLOROBENZENE	250	ND
1,4-DICHLOROBENZENE	250	ND

% SURROGATE RECOVERY
98.5% BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGH LEVELS REQUIRED DILULTION

PROJECT MANAGER: RU.

DATE: 3/24/88

Analytical Technologies, Inc

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE: N/A
LAB RECEIPT DATE: N/A
ANALYSIS DATE: 2/26/88
MATRIX: WATER
ANALYST: TMG

SAMPLE ID: SYSTEM BLANK
LOCATION:
LAB SAMPLE #: 16007
UNITS: ug/l
DILUTION FACTOR: 1

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	0.2	ND
BROMOMETHANE	0.2	ND
DICHLORODIFLUOROMETHANE	0.2	ND
VINYL CHLORIDE	0.2	ND
CHLOROETHANE	0.2	ND
METHYLENE CHLORIDE	2.0	2.7
TRICHLOROFLUOROMETHANE	2.0	ND
1,1-DICHLOROETHENE	0.2	ND
1,1-DICHLOROETHANE	0.2	ND
TRANS-1,2-DICHLOROETHENE	0.2	ND
CHLOROFORM	0.2	ND
1,2-DICHLOROETHANE	0.2	ND
1,1,1-TRICHLOROETHANE	0.2	ND
CARBON TETRACHLORIDE	0.2	ND
BROMODICHLOROMETHANE	0.2	ND
1,2-DICHLOROPROPANE	0.2	ND
TRANS-1,3-DICHLOROPROPENE	0.2	ND
TRICHLOROETHENE	0.2	ND
DIBROMOCHLOROMETHANE	0.2	ND
1,1,2-TRICHLOROETHANE	0.2	ND
CIS-1,3-DICHLOROPROPENE	0.2	ND
2-CHLOROETHYLVINYL ETHER	0.5	ND
BROMOFORM	0.5	ND
1,1,2,2-TETRACHLOROETHANE	0.2	ND
TETRACHLOROETHENE	0.2	ND
CHLOROBENZENE	0.5	ND
1,3-DICHLOROBENZENE	0.5	ND
1,2-DICHLOROBENZENE	0.5	ND
1,4-DICHLOROBENZENE	0.5	ND

COMMENTS: ND = NOT DETECTED

% SURROGATE RECOVERY
83.6% BROMOCHLOROMETHANE

PROJECT MANAGER: R.W.

DATE: 3/24/88

Analytical Technologies, Inc.

2.25

22 MARCH 1988

METRIC CORPORATION
8429 WASHINGTON PLACE
ALBUQUERQUE, NM 87113

Accession: 16012

Date Received: 2/26/88

Attention: GARY RICHARDSON

Project: SPARTON

M. Barry
Michael G. Barry
Project Manager

Robert V. Woods
Robert V. Woods
Laboratory Manager

RVW/jlf

Note: Samples will be disposed of within 30 days unless otherwise notified.

AnalyticalTechnologies, Inc.

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/25/88
LAB RECEIPT DATE:2/26/88
MATRIX: WATER

SAMPLE ID: MW-25 W/NaOH
LOCATION:
LAB SAMPLE #: 16012-5
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/10/88	CYANIDE (CN)	1	0.01	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Farley DATE: 3/22/88

Analytical Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/25/88
LAB RECEIPT DATE:2/26/88
MATRIX: WATER

SAMPLE ID: PW-1 W/NaOH
LOCATION:
LAB SAMPLE #: 16012-10
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/10/88	CYANIDE (CN)	1	0.01	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Bary DATE: 3/22/88

Analytical Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/25/88
LAB RECEIPT DATE:2/26/88
MATRIX:WATER

SAMPLE ID: RAW MW-25
LOCATION:
LAB SAMPLE #:16012-3
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/11/88	TOTAL DISSOLVED SOLIDS (TDS)	1	20	900
JH	3/15/88	HARDNESS	1	0.5	282
DW	3/14/88	CORROSIVITY (pH)	-	----	7.4

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Bally

DATE: 3/22/88

Analytical Technologies, Inc.

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/25/88
LAB RECEIPT DATE:2/26/88
MATRIX:WATER

SAMPLE ID: RAW PW-1
LOCATION:
LAB SAMPLE #:16012-8
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/11/88	TOTAL DISSOLVED SOLIDS (TDS)	1	20	840
JH	3/15/88	HARDNESS	1	0.5	321
DW	3/14/88	CORROSIVITY (pH)	-	----	11.3

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: T. Barry DATE: 3/22/88

Analytical Technologies, Inc.

METALS
PROJECT: SPARTON

SAMPLE DATE:2/25/88
LAB RECEIPT DATE:2/26/88
MATRIX: WATER

SAMPLE ID: MW-25
LOCATION:
LAB SAMPLE #:16012-4
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
JH	3/07/88	CHROMIUM (Cr Tot)	1	0.020	0.036

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Barg

DATE: 3/22/88

Analytical Technologies, Inc

METALS
PROJECT: SPARTON

SAMPLE DATE:2/25/88
LAB RECEIPT DATE:2/26/88
MATRIX: WATER

SAMPLE ID: PW-1
LOCATION:
LAB SAMPLE #:16012-9
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
JH	3/07/88	CHROMIUM (Cr Tot)	1	0.020	0.031

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Barry DATE: 3/22/88

Analytical Technologies, Inc

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE:2/25/88
LAB RECEIPT DATE:2/26/88
ANALYSIS DATE:2/26/88
MATRIX: WATER
ANALYST:TMG

SAMPLE ID: MW-25
LOCATION:
LAB SAMPLE #:16012-6
UNITS: ug/l
DILUTION FACTOR: 1000

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	200	ND
BROMOMETHANE	200	ND
DICHLORODIFLUOROMETHANE	200	ND
VINYL CHLORIDE	200	ND
CHLOROETHANE	200	ND
METHYLENE CHLORIDE	2000	2800
TRICHLOROFLUOROMETHANE	2000	ND
1,1-DICHLOROETHENE	200	1900
1,1-DICHLOROETHANE	200	ND
TRANS-1,2-DICHLOROETHENE	200	ND
CHLOROFORM	200	ND
1,2-DICHLOROETHANE	200	ND
1,1,1-TRICHLOROETHANE	200	37000
CARBON TETRACHLORIDE	200	ND
BROMODICHLOROMETHANE	200	ND
1,2-DICHLOROPROPANE	200	ND
TRANS-1,3-DICHLOROPROPENE	200	ND
TRICHLOROETHENE	200	46000
DIBROMOCHLOROMETHANE	200	ND
1,1,2-TRICHLOROETHANE	200	ND
CIS-1,3-DICHLOROPROPENE	200	ND
2-CHLOROETHYLVINYL ETHER	500	ND
BROMOFORM	500	ND
1,1,2,2-TETRACHLOROETHANE	200	ND
TETRACHLOROETHENE	200	ND
CHLOROBENZENE	500	ND
1,3-DICHLOROBENZENE	500	ND
1,2-DICHLOROBENZENE	500	ND
1,4-DICHLOROBENZENE	500	ND

% SURROGATE RECOVERY
101 % BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGHER LEVELS REQUIRED DILUTION

PROJECT MANAGER: M. Barry

DATE: 3/22/88

Analytical Technologies, Inc.

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE:2/25/88
LAB RECEIPT DATE:2/26/88
ANALYSIS DATE:2/26/88
MATRIX: WATER
ANALYST:TMG

SAMPLE ID: PW-1
LOCATION:
LAB SAMPLE #:16012-11
UNITS: ug/l
DILUTION FACTOR: 1000

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	200	ND
BROMOMETHANE	200	ND
DICHLORODIFLUOROMETHANE	200	ND
VINYL CHLORIDE	200	ND
CHLOROETHANE	200	ND
METHYLENE CHLORIDE	2000	11000
TRICHLOROFLUOROMETHANE	2000	ND
1,1-DICHLOROETHENE	200	560
1,1-DICHLOROETHANE	200	ND
TRANS-1,2-DICHLOROETHENE	200	ND
CHLOROFORM	200	ND
1,2-DICHLOROETHANE	200	ND
1,1,1-TRICHLOROETHANE	200	1700
CARBON TETRACHLORIDE	200	ND
BROMODICHLOROMETHANE	200	ND
1,2-DICHLOROPROPANE	200	ND
TRANS-1,3-DICHLOROPROPENE	200	ND
TRICHLOROETHENE	200	7200
DIBROMOCHLOROMETHANE	200	ND
1,1,2-TRICHLOROETHANE	200	ND
CIS-1,3-DICHLOROPROPENE	200	ND
2-CHLOROETHYLVINYL ETHER	500	ND
BROMOFORM	500	ND
1,1,2,2-TETRACHLOROETHANE	200	ND
TETRACHLOROETHENE	200	ND
CHLOROBENZENE	500	ND
1,3-DICHLOROBENZENE	500	ND
1,2-DICHLOROBENZENE	500	ND
1,4-DICHLOROBENZENE	500	ND

% SURROGATE RECOVERY
94.3% BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGHER LEVELS REQUIRED DILUTION

PROJECT MANAGER: M. Bailey

DATE: 3/22/88

Analytical Technologies, Inc.

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE:N/A
LAB RECEIPT DATE:N/A
ANALYSIS DATE:2/26/88
MATRIX: WATER
ANALYST:TMG

SAMPLE ID: SYSTEM BLANK
LOCATION:
LAB SAMPLE #:16012
UNITS: ug/l
DILUTION FACTOR: 1

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	0.2	ND
BROMOMETHANE	0.2	ND
DICHLORODIFLUOROMETHANE	0.2	ND
VINYL CHLORIDE	0.2	ND
CHLOROETHANE	0.2	ND
METHYLENE CHLORIDE	2.0	2.7
TRICHLOROFLUOROMETHANE	2.0	ND
1,1-DICHLOROETHENE	0.2	ND
1,1-DICHLOROETHANE	0.2	ND
TRANS-1,2-DICHLOROETHENE	0.2	ND
CHLOROFORM	0.2	ND
1,2-DICHLOROETHANE	0.2	ND
1,1,1-TRICHLOROETHANE	0.2	ND
CARBON TETRACHLORIDE	0.2	ND
BROMODICHLOROMETHANE	0.2	ND
1,2-DICHLOROPROPANE	0.2	ND
TRANS-1,3-DICHLOROPROPENE	0.2	ND
TRICHLOROETHENE	0.2	ND
DIBROMOCHLOROMETHANE	0.2	ND
1,1,2-TRICHLOROETHANE	0.2	ND
CIS-1,3-DICHLOROPROPENE	0.2	ND
2-CHLOROETHYLVINYL ETHER	0.5	ND
BROMOFORM	0.5	ND
1,1,2,2-TETRACHLOROETHANE	0.2	ND
TETRACHLOROETHENE	0.2	ND
CHLOROBENZENE	0.5	ND
1,3-DICHLOROBENZENE	0.5	ND
1,2-DICHLOROBENZENE	0.5	ND
1,4-DICHLOROBENZENE	0.5	ND

% SURROGATE RECOVERY
83.6 BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGHER LEVELS REQUIRED DILUTION

PROJECT MANAGER: M. Bailey

DATE: 3/22/88

Analytical Technologies, Inc.

ACCESSION: 16012

QUALITY CONTROL DATA: 188
METHOD 601/602 & 8010/8020

CLIENT: METRIC CORPORATION
UNITS: ng
ANALYSIS DATE: 2/26/88

	TRUE VALUE	RESULT
1,1-DICHLOROETHENE	102	82.1
CHLOROFORM	109	98.9
1,1,1-TRICHLOROETHANE	102	110
BROMODICHLOROMETHANE	118	123
TRICHLOROETHENE	105	118
BENZENE	99.6	92.3
TETRACHLOROETHENE	109	118
TOLUENE	103	108
CHLOROBENZENE	106	107

PROJECT MANAGER: M. Foley DATE: 3/22/88

Analytical Technologies, Inc

QUALITY CONTROL DATA

CLIENT: METRIC
DATE(S) RECEIVED: 2/29/88

METHOD:601 UNITS: ug/l
DATE ANALYZED: 3/1/88 ANALYST:TMG

SPIKE RECOVERY

LAB SAMPLE ID: 16017-1

PARAMETER	MATRIX % REC	DUPLICATE % REC
1,1-DICHLOROETHENE	104	104
CHLOROFORM	103	100
1,1-TRICHLOROETHANE	106	104
BROMODICHLOROETHANE	113	100
TRICHLOROETHENE	109	116
TETRACHLOROETHANE	97.9	119
BENZENE	102	109
TOLUENE	100	112
CHLOROBENZENE	92.6	113

% SURROGATE RECOVERIES

99.5	% BROMOCHLOROMETHANE	90.8
88.4	% BROMOFLUOROBENZENE	88.2

NOTES: NA = NOT APPLICABLE

PROJECT MANAGER: M. Dally DATE: 3/22/88

Analytical Technologies, Inc

22 MARCH 1988

METRIC CORPORATION
8429 WASHINGTON PLACE
ALBUQUERQUE, NM 87113

Accession: 16015

Date Received: 2/29/88

Attention: GARY RICHARDSON

Project: SPARTON

Michael G. Barry
Project Manager

Robert V. Woods
Laboratory Manager

RVW/jlf

Note: Samples will be disposed of within 30 days unless otherwise notified.

Analytica Technologies, Inc.

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/26/88
LAB RECEIPT DATE:2/29/88
MATRIX: WATER

SAMPLE ID: MW-25 W/NaOH
LOCATION:
LAB SAMPLE #: 16015-3
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/10/88	CYANIDE (CN)	1	0.01	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: [illegible] DATE: 3/22/88

Analytica Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/26/88
LAB RECEIPT DATE:2/29/88
MATRIX: WATER

SAMPLE ID: PW-1 W/NaOH
LOCATION:
LAB SAMPLE #: 16015-9
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/10/88	CYANIDE (CN)	1	0.01	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: [illegible] DATE: 3/22/88

Analytical Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/26/88
LAB RECEIPT DATE:2/29/88
MATRIX:WATER

SAMPLE ID: RAW MW-25
LOCATION:
LAB SAMPLE #:16015-1
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/11/88	TOTAL DISSOLVED SOLIDS (TDS)	1	20	900
JH	3/15/88	HARDNESS	1	0.5	288
DW	3/14/88	CORROSIVITY (pH)	-	----	7.4

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: Jill Pattin DATE: 3/22/88

Analytical Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/26/88
LAB RECEIPT DATE:2/29/88
MATRIX:WATER

SAMPLE ID: RAW PW-1
LOCATION:
LAB SAMPLE #:16015-7
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/11/88	TOTAL DISSOLVED SOLIDS (TDS)	1	20	650
JH	3/15/88	HARDNESS	1	0.5	196
DW	3/14/88	CORROSIVITY (pH)	-	----	10.

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: [illegible] DATE: 3/22/88

Analytical Technologies, Inc.

METALS
PROJECT: SPARTON

SAMPLE DATE:2/26/88
LAB RECEIPT DATE:2/29/88
MATRIX: WATER

SAMPLE ID: MW-25
LOCATION:
LAB SAMPLE #:16015-2
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
JH	3/07/88	CHROMIUM (Cr Tot)	1	0.020	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: [illegible] DATE: 3/22/88

Analytical Technologies, Inc.

METALS
PROJECT: SPARTON

SAMPLE DATE:2/26/88
LAB RECEIPT DATE:2/29/88
MATRIX: WATER

SAMPLE ID: PW-1
LOCATION:
LAB SAMPLE #:16015-8
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
JH	3/07/88	CHROMIUM (Cr Tot)	1	0.020	0.026

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: [illegible] DATE: 3/22/88

Analytical Technologies, Inc

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE:2/26/88
LAB RECEIPT DATE:2/29/88
ANALYSIS DATE:3/2/88
MATRIX: WATER
ANALYST:TMG

SAMPLE ID: MW-25
LOCATION:
LAB SAMPLE #:16015-4
UNITS: ug/l
DILUTION FACTOR: 1000

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	200	ND
BROMOMETHANE	200	ND
DICHLORODIFLUOROMETHANE	200	ND
VINYL CHLORIDE	200	ND
CHLOROETHANE	200	ND
METHYLENE CHLORIDE	2000	2700
TRICHLOROFLUOROMETHANE	2000	ND
1,1-DICHLOROETHENE	200	2200
1,1-DICHLOROETHANE	200	ND
TRANS-1,2-DICHLOROETHENE	200	ND
CHLOROFORM	200	ND
1,2-DICHLOROETHANE	200	ND
1,1,1-TRICHLOROETHANE	200	35000
CARBON TETRACHLORIDE	200	ND
BROMODICHLOROMETHANE	200	ND
1,2-DICHLOROPROPANE	200	ND
TRANS-1,3-DICHLOROPROPENE	200	ND
TRICHLOROETHENE	200	43000
DIBROMOCHLOROMETHANE	200	ND
1,1,2-TRICHLOROETHANE	200	ND
CIS-1,3-DICHLOROPROPENE	200	ND
2-CHLOROETHYLVINYL ETHER	500	ND
BROMOFORM	500	ND
1,1,2,2-TETRACHLOROETHANE	200	ND
TETRACHLOROETHENE	200	ND
CHLOROBENZENE	500	ND
1,3-DICHLOROBENZENE	500	ND
1,2-DICHLOROBENZENE	500	ND
1,4-DICHLOROBENZENE	500	ND

% SURROGATE RECOVERY
92.9% BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGHER LEVELS REQUIRED DILUTION

PROJECT MANAGER: M. Bill

DATE: 3/22/88

Analytical Technologies, Inc.

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE:2/26/88
LAB RECEIPT DATE:2/29/88
ANALYSIS DATE:3/2/88
MATRIX: WATER
ANALYST:TMG

SAMPLE ID: PW-1
LOCATION:
LAB SAMPLE #:16015-10
UNITS: ug/l
DILUTION FACTOR: 1000

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	200	ND
BROMOMETHANE	200	ND
DICHLORODIFLUOROMETHANE	200	ND
VINYL CHLORIDE	200	ND
CHLOROETHANE	200	ND
METHYLENE CHLORIDE	2000	10000
TRICHLOROFLUOROMETHANE	2000	ND
1,1-DICHLOROETHENE	200	670
1,1-DICHLOROETHANE	200	ND
TRANS-1,2-DICHLOROETHENE	200	ND
CHLOROFORM	200	ND
1,2-DICHLOROETHANE	200	ND
1,1,1-TRICHLOROETHANE	200	1700
CARBON TETRACHLORIDE	200	ND
BROMODICHLOROMETHANE	200	ND
1,2-DICHLOROPROPANE	200	ND
TRANS-1,3-DICHLOROPROPENE	200	ND
TRICHLOROETHENE	200	7400
DIBROMOCHLOROMETHANE	200	ND
1,1,2-TRICHLOROETHANE	200	ND
CIS-1,3-DICHLOROPROPENE	200	ND
2-CHLOROETHYLVINYL ETHER	500	ND
BROMOFORM	500	ND
1,1,2,2-TETRACHLOROETHANE	200	ND
TETRACHLOROETHENE	200	ND
CHLOROBENZENE	500	ND
1,3-DICHLOROBENZENE	500	ND
1,2-DICHLOROBENZENE	500	ND
1,4-DICHLOROBENZENE	500	ND

% SURROGATE RECOVERY
95.5% BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGHER LEVELS REQUIRED DILUTION

PROJECT MANAGER: [illegible]

DATE: 3/22/88

Analytical Technologies, Inc

ACCESSION: 16015

QUALITY CONTROL DATA: 188
METHOD 601/602 & 8010/8020

CLIENT: METRIC CORPORATION
UNITS: ng
ANALYSIS DATE: 3/2/88

	TRUE VALUE	RESULT
1,1-DICHLOROETHENE	102	93.8
CHLOROFORM	109	99.4
1,1,1-TRICHLOROETHANE	102	100
BROMODICHLOROMETHANE	118	120
TRICHLOROETHENE	105	98.5
BENZENE	99.6	89.5
TETRACHLOROETHENE	109	104
TOLUENE	103	111
CHLOROBENZENE	100	89.5

PROJECT MANAGER: T.T. Pally DATE: 3/22/88

Analytical Technologies, Inc

QUALITY CONTROL DATA

CLIENT: METRIC
DATE(S) RECEIVED: 3/3/88

METHOD: 601 UNITS: ug/l
DATE ANALYZED: 3/11/88 ANALYST: tmg

SPIKE RECOVERY

LAB SAMPLE ID: 16036

PARAMETER	MATRIX % REC	DUPLICATE % REC
1,1-DICHLOROETHENE	102	104
CHLOROFORM	103	98.9
1,1,1 TRICHLOROETHANE	99.9	91.9
BROMODICHLOROETHANE	97.2	89.6
TRICHLOROETHENE	98.5	88.3
TETRACHLOROETHANE	94.1	104
BENZENE	96.0	94.9
TOLUENE	96.0	95.6
CHLOROBENZENE	94.6	103

% SURROGATE RECOVERIES

106	% BROMOCHLOROMETHANE	107%
100	% BROMOFLUOROBENZENE	106%

NOTES: NA = NOT APPLICABLE

PROJECT MANAGER: M. Bailey DATE: 3/22/88

Analytical Technologies, Inc

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE: NA
LAB RECEIPT DATE: NA
ANALYSIS DATE: 3/2/88
MATRIX: H20
ANALYST: TMG

SAMPLE ID: SYSTEM BLANK
LOCATION:
LAB SAMPLE #: 16015
UNITS: ug/l
DILUTION FACTOR: 1

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	0.2	ND
BROMOMETHANE	0.2	ND
DICHLORODIFLUOROMETHANE	0.2	ND
VINYL CHLORIDE	0.2	ND
CHLOROETHANE	0.2	ND
METHYLENE CHLORIDE	2.0	6.7
TRICHLOROFLUOROMETHANE	2.0	ND
1,1-DICHLOROETHENE	0.2	ND
1,1-DICHLOROETHANE	0.2	ND
TRANS-1,2-DICHLOROETHENE	0.2	ND
CHLOROFORM	0.2	ND
1,2-DICHLOROETHANE	0.2	ND
1,1,1-TRICHLOROETHANE	0.2	ND
CARBON TETRACHLORIDE	0.2	ND
BROMODICHLOROMETHANE	0.2	ND
1,2-DICHLOROPROPANE	0.2	ND
TRANS-1,3-DICHLOROPROPENE	0.2	ND
TRICHLOROETHENE	0.2	ND
DIBROMOCHLOROMETHANE	0.2	ND
1,1,2-TRICHLOROETHANE	0.2	ND
CIS-1,3-DICHLOROPROPENE	0.2	ND
2-CHLOROETHYLVINYL ETHER	0.5	ND
BROMOFORM	0.5	ND
1,1,2,2-TETRACHLOROETHANE	0.2	ND
TETRACHLOROETHENE	0.2	ND
CHLOROBENZENE	0.5	ND
1,3-DICHLOROBENZENE	0.5	ND
1,2-DICHLOROBENZENE	0.5	ND
1,4-DICHLOROBENZENE	0.5	ND

COMMENTS: ND = NOT DETECTED

% SURROGATE RECOVERY
84.6% BROMOCHLOROMETHANE

PROJECT MANAGER: K. Pelly

DATE: 3/22/88

Analytical Technologies, Inc

22 MARCH 1988

METRIC CORPORATION
8429 WASHINGTON PLACE
ALBUQUERQUE, NM 87113

Accession: 16022

Date Received: 3/01/88

Attention: GARY RICHARDSON

Project: SPARTON

M. Barry
Michael G. Barry
Project Manager

Robert V. Woods
Robert V. Woods
Laboratory Manager

RVW/jlf

Note: Samples will be disposed of within 30 days unless otherwise notified.

Analytical Technologies, Inc.

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/29/88
LAB RECEIPT DATE:3/01/88
MATRIX: WATER

SAMPLE ID: MW-25 W/NaOH
LOCATION:
LAB SAMPLE #: 16022-3
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/10/88	CYANIDE (CN)	1	0.01	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: [illegible] DATE: 3/22/88

Analytical Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/29/88
LAB RECEIPT DATE:3/01/88
MATRIX: WATER

SAMPLE ID: PW-1 W/NaOH
LOCATION:
LAB SAMPLE #: 16022-7
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/10/88	CYANIDE (CN)	1	0.01	ND

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Pally DATE: 3/22/88

Analytical Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/29/88
LAB RECEIPT DATE:3/01/88
MATRIX:WATER

SAMPLE ID: RAW MW-25
LOCATION:
LAB SAMPLE #:16022-1
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/11/88	TOTAL DISSOLVED SOLIDS (TDS)	1	20	860
JH	3/15/88	HARDNESS	1	0.5	288
DW	3/14/88	CORROSIVITY (pH)	-	----	7.4

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Bai

DATE: 3/22/88

Analytical Technologies, Inc

INDICATORS
PROJECT: SPARTON

SAMPLE DATE:2/29/88
LAB RECEIPT DATE:3/01/88
MATRIX:WATER

SAMPLE ID: RAW PW-1
LOCATION:
LAB SAMPLE #:16022-5
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
DW	3/11/88	TOTAL DISSOLVED SOLIDS (TDS)	1	20	680
JH	3/15/88	HARDNESS	1	0.5	179
DW	3/14/88	CORROSIVITY (pH)	-	----	11

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: M. Patel DATE: 3/22/88

Analytical Technologies, Inc.

METALS
PROJECT: SPARTON

SAMPLE DATE:2/29/88
LAB RECEIPT DATE:3/01/88
MATRIX: WATER

SAMPLE ID: MW-25
LOCATION:
LAB SAMPLE #:16022-2
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
JH	3/07/88	CHROMIUM (Cr Tot)	1	0.020	0.027

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: T. Fary

DATE: 3/22/88

Analytical Technologies, Inc

METALS
PROJECT: SPARTON

SAMPLE DATE:2/29/88
LAB RECEIPT DATE:3/01/88
MATRIX: WATER

SAMPLE ID: PW-1
LOCATION:
LAB SAMPLE #:16022-6
UNITS: mg/l

ANALYST	ANALYSIS DATE	CONSTITUENT NAME	DILUTION FACTOR	DETECTION LIMIT	RESULT
JH	3/07/88	CHROMIUM (Cr Tot)	1	0.020	0.02

* THE LISTED DETECTION LIMITS REFLECT ANY SAMPLE DILUTION.

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: [illegible] DATE: 3/22/88

Analytical Technologies, Inc.

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE:2/29/88
LAB RECEIPT DATE:3/01/88
ANALYSIS DATE:3/2/88
MATRIX: WATER
ANALYST:TMG

SAMPLE ID: MW-25
LOCATION:
LAB SAMPLE #:16022-4
UNITS: ug/l
DILUTION FACTOR: 1000

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	200	ND
BROMOMETHANE	200	ND
DICHLORODIFLUOROMETHANE	200	ND
VINYL CHLORIDE	200	ND
CHLOROETHANE	200	ND
METHYLENE CHLORIDE	2000	4200
TRICHLOROFLUOROMETHANE	2000	ND
1,1-DICHLOROETHENE	200	2100
1,1-DICHLOROETHANE	200	ND
TRANS-1,2-DICHLOROETHENE	200	ND
CHLOROFORM	200	ND
1,2-DICHLOROETHANE	200	ND
1,1,1-TRICHLOROETHANE	200	42000
CARBON TETRACHLORIDE	200	ND
BROMODICHLOROMETHANE	200	ND
1,2-DICHLOROPROPANE	200	ND
TRANS-1,3-DICHLOROPROPENE	200	ND
TRICHLOROETHENE	200	47000
DIBROMOCHLOROMETHANE	200	ND
1,1,2-TRICHLOROETHANE	200	ND
CIS-1,3-DICHLOROPROPENE	200	ND
2-CHLOROETHYLVINYL ETHER	500	ND
BROMOFORM	500	ND
1,1,2,2-TETRACHLOROETHANE	200	ND
TETRACHLOROETHENE	200	ND
CHLOROBENZENE	500	ND
1,3-DICHLOROBENZENE	500	ND
1,2-DICHLOROBENZENE	500	ND
1,4-DICHLOROBENZENE	500	ND

% SURROGATE RECOVERY
102 % BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGHER LEVELS REQUIRED DILUTION

PROJECT MANAGER: T. Bailey

DATE: 3/22/88

Analytical Technologies, Inc

EPA METHOD 601
PROJECT: SPARTON

SAMPLE DATE:2/29/88
LAB RECEIPT DATE:3/01/88
ANALYSIS DATE:3/2/88
MATRIX: WATER
ANALYST:TMG

SAMPLE ID: PW-1
LOCATION:
LAB SAMPLE #:16022-8
UNITS: ug/l
DILUTION FACTOR: 1000

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	200	ND
BROMOMETHANE	200	ND
DICHLORODIFLUOROMETHANE	200	ND
VINYL CHLORIDE	200	ND
CHLOROETHANE	200	ND
METHYLENE CHLORIDE	2000	10000
TRICHLOROFLUOROMETHANE	2000	ND
1,1-DICHLOROETHENE	200	610
1,1-DICHLOROETHANE	200	ND
TRANS-1,2-DICHLOROETHENE	200	ND
CHLOROFORM	200	ND
1,2-DICHLOROETHANE	200	ND
1,1,1-TRICHLOROETHANE	200	1400
CARBON TETRACHLORIDE	200	ND
BROMODICHLOROMETHANE	200	ND
1,2-DICHLOROPROPANE	200	ND
TRANS-1,3-DICHLOROPROPENE	200	ND
TRICHLOROETHENE	200	6200
DIBROMOCHLOROMETHANE	200	ND
1,1,2-TRICHLOROETHANE	200	ND
CIS-1,3-DICHLOROPROPENE	200	ND
2-CHLOROETHYLVINYL ETHER	500	ND
BROMOFORM	500	ND
1,1,2,2-TETRACHLOROETHANE	200	ND
TETRACHLOROETHENE	200	ND
CHLOROBENZENE	500	ND
1,3-DICHLOROBENZENE	500	ND
1,2-DICHLOROBENZENE	500	ND
1,4-DICHLOROBENZENE	500	ND

% SURROGATE RECOVERY
102 % BROMOCHLOROMETHANE

COMMENTS: ND = NOT DETECTED
HIGHER LEVELS REQUIRED DILUTION

PROJECT MANAGER: M. Barry

DATE: 3/22/88

Analytical Technologies, Inc

EPA METHOD 601
PROJECT: SPARTON

SAMPLE ID: SYSTEM BLANK
LOCATION:
LAB SAMPLE #: 16022
UNITS: ug/l
DILUTION FACTOR: 1

ANALYSIS DATE:3/2/88
MATRIX:WATER
ANALYST:TMG

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	0.2	ND
BROMOMETHANE	0.2	ND
DICHLORODIFLUOROMETHANE	0.2	ND
VINYL CHLORIDE	0.2	ND
CHLOROETHANE	0.2	ND
METHYLENE CHLORIDE	2.0	6.7
TRICHLOROFLUOROMETHANE	2.0	ND
1,1-DICHLOROETHENE	0.2	ND
1,1-DICHLOROETHANE	0.2	ND
TRANS-1,2-DICHLOROETHENE	0.2	ND
CHLOROFORM	0.2	ND
1,2-DICHLOROETHANE	0.2	ND
1,1,1-TRICHLOROETHANE	0.2	ND
CARBON TETRACHLORIDE	0.2	ND
BROMODICHLOROMETHANE	0.2	ND
1,2-DICHLOROPROPANE	0.2	ND
TRANS-1,3-DICHLOROPROPENE	0.2	ND
TRICHLOROETHENE	0.2	ND
DIBROMOCHLOROMETHANE	0.2	ND
1,1,2-TRICHLOROETHANE	0.2	ND
CIS-1,3-DICHLOROPROPENE	0.2	ND
2-CHLOROETHYLVINYL ETHER	0.5	ND
BROMOFORM	0.5	ND
1,1,2,2-TETRACHLOROETHANE	0.2	ND
TETRACHLOROETHENE	0.2	ND
CHLOROBENZENE	0.5	ND
1,3-DICHLOROBENZENE	0.5	ND
1,2-DICHLOROBENZENE	0.5	ND
1,4-DICHLOROBENZENE	0.5	ND

COMMENTS: ND = NOT DETECTED

% SURROGATE RECOVERY
84.6% BROMOCHLOROMETHANE

PROJECT MANAGER: M. Bally

DATE: 3/22/88

Analytical Technologies, Inc

ACCESSION: 16022

QUALITY CONTROL DATA: 188
METHOD 601/602 & 8010/8020

CLIENT: METRIC CORPORATION
UNITS: ng
ANALYSIS DATE: 3/2/88

	TRUE VALUE	RESULT
1,1-DICHLOROETHENE	102	93.8
CHLOROFORM	109	99.4
1,1,1-TRICHLOROETHANE	102	100
BROMODICHLOROMETHANE	118	120
TRICHLOROETHENE	105	98.5
BENZENE	99.6	89.5
TETRACHLOROETHENE	109	104
TOLUENE	103	111
CHLOROBENZENE	100	89.5

PROJECT MANAGER: M. Beiny DATE: 3/22/88

Analytical Technologies, Inc

QUALITY CONTROL DATA

CLIENT: METRIC
DATE(S) RECEIVED: 3/3/88

METHOD: 601 UNITS: ug/l
DATE ANALYZED: 3/11/88 ANALYST: TMG

SPIKE RECOVERY

LAB SAMPLE ID: 16036

PARAMETER	MATRIX % REC	DUPLICATE % REC
1,1-DICHLOROETHENE	102	104
CHLOROFORM	103	98.9
1,1,1-TRICHLOROETHANE	99.9	91.9
BROMODICHLOROETHANE	97.2	89.6
TRICHLOROETHENE	98.5	88.3
TETRACHLOROETHANE	94.1	104
BENZENE	96.0	94.9
TOLUENE	96.0	95.6
CHLOROBENZENE	94.6	103

% SURROGATE RECOVERIES

106	% BROMOCHLOROMETHANE	107%
100	% BROMOFLUOROBENZENE	106%

NOTES: NA = NOT APPLICABLE

PROJECT MANAGER: M. Baly DATE: 3/22/88

AQUIFER TESTING
AT THE
SPARTON TECHNOLOGY, INC.
COORS ROAD PLANT
ALBUQUERQUE, NEW EMXICO

PREPARED BY

METRIC CORPORATON
ALBUQUERQUE, NEW MEXICO

NOVEMBER 18, 1988

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APPENDIX B - SEMI-LOG PLOTS

AQUIFER TESTING
AT THE
SPARTON TECHNOLOGY, INC.
COORS ROAD PLANT

Aquifer tests were performed in four groundwater recovery wells at the Sparton Technology, Inc., Coors Road Plant during September and October 1988. The purpose of the testing was to estimate well capacity and further define aquifer permeability of the "upper flow zone". The well capacities were used to develope estimates of the total capacity of the groundwater recovery system for equipment sizing and water rights requirements. The "upper flow zone" consists generally of the upper 5 to 10 feet of the saturated zone at the Coors Road site separated from the remainder of the saturated zone by a fine grained aquitard unit.

Pumping tests were conducted in four wells, MW-23 and MW-26 located along the south side of the plant building, MW-27 located along the west side of the plant building and MW-28 located at the west property corner. Each of the four wells are included in the groundwater recovery system.

The tests were conducted as follows:

Well: MW-23
Test Type: Constant Discharge
Test Drawdown: 2.5 ft.
Available Drawdown: 7.7 ft.
Duration of Pumping: 72.0 hrs.
Average Discharge: 0.26gpm
Observations Taken in Wells: MW-23

Well: MW-26
Test Type: Constant Discharge
Test Drawdown: 2.5 ft.
Available Drawdown: 13.4 ft.
Duration of Pumping: 71.1 hrs.
Average Discharge: 0.019gpm
Observations Taken in Wells: MW-26

Well: MW-27
Test Type: Constant Discharge
Test Drawdown: 2.2 ft.
Available Drawdown: 8.0 ft.
Duration of Pumping: 70.0 hrs.
Average Discharge: 0.117gpm
Observations Taken In Wells: MW-27

Well: MW-28
Test Type: Constant Discharge
Test Drawdown: 2.67 ft.
Available Drawdown: 4.1 ft.
Duration of Pumping: 72.0 hrs.
Average Discharge: 0.0705gpm
Observations Taken in Wells: MW-28

Each of the pumped wells are 2-inch, i.d. PVC wells with wire-wound stainless steel screens. The wells were installed in 7-inch diameter hollow stem auguer borings. They were pumped with a 1.66-inch o.d. positive displacement piston pump having a maximum discharge of about 2.5gpm. Water levels in the pumped wells were monitored with an airline and a water monometer. All water level measurements were taken to the nearest 0.01 feet. Discharge measurements were made with a graduated cylinder and stop watch.

The water level and discharge data collected during each test are presented in APPENDIX A. The data were analyzed using semi-log plots of time-duration and residual drawdown data (see APPENDIX B).

The time-drawdown data were checked using a procedure suggested by Johnson, 1972 to ensure that $u<0.05$ and, thus, validate the use of the Jacob solution. In the equation $u = \frac{1,87r^2S}{Tt}$, u was set equal to 0.05, and the time, t, was determined after which the Jacob solution is valid. The effective radii of the wells were assumed to be 0.29 ft. because the wells were installed in

7-inch (0.58 ft.) diameter boreholes. TABLE 1 shows that all but the early data are valid. The selected hydraulic conductivities were all determined from data for which the Jacob solution is valid.

The data were also checked using a procedure suggested by Schafer, 1978 to determine which portion of the data might be casing storage affected. The early portion of the time-drawdown data is casing storage affected in each case as shown in TABLE 2.

For determination of aquifer permeability, the residual draw data were used rather than the time-drawdown data because the time-drawdown was affected by fluctuations in the pump discharge and because the residual drawdown data is generally considered to be more reliable when only pumped well data are available as is the case here. Additionally, the middle or late residual drawdown data were used because the early data appears to be casing storage affected.

Based on the above described testing, it is the opinion of the investigators that the best estimate for the permeability (hydraulic conductivity) of the upper flow zone in the vicinity of each of the wells tested is as follows (see TABLE 3):

Well	Hydraulic Conductivity (cm/sec)
MW-23	8.54×10^{-4}
MW-26	3.91×10^{-5}
MW-27	9.08×10^{-4}
MW-28	1.07×10^{-3}

TABLE 1

JACOB VALIDATION

Well	r (ft)	T (gpd/ft)	t days	t min.
MW-23	0.29	139	0.0045	6.52
MW-26	0.29	11.1	0.057	81.6
MW-27	0.29	154	0.0041	5.88
MW-28	0.29	93.1	0.0068	9.73

$$t = \frac{1.87 \quad r^2 \quad S}{uT} = \frac{1.87 \ (.29)^2 \ (.2)}{0.05(T)}$$

S = 0.20

u = 0.05

TABLE 2

CASING STORAGE AFFECT

Well	Q (gpm)	S (ft)	Q/S (gpm/ft)	tc (min)
MW-23	0.264	2.2	0.12	7.6
MW-26	0.019	2.3	0.0082	112
MW-27	0.117	3.0	0.0390	23.5
MW-28	0.0705	1.1	0.0641	14.3

$d_c = 2.07$

$d_p = 1.66$

$$tc = \frac{0.6\ (dc^2 - dp^2)}{Q/S} = \frac{0.6\ (2.07^2 - 1.66^2)}{Q/S}$$

$$= \frac{0.9176}{Q/S}$$

TABLE 3

AQUIFER TESTING
SPARTON TECHNOLOGY, INC. COORS ROAD PLANT

Pumped Well	Observations At	Curve	Apparent T (gpd/ft)	b (ft)	Hydraulic Conductivity ft/day	Hydraulic Conductivity cm/sec	Comments
MW-23	MW-23	Early T-D	33.0				Casing storage affected
		Late T-D	456				
		Early R-D	45.0				Casing storage affected
		Late R-D	139	7.7	2.42	8.54×10^{-4}	Selected
MW-26	MW-26	Early T-D	1.58				Casing storage affected*
		Late T-D	24.9				
		Early R-D	2.94				Casing storage affected
		Late R-D	11.1	13.4	0.11	3.91×10^{-5}	Selected
MW-27	MW-27	Early R-D	27.3				
		Late R-D	154	8.0	2.57	9.08×10^{-4}	Selected
MW-28	MW-28	Early T-D	18.1				Casing storage affected
		Middle T-D	62.0				
		Late T-D	19.6				Impermeable boundary
		Early R-D	27.8				Casing storage affected
		Middle R-D	93.1	4.1	3.04	1.07×10^{-3}	Selected
		Late R-D	12.0				Impermeable boundary

* Jacob Solution Not Valid

The residual-drawdown curves (APPENDIX B) for MW-23, MW-26, MW-27, and to a lesser extent MW-28, show evidence that a "recharge effect" may be occurring during the pumping period. The residual drawdown curves show a t/t' value greater than 2 at zero drawdown, suggesting a "recharge effect". Possible explanations of the apparent "recharge effect" include reduction or reversal of prevailing downward vertical leakage in the cone of depression during the test or induced flow from a more permeable burried channel(s) existing within the upper flow zone.

Estimated well capacities have been computed for each of the wells included in the groundwater recovery system (see TABLE 4). The capacities were computed based on specific capacities observed in testing to date (see METRIC Corp., April 1987 and May 1988) and assuming 100% drawdown. This would tend to yield conservatively high values, however, MW-24 has undergone additional development since it was tested. This might increase its capacity beyond that shown in TABLE 4.

TABLE 4

ESTIMATED WELL CAPACITIES

Well #	Pumping Time(hrs)	Drawdown (ft)	Discharge (gpm)	Specific Capacity (gpm/ft)	Available Drawdown (ft)	Estimated Capacity (gpm)
18	49.0	5.02	0.264	0.0526	12.6	0.66
23	72.0	2.47	0.260	0.1054	7.65	0.81
24	73.2	3.26	0.205	0.0629	8.1	0.51
25	68.8	3.0	0.317	0.106	7.3	0.77
26	71.1	2.53	0.019	0.008	13.4	0.10
27	70.0	2.21	0.117	0.053	8.0	0.42
28	72.0	2.67	0.070	0.026	4.1	0.11
PW-1	69.6	2.12	0.13	0.06	4.3	0.26
					Total	3.64

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METRIC Corporation April 1987, Aquifer Testing at Sparton Technology, Inc., Coors Road Plant.

METRIC Corporation, May 1981, Aquifer Testing at Sparton Technology, Inc., Coors Road Plant.

Schafer, David C., 1978, Casing Storage Can Affect Pump Testing Data, The Johnson Drillers Journal.

APPENDIX A
PUMP TEST DATA

METRIC Corporation

Date: 9-27-88

Pumped Well MW-23

Measurements at Well MW-23

Pump Speed: _____ Q: 0.26417 gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min.sec/ℓ)
27 8:15:00	0			0	
15	.25			0.60	
30	.5			0.59	
45	.75			0.56	
16:00	1.0			0.11	
16:30	1.5			0.42	
17:00	2.0			0.60	
17:30	2.5			0.56	
18:00	3.0			0.66	
18:30	3.5			0.97	
19:00	4.0			0.41	
19:30	4.5			-	
20:00	5.0			0.86	
21	6			1.88	
22	7			2.06	
23	8			2.45	
24	9			2.16	
25	10			2.26	
27	12			2.37	1'09"/ℓ
29	14			2.43	
31	16			2.42	
33	18			2.19	
35	20			1.93	1'09"/ℓ
40	25			2.06	1'07"/ℓ
45	30			2.08	1'07"/ℓ
50	35			2.11	1'00"/ℓ
9:00	45			2.41	1'00"/ℓ
9:30	75			2.43	55"/ℓ
10:00	105			2.31	1'09"
10:30	135			2.16	1'05"

Date: 9-27-88

METRIC Corporation

Pumped Well MW-23

Measurements at Well MW-23

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min.sec/ℓ)
11:00	165			2.75	1'0"
12:00	225			2.75	47" adj 56"
13:00	285			2.86	59" 58"
14:00	345			3.00	49" adj
15:00	405			3.01	49" adj
16:00	465			2.89	59"
17:00	525			2.51	1'3"
18:00	585			2.52	1'5"
19:00	645			2.46	1'16" adj 1'00"
20:00	705			2.51	1'01"
21:00	765			2.66	1'01"
22:00	825			2.55	0'59"
23:00	885			2.39	1'02"
24:00	945			2.47	1'05"
1:00	1005			2.45	1'06"
2:00	1065			2.46	1'05"
3:00	1125			2.36	1'05"
4:00	1185			2.42	1'03"
5:00	1245			2.39	1'02"
6:00	1305			2.44	1'01"
7:00	1365			2.44	1'4"
8:00	1425			2.54	1'6" adj
9:00	1485			2.60	57"
10:00	1545			2.58	55" adj
11:00	1605			2.57	56" adj
12:00	1665			2.66	1'0"
13:00	1725			2.66	58"
14:00	1785			2.70	55" adj
15:00	1845			2.62	55" adj
16:00	1905			2.63	55" adj

METRIC Corporation

Date: 9-27-88

Pumped Well MW-23

Measurements at Well MW-23

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
-28	17:00	1965			2.51	60"
	18:00	2025			2.80	1'6" adj
	19:00	2085			2.37	1'01"
	20:00	2145			2.58	1'02"
	21:00	2205			2.51	1'05"
	22:00	2265			2.59	0'58"
	23:00	2325			2.44	1'00"
	24:00	2385			2.43	1'00"
29	1:00	2445			2.46	1'03"
	2:00	2505			2.48	1'01"
	3:00	2565			2.37	1'04"
	4:00	2625			2.53	0'58"
	5:00	2685			2.49	0'57"
	6:00	2745			2.45	1'02"
	7:00	2805			2.56	0'57"
	8:00	2865			2.71	1'2"
	9:00	2925			2.58	1'0"
	10:00	2985			2.52	1'0"
	11:00	3045			2.62	1'02"
	12:00	3105			2.64	58"
	13:00	3165			2.73	1'0"
	14:00	3225			2.88	52" adj
	15:00	3285			2.55	58"
	16:00	3345			2.59	56"
	17:00	3405			2.64	1'
	18:00	3465			2.71	1'6" adj
	19:00	3525			2.60	59"
	20:00	3585			2.49	59"
	21:00	3645			2.56	1'6"
	22:00	3705			2.44	58"

METRIC Corporation

Date: 9-27-88

Pumped Well MW-23

Measurements at Well MW-23

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
23:00	3765			2.34	1'03"
24:00	3825			2.65	1'05"
1:00	3885			2.53	56"
2:00	3945			2.37	1'07" 1'01"
3:00	4005			2.39	1'04"
4:00	4065			2.58	1'02"
5:00	4125			2.24	1'02"
6:00	4185			2.27	1'06" adj
7:00	4245			2.47	58"
8:00	4305			2.46	1'04"
8:15:15	4320.25	.25	17,281	1.39	Pump off @8:15
:30	4320.50	.50	8,641	0.83	
:45	4320.75	.75	5,761	0.68	
8:16:00	4321.00	1.0	4,321	0.36	
8:16:30	4321.5	1.5	2,881	0.19	
8:17:00	4322.0	2.0	2,161	0.14	
8: :30	4322.5	2.5	1,729	0.09	
8:18:00	4323.0	3.0	1,441	0.07	
:30	4323.5	3.5	1,235	0.07	
19:00	4324.0	4.0	1,081	0.07	
:30	4324.5	4.5	961	0.07	
20:00	4325.0	5.0	865	0.08	
21:00	4326	6	721	0.07	
22:00	4327	7	618	0.06	
23:00	4328	8	541	0.07	
24:00	4329	9	481	0.08	
25:00	4330	10	433	0.09	
27:00	4332	12	361	0.07	
29:00	4334	14	310	0.08	
30:00	4336	16	271	0.08	

METRIC Corporation

Date: 9-27-88

Pumped Well MW-23

Measurements at Well MW-23

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min.sec/ℓ)
33:00	4338	18	241	0.05	
35:00	4340	20	217	0.07	
40:00	4345	25	174	0.07	
45:00	4350	30	145	0.07	
50:00	4355	35	124	0.07	
55:00	4360	40	109	0.07	
9:00	4365	45	97	0.07	
9:15	4380	60	73	0.06	
9:30	4395	75	59	0.06	
10:00	4425	105	42	0.06	
11:00	4485	165	27	0.04	
11:30	4515	195	23	0.03	
13:19	4624	304	15	0.03	
15:10	4735	415	11	0.02	
17:01	4846	526	9	0.00	

METRIC
Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: 0.01887 gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
14	8:05:00	0			0	
	:15	0.25			0.23	
	:30	0.50			0.47	
	:45	0.75			0.67	
	6:00	1.00			0.93	
	:30	1.50			1.37	
	7:00	2.00			1.76	
	:30	2.50			2.20	
	8:00	3.00			2.27	
	:30	3.50			2.28	
	9:00	4.00			2.28	
	:30	4.50			2.29	
	10:00	5.00			2.33	
	11:00	6			2.37	
	12	7			2.41	
	13	8			2.38	
	14	9			2.38	
	15	10			2.41	
	17	12			2.57	
	19	14			2.53	14 min/ℓ
	21	16			2.52	
	23	18			2.50	
	25	20			2.28	
	30	25			2.44	
	35	30			2.62	14
	40	35			2.77	
	50	45			3.03	14
	9:00	55			2.71	11
	9:20	75			2.61	14
	9:40	95			2.48	12

Date: 9-14-88

METRIC
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Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
14	10:00	115			3.53	8
	10:30	145			3.48	10
	11:00	175			2.57	14, 12
	11:30	205			2.25	11, 14
	12:00	235			2.83	13, 11
	13:00	295			2.15	12, 15
	14:00	355			3.55	12, 11, 13, 12, 9
	15:00	415			3.72	15, 15, 11, 9, 9, 16
	16:00	475			3.25	16, 10, 12
	17:00	535			3.25	11, 10, 9, 11, 11
	18:00	595			2.85	10, 11, 11, 11
	19:00	655			3.03	10, 13, 15, 11
	20:00	715			2.55	10, 13, 15
	21:00	775			2.42	11, 13, 11, 12
	22:00	835			2.35	12, 11, 9, 9
	23:00	895			2.47	13, 12, 14, 11
	24:00	955			2.88	11, 9, 13, 10, 17
15	1:00	1015			2.07	16, 12, 17, 17
	2:00	1075			1.68	12, 11, 16
	3:00	1135			3.24	14, 13, 15, 13
	4:00	1195			1.50	11, 9, 10, 9
	5:00	1255			5.17	9, 8, 12, 10
	6:00	1315			4.75	10, 11, 17, 10
	7:00	1375			4.60	13, 11
	8:00	1435			2.78	9, 12, 17
	9:00	1495			2.26	
	9:05	1500			2.18	
	9:10	1505			2.10	15
	9:15	1510			2.76	
	9:20	1515			1.84	

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
-15	9:25	1520			2.57	14
	30	1525			3.30	
	35	1530			2.46	13
	40	1535			2.08	
	45	1540			2.00	
	50	1545			1.72	15
	55	1550			2.77	
	10:00	1555			2.63	
	05	1560			2.78	12
	10	1565			2.85	
	15	1570			2.83	
	20	1575			2.93	11
	25	1580			3.05	
	30	1585			2.82	11
	35	1590			2.78	
	40	1595			3.17	10
	45	1600			2.76	
	50	1605			2.05	
	55	1610			1.84	
	11:00	1615			1.92	
	05	1620			1.77	22
	10	1625			2.30	
	15	1630			2.65	
	20	1635			2.54	
	25	1640			2.20	
	30	1645			1.99	14
	35	1650			2.90	
	40	1655			3.14	
	45	1660			2.07	
	50	1665			2.44	14

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
-15 11:55	1670			2.59	
12:00	1675			2.70	12
05	1680			2.53	
10	1685			2.43	
15	1690			2.55	13
20	1695			2.53	
25	1700			2.49	
30	1705			2.52	14
35	1710			2.30	
40	1715			2.06	14
45	1720			2.70	
50	1725			2.35	
55	1730			1.89	
13:00	1735			2.10	
05	1740			2.45	16
10	1745			2.31	
15	1750			2.29	
20	1755			2.32	14
25	1760			2.32	
30	1765			2.21	
35	1770			2.39	
40	1775			2.47	12
45	1780			2.58	
50	1785			2.49	
55	1790			2.54	
14:00	1795			2.55	14
14:05	1800			2.52	
10	1805			2.80	
15	1810			1.65	
20	1815			2.80	15

METRIC
Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
14:25	1820			2.18	
30	1825			2.77	
35	1830			3.36	9
40	1835			3.30	
45	1840			3.00	10
50	1845			2.83	
55	1850			1.83	
15:00	1855			2.74	12
05	1860			2.73	
10	1865			2.13	
15	1870			2.48	14
20	1875			3.48	
25	1880			3.44	
30	1885			2.92	
35	1890			3.15	15
40	1895			2.94	
45	1900			2.91	
50	1905			2.83	14
55	1910			2.32	
16:00	1915			2.07	
05	1920			2.16	15.5
10	1925			2.54	
15	1930			2.77	
20	1935			2.62	13.5
25	1940			2.68	
30	1945			2.44	
35	1950			2.37	14
40	1955			2.37	
45	1960			2.61	Start aerator
50	1965			2.55	12.5

Date: 9-14-88

METRIC Corporation

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
-15	16:55	1970			2.57	
	17:00	1975			2.29	
	05	1980			2.09	16
	10	1985			2.25	
	15	1990			2.26	
	20	1995			2.43	12
	25	2000			3.23	
	30	2005			3.24	
	35	2010			3.37	
	40	2015			3.15	
	45	2020			3.35	10
	50	2025			4.09	
	55	2030			4.09	10
	18:00	2035			3.78	
	05	2040			3.15	
	10	2045			3.05	15
	15	2050			2.70	
	20	2055			2.21	
	25	2060			1.98	
	30	2065			2.52	18
	35	2070			1.89	
	40	2075			2.05	
	45	2080			2.13	aerator off ready to siphon
	50	2085			2.52	14.5
	55	2090			2.56	
	19:00	2095			2.43	15
	05	2100			1.92	
	10	2105			1.48	
	15	2110			1.28	
	20	2115			1.87	12

METRIC
Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
)-15 19:25	2120			2.73	
30	2125			2.49	12
35	2130			2.78	
40	2135			2.98	11
45	2140			3.10	
50	2145			3.06	
55	2150			3.00	12
20:00	2155			3.03	
05	2160			2.67	12
10	2165			2.27	
15	2170			2.25	
20	2175			2.33	
25	2180			1.84	
30	2185			2.95	11
35	2190			3.47	9
40	2195			3.54	
45	2200			2.95	
50	2205			2.93	12
55	2210			3.20	
21:00	2215			3.10	11
05	2220			3.17	
10	2225			3.37	10
15	2230			3.35	
20	2235			3.20	11
25	2240			3.09	
30	2245			2.90	
35	2250			2.78	12
40	2255			2.61	
45	2260			2.71	13
50	2265			2.79	

METRIC
Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
-15	21:55	2270			2.72	
	22:00	2275			2.85	13
	05	2280			2.81	
	10	2285			2.50	
	15	2290			2.43	14
	20	2295			2.16	
	25	2300			1.93	12
	30	2305			3.05	
	35	2310			3.10	12
	40	2315			2.96	
	45	2320			3.15	
	50	2325			3.12	12
	55	2330			3.48	
	23:00	2335			3.07	11
	05	2340			2.57	
	10	2345			3.26	12
	15	2350			3.60	
	20	2355			3.42	10
	25	2360			3.15	
	30	2365			3.26	11
	35	2370			3.23	
	40	2375			3.16	11
	45	2380			3.11	
	50	2385			2.97	12
	55	2390			2.43	Pump Off
	24:00	2395			1.88	
	03	2398			2.08	
	05	2400			2.20	
	10	2405			2.40	
	20	2415			2.35	

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
24:25	2420			2.18	15
30	2425			2.40	
35				3.01	11
40				3.36	10
45				3.39	
50				3.48	
55				3.71	10
1:00				1.85	
05				2.27	
10				2.53	14
15				2.55	
20				2.75	
25				2.80	
30	2485			2.54	13
35				2.61	
40				2.50	
45				2.65	12
50				2.71	
55				2.75	
2:00				2.72	
05				2.71	15
10				2.40	
15				2.66	
20				2.70	12
25				3.07	10
30	2545			3.35	
35				3.05	
40				2.40	15
45				2.43	
50				2.55	13

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
55				2.45	14
3:00				2.61	
05				2.47	
10				2.59	
15				2.65	11
20				2.72	
25				1.91	11
30	2605			2.05	12
35				2.39	13
40				2.51	
45				2.37	13
50				2.33	
55				1.99	
4:00				2.60	
05				2.10	12
10				2.98	
15				3.25	10
20				3.27	
25				3.25	11
30	2665			3.15	
35				3.18	11
40				3.11	
45				3.07	
50				2.50	12
55				3.02	
5:00				2.93	13
05				2.75	
10				2.80	
15				2.60	
20				3.28	11
25				3.59	

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
)-16	5:30	2725			2.50	13
	35				2.85	
	40				2.46	
	45				3.42	11
	50				3.01	
	55				3.54	12
	6:00				2.73	
	05				2.87	11
	10				3.35	
	15				2.92	12
	20				3.25	
	25				2.77	
	30	2785			2.63	13
	35				2.81	
	40				3.26	10
	45				3.57	
	50				2.56	
	55				3.14	12
	7:00				2.36	
	05				0.98	
	10				2.69	
	15				1.95	
	20				2.82	13
	25				2.68	
	30	2845			2.46	
	35				2.80	
	40				3.08	
	45				2.51	14
	50				2.08	
	55				1.90	

METRIC
Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
8:00				2.00	
05				2.25	16
10				2.48	
15				3.30	10
20				3.40	
25				2.62	
30	2905			2.24	14
35				1.78	
40				1.53	
45				2.21	17
50				2.58	
55				2.90	11
9:00				3.12	
05				2.20	
10				2.03	
15				2.08	17
20				3.17	
25				2.29	
30	2965			2.32	
35				2.36	14
40				2.42	
45				2.38	
50				2.44	14
55				2.49	
10:00				2.46	
05				2.63	13
10				2.59	
15				2.83	12
20				2.59	
25				2.29	

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
10:30	3025			2.12	
35				2.05	15
40				2.17	
45				2.36	
50				2.44	14
55				2.27	
11:00				2.09	
05				2.17	15
10				2.30	
15				2.36	
20				2.50	
25				2.48	13
30	3085			2.57	
35				2.64	
40				2.70	12
45				2.26	
50				2.17	
55				1.93	17
12:00				1.86	
05				1.80	
10				1.63	
15				1.86	16
20				2.29	
25				2.53	
30	3145			2.74	13
35				2.43	
40				2.46	
45				2.43	14
50				2.38	
55				2.48	

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
13:00				2.35	
05				2.15	
10				2.19	
15				2.07	16
20				1.91	
25				1.18	
30	3205				Pump started-adj chattering suc
35					
40				2.80	
45				2.50	
50				2.07	18
55				2.03	
14:00				1.92	
05				1.99	16
10				1.95	
15				1.97	
20				1.93	
25				1.74	18
30	3265			2.33	
35				2.62	10
40				2.87	
45				1.81	Power off 2:43:50-2:46:06
50				2.44	12
55				2.88	
15:00				3.00	
05				2.74	
10				2.54	12
15				2.43	
20				2.44	
25				2.47	

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
9-16	15:30	3325			2.39	
	35				2.21	
	40				2.44	
	45				2.27	
	50				2.33	13
	55				2.40	
	16:00				2.39	
	05				2.18	
	10				2.28	15
	15				2.23	
	20				2.16	
	25				2.13	14
	30	3385			2.37	
	35				2.18	
	40				2.10	15
	45				2.14	
	50				2.07	
	55				2.10	15
	17:00				1.97	
	05				2.11	
	10				2.07	
	15				1.97	
	20				1.83	
	25				1.79	15
	30	3445			2.87	
	35				2.43	12
	40				2.46	
	45				2.56	
	50				2.76	
	55				2.19	15

Date: 9-14-88

METRIC Corporation

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
9-16	18:00				1.77	
	05				1.80	
	10				1.63	15
	15				2.87	
	20				3.23	
	25				2.30	12
	30	3505			2.52	
	35				2.22	
	40				2.18	14
	45				2.16	
	50				2.35	
	55				2.35	
	19:00				2.10	15
	05				1.85	
	10				1.57	15
	15				2.60	
	20				2.02	
	25				2.09	
	30	3565			2.37	14
	35				2.23	
	40				1.85	
	45				2.47	14
	50				2.48	
	55				2.34	13
	20:00				2.78	
	05				2.45	
	10				2.07	14
	15				2.70	
	20				2.03	
	25				2.17	

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
9-16	30	3625			2.45	14
	35				2.33	
	40				2.18	14
	45				2.32	
	50				2.57	
	55				2.84	12
	21:00				2.95	
	05				2.62	13
	10				2.04	
	15				2.00	
	20				2.55	14
	25				2.69	
	30	3685			2.41	
	35				2.30	13
	40				2.20	
	45				2.35	14
	50				2.81	
	55				2.72	
	22:00				2.02	13
	05				1.92	
	10				2.10	
	15				2.20	15
	20				2.11	
	25				2.40	13
	30	3745			2.46	
	35				2.74	11
	40				3.38	
	45				3.15	15
	50				1.69	
	55				1.84	

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
23:00				1.65	
05				2.34	
10				2.43	14
15				2.28	
20				2.43	14
25				2.43	
30	3805			2.37	
35				2.60	15
40				2.50	
45				2.45	
50				2.43	14
55				2.28	
24:00				2.20	
05				2.25	14
10				2.30	
15				2.88	10
20				3.20	
25				3.18	11
30	3865			2.93	
35				2.81	
40				2.10	14
45				1.25	
50				1.94	
55				2.10	15
1:00				2.56	
05				3.50	N.R.
10				3.07	
15				2.16	
20				2.01	
25				2.07	

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
1:30	3925			1.92	N.R.
35				1.66	
40				2.15	
45				2.80	
50				1.30	14
55				2.43	
2:00				2.47	
05				2.27	
10				2.31	
15				2.26	
20				2.26	13
25				2.65	
30	3985			2.48	
35				2.23	14
40				2.57	
45				2.00	
50				2.32	14
55				2.54	
3:00				3.25	9
05				2.85	
10				2.90	
15				2.82	13
20				2.85	
25				2.29	14
30	4045			2.35	
35				2.90	11
40				2.32	
45				2.25	
50				2.08	
55				1.97	N.R.

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
4:00				1.88	
05				1.74	14
10				2.77	
15				2.20	
20				1.85	
25				2.53	15
30	4105			2.54	
35				2.39	14
40				2.41	
45				2.95	14
50				2.58	
55				2.60	
5:00				2.75	13
05				2.66	
10				3.45	
15				2.77	
20				2.49	
25				2.15	
30	4165			2.09	15
35				2.40	
40				1.69	
45				1.81	15
50				1.91	
55				2.09	
6:00				2.29	14
05				3.02	
10				2.15	
15				1.97	14
20				2.13	
25				1.98	

METRIC
Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
30	4225			2.03	15
35				1.82	
40				2.06	
45				2.45	14
50				2.42	
55				2.49	13
7:00				2.52	
05				2.53	Stop Pump
10	4265			2.53	
15					
20					
25					
30					
35					
40					
45					
50					
55					
8:00					
05					
10					
15					
20					
25					
30					
35					
40					
45					
50					
55					

Date: 9-14-88

METRIC Corporation

RECOVERY

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
7:10:00	4265	0	-	2.53	
15	4265.25	0.25	17061	2.38	
30	4265.50	0.50	8531	2.28	
45	4265.75	0.75	5688	2.13	
11:00	4266.0	1.0	4266	2.01	
30	4266.5	1.5	2844	1.77	
12:00	4267.0	2.0	2134	1.63	
30	4267.5	2.5	1707	1.39	
13:00	4268.0	3.0	1423	1.29	
30	4268.5	3.5	1220	1.19	
14:00	4269.0	4.0	1067	1.10	
30	4269.5	4.5	949	1.00	
15:00	4270.0	5.0	854	0.95	
16	4271	6	712	0.77	
17	4272	7	610	0.65	
18	4273	8	534	0.57	
19	4274	9	475	0.53	
20	4275	10	428	0.46	
22	4277	12	356	0.33	
24	4279	14	306	0.27	
26	4281	16	268	0.23	
28	4283	18	238	0.20	
30	4285	20	214	0.15	
35	4290	25	172	0.15	
40	4295	30	143	0.10	
45	4300	35	123	0.06	
50	4305	40	108	0.04	
8:00	4315	50	86	0.09	
10	4325	60	72	0.05	
29	4335	70	62	0.07	

METRIC Corporation

Date: 9-14-88

Pumped Well MW-26

Measurements at Well MW-26

Pump Speed: _____ Q: _____ gpm

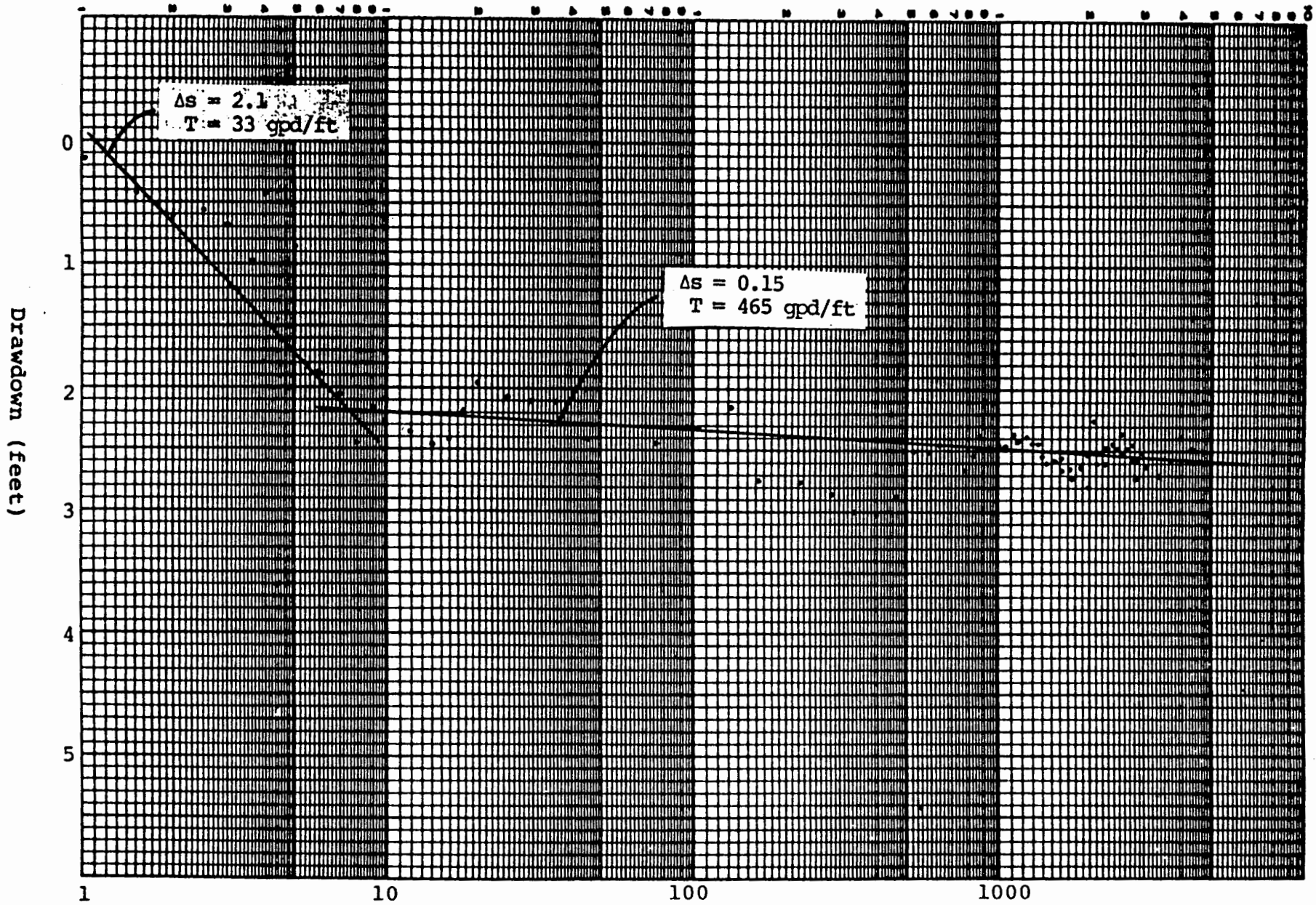
Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min/ℓ)
8:30	4345	80	54	0.06	
9:00	4375	110	40	0.07	
9:30	4405	140	31	0.07	
10:00	4435	170	26	0.05	
11:00	4495	230	20	0.03	
12:00	4555	290	16	0.01	
13:00	4615	350	13	0.04	
14:00	4675	410	11	0.05	
15:00	4735	470	10	0.07	
18:00	4915	650	7.6	0.12	

Pumped Well : MW-23
Observations at Well :MW-23

Time-Drawdown
Q = 0.264gpm

METRIC Corporation
Date: 9-27-88



APPENDIX B

SEMI-LOG PLOTS

METRIC
Corporation

Date: 10-11-88

Pumped Well MW-28

Measurements at Well MW-28

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
12:32	4332	12	361	1.82	
34	4334	14	310	1.77	
36	4336	16	271	1.71	
38	4338	18	241	1.66	
40	4340	20	217	1.62	
50	4350	30	145	1.44	
55	4355	35	124	1.33	
13:00	4360	40	109	1.26	
13:30	4390	70	63	0.85	
14:00	4420	100	44	0.56	
14:30	4450	130	34	0.32	
15:00	4480	160	28	0.20	
16:00	4540	220	21	0.07	
17:00	4600	280	16	0.01	
18:00	4660	340	14	0.00	
19:00	4720	400	12	0.00	

METRIC
Corporation

Date: 10-11-88

Pumped Well MW-28

Measurements at Well MW-28

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min.sec/ℓ)
1:00	3640			2.68	3'48"
2:00	3700			2.59	3'48"
3:00	3760			2.54	3'49"
4:00	3820			2.57	3'49"
5:00	3880			2.66	3'50"
6:00	3940			2.46	3'54" Hole Cleaned
7:00	4000			2.77	3'36"
8:00	4060			2.72	3'43"
9:00	4120			2.63	3'43"
10:00	4180			2.64	3'43"
11:00	4240			2.65	3'43"
12:00	4300			2.67	3'45"
12:20	4320	0		2.56	Pump Off
12:20:15	4320.25	.25	17,281	2.45	
:20:30	4320.50	.5	8,641		
:20:45	4320.75	.75	5,761	2.15	
:21:00	4321.0	1.0	4,321	2.14	
:21:30	4321.5	1.5	2,881	2.11	
:22:00	4322.0	2.0	2,161	2.10	
:22:30	4322.5	2.5	1,729	2.08	
:23:00	4323.0	3.0	1,444	2.06	
:23:30	4323.5	3.5	1,235	2.05	
:24:00	4324.0	4.0	1,081	2.03	
:24:30	4324.5	4.5	961	2.01	
:25:00	4325	5.0	865	2.00	
:26	4326	6	721	1.97	
:27	4327	7	618	1.94	
:28	4328	8	541	1.92	
:29	4329	9	481	1.89	
:30	4330	10	433	1.87	

METRIC
Corporation

Date: 10-11-88

Pumped Well MW-28

Measurements at Well MW-28

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
0/12 19:00	1840			2.49	3'45"
20:00	1900			2.66	3'44"
21:00	1960			2.59	3'46"
22:00	2020			2.67	3'48"
23:00	2080			2.39	3'52"
24:00	2140			2.29	4'00"
1:00	2200			2.17	4'08"
2:00	2260			2.62	3'46"
3:00	2320			2.74	3'44"
4:00	2380			2.74	3'45"
5:00	2440			2.63	3'48"
6:00	2500			2.58	3'48"
7:00	2560			2.61	3'48"
8:00	2620			2.68	3'48"
9:00	2680			2.42	3'47"
10:00	2740			2.59	3'49"
11:00	2800			2.68	3'47"
12:00	2860			2.53	3'47"
13:00	2920			2.53	3'46"
14:00	2980			2.51	3'46"
15:00	3040			2.53	3'45"
16:00	3100			2.50	3'45"
17:00	3160			2.69	3'44"
18:00	3220			2.71	3'43"
19:00	3280			2.61	3'45"
20:00	3340			2.65	3'42"
21:00	3400			2.70	3'44"
22:00	3460			2.56	3'44"
23:00	3520			2.66	3'44"
24:00	3580			2.63	3'45"

METRIC
Corporation

Date: 10-11-88

Pumped Well MW-28

Measurements at Well MW-28

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
14:30	130			1.44	4'32" adj
15:00	160			1.68	3'36" adj
15:30	190			1.58	5'26" adj
16:00	220			1.71	4'50" adj
17:00	280			1.88	2'06" adj
18:00	240			1.86	3'39" adj
19:00	400			1.73	3'49" adj
20:00	460			1.82	5'23" adj
21:00	520			1.81	3'45" tech adj.
22:00	580			1.94	3'38"
23:00	640			2.11	3'32"
24:00	700			2.20	3'48"
1:00	760			2.20	4'00"
2:00	820			2.16	3'49"
3:00	880			2.11	4'06"
4:00	940			2.18	3'55"
5:00	1000			2.19	3'47"
6:00	1060			2.30	3'47"
7:00	1120			2.21	3'47"
8:00	1180			2.33	3'47"
9:00	1240			2.30	3'43"
10:00	1300			2.43	3'44"
11:00	1360			2.52	3'46"
12:00	1420			2.59	3'45"
13:00	1480			2.69	3'43"
14:00	1540			2.45	3'42"
15:00	1600			2.48	3'43"
16:00	1660			2.50	3'46"
17:00	1720			2.52	3'43"
18:00	1780			2.54	3'44"

METRIC
Corporation

Date: 10-11-88

Pumped Well MW-28

Measurements at Well MW-28

Pump Speed: _____ Q: 0.07045 gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
12:20:00	0			0.05	
:15	.25			0.09	
:30	.50			0.16	
:45	.75			0.18	
21:00	1.0			0.21	
21:30	1.5			0.25	
22:00	2.0			0.31	
22:30	2.5			0.37	
23:00	3.0			0.42	
23:30	3.5			0.45	
24:00	4.0			0.49	
24:30	4.5			0.55	
25:30	5			0.56	
26	6			0.63	
27	7			0.70	
28	8			0.77	
29	9			0.83	Reduced motor spe
30	10			0.87	
12:32	12			0.93	
12:34	14			0.99	
36	16			1.04	
38	18			1.11	
40	20			1.13	
45	25			1.20	4'12"/ℓ
50	30			1.24	
55	35			1.23	
13:00	40			1.28	3'02"/ℓ
13:20	60			1.32	4'29'/ℓ
13:40	80			1.43	4'36"/ℓ
14:00	100				

Date: 9-20-88

METRIC Corporation

Pumped Well MW-27

Measurements at Well MW-27

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
9:20	4270	70	61	+0.03	
9:30	4280	80	54	+0.03	
10:00	4310	110	39	+0.03	
11:27					
13:49	3497	197	22	+0.03	
16:47	4539	339	13	+0.07	
	4717	407	11	+0.09	

Date: 9-20-88

METRIC Corporation

RECOVERY

Pumped Well MW-27

Measurements at Well MW-27

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
-23 8:10:00	4200	0.0		1.88	
8:10:15	4200.25	0.25	16801	1.10	
30	4200.50	0.50	8401	0.73	
45	4200.75	0.75	5601	0.47	
11:00	4201.00	1.00	4201	0.35	
11:30	4201.5	1.50	2801	0.20	
12:00	4202.0	2.00	2101	0.11	
12:30	4202.5	2.50	1681	0.09	
13:00	4203.0	3.00	1401	0.07	
13:30	4203.5	3.5	1201	0.05	
14:00	4204.0	4.0	1051	0.04	
14:30	4204.5	4.5	934	0.03	
15:00	4205.0	5.0	841	0.03	
16:00	4206	6	701	0.01	
17	4207	7	601	0.01	
18	4208	8	526	0.01	
19	4209	9	468	0.00	
20	4210	10	421	0.0	
22	4212	12	351	0.0	
24	4214	14	301	0.0	
26	4216	16	264	0.0	
28	4218	18	234	+0.01	
8:30	4220	20	211	+0.02	
35	4225	25	169	+0.02	
40	4230	30	141	+0.02	
45	4235	34	121	+0.03	
50	4240	40	106	+0.03	
55	4245	45	94	+0.02	
9:00	4250	50	85	0.03	
9:10	4260	60	71	0.03	

Date: 9-20-88

METRIC Corporation

Pumped Well MW-27

Measurements at Well MW-27

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
22	14:00	3110			2.61	2'19"/
	15:00	3170			2.61	2'29"/
	16:00	3230			2.86	2'8"/
	17:00	3290			2.48	2'23"/
	18:00	3350			2.54	2'9"/
	19:00	3410			2.87	2'11"
	20:00	3470			3.01	2'9"
	21:00	3530			2.83	2'28"
	22:00	3590			2.98	1'48" adj
	23:00	3650			2.75	2'18"
	24:00	3710			2.85	2'8"
23	1:00	3770			2.80	2'16"
	2:00	3830			2.54	2'17"
	3:00	3890			2.90	2'12"
	4:00	3950			3.11	2'10"
	5:00	4010			2.93	2'7" adj
	6:00	4070			2.80	2'19"
	7:00	4130			2.54	2'25" adj
	8:00	4190			2.22	2'14"
	8:10	4200			1.88	Stop pump

Date: 9-20-88

METRIC Corporation

Pumped Well MW-27

Measurements at Well MW-27

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
21	8:00	1310			3.24	2'10"/ℓ
	9:00	1370			2.39	2'15"/ℓ
	10:00	1430			2.36	2'17"/ℓ
	11:00	1490			2.78	2'15"/ℓ
	12:00	1550			2.87	2'17"/ℓ
	13:00	1610			2.51	2'18"/ℓ
	14:00	1670			2.47	2'15"/ℓ
	15:00	1730			2.95	2'18"/ℓ
	16:00	1790			3.15	2'17"/ℓ
	17:00	1850			3.18	2'11"/ℓ
	18:00	1910			3.68	2'10"/ℓ
	19:00	1970			3.19	2'14"
	20:00	2030			3.04	2'3" adj
	21:00	2090			3.00	2'11"
	22:00	2150			3.18	2'10"
	23:00	2210			2.85	2'10"
	24:00	2270			2.77	2'22"
2	1:00	2330			2.81	2'11"
	2:00	2390			2.94	2'6"
	3:00	2450			2.83	2'15"
	4:00	2510			2.88	2'27" adj
	5:00	2570			2.66	2'14"
	6:00	2630			2.87	-
	7:00	2690			2.58	2'15"/ℓ
	8:00	2750			3.11	2'17"/ℓ
	9:00	2810			2.56	2'17"/ℓ
	10:00	2870			2.46	adj to 2'10"
	11:00	2930			2.61	2'14'
	12:00	2990			2.71	2'12"
	13:00	3050			2.98	

METRIC Corporation

Date: 9-20-88

Pumped Well MW-27

Measurements at Well MW-27

Pump Speed: _____ Q: _____ gpm

Static Water Level _____

time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min·sec/ℓ)
-20 11:20	70			2.98	2'15"/ℓ
11:30	80			2.86	
11:40	90			2.25	2'19"/ℓ
11:50	100			2.58	
12:00	110			2.90	2'12"/ℓ
12:20	130			2.56	2'18"/ℓ
40	150			3.03	2'19"/ℓ
13:00	170			3.25	2'17"/ℓ
30	200			3.13	2'13"/ℓ
14:00	230			2.87	2'11"/ℓ
30	260			2.72	2'23"/ℓ
15:00	290			3.06	2'13",2'26",2'9",2'2
30	320			2.94	2'23", 2'14"
16:00	350			2.73	2'23", 2'19"
17:00	410			2.68	2'7", 26"
30	440			2.79	2'13"
18:00	470			2.68	2'35" adj 2'21"
19:00	530			2.69	2'14", 2'12"
20:00	590			2.85	2'10"
21:00	650			2.48	2'3", 2'25"
22:00	710			2.70	2'8"
23:00	770			2.66	2'15"
24:00	830			2.72	2'0" adj
1:00	890			2.54	2'20"
2:00	950			2.68	2'13"
3:00	1010			2.75	2'10"
4:00	1070			2.96	1'52" adj 2'16"
5:00	1130			2.88	2'10"
6:00	1190			3.01	2'17"
7:00	1250			3.38	1'48" adj 2'15"

METRIC Corporation

Date: 9-20-88

Pumped Well MW-27

Measurements at Well MW-27

Pump Speed: _____ Q: 0.11741 gpm

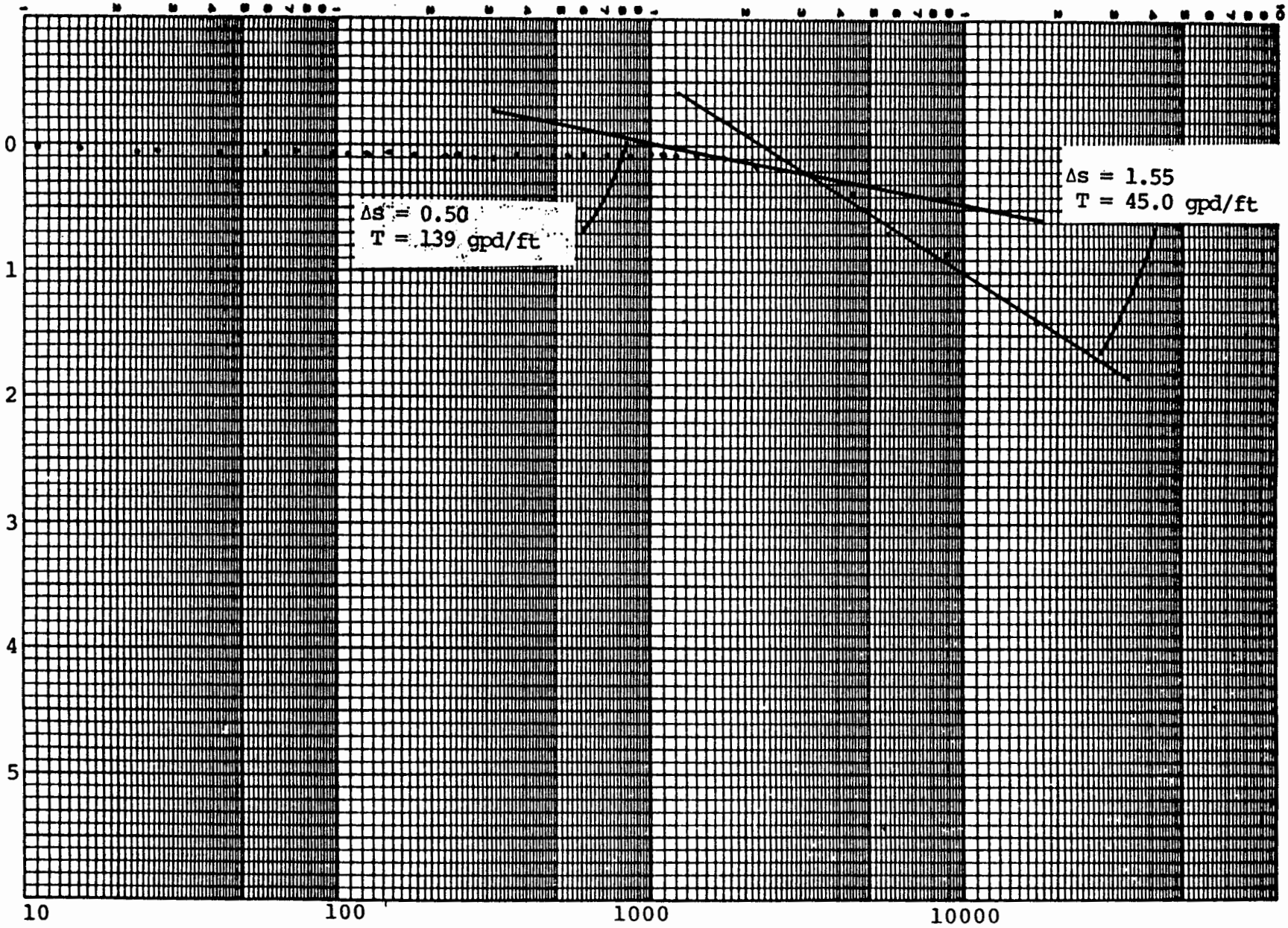
Static Water Level _____

	time (h:m:s)	t (min)	t' (min)	t/t'	Drawdown (ft)	Discharge (min.sec/ℓ)
9-20	10:10:00	0			0	
	15	.25			-	
	30	.5			0.43	
	45	.75			1.48	
	10:11:00	1			2.32	
	30	1.5			3.08	
	12:00	2.0			3.43	
	30	2.5			3.67	
	13:00	3.0			3.78	
	30	3.5			3.79	
	14:00	4.0			3.48	
	30	4.5			3.38	
	15:00	5			3.48	
	16:00	6			3.64	
	17:00	7			3.71	
	18:00	8			3.66	
	19:00	9			3.45	
	20:00	10			3.28	Discharge 2'16"/ℓ
	22	12			3.04	
	24	14			2.85	
	26	16			2.88	
	28	18			2.78	
	30	20			2.69	
	35	25			2.65	2'16"/ℓ
	40	30			2.86	
	45	35			2.80	2'10"/ℓ
	50	40			2.98	
	55	45			2.95	
	11:00:00	50			3.25	
	11:10:00	60			2.25	2'07"/ℓ

Pumped Well : MW-23
Observations at Well : MW-23

Residual-Drawdown
Q = 0.264 gpm

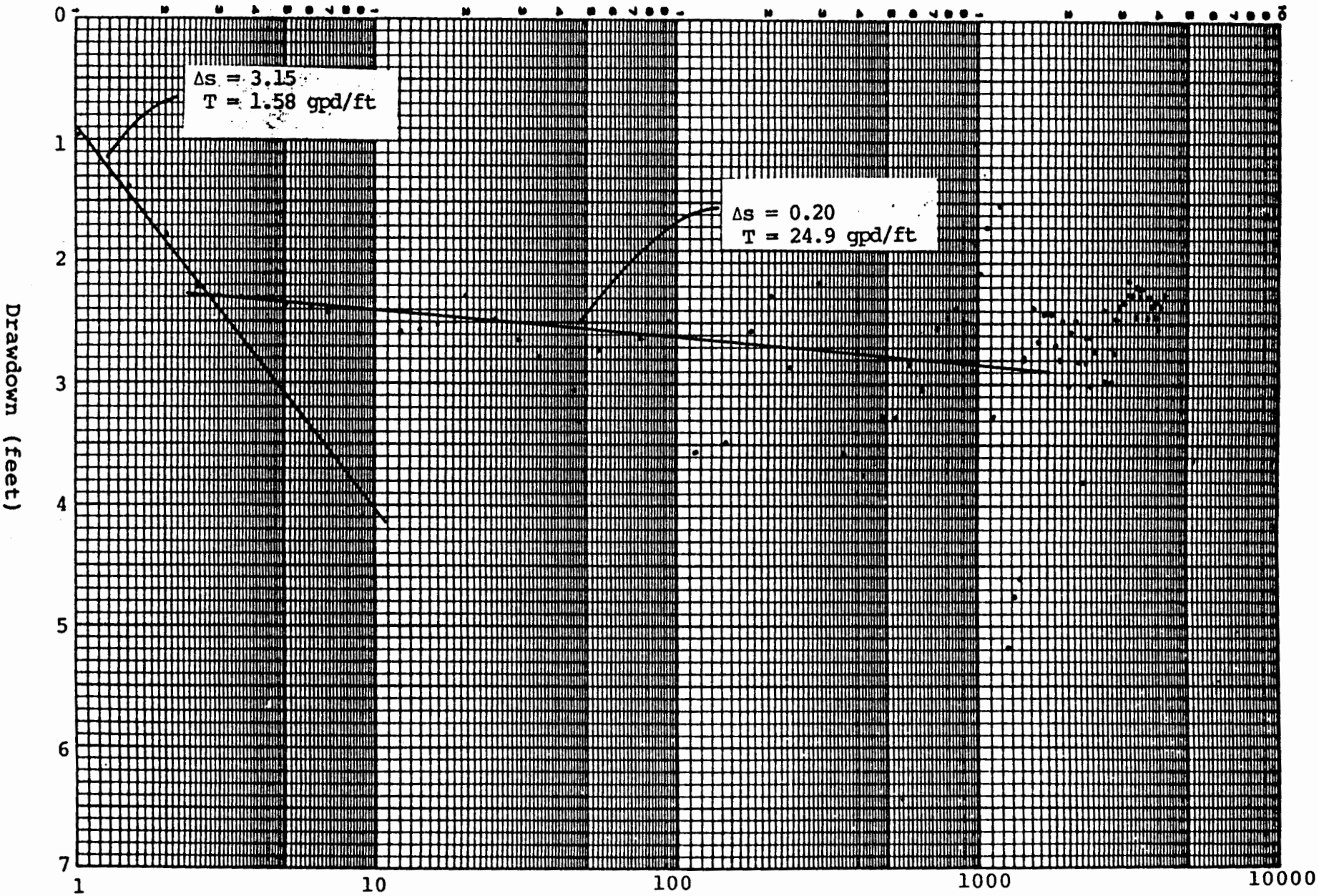
METRIC Corporation
Date: 9-27-88



Pumped Well : MW-26
Observations at Well : MW-26

Time-Drawdown
Q = .0189gpm

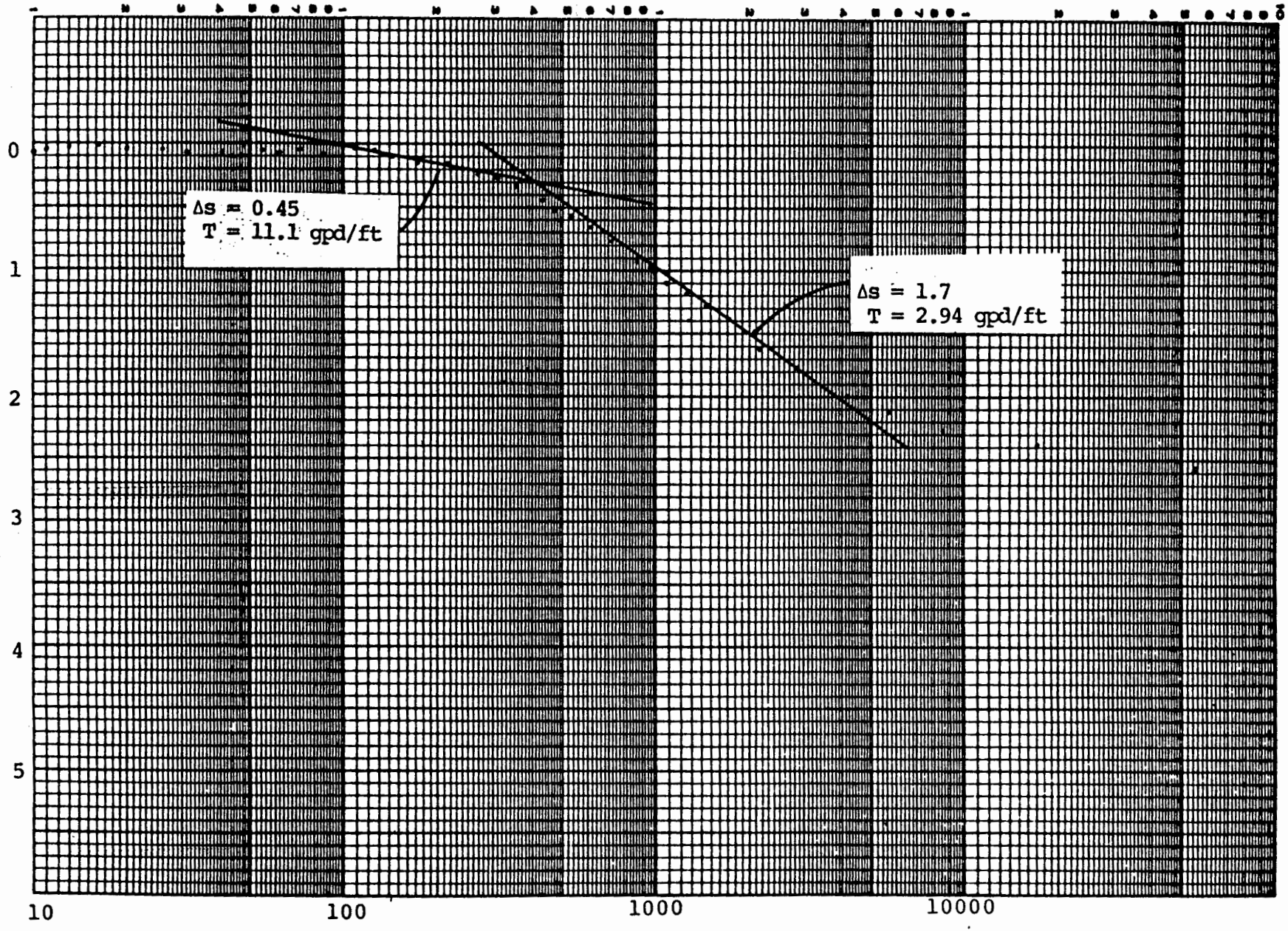
METRIC Corporation
Date: 9-14-88



Pumped Well : MW-26
Observations at Well : MW-26

Residual-Drawdown
Q = .0189gpm

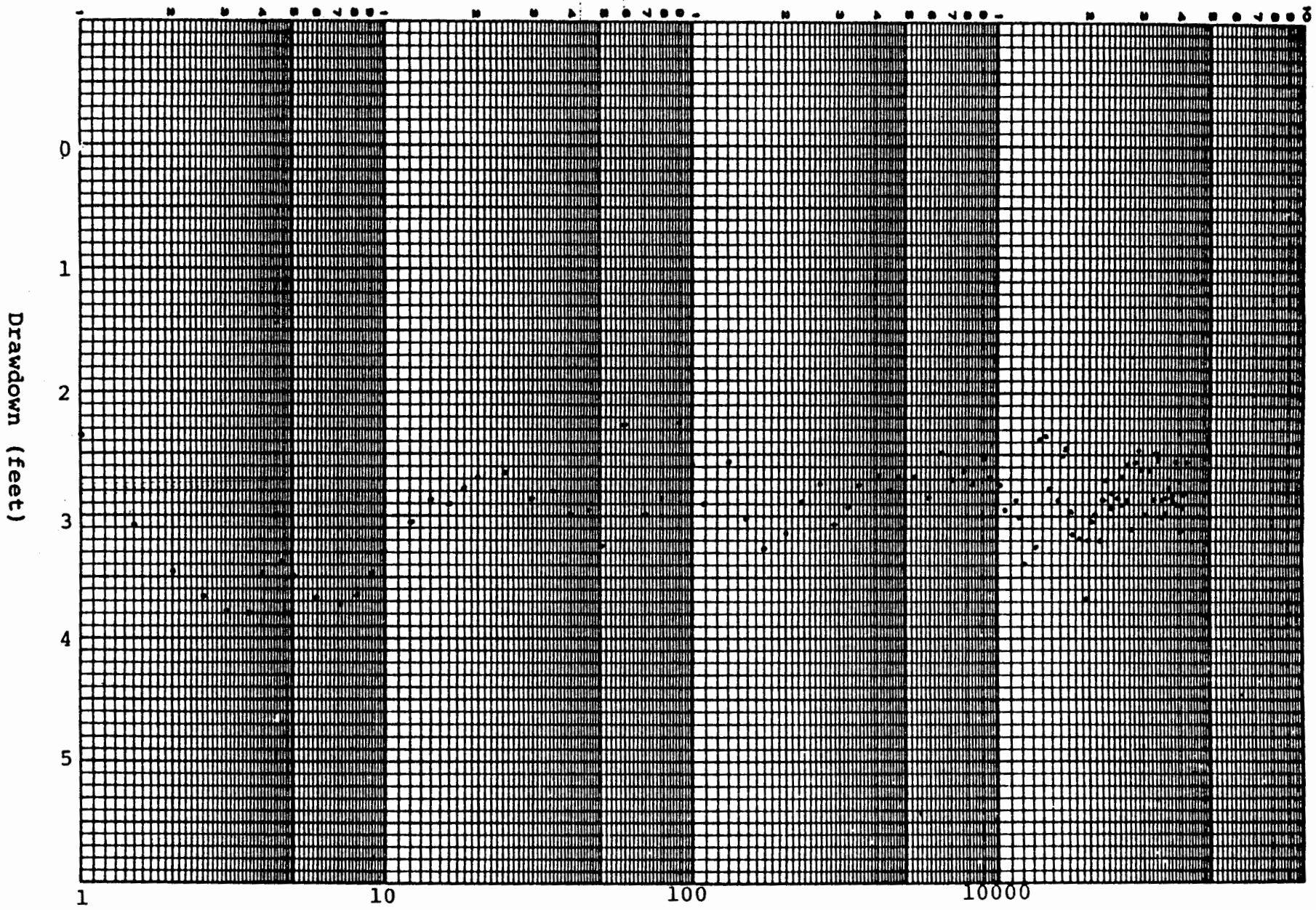
METRIC Corporation
Date: 9-14-88



Pumped Well : MW-27
Observations at Well : MW-27

Time-Drawdown
Q = 0.117gpm

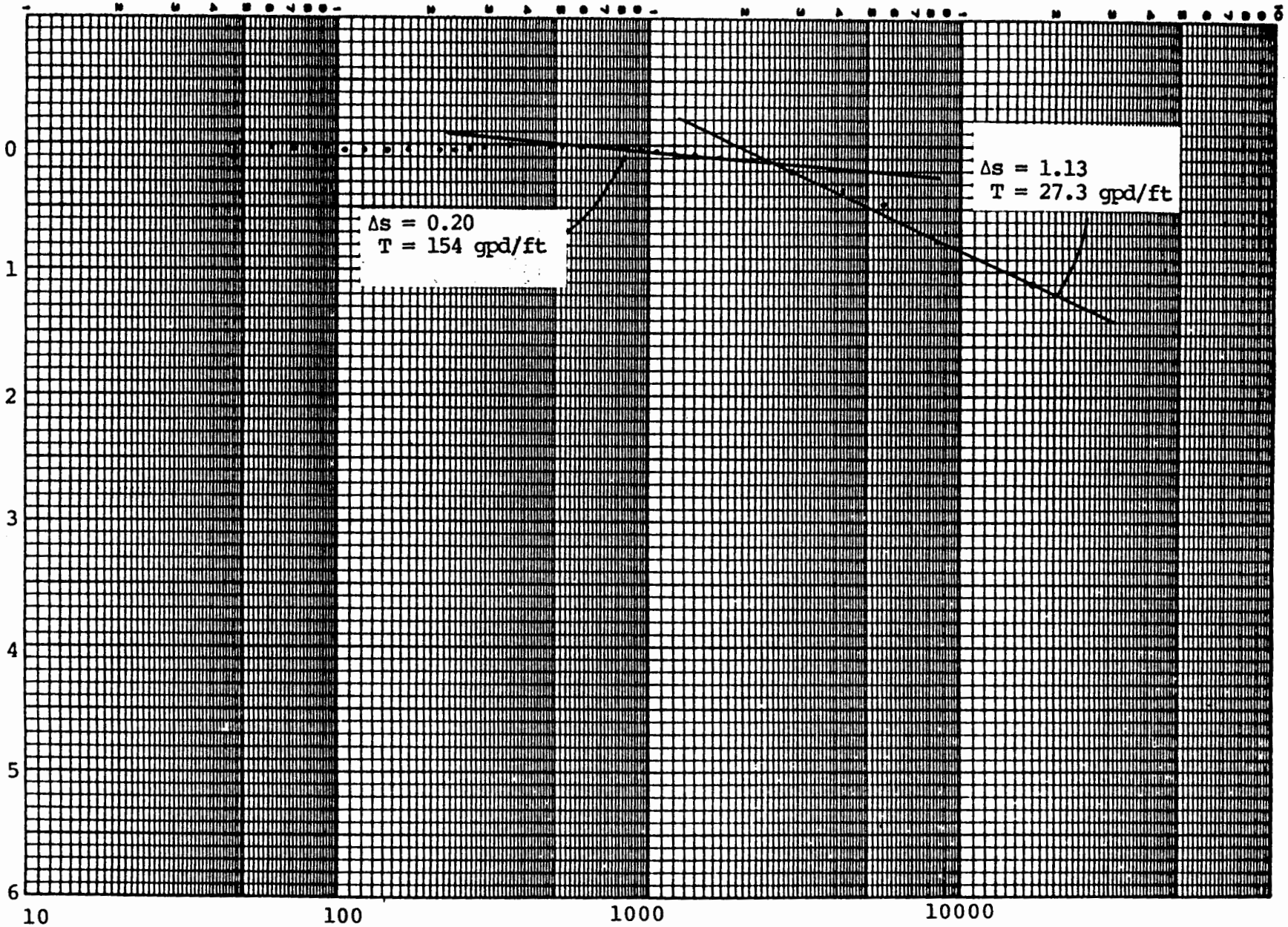
METRIC Corporation
Date: 9-20-88



Pumped Well : MW-27
Observations at Well : MW-27

Residual-Drawdown
Q = 0.117gpm

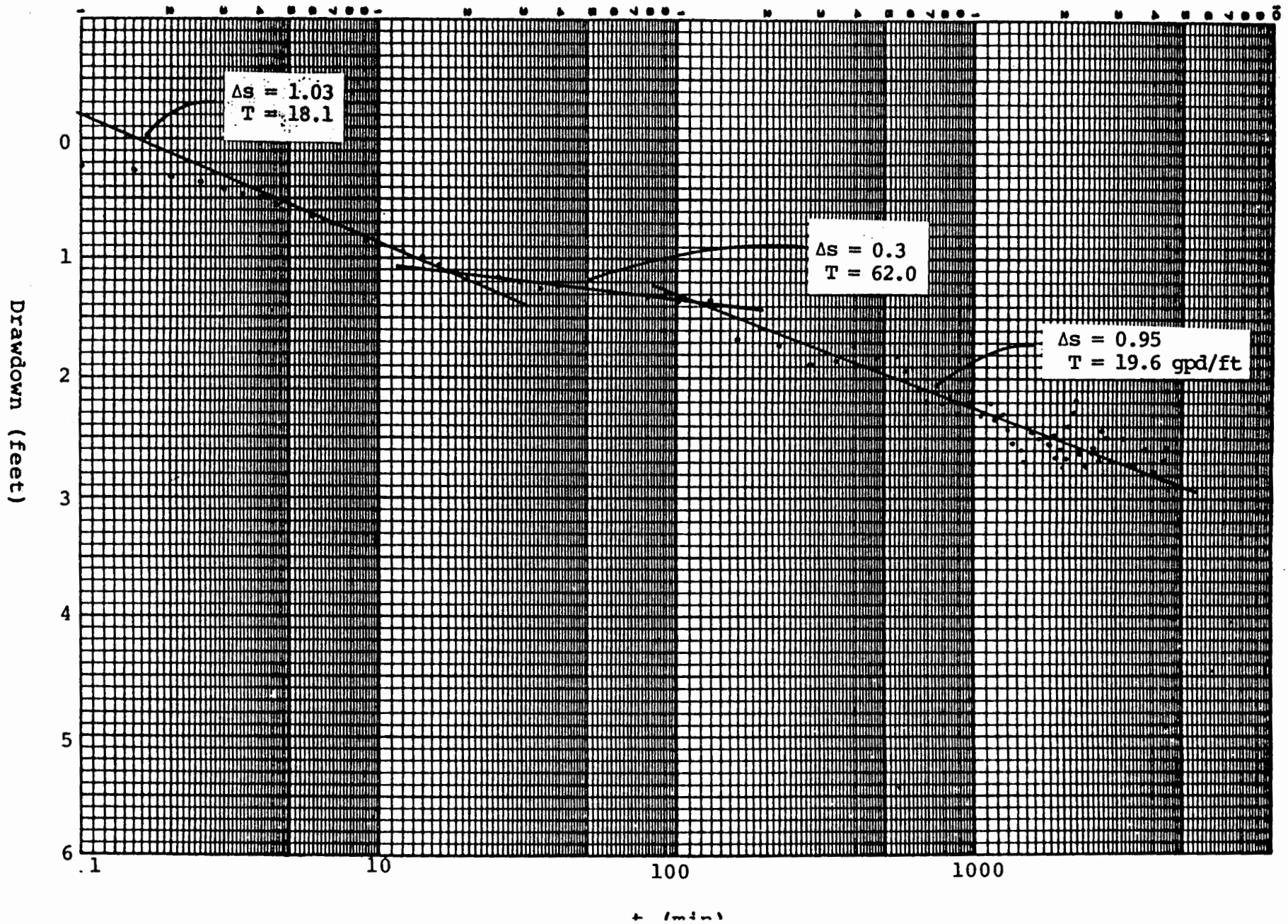
METRIC Corporation
Date: 1-20-88



Pumped Well : MW-28
Observations at Well : MW-28

Time-Drawdown
Q = .0705gpm

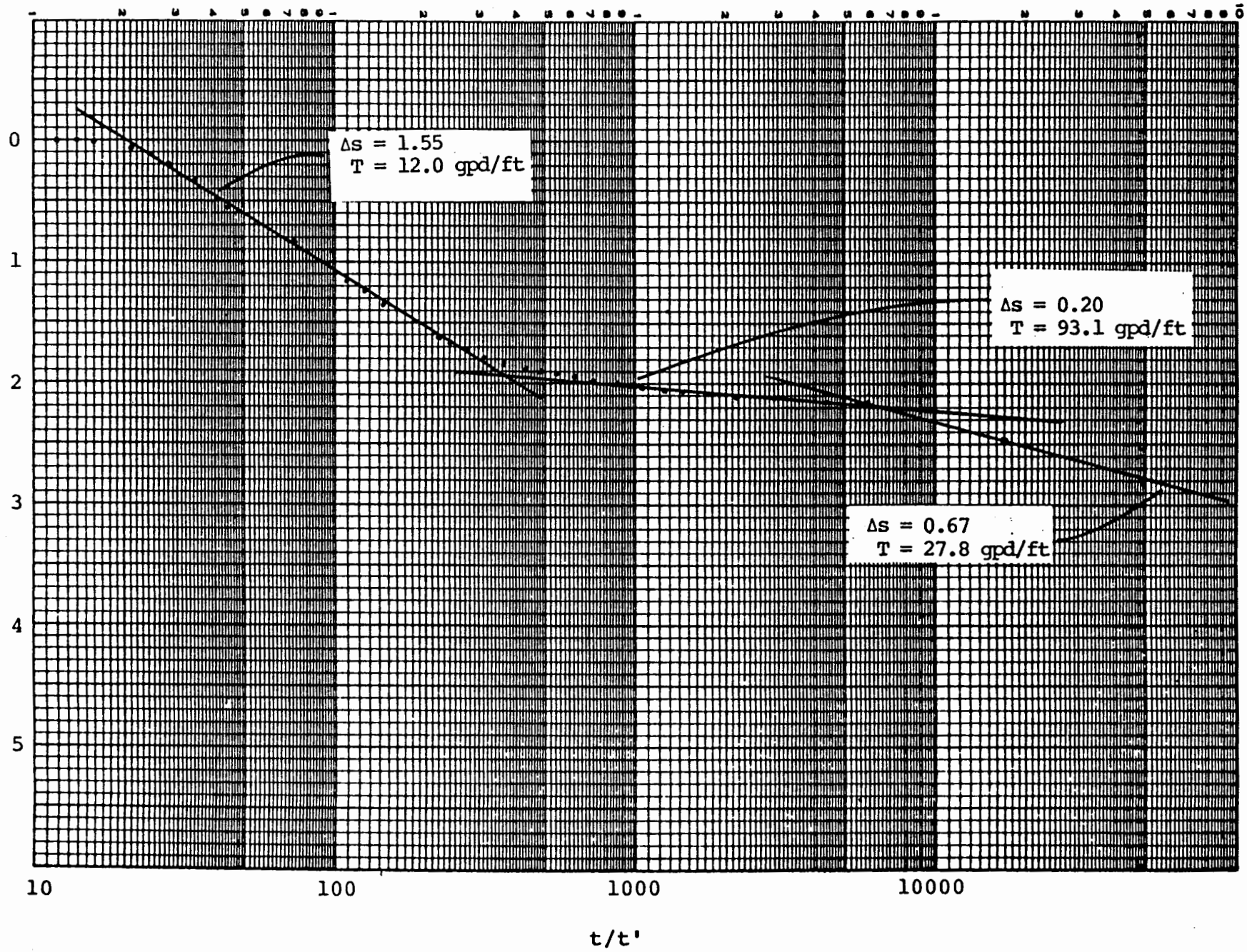
METRIC Corporation
Date: 10-11-88



Pumped Well : MW-28
Observations at Well : MW-28

Residual-Drawdown
Q = 0.0705gpm

METRIC Corporation
Date: 10-11-88



Attachment 2

- EACH OF THE RECOVERY SYSTEM WELLS HAS BEEN ANALYZED BY ACCEPTED HYDROGEOLOGICAL CALCULATIONS TO DETERMINE THE EFFECTIVE RADIUS OF INFLUENCE (R_o). R_o WAS calculated BY TAKING TRANSMISSIVITY VALUES TAKEN FROM TIME-DRAWDOWN CURVES AND APPLYING THESE VALUES TO THE FOLLOWING EQUATION:

$$S = \frac{0.3\,T\,t}{r_o^2}$$

WHERE: S = COEFFICIENT of STORAGE, dimensionless (1)
T = COEFFICIENT OF TRANSMISSIVITY, IN GALLONS PER DAY PER FOOT (GPD/FT.)
t = TIME SINCE PUMPING STARTED, IN DAYS
r_o = Intercept OF STRAIGHT LINE AT ZERO DRAWDOWN, IN FEET.

(1) STORATIVITY HAS BEEN ASSUMED TO BE 1×10^{-2} FOR AN UNCONFINED AQUIFER EXCEPT FOR MW-24 and MW-25. A CALCULATED $S = 2.5 \times 10^{-2}$ WAS TAKEN FROM A PLOTTED DISTANCE-DRAWDOWN CURVE FOR MW-24. THIS S VALUE WAS ALSO APPLIED TO MW-25 DUE TO ITS CLOSE PROXIMITY TO MW-24.

$$S = \frac{(0.3)Tt}{r_o^2}$$

① $$0.01 = \frac{(0.3)(22.8)\left(\frac{1000}{1440}\right)}{r_o^2}$$

$$r_o^2 = 475$$

$$r_o = 21.8'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; MAY, 1988 (METRIC)
TRANSMISSIVITY TAKEN FROM
TIME-DRAWDOWN CURVE

$$S = \frac{0.3\,T\,t}{r_o^2}$$

① $$0.01 = \frac{(0.3)(73)\left(\frac{10}{1440}\right)}{r_o^2}$$

$$r_o^2 = 15.2'$$

$$r_o = 3.9'$$

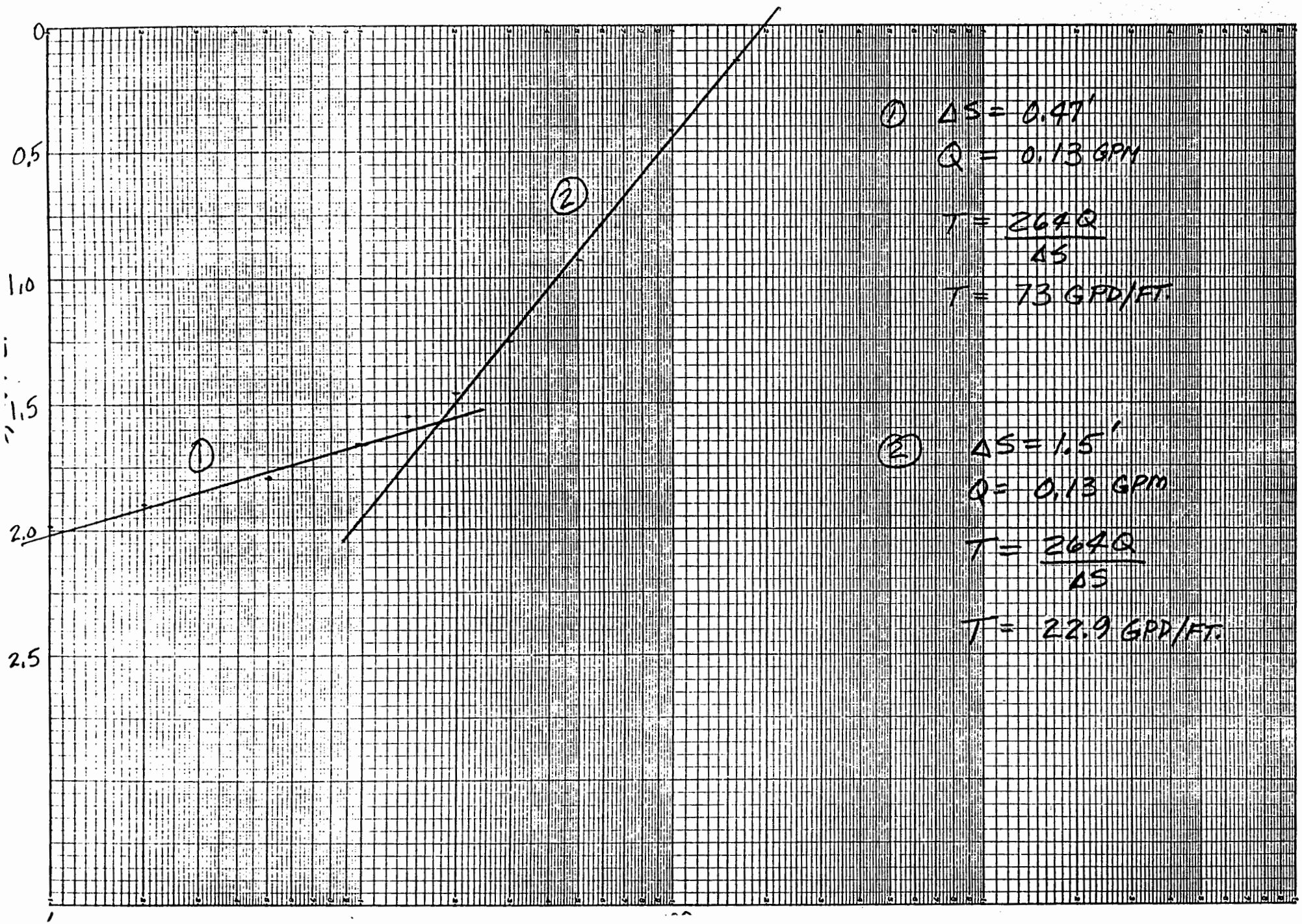
② $$0.01 = \frac{(0.3)(22.9)\left(\frac{100}{1440}\right)}{r_o^2}$$

$$r_o^2 = 47.7'$$

$$r_o = 6.9'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; MAY, 1988 (METRIC)
TRANSMISSIVITY TAKEN FROM ATTACHED RECOVERY DATA

PW-1



① $\Delta S = 0.47'$

$Q = 0.13$ GPM

$T = \frac{264Q}{\Delta S}$

$T = 73$ GPD/FT.

② $\Delta S = 1.5'$

$Q = 0.13$ GPM

$T = \frac{264Q}{\Delta S}$

$T = 22.9$ GPD/FT.

$$S = \frac{0.3\,T\,t}{r_o^2}$$

① $$0.01 = \frac{(0.3)(29)\left(\frac{100}{1440}\right)}{r_o^2}$$

$$r_o^2 = 60.4$$

$$r_o = 7.8'$$

② $$0.01 = \frac{(0.3)(87.1)\left(\frac{1000}{1440}\right)}{r_o^2}$$

$$r_o^2 = 1814.5$$

$$r_o = 42.6'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; APRIL, 1987 (METRIC)
TRANSMISSIVITY TAKEN FROM THE TIME-DRAWDOWN CURVE

Harding Lawson Associates
Engineers
and
Geoscientists

SHEET 6 OF 24
JOB NO. 6310, 039.12
DATE 1/30/90
COMPUTED BY JSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-18

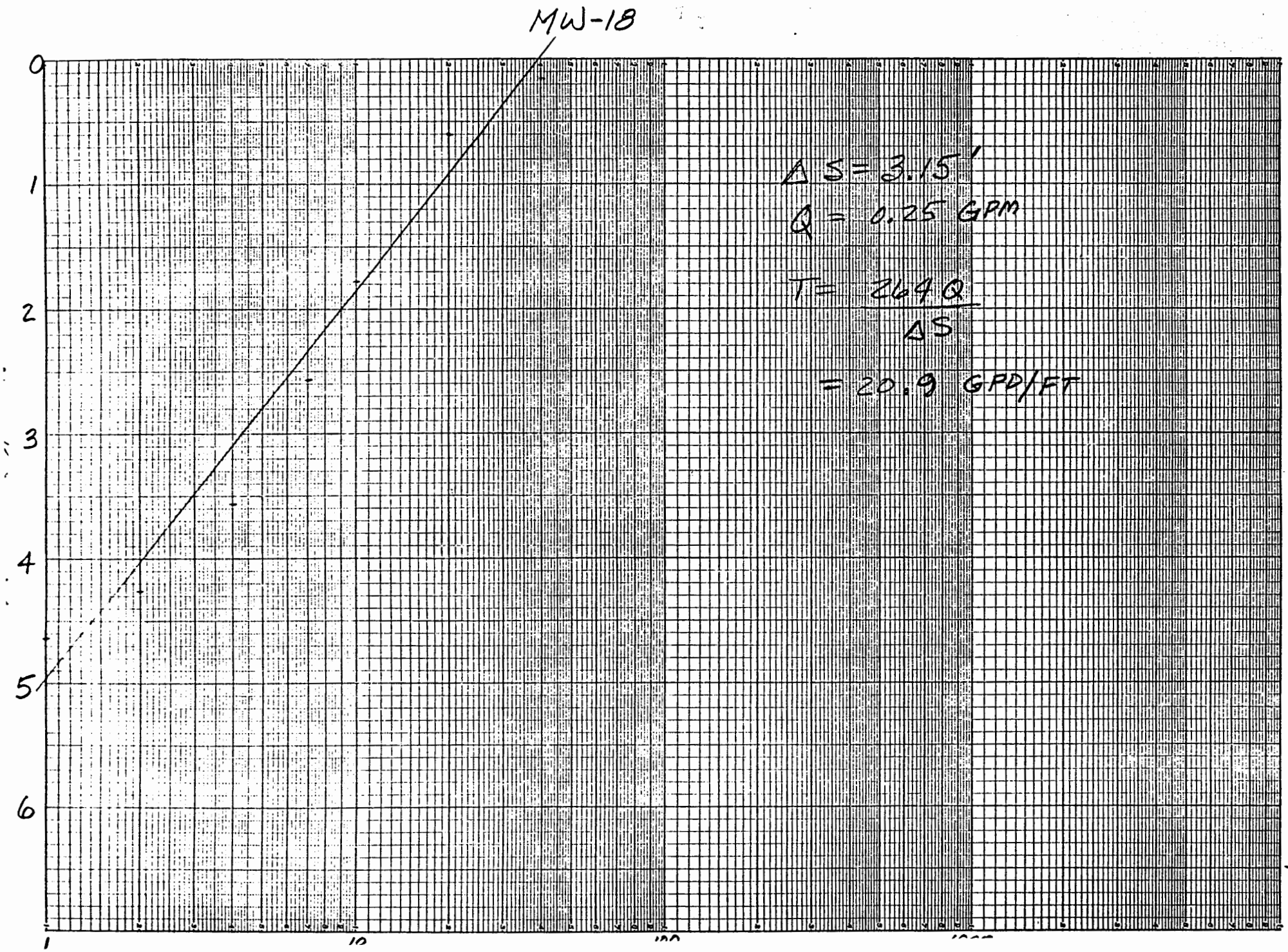
$$S = \frac{0.3\,T\,t}{r_o^2}$$

$$0.01 = \frac{(0.3)(20.9)\left(\frac{10}{1440}\right)}{r_o^2}$$

$$r_o^2 = 4.35$$

$$r_o = 2.08'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; APRIL, 1987 (METRIC) TRANSMISSIVITY TAKEN FROM THE ATTACHED RECOVERY DATA.



7/24

Harding Lawson Associates
Engineers
and
Geoscientists

SHEET 8 OF 24
JOB NO. 06310,039.12
DATE 1-22-90 (REV.)
COMPUTED BY VSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-23

$$S = \frac{0.3Tt}{r_o^2}$$

① $$0.01 = \frac{(0.3)(33)\left(\frac{10}{1440}\right)}{r_o^2}$$

$$r_o^2 = 6.875$$

$$r_o = 2.6'$$

② $$0.01 = \frac{(0.3)(465)\left(\frac{1000}{1440}\right)}{r_o^2}$$

$$r_o^2 = 9687.5$$

$$r_o = 98.4'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; NOVEMBER, 1988 (METRIC) TRANSMISSIVITY TAKEN FROM THE TIME-DRAWDOWN CURVE.

Harding Lawson Associates
Engineers
and
Geoscientists

SHEET 9 OF 24
JOB NO. 6310, 039.12
DATE 1/30/90
COMPUTED BY JSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-23

$$S = \frac{0.3Tt}{r_o^2}$$

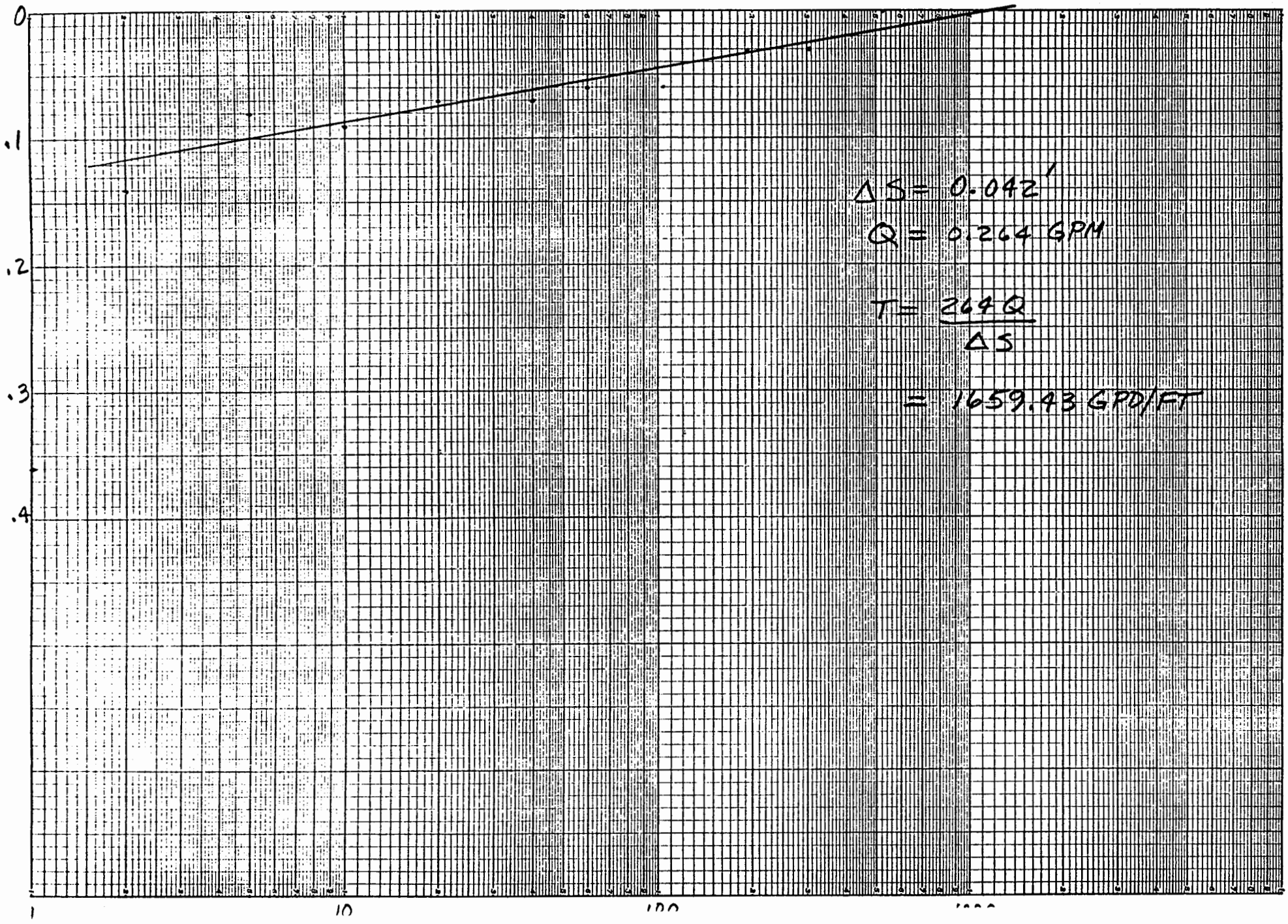
① $$0.01 = \frac{0.3(1659.43)\left(\frac{160}{1440}\right)}{r_o^2}$$

$$r_o^2 = 3457.15$$

$$r_o = 58.8'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; NOVEMBER, 1988 (METRIC)
TRANSMISSIVITY TAKEN FROM THE ATTACHED RECOVERY DATA

MW 23



$\Delta S = 0.042'$

$Q = 0.264$ GPM

$T = \frac{264\,Q}{\Delta S}$

$= 1659.43$ GPD/FT

10/24

Harding Lawson Associates
Engineers
and
Geoscientists

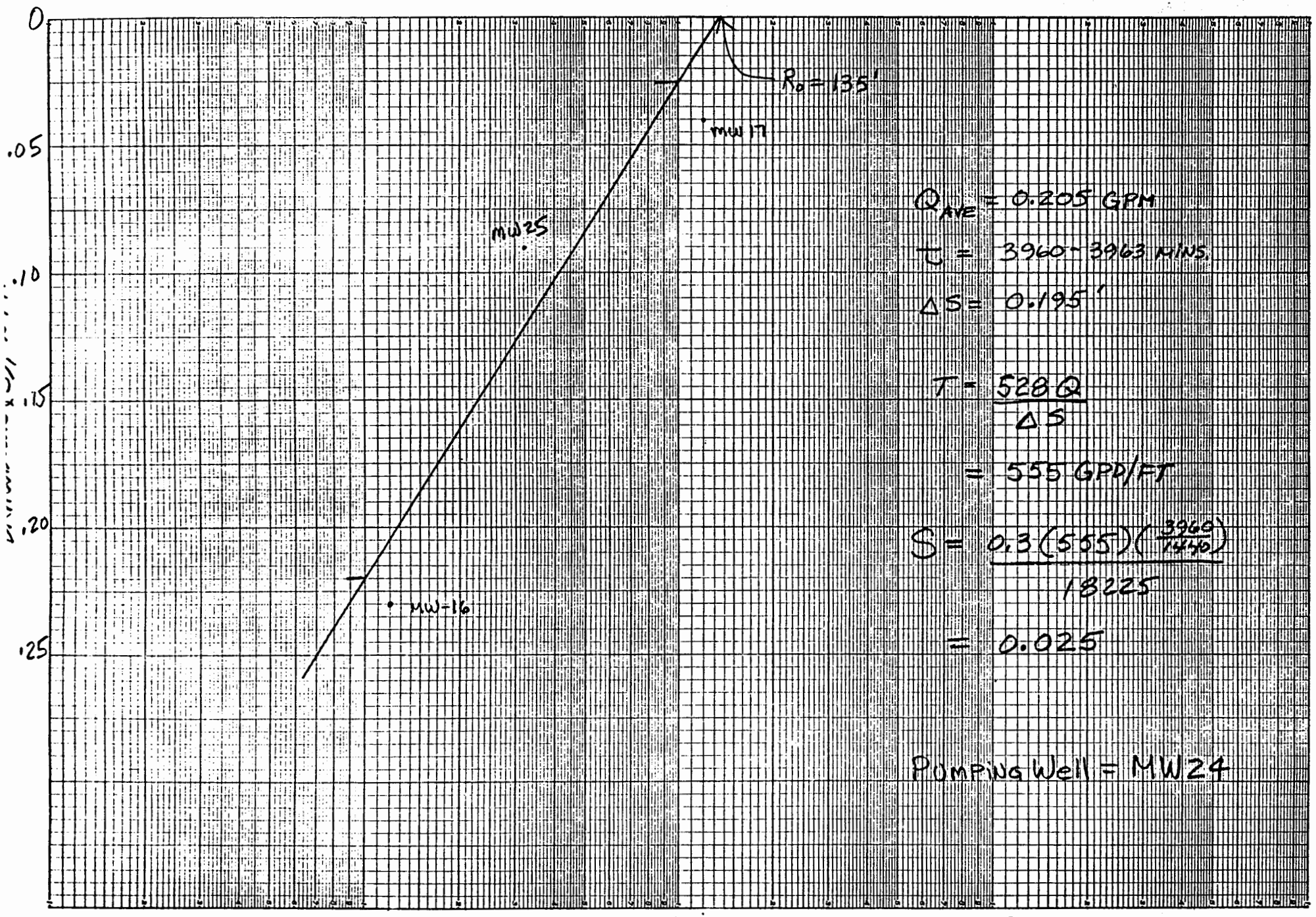
SHEET 11 OF 24
JOB NO. 6310 039.12
DATE 1-22-90
COMPUTED BY JSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-24

(1) $R_o = 135'$ as derived from THE ATTACHED DISTANCE-DRAWDOWN CURVE

(2) REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; APRIL, 1987 (METRIC)

MW-24



$Q_{AVE} = 0.205$ GPM

$\tau = 3960 - 3963$ MINS.

$\Delta S = 0.195'$

$$T = \frac{528\,Q}{\Delta S}$$

$= 555$ GPD/FT

$$S = \frac{0.3(555)\left(\frac{3960}{1440}\right)}{18225}$$

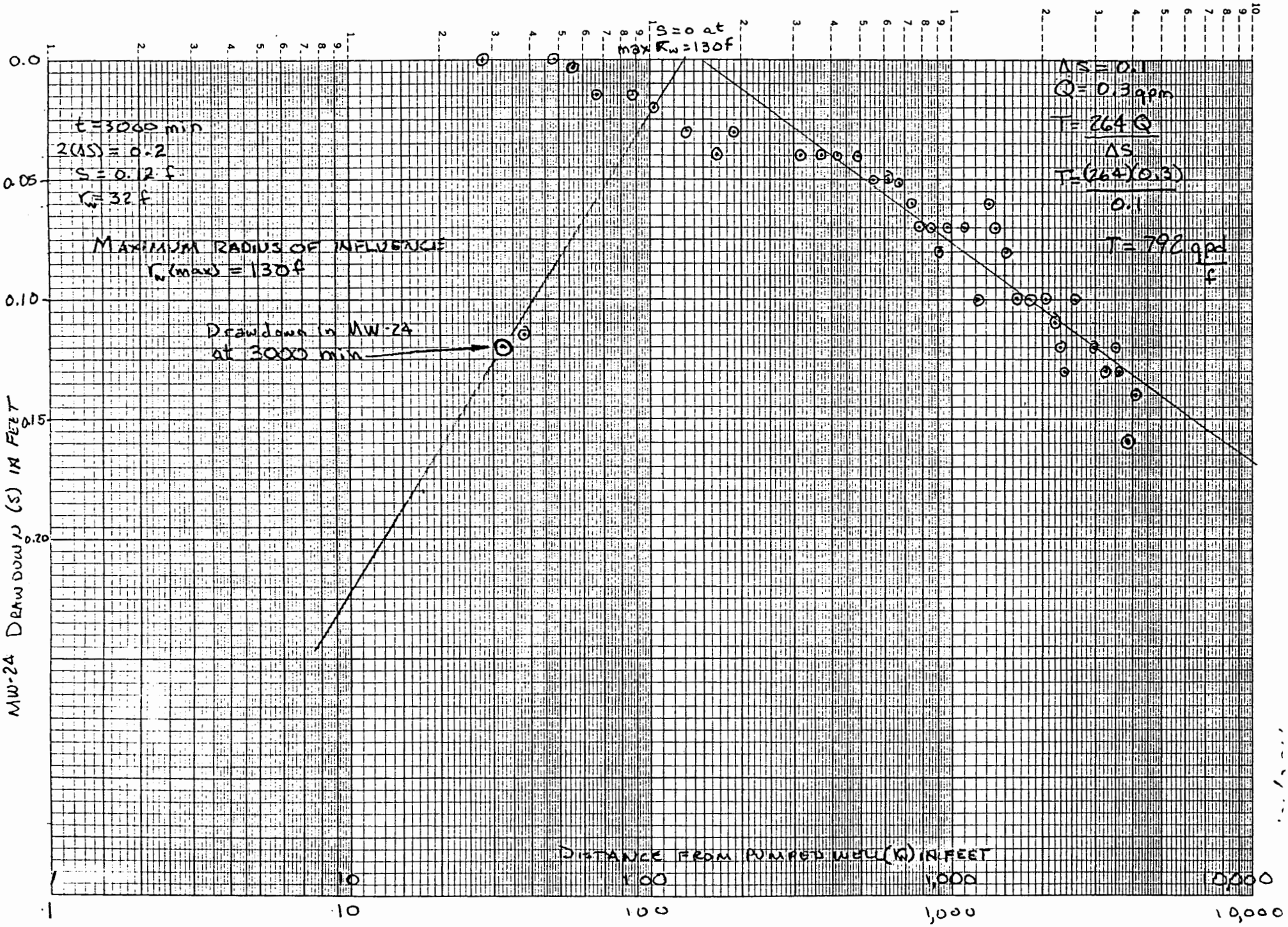
$= 0.025$

Pumping Well = MW24

12/24

KEUFFEL & ESSER CO. MADE IN U.S.A.

46 6010



Harding Lawson Associates
Engineers
and
Geoscientists

SHEET 13 OF 24
JOB NO. 6310, 039.12
DATE 1-22-90 (REV.)
COMPUTED BY JSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-25

$$S = \frac{0.3\,Tt}{r_o^2}$$

① $$0.025 = \frac{(0.3)(56.3)\left(\frac{10}{1440}\right)}{r_o^2}$$

$$r_o^2 = 4.69$$

$$r_o = 2.16'$$

② $$0.025 = \frac{(0.3)(281.6)\left(\frac{1000}{1440}\right)}{r_o^2}$$

$$r_o^2 = 2346.67$$

$$r_o = 48.4'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; MAY, 1988 (METRIC)
TRANSMISSIVITY TAKEN FROM THE TIME-DRAWDOWN CURVE. STORATIVITY TAKEN FROM VALUE ESTABLISHED AT MW-24 WHICH IS 32' FROM MW-25.

Harding Lawson Associates
Engineers
and
Geoscientists

SHEET 14 OF 24
JOB NO. 6310, 039.12
DATE 2-1-90
COMPUTED BY JSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-25

$$S = \frac{0.3\,T\,t}{r_o^2}$$

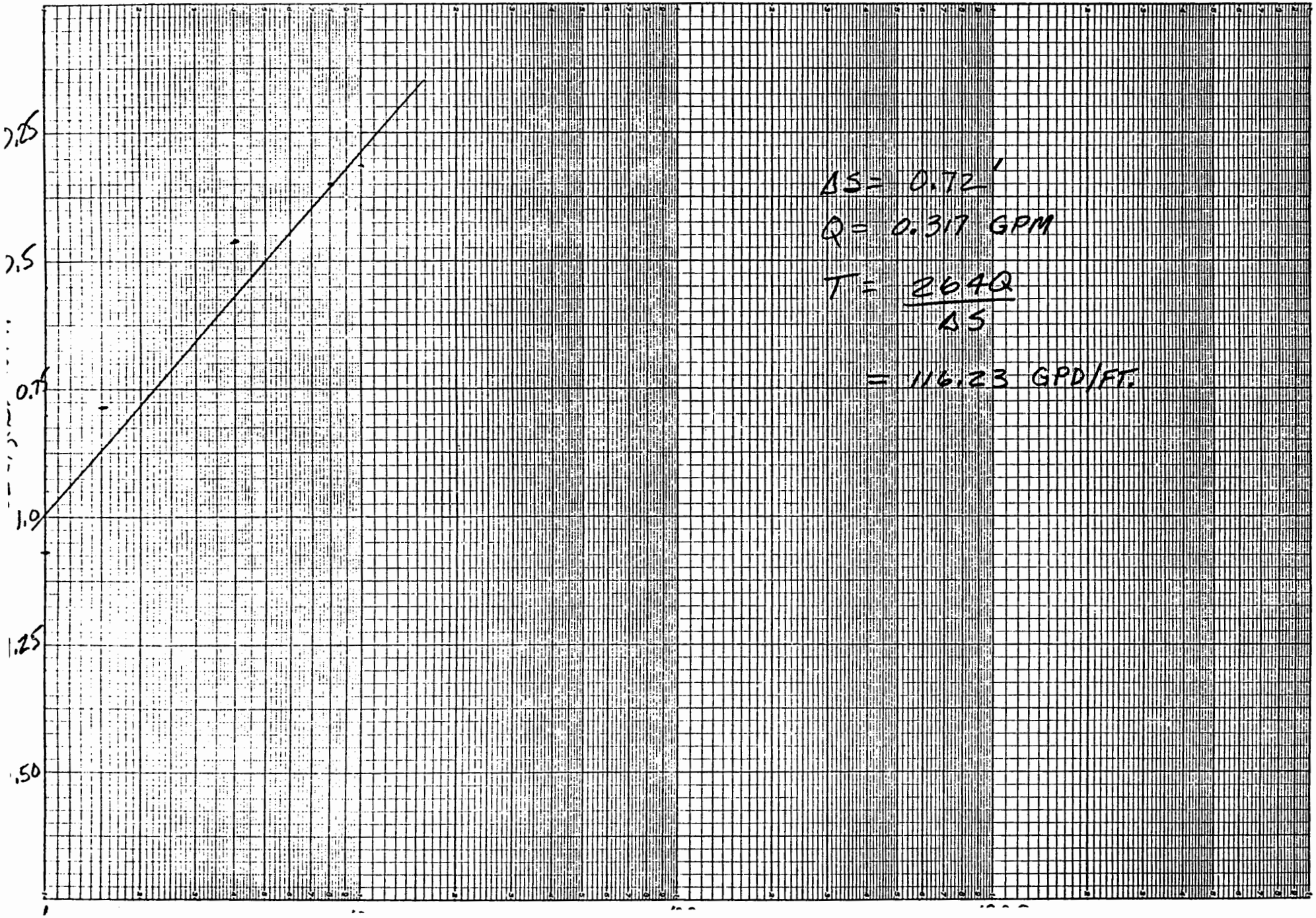
$$0.01 = \frac{(0.3)(116.23)\left(\frac{10}{1440}\right)}{r_o^2}$$

$$r_o^2 = 24.21$$

$$r_o = 4.9'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; MAY, 1988 (METRIC)
TRANSMISSIVITY TAKEN FROM THE ATTACHED RECOVERY DATA

MW-25



$\Delta S = 0.72'$

$Q = 0.317$ GPM

$T = \frac{264Q}{\Delta S}$

$= 116.23$ GPD/FT.

15/24

① $$S = \frac{(0.3)\,T t}{r_o^2}$$

$$0.01 = \frac{(0.3)(1.58)\left(\frac{10}{1440}\right)}{r_o^2}$$

$$r_o^2 = 0.329$$

$$r_o = 0.57'$$

② $$0.01 = \frac{(0.3)(24.9)\left(\frac{1000}{1440}\right)}{r_o^2}$$

$$r_o^2 = 518.75$$

$$r_o = 22.8'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC COOCS ROAD PLANT; NOVEMBER, 1988 (METRIC) TRANSMISSIVITY TAKEN FROM THE TIME-DRAWDOWN CURVE.

Harding Lawson Associates
Engineers
and
Geoscientists

SHEET 17 OF 24
JOB NO. 6310, 039.12
DATE 2-1-90
COMPUTED BY JSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-26

$$S = \frac{0.3Tt}{r_o^2}$$

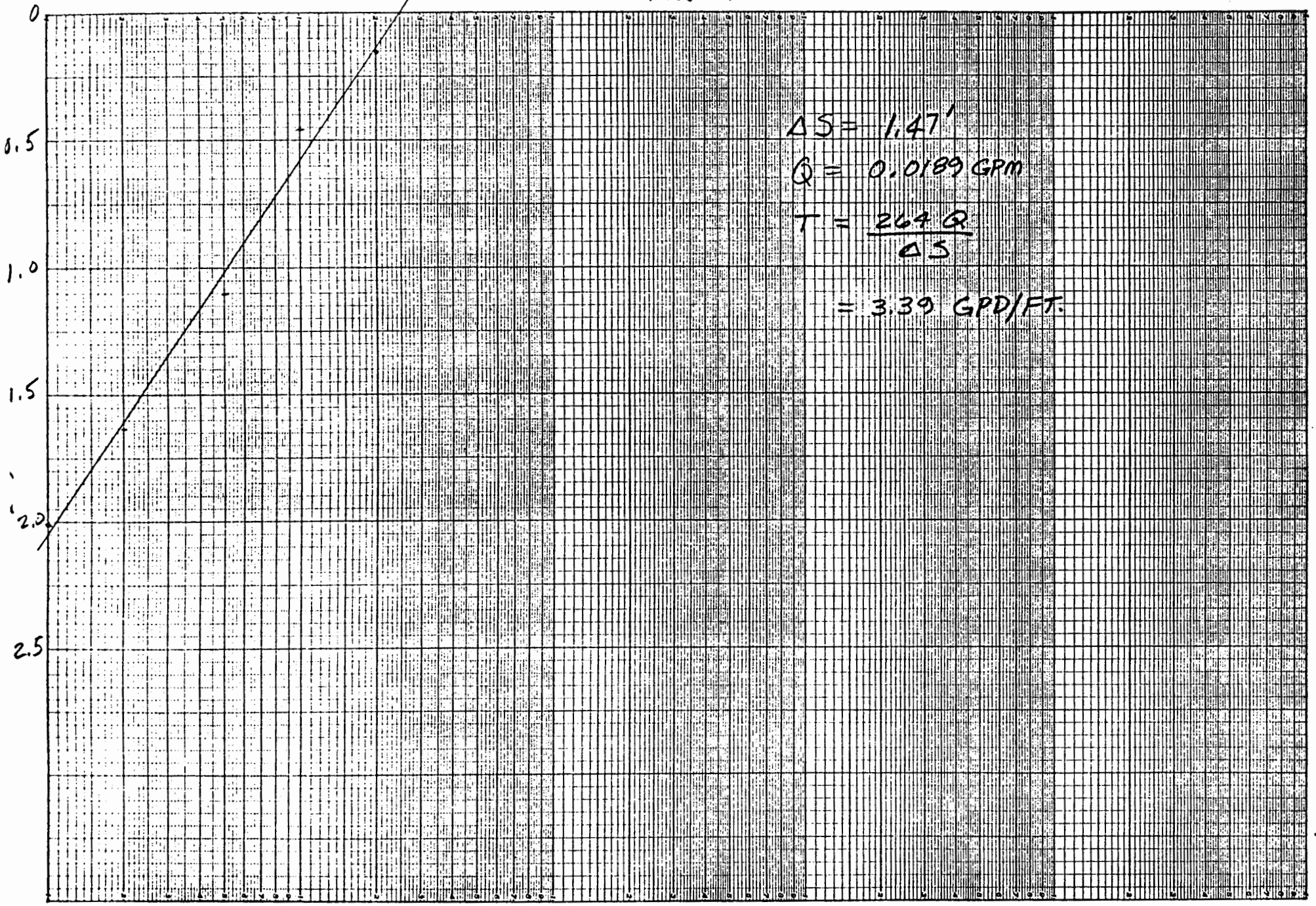
$$0.01 = \frac{(0.3)(3.39)\left(\frac{10}{1440}\right)}{r_o^2}$$

$$r_o^2 = 0.7$$

$$r_o = 0.84'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; NOVEMBER, 1988 (METRIC) TRANSMISSIVITY TAKEN FROM THE ATTACHED RECOVERY DATA.

MW26



$\Delta S = 1.47'$

$Q = 0.0189$ GPM

$T = \frac{264\,Q}{\Delta S}$

$= 3.39$ GPD/FT.

18/24

Harding Lawson Associates
Engineers
and
Geoscientists

SHEET 19 OF 24
JOB NO. 6310,039.12
DATE 1-22-90
COMPUTED BY JSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-27

- ANALYSIS CAN NOT BE PERFORMED DUE TO VERY ERRATIC DRAWDOWN PATTERN FROM THE TIME-DRAWDOWN CURVE.

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; NOVEMBER, 1988 (METRIC)

Harding Lawson Associates
Engineers
and
Geoscientists

SHEET 20 OF 24
JOB NO. 6310, 039.12
DATE 2-1-90
COMPUTED BY JSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-27

$$S = \frac{0.3\,T\,t}{r_o^2}$$

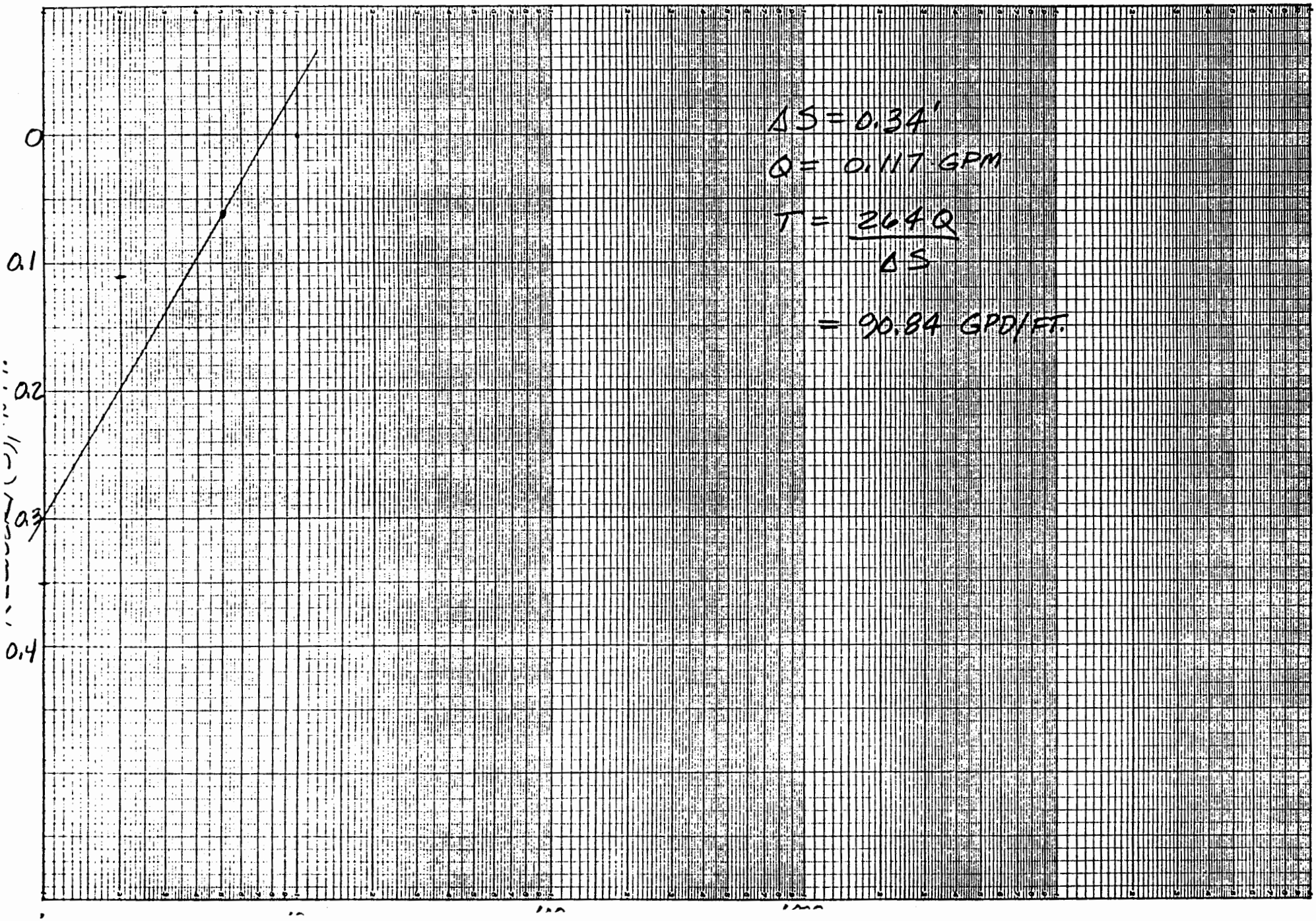
$$0.01 = \frac{(0.3)(90.84)\left(\frac{10}{1440}\right)}{r_o^2}$$

$$r_o^2 = 18.93$$

$$r_o = 4.35'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON FACILITY, INC. COOK ROAD PLANT; NOVEMBER, 1988 (METRIC) TRANSMISSIVITY TAKEN FROM ATTACHED RECOVERY DATA.

MW-27



21/2

Harding Lawson Associates
Engineers
and
Geoscientists

SHEET 22 OF 24
JOB NO. 6310,039.12
DATE 1-22-90 (REV.)
COMPUTED BY JSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-28

① $$S = \frac{(0.3)(T)t}{r_o^2}$$

$$0.01 = \frac{(0.3)(18.1)\left(\frac{10}{1440}\right)}{r_o^2}$$

$$r_o^2 = 3.77$$

$$r_o = 1.94'$$

② $$0.01 = \frac{(0.3)(62)\left(\frac{100}{1440}\right)}{r_o^2}$$

$$r_o^2 = 129.16$$

$$r_o = 11.37'$$

③ $$0.01 = \frac{(0.3)(19.6)\left(\frac{1000}{1440}\right)}{r_o^2}$$

$$r_o^2 = 408.33$$

$$r_o = 20.2'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COOKS ROAD PLANT; NOVEMBER, 1988 (METRIC)
TRANSMISSIVITY TAKEN FROM TIME-DRAWDOWN CURVE

Harding Lawson Associates
Engineering
and
Environmental Services

SHEET 23 OF 24
JOB NO. 6310,039.12
DATE 2-1-90
COMPUTED BY JSH
CHECKED BY

PROJECT SPARTON TECHNOLOGY
SUBJECT MW-28

$$S = \frac{0.3\,T\,t}{r_o^2}$$

① $$0.01 = \frac{(0.3)(68.93)\left(\frac{10}{1440}\right)}{r_o^2}$$

$$r_o^2 = 14.36$$

$$r_o = 3.8'$$

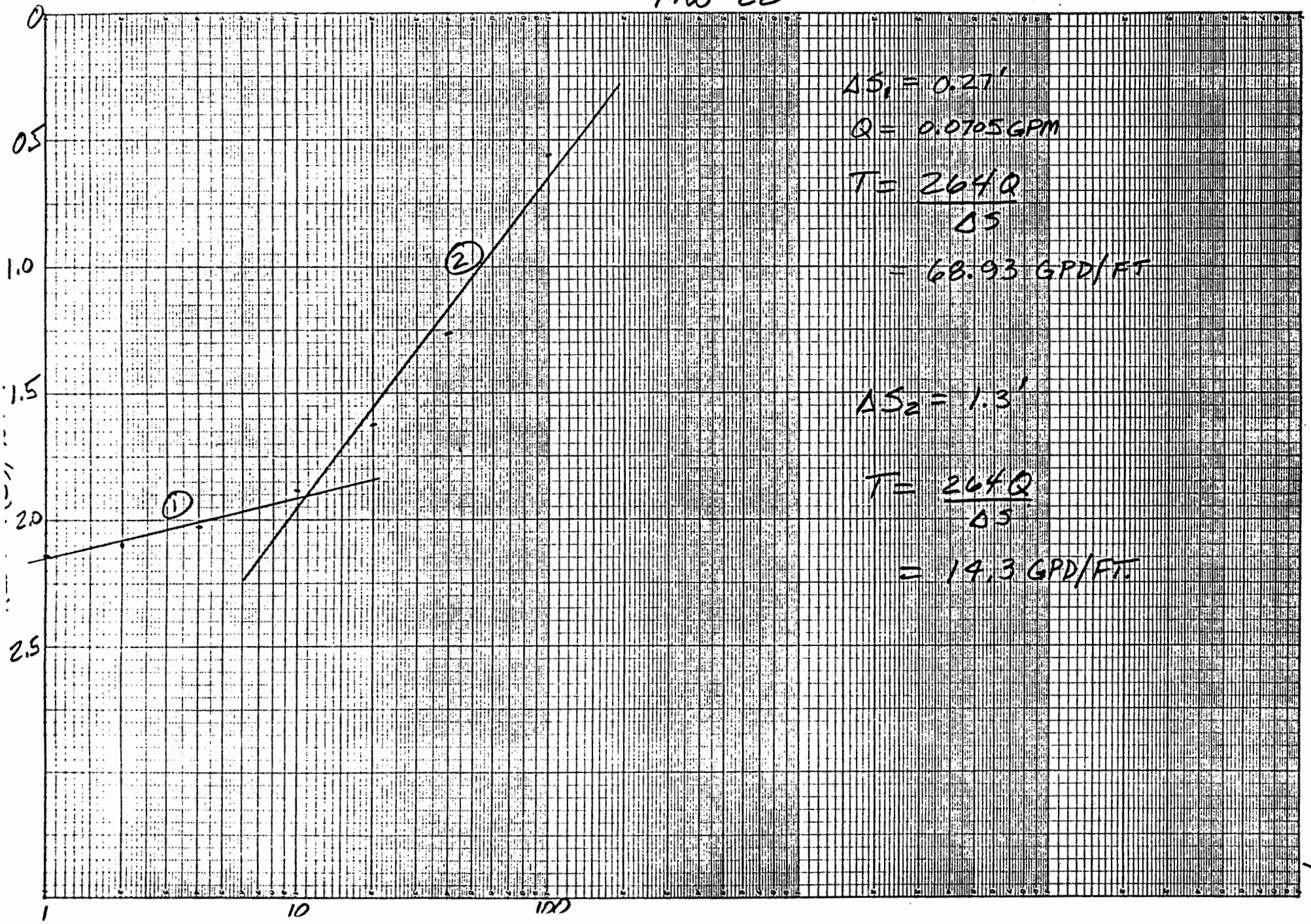
② $$0.01 = \frac{(0.3)(14.3)\left(\frac{100}{1440}\right)}{r_o^2}$$

$$r_o^2 = 29.79$$

$$r_o = 5.46'$$

REFERENCE: AQUIFER TESTING AT THE SPARTON TECHNOLOGY, INC. COORS ROAD PLANT; November, 1988 (METRIC) TRANSMISSIVITIES TAKEN FROM THE ATTACHED RECOVERY DATA

MW-28



$\Delta S_1 = 0.27'$

$Q = 0.0705$ GPM

$T = \frac{264Q}{\Delta S}$

$= 68.93$ GPD/FT

$\Delta S_2 = 1.3'$

$T = \frac{264Q}{\Delta S}$

$= 14.3$ GPD/FT.

24/2

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE
SELECTION: PERIOD >=11

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE9 6 VALID CASES

COEFF OF DETERM:	0.334780		
ADJUSTED R SQUARE:	0.168475	ESTIMATED CONSTANT TERM:	7191.43
MULTIPLE CORR COEFF:	0.578602	STANDARD ERR OF ESTIMATE:	817.138

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	1344143	1344143	2.01305	0.228
RESIDUALS	4	2670857	667714		
TOTAL	5	4015000			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-277.143	-0.578602	195.333	-1.41882	0.2289

WHICH COMMAND?

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE
SELECTION: PERIOD >=11

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE14 6 VALID CASES

COEFF OF DETERM:	0.673487		
ADJUSTED R SQUARE:	0.591858	ESTIMATED CONSTANT TERM:	12210.5
MULTIPLE CORR COEFF:	0.820662	STANDARD ERR OF ESTIMATE:	882.151

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PRO
REGRESSION	1	6420571	6420571	8.25064	0.04
RESIDUALS	4	3112762	778190		
TOTAL	5	9533333			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-605.714	-0.820662	210.874	-2.87239	0.0454

WHICH COMMAND?

```
COMMAND: REGR      MISSING VALUE TREATMENT: LISTWISE
SELECTION: PERIOD >=11

                 *** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE15                          6 VALID CASES
COEFF OF DETERM:          0.284593
ADJUSTED R SQUARE:        0.105741     ESTIMATED CONSTANT TERM:        526.571
MULTIPLE CORR COEFF:      0.533472     STANDARD ERR OF ESTIMATE:       69.1685

ANALYSIS OF VARIANCE FOR THE REGRESSION:
                       DEGREES OF     SUM OF      MEAN OF
SOURCE OF VARIANCE      FREEDOM       SQUARES     SQUARES      F TEST      PRO
      REGRESSION           1          7612.86     7612.86     1.59122    0.27
      RESIDUALS            4          19137.1     4784.29
      TOTAL                5          26750.0

                   REGRESSION   STANDARDIZED     STANDARD
VARIABLE          COEFFICIENT    COEFFICIENT       ERROR          T        PROB
PERIOD               -20.8571      -0.533472      16.5344     -1.26144   0.2757

WHICH COMMAND?
```

```
COMMAND: REGR      MISSING VALUE TREATMENT: LISTWISE
SELECTION: PERIOD >=11

                *** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE16                          6 VALID CASES
COEFF OF DETERM:          0.692035
ADJUSTED R SQUARE:        0.615043     ESTIMATED CONSTANT TERM:        48304.8
MULTIPLE CORR COEFF:      0.831886     STANDARD ERR OF ESTIMATE:       3149.45

ANALYSIS OF VARIANCE FOR THE REGRESSION:
                       DEGREES OF     SUM OF      MEAN OF
SOURCE OF VARIANCE      FREEDOM       SQUARES     SQUARES      F TEST      PRO
      REGRESSION           1          89157143    89157143     8.98848    0.04
      RESIDUALS            4          39676190    9919048
      TOTAL                5         128833333

                    REGRESSION   STANDARDIZED     STANDARD
VARIABLE           COEFFICIENT    COEFFICIENT       ERROR          T       PROB
PERIOD                -2257.14      -0.831886      752.863     -2.99808  0.0400


WHICH COMMAND?
```

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE
SELECTION: PERIOD >=11

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE21 6 VALID CASES

COEFF OF DETERM:	0.392478		
ADJUSTED R SQUARE:	0.240598	ESTIMATED CONSTANT TERM:	2853.33
MULTIPLE CORR COEFF:	0.626481	STANDARD ERR OF ESTIMATE:	364.326

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PRO
REGRESSION	1	343000	343000	2.58413	0.18
RESIDUALS	4	530933	132733		
TOTAL	5	873933			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-140.000	-0.626481	87.0905	-1.60752	0.1832

WHICH COMMAND?

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE
SELECTION: PERIOD >=11

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE22 5 VALID CASES

COEFF OF DETERM:	0.126260		
ADJUSTED R SQUARE:	-0.164986	ESTIMATED CONSTANT TERM:	185.400
MULTIPLE CORR COEFF:	0.355331	STANDARD ERR OF ESTIMATE:	23.0536

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	230.400	230.400	0.433517	0.557
RESIDUALS	3	1594.40	531.467		
TOTAL	4	1824.80			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-4.80000	-0.355331	7.29018	-0.658420	0.5573

WHICH COMMAND?

Attachment 3

SUMMARY OF REGRESSION EQUATIONS
1986 - 1989

General equation form : Y = Ao + Al (x)

where Y = TCE, ug/l
x = Period no.
Ao = intercept
Al = slope

Well no.	Regression Equation
6	Y = 404.962 - 20.4231 (x)
8	Y = 151.538 - 3.1978 (x)
9	Y = 6787.5 - 232.353 (x)
14	Y = 4289.01 - 29.6703 (x)
15	Y = 954.689 - 52.8022 (x)
16	Y = 31380.2 - 964.835 (x)
18	Y = 4556.36 - 78.1818 (x)
21	Y = 2619.34 - 122.088 (x)
22	Y = 327.161 - 14.0751 (x)
23	Y = 5446.67 + 298.333 (x)

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE6 13 VALID CASES

COEFF OF DETERM:	0.270384		
ADJUSTED R SQUARE:	0.204056	ESTIMATED CONSTANT TERM:	404.962
MULTIPLE CORR COEFF:	0.519985	STANDARD ERR OF ESTIMATE:	136.464

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	75912.6	75912.6	4.07643	0.0685
RESIDUALS	11	204845	18622.3		
TOTAL	12	280758			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-20.4231	-0.519985	10.1154	-2.01902	0.0685

WHICH COMMAND?

:OMMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

)EPENDENT VARIABLE: TCE8 13 VALID CASES

:OEFF OF DETERM: 0.0312679

.DJUSTED R SQUARE: -0.0567986 ESTIMATED CONSTANT TERM: 151.538

(ULTIPLE CORR COEFF: 0.176827 STANDARD ERR OF ESTIMATE: 72.4008

.NALYSIS OF VARIANCE FOR THE REGRESSION:

:OURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	1861.12	1861.12	0.355049	0.5633
RESIDUALS	11	57660.6	5241.87		
TOTAL	12	59521.7			

ARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
ERIOD	-3.19780	-0.176827	5.36670	-0.595860	0.5633

HICH COMMAND?

:OMMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

)EPENDENT VARIABLE: TCE9 16 VALID CASES

:OEFF OF DETERM: 0.472633

.DJUSTED R SQUARE: 0.434964 ESTIMATED CONSTANT TERM: 6787.50

(ULTIPLE CORR COEFF: 0.687483 STANDARD ERR OF ESTIMATE: 1209.53

.NALYSIS OF VARIANCE FOR THE REGRESSION:

:OURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	18355882	18355882	12.5470	0.0033
RESIDUALS	14	20481618	1462973		
TOTAL	15	38837500			

ARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
ERIOD	-232.353	-0.687483	65.5962	-3.54217	0.0033

HICH COMMAND?

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE14 13 VALID CASES

COEFF OF DETERM:	0.00586258		
ADJUSTED R SQUARE:	-0.0845135	ESTIMATED CONSTANT TERM:	4289.01
MULTIPLE CORR COEFF:	0.0765675	STANDARD ERR OF ESTIMATE:	1571.59

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	160220	160220	0.0648687	0.803
RESIDUALS	11	27169011	2469910		
TOTAL	12	27329231			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-29.6703	-0.0765675	116.494	-0.254693	0.8037

WHICH COMMAND?

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE15 12 VALID CASES

COEFF OF DETERM:	0.833126		
ADJUSTED R SQUARE:	0.816438	ESTIMATED CONSTANT TERM:	954.689
MULTIPLE CORR COEFF:	0.912757	STANDARD ERR OF ESTIMATE:	100.815

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	507429	507429	49.9254	0.000
RESIDUALS	10	101638	10163.8		
TOTAL	11	609067			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-52.8022	-0.912757	7.47294	-7.06579	0.0000

WHICH COMMAND?

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE16 14 VALID CASES

COEFF OF DETERM:	0.419903		
ADJUSTED R SQUARE:	0.371562	ESTIMATED CONSTANT TERM:	31380.2
MULTIPLE CORR COEFF:	0.648000	STANDARD ERR OF ESTIMATE:	4937.74

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	211781319	211781319	8.68621	0.012
RESIDUALS	12	292575824	24381319		
TOTAL	13	504357143			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-964.835	-0.648000	327.369	-2.94724	0.0122

WHICH COMMAND?

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE18 10 VALID CASES

COEFF OF DETERM:	0.101239		
ADJUSTED R SQUARE:	-0.0111058	ESTIMATED CONSTANT TERM:	4556.36
MULTIPLE CORR COEFF:	0.318181	STANDARD ERR OF ESTIMATE:	748.058

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	504273	504273	0.901145	0.370
RESIDUALS	8	4476727	559591		
TOTAL	9	4981000			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-78.1818	-0.318181	82.3585	-0.949287	0.3703

WHICH COMMAND?

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE21 13 VALID CASES

COEFF OF DETERM:	0.675165		
ADJUSTED R SQUARE:	0.645635	ESTIMATED CONSTANT TERM:	2619.34
MULTIPLE CORR COEFF:	0.821684	STANDARD ERR OF ESTIMATE:	344.460

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	2712793	2712793	22.8634	0.000
RESIDUALS	11	1305176	118652		
TOTAL	12	4017969			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-122.088	-0.821684	25.5330	-4.78157	0.0006

WHICH COMMAND?

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE22 12 VALID CASES

COEFF OF DETERM:	0.484136		
ADJUSTED R SQUARE:	0.432549	ESTIMATED CONSTANT TERM:	327.161
MULTIPLE CORR COEFF:	0.695799	STANDARD ERR OF ESTIMATE:	61.7980

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	35841.0	35841.0	9.38495	0.012
RESIDUALS	10	38189.9	3818.99		
TOTAL	11	74030.9			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-14.0751	-0.695799	4.59447	-3.06349	0.0120

WHICH COMMAND?

)MMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

EPENDENT VARIABLE: TCE23 9 VALID CASES

)EFF OF DETERM: 0.0471080

)JUSTED R SQUARE: -0.0890194 ESTIMATED CONSTANT TERM: 5446.67

JLTIPLE CORR COEFF: 0.217044 STANDARD ERR OF ESTIMATE: 3928.28

VALYSIS OF VARIANCE FOR THE REGRESSION:

)URCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	5340167	5340167	0.346058	0.5748
RESIDUALS	7	108019833	15431405		
TOTAL	8	113360000			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
ERIOD	298.333	0.217044	507.139	0.588267	0.5748

IICH COMMAND?

Attachment 4

SUMMARY OF REGRESSION EQUATIONS
for
PRE-RECOVERY and POST-RECOVERY PERIODS

General Equation Form : Y = Ao + Al (x)

where Y = TCE, ug/l
x = Period no.
Ao = intercept
Al = slope

Well no.	Regression Equations: Pre-recovery	Regression Equations: Post-recovery
9	Y = 6548.48 - 189.510 (x)	Y = 7191.43 - 277.143 (x)
14	Y = 2424.44 + 231.667 (x)	Y = 12210.5 - 605.714 (x)
15	Y = 1076.80 - 69.9099 (x)	Y = 526.571 - 20.8571 (x)
16	Y = 26109.1 - 121.212 (x)	Y = 48304.8 - 2257.14 (x)
21	Y = 2422.22 - 91.6667 (x)	Y = 2853.33 - 140.000 (x)
22	Y = 311.554 - 11.6792 (x)	Y = 185.400 - 4.80000 (x)

PRE-RECOVERY PERIOD

:OMMAND: REGR MISSING VALUE TREATMENT: LISTWISE
;ELECTION: PERIOD < 13

*** MULTIPLE LINEAR REGRESSION ***

)EPENDENT VARIABLE: TCE9 12 VALID CASES

:OEFF OF DETERM:	0.220449		
\DJUSTED R SQUARE:	0.142494	ESTIMATED CONSTANT TERM:	6548.48
!ULTIPLE CORR COEFF:	0.469520	STANDARD ERR OF ESTIMATE:	1347.63

\NALYSIS OF VARIANCE FOR THE REGRESSION:

;OURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	5135734	5135734	2.82790	0.1236
RESIDUALS	10	18160932	1816093		
TOTAL	11	23296667			

'ARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
'ERIOD	-189.510	-0.469520	112.694	-1.68164	0.1236

'HICH COMMAND?

OMMAND: REGR MISSING VALUE TREATMENT: LISTWISE
ELECTION: PERIOD < 13

*** MULTIPLE LINEAR REGRESSION ***

EPENDENT VARIABLE: TCE14 9 VALID CASES
OEFF OF DETERM: 0.152647
DJUSTED R SQUARE: 0.0315962 ESTIMATED CONSTANT TERM: 2424.44
ULTIPLE CORR COEFF: 0.390700 STANDARD ERR OF ESTIMATE: 1598.01

NALYSIS OF VARIANCE FOR THE REGRESSION:

OURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	3220167	3220167	1.26102	0.2985
RESIDUALS	7	17875389	2553627		
TOTAL	8	21095556			

ARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
ERIOD	231.667	0.390700	206.302	1.12295	0.2985

HICH COMMAND?

```
COMMAND: REGR      MISSING VALUE TREATMENT: LISTWISE
SELECTION: PERIOD < 13

                *** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE15                          8 VALID CASES
COEFF OF DETERM:          0.837710
ADJUSTED R SQUARE:        0.810661     ESTIMATED CONSTANT TERM:        1076.80
MULTIPLE CORR COEFF:      0.915265     STANDARD ERR OF ESTIMATE:       93.5856

ANALYSIS OF VARIANCE FOR THE REGRESSION:
                        DEGREES OF     SUM OF      MEAN OF
SOURCE OF VARIANCE       FREEDOM      SQUARES      SQUARES      F TEST      PROB
      REGRESSION            1          271250       271250      30.9708    0.001
      RESIDUALS             6         52549.5      8758.26
      TOTAL                 7          323800

                     REGRESSION   STANDARDIZED     STANDARD
VARIABLE           COEFFICIENT    COEFFICIENT       ERROR          T        PROB
PERIOD                -69.9099      -0.915265      12.5621     -5.56514   0.0014

WHICH COMMAND?
```

:OMMAND: REGR MISSING VALUE TREATMENT: LISTWISE
;ELECTION: PERIOD < 13

*** MULTIPLE LINEAR REGRESSION ***

)EPENDENT VARIABLE: TCE16 10 VALID CASES
:OEFF OF DETERM: 0.00653083
\DJUSTED R SQUARE: -0.117653 ESTIMATED CONSTANT TERM: 26109.1
IULTIPLE CORR COEFF: 0.0808135 STANDARD ERR OF ESTIMATE: 4800.88

\NALYSIS OF VARIANCE FOR THE REGRESSION:

;OURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	1212121	1212121	0.0525901	0.8244
RESIDUALS	8	184387879	23048485		
TOTAL	9	185600000			

'ARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
'ERIOD	-121.212	-0.0808135	528.560	-0.229325	0.8244

'HICH COMMAND?

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE
SELECTION: PERIOD < 13

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE21 9 VALID CASES

COEFF OF DETERM:	0.397329		
ADJUSTED R SQUARE:	0.311233	ESTIMATED CONSTANT TERM:	2422.22
MULTIPLE CORR COEFF:	0.630341	STANDARD ERR OF ESTIMATE:	330.524

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	504167	504167	4.61497	0.068
RESIDUALS	7	764722	109246		
TOTAL	8	1268889			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-91.6667	-0.630341	42.6704	-2.14825	0.0688

WHICH COMMAND?

:OMMAND: REGR MISSING VALUE TREATMENT: LISTWISE
;ELECTION: PERIOD < 13

*** MULTIPLE LINEAR REGRESSION ***

)EPENDENT VARIABLE: TCE22 8 VALID CASES
:OEFF OF DETERM: 0.158397
\DJUSTED R SQUARE: 0.0181293 ESTIMATED CONSTANT TERM: 311.554
!ULTIPLE CORR COEFF: 0.397991 STANDARD ERR OF ESTIMATE: 77.6175

\NALYSIS OF VARIANCE FOR THE REGRESSION:

;OURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	6803.13	6803.13	1.12925	0.3288
RESIDUALS	6	36146.9	6024.48		
TOTAL	7	42950.0			

'ARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
'ERIOD	-11.6792	-0.397991	10.9905	-1.06266	0.3288

'HICH COMMAND?

POST-RECOVERY PERIOD

COMMAND: REGR MISSING VALUE TREATMENT: LISTWISE

*** MULTIPLE LINEAR REGRESSION ***

DEPENDENT VARIABLE: TCE6 13 VALID CASES

COEFF OF DETERM:	0.270384		
ADJUSTED R SQUARE:	0.204056	ESTIMATED CONSTANT TERM:	404.962
MULTIPLE CORR COEFF:	0.519985	STANDARD ERR OF ESTIMATE:	136.464

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST	PROB
REGRESSION	1	75912.6	75912.6	4.07643	0.0685
RESIDUALS	11	204845	18622.3		
TOTAL	12	280758			

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	STANDARD ERROR	T	PROB
PERIOD	-20.4231	-0.519985	10.1154	-2.01902	0.0685

WHICH COMMAND?

WATER WELL LOCATIONS

LEGAL ADDRESS	OWNER NAME AND ADDRESS	PERMIT NO.	MAP NO. AND LOCATION	WELL DEPTH	USE	PERMIT DATE
11N-24-2E	Jim Warren 227 Mezcal Dr. N.E. Albuquerque, NM	RG-137	D-12	169 ft.	Domestic	5/28/57
11N-24-2E	Jim Warren 227 Mezcal Dr. N.E. Albuquerque, NM	RG-685	D-12 (300)	184 ft.	Domestic	5/06/57
11N-17-3E	Steven U. Rizek 8904 Rio Grande N.W. Albuquerque, NM	RG-43518	C-14 (400)	231 ft.	Domestic	6/10/85
11N-20-3E	Fred W. Carpenter 723 Ranchitos Rd. N.W. Albuquerque, NM	RG-19104	D-14 (400)	140 ft.	Domestic	7/08/71
11N-16-3E	David Garduno 8806 4th N.W. Albuquerque, NM	RG-22575	C-15 (421)	152 ft.	Domestic	5/02/73
11N-8-3E	Rick Shalk 9848 Coors Rd. N.W. Albuquerque, NM	RG-27958	B-14 (330)	149 ft.	Domestic	12/1/76

WATER WELL LOCATIONS
(CONTINUED)

LEGAL ADDRESS	OWNER NAME AND ADDRESS	PERMIT NO.	MAP NO. AND LOCATION	WELL DEPTH	USE	PERMIT DATE
11N-8-3E	Robert B. Briscoe 1900 Bryn Mawr N.E. Albuquerque, NM	RG-5774	B-14 (333)	140 ft	Domestic	5/08/61
11N-8-E	Albert J. Black P. O. Box 154 Alameda, NM	RG-3664 RG-6095	B-14 (134)	200 ft. 200 ft.	Domestic Domestic	11/16/81 3/02/62
11N-9-3E	Southern Union Gas Co. 4625 Edith N.E. Albuquerque, NM	RG-19136	B-15 (323)	200 ft.	Industrial Water	6/25/71
11N-9-3E	Charles Bonner Box 10143 Alameda, NM	RG-37025	B-15 Lot A of Bonner Subdiv.	200 ft.	Domestic	9/30/81
11N-9-3E	Johnny Atencio 4516 Carlisle N.W. Albuquerque, NM	RG-25421	B-15	212 ft.	Domestic	3/20/75

WATER WELL LOCATIONS
(CONTINUED)

LEGAL ADDRESS	OWNER NAME AND ADDRESS	PERMIT NO.	MAP NO. AND LOCATION	WELL DEPTH	USE	PERMIT DATE
11N-9-3E	Albert Klassen 844 Guadalupe Circle N.W. Albuquerque, NM	RG-10278	B-14	141 ft.	Domestic	2/12/82
11N-16-3E	Jose Tarango 218 Garduno Rd. N.W. Albuquerque, NM	RG-17887	C-15 (TR.E, 100F)	146 ft.	Domestic	10/16/70
11N-16-3E	Quintin Kruichak Rt. 4, Box 708C Albuquerque, NM	RG-504	C-15 (230)	112 ft.	Domestic	4/05/57
11N-17-3E	A.F. Black 200 16th St. N.W. Albuquerque, NM	RG-5711	C-14 (100)	68 ft.	Domestic	5/01/61
11N-17-3E	Jesse Morris 8821 Rio Grande N.W. Albuquerque, NM	RG-25308	C-14 (221)	38 ft.	Domestic	10/10/74
11N-18-3E	C.C. Roberson 600 Morningside S.E. Albuquerque, NM	RG-4455	C-13 (300)	115 ft.	Domestic	5/31/60

WATER WELL LOCATIONS
(CONTINUED)

LEGAL ADDRESS	OWNER NAME AND ADDRESS	PERMIT NO.	MAP NO. AND LOCATION	WELL DEPTH	USE	PERMIT DATE
11N-18-3E	Jerry Forrester 7100 Coors Blvd. N.W. Albuquerque, NM	RG-26578	C-13 (TR.A-1)	131 ft.	Domestic	10/24/75
11N-19-3E	William Ellison 1617 University N.E. Albuquerque, NM	RG-18259	D-13 (137E-1-9)	80 ft.	Domestic	6/14/71
11N-20-3E	Jerold Joseph 1009 Acequia Trail N.W. Albuquerque, NM	RG-24951	D-14 (122)	42 ft.	Domestic	6/01/74
11N-21-3E	Joe Atkinson 1013 Sandia Rd. N.W. Albuquerque, NM	RG-21926	D-15 (140)	95 ft.	Domestic	10/10/72
11N-21-3E	Horace Garcia 248 Los Ranchos N.W. Albuquerque, NM	RG-6908	D-15 (142)	37 ft.	Domestic	4/19/62

WATER WELL LOCATIONS
(CONTINUED)

LEGAL ADDRESS	OWNER NAME AND ADDRESS	PERMIT NO.	MAP NO. AND LOCATION	WELL DEPTH	USE	PERMIT DATE
11N-21-3E	Mike Sedillo 7820 2nd St. N.W. Albuquerque, NM	RG-18788	D-15 (200)	86 ft.	Domestic	8/31/72
11N-21-3E	City of Albuquerque	RG-2193	D-15 (442)	813 ft.	Exploratory	12/10/75
11N-8-3E	Robert Briscoe 9846 Coors Rd. N.W. Albuquerque, NM	RG-12467	B-14 (330)	152 ft.	Domestic	5/13/65
11N-21-3E	Academy For Boys 318 Silver S.W. Albuquerque, NM	RG-972	D-15 (300)	100 ft.	Domestic	8/21/58
11N-17-3E	Maud R. Anderson Rt. 2, Box 421 Albuquerque, NM	RG-64	C-14 (223)	53 ft.	Irrigation	12/12/55
11N-19-3E	W.F. Mann Rt. 3, Box 3021 Albuquerque, NM	RG-29059	D-13 (.75 Mi. S. of Sipi, .4 Mi. east)	140 ft.	Domestic	7/19/77

WATER WELL LOCATIONS
(CONTINUED)

LEGAL ADDRESS	OWNER NAME AND ADDRESS	PERMIT NO.	MAP NO. AND LOCATION	WELL DEPTH	USE	PERMIT DATE
11N-19-3E	Mary Mann 5036 Fairfax N.W. Albuquerque, NM	RG-18129	D-13 (E. of Coors)	40 ft.	Domestic	7/29/77
11N-24-2E	Jack Lynn Scott 12520 Monroe N.E. Albuquerque, NM	RG-38127	D-12 (Lot 11, Blk.7)	260 ft.	Domestic	6/21/82

A Report Prepared for:

Sparton Technology, Inc.
9621 Coors Road, N.W.
Albuquerque, New Mexico 87114

PRELIMINARY ENVIRONMENTAL ASSESSMENT PROPERTIES SURROUNDING SPARTON TECHNOLOGY, INC. 9621 COORS ROAD, N.W. ALBUQUERQUE, NEW MEXICO

HLA Job No. 06310,039.12

by

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December 27, 1989

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1.0 INTRODUCTION

This report presents the results of a preliminary environmental assessment conducted by Harding Lawson Associates (HLA) for properties surrounding the Sparton Technology, Inc. (Sparton) facility located at 9621 Coors Road, N.W. (see Plate 1). The Sparton facility was originally constructed in 1961. The facility has undergone expansion and remains an active electronics manufacturing facility.

The purpose of this assessment was to provide information on surrounding properties relative to the historical presence or use of hazardous or toxic materials, which could potentially impact the Sparton site. This evaluation is based on information gathered from Federal, State and local agencies; personal interviews with individuals familiar with the surrounding properties; and a site reconnaissance conducted by HLA personnel.

2.0 SCOPE OF SERVICES

To evaluate the potential impact of hazardous materials on the properties surrounding the Sparton facility, HLA conducted an environmental assessment which consisted of the following tasks:

- Reviewing available documents and aerial photographs related to historical development of the adjacent properties around the Sparton facility.

- Contacting appropriate, Federal, State and local regulatory agencies for documented hazardous materials information concerning the adjacent properties around the Sparton facility.

- Reviewing available reports and information pertaining to soil and groundwater contamination in the vicinity of the Sparton facility.

- Conducting a reconnaissance of the site and surrounding properties to assess visible evidence of the generation, use, storage or disposal of hazardous materials.

- Evaluating findings and preparing this report.

3.0 GENERAL AREA DESCRIPTION

The Sparton facility is located on an approximately 12-acre parcel which fronts on Coors Road, N.W., to the east. Across Coors Road, N.W. is partially cultivated agricultural acreage which slopes eastward to the Rio Grande River. Immediately to the south of the Sparton site is an approximately 100-foot-wide utility easement, south of which is located Sun Country Industries, Inc. (9421 Coors Road, N.W.) and Rowland Nurseries, Inc. (4349 Irving Boulevard). The City Lights Tavern and Grill (9401 Coors Road, N.W.) is located at the northwest intersection of Irving Boulevard and Coors Road, N.W. To the west of the Sparton facility is currently undeveloped acreage which rises in elevation toward the Paradise Hills residential subdivision. A small parcel of undeveloped acreage exists to the north of the Sparton facility extending over to Westside Drive. Located to the north of Westside Drive is the Westside Jeep/Eagle-Lincoln/Mercury car dealership (9733 Coors Road, N.W.) and a small commercial center (4330 Westside Drive) containing various automotive and lawn service establishments. The Arroyo las de Calabasillas, a natural surface drainage channel, borders the northern edge of the car dealership property.

4.0 SITE HISTORY

4.1 Oral and Written History

Information presented in this section was obtained through review of available historical records and documents at the City of Albuquerque - Central Public Library, information supplied by the Albuquerque Economic Development Corporation (formerly the Albuquerque Industrial Development Service, Inc.), and personal interviews conducted by HLA personnel of individuals and regulatory agency personnel familiar with the area and its past uses. Discussion will focus primarily on properties surrounding the Sparton site and will attempt to identify any operations or facilities which may have generated or handled hazardous materials, thus presenting a potential for environmental impact. In the case where a property has been occupied or owned by more than one company, the discussion will be presented in a chronological order from past to present.

A vast amount of acreage, including the Sparton site and immediately surrounding properties, was formerly part of the Seven Bar Ranch owned by the Black Family. Around 1961, the Black Family sold approximately 8500 acres south of the Arroyo de las Calabasillas and north of Coors Road, N.W., to the Horizon Corporation for development. At that time, apparently no development had taken place on the acreage on the north side of

Coors Road, N.W., between the Arroyo de las Calabasillas and the Paradise Hills Subdivision. Sparton constructed their electronics manufacturing facility, at 9621 Coors Road, N.W., in 1961 and later expanded the facility on the original approximately 12-acre tract.

Sun Country Industries, Inc., a machine shop operation, currently occupies a small tract of property adjacent to an approximately 100-foot-wide utility easement, south of the Sparton site. According to Mr. Douglas Spence, the current owner of Sun Country Industries, Inc. (505/899-7080), the facility was originally established around 1965 by Bill Rose (deceased) and Al Eckberg. Mr. Spence purchased the business in 1975. Aerial photographs show that the facility building was expanded sometime between 1973 and 1978. Mr. Spence stated that the present machine shop operation utilizes very small amounts of chemicals, primarily acetone, for cleaning. He added that he was not aware of any heavy chemical usage by the previous owners, who were unable to be contacted. He had no knowledge of the existence of any surface impoundments or waste disposal sites on the property prior to his purchase of the company.

The present day City Lights Tavern and Grill restaurant located at 9401 Coors Road, N.W., south of the Sun Country Industries property, was constructed around 1978. The restaurant

was originally named The Prime House. From its appearance in aerial photographs reviewed by HLA, the restaurant has undergone expansions prior to and after 1982. The facility appears to have always been a restaurant operation, which represents a low potential for environmental impact.

The adjacent Rowland Nurseries, Inc. establishment located at 4349 Irving Boulevard was constructed sometime around 1985. The 1982 aerial photographs shows the entire present day Rowlands property as being undeveloped acreage along Irving Boulevard. This facility did not appear to represent an environmental concern.

The approximately 12-acre tract of land located between the Sparton site and the Arroyo de las Calabasillas to the north, was initially developed in mid-1961 by Curtiss-Wright. Curtiss-Wright was an electronics manufacturing facility which conducted plating and printed circuit board (PCB) operations. The Curtiss-Wright facility apparently only operated at the 9733 Coors Road, N.W. location until the end of 1962 when it shut down its operation. Mr. John F. Quirk (505/255-6981), a former General Manager of the Electronics Division at Curtiss-Wright, was contacted and reported the facility's operations included PCB manufacturing with associated gold, nickel, and copper plating. Various acidic and alkaline solutions were utilized in the plating process. Mr. Quirk

added they had constructed three small, plastic-lined earthen pits outside the north wall of the building for storage and evaporation of plating solutions. According to Mr. Quirk, these pits were roughly six foot by six foot in size and fairly shallow, approximately one foot in depth. They were reportedly located between the north end of the building and the entrance drive along the Arroyo de las Calabasillas. Mr. Quirk added that the plating solutions were transferred through a plastic pipe into the pits which were used alternately for evaporation. Solid residues remaining after evaporation were reported to be mixed with cement for solidification in 10-gallon buckets and disposed of offsite at the local landfill. Mr. Quirk stated that they did not generate a large volume of wastes but could not give any specifics on amounts of wastes generated or the final offsite disposal site. Also mentioned was the existence of a small onsite machine shop which used various solvents for degreasing. Mr. Quirk mentioned trichloroethene (TCE) and carbon tetrachloride (CCl_4) as possible solvents utilized but did not recall the method of handling solvent wastes which may have been generated. Mr. Quirk recalled that sanitary wastes at the Curtiss-Wright facility were originally handled by an onsite leaching bed, but he was not aware if or when they may have been connected to the sewer main installed by Paradise Services Corporation in 1961. Mr. Quirk was unaware of any known releases or spills at the Curtiss-Wright facility during

its operation at 9733 Coors Road, N.W. Mr. Charles J. Harris (505/8804-8152), and Mr. John Cleveland (505/265-7893), both former Curtiss-Wright employees, were also contacted and stated plating activities associated with PCB manufacturing did occur at the facility. They added that solvents (TCE and alcohols) were also utilized, but that they were not familiar with the disposal practices. They speculated that the residues may have been discharged to the sanitary sewer system. Mr. John Feezor (505/892-5300), who is the current Director of Engineering at Sparton, was also interviewed, having been a former Curtiss-Wright employee. He also recalled the same basic information regarding the Curtiss-Wright operation as reported by Mr. Harris and Mr. Cleveland.

The next apparent occupant of the former Curtiss-Wright building was a company identified as American Car and Foundry (ACF). According to Mr. John Cleveland (505/265-7893), who also worked for ACF from 1964 to 1966, ACF conducted primarily engineering work at the Coors Road location. Mr. Richard Groff (505/894-2744), another former ACF employee, stated that ACF had three offices in Albuquerque and that the Coors Road facility was primarily utilized for engineering design and testing of electronic components used for nuclear testing. Mr. Douglas Spence (505/898-2080), and Mr. Ed Brawley (505/265-2476), were two other former ACF engineers contacted who reported that primarily engineering design

work and no manufacturing or plating operations took place when ACF occupied the site. No specific information on waste generation or disposal activities was revealed during interviews with the former ACF employees.

During HLA's review of the Cole's Directory in the Albuquerque public library, an entry in the 1967-1968 directory listed a company named EG&G, Inc. as being the occupant at 9733 Coors Road, N.W. No specific information was uncovered regarding any operational activities conducted by EG&G, Inc. during this period, and there was no listing for this address in the 1968-1969 directory. EG&G, Inc. later leased the facility at 9733 Coors Road, N.W. from 1973 to 1981, which will be discussed in more detail later in this report.

Records from the Albuquerque Economic Development Corporation (AED), which was formerly known as the Albuquerque Industrial Development Service, Inc. (AIDS), revealed that the "Curtiss-Wright property" was sold in 1969. According to Mr. James Covell, Executive Vice President of AED (505/764-3750), the property was purchased by the Industrial Foundation of Albuquerque, Inc. (IFA), which was a holding company created by AIDS. File information reviewed indicated the "Curtiss-Wright property" was sold to IFA

by Woodridge Enterprises, Inc. No further information on Woodridge Enterprises, Inc. was found.

In June 1969, IFA leased the building at 9733 Coors Road, N.W. to Friden Division, The Singer Company (Singer-Friden). Mr. A. I. Kinney, former Director/Plant Operations for Singer Business Machines (505/897-0811) was contacted and stated that Singer-Friden temporarily occupied the facility from mid-1969 to October 1970. They then relocated to their newly-constructed facility in Albuquerque. According to Mr. Kinney, the building was enlarged for Singer-Friden from its original 20,000 square feet to 40,000 square feet. He added that only electronic equipment assembly took place at the Coors Road facility and that no manufacturing or chemical usage occurred. Mr. Kinney was not aware of any onsite waste storage or disposal operations.

According to a lease agreement found in the AED files, Farah Manufacturing Company (Farah) leased the facility at 9733 Coors Road, N.W. for a two-year period from March 1971 to 1973. According to Mr. James Covell with AED, the Farah operation was a "cut and sew" operation. No further information pertaining to the Farah operation was available.

Beginning in August 1973, a company named EG&G, Inc. leased the facility at 9733 Coors Road, N.W. from IFA. According to Mr. George Hoke, (702/369/3000), who was formerly a Division Controller for EG&G, Inc., Albuquerque Division, the operations conducted at the facility were primarily electronic assembly. Mr. Hoke added there was also an in-house machine shop, a small technical paint booth, and a small photographic lab. He did not recall any information regarding the disposal of any wastes generated by EG&G, Inc. Mr. Sid Blocher, who is still employed by EG&G, Inc. in Albuquerque (505/243-2233), was also contacted and reported that the machine shop at the Coors Road facility conducted mostly milling and some sheet metal work to support in-house electronic component assembly. The small technical paint booth was utilized to paint small component cases and utilized small amounts of 1,1,1-trichloroethane but no acids or other chemicals. Mr. Blocher stated that some of their virgin cutting oils and solvents (5-6 drums) were stored in a fenced area on the rear asphalt parking area to the west of the facility building. Mr. Blocher stated they did not utilize large volumes of oils or solvents and that no accumulation of wastes occurred. He was not aware of any disposal practices involving pits, sumps or waste burial on the property. He added he had no knowledge of spills associated with the stored oils or chemicals. In August 1978, EG&G, Inc. obtained approval from IFA to sublease one-half (20,000 square feet) of the building

to Motorola, Inc. who planned to manufacture and assemble stereo speakers. EG&G, Inc. continued subleasing to Motorola, Inc. until EG&G, Inc. relocated their operation in July 1981. Motorola, Inc. then became the primary lessee of the building.

Mr. Douglas Bosomworth, currently the Production Manager for Motorola Ceramic Products (505/822-8801), (Motorola) was contacted and questioned about Motorola's operation at the Coors Road facility. He stated Motorola was registered with the U.S. Environmental Protection Agency (USEPA) as a hazardous waste generator under the Resource Conservation and Recovery Act (RCRA). Mr. Bosomworth stated that solvent wastes, which included freon and 1,1,1-trichloroethane, were used in degreasing and cleaning operations. Waste residues were drummed and stored in a designated hazardous waste storage area (40 feet by 60 feet) located on the rear asphalt parking area west of the facility building. Lead-bearing sludges, slurries and paper wastes generated as part of their manufacturing process were also drummed and stored in the hazardous waste storage area prior to offsite disposal. According to information submitted by Motorola on 1983 waste generator reports, supplied to HLA by the New Mexico Environmental Improvement Division (EID), the lead-bearing wastes (D008) were disposed of at the Chemical Waste Management, Inc. facility in Denver, CO., while the spent 1,1,1-trichloroethane (F002) was sent

to the Van Waters and Rogers facility in Los Angeles, CA. and the spent freon (F001) was sent to the Omega Chemical Corporation in Whittier, CA. Mr. Bosomworth stated that they also had a cooling water effluent from a ceramic slicing operation which was discharged to the sanitary sewer system. He added that no permit was required for this discharge and he was not aware of any discharge problems. According to Mr. Bosomworth, when Motorola vacated the facility in early 1982, they conducted proper closure of the hazardous waste storage area in accordance with an USEPA-approved closure plan. They also had the closure certified by the engineering firm of Deuel and Associates, Inc. who reviewed waste manifests and soil sample analyses conduct as part of the closure. HLA did not obtain or review a copy of the Motorola closure plan to determine specific information regarding closure activities.

In 1983, approximately 10,000 square feet of the building at 9733 Coors Road, N.W. was leased by Vawtpower, Inc. According to Mr. Paul N. Vosburgh (505/822-8445), the former company president, his firm engineered and designed wind turbines. There was no manufacturing conducted, only assembly of prototypes. Mr. Vosburgh stated that limited spray painting of the wind turbine blades was conducted on the rear paved parking area but painting was discontinued shortly thereafter in lieu of sandblasting the surfaces. The site was vacated by Vawtpower, Inc. in mid-1984, and

according to Mr. Vosburgh, he was not aware of any waste storage or disposal facilities left behind by previous tenants.

Information reviewed in the AED files revealed that during the period from 1983 to 1985, portions of the building at 9733 Coors Road, N.W. were leased to the Christian Life Center, a church organization, and Westside Gymnastics Center, which conducted gymnastic instruction. Due to the nature of these operations, no further inquiry regarding their activities appeared warranted.

Documents in the AED files revealed the property and building at 9733 Coors Road, N.W. was sold by IFA in July 1985 to JECH Enterprises. Mr. James Covell with AED, stated that JECH Enterprises was controlled by Mr. Ken Johns who developed and owns the present Westside Jeep/Eagle-Lincoln/Mercury car dealership and the adjacent commercial center. Mr. Dennis Kelley, Service Writer at the Westside car dealership (505/897-7691), was contacted and reported the car dealership has no underground tanks. A single, aboveground tank exists to store waste oil, which is periodically transported offsite. He was not aware of any onsite disposal activities related to the car dealership.

The Alameda Airport facility, originally located on the north side of the Arroyo de las Calabasillas, was part of the Seven Bar

Ranch operated by the Black Family. The airport began operation in 1947 and was utilized primarily as a flying school. The airport developed over the years and provided such services as aircraft maintenance and repair as well as painting and refueling services. Mr. Rolfe Black, former President of Seven Bar Enterprises, Inc. (505/842-4949) which operated the airport, was contacted regarding the past airport operations. Mr. Black stated that active airport operations ceased around 1987. The airport had several registered underground fuel storage tanks and a waste oil tank. He added that there were other aboveground tanks that contained kerosene and solvent (Stoddard solvent), which was used as a parts cleaner for maintenance activities. Mr. Black stated that several underground fuel tanks were removed a few years ago and were given to the City of Belen for their use. According to Mr. Black, soil sampling and analysis were conducted during the tank removal activity and indicated no leakage. He added that a couple of underground tanks remained on the property when it was sold in 1988 to Mr. Melvin Simon, who proposes development of a shopping center. The remaining underground tanks were reportedly assessed as part of an environmental evaluation conducted by Professional Service Industries in early 1989.

Mr. Ted M. Brooker (505/897-7833), a former airport employee, reported that he was aware of four underground aviation fuel tanks

near the northeast intersection of the two main runways and one underground automobile fuel tank located near a former building (Building C) at the southeast end of the airport property. Mr. Brooker stated that an underground waste oil tank existed between two building (Building A and B) and an underground solvent tank was located behind an adobe building near the central portion of the property. He mentioned that aircraft cleaning was previously conducted using commercial-grade cleaners and that engine repair and maintenance activities also took place on the property. A former aircraft painting operation existed in a building (Building P) near the former aircraft refueling area, but painting had ceased prior to his employment in 1983. He was not aware of any spills or leaks on the property during his tenure.

Mr. Willard Kelley (505/898-1316), a former maintenance supervisor at the airport, recalled various underground storage tanks on the property, some of which had been removed. He recalled that two, former underground aviation fuel tanks located behind an adobe building were converted to an automobile fuel tank and a solvent (Stoddard solvent) tank. A single underground tank was confirmed by Mr. Kelley as being located between the former maintenance buildings (Buildings A and B). Mr. Kelley stated this tank was utilized for storage of waste oils and wastes residues he called "petroleum wastes" from maintenance activities. He

mentioned the Stoddard solvent was similar to naphtha and was used as a parts cleaner. The waste oil tank was reportedly pumped out by a waste oil firm (name unknown) on a periodic basis. Mr. Kelley had no knowledge of the former painting operation and was not aware of any spills or disposal areas on the property.

As a follow-up on information that an assessment was performed of the remaining underground tanks on the former airport property, Mr. Mike Patterson, Senior Division Manager with Professional Service Industries (505/268-4537) was contacted. Mr. Patterson would only confirm that there are four underground tanks remaining on the property and that an evaluation (unspecified) was conducted earlier in 1989, which revealed no apparent contamination associated with the remaining underground tanks. Mr. Patterson stated that to his knowledge the only problem found during their assessment project was some asbestos pipe which an individual had dumped on the property.

4.2 Aerial Photograph Review

Historical and current land uses of the site and surrounding areas were also reviewed by examining the changing configurations of the land and the buildings in available aerial photographs. Aerial photographs of the area taken in 1959, 1963, 1967, 1978, and 1982 were available for examination.

In the 1959 aerial photograph, the Sparton property and acreage to the south of the Arroyo de las Calabasillas and west of Coors Road, N.W., appears undeveloped. Agricultural and undeveloped acreage appears along the east side of Coors Road, N.W. with some scattered farms to the southeast.

The 1963 aerial photograph shows the original Sparton facility building and associated parking areas which were constructed by Sparton in 1961. To the north on adjacent property is a single building and associated parking areas which were constructed in 1961 by Curtiss-Wright. The Alameda Airport appears on the north side of the Arroyo de las Calabasillas adjacent to Coors Road, N.W. A small, new building structure and upgraded runways and taxiways appear as changes from the 1959 aerial photograph. The agricultural acreage to the east of Coors Road, N.W. appears little changed with a few more residences noted to the southeast.

The 1967 aerial photograph shows minor improvements to the Alameda Airport. An addition to the western end of the Sparton building, with additional parking to the south, was noted. A single, smaller building, constructed around 1965, appears to the south of the Sparton facility. This facility was identified as a machine shop operated by Sun Country Industries, Inc. Farther south along the west side of Coors Road, N.W., a rectangular

earthen surface impoundment (estimated size 60 feet by 100 feet) appears on undeveloped acreage. According to Mr. Joe Ben Gardner and Mr. James Williams of New Mexico Utilities (505/898-2661) (formerly Paradise Hills Community Services Corporation and Paradise Services Corporation), the surface impoundment was constructed on property owned by the Horizon Corporation. The Horizon Corporation previously purchased approximately 8500 acres for proposed development from the Black Family, which owned and operated the Seven Bar Ranch and Alameda Airport. The earthen surface impoundment was reportedly an evaporation or holding pond for the sanitary effluent generated from the Sparton and former Curtiss-Wright facilities and later the Sun Country Industries facility. According to Mr. Gardner and Mr. Williams, these facilities were connected to a 12-inch sanitary sewer main in 1961 which transported the effluent to a septic field system located near the Paradise Boulevard and Coors Road, N.W. intersection. The septic system proved inadequate and, according to Mr. Gardner, a 4-inch line was connected from the 12-inch main sewer line to the surface impoundment. Use of this surface impoundment was reportedly discontinued around the end of 1973 when the 12-inch main sewer line was connected to a wastewater treatment plant servicing the nearby Paradise Hills Subdivision. Mr. Gardner mentioned that the Alameda Airport property was not connected into

this main sanitary line, and was utilizing an on-site septic system which apparently is still in use.

The 1973 aerial photograph shows little change to the Sparton and Sun Country Industries facilities but reveals an addition to the western portion of the building on the adjacent property to the north. This addition was reportedly constructed sometime in 1969. New building structures were in evidence at the Alameda Airport and residential development to the southeast had increased. The sanitary effluent surface impoundment, which was reportedly still in use at the time of the aerial photograph, appears larger in size (estimated size 60 feet by 200 feet). The acreage to the east of Coors Road, N.W. appears to be utilized for continued agricultural and residential purposes.

The 1978 aerial photograph reveals that Sun Country Industries had constructed an addition onto their facility building. A restaurant, then called The Prime House, was in existence to the south of the Sun Country Industries' property. The sanitary effluent surface impoundment is no longer present, but its former location can be identified with the surrounding acreage still undeveloped. The facility north of the Sparton facility appears little changed from the 1973 aerial photograph. The Alameda Airport shows newly constructed buildings near the southeast corner

along Coors Road, N.W.. The acreage and land use east of Coors Road, N.W. appears the same with some additional residential development to the southeast.

The 1982 aerial photograph appears to show the facility to the north of the Sparton site to be unoccupied. The Alameda Airport appears little changed; however, Coors Road, N.W. has been widened and Irving Boulevard constructed off Coors Road, N.W. The area of the former sanitary effluent surface impoundment, south of Irving Boulevard, appears as a dry, slightly depressed area with adjacent acreage still undeveloped.

A blue print copy of a more recent, but undated, aerial photograph was obtained and showed more recent development of the businesses surrounding the Sparton facility. The blue print copy shows the Westside car dealership to the north of the Sparton facility, occupying the former IFA building which had been enlarged.

A small commercial center appears to the west and adjacent to the car dealership. Additions to the Sun Country Industries' building and the City Lights Tavern and Grill (formerly The Prime House restaurant) can be observed. Also noted was the establishment of the Rowland Nurseries' facility located to the

south of the Sparton facility. This nursery was reportedly constructed sometime in 1985 or 1986.

5.0 INVESTIGATION ACTIVITIES AND FINDINGS

5.1 Site Visit

A visit to the Sparton facility was conducted by HLA personnel on November 15, 1989. Mr. Patrick C. Durkin, Maintenance Manager (505/892-5300) conducted a brief tour of the Sparton facility and arranged personal interviews with various long-time Sparton employees. The interviews were conducted to gather information about activities conducted by former businesses in the area which could potentially pose an environmental impact to the Sparton site. Information gathered from these personal interviews is incorporated throughout this report.

5.2 Surrounding Area Reconnaissance

Reconnaissance of the area surrounding the Sparton facility was also performed on November 15, 1989 by HLA personnel.

The businesses to the south of the Sparton facility were identified as the Sun Country Industries, machine shop; the City Lights Tavern and Grill, restaurant; and Rowland Nurseries, a retail nursery business. To the south of Irving Boulevard, a retail shopping center is under construction. Vacant undeveloped acreage is situated to the west of the Sparton facility extending over to Irving Boulevard. East, across Coors Road, N.W., is partially-cultivated acreage which slopes down to the nearby Rio

Grande River. A small, undeveloped tract of land is located immediately north of the Sparton facility, extending north to Westside Drive. The Westside Jeep/Eagle - Lincoln/Mercury car dealership fronts on Coors Road, N.W., south of the Arroyo de las Calabasillas. A small commercial center is located immediately west of the car dealership, and presently contains the following tenants:

A-1 - Riverview Mower and Sprinkler Supply

A-3 - Safelite Autoglass

A-5 - Finishing Touch Auto Detail

A-7 - Budget West Radiator

A-10 - Kelley's Small Engine Service

A-11 - Randy's Auto Service

B-23 - It's Tire Time

A retail shopping center and the Coors Road By-Pass roadway presently exists immediately north of the Arroyo de las Calabasillas, on the former southeast corner of the Alameda Airport property. Several former airport buildings still exist on the property, some of which were currently occupied by the following companies:

10001 Coors Road, N.W. - Marlin Realty, Inc.

10001 Coors Road, N.W. - Seven Bar Flying Service

10001-G Coors Road, N.W. - AAA Auto Accessories

10003 Coors Road, N.W. - Autoworks Transmission

10003 Coors Road, N.W. - West Mesa Small Engine Repair

10011 Coors Road, N.W. - State Farm Insurance (Ted Madrid)

10011-B Coors Road, N.W. - Discovery Realty and Management

Observations of these properties were made by driving by on public roadways or through public parking facilities associated with the various business establishments.

5.3 Review of Regulatory Agency Records

The discussion presented in this section is based on available information provided by government agencies. In addition to reviewing agency lists that contain general information about sites that have had reported problems with hazardous materials, HLA contacted agency personnel for information on additional sites that have been identified, but have not yet been placed on these lists, or if there are areas of potential environmental concern that may not be covered by the available lists.

5.3.1 Review of Published Regulatory Agency Lists

As part of HLA's assessment of whether there are areas that may pose potential environmental concerns relative to the Sparton site, the following regulatory agency lists were reviewed:

- U.S. Environmental Protection Agency (USEPA) National Priorities List (NPL), November 1989

  The NPL provides a list of Federal Superfund sites. No business or property in the surrounding area were included on the NPL. Only one NPL site was listed in the Albuquerque area, that being the South Valley site located in the southwest area of the city several miles from the Sparton facility. The likelihood of environmental impact on the subject property from this NPL site is extremely low.

- USEPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), September 1989

  The CERCLIS provides information for businesses or properties that are in the Federal Superfund program. Under this program, a business or property is identified and a preliminary assessment is performed to assess whether the site shall become a Federal Superfund site.

  None of the properties on the CERCLIS appeared to be in close proximity to the Sparton facility. The Sparton facility itself was identified on the CERCLIS.

5.3.2 Other Agency Contracts

In addition to reviewing published regulatory agency lists, HLA also contacted regulatory agency personnel regarding their knowledge of potential or known environmental concerns at the site or surrounding properties.

Mr. Ron Anglada, Supervisor of Hazardous Waste and Water Quality and Mr. Milo Meyers, Hazardous Waste Program Specialist with the City Albuquerque Environmental Health Department (505/768-2600) were contacted and stated that they were not aware of any known hazardous waste sites or problems in the area surrounding the Sparton facility. Their agency had developed a reference book, that attempted to identify known waste sites in the Albuquerque area. Sites identified in this reference book included illegal dump sites, sanitary landfills, military disposal sites and buried refuse sites. According to this reference, which was last updated in March 1989, no sites were identified as being in close proximity to the Sparton facility.

Ms. Rosemary Glenn, with the Albuquerque Environmental Health Department - Underground Storage Tank Division (505/768-2600), was also contacted regarding information on underground storage tanks (USTs) in the area of the Sparton facility. Ms. Glenn checked their computer database and identified USTs located at 10001 Coors

Road, N.W. registered by Seven Bar Enterprises, Inc. These USTs were later determined to be associated with former operations at the Alameda Airport. The database identified 15 USTs at the airport location having been registered in 1986. The registration indicated 14 of the USTs to be active, with 11 containing gasoline products, and one each containing kerosene, waste oil and solvent. Ms. Glenn stated that their records indicated no documented leaks or groundwater contamination associated with these tanks or in the immediate area.

Mr. Lee Rosenberger, with the Hazardous Waste Section of the New Mexico Environmental Improvement Division (EID) - Albuquerque District office (505/841-6580) was contacted and reported no known hazardous waste problems in the immediate area of the Sparton facility. Mr. Rosenberger referred HLA to the EID - Central office in Santa Fe for further information.

Mr. Colby Muckelroy, Environmental Scientist, with the EID - Hazardous Waste Division (505/827-2922) in Santa Fe, was contacted and provided with a list of company names to determine if any had files indicating hazardous waste generation or disposal operations. According to Mr. Muckelroy, the only referenced company having an existing file was the Motorola, Inc. facility. Motorola, Inc. had previously conducted operations at 9733 Coors Road, N.W. and had

registered as a hazardous waste storage facility. According to file information supplied by Mr. Muckelroy, Motorola, Inc. had closed their hazardous waste drum storage area in accordance with an USEPA-approved closure plan, after Motorola, Inc. had relocated to their new facility in July 1982.

Ms. Marcy Leavitt, with the EID - Underground Storage Tank Division (505/827-2211) in Santa Fe, was contacted and stated that their files did not contain any documentation of leaking USTs or groundwater contamination in the proximity of the Sparton facility.

6.0 CONCLUSIONS

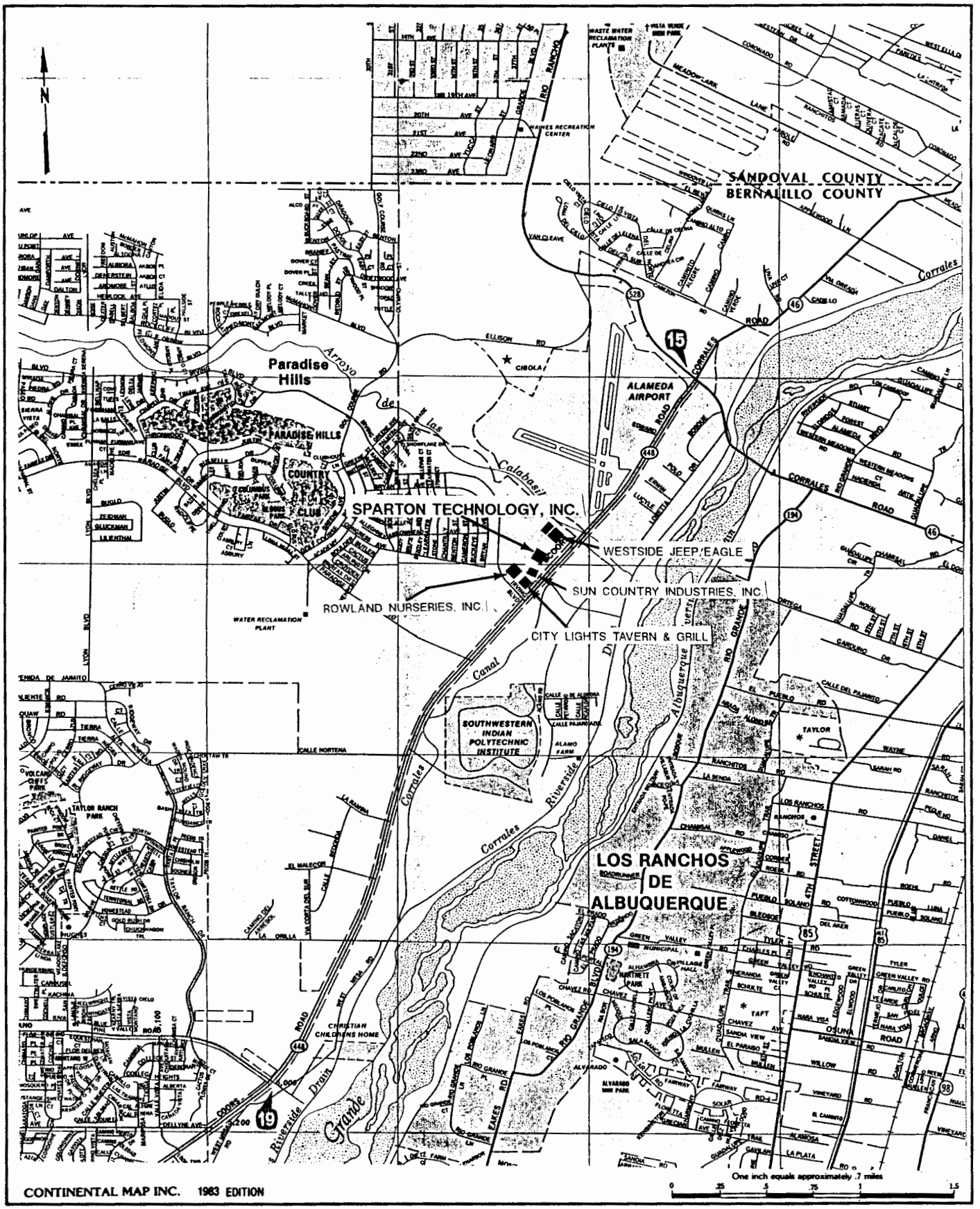
The environmental assessment performed by HLA, was an attempt to identify documented or potential environmental impairments related to past or present operations conducted on properties surrounding the Sparton facility which may cause an environmental impact on the Sparton site. Review of historical information and investigation by HLA, revealed that prior operations conducted by Curtiss-Wright while located at 9733 Coors Road, N.W. may present a potential for concern. Curtiss-Wright apparently utilized three, small plastic-lined earthen pits for storage and evaporation of their plating solutions generated from PCB manufacturing operations which were conducted. After the plating solutions were allowed to evaporate from these ponds, the solid residues were reportedly collected, solidified and disposed of offsite. Solvents were also utilized as part of the Curtiss-Wright operation and although the described pits were reportedly only utilized for plating solutions, the possibility exists that waste solvents may have been handled in a similar manner. Information regarding the possible utilization of a septic system by Curtiss-Wright to handle sanitary wastes may also present a potential source of contamination. If solvents or other chemical residues were allowed to discharge to the sanitary sewer system, as various past employees speculated, a potential exists from possible contamination related to the septic system. Possible leakage or breakage in the sanitary lines

which were later installed may also represent a potential source for subsurface contamination. Later operations at the same location conducted by EG&G, Inc. and then Motorola reportedly utilized various oils and solvents in their respective operations. EG&G, Inc. utilized small amounts of cutting oils and solvents in their machine shop and technical paint booth, but according to former employees, no wastes were stored or disposed of onsite during their occupation of the facility. Motorola was registered with the USEPA as a RCRA hazardous waste generator and did store drummed wastes, including lead-bearing residues, freon, and 1,1,1-trichloroethane, at a designated hazardous waste storage area located on the corner of the rear asphalt parking area. Documentation supplied by regulatory officials (EID) indicates that Motorola closed the drum storage area in accordance with an USEPA-approved closure plan. The closure work was certified by an engineering firm which submitted a certification letter indicating that soil sampling had been conducted as part of the closure and revealed levels of lead to be below allowable levels. Specific details regarding the closure actions undertaken by Motorola were unavailable and the possibility of contamination having gone undetected may exist, albeit slightly. Investigation regarding other companies which temporarily occupied the property at 9733 Coors Road, N.W. did not reveal information to indicate operations which may have created potential environmental concerns. The

current utilization of the site as an automotive dealership may generate some concern, due to the nature of its operations. It does not appear likely that activities conducted at this facility, after it was opened, could have contributed to the nature of the problem currently being investigated by Sparton.

Activities conducted as part of the former operations at the nearby Alameda Airport present a potential source of environmental concern, although the distance between the airport facility and the Sparton property is over one quarter mile. Underground aviation fuel, waste oil, and solvent tanks apparently existed on the airport site. According to individuals interviewed, several of the underground tanks were reportedly removed with no leakage found. Four underground tanks apparently still exist on the property. These remaining underground tanks were reported to have been assessed by a firm conducting environmental studies for the property owner, prior to development. No significant contamination was reported to have been found during the assessment project. If possible, a review of the assessment findings and project tasks conducted by Professional Service Industries may be useful in evaluating the existence of potential contamination sources on the former airport property.

ILLUSTRATION



CONTINENTAL MAP INC. 1983 EDITION

Harding Lawson Associates
Engineering and
Environmental Services

LOCATION MAP

SPARTON TECHNOLOGY, INC.
9621 COORS ROAD NW
ALBUQUERQUE, NEW MEXICO

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	06310,039.12	DJU	12-21-89		

APPENDICES

A Documentation Related to the Closure of a Hazardous Waste Storage Area by Motorola, Inc.

B Historical Aerial Photographs

APPENDIX A

Documentation Related to the Closure of a Hazardous Waste Storage Area by Motorola, Inc.

FORM 3 RCRA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

EPA I.D. NUMBER: F N M D 0 0 0 8 0 4 2 2 9 — T/A C: 1

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[X] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

C	YR.	MO.	DAY
8	7 8	0 8	0 1

[ ] 2. NEW FACILITY *(Complete item below.)*

FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

YR.	MO.	DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[ ] 1. FACILITY HAS INTERIM STATUS

[ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.

1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C DUP T/A C 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	S 0 1	23,000	G		7				
2	T 0 4	10,000	U		8				
3					9				
4					10				

NOV 17 198

Continued from the front.

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

Slicing slurry dewatered through a centrifuge with associated diatomaceous earth filtering including precipitators and neutralizers.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER — Enter the four—digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four—digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY — For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non—listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

ility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:
   For listed hazardous waste: For each listed hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non—listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non—listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* — A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non—listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				included with above

CONTINUE ON PAGE 3

ontinued from page 2.
OTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)		FOR OFFICIAL USE ONLY	
V N M D 0 0 0 8 0 4 2 2 9	T/A C 1	W DUP	T/A C 2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	D 0 0 8	150,000	P	T 0 4	S 0 1			Hauled off site for disposal
2	D 0 0 8	100,000	P	S 0 1				Hauled off site for disposal
3	F 0 0 2	50,000	P	S 0 1				Hauled off site for reclaim
4	F 0 0 1	5,000	P	S 0 1				Hauled off site for disposal
5	F 0 0 5	1,000	P	S 0 1				Hauled off site for disposal
6	D 0 0 2	5,000	P	S 0 1				Hauled off site for disposal
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

CONTINUE ON REVERSE

Continued from the front.

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. *(enter from page 1)*

F	N	M	D	0	0	0	8	0	4	2	2	9	T/N	6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail).*

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground—level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail).*

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
35 11 52	106 39 35

VIII. FACILITY OWNER

☐ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*
E Industrial Foundation of Albuquerque, Inc.	505-842-0400

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F 401 Second St., N. W.	G Albuquerque	NM	87102

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
James A. Covell	James A. Covell	11/13/80

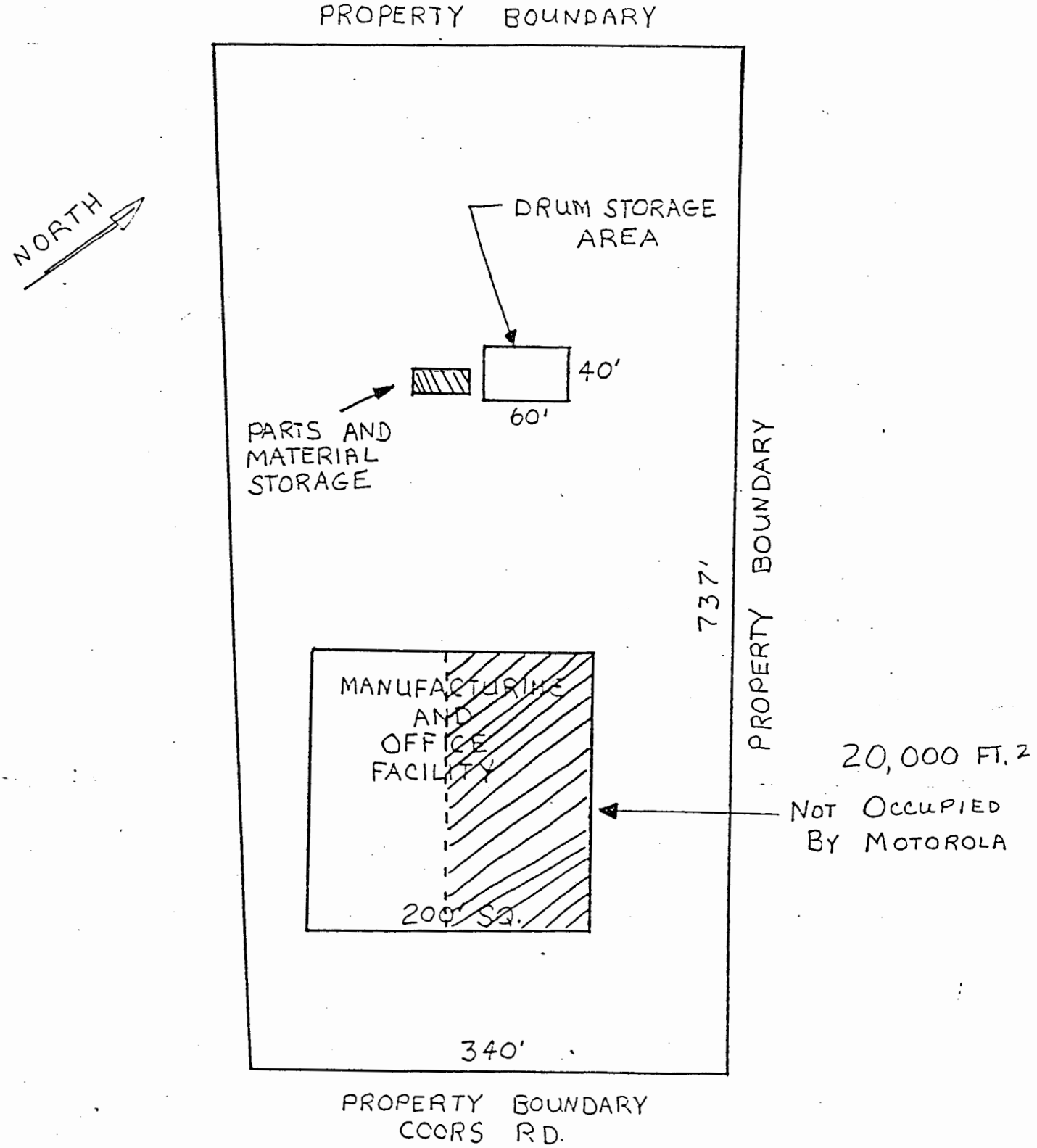
X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED

CONTINUE ON PAGE

MOTOROLA CERAMIC PRODUCTS
9733 COORS RD. N.W. ALBUQUERQUE, N.M.



SCALE: 1 INCH = 100'

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

November 30, 1981

Douglas R. Bosomworth
Operations Manager
Motorola Inc.
9733 Coors Road, N.W.
Albuquerque, New Mexico 87114

Dear Mr. Bosomworth:

This is to inform you that the closure plan submitted on June 2, 1981, to the U.S. EPA, by Motorola Inc., has passed the public comment phase of review. During the public comment period no comments were received by the EPA. Therefore, Motorola Inc., may initiate closure proceedings as outlined in the closure plan.

If you have further questions in this matter please contact Mr. Ed Nalepka at 214/767-3274.

Sincerely yours,

W. B. Hathaway

William B. Hathaway
Acting Director
Enforcement Division (6E)

cc: NMEID

RECEIVED
DEC 7 1981
EID: WATER
POLLUTION CONTROL

MOTOROLA INC.
Communications Systems Division

July 7, 1982

Mr. William B. Hathaway
Acting Director, Enforcement Division (6E)
United States Environmental Protection Agency
Region VI
1201 Elm Street
Dallas, Texas 75270

Reference: EPA I.D.#NMD000804229

Dear Mr. Hathaway:

This is to certify that the facility closure plan submitted June 2, 1981, and approved by your letters of September 22, 1981 and November 30, 1981, has been executed in its entirety.

Attached please find a letter from an independent registered professional engineer, Dr. Bruce M. Thomson, which certifies that the closure plan has been properly executed.

If any further action in this matter is required, please bring it to our attention. Otherwise, we will assume that the site identified by #NMD000804229 is removed from all active site lists.

Yours sincerely,

MOTOROLA, INC.

D R Bosomworth

Douglas R. Bosomworth
Operations Manager

DRB:dd

D&A / DEUEL and ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

9412 Indian School Road, N.E.
Albuquerque, New Mexico 87112
(505) 296-4838

Denver Office
(303) 665-6697

July 1, 1982

Motorola, Inc.
Attn: Mr. George Wegman
Materials Manager
4800 Richfield Dr., N.E.
Albuquerque, NM 87113

Dear Mr. Wegman:

This letter is Certification of Closure of the hazardous waste storage facility operated by your company at 9733 Coors Rd., N.W., Albuquerque, NM as required by the U.S. EPA in 40CFR265.115. I have reviewed your closure plan, received copies of shipment manifests to an EPA licensed hazardous waste disposal facility, inspected the site, and studied the results of soil analysis from the site. The facility appears to have been closed in complete compliance with the EPA approved closure plan. Furthermore, the soil analyses which were performed according to the extraction procedure specified by the EPA in Appendix II, "EP Toxicity Test Procedure," 40CFR261, May 19, 1980, show values for lead which are below the maximum levels allowed by more than an order of magnitude.

It is my opinion that this site no longer contains hazardous material which originated from your operations. I commend you on your efforts to comply with the Resource Conservation and Recovery Act (RCRA). I hope that we can be of service to you in the future.

Sincerely yours,

Bruce M. Thomson

Bruce M. Thomson, Ph.D., P.E.
N.M. Registration No. 7131

BMT:sg

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

August 9, 1982

Motorola Ceramic Products
Attn: Doug Bosomworth,
Production Manager
9733 Coors Road, NW
Albuquerque, New Mexico 87114

Re: EPA ID Number: NMD000804229
Facility Location: 9733 Coors Road, NW
Albuquerque, New Mexico

This is to acknowledge that the Environmental Protection Agency has completed processing the information submitted in your Part A Hazardous Waste Permit Application. It is the agency's opinion, based on the assumption that the information submitted is complete and accurate, that you as an owner or operator of a hazardous waste management facility, have met the requirements of Section 3005(e) of the Resource Conservation and Recovery Act (RCRA) for interim status. EPA has not verified the information submitted. If it is determined that the information is incomplete or inaccurate, you may be asked to provide additional information or in certain circumstances it may be determined that you do not qualify for interim status. In addition, this notice does not preclude a citizen from taking legal action under the provisions of Section 7002 of RCRA.

A facility not meeting the requirements for interim status under Section 3005 of RCRA may be required to close until such time as a Hazardous Waste Permit is issued. Interim status may also be terminated, according to procedures in 40 CFR, Part 124, if the owner or operator fails to furnish additional information which EPA requests in order to process a permit application.

As an owner or operator of a hazardous waste management facility, you are required to comply with the interim status standards as prescribed in 40 CFR, Parts 122 and 265, or with state rules and regulations in those states which have been authorized under Section 3006 of RCRA. In addition, you are reminded that operating under interim status does not relieve you from the need to comply with all applicable state and local requirements.

The enclosure to this letter identifies the processes your facility may use, their design capacities and the types of waste your facility may accept during interim status. This information was obtained from Part "A" of the Permit Application. If you wish to handle new wastes, change processes, increase the design capacity of existing processes, or change ownership or operational control of the facility, you may do so only as provided in 40 CFR, Sections 122.22 and 122.23.

CONDITIONS OF OPERATION DURING INTERIM STATUS

Date prepared: August 9, 1982

The information shown below is based solely on the information that the owner and operator of this facility submitted in Part A of the Hazardous Waste Permit Application. This is not a determination by EPA that this facility is an environmentally acceptable facility for treating, storing or disposing of the hazardous wastes listed below.

I. Facility name, location and EPA identification number:

Name: Motorola Ceramic Products

Location: 9733 Coors Road, NW

Albuquerque, New Mexico 87114

EPA ID No: NMD 00 080 4229

II. EPA considers the following to be the owner or operator of the facility and therefore the person(s) who must comply with the requirements set forth in 40 CFR Parts 122 and 265:

Owner's name: Industrial Foundation of Albuquerque, Inc.

Operator's name: Motorola, Inc.

III. During the period of interim status, the facility may use only the following processes for treating, storing or disposing of hazardous waste, up to the design capacities that are indicated:

Process Code	Design Capacity Amount	Unit of Measure
S01	23,000.	Gallons
T04	10,000.	Gallons per day

IV. During the period of interim status, the facility may handle only the hazardous wastes with the following EPA Hazardous Waste Numbers, and/or solid wastes exhibiting hazardous characteristics with the following EPA Hazardous Waste Numbers:

D000	D001	F001	F002	F003	F005	F007	U002	U152	U226	D002
D008										

If you have any questions concerning this letter, please contact Jack Paul at 214/767-9400 or write Environmental Protection Agency, Mail Code 6E-P, 1201 Elm Street, Dallas, Texas 75270.

Sincerely yours,

Allyn M. Davis

Allyn Davis
Director, Air and Waste Management Division (6AW)

Enclosure

cc: New Mexico Health and
Environmental Department
Scott Nicholson

ENVIRONMENTAL PROTECTION AGENCY

GENERATOR ANNUAL HAZARDOUS WASTE REPORT

This report is for the calendar year ending December 31, 1981.

I. GENERATOR'S EPA I.D. NUMBER

T/A C

N M D 0 0 0 8 0 4 2 2 9

1 2 13 14 15

II. NAME OF INSTALLATION

MOTOROLA CERAMIC PRODUCTS

30 69

III. INSTALLATION MAILING ADDRESS

9733 CORSRD NW

15 16 45

Street or P.O. Box

ALBUQUERQUE

15 16

City or Town

NM 87114

41 42 47 51

State Zip Code

IV. LOCATION OF INSTALLATION (if different than section III above)

15 16 45

Street or Route number

15 16

City or Town

41 42 47 51

State Zip Code

V. INSTALLATION CONTACT

GEORGE WEGMAN

15 16 45

Name (last and first)

505-822-8801

46 55

Phone No. (area code & no.)

VI. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

George Wegman Materials Manager George Wegman 1/20/83

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ENVIRONMENTAL PROTECTION AGENCY

Generator Annual Hazardous Waste Report (cont.)

This report is for the calendar year ending December 31, 1981.

VII. GENERATOR'S EPA I.D. NO.

T/A C

N M D 0 0 0 8 0 4 2 29

1 2 13 14 15

VIII. FACILITY NAME (specify facility to which all wastes on this page were shipped)

Chemical Waste Management Inc.

IX. FACILITY'S EPA I.D. NO.

C O D 0 0 0 6 95 0 0 7

16 28

X. FACILITY ADDRESS

900 Wawatta Street
Denver, CO

XI. TRANSPORTATION SERVICES USED (List the name and EPA identification numbers of all transporters whose services were used during 1981. This section to be completed only once. Do not repeat on supplemental sheets.)

Chemical Waste Management Inc. EPAID# COD073405771

XII. WASTE IDENTIFICATION

Line #	A. Description of Waste	B. DOT Hazard code	C. EPA Hazardous Waste No. (see instructions)	D. Amount of Waste	E. Unit of Measure
1	Lead bearing sludge & Powder used in PZT production.	1 5 (33 34)	D 008 (35–38) (39–42) (43–46) (47–50)	12 14 4 3 (51–59)	P (60)
2	Lead bearing slurry used in PZT production	1 5	D 008	38 90	P
3	Lead bearing paper waste used in PZT production.	1 5	D 008	12 96	P
4					
5					
6					
7					
8					
9					
10					
11					
12					

XIII. COMMENTS (enter information by section number—see instructions)

Section XII-D Weight of shipping containers (17E & 17H Drums) not included.

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ENVIRONMENTAL PROTECTION AGENCY

Generator Annual Hazardous Waste Report (cont.)

This report is for the calendar year ending December 31, 1981.

VII. GENERATOR'S EPA I.D. NO.

T/A C

N M D 0 0 0 8 0 4 2 2 9

1 2 13 14 15

VIII. FACILITY NAME (specify facility to which all wastes on this page were shipped)

Van Waters and Rogers (California)

IX. FACILITY'S EPA I.D. NO.

C A D 0 0 9 2 3 0 2 4 4

16 28

X. FACILITY ADDRESS

1363 Bonnie Beach Place
Los Angeles, CA 90051

XI. TRANSPORTATION SERVICES USED (List the name and EPA identification numbers of all transporters whose services were used during 1981. This section to be completed only once. Do not repeat on supplemental sheets.)

Van Waters and Rogers (Albuquerque) EPA ID# NMD076467364

XII. WASTE IDENTIFICATION

Sequence #	Line #	A. Description of Waste	B. DOT Hazard Code	C. EPA Hazardous Waste No. (see instructions)	D. Amount of Waste	E. Unit of Measure
	1	Spent Chlorothane (I,I,I, Trichlordethane) used in cleaning	1 5	F 0 0 2	2 3 9 4	P
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					
	11					
	12					

XIII. COMMENTS (enter information by section number—see instructions)

Section XII-D Weight of Shipping Containers (17 & Drums) not included.

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Do not make copies in shaded areas

ENVIRONMENTAL PROTECTION AGENCY

Generator Annual Hazardous Waste Report (cont.)

This report is for the calendar year ending December 31, 1981.

Date rec'd: _____ Rec'd by: _____

VII. GENERATOR'S EPA I.D. NO.

T/A C

G N M D 0 0 0 8 0 4 2 2 9 [illegible]

1 2 13 14 15

VIII. FACILITY NAME (specify facility to which all wastes on this page were shipped)

Omega Chemical Corp.
Bachlor Chemical Processing Div.

IX. FACILITY'S EPA I.D. NO.

F C A D 0 4 2 2 4 5 0 0 1

16 28

X. FACILITY ADDRESS

12504 East Whittier Blvd.
Whittier, CA 90602

XI. TRANSPORTATION SERVICES USED (List the name and EPA identification numbers of all transporters whose services were used during 1981. This section to be completed only once. Do not repeat on supplemental sheets.)

XII. WASTE IDENTIFICATION

Sequence # (1–32)	Line #	A. Description of Waste	B. DOT Hazard code (33–34)	C. EPA Hazardous Waste No. (see instructions) (35–38, 39–42, 43–46, 47–50)	D. Amount of Waste (51–59)	E. Unit of Measure (60)
	1	Spent Freon used in Degreasing operation	1 5	F 0 0 1	2 0 2 5	P
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					
	11					
	12					

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XIII. COMMENTS (enter information by section number—see instructions)

Section XII-D Weight of shipping containers (17E Drums) not included.

Do not make entries in shaded areas

OMB: 150-0005 Expires: 1-31-83

ENVIRONMENTAL PROTECTION AGENCY

FACILITY ANNUAL HAZARDOUS WASTE REPORT

This report is for the calendar year ending December 31, 1981.

AFFIX LABEL HERE

GENERAL INSTRUCTIONS: If you received a preprinted label attached to the mailing envelope in which this form was enclosed, affix it in the space provided. If any of the information on the label is incorrect, draw a line through it and provide the correct information in the appropriate section below. If the information is correct and complete, leave Sections I, II, and III below blank. If you did not receive a preprinted label, complete all sections. REFER TO THE SPECIFIC INSTRUCTIONS CONTAINED IN THIS BOOKLET BEFORE COMPLETING THIS FORM. The information requested in this report is required by law (Section 3004 of the Resource Conservation Recovery Act).

Please print/type with elite type (12 characters per inch)

I. FACILITY EPA I.D. NUMBER

T/A C

F N M D 0 0 0 8 0 4 2 2 9 1

1 2 13 14 15

II. NAME OF FACILITY

MOTOROLA CERAMIC PRODUCTS

30 69

III. FACILITY MAILING ADDRESS

3 9 7 3 3 COORS RD NW

15 16 45

Street or P.O. Box

4 ALBUQUERQUE NM 8 7 1 1 4

15 16 41 42 47 51

City or Town State Zip Code

IV. LOCATION OF FACILITY (if different than section III above)

5

15 16 45

Street or Route number

6

15 16 41 42 47 51

City or Town State Zip Code

V. FACILITY CONTACT

2 GEORGE WEGMAN

15 16 45

Name (last and first)

5 0 5 — 8 2 2 — 8 8 0 1

46 55

Phone No. (area code & no.)

VI. COST ESTIMATES FOR FACILITIES

$ . . 16 19 22

Cost Estimate for Facility Closure

See enclosed sheets

$ . . 25 28 31

Cost Estimate for Post Closure Monitoring and Maintenance (disposal facilities only)

VII. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

George Wegman - Materials Manager George Wegman 1-20-83

Print/Type Name Title Signature of Authorized Representative Date Signed

Tear out here

Do not make entries in shaded areas

ENVIRONMENTAL PROTECTION AGENCY

Facility Annual Hazardous Waste Report (cont.)

This report is for the calendar year ending December 31, 1981.

VIII. FACILITY'S EPA I.D. NO. T/A C

F N M D 0 0 0 8 0 4 2 2 9 1

Date received: _____

Received by: _____

IX. GENERATOR'S EPA I.D. NO.

G

X. GENERATOR NAME (specify generator from whom all wastes on this page were received)

Motorola Ceramic Products "On Site"

XI. GENERATOR ADDRESS

XII. WASTE IDENTIFICATION

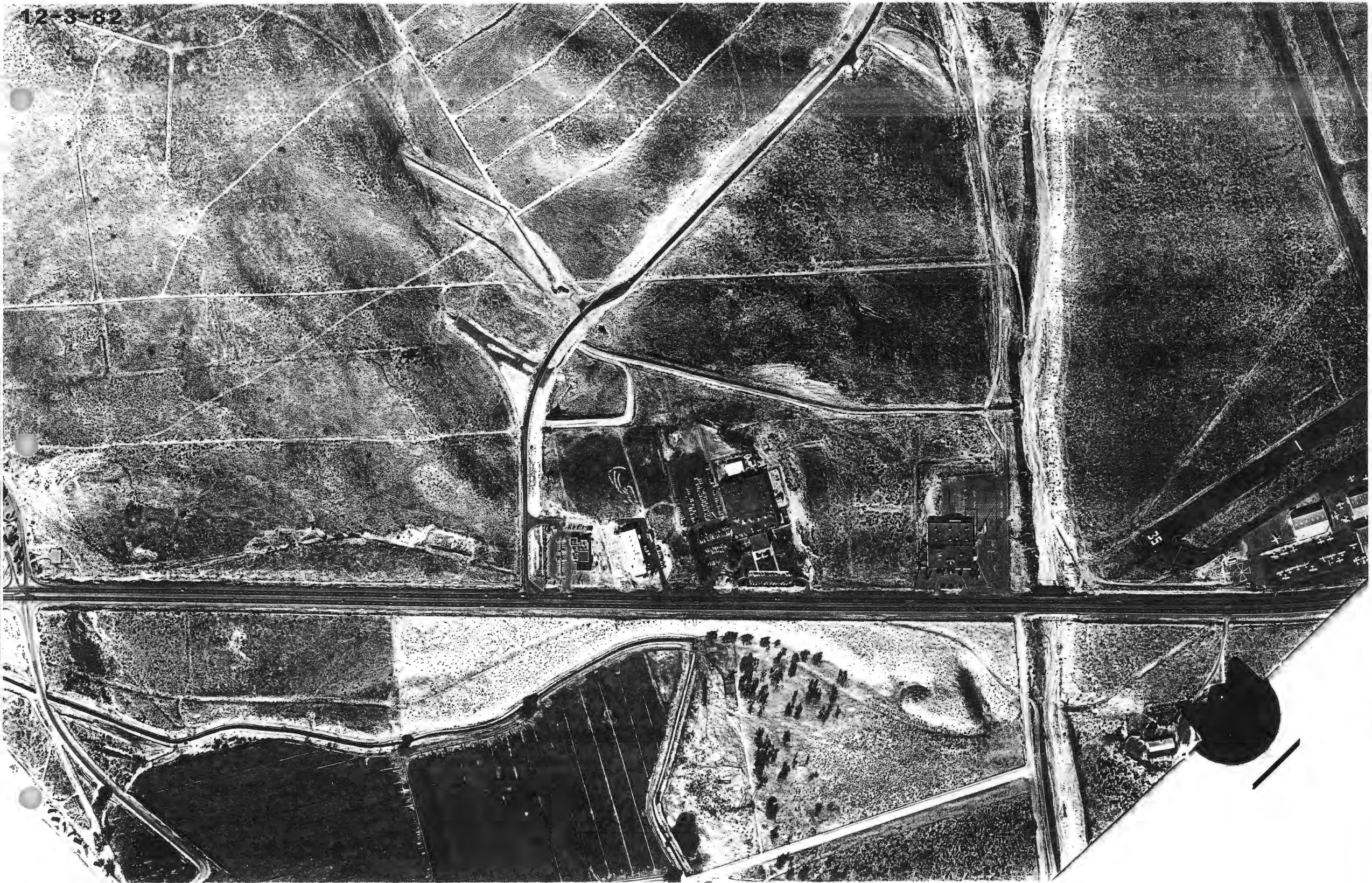
Sequence #	Line #	A. Description of Waste	B. EPA Hazardous Waste No. (see instructions)	C. Handling Method	D. Amount of Waste	E. Unit of Measure
	1	Lead bearing sludge and powder used in PZT production	D008	501	10244 2	P
	2	Lead bearing slurry used in PZT production	D008	501	5661	P
	3	Lead bearing paper waste used in PZT production	D008	501	1746	P
	4	Oil contaminated with lead	D008	501	1389	P
	5	Spent freon used in Degreasing operation	F001	501	2025	P
	6	Spent Chlorothane (1,1,1, Trichloroethane) used in cleaning	F002	501	2394	P
	7					
	8					
	9					
	10					
	11					
	12					

Tear out here

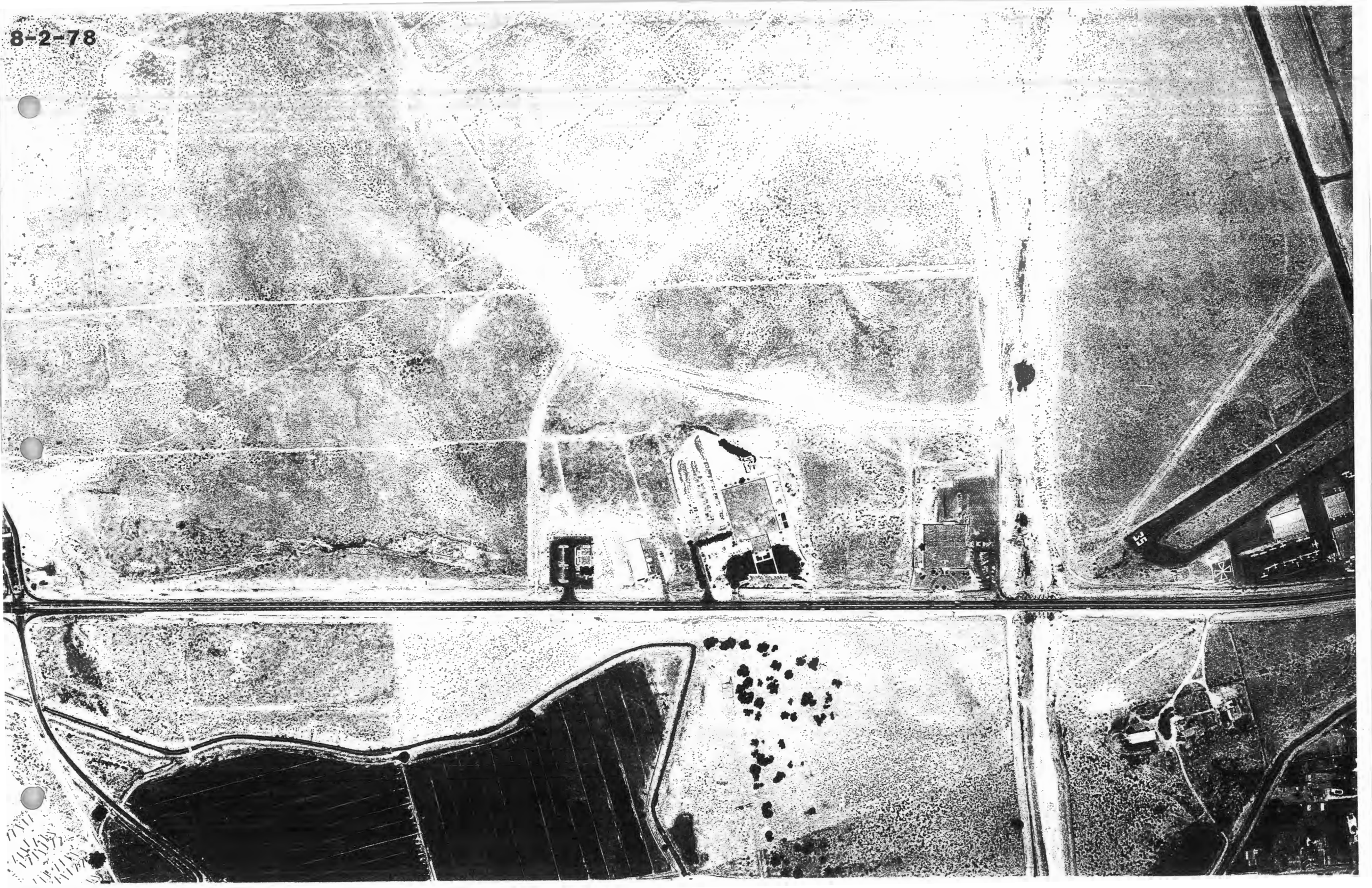
XIII. COMMENTS (enter information by section number—see instructions)

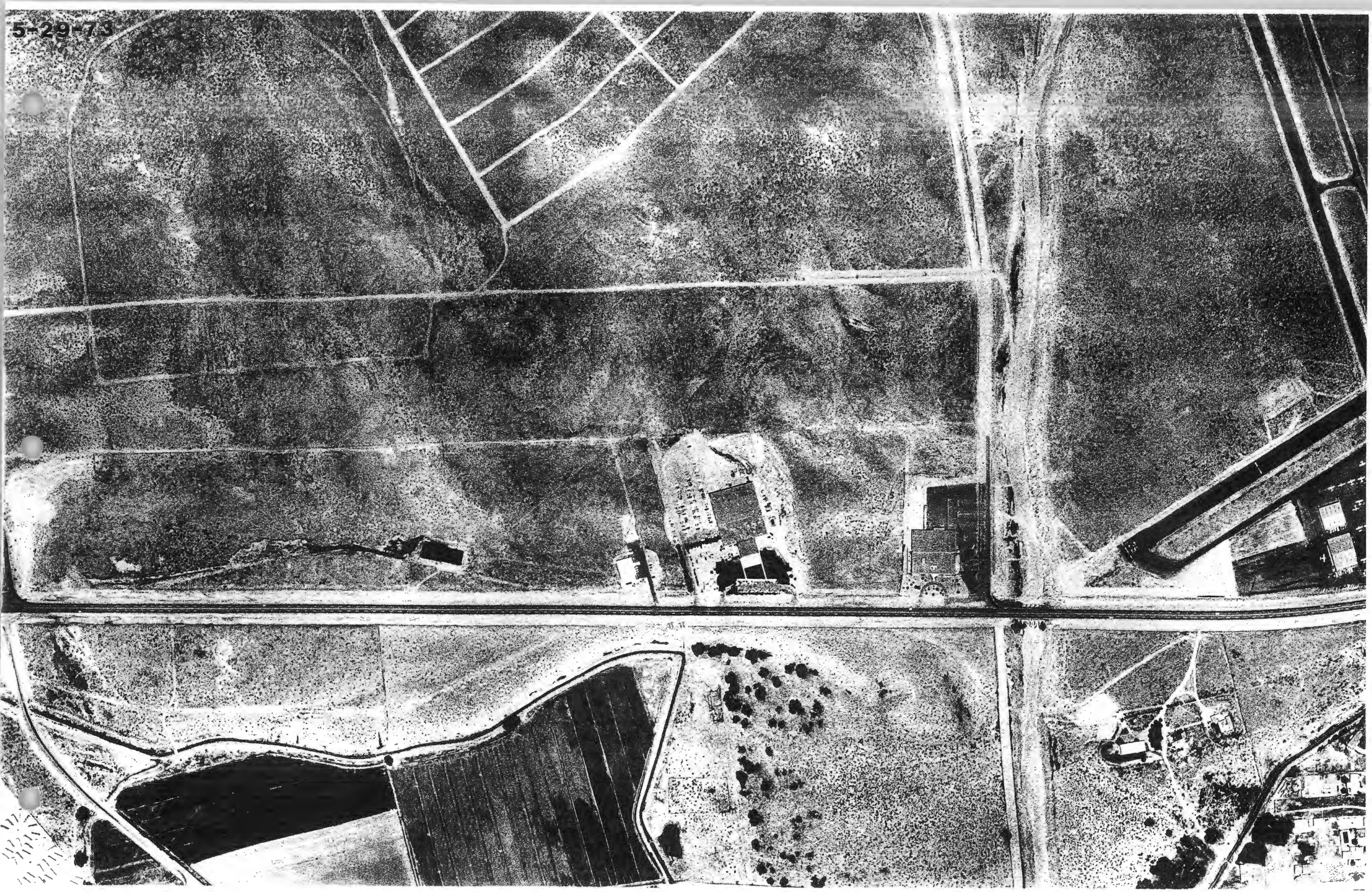
APPENDIX B

Historical Aerial Photographs


12-3-82
35

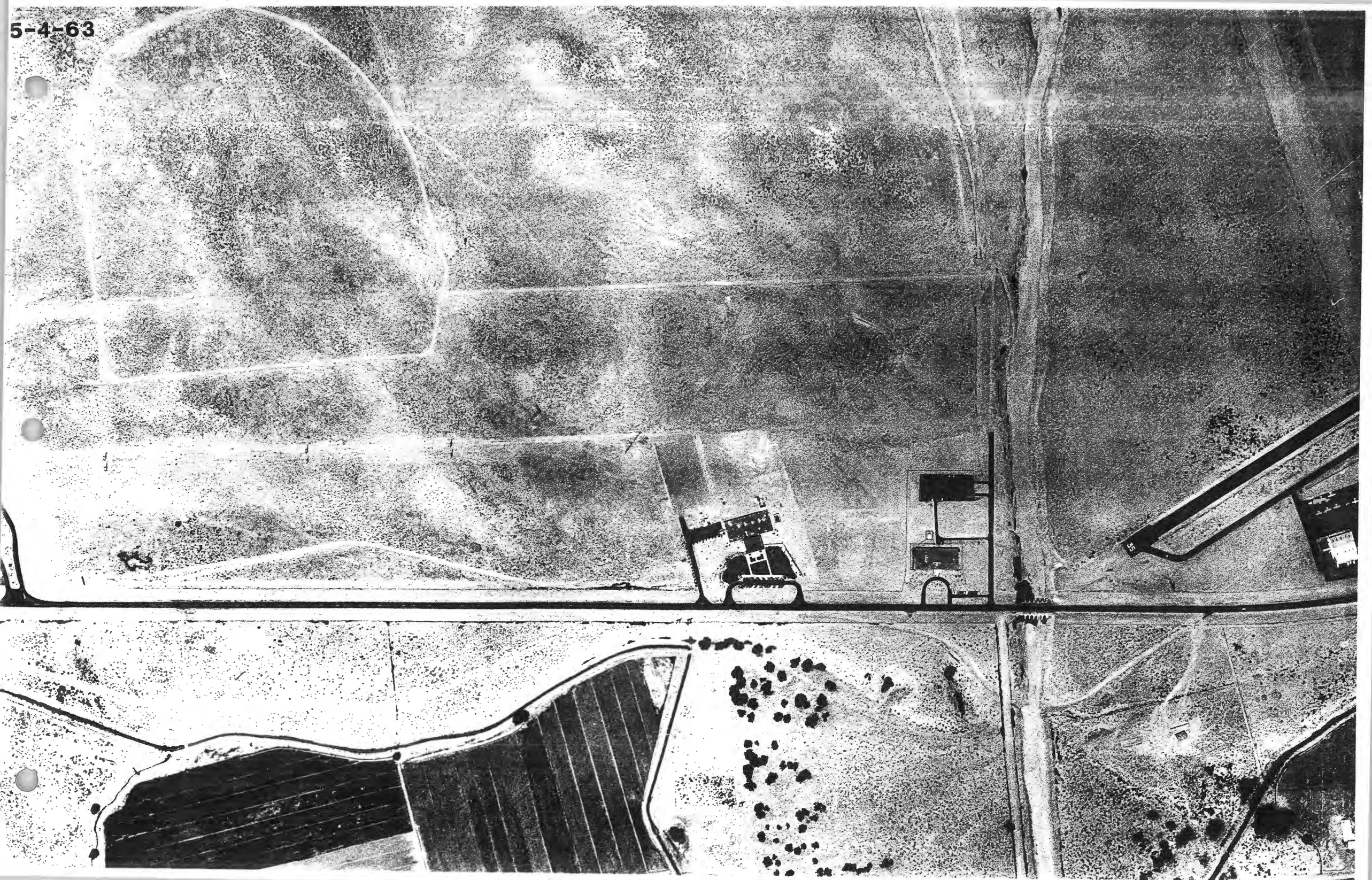
8-2-78




5-29-73

0-8-67

5-4-63



F-101