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REMEDIAL INVESTIGATION
McKESSON CORPORATION PROPERTY
9005 SORENSEN AVENUE
SANTA FE SPRINGS, CALIFORNIA

HLA Project No. 11136-168

Prepared for

McKESSON CORPORATION
One Post Street
San Francisco, California 94104

By

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Santa Ana, California 92707

June 25, 1992
Revised October 30, 1992

VOLUME I

REMEDIAL INVESTIGATION REPORT
TABLES
PLATES

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A Report Prepared for

McKesson Corporation
One Post Street
San Francisco, California 94104

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Client No. 17333
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EXECUTIVE SUMMARY

This report presents the results of Harding Lawson Associates' (HLA) Remedial Investigation (RI) conducted at McKesson Corporation's (McKesson) former chemical facility located at 9005 Sorensen Avenue, Santa Fe Springs, California. HLA conducted this work on behalf of McKesson in accordance with Consent Order 89/90-007, issued by the California Department of Health Services (DHS), now the California Environmental Protection Agency - Department of Toxic Substances Control (DTSC). HLA's work was conducted in compliance with the DTSC guidelines and the U.S. Environmental Protection Agency's (EPA), October 1988, "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA." Methods implemented during the RI are described in HLA's workplan entitled "Workplan (Revision 3), Remedial Investigation and Feasibility Study, McKesson Corporation Property, 9005 Sorensen Avenue, Santa Fe Springs, California," (Workplan), dated April 25, 1991.

The facility is located at 9005 Sorensen Avenue, in the City of Santa Fe Springs, Los Angeles County, California. The site is fenced; occupies approximately 4.3 acres in an industrialized area; and is bounded on the east by Sorensen Avenue, on the south by Fontaine Trucking Equipment Company, on the west by a small agricultural field owned by Liquid Air Corporation, and on the north by a Southern Pacific Railroad easement and Angeles Chemical Company (Angeles); a bulk chemical repackaging facility.

McKesson Chemical Company, a former division of McKesson, operated a bulk chemical repackaging facility at the site from 1976 to 1986. During this period of operation, the facility was organized into four areas for the purpose of chemical packaging:

- A solvent repack area,
- A corrosive repack area,
- A hydrogen peroxide repack area, and
- A Freon blending area.

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Forty-four aboveground storage tanks (now demolished) were situated onsite within the four areas of operations. The tanks were contained within 2- to 3-foot-high concrete containment berms and separated by internal dike walls. Twenty-three underground storage tanks (USTs) are presently onsite and predominately located adjacent to the former aboveground solvent tank storage area. Railroad spurs are located along the northern and western boundaries of the site. Loading platforms and underground distribution lines were associated with the offloading of chemicals delivered via the railroad spurs. A drum storage area was designated for the onsite storage of hazardous waste, though it was never used.

In September 1985, the DTSC issued a Resource Conservation and Recovery Act (RCRA) Part B Hazardous Waste Facility Permit for the drum-storage area. This area has since been closed under RCRA regulations. The final RCRA closure report was submitted to the DTSC on February 5, 1990 (HLA, 1990a). On June 28, 1990, the DTSC acknowledged that the storage-drum area was officially closed.

At the request of the DTSC, McKesson Environmental Services (MES) conducted three subsurface investigations at the facility during its period of operation. Two studies were undertaken in the aboveground solvent-storage area, and one study was conducted in the corrosive-storage area. Chlorinated solvents were detected in both the soil and groundwater in the aboveground solvent-storage area in these investigations. The corrosive storage area was investigated for EPA extraction procedure (EP) Toxic compounds; none were detected.

The purpose of the RI was to assess the nature and extent of chemicals of concern in air, soil, surface water, and groundwater associated with the former operations at the McKesson site.

The RI included the monitoring of ambient meteorological conditions and air quality, drilling of soil borings, drilling and installation of groundwater monitoring wells, cone penetrometer testing (CPT)/HydroPunch groundwater sampling, the collection and analysis of surface and subsurface soil samples, and the collection and analysis of surface water and groundwater samples. All field work and physical testing of soil samples was performed by HLA geologists, engineers, and technicians under the direct oversight of a registered geologist

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and/or professional engineer. Analytical testing of air, soil, and water samples was performed by a state-certified laboratory.

HLA's investigation of surface and subsurface soil and vadose zone conditions at the McKesson site was conducted in two phases. The first phase of the investigation was conducted from June to August 1990. Thirty-one soil borings were drilled and sampled during the first phase. Samples were also collected from four surface locations. Following review of the data collected during the first phase of the investigation, a second phase soil and vadose zone investigation was conducted in January and February of 1991, during which an additional ten soil borings were drilled and sampled.

Soil samples collected from borings drilled in the first phase of the investigation in the UST area, the aboveground storage tank area, and the Freon-blending area were analyzed for volatile and semivolatile organic compounds, glycols, and petroleum hydrocarbons. Based on the results from the first-phase borings, the samples collected from the three additional borings in the aboveground solvent-storage area were only analyzed for volatile organic compounds.

Soil samples collected in the corrosive and hydrogen peroxide bermed storage area were only analyzed for pH and selected ions and metals, with the exception of the two samples that were additionally analyzed for volatile and semivolatile organics, glycols, and petroleum hydrocarbons.

The groundwater investigation program consisted of the installation, monitoring, and sampling of a total of 18 onsite groundwater monitoring wells. Two wells were installed in a discontinuous perched-water zone encountered at two locations within the site. Twelve wells were installed in the upper portion of the underlying aquifer zone. The first three wells installed, MW-1 through MW-3, were installed inside an 18-inch conductor casing set to a depth of approximately 42 feet below ground surface in anticipation of the existence of a perched-water zone identified during previous investigations by McKesson Environmental Services. Four additional wells were installed in the aquifer, two at an intermediate depth, and two at the bottom of the aquifer, to assess vertical hydraulic and chemical distribution

characteristics. The monitoring well program was augmented by the collection of water samples using a HydroPunch sampling device. HydroPunch samples were collected at five onsite locations and twelve offsite locations.

Onsite groundwater monitoring wells were monitored for depth to groundwater 14 times during the period from June 1990 through April 1991. During the same period, three rounds of groundwater sampling were conducted. Samples collected in the first round of sampling conducted in August 1990 were analyzed using the following EPA methods:

- EPA Method 8240 - Volatile organic compounds,
- EPA Method 8270 - Semi-volatile compounds,
- EPA Method 8015 modified - Glycols,
- EPA Method 418.1 - Petroleum hydrocarbons,
- EPA Method 150.1 - pH,
- EPA Method 9050 - Conductivity,
- EPA Method 160.1 - Total dissolved solids,
- EPA Method 9036 - Sulfate,
- EPA Method 425.1 - Surfactants, and
- EPA Method 300.0/6010 - General minerals, selected metals.

Groundwater samples collected during subsequent sampling rounds were analyzed for volatile organics using EPA Method 8240 with selected samples being analyzed for general minerals and pH. Hydropunch groundwater samples collected from onsite and offsite locations were analyzed for volatile organics using EPA Method 8240.

Impacts to vadose zone soils and groundwater by chlorinated hydrocarbon compounds were identified in this investigation. The predominant compounds detected in both the soil and groundwater are 1,1,1-trichloroethane (1,1,1-TCA), tetrachloroethene (PCE), trichloroethene (TCE), and methylene chloride (dichloromethane [DCM]). Elevated concentrations of these compounds detected in the soil appear to be limited in their areal extent to the immediate vicinity, including and surrounding the aboveground solvent storage area. Minor impacts to the soil were identified along the subsurface distribution lines connecting the northern

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railroad spur to the UST area. No significant impacts to vadose zone soils or groundwater were identified as resulting from activities associated with the storage, handling, or processing of corrosives, hydrogen peroxides, or glycols.

Two groundwater plumes exhibiting elevated concentrations of VOCs were identified during this investigation. An onsite plume, characterized by elevated concentrations of chlorinated hydrocarbons, including 1,1,1-TCA, PCE, TCE, 1,1-dichloroethene (1,1-DCE), and DCM was detected. Maximum concentrations of the major compounds comprising the onsite plume were detected in groundwater samples collected immediately downgradient of the aboveground solvent-storage area. Elevated concentrations extend offsite both downgradient and upgradient of the McKesson site. Even though a significant reduction of the concentration of compounds is observed perpendicular to the plume axis, the lateral extent of the plume has not been completely assessed. Vertically, the elevated concentration of compounds appear to be restricted to the upper part of the aquifer. No observations were made that would indicate elevated concentrations of dissolved organics or non-aqueous phase liquid solvents exist at depth within the aquifer.

An offsite plume, characterized by elevated concentrations of MEK, MIBK, and BTEX, in addition to concentrations of chlorinated hydrocarbons, was identified to the north (upgradient) and west (cross-gradient) of the McKesson site. This offsite plume extends downgradient from the Angeles site, which appears to be a possible source. Based on the compounds detected in the soil and the groundwater at the Angeles site during a preliminary investigation conducted in 1990 by SCS Engineers and the distribution of compounds detected in the groundwater upgradient of the McKesson site, the Angeles site appears to have contributed to the onsite plume identified at the McKesson site.

The observed distribution of compounds in the vadose zone soils appears to result from two transport processes. Within and in the vicinity of the aboveground solvent-storage area, the observed distribution is most probably the result of vertical migration of liquid-phase solvents through the vadose zone accompanied with lateral spreading along zones of high permeability contrasts. Away from the solvent storage tank area and at depths of 40 to 45 feet bgs, the

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detected concentrations of volatile organics appear to be the result of volatilization of dissolved compounds present in the groundwater.

The observed plume configuration and aquifer test parameters indicated that the transport of chemical compounds in the groundwater is dominated by advection in a downgradient direction. Lateral to the plume axis, transport appears to be dependent primarily on diffusion. Diffusion also appears to control the distribution of compounds observed in the intermediate and deep zones of the aquifer.

A baseline risk assessment conducted by McLaren/ChemRisk concluded that under current conditions, the concentrations of the selected chemicals of concern detected in the site soils do not pose a significant noncancer risk or a significant increased cancer risk to future onsite residential or occupational populations. Risks to offsite populations were not quantitatively assessed. Site-related health risks associated with the chemicals detected in groundwater were assessed using existing groundwater concentrations. Since the relative contributions of probable onsite and offsite sources have not been established, it is not yet possible to determine the groundwater health risks that are attributed to the McKesson property.

Data collected as part of this investigation are sufficient to completely assess the extent of the groundwater plume identified onsite. However, offsite investigation of groundwater conditions is required to assess the downgradient, upgradient, and lateral extent of the plume. Assessment of soil and groundwater conditions upgradient of the McKesson site, including the Angeles site, is necessary to determine the magnitude of offsite contributions to the plumes identified both on and offsite.

Because of the proximity of the USTs onsite to the aboveground storage tank area in which elevated levels of volatile organics were encountered during the investigation, it was recommended by McKesson and agreed to by the DTSC that the removal of the USTs would be postponed until remedial measures were implemented that would effectively reduce the volatile content of the soils. One of the remedial action objectives presented in the Feasibility Study being prepared for onsite soil remediation is to reduce the VOC content

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of the soils in the UST area sufficiently to permit excavation of the USTs in full compliance with South Coast Air Quality Management District guidelines (SCAQMD Rule 1166).

The following activities are recommended to complete the remedial investigation of the McKesson site:

- Upon removal of the USTs, collection and analysis of soil samples from beneath the tanks.
- Analyses of soil samples collected during the tank removal activities should be evaluated.
- A report presenting the results of the UST removals and incorporating data generated during this investigation should be prepared as an addendum to the RI Report.

These activities would complete the assessment of vadose zone soils onsite .

A workplan for the downgradient investigation of the groundwater plume detected onsite should be prepared. The scope of work associated with the downgradient investigation should be designed to monitor and assess the downgradient and lateral extent of the onsite plume.

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1.0 INTRODUCTION

This report presents the results of Harding Lawson Associates (HLA) Remedial Investigation (RI) conducted at McKesson Corporation's (McKesson) former chemical facility located at 9005 Sorensen Avenue, Santa Fe Springs, California (Plate 1). HLA conducted this work in accordance with Consent Order 89/90-007, issued by the California Department of Health Services (DHS), now the California Environmental Protection Agency - Department of Toxic Substances Control (DTSC). HLA's work was conducted in compliance with the DTSC guidelines and the U.S. Environmental Protection Agency's (EPA), October 1988, "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA". Methods implemented during the RI are described in HLA's workplan entitled "Workplan (Revision 3), Remedial Investigation and Feasibility Study, McKesson Corporation Property, 9005 Sorensen Avenue, Santa Fe Springs, California," (Workplan), dated April 25, 1991 (HLA, 1990b).

1.1 REPORT ORGANIZATION

The following sections describe the study area investigated, the physical characteristics of the study area, the nature and extent of the chemicals present in the environment, and an evaluation of public health risks.

Section 1.0 presents the purpose of the RI, a description of the general features, history, and past operations of the site and previous investigations. Section 2.0 describes the components of the RI. Results of the physical characterization of the site are presented in Section 3.0. Section 4.0 describes the nature and extent of chemicals detected in the soil and groundwater. Chemical fate and transport processes are discussed in Section 5.0. Section 6.0 presents the results of a baseline risk assessment. Summary and conclusions are presented in Section 7.0.

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1.2 PURPOSE OF THE REMEDIAL INVESTIGATION

The RI was conducted to achieve four main objectives:

- Assess the nature and extent of chemicals of concern in air, soil, surface water, and groundwater associated with former operations at the McKesson site,
- Identify existing and potential migration pathways,
- Provide data sufficient to identify and evaluate appropriate remedial alternatives, and
- Collect and evaluate information necessary to prepare a remedial action plan in accordance with established regulatory guidelines.

1.3 SITE BACKGROUND

1.3.1 Site Description

The facility is located at 9005 Sorensen Avenue, in the City of Santa Fe Springs, Los Angeles County, California (Plate 1). The site is fenced and occupies approximately 4.3 acres in an industrialized area. The site is bounded on the east by Sorensen Avenue; on the south by Fontaine Trucking Equipment Company; on the west by a small agricultural field owned by Liquid Air Corporation; and on the north by a Southern Pacific Railroad easement and Angeles Chemical Company (Plate 2).

The facility lies at approximately 150 feet above Mean Sea Level (MSL). The surface of the facility is paved with asphalt, concrete, or a gravel base. Surface drainage is to the northeast, toward an adjacent drainage channel and Sorensen Avenue. Plate 3 illustrates the layout of the facility and immediate vicinity on a site topographic map developed for the RI.

1.3.2 Site History

Historic land uses were reviewed by studying available aerial photographs obtained from the Fairchild Aerial Photography Collection at Whittier College and from Aerial Map Industries,

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Santa Ana, California. From 1927 to the time that McKesson developed the facility, in 1975 the site was undeveloped and may have been used for agricultural purposes. Railroad tracks were visible along the northern property boundary as early at 1927. Activities in the surrounding area included agriculture, primarily to the north, and oil production to the south of the site. Industrial activities expanded into the general vicinity by 1965. By 1970, the railroad spur west of the site was present.

McKesson Chemical Company, a former division of McKesson, began operating a bulk chemical repacking facility at the site in 1976. The facility ceased operations on November 1, 1986, as a result of McKesson's sale of substantially all of the assets of its chemical company. At the time of closure, all underground and aboveground tanks were emptied.

During the period the facility operated, it was organized into four areas for the purpose of chemical packaging: 1) the solvent repack area, 2) the corrosive repack area, 3) the hydrogen peroxide repack area, and 4) the freon blending area. Chemicals were stored in both aboveground and underground tanks and piped to packaging areas as needed. Bulk chemicals were transported to and from the facility by rail and by truck. Finished products were generally transported from the facility by truck.

A concrete trench-sump is present in the northern portion of the facility adjacent to one of the railroad spurs. The sump contains piping for chemical transport. Contents of railroad cars were sometimes offloaded directly to these lines and transported to other areas of the facility.

Three buildings are currently present at the facility. The main building contained the office, warehouse, and packing and storage area. The warehouse was historically used for chemical and material storage. The other two buildings were yard offices. All buildings are currently empty. The site also contains a truck scale and a truck pit for loading and unloading. Loading platforms and a drum-wash shed were removed during demolition activities conducted during December 1990.

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The facility contained a drum-storage area that was designated for the onsite storage of hazardous waste, though it was never used. The bermed, formerly covered, concrete pad in this area measures 26 by 20 by 0.5-feet-thick and had the capacity for storing 144 drums on wooden pallets. In September 1985, the DTSC issued a Resource Conservation and Recovery Act (RCRA) Part B Hazardous Waste Facility Permit for the drum-storage area. This area has since been closed under RCRA regulations. The final RCRA closure report was submitted to the DTSC on February 5, 1990 (HLA, 1990a). On June 28, 1990, the DTSC acknowledged that the drum storage area was officially closed.

Aboveground tanks onsite were grouped in four locations: (1) adjacent to the solvent repack area, (2) the Freon blending area, (3) the hydrogen peroxide packaging area, and (4) the corrosive packaging area. The solvent storage area contained 13 steel tanks (S1 through S13); all aboveground tanks were removed during demolition activities conducted in December 1990. Tanks within the Freon blending area (S14 through S17) had been previously removed. The hydrogen peroxide and corrosive storage areas contained 27 steel tanks (C1 through C27); all tanks were removed in December 1990. All the aboveground tanks had been located within concrete-diked containment areas. The base of containment areas are composed of gravel and underlain by a compacted clay liner, except in the vicinity of former tanks S4, S13, and S18, where the ground surface was covered by concrete. After the facility was closed, the aboveground tanks were emptied using a vacuum truck. All aboveground tanks, loading platforms, drum-washing and repackaging sheds, and the RCRA Waste Canopy were removed during demolition activities conducted in December 1990 by Riedel Environmental Services.

The facility presently contains 21 underground storage tanks (USTs) (U1 through U21), and two sumps (4401 and 4402). One UST (U1) is located adjacent to the fuel dispenser island and was used to store diesel fuel. Nineteen of the USTs (U2 through U20) are located in the UST area and were used for solvent storage. Solvents were transferred from railroad cars along subsurface distribution lines, as illustrated on Plate 3. One solvent storage UST (U21) is located adjacent to the aboveground solvent storage area and was used to collect an assortment of spent solvent wastes. The two sumps are the neutralization pit (4401) and the runoff control sump (4402). After the facility was closed, the USTs were emptied using

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a vacuum truck. The USTs were emptied again in December 1990 during aboveground demolition activities by Riedel Environmental Services after it was discovered that surface runoff water had entered some of the USTs with unsecured fill-pipe caps. No further UST decontamination was conducted. The USTs are planned to be removed following onsite soil remediation.

Two waste streams were generated during facility operations: (1) corrosive drum-rinsing operations produced waste water, and (2) the solvent distribution lines (piping) were flushed after each use with isopropyl alcohol (IPA) and this generated a waste stream consisting of solvent-saturated IPA.

The corrosive drum-rinsing operations, which took place in the former drum-wash shed shown on Plate 3, generated approximately 1,500 gallons per day (gpd) of wastewater. Wastewater that collected on a concrete slab was drained to a rubber-lined concrete neutralization pit (4401). Prior to discharge to the sanitary sewer, the wastewater was monitored for pH and other critical parameters. This discharge was permitted by Los Angeles County Sanitation Industrial Wastewater Discharge Permit No. 3785 (June 17, 1985). After being rinsed, the drums were sent to a drum recycler and reconditioner. Drums were then either returned to the facility for reuse or disposed by the recycler.

Solvent-saturated IPA, generated during flushing of the solvent lines, was recovered in a closed-head metal drum. The drum was marked with the name of the flushed solvent and "IPA"; flushed material was reused to flush compatible products until it could no longer adequately clean the lines.

Outside containment areas, surface water runoff produced during periods of rainfall drains to the runoff-control sump (4402) located in the northeast section of the property. The sump is approximately 2 by 2 by 4 feet and is equipped with a locking gate valve. When the facility was in operation, a runoff water sample was tested for pH and specific gravity before the collected runoff was discharged to an unlined drainage channel north of the site. The discharge point is shown on Plate 3. Rainwater discharge was controlled by National Pollution Discharge and Elimination System (NPDES) Permit No. CA0057631, issued by the

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California Regional Water Quality Control Board (RWQCB) in December 1975. Currently, the gate valve is closed, and rainwater ponds on the site during periods of heavy rainfall.

1.3.3 Previous Investigations

1.3.3.1 Onsite Investigations

McKesson conducted three previous subsurface investigations at the facility at the request of the DTSC.

The first investigation was conducted in the aboveground solvent-storage area and was initiated on June 24, 1984. McKesson hand-augured four shallow borings at the locations shown on Plate 4. Three borings (B-2 through B-4) were located in the diked storage area and one "background" boring (B-5) was located in the drainage channel. Soil samples were collected at 1, 3, and 6 feet below ground surface (bgs) and analyzed for volatile organics. In addition, one surface-water sample was collected from water ponded in the diked storage area. Soil and water sample results are summarized in Table 1. Volatile organic chemicals were detected in the soil samples. The surface-water sample contained glycols, butyl cellosolve, and ethanols.

On October 4, 1984, two soil samples were collected from the corrosive-storage area near the sulfuric acid tanks (C3 through C5); the exact locations of these samples are unknown. Samples were collected at approximately 0.5 and 1 foot bgs and were analyzed for EPA Extraction Procedure (EP) Toxic compounds. The analytical results are presented in Table 2 and indicate that EP Toxic compounds were not detected.

McKesson Environmental Services (MES) conducted the second investigation in the aboveground solvent-storage area in March 1986. Three soil borings (B-1 through B-3) 32 to 35 feet deep and four monitoring wells (MW-1 through MW-4) 25 to 29 feet deep were drilled at the locations shown on Plate 4. Soil samples were collected at approximately 5-foot intervals above the water table and at more closely spaced intervals below the water table, which was at a depth of approximately 25 feet bgs at that time. Six soil and three

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groundwater samples were submitted to a laboratory for analysis. Collected samples were analyzed for volatile organics (EPA Method 8240/624), nonhalogenated volatile organics (EPA Method 8015), and polynuclear aromatic hydrocarbons (EPA Method 610). One soil sample (Boring B-1 at 27 feet) was also analyzed for semivolatile organics (EPA Method 8270). Sample results for soil and groundwater are summarized in Table 3. Volatile organic compounds (VOCs) and petroleum hydrocarbons were detected in both soil and perched groundwater underlying the aboveground solvent-storage area.

In October 1989, HLA conducted a limited investigation in the vicinity of the hazardous waste drum-storage area as part of the required RCRA closure. During HLA's investigation, five soil samples (SP-1 through SP-5) were collected at approximately 0.5 foot bgs at the locations shown on Plate 4. Samples were tested for pH (EPA Method 9045), glycols (EPA Method 8015, modified), volatile organics (EPA Method 8240), and semivolatile organics (EPA Method 8270). Analytical results are summarized in Table 4. The soil contained only relatively low concentrations of tetrachloroethene (PCE) and trichloroethene (TCE) underlying the RCRA drum storage area.

1.3.3.2 Offsite Investigations

Environmental investigations have previously been conducted at four facilities in the areas surrounding the McKesson site (Plate 2):

- Southern California Chemical Corporation (SCC)
  8851 Dice Road, Santa Fe Springs
- Diversey Wyandotte Corporation (Diversey)
  8021 Dice Road, Santa Fe Springs
- T-Chem Corporation
  9028 Dice Road, Santa Fe Springs
- Angeles Chemical Company (Angeles)
  8915 Sorensen Avenue, Santa Fe Springs

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1.3.3.2.1 Southern California Chemical Corporation

SCC is located west of the McKesson site and on the north side of the drainage channel that flows to the east, along the northern boundary of the McKesson site. The facility is reported to be an original manufacturer of patented and proprietary inorganic chemicals for electronic and printed circuitry, plating, water treatment, and agricultural uses. Chemicals historically manufactured onsite included: liquid copper sulfate; copper oxides; copper chlorides; ferric chlorides and other proprietary formulations that included ammoniacal and other etchants. Manufacture of zinc sulfate solutions was discontinued between 1977 and 1979. Chemicals reportedly used onsite as of 1985 included ammonia, iron, copper chemicals, hydrochloric acid, sulfuric acid, and other inorganic compounds (Kleinfelder, 1986a).

SCC has a history of hazardous waste discharge, spillage, and leakage dating from approximately 1957. SCC possesses an industrial waste discharge permit. An investigation was conducted in 1985/1986 by J.H. Kleinfelder and Associates in response to requests by the California Regional Water Control Board and the California Department of Health Services to monitor an onsite wastewater pond. The investigation was expanded after elevated levels of organics and inorganics were detected. A total of 19 soil borings were drilled to depths ranging from 15 to 110 feet bgs, and 13 monitoring wells were installed as part of the investigation. Elevated levels of the following constituents were detected in isolated wells at SCC (Kleinfelder, 1986a):

- Trichloroethene (TCE) - 550 ug/L,
- Toluene - 8,300 ug/L,
- Xylenes - 10,000 ug/L,
- Ethylbenzene - 3,000 ug/L,
- Tetrachloroethene (PCE) - 1.2 ug/L,
- 1,1-dichloroethene (1,1-DCE) - 100 ug/L, and
- 1,1-dichloroethane (1,1-DCA) - 100 ug/L.

No sources for the organics were identified during the investigation.

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1.3.3.2.2 Diversey Wyandotte Corporation

Diversey is located west of the McKesson site across Dice Road. The facility has reportedly been operating under various names since 1951, and as of 1985 was producing a range of products including cleaners and defoaming agents. From 1954 through 1970, acids, alkalis, ethyl alcohol, and IPA were disposed of in onsite injection wells. From 1980 through 1984, the waste stream from the facility reportedly consisted of acids, alkalis, methylene chloride, chromium, phenolic, and crysilic acids. A subsurface investigation was conducted in 1985 by J.H. Kleinfelder and Associates in response to concerns raised in a Preliminary Assessment prepared by the DHS in April 1984.

Nine soil borings were drilled to depths ranging from 30 to 78 feet, and three were converted to groundwater monitoring wells. Only one of the three wells was analyzed for organics (purgeable halocarbons), using EPA Method 601. Low levels of organics were detected:

- Methylene chloride - 14 ug/L,
- 1,1,1-trichloroethane (1,1,1-TCA) - 8 ug/L,
- PCE - 9 ug/L,
- TCE - 90 ug/L,
- 1,1-DCE - 34 ug/L,
- 1,1-DCA - 5 ug/L, and
- Chloroform - 3 ug/L.

No organics were detected in the soil samples analyzed (Kleinfelder 1986b).

1.3.3.2.3 T-Chem Corporation

The T-Chem facility is located southwest of the McKesson site at 9028 Dice Road. Materials listed with the Santa Fe Springs Fire Department as being used by T-Chem include: chlorine, sodium hydroxide, hydrogen peroxide, ammonia, dodecylbenzene, sulfur dioxide, sulfuric acid, diethanolamine, 1,4-dioxane, ethanol, ethoxysulfate, and sodium dichloroisocyanate. One 12,000 gallon UST containing diesel is known to exist onsite with four shallow (less than

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40 feet deep) leak detection wells. It is not known whether groundwater from these wells has been analyzed. County of Los Angeles Department of Health records indicate that water samples from the waste stream/clarifier system, analyzed in July 1989, had detectable concentrations of:

- 1,1-DCE - 18 ug/L,
- Chloroform ranging from 340 to 7,500 ug/L,
- 1,1,1-TCA - 210 ug/L, and
- Toluene - 31 ug/L.

Soil samples collected when the wells were installed had no detectable quantities of volatile organic compounds.

1.3.3.2.4 Angeles Chemical Company

SCS Engineers conducted a preliminary site investigation at the Angeles in 1990, as part of an underground storage tank permitting requirement of the Los Angeles County Department of Public Works (SCS, 1991). Angeles is a bulk chemical repacking facility located immediately north, and upgradient of the McKesson site. Chemicals stored and used on the Angeles site include, but are not limited to: acetone, methylene chloride, 1,1,1-TCA, PCE, methyl ethyl ketone (MEK), toluene, xylene, isobutyl acetate, butyl cellosolve, IPA, propanol, kerosene, diesel, and unleaded gasoline.

Fifteen soil borings were drilled as part of the site investigation and ranged in depth from 20 to 60 feet bgs; one monitoring well was installed. Collected soil samples were tested for VOCs using EPA method 8240; groundwater was tested for VOCs using EPA method 624. Elevated levels of 13 different VOCs were detected in the soil:

- 1,1,1-TCA - 28 mg/kg,
- PCE - 48 mg/kg,
- MEK - 29 mg/kg,
- Acetone - 55 mg/kg,

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- Toluene - greater than 220 mg/kg,
- Benzene - 15 mg/kg,
- 1,1-DCA - 0.31 mg/kg,
- 1,1-DCE - 0.68 mg/kg,
- Ethylbenzene - greater than 210 mg/kg,
- DCM - 10 mg/kg,
- 4 Methyl - 2-pentanone (MIBK) - 9.3 mg/kg,
- TCE - 9.9 mg/kg, and
- Xylene - greater than 540 mg/kg.

Eight VOCs were detected in the one groundwater sample analyzed:

- 1,1,1-TCA - 120 ug/L,
- Xylenes - 18 ug/L,
- Benzene - 10 ug/L,
- 1,1-DCA - 21 ug/L,
- 1,1-DCE - 270 ug/L,
- PCE - 100 ug/L,
- Toluene - 10 ug/L, and
- TCE - 210 ug/L.

Acetone, MEK, and MIBK are not included in the target analyte list for Method 624 and, therefore, were not analyzed for.

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2.0 STUDY AREA INVESTIGATION

This section describes the field and laboratory investigation conducted by HLA to characterize the site geology, soil and vadose zones, hydrogeology, meteorological setting and air quality, and the nature and extent of contaminants at and in the near vicinity of the site.

These investigations included the monitoring of ambient meteorological conditions and air quality, drilling of soil borings, drilling and installation of groundwater monitoring wells, cone penetrometer testing (CPT)/HydroPunch groundwater sampling, the collection and analysis of surface and subsurface soil samples, and the collection and analysis of surface water and groundwater samples. All field work and physical testing of soil samples was performed by HLA geologists, engineers, and technicians under the direct oversight of a registered geologist and/or professional engineer. All field work was done in accordance with the Project Procedures Manual presented as Appendix C in the Work Plan (HLA, 1990b). Analytical testing of air, soil, and water samples was performed by a state-certified laboratory.

2.1 SITE FEATURES INVESTIGATION

A site feature investigation was conducted to properly identify surface and subsurface facilities, features, and uses. Historical aerial photographs of the site were reviewed to document the land usage prior to the construction of the McKesson facility.

2.1.1 Topographic Survey

A detailed facility and topographic map (Plate 3) was produced to properly and accurately identify and locate site features including soil borings and monitoring wells. A combination of aerial photography and field surveying was used to create the map. All buildings, aboveground and underground tanks and piping, railroad spurs, drainage channels, and other pertinent surface features are located on the map. This map was used as the base plan for this investigation. Locations of all borings, monitoring wells, CPT probes, and surface

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samples were surveyed by a California state licensed surveyor. Survey data are presented in Appendix E.

2.1.2 Geophysical and Utility Surveys

Geophysical and utility surveys were conducted prior to initiating onsite and offsite subsurface investigation activities. Underground Services Alert was notified prior to all offsite activities. Geophysical techniques including ground penetrating radar, electromagnetic conductivity, and electromagnetic frequency detection was used to detect and locate underground utilities in the boring locations. Subsurface distribution lines connecting the northern railroad spur and the underground tank area were also identified and mapped.

2.2 HAZARDOUS SUBSTANCES INVESTIGATION

2.2.1 Hazardous Material Types

Available information on chemicals historically used, stored, or mixed on the McKesson site are presented in Tables 5 through 7, and include volatile organic solvents, glycols, acids, bases, and petroleum hydrocarbons. Tables 5 through 7 also identify the historic contents of the individual tanks, the materials of tank construction, and tank capacities.

2.2.2 Potential Contaminant Sources

2.2.2.1 Onsite Sources

Aboveground solvent storage tanks S-1 through S-13 were located in the bermed solvent tank area immediately to the west of the UST area. Historical contents of aboveground solvent-storage tanks S-1 through S-13 consisted of PCE, methylene chloride, 1,1,1-TCA, TCE, ethylene glycol, propylene glycol, glycol ether, butyl cellosolve, isopropyl alcohol, Sorbitol (polyol), and Freon-113.

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Aboveground storage tanks S-14 through S-17 were located within a bermed containment in the Freon-blending area to the northeast of the UST farm. The historical contents of Tanks S-14 through S-17 are not known.

The bermed corrosive and hydrogen peroxide storage area, located along the western perimeter of the site, contained aboveground storage tanks C-1 through C-28. Historically, Tanks C-1 through C-28 contained nitric acid, sulfuric acid, hydrochloric acid, acetic acid, sodium hydroxide, potassium hydroxide, Triton-N-101, Triton-N-100, naplum, and sludge.

All aboveground storage tanks, the packaging sheds, the drum-washing shed, and all loading platforms were removed from the site during demolition activities conducted in December 1990.

The UST area, which includes Tanks U2 through U20, is located near the middle portion of the northeast quadrant of the site (Plate 3). Historical contents of Tanks U2 through U20 consisted of fuels (gasoline), Stoddard solvent, mineral spirits, MCK solvent (a non-chlorinated, naphthene-based solvent), acetone, hexane, methanol, hydrocarbon solvent, cellosolve acetate, PX-2, glycol ether ED, xylene, toluene, heptane, isopropyl alcohol, methanol, and MEK. UST U-1 historically contained diesel fuel and is located in the southeast quadrant of the site adjacent to the diesel dispenser. UST U-21 is located immediately south of the aboveground solvent tank-storage area adjacent to the solvent packaging shed. UST U-21 was used as a solvent waste tank and also contained formaldehyde at various times.

Sumps 4401 and 4402 were used as a neutralization pit and runoff-control sump, respectively. Sump 4401 is located near the northwest corner of the site and stored mineral acids for neutralization of wastewater from corrosive drum-rinsing operations. Sump 4402 located to the northeast of the UST farm, was used to control runoff from the site.

All USTs and sumps are currently in place. Contents of these tanks were removed with a vacuum truck after the facility was closed. The USTs were again emptied using a vacuum

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truck during aboveground tank demolition activities in December 1990, because surface runoff had entered some of the USTs with unsecured fillcaps.

In addition to being stored onsite, chemicals were handled at various locations throughout the site. Chemicals were typically delivered (in bulk) to the facility via railroad spurs near the northern and western property perimeters. Chemical product was historically transferred from the northern railroad spur to the aboveground solvent storage tanks and USTs, using loading platforms, the pipe trench sump, and subsurface distribution lines as illustrated on Plate 3. Product was transferred from the western railroad spur to the corrosive and hydrogen peroxide storage area using the loading platforms.

Chemicals were packaged in the solvent, corrosive, and hydrogen peroxide packaging sheds at the locations illustrated on Plate 3. Packaged end-product was typically loaded onto trucks in the truck pit area before distribution.

2.2.2.2 Offsite Sources

In addition to the onsite chemical storage areas and potential release sources identified above, potential sources of contamination also exist offsite. Angeles is located approximately 110 feet north of the McKesson site (Plate 2). Angeles conducts a business similar to McKesson, handling many of the same chemical compounds. Chemicals reportedly used or stored at the Angeles site are listed in Table 8. The results of a subsurface investigation, conducted by SCS Consultants for Angeles are presented in Table 9. Compounds detected in the soil included acetone, benzene, DCM, MEK, 1,1-DCA, 1,1-DCE, ethylbenzene, MIBK, PCE, toluene, TCA, TCE, and xylenes. Benzene, 1,1-DCA, 1,1-DCE, PCE, toluene, TCA, TCE, and xylene were detected in the groundwater samples (SCC Consultants, January 1991).

Another potential source of offsite contribution to groundwater quality impairment underlying the McKesson site is the unlined drainage channel that parallels the northern property line and flows from west to east. To the west of Dice Road (approximately 1/8 mile west of the site), soil lining the drainage channel was observed to be stained, coated with an

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unknown, unidentified, white powdery substance, and containing excess moisture. Because the white powdery substance was located offsite on property not owned or leased by McKesson, no samples were collected for analysis.

2.3 METEOROLOGICAL INVESTIGATION

Meteorological and ambient air-quality monitoring was conducted onsite from April 27 to May 24, 1990. The objectives of the air monitoring program were to develop a micrometeorological database to characterize diurnal windflow patterns, collect integrated ambient air samples representative of the season during which sampling was being conducted, and measure "24-hour" and "less-than-24-hour" air contaminant concentrations at perimeter monitoring stations. Meteorological data recorded onsite during the initial two weeks of the monitoring program were evaluated to characterize the site-specific windflow profile and to select representative locations for the four perimeter monitoring stations.

A Climatronics F-460 Wind Recording System was installed at approximately the center of the site on April 27, 1990. This instrument provided a continuous record of onsite windspeed and direction. Continuously monitored meteorological data collected onsite were converted to hourly averages. Four ambient air-sampling systems were also installed at the site. Locations of the Meteorological Station and the four sampling system sites are shown on Plate 5. Two sampling systems (Sites 1 and 2) were installed at the eastern and northeastern perimeters of the site to monitor the downwind conditions during the observed daytime sea breeze windflow. Two additional sampling systems (Sites 3 and 4) were installed at the southwestern and southern perimeters and were operated during the hours of the expected evening drainage windflow conditions.

Two "24-hour" and two "less-than-24-hour" ambient air samples were collected:

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Sample Date (1990)	Site Number	Site Location	Sample Interval
May 16-17	2	Northeast Perimeter	1100-1100 (24 hours)
May 17-18	3	Southeast Perimeter	2300-0700 (8 hours)
May 17-18	4	South Perimeter	2300-0700 (8 hours)
May 23-24	1	East Perimeter	1100-1100 (24 hours)

The air samples were collected in Tedlar bags enclosed in sealed cardboard boxes to prevent photochemical reactions during sampling and transportation. Subsequent to collection, the air samples were transported to Analytical Technologies Inc. (ATI), a State-certified laboratory, under chain-of-custody procedures for analysis for VOCs using EPA Method 8240.

2.4 SOIL AND VADOSE ZONE INVESTIGATION

HLA's investigation of surface and subsurface soil and vadose zone conditions at the McKesson site was conducted in two phases. The first phase of the investigation was conducted from June to August 1990. Thirty-one soil borings were drilled and sampled during the first phase. Samples were also collected from four surface locations. Following review of the data collected during the first phase of the investigation, a second phase soil and vadose zone investigation was conducted in January and February of 1991, during which an additional ten soil borings were drilled and sampled. The borings and surface-sampling locations are presented on Plate 5.

2.4.1 Surface Soil

To assess the impact of surface water runoff from the site, four shallow hand-auger borings (SS-01 through SS-04) were drilled and sampled near the runoff control-sump discharge point in the unlined drainage channel along the northern boundary of the site. A total of eight soil samples were collected at depths of approximately 0.5 and 1.0 feet bgs at each location.

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2.4.2 Subsurface Soil

A total of forty-one soil borings were drilled and sampled to assess the subsurface conditions in ten areas of concern including those identified as potential contaminant sources. Areas targeted for subsurface investigation are as follows:

- Underground storage tank area,
- Aboveground solvent-storage area,
- Corrosive and hydrogen peroxide-storage area,
- Neutralization pit, pump pits, and sumps,
- Railroad spur area,
- Freon blending area,
- Loading platforms and truck pit,
- Underground distribution lines,
- Parking lot area (background), and
- Underlying aquifer.

A description of the drilling and sampling procedures are presented in Appendix A. Boring logs are presented in Appendix B.

The initial drilling program was based on information obtained by MES during the previous site investigations. Approximately 3 deep borings and 31 shallow borings were initially planned for the investigation. The 3 deep borings (70 to 90 feet bgs) were planned to provide information on the subsurface lithology and the configuration of a clay layer encountered by MES, suspected to occur at a depth of approximately 30 feet bgs. The borings were planned to be converted to groundwater monitoring wells to assess the condition of the underlying aquifer. The shallow borings (30 to 35 feet bgs) were to be drilled to assess shallow subsurface conditions. A maximum of 15 of the shallow borings were to be converted to groundwater monitoring wells to assess the conditions in the perched groundwater zone encountered by MES.

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Because perched groundwater was not encountered across the majority of the site, the borings, initially planned to terminate at 30 to 35 feet bgs, were extended to depths of approximately 40 to 60 feet. Most of the proposed perched groundwater monitoring wells were installed in the underlying aquifer. Four of the proposed borings, including those planned for the UST area, were not drilled (SB-22, SB-28, SB-29 and SB-31).

Three soil borings, SB-25 through SB-27, were drilled during the first phase at the perimeters of the UST area. Because of the limited space between the tanks, drilling within the UST area was not attempted. The borings were drilled to a depth of approximately 50 feet bgs.

Six soil borings were drilled and sampled to assess the impacts associated with the aboveground solvent-storage area. During the first phase, Soil Borings SB-23, SB-24 and SB-30 were drilled within the bermed area to depths of 66, 49, and 52 feet, respectively. Soil Borings SB-36 through SB-38 were drilled in the second phase after solvent-impacted soil was detected in samples from the initial three borings. Soil Borings SB-36 and SB-38 were drilled to the north and northwest of the bermed solvent-storage area to total depths of 65 and 50 feet respectively, in order to evaluate the lateral boundaries of the impacted soil. Soil Boring SB-37 was drilled inside the bermed area to assess the vertical distribution of solvents detected. Because perched water was encountered during the drilling of SB-37, this boring was terminated at 32 feet bgs and converted to a perched-zone monitoring well.

Four deep and three shallow borings were drilled in the corrosive and hydrogen peroxide bermed storage area. Initially four deep borings SB-16 through SB-18 and SB-21 were drilled to depths of 58.5 feet, 65 feet, 41.5 feet, and 46 feet bgs, respectively. During the second phase, soil Borings SB-33 through SB-35 were subsequently drilled in the northeastern section of the bermed area that had been inaccessible prior to the removal of the aboveground storage tanks. These three borings were terminated at 15 feet bgs based on the analytical results from the initial four borings and field pH screening during drilling.

Three borings were drilled and sampled adjacent to identified pits and sumps. Boring SB-4 was drilled next to the runoff-control sump to a depth of 61 feet. Boring SB-6 was drilled

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next to the pipe-trench sump to a depth of 52 feet, and SB-8 was drilled to a depth of 44 feet adjacent to the neutralization and pump pits.

Seven borings were drilled along the two railroad spurs within the site. Four soil borings, SB-2, SB-5, SB-7, and SB-9, were drilled along the northern railroad spur. Borings SB-2 and SB-9 were drilled to a depth of 41 feet bgs, while Borings SB-5 and SB-7 were drilled to a depths of approximately 65 feet bgs. Three Soil Borings, SB-10, SB-11, and SB-20, were drilled along the western railroad spur. Boring SB-11 was drilled to a depth of 42 feet, while Borings SB-10 and SB-20 were drilled to a depth of approximately 66 feet bgs.

Boring SB-3 was drilled to a depth of 51 feet bgs within the bermed Freon-blending area.

Four soil borings were drilled at locations associated with the loading platforms, truck pit, and underground fuel tank. SB-13 was drilled next to the underground diesel tank to a depth of 65 feet. Soil Borings SB-14, SB-15, and SB-19 were drilled near the loading platforms and truck pit to a depth of 42 feet.

Soil Borings SB-39 through SB-42 were drilled during the second phase next to fill ports and/or along the trace of the subsurface distribution lines that connect the northern railroad spur to the underground storage tank area. These four borings were drilled to depths of 10 feet.

To assess background conditions in the soil and vadose zone, three borings were drilled in the parking area along the eastern side of the site. Boring SB-1 was drilled in the northeast corner of the site, and SB-12 was drilled in the southeast corner. The borings were drilled to depths of 45 and 42 feet, respectively. A third boring, SB-32, was drilled between SB-1 and SB-2 in the northeastern corner of the site to assess a localized zone of perched water detected during the drilling and sampling of SB-2. SB-32 was drilled to a depth of 42 feet.

Three deep borings MW-1 through MW-3 were drilled and continuously cored to a depth of approximately 72 feet to permit detailed description and identification of the site stratigraphy and to assess the conditions of the underlying aquifer zone. MW-1 was situated

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along the southern boundary, MW-2 along the eastern, and MW-3 in the northwest corner of the site. Twelve-inch-diameter conductor casing was installed to a depth of approximately 40 feet using a bucket-auger drilling rig to seal off a perched groundwater zone identified in the previous investigations by MES.

2.4.3 Soil Analysis Program

Selected soil samples collected during both phases of drilling were submitted to laboratories for both physical properties and chemical analytical testing. A summary of the physical property tests and chemical analytical analyses conducted is presented in Table 10.

2.4.3.1 Physical Property Tests

Thirty-nine samples were selected for physical property testing by HLA's geotechnical laboratory. These samples were tested for dry density (ASTM D-2937), moisture content(ASTM D-2216-80), and grain-size distribution (ASTM D-422-63). In addition, seven samples were tested for hydraulic conductivity.

2.4.3.2 Chemical Analysis

Ninety-eight soil samples were submitted to Analytical Technologies, Inc. (ATI), in San Diego, California, for chemical analysis. All soil samples were submitted under chain-of-custody procedures. In general, two soil samples were selected from each boring for analysis. Samples were analyzed using one or more of the following methods:

- EPA Method 8240 - Volatile organic compounds,
- EPA Method 8270 - Semi-volatile compounds,
- EPA Method 8015 modified - Glycols,
- EPA Method 418.1 - Petroleum hydrocarbons,
- EPA Method 9045 - pH, and
- EPA Method 300.0/6010 - Selected soil ions, metals.

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Soil samples collected from borings drilled in the first phase of the investigation in the UST area, the aboveground storage tank area, and the Freon-blending area were analyzed for volatile and semivolatile organic compounds, glycols, and petroleum hydrocarbons. Based on the results from the first-phase borings, the samples collected from the three additional borings in the aboveground solvent-storage area were only analyzed for VOCs.

All soil samples collected in the corrosive and hydrogen peroxide bermed storage area were only analyzed for pH and selected ions and metals, with the exception of the two samples from SB-21, which were additionally analyzed for volatile and semivolatile organics, glycols, and petroleum hydrocarbons.

Samples collected from the four shallow borings along the subsurface distribution lines were only tested for volatile organics.

Subsurface samples collected from all other borings and the eight surface samples, were analyzed using the entire suite of methods listed above.

2.5 GROUNDWATER INVESTIGATION

The groundwater investigation program consisted of the installation, monitoring, and sampling of a total of 18 onsite groundwater monitoring wells. Two wells were installed in a discontinuous perched-water zone encountered at two locations within the site. Twelve wells were installed in the upper portion of the underlying aquifer zone. Four additional wells were installed in the aquifer, two at an intermediate depth, and two at the bottom of the aquifer, to assess vertical hydraulic and chemical distribution characteristics. The monitoring well program was augmented by the collection of water samples using a HydroPunch sampling device. HydroPunch samples were collected at five onsite locations and twelve offsite locations. Surface-water samples were also collected from the unlined drainage channel along the northern boundary of the site. Locations of the onsite monitoring wells, the onsite and offsite HydroPunch samples, and the surface-water samples are shown on Plate 6.

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2.5.1 Surface Water

Two surface-water samples (SW-01 and SW-02) were collected on June 23,1990, from water ponding near the northwest corner of the site in the unlined drainage channel.

2.5.2 Monitoring Well Installation

A summary of monitoring well construction details is presented in Table 11.
Well installation procedures are described in Appendix A. Well completion diagrams are provided in Appendix B.

2.5.2.1 Perched Zone Wells

Perched water was encountered twice during the soil drilling activities at the site. In the northeast corner of the site, SB-32 was drilled and converted to a perched-zone monitoring well after perched water was detected at a depth of 35 feet bgs in nearby SB-2. SB-32 is screened over a 20 foot interval from a depth of 20 to 40 feet bgs. During the second phase investigation in the aboveground solvent-storage tank area, a localized zone of perched water was encountered while drilling SB-37. This boring was terminated at a depth of 31 feet and converted to a perched-zone monitoring well. SB-37 is screened over a 10-foot interval from a depth of 21 to 31 feet bgs.

2.5.2.2 Aquifer Zone Wells

Twelve wells were installed in the upper part of the aquifer zone. The first three wells installed, MW-1 through MW-3, were installed inside an 18-inch steel conductor casing set to a depth of approximately 42 feet bgs in anticipation of the existence of a perched-water zone identified during previous investigations by MES. The wells are screened over a 25-foot interval from approximately 45 to 70 feet bgs.

Eight additional soil borings, SB-4, SB-7, SB-10, SB-13, SB-17, SB-20, SB-23, and SB-25, originally planned for conversion to perched-zone monitoring wells, were extended and

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installed as wells to monitor the upper zone of the underlying aquifer. Soil Boring SB-36, drilled during the second phase of the investigation, was also converted into a monitoring well. These wells were installed without conductor casing (no perched water was encountered) to an average depth of 64 feet bgs. The wells are screened over a 20-foot interval from a depth of approximately 44 to 64 feet bgs.

2.5.2.3 Well Nest Installation

Two intermediate depth wells (SB-17B and SB-23B), together with two deep wells (SB-17A and SB-23A), were installed during the second phase of the investigation to monitor groundwater conditions near the middle and at the base of the aquifer zone. These wells were located next to existing wells SB-17 and SB-23, which monitor the upper portion of the aquifer, to form two well nests. These well nests were used to evaluate the potential for stratification of the contaminants within the aquifer unit.

Wells SB-23, SB-23A, and SB-23B are located immediately downgradient of the aboveground solvent-storage area. Wells SB-17, SB-17A, and SB-17B are located downgradient of SB-23, SB-23A,and SB-23B. Wells SB-17B and SB-23B were drilled to depths of 91 and 97 feet, respectively. Both of these wells are screened over a 5-foot interval, from a depth of approximately 85 to 90 feet in well SB-17B, and from a depth of approximately 90 to 95 feet in SB-23B. Wells SB-17A and SB-23A were drilled to depths of 130 feet each. Both wells were screened over a 5-foot interval from approximately 111 to 116 feet in SB-17A and from a depth of approximately 122 to 127 feet in SB-23A. All four wells were installed inside an 18-inch conductor casing which extend to depths of 33 feet (SB-23A, SB-23B) and 40 feet (SB-17A, SB-17B). Both the deep and the intermediate wells were installed using a combination of bucket-auger and mud-rotary drilling techniques.

2.5.3 CPT/HydroPunch Investigation

Additional groundwater samples from the upper portion of the aquifer zone were collected at seventeen locations using a HydroPunch sampling system. Surveyed locations of

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CPT/HydroPunch samples are shown on Plate 6. A description of the CPT/Hydropunch sampling method and the logs of the CPT probes are provided in Appendix C.

Prior to driving the HydroPunch sampler to the required depth, a standard cone penetration (CPT) was made to the required depth to provide a detailed continuous profile of the soils encountered at each location. The CPT/HydroPunch investigation was conducted in three phases as a result of difficulties in acquiring offsite access. The first six CPT probes (CPT-1 through CPT-6) were conducted onsite in April 1991. The first probe, CPT-1, was driven adjacent to existing monitoring well MW-1, which had been continuously cored. This permitted: (1) the CPT response to be "calibrated" to the previous boring results and (2) comparison of the groundwater sample collected with the HydroPunch to the results obtained from the water sample collected from Monitoring Well MW-1. The second phase of CPT/HydroPunch sampling was conducted at five offsite locations (CPT-7 through CPT-11) in September 1991. CPT-7 through CPT-9 were situated upgradient of the site in the Southern Pacific Railroad right-of-way and downgradient of the neighboring Angeles. At locations CPT-7 through CPT-9, the CPT probe was unable to penetrate below 25 feet in depth. In order to deploy the HydroPunch sampler in the top of the aquifer, a standard hollow-stem drilling rig was used to drill to the top of the underlying aquifer and then to push the HydroPunch sampler into the aquifer for collection of the water samples. CPT-10 was situated downgradient, south of the site, on property owned by Fontaine Trucking Company. CPT-11 was situated downgradient, southwest of the site next to Dice Road, on agricultural property owned by Liquid Air Corporation. Because the majority of this agricultural land was under cultivation in September, seven additional CPT probes planned for the agricultural land were postponed until November 1991. In November 1991, the final seven offsite CPT/HydroPunch samples (CPT-12 through CPT-18) were collected.

2.5.4 Groundwater Monitoring and Analysis Program

Onsite groundwater monitoring wells were monitored for depth to groundwater 14 times during the period from June 1990 through April 1991. During the same period, three rounds of groundwater sampling were conducted. Groundwater samples were collected using procedures as described in Appendix A and were submitted under chain-of-custody protocol

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to ATI for analysis. Samples collected in the first round of sampling conducted in August 1990 were analyzed using the following EPA methods:

- EPA Method 8240 - Volatile organic compounds,
- EPA Method 8270 - Semi-volatile compounds,
- EPA Method 8015 modified - Glycols,
- EPA Method 418.1 - Petroleum hydrocarbons,
- EPA Method 150.1 - pH,
- EPA Method 9050 - Conductivity,
- EPA Method 160.1 - Total dissolved solids,
- EPA Method 9036 - Sulfate,
- EPA Method 425.1 - Surfactants, and
- EPA Method 300.0/6010 - General minerals, selected metals.

Groundwater samples collected during subsequent sampling rounds were analyzed for volatile organics using EPA Method 8240 with selected samples being analyzed for general minerals and pH. Hydropunch groundwater samples collected from onsite and offsite locations were analyzed for volatile organics using EPA Method 8240. A summary of the monitoring well and Hydropunch monitoring, sampling, and analysis schedule is provided in Table 12.

2.5.5 Aquifer Testing

On August 15 and 16, 1990, HLA performed slug tests in Monitoring Wells MW-1 through MW-3, SB-4, SB-7, SB-13, SB-17, and SB-32 to assess aquifer hydraulic conductivity. Slug test methods are presented in Appendix A-7.

On February 12 and 14, 1991, pump-out tests were conducted during the sampling of Wells SB-17, SB-17A, SB-17B, and Wells SB-23, SB-23A, and SB-23B to further assess aquifer hydraulic conductivity. Pumpout test methods are described in Appendix A-7.

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2.6 QUALITY ASSURANCE PROGRAM

A quality assurance/quality control (QA/QC) program was implemented to assure reliability of monitoring and measurement data. Reports documenting field investigation activities were prepared daily by field personnel and reviewed by the project manager. All field equipment used in the monitoring of site conditions and in the monitoring and collection of samples was calibrated on a regular basis. Duplicate samples, trip blanks, field blanks, and equipment blanks were collected and analyzed on a regular basis. Laboratory QA data used to evaluate the precision, accuracy, and completeness of the data included reagent blanks, matrix spikes, matrix spike duplicates, surrogate recoveries, and gas chromatograms. The quality assurance project plan (QAPP) and the project procedures manual (PPM) were presented in Appendix C of the Work Plan.

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3.0 PHYSICAL CHARACTERISTICS OF STUDY AREA

3.1 DEMOGRAPHY AND LAND USE

The site is bounded immediately to the east by Sorensen Avenue and a newly constructed light industrial park; to the south by Fontaine Trucking Company; to the west by an agricultural lot (owned by Liquid Air Corporation); and to the north by an unlined drainage channel, a Southern Pacific Transportation Company railroad easement (spur line), and Angeles. The site vicinity is heavily industrialized, especially to the southeast, south, west, and north. The area to the northeast of the site is currently being used for new car preparation. A few single-family residences are located 1/4-mile southwest of the site, but the nearest residential area is located more than 2 miles west of the site.

The site is located approximately 1/2-mile north of the northern extent of the Santa Fe Springs Oil Field, a producing Supergiant, and approximately 2 miles southeast of the San Gabriel River Groundwater Percolation Basin.

3.2 SURFACE FEATURES

The former McKesson facility occupies approximately 4.3 acres in a largely industrialized area of Santa Fe Springs, California. The site is secured with a fence which surrounds the perimeter of the property. The working portions of the site are paved with asphaltic concrete and concrete. The front of the property, facing Sorensen Avenue, is landscaped with plants and shrubbery and contains a parking lot. The Freon-blending area, the neutralization pit, the runoff-control sump, the loading areas, pipe-trench sump, truck pit, parking lot, UST area, the eastern portion of the aboveground solvent storage tank area, and intervening areas are all paved with concrete and/or asphalt. The railroad spurs (northern and western) are underlain with a gravel base as are the corrosive/hydrogen peroxide and aboveground solvent- storage bermed area.

The facility layout is illustrated on Plate 3. Aboveground chemical storage tanks (now demolished) were contained within approximately 2- to 3-foot-high concrete containment

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berms and separated by internal dike walls. These tanks have been generally grouped into: (1) the corrosives/hydrogen peroxide storage area, (2) the aboveground solvent-storage area, and (3) the Freon-blending area. USTs (presently in-place) are predominantly located immediately to the east of the bermed aboveground solvent-storage area. An underground solvent- collection tank and an underground diesel tank are located immediately south of the aboveground solvent storage area and approximately 80 feet south of the southern extent of the UST area, respectively. Solvents were packaged in the solvent-packaging shed located immediately south of the aboveground solvent-storage area; excess and various waste solvents were temporarily stored in the solvent-collection tank.

Railroad spurs, previously used to transport chemicals of various types onto the facility, are located along the northern and western boundaries of the site. A number of loading platforms, a pipe-trench pump, and subsurface distribution lines were associated with offloading of chemicals delivered via the railroad spurs.

3.3 METEOROLOGY

The principal and recurring windflow pattern experienced in the South Coast Air Basin (SCAB) is the daily sea breeze and land breeze circulation regime that exists all year. However, the characteristic onshore and offshore windflow pattern has a seasonal dependence. Essentially, in summer, the typical air breeze is about twice as strong as the return windflow (drainage land breeze) and is of greater duration. During winter, the drainage land breeze typically achieves maximum strength and duration and exhibits well organized flow characteristics as it moves from the inland mountain slopes to the ocean.

The following meteorological conclusions are based on approximately 5 years of wind data recorded by the South Coast Air Quality Management District (SCAQMD) at their Whittier Air Monitoring Station (McKesson, 1983); located about 3 miles from the McKesson site:

- Approximately 28 percent of the yearly wind flow originates from the sector south-southeast through south-southwest,

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- Over 17 percent of the yearly wind flow originates from the sector west-southwest through west, and
- Offshore or drainage wind flow from the sector east-northeast through east accounts for over 15 percent of the yearly winds.

Meteorological data monitored onsite from April 27 to May 18, 1990 (Table 13) exhibit excellent agreement with long-term climatological data recorded at the Whittier Air Monitoring Station operated by the SCAQMD. Both the SCAQMD data and the McKesson windflow profile indicated a clear bimodal characteristic in wind direction. The McKesson wind data show a predominance in windflow direction from the sector south-southwest through west, with nearly 50 percent of the wind originating from this sector. However, winds from the sector east-southeast through south-southeast account for approximately 28 percent of the windflow experienced at the site. The southeast sector winds generally represent the early formation stages of the daily sea breeze. The strong, well developed, mid- to late-afternoon sea breeze winds are represented by the southwest sector winds. The relative lack of northeast sector windflow is considered typical for the early summer season during which the air-monitoring program was conducted.

Hourly averaged windspeed and direction data recorded at the site during ambient air-sample collection intervals are presented in Table 14. Winds experienced at the site during the 24-hour sampling interval beginning on May 16, 1990, were predominantly from the west at an average speed of 3.5 mph. Wind direction recorded during the 8-hour drainage windflow interval beginning on May 17, 1990, indicates the existence of light northerly component winds at average speeds of 3 mph or less. The wind record clearly indicates that the air-sampler systems were positioned at representative downwind locations during sample collection.

None of the target VOCs were detected at concentrations above the EPA Method 8240 detection limits in any of the 24- and 8-hour ambient air samples collected during the period of May 16 to 24, 1991. Analytical results are presented in Appendix I.

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3.4 SURFACE-WATER HYDROLOGY

Surface waters in the site vicinity are intermittent and primarily limited to runoff associated with precipitation and irrigation. All of the ground surface at the site is paved, expect for the interior of the bermed aboveground solvent-tank area and the bermed corrosive and hydrogen peroxide storage areas which have gravel surfaces. Runoff from the McKesson site is discharged into the unlined drainage channel along the northern property line. This drainage channel flows generally to the east and serves as the discharge point for most of the industrial facilities located adjacent to it.

3.5 GEOLOGY

3.5.1 Regional Geologic Setting

The facility is located on the Santa Fe Springs Plain area of the Los Angeles Coastal Plain (Plate 7). The Santa Fe Springs Plain has been slightly warped by the Santa Fe Springs-Coyote Hills anticlinal system and dips gently to the northeast in the vicinity of the site. Prominent area features include the Puente and Coyote Hills to the northeast, east, and southeast; and the San Gabriel River to the west. The Coastal Plain area generally consists of alluvial materials deposited by the Los Angeles, San Gabriel, and Santa Ana Rivers during the late Pleistocene*. A generalized cross-section of the Los Angeles Coastal Plain is presented on Plate 8.

3.5.2 Local Geologic Setting

In the site vicinity, the Santa Fe Springs Plain consists of the late Pleistocene alluvium of the Lakewood Formation. The Lakewood Formation unconformably overlies the lower Pleistocene San Pedro Formation, and the Pliocene** Pico.

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* Pleistocene = 0.01 to 2 million years before present

** Pliocene = 2 to 5 million years before present

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The Lakewood Formation consists of interbedded clays, silts, silty sands, and sands representative of stream-type alluvial and flood-plain deposits. In the site vicinity, the Lakewood Formation ranges from 40 to 50 feet thick. The Gage aquifer is contained in the Lakewood Formation and generally occurs near the base of the formation. The Gage aquifer is approximately 30 feet thick in the site vicinity.

The early Pleistocene San Pedro Formation underlying most of the Coastal Plain of Los Angeles County is approximately 750 feet thick in the site vicinity and consists of stratified silt, silty sand, sand, and gravel. The formation has been divided into various stratigraphic units or members (aquicludes and aquifers); only the aquifers have been named. In downward succession the aquifers are: the Hollydale, Jefferson, Lynwood, Silverado, and Sunnyside.

The discontinuous Hollydale aquifer consists of silty sand and sand. Maximum thickness in the Los Angeles Coastal Plain is approximately 100 feet.

The Jefferson aquifer underlies the Hollydale and is separated from it by aquicludes of the San Pedro Formation. Sediments within the aquifer consist of clayey sand, sand, and gravelly sand.

The three deeper aquifers (the Lynwood, Silverado, and Sunnyside) are the major water-producing zones in the area. The aquifers range in thickness from less than 50 to 500 feet. Aquifer sediments generally consist of coarse-grained sands and gravels interbedded with lenses of silt and clay. These aquifers have all been affected, to some extent, by structural folding and faulting. Structural lows, created by faulting and synclinal folding, have formed groundwater reservoirs in these zones.

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3.6 SOILS

3.6.1 Onsite Soils

Borings drilled and logged as part of this investigation confirm the regional and local geologic setting of the site. A generalized stratigraphic column of the site is presented on Plate 9. Plate 10 shows the location of the geologic cross-sections across the site (Plates 11 through 14). Results of the physical property tests are summarized in Table 15. Laboratory reports are presented in Appendix J.

Shallow, near-surface materials underlying the site consist predominantly of silty sand, with minor amounts of silt and clay. Poorly sorted, fine- to coarse-grained sand (locally with gravel) underlie the fine-grained surficial deposits from depths between 15 and 25 to 30 feet bgs. These sand deposits (referred to as the upper sand zone) appear to form a northwest-southeast trending channel feature. A structural contour map depicting the base of this upper sand unit is shown on Plate 15. This upper sand zone is interpreted to be the Gage Aquifer which is stratigraphically positioned at the bottom of the Lakewood formation. Groundwater was not encountered in this unit except in the northeast corner of the site (SB-2 and MW-32) and, for a limited time, at MW-37. Below the upper sand unit a zone of discontinuous silt, clay, and silty sand units are encountered to depths of approximately 45 to 50 feet bgs. Beneath this zone of discontinuous units, a fine- to medium-grained sand is present. This sand unit, referred to as the aquifer sand, is continuous across the site and is approximately 75 feet thick, extending to depths of 117 and 126 feet bgs at locations MW-17A and MW-23A, respectively. A localized, discontinuous silt zone was present in MW-23A at a depth of 78 to 85 feet. This aquifer sand is water-bearing, (groundwater being encountered at depths between 48 and 50 feet bgs), and is interpreted as being the Hollydale aquifer, the upper-most aquifer of the San Pedro formation. A cross-section of the Hollydale aquifer is presented on Plate 16. A structural contour map of the top of the aquifer sand is presented on Plate 17.

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3.6.2 Offsite Soils

CPT data collected during onsite and offsite groundwater sampling activities were interpreted to identify the lithology encountered. The interpreted CPT logs are presented in Appendix D and a fence diagram depicting the offsite extension of the four major zones onsite is presented on Plate 18. Subsurface investigations conducted at nearby facilities, including Southern California Chemical Company (Kleinfelder, 1986a), Diversey-Wyandotte Corporation (Kleinfelder, 1986b) and Angeles Chemical Corporation (SCS, 1991), indicate that the four general lithologic zones identified at the McKesson site extend throughout the local vicinity.

3.7 HYDROGEOLOGY

Two identifiable aquifer sands were encountered during this investigation, the Gage aquifer and the Hollydale. This section presents regional setting and water quality data and local hydrogeologic characteristics of these units.

3.7.1 Regional Hydrogeologic Setting

The succession of aquifers in the vicinity of the site are depicted on Plate 8. The uppermost aquifer sand in this region of the Santa Fe Springs Plain is the Gage aquifer, which occurs near the base of the Lakewood formation. Permeable zones within this aquifer are discontinuous, and the aquifer is not generally considered to be a source of drinking water (California Department of Water Resources [DWR], 1961). The Gage aquifer occurs at a depth of approximately 15 to 20 feet bgs and is approximately 15 feet thick in the vicinity of the site.

Separated from the Gage aquifer by an aquiclude of the uppermost part of the San Pedro formation, is the Hollydale aquifer. The Hollydale aquifer has been characterized as irregular, sinuous, and meander-like. Generally the Hollydale is not considered to yield large quantities of water because of its lack of continuity. Dominant recharge of the Hollydale occurs northeast of the site where the Hollydale merges with the overlying Gage aquifer.

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About 1 to 2 miles southwest of the site, the Hollydale aquifer would appear to merge with the underlying Jefferson aquifer in the vicinity of the San Gabriel River. Neither the Hollydale nor the Jefferson aquifers are considered important water-producing aquifers, with less that 10 percent of the wells in the Central Basin being perforated in these zones.

The major water-producing aquifers within this region are located below the Jefferson aquifer and are, in downward succession, the Lynwood, Silverado, and Sunnyside aquifers. Groundwater gradients observed in all aquifers in the San Pedro formation are generally to the southwest.

3.7.2 Regional Water Quality

There are four production water wells operated by the City of Santa Fe Springs located within the Santa Fe Springs city limits. Of the four wells, the only one that draws water from the Hollydale aquifer is located approximately 9 miles south of the site. Water samples taken in November 1989 did not detect VOCs.

Santa Fe Springs Well No. 4 is located on Telegraph and Pioneer Road, approximately 2.5 miles southwest of the site. This well draws water from the Lynwood, Silverado, and Sunnyside aquifers. Water samples taken from this well in May 1991 indicated that no organic chemicals were present.

Santa Fe Springs Well No. 1, located near the corner of Burke Street and Dice Road approximately 0.5 miles north of the site, draws water from the Silverado and Sunnyside aquifers. Water quality data from samples taken in June 1991 indicate the presence 1.1 ug/L of TCE. No other chemicals of concern were detected.

Santa Fe Springs Well 304 WI, located approximately 2 miles west of the site, draws water from the Silverado aquifer. Water-quality data from samples taken in May 1991 indicate 0.5 ug/L TCE and 1.6 ug/L PCE. No other chemicals of concern were detected.

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Two wells owned by the City of Whittier are located approximately 7 miles due north of the site. These wells draw water from 55 and 120 feet bgs, in what is probably the Gaspur aquifer. Water analyses from both wells did not detect VOCs.

3.7.3 Local Hydrogeologic Setting

The Gage aquifer, identified at the site as the upper sand zone, was dry during this site investigation, except for isolated areas of perched water continuously present in the northeast corner of the site and periodically encountered in the aboveground solvent storage tank area. Offsite, perched water was detected in the eastern side of the Angeles site as reported in the SCS investigation. The presence of water in this unit is most likely seasonal and related to rainfall activity.

This unit is separated from the underlying Hollydale aquifer by a zone of discontinuous silts, clays, and silty sands. Permeability tests conducted on samples from this zone listed on Table 15 indicate that this zone would serve as an effective aquitard between the overlying high permeable sands of the Gage aquifer and the underlying high permeable sands of the Hollydale aquifer. Groundwater encountered at the site was in the lower sand identified as the Hollydale aquifer.

Well monitoring data are summarized in Table 16. Potentiometric surface maps were constructed for four of the periods monitored and are presented on Plates 19a to 19d. The local horizontal groundwater gradient determined from these data is typically to the southwest at a value of 0.005 foot-per-foot. Potentiometric data collected from the two well nests Wells SB-17/A/B and SB-23/A/B indicate a slight downward vertical gradient of 0.004 foot-per-foot. Hydrographs of water elevation changes observed in selected wells are shown on Plates 20a to 20c.

Over the time period of this investigation, groundwater elevations in the aquifer zone remained relatively constant until March-April 1991, when the groundwater elevations rose. This observed increase can be related to the rain during the first part of 1991.

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Evaluation of groundwater monitoring data collected during the monitoring periods supports the hydrogeologic separation of the perched groundwater zone from the aquifer zone. The groundwater elevations measured in SB-32, completed in the perched groundwater zone, reflect a strong dependence on seasonal rainfall activity, illustrated by a steep decline during drought months followed by a rapid increase immediately following a rain event in February 1991. Data from groundwater monitoring wells completed in the underlying aquifer exhibit a much more constant potentiometric level and a less severe rise associated with the rainfall event.

3.7.4 Aquifer Test Results

Results of slug tests conducted in Wells MW-1 through MW-3, SB-4, SB-7, SB-13, and SB-17 indicated that the hydraulic conductivity of the lower aquifer was too great to measure using this test method. Water levels recovered within seconds of lowering the slug mandrel into the water column. A slug test performed on Monitoring Well SB-32 (screened in the perched zone) indicated a hydraulic conductivity of 4.2 gallons per day per square foot (gpd/ft^2) corresponding to a transmissivity of 25 gallons per day per foot (gpd/ft). The low hydraulic conductivity in the perched zone in contrast with the high hydraulic conductivity in the lower aquifer supports the assertion that the two aquifers are hydrogeologically distinct.

Pumpout testing in cluster Wells SB-17, SB-17A, SB-23, SB-23A, and SB-23B indicated hydraulic conductivity values in the lower aquifer ranged from approximately 64 to 440 gpd/ft^2, with transmissivity values ranging from 5,200 to 33,000 gpd/ft (see Appendix H for aquifer test analyses). Hydraulic conductivity/transmissivity values were lower in the more shallow cluster wells (SB-17 and SB-23), possibly due to a decreased efficiency in the PVC slotted casing as opposed to the more efficient stainless-steel screen in Monitoring Well SB-17A and SB-23A. The transmissivity values for the deeper cluster wells are comparable to the results of field tests conducted on wells at the Southern California Chemical Company located approximately 1/4 mile to the northwest of the site. Transmissivity values at these wells ranged from 32,100 to 44,700 gpd/ft (Kleinfelder, 1986).

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Aquifer test data from Wells SB-17B and SB-23B were not analyzed because of malfunctioning equipment.

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4.0 NATURE AND EXTENT OF CHEMICALS

4.1 SOURCE AREAS

Elevated concentrations of organic chemicals detected in the soil and groundwater samples collected during this investigation indicate the presence of one primary onsite source area for the observed soil and groundwater chemical concentrations, and at least one offsite source area that contributes to both the observed onsite and offsite groundwater concentrations.

4.1.1 Onsite Source Area

The highest concentrations of chlorinated organic compounds were detected in the aboveground solvent storage area. This area was focused on in the previous onsite investigations conducted by MES. The other areas investigated onsite do not appear to have served as significant source areas for the observed chemical concentrations.

4.1.2 Offsite Source Area

Chemical analysis of upgradient groundwater samples and samples collected offsite, cross-gradient of the McKesson site, indicate the presence of an upgradient, offsite source contributing to the observed groundwater condition. A previous investigation of Angeles, located immediately north and upgradient of the McKesson site, revealed the presence of significant soil contamination to depths of over 40 feet. Analytes detected in the groundwater downgradient of Angeles are similar to those previously detected in the soil at Angeles. It appears, therefore, that Angeles has served as an offsite, upgradient source for some of the compounds detected during this investigation.

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4.2 SOIL AND VADOSE ZONE

Results of the chemical analysis of soil samples collected during this investigation are summarized in Tables 17a through 17d. Analytical laboratory reports and chain-of-custody documents are presented in Appendix K.

4.2.1 Inorganic Impacts to Soil

Shallow and isolated evidence of historic releases and treatment of acidic compounds was detected within the bermed, corrosive, and hydrogen peroxide storage area. Low pH levels ranging from 4.2 to 4.4 were detected in 3 of the 17 samples tested from this area. These three samples, collected from Borings SB-16 at 6 feet bgs, SB-17 at 1.5 feet bgs, and SB-34 at 5 feet bgs, also exhibited elevated sulfate levels (5620 to 9270 milligrams per kilogram [mg/kg]) and most likely reflect the impact of a sulfuric acid release. One sample, collected from Boring SB-33 at a depth of 1.5 feet bgs, exhibited a high pH value of 10. This sample also exhibited elevated sodium and sulfate levels (4730 and 1730 mg/kg, respectively) and might reflect the use of soda ash in the treatment of an acid release. Two additional samples (Borings SB-18 and SB-35, both from 1.5 feet bgs) also exhibited elevated sodium and sulfate levels, however, they showed pH values of 8.4 and 8.2, both within the range observed over the remainder of the site. Impacts related to the use of acidic or inorganic compounds appear to be surficial and limited to the interior of the bermed corrosive-storage area.

4.2.2 Organic Impacts to Soil

VOCs, specifically chlorinated hydrocarbons, were the major class of organic compounds detected in the soil and vadose zone, with a total of 17 separate VOCs being detected. Low levels of three semivolatile organic compounds (2-methyl naphthalene, naphthalene, and benzyl alcohol), together with concentrations of TPH greater than 10 mg/kg (as quantified by method 418.1) were also detected, but in only two borings onsite, SB-24 and SB-30. Selected glycols propylene, ethylene, hexylene, and diethylene were not detected in any of the samples analyzed.

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Surface soil samples collected offsite in the unlined drainage channel contained low levels of PCE ranging from 0.1 to 1.9 mg/kg. One sample collected at a depth of 1 foot bgs had a detected value of 61 mg/kg of PCE. The surface soil samples also contained low levels of Bis (2-ethyl-hexyl)-phthalate (1.9 to 4.5 mg/kg) and moderate amounts of TPH ranging from 13 to 1,400 mg/kg.

The six most prevalent compounds detected onsite were PCE, 1,1,1-TCA, TCE, DCM, 1,1-DCE, and 1,2-DCA. PCE was detected in 44 of the 98 samples analyzed (45 percent) at concentrations ranging from 0.05 to 2900 mg/kg. 1,1,1 TCA was detected in 36 samples (37 percent) at concentrations of 0.06 to 3500 mg/kg. Thirty-three samples (34 percent) contained detectable amounts of TCE at concentrations of 0.07 to 60 mg/kg, while DCM was detected in 32 samples (33 percent) at concentrations- ranging from 0.55 to 380 mg/kg. Both 1,1-DCE and 1,2-DCA were detected in 21 samples (22 percent), at concentration of 0.05 to 5.4 and 0.06 to 32 mg/kg, respectively. The concentration frequency distribution for these six compounds and number of samples with detected concentrations are presented on Plates 21a and 21b. These data indicate that high concentrations of these compounds are detected in only a very small percentage of the samples. A complete listing of the compounds detected onsite, their frequency of occurrence, and observed concentration range is provided in Table 18.

The areal distribution of all the detected compounds is generally restricted to the vicinity surrounding the aboveground solvent-storage tank area, in which approximately 80 percent of the samples analyzed contained detectable amounts of the target analytes. Samples collected from the three borings located within the bermed storage area contained the highest concentrations of 16 of the 17 compounds detected onsite. The site maximum concentrations of ten compounds 1,1,1-TCA (3,500 mg/kg), PCE (2,900 mg/kg), TCE (60 mg/kg), 1,1-DCE (5.4 mg/kg), 1,2-DCA (32 mg/kg), DCM (380 mg/kg), 1,1,2,2 PCA (31 mg/kg), ethylbenzene (50 mg/kg), chlorobenzene (170 mg/kg), and carbon tetrachloride (550 mg/kg) were detected in samples from Boring SB-30. Samples from Boring SB-24 contained the site maximum concentrations of MEK (65 mg/kg), acetone (120 mg/kg), toluene (130 mg/kg), and xylenes (160 mg/kg). Samples from Boring SB-37 contained the site maximum

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concentration of 1,1-DCA (0.63 mg/kg), and the only sample in which benzene (0.07 mg/kg) was detected.

Minor, isolated occurrences of acetone and MEK are also evident in shallow soil samples collected in Boring SB-42, situated along the subsurface distribution lines.

Soil concentration maps for 1,1,1 TCA; PCE; TCE; DCM; 1,1-DCE; and 1,2-DCA are presented on Plates 22 through 27, respectively. Data collected at two depth intervals (20 to 25 feet and 40 to 45 feet bgs) are presented in these plates. As shown on these plates, the detected concentrations of these compounds decrease with depth, while the areal extent of the impacted zone increases. Concentration data for 1,1,1 TCA and PCE are presented in cross-section on Plates 28 and 29. Lateral extension of the impacted soil zone is evident along base of the upper sand zone and along the upper capillary fringe zone of the lower aquifer sand.

4.3 GROUNDWATER

Results of the chemical analysis of groundwater samples collected during this investigation are summarized in Tables 19a through 19d. Laboratory reports and chain-of-custody forms are presented in Appendix L.

4.3.1 General Mineral Characterization

General mineral analyses indicate that the aquifer water would not be considered potable. All groundwater samples analyzed exceeded the State secondary drinking water maximum concentration levels (MCLs) for total dissolved solids (TDS = 500 mg/L) and conductivity (900 micromhos per centimeter). Over half of the wells analyzed exceeded the MCLs for sulfate (250 mg/L) and manganese (0.05 mg/L). Two wells analyzed also exceeded the Federal EPA drinking water MCL goal for nitrate (as Nitrogen) of 10 mg/L.

The general mineral composition of the groundwater in both the perched zone and aquifer zone were compared on a trilinear Piper diagram (Plate 30), which display anion (negative

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charge) and cation (positive charge) percent compositions on a milliequivalent basis. Data that group together represent similar ratios between ions and would suggest that the waters are compositionally related. Examination of Plate 30 indicates that water samples from the lower aquifer form a distinct group with approximately 60 percent sulfate (SO_4), chloride (Cl) anions, and 70 percent calcium (Ca) and magnesium (Mg) cations. Data from perched zone Well SB-32 plots outside the group reflecting increased percentages of carbonate (CO_3) and bicarbonate (HCO_3) anions and lower percentages of Ca and Mg cations. These data indicate that the water in the perched zone is compositionally different (and thus separate) from the lower aquifer groundwater.

Variations in the ionic ratios of groundwater from the intermediate and deep monitoring wells SB-17A, SB-17B, SB-23A, and SB-23B, drilled using mud-rotary techniques, reflect the use of the deflocculant sodium acid pyrophosphate (SAPP) during development.

4.3.2 Inorganic Impacts to Groundwater

General uniformity of general mineral composition and pH levels in site wells indicate that there has been little or no inorganic impact to groundwater. An extremely low pH value of 2.15 reported for the initial sample collected from Well MW-01 was most likely the result of analyzing the improper sample vial. While measurements for pH are made on non-acidized vials, some samples collected from Well MW-01 were decanted into acidized vials for preservation of inorganic constituents. It is believed that an acidized vial was inadvertently used for the pH measurement. Field measurements taken during the initial sampling of this well using a calibrated pH measurement instrument indicated normal pH levels. Subsequent resampling of Well MW-01, in which the pH was monitored in the field both with the standard calibrated field equipment and litmus paper as a redundant check, indicated a more normal pH value of approximately 7.

4.3.3 Organic Impacts to Groundwater

Concentrations of only two VOCs, 1,1,1-TCA (840 and 61 ug/L) and 1,1-DCA (180 and 34 ug/L), were detected in the two surface-water samples analyzed. Phenol (65 ug/L) and 4-

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methyl-phenol (27 ug/L) were detected in the same surface-water sample that contained the elevated VOC concentrations. The surface-water samples were not analyzed for TPH, however a sample of tap water (TW-01) did contain detectable TPH (0.06 ug/L).

Twenty-six VOC compounds were detected in the groundwater during this investigation. The three main classes of compounds identified were halogenated chlorinated hydrocarbons, aromatic hydrocarbons, and chlorofluorocarbons. Detected chlorinated compounds are:

- 1,1,1-TCA,
- DCM,
- PCE,
- TCE,
- 1-1-DCE,
- 1,2-DCE,
- 1,1-DCA,
- 1,2-DCA,
- 1,1,2-TCA, and
- Vinyl Chloride.

Aromatic VOCs detected include:

- Benzene,
- Toluene,
- Ethylbenzene, and
- Xylenes.

Chlorofluorocarbons detected include:

- Dichlorofluoromethane,
- Trichlorofluoromethane (Freon 11), and
- Trichlorotrifluoroethane (Freon 113).

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Other VOCs detected in one or more samples included:

- Acetone,
- MIBK,
- MEK,
- Chloroform,
- Dibromochloromethane,
- Ethylmethyl-benzene and trimethyl-benzene isomers, and
- Cyclic and aliphatic hydrocarbons.

Nine of the twenty-six compounds detected during this investigation were only detected offsite. Compounds detected offsite only were:

- 1,1,2-TCA,
- MEK,
- MIBK,
- Dichlorofluoromethane,
- Trichlorotrifluoroethane, ethylmethyl-benzene, and trimethyl-benzene isomers, and
- Cyclic and aliphatic hydrocarbons.

Vinyl chloride was not detected in the aquifer but was detected in the perched zone. A listing of VOCs detected in groundwater, their frequency of occurrence, and observed concentration range is provided in Table 19e.

Only two semivolatile compounds, benzoic acid and naphthalene, were detected onsite. Benzoic acid was detected only in Well SB-23 at a concentration of 70 micrograms per liter (ug/L), while naphthalene was detected only in Wells SB-17, SB-20, and SB-23 at concentrations of 16, 10, and 14 ug/L respectively. Phenol (65 ug/L) and 4-methyl-phenol (27 ug/L)were detected in one of the two samples of surface water collected in the drainage channel. Low level TPH concentrations ranging from 0.06 to 0.62 ug/L were detected in five on-site wells (SB-4, SB-20, SB-23, SB-25, SB-32) and in the tap-water sample collected at the

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site. Selected glycol compounds propylene, ethylene, hexylene, and diethylene, were not detected onsite.

The major organic compounds detected onsite in the groundwater were:

- 1,1,1-TCA (<1 to 94,000 ug/L),
- PCE (5 to 45,000 ug/L),
- TCE (7 to 11,000 ug/L),
- 1,1-DCE (<1 to 38,000 ug/L), and
- DCM (<5 to 93,000 ug/L).

Data collected from the on-site monitoring wells during the February 1991 sampling event were combined with Hydropunch sample analyses collected over the period of April through November 1991 to produce the isoconcentration maps for these five compounds presented in Plates 31 through 35. Examination of these isoconcentration maps reveals an organic plume oriented in a northeast to southwest direction extending under the site. Maximum concentrations were detected at two sampling locations situated along the axis of the plume. Maximum values of 1,1,1-TCA, PCE, and DCM were detected in Well SB-23, situated immediately downgradient of the aboveground solvent storage tank area, while the maximum concentrations of TCE and 1,1-DCE were detected at Hydropunch location CPT-13, situated offsite, downgradient of SB-23. A relatively narrow zone of high concentration values extend offsite, downgradient along the axis of the plume. High concentration values are also detected offsite, upgradient of the site.

A secondary plume, oriented in a similar northeast to southwest direction and originating from an area upgradient of the McKesson site, is evident in the isopleth for DCM. This offsite plume is situated cross-gradient of the onsite plume and extends under the agricultural property west of the site.

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4.3.3.1 Onsite Organic Plume Characteristics

The six most pervasive compounds detected onsite in the groundwater were:

- 1,1,1-TCA,
- PCE,
- TCE,
- 1,1-DCE,
- 1,1-DCA, and
- DCM.

Additional compounds detected onsite at least once include:

- 1,1-DCA,
- 1,2-DCA, and
- 1,2-DCE, as well as acetone, BTEX, Freon 11, and dibromochloromethane.

Analysis of samples collected from the wells completed in the middle of the aquifer (SB-17B and SB-23B) and at the bottom of the aquifer (SB-17A and SB-23A), indicates that the detected contamination is concentrated in the upper part of the aquifer. Both the number of compounds detected and their concentrations decreased significantly with depth. Only five compounds were detected in wells SB-23A and SB-23B, 1,1,1-TCA (12 and 17 ug/L), PCE (13 and 17 ug/L), TCE (7 and 67 ug/L), 1,1-DCE (2 and 2 ug/L), and toluene (10 and 10 ug/L). Only four compounds were detected further downgradient in wells SB-17A and SB-17B, 1,1,1-TCA (3 and 1 ug/L), PCE (7 and 5 ug/L), TCE (12 and 33 ug/L*), and toluene (11 and 3 ug/L). The vertical distribution of analytes detected at the two well nests is shown on Plate 36.

* Duplicate sample was nondetect (<1 ug/L) for TCE

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The relative percentage concentration of individual halogenated compounds was examined to determine which constituents were most prevalent. The relative percentage was calculated by dividing the concentration of an individual constituent by the total concentration of all six halogenated compounds (Table 20). The predominant chlorinated hydrocarbon detected in the onsite plume was 1,1,1-TCA, followed by PCE, 1,1-DCE, and TCE. This relationship is evident in all samples collected along the axis of the onsite plume and extending offsite to the southwest (Plate 37a). A similar relationship is observed in samples collected from the perched zone during the previous site investigation conducted by MES in 1986 (Plate 37b).

Concentration ratios of the chlorinated hydrocarbons were also calculated (Table 21). These data were plotted for each sample and are presented in Appendix N. All samples collected from along the axis of the plume exhibit a high TCA/TCE ratio, a moderate 1,1-DCE/TCE ratio, and a low TCE/PCE ratio (Plate 38a). A similar relationship is observed if one examines the ratios obtained from samples collected from the above-ground solvent storage area during the previous site investigation conducted by MES in 1986 (Plate 38b).

4.3.3.2 Offsite Organic Plume Characteristics

Elevated concentrations of acetone, MEK, MIBK, BTEX, DCM, PCE, TCE, 1,1,1-TCA, 1,1-DCE, 1,1-DCA, and 1,2-DCE were detected upgradient of the McKesson site. Two of these compounds, MEK and MIBK, were not detected in groundwater samples collected onsite. Isoconcentration maps/contours showing the distribution of MEK, MIBK, and BTEX were plotted and are presented on Plates 39 through 41. The offsite distribution of MEK and MIBK is very similar to BTEX and that previously observed for DCM (Plate 35). The observed distribution strongly suggests the presence of an upgradient, offsite source.

The relative percentage concentrations (Table 20) of the chlorinated hydrocarbons detected in the upgradient and offsite locations are much more variable than the relationships observed within the main plume. This variability is most likely the result of the mixing of two plumes with different initial compositions.

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Concentration ratios of TCA/TCE, 1,2-DCE/TCE, and TCE/PCE which were determined for CPT-9 and CPT-16, located to the west of the onsite plume and downgradient of Angeles are noticeably different from those observed in the onsite plume. These samples are typified by high 1,2-DCE/TCE ratios and low TCA/TCE and TCE/PCE ratios. Samples collected from CPT-6 and MW-2, located east and slightly upgradient of the onsite plume, exhibit relatively high TCE/PCE ratios that are similar to those exhibited by samples collected west of the offsite plume at CPT-17 and CPT-18.

4.4 QUALITY ASSURANCE

Sample collection procedures and laboratory analyses were evaluated by HLA personnel to validate the reliability, precision, accuracy, and completeness of data generated during this investigation. A "Data Validation Checklist" was filled out for each set of analytical results received. Items to be checked included: daily field activity logs; preservation of samples; completeness of chain-of-custody forms; condition of samples when received at the laboratory; laboratory QC data; trip, field, and equipment blanks; and field duplicates. Data validation checklists for each laboratory report are presented in Appendix M.

Results obtained from two groundwater samples were invalidated. An acidized groundwater sample MK-MW-01080190, collected from Monitoring Well MW-01 on August 1, 1990, was inappropriately analyzed for general minerals. The sample was identified by the low pH value of 2.15 and high sulfate value of 2,022 mg/L (site average = 240 ug/L). This well was resampled with acceptable results (pH= 6.93, sulfate = 249 ug/L). Results obtained from sample MK-SB-04-021191, collected from Well SB-04 in February 1991 were invalidated as the result of probable leakage of surface rainwater into the well. Results obtained were an order-of-magnitude lower than those reported during the previous two sampling events. Field log dailies reported that the well box had been covered by standing rainwater immediately prior to the sampling event, and that the well box was full of water. Evidence was found that rainwater had entered the well, thereby locally diluting the groundwater concentrations. Review of all laboratory records validated the reported analytical results.

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Data from duplicate samples were compared to assess the combined effect of sampling and analysis procedures on the precision of the reported results. The relative percent difference (RPD) was calculated for measurements of 1,1,1-TCA, PCE, TCE, DCM, 1,1-DCE, and 1,1-DCA in the 13 sets of duplicate samples analyzed and are summarized in Table 22. RPD values indicated generally acceptable levels of precision for the reported results. Results for the five analytes had a combined average RPD of 16.3 percent. The combined average RPD per sample/duplicate pair was 20.4 percent. These results indicate that the high variability between the values for the sample and the duplicate sample that were sometimes observed (e.g., 88,000 versus 62,000 ug/L; RPD = 34.7%) are within the normally acceptable precision of the measurement technique.

The value reported for TCE in the sample from Well SB-17B (33 ug/L) should be considered questionable as a result of comparison with the duplicate sample analyzed (<1 ug/L), yielding an unreasonably high RPD of 194 percent.

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5.0 CHEMICAL FATE AND TRANSPORT

The fate and transport of the chlorinated compounds detected in site soil and groundwater are influenced by their physical, chemical, and biochemical properties. These compounds are identified as having densities greater than water, viscosities less than water, low interfacial tension, high vapor pressure, and the ability to undergo biotransformations. A summary of pertinent properties associated with chlorinated hydrocarbons detected onsite is presented in Table 23. Possible biotransformations are presented on Plate 42.

5.1 FATE AND TRANSPORT OF CHLORINATED COMPOUNDS IN SOIL

The principle source area for introduction of compounds into the subsurface appears to have been the aboveground solvent-storage area. The highest concentrations of compounds detected in the soil at the McKesson site were in samples collected from the near surface within this bermed area. At depth, the highest detected concentrations were detected at two horizons; along or near the base of the upper sand zone, and near the capillary fringe of the Hollydale aquifer. The observed subsurface distribution can be related to the properties of these compounds and characteristics of the local subsurface geologic and hydrogeologic settings.

Liquid solvents migrated vertically downward to the base of the upper sand zone (approximately 25 feet bgs) with minimal lateral spreading . At this depth, the transition from the upper sand zone to the underlying silts and clays is characterized by a four order-of-magnitude decrease in permeability, as observed in the laboratory derived values (2.5×10^{-3} to 7.3×10^{-7} cm/sec), which promoted the lateral spreading of liquid-phase solvents that infiltrated through the sand zone. The historic presence of perched groundwater within the upper sand zone probably also contributed to the observed lateral extent of compounds detected along the base of the upper sand zone. Liquid phase solvents entering the perched groundwater column would tend to continue to migrate downward through the water as a result of their relatively high density. They would not spread laterally along the capillary fringe. However, solvents present within the water column would tend to dissolve into the

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perched groundwater and would have been able to spread laterally within the perched groundwater column by advective, dispersive, and diffusive mechanisms.

Volatilization from groundwater may have contributed to the concentrations detected at depths of 40 to 45 feet bgs, the deeper horizon in which elevated concentrations were detected. In most borings outside the aboveground solvent-storage area, compounds were only detected in the samples collected from these depths, near the top of the capillary fringe area, and not in samples collected from shallower depths. This distribution of detected compounds may be the result of volatilization from the underlying aquifer. The high vapor pressures associated with the chlorinated compounds together with the high dissolved concentrations detected in the groundwater could result in elevated concentrations of these compounds being present in the soil gas above the saturated zone. The concentrations detected in soil samples collected from depths of 40 to 45 feet bgs are in most cases lower than the concentrations that would be expected from the application of Henry's Law. Because analytical methods do not generally distinguish between the mass of a compound present in soil gas, soil moisture, or adsorbed onto the soil particles, the levels detected in samples from near the groundwater surface could reflect soil gas concentrations.

5.2 GROUNDWATER TRANSPORT AND CHEMICAL MIGRATION

The relative effect of groundwater transport mechanisms (advection, dispersion, and diffusion) on the migration of chemical compounds is dependent on aquifer properties including heterogeneity, permeability, and hydraulic gradient, and whether the compound is present in a dissolved or nonaqueous liquid phase. Based on analysis of boring logs and laboratory and aquifer tests, the lower aquifer sands can be characterized as being fairly homogeneous, exhibiting moderate permeability (2×10^{-3} cm/sec) and a moderate lateral gradient (0.005 foot-per-foot). This condition would tend to favor advection as the dominant mechanism governing the transport of compounds instead of dispersion.

Diffusion is also likely to contribute to the transport of chemical compounds in the groundwater. The lateral distribution of relatively low concentrations of chemicals detected

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on and offsite are most probably related to diffusive forces generated by the elevated concentrations of compounds detected in the groundwater.

Both relatively narrow zones of high level concentrations in the general direction of the groundwater gradient, and the cross-gradient distribution of low level concentrations illustrated in the isoconcentration contours (Plates 32 through 36), are indicative of the effects of both advection and diffusion. The slight deviation of the axis of both onsite and offsite plumes from the graphically determined gradient direction could be reflective of slight lateral heterogeneities within the aquifer sands and variation in gradient direction over time. This would not be unusual given the reported regional sinuous nature of the Hollydale unit.

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6.0 RISK ASSESSMENT

This section presents a summary of the results of a baseline health risk assessment conducted by McLaren/ChemRisk. The key elements of McLaren/ChemRisk's assessment are summarized below. The complete risk assessment is presented in Appendix O.

A baseline health risk assessment was conducted to evaluate the potential human health risks associated with exposure to chemicals at the McKesson site in Santa Fe Springs, California. The baseline health risk assessment was prepared in a manner consistent with EPA's Risk Assessment Guidance for Superfund Volume I (EPA, 1989a) and Guidance for Establishing Target Cleanup Levels for Soils at Hazardous Waste Sites (EPA, 1988b) and the draft California Environmental Protection Agency (Cal-EPA) (formerly the California Department of Health Services) guidance document Scientific and Technical Standards for Hazardous Waste Sites (Cal-EPA, 1990). Associated cleanup levels are presented in Appendix A of HLA's feasibility report entitled "Feasibility Study, Onsite Remediation, McKesson Corporation Facility, Santa Fe Springs, California", dated October 30, 1992.

6.1 CHEMICALS OF CONCERN

For the purposes of the risk assessment, the former "high activity" areas of the site are segregated into three areas: Area A (the railroad spur), Area B (the solvent storage area), and Area C (corrosive/oxidizer area). Any chemical detected in greater than 5 percent of the soil samples taken from these areas is considered a soil chemical of concern. This selection criterion yielded 12 soil chemicals of concern that were quantitatively evaluated in the assessment. It is known that upgradient contamination has contributed to the presence of chemicals in groundwater at the McKesson site and downgradient from the McKesson site. Since the degree relative of contribution of onsite vs. offsite activities to the presence of chemicals in groundwater has not yet been assessed, it is not yet possible to determine the groundwater health risks that are attributed to the McKesson property. Nonetheless, health risks associated with groundwater exposure are assessed using existing groundwater concentrations.

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6.2 POTENTIALLY EXPOSED POPULATIONS AND EXPOSURE PATHWAYS

Based on a consideration of the current site conditions, potential future uses of the site property, and the known fate and transport characteristics of the chemicals of concern, the following exposure pathways were assessed for a future onsite residential and future onsite occupational exposure scenario: soil ingestion, dermal contact with soil, and vapor inhalation. Site data were used to establish representative soil concentrations for assessing exposure via direct soil contact (soil ingestion and dermal contact) and as input to the vapor emission models. The impacted aquifer at the McKesson site is not currently used as a drinking water source and will likely not be used as such in the foreseeable future due to elevated concentrations of total dissolved solids; however, the groundwater could be used for non-drinking water purposes. Accordingly, onsite and offsite incidental residential exposure to groundwater via ingestion and dermal contact (for example, if the aquifer were used as an irrigation source) is assessed to determine the risks associated with groundwater under current conditions. In order to ensure that groundwater-related health risks are not under-estimated, the maximum detected chemicals concentrations in any onsite or offsite well are used as representative groundwater concentrations. Age-specific exposure estimates (children and adults) were incorporated into the residential exposure scenario. Where applicable, suggested regulatory default values of contaminant concentrations and exposure estimates were used to assess uptake in order to approximate a "reasonable maximal scenario". Although offsite populations could theoretically be exposed to site-related compounds via vapor inhalation and contact with groundwater, offsite populations are not quantitatively evaluated in this assessment because: 1) the contribution of site-related activities to the observed groundwater chemical concentration has not yet been quantitatively determined, and 2) the distance between onsite vapor emission sources and offsite populations is such that significant exposure to site-related vapors is unlikely to occur.

6.3 HEALTH RISK ESTIMATES

For the soil pathways of exposure (vapor inhalation, soil ingestion, and dermal contact with soil), the total noncancer hazard indices (including all chemicals) are 1.0 or less for residents and workers. These results suggest that the soil chemicals of concern do not pose a

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significant noncancer hazard, according to the assumptions used in the assessment. Estimated increased cancer risks are 8×10^{-6} and 2×10^{-5} for the occupational and onsite residential scenarios, respectively. These estimated cancer risks are well within the range of increased cancer risks that have typically been considered "insignificant" for large populations at both the State and Federal levels.

For the groundwater pathways of exposure (incidental dermal contact and ingestion), the hazard indices range from 0.1 (dermal contact by adults) to 11.0 (ingestion by children). The estimated increased cancer risks are 3×10^{-3} for incidental groundwater ingestion and 1×10^{-4} for incidental dermal contact. While these estimated risks and hazard indices exceed levels that have typically been considered "acceptable" by regulators, it is not yet known to what degree site-related chemicals detected in the site soil contribute to these estimates.

6.4 UNCERTAINTY ANALYSIS

The conservatism present in the above estimates was quantitatively evaluated using a Monte Carlo analysis of probability distribution frequencies, rather than "point" default estimates, to describe a reasonable range of values for each exposure parameter. This uncertainty analysis demonstrated that the health risk estimates derived for the "reasonable maximal scenario" were actually orders of magnitude greater than the health risks posed to a significant fraction of the potentially exposed populations. Hence, the uncertainty analysis quantitatively confirmed that there is a large degree of conservatism in the health risk estimates estimated for the "reasonable maximal scenario."

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7.0 SUMMARY AND CONCLUSIONS

7.1 SUMMARY

This section summarizes the findings of the remedial investigation and baseline health-based risk assessment.

7.1.1 Nature and Extent of Chemical Compounds

This investigation has identified significant impacts to vadose zone soils and groundwater by chlorinated hydrocarbon compounds. The predominant compounds detected in both the soil and groundwater are 1,1,1-TCA, PCE, TCE, and DCM. Elevated concentrations of these compounds detected in the soil appear to be limited in their areal extent to the immediate vicinity, including and surrounding the aboveground solvent storage area. The aboveground solvent-storage tank area appears to have been the primary onsite source area for the chemical compounds detected in the soil. This is based on the areal and vertical concentration distributions observed, previous investigations, and historic records of activities within the bermed solvent-storage area. Minor impacts to the soil were identified along the subsurface distribution lines connecting the northern railroad spur to the UST area. No significant impacts to vadose zone soils or groundwater were identified as resulting from activities associated with the storage, handling, or processing of corrosives, hydrogen peroxides, or glycols.

Two groundwater plumes exhibiting elevated concentrations of VOCs were identified during this investigation. An onsite plume, characterized by elevated concentrations of chlorinated hydrocarbons, including 1,1,1-TCA, PCE, TCE, 1,1-DCE, and DCM was detected. Maximum concentrations of the major compounds comprising the onsite plume were detected in groundwater samples collected immediately downgradient of the aboveground solvent-storage tank area. Elevated concentrations extend offsite both downgradient and upgradient of the McKesson site. A significant reduction of the concentration of compounds is observed in the lateral direction, perpendicular to the plume axis. Vertically, the elevated concentration of compounds appear to be restricted to the upper part of the aquifer. No

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observations were made that would indicate elevated concentrations of dissolved organics or non-aqueous phase liquid solvents exist at depth within the aquifer.

An offsite plume, characterized by elevated concentrations of MEK, MIBK, and BTEX, in addition to concentrations of chlorinated hydrocarbons, was identified to the north (upgradient) and west (cross-gradient) of the McKesson site. This offsite plume extends downgradient from the Angeles site, which appears to be a possible source. Based on the compounds detected in the soil and groundwater at the Angeles site and the distribution of compounds detected in the groundwater upgradient of the McKesson site, the Angeles site appears to have also served as a contributing source to the onsite plume identified at the McKesson site.

7.1.2 Fate and Transport

The observed distribution of compounds in the vadose zone soils appears to result from two transport processes. Within and in the vicinity of the aboveground solvent-storage area, the observed distribution is most probably the result of vertical migration of liquid-phase solvents through the vadose zone accompanied with lateral spreading along zones of high permeability contrasts. Away from the solvent storage tank area and at depths of 40 to 45 feet bgs, the detected concentrations of volatile organics appear to be the result of vaporization of dissolved compounds present in the groundwater.

The observed plume configuration and aquifer test parameters indicate that the transport of chemical compounds in the groundwater is dominated by advection in a downgradient direction. Lateral to the plume axis, transport appears to be dependant primarily on diffusion. Diffusion also appears to control the distribution of compounds observed in the intermediate and deep zones of the aquifer.

7.1.3 Risk Assessment

The baseline risk assessment conducted by McLaren/ChemRisk indicates that concentrations of the selected chemicals of concern detected in the site soils do not pose a significant

noncancer risk nor do they pose a significant increased cancer risk to future onsite residential or occupational populations under current conditions. Risks to offsite populations were not quantitatively assessed.

Site-related health risks associated with the chemicals detected in groundwater were not possible to assess because the relative contributions of probable onsite and offsite sources have not been established. The relationship between health effects and groundwater exposure irrespective of onsite versus offsite contributions of chemicals of concern was used to set cleanup levels for groundwater and soil. The cleanup levels are located in Appendix A of HLA's feasibility report entitled "Feasibility Study, Onsite Remediation, McKesson Corporation Facility, Santa Fe Springs, California", dated October 30, 1992.

7.2 CONCLUSIONS

Activities and compounds associated with the aboveground solvent-storage tank area appear to have been the primary cause of the concentrations of compounds detected in onsite soils and groundwater. This is based on the areal and vertical concentration distributions observed, previous investigations, and historic records of activities within the bermed solvent-storage area.

Based on the compounds detected in the soil at the Angeles site and the distribution of compounds detected in the groundwater offsite cross-gradient to and upgradient of the McKesson site, the Angeles site appears to be the primary source of the secondary offsite plume and a contributing source to the onsite plume identified at the McKesson site.

7.2.1 Data Limitations

No borings were drilled within the UST area because of the high uncertainty associated with the locations of the tanks. Any unassessed impacts to vadose zone soils associated with the USTs would be limited to soils within this area. Impacts to groundwater as a result of the USTs have been assessed by the presence of groundwater monitoring wells located adjacent to and downgradient of the UST area.

Data collected as part of this investigation are sufficient to completely assess the extent of the groundwater plume identified onsite. However, offsite investigation of groundwater conditions is required to assess the downgradient, upgradient, and lateral extent of the plume. Assessment of soil and groundwater conditions upgradient of the McKesson site, including the Angeles site, is necessary to determine the magnitude of offsite contributions to the plumes identified both on and offsite.

7.2.2 Recommendations for Future Work

The following activities are recommended to complete the remedial investigation of the McKesson site:

- Upon removal of the USTs, collection and analysis of soil samples from beneath the tanks.
- Analyses of soil samples collected during the tank removal activities should be evaluated.
- A report presenting the results of the UST removals and incorporating data generated during this investigation should be prepared as an addendum to the RI Report.

These activities would complete the assessment of vadose zone soils onsite.

A workplan for the downgradient investigation of the groundwater plume detected onsite should be prepared. The scope of work associated with the offsite investigation should be designed to monitor and assess the downgradient and lateral extent of the onsite plume.

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Table 1. McKesson Environmental Data
June 1984

Soil

	Concentration (mg/kg)									
Boring No. / Depth (ft)	B-2 / 1	B-2 / 3	B-2 / 6	B-3 / 1	B-3 / 3	B-3 / 6	B-4 / 1	B-4 / 3	B-4 / 6	B-5 / 3
Acetone	50	ND	1.5	0.80	ND	0.24	7.0	ND	ND	0.03
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001
2-butanone (MEK)	36	ND	ND	ND	ND	2.10	ND	ND	ND	ND
Chloroform	1	ND	0.75	0.80	ND	ND	1.0	ND	ND	ND
1,1-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.002
1,2-dichloroethane	ND	3.9	ND	ND	0.6	0.02	ND	ND	0.8	0.004
1,1-dichloroethene	ND	6.5	ND	ND	2.5	ND	ND	ND	0.8	0.002
Ethyl benzene	ND	ND	0.06	ND	ND	0.03	ND	ND	0.85	ND
Isopropanol	45	ND	ND	ND	ND	0.2	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	1.1	ND	ND	2.5	0.10
Tetrachloroethene	ND	18	0.89	0.22	70	0.67	ND	1.5	64	0.085
Toluene	0.12	ND	0.1	ND	ND	0.07	ND	ND	2.0	ND
1,1,1-trichloroethane	0.20	200	0.2	ND	60	0.18	ND	0.25	10.0	0.085
1,1,2-trichloroethene	ND	ND	ND	ND	0.93	ND	ND	ND	ND	ND
Trichloroethene	ND	4	0.03	ND	33	0.07	ND	ND	ND	0.008
Xylenes	ND	ND	0.32	ND	ND	0.09	ND	ND	5.8	ND

Notes:
Samples B-2, B-3, and B-4 were collected from Aboveground Solvent Storage area; Sample B-5 was collected from unlined drainage ditch.
mg/kg = milligrams per kilogram
ND = Not detected; available information indicates that detection limits are variable.
Data Source: McKesson Environmental Services (1984a)

92MKC001.tbl

Table 1. McKesson Environmental Data (continued)
June 1984

Surface Water

Chemical	Concentration (ug/ml)
Butyl cellosolve (2-butoxyethanol)	2,700
Hexylene glycol	1,100
Diethylene glycol	11,000
Butyl carbitol (butoxyethoxy ethanol)	9,400
Phenyl cellosolve (2-phenoxyethanol)	2,300
[ethanediyl bis(oxy)]bis-ethanol	23,000
Methyl carbitol acetate (methoxyethoxy ethanol acetate)	110
Phenyl carbitol (phenoxyethoxy ethanol)	1,500

Notes:

Sample collected from aboveground solvent storage area
ug/ml = micrograms per milliliter
Data source: McKesson Environmental Services (1984a)

Table 2. McKesson Environmental Data
October 1984

Soil

	Sample No. / Depth (inches)	1A 0-6	1B 12-18	2A 0-6	2B 12-18	3A 0-6
		Concentration (mg/kg)				
Pesticides						
Y-BHC		(0.26)	(0.26)	(0.26)	(0.26)	(0.26)
Endrin		(0.26)	(0.26)	(0.26)	0.26	(0.26)
2,4-D		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
2,4,5-TP		(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Toxaphene		(12)	(12)	(12)	(12)	(12)
Metal						
Arsenic		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Barium		(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
Cadmium		(0.02)	(0.02)	(0.02)	(0.02)	(0.5)
Chromium		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Lead		(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
Mercury		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Selenium		(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Silver		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)

Notes:

Samples collected from corrosive storage area
Samples analyzed for EP toxic compounds
mg/kg = milligrams per kilogram
( ) indicates not detected below enclosed detection limit
Data source: McKesson Corporation (1984b)

92MKC001.tbl

Table 3. McKesson Environmental Data
March 1986

	Soil Concentration (mg/kg)						Groundwater Concentration (mg/L)		
Boring/Well No.	B-1	B-1	B-1	B-2	B-3	MW-2	MW-1	MW-3	MW-4
Depth (ft)	25	30	37	35	36	25			
Acetone	23	200	60	2.7	1.4	5.4	430	23	160
Butyl cellosolve (2-butoxyethanol)	(50)	390	87	(50)	(50)	(50)	130	(0.002)	270
2-(2 butoxyethoxy) ethanol	--	44	--	--	--	--	--	--	--
1,1-dichloroethane	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	2.5	(0.001)	5
1,1-dichloroethene	0.93	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	32	7.5	34
1,2-dichloroethane	--	--	--	--	--	--	(0.001)	(0.001)	11
Ethylbenzene	0.63	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	--	--	--
Freon	0.78	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	0.5	(0.001)	(0.001)
Isopropanol	--	--	--	--	--	--	130	(0.010)	(0.010)
Methanol	2	11	5	9	8	(1)	--	--	--
Methylene chloride	0.20	4.3	1.8	2.2	3.5		430	67	730
Methyl ethyl ketone	(0.125)	130	51	2.0	(0.125)	(0.125)	210	(0.005)	(0.005)

Notes:
Samples collected in the aboveground solvent area.
Samples analyzed for purgeable organics by EPA Method 624/8240; total hydrocarbons by EPA Method 6010/8100; methanol by EPA Method 8015; and extractable organics by EPA Method 8270.
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
( ) indicates not detected below enclosed detection limits
-- = not tested
Data Source: McKesson Corporation (1986)

92MKC001.tbl

SFD1362

Table 3. McKesson Environmental Data
March 1986 (continued)

Boring/Well No.	Soil Concentration (mg/kg) B-1	B-1	B-1	B-2	B-3	MW-2	Groundwater Concentration (mg/L) MW-1	MW-3	MW-4
1-(2-methoxy-1-methylethoxy)-2-propanol	--	20	--	--	--	--	--	--	--
Naphthalene	(0.2)	0.2	(0.2)	(0.2)	(0.2)	(0.2)	(0.010)	(0.010)	0.24
2-phenoxy ethanol	--	49	--	--	--	--	--	--	--
Tetrachloroethene	94	2.2	0.13	0.05	0.18	0.05	110	22	96
Toluene	3.7	0.20	(0.025)	(0.025)	(0.025)	(0.025)	18	(0.001)	38
Total Hydrocarbons (low tomed BP)	14	37	(1)	(1)	(1)	(1)	(0.050)	0.051	7
Total Hydrocarbons (as diesel)	--	--	--	--	--	--	(0.100)	0.25	(0.100)
1,1,1-trichloroethane	56	2.0	0.08	0.03	1.1	(0.025)	880	220	740
Trichloroethene	0.55	0.10	(0.025)	(0.025)	(0.025)	(0.025)	4.5	1.5	31
Xylenes	2.7	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.001)	(0.001)	3

Notes:
Samples collected in the aboveground solvent area.
Samples analyzed for purgeable organics by EPA Method 624/8240; total hydrocarbons by EPA Method 6010/8100; methanol by EPA Method 8015; and extractable organics by EPA Method 8270.
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
( ) indicates not detected below enclosed detection limits
--- = not tested
Data Source: McKesson Corporation (1986)

92MKC001.tbl

Table 4. McKesson Environmental Data
October 1989

	Concentration mg/kg				
Sample No.	SP-1	SP-2	SP-3	SP-4	SP-5
Parameter					
pH*	8	8.3	8.3	8.0	7.7
Tetrachloroethene	0.50	0.45	0.09	0.42	0.20
Trichloroethene	0.10	0.09	(0.05)	0.11	(0.05)

Notes:

Samples collected at RCRA drum storage area
mg/kg = milligrams per kilogram
( ) indicates not detected below enclosed detection limit.
* = pH results are in units
Data Source: Harding Lawson Associates (1990a)

92MKC001.tbl

Table 5. Summary of Tank Information, McKesson Facility Aboveground Solvent Storage and Freon Blending Areas

Tank No.	Capacity (gallons)	Construction	Past Contents
S-1	10,000	Steel	Tetrachloroethene
S-2	10,000	Steel	Methylene chloride, tetrachloroethene
S-3	10,000	Steel	Tetrachloroethene
S-4	NA	NA	Mixture (blending tank)
S-5	10,000	Steel	1,1,1-trichloroethane
S-6	10,000	Steel	1,1,1-trichloroethane; trichloroethene Trichloroethylene
S-7	10,000	Steel	Propylene glycol
S-8	NA	NA	(Holding tank)
S-9	10,000	Steel	Glycol ether; butyl cellosolve
S-10	10,000	Steel	Trichloroethene; 1,1,1-trichloroethane
S-11	10,000	Steel	Ethylene glycol; isopropyl alcohol
S-12	10,000	Steel	Sorbitol (polyol)
S-13	6,500	Steel	Sorbitol (polyol); Freon-113
S-14	NA	NA	NA
S-15	NA	NA	NA
S-16	NA	NA	NA
S-17	NA	NA	NA

Note:

NA = Information not available
All aboveground tanks have been removed

92MKC001.tbl

Table 6. Summary of Tank Information, McKesson Facility Aboveground Corrosive and Hydrogen Peroxide Storage Areas

Tank Number	Capacity (gallons)	Construction	Past Contents
C-1	NA	NA	NA
C-2	NA	NA	NA
C-3	25,000	Steel	Sulfuric acid
C-4	25,000	Steel	Sulfuric acid
C-5	26,000	Steel	Sulfuric acid
C-6	NA	NA	NA
C-7	25,000	Steel	Sodium hydroxide
C-8	25,000	Steel	NA
C-9	1,500	Steel	Hydrochloric acid
C-10	NA	NA	NA
C-11	650	Steel	NA
C-12	1,500	Steel	Acetic acid
C-13	15,000	Steel	Hydrochloric acid
C-14	15,000	Steel	Hydrochloric acid
C-15	15,000	Steel	Hydrochloric acid
C-16	15,000	Steel	NA
C-17	25,000	Steel	Sodium hydroxide
C-18	25,000	Steel	Potassium hydroxide
C-19	25,000	Steel	Hydrochloric acid
C-20	20,000	Steel	Hydrochloric acid
C-21	5,000	Steel	Sludge
C-22	5,000	Steel	Acetic acid
C-23	10,000	Steel	Nitric acid
C-24	10,000	Steel	Triton-N-101
C-25	10,000	Steel	Triton X-100
C-26	10,000	Steel	Naplum, Triton
C-27	NA	NA	NA
C-28	NA	NA	NA

Note:

NA = Information not available
All aboveground tanks have been removed

Table 7. Summary of Underground Storage Tank Information, McKesson Facility

Tank Number	Capacity (gallons)	Construction	Wall	Lined	Year Installed	Past Contents	Status
U-1	10,000	Steel	Single	No	1976	Diesel	Empty
U-2	10,000	Steel	Single	No	1976	Hexane, methanol	Empty
U-3	10,000	Steel	Single	No	1976	Stoddard solvent, mineral spirits, acetone	Empty
U-4	10,000	Steel	Single	No	1977	PX-2 (hydrocarbon solvent)	Empty
U-5	10,000	Steel	Single	No	1977	PX-3 (hydrocarbon solvent), diesel	Empty
U-6	10,000	Steel	Single	No	1977	Cellosolve acetate, PX-2	Empty
U-7	10,000	Steel	Single	No	1977	Cellosolve acetate, PX-2	Empty
U-8	10,000	Steel	Single	No	1977	Acetone, hexane, gasoline	Empty
U-9	10,000	Steel	Single	No	1977	Hexane, fuel	Empty
U-10	10,000	Steel	Single	No	1976	Glycol Ether EB (butyl cellosolve)	Empty
U-11	10,000	Steel	Single	No	1976	MCK Solvent 140 Flash	Empty
U-12	10,000	Steel	Single	No	1976	Xylene	Empty
U-13	10,000	Steel	Single	No	1976	Toluene	Empty
U-14	10,000	Steel	Single	No	1976	MCK Solvent VM&P	Empty
U-15	10,000	Steel	Single	No	1976	Heptane	Empty
U-16	20,000	Steel	Single	No	1976	Acetone	Empty
U-17	20,000	Steel	Single	No	1976	Isopropyl alcohol; methanol	Empty
U-18	20,000	Steel	Single	No	1976	Methanol	Empty
U-19	20,000	Steel	Single	No	1976	Isopropyl alcohol	Empty

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Table 7. Summary of Underground Storage Tank Information, McKesson Facility (continued)

Tank Number	Capacity (gallons)	Construction	Wall	Lined	Year Installed	Past Contents	Status
U-20	20,000	Steel	Single	No	1976	Methyl ethyl ketone	Empty
U-21	1,000	Steel	Single	No	1976	Waste, formaldehyde	Empty
4401	750	Concrete	---	Rubber	1976	Mineral acids to neutralize	Empty
4402	750	Concrete	---	Rubber	1976	Runoff	Empty

Table 8. Summary of Chemicals Stored at Angeles Chemical Company

Compound	Maximum Daily Usage (gallons)	Average Daily Usage (gallons)	Largest On-site Container (gallons)
Acetone	10000	8000	10000
Amyl Acetate, Primary	500	375	55
Butyl Acetate, Normal	10000	5000	10000
Butyl Alcohol, Normal	5000	2000	5000
Butyl Cellosolve	8000	3500	10000
Cellosolve Acetate	500	165	55
Cyclohexane	1000	788	55
Denatured Alcohol	11400	4900	10000
Diacetone Alcohol	550	330	55
Diesel	8000	4000	8000
Diisobutyl Ketone	1000	550	55
Ethyl Acetate	1200	660	55
2-Ethyl Hexanol	110	55	55
Gasoline	5000	2000	NA
Glycol Ether DPM	605	330	55
Glycol Ether PM	660	330	55
Isobutyl Acetate	10000	3500	10000
Isobutyl Alcohol	7000	3500	365
Isobutyl Isobutylate	110	55	55
Isophorone	500	220	55
Isopropyl Acetate	500	165	55

NA = information not available
Data source: Santa Fe Springs Fire Department

Table 8. Summary of Chemicals Stored at Angeles Chemical Company (continued)

Compound	Maximum Daily Usage (gallons)	Average Daily Usage (gallons)	Largest On-site Container (gallons)
Isopropyl Alcohol	10000	6000	10000
Kerosene	35000	18000	20000
Methanol	10000	4000	10000
Methyl Amyl Ketone	1100	550	55
Methyl Ethyl Ketone	10000	6000	10000
Methyl Isobutyl Ketone	1500	900	55
Methylene Chloride	1000	495	55
Odorless Mineral Spirits	6000	3600	10000
PM Acetate	1200	900	514
Perchloroethene	2500	1000	2500
Petroleum Distillate, Light Aliphatic	20500	12200	10000
Petroleum Distillate, Medium Aliphatic	47500	26000	20000
Petroleum Naptha, Heavy Aromatic	2500	1800	2500
Petroleum Naptha, Light Aromatic	5000	2500	5000
Propasol Solvent P	550	110	55
Propyl Acetate, Normal	1800	800	934
Propyl Alcohol, Normal	1000	600	500
Propylene Oxide	550	275	55
Toluene	10000	6800	10000
1,1,1 Trichloroethane	4000	2000	4000
Turpentine	1650	495	55
Wash Thinner	10000	8800	10000
Xylene	10000	3800	10000

NA = information not available
Data source: Santa Fe Springs Fire Department

Table 9a. Summary of analytical data from Angeles Chemical Property - January 1990

Sample	Benzene	1,1-DCA	1,1-DCE	EB	MEK	MIBK	PCE	Toluene	1,1,1-TCA	TCE	Xylene
	(ug/kg)										
BH1-5	--	--	--	--	--	--	--	--	--	--	--
BH1-10	--	--	--	--	--	--	--	--	--	--	--
BH1-15	ND	ND	ND	ND	ND	ND	ND	19	ND	ND	ND
BH1-20	ND	ND	ND	ND	200	180	16	21	18	ND	12
BH2-5	--	--	--	--	--	--	--	--	--	--	--
BH2-10	21	76	29	87	ND	ND	210	250	91	40	412
BH2-15	ND	ND	ND	ND	ND	60	ND	12	ND	ND	ND
BH2-20	--	--	--	--	--	--	--	--	--	--	--
BH3-5	ND	62	ND	62	ND	230	120	440	19	10	450
BH3-10	ND	ND	ND	ND	ND	ND	ND	160	ND	ND	70
BH3015	ND	ND	ND	ND	110	370	ND	28	ND	ND	ND
BH3-20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH4-5	ND	98	ND	ND	ND	ND	ND	150	65	ND	ND
BH4-10	--	--	--	--	--	--	--	--	--	--	--
BH4-15	ND	ND	ND	ND	ND	ND	ND	33	39	ND	ND
BH4-20	ND	ND	ND	ND	ND	980	ND	ND	ND	ND	ND
BH5-5	ND	ND	ND	42	1800	2100	ND	160	ND	ND	177
BH5-10	ND	ND	ND	53	640	2100	30	360	30	ND	163
BH5-15	ND	ND	ND	ND	600	1300	ND	35	ND	ND	15
BH5-20	ND	ND	ND	ND	300	600	ND	12	ND	ND	ND
BH6-5	ND	ND	ND	71	110	120	ND	>700	ND	16	340
BH6-10	ND	ND	ND	ND	40	120	ND	40	ND	ND	13
BH6-15	11	25	ND	220	1300	1900	330	1900	230	60	>2300
BH6-20	ND	ND	ND	13	240	600	26	150	29	ND	67
BH6-25	ND	ND	ND	ND	110	450	ND	32	ND	ND	10
BH6-30	ND	240	ND	260	1000	2000	750	870	45	ND	1650
BH6-35	16	39	ND	ND	200	620	ND	26	ND	ND	12
BH6-40	160	310	270	220	1200	2300	150	820	720	33	530
BH6-45	160	180	680	1100	750	2200	940	1600	900	87	2570
BH6-50	67	56	31	39	ND	1200	10	65	18	ND	123
BH7-5	--	--	--	--	--	--	--	--	--	--	--
BH7-10	120	18	21	ND	ND	ND	20	20	11	ND	13
BH7-15	46	ND	ND	ND	ND	ND	ND	ND	71	ND	ND
BH7-20	ND	ND	ND	ND	ND	ND	ND	28	ND	ND	ND
BH8-5	--	--	--	--	--	--	--	--	--	--	--
BH8-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH8-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH8-20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

1. Reference: SCS Engineers, January 1991.
2. EB = ethylbenzene, MEK = 2-butanone, MIBK = 4-methyl-2-pentanone, PCE = tetrachloroehtene 1,1,1-TCA = 1,1,1-trichloroethane, TCE = trichloroethene.
3. ND = not detected.

Table 9b. Summary of analytical data from Angeles Chemical Property - JUNE 1990

Borehole	Acetone	Benzene	MEK	1,1-DCA	1,1-DCE	EB	DCM	MIBK	PCE	Toluene	1,1,1-TCA	TCE	Xylene
	(ug/kg)												
BH9-5	550	ND	120	30	ND	37	460	450	37	410	56	20	250
BH9-15	ND	ND	ND	24	ND	32	730	ND	ND	190	ND	ND	16
BH9-25	380	ND	390	ND	ND	ND	ND	170	ND	ND	ND	ND	ND
BH10-10	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH10-20	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH11-25	1300	ND	ND	ND	ND	ND	ND	ND	ND	59	ND	ND	50
BH11-30	ND	ND	500	ND	210	11000	ND	ND	ND	10000	1200	76	2430
BH11-35	ND	ND	ND	81	130	1400	ND	700	330	1900	1000	ND	2630
BH12-10	27000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH12-20	8600	ND	ND	ND	ND	ND	ND	54	ND	ND	ND	ND	ND
BH13-15	6900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH13-30	1300	ND	ND	ND	ND	ND	ND	ND	90	ND	210	ND	ND
BH13-40	11000	ND	530	ND	160	ND	300	150	230	98	280	120	60
BH14-5	ND	ND	ND	ND	ND	45000	ND	ND	ND	67000	ND	8700	23300
BH14-10	41000	ND	29000	ND	ND	ND	ND	ND	[illegible]	98000	ND	8400	11200
BH14-15	ND	ND	ND	ND	ND	9300	ND	ND	8900	27000	2300	ND	2830
BH14-20	50000	ND	ND	ND	ND	44000	ND	ND	48000	150000	28000	ND	12800
BH14-25	39000	ND	ND	ND	ND	17000	ND	ND	19000	37000	ND	ND	5200
BH14-30	31000	10000	ND	ND	ND	ND	7800	9300	ND	3300	ND	ND	1900
BH14-35	55000	15000	ND	ND	ND	ND	ND	6300	ND	1600	ND	ND	ND
BH14-40	ND	ND	ND	ND	ND	3600	ND	ND	1400	2400	1800	ND	8300
MW1-10	21000	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	ND
MW1-15	7900	ND	ND	21	92	ND	ND	ND	49	ND	150	ND	ND
MW1-20	8400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW1-25	430	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW1-30	15000	ND	ND	240	ND	2200	10000	ND	6300	330	3500	270	7700
MW1-35	85	16	ND	39	ND	ND	6800	ND	ND	ND	ND	180	2400
MW1-40	15000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Soil Sample													
S-1	ND	ND	ND	ND	ND	>210000	ND	ND	32000	>220000	6400	9900	>5400
S-2	ND	ND	ND	ND	ND	94000	ND	ND	33000	120000	ND	5100	26400
Water Sample	(ug/l)												
MW1-1	--	10	--	21	270	ND	ND	--	100	10	120	210	18
MCLs	--	1	--	5	6	680	NA	--	5	100	200	5	1750

Notes:

1. Reference: SCS Engineers, January 1991.
2. EB = ethylbenzene, MEK = 2-butanone, MIBK = 4-methyl-2-pentanone, PCE = tetrachloroehtene
   1,1,1-TCA = 1,1,1-trichloroethane, TCE = trichloroethene.
3. ND = not detected.
4. NA = not applicable.
5. MCLs = Maximum Contaminant Levels as established in California Code of Regulations Title 22.
6. trans-1,2-dichloroethene was also detected in the water sample at a concentration of 240 ug/l (MCL = 10 ug/l).

Table 10. Soil Analysis Schedule Summary

Boring	Volatile Organics 8240	Semi-Volatile Organics 8270	Total Petroleum Hydrocarbons 418.1	Ions/Metals	Glycols	pH	Physical Properties
MW-1	X	X	X	X	X	X	--
MW-2	X	X	X	X	X	X	X
MW-3	X	X	X	X	X	X	--
SB-1	X	X	X	X	X	X	--
SB-2	X	X	X	X	X	X	X
SB-3	X	X	X	--	X	--	--
SB-4	X	X	X	X	X	X	X
SB-5	X	X	X	X	X	X	--
SB-6	X	X	X	X	X	X	X
SB-7	X	X	X	X	X	X	--
SB-8	X	X	X	X	X	X	--
SB-9	X	X	X	X	X	X	X
SB-10	X	X	X	X	X	X	X
SB-11	X	X	X	X	X	X	X
SB-12	X	X	X	X	X	X	X
SB-13	X	X	X	--	X	--	X
SB-14	X	X	X	X	X	X	X
SB-15	X	X	X	X	X	X	X
SB-16	--	--	--	X	--	X	X
SB-17	--	--	--	X	--	X	--
SB-17A	--	--	--	--	--	--	X
SB-18	--	--	--	X	--	X	--
SB-19	X	X	X	X	X	X	X

Notes:

X = sample was analyzed for stated constituents
-- = sample was not analyzed for stated constituents

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Table 10. Soil Analysis Schedule Summary (continued)

Boring	Volatile Organics 8240	Semi-Volatile Organics 8270	Total Petroleum Hydrocarbons 418.1	Ions/Metals	Glycols	pH	Physical Properties
SB-20	X	X	X	X	X	X	--
SB-21	X	X	X	X	--	X	--
SB-23	X	X	X	--	X	--	--
SB-24	X	X	X	--	X	--	--
SB-25	X	X	X	X	X	X	--
SB-26	X	X	X	--	X	--	--
SB-27	X	X	X	--	X	--	--
SB-30	X	X	X	--	X	--	--
SB-32	--	--	--	--	--	--	X
SB-33	--	--	--	X	--	X	--
SB-34	--	--	--	X	--	X	--
SB-35	--	--	--	X	--	X	--
SB-36	X	--	--	--	--	--	--
SB-37	X	--	--	--	--	--	--
SB-38	X	--	--	--	--	--	--
SB-39	X	--	--	--	--	--	--
SB-40	X	--	--	--	--	--	--
SB-41	X	--	--	--	--	--	--
SB-42	X	--	--	--	--	--	--

Notes:

X = sample was analyzed for stated constituents
-- = sample was not analyzed for stated constituents

92MKC001.tbl

Table 11. Monitoring Well Completion Summary

Well Number	Date Drilled	Casing Diameter (inches)	Casing Depth (*feet bgs)	Screened Interval (feet bgs)	Conductor Depth (feet bgs)
MW-1	06/14/90	4	71	46-71	43
MW-2	06/14/90	4	71	46-71	43
MW-3	06/15/90	4	70.3	45.3-70.3	43
SB-4	06/26/90	4	63.5	43.5-63.5	--
SB-7	06/28/90	4	63.5	43.5-63.5	--
SB-10	06/22/90	4	65	45-65	--
SB-13	06/20/90	4	62.5	42.5-62.5	--
SB-17	07/03/90	4	65	45-65	--
SB-20	07/13/90	4	63.5	43.5-63.5	--
SB-23	07/05/90	4	65	45-65	--
SB-25	07/13/90	4	64	44-64	--
SB-32	07/06/90	4	39.6	19.6-39.6	--
SB-36	1/23/91	4	65.5	45.5-65.5	--
SB-37	1/24/91	4	31	21-31	--
SB-17A	1/25/91	4	116	111-116	41
SB-17B	02/07/91	4	90	85-90	40
SB-23A	1/29/91	4	128	123-128	33
SB-23B	02/06/91	4	95	90-95	33

Notes:

* = feet below ground surface
-- = no conductor casing present at that well

92MKC001.tbl

Table 12. Groundwater Monitoring Analysis Schedule Summary

Well	Date	Gen. Min.	8240	625	418.1	Metals	Glycols	NO_3	pH
MW-1	8/01/90	X	X	X	X	X	X	X	X
	10/24/90	X	X	--	--	X	--	X	X
	2/11/91	--	X	--	--	--	--	--	X
MW-2	8/01/90	X	X	X	X	X	X	X	X
	10/24/90	X	X	--	--	X	--	X	X
	2/11/91	X	X	--	--	X	--	X	X
MW-3	8/02/90	X	X	X	X	X	X	X	X
	10/24/90	--	X	--	--	--	--	--	X
	2/11/91	X	X	--	--	X	--	X	X
SB-4	8/03/90	X	X	X	X	X	X	--	X
	10/24/90	--	X	--	--	--	--	--	X
	2/11/91	--	X	--	--	--	--	--	X
SB-7	8/03/90	X	X	X	X	X	X	--	X
	10/24/90	--	X	--	--	--	--	--	X
	2/12/91	--	X	--	--	--	--	--	--
SB-10	8/02/90	X	X	X	X	X	X	X	X
	10/24/90	X	X	--	--	X	--	X	X
	2/11/91	--	X	--	--	--	--	--	--
SB-13	8/02/90	X	X	X	X	X	X	X	X
	10/24/90	--	X	--	--	--	--	--	X
	2/11/91	--	X	--	--	--	--	--	X
SB-17	8/02/90	X	X	X	X	X	X	X	X
	10/24/90	X	X	--	--	X	--	X	X
	2/13/91	X	X	--	--	X	--	X	X
SB-17A	2/12/91	X	X	--	--	X	--	X	X
SB-17B	2/12/91	X	X	--	--	X	--	X	X
SB-20	8/02/90	X	X	X	X	X	X	X	X
	10/24/90	--	X	--	--	--	--	--	X
	2/13/91	--	X	--	--	--	--	--	X
SB-23	8/03/90	X	X	X	X	X	X	--	X
	10/24/90	--	X	--	--	--	--	--	X
	2/14/91	X	X	--	--	X	--	X	X
SB-23A	2/14/91	X	X	--	--	--	X	X	X
SB-23B	2/14/91	X	X	--	--	--	X	X	X

Notes:

X = sample was analyzed for stated constituents
-- = sample was not analyzed for stated constituents

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Table 12. Groundwater Monitoring Analysis Schedule Summary (continued)

Well	Date	Gen. Min.	8240	625	418.1	Metals	Glycols	NO_3	pH
SB-25	8/03/90	X	X	X	X	X	X	--	X
	10/24/90	--	X	--	--	--	--	--	X
	2/13/91	--	X	--	--	--	--	--	--
SB-32	8/03/90	X	X	X	X	X	X	--	X
	10/24/90	X	X	--	--	X	--	X	X
	2/12/91	--	X	--	--	--	--	--	X
SB-36	2/13/91	--	X	--	--	--	--	--	X
CPT-1	4/09/91	--	X	--	--	--	--	--	--
CPT-2	4/09/91	--	X	--	--	--	--	--	--
CPT-3	4/09/91	--	X	--	--	--	--	--	--
CPT-4	4/09/91	--	X	--	--	--	--	--	--
CPT-5	4/09/91	--	--	--	--	--	--	--	--
CPT-6	4/10/91	--	X	--	--	--	--	--	--
CPT-7	10/2/91	--	X	--	--	--	--	--	--
CPT-8	10/2/91	--	X	--	--	--	--	--	--
CPT-9	10/2/91	--	X	--	--	--	--	--	--
CPT-10	09/10/91	--	X	--	--	--	--	--	--
CPT-11	9/10/91	--	X	--	--	--	--	--	--
CPT-12	10/28/91	--	X	--	--	--	--	--	--
CPT-13	10/28/91	--	X	--	--	--	--	--	--
CPT-14	10/28/91	--	X	--	--	--	--	--	--
CPT-15	10/28/91	--	X	--	--	--	--	--	--
CPT-16	10/28/91	--	X	--	--	--	--	--	--
CPT-17	10/29/91	--	X	--	--	--	--	--	--
CPT-18	10/29/91	--	X	--	--	--	--	--	--

Notes:

X = sample was analyzed for stated constituents
-- = sample was not analyzed for stated constituents

92MKC001.tbl

Table 13. Wind Speed and Direction Frequency Distribution

Period: APRIL 27, 1990 TO MAY 18, 1990
Hours: 499 HOURS MONITORED

WIND DIRECTION	WIND SPEED							
WIND DIRECTION POINT	0-2 MPH (%)	3-5 MPH (%)	6-8 MPH (%)	9-12 MPH (%)	13-15 MPH (%)	16-20 MPH (%)	>20 MPH (%)	ALL SPEEDS (%)
16 (N)	0.4	0.2	0	0	0	0	0	0.6
15 (NNW)	2.8	0.6	0	0	0	0	0	3.4
14 (NW)	1.8	0.6	0	0	0	0	0	2.4
13 (WNW)	2.6	0.8	0	0	0	0	0	3.4
12 (W)	0.8	5.6	0.8	0	0	0	0	7.2
11 (WSW)	3.7	10.9	9.2	0.6	0	0	0	24.4
10 (SW)	2.4	4.6	1.2	0	0	0	0	8.2
9 (SSW)	0.8	4.8	3.2	0	0	0	0	8.8
8 (S)	0.6	4	1.4	0	0	0	0	6
7 (SSE)	2.2	7.2	0.8	0	0	0	0	10.2
6 (SE)	2.2	6.6	0.4	0.4	0	0	0	9.6
5 (ESE)	3.4	4.2	0.2	0	0	0	0	7.8
4 (E)	1.6	1.8	0	0	0	0	0	3.4
3 (ENE)	2.2	0.2	0	0	0	0	0	2.4
2 (NE)	0.6	0	0	0	0	0	0	0.6
1 (NNE)	1.4	0.2	0	0	0	0	0	1.6
ALL	29.5	52.3	17.2	1	0	0	0	

Notes:

N = north, W = west, S = south, E = east.
MPH = miles per hour

SFD1378

Table 14. Hourly Wind Speed and Wind Direction Data

	DATE: May 16, 1990		DATE: May 17, 1990		DATE: May 18, 1990	
TIME	WD	WS	WD	WS	WD	WS
0000			W	3	N	2
0100			WNW	1	NNW	2
0200			W	2	NNW	2
0300			SW	2	NW	1
0400			SE	2	WNW	1
0500			NE	2	NNW	2
0600			NNE	2	NNW	1
0700			NNE	2		
0800			SSE	2		
0900			W	3		
1000			W	3		
1100	SW	3				
1200	SW	3				
1300	W	4				
1400	WSW	9				
1500	WSW	8				
1600	WSW	6				
1700	WSW	5				
1800	WSW	5				
1900	W	4				
2000	W	3				
2100	W	4				
2200	W	4				
2300	WNW	3	WSW	NE		

Notes:

WD = wind direction
WS = wind speed (miles per hour)
N = north, S = south, E = east, W = west

Table 15. Soil Physical Properties Test Results

POINT IDENTIF-ICATION	DEPTH	SOIL DESCRIPTION	FINES CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	IN-SITU MOISTURE (%)	IN-SITU DRY DENSITY (pcf)	LABORATORY PERMEABILITY (cm/sec)
MW-02	41.5	BROWN LEAN CLAY WITH SAND (CL)	76	31	11	18.4	111.0	1.0E-6
SB-02	0.5	BROWN SANDY LEAN CLAY (CL)	65	30	11	16.4	108.7	
SB-02	30.5	BROWN SILT (ML)	89	42	14	27.3	96.7	
SB-04	55.5	BROWN SAND (SP)	4			22.1	106.0	2.6E-3
SB-06	25.5	BROWN GRAVELLY SAND (SP)	5			23.0	104.0	2.5E-3
SB-06	30.5	BROWN SILT (ML)	92	43	14	30.7	92.0	7.3E-7
SB-09	20.5	BROWN SILTY SAND (SM)	14			13.0	110.1	
SB-09	25.5	BROWN CLAYEY SAND (SC)	43	34	14	12.3	109.2	
SB-09	35.5	BROWN CLAY WITH SAND (CL)	71					4.2E-8
SB-09	36.0	BROWN CLAY WITH SAND (CL)	71	36	16	16.9	116.6	
SB-10	36.0	BROWN SANDY SILT (ML)	63	37	19	14.6	122.8	
SB-11	20.5	BROWN SAND WITH SILT (SW-SM)	6			4.6	110.6	
SB-11	25.5	BROWN SILT (ML)	87	33	9	21.5	105.3	
SB-11	40.5	BROWN SILT (ML)	76	38	12	22.1	101.8	
SB-12	15.5	BROWN SAND WITH SILT (SW-SM)	7			5.1	108.2	
SB-12	25.0	BROWN SANDY LEAN CLAY (CL)	63	29	9	14.3	100.1	
SB-12	30.0	BROWN SANDY LEAN CLAY (CL)	76	34	11	23.2	97.5	
SB-13	15.5	BROWN SAND WITH SILT (SW-SM)	11			6.4	106.2	
SB-13	20.5	BROWN SAND WITH SILT (SP-SM)	8			4.7	97.6	
SB-13	35.5	BROWN SILT WITH SAND (ML)	70	36	18	16.7	97.0	
SB-13	45.5	BROWN SILTY SAND (SM)	21			15.7	91.2	
SB-13	56.0	BROWN SILTY SAND (SM)	18			22.1	106.0	6.7E-4
SB-14	5.5	BROWN LEAN CLAY WITH SAND (CL)	83	34	12	20.6	86.7	
SB-14	15.5	BROWN SILTY SAND (SM)	16			4.3	110.3	
SB-14	35.5	BROWN SANDY SILT (ML)	69	33	15	13.9	107.8	
SB-15	20.5	BROWN SILTY SAND (SM)	12					1.4E-4
SB-15	30.5	BROWN LEAN CLAY (CL)	89	32	9	25.5	100.6	
SB-15	40.5	BROWN SANDY SILT (ML)	58			17.2	111.7	
SB-16	15.5	BROWN SAND WITH GRAVEL (SW)	4			4.0		
SB-16	20.5	BROWN SAND (SP)	4			5.0		
SB-19	20.5	BROWN SAND (SP)	4			3.8		
SB-19	30.5	BROWN SILT (ML)	84	40	13	27.5	86.1	
SB-32	20.5	BROWN SAND WITH SILT AND GRAVEL (SP-SM)	10			4.3		
SB-32	25.5	BROWN SILT WITH SAND (ML)	73	35	10	19.4	105.8	

Notes: pcf = pounds per cubic foot
cm/sec = centimeters per second

Table 15. Soil Physical Properties Test Results (continued)

POINT IDENTIF-ICATION	DEPTH	SOIL DESCRIPTION	FINES CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	IN-SITU MOISTURE (%)	IN-SITU DRY DENSITY (pcf)	LABORATORY PERMEABILITY (cm/sec)
SB-32	30.5	BROWN SANDY SILT (ML)	69			22.0	101.3	
SB-32	35.5	BROWN SANDY SILT (ML)	59			15.7	117.0	
SB-32	40.5	BROWN LEAN CLAY WITH SAND (CL)	83	38	17	19.3	108.9	
SB17A	117.5	BROWN SILT WITH SAND (ML)	84	34	9	27.2		
SB17A	124.0	BROWN SILT WITH SAND (ML)	74	37	8	29.0		

Notes: pcf = pounds per cubic foot
cm/sec = centimeters per second

Table 16. Summary of Water Level Monitoring Data

Well No.	Date	Time	Reference Elevation (feet)	Water Depth (feet)	Water Elevation (feet)	
MW-01	8/07/90	08:11	148.52	47.81	100.56	*
	8/07/90	14:38	148.52	47.73	100.64	*
	8/15/90	10:00	148.52	47.92	100.45	*
	8/17/90	07:44	148.52	47.95	100.42	*
	8/20/90	08:52	148.52	47.99	100.38	*
	8/27/90	08:56	148.52	47.93	100.59	
	9/21/90	10:36	148.52	48.17	100.35	
	10/01/90	15:54	148.52	48.12	100.40	
	10/23/90	09:09	148.52	48.08	100.44	
	11/16/90	10:41	148.52	48.04	100.48	
	1/22/91	14:38	148.52	48.06	100.46	
	1/30/91	13:31	148.52	48.05	100.47	
	2/11/91	07:59	148.52	48.02	100.50	
	4/11/91	08:58	148.52	46.92	100.60	
MW-02	8/07/90	07:58	147.28	44.77	102.36	*
	8/07/90	14:13	147.28	44.72	102.41	*
	8/15/90	10:17	147.28	44.93	100.20	*
	8/17/90	07:23	147.28	44.93	100.20	*
	8/20/90	08:20	147.28	44.98	102.15	*
	8/27/90	08:45	147.28	44.92	102.36	
	9/21/90	10:29	147.28	45.15	102.13	
	10/01/90	15:42	147.28	45.01	102.27	
	10/23/90	08:33	147.28	45.02	102.26	
	11/16/90	10:29	147.28	44.99	102.29	
	1/22/91	13:55	147.28	44.95	102.33	
	1/30/91	13:16	147.28	44.99	102.29	
	2/11/91	07:44	147.28	44.96	102.32	
	4/11/91	08:20	147.28	43.73	103.55	
MW-03	8/07/90	08:25	149.03	48.49	100.39	*
	8/07/90	14:49	149.03	48.42	100.46	*
	8/15/90	09:26	149.03	48.64	100.24	*
	8/17/90	07:32	149.03	48.66	100.22	*
	8/20/90	09:22	149.03	48.71	100.17	*
	8/27/90	09:34	149.03	48.66	100.37	
	9/21/90	11:12	149.03	48.92	100.11	
	10/01/90	16:26	149.03	48.82	100.21	
	10/23/90	09:21	149.03	48.76	100.27	
	11/16/90	11:04	149.03	48.70	100.33	
	1/22/91	15:08	149.03	48.69	100.34	
	1/30/91	14:06	149.03	48.71	100.32	
	2/11/91	07:50	149.03	48.67	100.36	
	4/11/91	08:32	149.03	47.35	101.68	

* Water elevation has been corrected by a factor of -0.15 to account for Solinst well sounder calibration discrepencies

\- No water in the casing

Table 16. Summary of Water Level Monitoring Data (continued)

Well No.	Date	Time	Reference Elevation (ft)	Water Depth (ft)	Water Elevation (ft)	
SB-04	8/07/90	09:40	146.65	44.62	101.88	*
	8/07/90	15:18	146.65	44.55	101.95	*
	8/15/90	09:08	146.65	44.77	101.73	*
	8/17/90	08:00	146.65	44.78	101.72	*
	8/20/90	09:06	146.65	44.84	101.66	*
	8/27/90	09:17	146.65	44.78	101.87	
	9/21/90	10:55	146.65	45.02	101.63	
	10/01/90	16:14	146.65	44.88	101.77	
	10/23/90	09:51	146.65	44.88	101.77	
	11/16/90	11:27	146.65	44.84	101.81	
	1/22/91	14:47	146.65	44.78	101.87	
	1/30/91	13:52	146.65	44.83	101.82	
	2/11/91	08:18	146.65	44.81	101.84	
	4/11/91	09:07	146.65	43.51	103.14	
SB-07	8/07/90	10:16	147.77	46.93	100.69	*
	8/07/90	15:06	147.77	46.87	100.75	*
	8/15/90	09:18	147.77	47.11	100.51	*
	8/17/90	08:15	147.77	47.13	100.49	*
	8/20/90	09:14	147.77	47.18	100.44	*
	8/27/90	09:27	147.77	47.12	100.65	
	9/21/90	11:07	147.77	47.37	100.40	
	10/01/90	16:20	147.77	47.25	100.52	
	10/23/90	10:01	147.77	47.20	100.57	
	11/16/90	11:34	147.77	47.14	100.63	
	1/22/91	14:59	147.77	47.11	100.66	
	1/30/91	13:58	147.77	47.15	100.62	
	2/11/91	08:23	147.77	47.12	100.65	
	4/11/91	09:15	147.77	45.77	102.00	
SB-10	8/07/90	08:34	149.44	49.05	100.24	*
	8/07/90	14:54	149.44	48.97	100.32	*
	8/15/90	09:36	149.44	49.19	100.10	*
	8/17/90	08:29	149.44	49.23	100.06	*
	8/20/90	09:35	149.44	49.26	100.03	*
	8/27/90	09:42	149.44	49.21	100.23	
	9/21/90	11:18	149.44	49.46	99.98	
	10/01/90	16:32	149.44	49.38	100.06	
	10/23/90	09:30	149.44	49.33	100.11	
	11/16/90	11:11	149.44	49.27	100.17	
	1/22/91	15:13	149.44	49.30	100.14	
	1/30/91	14:14	149.44	49.30	100.14	
	2/11/91	08:30	149.44	49.26	100.18	
	4/11/91	09:18	149.44	48.02	101.42	

* Water elevation has been corrected by a factor of -0.15 to account for Solinst well sounder calibration discrepencies

- No water in the casing

Table 16. Summary of Water Level Monitoring Data (continued)

Well No.	Date	Time	Reference Elevation (ft)	Water Depth (ft)	Water Elevation (ft)	
SB-13	8/07/90	09:25	147.62	46.32	101.15	*
	8/07/90	14:33	147.62	46.26	101.21	*
	8/15/90	10:08	147.62	46.45	101.02	*
	8/17/90	07:52	147.62	46.48	100.99	*
	8/20/90	08:40	147.62	46.53	100.94	*
	8/27/90	09:07	147.62	46.45	101.17	
	9/21/90	10:46	147.62	46.69	100.93	
	10/01/90	16:05	147.62	46.61	101.01	
	10/23/90	08:53	147.62	46.60	101.02	
	11/16/90	10:52	147.62	46.55	101.07	
	1/22/91	14:27	147.62	46.56	101.06	
	1/30/91	13:42	147.62	46.56	101.06	
	2/11/91	08:08	147.62	46.53	101.09	
	4/11/91	09:04	147.62	45.39	102.23	
SB-17	8/07/90	09:17	148.63	48.32	100.16	*
	8/07/90	14:44	148.63	48.27	100.21	*
	8/15/90	09:54	148.63	48.47	100.01	*
	8/17/90	08:47	148.63	48.48	100.00	*
	8/20/90	09:50	148.63	48.53	99.95	*
	8/27/90	09:59	148.63	48.46	100.17	
	9/21/90	11:31	148.63	48.72	99.91	
	10/01/90	16:44	148.63	48.68	99.95	
	10/23/90	10:35	148.63	48.61	100.02	
	11/16/90	12:05	148.63	48.57	100.06	
	1/22/91	15:24	148.63	48.62	100.01	
	1/30/91	14:29	148.63	48.61	100.02	
	2/11/91	09:01	148.63	48.57	100.06	
	4/11/91	09:31	148.63	47.42	101.21	
SB-17A	2/11/91	09:18	149.56	49.85	99.71	
	4/11/91	08:41	149.56	48.08	101.48	
SB-17B	2/11/91	09:21	149.51	49.76	99.75	
	4/11/91	08:48	149.51	48.04	101.47	
SB-20	8/07/90	08:45	149.52	49.17	100.20	*
	8/07/90	15:00	149.52	49.10	100.27	*
	8/15/90	09:45	149.52	49.31	100.06	*
	8/17/90	08:38	149.52	49.33	100.04	*
	8/20/90	09:42	149.52	49.38	99.99	*
	8/27/90	09:50	149.52	49.32	100.20	
	9/21/90	11:23	149.52	49.57	99.95	
	10/01/90	16:38	149.52	49.51	100.01	
	10/23/90	10:12	149.52	49.45	100.07	
	11/16/90	11:43	149.52	49.39	100.13	
	1/22/91	15:20	149.52	49.44	100.08	

* Water elevation has been corrected by a factor of -0.15 to account for Solinst well sounder calibration discrepencies

- No water in the casing

Table 16. Summary of Water Level Monitoring Data (continued)

Well No.	Date	Time	Reference Elevation (ft)	Water Depth (ft)	Water Elevation (ft)	
SB-20	1/30/91	14:22	149.52	49.43	100.09	
cont.	2/11/91	08:45	149.52	49.40	100.12	
	4/11/91	09:27	149.52	48.19	101.33	
SB-23	8/07/90	10:25	149.16	48.32	100.69	*
	8/07/90	15:10	149.16	48.26	100.75	*
	8/15/90	10:38	149.16	48.48	100.53	*
	8/17/90	08:55	149.16	48.50	100.51	*
	8/20/90	09:57	149.16	48.54	100.47	*
	8/27/90	10:07	149.16	48.48	100.68	
	9/21/90	11:37	149.16	48.72	100.44	
	10/01/90	16:50	149.16	48.65	100.51	
	10/23/90	10:46	149.16	48.59	100.57	
	11/16/90	12:11	149.16	48.54	100.62	
	1/22/91	15:29	149.16	48.59	100.57	
	1/30/91	14:37	149.16	48.57	100.59	
	2/11/91	09:08	149.16	48.59	100.57	
	4/11/91	09:31	149.16	47.3	101.86	
SB-23A	2/11/91	09:23	148.43	48.12	100.31	
	4/11/91	08:53	148.43	46.22	102.21	
SB-23B	2/11/91	09:25	148.47	47.99	100.48	
	4/11/91	08:55	148.47	46.31	102.16	
SB-25	8/07/90	10:34	147.84	46.50	101.19	*
	8/07/90	15:13	147.84	46.44	101.25	*
	8/15/90	10:32	147.84	46.66	101.03	*
	8/17/90	09:02	147.84	46.68	101.01	*
	8/20/90	10:02	147.84	46.72	100.97	*
	8/27/90	10:13	147.84	46.66	101.18	
	9/21/90	11:45	147.84	46.90	100.94	
	10/01/90	16:55	147.84	46.82	101.02	
	10/23/90	10:22	147.84	46.79	101.05	
	11/16/90	11:49	147.84	46.74	101.10	
	1/22/91	15:34	147.84	46.75	101.09	
	1/30/91	14:43	147.84	46.74	101.10	
	2/11/91	08:54	147.84	46.73	101.11	
	4/11/91	09:34	147.84	45.5	102.34	
SB-32	8/07/90	07:47	147.61	33.27	114.19	*
	8/07/90	14:06	147.61	33.27	114.19	*
	8/15/90	10:26	147.61	33.47	113.99	*
	8/17/90	07:13	147.61	33.51	113.95	*
	8/20/90	08:13	147.61	33.55	113.91	*

* Water elevation has been corrected by a factor of -0.15 to account for Solinst well sounder calibration discrepencies

- No water in the casing

Table 16. Summary of Water Level Monitoring Data (continued)

Well No.	Date	Time	Reference Elevation (ft)	Water Depth (ft)	Water Elevation (ft)
SB-32	8/27/90	08:40	147.61	33.51	114.10
cont.	9/21/90	10:23	147.61	34.24	113.37
	10/01/90	15:35	147.61	35.43	112.18
	10/23/90	09:41	147.61	36.64	110.97
	11/16/90	11:19	147.61	37.26	110.35
	1/22/91	13:48	147.61	33.09	114.52
	1/30/91	13:10	147.61	33.49	114.12
	2/11/91	08:38	147.61	33.89	113.72
	4/11/91	09:23	147.61	31.42	116.19
SB-36	2/11/91	09:29	147.26	45.84	101.42
	4/11/91	09:11	147.26	44.51	102.75
SB-37	2/11/91	09:13	149.3	31.72	117.58
	4/11/91	09:42	149.3	-	
PIMW-1	10/23/90	11:15	148.52	-	
	09/21/90	11:53	148.52	-	
	11/16/90	12:19	148.52	-	
	1/30/91	15:14	148.52	-	
	2/11/91	09:40	148.52	-	
	4/11/91	09:50	148.52	-	
PIMW-2	10/23/90	10:59	147.28	26.83	120.45
	09/21/90	11:51	147.28	26.85	120.43
	11/16/90	12:14	147.28	26.86	120.42
	1/30/91	15:03	147.28	26.84	120.44
	2/11/91	09:33	147.28	26.86	120.42
	4/11/91	09:45	147.28	26.86	120.42
PIMW-3	10/23/90	11:11	149.03	-	
	09/21/90	11:57	149.03	-	
	11/16/90	12:17	149.03	-	
	1/30/91	15:10	149.03	26.37	122.66
	2/11/91	09:38	149.03	-	
	4/11/91	09:51	149.03	26.65	122.38
PIMW-4	10/23/90	11:07		-	
(Slant Well)	11/16/90	12:16		-	
	1/30/91	15.06		39.78	
	2/11/91	09:36		40.48	
	4/11/91	09:47		40.38	

* Water elevation has been corrected by a factor of -0.15 to account for Solinst well sounder calibration discrepencies

- No water in the casing

TABLE 17a. SUMMARY OF SOIL ANALYSIS - SELECTED SOIL IONS, METALS AND pH

Location ID	Sample Depth (ft)	Date Collected	Chloride	Fluoride	Nitrate as Nitrogen	Sulfate	pH	Iron	Potassium	Manganese	Sodium	Zinc
MW-01	23.0	6/12/90	<20	19	0.70	<100	8.2	25200	5600	655	397	65.0
MW-01	42.0	6/12/90	<20	5	1.2	<100	8.4	27600	3040	640	346	65.1
MW-02	23.0	6/12/90	<20	<5	0.50	<100	8.9	6780	579	320	222	16.9
MW-02	45.5	6/12/90	<20	<5	6.6	<100	8.0	26200	2020	472	270	55.0
MW-03	23.0	6/12/90	<20	<5	1.0	<100	8.1	11700	1450	189	201	27.8
MW-03	41.0	6/12/90	<20	15	0.70	<100	7.7	23200	3780	676	228	50.1
SB-01	36.0-36.5	6/18/90	<20	<5	15.3	<100	8.7	18450	NA	329	NA	48.7
SB-01	41.0-41.5	6/18/90	<20	<5	50.7	<100	8.2	29780	NA	418	NA	63.3
SB-02	20.5-21	6/19/90	100	<5	<2.6	<100	7.7	12700	1240	141	196	42.7
SB-02	41-41.5	6/19/90	<20	<5	<2.6	<100	7.6	26910	3550	309	342	59.6
SB-04	26	6/26/90	73.9	<5	0.8	<100	7.7	24740	4780	488	374	62.1
SB-04	46	6/26/90	52.2	<5	0.5	<100	7.9	32070	2190	651	329	61.2
SB-05	33.5	6/27/90	94.9	<5	0.7	<100	8.0	33240	4450	457	408	61.2
SB-05	43.5	6/27/90	84.8	<5	0.8	<100	7.6	18200	2750	363	260	40.4
SB-06	26	6/29/90	<5	<5	0.8	<100	7.4	6680	941	95.2	151	31.1
SB-06	46	6/29/90	<5	<5	0.5	<100	8.0	19170	2050	160	274	45.6
SB-07	26	6/29/90	<5	<5	0.8	<100	7.4	12520	1400	275	165	54.7
SB-07	46	6/29/90	395	<5	0.5	<100	7.4	13640	1220	232	219	46.8
SB-08	26	6/29/90	<5	<5	1.0	<100	7.5	7740	960	126	181	38.3
SB-08	42.5	6/29/90	<5	6	0.8	<100	7.7	20350	2900	313	234	53.7
SB-09	21	6/29/90	<5	<5	2.0	<100	7.6	8790	1250	208	140	39.0
SB-09	41	6/29/90	<5	<5	1.0	<100	7.5	22410	3680	1000	255	70.0
SB-10	30.5-31	6/22/90	100	13	8.4	257	7.7	26430	4320	521	424	78.1
SB-10	46-46.5	6/22/90	<20	<5	<2.6	<100	7.6	9140	1490	102	178	32.2
SB-11	26-26.5	6/22/90	<20	<5	<2.6	<100	7.9	26400	4980	559	396	78.1
SB-11	41-41.5	6/22/90	<20	<5	<2.6	<100	7.9	23920	4460	209	328	69.2
SB-12	20-20.5	6/20/90	<20	<5	<2.6	<100	7.7	8810	1290	98.0	168	32.9
SB-12	30.5-31	6/20/90	<20	<5	<2.6	<100	7.9	30120	3750	597	407	87.3
SB-12	41-41.5	6/20/90	<20	<5	<2.6	<100	7.9	23710	3160	459	307	63.4
SB-14	26-26.5	6/21/90	<20	8	<2.6	<100	8.0	25250	4830	545	367	71.9
SB-14	41-41.5	6/21/90	<20	8	<2.6	<100	8.1	23260	2920	642	381	74.7
SB-15	26-26.5	6/21/90	<20	<5	<2.6	172	7.4	26030	4730	606	333	121

Notes:
1. All values in milligrams per kilogram (mg/kg), except pH (units).
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. NA = Not Analyzed.

TABLE 17a. SUMMARY OF SOIL ANALYSIS - SELECTED SOIL IONS, METALS AND pH

Location ID	Sample Depth (ft)	Date Collected	Chloride	Fluoride	Nitrate as Nitrogen	Sulfate	pH	Iron	Potassium	Manganese	Sodium	Zinc
SB-15	41-41.5	6/21/90	<20	<5	<2.6	<100	7.7	26490	3910	607	324	70.6
SB-16	6	7/02/90	<5	<5	3.0	5620	4.2	10360	999	622	154	36.9
SB-16	21	7/02/90	<5	<5	0.6	239	6.3	24620	3060	233	268	87.8
SB-17	1.5	7/03/90	12.2	19	1.0	8900	4.4	20390	3180	598	945	69.7
SB-17	41	7/03/90	1000	6	0.7	<100	7.8	28650	4570	494	320	71.2
SB-18	1.5	7/03/90	428	55	6.5	6370	8.4	19290	3800	312	2860	48.9
SB-18	41	7/03/90	<5	8	1.0	<100	8.1	21760	4300	317	267	65.0
SB-19	26	6/26/90	51.3	<5	0.7	<100	8.2	24220	4390	606	350	68.4
SB-19	41	6/26/90	<5	9	0.8	<100	8.2	22300	4180	312	278	50.0
SB-20	11	7/13/90	399	<5	128	139	7.9	18020	2990	587	289	51.4
SB-20	20.5	7/13/90	184	<5	91.8	<100	7.7	8030	1070	421	183	23.4
SB-20	41	7/13/90	<5	<5	78.8	<100	8.3	22900	3270	337	321	70.2
SB-21	6	7/05/90	424	7	4.0	303	8.0	27770	2650	298	574	59.9
SB-21	36	7/05/90	<5	<5	3.6	<100	7.9	30430	5520	725	246	59.8
SB-33	1.5-2.0	1/23/91	540	122	32	1730	10	17800	8380	360	4730	59.4
SB-33	10.0-10.5	1/23/91	79.3	10	8.6	254	7.7	22800	3680	940	268	56.6
SB-33	15.0-15.5	1/23/91	30	<5	6.0	<100	7.9	8770	1240	143	162	25.7
SB-34	5.0-5.5	1/23/91	110	11.3	2.8	9270	4.3	23200	3980	250	631	170
SB-34	10.0-10.5	1/23/91	322	9.3	3.5	741	7.6	20000	3190	738	516	48.8
SB-34	15.0-15.5	1/23/91	1170	<5	18	179	7.2	25000	4580	743	380	60.3
SB-35	1.5-2.0	1/23/91	891	6.0	16	6400	8.2	23100	3990	398	3640	61.2
SB-35	10.0-10.5	1/23/91	58	7.1	14	174	8.0	23200	3620	875	365	54.2
SB-35	14.5-15.0	1/23/91	33	<5	9.0	119	7.9	10500	1360	157	181	170
SS-01	05	7/17/90	<5	15	77.6	<100	8.1	23400	3380	522	294	54.5
SS-01	1.0	7/17/90	24.5	11	144	<100	8.0	26150	3620	528	340	63.6
SS-02	0.5	7/18/90	<5	6	157	<100	7.4	28340	4090	428	319	555
SS-02	1.0	7/18/90	8.3	8	72.6	<100	7.1	26700	4050	294	286	913
SS-03	0.5	7/18/90	8.3	8	98.4	<100	7.8	24310	4110	494	316	117
SS-03	1.0	7/18/90	24.7	12	95.4	<100	7.8	24580	3190	416	306	801
SS-04	0.5	7/17/90	37.6	10	109	133	6.9	22990	4210	222	340	159
SS-04	1.0	7/17/90	12.5	13	75.5	<100	7.4	22800	4100	346	295	250

Notes:
1. All values in milligrams per kilogram (mg/kg), except pH (units).
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. NA = Not Analyzed.

TABLE 17b. SUMMARY OF SOIL ANALYSIS - EPA METHOD 8240 COMPOUNDS
McKesson Corporation Property - Santa Fe Springs

Location ID	Sample Depth (ft)	Date Collected	1,1,1-Tri-chloro-ethane	Methylene Chloride	Tetra-chloro-ethene	Tri-chloro-ethene	1,1-Di-chloro-ethene	1,2-Di-chloro-ethene	Cis-1,2-Di-chloro-ethene	Trans-1,2-Dichloro-ethene	1,1-Di-chloro-ethane	1,2-Di-chloro-ethane
MW-01	23.0	6/12/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
MW-01	42.0	6/12/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
MW-02	23.0	6/12/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
MW-02	45.5	6/12/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
MW-03	23.0	6/12/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
MW-03	41.0	6/12/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-01	36.0-36.5	6/18/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-01	41.0-41.5	6/18/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-02	20.5-21	6/19/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-02	41-41.5	6/19/90	0.1	<0.3	0.08	0.1	0.05	<0.05	NA	NA	<0.05	<0.05
SB-03	31	7/06/90	0.16	0.92	0.25	0.50	0.20	<0.05	NA	NA	<0.05	<0.05
SB-03	21	7/06/90	<0.05	<0.3	<0.05	0.26	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-04	26	6/26/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-04	46	6/26/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-05	33.5	6/27/90	<0.05	3.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-05	43.5	6/27/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-06	26	6/29/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-06	46	6/29/90	0.9	<0.3	0.5	0.07	0.2	<0.05	NA	NA	<0.05	<0.05
SB-07	26	6/29/90	0.06	<0.3	0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-07	46	6/29/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-08	26	6/29/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-08	42.5	6/29/90	<0.05	<0.3	0.080	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-09	21	6/29/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-09	41	6/29/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-10	30.5-31	6/22/90	0.3	<0.3	0.7	0.3	0.2	<0.05	NA	NA	<0.05	<0.05
SB-10	46-46.5	6/22/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-11	26-26.5	6/22/90	<0.05	<0.3	TR<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-11	41-41.5	6/22/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-12	20-20.5	6/20/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-12	30.5-31	6/20/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05
SB-12	41-41.5	6/20/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05

Notes:
1. All values in milligrams per kilogram (mg/kg)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 17b. SUMMARY OF SOIL ANALYSIS - EPA METHOD 8240 COMPOUNDS

Location ID	Sample Depth (ft)	Date Collected	Toluene	Ethyl Benzene	Total Xylenes	Acetone	4-Methyl-2-Pentanone (MIBK)	2-Butanone (MEK)	1,1,2,2-Tetrachloroethane	Carbon Tetrachloride	Chlorobenzene
MW-01	23.0	6/12/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
MW-01	42.0	6/12/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
MW-02	23.0	6/12/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
MW-02	45.5	6/12/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
MW-03	23.0	6/12/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
MW-03	41.0	6/12/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-01	36.0-36.5	6/18/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-01	41.0-41.5	6/18/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-02	20.5-21	6/19/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-02	41-41.5	6/19/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-03	31	7/06/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-03	21	7/06/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-04	26	6/26/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-04	46	6/26/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-05	33.5	6/27/90	0.1	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-05	43.5	6/27/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-06	26	6/29/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-06	46	6/29/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-07	26	6/29/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-07	46	6/29/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-08	26	6/29/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-08	42.5	6/29/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-09	21	6/29/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-09	41	6/29/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-10	30.5-31	6/22/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-10	46-46.5	6/22/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-11	26-26.5	6/22/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-11	41-41.5	6/22/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-12	20-20.5	6/20/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-12	30.5-31	6/20/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SB-12	41-41.5	6/20/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05

Notes:
1. All values in milligrams per kilogram (mg/kg)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 17b. SUMMARY OF SOIL ANALYSIS - EPA METHOD 8240 COMPOUNDS

Location ID	Sample Depth (ft)	Date Collected	Toluene	Ethyl Benzene	Total Xylenes	Acetone	4-Methyl-2-Pentanone (MIBK)	2-Butanone (MEK)	1,1,2,2-Tetrachloroethane	Carbon Tetrachloride	Chlorobenzene
SB-30	21	7/12/90	83	15	60	<120	<60.0	<120	<6.0	30	<6.0
SB-30	41	7/12/90	0.3	<0.10	<0.10	<2.0	<1.00	<2.0	<0.10	0.5	<0.10
SB-36	15.0-15.5	1/23/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-36	24.5-25.0	1/23/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-36	39.5-40.0	1/23/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-36	45.0-45.5	1/23/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-37	1.0-1.5	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-37	5.0-5.5	1/25/91	<0.1	<0.05	0.09	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-37	9.5-10.0	1/25/91	0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-37	14.5-15.0	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-37	19.5-20.0	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-37	24.0-24.5	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-38	5.0-5.5	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-38	15.0-15.5	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-38	19.5-20.0	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-38	24.5-25.0	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-38	29.5-30.0	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-38	34.5-35.0	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-38	40.0-40.5	1/25/91	<0.1	<0.05	0.06	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-38	44.0-44.5	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-39	9.5-10.0	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-39	5-5.5	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-40	5.0-5.5	1/25/91	<0.1	<0.05	<0.05	27	<0.5	4.5	<0.05	<0.05	<0.05
SB-40	9.5-10.0	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-41	9.5-10.0	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-41	4.5-5.0	1/25/91	<0.1	<0.05	<0.05	<1	<0.5	<1	<0.05	<0.05	<0.05
SB-42	9.5-10.0	1/25/91	<0.5	<0.25	<0.25	49	<2.5	6.0	<0.25	<0.25	<0.25
SB-42	5.0-5.5	1/25/91	<0.5	<0.25	<0.25	95	<2.5	13	<0.25	<0.25	<0.25
SS-01	05	7/17/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SS-01	1.0	7/17/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SS-02	0.5	7/18/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05

Notes:
1. All values in milligrams per kilogram (mg/kg)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 17b. SUMMARY OF SOIL ANALYSIS - EPA METHOD 8240 COMPOUNDS

Location ID	Sample Depth (ft)	Date Collected	1,1,1-Tri-chloro-ethane	Methylene Chloride	Tetra-chloro-ethene	Tri-chloro-ethene	1,1-Di-chloro-ethene	1,2-Di-chloro-ethene	Cis-1,2-Di-chloro-ethene	Trans-1,2-Dichloro-ethene	1,1-Di-chloro-ethane	1,2-Di-chloro-ethane	B
SS-02	1.0	7/18/90	<0.05	<0.3	0.1	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05	
SS-03	0.5	7/18/90	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05	
SS-03	1.0	7/18/90	<0.05	<0.3	1.0	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05	
SS-04	0.5	7/17/90	<0.05	<0.3	1.9	<0.05	<0.05	<0.05	NA	NA	<0.05	<0.05	
SS-04	1.0	7/17/90	<0.25	<1.5	61	<0.25	<0.25	<0.25	NA	NA	<0.25	<0.25	

Notes:
1. All values in milligrams per kilogram (mg/kg)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 17b. SUMMARY OF SOIL ANALYSIS - EPA METHOD 8240 COMPOUNDS

Location ID	Sample Depth (ft)	Date Collected	Toluene	Ethyl Benzene	Total Xylenes	Acetone	4-Methyl-2-Pentanone (MIBK)	2-Butanone (MEK)	1,1,2,2-Tetrachloroethane	Carbon Tetrachloride	Chlorobenzene
SS-02	1.0	7/18/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SS-03	0.5	7/18/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SS-03	1.0	7/18/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SS-04	0.5	7/17/90	<0.10	<0.05	<0.05	<1.0	<0.50	<1.0	<0.05	<0.05	<0.05
SS-04	1.0	7/17/90	<0.50	<0.25	<0.25	<5.0	<2.5	<5.0	<0.25	<0.25	<0.25

Notes:
1. All values in milligrams per kilogram (mg/kg)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 17c. SUMMARY OF SOIL ANALYSIS - EPA METHOD 8270 COMPOUNDS

Location ID	Sample Depth (ft)	Date Collected	2-Methyl-naph-thalene	Benzyl Alcohol	Bis(2-ethyl-hexyl)-phthalate	Naph-thalene
MW-01	23.0	6/12/90	<0.17	<0.17	<0.17	<0.17
MW-01	42.0	6/12/90	<0.17	<0.17	<0.17	<0.17
MW-02	23.0	6/12/90	<0.17	<0.17	<0.17	<0.17
MW-02	45.5	6/12/90	<0.17	<0.17	<0.17	<0.17
MW-03	23.0	6/12/90	<0.17	<0.17	<0.17	<0.17
MW-03	41.0	6/12/90	<0.17	<0.17	<0.17	<0.17
SB-01	36.0-36.5	6/18/90	<0.17	<0.17	<0.17	<0.17
SB-01	41.0-41.5	6/18/90	<0.17	<0.17	<0.17	<0.17
SB-02	20.5-21	6/19/90	<0.17	<0.17	<0.17	<0.17
SB-02	41-41.5	6/19/90	<0.17	<0.17	<0.17	<0.17
SB-03	31	7/06/90	<0.17	<0.17	<0.17	<0.17
SB-03	21	7/06/90	<0.17	<0.17	<0.17	<0.17
SB-04	26	6/26/90	<0.17	<0.17	<0.17	<0.17
SB-04	46	6/26/90	<0.17	<0.17	<0.17	<0.17
SB-05	33.5	6/27/90	<0.17	<0.17	<0.17	<0.17
SB-05	43.5	6/27/90	<0.17	<0.17	<0.17	<0.17
SB-06	26	6/29/90	<0.17	<0.17	<0.17	<0.17
SB-06	46	6/29/90	<0.17	<0.17	<0.17	<0.17
SB-07	26	6/29/90	<0.17	<0.17	<0.17	<0.17
SB-07	46	6/29/90	<0.17	<0.17	<0.17	<0.17
SB-08	26	6/29/90	<0.17	<0.17	<0.17	<0.17
SB-08	42.5	6/29/90	<0.17	<0.17	<0.17	<0.17
SB-09	21	6/29/90	<0.17	<0.17	<0.17	<0.17
SB-09	41	6/29/90	<0.17	<0.17	<0.17	<0.17
SB-10	30.5-31	6/22/90	<0.17	<0.17	<0.17	<0.17
SB-10	46-46.5	6/22/90	<0.17	<0.17	<0.17	<0.17
SB-11	26-26.5	6/22/90	<0.17	<0.17	<0.17	<0.17
SB-11	41-41.5	6/22/90	<0.17	<0.17	<0.17	<0.17
SB-12	20-20.5	6/20/90	<0.17	<0.17	<0.17	<0.17
SB-12	30.5-31	6/20/90	<0.17	<0.17	<0.17	<0.17
SB-12	41-41.5	6/20/90	<0.17	<0.17	<0.17	<0.17
SB-13	25.5-26	6/20/90	<0.17	<0.17	<0.17	<0.17
SB-13	41-41.5	6/20/90	<0.17	<0.17	<0.17	<0.17
SB-14	26-26.5	6/21/90	<0.17	<0.17	<0.17	<0.17
SB-14	41-41.5	6/21/90	<0.17	<0.17	<0.17	<0.17
SB-15	26-26.5	6/21/90	<0.17	<0.17	<0.17	<0.17
SB-15	41-41.5	6/21/90	<0.17	<0.17	<0.17	<0.17
SB-19	26	6/26/90	<0.17	<0.17	<0.17	<0.17
SB-19	41	6/26/90	<0.17	<0.17	<0.17	<0.17
SB-20	11	7/13/90	<0.17	<0.17	<0.17	<0.17
SB-20	20.5	7/13/90	<0.17	<0.17	<0.17	<0.17
SB-20	41	7/13/90	<0.17	<0.17	<0.17	<0.17
SB-21	21	7/05/90	<0.17	<0.17	<0.17	<0.17
SB-21	31	7/05/90	<0.17	<0.17	<0.17	<0.17
SB-23	26	7/05/90	<0.17	<0.17	<0.17	<0.17
SB-23	41	7/05/90	<0.17	<0.17	<0.17	<0.17
SB-24	1	7/11/90	4.3	<0.17	<0.17	6.9

Notes:
1. All values in milligrams per kilogram (mg/kg)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 17c. SUMMARY OF SOIL ANALYSIS - EPA METHOD 8270 COMPOUNDS

Location ID	Sample Depth (ft)	Date Collected	2-Methyl-naph-thalene	Benzyl Alcohol	Bis(2-ethyl-hexyl)-phthalate	Naph-thalene
SB-24	21	7/11/90	1.0	<0.17	<0.17	2.7
SB-24	41	7/11/90	<0.17	<0.17	<0.17	TR<0.17
SB-25	6	7/13/90	<0.17	<0.17	<0.17	<0.17
SB-25	21	7/13/90	<0.17	<0.17	<0.17	<0.17
SB-25	41	7/13/90	<0.17	<0.17	<0.17	<0.17
SB-26	21	7/16/90	<0.17	<0.17	<0.17	<0.17
SB-26	26	7/16/90	<0.17	<0.17	<0.17	<0.17
SB-26	41	7/16/90	<0.17	<0.17	<0.17	<0.17
SB-27	21	7/16/90	<0.17	<0.17	<0.17	<0.17
SB-27	31	7/16/90	<0.17	<0.17	<0.17	<0.17
SB-27	41	7/16/90	<0.17	<0.17	<0.17	<0.17
SB-30	1.5	7/12/90	<0.17	<0.17	<0.17	0.24
SB-30	21	7/12/90	0.31	1.2	<0.17	0.40
SB-30	41	7/12/90	<0.17	<0.17	<0.17	<0.17
SS-01	05	7/17/90	<0.17	<0.17	<0.17	<0.17
SS-01	1.0	7/17/90	<0.17	<0.17	<0.17	<0.17
SS-02	0.5	7/18/90	<0.85	<0.85	<0.85	<0.85
SS-02	1.0	7/18/90	<0.17	<0.17	<0.17	<0.17
SS-03	0.5	7/18/90	<0.17	<0.17	1.9	<0.17
SS-03	1.0	7/18/90	<0.17	<0.17	3.1	<0.17
SS-04	0.5	7/17/90	<0.17	<0.17	1.9	<0.17
SS-04	1.0	7/17/90	<0.17	<0.17	4.5	<0.17

Notes:
1. All values in milligrams per kilogram (mg/kg)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 17d. SUMMARY OF SOIL ANALYSIS - EPA METHOD 418.1 COMPOUNDS

Location ID	Sample Depth (ft)	Date Collected	Petroleum Hydro-carbons IR
MW-01	23.0	6/12/90	<1
MW-01	42.0	6/12/90	2
MW-02	23.0	6/12/90	<1
MW-02	45.5	6/12/90	1
MW-03	23.0	6/12/90	<1
MW-03	41.0	6/12/90	7
SB-01	36.0-36.5	6/18/90	3
SB-01	41.0-41.5	6/18/90	2
SB-02	20.5-21	6/19/90	<1
SB-02	41-41.5	6/19/90	1
SB-03	31	7/06/90	<1
SB-03	21	7/06/90	<2
SB-04	26	6/26/90	<1
SB-04	46	6/26/90	<1
SB-05	33.5	6/27/90	2
SB-05	43.5	6/27/90	<1
SB-06	26	6/29/90	3
SB-06	46	6/29/90	2
SB-07	26	6/29/90	9
SB-07	46	6/29/90	3
SB-08	26	6/29/90	2
SB-08	42.5	6/29/90	2
SB-09	21	6/29/90	<1
SB-09	41	6/29/90	1
SB-10	30.5-31	6/22/90	<1
SB-10	46-46.5	6/22/90	1
SB-11	26-26.5	6/22/90	<1
SB-11	41-41.5	6/22/90	<1
SB-12	20-20.5	6/20/90	2
SB-12	30.5-31	6/20/90	<1
SB-12	41-41.5	6/20/90	<1
SB-13	25.5-26	6/20/90	<1
SB-13	41-41.5	6/20/90	2
SB-14	26-26.5	6/21/90	<1
SB-14	41-41.5	6/21/90	<1
SB-15	26-26.5	6/21/90	1
SB-15	41-41.5	6/21/90	<1
SB-19	26	6/26/90	<1
SB-19	41	6/26/90	<1
SB-20	11	7/13/90	<1
SB-20	20.5	7/13/90	<1
SB-20	41	7/13/90	1
SB-21	21	7/05/90	2
SB-21	31	7/05/90	<1
SB-23	26	7/05/90	<1
SB-23	41	7/05/90	5

Notes: 1. All values in milligrams per kilogram (mg/kg)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.

TABLE 17d. SUMMARY OF SOIL ANALYSIS - EPA METHOD 418.1 COMPOUNDS

Location ID	Sample Depth (ft)	Date Collected	Petroleum Hydro-carbons IR
SB-24	1	7/11/90	3100
SB-24	21	7/11/90	600
SB-24	41	7/11/90	30
SB-25	6	7/13/90	1
SB-25	21	7/13/90	<1
SB-25	41	7/13/90	<1
SB-26	21	7/16/90	<1
SB-26	26	7/16/90	<1
SB-26	41	7/16/90	<1
SB-27	21	7/16/90	<1
SB-27	31	7/16/90	9
SB-27	41	7/16/90	1
SB-30	1.5	7/12/90	170
SB-30	21	7/12/90	140
SB-30	41	7/12/90	<1
SS-01	05	7/17/90	14
SS-01	1.0	7/17/90	13
SS-02	0.5	7/18/90	1400
SS-02	1.0	7/18/90	430
SS-03	0.5	7/18/90	200
SS-03	1.0	7/18/90	710
SS-04	0.5	7/17/90	290
SS-04	1.0	7/17/90	840

Notes:
1. All values in milligrams per kilogram (mg/kg)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.

Table 18. Soil Volatile Organic Compound Statistical Analysis Summary

VOC	Frequency	Concentration Range (PPM)
Tetrachloroethene	44/98	0.05 - 2,900
1,1,1-Trichloroethane	36/98	0.06 - 3,500
Trichloroethene	33/98	0.07 - 60
Methylene Chloride	32/98	0.55 - 380
1,1-Dichloroethene	21/98	0.05 - 5.4
1,2-Dichloroethane	21/98	0.06 - 32
1,1-Dichloroethane	13/98	0.09 - 0.63
Toluene	13/98	0.1 - 130
Methyl Ethyl Ketone	9/98	1 - 65
Acetone	8/98	3.5 - 120
Xylene (total)	8/98	0.06 - 160
1,2-Dichloroethene (total)	7/98	0.08 - 0.6
Carbon Tetrachloride	4/98	0.5 - 550
Ethylbenzene	4/98	1.8 - 50
Chlorobenzene	2/98	11, 170
1,1,2,2-Tetrachloroethane	2/98	5.9, 31
Benzene	1/98	0.07

Note:

VOC = Volatile organic compound

92MCK001.tb2

TABLE 19a. SUMMARY OF GROUNDWATER ANALYSIS - GENERAL MINERALS AND SELECTED METALS

Location ID	Date Collected	Bicarbonate as CACO3	Total Alkalinity as CACO3	Chloride	Nitrate as Nitrogen	Sulfate	Surfactants	Calcium	Copper	Iron	Potassium	Magnesium	Manganese
MW-01	8/01/90	<5	<5	100	10.0	2022	0.3	183	<0.02	0.83	5.7	44.5	0.02
MW-01	10/24/90	499	499	115	9.1	249	0.2	180	<0.02	<0.01	6.3	44.8	0.03
MW-01	2/11/91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-02	8/01/90	412	412	90	14.2	251	0.4	160	<0.02	<0.01	10.0	44.1	0.05
MW-02	10/24/90	412	412	100	14.5	264	0.2	173	<0.02	<0.01	6.8	44.1	0.04
MW-02	2/11/91	417	417	89.6	13.9	227	NA	161	<0.02	<0.01	14.0	42.6	0.03
MW-03	8/02/90	234	234	130	0.96	185	0.3	105	<0.02	<0.01	5.8	26.2	0.64
MW-03	10/24/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-03	2/11/91	240	240	130	1.0	193	NA	105	<0.02	<0.01	4.1	26.2	3.3
SB-04	8/03/90	436	436	115	9.2	256	0.1	176	<0.02	<0.01	6.5	44.1	0.30
SB-04	10/24/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-04	2/11/91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-07	8/03/90	364	364	90	5.1	202	0.3	125	<0.02	<0.01	5.9	32.0	0.12
SB-07	10/24/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-07	2/12/91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-10	8/02/90	361	361	115	8.1	319	0.1	159	<0.02	<0.01	8.7	44.5	0.90
SB-10	10/24/90	368	368	110	9.2	354	<0.1	171	<0.02	<0.01	6.7	42.1	0.05
SB-13	8/02/90	416	416	90	13.7	256	0.1	172	<0.02	<0.01	6.6	43.6	0.14
SB-13	10/24/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-13	2/11/91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-17	8/02/90	362	362	130	2.6	288	0.4	159	<0.02	<0.01	5.3	45.7	12.1
SB-17	10/25/90	437	437	205	2.4	230	<0.1	179	<0.02	<0.01	5.5	53.2	12.8
SB-17	2/13/91	406	406	115	5.6	290	NA	170	<0.02	0.02	5.4	47.3	9.1
SB-17A	2/12/91	330	330	75.3	8.4	475	NA	93.9	<0.02	0.03	9.5	42.2	0.04
SB-17B	2/12/91	231	231	63.3	7.4	270	NA	137	<0.02	0.02	5.0	42.2	0.01
SB-20	8/02/90	422	422	155	3.3	202	0.2	154	<0.02	<0.01	5.2	42.6	12.8
SB-20	10/25/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-20	2/13/91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-23	8/03/90	400	400	180	3.4	288	<0.1	174	<0.02	<0.01	10.0	51.4	5.7

Notes:
1. All values in milligrams per liter (mg/L), except pH (units), Conductivity (mmhos/cm) and cation/anion balance.
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. NA = Not Analyzed.

TABLE 19a. SUMMARY OF GROUNDWATER ANALYSIS - GENERAL MINERALS AND SELECTED METALS

Location ID	Date Collected	Sodium	Zinc	Cation/ Anion Balance	pH	Cond- ductivity	Total Dissolved Solids	Hardness
MW-01	8/01/90	115	0.24	NA	2.15	1510	1510	640
MW-01	10/24/90	117	0.04	0.94	6.93	1630	1060	634
MW-01	2/11/91	NA	NA	NA	7.11	NA	NA	NA
MW-02	8/01/90	109	0.02	0.98	7.29	1460	1120	581
MW-02	10/24/90	106	0.07	0.97	7.13	1520	1010	614
MW-02	2/11/91	106	0.09	0.99	7.42	1480	994	577
MW-03	8/02/90	93.1	0.01	0.95	7.27	1170	764	370
MW-03	10/24/90	NA	NA	NA	6.93	NA	NA	NA
MW-03	2/11/91	88.7	0.05	0.92	7.31	1150	680	370
SB-04	8/03/90	123	0.01	0.98	7.22	1540	1150	621
SB-04	10/24/90	NA	NA	NA	7.00	NA	NA	NA
SB-04	2/11/91	NA	NA	NA	7.19	NA	NA	NA
SB-07	8/03/90	130	0.01	1.02	7.44	1290	972	444
SB-07	10/24/90	NA	NA	NA	7.14	NA	NA	NA
SB-07	2/12/91	NA	NA	NA	7.29	NA	NA	NA
SB-10	8/02/90	117	<0.01	0.96	7.26	1450	1070	580
SB-10	10/24/90	102	<0.01	0.90	7.15	1490	1030	600
SB-13	8/02/90	109	<0.01	0.99	7.12	1450	1080	609
SB-13	10/24/90	NA	NA	NA	7.05	NA	NA	NA
SB-13	2/11/91	NA	NA	NA	7.10	NA	NA	NA
SB-17	8/02/90	111	0.02	1.00	6.99	1470	1070	585
SB-17	10/25/90	112	0.02	0.97	6.92	1760	1140	666
SB-17	2/13/91	98.2	0.03	0.96	7.11	1540	1040	619
SB-17A	2/12/91	200	0.06	0.89	5.95	1640	1180	408
SB-17B	2/12/91	64.1	<0.01	1.05	7.53	1190	802	516
SB-20	8/02/90	121	0.02	0.99	7.08	1540	1360	560
SB-20	10/25/90	NA	NA	NA	7.04	NA	NA	NA
SB-20	2/13/91	NA	NA	NA	7.07	NA	NA	NA
SB-23	8/03/90	121	0.02	0.96	7.12	1650	1230	646

Notes:
1. All values in milligrams per liter (mg/L), except pH (units), Conductivity (mmhos/cm) and cation/anion balance.
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. NA = Not Analyzed.

TABLE 19a. SUMMARY OF GROUNDWATER ANALYSIS - GENERAL MINERALS AND SELECTED METALS

Location ID	Date Collected	Bicarb-onate as CACO3	Total Alkalinity as CACO3	Chloride	Nitrate as Nitrogen	Sulfate	Surf-actants	Calcium	Copper	Iron	Potassium	Magnesium	Manganese
SB-23	10/25/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-23	2/14/91	391	391	237	3.7	248	<0.1	187	<0.02	<0.01	5.3	54.0	5.6
SB-23A	2/14/91	82	82	84.6	12.0	680	0.11	120	0.06	1.1	12.2	49.9	0.08
SB-23B	2/14/91	147	147	78.0	11.9	472	0.17	89.5	<0.02	<0.01	7.7	43.5	<0.01
SB-25	8/03/90	452	452	150	6.8	256	0.1	180	<0.02	<0.01	7.7	48.8	2.9
SB-25	10/25/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-32	8/03/90	494	494	70	0.21	190	<0.1	101	<0.02	<0.01	7.1	35.4	0.13
SB-32	10/25/90	521	521	70	<0.05	186	0.1	116	<0.02	<0.01	5.9	37.6	0.21
SB-32	2/12/91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-36	2/13/91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TW-01	7/18/90	181	181	60	1.1	135	<0.1	91.3	0.09	<0.01	3.5	20.7	<0.01
Quality Control Samples													
MW-01	10/24/90	493	493	110	8.8	225	0.2	184	<0.02	<0.01	5.1	45.3	0.03
MW-02	8/01/90	404	404	85	14.4	251	<0.1	155	<0.02	0.03	9.5	43.8	0.03
SB-17	8/02/90	372	372	135	2.6	325	0.2	158	<0.02	<0.01	5.5	45.1	12.0
SB-23	8/03/90	402	402	170	1.9	256	<0.1	173	<0.02	<0.01	8.4	50.7	5.8
SB-23	10/25/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EQUIP	8/01/90	<5	<5	<5	<0.05	<5	<0.1	0.08	<0.02	<0.01	<0.1	0.01	<0.01
EQUIP	8/02/90	<5	<5	100	<0.05	<5	<0.1	0.30	<0.02	<0.01	<0.1	0.07	0.03
EQUIP	8/03/90	<5	<5	30	<0.05	<5	<0.1	<0.05	<0.02	<0.01	<0.1	<0.01	<0.01
EQUIP	10/24/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EQUIP	10/25/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FIELD	10/24/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FIELD	10/25/90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP	8/01/90	<5	<5	<5	<0.05	9.7	<0.1	0.30	<0.02	<0.01	<0.1	0.07	0.03
TRIP	8/02/90	<5	<5	<5	<0.05	<5	<0.1	0.12	<0.02	<0.01	<0.1	0.02	<0.01
TRIP	8/03/90	<5	<5	<5	<0.05	<5	<0.1	<0.05	<0.02	<0.01	<0.1	<0.01	<0.01

Notes:
1. All values in milligrams per liter (mg/L), except pH (units), Conductivity (mmhos/cm) and cation/anion balance.
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. NA = Not Analyzed.

TABLE 19a. SUMMARY OF GROUNDWATER ANALYSIS - GENERAL MINERALS AND SELECTED METALS

Location ID	Date Collected	Sodium	Zinc	Cation/ Anion Balance	pH	Cond- ductivity	Total Dissolved Solids	Hardness
SB-23	10/25/90	NA	NA	NA	6.70	NA	NA	NA
SB-23	2/14/91	112	0.02	0.95	6.93	1880	1260	689
SB-23A	2/14/91	417	1.7	1.5	5.20	2640	2620	505
SB-23B	2/14/91	165	0.03	0.98	6.34	1530	1170	403
SB-25	8/03/90	113	0.03	0.95	7.14	1600	1170	650
SB-25	10/25/90	NA	NA	NA	6.73	NA	NA	NA
SB-32	8/03/90	155	<0.01	0.94	7.21	1330	904	398
SB-32	10/25/90	158	0.02	0.98	6.84	1430	912	444
SB-32	2/12/91	NA	NA	NA	7.03	NA	NA	NA
SB-36	2/13/91	NA	NA	NA	7.05	NA	NA	NA
TW-01	7/18/90	47.4	<0.01	1.02	7.91	NA	494	313
Quality Control Samples								
MW-01	10/24/90	119	0.04	1.00	6.90	1600	1050	646
MW-02	8/01/90	102	0.05	0.96	7.27	1460	1050	567
SB-17	8/02/90	110	0.02	0.93	6.94	1490	926	580
SB-23	8/03/90	120	0.02	1.01	7.09	1650	1250	641
SB-23	10/25/90	NA	NA	NA	6.68	NA	NA	NA
EQUIP	8/01/90	0.29	<0.01	NA	6.38	<20	<20	<0.5
EQUIP	8/02/90	0.34	<0.01	NA	6.66	<20	<20	1.0
EQUIP	8/03/90	0.27	<0.01	NA	6.01	<20	<20	<0.5
EQUIP	10/24/90	NA	NA	NA	6.23	NA	NA	NA
EQUIP	10/25/90	NA	NA	NA	6.05	NA	NA	NA
FIELD	10/24/90	NA	NA	NA	5.78	NA	NA	NA
FIELD	10/25/90	NA	NA	NA	6.03	NA	NA	NA
TRIP	8/01/90	0.32	<0.01	NA	6.36	<20	<20	1.0
TRIP	8/02/90	0.28	<0.01	NA	6.46	<20	<20	<0.5
TRIP	8/03/90	0.29	<0.01	NA	5.87	<20	<20	<0.5

Notes:
1. All values in milligrams per liter (mg/L), except pH (units), Conductivity (mmhos/cm) and cation/anion balance.
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. NA = Not Analyzed.

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	1,1,1-Tri-chloro-ethane	Methylene Chloride	Tetra-chloro-ethene	Tri-chloro-ethene	1,1-Di-chloro-ethene	1,2-Di-chloro-ethene	Cis-1,2-Di-chloro-ethene	Trans-1,2-Dichloro-ethene	1,1-Di-chloro-ethane	1,2-Di-chloro-ethane	Ben
MW-01	8/01/90	300	<30	600	590	1100	650	NA	NA	230	7	T
MW-01	10/24/90	260	<50	530	520	790	440	NA	NA	180	<10	<
MW-01	2/11/91	150	<25	350	360	530	NA	320	<5	93	<5	
MW-02	8/01/90	30	<5	220	400	270	80	NA	NA	20	6	
MW-02	10/24/90	27	<25	<5	680	67	47	NA	NA	<5	<5	
MW-02	2/11/91	37	<25	270	700	360	NA	78	<5	22	<5	
MW-03	8/02/90	1700	140	1100	230	1200	230	NA	NA	100	<8	
MW-03	10/24/90	2200	<100	1200	400	1700	630	NA	NA	480	<20	
MW-03	2/11/91	1300	<50	1100	210	1300	NA	280	<10	200	<10	
SB-04	8/03/90	2700	1400	4100	4300	6200	2500	NA	NA	460	<20	
SB-04	10/24/90	2000	640	4300	4200	5700	1300	NA	NA	400	<50	1
SB-04	2/11/91	150	<25	410	400	550	NA	110	<5	25	<5	
SB-07	8/03/90	17000	<250	6700	1100	10000	<50	NA	NA	150	<50	<
SB-07	10/24/90	3600	<200	3600	760	3300	<40	NA	NA	45	<40	<
SB-07	2/12/91	6000	<150	3300	680	3600	NA	<30	<30	<30	<30	<
SB-10	8/02/90	2900	410	2800	830	3600	83	NA	NA	160	<20	<
SB-10	10/24/90	2400	<125	1600	<25	1800	<25	NA	NA	<25	<25	<
SB-10	2/11/91	1800	<100	1400	390	1700	NA	<20	<20	85	<20	<
SB-13	8/02/90	170	700	510	870	630	150	NA	NA	66	53	
SB-13	10/24/90	16	<10	96	220	62	9	NA	NA	4	4	
SB-13	2/11/91	140	<10	300	340	360	NA	40	<2	28	23	
SB-17	8/02/90	65000	13000	45000	7200	5500	<500	NA	NA	<500	<500	<5
SB-17	10/25/90	25000	45000	19000	5300	6300	1000	NA	NA	<250	600	<2
SB-17	2/13/91	23000	4000	15000	2700	2900	NA	1000	<250	<250	<250	<2
SB-17A	2/12/91	3	<5	7	12	<1	NA	<1	<1	<1	<1	
SB-17B	2/12/91	<1	<5	5	33	<1	NA	<1	<1	<1	<1	
SB-20	8/02/90	36000	19000	19000	3200	20000	540	NA	NA	200	<500	<5

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

SFD1403

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	Toluene	Ethyl Benzene	Total Xylenes	Acetone	4-Methyl-2-Pentanone (MIBK)	2-Butanone (MEK)	Chloroform	Dichlorofluoromethane	Trichlorofluoromethane	1,1,2-Trichloro-1,2,2-Trifluoroethane	1,1,2 fluoro-trich eth
MW-01	8/01/90	180	<6	13	<120	<60	<120	TR<6	NA	NA	NA	
MW-01	10/24/90	<20	<10	<10	<200	<100	<200	<10	NA	NA	NA	
MW-01	2/11/91	<10	<5	<5	<100	<50	<100	<5	NA	NA	NA	
MW-02	8/01/90	6	<1	<1	<20	<10	<20	2	NA	NA	NA	
MW-02	10/24/90	<10	<5	<5	<100	<50	<100	<5	NA	NA	NA	
MW-02	2/11/91	<10	<5	<5	<100	<50	<100	<5	NA	NA	NA	
MW-03	8/02/90	14	<8	100	210	<80	<160	<8	NA	NA	NA	
MW-03	10/24/90	<40	<20	120	<400	<200	<400	<20	NA	NA	NA	
MW-03	2/11/91	<20	<10	49	<200	<100	<200	<10	NA	NA	NA	
SB-04	8/03/90	93	<20	77	<400	<200	<400	34	NA	NA	NA	
SB-04	10/24/90	<100	<50	52	<1000	<500	<1000	<50	NA	NA	NA	
SB-04	2/11/91	<10	<5	<5	<100	<50	<100	<5	NA	NA	NA	
SB-07	8/03/90	500	<50	<50	<1000	<500	<1000	<50	NA	NA	NA	
SB-07	10/24/90	<80	<40	<40	<800	<400	<800	<40	NA	NA	NA	
SB-07	2/12/91	<60	<30	<30	<600	<300	<600	<30	NA	NA	NA	
SB-10	8/02/90	<40	<20	<20	<400	<200	<400	<20	NA	NA	NA	
SB-10	10/24/90	<50	<25	<25	<500	<250	<500	<25	NA	NA	NA	
SB-10	2/11/91	<40	<20	<20	<400	<200	<400	<20	NA	NA	NA	
SB-13	8/02/90	<20	<10	<10	<200	<100	<200	<10	NA	NA	NA	
SB-13	10/24/90	<4	<2	<2	<40	<20	<40	<2	NA	NA	NA	
SB-13	2/11/91	<4	<2	<2	<40	<20	<40	<2	NA	NA	NA	
SB-17	8/02/90	1000	<500	<500	<10000	<5000	<10000	<500	NA	NA	NA	
SB-17	10/25/90	2000	<250	500	<5000	<2500	<5000	<250	NA	NA	NA	
SB-17	2/13/91	<500	<250	<250	<5000	<2500	<5000	<250	NA	NA	NA	
SB-17A	2/12/91	11	<1	<1	<20	<10	<20	<1	NA	NA	NA	
SB-17B	2/12/91	3	<1	<1	<20	<10	<20	<1	NA	NA	NA	
SB-20	8/02/90	<1000	<500	<500	<10000	<5000	<10000	<500	NA	NA	NA	

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

SFD1404

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	Trichloro-trifluoro-ethane	1,1,2-Tri-chloro-ethane	Aliphatic Hydrocarbon C3	Cyclic Hydrocarbon	Dibromo-chloro-methane	Ethylmethyl-benzene Isomer	Trimethyl-benzene Isomer	Vinyl Chloride
MW-01	8/01/90	NA	NA	NA	NA	<6	NA	NA	<6
MW-01	10/24/90	NA	NA	NA	NA	<10	NA	NA	<10
MW-01	2/11/91	NA	<5	NA	NA	<5	NA	NA	<5
MW-02	8/01/90	NA	NA	NA	NA	<1	NA	NA	<1
MW-02	10/24/90	NA	NA	NA	NA	<5	NA	NA	<5
MW-02	2/11/91	NA	<5	NA	NA	<5	NA	NA	<5
MW-03	8/02/90	NA	NA	NA	NA	<8	NA	NA	<8
MW-03	10/24/90	NA	NA	NA	NA	<20	NA	NA	<20
MW-03	2/11/91	NA	<10	NA	NA	<10	NA	NA	<10
SB-04	8/03/90	NA	NA	NA	NA	<20	NA	NA	<20
SB-04	10/24/90	NA	NA	NA	NA	<50	NA	NA	<50
SB-04	2/11/91	NA	<5	NA	NA	<5	NA	NA	<5
SB-07	8/03/90	NA	NA	NA	NA	<50	NA	NA	<50
SB-07	10/24/90	NA	NA	NA	NA	<40	NA	NA	<40
SB-07	2/12/91	NA	<30	NA	NA	<30	NA	NA	<30
SB-10	8/02/90	NA	NA	NA	NA	<20	NA	NA	<20
SB-10	10/24/90	NA	NA	NA	NA	<25	NA	NA	<25
SB-10	2/11/91	NA	<20	NA	NA	<20	NA	NA	<20
SB-13	8/02/90	NA	NA	NA	NA	12	NA	NA	<10
SB-13	10/24/90	NA	NA	NA	NA	<2	NA	NA	<2
SB-13	2/11/91	NA	<2	NA	NA	<2	NA	NA	<2
SB-17	8/02/90	NA	NA	NA	NA	<500	NA	NA	<500
SB-17	10/25/90	NA	NA	NA	NA	<250	NA	NA	<250
SB-17	2/13/91	NA	<250	NA	NA	<250	NA	NA	<250
SB-17A	2/12/91	NA	<1	NA	NA	<1	NA	NA	<1
SB-17B	2/12/91	NA	<1	NA	NA	<1	NA	NA	<1
SB-20	8/02/90	NA	NA	NA	NA	<500	NA	NA	<500

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	1,1,1-Tri-chloro-ethane	Methylene Chloride	Tetra-chloro-ethene	Tri-chloro-ethene	1,1-Di-chloro-ethene	1,2-Di-chloro-ethene	Cis-1,2-Di-chloro-ethene	Trans-1,2-Dichloro-ethene	1,1-Di-chloro-ethane	1,2-Di-chloro-ethane	B
SB-20	10/25/90	12000	6700	8600	1400	4000	<100	NA	NA	120	150	
SB-20	2/13/91	28000	29000	19000	2400	11000	NA	<200	<200	<200	460	
SB-23	8/03/90	71000	88000	24000	5800	17000	930	NA	NA	460	<300	
SB-23	10/25/90	87000	54000	27000	7100	8200	2500	NA	NA	<1000	<1000	<
SB-23	2/14/91	94000	93000	40000	5000	10000	NA	600	<500	<500	1300	
SB-23A	2/14/91	12	<5	13	7	2	NA	<1	<1	<1	<1	
SB-23B	2/14/91	17	<5	17	67	2	NA	<1	<1	<1	<1	
SB-25	8/03/90	2000	72000	7000	4200	9200	1900	NA	NA	740	<200	
SB-25	10/25/90	1800	25000	5100	4200	7600	1500	NA	NA	<120	160	
SB-25	2/13/91	1100	46000	5500	3300	6500	NA	<500	<500	<500	<500	
SB-32	8/03/90	5200	<100	3100	4100	5500	780	NA	NA	290	<20	
SB-32	10/25/90	4600	<125	2600	4100	4200	660	NA	NA	450	<25	
SB-32	2/12/91	3000	<100	2200	3100	3300	NA	520	<20	250	<20	
SB-36	2/13/91	40000	17000	13000	1900	14000	NA	<250	<250	<250	<250	
SW-01	6/23/90	840	<25	<5	<5	<5	<5	NA	NA	180	<5	
SW-02	6/23/90	61	<5	<1	<1	<1	<1	NA	NA	34	<1	
TW-01	7/18/90	<1	<5	<1	2	<1	<1	NA	NA	<1	<1	
CPT-01	4/09/91	48	<20	150	280	220	NA	160	8	64	<4	
CPT-02	4/09/91	610	450	330	220	330	NA	44	<5	88	<5	
CPT-03	4/09/91	2400	5000	1500	2200	1900	NA	2700	<50	270	<50	
CPT-04	4/09/91	20000	<500	10000	2400	11000	NA	150	<100	730	<100	
CPT-06	4/10/91	66	<10	130	200	300	NA	140	<2	81	<2	
CPT-07	10/02/91	760	307	460	120	960	NA	290	<10	280	<10	
CPT-08	10/02/91	4600	8200	13000	2100	3400	NA	<100	<100	400	<100	
CPT-09	10/02/91	300	8900	740	200	950	NA	1100	<50	1100	<50	
CPT-10	9/10/91	5	<10	89	240	56	NA	5	<2	<2	<2	
CPT-11	9/10/91	79	<5	70	10	68	NA	3	<1	32	<1	

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	Toluene	Ethyl Benzene	Total Xylenes	Acetone	4-Methyl-2-Pentanone (MIBK)	2-Butanone (MEK)	Chloroform	Dichlorofluoromethane	Trichlorofluoromethane	1,1,2-Trichloro-1,2,2-Trifluoroethane	1,1, fluoro tric et
SB-20	10/25/90	310	<100	<100	<2000	<1000	<2000	<100	NA	NA	NA	
SB-20	2/13/91	820	<200	<200	<4000	<2000	<4000	<200	NA	NA	NA	
SB-23	8/03/90	1600	440	<300	<6000	<3000	<6000	<300	NA	NA	NA	
SB-23	10/25/90	2600	<1000	<1000	<20000	<10000	<20000	<1000	NA	NA	NA	
SB-23	2/14/91	2500	<500	<500	<10000	<5000	<10000	<500	NA	NA	NA	
SB-23A	2/14/91	10	<1	<1	<20	<10	<20	<1	NA	NA	NA	
SB-23B	2/14/91	10	<1	<1	<20	<10	<20	<1	NA	NA	NA	
SB-25	8/03/90	1800	<200	<200	5700	<2000	<4000	<200	NA	NA	NA	
SB-25	10/25/90	1600	<120	400	4900	<1200	<2500	<120	NA	NA	NA	
SB-25	2/13/91	940	<500	<500	<10000	<5000	<10000	<500	NA	NA	NA	
SB-32	8/03/90	110	<20	<20	<400	<200	<400	21	NA	NA	NA	
SB-32	10/25/90	<50	<25	<25	<500	<250	<500	<25	NA	NA	NA	
SB-32	2/12/91	<40	<20	<20	<400	<200	<400	<20	NA	NA	NA	
SB-36	2/13/91	1900	<250	1200	<5000	<2500	<5000	<250	NA	NA	NA	
SW-01	6/23/90	<10	<5	<5	<100	<50	<100	<5	NA	NA	NA	
SW-02	6/23/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
TW-01	7/18/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
CPT-01	4/09/91	<8	<4	<4	<80	<40	<80	<4	NA	NA	NA	
CPT-02	4/09/91	18	<5	14	<100	<50	<100	<5	NA	NA	NA	
CPT-03	4/09/91	210	<50	98	<1000	<500	<1000	<50	NA	NA	NA	
CPT-04	4/09/91	<200	<100	<100	<2000	<1000	<2000	<100	NA	NA	NA	
CPT-06	4/10/91	<4	<2	<2	<40	<20	<40	<2	NA	28	NA	
CPT-07	10/02/91	160	180	370	<200	<100	<200	<10	NA	NA	NA	
CPT-08	10/02/91	400	<100	800	<2000	<1000	<2000	<100	NA	NA	NA	
CPT-09	10/02/91	2100	300	860	6800	1200	5300	<50	NA	NA	NA	
CPT-10	9/10/91	<4	<2	<2	<40	<20	<40	<2	NA	24	NA	
CPT-11	9/10/91	<2	<1	<1	<20	<10	<20	<1	NA	<5	NA	

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	Trichloro-trifluoro-ethane	1,1,2-Tri-chloro-ethane	Aliphatic Hydrocarbon C3	Cyclic Hydrocarbon	Dibromo-chloro-methane	Ethylmethyl-benzene Isomer	Trimethyl-benzene Isomer	Vinyl Chloride
SB-20	10/25/90	NA	NA	NA	NA	<100	NA	NA	<100
SB-20	2/13/91	NA	<200	NA	NA	<200	NA	NA	<200
SB-23	8/03/90	NA	NA	NA	NA	<300	NA	NA	<300
SB-23	10/25/90	NA	NA	NA	NA	<1000	NA	NA	<1000
SB-23	2/14/91	NA	<500	NA	NA	<500	NA	NA	<500
SB-23A	2/14/91	NA	<1	NA	NA	<1	NA	NA	<1
SB-23B	2/14/91	NA	<1	NA	NA	<1	NA	NA	<1
SB-25	8/03/90	NA	NA	NA	NA	<200	NA	NA	<200
SB-25	10/25/90	NA	NA	NA	NA	<120	NA	NA	<120
SB-25	2/13/91	NA	<500	NA	NA	<500	NA	NA	<500
SB-32	8/03/90	NA	NA	NA	NA	<20	NA	NA	78
SB-32	10/25/90	NA	NA	NA	NA	<25	NA	NA	<25
SB-32	2/12/91	NA	<20	NA	NA	<20	NA	NA	<20
SB-36	2/13/91	NA	<250	NA	NA	<250	NA	NA	<250
SW-01	6/23/90	NA	NA	NA	NA	<5	NA	NA	<5
SW-02	6/23/90	NA	NA	NA	NA	<1	NA	NA	<1
TW-01	7/18/90	NA	NA	NA	NA	<1	NA	NA	<1
CPT-01	4/09/91	NA	<4	NA	NA	<4	NA	NA	<4
CPT-02	4/09/91	NA	<5	NA	NA	<5	NA	NA	<5
CPT-03	4/09/91	NA	<50	NA	NA	<50	NA	NA	<50
CPT-04	4/09/91	NA	<100	NA	NA	<100	NA	NA	<100
CPT-06	4/10/91	NA	<2	NA	NA	<2	NA	NA	<2
CPT-07	10/02/91	NA	<10	NA	NA	<10	100	200	<10
CPT-08	10/02/91	<5	<100	NA	NA	<100	NA	NA	<100
CPT-09	10/02/91	NA	<50	NA	NA	<50	NA	NA	<50
CPT-10	9/10/91	25	<2	NA	NA	<2	NA	NA	<2
CPT-11	9/10/91	<5	<1	NA	NA	<1	NA	NA	<1

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	1,1,1-Tri-chloro-ethane	Methylene Chloride	Tetra-chloro-ethene	Tri-chloro-ethene	1,1-Di-chloro-ethene	1,2-Di-chloro-ethene	Cis-1,2-Di-chloro-ethene	Trans-1,2-Dichloro-ethene	1,1-Di-chloro-ethane	1,2-Di-chloro-ethane	Be
CPT-12	10/28/91	890	<100	2700	970	3400	NA	990	<20	430	<20	
CPT-13	10/28/91	88000	52000	36000	11000	38000	NA	4000	<500	1000	900	
CPT-14	10/28/91	3300	<120	3000	650	3700	NA	90	<25	100	<25	
CPT-15	10/28/91	160	<25	620	130	600	NA	40	<5	40	<5	
CPT-16	10/28/91	50	6700	400	200	400	NA	1,900	<50	710	<50	
CPT-17	10/29/91	5	<5	170	81	53	NA	3	<1	31	<1	
CPT-18	10/29/91	<1	<5	170	88	32	NA	3	<1	4	<1	
Quality Control Samples - duplicates and blanks												
MW-01	10/24/90	340	<50	710	680	1100	600	NA	NA	240	<10	
MW-01	2/11/91	200	<75	480	440	830	NA	400	<15	120	<15	
MW-02	8/01/90	27	<5	200	370	210	72	NA	NA	17	5	
SB-17	8/02/90	59000	13000	43000	6900	4300	<500	NA	NA	<500	<500	
SB-17B	2/12/91	1	<5	4	<1	<1	NA	<1	<1	<1	<1	
SB-23	8/03/90	63000	83000	31000	5200	16000	870	NA	NA	450	<300	
SB-23	10/25/90	78000	43000	27000	6600	14000	2600	NA	NA	<500	<500	
SB-23	2/14/91	110000	100000	44000	5400	11000	NA	500	<500	<500	1000	
SB-36	2/13/91	42000	18000	13000	1900	14000	NA	<300	<300	<300	<300	
CPT-06	4/10/91	94	<10	160	250	370	NA	160	5	88	<2	
CPT-08	10/02/91	4400	8200	12000	2000	3300	NA	<100	<100	400	<100	
CPT-10	9/10/91	5	<10	81	210	46	NA	5	<2	<2	<2	
CPT-13	10/28/91	62000	50000	38000	11000	50000	NA	3000	<500	900	900	
EQUIP	8/01/90	<1	<5	<1	<1	<1	<1	NA	NA	<1	<1	
EQUIP	8/02/90	<1	<5	<1	<1	<1	<1	NA	NA	<1	<1	
EQUIP	8/03/90	<1	<5	<1	<1	<1	<1	NA	NA	<1	<1	
EQUIP	10/24/90	<1	<5	<1	<1	<1	<1	NA	NA	<1	<1	
EQUIP	10/25/90	<1	<5	<1	<1	<1	<1	NA	NA	<1	<1	

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	Toluene	Ethyl Benzene	Total Xylenes	Acetone	4-Methyl-2-Pentanone (MIBK)	2-Butanone (MEK)	Chloroform	Dichlorofluoromethane	Trichlorofluoromethane	1,1,2-Trichloro-1,2,2-Trifluoroethane	1,1,2 fluoro- trich eth
CPT-12	10/28/91	<40	<20	100	<400	<200	<400	<20	200	100	NA	N
CPT-13	10/28/91	2000	<500	<500	<10000	<5000	<10000	<500	NA	NA	NA	N
CPT-14	10/28/91	<50	<25	<25	<500	<250	<500	<25	NA	NA	260	N
CPT-15	10/28/91	<10	<5	<5	<100	<50	<100	<5	120	40	NA	N
CPT-16	10/28/91	820	400	650	<1000	740	2,100	<50	NA	NA	NA	N
CPT-17	10/29/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
CPT-18	10/29/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	5
Quality Control Samples - duplicates and blanks												
MW-01	10/24/90	<20	<10	<10	<200	<100	<200	<10	NA	NA	NA	N
MW-01	2/11/91	<30	<15	<15	<300	<150	<300	<15	NA	NA	NA	N
MW-02	8/01/90	5	<1	<1	<20	<10	<20	1	NA	NA	NA	N
SB-17	8/02/90	1600	<500	<500	<10000	<5000	<10000	<500	NA	NA	NA	N
SB-17B	2/12/91	2	<1	<1	<20	<10	<20	<1	NA	NA	NA	N
SB-23	8/03/90	1500	400	<300	<6000	<3000	<6000	<300	NA	NA	NA	N
SB-23	10/25/90	2000	<500	<500	<10000	<5000	<10000	<500	NA	NA	NA	N
SB-23	2/14/91	3000	<500	620	<10000	<5000	<10000	<500	NA	NA	NA	N
SB-36	2/13/91	2000	<300	1300	<6000	<3000	<6000	<300	NA	NA	NA	N
CPT-06	4/10/91	<4	<2	<2	<40	<20	<40	<2	NA	36	NA	N
CPT-08	10/02/91	300	<100	700	<2000	<1000	<2000	<100	NA	NA	NA	N
CPT-10	9/10/91	<4	<2	<2	<40	<20	<40	<2	NA	18	NA	N
CPT-13	10/28/91	2000	<500	<500	<10000	<5000	<10000	<500	NA	NA	NA	N
EQUIP	8/01/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	N
EQUIP	8/02/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	N
EQUIP	8/03/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	N
EQUIP	10/24/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	N
EQUIP	10/25/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	N

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	Trichloro-trifluoro-ethane	1,1,2-Tri-chloro-ethane	Aliphatic Hydrocarbon C3	Cyclic Hydrocarbon	Dibromo-chloro-methane	Ethylmethyl-benzene Isomer	Trimethyl-benzene Isomer	Vinyl Chloride
CPT-12	10/28/91	200	<20	NA	NA	<20	NA	NA	<20
CPT-13	10/28/91	NA	<500	NA	NA	<500	NA	NA	<500
CPT-14	10/28/91	NA	<25	NA	NA	<25	NA	NA	<25
CPT-15	10/28/91	120	<5	NA	30	<5	NA	NA	<5
CPT-16	10/28/91	NA	<50	NA	NA	<50	NA	NA	<50
CPT-17	10/29/91	NA	1	700	NA	<1	NA	NA	<1
CPT-18	10/29/91	NA	<1	400	8	<1	NA	NA	<1
Quality Control Samples - duplicates and blanks									
MW-01	10/24/90	NA	NA	NA	NA	<10	NA	NA	<10
MW-01	2/11/91	NA	<15	NA	NA	<15	NA	NA	<15
MW-02	8/01/90	NA	NA	NA	NA	<1	NA	NA	<1
SB-17	8/02/90	NA	NA	NA	NA	<500	NA	NA	<500
SB-17B	2/12/91	NA	<1	NA	NA	<1	NA	NA	<1
SB-23	8/03/90	NA	NA	NA	NA	<300	NA	NA	<300
SB-23	10/25/90	NA	NA	NA	NA	<500	NA	NA	<500
SB-23	2/14/91	NA	<500	NA	NA	<500	NA	NA	<500
SB-36	2/13/91	NA	<300	NA	NA	<300	NA	NA	<300
CPT-06	4/10/91	NA	<2	NA	NA	<2	NA	NA	<2
CPT-08	10/02/91	<5	<100	NA	NA	<100	NA	NA	<100
CPT-10	9/10/91	22	<2	NA	NA	<2	NA	NA	<2
CPT-13	10/28/91	NA	<500	NA	NA	<500	NA	NA	<500
EQUIP	8/01/90	NA	NA	NA	NA	<1	NA	NA	<1
EQUIP	8/02/90	NA	NA	NA	NA	<1	NA	NA	<1
EQUIP	8/03/90	NA	NA	NA	NA	<1	NA	NA	<1
EQUIP	10/24/90	NA	NA	NA	NA	<1	NA	NA	<1
EQUIP	10/25/90	NA	NA	NA	NA	<1	NA	NA	<1

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	1,1,1-Tri-chloro-ethane	Methylene Chloride	Tetra-chloro-ethene	Tri-chloro-ethene	1,1-Di-chloro-ethene	1,2-Di-chloro-ethene	Cis-1,2-Di-chloro-ethene	Trans-1,2-Dichloro-ethene	1,1-Di-chloro-ethane	1,2-Di-chloro-ethane	Ben7
Quality Control Samples - duplicates and blanks												
EQUIP	2/11/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
EQUIP	2/12/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
EQUIP	2/13/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
EQUIP	2/14/91	25	<5	30	1	<1	NA	<1	<1	<1	<1	
EQUIP	4/09/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
EQUIP	9/10/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
EQUIP	10/02/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
EQUIP	10/28/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
FIELD	10/24/90	<1	<5	<1	<1	<1	<1	NA	NA	<1	<1	
FIELD	10/25/90	<1	<5	<1	<1	<1	<1	NA	NA	<1	<1	
Field	2/11/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
Field	2/12/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
Field	2/13/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
Field	2/14/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
Field	4/09/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
Field	9/10/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
Field	10/02/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
Field	10/28/91	<1	<5	<1	<1	<1	NA	<1	<1	<1	<1	
TRIP	7/18/90	1	<5	<1	<1	<1	<1	NA	NA	<1	<1	
TRIP	8/01/90	<1	<5	<1	<1	<1	<1	NA	NA	<1	<1	
TRIP	8/02/90	<1	<5	<1	<1	<1	<1	NA	NA	<1	<1	
TRIP	8/03/90	<1	<5	<1	<1	<1	2	NA	NA	<1	<1	

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	Toluene	Ethyl Benzene	Total Xylenes	Acetone	4-Methyl-2-Pentanone (MIBK)	2-Butanone (MEK)	Chloroform	Dichlorofluoromethane	Trichlorofluoromethane	1,1,2-Trichloro-1,2,2-Trifluoroethane	1,1,2 fluoro-trich eth
Quality Control Samples - duplicates and blanks												
EQUIP	2/11/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
EQUIP	2/12/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
EQUIP	2/13/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
EQUIP	2/14/91	2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
EQUIP	4/09/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
EQUIP	9/10/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
EQUIP	10/02/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
EQUIP	10/28/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
FIELD	10/24/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
FIELD	10/25/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
Field	2/11/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
Field	2/12/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
Field	2/13/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
Field	2/14/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
Field	4/09/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
Field	9/10/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
Field	10/02/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
Field	10/28/91	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
TRIP	7/18/90	<2	<1	<1	50	<10	<20	<1	NA	NA	NA	
TRIP	8/01/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
TRIP	8/02/90	<2	<1	<1	<20	<10	<20	<1	NA	NA	NA	
TRIP	8/03/90	2	<1	<1	<20	<10	<20	<1	NA	NA	NA	

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

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TABLE 19b. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 624/8240 COMPOUNDS

Location ID	Date Collected	Trichloro-trifluoro-ethane	1,1,2-Tri-chloro-ethane	Aliphatic Hydrocarbon C3	Cyclic Hydrocarbon	Dibromo-chloro-methane	Ethylmethyl-benzene Isomer	Trimethyl-benzene Isomer	Vinyl Chloride
Quality Control Samples - duplicates and blanks									
EQUIP	2/11/91	NA	<1	NA	NA	<1	NA	NA	<1
EQUIP	2/12/91	NA	<1	NA	NA	<1	NA	NA	<1
EQUIP	2/13/91	NA	<1	NA	NA	<1	NA	NA	<1
EQUIP	2/14/91	NA	<1	NA	NA	<1	NA	NA	<1
EQUIP	4/09/91	NA	<1	NA	NA	<1	NA	NA	<1
EQUIP	9/10/91	NA	<1	NA	NA	<1	NA	NA	<1
EQUIP	10/02/91	NA	<1	NA	NA	<1	NA	NA	<1
EQUIP	10/28/91	NA	<1	NA	NA	<1	NA	NA	<1
FIELD	10/24/90	NA	NA	NA	NA	<1	NA	NA	<1
FIELD	10/25/90	NA	NA	NA	NA	<1	NA	NA	<1
Field	2/11/91	NA	<1	NA	NA	<1	NA	NA	<1
Field	2/12/91	NA	<1	NA	NA	<1	NA	NA	<1
Field	2/13/91	NA	<1	NA	NA	<1	NA	NA	<1
Field	2/14/91	NA	<1	NA	NA	<1	NA	NA	<1
Field	4/09/91	NA	<1	NA	NA	<1	NA	NA	<1
Field	9/10/91	NA	<1	NA	NA	<1	NA	NA	<1
Field	10/02/91	NA	<1	NA	NA	<1	NA	NA	<1
Field	10/28/91	NA	<1	NA	NA	<1	NA	NA	<1
TRIP	7/18/90	NA	NA	NA	NA	<1	NA	NA	<1
TRIP	8/01/90	NA	NA	NA	NA	<1	NA	NA	<1
TRIP	8/02/90	NA	NA	NA	NA	<1	NA	NA	<1
TRIP	8/03/90	NA	NA	NA	NA	<1	NA	NA	<1

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.
4. TR indicates Trace. NA = Not Analyzed.

TABLE 19c. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 625 COMPOUNDS

Location ID	Date Collected	Phenol	2-Methyl Naph-thalene	4-Methyl-phenol	Benzoic Acid	Benzyl Alcohol	Isophorone	Naph-thalene
MW-01	8/01/90	<10	<10	<10	<50	<10	<10	<10
MW-02	8/01/90	<10	<10	<10	<50	<10	<10	<10
MW-03	8/02/90	<10	<10	<10	<50	<10	TR<10	<10
SB-04	8/03/90	<10	<10	<10	<50	<10	<10	<10
SB-07	8/03/90	<10	<10	<10	<50	<10	<10	<10
SB-10	8/02/90	<10	<10	<10	<50	<10	<10	<10
SB-13	8/02/90	<10	<10	<10	<50	<10	<10	<10
SB-17	8/02/90	<10	TR<10	<10	<50	<10	<10	16
SB-20	8/02/90	<10	<10	<10	<50	<10	TR<10	10
SB-23	8/03/90	<10	TR<10	<10	70	<10	TR<10	14
SB-25	8/03/90	<10	<10	<10	<50	<10	<10	<10
SB-32	8/03/90	<10	<10	<10	<50	<10	<10	<10
SW-01	6/23/90	65	<10	27	<50	TR<10	<10	<10
SW-02	6/23/90	<10	<10	<10	<50	<10	<10	<10
TW-01	7/18/90	<10	<10	<10	<50	<10	<10	<10
Quality Control Samples - duplicates and blanks								
MW-02	8/01/90	<10	<10	<10	<50	<10	<10	<10
SB-17	8/02/90	<10	TR<10	<10	<50	<10	<10	13
SB-23	8/03/90	<10	TR<10	<10	62	<10	<10	14
EQUIP	8/01/90	<10	<10	<10	<50	<10	<10	<10
EQUIP	8/02/90	<10	<10	<10	<50	<10	<10	<10
EQUIP	8/03/90	<10	<10	<10	<50	<10	<10	<10
TRIP	8/01/90	<10	<10	<10	<50	<10	<10	<10
TRIP	8/02/90	<10	<10	<10	<50	<10	<10	<10
TRIP	8/03/90	<10	<10	<10	<50	<10	<10	<10

Notes: 1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.

TABLE 19d. SUMMARY OF GROUNDWATER ANALYSIS - EPA METHOD 418.1 COMPOUNDS

Location ID	Date Collected	Petroleum Hydro-carbons IR
MW-01	8/01/90	<0.05
MW-02	8/01/90	<0.05
MW-03	8/02/90	<0.05
SB-04	8/03/90	0.07
SB-07	8/03/90	<0.05
SB-10	8/02/90	<0.05
SB-13	8/02/90	<0.05
SB-17	8/02/90	<0.05
SB-20	8/02/90	0.15
SB-23	8/03/90	0.06
SB-25	8/03/90	0.18
SB-32	8/03/90	0.62
TW-01	7/18/90	0.06
Quality Control Samples - duplicates and blanks		
MW-02	8/01/90	<0.05
SB-17	8/02/90	<0.05
SB-23	8/03/90	<0.05
EQUIP	8/01/90	<0.05
EQUIP	8/02/90	<0.05
EQUIP	8/03/90	<0.05
TRIP	8/01/90	<0.05
TRIP	8/02/90	<0.05
TRIP	8/03/90	<0.05

Notes:
1. All values in micrograms per liter (ug/L)
2. Compounds shown are those detected at one or more sample locations.
3. See Appendix for laboratory data reports.

Table 19e. Groundwater Volatile Organic Compounds Statistical Summary

Analyte	Onsite Frequency*	Onsite Range (µg/ℓ)	Offsite Frequency*	Offsite Range (µg/ℓ)
1,1,1-TCA	20/21	3-94,000	11/12	5-88,000
DCM	11/21	140-93,000	5/12	307-52,000
PCE	21/21	5-45,000	12/12	70-36,000
TCE	21/21	7-7,200	12/12	10-11,000
1,1-DCE	19/21	2-20,000	12/12	32-38,000
1,2-DCE	15/21	8-2,700	11/12	3-4,000
1,1-DCA	15/21	4-730	11/12	4-1,100
1,2-DCA	7/21	4-1,300	1/12	900
1,1,2-TCA	0/21	-	1/12	1
Vinyl Chloride	0/21	-	0/12	-
Benzene	4/21	4-210	4/12	20-70
Toluene	16/21	3-2,600	5/12	160-2,100
Ethylbenzene	1/21	440	3/12	180-400
Xylenes	8/21	14-1,200	5/12	100-860
Dichlorofluoromethane	0/21	-	2/12	120-200
Freon 11	1/21	28	3/12	24-100
Freon 113	0/21	-	3/12	9-260
Acetone	2/21	210-5,700	1/12	6,800
MIBK	0/21	-	2/12	740-1,200
MEK	0/21	-	2/12	2,100-5,300
Chloroform	1/21	34	0/12	-
Dibromochloromethane	1/21	12	0/12	-

* Number of wells/hydropunch locations with at least one detection ÷ total number of well/hydropunch locations.

Table 20. RELATIVE PERCENTS OF TOTAL CONCENTRATIONS OF SELECTED COMPOUNDS

WELL NUMBER	DATE	%DCM	%PCE	%TCE	%TCA	%1,1DCE	%1,2DCE	%1,1DCA	%1,2DCA
MW-01	AUG-90	0.00%	17.26%	16.97%	8.63%	31.64%	18.69%	6.61%	0.20%
	OCT-90	0.00%	19.35%	18.53%	9.26%	29.97%	16.35%	6.54%	0.00%
	OCT-90	0.00%	19.49%	19.12%	9.56%	29.04%	16.18%	6.62%	0.00%
	FEB-91	0.00%	19.41%	19.97%	8.32%	29.40%	17.75%	5.16%	0.00%
	FEB-91	0.00%	19.43%	17.81%	8.10%	33.60%	16.19%	4.86%	0.00%
MW-02	AUG-90	0.00%	21.44%	38.99%	2.92%	26.32%	7.80%	1.95%	0.58%
	OCT-90	0.00%	0.00%	82.83%	3.29%	8.16%	5.72%	0.00%	0.00%
	FEB-91	0.00%	18.40%	47.72%	2.52%	24.54%	5.32%	1.50%	0.00%
MW-03	AUG-90	2.98%	23.40%	4.89%	36.17%	25.53%	4.89%	2.13%	0.00%
	OCT-90	0.00%	18.15%	6.05%	33.28%	25.72%	9.53%	7.26%	0.00%
	FEB-91	0.00%	25.06%	4.78%	29.61%	29.61%	6.38%	4.56%	0.00%
SB-04	AUG-90	6.46%	18.93%	19.85%	12.47%	28.62%	11.54%	2.12%	0.00%
	OCT-90	3.45%	23.19%	22.65%	10.79%	30.74%	7.01%	2.16%	0.00%
	FEB-91	0.00%	24.92%	24.32%	9.12%	33.43%	6.69%	1.52%	0.00%
SB-07	AUG-90	0.00%	19.17%	3.15%	48.64%	28.61%	0.00%	0.43%	0.00%
	OCT-90	0.00%	31.84%	6.72%	31.84%	29.19%	0.00%	0.40%	0.00%
	FEB-91	0.00%	24.30%	5.01%	44.18%	26.51%	0.00%	0.00%	0.00%
SB-10	AUG-90	3.80%	25.97%	7.70%	26.89%	33.39%	0.77%	1.48%	0.00%
	OCT-90	0.00%	27.59%	0.00%	41.38%	31.03%	0.00%	0.00%	0.00%
	FEB-91	0.00%	26.05%	7.26%	33.49%	31.63%	0.00%	1.58%	0.00%
SB-13	AUG-90	22.23%	16.20%	27.63%	5.40%	20.01%	4.76%	2.10%	1.68%
	OCT-90	0.00%	23.36%	53.53%	3.89%	15.09%	2.19%	0.97%	0.97%
	FEB-91	0.00%	24.37%	27.62%	11.37%	29.24%	3.25%	2.27%	1.87%
SB-17	AUG-90	9.58%	33.16%	5.31%	47.90%	4.05%	0.00%	0.00%	0.00%
	OCT-90	44.03%	18.59%	5.19%	24.46%	6.16%	0.98%	0.00%	0.59%
	FEB-91	8.23%	30.86%	5.56%	47.33%	5.97%	2.06%	0.00%	0.00%
SB-32	AUG-90	0.00%	16.34%	21.61%	27.41%	28.99%	4.11%	1.53%	0.00%
	OCT-90	0.00%	15.65%	24.68%	27.69%	25.29%	3.97%	2.71%	0.00%
	FEB-91	0.00%	17.78%	25.06%	24.25%	26.68%	4.20%	2.02%	0.00%
SB-20	AUG-90	19.40%	19.40%	3.27%	36.76%	20.42%	0.55%	0.20%	0.00%
	OCT-90	20.32%	26.08%	4.25%	36.40%	12.13%	0.00%	0.36%	0.45%
	FEB-91	32.27%	21.14%	2.67%	31.16%	12.24%	0.00%	0.00%	0.51%
SB-23	AUG-90	42.47%	11.58%	2.80%	34.27%	8.21%	0.45%	0.22%	0.00%
	OCT-90	29.06%	14.53%	3.82%	46.82%	4.41%	1.35%	0.00%	0.00%
	OCT-90	25.12%	15.77%	3.86%	45.56%	8.18%	1.52%	0.00%	0.00%
	FEB-91	38.13%	16.40%	2.05%	38.54%	4.10%	0.25%	0.00%	0.53%
SB-25	AUG-90	74.20%	7.21%	4.33%	2.06%	9.48%	1.96%	0.76%	0.00%
	OCT-90	55.11%	11.24%	9.26%	3.97%	16.75%	3.31%	0.00%	0.35%
	FEB-91	73.72%	8.81%	5.29%	1.76%	10.42%	0.00%	0.00%	0.00%
SB-36	FEB-91	19.79%	15.13%	2.21%	46.57%	16.30%	0.00%	0.00%	0.00%
	FEB-91	20.25%	14.62%	2.14%	47.24%	15.75%	0.00%	0.00%	0.00%

Table 20. RELATIVE PERCENTS OF TOTAL CONCENTRATIONS OF SELECTED COMPOUNDS (continued)

WELL NUMBER	DATE	%DCM	%PCE	%TCE	%TCA	%1,1DCE	%1,2DCE	%1,1DCA	%1,2DCA
CPT-1	APR-91	0.00%	16.27%	30.37%	5.21%	23.86%	17.35%	6.94%	0.00%
CPT-2	APR-91	21.72%	15.93%	10.62%	29.44%	15.93%	2.12%	4.25%	0.00%
CPT-3	APR-91	31.31%	9.39%	13.78%	15.03%	11.90%	16.91%	1.69%	0.00%
CPT-4	APR-91	0.00%	22.58%	5.42%	45.17%	24.84%	0.34%	1.65%	0.00%
CPT-6	APR-91	0.00%	14.18%	21.81%	7.20%	32.72%	15.27%	8.83%	0.00%
CPT-7	OCT-91	9.66%	14.48%	3.78%	23.92%	30.22%	9.13%	8.81%	0.00%
CPT-8	OCT-91	25.87%	41.01%	6.62%	14.51%	10.73%	0.00%	1.26%	0.00%
CPT-9	OCT-91	66.97%	5.57%	1.50%	2.26%	7.15%	8.28%	8.28%	0.00%
CPT-10	SEPT-91	0.00%	22.53%	60.76%	1.27%	14.18%	1.27%	0.00%	0.00%
CPT-11	SEPT-91	0.00%	26.72%	3.82%	30.15%	25.95%	1.15%	12.21%	0.00%
CPT-12	OCT-91	0.00%	28.78%	10.34%	9.49%	36.25%	10.55%	4.58%	0.00%
CPT-13	OCT-91	22.52%	15.59%	4.76%	38.11%	16.46%	1.73%	0.43%	0.39%
CPT-14	OCT-91	0.00%	27.68%	6.00%	30.44%	34.13%	0.83%	0.92%	0.00%
CPT-15	OCT-91	0.00%	38.99%	8.18%	10.06%	37.74%	2.52%	2.52%	0.00%
CPT-16	OCT-91	64.67%	3.86%	1.93%	0.48%	3.86%	18.34%	6.85%	0.00%
CPT-17	OCT-91	0.00%	49.56%	23.62%	1.46%	15.45%	0.87%	9.04%	0.00%
CPT-18	OCT-91	0.00%	57.24%	29.63%	0.00%	10.77%	1.01%	1.35%	0.00%

Table 21. CONCENTRATION RATIOS FOR SELECTED COMPOUNDS

WELL NO	DATE	1,1DCA / 1,1DCE	1,1DCA / TCA	1,1DCE / TCA	1,1DCE / TCE	1,1DCE / TCA+TCE	1,2DCE / TCE	TCA / TCE	TCA / PCE	TCE / PCE	PCE / TCE	DCM / TCA
MW-01	AUG-90	0.21	0.77	3.67	1.86	1.24	1.10	0.51	0.50	0.98	1.02	0.00
	OCT-90	0.22	0.71	3.24	1.62	1.08	0.88	0.50	0.48	0.96	1.04	0.00
	OCT-90-D	0.23	0.69	3.04	1.52	1.01	0.85	0.50	0.49	0.98	1.02	0.00
	FEB-91	0.18	0.62	3.53	1.47	1.04	0.89	0.42	0.43	1.03	0.97	0.00
	FEB-91-D	0.14	0.60	4.15	1.89	1.30	0.91	0.45	0.42	0.92	1.09	0.00
MW-02	AUG-90	0.07	0.67	9.00	0.68	0.63	0.20	0.08	0.14	1.82	0.55	0.00
	OCT-90	0.00	0.00	2.48	0.10	0.09	0.07	0.04	ERR	ERR	0.00	0.00
	FEB-91	0.06	0.59	9.73	0.51	0.49	0.11	0.05	0.14	2.59	0.39	0.00
MW-03	AUG-90	0.08	0.06	0.71	5.22	0.62	1.00	7.39	1.55	0.21	4.78	0.08
	OCT-90	0.28	0.22	0.77	4.25	0.65	1.58	5.50	1.83	0.33	3.00	0.00
	FEB-91	0.15	0.15	1.00	6.19	0.86	1.33	6.19	1.18	0.19	5.24	0.00
SB-04	AUG-90	0.07	0.17	2.30	1.44	0.89	0.58	0.63	0.66	1.05	0.95	0.52
	OCT-90	0.07	0.20	2.85	1.36	0.92	0.31	0.48	0.47	0.98	1.02	0.32
	FEB-91	0.05	0.17	3.67	1.38	1.00	0.28	0.38	0.37	0.98	1.03	0.00
SB-07	AUG-90	0.02	0.01	0.59	9.09	0.55	0.00	15.45	2.54	0.16	6.09	0.00
	OCT-90	0.01	0.01	0.92	4.34	0.76	0.00	4.74	1.00	0.21	4.74	0.00
	FEB-91	0.00	0.00	0.60	5.29	0.54	0.00	8.82	1.82	0.21	4.85	0.00
SB-10	AUG-90	0.04	0.06	1.24	4.34	0.97	0.10	3.49	1.04	0.30	3.37	0.14
	OCT-90	0.00	0.00	0.75	ERR	0.75	ERR	ERR	1.50	0.00	ERR	0.00
	FEB-91	0.05	0.05	0.94	4.36	0.78	0.00	4.62	1.29	0.28	3.59	0.00
SB-13	AUG-90	0.10	0.39	3.71	0.72	0.61	0.17	0.20	0.33	1.71	0.59	4.12
	OCT-90	0.06	0.25	3.88	0.28	0.26	0.04	0.07	0.17	2.29	0.44	0.00
	FEB-91	0.08	0.20	2.57	1.06	0.75	0.12	0.41	0.47	1.13	0.88	0.00
SB-17	AUG-90	0.00	0.00	0.08	0.76	0.08	0.00	9.03	1.44	0.16	6.25	0.20
	OCT-90	0.00	0.00	0.25	1.19	0.21	0.19	4.72	1.32	0.28	3.58	1.80
	FEB-91	0.00	0.00	0.13	1.07	0.11	0.37	8.52	1.53	0.18	5.56	0.17
SB-32	AUG-90	0.05	0.06	1.06	1.34	0.59	0.19	1.27	1.68	1.32	0.76	0.00
	OCT-90	0.11	0.10	0.91	1.02	0.48	0.16	1.12	1.77	1.58	0.63	0.00
	FEB-91	0.08	0.08	1.10	1.06	0.54	0.17	0.97	1.36	1.41	0.71	0.00
SB 20	AUG 90	0.01	0.01	0.56	6.25	0.51	0.17	11.25	1.89	0.17	5.94	0.53
	OCT 90	0.03	0.01	0.33	2.86	0.30	0.00	8.57	1.40	0.16	6.14	0.56
	FEB 91	0.00	0.00	0.39	4.58	0.36	0.00	11.67	1.47	0.13	7.92	1.04

Table 21. CONCENTRATION RATIOS FOR SELECTED COMPOUNDS (continued)

WELL NO	DATE	1,1DCA / 1,1DCE	1,1DCA / TCA	1,1DCE / TCA	1,1DCE / TCE	1,1DCE / TCA+TCE	1,2DCE / TCE	TCA / TCE	TCA / PCE	TCE / PCE	PCE / TCE	DCM / TCA
SB-23	AUG-90	0.03	0.01	0.24	2.93	0.22	0.16	12.24	2.96	0.24	4.14	1.24
	OCT-90	0.00	0.00	0.09	1.15	0.09	0.35	12.25	3.22	0.26	3.80	0.62
	OCT-90-D	0.00	0.00	0.18	2.12	0.17	0.39	11.82	2.89	0.24	4.09	0.55
	FEB-91	0.00	0.00	0.11	2.00	0.10	0.12	18.80	2.35	0.13	8.00	0.99
SB-25	AUG-90	0.08	0.37	4.60	2.19	1.48	0.45	0.48	0.29	0.60	1.67	36.00
	OCT-90	0.00	0.00	4.22	1.81	1.27	0.36	0.43	0.35	0.82	1.21	13.89
	FEB-91	0.00	0.00	5.91	1.97	1.48	0.00	0.33	0.20	0.60	1.67	41.82
SB-36	FEB-91	0.00	0.00	0.35	7.37	0.33	0.00	21.05	3.08	0.15	6.84	0.43
	FEB-91-D	0.00	0.00	0.33	7.37	0.32	0.00	22.11	3.23	0.15	6.84	0.43
CPT-1	APR-91	0.29	1.33	4.58	0.79	0.67	0.57	0.17	0.32	1.87	0.54	0.00
CPT-2	APR-91	0.27	0.14	0.54	1.50	0.40	0.20	2.77	1.85	0.67	1.50	0.74
CPT-3	APR-91	0.14	0.11	0.79	0.86	0.41	1.23	1.09	1.60	1.47	0.68	2.08
CPT-4	APR-91	0.07	0.04	0.55	4.58	0.49	0.06	8.33	2.00	0.24	4.17	0.00
CPT-6	APR-91	0.27	1.23	4.55	1.50	1.13	0.70	0.33	0.51	1.54	0.65	0.00
CPT-7	OCT-91	0.29	0.37	1.26	8.00	1.09	2.42	6.33	1.65	0.26	3.83	0.40
CPT-8	OCT-91	0.12	0.09	0.74	1.62	0.51	0.00	2.19	0.35	0.16	6.19	1.78
CPT-9	OCT-91	1.16	3.67	3.17	4.75	1.90	5.50	1.50	0.41	0.27	3.70	29.67
CPT-10	SEP-91	0.00	0.00	11.20	0.23	0.23	0.02	0.02	0.06	2.70	0.37	0.00
CPT-11	SEP-91	0.47	0.41	0.86	6.80	0.76	0.30	7.90	1.13	0.14	7.00	0.00
CPT-12	OCT-91	0.13	0.48	3.82	3.51	1.83	1.02	0.92	0.33	0.36	2.78	0.00
CPT-13	OCT-91	0.03	0.01	0.43	3.45	0.38	0.36	8.00	2.44	0.31	3.27	0.59
CPT-14	OCT-91	0.03	0.03	1.12	5.69	0.94	0.14	5.08	1.10	0.22	4.62	0.00

Table 21. CONCENTRATION RATIOS FOR SELECTED COMPOUNDS (continued)

WELL NO	DATE	1,1DCA / 1,1DCE	1,1DCA / TCA	1,1DCE / TCA	1,1DCE / TCE	1,1DCE / TCA+TCE	1,2DCE / TCE	TCA / TCE	TCA / PCE	TCE / PCE	PCE / TCE	DCM / TCA
CPT-15	OCT-91	0.07	0.25	3.75	4.62	2.07	0.31	1.23	0.26	0.21	4.77	0.00
CPT-16	OCT-91	1.78	14.20	8.00	2.00	1.60	9.50	0.25	0.13	0.50	2.00	134.00
CPT-17	OCT-91	0.58	6.20	10.60	0.65	0.62	0.04	0.06	0.03	0.48	2.10	0.00
CPT-18	OCT-91	0.13	ERR	ERR	0.36	0.36	0.03	0.00	0.00	0.52	1.93	ERR
MCK-MW-01*		0.08	0.00	0.04	7.11	0.04	0.00	195.56	8.00	0.04	24.44	0.49
MCK-MW-03*		0.00	0.00	0.03	5.00	0.03	0.00	146.67	10.00	0.07	14.67	0.30
MCK-MW-04*		0.15	0.01	0.05	1.10	0.04	0.00	23.87	7.71	0.32	3.10	0.99

NOTES:

"D" Indicates duplicate sample
ERR Indicates the compound in the denominator of the ratio was not detected
* Monitoring wells installed by McKesson Environmental Services and sampled prior to this investigation

Table 22. Groundwater Duplicate Sample Relative Percent Difference Summary (RPD%)

Well	Sample Date	Analyte						
		1,1,1-TCA	PCE	TCE	DCM	1,1-DCE	1,1-DCA	Ave RPD
MW-01	10/90	26.7	29	26.7	ND	32.8	28.6	28.8
	2/91	28.6	31.3	20	ND	44.1	25.4	29.9
MW-02	8/90	10.5	9.5	7.8	ND	25	16.2	13.8
SB-17	8/90	9.7	4.5	4.3	0.0	24.5	ND	8.6
SB-17B	2/91	66.7	22.2	194.0	ND	ND	ND	94.3
SB-23	8/90	11.9	25.4	10.9	5.8	6.1	2.2	10.4
	10/90	10.9	0.0	7.3	22.7	52.3	ND	18.6
	2/91	15.7	9.5	7.7	7.3	9.5	ND	9.9
SB-36	2/91	4.9	0.0	0.0	5.7	0.0	ND	2.1
CPT-6	4/91	35.0	20.7	22.2	ND	20.9	8.3	21.4
CPT-8	10/91	4.4	8.0	4.9	0.0	3.0	0.0	3.4
CPT-10	9/91	0.0	9.4	13.3	ND	21.8	ND	11.1
CPT-13	10/91	34.7	5.4	0.0	3.9	27.3	10.5	13.6
Ave RPD		19.9	13.4	24.5	6.5	20.6	13.0	

$$RPD = \frac{(Sample - Duplicate)}{\frac{Sample + Duplicate}{2}} \times 100$$

ND = Analyte not detected

92MKC002.tb2

SFD1423

Table 23. Physical and Chemical Properties of Selected Solvent Compounds

Compound	MW (grams)	S (mg/L)	Po (torr)	Koc (mL/g)	d (g/cm3)	BP (deg C)	u Absolute Viscosity (cp)	v Kinematic Viscosity (cs)	H (atm-m3/mo	Relative Vapor Density*
1,1,1-TCA	133.4	720**	100	152	1.35	74	0.84	0.62	0.01300	1.47
PCE	165.8	200	14	364	1.63	121	0.90	0.54	0.01310	1.09
TCE	131.5	1100	58	126	1.46	87	0.57	0.39	0.00710	1.27
DCM	84.9	20000	349	8.8	1.33	40	0.44	0.32	0.00170	1.89
1,1-DCE	97	400	590	65	1.22	32	0.36	0.30	0.02100	2.54
1,2-cis-DCE	97	800**	200**	-	1.28	60	0.48	0.38	0.00290	1.62
1,2-trans-DCE	97	600	326	59	1.26	48	0.40	0.32	0.07200	2.01
1,1-DCA	99	5500	180	30	1.17	57	0.50	0.43	0.00430	1.57
1,2-DCA	99	8690	61	14	1.26	83	0.84	0.67	0.00091	1.19
trichlorofluoromethane	137.4	1100	667	159	1.49	24	-	-	0.11000	4.28
carbon tetrachloride	153.8	785	90	439	1.59	77	0.97	0.61	0.02300	1.51
1,1,2,2-PCA	167.9	2900	5	118	1.60	146	1.76	1.12	0.00038	1.03

Note:

Temperature of measurement is 20 degrees Celsius unless otherwise noted. MW = molecular weight (grams); S = solubility in water (milligrams per liter); Po = vapor pressure (torr); Koc = sediment/water partition coefficient (milliliters per gram); d = density (grams per cubic centimeter); BP = boiling point at 760 torr pressure (degrees Celsius); u = absolute viscosity (centipoise); v = kinematic viscosity (centistoke); H = Henry's Law constant for partitioning between air and water (atmosphere-cubic meters per mole); and Relative Vapor Density is the vapor density relative to dry air (dimensionless).

* Relative Vapor Density values have been calculated as the density of dry air saturated with the compound of interest at 20 degrees C. It represents the weighted mean molecular weight of the compound-saturated air relative the mean molecular weight of dry air which is 29.0 grams per mole. If MW = molecular weight of the compound of interest, the relative vapor density value may be calculated as:

$$RVD = \frac{Po/760 * MW + 760 - Po/760 * 29.0}{29.0}$$

If the relative vapor density relative to air saturated with water is desired, then the mean molecular weight for moist air at 20 degrees Celsius (28.75) should be used in place of 29.0 in the above formula.

** Value measured at 25 degrees Celsius.

Data source: Schwille, Friedrich, 1988.

Table 24. Comparison of Groundwater Cleanup Levels with Selected Water Quality Criteria

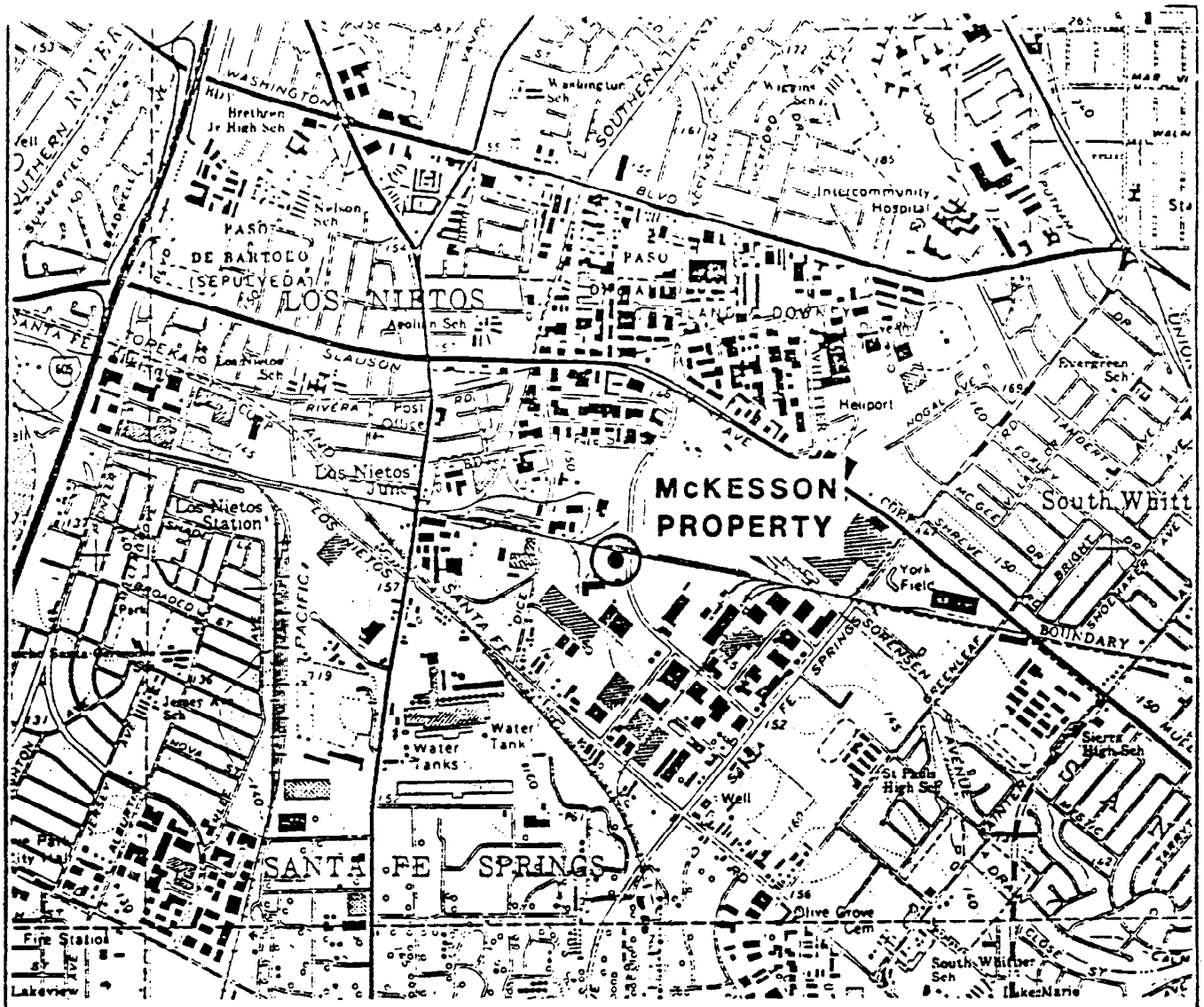
Chemical	Cleanup Level[1] (ppb)	Water Quality Criteria (ppb)			
		USEPA MCL[2]	Cal-EPA MCL[3]	USEPA Health Advisory	SNARL[4]
1,1,1-Trichloroethane	10,600 (94,000)	200	200	200	3,800
1,2-Dichloroethane	450 (1,300)	0.5	5	700 (10-day)	---
Methylene Chloride	5,500 (93,000)	5	—	1,500 (10-day)	5,000 (7-day)
Tetrachloroethene	800 (45,000)	5	5	1,000/5,000 (7-year)	
Trichloroethene	3,700 (11,000)	5	5	---	---

* All standards taken from Cal-EPAs A Compilation of Water Quality Criteria (Cal-EPA, 1991)

[1] Numbers in parentheses are maximally detected concentrations.
[2] USEPA maximum contaminant level (MCL) for drinking water.
[3] Cal-EPA maximum contaminant level (MCL) for drinking water.
[4] Suggested No-Adverse Response Level (SNARL) established by the National Academy of Sciences.

Table 25. Soil Cleanup Levels

Chemical	Soil Cleanup Levels (mg/kg)	Maximum Detected Concentration (mg/kg)
1,1,1-Trichloroethane	1,700	3,500
1,2-Dichloroethane	69	32
Methylene Chloride	460	380
Tetrachloroethane	170	2,900
Trichloroethene	725	60



Reference: USGS 7.5-minute quadrangle, Whittier, California (photorevised 1981)

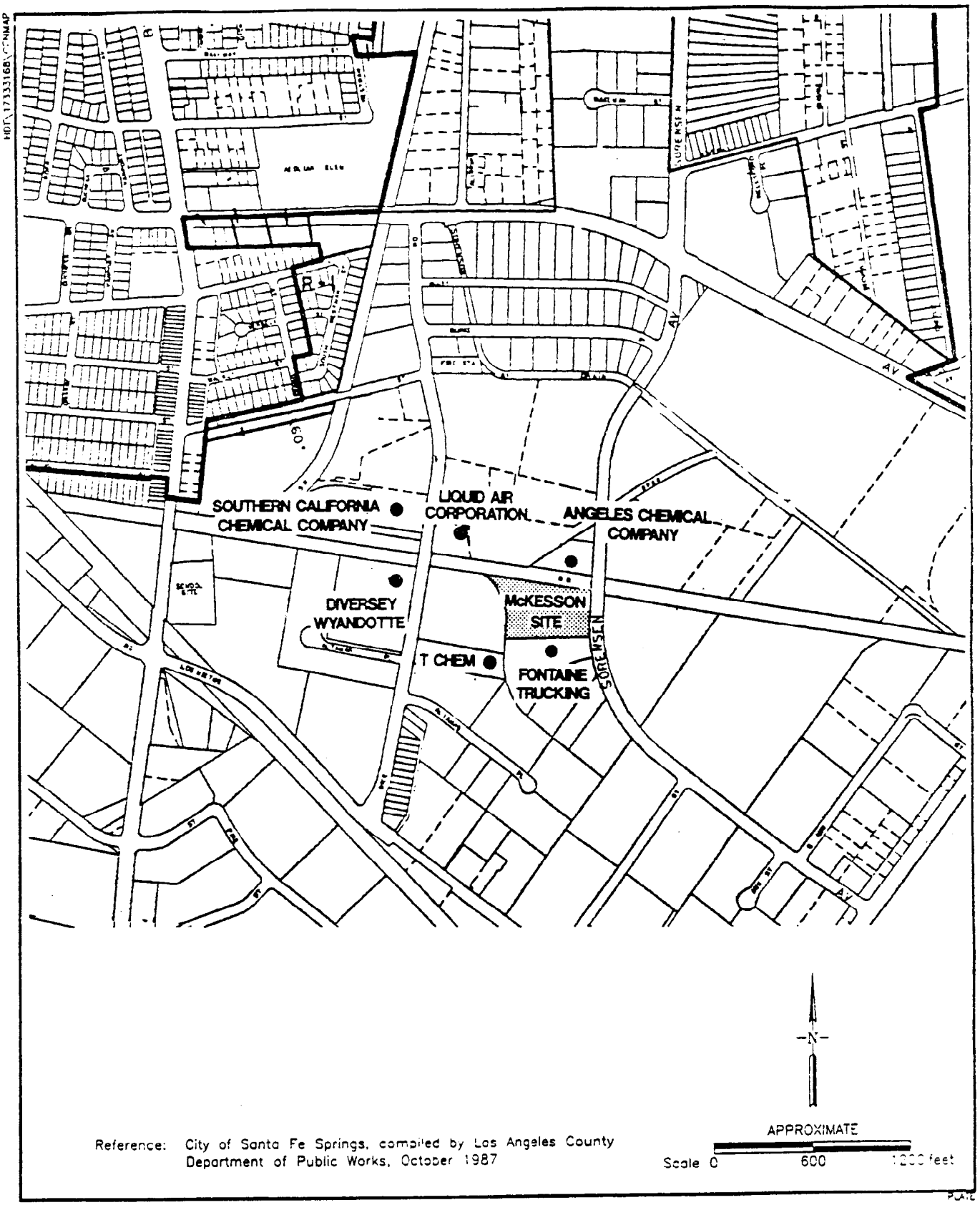
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

GENERAL LOCATION MAP
McKesson Corporation Property
Santa Fe Springs, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17333,168.11	TAC	1/92		

SFD1427



Reference: City of Santa Fe Springs, compiled by Los Angeles County Department of Public Works, October 1987

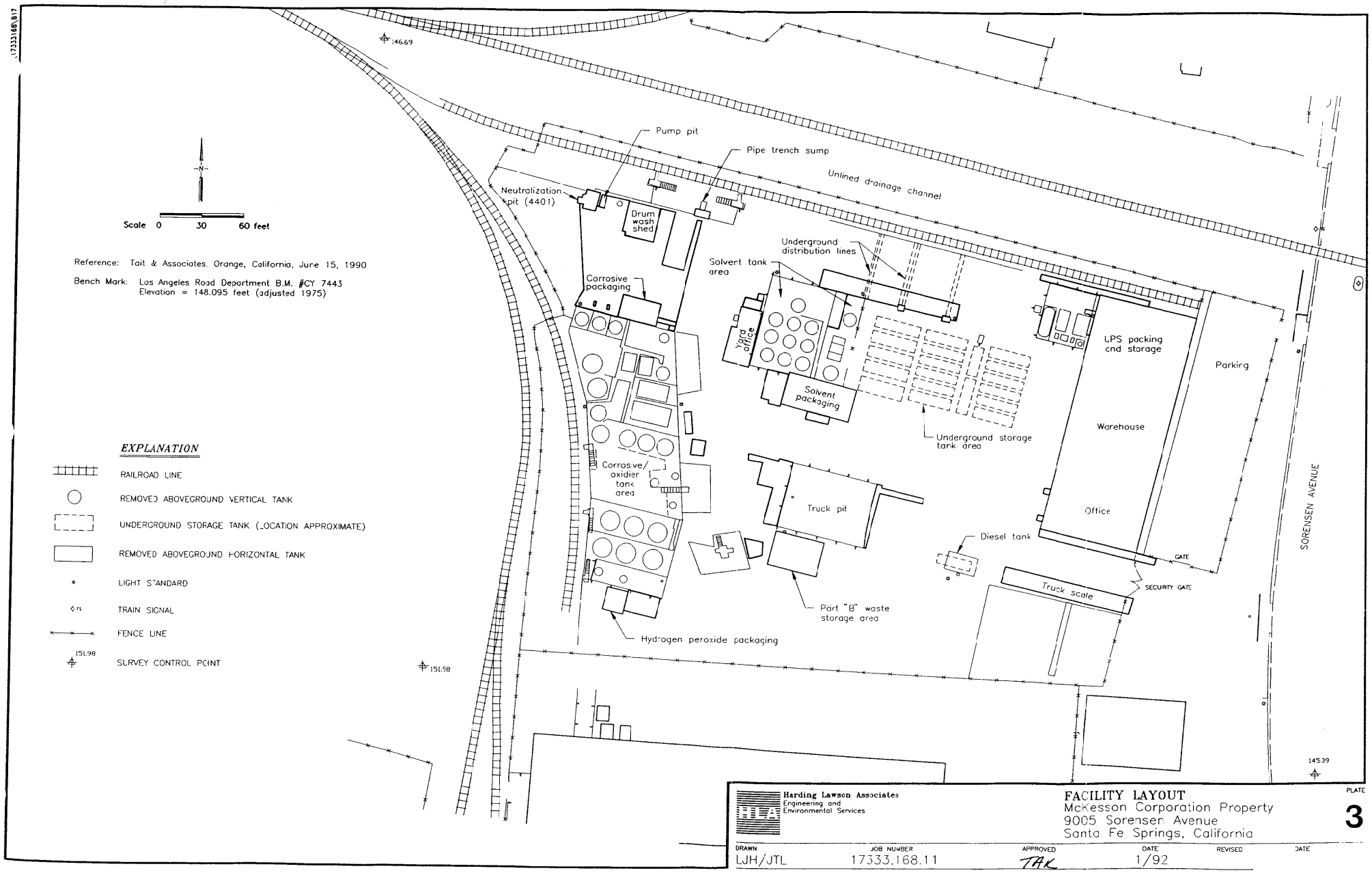
Harding Lawson Associates
Engineering and Environmental Services

NEIGHBORING FACILITIES
Mckesson Corporation Property
Santa Fe Springs, California

PLATE 2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333.168.11	TAK	1/92		

SFD1428



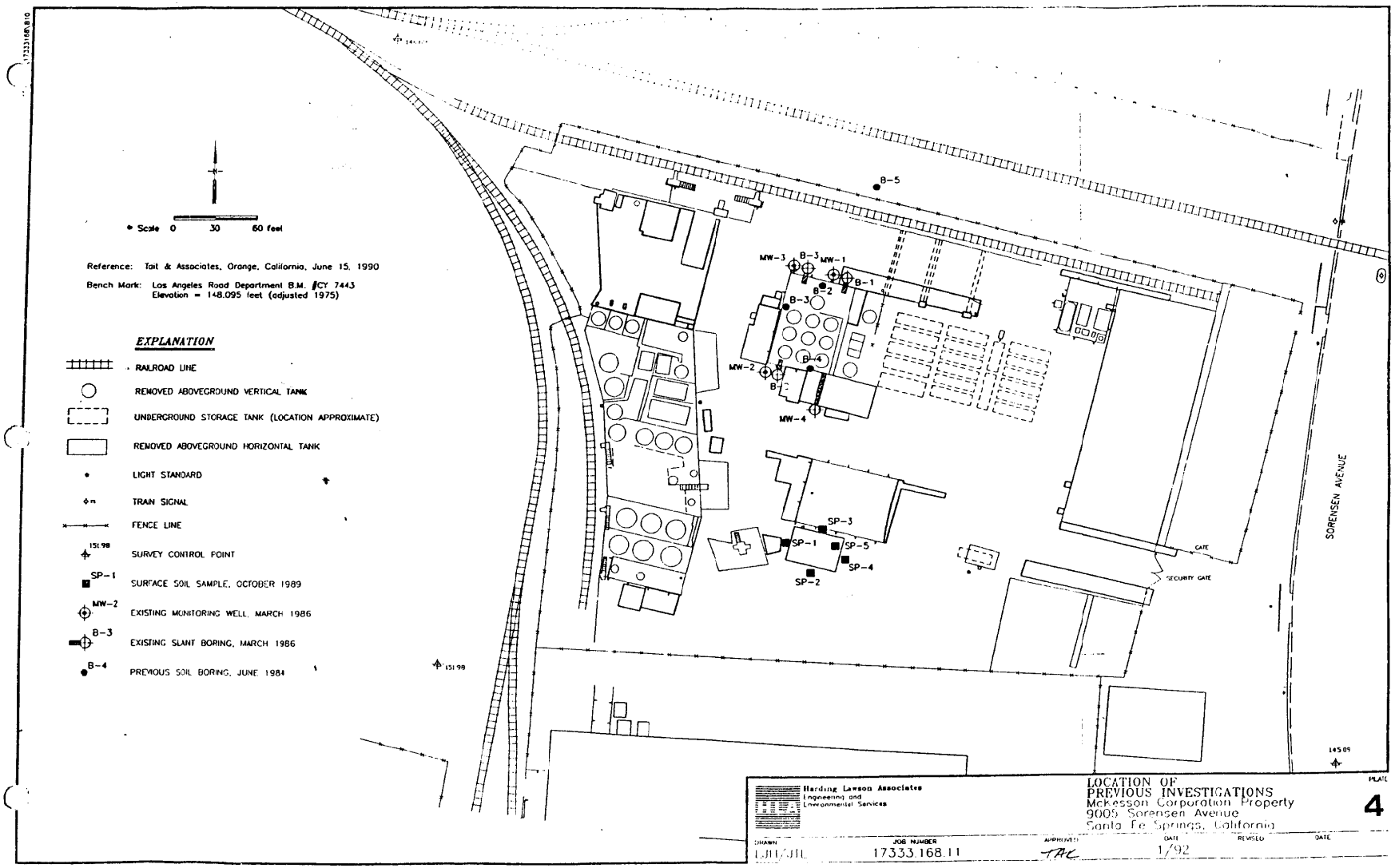
Harding Lawson Associates
Engineering and Environmental Services

FACILITY LAYOUT
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California

PLATE **3**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LJH/JTL	17333.168.11	TAK	1/92		

MCK0006810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Reference: Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
SURFACE SOIL SAMPLE, OCTOBER 1989
EXISTING MONITORING WELL, MARCH 1986
EXISTING SLANT BORING, MARCH 1986
PREVIOUS SOIL BORING, JUNE 1984
B-5
MW-3
B-3
MW-1
B-1
B-2
B-3
B-4
MW-2
B-2
MW-4
SP-3
SP-1
SP-5
SP-4
SP-2
GATE
SECURITY GATE
SORENSEN AVENUE
Harding Lawson Associates
Engineering and Environmental Services
LOCATION OF
PREVIOUS INVESTIGATIONS
Mckesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE
4
DRAWN LJH/JIL
JOB NUMBER 17333.168.11
APPROVED TAC
DATE 1/92
REVISED
DATE

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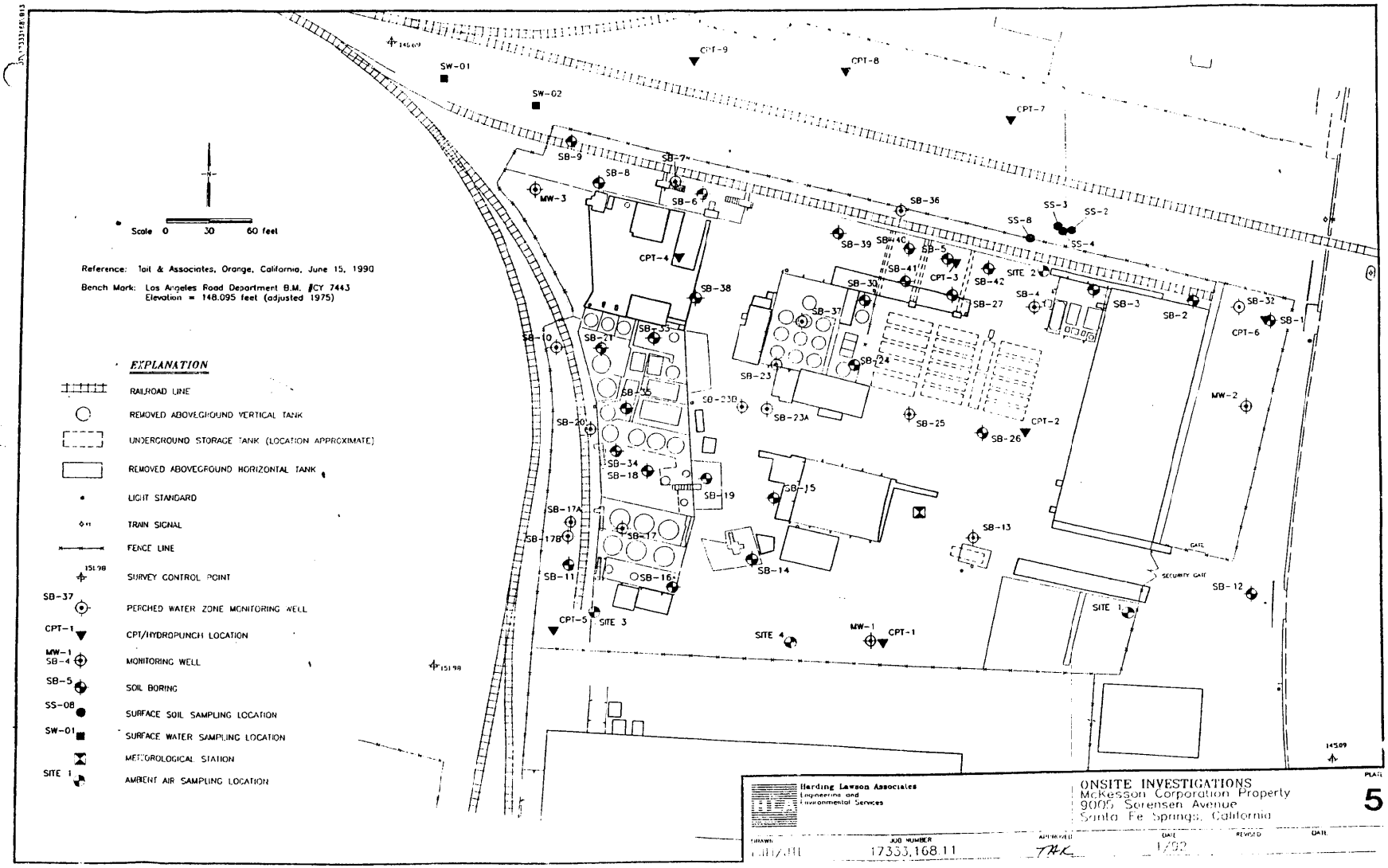
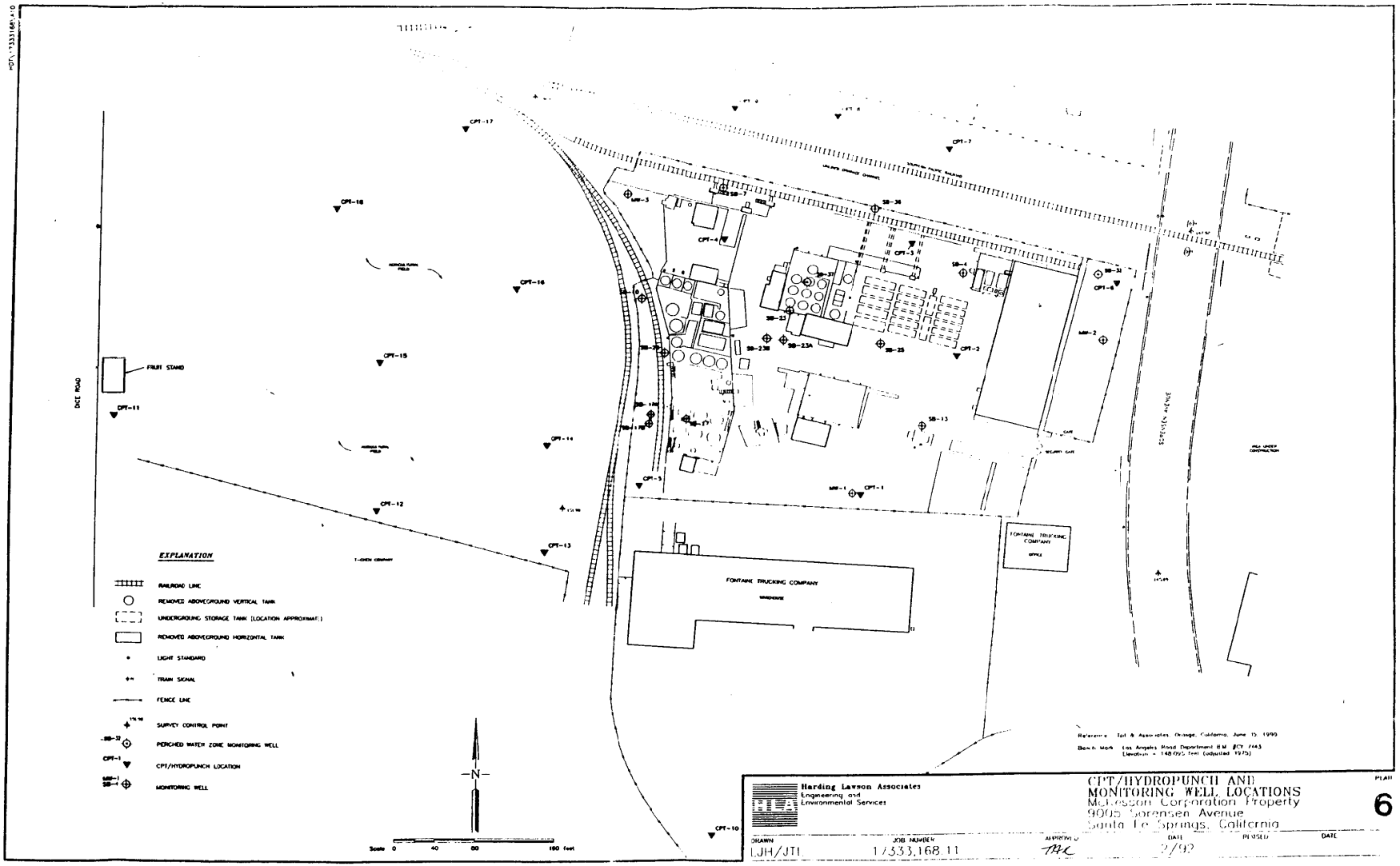
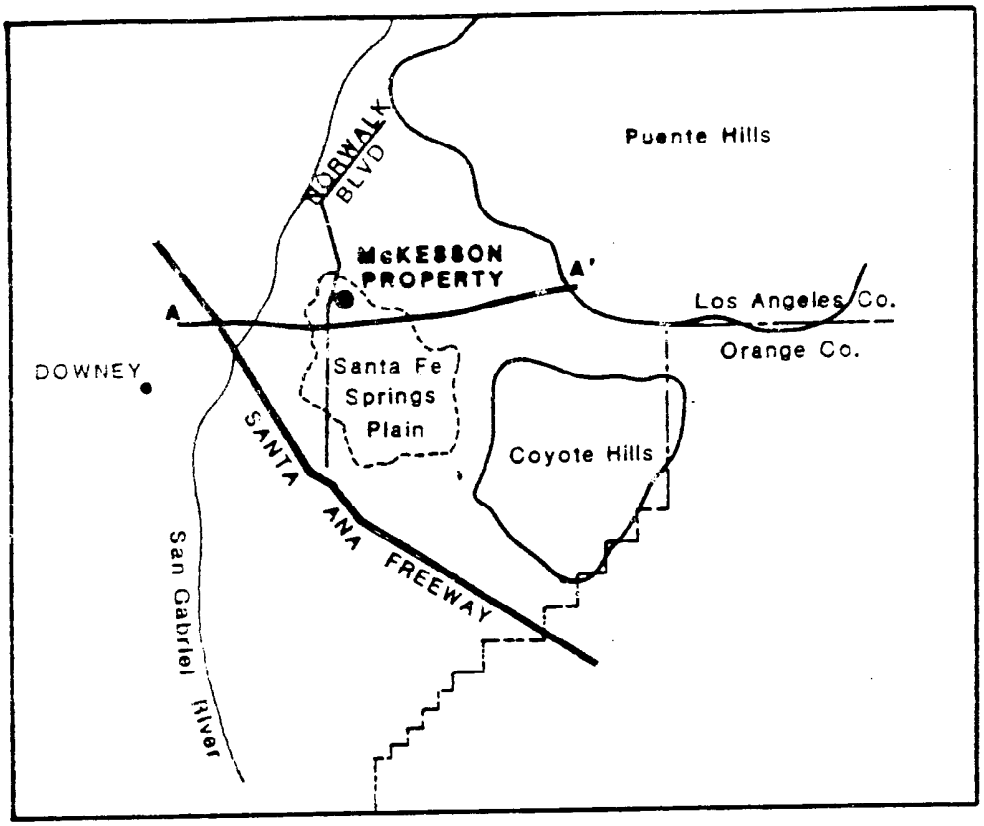

Scale 0 30 60 feet
Reference: Ioil & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
PERCHED WATER ZONE MONITORING WELL
CPT/HYDROPUNCH LOCATION
MONITORING WELL
SOIL BORING
SURFACE SOIL SAMPLING LOCATION
SURFACE WATER SAMPLING LOCATION
METEOROLOGICAL STATION
AMBIENT AIR SAMPLING LOCATION
SW-01
SW-02
CPT-9
CPT-8
CPT-7
CPT-6
CPT-5
CPT-4
CPT-3
CPT-2
CPT-1
MW-1
MW-2
MW-3
SS-2
SS-3
SS-4
SS-8
SITE 1
SITE 2
SITE 3
SITE 4
SECURITY GATE
GATE
Harding Lawson Associates
Engineering and Environmental Services
ONSITE INVESTIGATIONS
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
JOB NUMBER
17333,168.11
APPROVED
THK
DATE
1/92
REVISED
DATE
PLATE
5

SFD1430



FRUIT STAND
DICE ROAD
CPT-11
CPT-12
CPT-13
CPT-14
CPT-15
CPT-16
CPT-17
CPT-18
CPT-1
CPT-2
CPT-3
CPT-4
CPT-5
CPT-6
CPT-7
CPT-10
SB-13
SB-23
SB-23A
SB-23B
SB-25
SB-36
SB-37
SB-4
SB-31
MW-1
MW-2
MW-3
FONTAINE TRUCKING COMPANY
FONTAINE TRUCKING COMPANY
SORENSEN AVENUE
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
PERCHED WATER ZONE MONITORING WELL
CPT/HYDROPUNCH LOCATION
MONITORING WELL
N
Scale 0 40 80 160 feet
Reference: Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7143
Elevation = 148.095 feet (adjusted 1975)
Harding Lawson Associates
Engineering and Environmental Services
CPT/HYDROPUNCH AND MONITORING WELL LOCATIONS
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE
6
DRAWN
LJH/JTL
JOB NUMBER
17333,168.11
APPROVED
DATE
2/92
REVISED
DATE

SFD1431



EXPLANATION

A ——— A' Hydrogeologic Cross-section (Plate 6)

County line

Plain boundary line

-N-

Reference: California Department of Water Resources Bulletin No. 104. Appendix A. June 1981.

Scale 0 1 2 3 miles

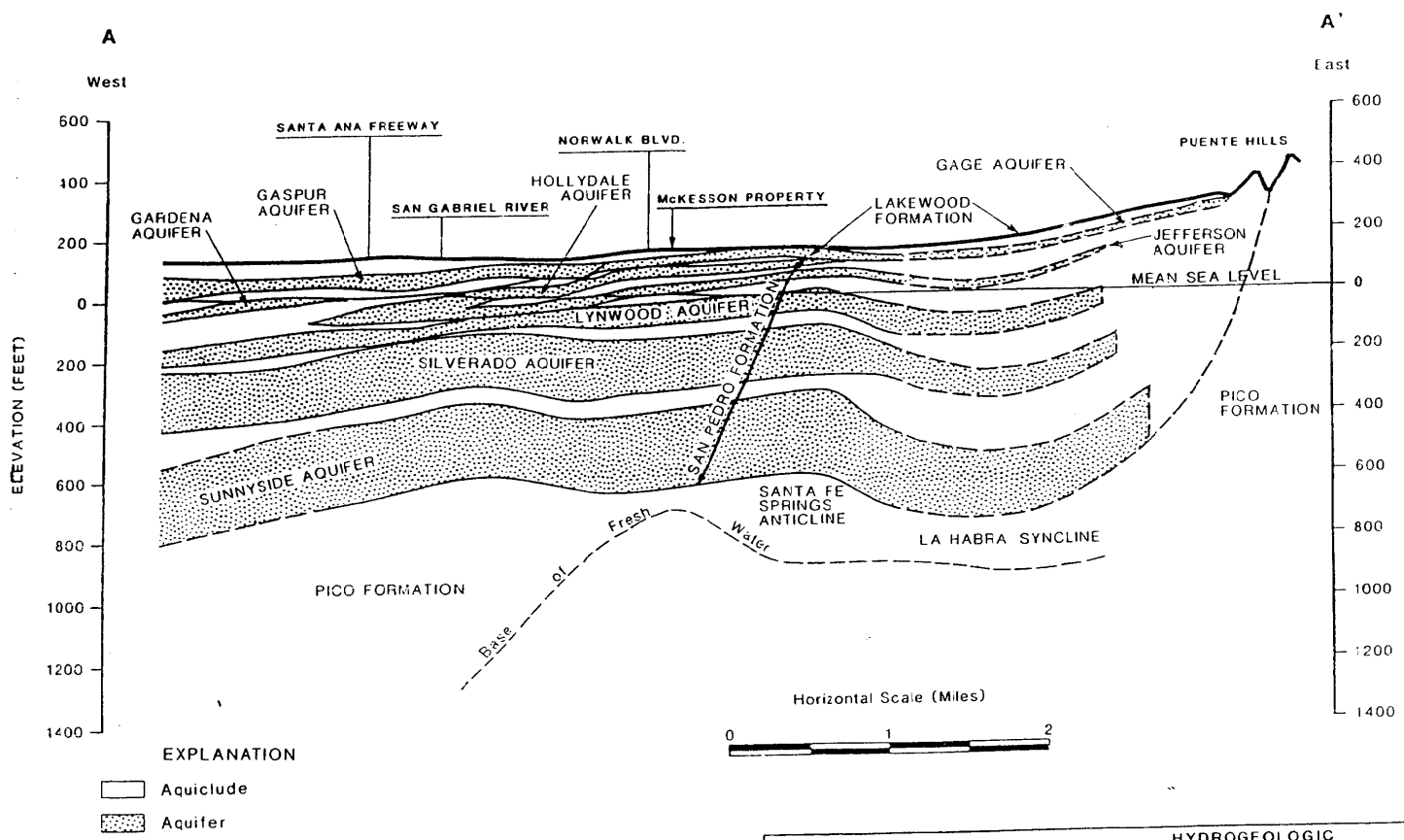
Harding Lawson Associates
Engineers, Geologists & Geophysicists

PHYSIOGRAPHIC MAP
McKesson Corporation Property
Santa Fe Springs, California

PLATE 7

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17333.168.11	TAK	1/92		

SFD1432



EXPLANATION

Aquiclude

Aquifer

Reference: California Department of Water Resources Bulletin No. 104. Appendix A. June 1981

Harding Lawson Associates
Engineers, Geologists & Geophysicists

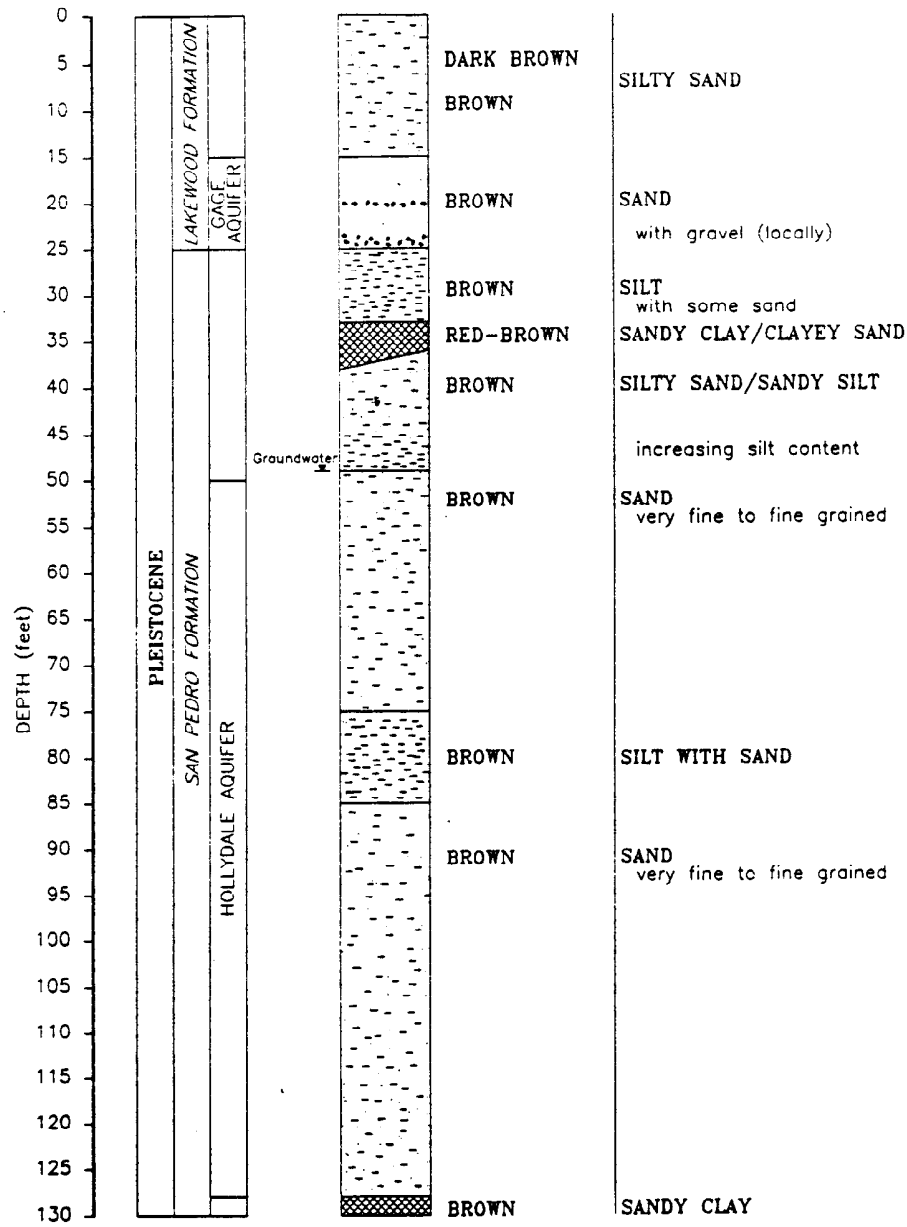
HYDROGEOLOGIC CROSS-SECTION
McKesson Corporation Property
Santa Fe Springs, California

FIG. 8

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
k.m	17333,168.11	TAK	1/92		

SFD1433

HDT\17333168\STRAT



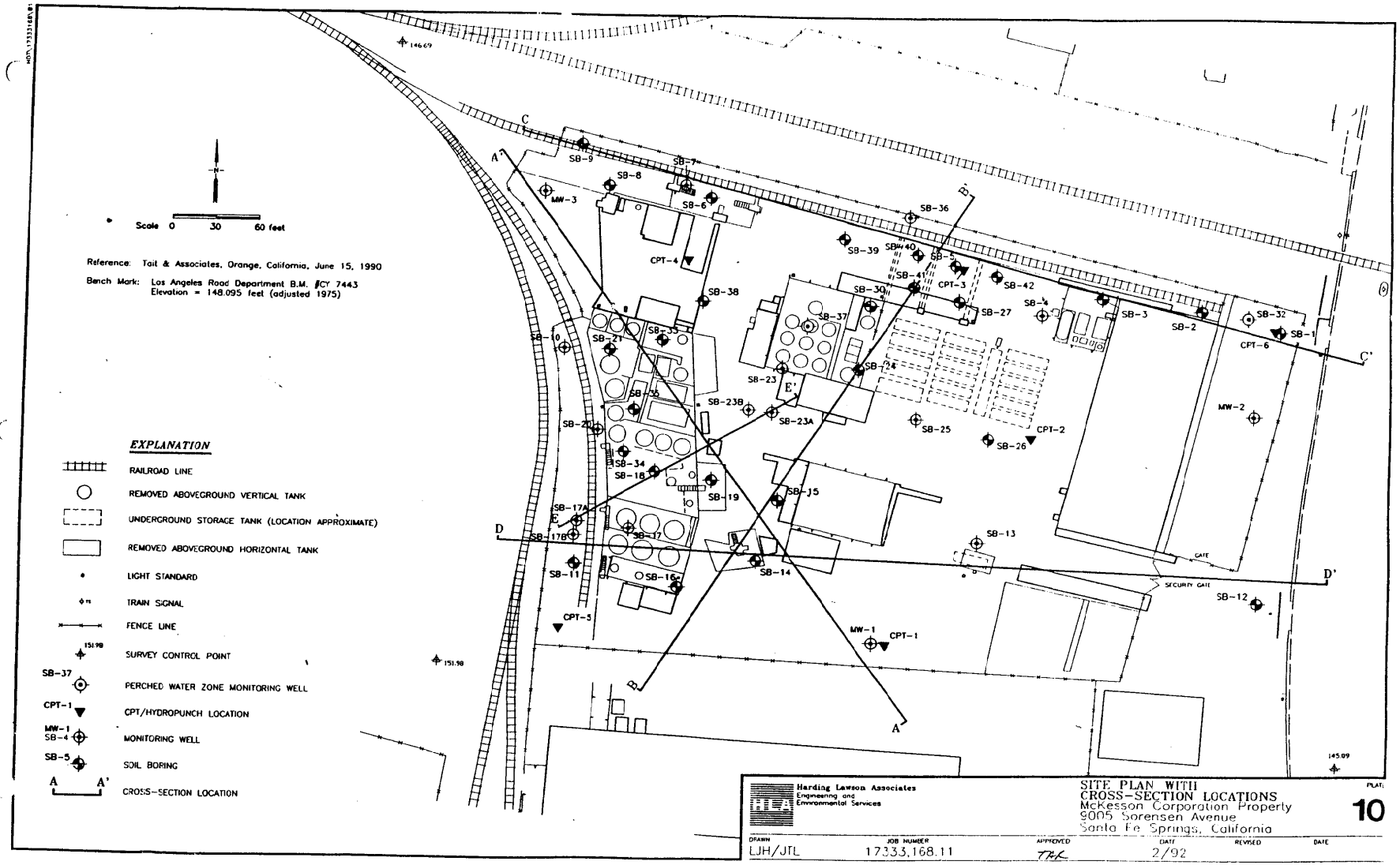
Harding Lawson Associates
Engineering and Environmental Services

GENERALIZED SITE STRATIGRAPHIC SECTION
McKesson Corporation Property
Santa Fe Springs, California

PLATE 9

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TAK	1/92		

SFD1434



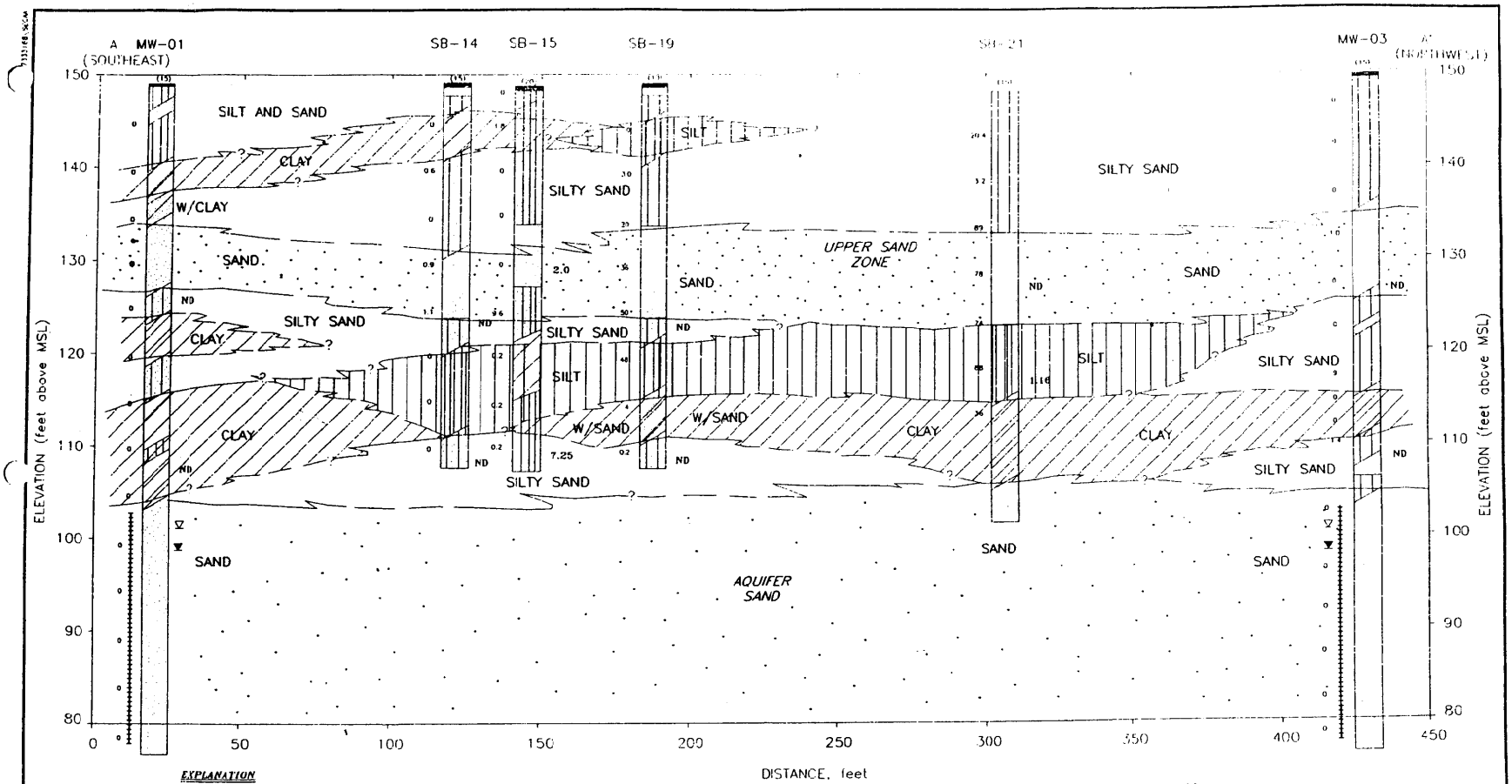
Harding Lawson Associates
Engineering and Environmental Services

SITE PLAN WITH CROSS-SECTION LOCATIONS
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California

PLATE 10

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LJH/JTL	17333,168.11	THK	2/92		

SFD1435



EXPLANATION

——— — —?	Geologic contact, dashed where approximate, queried where uncertain
(15)	Distance, in feet, of projection into line of cross section
MSL	Mean Sea Level
▽	Water level measured on 8/17/90
▼	Ground-water level encountered during drilling
‡	Screened section of well
88	Field OVA reading
1.16	Total volatile organics (Method 8240) in ppm, ND indicates not detected

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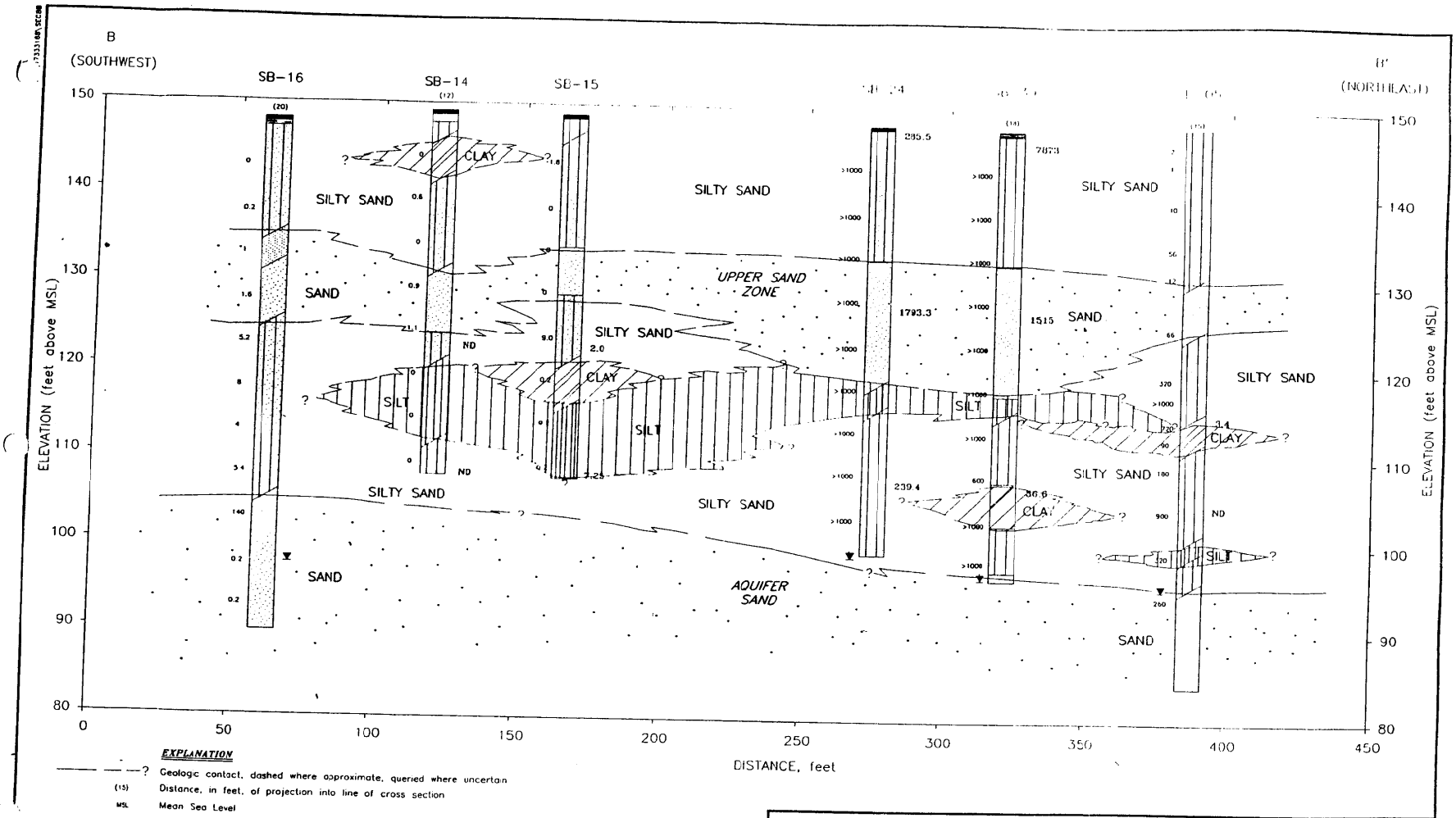
CROSS SECTION A-A'
Mckesson Corporation Property
Santa Fe Springs, California

PLATE 11

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JAV	17333,368 11	TAK	1/92		

SFD1436



EXPLANATION

- ——— ? Geologic contact, dashed where approximate, queried where uncertain
- (15) Distance, in feet, of projection into line of cross section
- MSL Mean Sea Level
- ▼ Ground-water level encountered during drilling
- 66 Field OVA reading
- 1515 Total volatile organics (Method 8240) in ppm, ND indicates not detected

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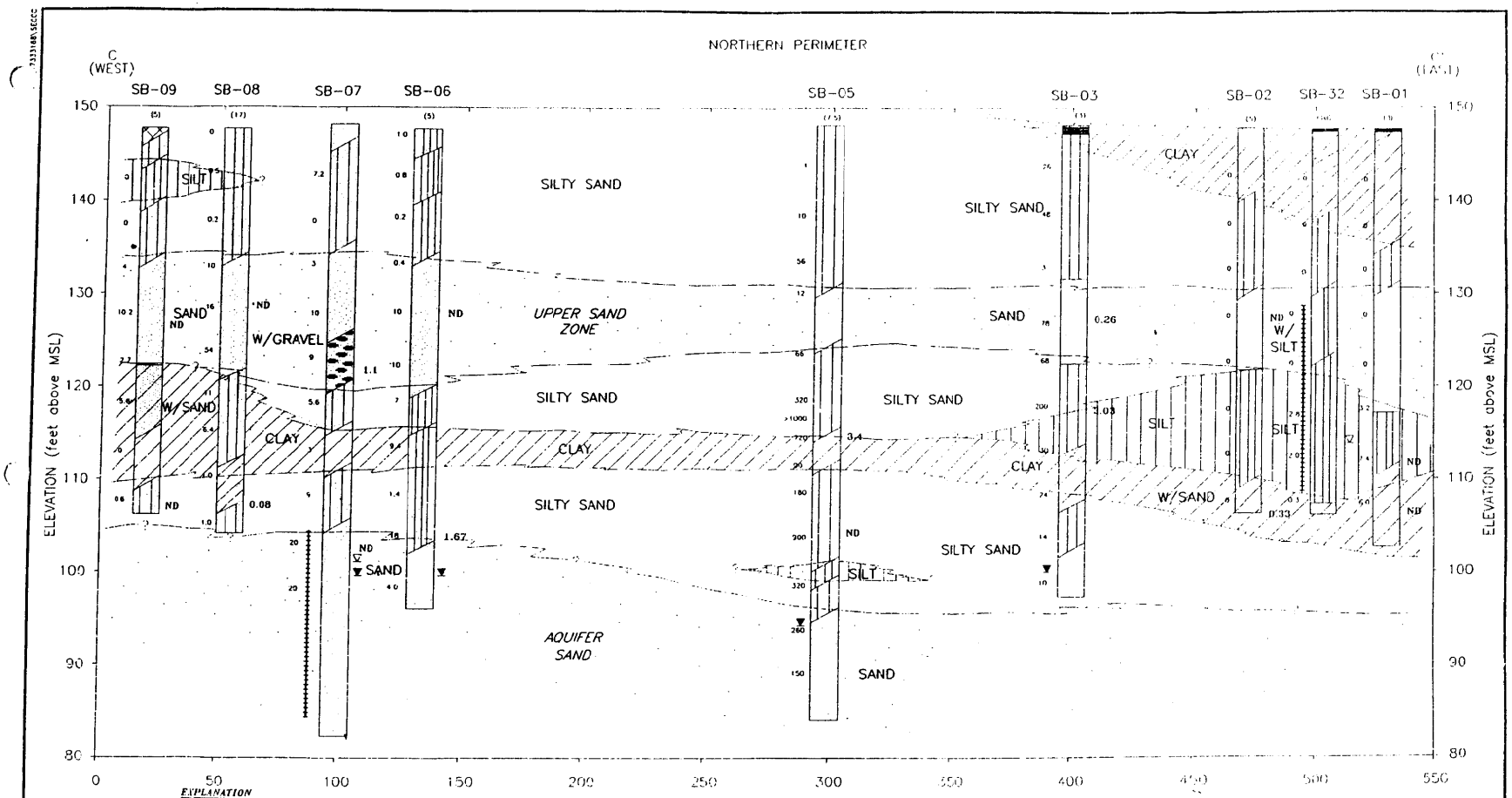
Engineering and Environmental Services

CROSS SECTION B-B'
McKesson Corporation Property
Santa Fe Springs, California

PLATE 12

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JAV	17333,168.11	TBK	2/92		

SFD1437



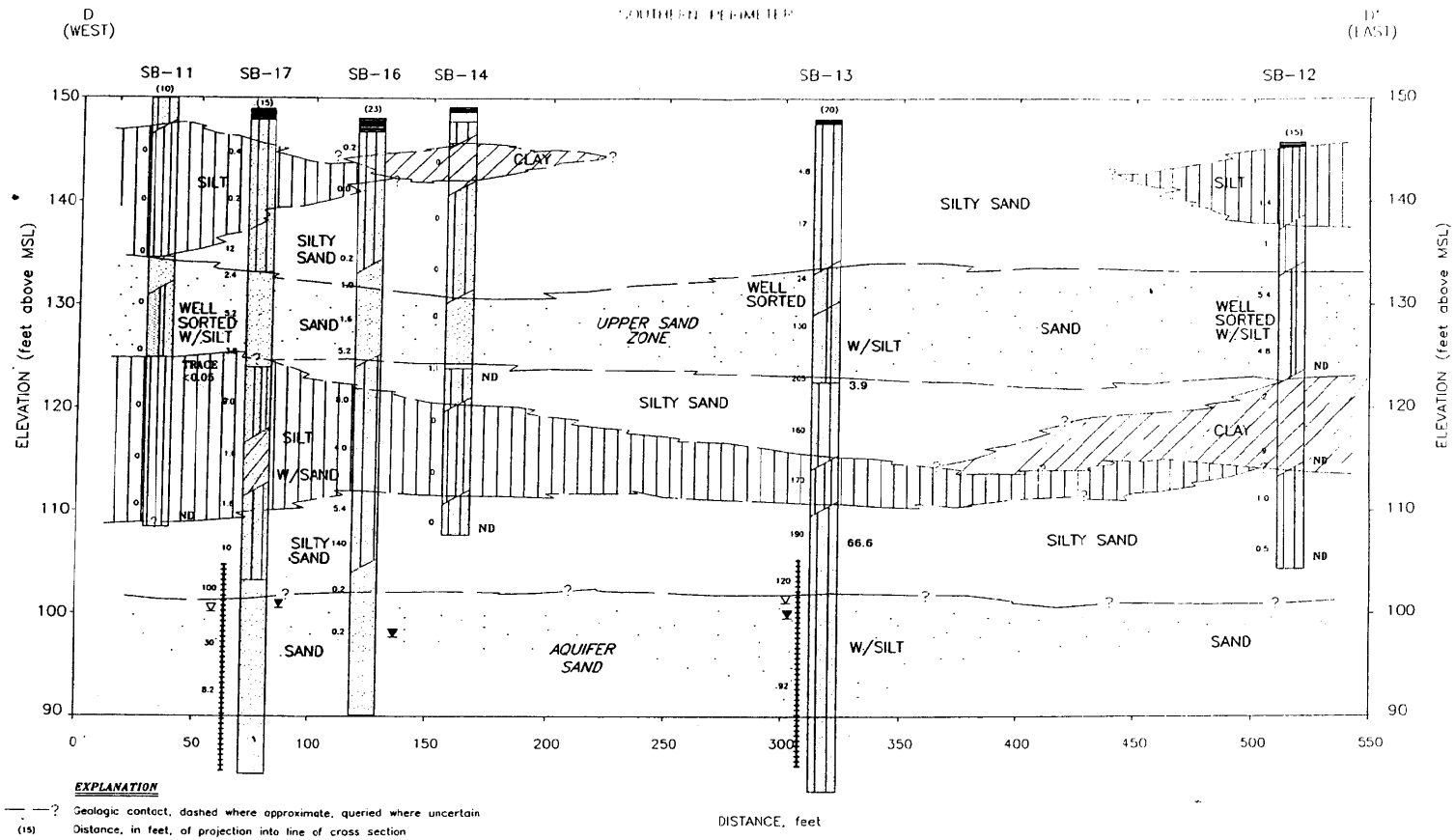
Harding Lawson Associates
Engineering and Environmental Services

CROSS SECTION C-C'
McKesson Corporation Property
Santa Fe Springs, California

PLATE 13

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JAV	17333,168.11	TAL	1/92		

SFD1438



EXPLANATION

——— ?	Geologic contact, dashed where approximate, queried where uncertain
(15)	Distance, in feet, of projection into line of cross section
MSL	Mean Sea Level
▽	Water level measured on 8/17/90
▼	Ground-water level encountered during drilling
‡	Screened section of well
120	Field OVA reading
66.6	Total volatile organics (Method 8240) in ppm, ND indicates not detected

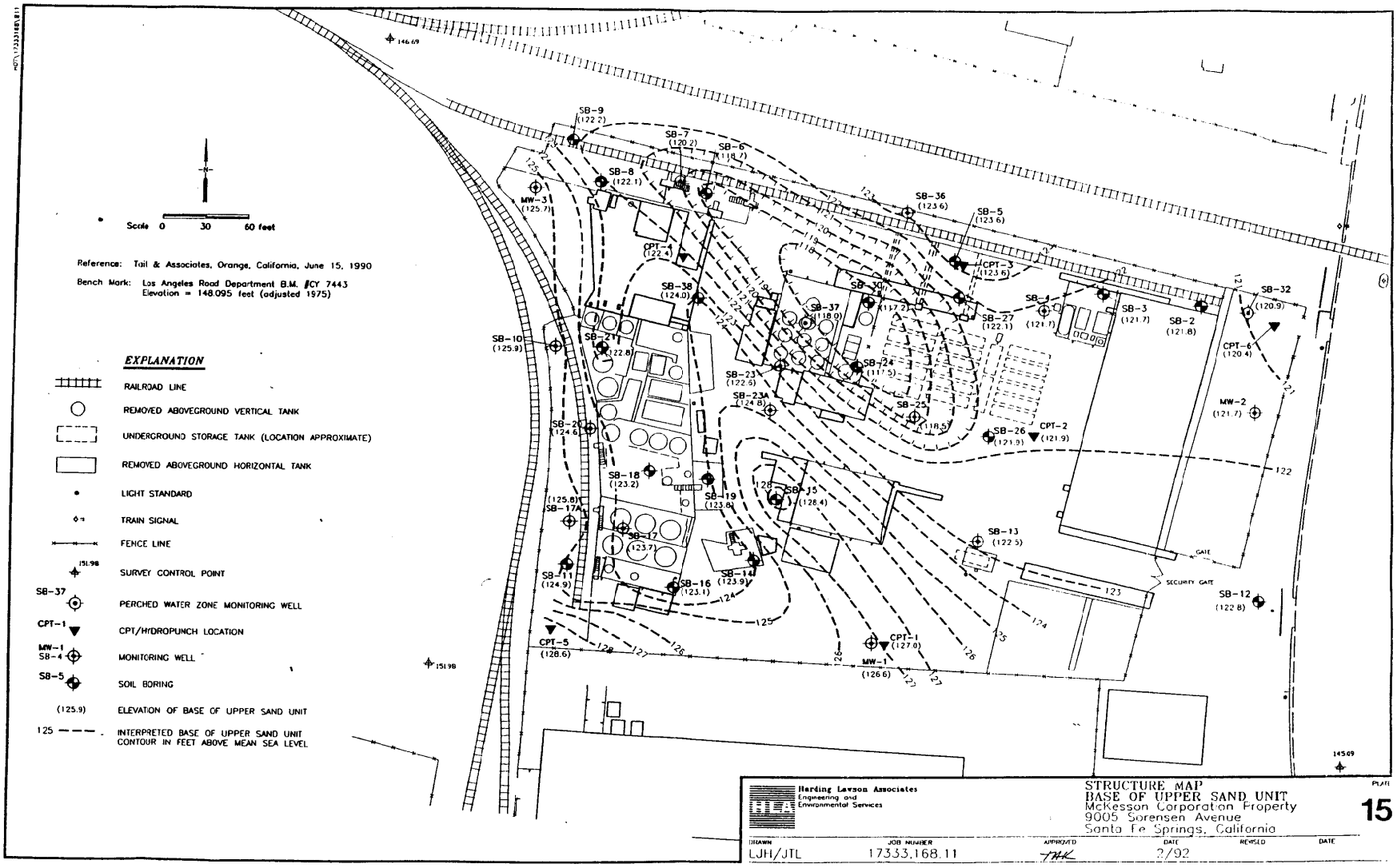
Harding Lawson Associates
Engineering and Environmental Services

CROSS SECTION D-D'
McKesson Corporation Property
Santa Fe Springs, California

PLATE 14

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JAV	17333.168.11	THK	1/92		

SFD1439



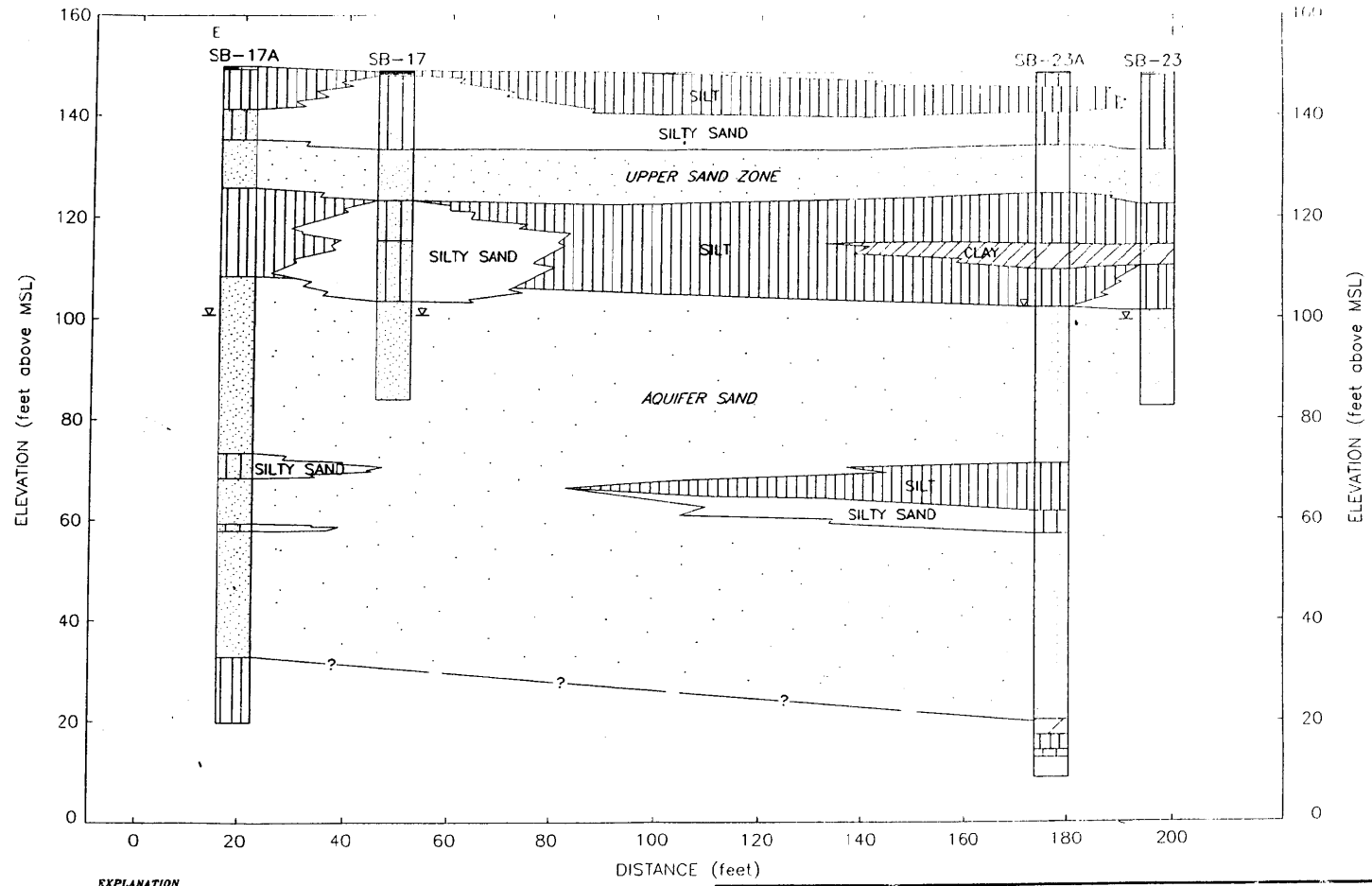
Harding Lawson Associates
Engineering and Environmental Services

STRUCTURE MAP
BASE OF UPPER SAND UNIT
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California

PLATE 15

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LJH/JTL	17333.168.11	THK	2/92		

SFD1440



EXPLANATION

——?—— Approximate geologic contact

MSL Mean Sea Level

▽ Groundwater level monitored on 4-11-91

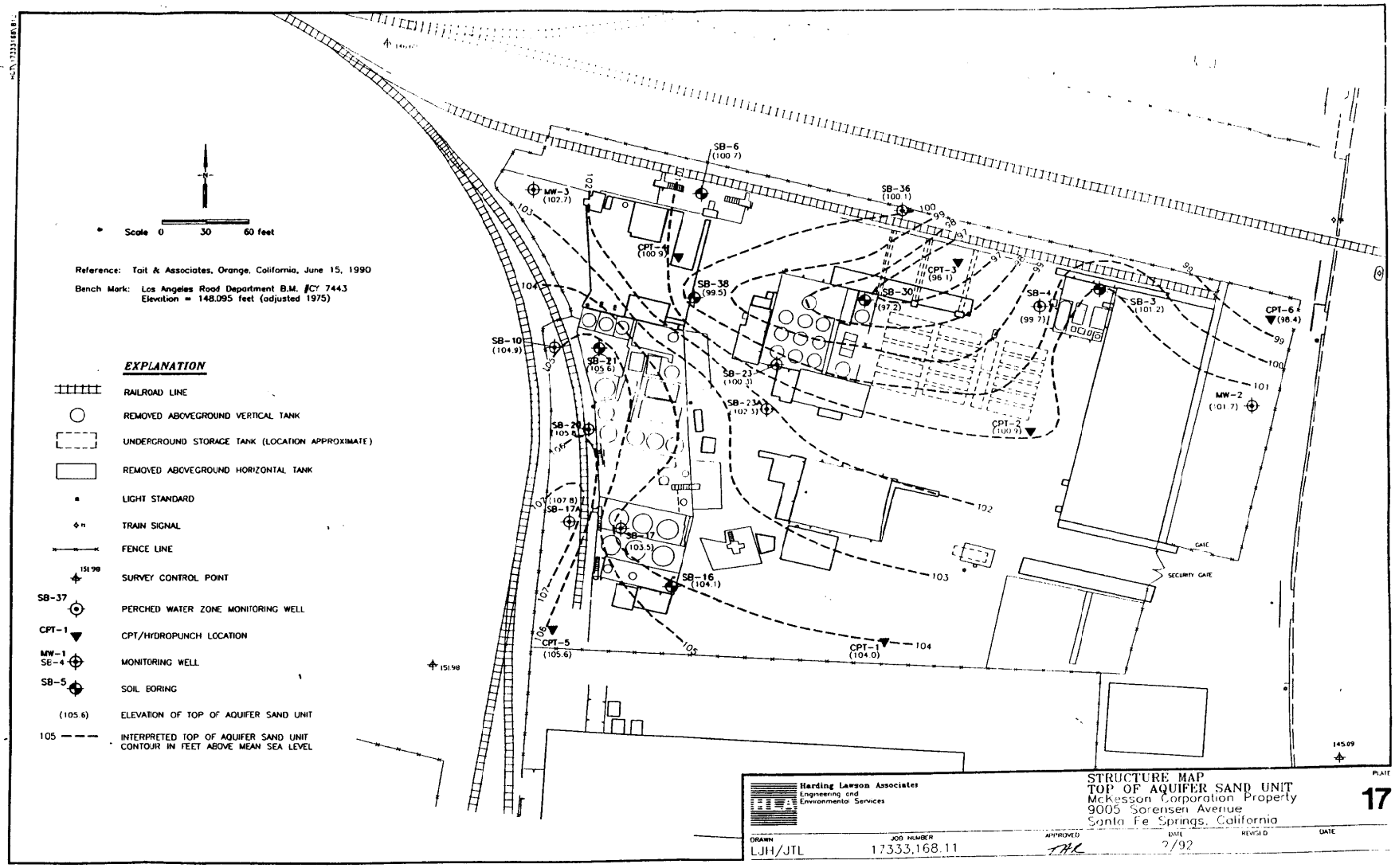
Harding Lawson Associates
Engineering and Environmental Services

AQUIFER CROSS SECTION E-E'
McKesson Corporation Property
Santa Fe Springs, California

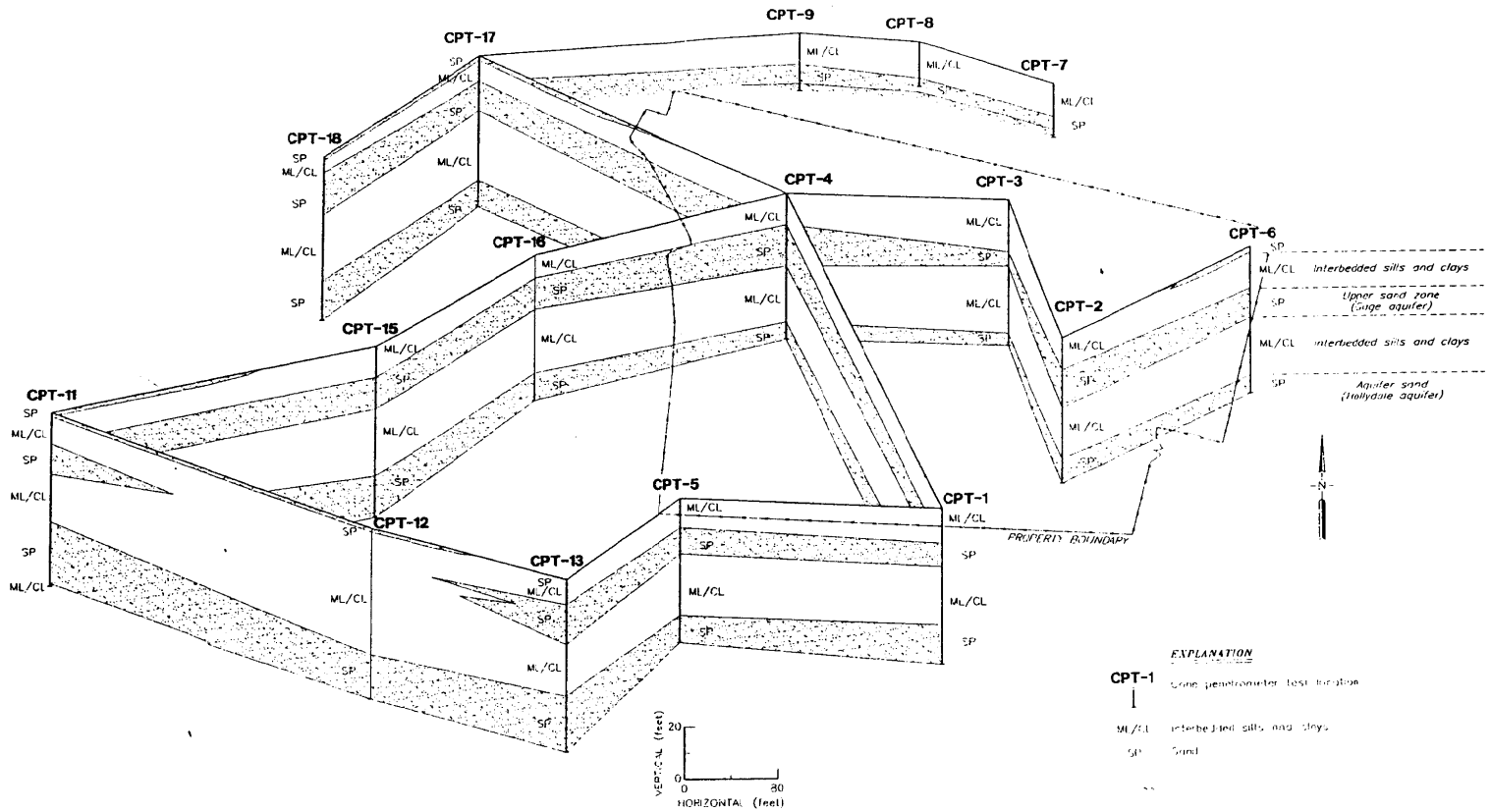
PLATE 16

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TRL	2/92		

SFD1441


N
Scale 0 30 60 feet
Reference: Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. FCY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
151.98
SURVEY CONTROL POINT
SB-37
PERCHED WATER ZONE MONITORING WELL
CPT-1
CPT/HYDROPUNCH LOCATION
MW-1
SE-4
MONITORING WELL
SB-5
SOIL BORING
(105.6)
ELEVATION OF TOP OF AQUIFER SAND UNIT
105
INTERPRETED TOP OF AQUIFER SAND UNIT CONTOUR IN FEET ABOVE MEAN SEA LEVEL
SB-6 (100.7)
SB-36 (100.1)
MW-3 (102.7)
CPT-4 (100.9)
SB-38 (99.5)
CPT-3 (96.1)
SB-30 (97.2)
SB-4 (99.7)
SB-3 (101.2)
CPT-6 (98.4)
SB-10 (104.9)
SB-21 (105.6)
SB-23 (100.3)
SB-23A (102.3)
MW-2 (101.7)
CPT-2 (100.9)
SB-20 (105.8)
SB-17A (107.8)
SB-17 (103.5)
SB-16 (104.1)
CPT-5 (105.6)
CPT-1 (104.0)
GATE
SECURITY GATE
145.09
Harding Lawson Associates
Engineering and Environmental Services
HLA
STRUCTURE MAP
TOP OF AQUIFER SAND UNIT
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE
17
DRAWN
LJH/JTL
JOB NUMBER
17333,168.11
APPROVED
DATE
2/92
REVISED
DATE

SFD1442



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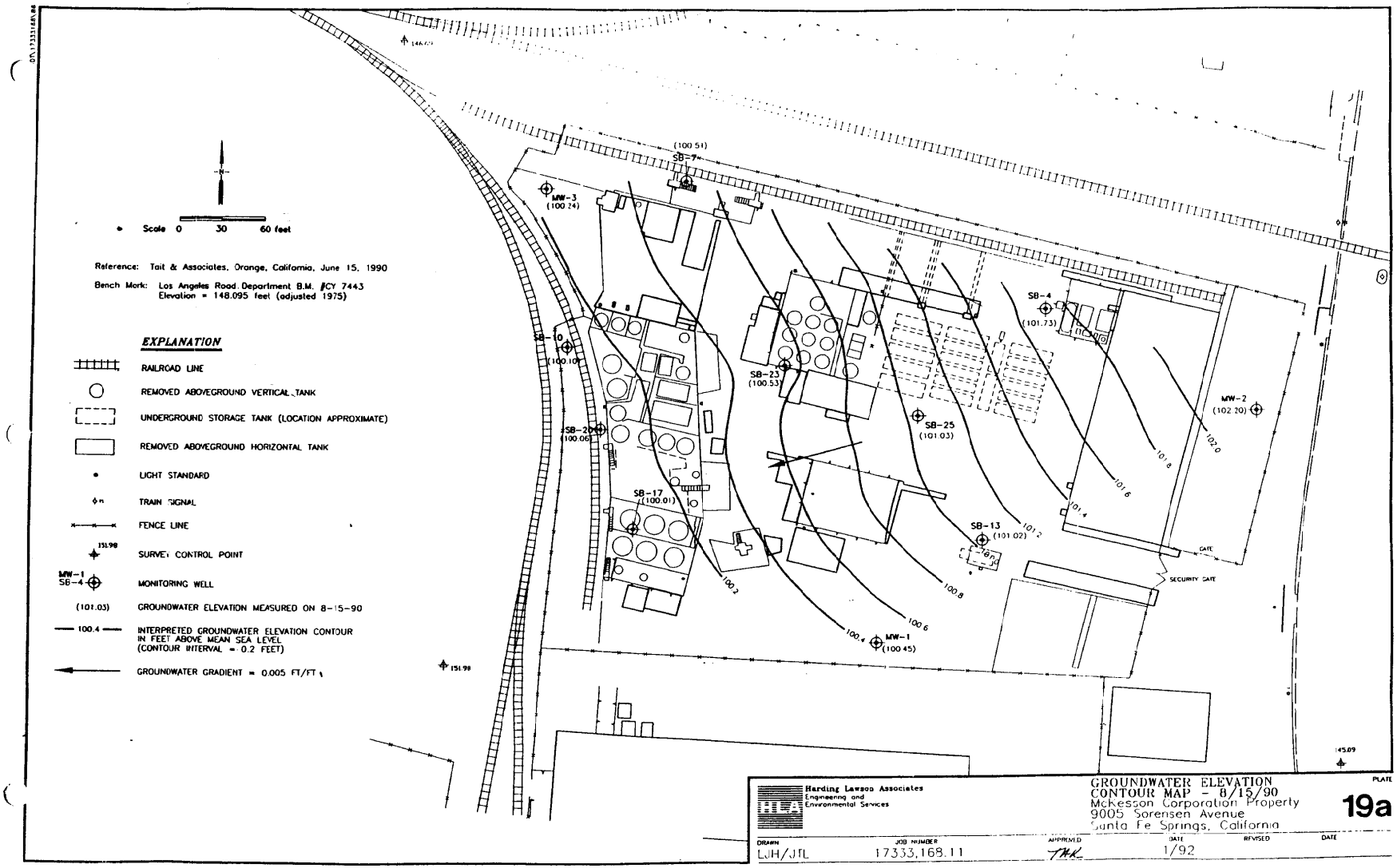
Engineering and Environmental Services

FENCE DIAGRAM FROM ON- AND OFF-SITE CPT DATA
McKesson Corporation Property
Santa Fe Springs, California

PLATE 18

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17555,168.11	TAK	1/92		

SFD1443



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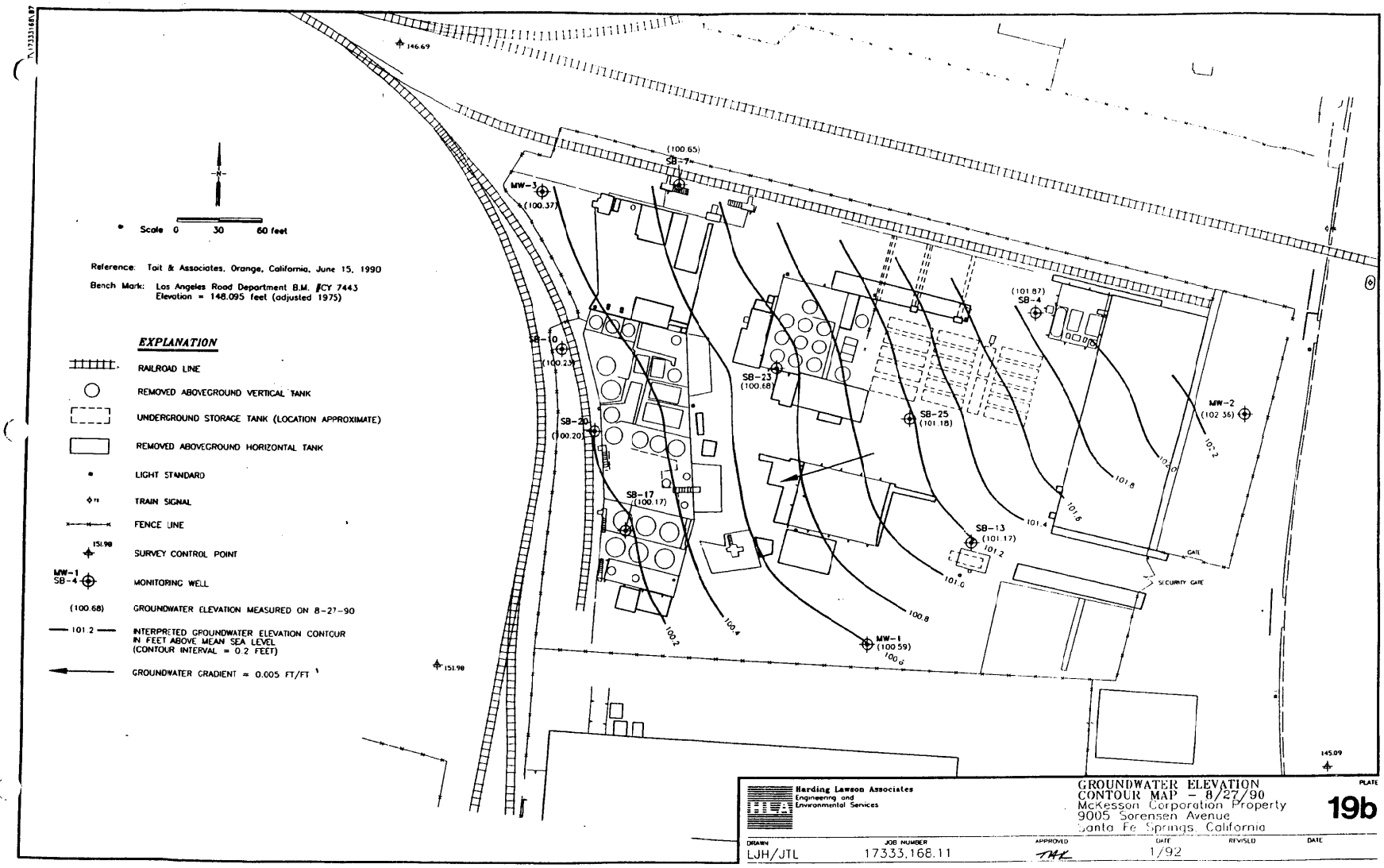
Engineering and Environmental Services

GROUNDWATER ELEVATION CONTOUR MAP - 8/15/90
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California

PLATE 19a

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LJH/JTL	17333,168.11	THK	1/92		

SFD1444



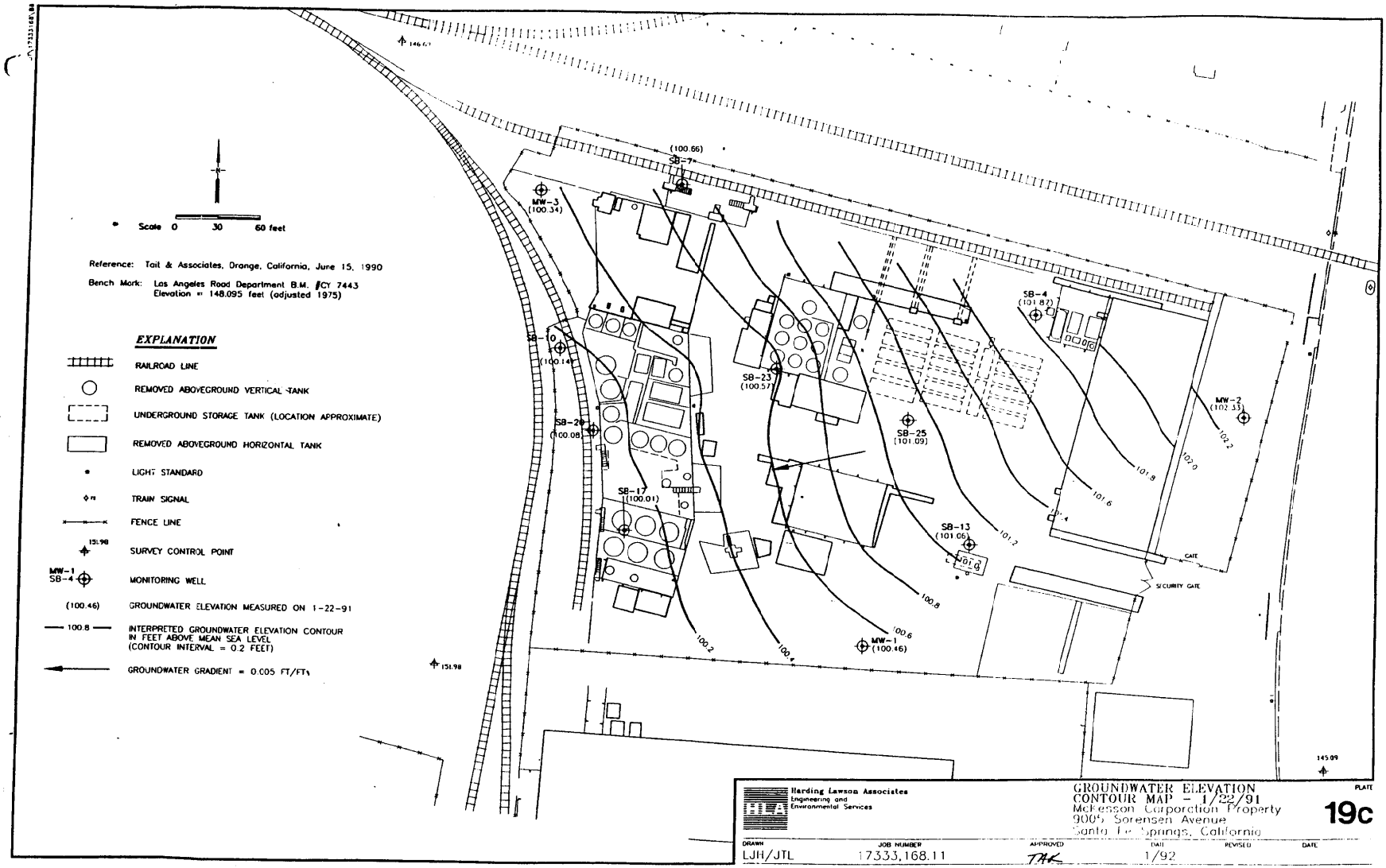
Harding Lawson Associates
Engineering and Environmental Services

GROUNDWATER ELEVATION CONTOUR MAP - 8/27/90
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California

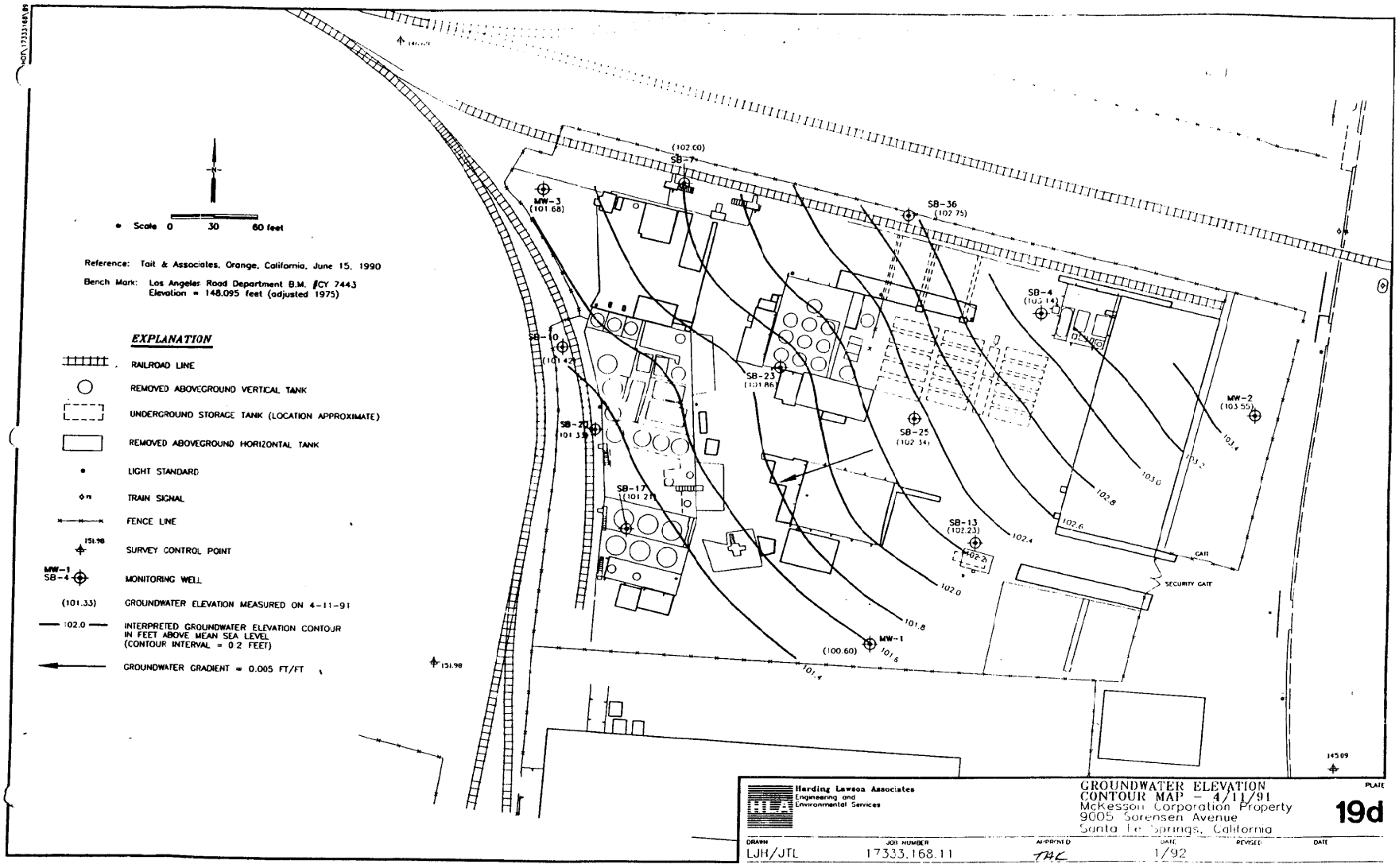
PLATE 19b

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LJH/JTL	17333.168.11	TAK	1/92		

SFD1445


Scale 0 30 60 feet
Reference: Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
MONITORING WELL
(100.46) GROUNDWATER ELEVATION MEASURED ON 1-22-91
100.8 INTERPRETED GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (CONTOUR INTERVAL = 0.2 FEET)
GROUNDWATER GRADIENT = 0.005 FT/FT
MW-3 (100.34)
SB-7 (100.66)
SB-10 (100.14)
SB-20 (100.08)
SB-17 (100.01)
SB-23 (100.57)
SB-25 (101.09)
SB-13 (101.06)
SB-4 (101.87)
MW-2 (102.33)
MW-1 (100.46)
GATE
SECURITY GATE
Harding Lawson Associates
Engineering and Environmental Services
GROUNDWATER ELEVATION CONTOUR MAP - 1/22/91
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE 19c
DRAWN LJH/JTL
JOB NUMBER 17333,168.11
APPROVED TAK
DATE 1/92
REVISED
DATE

SFD1446

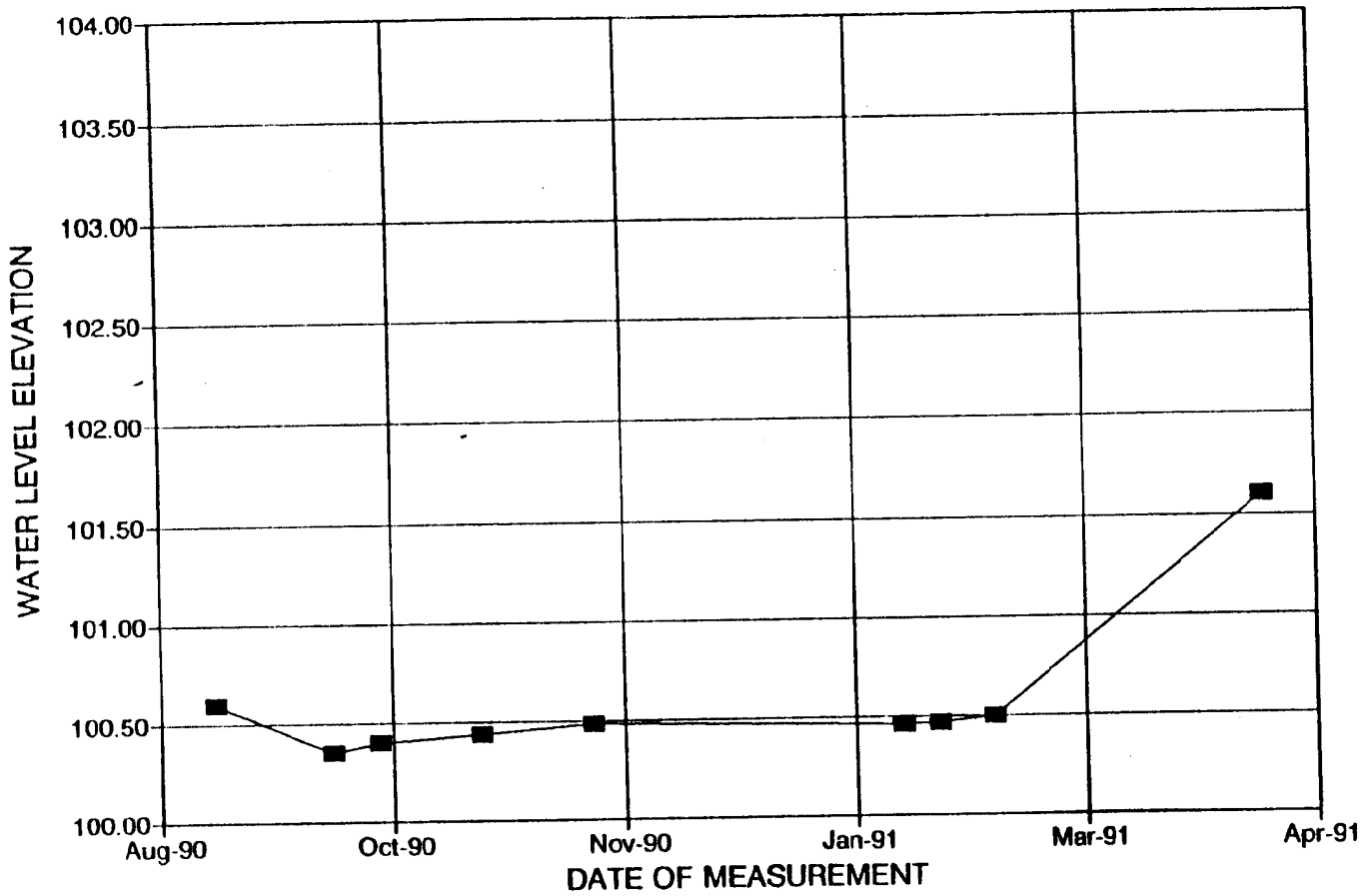

Scale 0 30 60 feet
Reference: Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
MONITORING WELL
(101.33) GROUNDWATER ELEVATION MEASURED ON 4-11-91
102.0 INTERPRETED GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (CONTOUR INTERVAL = 0.2 FEET)
GROUNDWATER GRADIENT = 0.005 FT/FT
MW-3 (101.68)
SB-7 (102.00)
SB-36 (102.75)
SB-4 (103.14)
SB-10 (101.42)
SB-23 (101.86)
SB-25 (102.34)
MW-2 (103.55)
SB-20 101.39
SB-17 (101.21)
SB-13 (102.23)
MW-1 (100.60)
GATE
SECURITY GATE
151.98
145.09
Harding Lawson Associates
Engineering and Environmental Services
GROUNDWATER ELEVATION CONTOUR MAP - 4/11/91
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE 19d
DRAWN LJH/JTL
JOB NUMBER 17333.168.11
APPROVED TAC
DATE 1/92
REVISED
DATE

SFD1447

HDT\17333069 DIA1

WELL MW-01

WATER LEVEL ELEVATIONS AUG 90 - APR 91



PLATE

Harding Lawson Associates
Engineering and Environmental Services

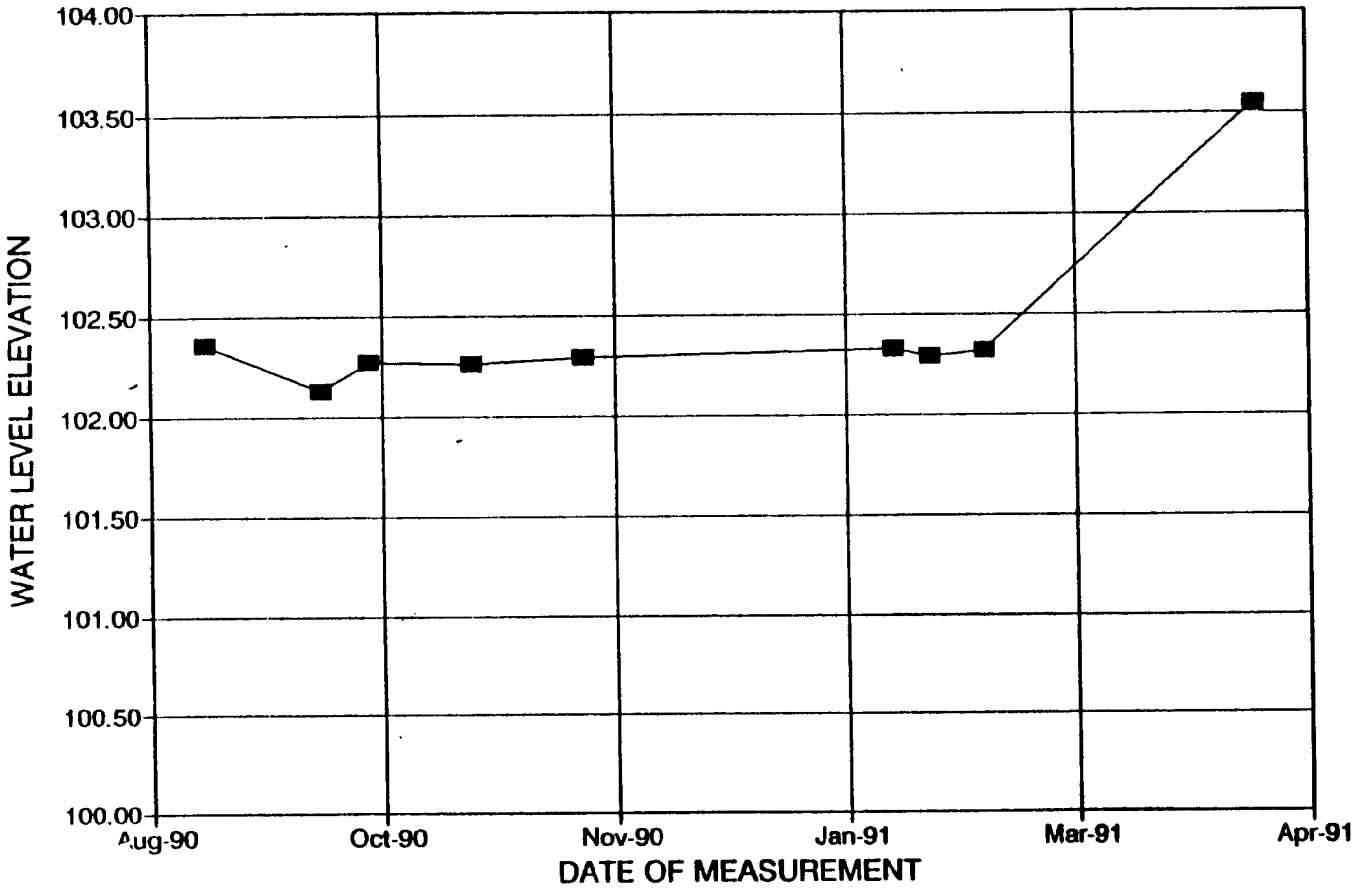
WELL MW-01 HYDROGRAPH
McKesson Corporation Property
Santa Fe Springs, California

20a

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TAK	1/92		

WELL MW-02

WATER LEVEL ELEVATIONS AUG 90 - APR 91



Harding Lawson Associates
Engineering and Environmental Services

WELL MW-02 HYDROGRAPH
McKesson Corporation Property
Santa Fe Springs, California

PLATE 20b

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TMK	1/92		

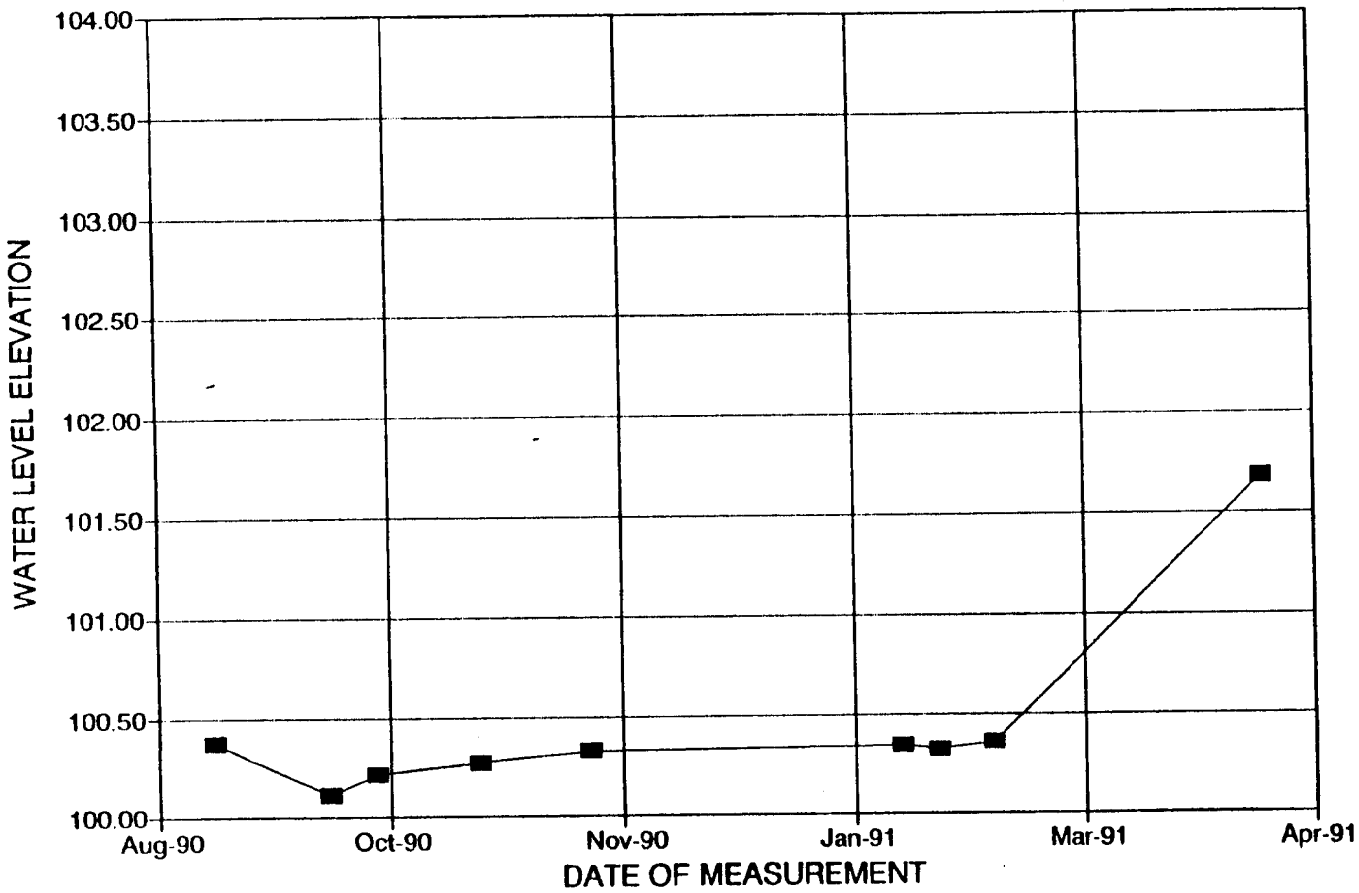
SFD1449

HDT\17333058\DIA1

SFD1450

WELL MW-03

WATER LEVEL ELEVATIONS AUG 90 - APR 91



PLATE

Harding Lawson Associates
Engineering and Environmental Services

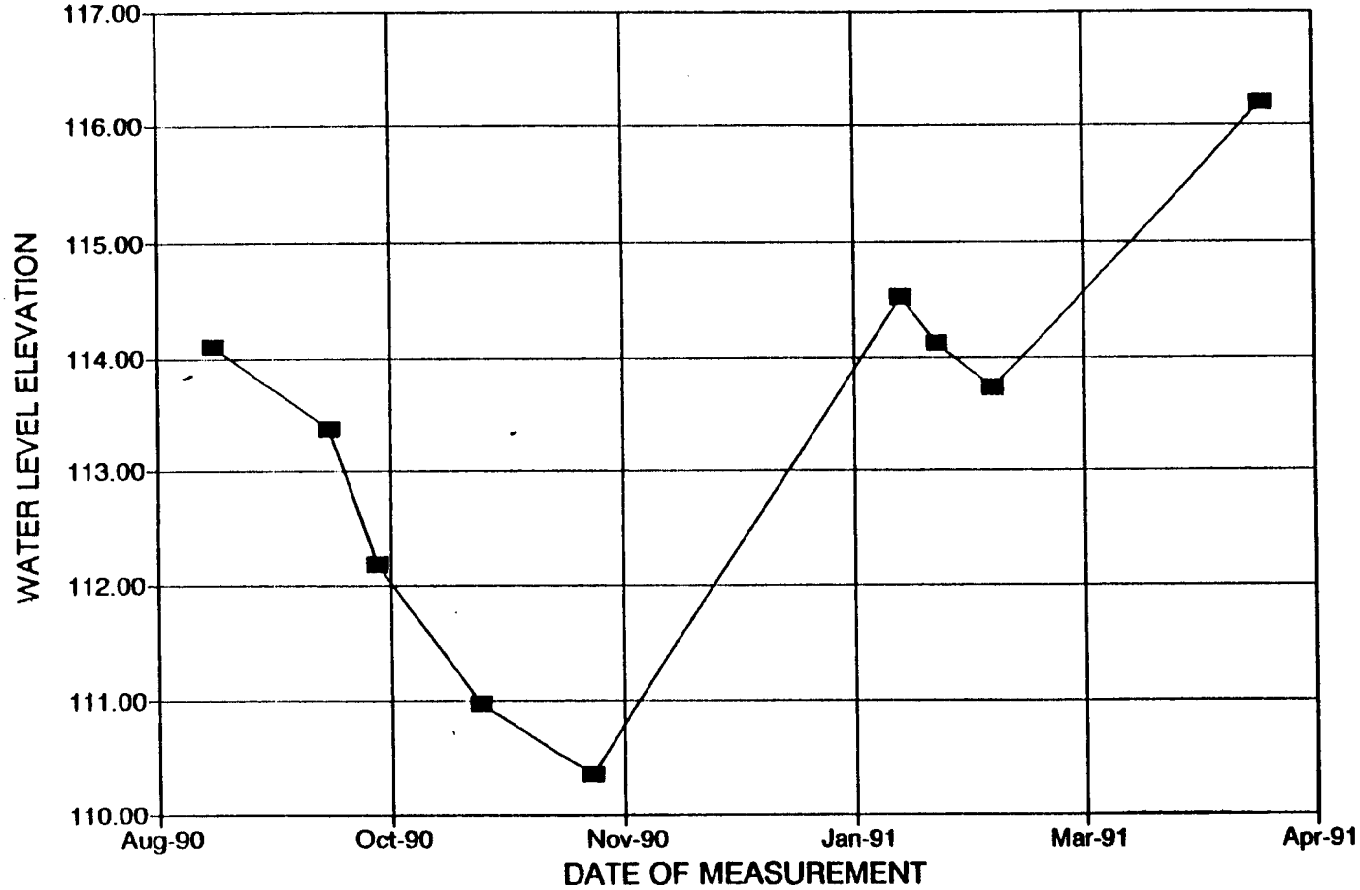
WELL MW-03 HYDROGRAPH
McKesson Corporation Property
Santa Fe Springs, California

20c

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TMK	1/92		

WELL SB-32

WATER LEVEL ELEVATIONS AUG 90 - APR 91



Harding Lawson Associates
Engineering and Environmental Services

WELL SB-32 HYDROGRAPH
McKesson Corporation Property
Santa Fe Springs, California

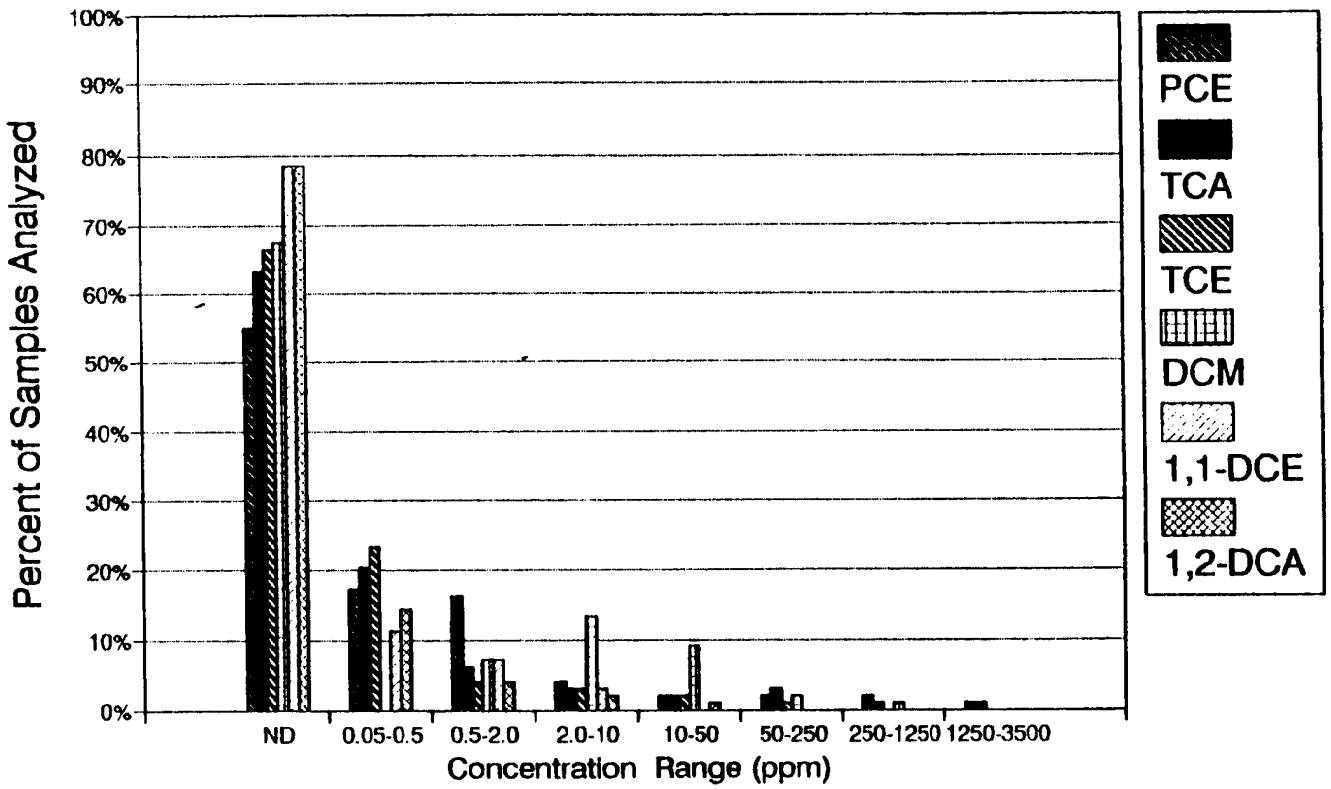
PLATE **20d**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TMK	1/92		

SFD1451

Frequency Distribution

PCE*TCA*TCE*DCM*1,1-DCE*1,2-DCA



Harding Lawson Associates
Engineering and Environmental Services

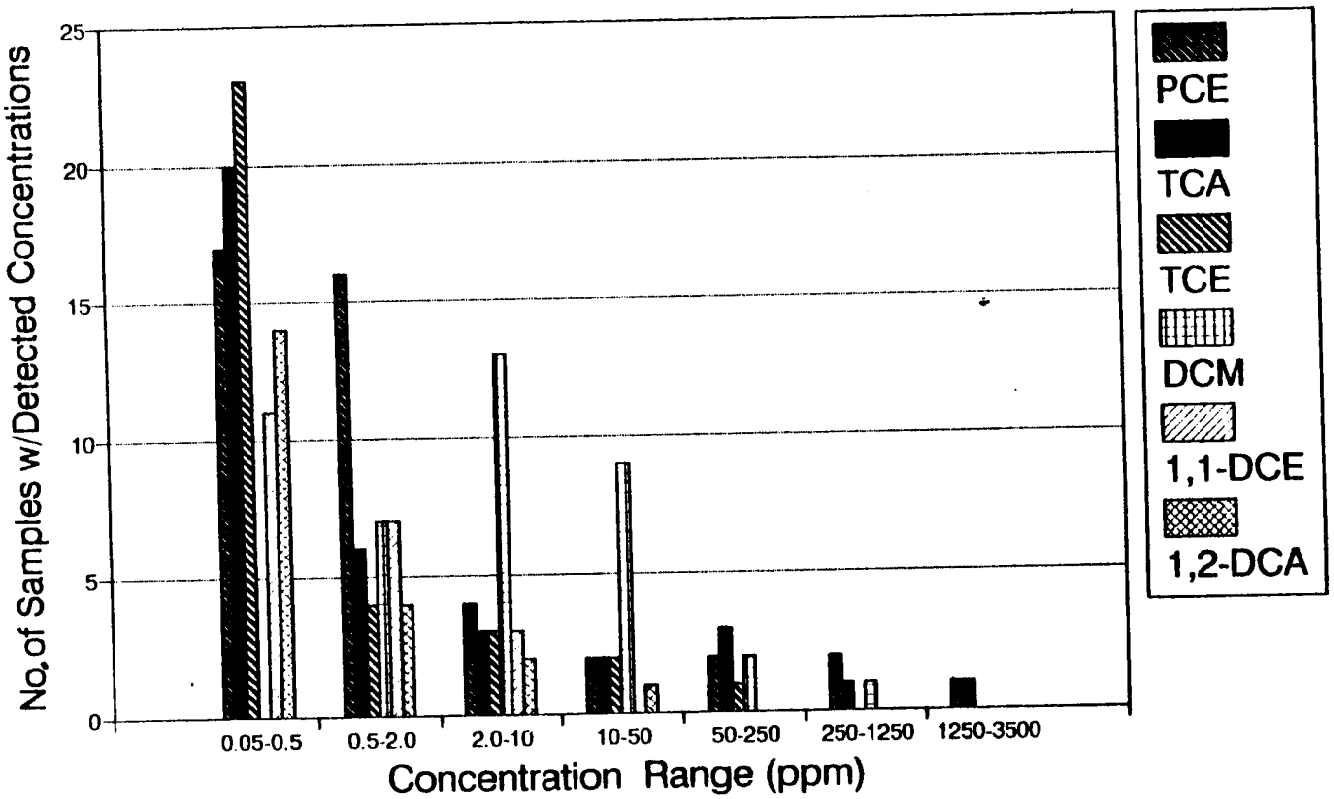
FREQUENCY DISTRIBUTION CHART
McKesson Corporation Property
Santa Fe Springs, California

PLATE **21a**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TAK	1/92		

Frequency Distribution

PCE*TCA*TCE*DCM*1,1-DCE*1,2-DCA



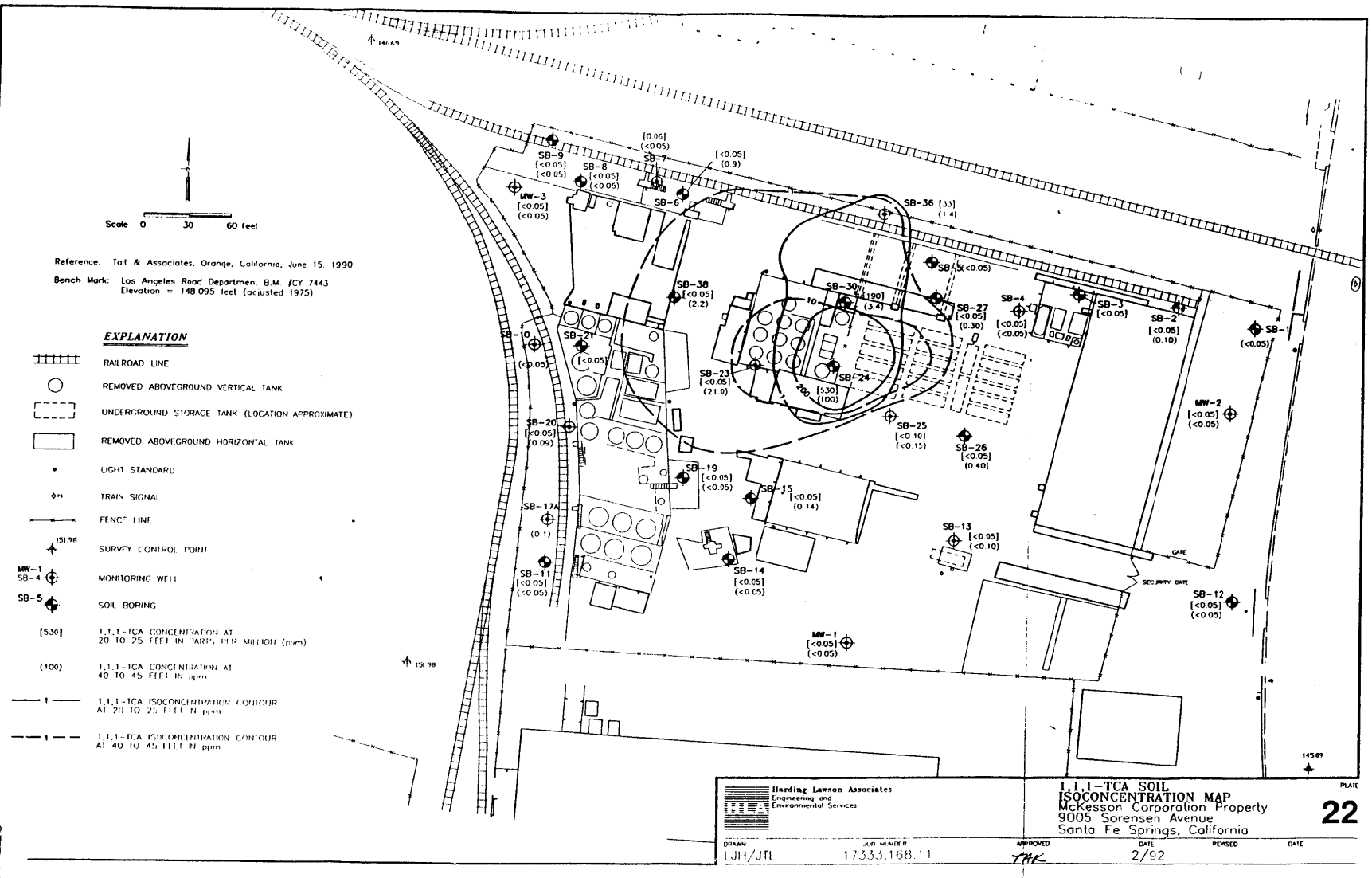
PLATE

21b

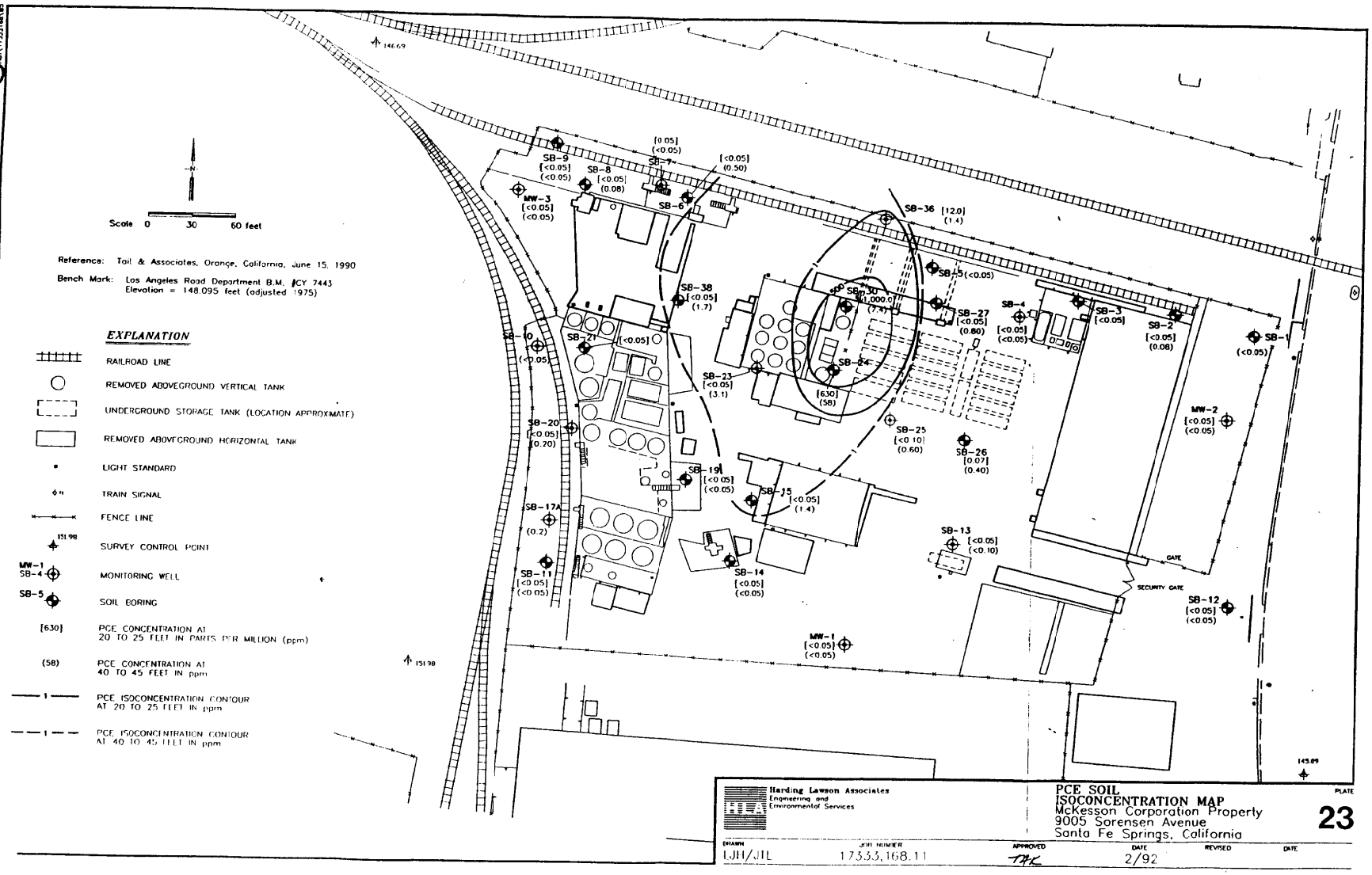
Harding Lawson Associates
Engineering and Environmental Services

FREQUENCY DISTRIBUTION CHART
McKesson Corporation Property
Santa Fe Springs, California

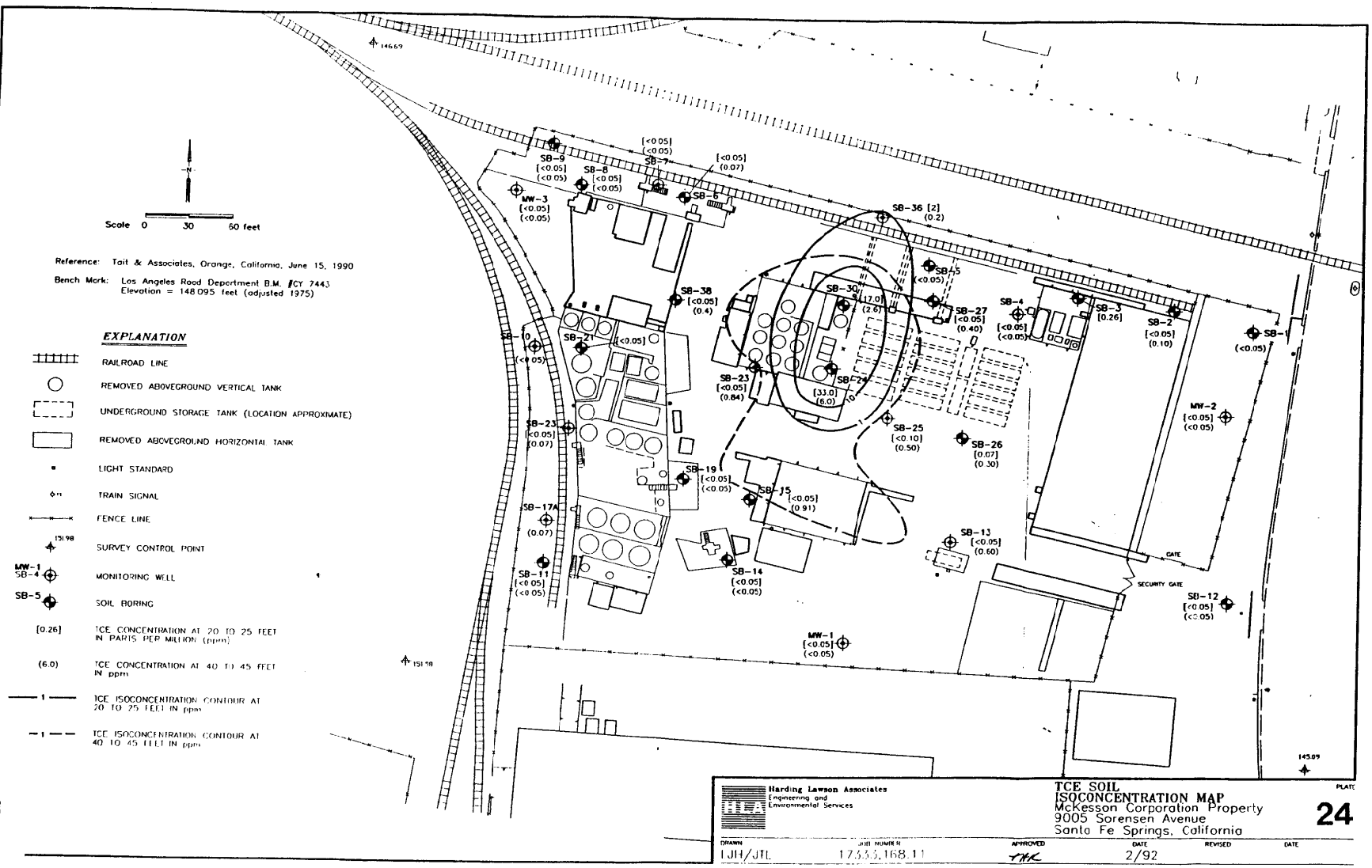
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	JAK	1/92		


Scale 0 30 60 feet
Reference: Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
MONITORING WELL
SOIL BORING
[530] 1,1,1-TCA CONCENTRATION AT 20 TO 25 FEET IN PARTS PER MILLION (ppm)
(100) 1,1,1-TCA CONCENTRATION AT 40 TO 45 FEET IN ppm
1,1,1-TCA ISOCONCENTRATION CONTOUR AT 20 TO 25 FEET IN ppm
1,1,1-TCA ISOCONCENTRATION CONTOUR AT 40 TO 45 FEET IN ppm
SB-9 [<0.05] (<0.05)
SB-8 [<0.05] (<0.05)
SB-7 [0.06] (<0.05)
SB-6 [<0.05] (0.9)
MW-3 [<0.05] (<0.05)
SB-36 [33] (1.4)
SB-5 (<0.05)
SB-38 [<0.05] (2.2)
SB-30 [190] (3.4)
SB-27 [<0.05] (0.30)
SB-4 [<0.05] (<0.05)
SB-3 [<0.05]
SB-2 [<0.05] (0.10)
SB-1 (<0.05)
SB-10 (<0.05)
SB-21 [<0.05]
SB-23 [<0.05] (21.0)
SB-24 [530] (100)
MW-2 [<0.05] (<0.05)
SB-20 [<0.05] (0.09)
SB-25 [<0.10] (<0.15)
SB-26 [<0.05] (0.40)
SB-19 [<0.05] (<0.05)
SB-15 [<0.05] (0.14)
SB-17A (0.1)
SB-13 [<0.05] (<0.10)
SB-11 [<0.05] (<0.05)
SB-14 [<0.05] (<0.05)
GATE
SECURITY GATE
SB-12 [<0.05] (<0.05)
MW-1 [<0.05] (<0.05)
Harding Lawson Associates
Engineering and Environmental Services
1,1,1-TCA SOIL ISOCONCENTRATION MAP
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE 22
DRAWN LJH/JTL
JOB NUMBER 17333,168.11
APPROVED TMK
DATE 2/92
REVISED
DATE

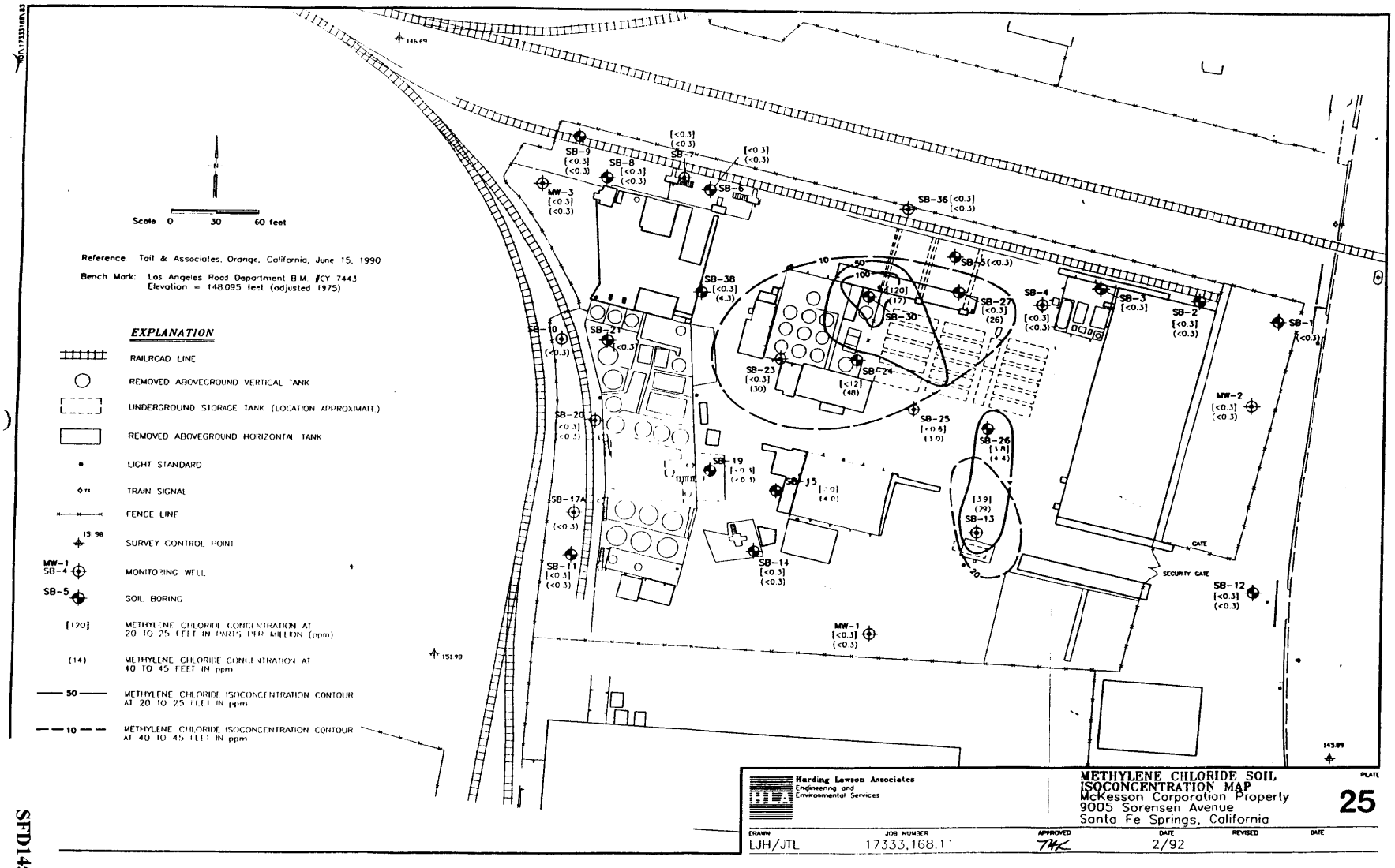
SFD1454


Scale 0 30 60 feet
Reference: Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
MONITORING WELL
SOIL BORING
[630] PCE CONCENTRATION AT 20 TO 25 FEET IN PARTS PER MILLION (ppm)
(58) PCE CONCENTRATION AT 40 TO 45 FEET IN ppm
PCE ISOCONCENTRATION CONTOUR AT 20 TO 25 FEET IN ppm
PCE ISOCONCENTRATION CONTOUR AT 40 TO 45 FEET IN ppm
SB-9 [<0.05] (<0.05)
SB-8 [<0.05] (0.08)
SB-7 [0.05] (<0.05)
SB-6 [<0.05] (0.50)
MW-3 [<0.05] (<0.05)
SB-36 [12.0] (1.4)
SB-35 (<0.05)
SB-38 [<0.05] (1.7)
SB-30 [1,000.0] (7.4)
SB-27 [<0.05] (0.80)
SB-4 [<0.05] (<0.05)
SB-3 [<0.05]
SB-2 [<0.05] (0.08)
SB-1 (<0.05)
SB-10 (<0.05)
SB-21 [<0.05]
SB-23 [<0.05] (3.1)
SB-24 [630] (58)
MW-2 [<0.05] (<0.05)
SB-20 [<0.05] (0.20)
SB-25 [<0.10] (0.60)
SB-26 [0.07] (0.40)
SB-19 [<0.05] (<0.05)
SB-15 [<0.05] (1.4)
SB-17A (0.2)
SB-13 [<0.05] (<0.10)
SB-11 [<0.05] (<0.05)
SB-14 [<0.05] (<0.05)
GATE
SECURITY GATE
SB-12 [<0.05] (<0.05)
MW-1 [<0.05] (<0.05)
Harding Lawson Associates
Engineering and Environmental Services
PCE SOIL
ISOCONCENTRATION MAP
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE
23
DRAWN LJH/JIL
JOB NUMBER 17533,168.11
APPROVED TAK
DATE 2/92
REVISED
DATE

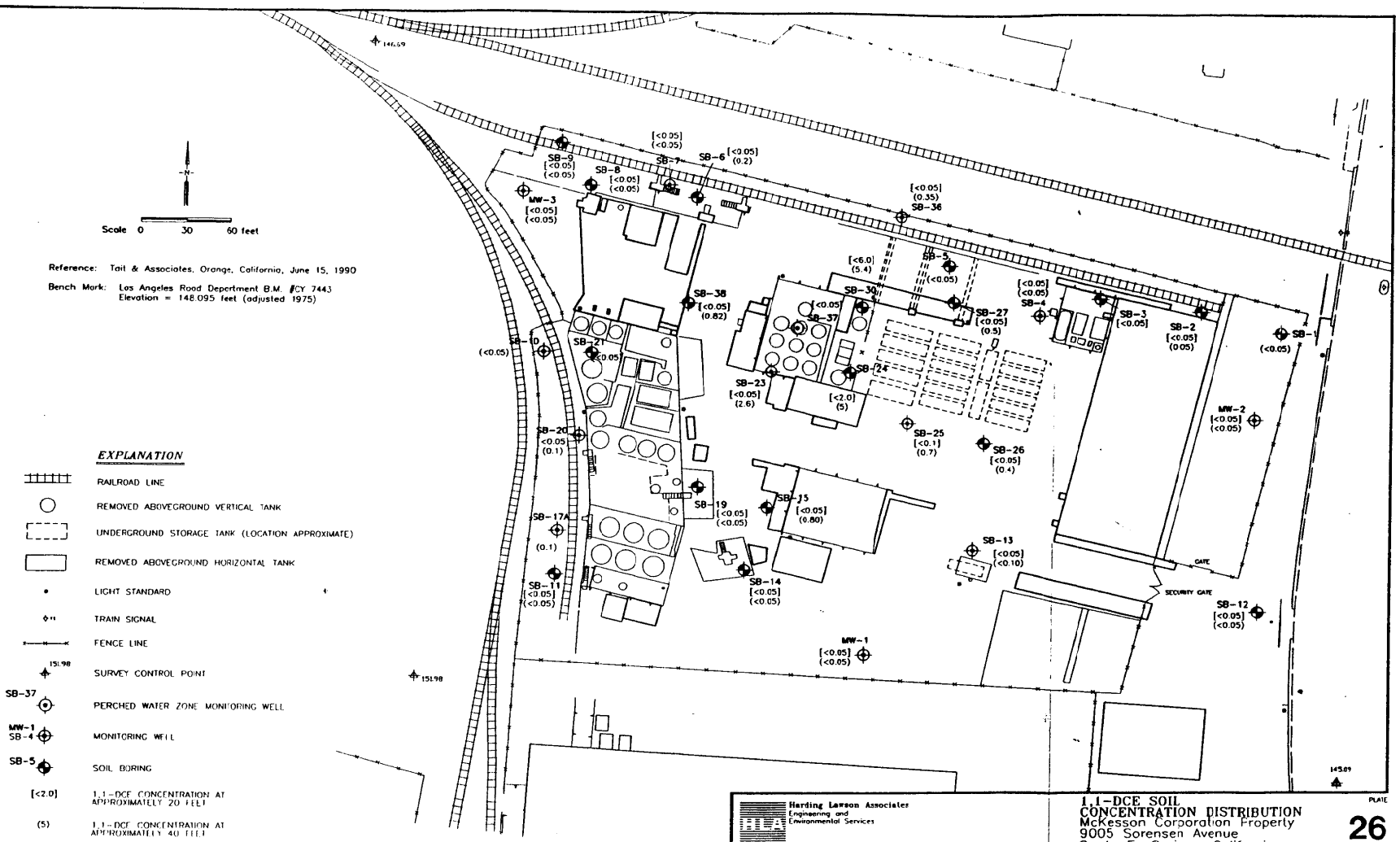
SFD1455


Scale 0 30 60 feet
Reference: Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
MONITORING WELL
SOIL BORING
[0.26] TCE CONCENTRATION AT 20 TO 25 FEET IN PARTS PER MILLION (ppm)
(6.0) TCE CONCENTRATION AT 40 TO 45 FEET IN ppm
TCE ISOCONCENTRATION CONTOUR AT 20 TO 25 FEET IN ppm
TCE ISOCONCENTRATION CONTOUR AT 40 TO 45 FEET IN ppm
SB-36 [2] (0.2)
SB-38 [<0.05] (0.4)
SB-30 (17.0) (2.6)
SB-27 [<0.05] (0.40)
SB-4 [<0.05] (<0.05)
SB-3 [0.26]
SB-2 [<0.05] (0.10)
SB-1 (<0.05)
MW-2 [<0.05] (<0.05)
SB-23 [<0.05] (0.84)
SB-24 (33.0) (6.0)
SB-25 [<0.10] (0.50)
SB-26 [0.07] (0.30)
SB-13 [<0.05] (0.60)
SB-12 [<0.05] (<0.05)
SB-14 [<0.05] (<0.05)
SB-15 [<0.05] (0.91)
SB-19 [<0.05] (<0.05)
SB-17A (0.07)
SB-11 [<0.05] (<0.05)
SB-23 [<0.05] (0.07)
SB-10 (<0.05)
SB-21 [<0.05]
SB-6 [<0.05] (<0.05)
SB-8 [<0.05] (<0.05)
SB-7 [<0.05] (<0.05)
SB-6 [<0.05] (0.07)
MW-3 [<0.05] (<0.05)
MW-1 [<0.05] (<0.05)
GATE
SECURITY GATE
Harding Lawson Associates
Engineering and Environmental Services
TCE SOIL
ISOCONCENTRATION MAP
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE
24
DRAWN
JJH/JTL
JOB NUMBER
17333,168.11
APPROVED
DATE
2/92
REVISED
DATE

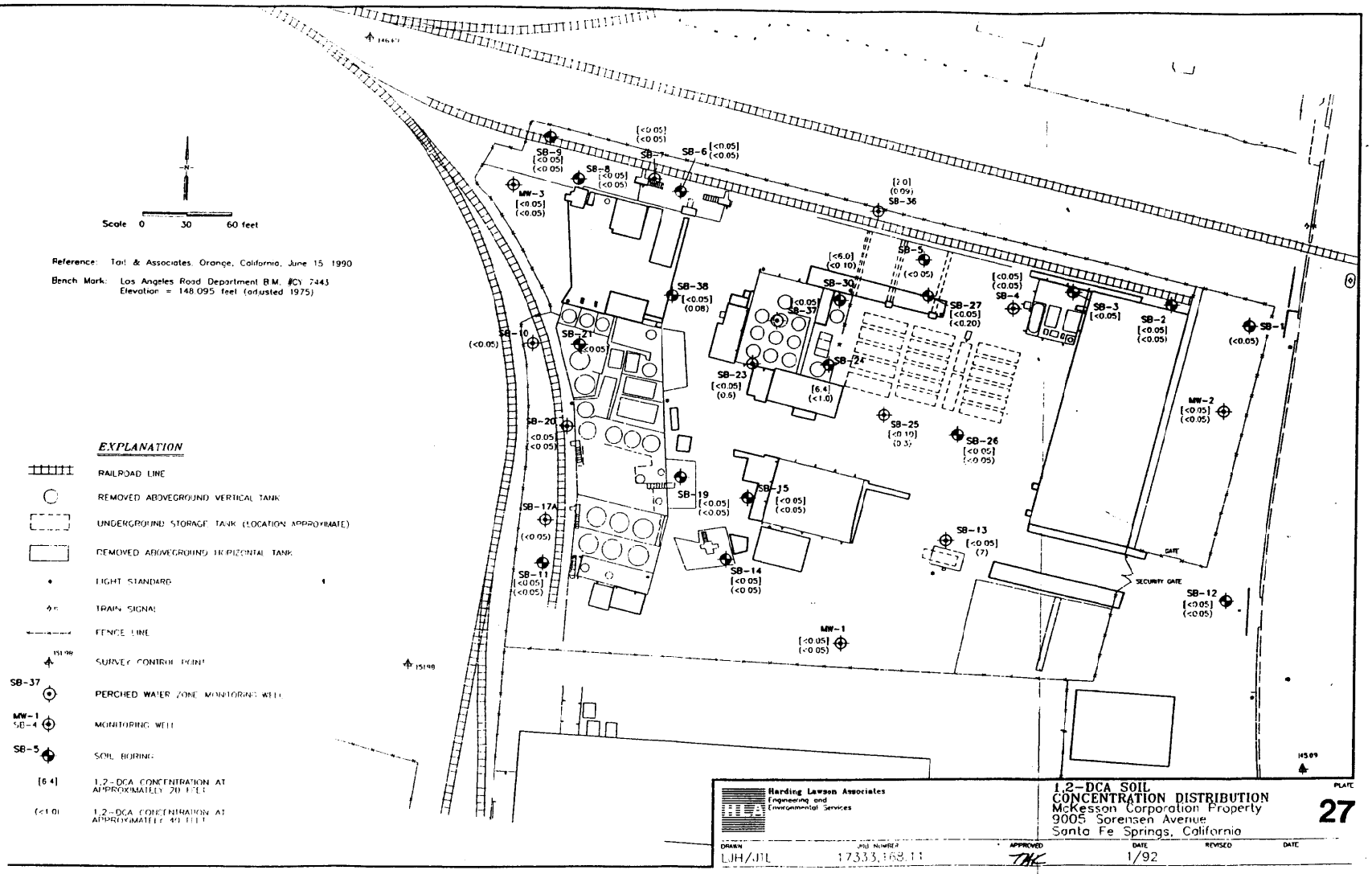
SFD1456


N
Scale 0 30 60 feet
Reference Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
MONITORING WELL
SOIL BORING
METHYLENE CHLORIDE CONCENTRATION AT 20 TO 25 FEET IN PARTS PER MILLION (ppm)
METHYLENE CHLORIDE CONCENTRATION AT 40 TO 45 FEET IN ppm
METHYLENE CHLORIDE ISOCONCENTRATION CONTOUR AT 20 TO 25 FEET IN ppm
METHYLENE CHLORIDE ISOCONCENTRATION CONTOUR AT 40 TO 45 FEET IN ppm
SB-9 [<0.3] (<0.3)
SB-8 [<0.3] (<0.3)
SB-7
SB-6
MW-3 [<0.3] (<0.3)
SB-36 [<0.3] (<0.3)
SB-38 [<0.3] (4.3)
SB-5 (<0.3)
SB-27 [<0.3] (26)
SB-4 [<0.3] (<0.3)
SB-3 [<0.3]
SB-2 [<0.3] (<0.3)
SB-1 (<0.3)
SB-30
SB-23 [<0.3] (30)
SB-24 [<12] (48)
SB-25 [<0.6] (10)
SB-26 [38] (44)
SB-13 [39] (79)
MW-2 [<0.3] (<0.3)
SB-10 (<0.3)
SB-21 (<0.3)
SB-20 [<0.3] (<0.3)
SB-19
SB-17A (<0.3)
SB-11 [<0.3] (<0.3)
SB-14 [<0.3] (<0.3)
MW-1 [<0.3] (<0.3)
SB-12 [<0.3] (<0.3)
GATE
SECURITY GATE
146.69
151.98
145.89
Harding Lawson Associates
Engineering and Environmental Services
METHYLENE CHLORIDE SOIL ISOCONCENTRATION MAP
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE 25
DRAWN LJH/JTL
JOB NUMBER 17333,168.11
APPROVED TMK
DATE 2/92
REVISED
DATE

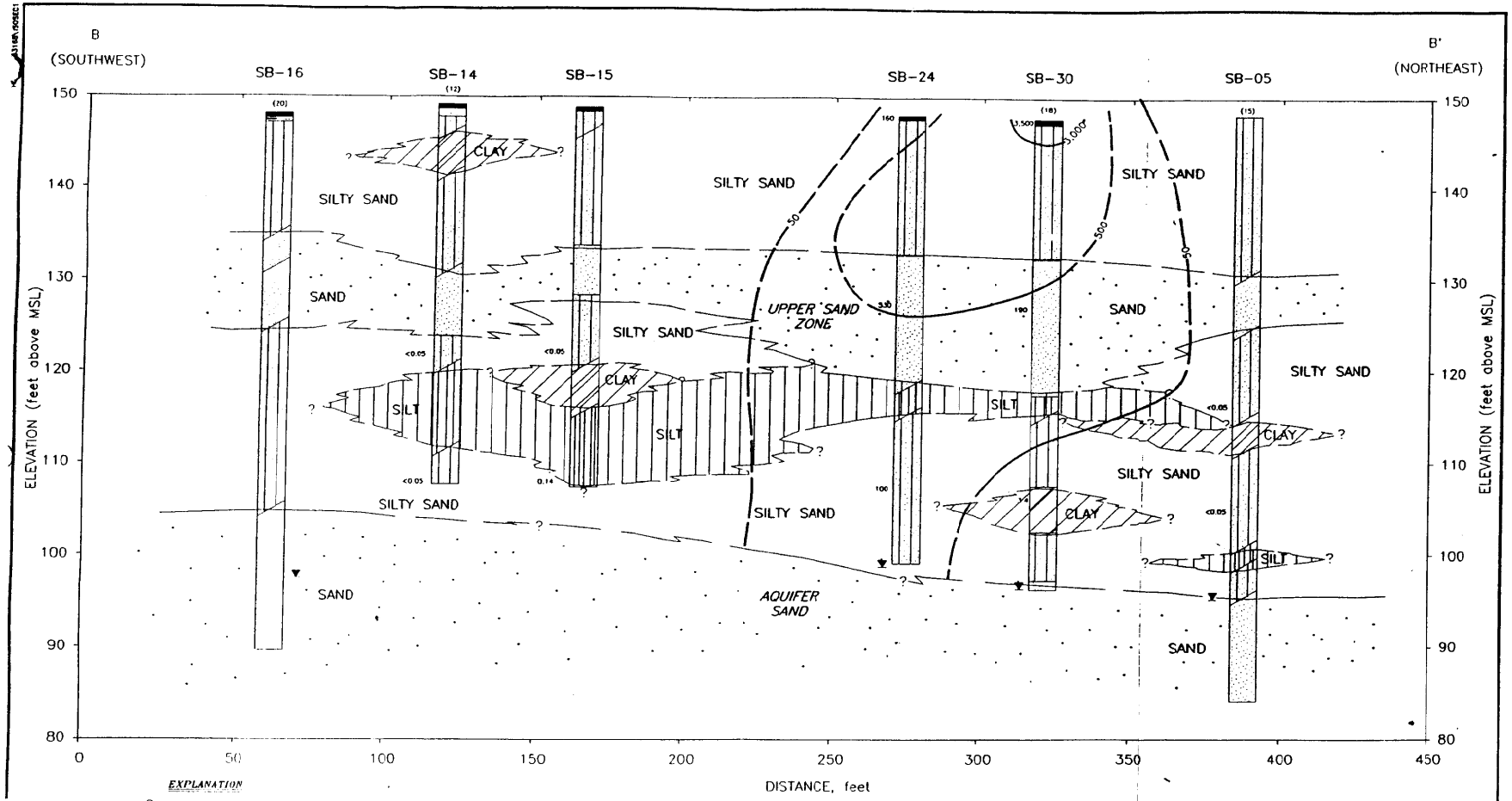
SFD1457


Scale 0 30 60 feet
Reference: Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
PERCHED WATER ZONE MONITORING WELL
MONITORING WELL
SOIL BORING
[<2.0] 1,1-DCE CONCENTRATION AT APPROXIMATELY 20 FEET
(5) 1,1-DCE CONCENTRATION AT APPROXIMATELY 40 FEET
SB-9 [<0.05] [<0.05]
SB-8 [<0.05] [<0.05]
SB-7 [<0.05] [<0.05]
SB-6 [<0.05] (0.2)
MW-3 [<0.05] [<0.05]
SB-36 [<0.05] (0.35)
SB-5 [<0.05]
SB-30 [<6.0] (5.4)
SB-37 [<0.05]
SB-38 [<0.05] (0.82)
SB-27 [<0.05] (0.5)
SB-4 [<0.05] [<0.05]
SB-3 [<0.05]
SB-2 [<0.05] (0.05)
SB-1 [<0.05]
SB-10 [<0.05]
SB-21 [<0.05]
SB-23 [<0.05] (2.6)
SB-24 [<2.0] (5)
MW-2 [<0.05] [<0.05]
SB-20 [<0.05] (0.1)
SB-25 [<0.1] (0.7)
SB-26 [<0.05] (0.4)
SB-19 [<0.05] [<0.05]
SB-15 [<0.05] (0.80)
SB-17A (0.1)
SB-13 [<0.05] [<0.10]
SB-11 [<0.05] [<0.05]
SB-14 [<0.05] [<0.05]
GATE
SECURITY GATE
SB-12 [<0.05] [<0.05]
MW-1 [<0.05] [<0.05]
146.69
151.98
145.09
Harding Lawson Associates
Engineering and Environmental Services
1,1-DCE SOIL CONCENTRATION DISTRIBUTION
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE 26
DRAWN LJH/JTL
JOB NUMBER 17333,168.11
APPROVED TAK
DATE 2/92
REVISED
DATE

SFD1458


Scale 0 30 60 feet
Reference: Tait & Associates, Orange, California, June 15 1990
Bench Mark: Los Angeles Road Department B.M. #CY 7443
Elevation = 148.095 feet (adjusted 1975)
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
PERCHED WATER ZONE MONITORING WELL
MONITORING WELL
SOIL BORING
1,2-DCA CONCENTRATION AT APPROXIMATELY 20 FEET
1,2-DCA CONCENTRATION AT APPROXIMATELY 40 FEET
SB-9 [<0.05] (<0.05)
SB-8 [<0.05] (<0.05)
SB-7 [<0.05] (<0.05)
SB-6 [<0.05] (<0.05)
MW-3 [<0.05] (<0.05)
SB-36 [2.0] (0.09)
SB-5 (<0.05)
SB-30 [<6.0] (<0.10)
SB-37 [<0.05]
SB-38 [<0.05] (0.08)
SB-27 [<0.05] (<0.20)
SB-4 [<0.05] (<0.05)
SB-3 [<0.05]
SB-2 [<0.05] (<0.05)
SB-1 (<0.05)
SB-10 (<0.05)
SB-21 (<0.05)
SB-23 [<0.05] (0.6)
SB-24 [6.4] (<1.0)
MW-2 [<0.05] (<0.05)
SB-20 [<0.05] (<0.05)
SB-25 [<0.10] (0.3)
SB-26 [<0.05] (<0.05)
SB-19 [<0.05] (<0.05)
SB-15 [<0.05] (<0.05)
SB-17A (<0.05)
SB-13 [<0.05] (7)
SB-11 [<0.05] (<0.05)
SB-14 [<0.05] (<0.05)
GATE
SECURITY GATE
SB-12 [<0.05] (<0.05)
MW-1 [<0.05] (<0.05)
Harding Lawson Associates
Engineering and Environmental Services
1,2-DCA SOIL CONCENTRATION DISTRIBUTION
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE 27
DRAWN LJH/JTL
JOB NUMBER 17333,168.11
APPROVED THK
DATE 1/92
REVISED
DATE

SFD1459



EXPLANATION

- ——— — —? Geologic contact, dashed where approximate, queried where uncertain
- (15) Distance, in feet, of projection into line of cross section
- MSL Mean Sea Level
- ▼ Ground-water level encountered during drilling
- 530 1,1,1-TCA concentration in mg/kg
- —500— 1,1,1-TCA soil isoconcentration contour in mg/kg

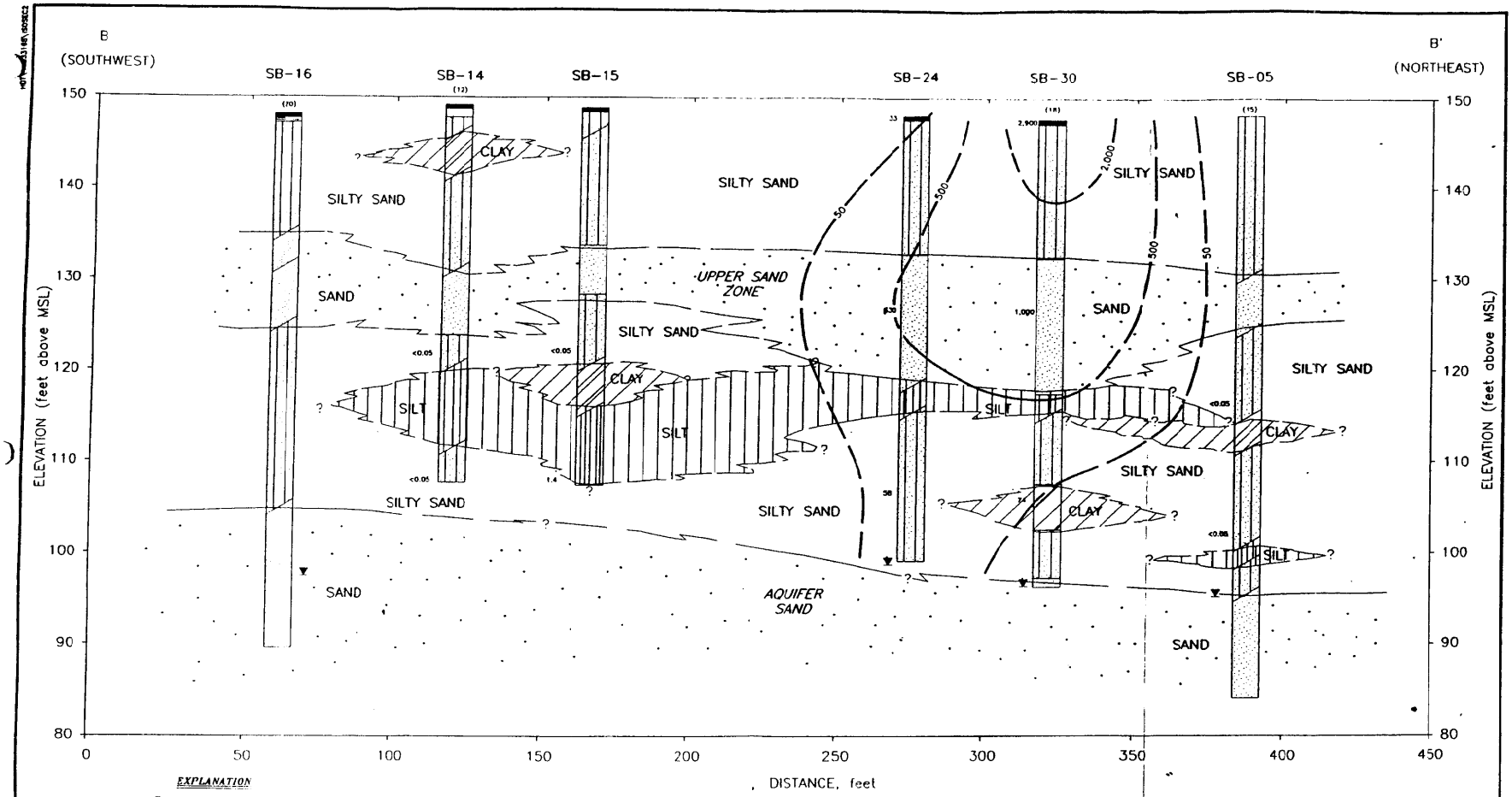
Harding Lawson Associates
Engineering and Environmental Services

CROSS SECTION B-B' WITH VERTICAL 1,1,1-TCA SOIL ISOCONCENTRATION CONTOURS
McKesson Corporation Property
Santa Fe Springs, California

PLATE 28

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JAV	17333.168.11	TAC	2/92		

SFD1460



EXPLANATION

- Geologic contact, dashed where approximate, queried where uncertain
- (15) Distance, in feet, of projection into line of cross section
- MSL Mean Sea Level
- Ground-water level encountered during drilling
- 630 PCE concentration in mg/kg
- 500 PCE soil isoconcentration contour in mg/kg

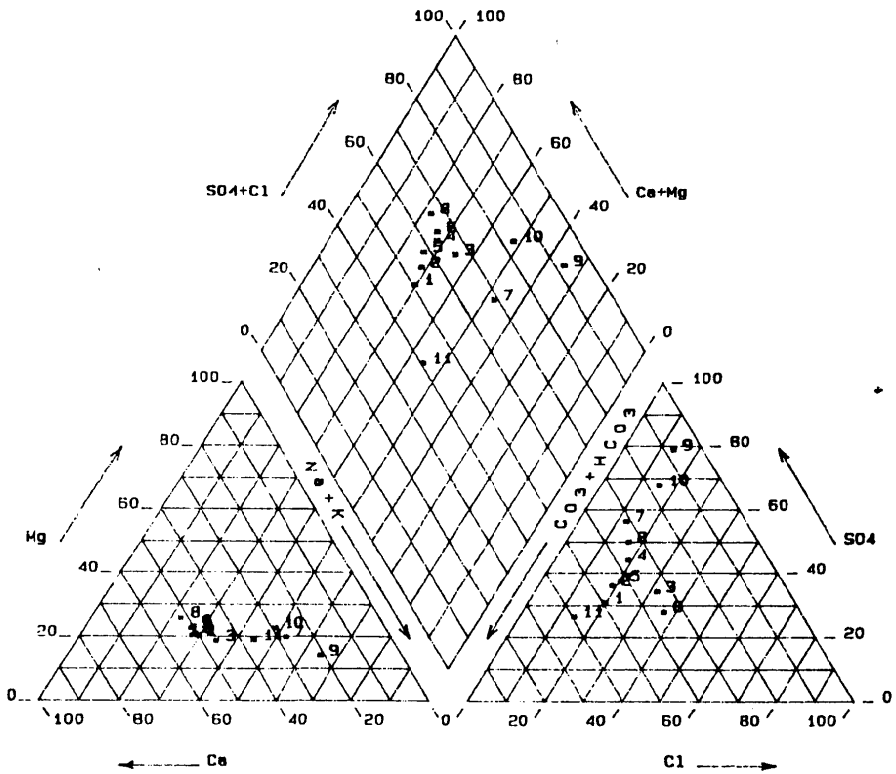
Harding Lawson Associates
Engineering and Environmental Services

CROSS SECTION B-B' WITH VERTICAL PCE SOIL ISOCONCENTRATION CONTOURS
McKesson Corporation Property
Santa Fe Springs, California

PLATE 29

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JAV	17333,168.11	TAK	2/92		

SFD1461



#	Date YYMMDD	Zone	Well I.D.
1	901025	1, 4, 9	MW-01
2	901025	1, 4, 9	MW-02
3	910211	1, 4, 9	MW-03
4	901025	1, 4, 9	SB-10
5	910213	1, 4, 9	SB-17
6	910211	1, 4, 9	SB-23
7	910212	2, 4, 7	SB-17A
8	910212	1, 4, 9	SB-17B
9	910211	2, 4, 7	SB-23A
10	910211	1, 4, 9	SB-23B
11	901025	1, 3, 5	SB-32

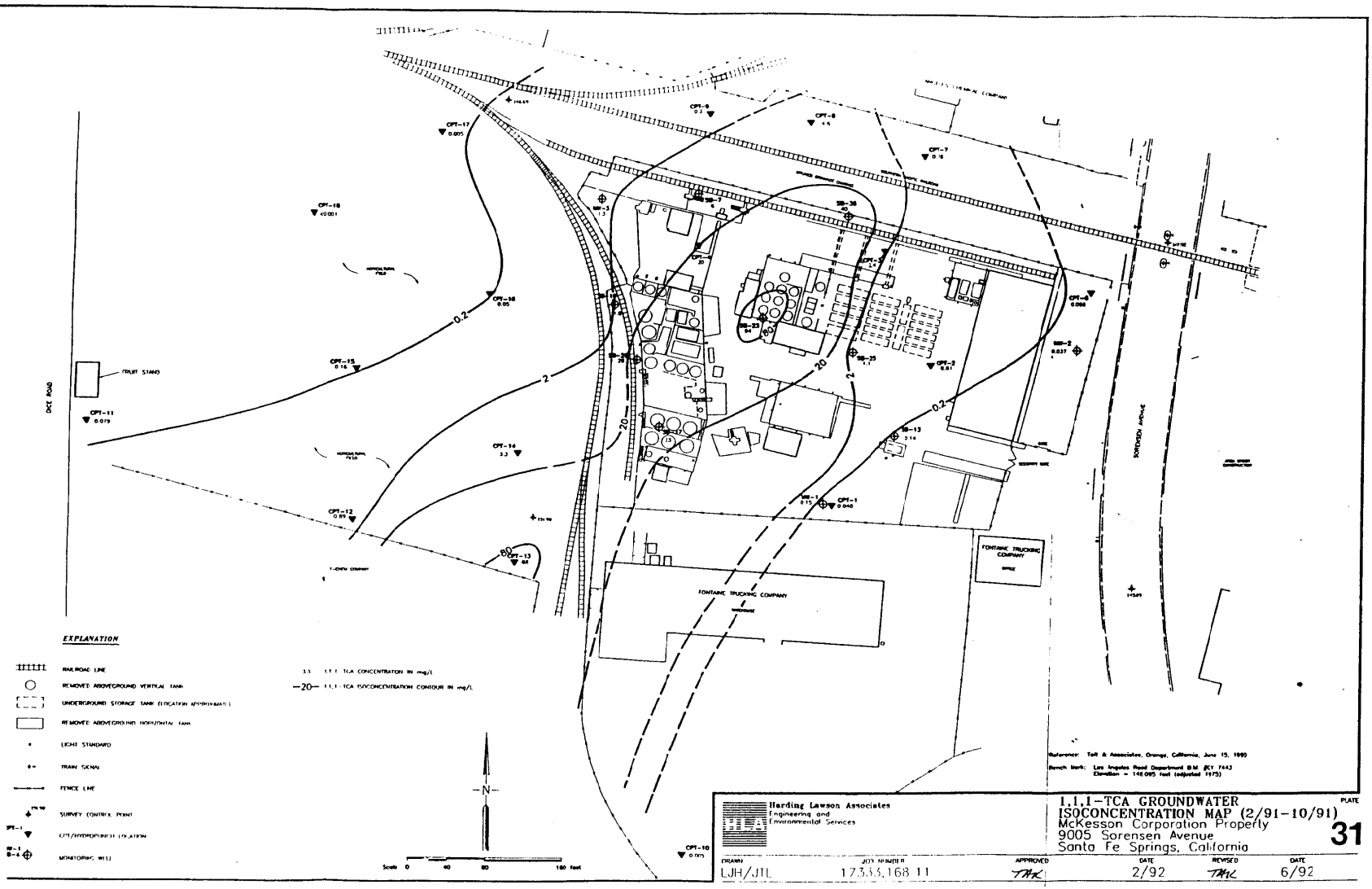
Harding Lawson Associates
Engineering and Environmental Services

PIPER DIAGRAM
McKesson Corporation Property
Santa Fe Springs, California

PLATE **30**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TMK	1/92		

SFD1462



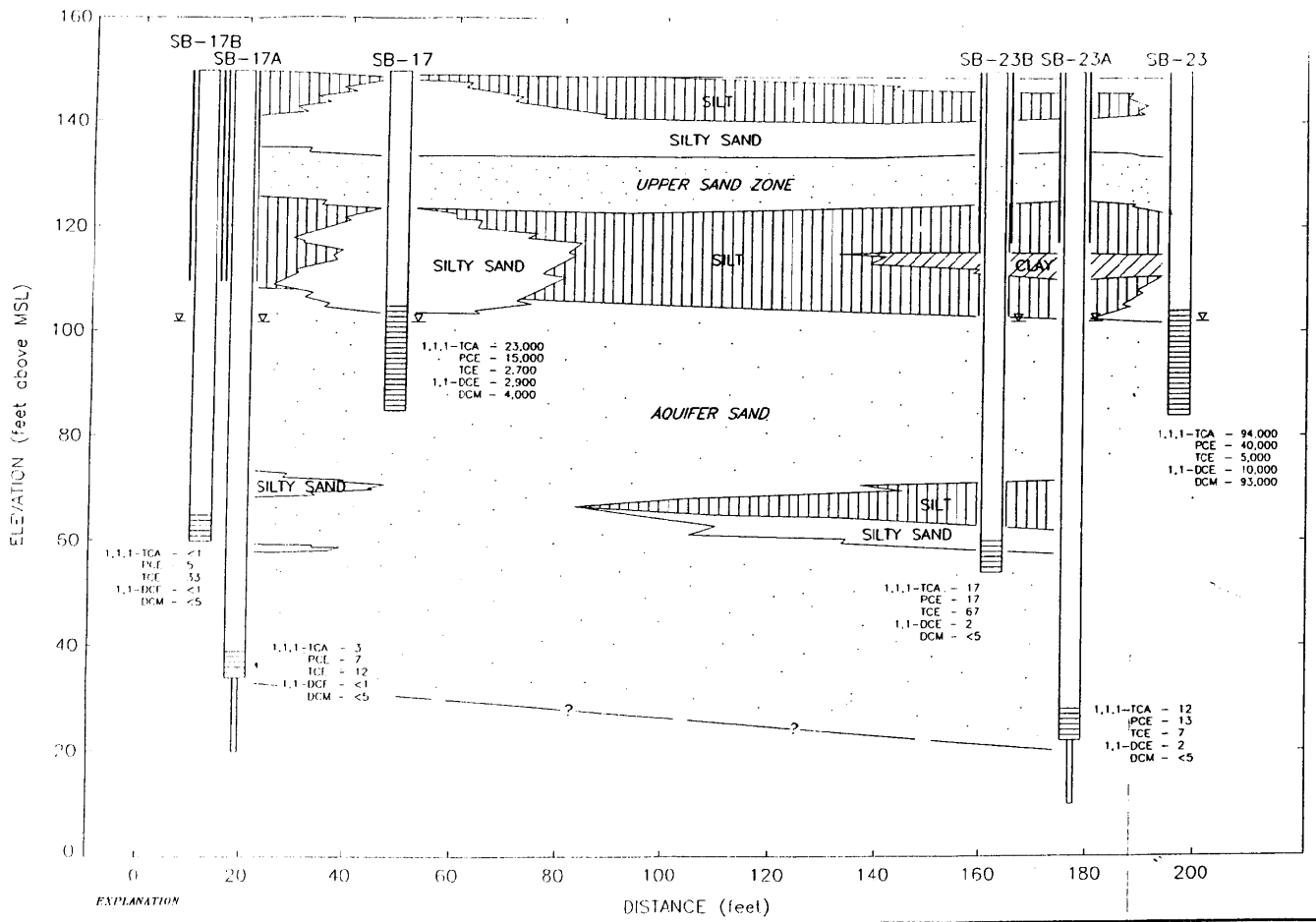
Harding Lawson Associates
Engineering and Environmental Services

1,1,1-TCA GROUNDWATER ISOCONCENTRATION MAP (2/91-10/91)
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California

PLATE 31

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LJH/JTL	17333.168 11	TAK	2/92	TAK	6/92

SFD1463



EXPLANATION

? Approximate geologic contact

MSL Mean sea Level

V Water level measured on 4/11/91

Monitoring well
conductor casing
screened interval

Note: All concentrations are in micrograms per liter (ug/L)

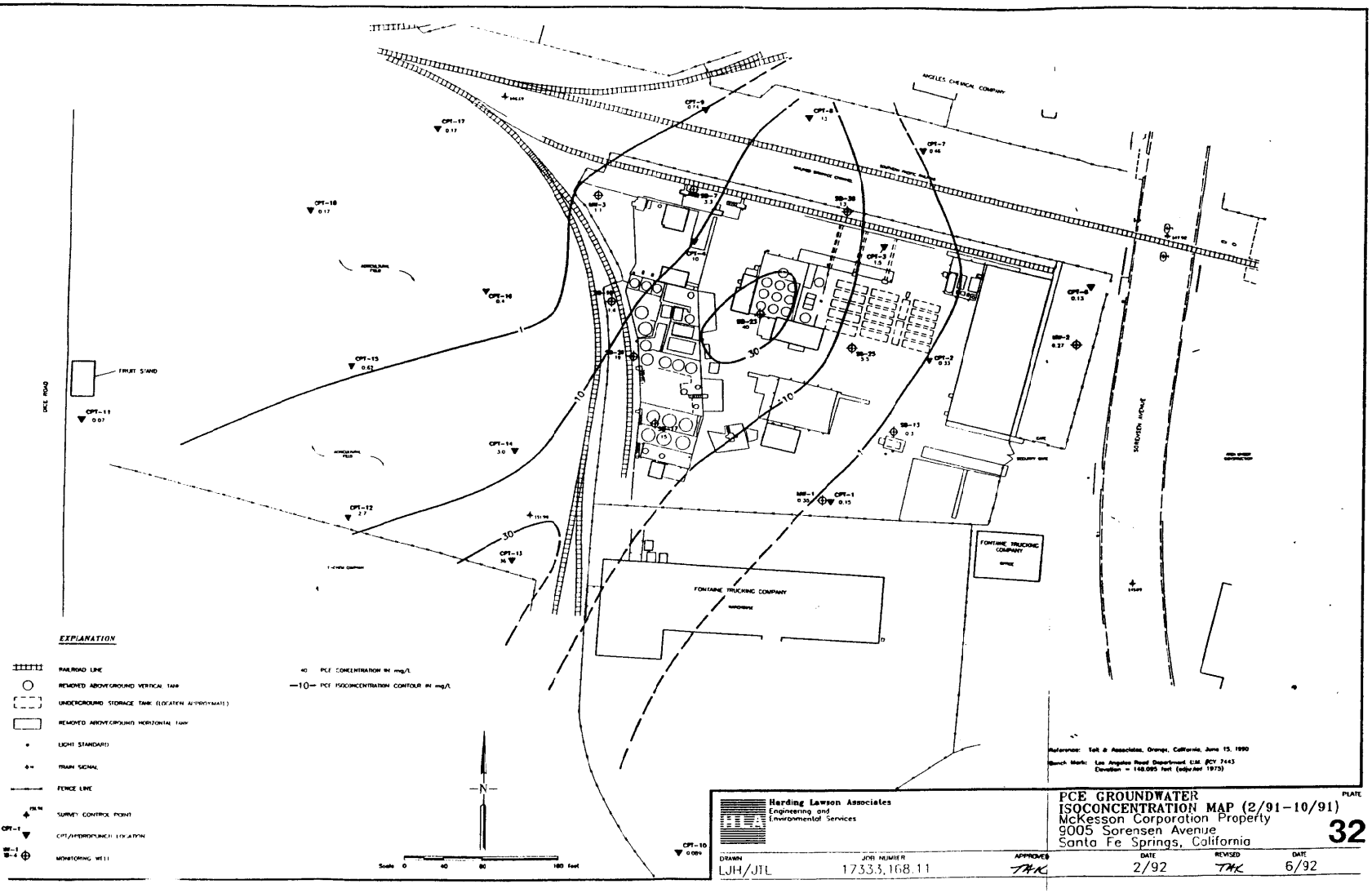
Harding Lawson Associates
Engineering and Environmental Services

GROUNDWATER CONTAMINANT CONCENTRATION WITH DEPTH (2/91)
McKesson Corporation Property
Santa Fe Springs, California

PLATE **36**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JIL	17333,168.11	TAK	1/92	TAK	6/92

SFD1464



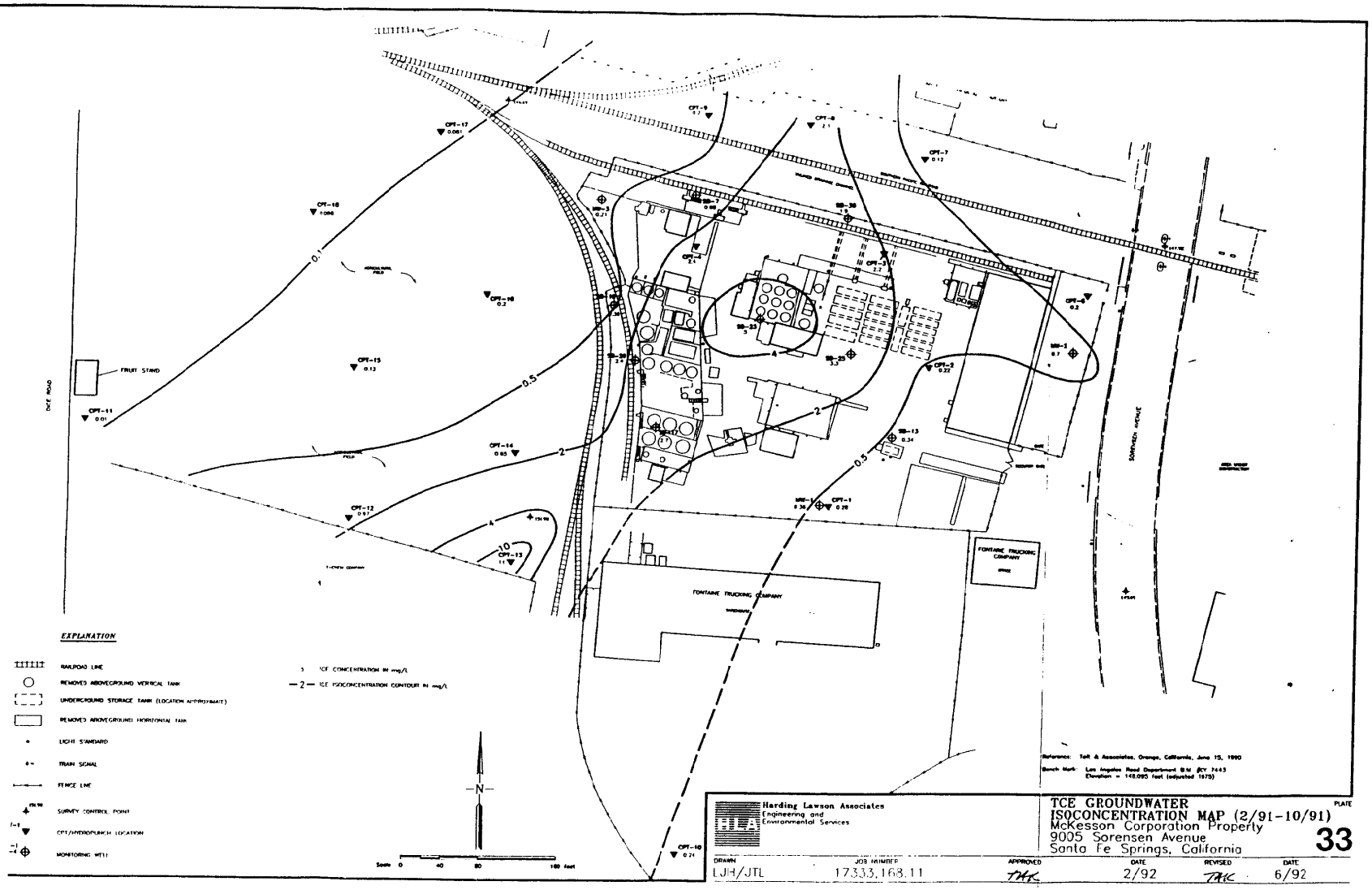
Harding Lawson Associates
Engineering and Environmental Services

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LJH/JTL	17333.168.11	TAK	2/92	TAK	6/92

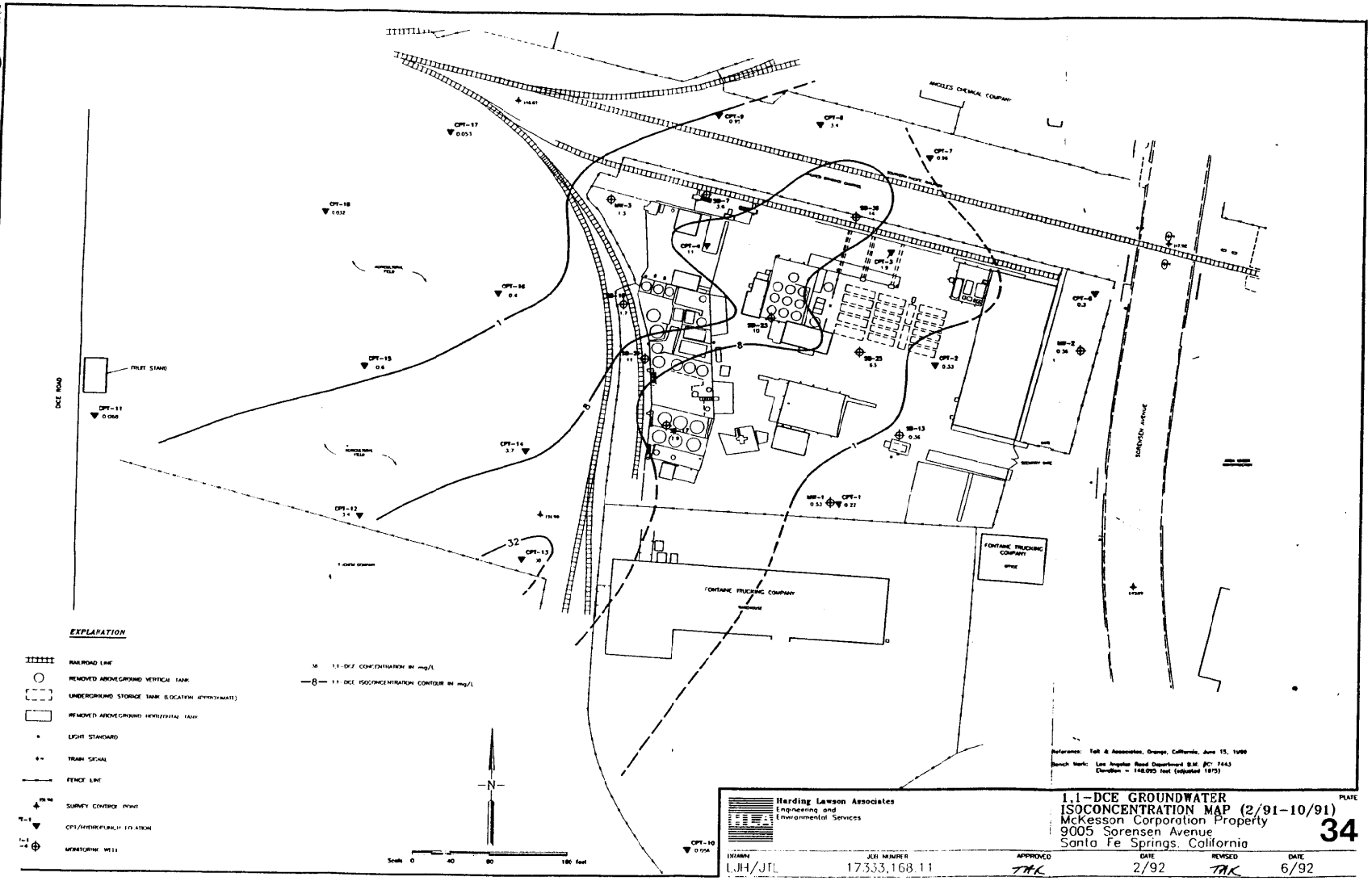
PCE GROUNDWATER ISOCONCENTRATION MAP (2/91-10/91)
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California

PLATE 32

SFD1465


EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
CPT/HYDROPUNCH LOCATION
MONITORING WELL
5 TCE CONCENTRATION IN mg/L
2 TCE ISOCONCENTRATION CONTOUR IN mg/L
N
Scale 0 40 80 160 feet
FRUIT STAND
DICE ROAD
SORENSEN AVENUE
FONTAINE TRUCKING COMPANY
FONTAINE TRUCKING COMPANY
Reference: Toft & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. BCY 7443
Elevation = 148.095 feet (adjusted 1975)
Harding Lawson Associates
Engineering and
Environmental Services
TCE GROUNDWATER
ISOCONCENTRATION MAP (2/91-10/91)
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE
33
DRAWN LJH/JTL
JOB NUMBER 17333,168.11
APPROVED THK
DATE 2/92
REVISED THK
DATE 6/92

SFD1466



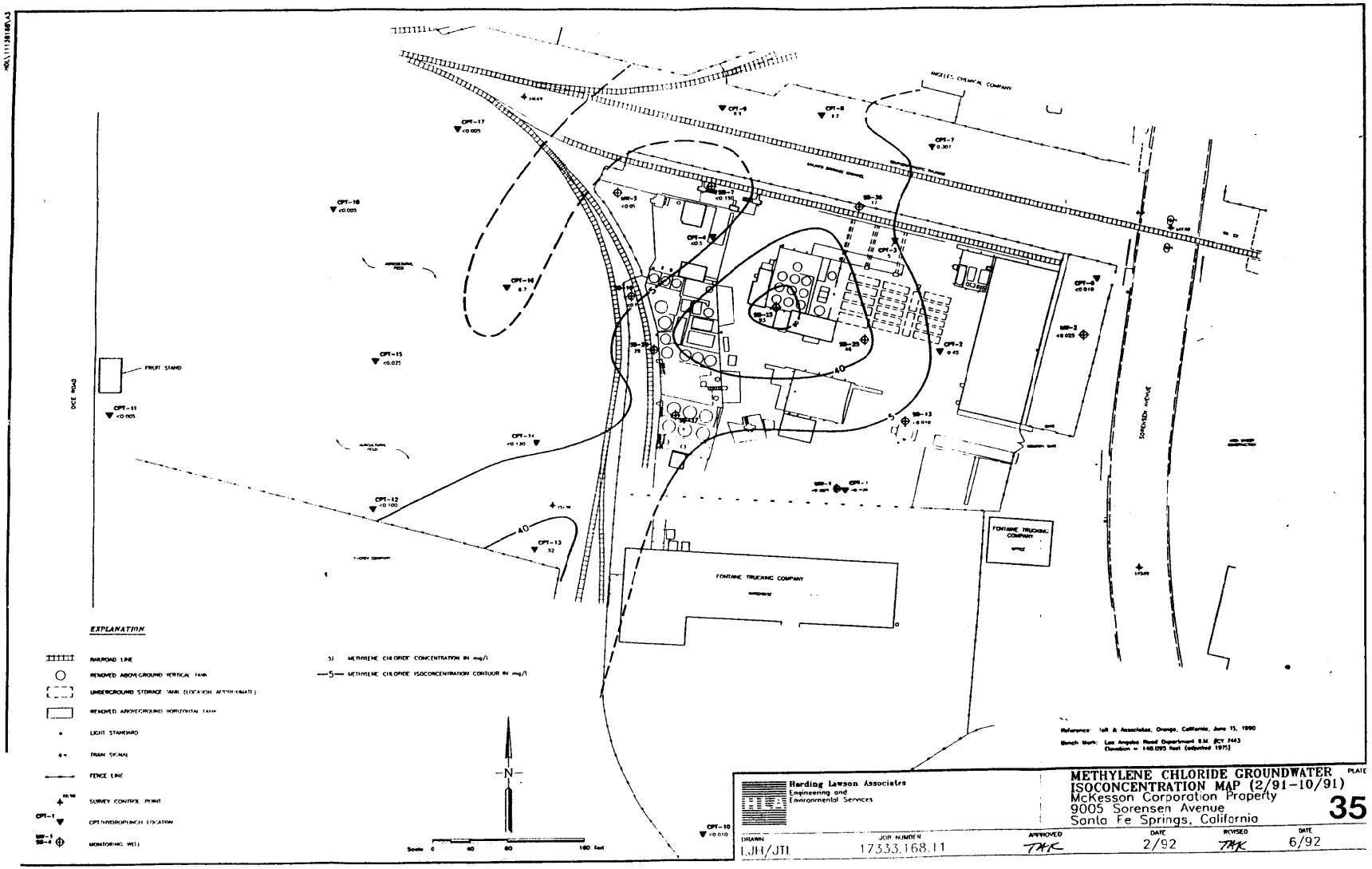
Harding Lawson Associates
Engineering and Environmental Services

1,1-DCE GROUNDWATER ISOCONCENTRATION MAP (2/91-10/91)
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California

PLATE 34

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LJH/JTL	17333,168.11	TAK	2/92	TAK	6/92

SFD1467


ANGELUS CHEMICAL COMPANY
UNION PACIFIC RAILROAD
SORENSEN AVENUE
DICE ROAD
FRUIT STAND
FONTAINE TRUCKING COMPANY
FONTAINE TRUCKING COMPANY
OFFICE
CPT-1
CPT-2
CPT-3
CPT-4
CPT-5
CPT-6
CPT-7
CPT-8
CPT-9
CPT-10
CPT-11
CPT-12
CPT-13
CPT-14
CPT-15
CPT-16
CPT-17
SB-1
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SB-7
SB-13
SB-25
SB-33
SB-36
MW-3
MW-4
MW-5
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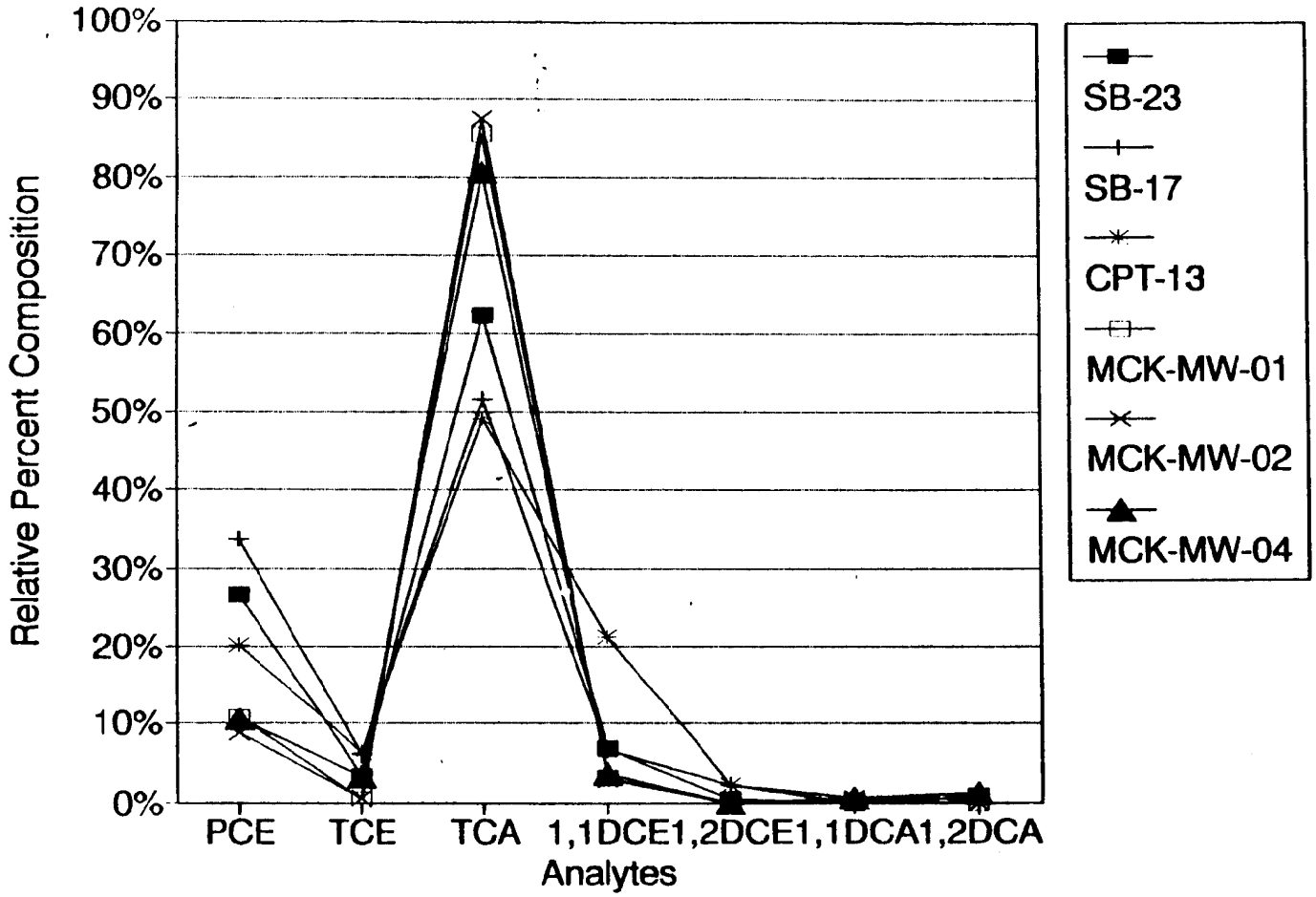
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
CPT-1 CPT/HYDROPUNCH LOCATION
MW-1 SB-4 MONITORING WELL
5) METHYLENE CHLORIDE CONCENTRATION IN mg/l
—5— METHYLENE CHLORIDE ISOCONCENTRATION CONTOUR IN mg/l
N
Scale 0 40 80 160 feet
Reference: Ielt & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. (BCY 7443
Elevation = 148.095 feet (adjusted 1975)
Harding Lawson Associates
Engineering and
Environmental Services
METHYLENE CHLORIDE GROUNDWATER
ISOCONCENTRATION MAP (2/91-10/91)
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE
35
DRAWN LJH/JTI
JOB NUMBER 17333.168.11
APPROVED TAK
DATE 2/92
REVISED TAK
DATE 6/92

SFD1468

RELATIVE PERCENT CONCENTRATION



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Engineering and Environmental Services

RELATIVE PERCENT CONCENTRATION
McKesson Corporation Property
Santa Fe Springs, California

PLATE 37a

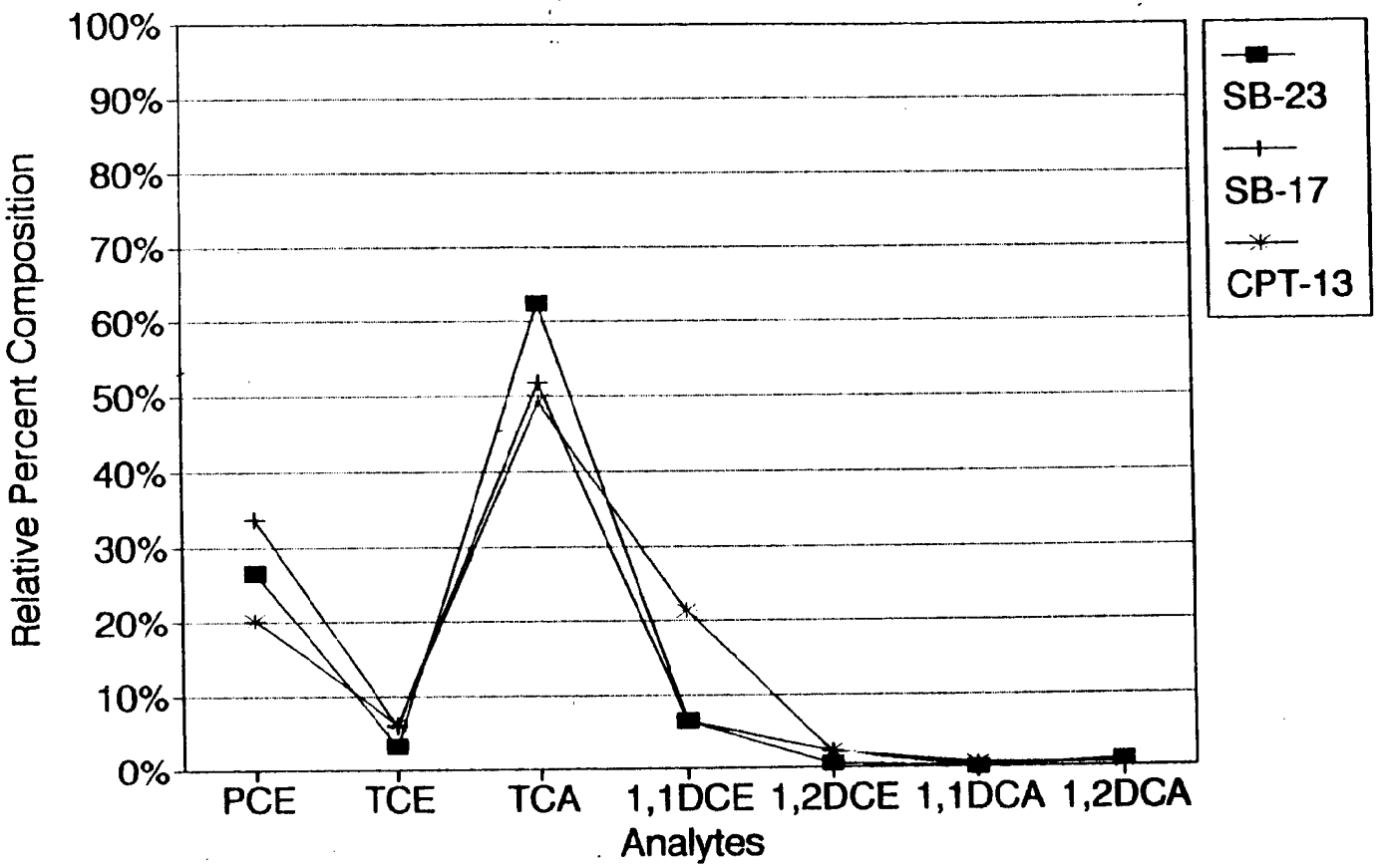
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TMK	1/92		

SFD1469

HDT\17333068\DIA1

RELATIVE PERCENT CONCENTRATION

On-Site Plume Axis



PLATE

37b

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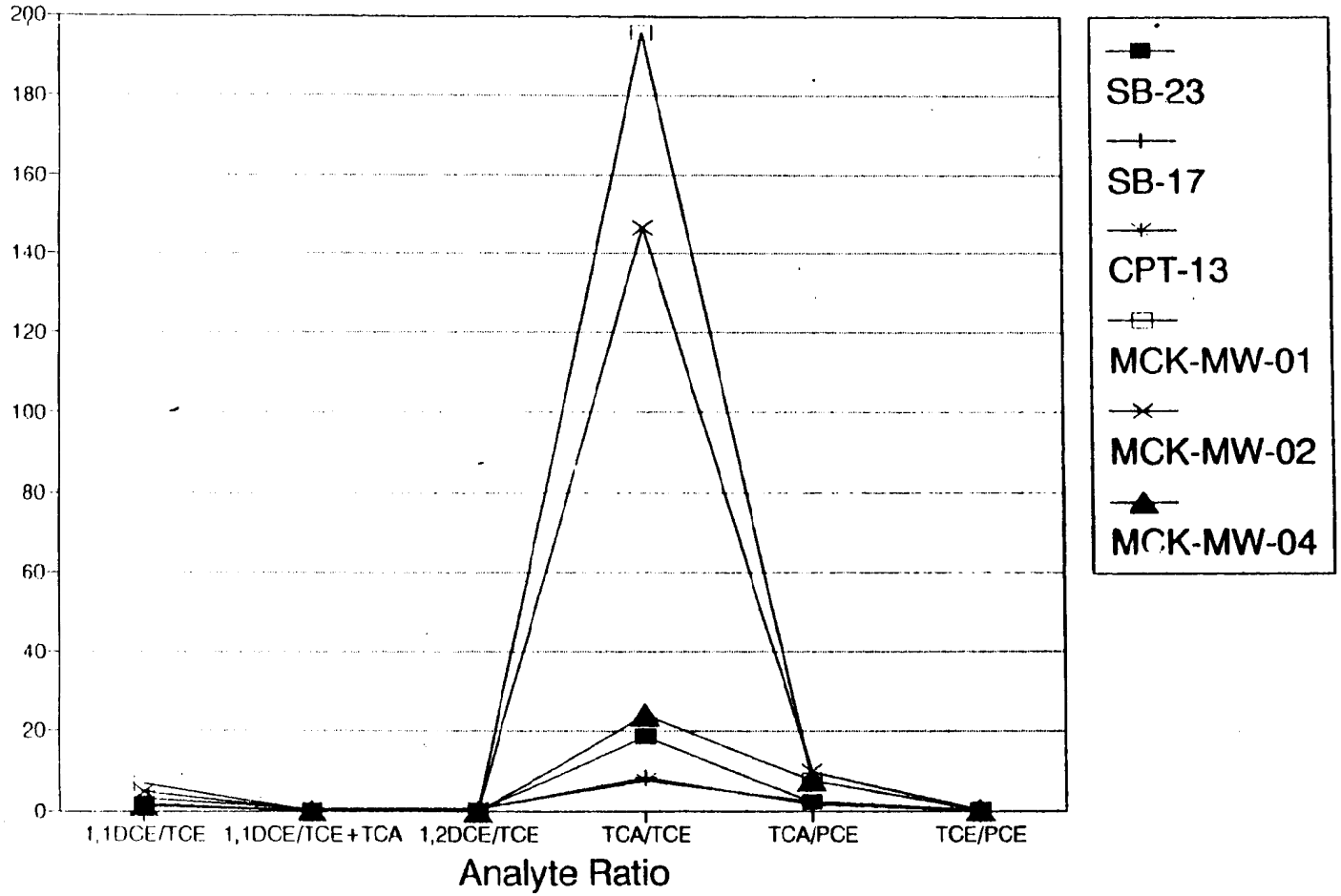
RELATIVE PERCENT CONCENTRATION
McKesson Corporation Property
Santa Fe Springs, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TMK	1/92		

SFD1470

Chlorinated Concentration Ratios



SFD1471

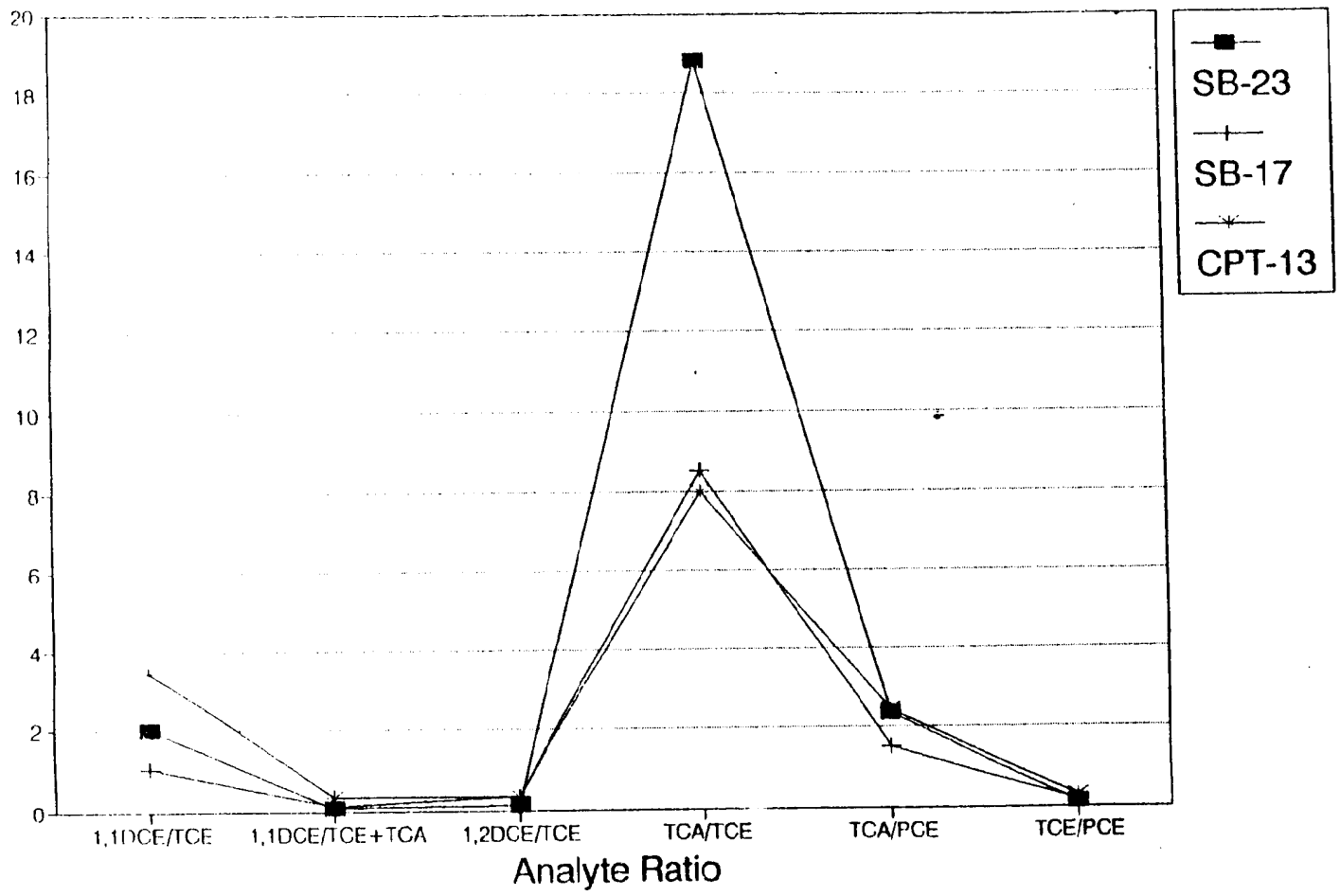
Harding Lawson Associates
Engineering and Environmental Services

CHLORINATED CONCENTRATION RATIOS
McKesson Corporation Property
Santa Fe Springs, California

PLATE 38a

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	TAK	1/92		

Chlorinated Concentration Ratios



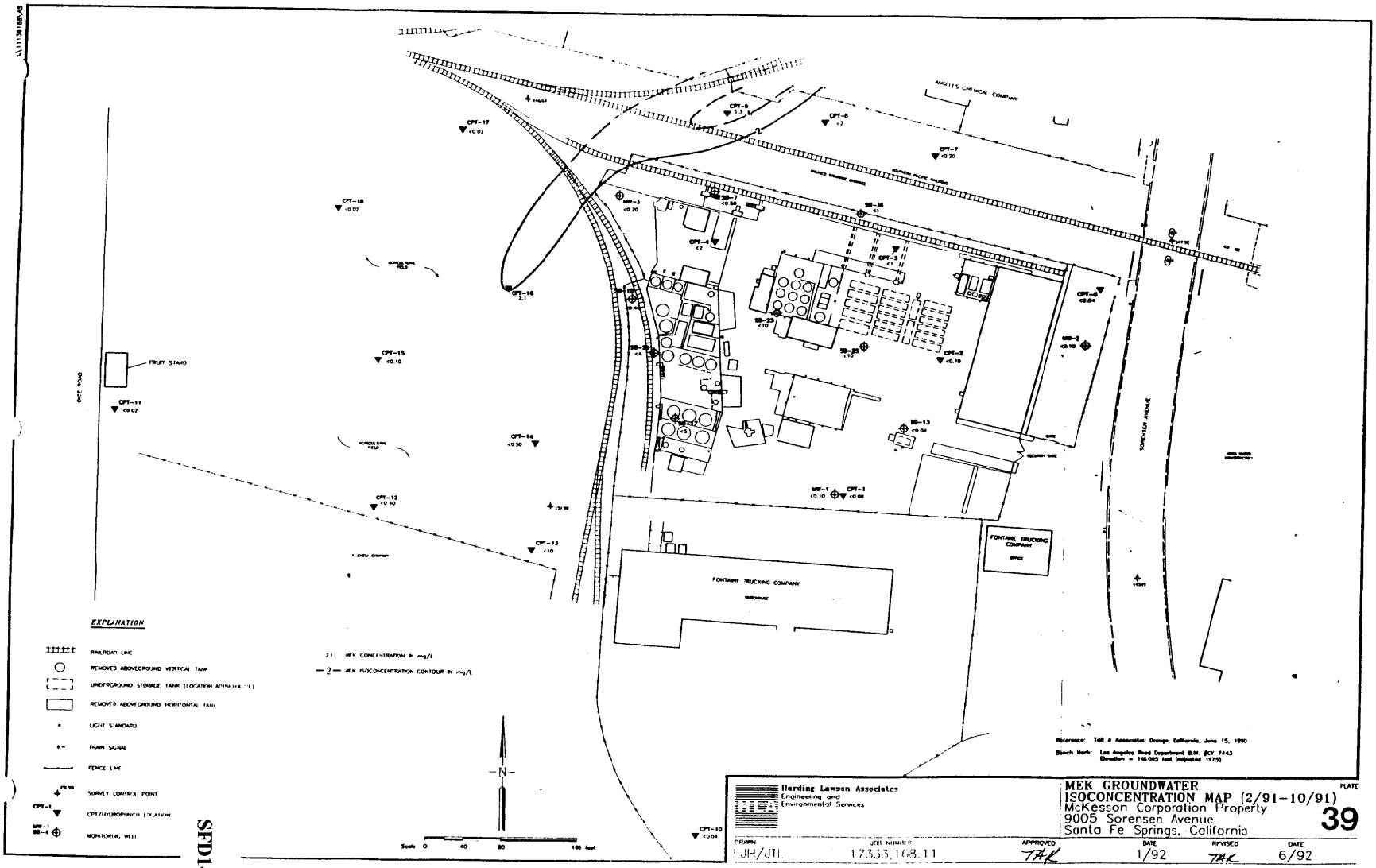
Harding Lawson Associates
Engineering and Environmental Services

CHLORINATED CONCENTRATION RATIOS
McKesson Corporation Property
Santa Fe Springs, California

PLATE
38b

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JTL	17333,168.11	THK	1/92		

SFD1472



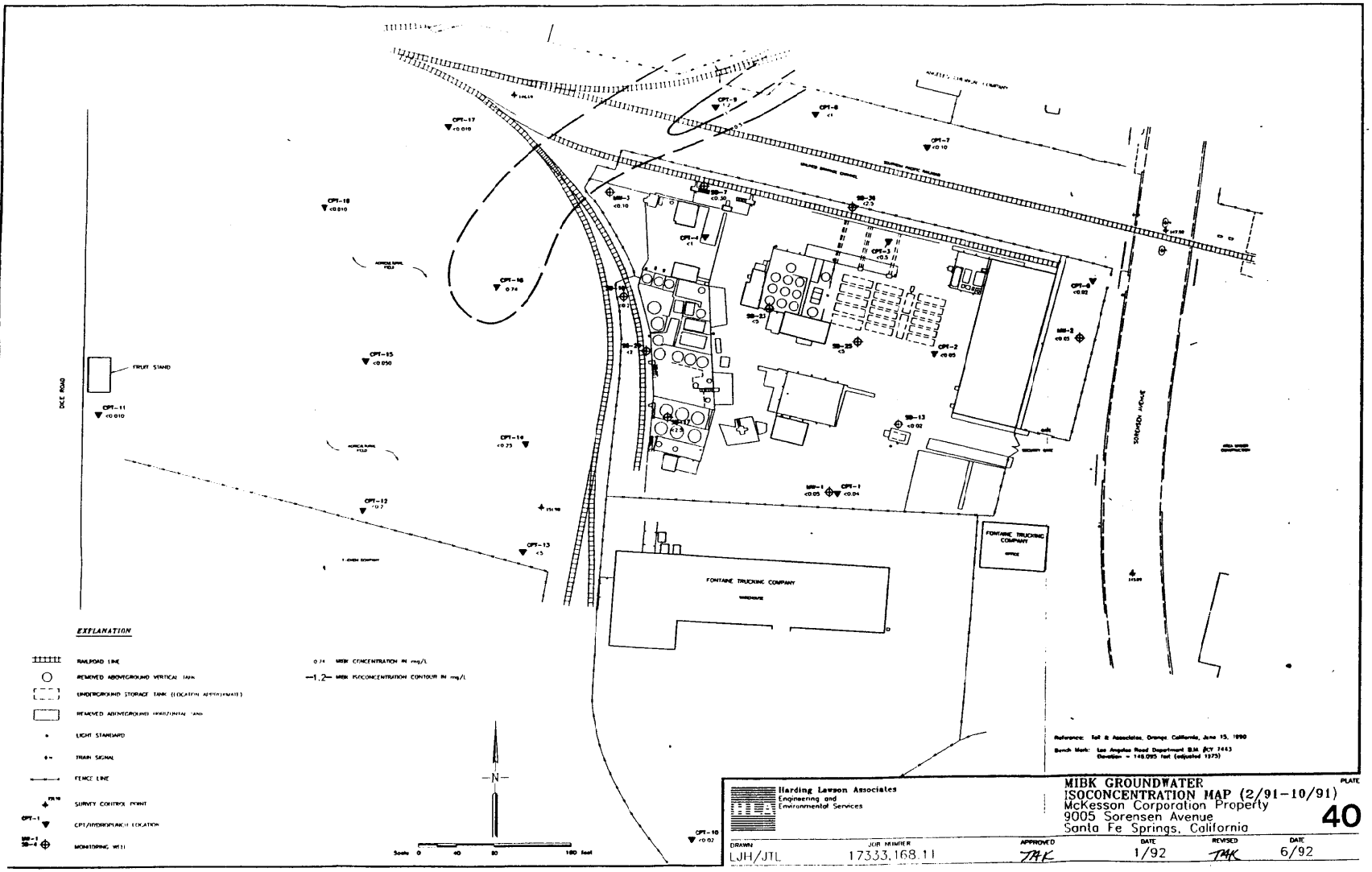
Harding Lawson Associates
Engineering and
Environmental Services

MEK GROUNDWATER ISOCONCENTRATION MAP (2/91-10/91)
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California

PLATE **39**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LJH/JTL	17333,168.11	TAK	1/92	TAK	6/92

SFD1473



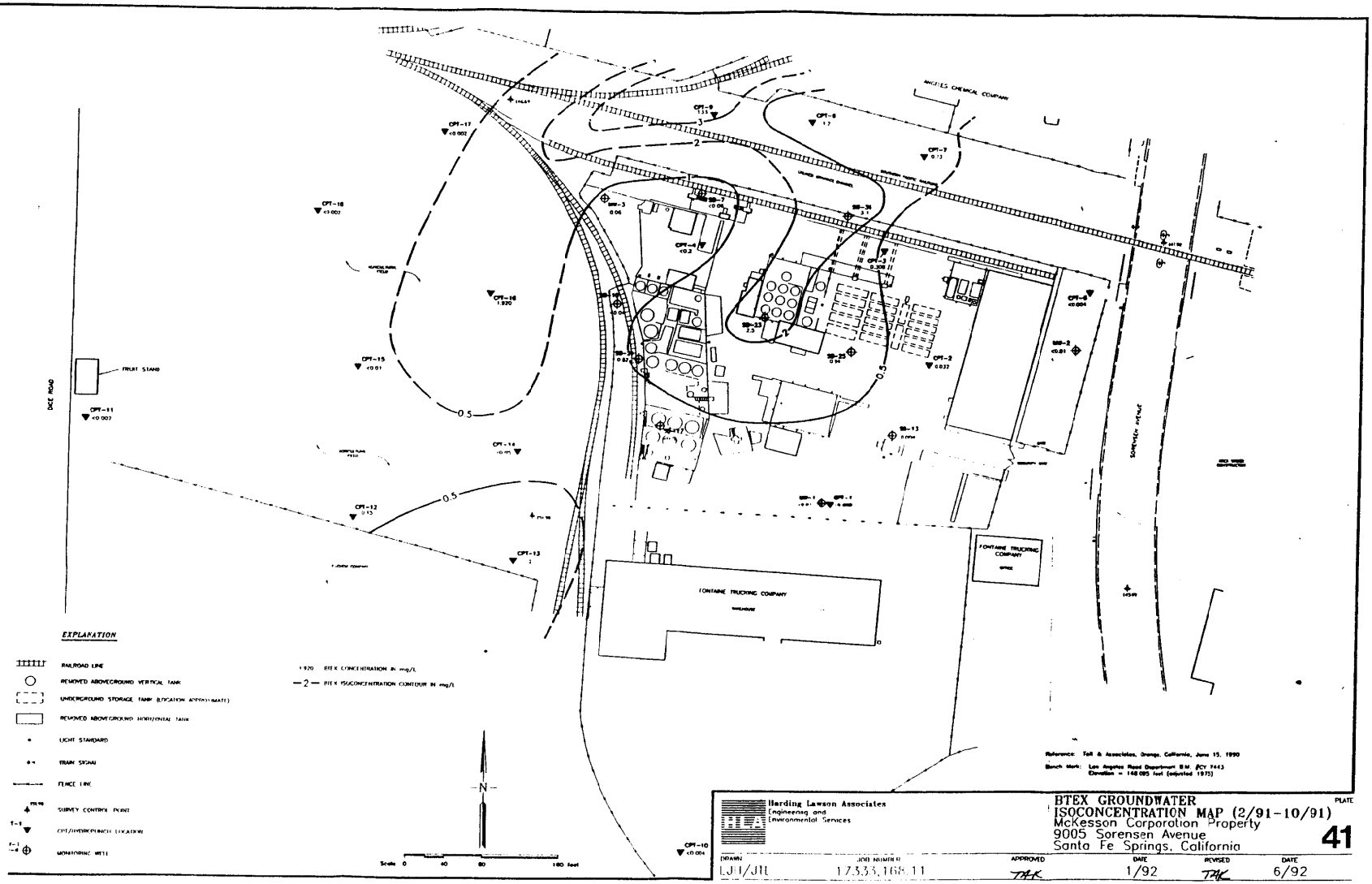
Harding Lawson Associates
Engineering and
Environmental Services

MIBK GROUNDWATER
ISOCONCENTRATION MAP (2/91-10/91)
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California

PLATE 40

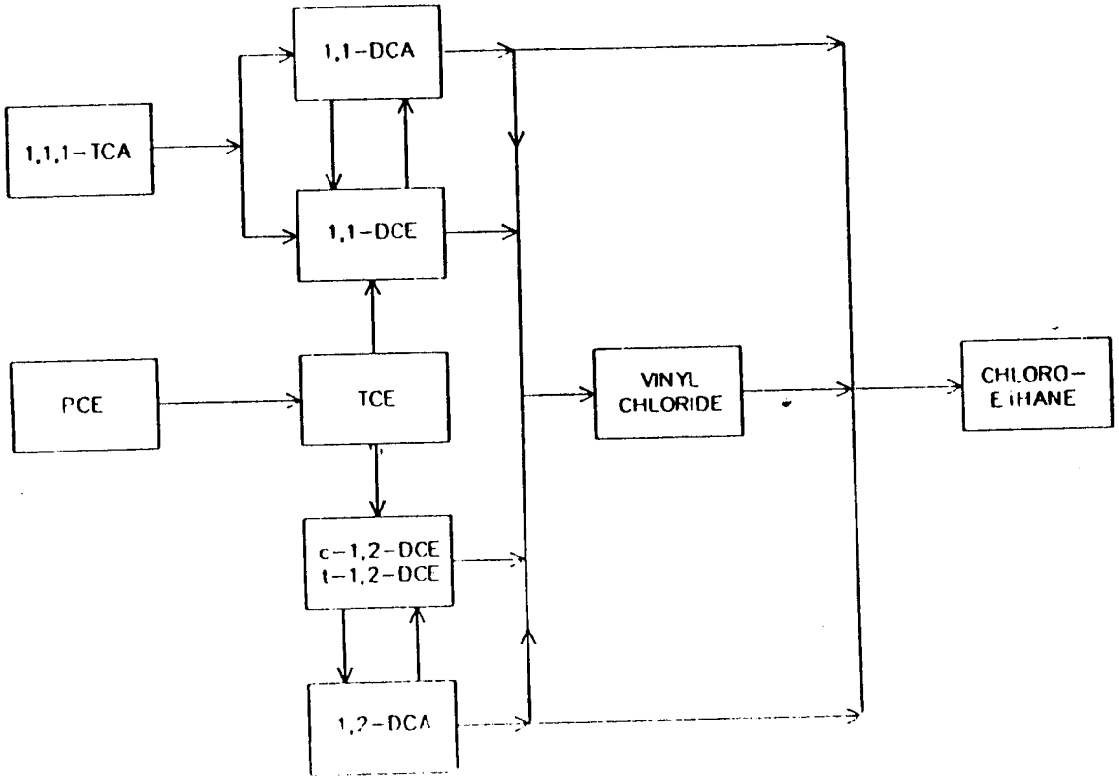
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LJH/JTL	17333.168.11	TAK	1/92	TAK	6/92

SFD1474



ANGELES CHEMICAL COMPANY
FRUIT STAND
DICE ROAD
SORENSEN AVENUE
FONTAINE TRUCKING COMPANY
FONTAINE TRUCKING COMPANY
EXPLANATION
RAILROAD LINE
REMOVED ABOVEGROUND VERTICAL TANK
UNDERGROUND STORAGE TANK (LOCATION APPROXIMATE)
REMOVED ABOVEGROUND HORIZONTAL TANK
LIGHT STANDARD
TRAIN SIGNAL
FENCE LINE
SURVEY CONTROL POINT
CPT/HYDROPUNCH LOCATION
MONITORING WELL
1.920 BTEX CONCENTRATION IN mg/L
2 BTEX ISOCONCENTRATION CONTOUR IN mg/L
N
Scale 0 40 80 160 feet
Reference: Tait & Associates, Orange, California, June 15, 1990
Bench Mark: Los Angeles Road Department B.M. (CY 7443)
Elevation = 148.095 feet (adjusted 1975)
Harding Lawson Associates
Engineering and Environmental Services
BTEX GROUNDWATER
ISOCONCENTRATION MAP (2/91-10/91)
McKesson Corporation Property
9005 Sorensen Avenue
Santa Fe Springs, California
PLATE
41
DRAWN LJH/JTL
JOB NUMBER 17333,168.11
APPROVED TAK
DATE 1/92
REVISED TAK
DATE 6/92

SFD1475



Harding Lawson Associates
Engineering and Environmental Services

BIOTRANSFORMATION PATHWAYS FOR VARIOUS CHLORINATED VOLATILE HYDROCARBONS (DRAGUN, 1988)
McKesson Corporation Property
Santa Fe Springs, California

PLATE 42

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JIL	17333,168.11	TAK	1/92		

SFD1476