GROUNDWATER STUDY REPORT
CALMAR SITE
CITY OF INDUSTRY, CALIFORNIA
REGIONAL BOARD FILE NO. 102.0055

May 1991

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The information contained in this report has received appropriate technical review and approval. The conclusions and recommendations presented represent professional judgments and are based upon the findings from the investigation identified in the report and the interpretation of such data based on our experience and background. This acknowledgement is made in lieu of all warranties, either express or implied.

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1.0 INTRODUCTION

Calmar Incorporated occupies an approximately 6.3-acre site in the City of Industry (Los Angeles County), California. This site is on the western corner of Turnbull Canyon Road and Proctor Avenue (see Figure 1). The address for the Calmar facility is 333 South Turnbull Canyon Road, City of Industry, California 91749.

As a part of a site characterization requested by the California Regional Water Quality Control Board-Los Angeles Region (CRWQCB), three monitoring wells (MW-1, MW-2 and MW-3) have been placed at the site. Three piezometers (Pz-1, Pz-2 and Pz-3) were placed to further assess the groundwater gradient at the site. These three wells and three piezometers were installed during a Preliminary Environmental Assessment performed by BCL Associates in 1988. See Figure 2 for the locations of the monitoring wells and piezometers.

In conformance with the CRWQCB-approved Work Plan for Phase II Subsurface Soils Investigation At Calmar Incorporated (February 1990) (Work Plan), the water levels in the wells and piezometers were obtained to measure the potentiometric surface of the groundwater beneath the Calmar site and water samples were collected from the monitoring wells and subjected to laboratory analysis.

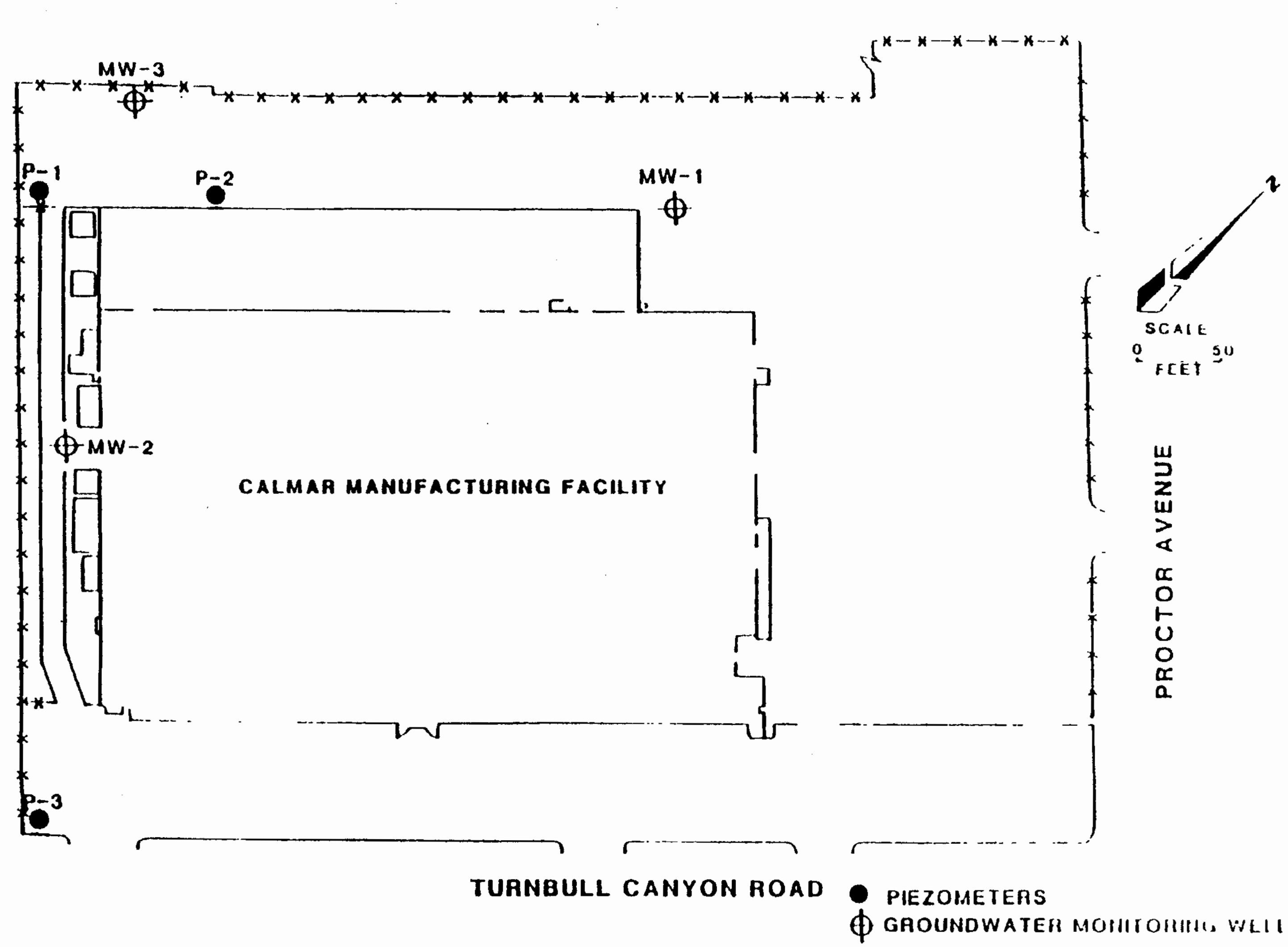
This report presents the findings of this April 29/May 13, 1991 water sampling and elevation measurements at Calmar Inc.

2.0 HYDROGEOLOGY

Regional and site hydrogeology were a portion of the study included in an Environmental Site Audit of Calmar Incorporated (Audit) prepared by BCL Associates in May 1989. The section of this Audit

CDM | Figure 1

Calmar Inc.
Site Location Map



Source: BCL Associates Inc.

Calmar Inc.	
Piezometric & Monitoring Well locations and elevations	
Camp Dresser & McKee **CDM**	FIGURE 2

describing regional hydrogeology and site hydrogeology studies is included in Appendix A.

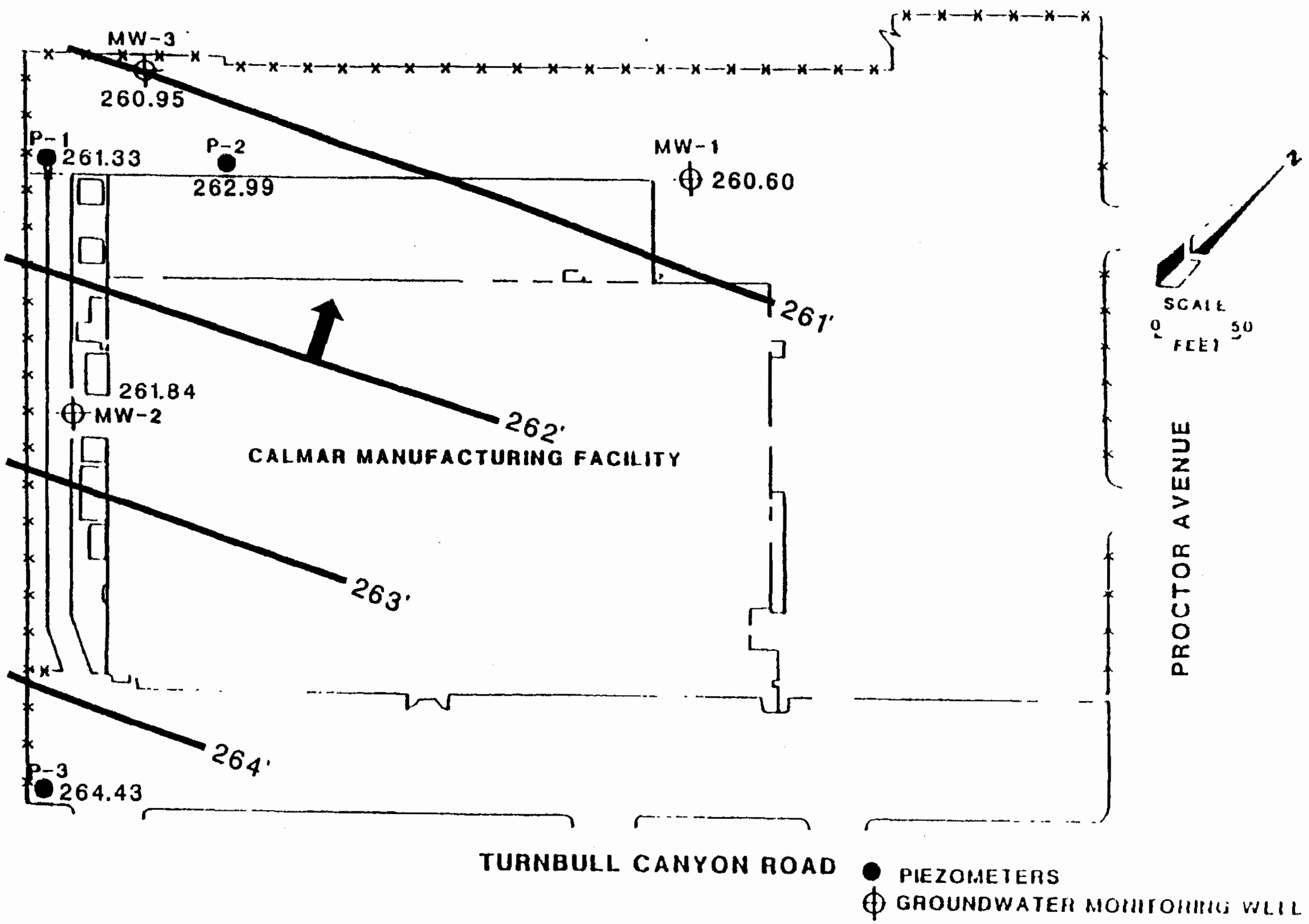
3.0 FIELD WORK

The field work which is described in this report includes ground-water sampling and field measurements at the monitoring well locations. The field work was conducted on April 29 and May 13, 1991.

3.1 Groundwater Levels

The water levels were measured in the three monitoring wells and the three piezometers prior to sampling. An electric sounder was used to measure the depth to water from the surveyed notch in the casing. Groundwater depths were measured by sequentially measuring the depths in each of the wells and piezometers. The measuring sequence was repeated until three consecutive readings of each well and piezometer were within +/- 0.1 feet to assure accurate readings. The sounder was decontaminated between each measurement by washing with Alconox-water solution followed by a tap water rinse and then a distilled water rinse. A time interval of at least 10 minutes elapsed between each measurement of a single well.

In order to measure the potentiometric surface, the monitoring wells and the piezometers were surveyed for elevation and location relative to a USGS benchmark. The elevation of a notch at the top of each well and piezometer serves as reference for water level measurements. These elevations are noted as reference points in Table 1 which is a compilation of the elevations of the groundwater potentiometric surface at the site. Figure 3 is a groundwater gradient map prepared from the most recent groundwater elevation measurements.



Ground Water Flow Direction

Ground Water Gradient = .008 (one vertical foot per 125 horizontal feet)

Lines of equal ground water elevation (feet)

260.60 Ground water elevation (May 10, 1991)

Calmar Inc.	
Calmar Ground Water Gradient Map	
Camp Dresser & McKee CDM	FIGURE 3

Table 1

ELEVATIONS OF THE GROUNDWATER POTENTIOMETRIC SURFACE

Well Number	Reference Elevation (ft MSL)	Depth of Casing (ft)	Elevation of the Groundwater Potentiometric Surface (ft MSL)		
		Date	3/29/89	4/29/91	5/10/91
MW-1	303.32	57	267.48	260.67	260.60
MW-2	303.29	48	268.15	261.91	261.84
MW-3	302.67	44	267.66	261.00	260.95
P-1	301.99	50	267.93	261.40	261.33
P-2	303.09	55	267.95	261.05	262.99
P-3	305.11	55	268.52	264.52	264.43

3.2 Water Sample Collection

Prior to purging, water samples were collected from the wells to analyze for floating constituents by EPA Method 602. In order to prevent the escape of volatile constituents, each sample was collected by carefully lowering a clean disposable (one-time) PVC bailer into the well so that the bailer entered the water smoothly without splashing.

Purging was accomplished using a clean disposable (one-time) PVC bailer to evacuate the water. Temperature, pH, and specific conductance was measured every 5 gallons. In order to avoid cascading water in the wells during purging, the wells were initially bailed at an extremely slow rate of 0.1 gallons per minute (gpm). The water level did not lower significantly in any of the three wells samples, using the slow rate of bailing. Cascading water was not observed during purging and none of the three wells were bailed dry during purging.

Purging proceeded until three successive temperature, pH and specific conductance measurements were within 10 percent, and at least three well volumes were removed.

Upon completion of purging, a disposable (one-time) PVC bailer was used to withdraw water for sampling. The bailer was lowered carefully into the water without splashing to prevent the loss of any volatile constituents.

VOA jars, with threaded caps and Teflon-faced silicon septa, were used to collect water samples. The water sample was carefully transferred from the top of the bailer into the jar to form a tension bubble (convex meniscus) on top of the jar, being careful not to spill the material over the side of the jar. The septum (Teflon-faced down) was then slid over the top of the jar being careful not to allow any air under the septum. The jar was tightly capped. The jar was turned over to assure that no air was in the VOA jar. Each VOA jar was then labeled and sealed and immediately stored in an insulated chest with blue ice to chill the sample to 4°C. Samples for volatile organics were collected in duplicate.

3.3 Total Settleable Solids

Samples were collected from each well to determine the amount of total settleable solids by using Imhoff cones. This test was performed twice, using two, one-liter samples from each well. The water samples were allowed to stand undisturbed for 60 to 70 minutes. Table 2 shows the results for this field test.

TABLE 2
RESULTS OF TOTAL SETTLEABLE SOLIDS TEST
(mg/L)

	MW-1	MW-2	MW-3
Sample 1	<.1	8.4	6.0
Sample 2	.1	8.5	9.5
Average:	.1	8.45	7.75

4.0 DISCUSSION OF ANALYTICAL RESULTS

One sample was collected from each of the monitoring wells, MW-1 MW-2, and MW-3, prior to purging. This was done to provide a greater assurance that floating contaminants, in this case gasoline constituents, would be collected. These samples were subjected to laboratory analysis by EPA Method 602 at Terra Tech Labs, a California certified laboratory. Gasoline constituents (benzene, toluene, ethylbenzene and total xylenes) were not detected above trace amounts in the three samples. The detection limit for these analyses was 1.0 ug/L.

Table 3
Monitoring Well
Water Sample Analysis
EPA Method 601 and 602
Results Summary (ug/L)

Well No.	MW-1		MW-2		MW-3	
Sample Date	9/1/88	4/29/91	9/1/88	4/29/91	9/1/88	4/29/91
Compound						
1,1-dichloroethene	6.1	19	4	52	79	27
1,1-dichloroethane	ND<0.5	ND<0.5	ND<0.5	5.4	36	2.8
cis-1,2-dichloroethene	TR<0.5	2.9	1.9	2.2	TR<0.5	ND<0.5
1,2-dichloroethane	ND<0.5	ND<0.5	ND<0.5	ND<0.5	3.98	ND<0.5
1,1,1-trichloroethane	6.5	4.5	0.77	73	2.3	5.4
Trichloroethene	23	34	42	140	20	21
Tetrachloroethene	20	34	7	11	47	170
Benzene	TR<0.5	ND<1.0	ND<0.5	ND<1.0	ND<0.5	ND<1.0
Ethyl Benzene	ND<0.5	ND<1.0	ND<0.5	ND<1.0	TR<0.5	ND<1.0
Toluene	TR<0.5	ND<1.0	ND<0.5	ND<1.0	ND<0.5	ND<1.0
Xylenes (dimethyl benzenes)	TR<0.5	ND<1.0	ND<0.5	ND<1.0	ND<0.5	ND<1.0

ND= Not Detected
TR = Trace, Below Detection Limit

Table 3 shows a summary of the results of laboratory analysis for groundwater samples obtained from the monitoring wells at Calmar during the September 1, 1988 and the April 29, 1991 samplings. Appendix B includes the laboratory reports for these analyses.

The water from this round of sampling shows increases in the concentration of 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, and trichloroethene in MW-2; an increase in tetrachloroethene in MW-3, and a decrease in the 1,1-dichloroethene and 1,1-dichloroethane concentrations in the same well. The concentration of compounds in MW-1 have not changed significantly, except for an increase in 1,1-dichloroethene, from the 1988 sampling. The source of elevated concentrations in MW-2 and MW-3 has not been conclusively established.

Based on the analytical results of the samples from the monitoring wells, samples were obtained from piezometers P-2 and P-3. The piezometers had been recognized by the CRWQCB in a meeting on January 12, 1990 as valid sample locations which had been constructed to rigorous design and construction standards.

The samples from piezometers P-2 and P-3 were collected in a manner consistent with that described in Section 3.2. These two samples were subjected to analysis by EPA Methods 601 and 602. The sample from piezometer P-3 was also analyzed for PCBs using Method 608. Table 4 is a summary of the analytical results for the piezometer samples. Concentrations of tetrachloroethene (20 ppb in P-2 and 5.2 ppb in P-3) and trichloroethene (5.7 ppb in P-2 and 2.3 ppb in P-3) were found in both piezometers. Gasoline constituents (benzene, toluene, ethylbenzene and total xylenes) were not detected in these samples. No PCB compounds were detected in the sample from piezometer P-3.

Table 4
Piezometer P-2 and P-3
Water Sample Analysis
EPA Method 601 and 602
Results Summary (ug/L)

Well No.	P-2	P-3
Sample Date	5/13/91	5/13/91
Compound		
1,1-dichloroethene	ND<1.0	ND<1.0
1,1-dichloroethane	ND<1.0	ND<1.0
cis-1,2-dichloroethene	ND<1.0	ND<1.0
1,2-dichloroethane	ND<1.0	ND<1.0
1,1,1-trichloroethane	ND<1.0	ND<1.0
Trichloroethene	5.7	2.3
Tetrachloroethene	20	5.2
Benzene	ND<1.0	ND<1.0
Ethyl Benzene	ND<1.0	ND<1.0
Toluene	ND<1.0	ND<1.0
Xylenes (dimethyl benzenes)	ND<1.0	ND<1.0

ND = Not Detected

APPENDIX A

REGIONAL AND SITE HYDROGEOLGY DISCUSSION

HYDROGEOLOGY

Regional Hydrogeology

The following sections describe the regional physiography, setting, and stratigraphy of the area encompassing the Calmar project site. Structures which affect groundwater movement are also discussed. Information presented in these sections was primarily compiled from relevant, available geologic and hydrogeologic literature (CDWR, 1966; CLADPW, 1987), and from information obtained during previous studies at the project site (BCLA, 1988).

Physiography

The Calmar facility is located in the southern portion of the San Gabriel Valley, which is located in eastern Los Angeles County, approximately 25 miles from the Pacific Ocean. The San Gabriel Valley System is comprised of about 167 square miles of groundwater-bearing valley land, 46 square miles of nonwater-bearing hill land, and 275 square miles of nonwater-bearing mountain land. The total groundwater storage capacity of the San Gabriel Valley Groundwater Basin is estimated to be 9.5 million acre-feet.

The San Gabriel Valley is a broad piedmont plain that slopes downward from the base of the San Gabriel Mountains to the Whittier Narrows, the lowest point of the area. The average slope of the valley floor is approximately 65 feet per mile.

The San Gabriel Valley is bounded on the north by the San Gabriel Mountains, which consist of steep, rocky ridges broken by numerous irregular canyons. The elevation of the mountains vary from approximately 900 feet along the base, to a maximum of more than 10,000 feet above mean sea level (msl). The San Gabriel Mountains are essentially nonwater-bearing igneous and metamorphic rock. The mountains provide runoff from precipitation and the bulk of alluvial debris to the valley below.

The Whittier Narrows is located between the Merced and Puente Hills. The Rio Hondo and San Gabriel River Systems drain through the Whittier Narrows after crossing the valley from north to south.

South of the San Gabriel Valley, the Repetto, Merced, Puente, and San Jose Hills form a system of low rolling hills which rise about 500 feet from the valley floor to separate the valley from the coastal plain. These hills are broken only at Whittier Narrows by a 1.5 mile wide floodplain. The hills form a crescent shape around the valley. These low hills were formed primarily by the folding of sedimentary and volcanic rocks ranging in age from Tertiary to Quaternary. These hills also contribute runoff and some alluvial debris to the valley areas.

Puente Valley, which is situated between the Puente and San Jose Hills, is considered to be part of the San Gabriel Valley. Puente Valley and the San Gabriel Valley are in direct hydraulic continuity (CDWR, 1966).

Regional Setting

The portion of the San Gabriel Valley that contains the principal groundwater-bearing deposits underlying the valley floor is called the San Gabriel Valley Groundwater Basin. The boundaries of the basin are: the Raymond Fault on the northwest; the line of contact between alluvium and bedrock of the San Gabriel Mountains on the north; the bedrock high between San Dimas and La Verne on the east; and the line of contact between alluvium and bedrock of the low hills on the southern periphery of the basin. Puente Valley, which is situated between the Puente and San Jose Hills, is considered to be part of the San Gabriel Valley since it is in direct hydraulic continuity with the valley (CDWR, 1966).

The San Gabriel Valley Groundwater Basin is a subsurface reservoir that provides groundwater to wells drilled in the area. It is a structural basin of permeable alluvial deposits, underlain and surrounded by relatively impermeable rock. Alluvial deposits which fill the valley are mainly Quaternary in age.

The thickness of water-bearing deposits averages from 900 to 1,000 feet over most of the center of the basin, and about 800 feet in Whittier Narrows. Near the eastern and western ends of the basin, the average thickness of permeable material is about 400 feet. Near Puente Valley, the average thickness of permeable materials is less than 200 feet. The stratigraphic sequence of water-bearing formations or units, their lithology and approximate thickness are shown on Figure 4-1.

Stratigraphy

Nonwater-Bearing Formations

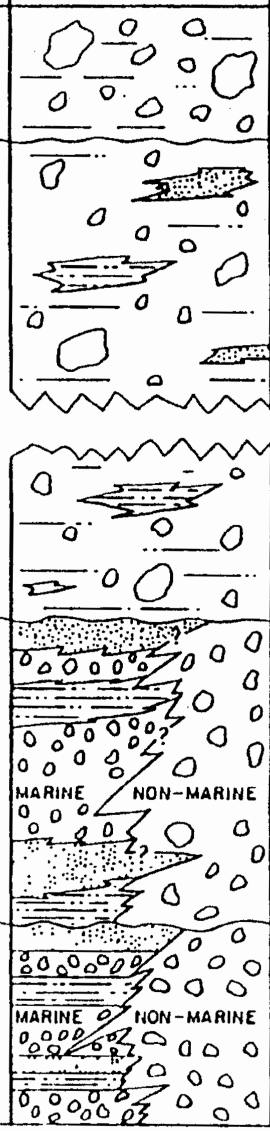
Formations are classified as "nonwater-bearing" if wells drilled into these formations produce relatively limited quantities of groundwater (5-15 gpm), compared to wells drilled into water-bearing which produce significant quantities of groundwater (100-4,600 gpm). Nonwater-bearing sedimentary formations surrounding the San Gabriel Valley Groundwater Basin have relatively small interstices between the grains which are often unconnected, or poorly connected, and which generally transmit no or very small quantities of groundwater.

In the San Gabriel Valley, the basement complex, the Glendora Volcanics, and most of the sedimentary Tertiary formations are considered to be nonwater-bearing (CDWR, 1966). Each of these formations will be discussed in order of deposition.

Basement Complex

The basement is pre-Cretaceous crystalline and metamorphic rocks comprising the main mass of the San Gabriel Mountains and outcropping the northeast portions of the San Jose and Puente Hills. The basement complex in contains numerous faults and fractures, many of which contain water. The basement complex is locally capable of producing 5 to 50 gpm during a wet season (CDWR, 1966).

SYSTEM	SERIES	FORMATION	LITHOLOGY	MAXIMUM THICKNESS (FEET)	PREVIOUS FORMATION NAMES
QUATERNARY	RECENT	RECENT ALLUVIUM		0-100+	
				UNCONFORMITY	
	UPPER PLEISTOCENE	OLDER ALLUVIUM		0-4000±	SAN DIMAS [1]
				UNCONFORMITY	
	LOWER PLEISTOCENE	SAN PEDRO FORMATION	MARINE / NON-MARINE	0-2000+	SAUGUS [2] FERNANDO [3]
				LOCAL UNCONFORMITY	
TERTIARY	UPPER PLIOCENE	UPPER MEMBER-PICO FORMATION	MARINE / NON-MARINE	300± (?)	INCLUDES CONTINENTAL DUARTE CONGLOMERATE



LEGEND OF LITHOLOGY

- GRAVEL AND SAND
- SAND
- SILTY OR SANDY CLAY OR CLAY

1/ ECKIS, 1928

2/ QUARLES, 1940

3/ DIVISION OF WATER RESOURCES BULLETIN, NO 45, 1934

BCL

Source: CDWR, 1966

Title: STRATIGRAPHIC COLUMN OF WATER BEARING SEQUENCE, SAN GABRIEL VALLEY

4-1

Glendora Volcanics

The Glendora Volcanics are Miocene in age. These volcanics are exposed in the foothills of the San Gabriel Mountains near Glendora. Similar volcanic rocks have also been found in the South Hills and in the northeast end of the San Jose Hills (CDWR, 1966).

Tertiary Sedimentary Units

Tertiary sedimentary units identified in the San Gabriel Valley are the Punchbowl, Topanga, Puente, Repetto, and Pico Formations. These units range in age from Miocene to Pliocene. With the exception of the Punchbowl Formation, these Tertiary formations are found underlying and flanking the unconsolidated alluvial sediments that constitute the groundwater basin (CDWR, 1966).

a. Tertiary Punchbowl Formation

The Tertiary Punchbowl Formation is a continental deposit of Miocene age which occupies a structural trough within the San Jacinto fault system. It is composed of interbedded shale, sandstone, and conglomerate members, some of which are permeable. However, this formation is not considered to be part of the water-bearing series because of its isolated position (CDWR, 1966).

b. Tertiary Topanga and Puente Formations

The Tertiary Topanga and Puente Formations are marine deposits of middle and upper Miocene age, respectively. These formations consist of interbedded siltstones, sandstones, conglomerate, and shale. They outcrop in places along the base of the San Gabriel Mountains and in the South Hills, and constitute a major part of the low hills which form the basin boundary on the east, south, and west. The Puente Formation does yield some water locally which is used for domestic purposes and for limited irrigation. No wells in the basin are known to produce fresh water from the Topanga Formation.

c. Tertiary Repetto Formation

The Tertiary Repetto Formation overlies the Topanga and Puente Formations in parts of the Repetto, Merced, Puente, and San Jose Hills. The sedimentary beds that form the Repetto Formation were laid down during early Pliocene time in the last and most extensive of the seas that invaded the San Gabriel Valley toward the end of the Tertiary period. A typical section of the Repetto Formation is generally 2,000 feet thick and consists of micaceous siltstone with subordinate layers of sandstone and conglomerate. Other outcrops of the Repetto Formation can be observed in the western extension of the Puente and San Jose Hills. Although the Repetto Formation is generally nonwater-bearing, some sandstone and conglomerate members of the formation are permeable, capable of yielding 5 to 60 gpm (CDWR, 1966).

d. Tertiary Pico Formation

The Tertiary Pico Formation was deposited in shallow water during the late Pliocene Epoch as the sea receded from the area which now constitutes the San Gabriel Valley. The formation outcrops in the Repetto, Merced, Puente, and San Jose Hills. It unconformably overlies the lower Pliocene Repetto Formation. Small isolated outcrops of the Pico Formation are also exposed low on the south flank of the San Gabriel Mountains, north of the Sante Fe Dam.

The Tertiary Pico Formation is divided into lower and upper members. The lower member is nonwater-bearing and consists of greenish-gray micaceous siltstone and fine to coarse light gray feldspathic sandstone interbedded with claystone and shale (CDWR, 1966). The upper water-bearing member is discussed with water-bearing formations (Section 4.1.3).

Water-Bearing Formations

The principal water-bearing formations of the San Gabriel Valley are unconsolidated and semiconsolidated nonmarine sediments of Recent and Pleistocene age. Of lesser importance are marine sediments of probable Pleistocene age, and marine sediments of late Pliocene age. Water-bearing formations in the San Gabriel Valley were derived primarily from the San Gabriel Mountains. The formations extend to a maximum depth of over 4,000 feet. The thickness of alluvial deposits resulted from sedimentation combined with uplift in the mountains and subsidence in the valley.

Water-bearing sediments forming this groundwater basin vary in size depending on locality, but generally grade from coarse gravel and boulders, close to the mountain front, to fine- and medium-grained sand containing a larger amount of silt and clay, as the distance from the mountains increases. These formations have relatively large and interconnected interstices between the particles in which groundwater can be stored and through which the stored water is readily transmitted to water wells (CDWR, 1966).

The following paragraphs describe the water-bearing formations in the order that the formations were deposited.

Tertiary Pico Formation

The upper member of the Tertiary Pico Formation consists of semiconsolidated alluvial marine deposits of sand, silt, and clay interbedded with marine gravels. Beds of sand and gravel or sand which vary from 20 to 100 feet in thickness are separated by beds of micaceous clay and silt. The Pico Formation is capable of yielding groundwater in the vicinity of Whittier Narrows. This formation contains little or no groundwater in the Repetto, Merced, and Puente Hills where it outcrops (CDWR, 1966).

Quaternary Deposits

Quaternary deposits which constitute the San Gabriel Valley Groundwater Basin fill material are divided into the following three categories: the lower Pleistocene San Pedro Formation; the older alluvium; and Recent alluvium. These alluvial deposits were laid down during the Pleistocene and Recent Epochs. These deposits consist of a complex interfingering sequence of clay, silty and sandy clay, sand and gravel (CDWR, 1966).

a. San Pedro Formation

The San Pedro Formation is exposed in the Repetto and Merced Hills and overlies the water-bearing Pico Formation in the area north of Whittier Narrows. This formation is lower Pleistocene in age, and is marine in origin. It may grade into a continental facies in the central and northern part of the basin. The San Pedro Formation outcrops in the Repetto and Merced Hills and has been encountered in wells drilled just north of Whittier Narrows. In the Repetto and Merced Hills, the San Pedro Formation consists predominantly of coarse sand and gravel members, with interbedded medium- and fine-grained sands and dark gray massive silts, some of which contain faunal remains. These beds occupy a synclinal depression that trends southwest and slopes gently downward in the southwesterly direction. The maximum thickness of this formation is approximately 2,000 feet (CDWR, 1966).

b. Older Alluvium

The older alluvium, including terrace deposits, constitutes the main valley fill material and is exposed around the margins of the entire San Gabriel Valley. These deposits are considered to be late Pleistocene in age. This formation outcrops at the surface and occurs as dissected alluvial fans, and locally as isolated low hills or ridges that stand above the general level of Recent deposits around them. Older alluvium occurs around the northern margins of the San Gabriel Valley as erosional remnants or terraces along the foothills of the San Gabriel Mountains, and as locally merging alluvial fans which overlie Tertiary sediments on the San Jose, Puente, Repetto, and Merced Hills. It is exposed on the surface over much of Puente Valley. In the central and north-central part of the valley, the older alluvium is covered by Recent alluvium carried down from the mountains by the Rio Hondo and San Gabriel River system.

The heterogeneous nature of the older alluvium and the presence of weathered soil horizons are indicative of periods of restricted sedimentation, during which weathering of surface deposits occurred. Older alluvial deposits consist of unsorted yellowish to reddish-brown, angular to subrounded continental debris, derived from surrounding highlands. Material in these deposits range in size from silt to boulders over two feet in diameter. The percentage of clay in older alluvium material varies throughout the valley.

Generally, the sediments underlying the Rio Hondo and San Gabriel River system and the alluvial fan built up by this system contain less clay than older alluvium in other parts of the valley. Older alluvium in the Puente Valley, which was derived largely from older sedimentary beds, contains more clay than in the San Gabriel Valley proper.

Older alluvium near the mouth of the San Gabriel River, in the northern part of the valley, extends to a depth of about 300 feet. Just north of the Workman Hill fault extension, older alluvium extended to a depth of about 4,100 feet (CDWR, 1966).

c. Transition Zone Deposits

Transition zone deposits, which were derived from reworked Older and Recent alluvium, cannot be positively classified as either older or Recent. In the northeastern portion of the San Gabriel Valley, a transition zone approximately two miles wide extends from San Dimas to Baldwin Park contains alluvial deposits which possess characteristics of both the older and Recent alluvium. The thickness of the transition zone deposits is limited. These deposits thin and merge laterally into older alluvium flanking San Jose Hills to the southeast, and into the Recent deposits along Little Dalton and Big Dalton Washes to the southwest. The maximum known thickness of these deposits is 26 feet. Transition zone deposits comprise a very small percentage of the water-bearing series. The vertical permeability of these deposits allows rapid percolation of water to the underlying groundwater basin (CDWR, 1966).

d. Recent Alluvium

The Recent alluvium blankets the center of the valley floor, and the transition zone deposits that lie along Dalton Wash, San Dimas Wash, and Walnut Creek in the eastern part of the basins. Recent alluvium overlies the older alluvium in the central part of the valley. These deposits are also found in streambeds, and as alluvial fans overlying older sediments along the floor or the San Gabriel Mountains.

Recent alluvium deposits were primarily derived from basement complex materials which forms the mountains to the north, with minor contributions from Tertiary marine sediments and volcanic rocks which outcrop in the marginal hill areas surrounding the basin. Recent deposits are restricted to narrow, ribbon-like bands blanketing the active stream channels in many parts of the southeastern, eastern, and western areas of the San Gabriel Valley. To the north, the Recent debris is much more widespread and mantles the entire central and north-central portions of the valley floor, narrowing to the south where the alluvial fan, formed by the Rio Hondo and San Gabriel River system passes through Whittier Narrows.

Recent alluvium consists predominantly of coarse boulders, gravels, and sands, light-gray to buff in color. The thickness of these deposits ranges from a few inches, to about 100 feet near Whittier Narrows. Throughout the rest of the basin, the thickest portions of Recent alluvium are found along the San Gabriel River Channel and its adjacent floodplains. Laterally, away from the river, the Recent alluvium deposits gradually thin and feather out at the contact with older exposed sediments.

The Recent alluvium favorably absorbs, transmits, and yields water. However, most of these deposits lie above the historic high groundwater table (CDWR, 1966).

Structures Affecting Groundwater Movement

Structural features which can affect groundwater movement include valleys or topographic highs formed by folding or faulting, faults, anticlines, or synclines. The major topographic features in the San Gabriel Valley (the San Gabriel Mountains, the San Gabriel Valley, and the Repetto, Merced, Puente, and San Jose Hills) are major structural features which regionally affect groundwater movement. In addition to these major structures, three other low structural features formed by folding or faulting are also present in the San Gabriel Valley (CDWR, 1966).

San Gabriel Mountains

The San Gabriel Mountains were formed by the uplift of several fault blocks along essentially parallel lines during late Pleistocene and Recent times. The east-west trending mountains are bounded on the north by the San Andreas fault system, and on the south by the Sierra Madre fault system. The mountains are cut longitudinally by the San Gabriel fault zone which extends nearly the entire length of the range, generally following the east and west forks of the San Gabriel River. The San Gabriel fault zone divides the mountains into front and back ranges. The front range lies between the San Gabriel Valley on the south, and the east and west forks of the San Gabriel River on the north. The back range extends northward from the east and west forks of the San Gabriel River to the San Andreas fault, which marks the northern boundary of the mountains. The front range contributes direct runoff to the San Gabriel Valley Groundwater Basin. The back range contributes runoff to the valley via the San Gabriel River which cuts through the front range on its way to the valley (CDWR, 1966).

San Gabriel Valley

The San Gabriel Valley is a sediment-filled downdropped block which constitutes the groundwater reservoir of the area. The Sierra Madre fault system extends along the north side of the valley. This fault system impedes subsurface flow of groundwater into the valley from the alluvial fill of canyons along the mountain front, causing a groundwater cascade in the vicinity of San Gabriel and San Dimas Canyons. The fault system is responsible for the extensive alluvial deposits found on the south side of the bedrock-alluvium contact.

Smaller structural features that affect groundwater movement in the San Gabriel Valley include the South Hill, and two low bedrock outcrops lying north of the Lone Hill-Way Hill fault. These features divert groundwater flow around them (CDWR, 1966).

Repetto, Merced, Puente and San Jose Hills

These structures, which border the San Gabriel Valley, are geographically situated such that major surface outflow and subsurface outflow from the valley must pass through Whittier Narrows (CDWR, 1966).

Whittier Narrows

Subsurface outflow in the San Gabriel Valley Groundwater Basin passes through Whittier Narrows. Structurally, the narrows was originally formed as a northeast-trending syncline, lying between the Puente Hills on the east and the Repetto and Merced Hills on the west. Three northeast-trending faults have been delineated in the narrows area. However, these faults do not restrict the flow of groundwater from the valley (CDWR, 1966).

Faults

All of the major structural features surrounding the valley have been subjected to faulting at one time or another. Several subsurface faults have been delineated in the valley.

The effects of the San Gabriel fault zone on the San Gabriel Mountains was discussed in subsection discussing the San Gabriel Mountains earlier in Section 4.1.5. The fault zone varies from about 1/4 mile to two miles in width. It appears to be an effective barrier to groundwater flow between the back and front ranges of the mountains, because of gouge formed by faulting of basement rock, and because of clays developed from weathering of fractured rock found in the fault zone itself.

The Sierra Madre Fault System trends generally east-west along the southern base of the San Gabriel Mountains. This system consists of several distinct faults traceable along the mountain front. These faults are cut by numerous transverse faults. In some areas, groundwater flows in the upper 50 feet of alluvium not cut by faulting. The faults do impede groundwater flow below a depth of 50 feet which results in groundwater cascading across the faults into the valley.

The Raymond Fault forms the northwestern basin boundary from a point northwest of South Pasadena eastward to Sawpit Canyon in the San Gabriel Mountains. The fault impedes groundwater movement southward from the Raymond Groundwater Basin into the San Gabriel Valley Groundwater Basin. Although the fault generally impedes groundwater flow, the fault becomes more permeable at some locations.

The Lone Hill-Way Hill Fault extends in a northeast direction along the south side of Lone and Way Hills. This fault displaces the water-bearing series such that water level differences as high as 150 feet on either side of this fault has occurred. Subsurface flow in this area is mainly to the southeast, parallel to these faults.

The Workman Hill Fault Extension trends northwest into the valley from the Puente Hills northeast of Whittier Narrows. This fault extension does not appear to affect the movement of groundwater.

The Walnut Creek Fault trends northeast in alluvium northwest of the San Jose Hills. A few groundwater level differences across the fault have been observed (CDWR, 1966).

Hydrogeologic Parameters

The specific yield and transmissibility of alluvial deposits vary throughout the San Gabriel Valley Groundwater Basin. The average specific yield in the eastern end of the basin is approximately 8 percent. In the center, near the more permeable portion of the basin, the average specific yield is about 14 percent. In the western end of the basin, the average yield is about 9 percent. The average specific yield near the Calmar site is estimated to be approximately 7 percent.

The average transmissibility of the center of the basin is estimated to be about 2,240 acre-feet per year per foot of width. At Whittier Narrows, near the southwestern edge of the basin, the average transmissibility is about 670 acre-feet per year per foot of width.

Average transmissibilities in the western and eastern portions of the basin are about 170 and 100 acre-feet per year per foot of width, respectively. Transmissibility varies laterally in the basin, with larger values occurring in the north-south direction, than in the east-west direction.

Aquifer tests were conducted at various locations in the valley during the 1960's. Data from these tests yielded storage coefficients ranging between 6.0x10-5 to 1.1x10-2; permeabilities ranging between 512 to 4,900 gallons per day per square foot (gpd/ft2); and transmissibilities ranging between 42,000 to 875,000 gallons per day per foot (gpd/ft) (CDWR, 1966). Recent aquifer tests performed near the Calmar project site estimated local hydraulic conductivity values ranging between 15 to 160 gpd/ft2, and transmissivity values ranging between 1,400 to 15,000 gpd/ft (WWC, 1987).

Groundwater Elevation and Flow Direction

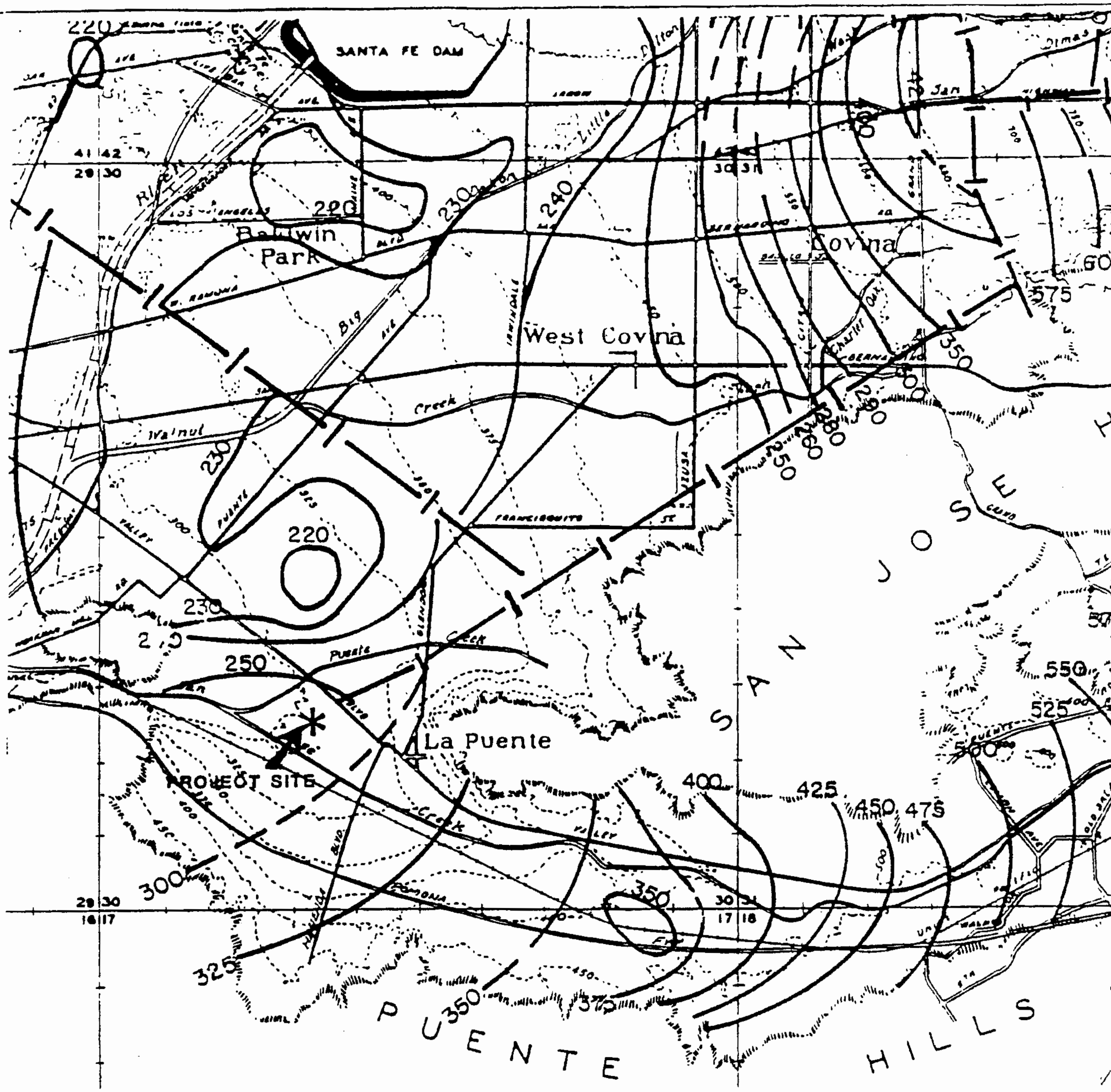
Historically, groundwater levels in the basin have varied due to droughts, groundwater extraction, and exportation of wastewater. A review of historic groundwater contour maps indicated the following. At the end of dry periods in 1933 and 1966, the groundwater elevation near the Calmar site was approximately 270 feet msl, and 280 feet msl, respectively (CDWR, 1966).

Groundwater elevations and flow directions for 1987 are shown on Figure 4-2. According to the figure, the 1987 elevation of groundwater near the Calmar project site was approximately 270 feet msl (CLADWP, 1987).

The direction of groundwater flow has historically been toward the northwest (CDWR, 1966). Based on groundwater contours on Figure 4-2, the regional hydraulic gradient near the Calmar project site was estimated to be 0.009 feet per foot toward the northwest. A recent field investigation performed at the Calmar project site also concluded that the direction of groundwater flow is toward the north (BCLA, 1988).

Subsurface Inflow

Groundwater moves into the San Gabriel Valley from the Raymond Groundwater Basin, across the Raymond Fault on the northeast, and from the Chino Groundwater Basin on the east. Some subsurface inflow also takes place from the San Gabriel Mountains on the north (CDWR, 1966).



EXPLANATION

LINES OF EQUAL GROUNDWATER LEVELS, (INTERPOLATED BETWEEN WELLS.)

SAME AS ABOVE, (LOCATION APPROXIMATE.)

RESTRICTIONS AND/OR BARRIERS TO GROUNDWATER MOVEMENT, GEOLOGIC AND HYDROLOGIC.

GROUND SURFACE CONTOURS.

SPREADING GROUNDS.

N

BCL	Source: COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS	Title: SAN GABRIEL VALLEY GROUNDWATER CONTOURS FOR FALL 1987	4-2

Site Hydrogeology

The following sections described geologic and groundwater conditions observed at the project site. Information presented in these sections was derived from site-specific data (boring logs, well logs, water level measurements) recently collected at the project site.

Site Geology

Lithologies penetrated at groundwater monitoring well locations, MW-1, MW-2, and MW-3, and at piezometer locations P-1, P-2, and P-3, are illustrated on Figure 4-3. Based on a comparison of the lithologies encountered at the project site with regional stratigraphy described in Section 4.1.3, it appears that the project site is underlain primarily by Recent alluvial material. It is possible that the borings drilled at this site may also have encountered the underlying, heterogeneous older alluvial deposits. The cross section shown on Figure 4-3 illustrates that the lithology beneath the project site consists of a complex, variable sequence of alluvial materials. In general, the upper 13 feet of section consists of low plasticity clays (CL), which are underlain by variable thicknesses of silty or sandy materials.

Groundwater Movement Under the Site

The depth to groundwater was measured at three well and three piezometer locations shown on Figure 4-3. Groundwater elevations estimated from these measurements are summarized on Table 6. The groundwater elevation data appear to indicate that groundwater is moving in a northerly direction under the project site (Figure 4-4).

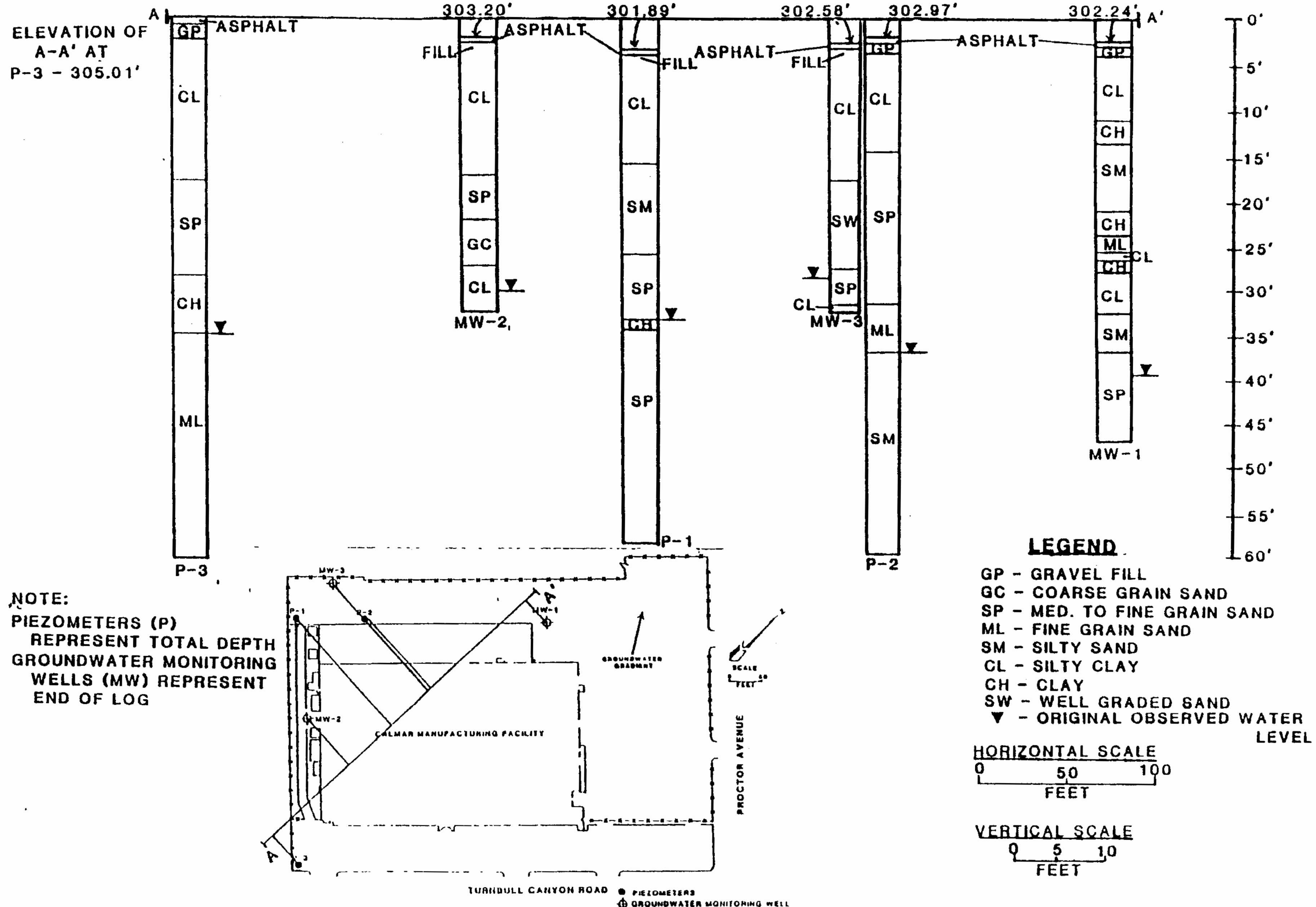
The groundwater level contours illustrated on Figure 4-5 were estimated by interpolating groundwater elevations between the measured elevations at each well and piezometer location. The contours were used to estimate the groundwater gradient at the project site. Based on the March 29, 1989 groundwater measurements, the groundwater gradient at the site is estimated to be 0.004 feet per feet.

TABLE 6

Groundwater Elevations Measured March 29, 1989

Location[1]	Elevation Top of Casing (feet msl)	Average Depth to Water[2] Below Top of Casing (feet)	Groundwater Elevation (feet)
P3	305.01	36.59	268.42
MW-2	303.20	35.14	268.06
P-1	301.89	34.06	267.83
MW-3	302.58	35.01	267.57
P-2	302.97	35.41	267.56
MW-1	302.24	35.84	266.40

[1]The average land elevation near the project site is approximately 300 feet msl (USGS, 1966).
[2]Average value from first round of measurements.



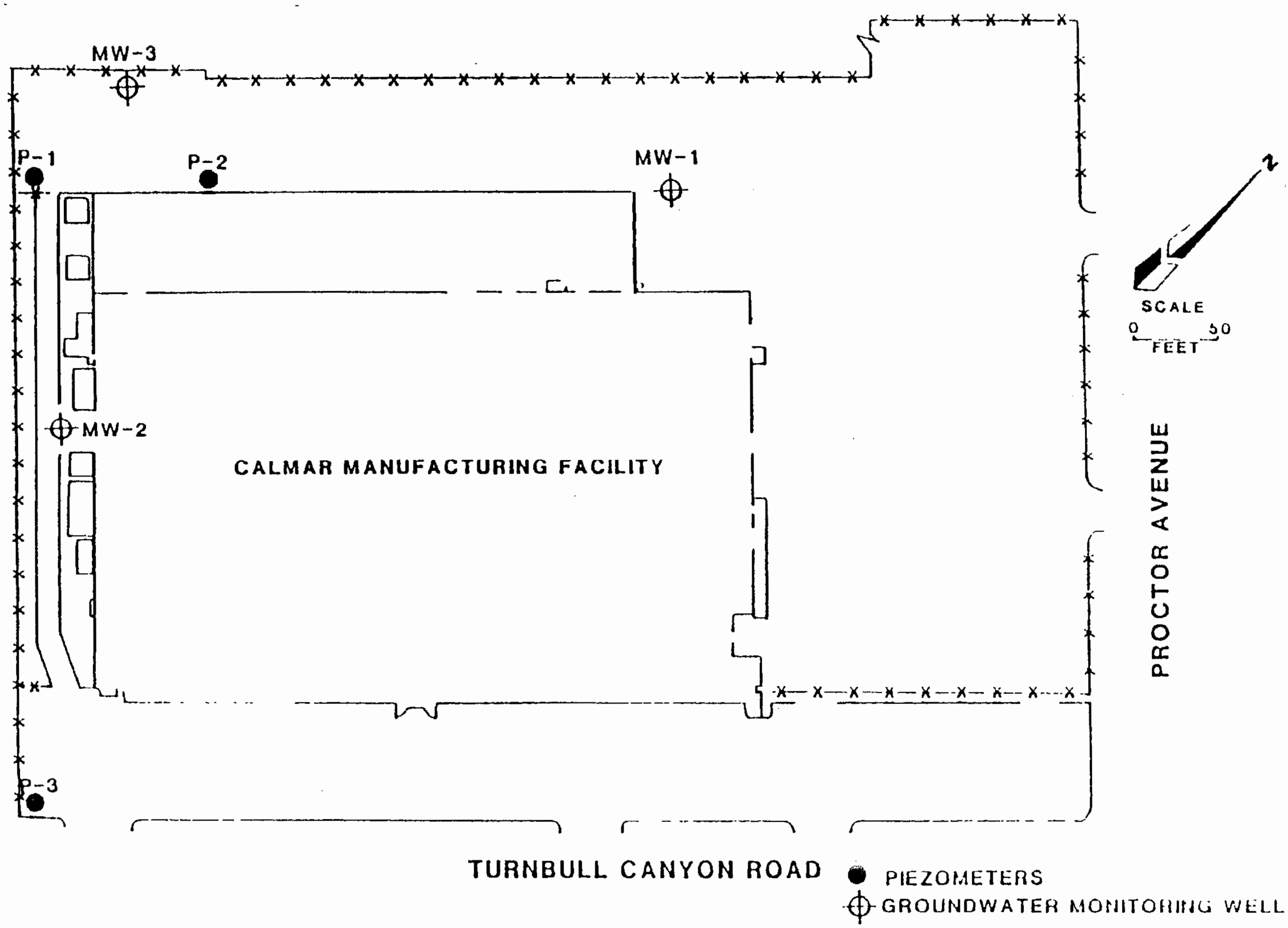
BCL

Source: BCL ASSOCIATES, INC.

Title: PROJECTED GEOLOGIC CROSS SECTION OF THE CALMAR PROJECT SITE

4-3

WELL	ELEVATION
MW-1	302.24'
MW-2	303.20'
MW-3	302.58'
P-1	301.89'
P-2	302.97'
P-3	305.01'

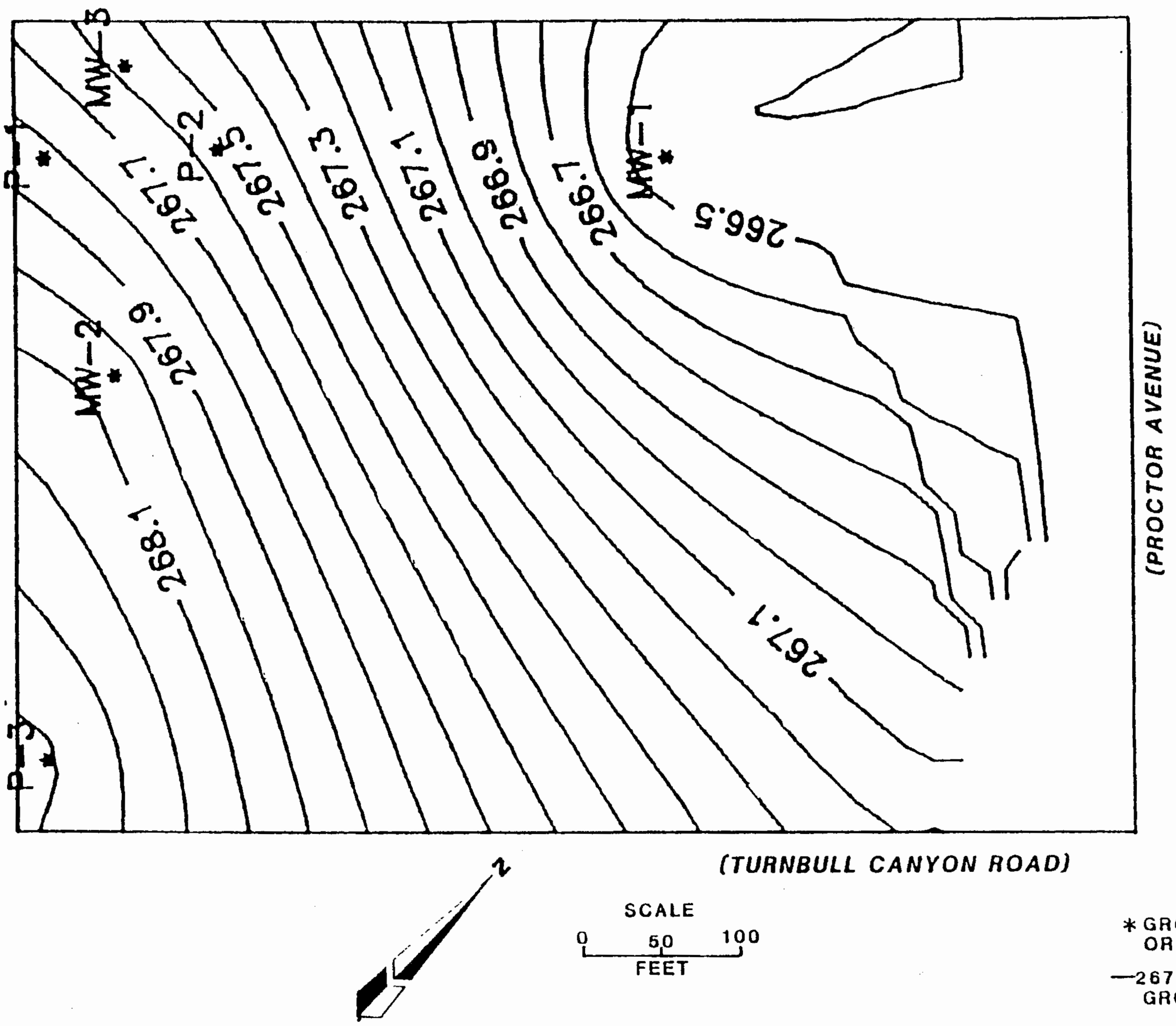


BCL

Source: BCL ASSOCIATES, INC.

Title: PIEZOMETER & MONITORING WELL LOCATIONS & ELEVATION

4-4



LEGEND

* GROUNDWATER MONITORING WELL OR PIEZOMETER LOCATION

—267.1— LINE OF EQUAL GROUNDWATER ELEVATION

BCL	Source: BCL ASSOCIATES, INC.	Title: GROUNDWATER LEVEL CONTOURS 3/29/89	4-5

Surface Water

The stream systems in the San Gabriel Valley consist of two major streams, the Rio Hondo and San Gabriel Rivers, and their tributaries. The headwaters of these streams are located in the San Gabriel Mountains, from which a major portion of their flow is derived. The rivers and their tributaries which traverse the valley floor have a common exit from the valley at Whittier Narrows, a narrow gap in the low hills flanking the southern portion of the basin. Most of the natural surface outflow from the San Gabriel Valley passes through Whittier Narrows. Small amounts of natural surface outflow pass through two low gaps in the Repetto Hills, south of Monterey Park, and minor amounts of the outflow pass over the eastern portion of the basin boundary near La Verne.

Most natural surface inflow to the valley originates from the tributary San Gabriel Mountains, although significant amounts originate from the Raymond Basin; Walnut Creek, which is near San Dimas; and San Jose Creek, which is located just south of the Calmar project site.

The San Gabriel River drains about 77 percent of the San Gabriel Mountains that are tributary to the San Gabriel Valley. From its mouth near Azusa, the San Gabriel River traverses the San Gabriel Valley in a southwesterly direction, passes through Whittier Narrows, and extends southerly across the coastal plain to the Pacific Ocean near Seal Beach.

Within the San Gabriel Valley, Fish Canyon, Rogers Canyon, Big Dalton, Little Dalton, San Dimas, Walnut, and San Jose Creeks are tributaries to the San Gabriel River. The headwaters of these creeks are in the San Gabriel River (CDWR, 1966).

The Calmar project site is located just east of the confluence of Puente and San Jose Creek. Near the project site, these creeks primarily flow in a westerly direction (CLADPW, 1987).

Stream channels in the San Gabriel Valley are relatively well defined, although historically they have braided and meandered. In the past, most streams had some sort of improvement that sometimes amounted to no more than a trash dike. Farmers had numerous diversions on the streams for irrigation and water conversation. Phreatophytes were abundant in the stream channels and along their banks. During the summer, most streams were dry. However, due to rising water, the Rio Hondo and San Gabriel Rivers have perennial flow at Whittier Narrows.

By 1965, flood flow in most major stream channels was controlled by flood control reservoirs. With the exception of the San Gabriel River above Santa Fe Dam and most of the San Jose Wash which flows through the San Gabriel Valley, stream channels were improved (CDWR, 1966).

The "map" west side of the Calmar site and the south parking lot area drain toward Turnbull Canyon Road. The runoff from the north and east sides of Calmar drains toward Proctor Avenue.

Climate

The San Gabriel Valley is in a region of both semi-arid and Mediterranean climate. Intermittent rain during winter months and rainless summer months is common. Approximately 77 percent of annual precipitation occurs during December through March. Seasonal precipitation varies from periods of above-normal rainfall to periods of long, persistent droughts. Precipitation generally occurs in the Gabriel Mountains, although snow is common at higher elevations.

Precipitation, which is affected primarily by ground surface elevation, varies within the San Gabriel Valley. For example, during a base period, the average seasonal precipitation on the frontal area of the San Gabriel Mountains was about 27 inches. During that same period, the average seasonal precipitation in the valley was about 18 inches.

Temperatures are usually moderate in the valley areas, with little fluctuation in extremes. The average annual temperature of the San Gabriel Valley is about 62 degrees Fahrenheit. Temperatures in the valley rarely drop below freezing, although plant killing frosts occur in late fall and winter in the higher mountain elevations (CDWR, 1966).

APPENDIX B

LABORATORY REPORTS

TERRA TECH LABS Inc

ENVIRONMENTAL TESTING

LABORATORY REPORT

Client:	Camp, Dresser & McKee	Report Date:	5/2/91
Client Address:	18881 Von Karman, ste 650	Lab P.N.:	1790
	Irvine, CA 92715	Client P.N.:	2424-110
Contact:	Stephen Mutch		
Project Name:	Calmar	Date Sampled:	4/29/91
Project Address:	333 Turnball Canyon	Date Received:	4/29/91
	City of Industry, CA	Date Analyzed:	5/1/91
		Physical State:	Aqueous

Quality Assurance/Quality Control Summary

Parameter (Method)	QC Type	Percent Recovery	Acceptable Range	Relative Percent Difference	Acceptable Range
Benzene (EPA 602)	M	79	39-150	15	0-20
Toluene (EPA 602)	M	86	46-148	13	0-20
Ethylbenzene (EPA 602)	M	82	32-160	13	0-20
Xylenes, Total (EPA 602)	M	87	46-148	12	0-20
Chlorobenzene (EPA 601)	M	93	38-150	13	0-50
Cis 1,3-Dichloropropane (EPA 601)	M	98	22-178	1	0-50
1,1 Dichloroethane (EPA 601)	M	72	47-132	14	0-50
1,1,1,-Trichloroethane (EPA 601)	M	92	41-138	16	0-50

M = Matrix Spike / Spike Duplicate

L = Laboratory Control Sample Spike / Spike Duplicate

Reviewed

Approved

TERRA TECH LABS Inc

ENVIRONMENTAL TESTING

LABORATORY RESULTS

Client: Camp, Dresser & McKee
Client Address: 18881 Von Karman, ste 650
Irvine, CA 92715

Report Date: 5/2/91
Lab P.N.: 1790
Client P.N.: 2424-110

Project Name: Calmar
Project Address: 333 Turnball Canyon
City of Industry, CA

Date Sampled: 4/29/91
Date Analyzed: 5/1/91
Physical State: Aqueous

Sample ID	Benzene EPA 602 µg/l	Toluene EPA 602 µg/l	Ethylbenzene EPA 602 µg/l	Xylenes, Total EPA 602 µg/l
MW-1	ND	ND	ND	ND
MW-2	ND	ND	ND	ND
MW-3	ND	ND	ND	ND
Detection Limit, µg/l	1.0	1.0	1.0	1.0

ND; Not Detectable
The Laboratory Results are only a portion of the Laboratory Report.

TERRA TECH LABS Inc

ENVIRONMENTAL TESTING

LABORATORY RESULTS

Client:	Camp, Dresser & McKee	Report Date	5/2/91
Client Address:	18881 Von Karman, ste 650	Lab P.N	1790
	Irvine, CA 92715	Client P.N.:	2424-110
Project Name:	Calmar	Date Sampled:	4/29/91
Project Address:	333 Turnball Canyon	Date Analyzed:	5/1/91
	City of Industry, CA	Physical State:	Aqueous

EPA 601

Sample ID Parameters	MW-1 Conc. µg/l	MW-2 Conc. µg/l	MW-3 Conc. µg/l	Detection Limts µg/l
Chloromethane	ND	ND	ND	0.5
Vinylchloride	ND	ND	ND	0.5
Trichlorofluoromethane	ND	ND	ND	0.5
Bromomethane	ND	ND	ND	0.5
Chloroethane	ND	ND	ND	0.5
1,1-Dichloroethene	19	52	27	0.5
Methylene Chloride	ND	ND	ND	20
Trans-1,2-Dichloroethene	ND	ND	ND	0.5
1,1-Dichloroethane	ND	5.4	2.8	0.5
Chloroform	ND	ND	ND	0.5
1,1,1-Trichloroethane	4.5	73	5.4	0.5
Carbon Tetrachloride	ND	ND	ND	0.5
1,2-Dichloroethane	ND	ND	ND	0.5
Trichloroethene	34	140	21	0.5
1,2-Dichloropropane	ND	ND	ND	0.5
Bromodichloromethane	ND	ND	ND	0.5
Cis-1,3-Dichloropropene	ND	ND	ND	0.5
Trans-1,3-Dichloropropene	ND	ND	ND	0.5
1,1,2-Trichloroethane	ND	ND	ND	0.5
Tetrachloroethene	34	11	170	0.5
Dibromochloromethane	ND	ND	ND	0.5
Chlorobenzene	ND	ND	ND	0.5
Bromoform	ND	ND	ND	0.5
1,1,2,2-Tetrachloroethane	ND	ND	ND	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.5
1,4-Dichlorobenzene	ND	ND	ND	0.5
1,2-Dichlorobenzene	ND	ND	ND	0.5

ND; Not Detectable
The Laboratory Results are only a portion of the Laboratory Report.

1790

CHAIN-OF-CUSTODY RECORD

Client: CDM
Date: 4-29-91
TTL Project #: 1107.17
Project Name: Colwell
Client Project #: 2424-110
Page 1 of 1
Project Address: 333 Turnbull Cyn, City of Industry
Sampler's Signature: Steph Mutch

Turn Around Requested:
- ☐ Immediate Attention
- ☒ Rush 24-48 Hours
- ☐ Rush 72-96 Hours
- ☐ Mobile Lab
- ~~☒ Normal~~ Rush

Lab Use Only.
Sample Condition as received:
Chilled yes / no
Sealed yes / no

Sample ID	Sample Location	Date	Time	Laboratory Sample Number	Sample Matrix: Soil(S), Sludge(SL), Aqueous(A)	Total Petroleum Hydrocarbons as Gasoline, LUFT Manual (P&T)	TPH as Diesel Fuel, LUFT Manual	TPH as Gasoline, Extractable	TPH by EPA Method 418.1	BTEX by EPA Method 8020	EPA 601	EPA 602	Archive	Number of Containers	Container / Comments
MW-1	Monitoring Wells	4-29-91	15.15	TT00029	A						X	X		4	VOA VIALS
MW-2	" "	↓	↓	TT00030	A						X	X		4	↓
MW-3	" "	↓	↓	TT00031	A						X	X		4	↓
	Trip Blank	↓	↓	TT00032	A								X	4	↓

* Changed to 48 hr TAT as per Stephen Mutch @ CDM 4/29/91 [illegible]

① Relinquished by: (Signature)	Date	② Received by: (Signature)	Date	Total Number of Containers
Steph Mutch	4-29-91			16
Company: CDM	Time: 1515	Company:	Time:	
③ Relinquished by: (Signature)	Date	④ Received by Laboratory: (Signature) Ruth Wilkins	Date: 4-29-91	
Company:	Time	Company: TTL	Time: 1515	

TERRA TECH LABS, INC.
ENVIRONMENTAL TESTING
16371 Gothard Street, Suite G
Huntington Beach, CA 92647
Tel. (714) 842-6077

TERRA TECH LABS Inc.

ENVIRONMENTAL TESTING

MAY - 9 1991

LABORATORY REPORT

Client:	Camp, Dresser & McKee	Report Date:	5/7/91
Client Address:	18881 Von Karman, ste 650	Lab P.N..	1790
	Irvine, CA 92715	Client P.N.:	2424-110
Contact:	Stephen Mutch		
Project Name:	Calmar	Date Sampled:	4/29/91
Project Address:	333 Turnball Canyon	Date Received:	4/29/91
	City of Industry, CA	Date Analyzed:	5/7/91
		Physical State:	Aqueous

Quality Assurance/Quality Control Summary

Parameter (Method)	QC Type	Percent Recovery	Acceptable Range	Relative Percent Difference	Acceptable Range
Chlorobenzene (EPA 601)	M	120	38-150	20	0-50
Cis 1,3-Dichloropropane (EPA 601)	M	102	22-178	7	0-50
1,1 Dichcloroethane (EPA 601)	M	128	47-132	1	0-50
1,1,1,-Trichlorethane (EPA 601)	M	113	41-138	7	0-50

M = Matrix Spike / Spike Duplicate

L = Laboratory Control Sample Spike / Spike Duplicate

Reviewed

Approved

The samples were received by TERRA TECH LABS, Inc in a chilled state, intact and accompanied by the Chain-of-Custody Record
Acceptance of samples by Terra Tech Labs, Inc is not an indication of condition upon receipt
Laboratory Results apply only to the sample matrix analyzed and may not apply to an apparently identical or similar sample
The Laboratory Report is the property of the client to whom it is addressed
The Laboratory Results are only a portion of the Laboratory Report

TERRA TECH LABS Inc
ENVIRONMENTAL TESTING

LABORATORY RESULTS

Client	Camp, Dresser & McKee	Report Date	5/7/91
Client Address:	18881 Von Karman, ste 650	Lab P.N	1790
	Irvine, CA 92715	Client P.N.:	2424-110

Project Name:	Calmar	Date Sampled:	4/29/91
Project Address:	333 Turnball Canyon	Date Analyzed:	5/7/91
	City of Industry, CA	Physical State:	Aqueous

EPA 601

Sample ID	Trip Blank	
		Detection
	Conc.	Limts
Parameters	µg/l	µg/l
Chloromethane	ND	1.0
Vinylchloride	ND	1.0
Trichlorofluoromethane	ND	1 0
Bromomethane	ND	1.0
Chloroethane	ND	1.0
1,1-Dichloroethene	ND	1.0
Methylene Chloride	ND	1 0
Trans-1,2-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
Chloroform	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon Tetrachloride	ND	1.0
1,2-Dichloroethane	ND	1.0
Trichloroethene	ND	1.0
1,2-Dichloropropane	ND	1.0
Bromodichloromethane	ND	1 0
Cis-1,3-Dichloropropene	ND	1 0
Trans-1,3-Dichloropropene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
Tetrachloroethene	ND	1 0
Dibromochloromethane	ND	1 0
Chlorobenzene	ND	1.0
Bromoform	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1 0
1,3 Dichlorobenzene	ND	1 0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1 0

ND; Not Detectable
The Laboratory Results are only a portion of the Laboratory Report.

CHAIN-OF-CUSTODY RECORD

1790

Client: CDM
Project Name: Calmat
Project Address: 333 Turnbull Cyn, City of Industry
Sampler's Signature: Stephen Mutch

Date: 4-29-91
Client Project #: 2424-110

Turn Around Requested:
- [ ] Immediate Attention
- [x] Rush 24-48 Hours
- [ ] Rush 72-96 Hours
- [ ] Mobile Lab
- ~~Is Normal~~

TTL Project #: 1107-17
Page 1 of 1

Lab Use Only.
Sample Condition as received:
Chilled yes / no
Sealed yes / no

Sample ID	Sample Location	Date	Time	Laboratory Sample Number	Sample Matrix: Soil(S), Sludge(SL), Aqueous(A)	Total Petroleum Hydrocarbons as Gasoline, LUFT Manual (P&T)	TPH as Diesel Fuel, LUFT Manual	TPH as Gasoline, Extractable	TPH by EPA Method 418.1	BTEX by EPA Method 8020	EPA 601	EPA 602	Nitrite	Number of Containers	Container / Comments
MW-1	Monitoring Well	4-29-91	15:15	TT00029	A						X	X		4	VOA VIAL
MW-2	" "	↓	↓	TT00030	A						X	X		4	
MW-3	" "	↓	↓	TT00031	A						X	X		4	
	Trip Blank	↓	↓	TT00032	A						X		X	4	

* Additional analysis requested by Mike Pumarny at CDM 5/3/91

* Change to 48 hr TAT as per Stephen Mutch @ CDM

Total Number of Containers: 16

① Relinquished by: (Signature)	Date	② Received by: (Signature)	Date
Stephen Mutch	4-29-91		
Company: CDM	Time: 1515	Company:	Time:
③ Relinquished by: (Signature)	Date	④ Received by Laboratory: (Signature)	Date
		Ruth Willson	4-29-91
Company:	Time:	Company: TTL	Time: 1515

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Huntington Beach
California
92647
Tel 714 842 6077
Fax 714 842 1891

TERRA TECH LABS Inc
ENVIRONMENTAL TESTING

LABORATORY REPORT

Client:	Camp, Dresser & McKee	Report Date:	5/17/91
Client Address:	18881 Von Karman, ste 650 Irvine, CA 92715	Lab P.N.:	1851
		Client P.N.:	2424-110
Contact:	Stephen Mutch		
Project Name:	Calmar Inc.	Date Sampled:	5/13/91
Project Address:	333 Turnball Cyn Rd. City of Industry, CA	Date Received:	5/13/91
		Date Analyzed:	5/15/91-5/17/91
		Physical State:	Aqueous

Quality Assurance/Quality Control Summary

Parameter (Method)	QC Type	Percent Recovery	Acceptable Range	Relative Percent Difference	Acceptable Range
Benzene (EPA 602)	M	99	39-150	1	0-20
Toluene (EPA 602)	M	101	46-148	0	0-20
Ethylbenzene (EPA 602)	M	101	32-160	2	0-20
Xylenes, Total (EPA 602)	M	101	46-148	1	0-20
Chlorobenzene (EPA 601)	M	116	38-150	8	0-50
Cis 1,3-Dichloropropane (EPA 601)	M	118	22-178	1	0-50
1,1 Dichloroethane (EPA 601)	M	122	47-132	7	0-50
1,1,1-Trichloroethane (EPA 601)	M	110	41-138	0	0-50
PCB's (EPA 608)	M	67	39-150	6	0-50

M = Matrix Spike / Spike Duplicate
L = Laboratory Control Sample Spike / Spike Duplicate

Reviewed

Approved

The samples were received by TERRA TECH LABS, Inc in a chilled state, intact and accompanied by the Chain-of-Custody Record
Acceptance of samples by Terra Tech Labs, Inc. is not an indication of condition upon receipt
Laboratory Results apply only to the sample matrix analyzed and may not apply to an apparently identical or similar sample.
The Laboratory Report is the property of the client to whom it is addressed
The Laboratory Results are only a portion of the Laboratory Report

TERRA TECH LABS Inc
ENVIRONMENTAL TESTING

LABORATORY RESULTS

Client:	Camp, Dresser & McKee	Report Date:	5/17/91
Client Address:	18881 Von Karman, ste 650	Lab P.N.:	1851
	Irvine, CA 92715	Client P.N.:	2424-110

Project Name:	Calmar Inc.	Date Sampled:	5/13/91
Project Address:	333 Turnball Cyn Rd.	Date Analyzed:	5/16/91
	City of Industry, CA	Physical State:	Aqueous

Sample ID	Benzene EPA 602 µg/l	Toluene EPA 602 µg/l	Ethylbenzene EPA 602 µg/l	Xylenes, Total EPA 602 µg/l
P2 Piezometer	ND	ND	ND	ND
P3 Piezometer	ND	ND	ND	ND
Detection Limit, µg/l	1.0	1.0	1.0	1.0

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TERRA TECH LABS Inc

E N V I R O N M E N T A L   T E S T I N G

LABORATORY RESULTS

Client:	Camp, Dresser & McKee	Report Date:	5/17/91
Client Address:	18881 Von Karman, ste 650	Lab P.N.:	1851
	Irvine, CA 92715	Client P.N :	2424-110

Project Name:	Calmar Inc.	Date Sampled:	5/13/91
Project Address:	333 Turnball Cyn Rd.	Date Analyzed:	5/15/91
	City of Industry, CA	Physical State:	Aqueous

PCB's-EPA 608

Sample ID	P3 Piezometer
	Conc. (µg/l)
Aroclor 1016	ND
Aroclor 1221	ND
Aroclor 1232	ND
Aroclor 1242	ND
Aroclor 1248	ND
Aroclor 1254	ND
Aroclor 1260	ND
Detection limits µg/l	50

ND; Not Detectable
The Laboratory Results are only a portion of the Laboratory Report.

TERRA TECH LABS Inc
E N V I R O N M E N T A L   T E S T I N G

LABORATORY RESULTS

Client:	Camp, Dresser & McKee	Report Date:	5/17/91
Client Address:	18881 Von Karman, ste 650	Lab P.N.:	1851
	Irvine, CA 92715	Client P.N.:	2424-110
Project Name:	Calmar Inc.	Date Sampled:	5/13/91
Project Address:	333 Turnball Cyn Rd.	Date Analyzed:	5/17/91
	City of Industry, CA	Physical State:	Aqueous

EPA 601

Sample ID / Parameters	P2 Piezometer Conc. (µg/l)	P3 Piezometer Conc. (µg/l)	P2 Equipment Blank Conc. (µg/l)	P3 Equipment Blank Conc. (µg/l)	Detection Limits (µg/l)
Chloromethane	ND	ND	ND	ND	1.0
Vinylchloride	ND	ND	ND	ND	1.0
Trichlorofluoromethane	ND	ND	ND	ND	1.0
Bromomethane	ND	ND	ND	ND	1.0
Chloroethane	ND	ND	ND	ND	1.0
1,1-Dichloroethene	ND	ND	ND	ND	1.0
Methylene Chloride	ND	ND	ND	ND	50
Trans-1,2-Dichloroethene	ND	ND	ND	ND	1.0
1,1-Dichloroethane	ND	ND	ND	ND	1.0
Chloroform	ND	ND	ND	ND	1.0
1,1,1-Trichloroethane	ND	ND	ND	ND	1.0
Carbon Tetrachloride	ND	ND	ND	ND	1.0
1,2-Dichloroethane	ND	ND	ND	ND	1.0
Trichloroethene	5.7	2.3	ND	ND	1.0
1,2-Dichloropropane	ND	ND	ND	ND	1.0
Bromodichloromethane	ND	ND	ND	ND	1.0
Cis-1,3-Dichloropropene	ND	ND	ND	ND	1.0
Trans-1,3-Dichloropropene	ND	ND	ND	ND	1.0
1,1,2-Trichloroethane	ND	ND	ND	ND	1.0
Tetrachloroethene	20	5.2	ND	ND	1.0
Dibromochloromethane	ND	ND	ND	ND	1.0
Chlorobenzene	ND	ND	ND	ND	1.0
Bromoform	ND	ND	ND	ND	1.0
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	1.0
1,3-Dichlorobenzene	ND	ND	ND	ND	1.0
1,4-Dichlorobenzene	ND	ND	ND	ND	1.0
1,2-Dichlorobenzene	ND	ND	ND	ND	1.0

The Laboratory Results are only a portion of the Laboratory Report.

CHAIN-OF-CUSTODY RECORD

Client: CDM
Project Name: Colmar Inc.
Project Address: 333 Turnbull Cyn Rd. City of Industry
Sampler's Signature: [signature]

Date: 5-13-91
Client Project #: 2424-110

Turn Around Requested:
- ☐ Immediate Attention
- ☑ Rush 24-48 Hours
- ☒ Rush 72-96 Hours
- ☐ Mobile Lab
- ☑ ~~Normal~~ SW

TTL Project # 1107 **1851**
Page 1 of 1

Lab Use Only.
Sample Condition as received:
Chilled (yes) / no
Sealed yes / (no)

Analysis Requested

Sample ID	Sample Location	Date	Time	Laboratory Sample Number	Sample Matrix: Soil(S), Sludge(SL), Aqueous(A)	Total Petroleum Hydrocarbons as Gasoline, LUFT Manual (P&T)	TPH as Diesel Fuel, LUFT Manual	TPH as Gasoline, Extractable	TPH by EPA Method 418.1	BTEX by EPA Method 8020	601	602 + Xylene	608 (PCBs only)	Number of Containers	Container / Comments
P-2	Piezometer	5-13-91	1445	1100488							X			2	
P-3	"	↓	↓	1100489							X			2	
P-2	"											X		2	
P-3	"											X		2	
P-3	"												X	4	
P-2	Equipment Blank			1100490							X			2	
P-3	" "			1100491							X			2	
	Trip Blank	↓	↓	1100492										4	

① Relinquished by: (Signature) Steph Mutz	Date 5-13-91	② Received by: (Signature)	Date
Company: CDM	Time 1445	Company:	Time
③ Relinquished by: (Signature)	Date	④ Received by Laboratory: (Signature) Ruth Williams	Date 5-13-91
Company:	Time	Company: TTL	Time 1445

Total Number of Containers: 20

TERRA TECH LABS, INC.
ENVIRONMENTAL TESTING
16371 Gothard Street, Suite G
Huntington Beach, CA 92647
Tel. (714) 842-6077