UPPER LOS ANGELES RIVER AREA WATERMASTER

CITY OF LOS ANGELES VS. CITY OF SAN FERNANDO, ET AL CASE NO. 650079 - COUNTY OF LOS ANGELES

WATERMASTER SERVICE IN THE UPPER LOS ANGELES RIVER AREA LOS ANGELES COUNTY

1998-99 WATER YEAR OCTOBER 1, 1998 - SEPTEMBER 30, 1999



MAY 2000

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FOREWORD

As Watermaster for the Upper Los Angeles River Area (ULARA), I am pleased to submit this report of the water supply in accordance with the provisions of the Final Judgment signed by the Los Angeles Superior Court on January 26, 1979.

This report describes the water rights in each basin, lists the allowable pumping for the 1998-99 Water Year, and indicates the water in storage to the credit of each party as of October 1, 1999. In addition, this report includes background information on the history of the <u>San Fernando Case</u>, information as to each basin and the ULARA, with respect to water supply, groundwater extractions, groundwater levels, quantities of imported water use, recharge operations, water quality conditions, and other pertinent information occurring during the 1998-99 Water Year pursuant to the provisions of the Judgment.

Updates on the development of "Significant Events" through April 2000 are discussed in Section 1.5. These include the status of the Glendale North/South Operable Unit and the Headworks Well Field Remediation Project, the progress of the East Valley Water Recyling Project, and the status of the Pollock Wells Treatment Plant Project. There are comments on the agreements established with Middle Ranch, Hathaway, and Vulcan – CalMat Division confirming the water rights of the City of Los Angeles, and details about a map that has been produced which brings together the boundary of ULARA and all the Assessor and Thomas Brother map pages within the ULARA boundary area.

Other matters that are under investigation are the presence of illegal pumpers in both the City of Los Angeles and the unincorporated areas of Los Angeles County within the boundaries of ULARA, and dewaterers along Ventura Boulevard and the western end of ULARA.

To provide more extensive groundwater quality management for the ULARA basins, the ULARA Watermaster and Administrative Committee met on a nearly monthly basis during 1998-99. As provided in Section 5.4 of the ULARA Policies and Procedures, the fifth <u>ULARA Groundwater Pumping and Spreading Plan</u> was completed and filed with the court on July 1999.

I also wish to acknowledge and express appreciation to all the parties who have provided information and data which were essential to the completion of this report.

MELVIN L. BLEVINS ULARA Watermaster

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1. INTRODUCTION

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1. INTRODUCTION

1.1 Background

The Upper Los Angeles River Area (ULARA) encompasses all the watershed of the Los Angeles River and its tributaries above a point in the river designated as Los Angeles County Department of Public Works (LACDPW) Gaging Station F-57C-R, near the junction of the Los Angeles River and the Arroyo Seco (Plates 1 and 5). ULARA encompasses 328,500 acres, composed of 122,800 acres of valley fill, referred to as the groundwater basins, and 205,700 acres of hills and mountains. ULARA is bounded on the north and northwest by the Santa Susana Mountains; on the north and northeast by the San Gabriel Mountains; on the east by the San Rafael Hills, which separate it from the San Gabriel Basin; on the south by the Santa Monica Mountains, which separate it from the Los Angeles Coastal Plain; and on the west by the Simi Hills.

ULARA has four distinct groundwater basins. The water supplies of these basins are separate and are replenished by deep percolation from rainfall, surface runoff and from a portion of the water that is delivered for use within these basins. The four groundwater basins in ULARA are the San Fernando, Sylmar, Verdugo, and Eagle Rock Basins.

THE SAN FERNANDO BASIN (SFB), the largest of the four basins, consists of 112,000 acres and comprises 91.2 percent of the total valley fill. It is bounded on the east and northeast by the San Rafael Hills, Verdugo Mountains, and San Gabriel Mountains; on the north by the San Gabriel Mountains and the eroded south limb of the Little Tujunga Syncline which separates it from the Sylmar Basin; on the northwest and west by the Santa Susana Mountains and Simi Hills; and on the south by the Santa Mountains.

THE SYLMAR BASIN, in the northerly part of ULARA, consists of 5,600 acres and comprises 4.6 percent of the total valley fill. It is bounded on the north and east by the San Gabriel Mountains; on the west by a topographic divide in the valley fill between the Mission Hills and the San Gabriel Mountains; on the southwest by the Mission Hills; on the east by the Saugus formation along the east bank of the Pacoima Wash; and on the south by the eroded south limb of the Little Tujunga Syncline, which separates it from the SFB.

THE VERDUGO BASIN, north and east of the Verdugo Mountains, consists of 4,400 acres and comprises 3.6 percent of the total valley fill. It is bounded on the north by the San Gabriel Mountains; on the east by a groundwater divide separating it from the Monk Hill Subarea of the

Raymond Basin; on the southeast by the San Rafael Hills; and on the south and southwest by the Verdugo Mountains.

THE EAGLE ROCK BASIN, the smallest of the four basins, is in the extreme southeast corner of ULARA. It comprises 800 acres and consists of 0.6 percent of the total valley fill.

1.2 History of Adjudication

The water rights in ULARA were established by the JUDGMENT AFTER TRIAL BY COURT in Superior Court Case No. 650079, entitled <u>The City of Los Angeles, a Municipal Corporation,</u> <u>Plaintiff, vs. City of San Fernando, et al., Defendants, signed March 14, 1968, by the Honorable</u> Edmund M. Moor, Judge of the Superior Court. Numerous pretrial conferences were held subsequent to the filing of the action by the City of Los Angeles in 1955 and before the trial commenced on March 1, 1966.

On March 19, 1958, an Interim Order of Reference was entered by the Court directing the State Water Rights Board, now known as the State Water Resources Control Board (SWRCB), to study the availability of all public and private records, documents, reports, and data relating to a proposed order of reference in the case. The Court subsequently entered an "Order of Reference to State Water Rights Board to Investigate and Report upon the Physical Facts (Section 2001, Water Code)" on June 11, 1958.

A final Report of Referee was approved on July 27, 1962 and filed with the Court. The Report of Referee made a complete study of the geology, insofar as it affects the occurrence and movement of groundwater and the surface and groundwater hydrology of the area. In addition, investigations were made of the history of channels of the Los Angeles River and its tributaries; the areas, limits, and directions of flow of all groundwater within the area; the historic extractions of groundwater in the basin and their quality; and all sources of water, whether they be diverted, extracted, imported, etc. The Report of Referee served as the principal basis for geological and hydrological facts for the original Trial Court Judgment in 1968, the Decision of the Supreme Court in 1975 (14 Cal 3d 199, 123 Cal Rept 1), and the Trial Court Final Judgment on remand on January 26, 1979.

The City of Los Angeles filed an appeal from the Judgment of the Trial Court with the Court of Appeal, which held a hearing on November 9, 1972, and issued its opinion on November 22, 1972. The opinion, prepared by Judge Compton and concurred in by Judges Roth and

Fleming, reversed, with direction, the original judgment handed down by Judge Moor. In essence, the City of Los Angeles was given rights to all water in ULARA, including the use of the underground basins. The defendants, however, were given the right-to capture "return water", which is water purchased from the Metropolitan Water District of Southern California (MWD) that percolates into the basin.

A petition for rehearing was filed on December 7, 1972, but was denied by the Court of Appeal. On January 2, 1973, the defendants filed a petition for hearing with the State Supreme Court. The Court on March 2, 1973 advised the parties it would hear the case. The hearing was held on January 14, 1975.

On May 12, 1975, the California Supreme Court filed its opinion on the 20-year San Fernando Valley water litigation. This opinion, which became final on August 1, 1975, upheld the Pueblo Water Rights of the City of Los Angeles to all groundwater in the SFB derived from precipitation within ULARA. The City of Los Angeles' Pueblo Water Rights were not allowed to extend to the groundwaters of the Sylmar and Verdugo Basins.

The City of Los Angeles was also given rights to all SFB groundwater derived from water imported by it from outside ULARA and either spread or delivered within ULARA. The Cities of Glendale and Burbank were also given rights to all SFB groundwater derived from water that each imports from outside ULARA and delivered within ULARA. San Fernando was not a member of MWD until the end of 1971, and had never prior thereto imported any water from outside ULARA. However, San Fernando has no return flow rights based on a mutual agreement between Los Angeles and San Fernando in the March 22, 1984 amendment to the Final Judgment.

The Supreme Court reversed the principal judgment of the Trial Court and remanded the case back to the Superior Court for further proceedings consistent with the Supreme Court's opinion. On remand the case was assigned to the Honorable Harry L. Hupp, Judge of the Superior Court of Los Angeles County.

The Final Judgment (Judgment), signed by the Honorable Harry L. Hupp, was entered on January 26, 1979. Copies of the Judgment are available from the ULARA Watermaster's (Watermaster) office. The water rights set forth in the Judgment are consistent with the opinion of the Supreme Court described above. In addition, the Judgment includes provisions and stipulations regarding water rights, the calculation of imported return water credit, storage of water, stored water credit, and arrangements for physical solution water for certain parties as

suggested by the Supreme Court. A separate stipulation was filed in Superior Court on January 25, 1979 appointing Melvin L. Blevins to act as Watermaster under the Judgment in this case.

On August 26, 1983, the Watermaster reported to the Court pursuant to Section 10.2 of the Judgment that the Sylmar Basin was in a condition of overdraft. In response to the Watermaster's letter and a Minute Order of this Court, the Cities of Los Angeles and San Fernando responded by letter to the Court, agreeing with the Watermaster's report on overdraft. On March 22, 1984, Judge Harry L. Hupp signed a stipulation ordering, effective October 1, 1984, that the Cities of Los Angeles and San Fernando would be limited in their pumping to bring the total pumping within the safe yield of the basin, including any rights exercised by private parties.

The following table lists the judges who have succeeded Judge Hupp as Judge of Record for the San Fernando Judgment.

Judge	Date Appointed
Susan Bryant-Deason	January 1, 1999
Ricardo A. Torres	January 1, 1993
Gary Klausner	December 9, 1991
Jerold A. Krieger	April 16, 1991
Sally Disco	May 25, 1990
Miriam Vogel	January 16, 1990
Vernon G, Foster	April 30, 1985

TABLE 1-1: JUDGES OF RECORD

1.3 Extraction Rights

The extraction rights under the Judgment and Sylmar Basin Stipulation are as follows:

San Fernando Basin

Native Water

Los Angeles has an exclusive right to extract and utilize all the native safe yield water which has been determined to be 43,660 acre-feet per year.

Import Return Water

Los Angeles, Glendale, and Burbank each has a right to extract the following amount:

- Los Angeles: 20.8 percent of all delivered water, including reclaimed water, to valley fill lands of the SFB.
- Burbank: 20.0 percent of all delivered water, including reclaimed water, to the SFB and its tributary hill and mountain areas.
- Glendale: 20.0 percent of all delivered water, including reclaimed water, to the SFB and its tributary hill and mountain areas (i.e., total delivered water less 105 percent of total sales by Glendale in the Verdugo Basin and its tributary hills).

Physical Solution Water

Several parties are granted limited entitlement to extract water chargeable to the rights of others upon payment of specified charges. The following table lists the parties and their maximum physical solution quantities.

Chargeable Party	Pumping Party	Allowable Pumping
		(acre-feet)
City of Los Angeles	City of Glendale	5,500
	City of Burbank	4,200
	Middle Ranch	50
	Hathaway	60
	Van de Kamp ¹	120
	Toluca Lake	100
	Sportsmen's Lodge	25
City of Glendale	Forest Lawn	400
	Angelica Healthcare ¹	75
City of Burbank	Valhalla	300
	Lockheed	25

TABLE 1-2: PHYSICAL SOLUTION PARTIES

1. Abandoned Physical Solution rights.

Stored Water

Los Angeles, Glendale, and Burbank each has a right to store water and the right to extract equivalent amounts.

Sylmar Basin

Native and Import Return Water

As of October 1, 1984, Los Angeles and San Fernando were assigned equal rights to the safe yield of the basin. The Administrative Committee on July 16, 1996 approved increasing the safe yield in the Sylmar Basin on a trial basis by 300 acre-feet to 6,510 acre-feet per year. The only potentially active private party with overlying rights is Santiago Estates. As a successor to Meurer Engineering, M.H.C. Inc owned Santiago Estates as of June 1998. Santiago Estates pumping is deducted from the safe yield and the two cities divide the remainder. Santiago Estates did not pump during the 1998-99 Water Year and reported that the pump was removed from the well.

Stored Water

Los Angeles and San Fernando each has a right to store water and the right to extract equivalent amounts.

Verdugo Basin

Native and Import Return Water

Glendale and the Crescenta Valley Water District (CVWD) own prescriptive rights to extract 3,856 and 3,294 acre-feet per year, respectively. Glendale is not currently pumping its full prescriptive right. CVWD has requested and been given approval by the Watermaster and Administrative Committee to once again pump an adjusted amount above its prescriptive amount for the 1999-2000 Water Year (Appendix G). CVWD pumped 503 acre-feet above its prescriptive right during the 1998-99 Water Year.

Eagle Rock Basin

Native Water

The Eagle Rock Basin has no significant native safe yield.

Imported Return Water

Los Angeles delivers imported water to lands overlying the basin, and return flow from this delivered water constitutes the entire safe yield of the basin (approximately 500 acre-feet per year). Los Angeles has the right to extract or cause to be extracted the safe yield of the basin.

Physical Solution Water

McKesson Water Products (successor to Sparkletts) and Deep Rock each have physical solution rights to extract water pursuant to a stipulation with the City of Los Angeles, and as provided in Section 9.2.1 of the Judgment.

1.4 Watermaster Service and Administrative Committee

In preparing the annual Watermaster Report, the Watermaster collected and reported all information affecting and relating to the water supply, water use and disposal, groundwater levels, water quality, and ownership and location of new wells within ULARA. Groundwater pumpers report their extractions monthly to the Watermaster. This makes it possible to update the Watermaster Water Production Accounts on a monthly basis and determine the allowable pumping for the remainder of the year.

Section 8, Paragraph 8.3 of the Judgment established an Administrative Committee for the purpose of advising the Watermaster in the administration of his duties. The duly appointed members of the Committee, as of May 1, 2000, are:

BURBANK, CITY OF Fred Lantz (President) Peter Frankel (Alternate)

SAN FERNANDO, CITY OF Michael Drake Harold Tighe (Alternate)

CRESCENTA VALLEY WATER DISTRICT Michael Sovich David Gould (Alternate) <u>GLENDALE, CITY OF</u> Donald Froelich (Vice-President) Wil Wilson (Alternate)

LOS ANGELES, CITY OF Thomas Erb Ernest Wong (Alternate) The Watermaster may convene the Administrative Committee at any time in order to seek its advice. Each year the Committee is responsible for reviewing and approving with the Watermaster the proposed annual report. The Committee met in October, November, December, February, April, June, and August of 1998-99. The Committee approved the 1998-99 Watermaster Report on April 12, 2000.

1.5 Significant Events through April 2000

Burbank Operable Unit (BOU)

The Burbank OU, operated by Lockheed and funded by the EPA, removes VOCs from elevated nitrate groundwater and then blends it with water from the MWD for delivery to the City of Burbank. Lockheed began delivering water to the Burbank distribution system in January 1996. In mid-December 1997, the facility was closed to rehabilitate Burbank Well No. 10, improve filtration of the backwash, and re-configure the Liquid-Phase GAC to a downward flow system. The facility was returned to service December 12, 1998. The lengthy down time occurred because the California Department of Health Services (DHS) required re-permitting of the facility and specified additional operational conditions to provide greater protection to the drinking water supply. Following a six-month operation transition, the city will begin the 18-year operation on December 12, 2000 under the Second Consent Decree. During the 1998-99 water year 9,184 AF of groundwater were treated at the facility.

Glendale Operable Unit

Construction of the Glendale North and South Operable Unit has been completed. This facility includes the water treatment plant, a blending pipeline, and refurbishing of the Grandview Pump Station. The facility will pump and treat up to 5,000 gpm from the Glendale North and South OU Well Fields. All systems of the facility are in the final phase of testing. The DHS is completing its review of Glendale's compliance with the DHS Impaired Drinking Water Policy 97-005.

Glendale-Verdugo Park Water Treatment Plant

The City of Glendale completed construction of the Verdugo Park Water Treatment Plant, however, the facility is running at 400 gpm instead of the expected 700 gpm. Methods to increase the efficiency of Glendale's wells are being investigated.

Glenwood Nitrate Removal Plant

CVWD completed a rehabilitation of the ion exchange system at the Glenwood Nitrate Removal Plant. The replacement resin should last about eight years. The system produces approximately 50 - 60,000 gallons of brine water from the 1.5 million gallons processed daily.

East Valley Water Recycling Project

The East Valley Water Recycling Project (EVWRP) is the cornerstone of the City of Los Angeles' water recycling efforts and will ultimately fulfill nearly half the goal of reusing about 40 percent of the city's wastewater by 2010. This project will ultimately utilize up to 35,000 acre-feet per year of reclaimed water from the Tillman Water Reclamation Plant, primarily for groundwater recharge in the Hansen and Pacoima Spreading Grounds within the Sun Valley area of the San Fernando Valley. Other incidental uses will be for irrigation and industrial applications. Construction of project facilities, including the Balboa Pumping Station, 10.2 miles of 54-inch pipeline, and twelve monitoring wells has been completed. Recycled water was first delivered to the Hansen Spreading Grounds on October 21, 1999 as part of project testing activities. A total of 13.1 million gallons (40 acre feet) of recycled water was delivered to the Hansen Spreading Grounds through December 1999. Work to automate the pumping station is underway, and regular operation of the EVWRP is scheduled to begin in spring 2000 after the rainy season. Phase I of the EVWRP is a three-year demonstration project that features 10,000 acre-feet per year of recycled water spread at the Hansen Spreading Grounds. Groundwater quality will be evaluated over this three-year period with the goal of increasing the spreading up to 35,000 acre-feet per year.

Headworks Well Field Remediation Project

The City of Los Angeles Department of Water and Power is proceeding with its Headworks Well Field Remediation Project that will restore the use of an important well field that was removed from service in the 1980s due to contamination with volatile organic compounds. The Headworks Project will treat and deliver up to 13,500 gallons-per-minute of groundwater supply to ensure that maximum inflows to the Silver Lake Reservoir service area can be maintained. Construction of the on-site facilities is scheduled for completion in August 2002.

Pollock Wells Treatment Plant

The City of Los Angeles Department of Water and Power Pollock Wells Treatment Plant was placed into service on March 17, 1999. This 3,000 gpm facility located in the Los Angeles River Narrows area restores the use of two existing Pollock production wells by treating the

groundwater with Liquid-Phase Granular Activated Carbon (GAC). The GAC removes the volatile organic compounds (VOCs), then the supply is chlorinated, and blended with imported supplies to reduce nitrate. Restoring the use of the Pollock wells will reduce groundwater levels in a localized area near the Los Angeles River and eliminate and excessive rising groundwater discharges to the river, thus preserving Los Angeles' water rights of up to 3,000 acre feet per year. A total of 1,513 AF were treated in the 1998-99 water year.

Holchem Inc. - Pacoima Area Groundwater Investigation

A significant groundwater contaminant plume exists in the Pacoima area near the intersection of the Simi Valley Freeway and San Fernando Road. As the lead agency, the Department of Toxic Substances Control (DTSC) of the California Environmental Protection Agency (Cal-EPA) is working with the Los Angeles Regional Water Quality Control Board (RWQCB), the DWP, and the Watermaster's Office to develop strategies to further investigate the extent and nature of the contaminant plume. The DWP has installed two downgradient monitoring wells to provide a better understanding of the extent of contamination and to provide an early warning detection system for the nearest DWP supply wells, the Tujunga Well Field. In February 2000 a CEQA Notice of Exemption was approved for a Holchem Inc. pilot study and the pilot test work plan was adopted by DTSC. A Notice of the Consent Decree was published in the California Register in January 2000. The Attorney General will lodge the Consent Decree with the court and file a motion requesting approval of the Consent Decree.

Marguardt Contamination Investigation

Marquardt Company property in the San Fernando Valley was used for rocket testing and development. Under the direction of the DTSC Marquardt is still characterizing the site contamination and has not submitted a corrective measure study for DTSC's evaluation. DTSC has not issued any letter regarding future use of the property. DTSC is working with the new owners, Trammel Crow, and the Mayor's office to assure any proposal for development will not interfere with the necessary characterization and cleanup of existing contamination.

Hathaway Children and Family Services (Hathaway)

Hathaway is a Party in the case of City of Los Angeles vs. San Fernando by virtue of being successor-in-interest to Disclaiming Parties, the DeMille Estate. In June 1999 *the* Watermaster, City of Los Angeles and Hathway signed a stipulation to permit Hathaway to pump up to 60 acre-feet annually until such time as a water purveyor is available. Monthly the production reports for the three wells will be sent to the Watermaster, and Hathaway will be required to pay Los Angeles, the water right holder, for pumped groundwater.

Middle Ranch (formerly DeMille)

In June 1998 the Superior Court of Los Angeles ordered that the motion to enforce the injunction set forth in the Judgment against Middle Ranch be granted. The order affirmed that the parties are successors-in-interest to a party (DeMille) originally named in the action with respect to water rights adjudicated in the Judgment, and that the parties are subject to the terms of the Judgment to the same extent as such predecessor in interest. Middle Ranch has complied with the terms of the agreement and has reported its pumping

Vulcan-CalMat Division

Under the Judgment, CalMat was permitted to pump groundwater to be used for processing sands and gravel in their mining operations with the entire amount of groundwater being returned (recharged) to the San Fernando Basin. CalMat does not hold a water right. CalMat may use the groundwater for aggregate washing with the obligation to return 90 percent of the pumped groundwater back into the basin and to compensate Los Angeles for up to 10 percent consumptive losses by purchasing an equivalent amount of water from the City of Los Angeles municipal water distribution system. The Judgment established that the pumped groundwater would be for a non-consumptive or minimal consumptive use. The intent was to recharge the aquifer with the remaining 90 percent of the same processed groundwater and also with the additionally purchased water. During this past year CalMat, the City of Los Angeles, and the Watermaster agreed to participate in a Settlement Hearing before Judge Susan Bryant-Deason of the California Superior Court. An agreement was reached regarding the three years from 1997-1999 in which CalMat was found to have consumed in excess of the amount detailed in the Judgement, and furthermore, it was agreed that more precise measurement devices would be installed to calculate groundwater usage. These measurement systems allow the return flows to the Sheldon Pond to be measured for Total Suspended Solids (TSS), which are deducted from the returned flow volume. A transducer has also been installed to measure the groundwater elevation and to assist in the calculation of evaporation from the surface of the Sheldon Pond.

Chromium Task Force

The Watermaster has coordinated a group including the EPA, RWQCB, DHS, DTSC, and the cities of Burbank, Glendale, and Los Angeles whose purpose is to gather information on chromium and to understand the implications to the groundwater supply. In February 1999, the Public Health Goal for chromium was formally adopted by the Office of Environmental Health Hazard Assessment/California Environmental Protection Agency at 2.5 µg/L. The current Maximum Contaminant Level (MCL) for chromium is 50 µg/L. The MCL is the drinking water

standard established by the State Department of Health Services after a lengthy process which tests health risk and the willingness of the public to finance a new standard

Hansen and Tujunga Spreading Grounds Task Force

The Watermaster initiated the Hansen and Tujunga Spreading Grounds Task Force in May 1998. The purpose of the task force was to establish criteria to better utilize the Hansen and Tujunga Spreading Grounds to recharge the SFB with native and imported waters. The maximum use of the spreading grounds has been significantly limited in above normal runoff years because of environmental issues associated with nearby landfills. The task force is made up of representatives of the Los Angeles County Department of Public Works, Los Angeles Bureau of Sanitation, DWP, and the Watermaster's Office. The task force established an improved method for monitoring water levels near the Hansen Spreading Grounds. This will allow for increased spreading operations. In addition, the task force is presently working on a mitigation plan for the Tujunga Spreading Grounds.

Upper Sun Valley Watershed Stakeholders

The Watermaster's Office has been participating in the Upper Sun Valley Watershed Stakeholders meetings. The objective of the group is to identify the feasibility of alternative ways to solve the local flooding problems in the Upper Sun Valley area. Alternatives could replace or support the traditional approach of an improved storm drain system and have the potential of saving money. Some of the alternatives under consideration include permeable road covers, storm detention basins, and individual home cisterns. A decision is anticipated in the spring of 2000.

Dewaterers

The groundwater table in parts of the SFB is near the ground surface. This circumstance in some instances requires continuous dewatering to maintain subsurface structures. As permits are requested in the SFB, the Department of Building and Safety notifies the Watermaster's Office when plans are submitted that have the potential for dewatering. The Watermaster's Office reviews the plans, determines the need for short or long-term dewatering, and provides instruction for compliance. If there is no long-term dewatering, the party is released from any further responsibilities.

Pumping in the County outside of the City

The Watermaster has been meeting with Supervisor Antonovich's staff to investigate pumping in areas of the Upper Los Angeles River Area located in unincorporated areas of the County. The water rights in this geographic area belong to the City of Los Angeles. The Watermaster is examining the rights and responsibilities of all the parties and government agencies.

Well Permits and the ULARA Assessor Page Map

Well permits are obtained and approved by the Los Angeles County DHS. The DHS's primary concern is public health. The issue becomes confusing when a party obtains a permit to install a well because the permit does not establish a water right. In adjudicated groundwater basins, water rights are assigned to parties by their judgments and are enforced by the various Court appointed Watermasters. In the 1997-98 water year, the Watermaster's Office working with DHS developed a public notice explaining water rights. This year the Watermaster's Office has coordinated the development of a ULARA Assessor Page Map that links the information available within the perimeter of ULARA from the Thomas Brother Map Pages to the Assessor Pages. This information permits the Watermaster's Office to answer water rights questions more quickly and to identify the ownership of the water right of a specific parcel.

1.6 Summary of Water Supply, Operations, and Hydrologic Conditions

Highlights of operations for the 1997-98 and 1998-99 Water Years are summarized in Table 1-3. Details of the 1998-99 Water Year operations and hydrologic conditions are given in Section 2. Locations of the groundwater basins, water service areas of the parties and individual producers, and other pertinent hydrologic facilities are shown on Plates 2 through 9.

Average Rainfall

Precipitation on the valley floor area during 1998-99 was 9.81 inches, 60 percent of the calculated 100-year mean (16.48 inches); precipitation in the mountain areas was 11.53 inches, 53 percent of the calculated 100-year mean (21.62 inches).

Spreading Operations

A total of 14,662 acre-feet of water were spread, a large decrease from the 61,119 acre-feet spread during the rainy 1997-98 Water Year. Average annual spreading for the 1968-1999 period was 33,762 acre-feet.

Extractions

Total extractions amounted to 156,487 acre-feet. This is an increase of 47,995 acre-feet from 1997-98 and approximately 160 percent of the 1968-99 average of 97,880 acre-feet. Of the total for the 1998-99 Water Year, 3,077 acre-feet were for non-consumptive use. The increase in pumping was due in part to the low precipitation. Appendix A contains a summary of groundwater extractions for the 1998-99 Water Year.

Imports

Gross imports (including pass-through water) totaled 533,855 acre-feet, an increase of 5 percent from 1995-96. Net imports used within ULARA amounted to 316,123 acre-feet, a 6,430 acre-feet increase.

Exports

A total of 317,958 acre-feet of water was exported from ULARA, an increase of 19,844 acrefeet from the previous year. Of the 317,958 acre-feet exported, 112,006 acre-feet were from groundwater extractions, and 205,952 acre-feet were from imported supplies (pass-through).

Treated Wastewater

A total of 90,062 acre-feet of wastewater were treated in ULARA. The majority of the treated water was discharged to the Los Angeles River, a small amount was delivered to the Hyperion Treatment Plant, and approximately seven percent was used as reclaimed water.

Recycled Water

Total recycled water used in ULARA was 6,771 acre-feet, a 141 acre-feet increase from last year. The recycled water is used for landscape irrigation, in-plant use, power plant use (i.e. cooling), and other industrial uses.

Sewage Export

Sewage export was estimated at 93,454 acre-feet; this was the amount of sewage delivered by pipeline to the Hyperion Treatment Plant. The estimate does not include treated wastewater discharged to the Los Angeles River that leaves ULARA as surface flow.

Groundwater Storage

Groundwater storage in the SFB during 1998-99 decreased by 82,673 acre-feet; the total cumulative increase in groundwater storage since October 1, 1968 is 187,689 acre-feet. The 1998-99 decrease is due to a combination of below average spreading activities by the

LACDPW, below average rainfall, and above average groundwater pumping. The change in groundwater storage for the Sylmar, Verdugo, and Eagle Rock Basins was – 2,398, - 4,028, and -178 acre-feet, respectively. The total change in groundwater storage in ULARA was – 89,378 acre-feet.

Wells

During 1998-99 Pollock Well No. 5 (3948C) was abandoned.

	Water Year	Water Year
Item	1997-98	1998-99
Active Pumpers (party and nonparties)	29	26
Inactive Pumpers (parties within valley fill)	4	4
Valley Rainfall, in inches		
Valley Floor	37.04	9.81
Mountain Area	39.45	11.53
Spreading Operations, in acre-feet	61,119	14,662
Extractions, in acre-feet		
Used in ULARA	25,494	37,937
Exported from ULARA	78,244	112,006
Nonconsumptive Use	2,552	3,076
Basin Account/Testing	1,102	413
Clean-up/Dewaterers	1,009	3,055
Total	108,401	156,487
Gross Imports, in acre-feet		
Los Angeles Aqueduct Water	401,665	394,906
MWD Water	101,446	94,586
Total	503,111	489,492
Exports, in acre-feet		
Los Angeles Aqueduct Water	196,250	184,145
MWD Water	23,620	21,807
Groundwater	78,244	112,006
Total	298,114	317,958
Net Imports Used in ULARA, in acre-feet	283,241	283,540
Reclaimed Water Use, in acre-feet	6,912	6,771
Total Water Use in ULARA, in acre-feet	315,647	328,248
Treated Wastewater, in acre-feet	108,579	90,062
Sewage Export to Hyperion, in acre-feet	109,544	93,454

TABLE 1-3: SUMMARY OF OPERATIONS IN ULARA

1) The four inactive pumpers are Hinkle-Schmidt (Deep Rock), Van de Kamp, Disney, Angelica.

2) Water accounted for under a testing situation or treatment facility water used for backwash.

3) Extractions used in ULARA plus Net Imports and Reclaimed.

4) Most treated wastewater flows to LAR, a portion to Hyperion (see T2-7), and for reclaimed water.

 Sewage outflow includes estimates of outflow from each of the four basins, and discharges to Hyperion from the Tillman and Los Angeles-Glendale Reclamation Plants.

1.7 Allowable Pumping for the 1999-2000 Water Year

Table 1-4 shows a summary of extraction rights for the 1999-2000 Water Year and stored water credit as of October 1, 1999, for the Cities of Los Angeles, Burbank, Glendale, San Fernando, and the CVWD. The calculation of these values is shown in more detail in Section 2.

	Native	Import		Stored Water	Allowable
	Safe Yield	Return	Total	Credit	Pumping
	Credit ¹	Credit ²	Native+Import	(as of Oct. 1, 1999)	1999-00 Water Year
San Fernando Basin			-		- 1.
City of Los Angeles	43,660	43,036	86,696	254,895	342,591
City of Burbank	-	4,534	4,534	50,771	54,305
City of Glendale		5,334	5,334	69,665	74,999
Total	43,660	52,904	96,564	375,331	471,895
Sylmar Basin					
City of Los Angeles	3,255		3,255	3,090	6,345
City of San Fernando	3,255		3,255	1,991	5,246
Total	6,510		6,510	5,081	11,591
Verdugo Basin ³			and the second sec		
CVWD	3,294		3,294	-	3,294
City of Glendale	3,856		3,856	<u></u>	3,856
Total	7,150		7,150		7,150

TABLE 1-4: ALLOWABLE PUMPING 1999-2000 WATER YEAR

(acre-feet)

1) Native Safe Yield extraction right per Judgment, page 11.

2) Import Return extraction right per Judgment, page 17.

3) There is no Stored Credit assigned in the Verdugo Basin.

2. WATER SUPPLY, OPERATIONS, AND HYDROLOGIC CONDITIONS

2. WATER SUPPLY, OPERATIONS, AND HYDROLOGIC CONDITIONS

2.1 Precipitation

Precipitation varies considerably throughout ULARA depending on topography and elevation. Mean seasonal precipitation ranges from about 14 inches at the western end of the San Fernando Valley to 35 inches in the San Gabriel Mountains. Approximately 80 percent of the annual rainfall occurs from December through March.

The 1998-99 Water Year experienced below average rainfall. The valley floor received 9.81 inches of rain (60 percent of the 100-year mean), while the mountain area received 11.53 inches (53 percent of the 100-year mean). Figure 2.1 shows monthly valley floor and mountain area rainfall in ULARA. The weighted average of both valley and mountain areas was 10.83 inches (55 percent of the 100-year mean). Table 2-1 shows a record of rainfall at the valley and mountain precipitation stations, and Plate 5 shows their locations.



FIGURE 2.1: MONTHLY RAINFALL

LACDPW Rain Gage Stations		1998-99	100-Year Mean	Percent of	
No.	Name	Precipitation	(1881-1981)	100-Year Mean	
	Valley Stations				
13C	North Hollywood-Lakeside	10.82	16.63	65%	
1107D	La Tuna Canyon ²	9.40	14.98	63%	
465C	Sepulveda Dam	8,12	15.30	53%	
21B	Woodland Hills	8.62	14.60	59%	
23B	Chatsworth Reservoir ³	8.88	15.19	58%	
25C	Northridge-LADWP	8.52	15.16	56%	
251C	La Crescenta	12.96	23.31	56%	
293B	Los Angeles Reservoir	11.52	17.32	67%	
	Weighted Average ¹	9.81	16.48	60%	
	Mountain Stations				
11D	Upper Franklin Canyon Reservoir	11.43	18.50	62%	
17	Sepulveda Canyon at Mulholland	12.14	16.84	72%	
33A	Pacoima Dam	14.36	19.64	73%	
47D	Clear Creek - City School	15.48	33.01	47%	
1076B	Monte Cristo Ranger Station 4	11.28	29.04	39%	
54C	Loomis Ranch-Alder Creek	11.32	18.62	61%	
210C	Brand Parks	8.90	19.97	45%	
797	DeSoto Reservoir⁵	11.47	17.52	65%	
1074	Little Gleason	4.67	21.79	21%	
	Weighted Average ¹	11.53	21.76	53%	
	Weighted Average			1	
	Valley/Mountain Areas ¹	10.83	19.64	55%	

TABLE 2-1: 1998-99 PRECIPITATION

(inches)

1. Weighted Average calculations performed according to Report of Referee-7/62.

2. Station 1107D substituted for Station 14C.

3. Station 23B estimated from Station 735H.

4. Station 1076B substituted for 53D.

5. Station 797 replaced Station 259 which has been discontinued.

2.2 Runoff and Outflow from ULARA

The drainage area of ULARA contains 328,500 acres, of which 205,700 acres are hills and mountains. The drainage system is made up of the Los Angeles River and its tributaries. Surface flow originates as storm runoff from the hills and mountains, storm runoff from the

impervious areas of the valley, industrial and sanitary waste discharges, and rising groundwater.

A number of stream-gaging stations are maintained throughout ULARA, either by the LACDPW or the United States Geological Survey (USGS). The Watermaster has selected six key gaging stations which record runoff from the main hydrologic areas in ULARA (Plate 5 shows the location of the stations). The six gage stations are as follows:

- 1. Station F-57C-R registers all surface outflow from ULARA.
- Station F-252-R registers flow from Verdugo Canyon which includes flows from Dunsmore and Pickens Canyons.
- Station E-285-R registers flow from the westerly slopes of the Verdugo Mountains and some flow from east of Lankershim Boulevard. It also records any releases of reclaimed wastewater discharged by the City of Burbank.
- 4. Station F-300-R registers all flow east of Lankershim Boulevard plus the portion of outflow from Hansen Dam which is not spread. These records also include flow through the Sepulveda Dam, which may include extractions from the Reseda wells.
- Station F-168-R registers all releases from Big Tujunga Dam, which collects runoff from the watershed to the northeast. Runoff below this point flows to Hansen Dam.
- Station F-118B-R registers all releases from Pacoima Dam. Runoff below this point flows to the Los Angeles River through lined channels, or can be diverted to the Lopez and Pacoima spreading grounds. This station, severely damaged in January 1994 during the Northridge Earthquake, began reporting again in November 1996.

Table 2-2 summarizes the 1997-98 and 1998-99 monthly runoff for these stations. The higher runoff in 1997-98 is related to higher rainfall in 1997-98 than in 1998-99. The mean daily discharge rates for these six stations during 1998-99 are summarized in Appendix B.

Station	Water Year	OCT	NOV	DEC	NAL	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
F-57C-R	1997-98	6,210	16,400	29,050	17,960	140,100	37,100	20,460	49,050	10,300	7,700	6,270	6,130	345,730
L.A. River Arroyo Seco	1998-99	6,940	11,050	7,600	14,020	7.110	13,940	17,830	7,750	9,210	6,300	6,360	5,790	113,910
F-252-R	1997-98	327	722	945	966	6,210	1,850	985	1,750	642	644	523	506	16,090
Verdugo Wash	1998-99	594	756	531	882	588	775	1,030	490	652	311	333	313	7,255
E-285-R	1997-98	641	1,330	1,810	1,350	7,200	2,670	1,250	2,280	772	707	873	787	21,670
Burbank Storm Drain	1998-59	733	1,110	827	1,210	764	1,240	1,300	808	828	768	749	587	10,924
F-300-R	1997-98	4,810	13,500	25,010	13,600	126,500	35,760	16,760	44,500	6,330	6,250	6,500	4,760	304,280
LA River Tujunga Ave	1998-99	3,710	6,410	4,280	7,090	3,720	7,470	9,950	2,890	3,610	3,770	4,160	4,570	61,620
F-168-R	1997-98	2	94		20	1.1	4	4	÷.		141	GC -	÷	36
Big Tujunga Dam	1998-99	443	474	659	385	867	860	1,190	341	569	90	4	3	5,885
F-1188-R	1997-98	181	43	133	471	7,240	6,160	4,580	7,030	4,190	1,140	150	377	31,695
Pacoima Dam	1998-99	0	171	555	188	263	280	245	118	97	186	0	0	2,103

TABLE 2-2: MONTHLY RUNOFF AT SELECTED GAGING STATIONS

(acre-feet)

2.3 Components of Surface Flow

The surface flow of the Los Angeles River at Gaging Station F-57C-R consists of:

- 1. Storm flows;
- Reclaimed wastewater from the Tillman, Burbank, and Los Angeles-Glendale Water Reclamation Plants;
- 3. Industrial discharges; and,
- 4. Rising groundwater.

In the Report of Referee (Volume II, Appendix O), procedures were developed for the calculation of rising groundwater for the period 1928-1958. Some of the important factors of that study are no longer significant - releases of Owens River water, operation of the Chatsworth Reservoir, and (temporarily, at least) operation of the Headworks Spreading Grounds. As shown on Figure O-2 of the Report of Referee, rising groundwater was considered to have fallen to zero by the late 1950s. The January 1993 report by Brown and Caldwell, "Potential Infiltration of Chlorides from the Los Angeles River into the Groundwater Aquifer" studied groundwater levels along the course of the Los Angeles River. The Watermaster provided the insight and data for this evaluation. As of the end of the drought period in 1977, groundwater levels in the Los Angeles Narrows were very low, with very little

potential for rising groundwater. Heavy runoff occurred during the 1978-83 period, which, combined with reduced pumping in the Crystal Springs, Grandview, and Pollock Well Fields, caused large recoveries of groundwater levels in the Los Angeles Narrows.

An even greater factor affecting hydrologic conditions in the Los Angeles Narrows has been the increasing releases of reclaimed waters. Releases from the Los Angeles-Glendale Plant were started in 1976-77 and from the Tillman Plant in 1985-86. These large year-round releases tend to keep the alluvium of the Los Angeles River Narrows full, even in dry years. There is opportunity for continuing percolation in the unlined reach, both upstream and downstream of the paved section near the confluence of the Verdugo Wash and the Los Angeles River. Water percolating in the unlined reach is believed to circulate through shallow zones and re-appear as rising groundwater downstream from Los Feliz Boulevard. Also, there is up to 3,000 acre-feet of recharge from delivered water within the Los Angeles Narrows-Pollock Well Field area that adds to the rising groundwater conditions.

Rising groundwater also occurs above the Verdugo Narrows, and in the reach upgradient from Gage F-57C-R. During dry periods, conditions in the unlined reach are stabilized with regard to percolation and rising water by releases of treated water. In wet periods, rising groundwater above Gage F-57C-R has been considered to be related to the increase of rising water above the Verdugo Narrows. From 1991-92 (Table 2-3) to the very wet year of 1992-93 there was an increase of rising water at Gage F-252-R of about 1,900 acre-feet. From 1997-98 to 1998-99, flows of rising water at Gage F-252-R was estimated at 1,300 acre-feet. For 1998-99 the rising groundwater flow at Gage F-57C-R was estimated at 4,400 acre-feet.

Field inspection during 1998-99 revealed significant unmetered flows of storm drain water contributing to year-round flows of water from residences, golf courses and others beginning high in the San Rafael Hills that flow down to the Los Angeles River through the Sycamore Channel and several other storm drains north of gage F-57 C-R. The Watermaster's Office is working with the LACDPW to more precisdely measure the rising groundwater from other sources of run-off.

		F-57	C-R	F-252-R			
Water	Rising	Waste	Storm	Total	Rising	Storm	Total
Year	Groundwater	Discharge	Runoff	Outflow	Groundwater	Runoff	Outflow
1998-99	4,400	70,390	39,110	113,900	1,300	2,185	7,250
1997-98	4,000	97,681	245,079	346,730	4,000	12,140	16,140
1996-97	3,000	75,827	76,485	155,312	3,000	13,860	16,860
1995-96	3,841	86,127	61,188	151,156	2,577	10,946	13,52
1994-95	4,900	66,209	367,458	438,567	4,809	28,881	33,696
1993-94	2,952	60,594	73,149	136,695	1,387	6,156	7,54
1992-93	4,900	77,000	478,123	560,023	3,335	20,185	23,52
1991-92	3,000	120,789	197,040	320,829	1,412	13,209	14,62
1990-91	3,203	75,647	117,779	196,629	1,157	6,865	8,02
1989-90	3,000	76,789	55,811	157,639	1,182	2,938	4,12
1988-89	3,000	80,020	56,535	136,843	1,995	4,453	6,44
1987-88	3,000	81,920	74,074	156,204	3,548	10,493	14,04
1986-87	3,000	64,125	19,060	83,295	2,100	1,690	3,79
1985-86	3,880	48,370	102,840	155,090	2,470	6,270	8,74
1984-85	3,260	21,600	46,300	71,160	2,710	3,970	6,68
1983-84	3,000	17,780	49,090	69,870	4,000	n/a	n/a
1982-83	3,460	17,610	384,620	405,690	5,330	21,384	26,71
1981-82	1,280	18,180	80,000	99,460	3,710	5,367	9,07
1980-81	4,710	19,580	51,940	76,230	5,780	2,917	8,69
1979-80	5,500	16,500	n/a	n/a	5,150	7,752	12,90
1978-79	2,840	16,450	119,810	139,100	2,470	n/a	n/a
1977-78	1,331	7,449	357,883	366,663	1,168	23,571	24,73
1976-77	839	7,128	58,046	66,013	1,683	2,635	4,318
1975-76	261	6,741	32,723	39,725	2,170	2,380	4,550
1974-75	427	7,318	56,396	64,141	1,333	4,255	5,588
1973-74	2,694	6,366	79,587	88,878	1,772	5,613	7,38
1972-73	4,596	8,776	100,587	113,959	1,706	7,702	9,408
1971-72	-				2,050	2,513	4,56

TABLE 2-3: ESTIMATED SEPRATION OF SURFACE FLOW AT STATIONS F-57C-R & F-252-R

(acre-feet)

2.4 Groundwater Recharge

Precipitation has a marked influence on groundwater recharge and, with some delay, groundwater storage. Urban development in ULARA has resulted in approximately 20 percent of the rainfall being collected and routed into paved channels which discharge into the Los Angeles River. To partially offset the increased runoff due to urbanization, Pacoima and Hansen Dams, originally built for flood control, are utilized to regulate storm flows and allow recapture of the flow in downstream spreading basins operated by the LACDPW and the City of Los Angeles.

The LACDPW operates the Branford, Hansen, Lopez, and Pacoima Spreading Grounds; the City of Los Angeles operates the Headworks Spreading Grounds, however, it is currently inactive. The LACDPW, in cooperation with the City of Los Angeles, operates the Tujunga Spreading Grounds. The spreading grounds operated by the LACDPW are utilized for spreading native water and imported water under agreements. Table 2-4 summarizes the spreading operations for the 1998-99 Water Year, and Plate 6 shows the locations of the spreading basins.

	Spreading	~~		~		-							-	
Agency	Facility	UL1	NON	DBS	JAN	FEB	MAR	AHK	MAY	JUN	JUL	AUG	SEP	IOIA
LACOPW												-		
	Branford	49	129	34	73	33	72	41	16	51	17	17	15	547
	Hansen	1,370	955	1,430	1,260	1,670	1,440	340	255	205	24	0	D	8,949
	Lopez	0	34	94	0	56	181	133	5	15	17	0	0	536
	Pacoima	0	44	55	276	206	0	o	56	59	0	0	0	696
	Tujunga	Ø	310	O	108	12	65	1,760	682	420	396	178	3	3,934
	Total	1,419	1,472	1,613	1,717	1,977	1,758	2,274	1,014	751	454	195	18	14,662
City of Los	Angeles										-			
	Tujunga	0	0	0	0	0	o	0	0	0	0	0	0	c
	Headworks	D	0	0	0	O	0	0	O	O	O	O	0	G
	Hansen	0	- O	σ	0	0	0	0	0	0	0	0	0	
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
B	asin Total	1,419	1,472	1,613	1,717	1,977	1,758	2,274	1,014	751	454	195	18	14,65

TABLE 2-4:	1998-99 SPREADING	OPERATIONS	IN THE SAN	FERNANDO	BASIN
		(acre-feet)			

2.5 Groundwater Extractions

The original trial court adjudication of groundwater rights in ULARA restricted all groundwater extractions, effective October 1, 1968. On that date, extractions were restricted to approximately 104,000 acre-feet per water year. This amounted to a reduction of approximately 50,000 acre-feet from the previous six-year average. The State Supreme Court's opinion, as implemented on remand in the Judgment entered on January 26, 1979, provides a similar restriction in groundwater pumping.

McKesson Water Products (formerly Sparkletts Drinking Water Corporation) and Deep Rock Water Company are the only parties which have rights to extract water from the Eagle Rock Basin. These parties pay the City of Los Angeles for pumped groundwater pursuant to the Judgment.

Figure 2.2 illustrates the imported water used in ULARA and annual groundwater extractions, beginning with the 1954-55 Water Year. It can be noted that for the 14 years prior to pumping restrictions (1954-55 to 1967-68), imports exceeded extractions by 50,000 to 90,000 acre-feet per year, in contrast to the past 30 years (1968-69 to 1998-99) where imports have exceeded extractions by 110,000 to 250,000 acre-feet per year (Refer to Figure 2.3 - Monthly Extractions and Imports).

A total of 156,487 acre-feet was pumped from ULARA during the 1998-99 Water Year-141,757 acre-feet from the SFB, 8,064 acre-feet from the Sylmar Basin, 6,724 acre-feet from the Verdugo Basin, and 241 acre-feet from the Eagle Rock Basin. The respective safe yield values for the 1998-99 Water Year are 93,025 acre-feet (Native Safe Yield of 43,660 and an import return of 49,368 acre-feet) for the SFB, 6,510 acre-feet for the Sylmar Basin, and 7,150 acre-feet for the Verdugo Basin. Appendix A contains a summary of groundwater extractions for the 1998-99 Water Year, Plate 9 shows the locations of the well fields, and Plate 10 describes the pattern of groundwater extractions.

Of the total amount pumped in the SFB (141,757 acre-feet), 133,969 acre-feet constitutes extraction rights by Parties to the Judgment, 3,301 acre-feet constitutes nonconsumptive use, and 4,487 acre-feet was by physical solution parties, groundwater cleanup, testing/well development, and dewatering parties (Appendix E). Table 2-5 summarizes 1998-99 private party pumping in the SFB, and Plate 3 shows the locations of the individual producers.







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FIGURE 2.2 - YEARLY IMPORTS USED IN ULARA AND ULARA EXTRACTIONS

Water Year

ULARA Watermaster Report

1998-99 Water Year

TABLE 2-5: 1998-99 PRIVATE PARTY PUMPING - SAN FERNANDO BASIN (acre-feet)

Nonconsumptive Use or Minimal Co	onsumption	Groundwater Dewatering			
CalMat	2,839	Auto Stiegler	59		
(Gravel washing)		(Charged to Los Angeles' water rights)			
Sears, Roebuck and Company	218	First Financial Plaza Site	20		
(Air Conditioning)		(Charged to Los Angeles' water rights)			
Sportsmen's Lodge	0	Trillium Corporation	27		
Toluca Lake Property Owners Ass'n	19	(Charged to Los Angeles' water rights)			
(Lake overflows to LA River)		Metropolitan Transportation Agency	268		
Walt Disney Productions	0	(Charged to Basin Account)			
(3 wells inactive/ Not abandoned.)		Metropolitan Water District (MWD)	199		
		Walt Disney Riverside Building	2696		

(Charged to Burbank's water rights=2336 (Charged to Los Angeles' water rights=360)

Total	3,076	Total	3,269
Groundwater Cleanup		Physical Solution	
Burbank GAC	3	Angelica Healthcare Services	0
(GAC restart to Basin Account)		(Well Abandoned 12/97)	
Lockheed-Burbank Operable Unit	142	CalMat	564
(Well Development to Basin Account)		(Charged to Los Angeles' water rights;	
Hughes	2	10% applied to evaporative loss=340;	
(Charged to Los Angeles' water rights)		Amount in excess of 90/10 =224.4)	
Micro Matics USA, Inc.	0.48	Forest Lawn Cemetery Assn.	415
(Charged to Los Angeles' water rights)		(Charged to Glendale's water rights)	
Mobil Oil Corporation	0.45	Hathaway (deMille)	32
(Charged to Los Angeles' water rights)		(Charged to Los Angeles' water rights)	
3M-Pharmaceutical	52	Middle Ranch (deMille)	8
(Charged to Los Angeles' water rights)		(Charged to Los Angeles' water rights)	
		Sportsmen's Lodge	0
		(Charged to Los Angeles' water rights)	
		Toluca Lake Property Owners Ass'n	30
		(Charged to Los Angeles' water rights)	
		Valhalla Memorial Park	342
		(Charged to Burbank's water rights)	
Total	199.09	Total	1,391
Total Extractions	7,936		
2.6 Imports and Exports of Water

Residential, commercial, and industrial expansions in ULARA have required the importation of additional water supplies to supplement that provided by the groundwater basins.

The imported supplies to ULARA are from the Los Angeles Aqueducts and the MWD. Los Angeles Aqueduct water consists of runoff from the Eastern Sierra Nevada and groundwater from Owens Valley. The MWD supplies consist of State Water Project and Colorado River Aqueduct waters.

Exports from ULARA include imported Los Angeles Aqueduct and MWD water (pass-through), and groundwater from the SFB. Exports of wastewater are by pipeline to Hyperion Treatment Plant.

Table 2-6 summarizes the nontributary imports and exports from ULARA during the 1997-98 and 1998-99 Water Years, and Figure 2.3 shows the monthly extractions and imports.





	Water Year	Water Year	
Source and Agency	1997-98	1998-99	
Gross Importe	d Water		
Los Angeles Aqueduct			
City of Los Angeles	401,665	394,906	
MWD Water			
City of Burbank	16,972	10,536	
Crescenta Valley Water District	1,244	1,599	
City of Glendale	25,685	26,639	
City of Los Angeles ¹	51,204	48,215	
La Canada Irrigation District ¹	990	1,136	
Las Virgenes Municipal Water District ¹	5,351	6,463	
City of San Fernando	0	0	
Total	101,446	94,586	
Grand Total	503,111	489,492	
Exported Water (Pa	ss-Through)		
Los Angeles Aqueduct			
City of Los Angeles	196,250	184,145	
MWD water			
City of Los Angeles	23,620	21,807	
Total	219,870	205,952	
Net Imported Water	283,241	283,541	

TABLE 2-6: ULARA NONTRIBUTARY WATER IMPORTS AND EXPORTS

(acre-feet)

1. Deliveries to those portions of these Districts that are within ULARA.

2.7 Water Recycling

Water recycling presently provides a source of water for irrigation, industrial, and recreational uses. In the future, water recycling will provide water for groundwater recharge within the Hansen, Headworks and Pacoima spreading basins. Six wastewater reclamation plants are in operation in ULARA. The Las Virgenes Municipal Water District operates a water recycling facility outside ULARA but uses part of the treated water in ULARA. The goal of the East Valley Water Recycling Project is to use up to 35,000 acre-feet/year of reclaimed water from the Donald C. Tillman Reclamation Plant for groundwater recharge. Table 2-7 summarizes the 1998-99 reclamation plant operations, and Plate 6 shows their location.

	Treated	Water Disc	harged to	Recycled
Plant/Agency	Water	L.A. River	Hyperion	Water
City of Burbank	7,546	5,075	5,075	1,210
Los Angeles-Glendale	20,536	13,895	2,465	3,720 ²
Donald C. Tillman	61,895	40,352	20,927	616 ³
Indian Hills Mobile Homes	÷.	-	-	20 4
The Independent Order of Foresters	85	o	o	85 4
Rocketdyne (Canoga Park)	N/A	N/A	N/A	N/A ^s
Las Virgenes MWD	-	o	o	1,120 6
Total	90,062	59,322	28,467	6,771

TABLE 2-7: 1998-99 WASTEWATER RECYCLING OPERATIONS (acre-feet)

Of the total recycled water (1,210 AF), 769 AF was delivered to the Burbank power plant. Of that, 154 AF
is for cooling and 615 AF is for discharge to the Los Angeles River. Half of the water for cooling is also
included in the "river discharges" column. 441 AF was used by CalTrans, DeBell Golf Course and other
landscape irrigation.

2. Of the total recycled water (3,720 AF), 1,899 AF was delivered to Glendale for use in Glendale's Phosphate Plant and for irrigation water for CalTrans, Forest Lawn and Brand Park; 644 AF was for in plant use; 733 AF was delivered to Griffith Park by Los Angeles for irrigation; and 877 AF was used by CalTrans, Lake Side, Sinai Memorial Park, Forest Lawn 2, and Universal City MCA for irrigation.

3. Recycled water was for in plant use and then discharged to the Los Angeles River.

4. Recycled water is used for irrigation.

5. Rocketdyne: Treated water is reused within the facility.

6. Portion of recycled water is used within ULARA for irrigation.

2.8 Water Level Elevations

The 1999 contour maps for the Spring (April) and the Fall (September) were produced by using the SFB Groundwater Flow Model. The SFB model was initially developed during the RI study of groundwater contamination in the San Fernando Valley. The RI study was funded through the EPA's Superfund program.

The model is comprised of up to four layers, in the deepest portion of the eastern SFB, and includes 22,016 cells, ranging in size from 1,000 by 1,000 feet to 3,000 by 3,000 feet. The model parameters were calibrated by matching the simulated hydraulic-head fluctuations with the historical water level fluctuations measured at selected key monitoring wells for a 10-year period. The 1999 contours were simulated by incorporating the estimated monthly recharge (e.g. spread water, precipitation, etc.) and discharge (groundwater extractions, rising groundwater, etc.) values for the 1998-99 water year. The model was then run for twelve consecutive stress periods beginning October 1998 through September 1999. The simulated head values at the end of the April and September stress periods were then plotted by utilizing a groundwater contour software package.

The simulated Spring and Fall 1999 Groundwater Contour Maps are shown as Plates 9 and 10. These contours are intended to depict the general trend of groundwater flow for April and September of 1999. Up-to-date groundwater elevations for specific locations can be obtained by contacting the Watermaster's Office at (213) 367-0921 or (213) 367-1020.

Plate 11 exhibits the change in groundwater elevation from the Fall of 1998 to the Fall of 1999. The drop in groundwater levels in the north portion of the SFB, specifically near the Hansen Spreading Grounds is attributed to the small volume of Native runoff water spread at the Hansen, Pacoima, and Tujunga Spreading Grounds (14,662 AF), as compared to the long-term average of 30, 755.

The 10 to 42 foot decrease in groundwater levels as shown near the Rinaldi-Toluca, North Hollywood and Burbank well field areas is primarily due to increased groundwater extractions. Overall SFB extractions increased 50 percent from 1997-98 to 1998-99 (94,700 acre-feet to 141,700 acre-feet). More specifically the increase in extractions were by well field: Rinaldi-Toluca: 14,200 acre-feet, North Hollywood: 500 acre-feet, Tujunga: 17,000 acre-feet, and Burbank/Lockheed: 6,600 acre-feet. Plate 12 exhibits groundwater flow directions and estimated groundwater velocities in ULARA. Figure 2.4 shows historic well hydrographs of wells throughout ULARA and their locations.

2.9 Groundwater Storage

San Fernando Basin

The total groundwater storage capacity of the SFB was estimated in the Report of Referee to be approximately 3,200,000 acre-feet, of which a regulatory storage capacity of 360,000 acre-feet is required by the Judgment.

The estimated change in groundwater storage for 1998-99 is -82,673 acre-feet (Table 2-8). From the start of safe yield operation in the Fall of 1968 through Fall of 1999, the amount of groundwater in storage has increased by +187,689 acre-feet. However, during the 1968-99 period there has been an accumulation of 375,331 acre-feet of stored water credit through spreading and in-lieu activities of the parties. Such groundwater can be extracted at any time by the credited parties in excess of normal pumping rights. If this water were to be removed, the cumulative change in storage since 1969 would be -187,642 acre-feet.

An annual comparison is made between the hydrologic conditions of the water year and change in storage. Table 2-8 summarizes the annual precipitation and change in storage from 1968-69 through 1998-99. Plate 15 shows the cumulative change in storage from Fall 1928 to the present.

Sylmar Basin

The groundwater storage capacity of the Sylmar Basin is approximately 310,000 acre-feet. The estimated change in storage for 1998-99 is - 2,398 acre-feet, and the cumulative change in storage from 1968-69 through 1998-99 is - 3,626 acre-feet.

Verdugo Basin

The groundwater storage capacity of the Verdugo Basin is approximately 160,000 acre-feet. The estimated change in storage for 1998-99 is -4,028 acre-feet, and the cumulative change in storage from 1968-69 through 1998-99 is -9,528 acre-feet.

Eagle Rock Basin

The estimated change in storage is - 178 acre-feet.

Water Year	Valley Floor Precipitation (in)	Change in Storage (acre-feet)	Cumulative Change in Storage (acre-feet)	Pumping (acre-feet)
1998-99	9.81	(82,673)	187,689	141,757
1997-98	37.04	44,113	270,362	94,682
1996-97	15.17	(35,737)	226,249	105,899
1995-96	12.03	(49,223)	261,986	82,862
1994-95	33.36	79,132	311,209	58,121
1993-94	10.19	(22,238)	232,077	62,990
1992-93	36.62	106,317	254,315	36,419
1991-92	30.05	411	147,998	76,213
1990-91	14.38	(14,122)	147,587	71,065
1989-90	8.20	(29,941)	161,709	81,466
1988-89	9.12	(30,550)	191,650	127,973
1987-88	18.62	(5,000)	222,200	105,470
1986-87	5.99	(31,940)	227,200	91,632
1985-86	20.27	(7,980)	259,140	86,904
1984-85	11.00	(31,690)	267,120	101,591
1983-84	9.97	(63,180)	298,810	115,611
1982-83	39.64	121,090	361,990	68,394
1981-82	17.18	(530)	240,900	84,682
1980-81	11.04	(32,560)	241,430	92,791
1979-80	30.25	99,970	273,990	58,915
1978-79	21.76	78,080	174,020	59,843
1977-78	35.43	136,150	95,940	66,314
1976-77	14.19	(50,490)	(40,210)	125,445
1975-76	9.90	(30,090)	10,280	103,740
1974-75	14.74	(22,580)	40,370	95,830
1973-74	15.75	(21,820)	62,950	88,017
1972-73	20.65	17,020	84,770	82,004
1971-72	8.10	(17,090)	67,750	84,140
1970-71	15.57	15,340	84,840	79,010
1969-70	10.50	(9,740)	69,500	88,856
1968-69	29.00	79,240	79,240 1	84,186
A	19 57	6054 48		87 188

TABLE 2-8: CHANGE IN GROUNDWATER STORAGE SAN FERNANDO BASIN

1. Assumes storage as of October 1, 1968, to be zero.

Section 2 - Water Supply, Operations, and Hydrologic Conditions

SAN FERNANDO BASIN









Section 2 - Water Supply, Operations, and Hydrologic Conditions

SAN FERNANDO BASIN







SYLMAR BASIN



SYLMAR BASIN



VERDUGO BASIN





FIGURE 2.4: HYDROGRAPHS AND LOCATIONS OF WELLS THROUGHOUT ULARA

2.10 Water Supply and Disposal - Basin Summaries

Tables 2-9A, 2-9B, 2-9C, and 2-9D summarize water supply and disposal in the San Fernando, Sylmar, Verdugo, and Eagle Rock basins, respectively. The Watermaster made computations of subsurface outflows based on similar computations made by the State Water Rights Board in the Report of Referee.

2.11 Extraction Rights and Stored Water Credit - Basin Summaries

San Fernando Basin

Tables 2-10A and 2-11A show the calculation of SFB extraction rights for the 1998-99 Water Year and stored water credit (as of October 1, 1999) for the Cities of Burbank, Glendale, and Los Angeles. All rights are based on the City of Los Angeles vs. City of San Fernando, et al., Judgment, dated January 26, 1979.

Sylmar Basin

Tables 2-10B and 2-11B show the calculation of Sylmar Basin extraction rights for the 1997-98 Water Year and stored water credit (as of October 1, 1997) for the Cities of Los Angeles and San Fernando. All rights are based on the March 22, 1984 stipulation between the City of San Fernando and the City of Los Angeles (filed with the Superior Court) and the action by the Administrative Committee on July 16, 1996 to increase the safe yield from 6,210 AF/Yr. to 6,510 AF/Yr.

TABLE 2-9A: SUMMARY OF 1998-99 WATER SUPPLY AND DISPOSAL SAN FERNANDO BASIN

(acre-feet)

Water Source and Use	City of Burbank	City of Glendale	City of Los Angeles	City of San Fernando	All Others	Total
Extractions						
Municipal Use	10,583	30	123,207	-	0	133,820
Basin Account		0	0	-	413	413
Physical Solution	342 1	415 1	-	_	634	1,393
Cleanup/Devaluerers	-		-	-	3,056	3,056
Nan-consumptive Use	-	=	-	-	3,077	3,077
Total	10,925	445	123,207	0	7,179	141,758
Imparts						
LA Aqueduct Water		-	394,906		-	394,906
MND Water (25+35)	10,536	26,639	46,797	0	6,463 ²	90,434
Groundwater from						
Sylmer Basin			4,536	3,211	-	7,747
Total	10,536	26,639	446,239	3,211	6,463	493,087
Reclaimed Water Use	1,210	1,665	2,435	0	1,066	6,376
Exports						
LA Aqueduct Water		-				
aut of LLARA		-	184,145	-	14	184,145
to Eagle Rock Basin	÷.	-		-	-	0
MV/D Water						
at of ULARA	-	-	21,807	-	-	21,807
to Verdugo Basin		2,079	0	-		2,079
to Sylmer Basin	-	-	0	-	-	C
Groundwater	-		111,777	-		111,777
Total	0	2,079	317,729	D	0	319,808
Delivered Water						
Hill & Mountain Areas			47,249		1 .	47,249
Total - All Areas	22,671	25,659	254,152	3,211	14,708	321,413
Water Outflow						
Surface (Sta F-57C-R)	-	· ·	-	-	1	113,900
Subsurface	-		-	-	-	397
Sewage	5,075	17,957	61,895	2,389		87,317
Reclaimed Water to						
the LA River	5,075	-		10 0 0	-	5,075
Total	10,150	17.957	61.895	2.389	0	206,689

1. Includes Valhalla (Burbank) and Forest Lawn (Glendale).

2. Las Virgenes Municipal Water District.

	(acre-feet)				
	City of	City of			
Water Source and Use	Los Angeles	San Fernando	All Others	Total	
Total Extractions	4,536	3,528	1.1	8,066	
Imports					
LA Aqueduct Water	8,171	-		8,171	
MWD Water	969	0	141	969	
Total	9,140	0	0	9,140	
Exports - Groundwater	1.1.1.1				
San Fernando Basin	4,536	3,211	0	7,747	
Total Delivered Water	9,140	318	1	9,460	
Water Outflow					
Subsurface	460 ²		-	462	
Sewage	830 3	215	7	1,048	
Total	1,290	215	0	1,510	

TABLE 2-9B: SUMMARY OF 1998-99 WATER SUPPLY AND DISPOSAL SYLMAR BASIN

1. Pumping for landscape irrigation by Santiago Estates.

2. Estimated in the Report of Referee.

3. Estimated.

TABLE 2-9C: SUMMARY OF 1998-99 WATER SUPPLY AND DISPOSAL VERDUGO BASIN

10	-	-	600	-+1	
(a	CI	е.	re	eri	

	(doit real)			
Crescenta Valley Water District	City of Glendale	La Canada Irrigation District	City of Los Angeles	Total
3,795 1	2,627	0	~	6,422
-		-	686	686
1,599	2,079	1,136	81	4,896
1,599	2,079	1,136	767	5,581
0	0	0	0	0
5,394	4,706 2	1,136	767	12,004
-	-	-		300
-		-	-	70
1,818	1,138	0	190 ³	3,145
1,818	1,138	0	190	3,516
	Crescenta Valley Water District 3,795 ¹ 1,599 1,599 0 5,394 1,818 1,818	Crescenta City of District Glendale 3,795 ¹ 2,627 - - 1,599 2,079 1,599 2,079 0 0 5,394 4,706 ² - - 1,818 1,138 1,818 1,138	Crescenta La Canada Valley Water City of Irrigation District Glendale District 3.795 ¹ 2,627 0 - - - 1,599 2,079 1,136 1,599 2,079 1,136 0 0 0 5,394 4,706 ² 1,136 1,818 1,138 0 1,818 1,138 0	Crescents La Canada Valley Water City of Irrigation City of District Glendale District Los Angeles 3,795 ¹ 2,627 0 - - - 686 1,599 2,079 1,136 81 1,599 2,079 1,136 767 0 0 0 0 0 5,394 4,706 ² 1,136 767 - - - - - 1,818 1,138 0 190 ³

 Administrative Committee and Watermaster approval (10/98), on a temporary basis, that CVWD may pump in excess of its prescriptive rights until the city of Glendale is able to pump its complete prescriptive right (Appendix G).

2. Verdugo Basin metered sales x 105%. Based on 15% of total water consumption of city.

3. Maximum with high groundwater levels (Report of Referee).

-

Exports

Groundwater

Total Delivered Water

Subsurface

Sewage

Water Outflow Surface

4,232

241

4,232

0

0

1,943

1,943

(acre-feet)					
Water Source and Use	City of Los Angeles	Deep Rock Water Company	McKesson Water Products Co.	Total	
Total Extractions	0	0 1	241 '	241	
Imports					
LA Aqueduct Water	1,951	1.1.1	-	1,951	
MWD Water (25+35)	233			233	
MWD Water (17)	1,418			1,418	
Groundwater from SFB	630.51			631	

4,232

4,232

0

0 2

1,940 3

1,940

0

0

0

0

0

0

241

0

0

0

TABLE 2-9D: SUMMARY OF 1998-99 WATER SUPPLY AND DISPOSAL EAGLE ROCK BASIN

Deep Rock Water Co. and McKesson Water Products Co. (formerly Sparkletts Drinking Water Co.) are allowed 1. to pump under a stipulated agreement with The City of Los Angeles; extractions are limited to 500 AF/year, and they are allowed to export equivalent amounts.

Estimated in Supplement No. 2 to Report of Referee for dry years 1960-61. Currently considered insignificant. 2.

Estimated. 3.

Total

Total

TABLE 2-10A: CALCULATION OF 1999-2000 EXTRACTION RIGHTS SAN FERNANDO BASIN

(acre-feet)

	City of Burbank	City of Glendale	City of Los Angeles
Total Delivered Water, 1998-99	22,671	26,670	254,152
Water Delivered to Hill and Mountain Areas, 1998-99	-	-	47,249
Water Delivered to Valley Fill, 1998-99	22,671	26,670	206,902
Percent Recharge Credit	20.0%	20.0%	20.8%
Return Water Extraction Right	4,534	5,334	43,036
Native Safe Yield Credit		-	43,660
Total Extraction Right for the 1999-2000 Water Year ¹	4,534	5,334	86,696

1. Does not include stored water credit.

TABLE 2-10B: CALCULATION OF 1999-2000 EXTRACTION RIGHT SYLMAR BASIN

(acre-feet)

	City of Los Angeles	City of San Fernando	All Others
Extraction Right for the	0.00	1	
1999-2000 Water Year ¹	3,255	3,255	-

 Does not include stored water credit. The safe yield of the Sylmar Basin has been increased on a trial basis to 6,510 AF/YR effective 10/1/95. Effective October 1, 1984 safe yield less pumping by one overlying party is equally shared by Los Angeles and San Fernando.

2. Santiago Estates (Home Owners Group) is pumping for irrigation.

TABLE 2-11A: CALCULATION OF STORED WATER CREDIT SAN FERNANDO BASIN

(acre-feet)

	City of Burbank	City of Glendale	City of Los Angeles
1. Stored Water Credit			
(as of October 1, 1998)	57,544	64,983	298,067
 Physical Solution Water¹ Extraction Right for the 	2,000		(2,000)
1998-99 Water Year	4,489	5,127	83,412
3. 1998-99 Extractions			
Party Extractions	10,583	31	123,206
Physical Solution Extractions	342	415	634
Clean-up/Dewaterers	2,336		720
Adjustment for CalMat ²			24
Total	13,262	445	124,584
4. Total 1998-99 Spread Water	0	0	0
5. Stored Water Credit ³			
(as of October 1, 1999)	50,771	69,665	254,895

1. Burbank excercised option under Physical Solution provisions and purchased 2,000 AF from Los Angeles.

2. Superior Court Settlement of CalMat overconsumption.

3. Item 5 = 1 + 2 - 3 + 4.

ź

TABLE 2-11B: CALCULATION OF STORED WATER CREDIT SYLMAR BASIN

(acre-feet)

	City of Los Angeles	City of San Fernando
1. Stored Water Credit (as of October 1, 1998)	4,371	2,264
2. Extraction Right for the 1998-99 Water Year	3,255	3,255
 Total 1998-99 Extractions Santiago Estates² 	4,536 0.0	3,528 0.0
 Stored Water Credit³ (as of October 1, 1999) 	3,090	1,991

1. The safe yield of the Sylmar Basin has been increased on a trial basis to 6,510 AF/YR as of 10/1/95.

 Santiago Estates pumping is equally taken from the rights of San Fernando and Los Angeles.

3. Item 4 = 1 + 2 - 3

3. WATER QUALITY, TREATMENT, AND REMEDIAL INVESTIGATION ACTIVITIES

3. WATER QUALITY, TREATMENT, AND REMEDIAL INVESTIGATION ACTIVITIES

3.1 Water Quality

Imported Water

- LOS ANGELES AQUEDUCT water is sodium bicarbonate in character and is the highest quality water available to ULARA. Its TDS concentration averaged about 210 milligrams per liter (mg/L) for 30 years before 1969. The highest on record was 320 mg/L on April 1, 1946. TDS concentration on September 28, 1999, was 223 mg/L.
- 2. COLORADO RIVER water is predominantly sodium-calcium sulfate in character, changing to sodium sulfate after treatment to reduce total hardness. Samples taken at the Burbank turnout between 1941 and 1975 indicated a high TDS concentration of 875 mg/L in August 1955 and a low of 625 mg/L in April 1959. The average TDS concentration over the 34-year period was approximately 740 mg/L. Tests conducted at Lake Matthews showed an average TDS concentration of 587 mg/L for the 1998-99 Fiscal Year.
- 3. NORTHERN CALIFORNIA water (State Water Project) is sodium bicarbonatesulfate in character. It generally contains less TDS and is softer than local and Colorado River water. Since its arrival in Southern California in April 1972, the water has had a high TDS concentration of 410 mg/L and a low of 247 mg/l. Tests conducted at the Joseph Jensen Filtration Plant showed an average TDS concentration of 310 mg/L during the 1998-99 Fiscal Year.
- COLORADO RIVER/NORTHERN CALIFORNIA water were first blended at Weymouth Plant in May 1975. Blending ratios vary, and tests are taken from the effluent. Tests conducted at the Weymouth Plant showed an average TDS concentration of 534 mg/L during the 1998-99 Fiscal Year.

Surface Water

Surface runoff contains salts dissolved from rocks in the tributary areas and is sodium-calcium, sulfate-bicarbonate in character. The most recent tests taken in September 1995 from flows in the Los Angeles River at the Arroyo Seco showed a TDS concentration of 667 and a total

hardness of 270 mg/L. These values also reflect the inclusion of rising groundwater in the Los Angeles River reach between Los Feliz Blvd. and Gage F-57C-R.

Groundwater

Groundwater in ULARA is moderately hard to very hard. The character of groundwater from the major water-bearing formations is of two general types, each reflecting the composition of the surface runoff in the area. In the western part of ULARA, it is calcium sulfate-bicarbonate in character, while in the eastern part, including Sylmar and Verdugo Basins, it is calcium bicarbonate in character.

Groundwater is generally within the recommended limits of the California Title 22 Drinking Water Standards, except for: 1) areas of the eastern SFB where high concentrations of TCE, PCE, and nitrates are present; 2) wells in the western end of the SFB having excess concentrations of sulfate; and 3) areas throughout the Verdugo Basin that have abnormally high concentrations of nitrate. In each area the groundwater delivered is either being treated or blended in order to meet State Drinking Water Standards.

A history of the TDS content and mineral analyses of imported, surface, and groundwater is contained in Appendix D.

3.2 Groundwater Quality Management Plan

During the 1998-99 Water Year, the Interagency Coordinating Committee continued to implement the recommendations of the "Groundwater Quality Management Plan - San Fernando Valley Basins" issued in July 1983. The objective of this effort is to protect and upgrade the quality of stored water held in ULARA. Special emphasis is placed on monitoring and removing the organic contaminants TCE and PCE found in the groundwater. Table 3-1 summarizes the number of ULARA wells that are contaminated at the indicated levels above the Maximum Contaminant Level (MCL) of the California Drinking Water Standards of 5 micrograms per liter (μ g/L) for TCE and 5 μ g/L for PCE.

3-2

	Number of Wells Exceeding Contaminant Level 1													
	City of Los Angeles ³								Sub-	Others ³			Grand	
Total Number of	NH 36	RT 15	T P 5 3	HW 0	E 8	W 6	TJ 12	V 8	AE 7	Total 95	B 10	G 15	C 11	Total 131
Wells in Well Field ²														
TCE Levels µg/L														
5-20	6	3	1	0	3	5	8	1	0	27	0	3	0	30
20-100	9	0	2	5	0	3	0	3	6	28	5	4	0	37
>100	2	0	0	1	0	0	0	D	1	4	4	2	0	10
Total	17	3	3	6	3	8	8	4	7	59	9	9	a	77
PCE Levels µg/L							-					_		
5-20	7	0	1	3	0	1	0	1	4	17	1	2	0	20
20-100	2	0	2	1	0	0	0	0	2	7	4	0	0	11
>100	0	0	0	0	0	0	0	0	0	0	4	0	0	4
Total	9	0	3	4	0	1	0	1	6	24	9	2	0	35

TABLE 3-1: 1998-99 NUMBER OF WELLS IN THE ULARA WELL FIELDS EXCEEDING STATE MCL FOR TCE AND PCE

1. Wells are categorized based upon maximum TCE and PCE values attained during the 1998-99 Water Year, where data was not available for 1998-99; data from the most recent water year was used. No data was available for some old inactive

2. Includes active, inactive, and stand-by wells.

Well Fi

3

leids:	NH	•
	-	

- Pollock Headworks
- HW -
- E Erwin w .
- Whitnall TJ -Tujunga

North Hollywood

V -Verdugo AE -LADWP Aeration Tower Wells

- в -City of Burbank
- G -City of Glendale
- С **Crescenta Valley Water District**

3.3 Underground Tanks, Sumps, and Pipelines

The City of Los Angeles Fire Department (LAFD) continues to implement the State-mandated Underground Storage Tank Program (UST) and is actively conducting a program to bring the large number of underground tanks in the San Fernando Valley into compliance with current law. During the 1998-99 Water Year, a total of 301 sites were remediated under the direction of the LAFD.

The main focus of the LAFD UST in ULARA has been the monitoring and removal of gasoline, diesel, and their related constituents from the soils, in order to prevent contamination of the underlying groundwater. If a site investigation indicates contamination, the site is referred to the RWQCB for further action. Since October 1, 1988, 3,793 sites have been assigned to the Underground Tank Plan Check Unit, and of these, 1,961 have been remediated. In addition, 997 sites have been referred to the RWQCB. Currently, the Environmental Unit of the LAFD is monitoring the remediation of 533 sites.

3.4 Private Sewage Disposal Systems (PSDS)

In order to eliminate existing commercial and industrial PSDS and their discharges of wastewater to the groundwater basin, a sanitary sewer construction program was in progress for many years until the passage of Proposition 218. This program is continuing to systematically install sanitary sewers in eighteen designated areas throughout the San Fernando Valley. To date a total of twelve areas have had construction completed, and five areas are in various stages of right-of-way acquisition and processing. Plate 8 shows the locations of the Districts.

The sewer construction program ordered by the City Council was affected through Assessment Act provisions. Proposition 218, approved by the electorate on November 5, 1996, requires a weighted majority mail-in ballot of property owners for any new or increased assessments. The passage of Proposition 218 and continued downsizing of the workforce of the City of Los Angeles has impeded the sewer construction program for the remaining six areas.

Toward the end of the 1998-1999 water year, inquiries by the Watermaster regarding scheduling for the completion of the remaining six designated area projects led to the revision and re-estimation of construction plans for these improvements. It is likely that these projects will be reactivated for construction through the Assessment Program or by other means. The Industrial Waste Management Division of the Bureau of Sanitation continued to pursue the enforcement aspect to the PSDS elimination program. There has been good compliance with the mandatory sewer hook-up ordinance, and more than 2,025 properties have already abandoned PSDS and connected to the public sewer. Continuation of this effort depends upon completion of the sanitary sewer construction program.

3.5 Landfills

The Solid Waste Assessment Test (SWAT) reports for major SWAT Rank 1 to 4 landfills in the Los Angeles area have been completed and submitted to the RWQCB for approval. The reports reviewed by the RWQCB are listed in Table 3-2.

3-4

TABLE 3-2: LANDFILLS WITH SWAT INVESTIGATIONS

(reported to Interagency Coordinating Committee)

Name	Rank	Status	Current Owner	Location	SWAT Report Completed	Final SWAT Submitted	Phase II SWAT Req.	Approved by RWQCB	Site Leak (1)	Type of Emission (2)	Further Monitoring
Bradley West	1	Open	WMDSC	Sun Valley, SE of Sheldon St.	6/87	11/90		4/92	G	NHA (1/O)	3
Sheldon- Arleta	1	Closed	City of Los Angeles Bureau of Sanitation	Sun Valley District near Hollywood & Golden State Fwys	5/87	5/87		2/90			4
Scholl Canyon	. 1	Open	City of Glendale	San Rafael Hills, 1 mile West of Rose Bowl	7/87	4/88		8/90	G	NHA (I/O)	3
Scholl Canyon	2	Closed	City of Glendale	San Rafael Hills, 1 mile West of Rose Bowl	7/87	1/91		12/93		1.00	5
Bradley East	2	Closed	WMDSC	SE of Sheldon St	6/87	11/90		4/92	G	NHA (1/O)	4.8
Bradley West Extension	3	Open	WMDSC	Near Canyon Blvd & Sheldon St	7/68	7/89		4/92	G	Inert Site	4, 8
Sunshine Cyn LA Cily	2	Closed	Browning - Ferris Industries	SE Santa Susana Mtns W of Golden State Fwy	7/88	7/89		4/94			6
Sunshine Cyn LA County	2	Open	Browning - Ferris Industries	SE Santa Susana Mins W of Golden State Fwy	7/88	7/89		4/94			6
Gregg Pil/Bentz	2	Closed	CalMat Properties	Between Pendleton St & Tujunga Ave	7/89	7/89		2/90	G	NHA	4
Branford	2	Closed	City of Los Angeles Bureau of Sanitation	Sun Valley District, NW of Tujunga Wash	7/88	10/90	x				5
CalMat (Sun Valley #3)	2	Open	CalMat Properties	Sun Valley District, NE of Glenoaks Blvd	7/88	11/90		6/92	N		7
Lopez Canyon	2	Closed	City of Los Angeles Bureau of Sanitation	N of Hansen Dam near Lopez and Kagel Cyn	6/88	6/88	x				В
Toyon Canyon	2	Closed	City of Los Angeles Bureau of Sanitation	Griffith Park	6/88	3/89		4/91	T.L.	NHA (1/O)	3
Tuxford Pit	2	Closed	Aadlin Bros. (LA By-Products Co.)	Sun Valley District, SW of Golden State Fwy & Tujunga Ave	6/88	12/90		6/92	1		4, 8, 9
Penrose	2	Closed	Los Angeles (LA By-Products Co.)	N of Strathern St, Tujunga Ave	6/88	7/89		9/89	G	NHB (I/O)	4
Newberry	3	Closed	Los Angeles (LA By-Products Co.)	N of Strathern St. Tujunga Ave	6/88	7/89		9/89	G	NHB (VO)	4
Hewitt Pit	2	Closed	CalMat Properties	North Hollywood District Hollywood Fwy, Laurel	6/88	7/89		5/91	G	NHB (I)	
Pendleton St	4	Closed	DWP	Sun Valley, Pendelton St & Glencaks Blvd	7/90	5/91		6/92	N		
Stough Park	2	Open	City of Burbank	Bel Air Drive & Cambridge Drive	6/86	12/88	-	4/90	Y/G	NHA Inert Site	3
Strathern			Never completed. Application 12/88,	Strathern St. & Tujunga Ave			-				10

1. G - Gas, L - Liquid.

2 NHA - Non-Hazardous but above state drinking water regulatory levels NHB - Non-Hazardous but below state drinking water regulatory levels

I - Inorganic, O - Organic

3. Under Title 27 Corrective Action Program (CAP), after completion of EMP.

4. Closed landfills with groundwater monitoring required under Title 27. Monitoring results are submitted to the Regional Board periodically.

5 Subject to SWAT requirements. Further monitoring may be required under Title 27.

6/ All open landfills are required to have groundwater monitoring under Title 27. Monitoring results are submitted to the Regional Board quarterly or semi-annually

7. Semi-annual groundwater monitoring.

8. Groundwater contamination Evaluation Monitoring Program (EMP) required under Title 27.

9. EPA involved in evaluation.

10. Under permit as Inert Landfill

As stipulated by Article 5 of Title 27, a follow-on sampling program under an Evaluation Monitoring Plan was required for some landfills due to the presence of VOCs in the underlying groundwater. The Pendleton Landfill, owned by the DWP is an inactive landfill and was closed under permit approved by the RWQCB. The sale of the property to the Bureau of Sanitation is pending. The Bureau of Sanitation intends to have a Transfer Station at this site.

3.6 San Fernando Valley Remedial Investigation Activities

A remedial investigation (RI) of groundwater contamination in the San Fernando Valley was initiated in July 1987 by the EPA to characterize the SFB and the Verdugo Basin and their contamination with TCE and PCE. The DWP was selected by the EPA to serve as the lead agency in conducting the RI and entered into a cooperative agreement that has provided over \$21 million in federal funding to DWP since July 1987. In August 1987, the DWP selected James M. Montgomery, Consulting Engineers, Incorporated to serve as its consultant to perform various RI tasks.

The report, "Remedial Investigation of Groundwater Contamination in the San Fernando Valley," was completed in December 1992 and is a comprehensive, five-volume report that presents the findings and characterizations of the SFB and the Verdugo Basin with regard to their geology, hydrogeology, and nature and extent of contamination. The RI report also provides a description and the documentation of the SFB Groundwater Flow Model, summarizes the RI field investigation activities, and evaluates potential risks to human health and the environment.

The SFB Groundwater Flow Model was developed as a part of the San Fernando Valley Remedial Investigation and is a comprehensive, three-dimensional, regional-scale model. A three-dimensional mass transport model has also been developed for the SFB. The model has been utilized for the EVWRP and other groundwater remediation projects to analyze the storage and physical characteristics of groundwater in the SFB.

EPA's consultant, CH2M HILL, continues to periodically sample the 87 groundwater monitoring wells that were installed as part of the RI. CH2M HILL also obtains groundwater quality and groundwater elevation data from the DWP, other municipalities, and various agencies and facilities in the San Fernando Valley to update the SFB database. CH2M HILL utilizes the data to produce contaminant plume maps.

The RI Report and semi-annual sampling reports are available for public use at the Superfund Primary Information Repositories, which are located in the following agencies' libraries: City of Glendale, City of Burbank, DWP, California State University-Northridge, and the University of California - Los Angeles.

The DWP also maintains a current SFB database for use with the SFB flow model and generation of groundwater contour maps and contaminant plume maps. CH2M HILL forwards current groundwater quality data for incorporation into the DWP database.

3.7 Water Treatment

EPA Operable Units

The EPA is proceeding with enforcement actions against potentially responsible parties (PRPs) for the North Hollywood, Burbank, Glendale North and Glendale South OUs, which are part of the EPA's overall, long-term groundwater remediation activities in the SFB. The OUs are described below.

 NORTH HOLLYWOOD OU - The North Hollywood OU was funded by the EPA and the California Department of Health Services (DHS). In 1998-99 a total of 445 million gallons (1,365 acre-feet) of groundwater was treated.

The quality of air discharged to the atmosphere from the Aeration Facility was monitored on a regular basis to verify its conformance to permit requirements of the South Coast Air Quality Management District. The GAC in the off-gas adsorber was replaced in April 1999.

2. BURBANK OU - The Burbank OU, operated by Lockheed and funded by the EPA, removes VOCs from high nitrate groundwater and then blends it with water from the MWD for delivery to the City of Burbank. Lockheed started pumping and delivering groundwater to Burbank on January 3, 1996, pursuant to Phase I of the Consent Decree. A monthly peak of 1,233 acrefeet was pumped and delivered to Burbank in October 1999. The facility was shut down from December 1997 until December 1998 to change the Liquid-Phase GAC contactors to a downward flow system and to reconfigure the treatment of a secondary collection point of contaminants. Burbank is awaiting the final permit to operate the facility from DHS. A total of 9,184 AF were treated in the 1998-99 water year.

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3. GLENDALE NORTH AND SOUTH OUS – Construction of the Glendale North and South Operable Units has been completed. This project is being funded by the USEPA. The system includes four Glendale North OU wells with a capapcity of 3,300 gpm and four Glendale South OU extraction wells with a capacity of 1,700 gpm. The contaminated water will be treated and then blended with MWD water at the refurbished Grandview Pump Station. Glendale will operate the facility using an operator under contract. The Glendale North and South OU is the first constructed treatment facility to go through the screen of the Impaired Water Policy 97-005. In January 2000 Glendale began testing the operating systems under the direction of the USEPA and DHS.

Other Treatment Facilities

- GLENDALE-VERDUGO PARK WATER TREATMENT PLANT (VPWTP) The VPWTP produces about 600 gpm. The water supply is limited at the lower end of the Verdugo Basin. Glendale continues to investigate opportunities to increase groundwater production.
- GLENWOOD NITRATE WATER TREATMENT PLANT The CVWD's Glenwood Nitrate Water Treatment Plant, which uses an ion-exchange process for nitrate removal, continued to operate satisfactorily during the 1998-99 Water Year. A total of 418 million gallons (1,282 acre-feet) of water was treated.
- 3. POLLOCK WELLS TREATMENT PLANT PROJECT The 3,000 gpm City of Los Angeles Pollock Project was dedicated on March 17, 1999. The treatment plant restores Pollock Wells No. 4 and No. 6 to operation. The Pollock Project's focus is to reactivate the Pollock Well Field, to reduce rising groundwater flowing past gaging station F-57C-R, and to capture nearly all of the contamination upgradient of the wellfield and prevent migration of any contaminated groundwater into the Los Angeles River. The facility uses four Granular Activated Carbon (GAC) vessels to remove dissolved organic chemicals. The treated water is chlorinated before distribution in the water system. A total of 428 million gallons (1,513 acre-feet) of groundwater was treated during 1998-99. The plant was shutdown on September 21, 1999 for spent GAC replacement.

3-8

4. HEADWORKS WELL FIELD REMEDIATION – The City of Los Angeles Department of Water and Power is proceeding with its Headworks Well Field Remediation project that will restore the use of an important well field that was removed from service in the 1980s due to contamination with volatile organic compounds.

The Headworks Project consists of groundwater treatment and distribution facilities to be located at the Headworks Spreading Grounds and the construction of four new production wells to replace four existing Headworks Wells that do not comply with current well head standards as required by the California Department of Health Services. At an estimated capital cost of \$22 million, the Headworks Project will treat and deliver up to 13,500 gallons-per-minute of groundwater supply to ensure that maximum inflows to the Silver Lake Reservoir service area can be maintained.

Planning activities for the Headworks Project have been completed with the Conditional Use Permit being secured in March 2000. Design of the on-site treatment and distribution facilities began in November 1999 and will extend to February 2001. Construction of the on-site facilities is scheduled for completion in August 2002. Off-site construction of the influent line and the new production wells are currently in progress.

5. BURBANK GAC TREATMENT PLANT - The City of Burbank GAC system treated 1,545 acre-feet of water from the combined pumping of Burbank Wells No. 7 and No. 15. The treatment plant has been incorporated into Phase II of the Consent Decree (Burbank OU) between EPA, Lockheed, and Burbank. Production at the GAC may be considered as part of the designated average annual pumping goal of 9,000 gpm for the Burbank OU.

3.8 Groundwater Quality Investigations

During the 1998-99 Water Year, several groundwater contamination investigations were performed at various sites. As part of these investigations, groundwater monitoring wells have been drilled, and groundwater has been extracted for the purpose of testing or cleanup. Some of the major sites and their activities through April 2000 are summarized below:

Boeing (Rockwell-Rocketdyne 6633 Canoga Avenue, Canoga Park)

Contaminants at this site include chloroform, TCE, PCE, 1,1-DCE, TCA and Freon 113. There are also free-floating hydrocarbons derived from several upgradient service stations. There are 85 monitoring wells on site: 65 in the shallow zone, 14 in the upper zone, and 6 in the lower zone. Additionally, there are another 31 monitoring wells near four upgradient service stations. Nine extraction wells feed a treatment facility in the southeast portion of the property. There has been an interim "No Further Action" state at this facility since April 30, 1998. In May 2000 the plant will be turned on again. The shutdown of the groundwater extraction and treatment system is planned to provide an opportunity to evaluate the potential for contaminant concentration rebound over time. Rocketdyne submitted for evaluation a new groundwater monitoring plan in April 1998 to the Regional Board that provides for the monitoring of groundwater contaminant rebound.

Holchem - Pacoima Area Groundwater Investigation

Progress has been made in the Pacoima Area investigation by a coordinated effort with the lead agency Cal-EPA DTSC, the RWQCB, DWP, and the Watermaster's Office. A potential groundwater contaminant plume was identified in the Pacoima district near the intersection of the Simi Valley Freeway and San Fernando Road. The contaminant plume is comprised of VOCs with levels upward of 12,000 µg/l of TCE, 3,900 µg/l of PCE, and 7,600 µg/l of 1,1,1-TCA. This site is approximately 2.5 miles upgradient of DWP's Tujunga Well Field, which can supply up to 120 cfs of groundwater. DWP installed two monitoring wells downgradient of the contaminant plumes. In March a pilot study for Soil-Vapor Extraction combined with air sparging was completed.

Raytheon (Hughes Missile Systems Company 8433 Fallbrook Avenue, Canoga Park)

The most prominent contaminant has been 1,1-DCE with lesser amounts of TCE, PCE, TCA, and 1,1-DCA. Petroleum compounds (BTEX) are found in the northwest area (Buildings 269 and 270). TDS is in excess of the Basin Plan objectives, and may not be discharged to the Los Angeles River, although the origin of the high TDS is related to the naturally occurring groundwater. As a result of the high TDS, the treatment plant effluent is stored in holding tanks, and used for on-site irrigation. Since September 1995, approximately 6,765 pounds of hydrocarbons and 500 pounds of chlorinated hydrocarbons have been removed from the soil. Due to significant decreases in contaminant concentrations, the RWQCB has approved groundwater sampling and analyses on a semiannual basis. Residual concentrations of VOCs in groundwater remain primarily along the northern boundary of the property in the northwest

corner of the facility. The property has been sold and is no longer owned by either Raytheon or Hughes. There is a contained area of approximately 100 feet by 100 feet of contamination. The new owners have a three year aggressive plan to complete cleanup of the site.

3M (Formerly Riker Lab, 19901 Nordhoff, Northridge)

The main pollutant at this site is chloroform. There has been an interim groundwater extraction and treatment system since 1988. REW-1 and REW-2 pump from the shallow zone. RMW-1 pumps from the lower water-bearing zone. There are numerous monitoring wells on the property, and off-site to the south. Treatment is by three GAC columns in series, then to an on-site holding tank. The pumping rate of the three wells is demand driven for the cooling tower. During the 1998-99 Water Year, 51.63 acre-feet were treated of which 12 acre feet were recycled for use in the plant. Based on the analytical data from air samples collected during start-up and sustained operations, approximately 14,000 pounds of VOCs have been removed from the soil and 2,000 pounds of VOCs in the groundwater from the three affected areas from start-up through the end of August 1997. Clean-up of the affected areas is projected for completion in a two to three year time frame.

Taylor Yard (Narrows Area)

The remediation of the Taylor Yard of the Southern Pacific Transportation Company is under the jurisdiction of the Cal-EPA DTSC. To expedite the remediation, the Taylor Yard has been divided into two parts - active yard and sale parcel. Part of the Taylor Yard was sold to Lincoln Properties for movie industry related facilities. The active yard has two areas of contamination located in the northern and northeastern sections of the Taylor Yard. Light nonaqueous phase liquids, approximately 6 inches deep, are perched at a depth of 30 feet over an area of five acres. Vapor extraction will be used in remediation. Phase III of the Remedial Investigation has been completed. Installation of 10 - 14 monitoring wells began in November 1997.

Chromium

Chromium is a naturally occurring element of the earth. It is usually found in two main forms: trivalent chromium III (Cr³⁺) and hexavalent chromium VI (Cr⁵⁺). Trivalent chromium occurs naturally in the environment. The occurrence of hexavalent chromium is usually the result of industrial processes. Chromium is used in chrome plating, leather tanning, wood preservatives, and in the manufacturing of stainless and hard-alloy steels, dyes and pigments.

Trivalent chromium is relatively harmless and is an essential nutrient for the human body. Hexavalent chromium is considered to be carcinogenic through inhalation, but it is uncertain whether it is a carcinogen through ingestion of drinking water. There is no known taste or odor associated with chromium. Under a contract with the EPA, CH2M Hill conducted a basin-wide investigation of total and hexavalent chromium through evaluation of some existing databases and a sampling of the RI monitoring wells. The results were published in February 1996 and indicated some areas with pockets of relatively high chromium concentrations.

The state of California DHS previously set the state Maximum Contaminant Level (MCL) for total chromium at 50 μ g/L. At the federal level the MCL is set at 100 μ g/L. In establishing MCLs the states and federal government use two tests – the health risk and the willingness of the public to pay for the incremental cost of meeting the new standard. The Office of Environmental Health Hazard Assessment California Environmental Protection Agency formally adopted a Public Health Goal (PHG) for Chromium in drinking water of 2.5 ppb in February 1999. As part of the process, DHS will evaluate the PHG and other information relative to the existing MCL for chromium.

The Watermaster, EPA, RWQCB, DHS, DTSC, Burbank, Glendale, and Los Angeles are working in a task force for the purpose of gathering data on chromium, the processes for establishing new PHGs and MCLs, the location and actual sources of chromium in surface and groundwater, the levels of naturally occurring chromium, exploring effective cleanup technology, and identifying laboratories capable of accurately measuring chromium at very low levels. It is neither a regulatory nor an authoritative body that can require specific actions by another regulatory body. The group will continue to evaluate the impact of chromium to the basin's water quality.

PLATES
































APPENDIX A GROUNDWATER EXTRACTIONS

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LACDPW	Owner	22.5	1998	19-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	10		-		1999					
Well No.	Well No.	Det	Nov	Dec.	Jan.	Feb.	Mar,	Apr.	May	June	July	Aug.	Sept	TOTA
1						San	Fernando	Basin						
Angelica H	Healthcare Se	rvices	(2	bandoned 12	/97)									
3934A	MOSOA	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0,00	0.00	0.00	0.00	0.00
Auto Stieg	ler													
-	-	5.34	4.07	5.94	5.21	521	5.78	7.03	4.89	4.89	3.08	3,67	4.36	59.47
Rochank	City of													1.0
3841C	64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3882P	7	136.20	125.62	41.83	0.00	0.00	0,00	0.00	45.44	108 39	121.27	55.79	136.91	771.45
3851E	12	D.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3851K	13A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3882T	15	118.47	112.52	36 86	0,00	0.00	0.00	0.00	76.61	109.81	111.87	95.77	111.57	773.48
3841G	18	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0,00	0,00	0,00
	Total	254 67	238.14	78 69	0.00	0.00	0.00	0.00	122.05	218 20	233.14	151.56	248.48	1,544,93
0.114		0,0												
CalMat		137.33	10.10	120 40						100.02	-	-	mee	100.00
1016	2	125.32	19.10	130,60	0,00	25.56	2.17	0.00	254	109.82	75,94	81.50	93,60	385.05
1016(-)		29.92	83 14	11.34	175.09	1017	143.33	137 53	147.05	44.01	174.97	33.39	99.07	1 566 01
Sheldon Po	had	200.76	04,40	137,70	123,00	105.21	145.52	146.25	144.39	75.65	56 16	64.99	66.28	884 88
Shadon ru	Total	357.07	188 77	279 77	253 13	766 84	293.00	283 77	290.66	324 45	291.61	788 76	285 36	3 403 04
			- serve	- leave		- Anna (cities.	0.00	44.444	a inte	400.0		at the
VA	EEDC	204	10	1 67		1.70	1.0	210				10	1.47	70.15
VA	r.r.s.	6.24	1.52	1.07	0,85	1.10	1.41	1.17	1.41	1.04	1.01	1.92	1.27	20,15
Forest Law	m Memorial	Park												1.5
947A	2	15.37	9.11	3.54	3.62	2.05	3.87	5,98	14.96	19.67	18.44	19.20	22.60	138.41
947B	3	16.94	9.30	3.27	3.36	2,19	4.20	6.49	16,49	21.83	20.53	21.49	25.08	151,17
1947C	4	14.44	9.11	3.57	3.16	1.98	3.80	5.85	10.44	13.76	18.08	18.79	22.06	125.04
858K	7	0.00	0,00	0.00	0.00	0.00	0,00	0,00	0,00	0,00	0,00	0,00	0.00	0.00
	Total:	46.75	27.52	10.38	10.14	6.22	11,87	18.32	41,89	55.26	57.05	59.48	69.74	414.62
Sendale (Tity of													
924N	STPT	2.44	0.93	3.54	1.18	0.70	0.95	1.75	5.10	3.06	5.70	1.71	3.76	30.82
924R	STPT 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0.00
IVENT	GVENT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	2 44	0.93	154	1.18	0.70	0.95	1.75	510	1.05	5.70	171	3.76	30.82
	1000.	~~~	0.54		1.10	0.75	0.12	1.12	0.10	2.00	3.10	1.00	5.70	50,02
	HO INFA												- 1	0.00
Intheway (specessor to	deMille)											1.5	
	1	1,68	1.12	0.35	0.35	0.18	0.39	0.86	136	1.76	1.78	2.67	2.21	14.71
	2	1.42	1.26	1.45	1.45	1.11	1.42	1.33	1.15	1.09	0.92	1.21	0.92	14.73
	3	0.00	0,00	0.00	0.00	0.25	0.00	0.00	0.43	0.71	0.00	0.23	0,93	2.55
	Total:	3.10	2.38	1,80	1.80	1.54	1.81	2.19	2.94	3.56	2.70	4.11	4.06	31.99
laghes Mis	sile Systems													1.15
1000	_	0.62	D 56	0.34									- 1	1.52

LACDPW	Owner	c ::	1998		Sec. al	1. A.			1999	12.11				
Well No.	Well No.	Oct	Nov	Dec.	Jan:	Feb.	Mar.	Apr.	May	June	July	Aug	Sept	TOTAL
						San Ferr	aando Basi	u (cout'd)						
Lockheed	- Burbank O	perable L	Init											1
3871L	VO-1	0.00	0.00	26.37	0.48	0.14	0.12	0.10	0.10	0.78	138.12	173.02	170.61	509.84
3861G	VO-2	0.00	2.12	91.66	122.32	81.12	99.87	136.90	151.13	147.58	152.36	168.05	170.37	1,323.48
3861K	VO-3	0.00	2.62	13.42	51.05	42.55	12.28	44.32	19.38	41.35	0.27	0.82	0.24	228.30
3861L	VO-4	0.00	3.36	99.82	125.03	24.13	65.07	113,62	176.57	142.21	154.09	111.01	104.98	1,119.89
3850X	VO-5	1.24	6.09	72.70	70.65	80.35	147.18	96.78	148.91	174.62	45.13	150.59	209.98	1,204.22
3850Z	VO-6	7.31	4,77	74.30	179.38	141.87	186,49	120.17	234.05	174.38	240.42	272.01	275,60	1,910.75
3850	VO-7	8.62	20.99	93.45	155.02	78,74	41.97	147.84	153.65	140.90	179.16	231.13	247.72	1,499.19
3815C	V0-8	0.33	3.48	97.26	138.24	140,68	187.16	170.08	196.51	185,78	193.35	75.13	0.00	1,388.00
	Total:	17.50	43.43	568,98	842.17	589.58	740,14	829.81	1,080.30	1,007.60	1,102.90	1,181.76	1,179.50	9,183.67
Mens, Joh	n & Barbara													1.1
49733		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.05	0.08	0.96
Metropolit	an Transpor	tation Au	thority											1.1
-	1065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	1075	0.00	27.93	0.00	0,00	0.00	0.00	0,00	0.00	0.00	0,00	0.00	0.00	27.93
-	1130	26.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0 02	0.02	0.53	0.52	27.26
-	1140	0.00	0.00	0.00	0.00	0.00	0,00	0,00	0.00	0.00	0.00	0.00	0,00	0.00
-	1150	0.00	0.00	0,00	0,00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0,00	0.00
-	1070	0,00	0.00	32.99	29.30	30 35	29.12	28.11	25.62	14.43	7.74	5.17	4,88	207.71
-	1133		0.92	0.95	0.95	0.95	0,46	0.46	0.48	0.05	0.01	0.10	0.17	5.50
	Total:	26.17	28.85	33.94	30.25	31.30	29.58	28.57	26.10	14.50	7.77	5.80	5.57	268.40
Metropolit	an Water Di	strict												
	Jensen	17.00	15.00	16.10	16.20	14.60	15.90	18.10	17.80	16 50	17.60	16.70	16.20	198.70
					1000	21.34	0.0012		1. mar.	1010	1.000	-57-01		20042
Mobil Oil C	orporation	0.05	0.12		0.10	0.03	0.00	0.00	0.02	0.01	0.01			0.45
S		0,08	0.12	0.05	0,10	0.03	0.00	0.00	0.02	0.05	0.01	0.00	0,01	0.45
Middle Ran	sch (Success	or to deM	ille)											
1931 ×	3	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00	-0,01	-0.01
1940-1	4	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0,00	0,00	0,00	0,00	0.00	0,00
icw	5	0.00	0.00	0.00	0,00	0.00	0.00	0,00	0.13	0,07	0.09	0.10	0,05	0,44
940-3	6	0.00	0,00	0.00	0,00	0.00	0,00	0.00	0.40	0.67	0,56	0.81	0.35	2.79
	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.20	0.79	0.00	0.53	1.35
	Spring 1&2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.12	0.05	0.08	0.31
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	1.16	2.05	2.15	1.64	7.91
ficro Mati														
-	-							0.02	0.07	0.07	0.09	0.09	0.09	0,48
lockwell In	ternstional	(No fart	ber pumpine	until 2000)										
•C[13	E-1 to E-9	12												0.00
ears Roeb	nck & Co.													
945	3945	17.87	17.20	32,75	16.34	16.00	16.08	16.21	16 56	16.53	17.25	17.68	17.54	218.01
portsmen	Lodge												k	
785A	1	0.01	0,01	0,01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	6.01	0.08
M-Pharms	centicals	1												
4.11.5	-	4.76	4.62	3,63	4.25	2.87	2.84	4.06	5.73	4.50	4.07	5,17	5,13	51,63

LACOPW	Owner	1.00	1998				200		1999	£				15
Well No.	Well No.	Oct	Nov.	Dec.	Jan.	Feb.	Mar,	Apr.	May	June	July	Aug	- Sept	TOTAL
						San Fer	aando Bas	in (cont'd)						
Toluca La	ke Property	Owners /	stociation	1 I.										
3845F	3845F	4.57	3.78	4.24	2.59	0,74	2.91	2.91	3,44	6.21	5.98	6 29	3.74	49.40
Trillium (orporation													
Well #1	-	2.41	1,53	1.53	1.50	1.50	0.92	0.61	061	0.61	0.00	0.00	0.64	11.86
Well #2	2		3,36	3.36	0.51	0.51	0.51	0.47	0.98	0.98	0.00	0.00	4.13	14.81
	Total:	2.41	4.89	4.89	2.01	2,01	1.43	1.08	1.59	1.59	0.00	0.00	4.77	26.67
Valhalla N	temorial Pa	rk and Me	ortuary											1.1
3840K	4	30.81	2.79	1.19	14.67	15.06	11.83	23.32	39.98	49.34	58.43	58.80	36.00	342.22
Waste Ma	nagement D	inneral Se	wire of C	alif										
4916D	in the second seco	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Walt Dion	Pictures	and Televi	sion	(seells inaci	ive/ net also	daned								
3874E	EAST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3874F	WEST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3874G	NORTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total:	0,00	0.00	0,00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0.00
Walt Diene	. Discosida	Building												
-		359,85	361.49	405.29	390.29	289.40	243.53	199.10	187,80	177.21	81,83	0.00	0.00	2,695.79
Los Angele	s, City of													
Anntion (A														
SECOF	A-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
381017	A-2	17.37	18.64	1751	18.93	16.71	19.03	23.69	215	0.00	0.00	0.00	0.00	134.05
3810V	A-3	36 63	36.54	32 64	37.12	31.61	36.34	45.01	9.79	0.00	0.00	0.00	0.00	265 38
1810W	A-4	30.37	32.11	24.93	29.06	19 39	25.57	39.60	2.27	0.00	0.00	0.00	0.00	203.30
1820H	A-5	15.93	15 58	15.03	17.42	11 61	12.41	19.67	6.12	0.00	0.00	0.00	0.00	113.77
8211	A-6	35.26	35.12	32.50	36.15	25.25	34.66	43.98	1531	0.00	0.00	0.00	0.00	258.23
1830P	A-7	15 99	36.04	31.33	17 02	25.96	35.95	45 47	6.12	0.00	0.00	0.00	0.00	255.88
831K	A-8	38.77	38.68	15.77	19.41	27.75	38 70	48.48	17.79	0.00	0.00	0.00	0.00	284 82
	A Total:	210.32	212.71	191.66	215.13	158.50	202.16	265 90	59.05	0.00	0.00	0.00	0.00	1,515,43
Erwin (E)														
831H	E-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0.00
8211	E-2A	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0,00
831G	E-3	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0,00
821F	E-4	0,00	0.00	0.00	0.00	0,00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00
831F	E-5	0,00	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0,00	0.00
821H	E-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.69	182.27	187.96
811F	E-10	133.81	125.96	95.61	29.43	129.54	118.18	143.27	103.16	137.92	77.24	83.05	97,75	1,274.92
	E Total:	(33.81	125.96	95.61	29.43	129.54	118.18	143,27	103.16	137.92	77.24	88.74	280.02	1,462.88

LACDPW	Owner	1	1998	and the second		- <u>3</u> 86			1999	line -	1			1.0
Well No.	Well No	Oct	Nov.	Der.	Jan.	Feb.	Mar.	Apr.	Мау	June	fuly	Aug	Sept	TOTAL
						San Fer	mando Bay	un (cont'd)						
Headwork	s (H)													
3893L	H-26	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0,00	0.00
3893K	H-27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893M	H-28	0.00	0.00	0,00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893N	H-29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893P	H-30	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00
	H Total:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00
North Holl	ywood (NH													
3800	NH-2	302.66	302.41	119.30	31.31	110,76	0.00	0.00	0.00	0.00	0,00	0,16	0,64	867.24
780A	NH-4	0,00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0,00	0.00	D.00	0.00	0.00
1810S	NH-5	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00
3770	NH-7	136.27	135.23	52.64	14.39	114.46	131.19	184,80	128.32	139.32	80.25	12.55	148.96	1.278.3
1810	NH-11	0.00	0.00	0.00	0,00	0.00	0.00	0.00	12.62	0.18	039	0.00	0.00	13.19
810A	NH-13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8108	NH-14A	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
790B	NH-15	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00
820D	NH-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
820C	NH-17	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0.57	0.00	0.00	0.00	0.00	0.57
820B	NH-18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.63	0.45	0.00	0.71	0.16	25.95
830D	NH-19	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
830C	NH-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.36	0.00	0.52
830B	NH-21	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00
790C	NH-22	258.10	256.70	100.41	27.11	94.16	0.00	0.00	0.00	235.21	231.95	226.53	256.47	1,686.64
790D	NH-23	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	271.55	271.55
800C	NH-24	0,00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00
790F	NH-25	0,00	0.00	0.00	0.00	0.00	0,00	0,00	0.00	0.00	0.00	0.00	0.00	0.00
790E	NH-26	180.44	180.69	70.63	19.55	157.11	186.66	248.96	177.02	190.15	477.02	159.45	176.28	2,223,96
SZOF	NH-27	0,00	0,00	0.00	0,00	0.00	0.00	0.00	5.05	0.00	0.00	0.00	0,00	5.05
SIOK	NH-28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.08	25.29	0.29	0.16	0.00	38.82
810L	NH-29	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800D	NH-30	0.11	0.00	0.13	0.00	0.00	0.22	0.11	0.27	0.11	0.11	0,11	0.18	1.35
SIOT	NH-31	0.00	0,00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00
770C	NH-32	224.05	219.49	85.53	23.87	189.99	218.61	310,26	217.60	230.83	129.15	20.52	245.82	2,115.72
780C	NH-33	140.40	138.52	54.47	14.89	116.25	134.91	187.80	127.96	362.85	76.79	7.57	137.25	1,499.66
790G	NH-34	221.34	220.13	86.79	23.18	184.61	219.85	295.47	207.62	0.00	195.00	192.19	222.70	2,068.88
BION	NH-35	0.00	0.00	0,00	0,00	0.00	0.00	0.00	69.49	350.55	277.91	231.88	339.76	1,269.59
790H	NH-36	0.00	0.00	0.00	0.00	0.09	0.16	0.16	182.00	284,18	243.66	242.35	283.65	1,236.25
7903	NH-37	0.00	0.00	0.55	0.29	0.00	0.20	0.20	258.99	409.98	351,97	347.45	406.24	1,775.87
MOI	NH-38	0.00	0,00	0.00	0.00	0,00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00
ION	NH-39	0.00	0.00	0.00	0,00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0,00	0,00
IOP	NH-40	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	258.56	339.41	332.80	413 59	1,344.36
SIOQ	NH-4)	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.34
IOR	NH-42	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.59
90K	NH-43A	0,00	0.00	0.00	0.00	0,00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00
790L	NH-44	367.30	365.42	142.24	38,84	308,40	369,23	501,37	345.70	402.34	346.25	341.16	34.06	3,562.31
790M	NH-45	454.66	449 26	175.84	47.79	379.56	455.23	618,61	444.76	500,73	434.04	431.15	496.44	4,888.07
	NH Total	2 285 33	2.267.85	888.53	241 22	1.655 39	1.716.26	2 347 74	2 215 68	3.391 87	3.184 10	2 547 10	3 433 75	26 174 84
		2,200.00		000.00		1000.00	11.10.40		a.a.13.00	3,391.02	51154.13		3,743,113	av.117.0

LACDPW	Owner		1998		1				1999				14	1
Well No.	Well No.	Oct	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	- Sept	TOTA
						San Fer	nando Bas	in (cont'd)						
Pollock (P)						1.11							£	1
3959E	P-4	0.00	0.00	0.00	0.00	61 16	15.65	139.83	0.00	0.00	72.58	246,71	0,00	535.93
3958H	P-6	0.00	0.00	0.00	0.00	44.44	25.68	0,00	0,00	187.32	146,25	160,10	173.00	736.79
3958J	P-7	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0.00	240.26	240.26
	P Total:	0.00	0.00	0,00	0.00	105.60	41.33	139.83	0.00	187.32	218.83	406.81	413.26	1,512.9
Rinaldi-Tol	uca (RT)													100
1909E	RT-1	0.00	0.00	0.00	292.56	13,10	105.00	532.87	0.00	319.51	359,15	359.96	447.88	2,430.0
1898A	RT-2	0.00	0.29	0.00	258.28	448.09	445 59	476.10	450.29	526.81	422.93	424.38	534.87	3,987.6
1898B	RT-3	0.00	0.00	0.00	292.69	150.80	0.06	0.00	0.00	0.00	0.00	88 01	610.58	1,142.1
898C	RT-4	0.00	0.41	0,00	284.22	465.28	463,10	230.50	0.00	0,00	0.00	0.00	0.00	1,443.5
1898D	RT-5	0.84	0.16	0.00	297.75	449.40	281.15	606.42	493 29	579.82	468.13	469.49	594.00	4,240.4
1898E	RT-6	0.00	0.00	0.00	310.72	512.64	447,70	543.27	517,79	610.05	0,00	495.11	630.76	4,068.0
898F	RT-7	0.00	0.00	0.00	286.89	473.92	464.25	243.38	0.00	0.00	493.75	0.00	0.00	1,962.1
1898G	RT-8	0.00	0.00	0,00	233.14	465.47	461.73	582 16	472.52	557.57	450.16	456,49	584.32	4,263.5
898H	RT-9	0.00	0.00	0.00	281.01	462.64	55.07	0,00	0.00	0.00	0.00	0.00	0.00	798,72
1909G	RT-10	0.00	0,13	0.00	298.00	497.22	491.11	592.14	495.91	599,74	450,16	483.86	575.16	4,483 43
1909K	RT-11	0.00	0.13	0.00	50.25	206.31	0,00	96.25	452.47	546.16	409.89	441.96	527,43	2,730.8
909H I	RT-12	0.00	0 13	0.00	293.61	457.92	452.15	542.14	437.37	549.35	410.65	443.15	525.98	4,112.45
909J 1	RT-13	0.00	0.00	0.00	279.20	469.92	464.27	556.84	450.18	560.42	409.41	439.21	542.42	4.171.8
909L I	RT-14	0.09	0,09	0.00	0.18	0.20	0.00	34.27	416.64	519.55	389.41	418.84	499.21	2,278.48
909M 1	RT-15	0.09	0.09	0.00	0.41	255.32	391.85	448.04	363.56	459.41	352.64	206.63	0.36	2,478.40
	RT Total:	1.02	1.43	0.00	3,458 91	5,328,23	4,523.03	5,484.38	4,550.02	5,828.39	4,616.28	4,727.09	6.072.97	44,591 7
ujunga (T)														1
887C 1	T-1	395.75	297.79	0.36	0,36	134.75	509.27	660.03	531.63	612.71	500.09	499.93	617.26	4,759.93
887D 1	Г-2	408.05	307,50	0.68	417.14	546.25	445.95	473,41	546.44	466.64	518.41	517.17	638,65	5,286.25
887E 1	E-3	405.83	268,80	0.45	416.71	405.67	80.80	187.87	495,91	634.61	516.62	515.81	637.78	4,566.86
887F 7	F-4	392.30	259.43	0.55	394 60	527.64	522.93	646,64	528 48	579.59	494.74	493.43	609.34	5,449.67
887G 1	r-5	531.77	262.44	0.50	155.16	514.76	0.00	94.92	541.16	620.66	504.93	503.58	624.22	4,354.10
887H 1	T-6	540.97	268.06	1.28	337.80	22.26	540.81	481.86	513.68	615.31	510.26	504.56	360.42	4,697.27
887) 1	F-7	533.26	262.64	1.05	346,23	544.71	537.05	472.24	11.50	517.74	509,48	507.94	630.11	4,873.95
887K 1	Г-8	534.52	263.47	0.87	-24.57	0,00	0.29	188,42	299 56	586.57	513,65	516.39	632.25	3,511.42
886B 7	F-9	539 14	265,08	1.46	0,39	0.00	0.48	183,81	235.60	140.42	253,60	505.64	250.04	2,375.66
886C 7	-10	0.00	1.01	1.74	0.29	0.00	0.22	0.82	0.36	0.32	0.66	0.36	0.45	6.23
886D 7	F-11	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0,00	0,00	0.00	0,00	0,00	0,00
386E 1	r-12	0.00	1.01	1.76	0.50	0.00	0.39	0.75	0.36	0.27	0.71	0.36	277.24	283,35
	T Total:	4,281.59	2,457.23	10.70	2,044.61	2,696.04	2,638 19	3,390.77	3,704.68	4,774.84	4,323.15	4,565.17	5,277.76	40,164.7
erdugo (V)														1.4.17
63H V	/-1	0.27	0.04	0.04	0.00	0.06	0.18	0.18	_ 0.00	0.29	0.00	0.00	0.34	1.40
63P V	/-2	0.11	0.04	0.00	0.00	0.00	0.09	0.27	0.00	0.50	0.00	0.00	0.57	1.58
63J V	-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0.00
63L V	-11	201.03	205.55	147.52	41.87	197.45	214.11	244.51	195.54	243,98	191.09	189,80	239.00	2,308.45
53G V	-13	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00
S4F V	-22	0.00	0,00	0,00	0,00	0,00	0.00	0,00	0,00	0.00	0.00	0,00	0,00	0,00
44R V	-24	0,00	0,00	0,13	D,00	0.13	0 13	0.18	0,00	288,13	237.32	237.62	302.08	1,065.72
													100 million 11	

LACOPW	Owner	25	1998	194. A	12	1	10	-	1999			9.9.2	5.15	
Well No.	Well No.	Oct.	Nov.	Dec.	Jan.	Feb	Mar	Apr.	May	June	July	Aug.	Sept	TOTAL
						San Ferr	ando Basi	a (costa)						
Whitnall (w)													
3820E	W-1	0.00	0.00	0.00	0,00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821B	W-2	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821C	W-3	0.00	0,00	0.00	0.00	0.00	0,00	D.00	0.00	0,00	0 20	0.00	0.00	0.20
3821D	W-4	0.20	8,20	0 00	0.00	036	0.39	0.27	0.39	0.55	0.11	0.29	0.00	2.76
3821E	W-5	0.25	0.13	0.00	0.00	0.29	0.22	0.18	0.20	0,45	237.14	0.39	0.00	239.25
38315	W-6A	275.98	271.30	212.55	57.36	260.74	254.91	307.20	229.63	292.88	118.18	223.76	262.35	2,766.84
3B32K	W-7	151.42	146.71	110.67	30.85	117.17	138.65	165.17	124.90	157,30	0.00	115.08	139.78	1,397.70
38321.	W-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3832M	W-9	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0,00	0.00
3842E	W-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00
	W Total:	427.85	418.34	323,22	88.21	378.56	394.17	472.82	355,12	451.18	355.63	339.52	402.13	4,406,75
Los Ange	les, City of								and the				1	
То	otal:	7,541.33	5,689.15	1,657.41	6,119,38	10,649.50	9,844.83	12,489.85	11,183.25	15,304.37	13,203.73	13,101.85	16,421.58	123,206 53
San Fe	obaana	1	1.0	Faire	in an	10.0	-	-0					1.2	
Barin	Total:	8,695 32	6,636.26	3,110.64	7.710.64	11,893,39	11,223,98	13,928 42	13,034,57	17,210.75	15,096.69	14,907.30	18,309.49	141.757.44

						S	ylmar Basi	in						
Los Ang	eles, City of													
Plant	Mission													0.00
Well	5	142.72	137.78	116.02	0.18	0.00	0.06	0,00'	0.09	9.27	40.28	145.11	170.70	762.21
Well	6	133.03	129.93	109.27	17.83	138.98	110.69	176.79	132.02	170.29	136.93	138.17	166.34	1,560.23
Well	7	186.47	183.90	154.68	22.65	198.16	157.85	251.28	188.17	239.73	191.78	198.64	240.33	2,213.64
		462.22	451,61	379.97	40,66	337.14	268,60	428.07	320,28	419.29	368.99	481,92	577 37	4,536.12
Santiago	Estates	well capped	3/11/99										12.00	
5998	3	0,00	0,00	0.00	0,00	0,00	0.00	0,00	0,00	0.00	0.00	0.00	0.00	0,00
San Fern	ando, City o	ſ												
5969D	2A	156.54	123.02	94.75	96.17	135,98	139,03	126 47	167.11	178.20	203.44	209.26	174.06	1,804.03
5959	3	51.04	50.10	56.99	66 40	45.88	\$1.02	62 11	72.43	78.80	97.78	94.81	92.69	820.05
5969	4	33.54	27.73	32.35	20.53	14.28	17.78	18.61	21.19	22.17	30.28	26.69	22.96	288.11
5968	7A	71.21	53.22	62.R5	45.14	27.61	36.51	36.29	46.83	47.12	63.53	66.48	59.31	616.10
	Total	312.33	254,07	246.94	228,24	223 75	244.34	243.48	307,56	326 29	395,03	397.24	349.02	3,528.29
s	iyimar											2.1		

Crescent	a Valley C	ounty Water I	District			v	erduge Bas							
5058B	1	18,80	12.89	17.34	11,67	3.20	2.40	5.07	48.06	44.89	45,15	42.45	41.48	293.44
5036A	2	036	0.29	0.23	0.30	030	0.29	0.00	0.00	8,00	0.00	0,00	0.00	1.77
5058H	5	56.10	30,53	12,01	7.64	9.08	0.00	0,36	33.71	52.88	48.62	66.86	88.76	406.5
5058	6	17.81	5.62	8,80	8.36	2.52	15.71	20,72	22.44	18.44	14.19	16,58	13,38	164.8
5047B	7	38.64	30,07	27.67	41.53	39.88	43.28	39.72	24.69	18.46	20.22	20.80	14,49	359.45
50691	8	59.19	57.66	40.98	48.00	51.64	60.43	53.91	52.04	52.26	51.70	57.50	38,22	623.53
5047D	9	32.52	25.10	13.85	36.18	25.35	30.16	26.82	33.66	34.96	33.26	31,49	25.19	348.54

LACDPW	Owner	- All	1998	6-1	12 -				1999					
Well No.	Well No.	0a	Nov.	Dec.	Jan.	Feb.	Mar.	Apr	May	June	July	Aug.	- Sept	TOTAL
						Verdu	go Basin (coat'd)						
Crescents	Valley Com	ty Water	District, co	nt'd										
5058D	10	56.08	41.43	54.22	61.58	39,17	57.83	53.37	57.11	\$4,09	35.27	55.66	56.60	642.41
5058E	н	38.66	33.02	22.03	34.07	21.92	31.08	24,80	36.16	34 63	29.82	31.07	6.15	343.41
50583	12	40,77	40.41	20.05	4.88	27.54	33.49	29.95	47.08	43.48	27,24	27.65	6.65	349.19
5069F	14	7.87	5.18	27.17	26.08	17.22	6.60	0.00	0.00	25.28	\$1.52	17.01	14.20	198,13
	PICK	5,55	5,36	5,47	5,44	4.86	5,44	5.19	5,39	5.57	5,80	5,81	5.55	65.43
	Total:	372.35	287.56	249.82	285,73	242.68	286.71	259.91	360.34	384.94	382,79	373.18	310,67	3,796 68
Glendale. (City of												-	1.1
3961-3971	GL3-5	108.15	104.89	101,61	98.37	79.74	93.34	59.71	109.56	111.70	113.92	113.55	111.94	1,206.48
3970	GL-6	83.52	78.10	75.16	75.97	68.49	72.35	66.57	68.12	31:34	0.00	0.00	70.42	690.04
-	VPCKP	65.55	67.00	68.83	63.67	62.22	70.03	64.70	66.44	62.70	50.24	24.13	65.35	730.86
÷	MM-1	0.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0,00
	Total:	257,22	249,99	245.60	238.01	210.45	235.72	190.91	244.12	205.74	164,16	137.68	247.71	2,627.38
Ven	dugo													1.5
Basin	Total:	629.57	537.55	495.42	523,74	453.13	522.43	450,89	604.46	590.68	546.95	510,86	558.38	6,424.06

McKesse	water Prod	iucta				Eng	de Rock Br	usin	.at.	1.5				
3987A	1	0.00	0,00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3987B	2	5.51	5,20	5,16	5.09	4,57	6,07	5,65	5.15	6.27	6.80	6.52	6.16	68.15
3987F	3	5.20	4,67	5,10	4.36	5.36	5.51	6.00	5.15	6.31	6.74	6.52	6.26	67.18
	4	7.68	5.83	7.92	7.46	6,66	8,44	7.91	8,03	18 24	9.74	8.91	9.03	105,85
	Total:	18.39	15.70	18 18	16.91	16.59	20,02	19.56	18.33	30.82	23.28	21.95	21,45	241.18
Eag	de Rock	18 30	15 70	18.18	16.91	16 50	70.02	19.56	18.33	30.82	23.28	21.05	71.45	241 18

ULARA Total: 10,117.83 7,895.19 4,251.15 8,520.19 12,924.00 12,279.37 15,070.42 14,285.20 18,577.83 16,430.94 16,319.27 19,815.71 156,487.09

1.1

APPENDIX B KEY GAGING STATIONS SURFACE RUNOFF

WESTERN HYDROLOGIC SYSTEMS - (916) 885-2480 F57C-R LOS ANGELES RIVER ABOVE ARROYO SECO

	AILY	DISCH	LARGE	IN O	CUBIC	FEET	PER	SECOND	WATER	YEAR	OCT 1998	то	SEP 1999	are
Day		ОСТ	NOV	1	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1		111	113		327	112	102	108	157	136	106	133	92	96
2		113	113	1.13	135	115	97	111	264	131	945	132	96	91
3		118	113	1.1.1.2	110	113	91	113	138	134	323	128	95	92
4		110	112	1.1.1	109	115	98	121	123	137	175	119	98	92
5		107	105	11.8	121	119	202	119	125	143	102	117	100	90
6		95	126	1.1.1	406	120	96	121	1,510	124	104	113	101	85
7		100	121	1 14	103	120	95	121	1,470	133	104	103	104	95
8		103	972	1.11	100	122	103	122	140	137	100	95	103	98
9		99	113		98	122	810	227	134	135	101	89	103	94
10		108	102		97	124	153	131	112	137	104	95	101	96
11		104	178	1.13	100	126	.94	136	1,380	138	109	99	103	102
12		107	103	1.113	101	122	97	136	1,040	142	111	96	106	96
13		105	88	1.14	100	125	95	136	126	138	112	95	109	98
14		104	101	13	100	126	92	143	113	135	111	97	109	102
15		103	101	114	101	126	91	1,330	111	136	113	100	108	104
16		92	102	1.13	102	131	96	124	111	130	110	104	109	105
17		102	99	1119	105	131	98	106	113	127	109	107	106	105
18		103	99	1111	104	132	96	106	113	125	122	104	107	104
19		105	101	1.1.1	109	136	94	104	119	127	124	101	108	97
2		101	103	1.13	107	319	99	890	126	113	126	102	107	98
21		101	110	110	105	121	95	112	139	122	134	100	108	121
22		92	108	<	107	116	94	106	133	122	135	98	114	98
23		107	95		107	120	93	101	184	128	131	99	112	101
24		115	110	- 3	106	125	97	104	195	112	133	94	104	93
25		113	114	l d	109	1,080	97	1,340	130	111	140	94	100	98
26		108	114		109	1,010	101	185	136	112	138	97	104	93
27		102	111	1 3	109	283	106	115	137	111	136	96	102	96
28		106	1,520		110	109	105	110	136	110	131	92	102	85
29		126	121	1.113	111	104		115	137	109	128	90	101	99
30		302	107	1.1.3	111	104		116	138	105	125	91	97	93
31		136			112	1,240		121		106		94	96 -	*****
TOTAL	£ 1. 1	3,498	5,575	3,8	831	7,068	3,587	7,030	8,990	3,906	4,643	3,174	3,205	2,917
MEAN		113	186	1.1	124	228	128	227	300	126	155	102	103	97.2
MAX		302	1,520	L D	406	1,240	810	1,340	1,510	143	946	133	114	121
MIN		92	88		97	104	91	101	111	105	100	89	92	85
AC-FT	0	6,940	11,060	7,6	500	14,020	7,110	13,940	17,830	7,750	9,210	6,300	6,360	5,790
CAL Y	EAR 1996	TOTAL*	12	.904	MEAN	140	MA	X 1.520	MIN	85	AC-FT	25.60	0	
WTR Y	EAR 199	TOTAL	57	,424	MEAN	157	MA	X 1,520	MIN	8	AC-FT	113,90	0	

* Incomplete Record

WESTERN HYDROLOGIC SYSTEMS - (916) 885-2480 F118B-R PACIOMA DAM OUTFLOW

DAILY	DISCE	IARGE	IN CUB	IC FEET	PER	SECOND	WATER	YEAR	OCT 199	8 TO	SEP 1999	Al
Day	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	D	0	24	2.7	1.2	16	O	0	0	0	0	0
2	D	0	24	2.0	1.2	27	0	0	0	18	0	0
3 -	0	0	13	1.2	1.2	28	0	32	12	13	0	0
4	0	0	4.8	.60	1.2	9.4	0	14	0	.73	0	0
5	0	0	4.8	.60	1.2	0	0	0	0	D	0	D
6	0	D	4.8	. 60	1.2	Ó	o	0	0	0	D	0
7	0	0	4.8	.60	1.2	0	0	0	0	0	0	0
B	0	0	4.8	- 60	29	0	15	0	19	0	0	0
9	0	D	4.8	- 60	29	0	24	0	18	0	0	0
10	0	0	4.8	.60	2.5	0	8.5	0	0	0	0	0
11	0	0	4.8	.54	33	o	o	0	o	D	0	O
12	0	0	4.8	D	30	0	0	0	0	0	0	0
13	0	0	4.8	0	.88	0	0	0	0	0	0	0
14	0	0	16	0	0	0	17	0	0	0	0	0
15	0	0	24	0	0	0	25	0	0	0	0	0
16	0	0	22	0	0	0	8.2	o	0	0	D	D
17	0	18	10	0	0	13	0	9.2	0	0	0	0
18	0	32	1.8	0	0	19	0	4.5	0	0	0	0
19	0	21	1.8	0	0	0	0	0	0	0	0	0
1	0	0	1.8	O	0	0	18	0	0	0	D	0
21	0	0	1.8	0	0	0	7.7	0	o	0	0	O
22	0	0	1.8	0	0	0	Ó	0	0	0	0	0
23	0	0	1.8	0	0	0	0	0	0	0	0	- 0
24	0	0	1.8	0	0	0	0	0	0	0	0	0
25	0	0	1.8	23	0	0	0	0	O	0	0	0
26	0	0	1.8	37	0	o	0	0	0	18	0	0
27	0	0	1.8	19	0	0	0	0	0	30	0	0
28	0	D	24	1.3	0	0	0	0	0	13	0	0
29	0	0	38	1.2		15	0	0	0	1.0	0	0
30	0	15	16	1.2		14	0	0	0	0	0	0
31	0		3.0	1.2		0		0		0	o -	
TOTAL	0	86	280.0	94.54	132.78	141.4	123.4	59.7	49	93.73	0	o
MEAN	0	2.87	9.03	3.05	4.74	4.56	4.11	1.93	1.63	3.02	0	0
MAX	0	32	38	37	33	28	25	32	19	30	0	0
MIN	0	0	1.8	0	0	0	0	0	0	0	0	0
AC-FT	0	171	555	188	263	280	245	118	.97	186	0	0
CAL YEAR 1998	TOTAL*	36	6.00 MEA	N 3.98	MA	X 38	MIN	0	AC-FT	726	i	
WTR YEAR 1999	TOTAL	1,06	0.55 MEA	N 2.91	MA	X 38	MIN	0	AC-FT	2,100)	

* Incomplete Record Record based on Dam records.

WESTERN HYDROLOGIC SYSTEMS - (916) 885-2480 F300-R LOS ANGELES RIVER @ TUJUNGA AVE.

TAILS	DISCH	IARGE	IN C	CUBIC	FEET	PER	SECOND	WATER	YEAR	OCT 199	8 TO	SEP 199	9 000
Day	ОСТ	NOV	D	EC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	54	1	.99	55	56	44	53	52	44	51	64	67
2	57	58		81	55	50	44	154	46	343	48	64	65
3	60	56		69	51	44	44	54	51	190	49	62	67
4	57	53		76	53	51	48	49	56	67	44	66	69
5	53	46		85	56	119	44	49	50	50	45	65	65
6	49	75	2	71	56	52	45	821	38	51	48	67	67
7	54	71		59	53	47	44	842	47	48	46	68	82
8	54	743		55	56	61	42	72	52	44	45	68	80
9	52	72		53	59	511	95	78	48	44	52	67	75
10	57	59		53	59	82	48	55	49	44	66	63	82
11	55	119		55	56	52	64	1,200	48	47	62	64	83
12	55	54		59	51	54	50	526	51	47	67	69	76
13	54	39		53	51	51	51	69	46	44	64	68	79
14	54	57		51	50	46	49	62	44	43	69	64	101
15	51	54		55	51	45	791	55	45	42	58	62	84
16	41	54		55	55	46	62	55	43	46	73	64	87
17	54	49		56	52	43	49	53	43	40	72	65	84
18	55	48		55	53	45	46	50	46	46	68	68	83
19	55	51		60	54	43	46	50	50	44	68	66	82
2	52	55		53	107	48	533	54	36	45	66	72	83
21	51	64		52	53	41	52	61	52	46	70	69	132
22	48	51		53	52	38	50	50	53	44	69	77	83
23	62	43		54	57	38	46	121	48	42	69	77	57
24	65	62		55	62	40	46	67	45	44	71	71	75
25	64	56		59	517	39	992	52	46	47	64	68	79
26	60	60		56	603	42	89	55	48	46	70	76	71
27	57	58		54	132	48	56	53	50	46	67	71	73
28	59	838		57	58	43	49	56	46	46	57	71	50
29	100	69		57	54		49	52	45	44	61	68	72
30	154	62		55	55		50	50	42	45	67	65	51
31	78			54	792		48		43		67	67	
TOTAL	1,871	3,230	2,1	.59 3	3,568	1,875	3,766	5,018	1,459	1,819	1,903	2,096	2,305
MEAN	60.4	108	69	.6	115	67.0	121	167	47.1	60.6	61.4	67.6	76.8
MAX	154	838	2	71	792	511	992	1,200	56	343	73	77	132
MIN	41	39		51	50	38	42	49	36	40	44	62	50
AC-FT	3,710	6,410	4,2	80 7	7,080	3,720	7,470	9,950	2,890	3,610	3,770	4,160	4,570
CAL YEAR 19	98 TOTAL*	7	,260	MEAN	78.9	MA	X 838	MIN	39	AC-FT	14,400)	
WTR YEAR 19	99 TOTAL	31	,069	MEAN	85.1	MA	X 1,200	MIN	36	AC-FT	61,630)	

* Incomplete Record

VESTERN HYDROLOGIC SYSTEMS - (916) 885-2480 F168-R BIG TUJUNGA CREEK BELOW DAM

-VILY	DISC	HARGE	IN CUBI	C FEET	PER	SECOND	WATER	YEAR	OCT 199	8 TO	SEP 1999	A
Эау	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEI
1	0	0	41	3.0	.10	.09	0	0	.52	2.8	.12	.03
2	0	26	31	0	27	31	0	0	.27	1.7	.09	-04
3	0	38	17	0	40	45	0	0	- 42	.86	.06	.04
4	0	35	3.0	0	35	43	0	0	59	.43	.05	.04
5	25	11	0	0	15	16	38	40	.53	.23	.04	.05
6	37	0	0	o	.02	.02	55	50	.53	.14	.04	.04
7	36	0	0	0	0	.01	52	16	.48	.10	.04	.05
8	30	0	15	0	-14	D	50	0	.39	.09	.04	.05
9	6.3	0	26	0	.40	0	18	0	.34	.08	.03	.05
10	0	1.7	0	0	. 38	.01	0	0	.35	-07	.04	.05
11	0	14	0	D	71	.02	0	D	.34	.07	.05	.05
12	0	19	0	27	52	.03	0	D	.40	.09	.06	.05
13	28	0	0	39	.86	.05	30	0	.43	.09	.05	.05
14	38	0	0	12	.64	-08	50	0	.45	.09	.07	.07
15	23	0	0	0	.42	33	47	0	.42	.08	.07	.05
16	0	0	23	0	.28	57	18	0	24	.07	.07	.05
17	0	0	17	0	.21	64	0	0	18	.07	.07	.05
18	0	.08	0	0	.16	23	.02	29	.50	.06	-07	.05
19	0	.01	0	0	.13	.04	23	27	.55	.05	.08	.05
20	Q	0	0	0	.11	.05	66	0	.51	.04	.08	.05
21	0	0	27	0	.10	.07	62	0	.29	.03	.09	.06
22	0	0	41	0	35	.08	22	0	.20	.03	.08	.08
23	0	26	14	0	60	24	0	0	.15	.02	.08	.06
24	0	38	0	0	54	59	0	0	.10	.02	.07	.05
25	0	12	0	25	44	38	0	0	.10	.02	.08	.05
26	0	0	0	38	.11	0	0	0	.08	20	.07	.05
27	0	0	0	37	.11	0	0	0	.07	14	.07	.05
28	0	0	0	13	.11	0	0	0	.06	2.3	.06	.05
29	0	0	24	0		.02	46	0	.05	1.2	.05	.05
30	0	18	35	0		.05	25	0	21	.51	.04	.06
31	0		18	0		.08		.06		.23	.04	
TOTAL	223.3	238.79	332.0	194.0	437.28	433.70	602.02	172.06	130.53	45.57	1.96	1.52
MEAN	7.20	7.96	10.7	6.26	15.6	14.0	20.1	5.55	4.35	1.47	.063	.051
MAX	38	38	41	39	71	64	66	60	59	20	.12	.08
MIN	0	0	0	0	0	0	0	0	.05	.02	.03	.03
AC-FT	443	474	659	385	867	860	1,190	341	259	90	3.9	3.0
CAL YEAR 1998	TOTAL	794	.09 MEAN	8.63	MAX	41	MIN	0	AC-FT	1,580		
WTR YEAR 1999	TOTAL	2,812	.73 MEAN	. 7.71	MAX	71	MIN	0	AC-FT	5.580	ň	

* Incomplete Record Record based on Dam records; due to obstructed communication; Dates: Oct, Nov,

F Jan, Feb. Cleaned mud from commun. holes 9/14,9/22,9/27

WESTERN HYDROLOGIC SYSTEMS - (916) 885-2480 E285RO Burbank Western Storm Drain

AILY	DISCH	ARGE I	N CUBIC	: FEET	PER	SECOND	WATER	YEAR	OCT 1998	TO	SEP 1999	ne
Day	ост	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	11	35	11	12	14	17	12	11	12	14	10
2	13	14	14	11	12	13	21	13	96	13	13	9.9
3	11	14	13	12	12	13	13	14	34	13	13	9.6
4	11	13	13	11	13	13	12	12	12	12	14	10
5	13	13	12	12	21	13	13	12	11	13	15	9.7
6	12	11	31	12	13	12	77	13	11	12	16	10
7	13	11	12	12	13	12	80	14	11	12	15	10
8	12	32	12	11	12	13	. 14	11	11	11	14	10
9	9.7	12	13	10	47	13	14	11	10	12	14	9.8
10	10	13	12	10	12	13	14	11	11	13	13	10
11	12	20	12	11	11	14	106	14	10	12	13	10
12	13	15	12	11	12	12	39	17	10	13	13	10
13	12	13	11	11	14	14	14	17	10	12	13	10
14	12	12	11	12	12	15	13	16	10	12	13	8.2
15	12	12	12	11	12	103	12	14	10	14	12	9.4
16	12	13	12	12	12	13	11	14	9.6	11	13	9.0
17	11	13	12	12	12	13	12	13	10	13	14	9.2
18	11	13	12	12	12	12	12	14	10	13	13	9.8
19	13	13	13	12	11	13	13	14	10	13	13	9.5
2	13	12	12	22	13	70	9.5	13	8.8	13	12	10
21	12	11	12	13	12	13	12	13	11	12	11	10
22	11	9.4	13	13	12	13	13	14	10	11	11	10
23	11	11	12	13	12	13	18	15	9.8	13	11	11
24	11	11	12	12	12	13	14	15	9.6	12	10	9.7
25	11	12	11	114	12	91	14	15	10	12	9.6	10
26	11	12	12	67	12	14	13	13	9.4	13	9.5	10
27	12	11	11	15	12	13	14	9.3	10	12	8.9	11
28	12	175	12	14	13	12	13	11	10	13	10	10
29	13	12	12	14		13	13	11	10	13	9.6	10
30	15	13	12	13		12	13	11	11	13	9.9	10
31	12		12	86		12		11		14	7.3	
TOTAL	369.7	557.4	417	612	385	627	653.5	407.3	417.2	387	377.8	295.8
MEAN	11.9	18.6	13.5	19.7	13.8	20.2	21.8	13.1	13.9	12.5	12.2	9.86
MAX	15	175	35	114	47	103	106	17	95	14	16	11
MIN	9.7	9.4	11	10	11	12	9.5	9.3	8.8	11	7.3	8.2
AC-FT	733	1,110	827	1,210	764	1,240	1,300	808	828	768	749	587
CAL YEAR 199	B TOTAL*	1,344.	1 MEAN	14.5	MA	X 175	MIN	9.4	AC-FT	2,670)	
WTR YEAR 199	9 TOTAL	5,506.	7 MEAN	15.1	MA	X 175	MIN	7.3	AC-FT	10,920)	

* Incomplete Record

WESTERN HYDROLOGIC SYSTEMS - (916) 885-2480 F252-R VERDUGO WASH @ ESTELLE AVE.

AILA.	DISCE	LARGE	IN CUBIC	FEET	PER	SECOND	WATER	YEAR	OCT 1998	TOS	SEP 1999	ose
Day	ОСТ	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.2	10	21	7.2	7.2	7.7	21	8.0	7.3	4.7	6.2	4.7
2	8.8	8.4	9.2	7.0	7.0	7.3	22	8.1	88	4.7	6.2	4.7
3	8.7	8.6	10	6.9	6.9	8.6	7.1	8.5	33	4.7	6.2	4.4
4	8.7	8.3	8.4	7.7	7.0	9.1	7.1	8.5	8.4	4.7	6.7	4.1
5	8.5	7.6	6.5	7.2	14	7.1	7.1	8.6	7.5	4.7	6.4	4.4
6	8.6	7.3	19	7.6	6.8	7.1	117	8.2	7.2	4.7	6.2	5.3
7	8.6	7.8	9.0	7.8	7.0	7.5	45	8.0	7.8	4.7	6.0	6.2
8	8.8	35	7.8	7.6	8.3	7.1	14	8.0	7.8	4.7	5.8	5.5
9	8.9	8.8	6.9	7.4	87	8.3	7.9	7.7	7.7	5.0	5.0	5.2
10	9.4	7.3	6.9	7.2	8.3	7.2	6.9	7.8	7.5	5.7	4.9	4.7
11	9.3	11	6.7	8.0	7.1	7.2	69	7.7	7.6	5.8	5.4	4.7
12	9.3	7.2	6.9	7.3	6.9	7.1	46	8.0	8.1	5.4	5.4	4.7
13	9.4	7.1	7.0	7.5	6.9	7.5	7.9	7.6	8.8	5.4	5.7	4.7
14	9.6	7.1	6.9	7.5	7.0	7.2	7.2	7.1	8.4	4.8	5.4	4.7
15	11	7.3	7.1	6.9	7.0	85	7.3	7.1	8.6	4.7	5.3	4.7
16	12	7.4	7.2	6.9	7.0	7.5	7.1	7.1	7.8	4.5	4.8	4.8
17	11	7.4	7.6	6.9	7.2	7.2	7.7	7.1	7.8	3.9	5.0	4.7
18	11	8.2	7.3	7.1	7.3	7.0	7.8	6.8	11	3.9	5.0	4.7
19	10	7.4	9.2	7.5	7.3	7.1	8.4	6.5	12	3.6	5.4	4.7
2	9.0	7.4	7.5	19	7.2	38	7.8	6.9	7.0	3.7	5.4	4.7
21	8.9	7.1	7.0	7.0	8.1	7.1	8.3	6.9	7.5	3.9	5.8	5.1
22	8.9	7.1	7.0	7.7	7.8	7.2	8.8	11	7.3	4.2	5.4	5.7
23	8.9	7.4	6.9	7.3	7.9	7.1	12	17	6.7	5.2	5.4	9.1
24	8.8	11	8.2	7.6	8.4	7.0	8.2	7.7	7.0	5.6	5.4	7.6
25	8.6	12	9.3	75	8.9	60	8.0	7.6	6.1	6.2	5.1	6.0
26	8.2	11	9.4	91	8.4	7.4	8.0	7.2	5.4	6.4	4.7	5.7
27	8.2	11	9.5	9.8	8.8	6.9	8.2	7.2	5.4	6.2	5.1	6.2
28	10	103	9.7	7.2	7.6	7.1	8.4	7.3	4.7	6.2	4.7	5.9
29	14	11	8.6	7.0		7.1	8.0	7.1	4.7	6.2	4.7	5.4
30	13	14	7.0	6.9		7.0	8.4	7.2	4.7	6.2	4.7	4.9
31	13		7.0	60		9.1	******	7.4		6.7	4.7	
TOTAL	299.3	381.2	267.7	444.7	296.3	390.8	517.6	246.9	328.8	157.0	168.1	157.9
MEAN	9.65	12.7	8.64	14.3	10.5	12.5	17.3	7.96	11.0	5.05	5.42	5,26
MAX	14	103	21	91	87	85	117	17	88	6.7	6.7	9.1
MIN	8.2	7.1	6.5	6.9	6.8	6.9	6.9	6.5	4.7	3.6	4.7	4.1
AC-FT	594	756	531	882	588	775	1,030	490	652	311	333	313
CAL YEAR 199	8 TOTAL*	9	48.2 MEAN	10.3	MA	X 103	MIN	6.5	AC-FT	1,880		
WTR YEAR 199	9 TOTAL	3.6	56.3 MEAN	10.0	MA	x 117	MIN	3.6	AC-FT	7.250		

* Incomplete Record

APPENDIX C COMPONENTS OF LOS ANGELES RIVER FLOW

		199	98-1999 WA	TER YE	AR					
		1	1	1						
TOTAL FLOW AT G	AGE F-5	7C-R	F-57C-R:	Storm, Re	claimed, In	dustrial,	Rising Grou			
		1	F300-R: S	torm, Till	man, Indus	trial Wast	e, and Risin			
Total:	113910		E285-R :Storm, Burbank WRP, Industrial Waste							
			F252-R: S	torm, Risi	ing Water					
I. RECLAIMED WA	TER DIS	CHARGE	D TO L.A.	RIVER I	N ULARA		1			
Tillman:	39786	: Record								
L.AGlendale:	13894	: Record								
Burbank WRP:	5075	: Record					1			
Total:	58755									
II. INDUSTRIAL WA	TER and	STORM	FLOWS D	ISCHAR	GED TO I	A. RIVE	ER IN ULA			
Upstream of F300-R										
Industrial Water	161	· From F3	00-R separa	tion of flo						
LIS Army Com	6300	Includes	168	ation of the		-	1			
E205	4620	Includes I	108				-			
F303	4020	Charme Gar	110				-			
Storm Flows @300 10760		Storm Hov	ws	-	-		-			
	21841					-				
Between F300-R and E-	285						-			
Disney	2696	Disney Ri	verside Con	struction			-			
MTA Storm Drains and Unaccounted	268	-								
water	7964	:10 cfs ass	sumes 7964							
Headworks:	0	:pilot proje	ect record							
Western Drain:	3516	: From E2	85-R separa	tion of flo	w					
Storm Flows @285	2335			·						
222	16779	1	2							
Between E-285 and F57	C-R	1								
Storm Flows@ 252	2185									
Sycamore Canyon	1100	Estimated	from histori	c flows						
Storm Drains and Unaccounted water	8819	12.2 cfs								
	12104			-						
Total Part II	50845									
II. RISING WATER	N L.A. R	IVER IN U	JLARA							
Total:	4431	: See Section	on 2.3 of the	e Waterma	aster's Repo	ort				
							1/1			

Q1. Kanth (大) (4-1)

2



APPENDIX D WATER QUALITY DATA

REPRESENTATIVE MINERAL ANALYSES OF WATER

	Date Sampled		Mineral Constituents in milligrams per liter (mg/l)										1			
Well Number or Source		Spec. Cond. µmho/c	рН	Ca	Mg	Na	к	CO3	HCO3	SO4	ci	NO3	F	B TDS mg/l	Hardness as CaCO ₃ mg/l	
				-	-		Imp	orted V	Vater						-	
Colorado River Water at																
Eagle Rock Reservoir	1999CY	835	8.1	62	23.5	77	3.8	0	138	195	71	1.1	0.26	0.12	512	252
LA Aqueduct Influent	9/28/99	380	8.2	28.4	7.4	38.1	4.0	0	149	35.5	25.4	0.59	0.59	0.68	223	99.8
LA Aqueduct/MWD																
Filtration Plant Influent	5/26/99	322	8.3	24.9	5.8	35.6	3.8	ND	136	27	19.5	ND	0.58	0.56	197	79.6
State Water Project at																
Joseph Jensen Filtration Plant (Influent)	1999CY	530	8.0	40	16.5	42	2.9	0	125	96	42	1.4	0.31	0.34	317	168
							Sur	face W	ater							
Tillman Rec. Plant																
Discharge to LA River	1999FY	909.4	7.1	37.5	10.5	82	12		15	118	100	0.78	0.68	0.8	509	156
Los Angeles River																
at Arroyo Seco	9/95	981	8.0	68.1	24.3	96.5	9.75	ND.	171	191	108	7.4	0.3	0.58	666	270
LA/Glendale Rec. Plant																
Discharge to LA River	1999FY	101	7.2	57	21	124	14		+	187	150	2.1	0.64	0.53	726	266
							Gro	und W	ater							
					(Si	in Fern	ando B	asin - 1	Vestern	Portio	n)					
4757C											~					
(Reseda No. 6)	10/13/83	944	7.8	115	31	43	2.1		301	200	33	2.6	0.31	0,24	595	416
					(S	an Ferr	ando E	asin + 1	Eastern	Portion	1)					
3800					4.5											
(No. Hollywood No. 2)	8/18/99	724	7.6	101	17	29	3.7	ND	290	81.8	33.8	36	0.19	0.33	465	322
3841C																
(Burbank No. 7)	6/24/97	570	7.4	63.2	14.8	35.2	3.39	ND	218.4	105	30.5	19	0.53	4	384	228
3913H																
(Grandview No. 16)	1/96	540	7.8	60	14	37	3.8	ND	220	54.8	27	12.6	ND	1	326	180
					(5	an Fer	nandol	Basin -	L.A. Na	utows)	1					
3959E																
(Pollock No. 6) (b)	4/15/99	918	7.2	93,1	34.3	55.2	2.32	ND	291	121	72.7	38.7	0.27	0.38	612	363
							(Syb	nar Ba	sin)							
4840J				2.2			15.5		Ũ., .						lant.	
(Mission No. 5)	6/17/99	730	7.7	79.8	18.8	34.5	4.31	ND	261	73.8	33.2	28.6	0,3	0.32	449	214
5959																
(San Fernando No. 3)	1/28/97	585	7.5	62	24	30	2.6	0.48	232	66	27	30.4	0.38		366	253
							(Verd	ugo Ba	isin)							
(Glarietta No. 2)	11/26/00	1066	6.0	106	164	44.2	2.60	MD	210	146	07	20 1	0.16	12.1	644	702
(Giorietta No. 3)	11/25/99	1005	0.8	100	30.4	44.3	3.69	ND	210	140	31	38.1	0.10		044	393
5058		115							10			5.2			100	
(CVWD No. 8)	2/18/99	830	6.9	97.4	20.6	40.1	3.2	<1,0	203	115	67.8	45.1	<0.10	21	489 -	329

APPENDIX E DEWATERING AND REMEDIATION PROJECTS

DEWATERING PROJECTS

No.	Company	Contact	Address	ID	Start Date
1	Danalax Engineering Corp.	Krell, Alex	11239 Ventura Blvd.	Р	
2		Henkin, Doug	8806 Etiwanda Ave.	Р	
3	Delta Tech. Engineering	Abbasi, Z. A.	12800 Ventura Blvd.	P	
4	Helfman, Hoffman & Associates	Varadi, Ivan	5550 Topanga Canyon	D	Jun 19, 1989
5	Encino Spectrum Project	Helfman, Haloosim & Ass.	15503 Ventura Blvd.	D	Jun 14, 1989
6	Home Savings of America	Eli Silon & Associates	13949 Ventura Blvd.	D	Jun 14, 1989
7	Warner Center Ent. Complex	Tsuchiyama and Kaino	5955 Owensmouth Ave.	D	Jun 26, 1989
8	T Violes Construction Company	Viole, Tim, Jr.	15840 Ventura Blvd.	P	
9		Eccleston, C. W.	22020 Clarendon St.	P	
10		Marks, Ronald	5348 Topanga Canyon	P	
11		Helfman, Haloosim & Assoc.	21820 Burbank Blvd.	Р	2,212,22
12	Park Hill Medical Plaza	Anjomshoaa, Mahmoud	7303 Medical Center Dr.	D	Dec 27, 1989
13	Danalex Engineering		12050 Ventura Blvd.	P	
14	Ellis Plumbing Co.	Ellis, Chris	4235 Mary Ellen Ave.	P	
15	Tarzana Office Plaza	Varadi Engineering	18701 Burbank Ave.	Р	
16	Helfman, Haloosim & Associates	Varadí, Ivan	5350 White Oak Ave.	P	
17	First Financial Plaza Site	Slade, Richard	16830 Ventura Blvd.	D	Oct 9, 1987
18	Trillium	Braley, Randy	6310 Canoga Ave.	D	Apr 27, 1988
19	LAMCO	O'Neil, John	21300 Victory Blvd	D	Apr 27, 1988
20	La Reina Fashion Plaza	Blumenfeld, Dolores	14622 Ventura Blvd.	D	Apr 27, 1988
21	Auto Stiegler	Stiegler, John	16721 Ventura Blvd.	D	Oct 31, 1987
22	Sherway Properties	Vasquez, Rodney	4477 Woodman Ave.	P	
23	Ellis Plumbing Co.	Ellis, Chris	19951 Roscoe Blvd.	Р	
24	Metropolitan Transit Authority	Higgins, John	Metro Red Line	TD	April, 1995
25		Carter, Dennis	4547 Murietta Ave	Р	Jan 16, 1997
26	Brent & Miller	Brent, Stanley	4328 Mammoth Ave	D	13-Jan-00

Notes:

1) ID - Refers to the type of project;

D: Permanent dewatering required.

P: No dewatering required presently, however there is potential for dewatering in the future.

TD: Temporary Dewatering

2) Start Date - Date project was brought to the attention of the ULARA Watermaster.

REMEDIATION PROJECTS

No.	Company	Contact	Address	ID	Start Date
1	Mobil Oil	Alton Geoscience	16461 Ventura Blvd.	R	May 11, 1989
2	Thrifty Oil	Delta Tech. Eng.	18226 Ventura Blvd.	R	Feb 2, 1990
3	California Environmental	Buckley, Charles	5455 Van Nuys Blvd.	R	Oct 4, 1989
4	Boeing (Rockwell International)	Lafflam, S. R.	6633 Canoga Park Ave.	R	Jun 10, 1990
5	Lockheed	Carol Yuge	E. Empire Ave.	R	Jan 5, 1989
6	3M Pharmaceutical	Lee, M. E.	19901 Nordhoff St.	R	Feb 8, 1989
7	Philips Components	Smith, Wade	4561 Colorado St.	R	Jul 14, 1987
8	Greeff Fabrics	Edelson, Bruce	4000 Chevy Chase Dr.	R	March, 1993
9	Raytheon (Hughes)	Garvey, Tim	Canoga Park, CA	R	February 1995
10	Holchem	Simko, Jeff	Pacoima, CA	R	Feb-00

Notes:

1) ID - Refers to the type of project;

R: Ground water remediation site.

2) Start Date - Date project was brought to the attention of the ULARA Watermaster.

APPENDIX F CRESCENTA VALLEY WATER DISTRICT



Crescenta Valley Water District

2700 Foothill Boulevard, La Crescenta, California 91214 Phone (818) 248-3925 Fax (818) 248-1659

M. BLEVINS OCT 0 8 1998

Directors Judy B. Tejeda Vernon E. Valantine Brent Anderson Jerry E. Lane Ernest M. Weber

Officers

Michael G. Sovich General Manager Etic E. Ford Secretary-Treasurer

October 4, 1998

Mr. Mel Blevins ULARA Watermaster P.O. Box 511111, Room 1463 Los Angeles, CA 90051-0100

SUBJECT: REQUEST FOR ADJUSTMERNT 1998-99 VERDUGO BASIN PRESCRIPTIVE RIGHTS

With the recently concluded 1997-98 water year, the District pumped approximately 3682 Acre-Feet (AF) of groundwater from the Verdugo Basin. This is 388 AF or 12% more than the 3294 AF adjudication and was allowed by the Watermaster and the ULARA Administrative Committee for said year.

I would now like to formally request a similar adjustment for our Verdugo Basin pumping for the 1998-99 water year. I realize that any adjustment will take into account the City of Glendale's projection of Verdugo Basin pumping for the coming year as well as your evaluation of the total safe yield of the basin. A decision early in the water year would certainly help in the District's water production planning process. Perhaps this issue could be agendized for the next regular Administrative Committee Meeting on October 13, 1998. Thanks in advance for your consideration and please call if you need more information.

Very truly yours,

CRESCENTA VALLEY WATER DISTRICT

I & South

Michael G. Sovich General Manager

MGS:jb

cc: Mr. Don Froelich, City of Glendale

CITY OF LOS ANGELES VS. CITY OF SAN FERNANDO, ET AL CASE NO. 650079 -- COUNTY OF LOS ANGELES

MELVIN L. BLEVINS - WATERMASTER

OFFICE LOCATION: 111 North Hope Street, Room 1463 Los Angeles, CA 90012 TELEPHONE: (213) 367-1020 FAX: (213) 367-1131 MAILING ADDRESS: ULARA WATERMASTER P.O. Box 51111, Room 1463 Los Angeles, CA 90051-0100

October 27, 1999

Mr. Michael G. Sovich General Manager Crescenta Valley Water District 2700 Foothill Boulevard La Crescenta, California 91214

Dear Mr. Sovich:

1999-2000 Verdugo Basin Water Rights

The Watermaster and the Administrative Committee at its meeting October 13, 1999, approved the additional pumping requested by Crescenta Valley Water District (CVWD) in the Verdugo Basin for the 1999-2000 water year.

This approval permits CVWD to pump the unused portion of Glendale's annual pumping allocation, so long as, the total amount pumped is within the total safe yield for the Verdugo Basin of 7,150 acre foot per year.

Sincerely,

MELVIN L. BLEVINS ULARA Watermaster

PTK:pg

c: <u>ULARA Administrative Committee</u> Mr. Fred Lantz, President City of Burbank Mr. Michael Drake City of San Fernando Mr. Donald Froelich City of Glendale Mr. Thomas M. Erb City of Los Angeles

The Honorable Judge Susan Bryant-Deason Mr. Richard A. Nagel

bc: Patricia T. Kiechler ULARA Watermaster File

入び PLG01-Verdugo や「M. BLEVINS 0CT 27 1999

PAT KIECHLER OCI 26 1999 He

APPENDIX G METROPOLITAN TRANSPORTATION AGENCY TIME EXTENSION
UPPER LOS ANGELES RIVER AREA WATERMASTER

CITY OF LOS ANGELES VS. CITY OF SAN FERNANDO, ET AL CASE NO. 650079 - COUNTY OF LOS ANGELES

MELVIN L. BLEVINS - WATERMASTER

OFFICE LOCATION: 111 North Hope Street, Room 1463 Los Angeles, CA 90012 TELEPHONE: (213) 367-1020 FAX: (213) 367-1131 MAILING ADDRESS: ULARA WATERMASTER P.O. Box 51111, Room 1463 Los Angeles, CA 90051-0100

December 17, 1999

Mr. John C. Higgins Senior Third Party Coordinator Metropolitan Transportation Authority One Gateway Plaza Los Angeles, CA 90012

Dear Mr. Higgins:

Time Extension for Construction Dewatering

The Administrative Committee during its meeting December 15, 1999, approved the Metropolitan Transportation Authority's (MTA) request for an extension of its Basin Account dewatering activities until June 2000 with the understanding that the motion does not expand the quantity of water previously approved at a total of 1,700 acre-feet for the construction period.

As the MTA approaches the end of its construction and makes the transition to the operation and maintenance phase, please contact the Watermaster's office to arrange for a new agreement, where MTA will be required to pay for the groundwater that flows into its system from the San Fernando Valley. If you have any further questions, please contact me at (213) 367-1020 or Ms. Patricia Kiechler at (213) 367-0921.

Sincerely,

MELVIN L. BLEVINS ULARA Watermaster

c: <u>Administrative Committee Members</u> Mr. Fred Lantz, City of Burbank Mr. Michael Sovich, Crescenta Valley Water District Mr. Michael Drake, City of San Fernando Mr. Donald Froelich, City of Glendale Mr. Thomas M. Erb, City of Los Angeles Mr. Ernest F. Wong, City of Los Angeles Watermaster Staff Mr. Melvin L. Blevins, Watermaster Mr. Frederic Fudacz, Special Counsel Mr. Richard A. Nagel, Assistant Ms. Patricia T. Kiechler, Administrator Mr. Mark G. Mackowski, Geologist

APPENDIX H ACTION ITEMS

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ACTION ITEMS

WATERMASTER ACTIVITIES FOR 1999-00 REPORT

- Investigate Dewaterers and Small Pumpers
- Develop Public Notification of Water Rights to DHS offices for drillers
- Coordinate Water Service for County Areas
- Continue working with Department of Building and Safety to notify potential dewaterers
- Facilitate Pacoima Area Investigation.
- Facilitate dissemination of information on chromium standards.
- Evaluate method to calculate Separation of Flow at Gage F57.
- Continue conversion of Basinwide Groundwater Flow Model to the GMS System.
- Re-evaluate Verdugo Basin Safe-Yield.
- Continue maximization program for the Tujunga/Hansen Spreading Grounds.
- Investigate Conjunctive Use programs in the San Fernando Basin.
- Deliver legal description of each parcel in ULARA to title companies.

APPENDIX I CONVERSION FACTORS

CONVERSION FACTORS

Quantity	Metric Unit	Customary Unit	To Convert to Customary Unit Multiply Metric Unit By	To Convert to Metric Unit Multiply Customary Unit By
Length	millimators (mm)	inches (in)	0.02027	25.4
	minimeters (mm)	inches (in)	0.03937	25.4
	meters (m)	feet (ft)	3 2808	0.3048
	kilometers (km)	miles (mi)	0.62139	1.6093
			La state	twalite
Area	square millimeters (mm ²)	square inches (in ²)	0.00155	645.16
	square meters (m ²)	square feet (ft ²)	10.764	0.092903
	square meters (m ²)	acres (ac)	0.00025	4046.9
	hectares (ha)	acres (ac)	2.4710	0.40469
	square kilometers (km ²)	square miles (mi ²)	0.3861	2.590
Volume	liters (L)	gallons (gal)	0.26417	3.7854
	megaliters	million gallons (10 ⁶ gal)	0.26417	3.7854
	cubic meters (m ³)	gallons (gal)	264.17	0.003785
	cubic meters (m ³)	cubic feet (ft3)	35.315	0.028317
	cubic meters (m ³)	cubic yards (yd ³)	1.308	0.76455
	cubic meters (m ³)	acre-feet (ac-ft)	0.00081	1233.5
	cubic decameters (dam ³)	acre-feet (ac-ft)	0.8107	1.2335
Flow	cubic meters per second (m ³ /s)	cubic feet per second (ft ³ /s)	35.315	0.028327
	liters per second (L/s)	cubic feet per second (ft ³ /s)	0.035325	28.317
	liters per second (L/s)	gallons per minute (gal/min)	15.850	0.06309
	liters per minute (L/min)	gallons per minute (gal/min)	0.26417	3.7854
	liters per day (L/day)	gallons per day (gal/day)	0.26417	3.7854
	megaliters per day	million gallons per day	0.26417	3.7854
	cubic decameters per day (dam ³ /day)	acre-feet per day (ac-ft/day)	0.8107	1.2335
Mass	kilograms (kg)	pounds (lb)	2 2046	0.45359
	megagrams (Mg)	tons	1.1.023	0.90718
Velocity	meters per second (m/s)	feet per second (ft/s)	3.2808	0.3048
Concentration	milligrams per liter (mg/L)	parts per million (ppm)	1.0	1.0
Temperature	degrees Celsius (°C)	degrees Fahrenheit (°F)	(1.8 x °C)+32	(°F - 32)/1.8

MA: CONVERS.DOC