REPORT OF RESULTS

DECOMMISSIONING MONITORING
WELLS MW-2, MW-3, MW-4, MW-7, and MW-8
2130 WEST WASHINGTON STREET
STOCKTON, CALIFORNIA

PREPARED FOR:

UNOCAL DBG/AMG
2121 North California Blvd., Suite 250
Walnut Creek, California 94596

PREPARED BY:

SIERRA-PACIFIC GROUP
4911 Windplay Drive, Suite 4
El Dorado Hills, California 95762
(916) 933-1468

Sierra-Pacific Project Number 92-033.04
April 13, 1999

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FIGURES

APPENDIX

DOCUMENT DISTRIBUTION

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Walnut Creek, California 94596

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Unocal, DBG/AMG
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Port of Stockton, Real Estate Division
P.O. Box 2089
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California Regional Water Quality Control Board
3443 Routier Road, Suite A
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Michael Infurna
San Joaquin County Department of Public Health Services
Environmental Health Division, Unit 4
P.O. Box 2009
Stockton, California 95201

REPORT OF RESULTS
DECOMMISSIONING MONITORING WELLS MW-2, MW-3, MW-4, MW-7, and MW-8
2130 WEST WASHINGTON STREET
STOCKTON, CALIFORNIA
SIERRA-PACIFIC PROJECT NO. 92-033.04

1.0 INTRODUCTION

Union Oil Company of California, dba Unocal, authorized Sierra-Pacific Groundwater Consultants, Inc. (Sierra-Pacific) to install five ground-water monitoring wells and collect ground-water data at a former PureGro (currently Westway, Inc.) Molasses feed product facility located at 2130 West Washington Street, Stockton, California (Figures 1 and 2). Background information is provided in earlier Sierra-Pacific work plans and reports listed in Section 5.0 of this report.

Sierra-Pacific completed a comprehensive soils investigation at the 2130 West Washington Street, Stockton, California site in 1994. Ground-water monitoring has continued at the site since 1993, and the frequency of sampling was reduced from quarterly to semi-annually in September 1996. Near-surface ground water has flowed generally west since 1993. Ground water was flowing west-southwest, with a gradient of 0.0066, during the last monitoring event on March 9, 1998 (Figure 3). Ground-water levels rise and fall seasonally, and the water level at monitoring well MW-2 fluctuates more than the other monitoring wells due to ponding and infiltration of storm water near the southeast corner of the site.

Nitrate concentrations in ground-water samples from wells MW-2 and MW-8 are always higher than concentrations detected in samples from other wells, and the nitrates are derived from an off-site (eastern) source. Nitrate-as-nitrogen (NO_3-N) concentrations detected at MW-8 have fluctuated from 13.7 to 60 mg/ℓ. NO_3-N concentrations detected at MW-2 have attenuated with time from 47.3 mg/ℓ to 20 mg/ℓ in three years. Previous sampling events have recorded anomalous nitrogen spikes in ground-water samples from side-gradient well MW-3. The "side-gradient" nitrogen spikes are due to seasonal shifting of near-surface ground water and up-gradient sources of nitrate. Ground-water samples collected from the down-gradient monitoring well (MW-7) have consistently had little or no nitrates and ammonium.

Elevated Total Dissolved Solids (TDS) concentrations, including chlorides, detected in ground-water samples from MW-3, MW-4, and MW-7 indicate that brackish (connate) ground water pervades near-surface deltaic sediments of the Port of Stockton. The seasonal infiltration of relatively fresh storm water flushes saline components from near-surface sediments, most notably in areas where storm water ponds at the surface. Soil borings advanced in the western part of the site routinely intercepted olive-green silty-sand formations which contained elevated concentrations of dissolved salts. Several years of laboratory testing indicate that molasses feed product constituents, which are present in the subsurface beneath the Washington Street facility, have little or no deleterious effect on shallow ground-water resources.

The California Regional Water Quality Control Board (RWQCB) notified Unocal in writing on September 2, 1998 that with no significant change in ground-water conditions at the site, no further investigative work or other actions would be required by the RWQCB. Decommissioning shallow monitoring wells MW-2, MW-3, MW-4, MW-7, and MW-8 will close Unocal's involvement with the site.

2.0 MONITORING WELL DECOMMISSIONING

Monitoring wells MW-2, MW-3, MW-4, MW-7, and MW-8 were sealed and decommissioned to preclude the introduction of contaminants into the abandoned wells and to reduce the vertical movement of shallow ground water on November 30, 1998. The field work was done by Woodward Drilling Company, a State-licensed C-57 drilling contractor, in conformance with State and San Joaquin County guidelines for well abandonment. Representatives from Sierra-Pacific and San Joaquin County observed the decommissioning work.

2.1 Field Preparations

Field preparations included a pre-construction meeting, telephone conversations, and correspondence with various parties, including Unocal, RWQCB, San Joaquin County, and the drilling contractor. A well decommissioning permit was obtained from the San Joaquin County Department of Public Health Services, Environmental Health Division.

A tailgate safety meeting was conducted prior to commencing site work.

2.2 Overboring, Casing Removal, and Grouting

All of the concrete well heads and well boxes were removed using a sledge hammer and hand tools. The PVC well casings and screens of MW-3, MW-4, and MW-7 were removed by over-boring to total-depths using a truck-mounted, 9-inch diameter, hollow-stem auger, fitted with a pilot shaft. The over-boring was advanced slowly to allow complete destruction and removal of the PVC-casing fragments. Large aboveground storage tanks precluded truck access to MW-2 and MW-8. Part of the PVC well casing at MW-2 was removed using a bumper jack. The PVC well casing and screen of MW-8 was pulled from the ground by hand. All of the monitoring well borings were then sealed with Portland cement grout. Potable water for drilling and decontamination of equipment was obtained at the site.

2.3 Site Cleanup

Construction debris and soil cuttings was contained and removed from the site. Cuttings were placed in three 55-gallon drums, characterized, and disposed of at Forward Landfill in Manteca, California. Copies of Forward's approval and shipping documents are attached herein as Appendix B. A high-pressure washer was used to clean the drilling tools and equipment. Decontamination rinsates were discharged to the ground.

3.0 HEALTH AND SAFETY PROGRAM

A detailed Health and Safety (H&S) Plan to support the fieldwork was developed as a separate and stand-alone document for previous Sierra-Pacific work at the Washington Street facility. Risks associated with well abandonment procedures include accidental contact with overhead electrical power lines and buried utilities. Drilling truck operations posed an additional risk. All workers at the site were required to have 40-hour OSHA training and participate in a site safety meeting, discussions of work safety, and the establishment of sound emergency procedures. Hard hats, eye protection, steel-toed boots, protective gloves, and high visibility vests were worn at the facility.

4.0 REMARKS AND SIGNATURES

Recommendations and the approach to the work outlined in this report represents our professional opinions. These opinions are based on currently available client information, and were developed in accordance with currently accepted hydrogeologic and engineering practices. Other than this, no warranty is implied or intended.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I further certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIERRA-PACIFIC GROUP

This report of results was prepared by:

J Rapp — April 14, 1999

John Stephen Rapp, CEG-1133 — Date
Senior Engineering Geologist

This report was reviewed by:

John Killey — April 14, 1999

John Killey, REA — Date
Senior Chemist

5.0 PREVIOUS SIERRA-PACIFIC REPORTS AND WORK PLANS

Soil Sampling Plan, PM AG Products: Sierra-Pacific Groundwater Consultants, Inc., December 10, 1992.

Health and Safety Plan, Soil Sampling at the Cargill Molasses Facility (formerly PureGro Company, PM AG Products): Sierra-Pacific Groundwater Consultants, Inc., April 6, 1993.

Results of Soil Investigation: Sierra-Pacific Groundwater Consultants, Inc., July 2, 1993.

Work Plan For Soil Sampling, Monitoring Well (MW-1) Abandonment, Monitoring Well Installations, and Ground Water Monitoring: Sierra-Pacific Groundwater Consultants, Inc.,October 8, 1993.

Soil Sampling Plan: Sierra-Pacific Groundwater Consultants, Inc., November 16, 1993.

Results of Soil Investigation: Sierra-Pacific Groundwater Consultants, Inc., December 9, 1993.

Soil Sampling Plan III: Sierra-Pacific Groundwater Consultants, Inc., January 28, 1994.

Fourth-Quarter 1993, Monitoring Well Report (12/27/93 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., February 10, 1994.

First-Quarter 1994, Monitoring Well Report (02/11/94 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., April 18, 1994.

Results of Soil Investigation: Sierra-Pacific Groundwater Consultants, Inc., May 11, 1994.

Work Plan For Monitoring Well (MW-7) Installation: Sierra-Pacific Groundwater Consultants, Inc., June 28, 1994.

Second-Quarter 1994, Monitoring Well Report (05/19/94 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., July 10, 1994.

Third-Quarter 1994, Quarterly Monitoring Report (08/11/94 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., September 30, 1994.

Fourth-Quarter 1994, Quarterly Monitoring Report (11/02/94 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., November 17, 1994.

First-Quarter 1995, Quarterly Monitoring Report (02/07/95 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., April 12, 1995.

Second-Quarter 1995, Quarterly Monitoring Report (05/09/95 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., June 15, 1995.

Well (MW-5) Decommissioning Report, 2139 West Washington Street, Stockton, California: Sierra-Pacific Groundwater Consultants, Inc., September 29, 1995, Cargill, Inc.

Third-Quarter 1995, Quarterly Monitoring Report (08/23/95 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., October 5, 1995.

Fourth-Quarter 1995, Quarterly Monitoring Report (11/08/95 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., December 15, 1995.

First-Quarter 1996, Quarterly Monitoring Report (03/18/96 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., May 21, 1996 (Referred to herein as the First Semi-Annual Monitoring Report-1996. The decision to revise the monitoring schedule to semi-annual was made following the completion and submission of this report).

Second Semi-Annual 1996, Monitoring Report (09/19/96 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., December 5, 1996.

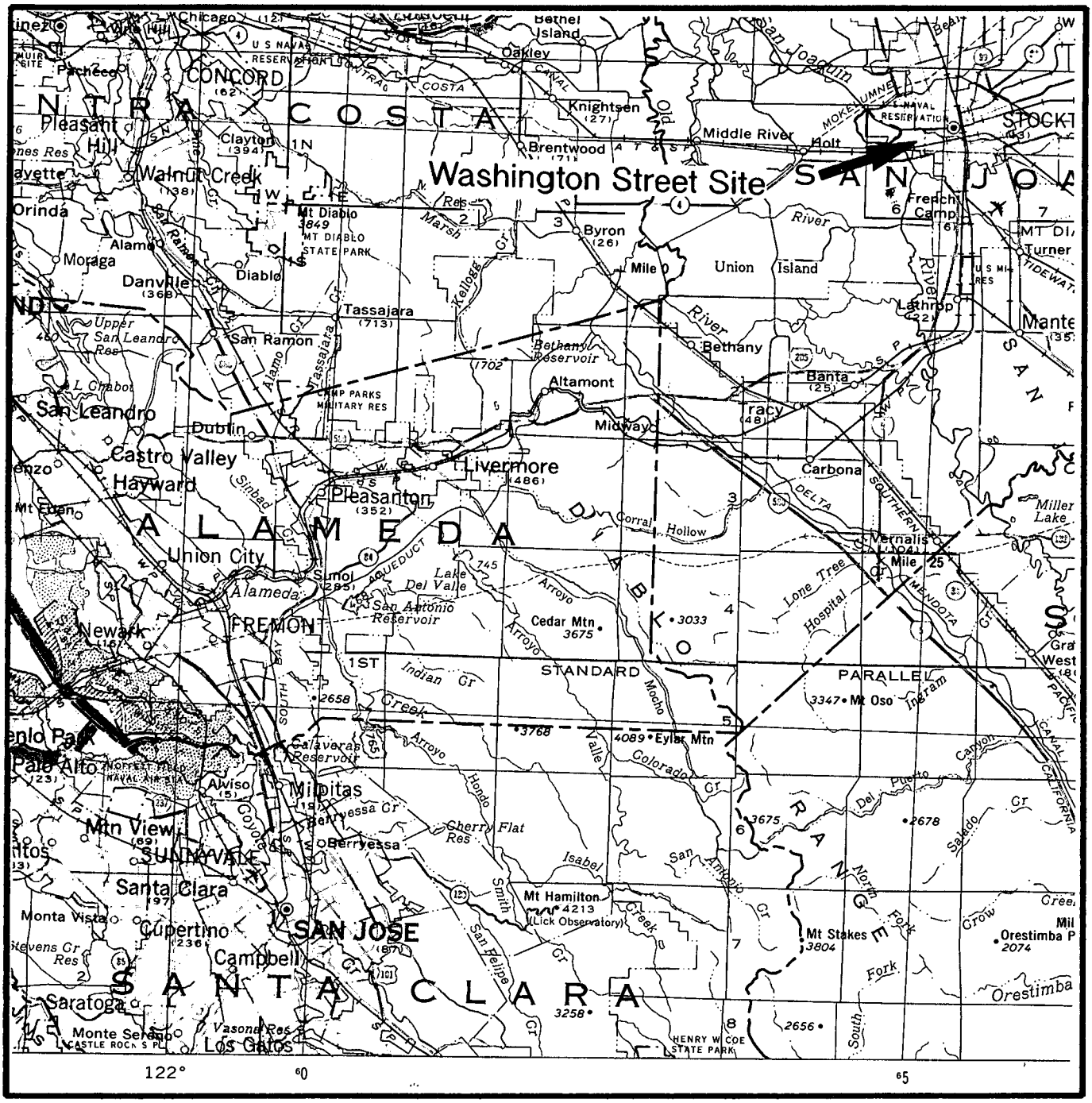
First Semi-Annual 1997, Monitoring Report (02/26/97 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., April 21, 1997.

Second Semi-Annual 1997, Monitoring Report (08/18/97 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., October 10, 1997 (Herein).

First Semi-Annual 1998, Monitoring Report (03/09/98 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., April 16, 1998.

Work Plan, Decommissioning Monitoring Wells MW-3, MW-4, and MW-7, 2130 West Washington Street, Stockton, California: Sierra-Pacific Groundwater Consultants, Inc., September 8, 1998.

Report of Results, Decommissioning Monitoring Wells MW-2, MW-3, MW-4, MW-7, and MW-8, 2130 West Washington Street, Stockton, California: Sierra-Pacific Group, April 13, 1999 (Herein).



10 MILES

1:500,000 Scale

N

Modified from USGS 1:500,000 scale planimetric map of northern California.

Figure 1
REGIONAL LOCATION MAP

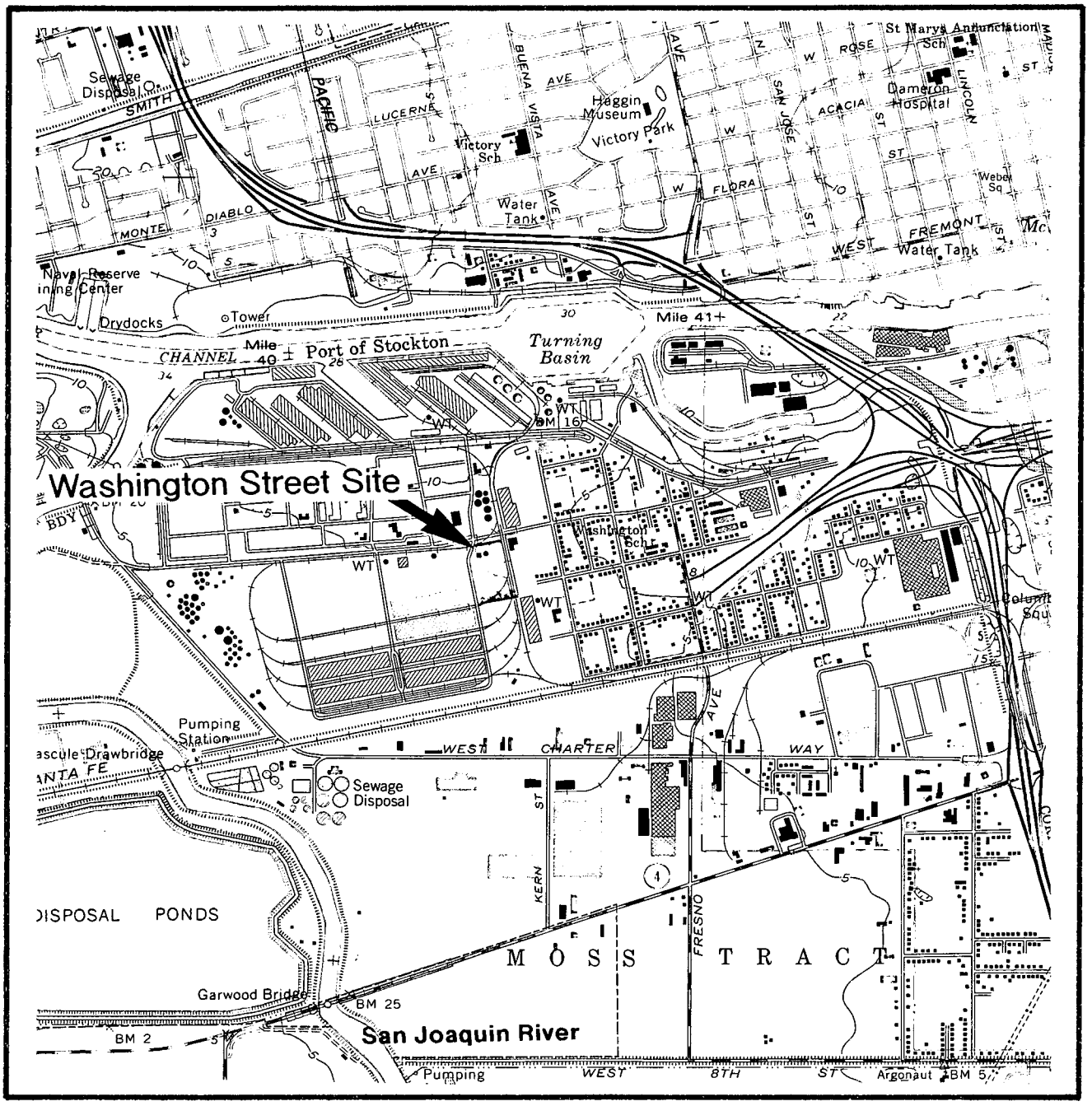
Sierra-Pacific Groundwater Consultants, Inc.

PREPARED BY: JPage	REVIEWED BY: CJM 5/10/94
CAD NO. CAD033A.GCD	REV DATE: 11/30/92

HWY I-5

R 6 E

T 1 N



ONE MILE

Scale 1:24,000

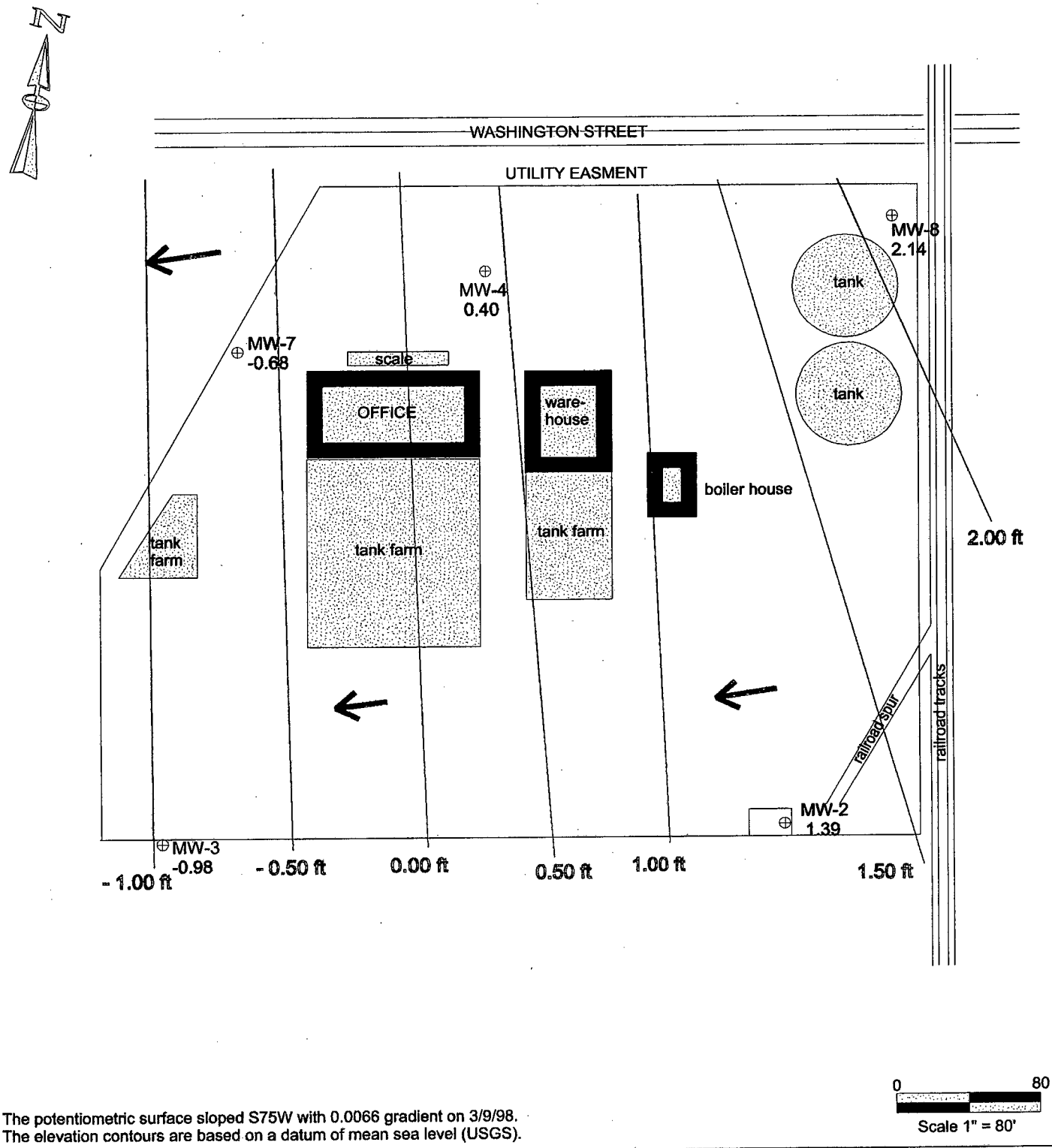
CONTOUR INTERVAL = 5 FEET

Modified from USGS 7.5 Minute Stockton West, CA Quadrangle.

Figure 2
STOCKTON WEST 7.5' USGS QUADRANGLE

Sierra-Pacific Groundwater Consultants, Inc.

PREPARED BY: JL	REVIEWED BY: 5/10/94
CAD NO. CAD033B.GCD	REV DATE: 04/06/93



The potentiometric surface sloped S75W with 0.0066 gradient on 3/9/98.
The elevation contours are based on a datum of mean sea level (USGS).

EXPLANATION

MW-3 -0.98 — Monitoring well (showing ground-water elevation)

Potentiometric contour and groundwater flow direction

Note that the collar-elevation of each well has been surveyed twice.

Figure 3

WASHINGTON STREET SITE MAP
SHOWING POTENTIOMETRIC SURFACE

Sierra-Pacific Groundwater Consultants, Inc.

Prep by: J. Killey	Reviewed by:
Corel No. WASH 1st Q 98.CDR	Prep date: 4/10/98

APPENDIX A

Field Notes and County Permit

SIERRA-PACIFIC GROUNDWATER CONSULTANTS, INC.

DAILY WORK ACTIVITIES LOG

Field Activity: WELL DECOMMISSION
Location: 2130 WEST WASHINGTON
Date: 11/30/98

Start Date: _____
Finish Date: _____
Weather: CLOUDY, RAIN HEAVY AT 11:20

Time	Activities
615-800	TRAVEL TO STOCKTON SITE
800-815	HEALTH AND SAFETY DISCUSSION, NOTES CALL MIKE INFURNA ABOUT PERMIT
815-830	SET UP AT MW-3 OUTSIDE FENCE
830-845	OVERBORE TO 25 FT BGS, PLACE 26 FEET OF 1.25-INCH PVC INSIDE THE AUGERS. MOVE TO MW-2
845-1030	BREAK-UP CONCRETE WELL HEAD AND REMOVE PVC CASING FROM MW-2
1030-1045	GROUT HOLE, BACKFILL HOLE WITH CONCRETE
1045-1100	GROUT MW-3, MOVE TO MW-8
1100-1120	USE ELECTRIC HAMMER TO BREAK UP WELL HEAD, REMOVE IN LARGE PIECES PULL CASING FROM GROUND BY HAND
1120-1130	MOVE TO MW-4. LOCATE WELL HEAD WITH METAL DETECTOR. THE BOX HAS BEEN SMASHED. WILL HAVE TO BE REDRILLED TO FIND THE CASING
1130-1200	DUG OUT CASING, AUGER OVERBORE
1200-1215	Lunch

Activities Summary: MIKE INFURNA ARRIVED AT 830 AM

Team Signatures:
1. J. Pappa
2.

SIERRA-PACIFIC GROUNDWATER CONSULTANTS, INC.

DAILY WORK ACTIVITIES LOG

Field Activity: WELL DECOMMISSION | Start Date:

Location: 2130 W. WASHINGTON | Finish Date:

Date: 11/30/98 | Weather: HEAVY RAIN & WIND

Time	Activities
1215-1245	CONTINUE AUGERING TO 25 FEET BGS
1245-1300	REPAIR DRILL RIG CABLES, SET UP AT MW-7
1300-1315	DRILL OUT MW-7
1315-1345	GROUT MW-7 AND MW-4. NO PROBLEMS
1345-1400	PLACE QUIK SET AT MW-7 TO FILL DRIVEWAY
1400-1530	SET UP AT MW-8 TO GROUT. SAND PACK SLOUGHED. GROUTED UPPER 10 FEET WITH CEMENT GROUT.
1530-1700	TRAVEL TO EL DORADO HILLS
	MW-2 WAS GROUTED FROM BOTTOM AND TOP. 12 FEET OF CASING SCREEN LEFT IN HOLE FROM -2.0 FEET TO -12.0 FEET BGS. BROKEN CONCRETE AND ROCK PUSHED INTO UPPER HOLE FILLED WITH GROUT. THE CASING OF MW-8 WAS PULLED FROM THE BORING WITHOUT PLACING A TREMMIE PIPE IN THE WELL. THE SAND PACK SLOUGHED. THE UPPER 10 FEET WAS GROUTED. THE LOWER PART OF MW-8 WAS IN FINE SAND. THERE ARE NO AQUITARDS WITHIN THE UPPER 20 FEET.

Activities Summary: 10 FEET WAS GROUTED. THE LOWER PART OF MW-8 WAS IN FINE SAND. THERE ARE NO AQUITARDS WITHIN THE UPPER 20 FEET.

Team Signatures:
1. J. Paff
2.

PAYMENT

SAN JOAQUIN COUNTY PUBLIC HEALTH SERVICES
ENVIRONMENTAL HEALTH DIVISION
P.O. BOX 388, 446 N. SAN JOAQUIN ST., STOCKTON, CA 96201-388
(209) 468-3420

COPY

NOV 2 4 1998

NON-REFUNDABLE PERMIT EXPIRES 1 YEAR FROM DATE ISSUED

(Complete in Triplicate)

Application is hereby made to the San Joaquin County for a permit to construct and/or install the work described. This application is made in compliance with San Joaquin County Development Title, Chapter 9-1163 and the Standards of San Joaquin County Public Health Services, Environmental Health Division.

Job Address/or APH# 2130 West Washington St City Stockton Parcel Size/APH# _____

Owner's Name PORT OF STOCKTON Address _____ Phone# _____

Contractor SIERRA-PACIFIC GROUP Address 4911 WINDPLAY DR EL DORADO HILLS Lic# _____ Phone# 916 933 1468

Sub Contractor WOODWARD DRILLING Address 550 RIVERA RIO VISTA Lic# 710079 Phone# 707 _____

TYPE OF WELL/PUMP:
[] NEW WELL [] REPLACEMENT WELL [] MONITORING WELL # 2, 3, 4, 7, 8 [] Other
[X] DESTRUCTION [] OUT-OF-SERVICE WELL [] GEOPHYSICAL WELL # _____ [] SOIL BORING _____
[] INSTALLATION [] WELL SYSTEM REPAIR [] CROSS-CONNECT REPAIR [] VAPOR EXTRACTION WELL # _____
_____ [] New [] Repair H.P. _____ DEPTH PUMP SET _____ FT. FIRST WATER LEVEL _____
(TYPE OF PUMP)

INTENDED USE	TYPE OF WELL	CONSTRUCTION SPECIFICATIONS	
[] INDUSTRIAL	[] OPEN BOTTOM	DIA. OF WELL EXCAVATION 8 inch	DIA. OF CONDUCTOR CASING 2 INCH
[] DOMESTIC/PRIVATE	[] GRAVEL PACK SIZE	TYPE OF CASING/STEEL/PVC PVC	DIA. OF WELL CASING 2 INCH
[] PUBLIC MUNICIPAL	[] DRIVEN	DEPTH OF GROUT SEAL 5 FEET	SPECIFICATION _____
[] IRRIGATION/AG	[] OTHER	GROUT SEAL INSTALLED BY _____	GROUT BRAND NAME _____
[] MONITORING		GROUT SEAL PUMPED: [X] Yes [] No	CONCRETE PEDESTAL BY DRILLER: [X] Yes [] No
APPROX. DEPTH _____		LOCKING CHESTER BOX/STOVE PIPE BOX	

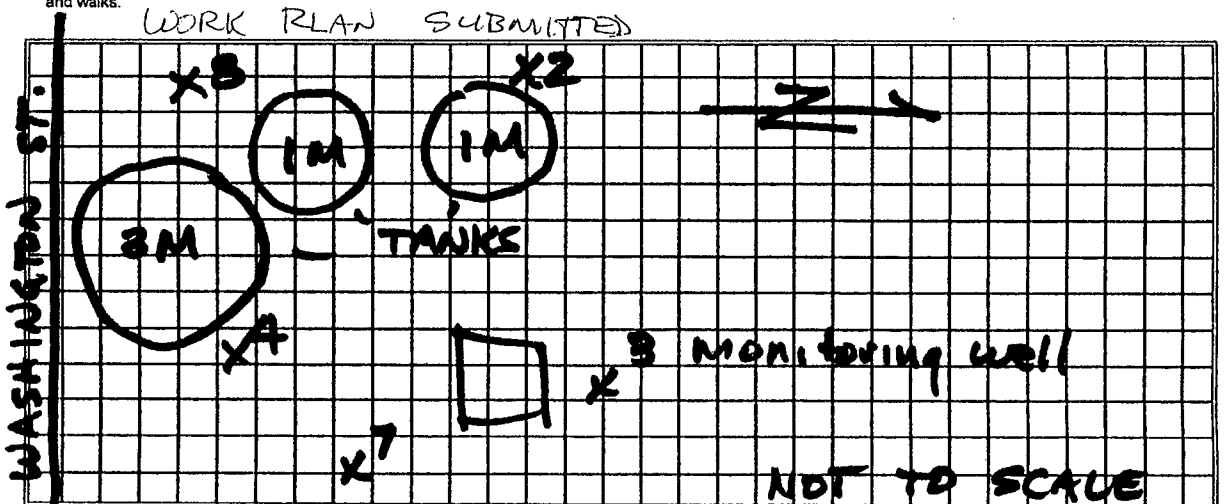
PROPOSED CONSTRUCTION/DRILLING METHOD: MUD ROTARY___ AIR ROTARY___ AUGER X CABLE___ OTHER___

I hereby certify that I have prepared this application and that the work will be done in accordance with San Joaquin County Ordinances, State Laws, and Rules and Regulations of the San Joaquin County. Home owner or licensed agent's signature certifies the following: "I certify that in the performance of the work for which this permit is issued, I shall not employ persons subject to WORKMAN'S COMPENSATION Laws of California." Contractor's hiring or sub-contracting signature certifies the following: "I certify that in the performance of the work for which this permit is issued, I shall employ persons subject to WORKMAN'S COMPENSATION Laws of California." **THE APPLICANT MUST CALL 24 HOURS IN ADVANCE FOR ALL REQUIRED INSPECTIONS AT (209) 488-3423.** Complete drawing at lower area provided.

Signed X J Ralph Title CEG 1133 Date 10/20/98

PLOT PLAN (Draw to Scale) Scale _____" to _____

1. Names of streets or roads nearest to or bounding the property.
2. Outline of the property, giving dimensions and North direction.
3. Dimensioned outlines and locations of all existing and proposed structures, including covered areas such as patios, driveways, and walks.
4. Location of house sewage disposal system or proposed expansion of sewage disposal systems.
5. Location of wells within radius of 150 ft. on the property or adjoining property.



DEPARTMENT USE ONLY

Application Accepted By _____ Date 11/30/98 Area 0684

Grout Inspection By _____ Date _____ Pump Inspection By _____ Date _____

Destruction Inspection By _____ Date _____ Comments: all wells destruction

ACCOUNTING ONLY:	AID#	FAC#

PE CODES	FEE INFO	AMOUNT REMITTED	CHECK#/CASH	RECEIVED BY	DATE	PERMIT/SERVICE REQUEST NUMBER	INVOICE
2902	WD	60.-	2048	Cash	11/25	SR 017700	

WOODWARD DRILLING CO., INC.

P.O. BOX 336, RIO VISTA, CA 94571 C-57 LIC.# 710079

(707) 374 - 4300 FAX: (707) 374 - 5677

CLIENT: BPI

JOB/P.O.NO 98023

SITE: [illegible]

ADDRESS: 2130 W. Washington St.

CITY: Stockton

DATE: 11-30-98

GEOLOGIST: John Rapp

DRILLER: Al Adie

HELPER: [illegible]

HELPER:

DEPTHS OF PROJECT							TOTAL
BORING							
2' WELL							
4" WELL							
6" WELL							
CONTINUOUS SAMPLE							
ABANDON	25'	25'	20'				70'
PRESS GROUT	20'	20'					40'
DUAL COMPLETION							

DESCRIPTION OF WORK PERFORMED

OVERDRILL 2X25' mw

overdrill 1X20' mw

Jackhammer out 2X20' mw and

Pull out Pipe

DEPTH TO WATER		2" X 5' SCREEN .010 .020 .030 .100 PVC S/S C/W		FILTER SAND #		1" X 5' SCREEN	
TRAVEL TIME	2	2" X 10' SCREEN .010 .020 .030 .100 PVC S/S C/W		BENTONITE CHIPS		1" X 10' SCREEN	
DRILL HOURS	5	2" X 5' BLANK PVC S/S		BENTONITE PELLETS		1" X 5' BLANK	
CONSTRUCTION TIME	8½	2" X 10' BLANK PVC S/S		BENTONITE POWDER/GEL	1	1" X 10' SCREEN	
STANDBY		2" THREADED PLUG PVC S/S		VOLCLAY GROUT		1" TRHEADED PLUG	
FLATBED TRUCK	1	2" SLIP CAP		PEA GRAVEL		1" SLIP CAP	
PICKUP TRUCK		2" LOCKING CAP		PORTLAND CEMENT	25	____WELL POINT	
STEAM CLEANER	1	8" WELL COVER		FAST SET CEMENT	2	6" X 5' SCREEN PVC S/S C/W	
GROUT PUMP	1	4" X 5' SCREEN .010 .020 .030 .100 PVC S/S C/W		READY MIX CEMENT		6" X 10' SCREEN PVC S/S C/W	
EXTRA PUMP		4" X 10' SCREEN .010 .020 .030 .100 PVC S/S C/W		ASPHALT PATCH		6" X 5' BLANK PVC S/S	
FORKLIFT / HOPPER		4" X 5' BLANK PVC S/S		PLASTIC SHEETING		6" X 10' BLANK PVC S/S	
SUBSISTENCE		4" X 10' BLANK PVC S/S		SAFETY EQUIP		6" BOTTOM PLUG PVC S/S	
SAMPLE TUBES		4" THREADED PLUG PVC S/S		WOOD PLUGS		6" SLIP CAP	
HYDROPUNCH		4" SLIP CAP		TREMIE PIPE	50'	WELL COVER	
HYDROPUNCH TIPS		4" LOCKING CAP		55 GAL STEEL DRUMS	3	DISPOSAL	
CONTINUOUS SAMPLER 5'		12" WELL COVER		PAPER DRUMS			
JACKHAMMER	1	DEVELOPMENT PUMP 2" 4"		PLYWOOD / MATS			
CONCRETE CORE		SAFETY UPGRADE 'C' 'B' OTHER		WATER PURCHASED			

CLIENT/REP SIGNATURE J. Rapp 11/30/98 DATE

APPENDIX B

Waste Disposal Documentation

FORWARD
INCORPORATED

P.O. Box 6336
1145 W. Charter Way • Stockton, CA 95206
(209) 466-4482 • (800) 204-4242 • FAX (209) 466-1067

September 17, 1998

Sierra Pacific Groundwater
4911 Windplay Drive, Ste 4
El Dorado Hills, CA 95762

Attn: John Killey

Re: Approval No. 748471
Drill Cuttings
2130 West Washington Street

Dear Mr. Killey:

FORWARD INC. is pleased to inform you that the approximately 10 tons of Drill Cuttings from the referenced site has been approved for acceptance at our Manteca, California Landfill as a Class 2 waste. This approval has been based on the information provided in the waste profile and associated materials submitted on behalf of Unocal Corporation (Generator). Acceptance of the waste is subject to regulatory requirements, and is also subject to the "Terms and Conditions" agreed to and signed by Generator in the waste profile.

Your approval number for this project will be 748471. This number should be used in all scheduling and correspondence with ***FORWARD, INC.*** regarding this waste profile.

This profile shall remain in effect until February 28, 1999, or until any significant changes in the waste stream occur. At that time, ***FORWARD, INC.*** will re-evaluate the profile, and current analytical data and requirements will be reviewed.

Please schedule all waste shipments with the Landfill (209-982-4298) at least 24 hours in advance. The landfills hours of operation are Monday through Friday 6:00 am to 4:30 pm for soil, 6:00 am to 3:00 pm for all other waste types.

Thank you for the opportunity to be of service. Should you have any questions, please do not hesitate to contact me or our Customer Service at (800) 204-4242.

Sincerely,

FORWARD, INC.

Brad Bonner
Brad J. Bonner
Sales Manager

BJB/sr

F:\FORWARD\MERGE FORMS\ACCEPT.DOC

GENERATOR: Tosco Marketing
MAILING ADDRESS: 2010 Crow Canyon Pl #100
CITY, STATE, ZIP: San Ramon CA 94583
PHONE: 925-277-2321
CONTACT PERSON: Bill Nickerson
SIGNATURE OF AUTHORIZED AGENT / TITLE / DATE: *

REQUIRED PERSONAL PROTECTIVE EQUIPMENT:
☐ GLOVES ☐ GOGGLES ☐ RESPIRATOR ☐ HARD HAT
☐ TY-VEK ☐ OTHER

SPECIAL HANDLING PROCEDURES:

TO BE COMPLETED BY GENERATOR

WASTE TYPE:
☐ TREATMENT SOIL
☐ DISPOSAL SOIL
☐ CONSTRUCTION SOIL
☐ SLUDGE
☐ NON-FRIABLE ASBESTOS
☐ WOOD
☐ ASH
☐ OTHER

GENERATING FACILITY: Puregro 2130 West Washington St. Stockton CA

RECEIVING FACILITY:

FORWARD INC. LANDFILL
9999 SOUTH AUSTIN ROAD
MANTECA, CALIFORNIA 95336
(209) 982-4298 PHONE
(209) 982-1009 FAX

TO BE COMPLETED BY HAULER

NAME: Manley & Sons
ADDRESS: 6076 Elder Creek Rd.
CITY, STATE, ZIP: Sacramento CA 95824
PHONE: 916 383 8624
SIGNATURE OF AUTHORIZED AGENT OR DRIVER / DATE: * 12-10-98

TICKET NO.: SK70028
TRUCK NUMBER: M97

☐ END DUMP ☐ BOTTOM DUMP ☐ TRANSFER
☐ ROLL-OFF(S) ☐ FLAT BED ☐ VAN ☐ DRUMS
27

FACILITY REQUIREMENTS

FORWARD INC. LANDFILL

Forward shall have no obligation to accept the waste if weather or other conditions impair the safe and effective disposal of the waste or if the waste impairs the safe and effective operation of the Landfill. Forward shall use reasonable efforts to promptly notify Disposer of its inability to accept the waste for any reason. If Forward's refusal to accept the waste is based on weather or other site conditions, Forward shall notify the Disposer when site conditions are expected to change such that Forward will be able to accept the waste.

REMARKS:

FACILITY TICKET NUMBER:

SIGNATURE OF AUTHORIZED AGENT / DATE: * 12-10-98

CUBIC YARDS: 1 (30 rums)

DISPOSAL METHOD	TO BE COMPLETED BY FORWARD: DISPOSE	BIO	AERATE	STOCKPILE	OTHER
☐ SOIL	✓				
☐ SLUDGE					
☐ NON-FRIABLE ASBESTOS					
☐ WOOD					
☐ ASH					
☐ OTHER					

SCHEDULING MUST BE MADE PRIOR TO 4:00 P.M. THE DAY PRIOR TO EXPECTED ARRIVAL • ANY UNSCHEDULED LOADS SUBJECT TO REFUSAL UPON ARRIVAL. ONGOING DAILY DELIVERIES MUST BE SCHEDULED WITH THE LANDFILL THE DAY BE
TO SCHEDULE CALL (209) 982-4298

MANIFEST # 993 [illegible]8

GENERATOR COPY

9999 South Austin Road
Manteca, CA 95336
Landfill: (209) 982-4298 Fax (209) 982-1009
Resource Recovery: (209) 982-4936

P.O. Box 6336
Stockton, CA 95206
Main Office: (209) 466-4482
Fax: (209) 465-0631

CUSTOMER NO. 74847 TRUCK NO. M97

BILL TO: Unocal

154906

recycled paper

SIZE YDS.	DESCRIPTION	$ PER YD.	$ AMOUNT	NOTES
	☐ REFUSE ☐ TREATED WOOD			22802
	☐ SLUDGE ☐ ASH			20900
	☐ ASBESTOS ☐ NON-FRIABLE ASBESTOS			1900
1	☐ I SOIL ☐ III SOIL ☐ AERATION SOIL			.95
	☐ A/B SOIL ☐ BIO. SOIL ☐ COVER SOIL			
30	Drums			
		TOTAL ▶		

Signed _____ IN _____ A.M./P.M.

FIRST SEMI-ANNUAL 1998 MONITORING REPORT

2130 WEST WASHINGTON STREET FACILITY STOCKTON, CALIFORNIA

(03/09/98 Sampling Event)

PREPARED FOR:

UNOCAL DBG/AMG
2121 North California Blvd., Suite 250
Walnut Creek, California 94596

PREPARED BY:

SIERRA-PACIFIC GROUNDWATER CONSULTANTS, INC.
4911 Windplay Drive, Suite 4
El Dorado Hills, California 95762
(916) 933-1468

Sierra-Pacific Project Number 92-033.04
April 16, 1998

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TABLES

FIGURES

APPENDICES

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EXECUTIVE SUMMARY

Sierra-Pacific Groundwater Consultants, Inc. (Sierra-Pacific) completed a comprehensive soils investigation at the former PureGro facility at 2130 West Washington Street, Stockton, California in 1994 (Figure 2). Ground-water monitoring has continued at the site since 1993, and the frequency of sampling was reduced from quarterly to semi-annually in September 1996. Near-surface ground water has flowed generally west since 1993. Ground water was flowing west-southwest, with a gradient of 0.0066, on March 9, 1998. Ground-water levels rise and fall seasonally (Figure 4). The water level at monitoring well MW-2 fluctuates more than the other monitoring wells due to localized ponding and infiltration of storm water near the southeast corner of the site (Figure 3).

Nitrate concentrations in ground-water samples from the upgradient wells MW-2 and MW-8 continue to be higher than concentrations detected in samples from other wells, and the nitrates are derived from an off-site (eastern) source. Nitrate-as-nitrogen (NO_3-N) concentrations detected at MW-8 have fluctuated from 13.7 to 69 mg/ℓ. NO_3-N concentrations detected at MW-2 have attenuated with time from 47.3 mg/ℓ to 20 mg/ℓ in four years. Previous sampling events have recorded anomalous nitrogen spikes in ground-water samples from side-gradient well MW-3. The "side-gradient" nitrogen spikes are due to seasonal shifting of near-surface ground water and up-gradient sources of nitrate. Ground-water samples collected from the down-gradient monitoring well (MW-7) have consistently had little or no nitrates and ammonium.

Elevated Total Dissolved Solids (TDS) concentrations, including chlorides, detected in ground-water samples from MW-3, MW-4, and MW-7 indicate that brackish (connate) ground-water pervades near-surface deltaic fluvial sediments of the Port of Stockton. The seasonal infiltration of relatively fresh storm water flushes saline components from near-surface sediments, most notably in areas where storm water ponds at the surface. Soil borings advanced in the western part of the site routinely intercepted olive-green silty-sand formations which contained elevated concentrations of dissolved salts. Several years of laboratory testing indicate that molasses feed product constituents which are present in the subsurface beneath the Washington Street facility have little or no deleterious effect on shallow ground-water resources. In fact, extremely low nitrate concentrations detected at MW-7 support Sierra-Pacific's contention that molasses enhance the viability of organisms which are denitrifying saturated sediments beneath the Washington Street facility.

FIRST SEMI-ANNUAL 1998
MONITORING REPORT
2130 WEST WASHINGTON STREET FACILITY
STOCKTON, CALIFORNIA
SIERRA-PACIFIC PROJECT NO. 92-033.04

1.0 BACKGROUND

Union Oil Company of California, dba Unocal, authorized Sierra-Pacific Groundwater Consultants, Inc. (Sierra-Pacific) to install five ground-water monitoring wells and collect ground-water data at a former PureGro (currently Westway, Inc.) Molasses feed product facility located at 2130 West Washington Street, Stockton, California (Figures 1 and 2). A large volume of background information is provided in earlier Sierra-Pacific work plans and reports listed in *Section 6.0* of this report.

2.0 METHODS

2.1 Water-Level Measurements

Well caps were removed and the water level was allowed to equilibrate before ground-water depth measurements were made. Ground-water levels were measured to the nearest 0.01 foot by Sierra-Pacific on March 9, 1968 and are listed in Table 1. Each of the Unocal monitoring well collar elevations has been surveyed to a vaulted, permanent, brass benchmark located on West Washington Street. The datum is Mean Sea Level, as determined by the U.S. Geological Survey.

2.2 Ground-Water Sampling and Laboratory Analysis

Prior to sampling, more than three wetted-well-volumes of ground water was purged from the uppermost saturated zone from each of the five wells to assure the collection of representative samples. Water quality field parameters (conductivity, pH and temperature) were measured and recorded during purging (Appendix A). Samples were collected after the field parameters stabilized. Analytical results and chain-of-custody forms are included in Appendix B. Ground-water samples were examined for odors, coloration, and turbidity. No odors were detected and the appearance ranged between clear and cloudy

with minor turbidity. See Appendix C for sampling methods and quality assurance. Routine well maintenance is performed as part of each monitoring event.

3.0 RESULTS

3.1 Ground-Water Chemistry

On March 9, 1998, ground-water samples from the five monitoring wells contained between 0.52 and 64 mg/ℓ nitrate-as-nitrogen (NO_3-N). Total Kjeldahl Nitrogen (TKN) concentrations ranged from "non-detect" (ND) at a detection limit of 0.20 mg/ℓ to 0.37 mg/ℓ. Ammonium-as-nitrogen (NH_4-N) concentrations ranged from ND at a detection limit of 0.082 mg/ℓ to 0.10 mg/ℓ. Calculated Total Nitrogen (N) values ranged from 0.89 to 64 mg/ℓ. Sixty-four mg/ℓ of NO_3-N was detected in the ground-water sample collected from the up-gradient well MW-8 and 20 mg/ℓ NO_3-N was detected at MW-2, the other up-gradient well. Nitrate levels have consistently attenuated with time at MW-2 (Figure 5). Traces of TKN and nitrate, with a combined concentration of 1.3 mg/ℓ Total-N, were detected in the sample from the down-gradient monitoring well MW-7 (Table 2). Ground-water samples from MW-7 have contained little or no detectable nitrate and ammonium since MW-7 was installed in August 1994 (Figure 5). MW-7 has been sampled 11 times since August 1994.

Total Dissolved Solids (TDS) values ranged from 1,400 to 3,300 mg/ℓ, with a mean of 2,320 mg/ℓ. The corresponding Specific Conductance (Sp Cond) ranged from 2,010 to 4,250 μmhos/cm, with a mean of 2,996 μmhos/cm. The ratio of mean TDS to mean Sp Cond was 0.77. Ground-water samples collected on March 9, 1998 were tested for chloride ions (Cl^-) because ground-water resources of the Port of Stockton are subject to connate diffusion (salt water intrusion). Chloride concentrations, which may be largely derived from the diffusion of brackish connate ground water, ranged from 60 mg/ℓ to 1,300 mg/ℓ. Chloride concentrations have consistently been lower in areas of the site where storm water infiltrates. All ground-water quality data are presented in Tables 1 through 4.

Ground-water level measurements indicate that shallow ground water moves westward beneath the site. Laboratory test results indicate that the nitrate compounds are being reduced as ground water passes under the facility. The down-gradient well (MW-7) has yielded essentially nitrate-free ground-water samples since August 1994 (Table 2, Figure 5).

3.2 Ground-Water Level Data and Predicted Flow Directions

The elevation of the uppermost saturated zone has changed seasonally since monitoring began in December 1993 (Figure 5). The water table raises and lowers in response to seasonal precipitation, infiltration of storm water, and San Joaquin River levels. Monitoring well MW-2 routinely exhibits the greatest variations in water levels (Table 1, Figure 4) due to ponding and associated infiltration of storm water near the southeast corner of the site. Shallow ground water was flowing west-southwest on March 9, 1998, and has flowed generally west since monitoring began in December 1993 (Figure 3). There was a temporary reversal in August 1997, and without localized infiltration of storm water, shallow ground water would flow to the southeast.

4.0 CONCLUSIONS

- **Ground-Water Levels and Flow Directions** - Near-surface ground water has flowed generally westward since 1993. It was flowing west-southwest on May 9, 1998. Monitoring well MW-2 continues to exhibit greater variations in ground-water level due to localized ponding and infiltration of surface runoff (Figure 4).

- **Off-Site Sources of Nitrate** - NO_3-N concentrations detected in ground-water samples from wells along the eastern property boundary (MW-2 and MW-8) continue to be the highest, indicating that ground-water nitrates are derived from an off-site source (Figure 5). Nitrate concentrations detected at MW-2 have steadily attenuated with time since monitoring began in December 1993.

- **Down-Gradient Monitoring Well** - Through 11 sampling events, ground-water samples from down-gradient monitoring well (MW-7) have contained little or no nitrates and ammonium concentrations. Monitoring of this well began in August 1994 (Table 2).

- **Salt Water Intrusion** - Elevated chloride and TDS concentrations detected in ground-water samples collected at the site indicate the generally inferior quality of shallow ground water at the Port of Stockton. Chloride and TDS concentrations have been particularly high in samples from the western wells (MW-3, MW-4, and MW-7). Brackish connate ground water, rich in chlorides, is believed to be derived from olive-green, silty-sand, formations which underlie the western and central parts of the site. Relatively fresh storm water ponds near the site, infiltrates, and flushes out naturally occurring saline compounds from the near-surface sediments.

- **Microbial Denitrification** - Molasses and other animal feed product constituents known to be present in the subsurface beneath the Washington Street facility appear to have little or no deleterious effect on ground-water resources at the Port of Stockton. A large body of scientific evidence indicates that molasses-based feed products actually enhance the viability of micro-organisms present in the subsurface which metabolize and remove (denitrify) nitrogen compounds from saturated sediments and ground water.

- **Recommended Site Closure** - The down-gradient well MW-7 has yielded essentially nitrate-free ground-water samples since monitoring began at MW-7 in August 1994. After 14 successive site-wide monitoring events, Sierra-Pacific recommends that no further monitoring is needed.

5.0 REMARKS AND SIGNATURES

Conclusions, recommendations, and the approach to the work described in this semi-annual monitoring report represent our professional opinions. These opinions were based on site conditions at the time of our visit, and were developed in accordance with currently accepted hydrogeologic and engineering practices. Other than this, no warranty is implied or intended.

SIERRA-PACIFIC GROUNDWATER CONSULTANTS, INC.

This semi-annual monitoring report was prepared by:

John Stephen Rapp, CEG-1133
Senior Engineering Geologist

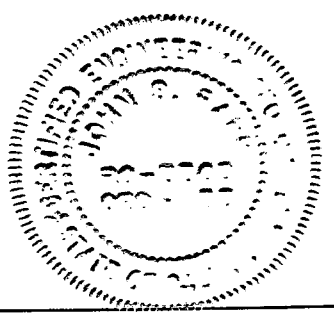
April 17, 1998
Date

This semi-annual monitoring report was reviewed by:

John Killey, REA
Senior Chemist

April 17, 1998
Date

04/16/98/1smr98.033/JSR/JLB



6.0 PREVIOUS SIERRA-PACIFIC REPORTS AND WORK PLANS

Soil Sampling Plan, PM AG Products: Sierra-Pacific Groundwater Consultants, Inc., December 10, 1992.

Health and Safety Plan, Soil Sampling at the Cargill Molasses Facility (formerly PureGro Company, PM AG Products): Sierra-Pacific Groundwater Consultants, Inc., April 6, 1993.

Results of Soil Investigation: Sierra-Pacific Groundwater Consultants, Inc., July 2, 1993.

Work Plan For Soil Sampling, Monitoring Well (MW-1) Abandonment, Monitoring Well Installations, and Ground Water Monitoring: Sierra-Pacific Groundwater Consultants, Inc.,October 8, 1993.

Soil Sampling Plan: Sierra-Pacific Groundwater Consultants, Inc., November 16, 1993.

Results of Soil Investigation: Sierra-Pacific Groundwater Consultants, Inc., December 9, 1993.

Soil Sampling Plan III: Sierra-Pacific Groundwater Consultants, Inc., January 28, 1994.

Fourth-Quarter 1993, Monitoring Well Report (12/27/93 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., February 10, 1994.

First-Quarter 1994, Monitoring Well Report (02/11/94 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., April 18, 1994.

Results of Soil Investigation: Sierra-Pacific Groundwater Consultants, Inc., May 11, 1994.

Work Plan For Monitoring Well (MW-7) Installation: Sierra-Pacific Groundwater Consultants, Inc., June 28, 1994.

Second-Quarter 1994, Monitoring Well Report (05/19/94 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., July 10, 1994.

Third-Quarter 1994, Quarterly Monitoring Report (08/11/94 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., September 30, 1994.

Fourth-Quarter 1994, Quarterly Monitoring Report (11/02/94 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., November 17, 1994.

First-Quarter 1995, Quarterly Monitoring Report (02/07/95 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., April 12, 1995.

Second-Quarter 1995, Quarterly Monitoring Report (05/09/95 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., June 15, 1995.

Well (MW-5) Decommissioning Report, 2139 West Washington Street, Stockton, California: Sierra-Pacific Groundwater Consultants, Inc., September 29, 1995, Cargill, Inc.

Third-Quarter 1995, Quarterly Monitoring Report (08/23/95 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., October 5, 1995.

Fourth-Quarter 1995, Quarterly Monitoring Report (11/08/95 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., December 15, 1995.

First-Quarter 1996, Quarterly Monitoring Report (03/18/96 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., May 21, 1996 (Referred to herein as the First Semi-Annual Monitoring Report-1996. The decision to revise the monitoring schedule to semi-annual was made by the RWQCB following the completion and submission of this report).

Second Semi-Annual 1996, Monitoring Report (09/19/96 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., December 5, 1996.

First Semi-Annual 1997, Monitoring Report (02/26/97 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., April 21, 1997.

Second Semi-Annual 1997, Monitoring Report (08/18/97 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., October 10, 1997.

First Semi-Annual 1998, Monitoring Report (03/09/98 Sampling Event): Sierra-Pacific Groundwater Consultants, Inc., April 16, 1998 (herein).

Table 1. Ground-Water Level Data 1/

Well, Date, and Time	Casing Elev (feet)	GW Depth (feet)	GW Elev (feet)	Observations
MW-2, 12/24/93, 13:45	2.29 Feet	11.95 Feet	-9.66	No odors
MW-2, 12/27/93, 10:45	2.29	11.97	-9.68	No odors
MW-2, 12/30/93, 08:18	2.29	12.12	-9.83	No odors
MW-2, 02/11/94, 09:03	2.29	10.02	-7.73	No odors
MW-2, 03/16/94, 11:30	2.29	9.83	-7.54	No odors
MW-2, 05/19/94, 10:15	2.29	11.40	-9.11	No odors
MW-2, 08/08/94, 08:37	2.29	13.19	-10.9	No odors
MW-2, 08/11/94, 15:36	2.29	13.27	-10.98	No odors
MW-2, 08/30/94, 10:35	2.29	13.71	-11.42	No odors
MW-2, 11/01/94, 14:35	2.29	14.31	-12.02	No odors
MW-2, 11/02/94, 08:20	2.29	14.36	-12.07	No odors
MW-2, 02/07/95, 12:53	2.29	7.71	-5.42	No odors
MW-2, 05/09/95, 10:32	2.29	7.51	-5.22	No odors
MW-2, 08/23/95, 10:35	2.29	10.08	-7.79	No odors
MW-2, 11/08/95, 11:02	2.29	11.52	-9.23	No odors
MW-2, 03/15/96, 14:40	2.29	2.58	-0.29	No odors
MW-2, 03/18/96, 09:01	2.29	2.67	-0.38	No odors
MW-2, 09/19/96, 10:34	2.29	8.46	-6.17	No odors
MW-2, 02/26/97, 17:43	2.29	1.98	0.31	No odors
MW-2, 08/18/97, 12:21	2.29	7.40	-5.11	No odors
MW-2, 03/09/98, 14:12	2.26 2/	0.87	1.39	No odors
MW-3, 12/24/93, 13:24	2.17	14.07	-11.90	No odors
MW-3, 12/27/93, 11:59	2.17	13.93	-11.76	No odors
MW-3, 12/30/93, 08:20	2.17	13.90	-11.73	No odors
MW-3, 02/11/94, 09:10	2.17	13.38	-11.21	No odors

Table 1. Ground-Water Level Data 1/ (Continued)

Well, Date, and Time	Casing Elev (feet)	GW Depth (feet)	GW Elev (feet)	Observations
MW-3, 03/16/94, 11:45	2.17	12.30	-10.13	No odors
MW-3, 05/19/94, 10:22	2.17	12.90	-10.73	No odors
MW-3, 08/08/94, 08:30	2.17	14.53	-12.36	No odors
MW-3, 08/11/94, 16:28	2.17	14.62	-12.45	No odors
MW-3, 08/30/94, 10:30	2.17	15.00	-12.83	No odors
MW-3, 11/01/94, 14:45	2.17	15.14	-12.97	No odors
MW-3, 11/02/94, 08:50	2.17	15.24	-13.07	Strong sewage
MW-3, 02/07/95, 11:16	2.17	10.87	-8.70	Sewage odor
MW-3, 05/09/95, 10:34	2.17	8.75	-6.58	Sewage odor
MW-3, 08/23/95, 10:40	2.17	10.55	-8.38	No odors
MW-3, 11/08/95, 10:59	2.17	11.62	-9.45	No odors
MW-3, 03/15/96, 15:00	2.17	6.17	-4.00	No odors
MW-3, 03/18/96, 08:29	2.17	6.06	-3.89	No odors
MW-3, 09/19/96, 10:30	2.17	8.57	-6.40	No odors
MW-3, 02/26/97, 16:31	2.17	3.81	-1.64	No odors
MW-3, 08/18/97, 12:08	2.14 2/	7.08	-4.94	No odors
MW-3, 03/09/98, 14:28	2.14	3.12	-0.98	No odors
MW-4, 12/24/93, 12:28	3.18	14.80	-11.62	No odors
MW-4, 12/27/93, 12:52	3.18	14.65	-11.47	No odors
MW-4, 12/30/93, 08:23	3.18	14.69	-11.51	No odors
MW-4, 02/11/94, 09:18	3.18	13.99	-10.81	No odors
MW-4, 03/16/94, 11:55	3.18	12.97	-9.79	No odors
MW-4, 05/19/94, 10:28	3.18	13.54	-10.36	No odors
MW-4, 08/08/94, 08:58	3.18	15.16	-11.98	No odors

Table 1. Ground-Water Level Data 1/ (Continued)

Well, Date, and Time	Casing Elev (feet)	GW Depth (feet)	GW Elev (feet)	Observations
MW-4, 08/11/94, 13:45	3.18	15.25	-12.07	No odors
MW-4, 08/30/94, 09:20	3.18	15.71	-12.53	No odors
MW-4, 11/01/94, 15:00	3.18	15.89	-12.71	No odors
MW-4, 11/02/94, 10:45	3.18	15.95	-12.77	No odors
MW-4, 02/07/95, 12:02	3.18	10.99	-7.81	Musty odors
MW-4, 05/09/95, 10:36	3.18	9.40	-6.22	Slight sewage
MW-4, 08/23/95, 10:45	3.18	11.32	-8.14	No odors
MW-4, 11/08/95, 10:55	3.18	12.4	-9.22	No odors
MW-4, 03/15/96, 14:10	3.18	6.13	-2.95	No odors
MW-4, 03/18/96, 08:32	3.18	6.02	-2.84	No odors
MW-4, 09/19/96, 10:21	3.18	9.31	-6.13	No odors
MW-4, 02/26/97, 12:30	3.18	3.3	-0.12	No odors
MW-4, 08/18/97, 12:13	3.18	7.88	-4.70	No odors
MW-4, 03/09/98, 14:21	3.18	2.78	0.40	No odors
MW-5, 12/24/93, 14:10	3.22 3/	14.29	-11.07	No odors
MW-5, 12/27/93, 13:45	3.22	14.22	-11	No odors
MW-5, 12/30/93, 08:15	3.22	14.31	-11.09	No odors
MW-5, 02/11/94, 09:23	3.22	12.63	-9.41	No odors
MW-5, 03/16/94, 12:02	3.22	12.35	-9.13	No odors
MW-5, 05/19/94, 10:34	3.22	13.08	-9.86	No odors
MW-5, 08/08/94, 08:45	3.22	14.91	-11.69	No odors
MW-5, 08/11/94, 14:50	3.22	15.00	-11.78	No odors
MW-5, 08/30/94, 10:40	3.22	15.46	-12.24	No odors
MW-5, 11/01/94, 15:05	3.22	15.76	-12.54	No odors

Table 1. Ground-Water Level Data 1/ (Continued)

Well, Date, and Time	Casing Elev (feet)	GW Depth (feet)	GW Elev (feet)	Observations
MW-5, 11/02/94, 12:40	3.22	15.84	-12.62	No odors
MW-5, 02/07/95, 11:55	3.22	9.92	-6.70	No odors
MW-5, 05/09/95, 10:38	3.22	8.89	-5.67	No odors
MW-5, 08/23/95, 10:50	3.22 3/	11.42	-8.20	No odors
MW-6, 03/16/94, 12:06	6.09 3/	15.63	-9.54	No odors
MW-6, 05/19/94, 09:37	6.09	16.18	-10.09	No odors
MW-6, 08/08/94, 09:05	6.09	17.71	-11.62	No odors
MW-7, 08/11/94, 10:35	2.40	14.62	-12.22	No odors
MW-7, 08/30/94, 10:25	2.40	15.03	-12.63	No odors
MW-7, 11/01/94, 14:50	2.40	15.14	-12.74	No odors
MW-7, 11/02/94, 10:20	2.40	15.26	-12.86	No odors
MW-7, 02/07/95, 11:07	2.40	10.50	-8.10	No odors
MW-7, 05/09/95, 10:40	2.40	8.83	-6.43	No odors
MW-7, 08/23/95, 10:55	2.40	10.64	-8.24	No odors
MW-7, 11/08/95, 10:57	2.40	11.68	-9.28	No odors
MW-7, 03/15/96, 14:15	2.40	5.69	-3.29	No odors
MW-7, 03/18/96, 08:31	2.40	5.62	-3.22	No odors
MW-7, 09/19/96, 10:28	2.40	8.6	-6.20	No odors
MW-7, 02/26/97, 10:56	2.40	3.5	-1.10	No odors
MW-7, 08/18/97, 12:04	2.37 2/	7.03	-4.66	No odors
MW-7, 03/09/98, 14:05	2.37	3.05	-0.68	No odors

Table 1. Ground-Water Level Data 1/ (Continued)

Well, Date, and Time	Casing Elev (feet)	GW Depth (feet)	GW Elev (feet)	Observations
MW-8, 03/15/96, 15:10	4.80 4/	5.73	-0.93	No odors
MW-8, 03/18/96, 08:44	4.80	5.92	-1.12	No odors
MW-8, 09/19/96, 10:24	4.80	11.18	-6.38	No odors
MW-8, 02/26/97, 12:25	4.80	3.87	0.93	No odors
MW-8, 08/18/97, 12:17	4.80	9.82	-5.02	No odors
MW-8, 03/09/98, 14:17	4.80	2.66	2.14	No odors

1/ Casing and ground-water elevations are listed in feet, and referenced to Mean Sea Level as determined by the U.S. Geological Survey. Monitoring wells MW-2, MW-3, MW-4, MW-5, and MW-7 were surveyed by licensed surveyors to establish accurate elevations.

2/ Machined aluminum well caps and bronze collars originally installed at MW-2, MW-3, and MW-7 were removed from the wells because of severe corrosion damage. The metal caps and collars were replaced with two-inch expansible plugs. The collar elevations of wells MW-2, MW-3, and MW-7 are now 0.03 feet lower.

3/ Monitoring well (MW-6) was decommissioned on behalf of PM Ag Products, Inc. by Sierra-Pacific on August 8, 1994. Monitoring well (MW-5) was decommissioned on behalf of Cargill, Inc. by Sierra-Pacific on August 25, 1995.

4/ Monitoring well (MW-8) was installed on behalf of Cargill, Inc. by Sierra-Pacific on February 12, 1996.

92033TBA.398/jsr

Table 2. Laboratory Test Results - Nitrogen Compounds 1/

Well, Sample Number, Date	TKN	NH_4-N	NO_3-N	Total-N 1/
Analyte Units	mg/ℓ	mg/ℓ	mg/ℓ	mg/ℓ
MW-2, 2241, 12/27/93	0.2	0.27	40.5	40.8
MW-2, 7770, 02/11/94	0.2	0.25	36.0	36.3
MW-2, 5514, 05/19/94	ND (0.20)	0.47	45.0	45.5
MW-2, 6123, 08/11/94	ND (0.20)	ND	42.8	42.8
MW-2, 6160, 11/02/94	ND (0.20)	NA	47.3	47.3
MW-2, 1115, 02/07/95	ND (0.20)	ND	42.8	42.8
MW-2, 991, 05/09/95	ND (0.20)	NA	40.5	40.5
MW-2, 996, 05/09/95 (dup)	ND (0.20)	NA	38.3	38.3
MW-2, 1211, 08/23/95	ND (0.20)	NA	40.5	40.5
MW-2, 924, 11/08/95	ND (0.20)	NA	40.5	40.5
MW-2, 819, 03/18/96	ND (0.20)	NA	33.8	33.8
MW-2, 5211, 03/18/96 1/	ND (0.50)	0.05	41	41
MW-2, 0806, 09/19/96	ND (0.20)	NA	27	27
MW-2, 0860, 02/26/97	0.34	NA	20.3	20.6
MW-2, 81801, 08/18/97	ND (0.20)	1.5	23	24.5
MW-2, 81808, 08/18/97 (dup)	NA	ND	21	NA
MW-2, 39981, 03/09/98	ND (0.20)	ND (0.082)	20	20
MW-3, 2243, 12/27/93	0.52	0.32	ND	0.52
MW-3, 7771, 02/11/94	1.6	0.58	ND	1.6
MW-3, 5513, 05/19/94	1.1	1.6	ND	1.6
MW-3, 5517, 05/19/94 (dup)	0.73	0.51	ND	0.73
MW-3, 6124, 08/11/94	0.39	0.37	ND	0.39
MW-3, 6161, 11/02/94	0.40	NA	ND	0.4

Table 2. Laboratory Test Results - Nitrogen Compounds (Continued)

Well, Sample Number, Date	TKN	NH_4-N	NO_3-N	Total-N 1/
Analyte Units	mg/ℓ	mg/ℓ	mg/ℓ	mg/ℓ
MW-3, 1114, 02/07/95	0.22	0.43	0.36	0.79
MW-3, 995, 05/09/95	0.22	NA	1.84	2.06
MW-3, 1209,08/23/95	ND (0.20)	NA	0.76	0.76
MW-3, 925, 11/08/95	0.20	NA	0.97	1.17
MW-3, 928, 11/08/95 (dup)	0.23	NA	1.78	2.01
MW-3, 820, 03/18/96	0.33	NA	ND	0.33
MW-3, 0807, 09/19/96	ND (0.20)	NA	20.9	20.9
MW-3, 0861, 02/26/97	0.31	NA	1.39	1.7
MW-3, 81802, 08/18/97	ND (0.20)	3.0	16	19
MW-3, 39982, 03/09/98	0.28	0.10	1.7	2.1
MW-4, 2245, 12/27/93	0.33	0.13	ND	0.33
MW-4, 7772, 02/11/94	1.2	0.34	0.31	1.5
MW-4, 5515, 05/19/94	0.30	0.28	ND	0.3
MW-4, 6125, 08/11/94	0.21	0.12	ND	0.21
MW-4, 6163, 11/02/94	0.37	NA	ND	0.37
MW-4, 1113, 02/07/95	ND (0.20)	0.12	0.36	0.48
MW-4, 994, 05/09/95	ND (0.20)	NA	0.49	0.49
MW-4, 1210, 08/23/95	ND (0.20)	NA	1.12	1.12
MW-4, 926, 11/08/95	ND (.0.20)	NA	0.25	0.25
MW-4, 821, 03/18/96	ND (0.20)	NA	0.72	0.72
MW-4, 0808, 09/19/96	ND (0.20)	NA	0.59	0.59
MW-4, 0862, 02/26/97	0.31	NA	0.18	0.49
MW-4, 81803, 08/18/97	ND (0.20)	0.40	1.2	1.6
MW-4, 39983, 03/09/98	0.37	ND (0.082)	0.52	0.89

Table 2. Laboratory Test Results - Nitrogen Compounds (Continued)

Well, Sample Number, Date	TKN	NH_4-N	NO_3-N	Total-N 1/
Analyte Units	mg/ℓ	mg/ℓ	mg/ℓ	mg/ℓ
MW-5, 2246, 12/27/93	0.31	0.09	2.7	3.0
MW-5, 7773, 02/11/94	2.7	0.25	0.72	3.4
MW-5, 5516, 05/19/94	0.31	0.15	3.6	3.9
MW-5, 6121, 08/11/94	ND (0.20)	ND	6.3	6.3
MW-5, 6164, 11/02/94	0.30	NA	4.3	4.6
MW-5, 1112, 02/07/95	ND (0.20)	ND	20.2	20.2
MW-5, 1110, 02/07/95 (dup)	ND (0.20)	ND	21.4	21.4
MW-5, 993, 05/09/95	ND (0.20)	NA	38.3	38.3
MW-5, 1212, 08/23/95	ND (0.20)	NA	31.5	31.5
MW-6, 6416 03/16/94	2.5	1.3	ND	2.5
MW-7, 6120, 08/11/94	0.34	0.13	0.27	0.61
MW-7, 6122, 08/11/94 (dup)	0.24	ND	ND	0.24
MW-7, 6162, 11/02/94	ND (0.20)	NA	ND	ND
MW-7, 6165, 11/02/94 (dup)	0.20	NA	ND	0.2
MW-7, 1111, 02/07/95	ND (0.20)	0.09	ND	0.09
MW-7, 992, 05/09/95	ND (0.20)	NA	ND	ND
MW-7, 1208, 08/23/95	ND (0.20)	NA	ND	ND
MW-7, 927, 11/08/95	ND (0.20)	NA	0.27	0.27
MW-7, 822, 03/18/96	ND (0.20)	NA	ND	ND

Table 2. Laboratory Test Results - Nitrogen Compounds (Continued)

Well, Sample Number, Date	TKN	NH_4-N	NO_3-N	Total-N 1/
Analyte Units	mg/ℓ	mg/ℓ	mg/ℓ	mg/ℓ
MW-7, 5212, 03/18/96 (dup) 1/	ND (0.50)	ND	ND	ND
MW-7, 0809, 09/19/96	ND (0.20)	NA	ND	ND
MW-7, 0863, 02/26/97	0.24	NA	ND	0.24
MW-7, 81804, 08/18/97	ND (0.20)	0.16	0.096	0.26
MW-7, 39984, 03/09/98	0.33	ND (0.082)	0.98	1.31
MW-8, 823, 03/18/96	ND (0.20)	NA	40.5	40.5
MW-8, 5213, 03/18/96 (dup) 1/	ND (0.50)	ND	45	45
MW-8, 0810, 09/19/96	ND (0.20)	NA	49.5	49.5
MW-8, 0811, 09/19/96 (dup)	ND (0.20)	NA	31.5	31.5
MW-8, 0864, 02/26/97	0.23	NA	13.7	13.9
MW-8, 81805, 08/18/97	ND (0.20)	ND	69	69
MW-8, 39985, 03/09/98	0.23	ND (0.082)	63	63
MW-8, 39986, 03/09/98 (dup)	ND (0.20)	ND (0.082)	64	64
San Joaquin River 2/	0.2	0.04	ND	0.24
Water Quality Goals 3/	NL	NL	10	NL

Continued

Table 2. Laboratory Test Results - Nitrogen Compounds (Continued)

1/ Water samples were analyzed by Sequoia Analytical, 819 Striker Avenue, Suite 8, Sacramento, California 95834. "NA" denotes that an analysis was not performed for that chemical parameter. "ND (0.20)" denotes the chemical parameter was not detected at the specified detection limit. "NL" denotes a parameter that is not listed by the State.

Duplicate ground-water samples were collected by the Regional Water Quality Control Board (RWQCB) on 03/18/96. The RWQCB samples were tested at Anlab, Analytical Laboratory, Sacramento, California. Anlab results were originally reported as nitrogen (NO_3-N) equivalents (eg. nitrate-as-nitrogen).

Under normal soil conditions, total-nitrogen (Total-N) is approximately equal to the sum of TKN and NO_3-N. Where applicable, Nitrate (NO_3) test results were converted to nitrogen-as-nitrate (NO_3-N) values by multiplying each reported result by 0.225.

2/ November 1991 water chemistry data for the San Joaquin River near Vernalis, California is shown for comparison. Vernalis is located about 20 miles south of Stockton. Data derived from U.S. Geological Survey, 1992, Water Resources Data - California, Water Year 1991: Water-Data Report CA-91-3, p. 322-329.

3/ Statewide water quality goals have been established by the Department of Health Services. Values shown include primary and secondary State maximum contaminant levels (MCL).

92033tbb.398/jsr

Table 3. Laboratory Test Results - Metals

Well Number, Sample Number, Date	Na mg/ℓ	Mg mg/ℓ	K mg/ℓ	Ca mg/ℓ	Mn mg/ℓ	Fe mg/ℓ	Cu mg/ℓ	Zn mg/ℓ
Detection Limits	25	0.1	1	0.5	0.01	0.01	0.01	0.01
MW-2, 2241, 12/27/93	320	18	2.8	91	0.04	0.13	ND	ND
MW-2, 7770, 02/11/94	310	57	9.2	93	1.5	10	0.04	0.13
MW-2, 5514, 05/19/94	290	46	1.8	93	0.13	9.9	ND	ND
MW-2, 6123, 08/11/94	310	5.9	3.6	120	1.5	9.8	0.05	0.1
MW-2, 6160, 11/02/94	300	48	2.8	97	0.64	19	0.06	0.05
MW-3, 2243, 12/27/93	440	130	6.9	260	2.4	0.35	ND	ND
MW-3, 7771, 02/11/94	450	130	6.9	250	3	2.5	ND	0.01
MW-3, 5513, 05/19/94	440	130	4.4	260	3.1	21	0.04	0.05
MW-3, 5517, 05/19/94	430	130	5.2	280	3.4	35	0.06	0.09
MW-3, 6124, 08/11/94	450	160	7.5	300	5.9	79	0.32	0.36
MW-3, 6161, 11/02/94	440	130	4.4	290	3.1	21	0.04	0.05
MW-4, 2245, 12/27/93	560	120	5.3	230	3	0.76	ND	ND
MW-4, 7772, 02/11/94	570	130	6.9	190	3.2	4	0.01	0.01
MW-4, 5515, 05/19/94	570	120	2.4	210	3.2	10	0.02	0.02
MW-4, 6125, 08/11/94	570	140	2.9	240	5.9	50	0.18	0.2
MW-4, 6163, 11/02/94	530	96	2.8	200	3.4	19	0.05	0.05
MW-5, 2246, 12/27/93	300	29	6.2	67	0.88	18	ND	ND
MW-5, 7773, 02/11/94	290	34	4.4	52	1.1	6.9	0.04	0.03
MW-5, 5516, 05/19/94	280	34	2.6	65	1.2	32	0.06	0.08
MW-5, 6121, 08/11/94	290	49	3.5	100	4.1	22	0.26	0.21
MW-5, 6164, 11/02/94	270	55	6.4	81	2.7	100	0.25	0.26

Table 3. Laboratory Test Results - Metals (Continued)

Well Number, Sample Number, Date	Na mg/ℓ	Mg mg/ℓ	K mg/ℓ	Ca mg/ℓ	Mn mg/ℓ	Fe mg/ℓ	Cu mg/ℓ	Zn mg/ℓ
Detection Limits	25	0.1	1	0.5	0.01	0.01	0.01	0.01
MW-7, 6120, 08/11/94	590	78	12	150	1.1	57	ND	0.02
MW-7, 6122, 08/11/94	600	79	9.8	150	1.2	53	ND	0.02
MW-7, 6162, 11/02/94	600	81	4.4	160	1.5	0.26	0.01	ND
MW-7, 6165, 11/02/94	570	91	3.3	190	2.3	0.2	ND	ND
San Joaquin River 5/	79	18	2.7	32	0.03	0.01	0	0.01
Water Quality Goals 6/	NL	NL	NL	NL	0.05	0.3	1	5

4/ Water samples were analyzed by Sequoia Analytical, 819 Striker Avenue, Suite 8, Sacramento, California 95834. "ND" denotes that the chemical parameter was not detected during analysis. "NA" denotes that an analysis was not performed for that chemical parameter. "NL" denotes a parameter that is not listed by the State. Metals have not been analyzed since November 11, 1994.

5/ November 1991 water chemistry data for the San Joaquin River near Vernalis, California is shown for comparison. Vernalis is located about 20 miles south of Stockton. Data derived from U.S. Geological Survey, 1992, Water Resources Data - California, Water Year 1991: Water-Data Report CA-91-3, p. 322-329.

6/ Statewide water quality goals have been established by the Department of Health Services. Values shown include primary and secondary State maximum contaminant levels (MCL).

92033tbc.398/jsr

Table 4. Laboratory Test Results - Anions and Field Test Results

Well, Sample Number, Date	HCO_3	Cl	SO_4	Hard	pH 2/	Sp Cond	TDS
Analyte Units	mg/ℓ	mg/ℓ	mg/ℓ	mg/ℓ	units	μmhos/c	mg/ℓ
Detection Limits	1	0.2	0.1	1	0.1	10	5
MW-2, 2241, 12/27/93	540	270	120	300	7.2	1800	1400
MW-2, 7770, 02/11/94	600	480	200	550	6.9	1800	1000
MW-2, 5514, 05/19/94	550	240	110	420	6.9	2200	1400
MW-2, 6123, 08/11/94	530	250	110	540	7.3	1800	1300
MW-2, 6160, 11/02/94	560	240	100	440	7.1	1900	1400
MW-2, 1115, 02/07/95	NA	NA	NA	NA	NA	2410	NA
MW-2, 0991, 05/09/95	NA	NA	NA	NA	NA	NA	NA
MW-2, 0996, 05/09/95	NA	NA	NA	NA	NA	NA	NA
MW-2, 1211, 08/23/95	NA	NA	NA	NA	NA	NA	NA
MW-2, 0924, 11/08/95	NA	NA	NA	NA	NA	NA	NA
MW-2, 0819, 03/18/96	NA	NA	NA	NA	6.89	1950	1200
MW-2, 5211, 03/18/96 1/	NA	NA	NA	NA	NA	NA	1300
MW-2, 0806, 09/19/96	NA	NA	NA	NA	6.81	1770	1200
MW-2, 0860, 02/26/97	NA	NA	NA	NA	7.47	2060	1400
MW-2, 81801, 08/18/97	NA	360	NA	NA	6.92	1880	1400
MW-2, 39981, 03/09/98	NA	390	NA	NA	6.16	2010	1400
MW-3, 2243, 12/27/93	460	1400	16	1200	7.3	3900	2900
MW-3, 7771, 02/11/94	560	1500	16	1300	7	4000	3200
MW-3, 5513, 05/19/94	530	1300	12	1200	7	5000	3600
MW-3, 5517, 05/19/94	470	1300	14	1200	7	5000	3500
MW-3, 6124, 08/11/94	510	1200	33	1400	7.2	4000	3500
MW-3, 6161, 11/02/94	540	1200	5.6	1200	7.1	4100	3800
MW-3, 1114, 02/07/95	NA	NA	NA	NA	NA	4760	NA
MW-3, 0995, 06/09/95	NA	NA	NA	NA	NA	NA	NA

Table 4. Laboratory Test Results- Anions and Field Test Results (Continued)

Well, Sample Number, Date	HCO_3	Cl	SO_4	Hard	pH 2/	Sp Cond	TDS
Analyte Units	mg/ℓ	mg/ℓ	mg/ℓ	mg/ℓ	units	μmhos/c	mg/ℓ
Detection Limits	1	0.2	0.1	1	0.1	10	5
MW-3, 1209, 08/23/95	NA	NA	NA	NA	NA	NA	NA
MW-3, 0925, 11/08/95	NA	NA	NA	NA	NA	NA	NA
MW-3, 0928, 11/08/95	NA	NA	NA	NA	NA	NA	NA
MW-3, 0820, 03/18/96	NA	NA	NA	NA	6.95	4870	3000
MW-3, 0807, 09/19/96	NA	NA	NA	NA	6.59	5190	3400
MW-3, 0861, 02/26/97	NA	NA	NA	NA	7.19	4700	3400
MW-3, 81802, 08/18/97	NA	1400	NA	NA	6.77	4130	3600
MW-3, 39982, 03/09/98	NA	1300	NA	NA	5.63	3790	3300
MW-4, 2245, 12/27/93	870	1200	84	1100	7.4	3800	3000
MW-4, 7772, 02/11/94	890	1300	210	1000	7.1	3800	2800
MW-4, 5515, 05/19/94	760	1100	100	1000	6.9	5000	2900
MW-4, 6125, 08/11/94	750	1000	120	1200	7.2	3900	2800
MW-4, 6163, 11/02/94	890	910	120	900	6.9	4000	2800
MW-4, 1113, 02/07/95	NA	NA	NA	NA	NA	4340	NA
MW-4, 0994, 05/09/95	NA	NA	NA	NA	NA	NA	NA
MW-4, 1210, 08/23/95	NA	NA	NA	NA	NA	NA	NA
MW-4, 0926, 11/08/95	NA	NA	NA	NA	NA	NA	NA
MW-4, 0821, 03/18/96	NA	NA	NA	NA	6.9	3330	2000
MW-4, 0808, 09/19/96	NA	NA	NA	NA	6.68	3390	2000
MW-4, 0862, 02/26/97	NA	NA	NA	NA	7.2	2630	1700
MW-4, 81803, 08/18/97	NA	620	NA	NA	6.98	2560	2000
MW-4, 39983, 03/09/98	NA	550	NA	NA	7.13	2860	1900
MW-5, 2246, 12/27/93	710	84	200	290	7.5	1500	1200

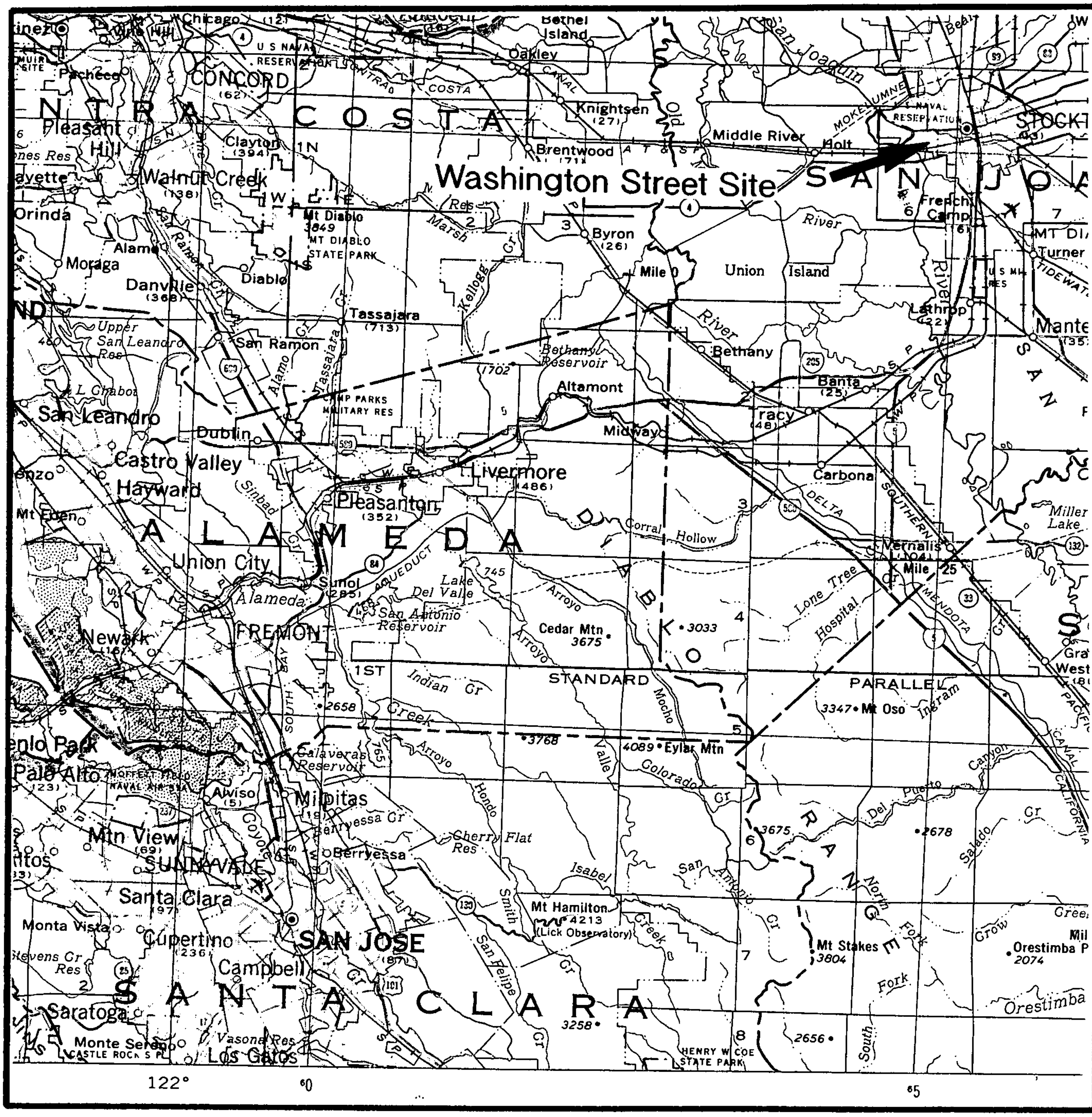
Table 4. Laboratory Test Results- Anions and Field Test Results (Continued)

Well, Sample Number, Date	HCO_3	Cl	SO_4	Hard	pH 2/	Sp Cond	TDS
Analyte Units	mg/ℓ	mg/ℓ	mg/ℓ	mg/ℓ	units	μmhos/c	mg/ℓ
Detection Limits	1	0.2	0.1	1	0.1	10	5
MW-5, 7773, 02/11/94	370	32	220	300	7.3	1200	500
MW-5, 5516, 05/19/94	510	31	240	300	7.1	1700	1100
MW-5, 6121, 08/11/94	200	19	200	450	7.5	1400	980
MW-5, 6164, 11/02/94	670	31	470	430	7.2	1500	1100
MW-5, 1112, 02/07/95	NA	NA	NA	NA	NA	NA	NA
MW-5, 1110, 02/07/95	NA	NA	NA	NA	NA	2080	NA
MW-5, 0993, 05/09/95	NA	NA	NA	NA	NA	NA	NA
MW-5, 1212, 08/23/95	NA	NA	NA	NA	NA	NA	NA
MW-6, 6416, 03/16/94	NA	NA	NA	NA	NA	NA	NA
MW-7, 6120, 08/11/94	660	820	45	700	7	3200	2400
MW-7, 6122, 08/11/94	640	920	28	700	7.2	3200	2300
MW-7, 6162, 11/02/94	820	930	13	740	6.7	3800	2400
MW-7, 6165, 11/02/94	810	840	13	840	6.8	3800	2500
MW-7, 1111, 02/07/95	NA	NA	NA	NA	NA	4840	NA
MW-7, 0992, 05/09/95	NA	NA	NA	NA	NA	NA	NA
MW-7, 1208, 08/23/95	NA	NA	NA	NA	NA	NA	NA
MW-7, 0927, 11/08/95	NA	NA	NA	NA	NA	NA	NA
MW-7, 0822, 03/18/96	NA	NA	NA	NA	6.76	4710	2500
MW-7, 5212, 03/18/96 1/	NA	NA	NA	NA	NA	NA	2600
MW-7, 0809, 09/19/96	NA	NA	NA	NA	6.59	4640	1700

Table 4. Laboratory Test Results- Anions and Field Test Results (Continued)

Well, Sample Number, Date	HCO_3	Cl	SO_4	Hard	pH 2/	Sp Cond	TDS
Analyte Units	mg/ℓ	mg/ℓ	mg/ℓ	mg/ℓ	units	μmhos/c	mg/ℓ
Detection Limits	1	0.2	0.1	1	0.1	10	5
MW-7, 0863, 02/26/97	NA	NA	NA	NA	6.32	4490	2900
MW-7, 81804, 08/18/97	NA	1300	NA	NA	6.35	3930	2900
MW-7, 39984, 03/09/98	NA	3000	NA	NA	6.76	4250	3000
MW-8, 0823, 03/18/96	NA	NA	NA	NA	7.1	2160	1600
MW-8, 5213, 03/18/96 1/	NA	NA	NA	NA	NA	NA	1600
MW-8, 0810, 09/19/96	NA	NA	NA	NA	6.93	2110	1700
MW-8, 0811, 09/19/96	NA	NA	NA	NA	6.93	2110	1600
MW-8, 0864, 02/26/97	NA	NA	NA	NA	7.3	2490	1900
MW-8, 81805, 08/18/97	NA	110	NA	NA	7.11	2110	1900
MW-8, 39985, 03/09/98	NA	58	NA	NA	7.24	2070	2000
MW-8, 39986, 03/09/98 (dup)	NA	60	NA	NA	7.24	2070	2000
San Joaquin River 3/	126	110	91	150	7.6	750	410
Water Qual. Goals 4/	NL	250	250	NL	6.5 - 8.5	900	500

Continued



10 MILES

1:500,000 Scale

Modified from USGS 1:500,000 scale planimetric map of northern California.

Figure 1

REGIONAL LOCATION MAP

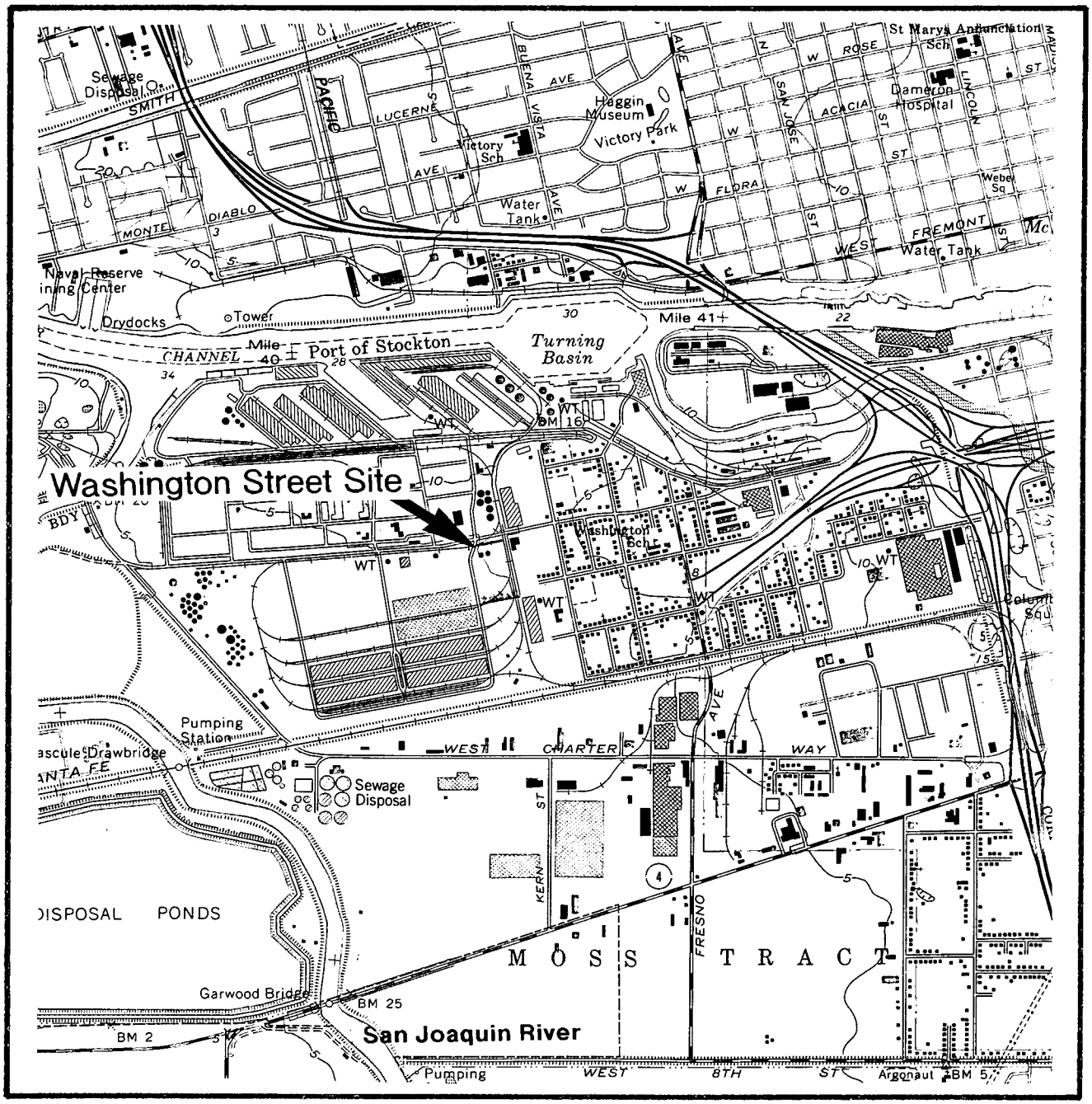
Sierra-Pacific Groundwater Consultants, Inc.

PREPARED BY: JPapp	REVIEWED BY: CWM 5/10/94
CAD NO. CAD033A.GCD	REV DATE: 11/30/92

HWY I-5

R 6 E

T 1 N



ONE MILE

Scale 1:24,000

CONTOUR INTERVAL - 5 FEET

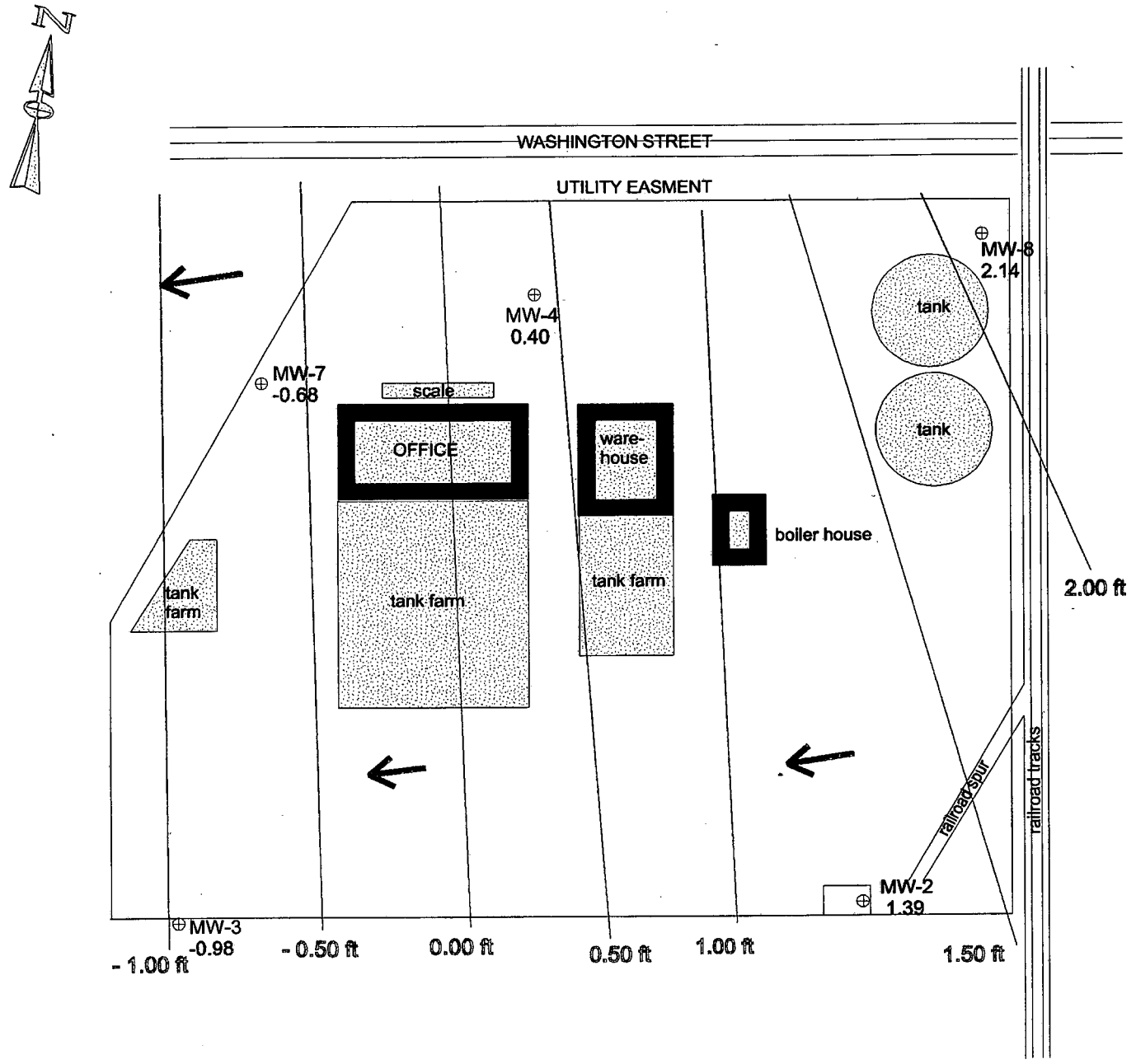
Modified from USGS 7.5 Minute Stockton West, CA Quadrangle.

Figure 2

STOCKTON WEST 7.5' USGS QUADRANGLE

Sierra-Pacific Groundwater Consultants, Inc.

PREPARED BY:	REVIEWED BY: 5/10/94
CAD NO. CAD033B.GCD	REV DATE: 04/06/93



The potentiometric surface sloped S75W with 0.0066 gradient on 3/9/98.
The elevation contours are based on a datum of mean sea level (USGS).

EXPLANATION

MW-3 -0.98 — Monitoring well (showing ground-water elevation)

Potentiometric contour and groundwater flow direction

Note that the collar-elevation of each well has been surveyed twice.

Figure 3

WASHINGTON STREET SITE MAP
SHOWING POTENTIOMETRIC SURFACE

Sierra-Pacific Groundwater Consultants, Inc.

Prep by: J. Killey	Reviewed by:
Corel No. WASH 1st Q 98.CDR	Prep date: 4/10/98

Figure 4
Hydrograph

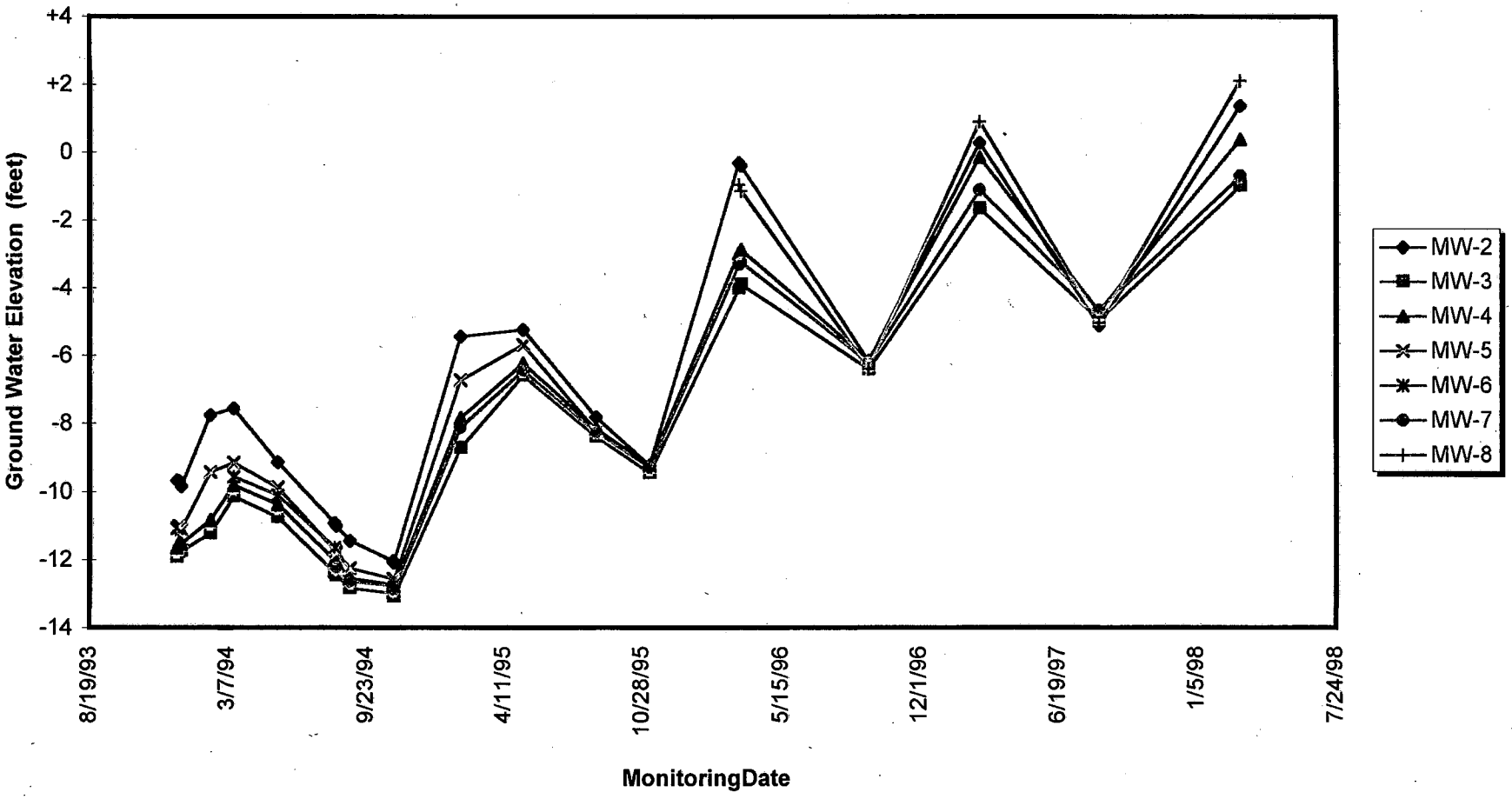
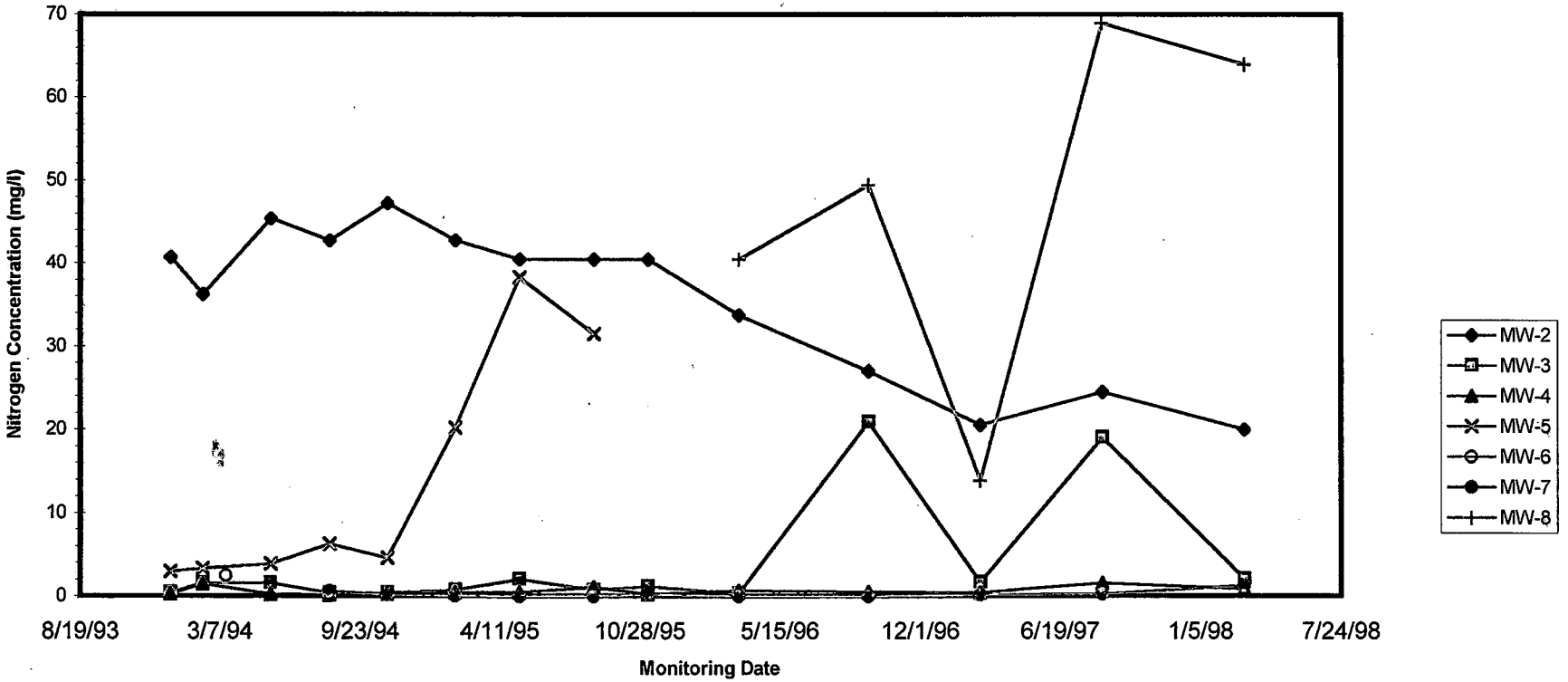


Figure 5
Total Nitrogen Concentration



APPENDIX A

Field Notes

SIERRA-PACIFIC GROUNDWATER CONSULTANTS, INC.

DAILY WORK ACTIVITIES LOG

Field Activity: SEMI-ANNUAL MONITOR Start Date: 9/9/98

Location: WASHINGTON STREET Finish Date: 9/9/98

Date: 9/9/98 Weather: SUNNY

Time	Activities
800-915	TRAVEL TO STOCKTON
915-1000	USE METAL DETECTOR TO FIND OLD WELL AT CARGILL WEST, PORT ROAD NO. 8
1000-1015	CHECK IN WITH JACK HOLM AT WESTWAY
1015-1030	LOCATE WELL NO. 2 AT SE CORNER
1030-1115	LOOK FOR CARGILL WEST WELL WITH JACK HOLM. FOUND IT, NO COVER, VAULT -
1115-1215	LUNCH
1215-1315	PULL WELL COVERS AND CAPS MW-7 - VAULT BROKEN BUT SEALED WITH SILICON SEALER, FLOODED, UNDER SIGNIFICANT PRESSURE. BAILED OUT NO WATER GOT PAST THE EXPANSION PLUG MW-2 - VAULT FLOODED, BUT SEALED WITH SILICON. MACHINED ALUMINUM CAP WAS CORRODED ON BRONZE COLLAR. REMOVED TO EXPOSE PLASTIC PIPE. UNDER SIGNIFICANT PRESSURE MW-8 - MINOR FLOODING, VAULT IN GOOD SHAPE, REPLACE LOCK NO SIGNIF PRESSURE MW-4 - VAULT CONCRETE DAMAGED, NO FLOODING.

Activities Summary: NH4-N, TKN, NO3-N, TDS, Cl

Team Signatures:
1. J. Ralph
2.

SIERRA-PACIFIC GROUNDWATER CONSULTANTS, INC.

DAILY WORK ACTIVITIES LOG

Field Activity: MONITORING

Location: WASHINGTON STREET

Date: 3/9/98

Start Date:

Finish Date:

Weather: SUNNY

Time	Activities
	MW-3, VAULT IN GOOD SHAPE, FLOODED
1345-1405	NOTES, LABELS, COC, WAIT A LITTLE LONGER FOR WELLS TO EQUALIZE.
1405-1430	MEASURE WATER LEVELS. EACH WELL WAS ALLOWED TO EQUALIZE FOR AT LEAST ONE HOUR
1430-1442	SET UP AT MW-7
1442-1510	PURGE 9 GALLONS FROM MW-7, COLLECT WATER SAMPLES, RINSE PUMP AND HOSE, MOVE
1510-1540	PURGE 12 GALLONS FROM MW-8, COLLECT WATER SAMPLES AND DUPLICATES, RINSE PUMP, MOVE
1540-1603	PURGE 15 GALLONS FROM MW-4, COLLECT WATER SAMPLES, RINSE PUMP, MOVE.
1603-1645	PURGE 9 GALLONS WITH DISPOSABLE BAILER, COLLECT WATER SAMPLES, MOVE
1645-1700	PURGE 15 GALLONS FROM MW-03, COLLECT WATER SAMPLES, LOAD TRUCK.
1700-1830	TRAVEL TO EL DORADO HILLS

Activities Summary:

1710 leave

Team Signatures:

1. [signature]

2.

Page 2 of 10

SIERRA-PACIFIC GROUNDWATER CONSULTANTS, INC.

Ground-Water Level Data

Sierra-Pacific Project No.: 97 - 033 - 04 Project Location: WASHINGTON STREET

Date: 03 - 09 - 98 Recorder: JOHN RAPP Measuring Device: SOLINST

M-Well No.	Time	Reference Elevation	Depth to G.W.	G.W. Elevation	Free Product Thickness	Comments
MW-2	14:12	2.26	0.87	1.39	NONE	NOW PVC (-0.03 ELEV)
MW-3	14:28	2.14	3.12	-0.98	NONE	NOW PVC (-0.03 ELEV)
MW-4	14:21	3.18	2.78	0.40	NONE	BRONZE COLLAR
MW-7	14:05	2.37	3.05	-0.68	NONE	NOW PVC (-0.03 ELEV)
MW-8	14:17	4.80	2.66	2.14	NONE	BRONZE COLLAR

PAGE 3

Sampling Information

Sampling Point MW-2 Project WASHINGTON STREET

Location SOUTHEAST CORNER Project No. _____

Sample ID# 39981 Date Sampled 3/9/98 Time 16:30 am/pm

Describe Sampling Point FLUSH-MOUNTED WELL, NORMALLY BURIED IN CRUSHED STONE DUE TO 1997 CONSTRUCTION

Well Depth 19.7 feet below MP. Casing Diameter 2 in

Depth to Water (below MP) 0.87 feet Date 3/9/98 Time 14:12 am (pm)

At least 3 bore volumes have been removed before sampling.

Sampling Method: O Tap O Submersible Pump X Bailer O Other

Pump Intake or Bailer Set at N/A feet below MP.

Tubing Type O Teflon O Other _____

Sample Appearance CRYSTAL CLEAR SOME MOLASSES IN FLOOD WATER Odor NONE

Note any Sampling Problems NONE

Note any Cleaning Performed in Field NONE

Samples Collected: 500 ML w/ H_2SO_4, 500 ML PLASTIC w/o

SAMPLING DATA

Time	pH	Conduc.	Temp.	Water Level	Removal Volume	Pumping Rate Rate
16:03				0.87		START BAILING
16:10	6.16	2060	63.6		3 GALS	
16:19	6.11	2070	64.2		6 GALS	WELL RECHARGED NICELY AT
16:26	6.16	2010	63.4		9 GALS	0.3 GPM
16:30				2.50	10 GALS	SAMPLES

Bailing Start Time 16:03 am/(pm) Water Level -0.87

Bailing Stop Time 16:30 am/(pm) Water Level -2.5 FEET

Comments: FIELDS NORTHEAST AND EAST OF WELL FLOODED. BYWAY SITE FLOODED IN SOUTHEAST CORNER

Completed By: J. Ralph Witnessed By: EXPANSIBLE PLUG

Sampling Information

Sampling Point MW-3 Project WASHINGTON STREET

Location SOUTHWEST CORNER Project No. _____

Sample ID# 39982 Date Sampled 3/9/98 Time 16:57 am/(pm)

Describe Sampling Point FLUSH-MOUNTED WELL LOCATED OUTSIDE THE FENCE

Well Depth 25 feet below MP. SOFT BOTTOM GREENISH-GRAY SILT Casing Diameter 2 in

Depth to Water (below MP) 3.12 feet Date 3/9/98 Time 14:28 am/(pm)

At least _____ bore volumes have been removed before sampling.

Sampling Method: O Tap (X) Submersible Pump O Bailer O Other

Pump Intake or Bailer Set at 19 feet below MP.

Tubing Type O Teflon O Other _____

Sample Appearance GREENISH-GRAY TO CLEAR Odor NONE

Note any Sampling Problems NONE

Note any Cleaning Performed in Field RINSE PUMP AND HOSE AT HOME

Samples Collected: 500 ML W/ H_2SO_4 500 ML W/O

SAMPLING DATA

Time	pH	Conduc.	Temp.	Water Level	Removal Volume	Pumping Rate Rate
16:45				3.12		START
16:48	5.60	3690	66.6		5 GALS	1.5 GPM
16:51	5.61	3740	67.0		10 GALS	
16:54	5.63	3790	67.1		15 GALS	
16:57					~20 GALS	SAMPLES

Bailing Start Time 16:45 am/(pm) Water Level 3.12

Bailing Stop Time 16:57 am/(pm) Water Level _____

Comments: AREA PARTLY FLOODED

Completed By: J. Rapp Witnessed By: EXPANSIBLE PLUG

Sampling Information

Sampling Point MW-4 Project WASHINGTON STREET

Location PARKING LOT Project No. 92-033.04

Sample ID# 39983 Date Sampled 3/9/98 Time 15:52 am (pm)

Describe Sampling Point FLUSH-MOUNTED WELL

Well Depth 24 feet below MP. SOFT BOTTOM, GREEN SILT Casing Diameter 2 in

Depth to Water (below MP) 2.78 feet Date 3/9/98 Time 14:21 am (pm)

At least 4 bore volumes have been removed before sampling.

Sampling Method: O Tap X Submersible Pump O Bailer O Other

Pump Intake or Bailer Set at 19 feet below MP.

Tubing Type O Teflon O Other

Sample Appearance GREENISH-GRAY TO CLEAR Odor NONE

Note any Sampling Problems NONE

Note any Cleaning Performed in Field RINSE PUMP AND HOSE

Samples Collected: 500 ML W/ H_2SO_4 500ML PLASTIC W/O

SAMPLING DATA

Time	pH	Conduc.	Temp.	Water Level	Removal Volume	Pumping Rate Rate
15:40				2.78		START
15:43	7.13	2620	66.8		5 GALS	1.5 GPM
15:46	7.14	2810	69.1		10 GALS	
15:49	7.13	2860	68.8		15 GALS	
15:52					<20 GALS	SAMPLES

Bailing Start Time 15:40 am/(pm) Water Level 2.78

Bailing Stop Time 15:52 am/pm Water Level —

Comments:

Completed By: J Rapp Witnessed By: ALUMINUM CAP

Sampling Information

Sampling Point MW-7 Project WASHINGTON STREET

Location DRIVEWAY Project No. 92-033.04

Sample ID# 39984 Date Sampled 3/9/98 Time 14:50 am/(pm)

Describe Sampling Point FLUSH-MOUNTED WELL WITH DAMAGED WELL BOX. EXPANSION PLUG REPLACEMENT

Well Depth 19.60 feet below MP. Casing Diameter 2 in

Depth to Water (below MP) 3.05 feet Date 3/9/98 Time 14:05 am/(pm)

At least 3 bore volumes have been removed before sampling.

Sampling Method: O Tap X Submersible Pump O Bailer O Other

Pump Intake or Bailer Set at 19 feet below MP.

Tubing Type O Teflon O Other

Sample Appearance GREENISH-GRAY SILT THEN CRYSTAL CLEAR Odor NONE

Note any Sampling Problems NONE

Note any Cleaning Performed in Field RINSE PUMP AND HOSE

Samples Collected: 500 ML PLASTIC W/ H_2SO_4, 500 ML PLASTIC W/O

SAMPLING DATA

Time	pH	Conduc.	Temp.	Water Level	Removal Volume	Pumping Rate Rate
1442				3.05		START
1444	6.76	4140	68.1		3 GALS	1.5 GPM
1446	6.75	4210	68.4		6 GALS	
1448	6.76	4250	69.0		9 GALS	
1450					11 GALS	SAMPLE

Bailing Start Time 14:42 am/(pm) Water Level 3.05

Bailing Stop Time 14:50 am/pm Water Level ———

Comments: EXCELLENT SAMPLES. WELL BOX FLOODED. CAP UNDER SIGNIFICANT PRESSURE.

Completed By: J Rapp Witnessed By: EXPANSIBLE PLUG

Sampling Information

Sampling Point MW-8 Project WASHINGTON STREET

Location NORTHEAST CORNER Project No. 92-033.04

Sample ID# 39985 39986 D Date Sampled 3/9/98 Time 15:20 am/(pm)

Describe Sampling Point FLUSH-MOUNTED WELL NEAR TANK

Well Depth 20.77 feet below MP. Casing Diameter 2 in

Depth to Water (below MP) 2.66 feet Date 3/9/98 Time 14:18 am/(pm)

At least 4 bore volumes have been removed before sampling.

Sampling Method: O Tap X Submersible Pump O Bailer O Other

Pump Intake or Bailer Set at 19 feet below MP.

Tubing Type O Teflon O Other

Sample Appearance GRAYISH-BROWN SILTY TO CLEAR Odor NONE

Note any Sampling Problems NONE (NEWEST WELL)

Note any Cleaning Performed in Field RINSE PUMP AND HOSE

Samples Collected: 2-500 ML PLASTIC w/H_2SO_4, 2-500 ML PLASTIC w/o DUPLICATE HERE

SAMPLING DATA

Time	pH	Conduc.	Temp.	Water Level	Removal Volume	Pumping Rate Rate
1510				2.66		START
1513	7.12	1990	62.6		4 GALS	1.5 GPM
1516	7.17	2020	61.7		8 GALS	
1519	7.24	2070	62.6		12 GALS	
1520					14 GALS	SAMPLES

Bailing Start Time 15:10 am/(pm) Water Level 2.66

Bailing Stop Time 15:19 am/(pm) Water Level —

Comments: NO DIFFICULTY WITH SAMPLING. FIELDS TO THE NORTHEAST AND EAST WERE STILL FLOODED.

Completed By: J. Raff Witnessed By: ALUMINUM CAP

APPENDIX B

Laboratory Reports and Chain-of-Custody

RECEIVED APR - 2 1998

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Sierra Pacific Groundwater	Client Project ID:	Unocal, Washington Street	Sampled: Mar 9, 1998
4911 Windplay Dr., Ste. 4	Sample Descript:	Water	Received: Mar 10, 1998
El Dorado Hills, CA 95762	Analysis for:	Total Kjeldahl Nitrogen	Analyzed: Mar 19, 1998
Attention: John Rapp	First Sample #:	803-0411	Reported: Mar 24, 1998

LABORATORY ANALYSIS FOR: Total Kjeldahl Nitrogen

Sample Number	Sample Description	Reporting Limit mg/L	Sample Result mg/L	
803-0411	39981	0.20	N.D.	
803-0412	39982	0.20	0.28	
803-0413	39983	0.20	0.37	
803-0414	39984	0.20	0.33	
803-0415	39985	0.20	~~1.4~~	4/17/98 Re-run verbally reported as 0.23. Written correction to be issued.
803-0416	39986	0.20	N.D.	

Analytes reported as N.D. were not detected at or above the reporting limit.

SEQUOIA ANALYTICAL, ELAP #1210

Linda C. Schneider
Project Manager/Sacramento Laboratory

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Sierra Pacific Groundwater	Client Project ID:	Unocal, Washington Street	Sampled:	Mar 9, 1998
4911 Windplay Dr., Ste. 4	Sample Descript:	Water	Received:	Mar 10, 1998
El Dorado Hills, CA 95762	Analysis for:	Ammonium as N	Analyzed:	Mar 15, 1998
Attention: John Rapp	First Sample #:	803-0411	Reported:	Mar 24, 1998

LABORATORY ANALYSIS FOR: Ammonium as N

Sample Number	Sample Description	Reporting Limit mg/L	Sample Result mg/L
803-0411	39981	0.082	N.D.
803-0412	39982	0.082	0.10
803-0413	39983	0.082	N.D.
803-0414	39984	0.082	N.D.
803-0415	39985	0.082	N.D.
803-0416	39986	0.082	N.D.

Analytes reported as N.D. were not detected at or above the reporting limit.

SEQUOIA ANALYTICAL, ELAP #1624

Linda C. Schneider
Project Manager/Sacramento Laboratory

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Sierra Pacific Groundwater	Client Project ID:	Unocal, Washington Street	Sampled:	Mar 9, 1998
4911 Windplay Dr., Ste. 4	Sample Descript:	Water	Received:	Mar 10, 1998
El Dorado Hills, CA 95762	Analysis for:	Nitrate as N	Analyzed:	Mar 11, 1998
Attention: John Rapp	First Sample #:	803-0411	Reported:	Mar 24, 1998

LABORATORY ANALYSIS FOR: Nitrate as N

Sample Number	Sample Description	Reporting Limit mg/L	Sample Result mg/L
803-0411	39981	0.23	20
803-0412	39982	0.12	1.7
803-0413	39983	0.046	0.52
803-0414	39984	0.046	0.98
803-0415	39985	0.46	63
803-0416	39986	0.46	64

Analytes reported as N.D. were not detected at or above the reporting limit.

SEQUOIA ANALYTICAL, ELAP #1624

Linda C. Schneider
Project Manager/Sacramento Laboratory

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Sierra Pacific Groundwater	Client Project ID:	Unocal, Washington Street	Sampled: Mar 9, 1998
4911 Windplay Dr., Ste. 4	Sample Descript:	Water	Received: Mar 10, 1998
El Dorado Hills, CA 95762	Analysis for:	Total Dissolved Solids	Analyzed: Mar 13, 1998
Attention: John Rapp	First Sample #:	803-0411	Reported: Mar 24, 1998

LABORATORY ANALYSIS FOR: Total Dissolved Solids

Sample Number	Sample Description	Reporting Limit mg/L	Sample Result mg/L	
803-0411	39981	5.0	1,400	
803-0412	39982	5.0	3,300	
803-0413	39983	5.0	~~19,000~~	4/17/98 re-run reported as 1,900. Written correction to be issued.
803-0414	39984	5.0	3,000	
803-0415	39985	5.0	2,000	
803-0416	39986	5.0	2,000	

Analytes reported as N.D. were not detected at or above the reporting limit.

SEQUOIA ANALYTICAL, ELAP #1624

Linda C. Schneider
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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Sierra Pacific Groundwater	Client Project ID:	Unocal, Washington Street	Sampled:	Mar 9, 1998
4911 Windplay Dr., Ste. 4	Sample Descript:	Water	Received:	Mar 10, 1998
El Dorado Hills, CA 95762	Analysis for:	Chloride	Analyzed:	Mar 24, 1998
Attention: John Rapp	First Sample #:	803-0411	Reported:	Mar 24, 1998

LABORATORY ANALYSIS FOR: Chloride

Sample Number	Sample Description	Reporting Limit mg/L	Sample Result mg/L
803-0411	39981	10	390
803-0412	39982	20	1,300
803-0413	39983	10	550
803-0414	39984	20	1,200
803-0415	39985	1.0	58
803-0416	39986	1.0	60

Analytes reported as N.D. were not detected at or above the reporting limit.

SEQUOIA ANALYTICAL, ELAP #1624

Linda C. Schneider
Project Manager/Sacramento Laboratory

Sequoia Analytical

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Sierra Pacific Groundwater
4911 Windplay Dr., Ste. 4
El Dorado Hills, CA 95762
Attention: John Rapp

Client Project ID: Unocal, Washington Street
Matrix: Water
QC Sample Group: 8030411-0416
Reported: Mar 24, 1998

QUALITY CONTROL DATA REPORT

ANALYTE	Total Dissolved Solids	Chlorides	Nitrate	Ammonia	Total Kjeldahl Nitrogen
Method:	EPA 160.1	EPA 300.0	EPA 300.0	EPA 350.3	EPA 351.4
Analyst:	L.M./K.M./S.P.	L.M./K.M.	L.M./K.M.	K. Marchand	K. Cesar
Concentration Spiked:	500 mg/L	50 mg/L	100 mg/L	82 mg/L	100 mg/L
LCS Batch#:	LCS031398	LCS031198	LCS031198	LCS031598	LCS031998
Date Prepared:	03/13/98	03/11/98	03/11/98	03/15/98	03/19/98
Date Analyzed:	03/13/98	03/11/98	03/11/98	03/15/98	03/19/98
Instrument I.D.#:	BAL-4	IC-1	IC-1	MV-1	Manual
LCS % Recovery:	100	101	98	98	82
Control Limits:	80-120%	80-120%	80-120%	80-120%	80-120%
MS/MSD Batch #:	8030411	8011000	8011000	8030326	9803A10-6
Date Prepared:	03/13/98	03/11/98	03/11/98	03/15/98	03/19/98
Date Analyzed:	03/13/98	03/11/98	03/11/98	03/15/98	03/19/98
Instrument I.D.#:	BAL-4	IC-1	IC-1	MV-1	Manual
Matrix Spike % Recovery:	98	96	96	98	22
Matrix Spike Duplicate % Recovery:	102	95	96	102	23
Relative % Difference:	4.0	1.0	0.0	4.0	4.5

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

SEQUOIA ANALYTICAL

Linda C. Schneider
Project Manager/Sacramento Laboratory

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Sierra Pacific Groundwater
4911 Windplay Dr., Ste. 4
El Dorado Hills, CA 95762
Attention: John Rapp

Client Project ID: Unocal, Washington Street

Lab Project ID: 8030411-0416

Reported: Mar 24, 1998

LAB NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 8 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

SEQUOIA ANALYTICAL, ELAP #1624

Linda C. Schneider
Project Manager/Sacramento Laboratory

UNOCAL 76

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☐ 18939 120th Ave., N.E., Suite 101 • Bothell, WA 98011 • (206) 481-9200
☐ East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
☐ 15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9800

Consultant Company: SIERRA-PACIFIC GWC	Project Name: WASHINGTON STREET
Address: 4011 WINDPLAY DRIVE	UNOCAL Project Manager: W.T. NICKERSON
City: EL DORADO HILLS State: CA Zip Code: 95762	AFE #:
Telephone: 916 933 1468 FAX #: 933 3197	Site #, City, State:
Report To: RAPP Sampler: RAPP	QC Data: ☒ Level D (Standard) ☐ Level C ☐ Level B ☐ Level A

Turnaround Time: ☒ 10 Work Days ☐ 5 Work Days ☐ 3 Work Days ☐ 2 Work Days ☐ 1 Work Day ☐ 2-8 Hours

CODE: ☐ Misc. ☒ Detect. ☐ Eval. ☐ Remed. ☐ Demol. ☐ Closure

☐ Drinking Water ☐ Waste Water ☒ Other

Analyses Requested

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	TKN	NH4-N	NO3-N	TDS	Cl-	Comments
1. 39981	3/9/98 16:30	WATER	2	PLASTIC	5803-0411	✓	✓	✓	✓	✓	
2. 39982	" 16:54	"	2	"	0412	✓	✓	✓	✓	✓	
3. 39983	" 15:52	"	2	"	0413	✓	✓	✓	✓	✓	
4. 39984	" 14:50	"	2	"	0414	✓	✓	✓	✓	✓	
5. 39985	" 15:20	"	2	"	0415	✓	✓	✓	✓	✓	
6. 39986	" 17:00	"	2	"	0416	✓	✓	✓	✓	✓	
7.											
8.											
9.											
10.											

Relinquished By: J Rapp	Date: 3/10/98	Time: 6:00	Received By: Judith B Rapp	Date: 3/10/98	Time: 6:00
Relinquished By: Judith B Rapp	Date: 3/10/98	Time: 12:25	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab: Enditha	Date: 3/10/98	Time: 1225

Were Samples Received in Good Condition? ☐ Yes ☐ No Samples on Ice? ☐ Yes ☐ No Method of Shipment HAND Page 1 of 1

To be completed upon receipt of report:

1) Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? _____

2) Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? _____

Approved by: _____ Sign _____ Company _____ Date: _____

Pink - Client

Yellow - Laboratory

White - Laboratory

APPENDIX C

Sampling Methods and Quality Assurance

Appendix C

Sampling Methods and Quality Assurance

Water Level Measurements

A Solinst electronic water sounder was used to measure ground-water elevations. The manufacturer claims accuracy of measurement of ± 5/100-foot (0.05-foot) at a measurement length of 40 feet. Measurements are recorded for the interval between the static water surface and the marked top edge of the well casing.

Temperature, Electrical Conductivity, and pH

Temperature, electrical conductivity, and pH measurements are made using a Hydac tester with an external electrode, which has an integrated electronic thermometer with variable temperature compensation selectivity. All pH measurements are read to within 0.1 standard pH units, and have manufacturer specified accuracy of deviation of no greater than ± 0.01 standard pH units at discrete temperatures in the range of 55° to 75° F. Electrical conductivity (resistance) measurements are read to within 10 micromhos per centimeter (μmho/cm), and have manufacturer specified accuracy of deviation of no greater than ± 3% of full scale.

Ground-Water Sampling

Each of the monitoring wells are purged with a disposable bailer until water-quality parameters (pH, conductivity, and temperature) are stabilized in accordance with EPA protocols. More than three wetted-volumes of water are normally removed from each monitoring well prior to sampling. No parameter varied more than 10 percent from previous measurements. Each of the wells was allowed to settle for several minutes before taking water samples.

Chain-of-Custody

Chain-of-custody forms are used to record possession of the sample from time of collection to its arrival at the laboratory. During shipment, the person with custody of the samples relinquishes them to the next person by signing the chain-of-custody form(s) and noting the date and time. The sample-control officer at the laboratory verifies sample integrity, correct preservation, confirm collection in the proper

container(s), and ensure adequate volume for analysis. Samples are assigned unique laboratory log numbers for identification throughout analysis and reporting. The log numbers are recorded on the chain-of-custody forms and in the legally-required log book maintained in the laboratory. The sample description, date received, client's name, and any other relevant information is also recorded.

Decontamination and Equipment Maintenance

Field equipment, truck-mounted augers, soil sampling tubes, and other tools are thoroughly decontaminated before being introduced to field sampling areas. Plastic sheets and paper towels are placed beneath sampling tools and containers at each sample locality to preclude accidental cross-contamination of sampling supplies with surface soil and debris. Final rinsates from decontamination work may be sampled and analyzed.

Duplicate Sampling

Duplicate (replicate) water and soil samples may be collected during a sampling event, especially during confirmation sampling. The duplicate sample would be assigned a bogus identification number and collected as a replicate split. The duplicate sample would be submitted with other soil samples as a means to verify analytical precision.

Laboratory Procedures

Sequoia Analytical, a California-certified analytical laboratory located in Sacramento, performed specified chemical analyses. Sequoia Analytical provides clients with quality assurance and quality control (QA/QC) data related to laboratory protocols. These documents include surrogate recovery data and analytical charts that describe routine application of spikes and matrix spike duplicates. Copies of laboratory QA/QC documents are normally attached to Sierra-Pacific quarterly monitoring reports.

In addition to routine instrument calibration, replicates, spikes, blanks, spiked blanks, and certified reference materials are routinely analyzed at method-specific frequencies to monitor precision and bias. Additional components of the laboratory QA/QC program include participation in State and federal laboratory certification programs, and EPA performance evaluation studies.

Data Review and Analysis

Analytical results from field testing and laboratory work is routinely compared and evaluated. Field sampling difficulties and possible laboratory errors can often be discovered by reviewing empirical data for apparent anomalies and inconsistencies.