THIRD QUARTERLY OPERATIONS REPORT

JANUARY 1, 1987 THROUGH MARCH 31, 1987

FOR THE

WILLOW CREEK R&D PROJECT

SUBMITTED TO:

U.S. NUCLEAR REGULATORY COMMISSION

SOURCE MATERIALS LICENSE SUA-1337, DOCKET NO. 40-8684

and

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

RESEARCH AND DEVELOPMENT LICENSE 14 RD

THIRD QUARTERLY OPERATIONS REPORT

JANUARY 1, 1987 THROUGH MARCH 31, 1987

1.0 INTRODUCTION

Pursuant to License Condition No. 24 of Source Materials License No. SUA-1337, Malapai Resources Company (Malapai) hereby submits the following quarterly report which summarizes the status of our Willow Creek R&D test program for the period of January 1, 1987 through March 31, 1987. This report is the third quarterly operations report submitted to date to the U.S. Nuclear Regulatory Commission (NRC) and Wyoming Department of Environmental Quality (WDEQ).

2.0 OPERATIONS STATUS

Activites at the Willow Creek site for this reporting quarter involved the cessation of lixiviant injection, plant and wellfield preparation for restoration, and the commencement of aquifer restoration. The mining phase of the test operation ended during the first week of January, 1987 so that changes in the processing facility could be made for the restoration phase.

Preparation for the groundwater sweep and surface discharge began on January 22, 1987 by the pumping of solutions, with no injection. The groundwater solutions were processed through the ion exchange columns, for

uranium removal, then sent to the south pond where barium chloride was added for radium-226 precipitation/removal. Laboratory tests and analyses were then made on the solutions to assure that the surface discharge limits of the NPDES permit would be met. The Wyoming NPDES permit for surface discharge of treated groundwater was issued on Janaury 20, 1987.

Phase I of the restoration process (Groundwater Sweep with Surface Discharge) officially commenced on February 13, 1987. Operation of the groundwater sweep and surface discharge continued through the remainder of February and part of March, 1987. Restoration operations were shut down during the first two weeks in March due to a leak discovered in the south evaporation pond. Because the water in the south pond had been treated for uranium and radium removal, the majority of the contents were evacuated by surface discharge rather than by transferring the fluid to the north pond. When the levels of the south pond reached approximately 2.5 feet, the remaining solutions were transferred to the north pond. The details of the south pond leak are given later in this report, specifically Section 4.4, Reportable Events.

Groundwater sweep operations were restarted on March 13, 1987, using the reverse osmosis (R.O.) unit to process wellfield injection solutions with surface discharge of the R.O. permeate. Brine from the R.O. unit was discharged to the north pond and efforts continued to find the source of the south pond's problem.

On April 1, 1987, the source of the leak in the south pond was discovered. A series of small puncture holes in the liner were located on the pond bottom in

the northeast corner adjacent to the north sump. The holes were apparently caused by a pump which had been used to circulate the barium chloride addition to the pond solutions. The area was patched and no further problems have been experienced with the south pond.

A chronology which summarizes the above major events for this reporting quarter is given in Table 1.

3.0 PRODUCTION OPERATIONS DATA

3.1 WELLFIELD DATA

3.1.1 Volumes of injected lixiviant and pregnant solution produced:

January 1, 1987 through March 31, 1987

Volume Produced - 1,090,160 Gallons

Volume Injected - 134,082 Gallons

3.1.2 Injection and production flow rates:

January 1, 1987 through March 31, 1987

Average Flow Rate Production - 21.9 gpm

Average Flow Rate Injection - 18.6 gpm (First 5 days of January only)

3.1.3 Injection Pressures:

Wellfield injection pressures for the R&D operations are summarized in Table 2. The injection pressures listed are the

TABLE 1

CHRONOLOGY OF MAJOR EVENTS
WILLOW CREEK R & D

01-07-87	Pumping shut down after withdrawing 50,000 gallons from WCPW-21.
01-22-87 01-27-87	Started pumping RW-02 with no injection. Barren solution discharged to south pond with barium chloride addition.
01-31-87	Ten cubic feet of radium complexing resin was loaded into column C.
02-02-87	All flowmeters calibrated.
02-13-87	Started groundwater sweep and surface discharge. Lixiviant was pumped from 6 injectors. No wellfield injection.
02-23-87	Surface discharge discontinued. Circulating south pond solution through IX column to reduce uranium content.
03-01-87	Water discovered in north sump of the south pond.
03-02-87	Continuous surface discharge of south pond water. Wellfield production ceased.
03-09-87	Start transferring the remaining south pond solution to north pond.
03-13-87	Start-up reverse osmosis unit to process wellfield injection solution. Brine goes to north pond. Permeate to surface discharge.
03-30-87	Operation temporarily shut down due to high water level in the north pond (south pond empty - still searching for holes in liner).
04-01-87	Small punctures located in liner at [illegible] h east corner of south pond bottom.
04-04-87	South pond liner repaired. Pumped 12,000 gallons from RW-01 to south pond, to test adequacy of repair.

TABLE 2

WELLFIELD INJECTION PRESSURES

Injection Well No.	Maximum Pressure (psi)
IW-01	40
IW-02	61
IW-03	14
IW-04	9
IW-06	28
IW-07	9
Average	26.8 psi

maximum pressures recorded for each individual well during the period of January 1, 1987 through Janaury 5, 1987, (only period during quarter when injection occurred).

3.1.4 Lixiviant migration control measures.

Except for the first 5 days in January, no lixiviant has been injected. All fluids that have been recovered were for the purpose of restoration. During the groundwater sweep phase of restoration an adequate cone of depression returned lixiviant from around the wellfield and prevented any migration of wellfield solutions.

3.2 PROCESS DATA

3.2.1 Chemical Balance (for chloride only):

January 1, 1987 through January 5, 1987 (Period of Injection and Recovery)

	Daily Average	Estimated Quarterly Total
Pounds Injected -	33.27	232.9
Pounds Recovered -	31.05	217.4
Pounds Unaccounted for -	2.22	15.5
Percentage error -	7.7%	7.7%

3.2.2 Pounds of Uranium Produced:

January 1, 1987 through March 31, 1987

Uranium Produced - 497 Pounds

Previous Uranium Produced - 2551.5 Pounds

Project Total 3048.5 Pounds

3.2.3 Waste Volumes Generated and Discharged to the Ponds:

January 1, 1987 through March 31, 1987

Process bleed - 956,078 Gallons

Other sources - 10,555 Gallons

Total Waste Volume to ponds - 966,633 Gallons

Process Bleed Flow Rate - 19.3 gpm

Percentage Process Bleed to Total Production Flow - 87.8%

3.2.4 Water Quality Data for Waste Discharged to the Ponds:

Water quality data for fluids discharged to the ponds are given in Table 3.

4.0 RESULTS - ENVIRONMENTAL MONITORING

4.1 GROUNDWATER SAMPLING

4.1.1 Analytical results of the water quality monitoring program during this reporting quarter are given in Appendix 1. All data for the

TABLE 3

WATER QUALITY DATA FOR WASTE DISCHARGED TO THE PONDS
Biweekly Assay (mg/l)

DATE & LOCATION	TOTAL CARBONATE	URANIUM	SULFATE	CHLORIDE	CONDUCTIVITY (umho/cm)	MONTHLY ASSAY RADIUM (pCi/l)	
1/12/87							
North Pond	963	106.0	180	1455	6400	117.4	
South Pond	1309	0.8	279	159	2900	796.3	
1/29/87							
Plant Sump	314	9.0	128	1627	5820	-----	
1/30/87							
North Pond	302	1.7	11	12,772	34,660	-----	
South Pond	1069	0.1	154	239	2630	-----	
2/13/87							
North Pond	0	14.6	1.0	5161	47,670	*	*Unable to test Excess barium in sample
South Pond	1048	0.4	161	229	2540	1.8	
2/24/87							
North Pond	1108	9.3	7.236	55,299	138,000	-----	
South Pond	1294	3.7	392	192	3290		
3/9 /87							
North Pond	218	5.3	153	1420	5090	3.7	
South Pond	*	*	*	*	*	*	*No discharge to South Pond
3/24/87							
North Pond	140	0.7	211	546	2615	-----	
South Pond	*	*	*	*	*	*	*No discharge to South Pond
3/31/87							
Plant Sump	1004	59.8	640	10,000	17,000		

monitor and trend wells are presented in both tabular and graphical forms. Upper Control Limits (UCL's) and UCL + 20% are indicated for each monitor well.

No lixiviant excursions were detected in the monitor wells during this operational quarter. Groundwater sweep operations during restoration have maintained an inward flow of solutions toward the wellfield. The effects of wellfield flaring which were previously detected in trend wells WCOW-25 and WCOW-26 have been mitigated by the restoration operation.

4.1.2 Piezometric elevations measured at the time of sampling are given for each monitor and trend well in Appendix I. Also given are the barometric pressure measurements read at the time of water level measurement. Table AI-1, found at the beginning of Appendix I, gives the net flow rates of the wellfield on the day of each sampling event.

4.2 SURFACE WATER SAMPLING

4.2.1 Condition No. 17 of NRC License SUA-1337 requires that surface water samples are to be collected from Willow Creek at a minimum of one (1) location upstream and one (1) location downstream from the project site on a quarterly basis, or whenever sufficient flow is available. During leaching and restoration, downstream sampling shall be increased to monthly when flow is available.

During this reporting period of January, February, and March 1987, samples were collected from the downstream Willow Creek site on a monthly basis. One sample was collected from the upstream location as per Condition No. 17. A map showing the locations of the surface water sampling points is provided in Appendix II. Analytical data for the monthly downstream samples and the quarterly upstream sample are also given in Appendix II.

4.3 ACCUMULATED BASELINE DATA

4.3.1 Condition No. 12 (F) of the NRC License SUA-1337 required Malapai to establish background radium-226 concentrations in the soil at the surface discharge outfall location, as well as downstream. The data was to be submitted to NRC by April 1, 1987. The first round of soil samples were taken at the outfall point and downstream in the receiving drainage area on January 19, 1987. However, the analyzing laboratory informed Malapai by telephone on February 25, 1987, that the samples had been inadvertently contaminated in the laboratory, and that new samples should be obtained. By this time, the surface discharge had been operational for approximately eight days. Regardless, new soil samples were obtained and analyses were run for radium-226. A comparison of the data from the resampling of the drainage soils with background soils data from the R & D site shows that there are no significant differences. The report which describes the soil sampling, with locations and final radium-226 analyses, was

submitted to NRC by letter dated March 31, 1987, with copies to the WDEQ.

4.3.2 There were no casing integrity tests performed during this quarter.

4.3.3 Condition number 43 of NRC License SUA-1337 requires that personnel dosimeter results be included in quarterly reports. The dosimetry data for personnel assigned to the mine site are not included in this report, however are given in the Willow Creek Semiannual ALARA audit report, submittal date to the NRC of April 28, 1987.

4.4 REPORTABLE EVENTS

There were two events which were reported to the appropriate regulatory agencies during this reporting quarter. These events are described below.

4.4.1 As previously indicted, a leak in the northeast corner of the south pond was experienced during this quarter. Sufficient fluid to indicate a leak was discovered in the north sump of the south pond on Sunday, March 1, 1987, during the routine daily inspection of the pond leak detection system. The leak was verified the following day by analysis of the sump water, and the pond leak verification were made to the NRC and WDEQ on Monday, March 2, 1987.

Corrective action of evacuating the contents of the south pond commenced on March 3, 1987, so that the source of the leak could be found and repaired. Because the contents of the south pond were groundwater solutions which had been treated to remove uranium and radium-226, in preparation for surface discharge, permission was received from the NRC and WDEQ to evacuate the south pond contents by surface discharge, rather than by transferring the solutions to the north pond. If Malapai had transferred the contents of the south pond to the north pond, the clean water from the south pond would be mixed with brine in the north pond, and all previous treatment efforts of the south pond would be wasted.

On March 8, 1987, the water level of the south pond had been decreased from 6.7 feet to 2.8 feet. At this time, treatment and surface discharge were discontinued so that sediments in the pond bottom (from the barium chloride treatment) would not be disturbed. Pumping of the remaining 2.8 feet of solution to the north pond then began on March 9, 1987. Severe weather and freezing temperatures hampered the efforts of removing the remaining solutions, which were frozen. Warmer temperatures towards the end of March allowed Malapai to evacuate the final contents into the north pond.

On April 1, 1987 the source of the leak in the south pond was discovered. A series of small puncture holes were found in the

northeastern corner of the pond bottom, which are presumed to have been caused by a pump used for a short period of time for circulation of the barium chloride solution. The holes have been patched, and no further problems have been experienced. The report describing the pond leak and corrective actions taken was submitted to NRC, copies to WDEQ, by letter dated March 31, 1987.

4.4.2 A mine spill of solutions occurred at Willow Creek when a failure in a two inch line occurred on February 19, 1987. The pipe breakage caused approximately 50 gallons of solution from the wellfield restoration process, which had been processed for uranium removal, to spill within the bermed spillage containment system. The spill in no way approached the capacity of this system.

A survey of the area with a portable alpha meter could detect no contamination. In addition, a gross alpha count of the spill soaked soil showed no significant increase over background. A report describing the spill was submitted to NRC, copies to WDEQ, by letter dated February 25, 1987.

5.0 PROJECT SCHEDULE

Groundwater restoration activities will continue through the next quarterly reporting period. The second phase of restoration, which consists of treatment of the groundwater with reverse osmosis (R.O.) and reinjection of

the R.O. permeate, will commence in mid-April, 1987. This phase will continue for approximately 3 weeks, at which time a chemical precipitation/reduction step may be necessary. Malapai expects that final restoration may be achieved by the end of May, 1987. The agencies will be notified at this point so that water sample splits may be obtained prior to the stabilization period.

APPENDIX I

RESULTS OF GROUNDWATER MONITORING PROGRAM

TABLE AI-1

Net Flow Rates Into and Out of the Wellfield
On Dates Monitor and Trend Wells Were Sampled

All Units in GPM

SAMPLE DATE (1987)	PRODUCTION FLOW	INJECTION FLOW	NET BLEED FLOW
1/5	23.8	21.8	2.0
1/8	0	0	0
1/12	0	0	0
1/19	0	0	0
1/21	0	0	0
1/22	0	0	0
1/26	7.7	0	7.7
2/2	0	0	0
2/3	0	0	0
2/9	0	0	0
2/17	23.5	0	23.5
2/24	5.2	0	5.2
3/2	0	0	0
3/9	0	0	0
3/16	24.0	0	24.0
3/23	24.0	0	24.0
3/31	0	0	0

MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	MW-01	COMPLETED INTERVAL	420.0
WELL TYPE	MONITOR		458.0
NORTHING	1137424.2	CASING ELEVATION	4783.1
EASTING	849701.8	DISTANCE FROM FIELD, FT.	144.7
GROUND ELEVATION	4779.1	REFERENCE WELL	IW-01

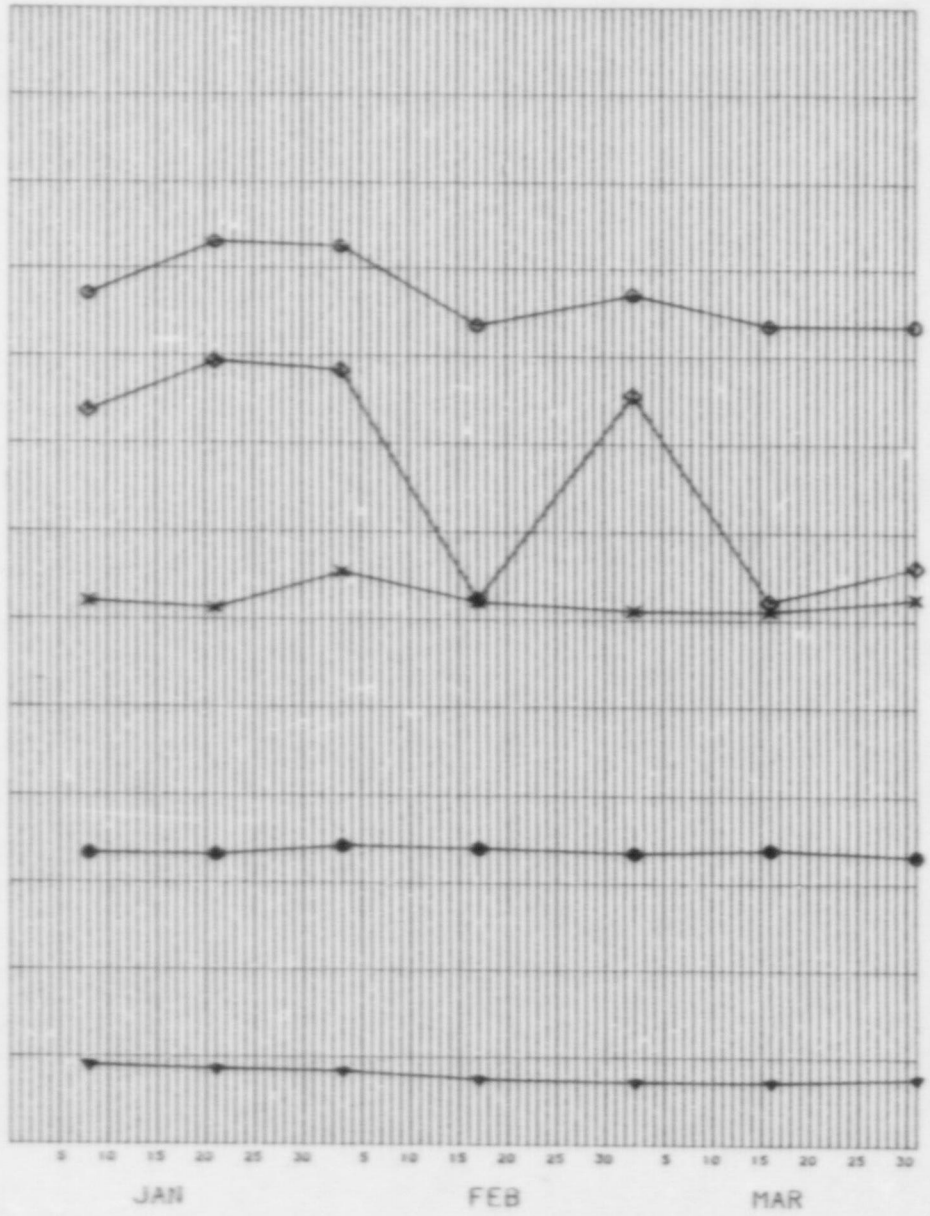
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	13.2	208.0	140.3	721.0		
UCL + 20%	15.8	249.6	168.4	865.2		
SAMPLE DATE						
01/08/87	9.0	194.0	124.0	667.0	4643.6	30.40 S
01/21/87	8.6	206.0	122.5	665.0	4649.3	30.20 S
02/03/87	8.4	205.0	130.8	685.0	4648.3	30.00 S
02/17/87	7.5	187.0	124.0	680.0	4622.3	30.15 R
03/02/87	7.2	194.0	122.0	670.0	4645.5	30.10 R
03/16/87	7.2	187.0	122.0	678.0	4622.1	30.00 S
04/01/87	7.7	187.0	124.9	663.0	4626.1	30.35 R

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL MW-01

○ TOTAL SO4 (MG/L)	× TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV.-MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	240	4680	2400	120
220	220	4670	2200	110
200	200	4660	2000	100
180	180	4650	1800	90
160	160	4640	1600	80
140	140	4630	1400	70
120	120	4620	1200	60
100	100	4610	1000	50
80	80	4600	800	40
60	60	4590	600	30
40	40	4580	400	20
20	20	4570	200	10
0	0	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	MW-03	COMPLETED INTERVAL	409.0
WELL TYPE	MONITOR		473.0
NORTHING	1137280.8	CASING ELEVATION	4796.7
EASTING	849469.5	DISTANCE FROM FIELD, FT.	187.9
GROUND ELEVATION	4793.5	REFERENCE WELL	IW-06

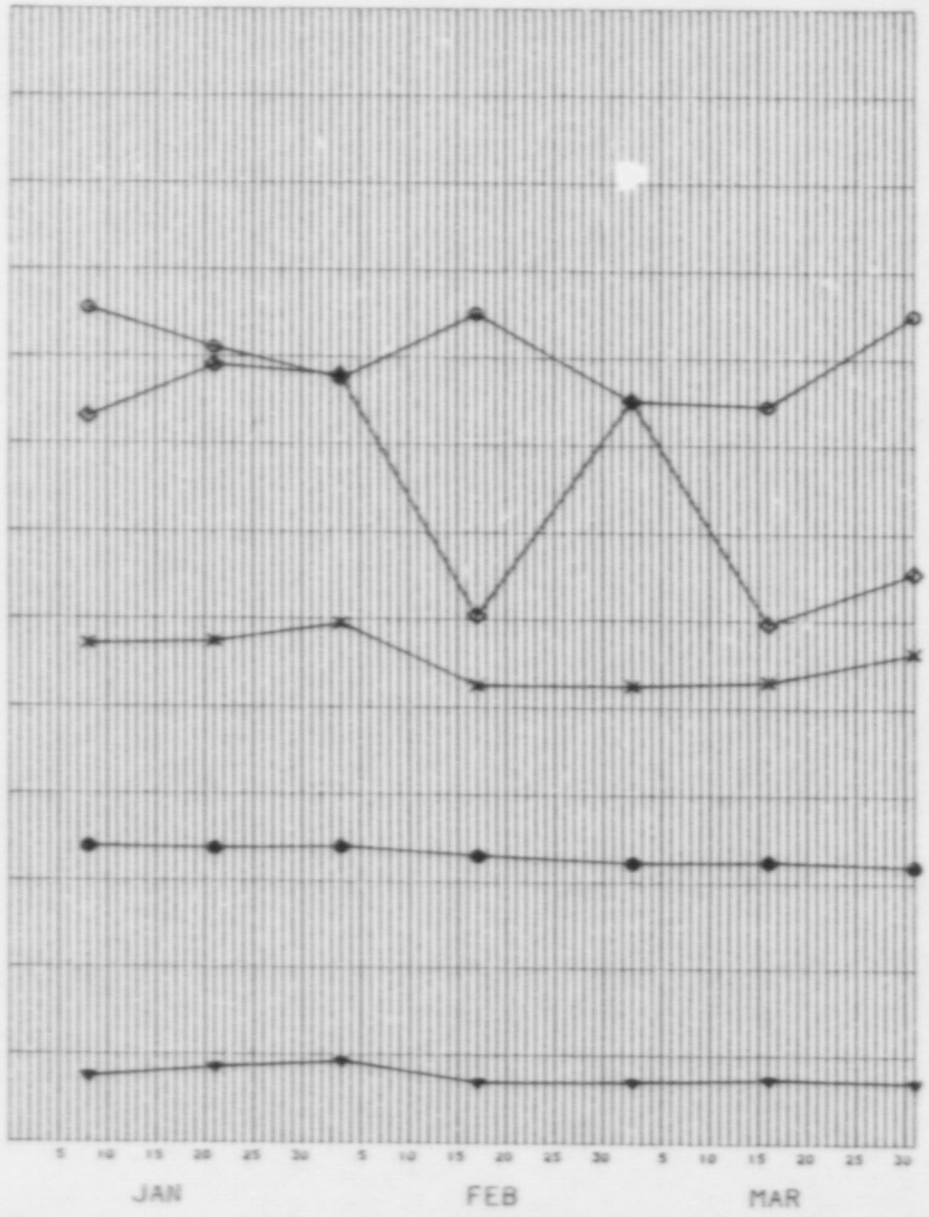
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	13.1	202.0	132.0	713.0		
UCL + 20%	15.7	242.4	158.4	855.6		
SAMPLE DATE						
01/08/87	7.5	191.0	114.0	678.0	4643.0	30.40 S
01/21/87	8.6	182.0	114.7	675.0	4649.0	30.20 S
02/03/87	9.3	175.0	118.9	680.0	4647.9	30.00 S
02/17/87	6.9	190.0	105.0	660.0	4620.4	30.15 R
03/02/87	7.0	170.0	105.0	645.0	4645.1	30.10 R
03/16/87	7.3	169.0	106.0	648.0	4619.6	30.00 S
04/01/87	7.0	190.0	112.6	638.0	4625.5	30.35 R

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL MW-03

○ TOTAL SO4 (MG/L)	✕ TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV.MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	240	4680	2400	120
220	220	4670	2200	110
200	200	4660	2000	100
180	180	4650	1800	90
160	160	4640	1600	80
140	140	4630	1400	70
120	120	4620	1200	60
100	100	4610	1000	50
80	80	4600	800	40
60	60	4590	600	30
40	40	4580	400	20
20	20	4570	200	10
0	0	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

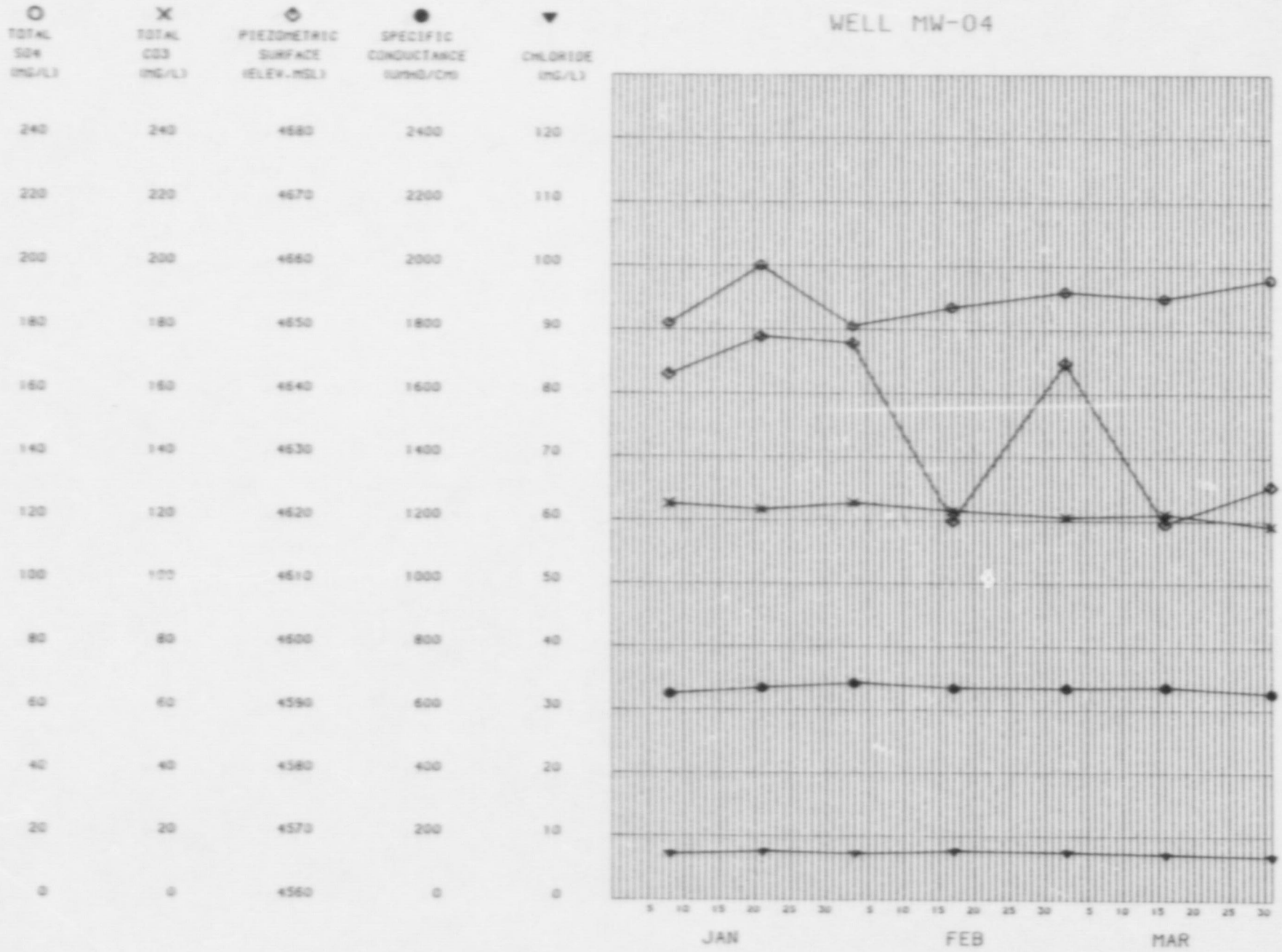
WELL NO.	MW-04	COMPLETED INTERVAL	389.0
WELL TYPE	MONITOR		461.0
NORTHING	1137339.9	CASING ELEVATION	4791.8
EASTING	849518.0	DISTANCE FROM FIELD, FT.	154.1
GROUND ELEVATION	4788.8	REFERENCE WELL	IW-06

	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	13.6	206.0	133.0	716.0		
UCL + 20%	16.3	247.2	159.6	859.2		
SAMPLE DATE						
01/08/87	7.2	182.0	125.0	651.0	4642.9	30.40 S
01/21/87	7.6	200.0	123.3	670.0	4648.8	30.20 S
02/03/87	7.3	181.0	125.4	685.0	4647.8	30.00 S
02/17/87	7.7	187.0	123.0	670.0	4619.9	30.15 R
03/02/87	7.5	192.0	121.0	670.0	4644.8	30.10 R
03/16/87	7.2	190.0	122.0	673.0	4619.5	30.00 S
04/01/87	6.9	196.0	118.3	653.0	4625.4	30.35 R

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL MW-04



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	MW-05	COMPLETED INTERVAL	420.0
WELL TYPE	MONITOR		465.0
NORTHING	1137339.7	CASING ELEVATION	4790.5
EASTING	849567.2	DISTANCE FROM FIELD, FT.	111.5
GROUND ELEVATION	4787.3	REFERENCE WELL	IW-06

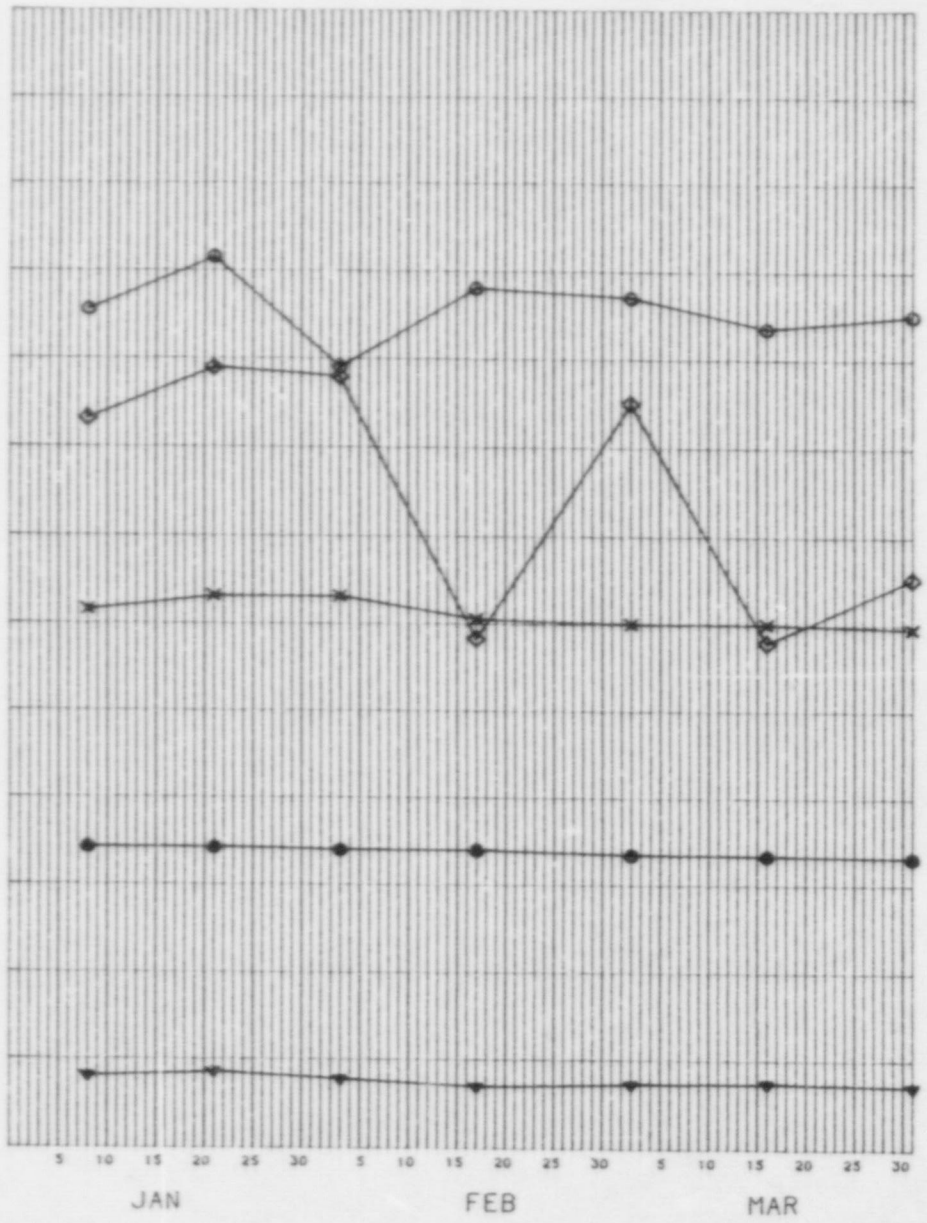
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	13.3	208.0	135.0	716.0		
UCL + 20%	16.0	249.6	162.0	859.2		
SAMPLE DATE						
01/08/87	8.1	191.0	123.0	685.0	4643.1	30.40 S
01/21/87	8.6	203.0	126.2	685.0	4648.9	30.20 S
02/03/87	7.8	178.0	126.2	680.0	4647.9	30.00 S
02/17/87	7.0	196.0	121.0	680.0	4618.3	30.15 R
03/02/87	7.3	194.0	120.0	670.0	4645.0	30.10 R
03/16/87	7.4	187.0	120.0	668.0	4617.9	30.00 S
04/01/87	7.1	190.0	119.0	663.0	4625.3	30.35 R

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL MW-05

○ TOTAL SO4 (MG/L)	× TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV. MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	240	4680	2400	120
220	220	4670	2200	110
200	200	4660	2000	100
180	180	4650	1800	90
160	160	4640	1600	80
140	140	4630	1400	70
120	120	4620	1200	60
100	100	4610	1000	50
80	80	4600	800	40
60	60	4590	600	30
40	40	4580	400	20
20	20	4570	200	10
0	0	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	MW-06	COMPLETED INTERVAL	437.0
WELL TYPE	MONITOR		460.0
NORTHING	1137256.0	CASING ELEVATION	4788.2
EASTING	849918.1	DISTANCE FROM FIELD, FT.	214.6
GROUND ELEVATION	4786.8	REFERENCE WELL	IW-03

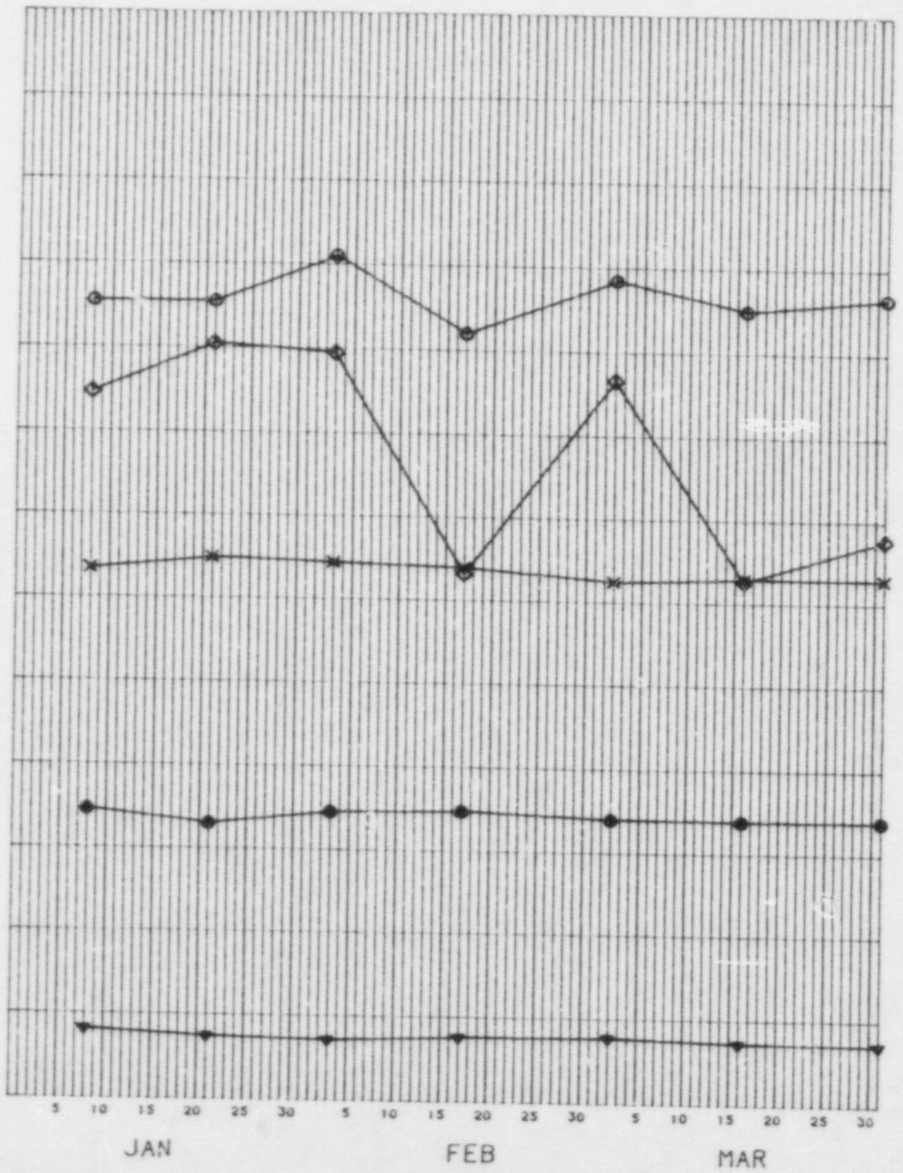
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	12.9	210.0	139.7	708.0		
UCL + 20%	15.5	252.0	167.6	849.6		
SAMPLE DATE						
01/08/87	8.2	191.0	127.0	692.0	4644.7	30.40 S
01/21/87	7.5	191.0	129.8	660.0	4650.5	30.20 S
02/03/87	7.2	202.0	128.9	690.0	4649.5	30.00 S
02/17/87	7.7	184.0	128.0	695.0	4623.3	30.15 R
03/02/87	7.8	197.0	125.0	680.0	4646.7	30.10 R
03/16/87	7.3	190.0	126.0	678.0	4622.7	30.00 S
03/31/87	7.2	193.0	125.9	678.0	4627.8	30.15 S

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL MW-06

○ TOTAL SO4 (MG/L)	× TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV. MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	240	4680	2400	120
220	220	4670	2200	110
200	200	4660	2000	100
180	180	4650	1800	90
160	160	4640	1600	80
140	140	4630	1400	70
120	120	4620	1200	60
100	100	4610	1000	50
80	80	4600	800	40
60	60	4590	600	30
40	40	4580	400	20
20	20	4570	200	10
0	0	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	MW-07	COMPLETED INTERVAL	405.0
WELL TYPE	MONITOR		474.0
NORTHING	1137139.8	CASING ELEVATION	4792.0
EASTING	849892.9	DISTANCE FROM FIELD, FT.	220.1
GROUND ELEVATION	4790.8	REFERENCE WELL	IW-03

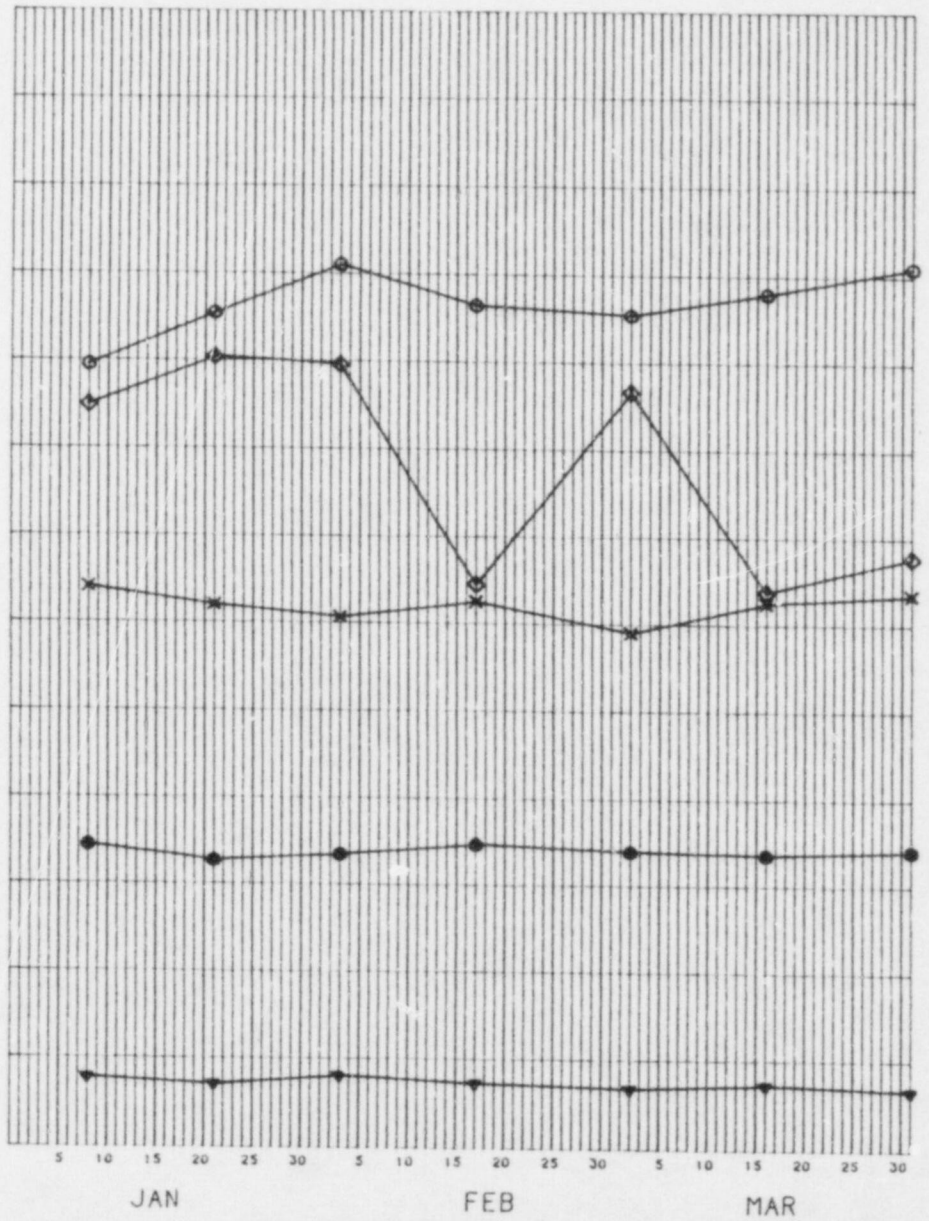
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	12.9	208.0	137.0	710.0		
UCL + 20%	15.5	249.6	164.4	852.0		
SAMPLE DATE						
01/08/87	7.8	179.0	128.0	690.0	4644.9	30.40 S
01/21/87	7.1	191.0	124.0	655.0	4650.4	30.20 S
02/03/87	8.1	202.0	121.3	670.0	4649.6	30.00 S
02/17/87	7.3	193.0	125.0	695.0	4624.5	30.15 R
03/02/87	6.8	191.0	118.0	680.0	4646.7	30.10 R
03/16/87	7.3	196.0	125.0	673.0	4623.8	30.00 S
03/31/87	6.7	202.0	127.0	683.0	4627.8	30.15 S

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL MW-07

○ TOTAL SO4 (MG/L)	× TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV. MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	240	4680	2400	120
220	220	4670	2200	110
200	200	4660	2000	100
180	180	4650	1800	90
160	160	4640	1600	80
140	140	4630	1400	70
120	120	4620	1200	60
100	100	4610	1000	50
80	80	4600	800	40
60	60	4590	600	30
40	40	4580	400	20
20	20	4570	200	10
0	0	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	MW-08	COMPLETED INTERVAL	437.0
WELL TYPE	MONITOR		476.0
NORTHING	1137158.1	CASING ELEVATION	4797.9
EASTING	849554.3	DISTANCE FROM FIELD, FT.	137.3
GROUND ELEVATION	4797.1	REFERENCE WELL	IW-07

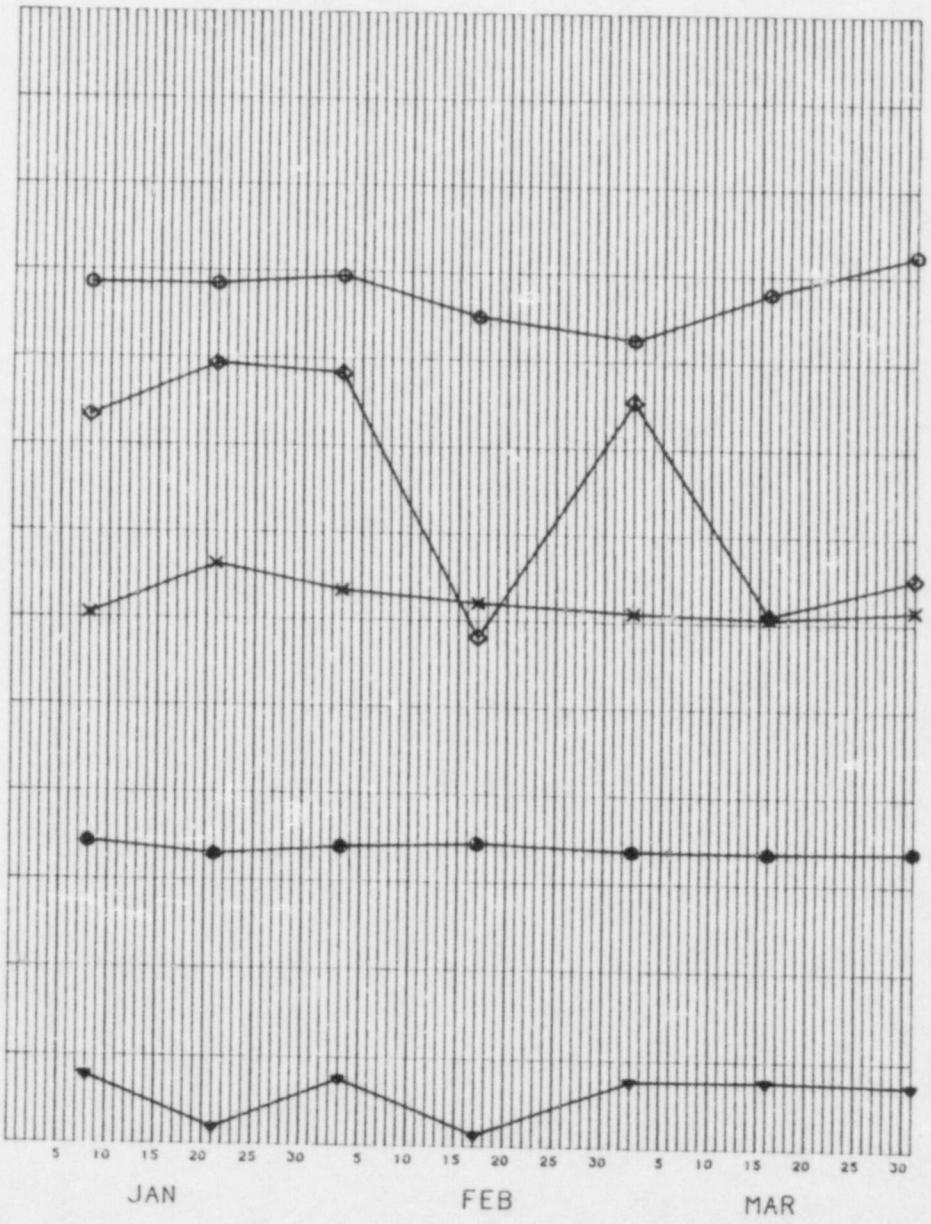
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	13.9	210.0	139.0	734.0		
UCL + 20%	16.7	252.0	166.8	880.8		
SAMPLE DATE						
01/08/87	7.8	197.0	121.0	687.0	4643.3	30.40 S
01/21/87	1.9	197.0	132.5	660.0	4649.3	30.20 S
02/03/87	7.6	199.0	126.7	680.0	4648.3	30.00 S
02/17/87	1.3	190.0	124.0	690.0	4618.1	30.15 R
03/02/87	7.6	185.0	122.0	675.0	4645.4	30.10 R
03/16/87	7.7	196.0	121.0	673.0	4620.9	30.00 S
04/01/87	7.3	205.0	123.1	678.0	4625.2	30.35 R

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL MW-08

○ TOTAL SO4 (MG/L)	× TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV. MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	240	4680	2400	120
220	220	4670	2200	110
200	200	4660	2000	100
180	180	4650	1800	90
160	160	4640	1600	80
140	140	4630	1400	70
120	120	4620	1200	60
100	100	4610	1000	50
80	80	4600	800	40
60	60	4590	600	30
40	40	4580	400	20
20	20	4570	200	10
0	0	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	MW-09S	COMPLETED INTERVAL	265.0
WELL TYPE	MONITOR		298.0
NORTHING	1137 38.2	CASING ELEVATION	4789.3
EASTING	849. 41.	DISTANCE FROM FIELD, F..	0.0
GROUND ELEVATION	4 38	REFERENCE WELL	---

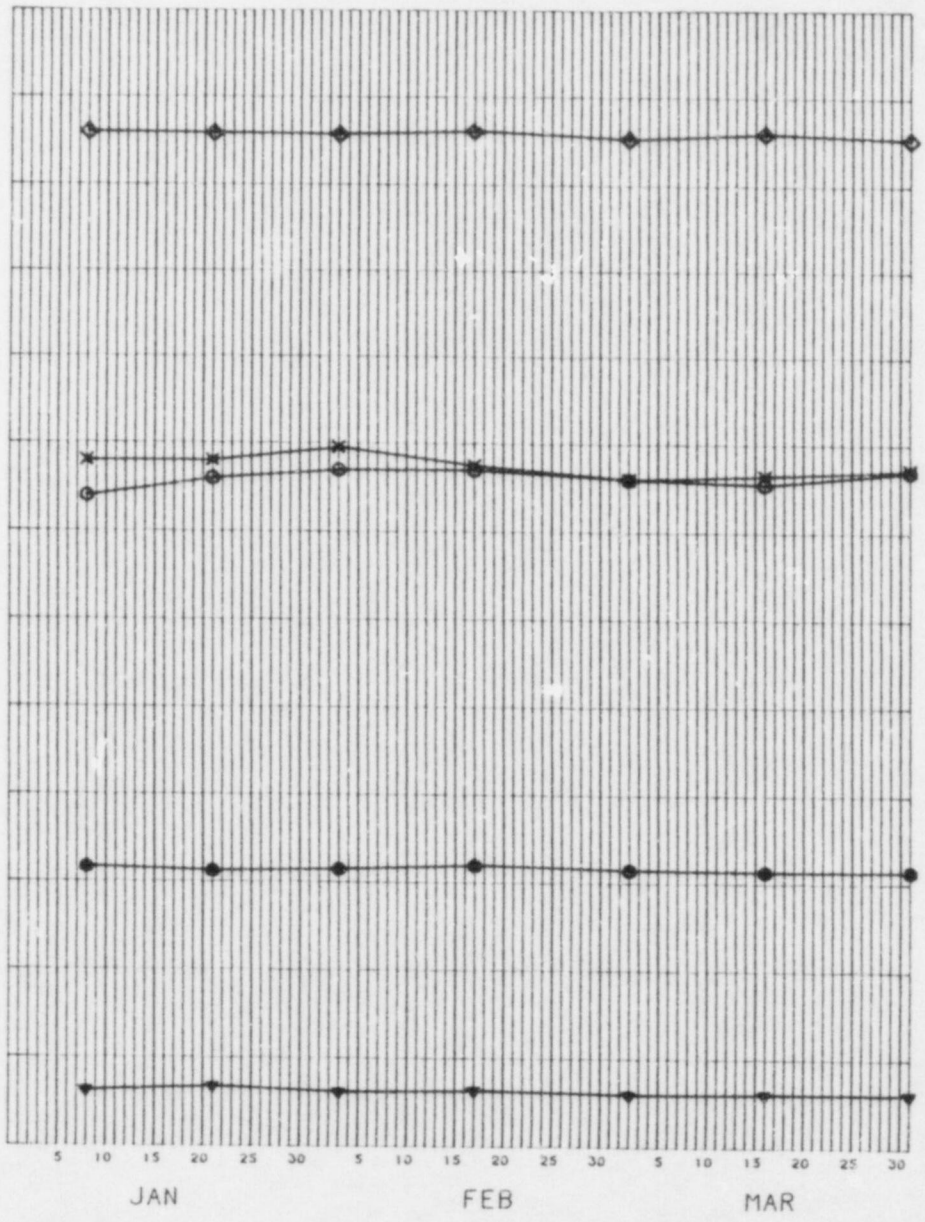
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	12.1	157.0	173.0	669.0		
UCL + 20%	14.5	188.4	207.6	802.8		
SAMPLE DATE						
01/08/87	6.3	148.0	156.0	633.0	4675.9	30.40 S
01/21/87	6.8	152.0	156.0	625.0	4675.8	30.20 S
02/03/87	6.2	154.0	159.1	630.0	4675.7	30.00 S
02/17/87	6.4	154.0	155.0	640.0	4676.1	30.15 R
03/02/87	6.0	152.0	152.0	630.0	4675.2	30.10 R
03/16/87	6.1	151.0	153.0	627.0	4675.9	30.00 S
03/31/87	6.1	154.0	154.4	628.0	4675.3	30.15 S

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL MW-09S

○ TOTAL SO4 (MG/L)	× TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV. MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	240	4680	2400	120
220	220	4670	2200	110
200	200	4660	2000	100
180	180	4650	1800	90
160	160	4640	1600	80
140	140	4630	1400	70
120	120	4620	1200	60
100	100	4610	1000	50
80	80	4600	800	40
60	60	4590	600	30
40	40	4580	400	20
20	20	4570	200	10
0	0	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	MW-10D	COMPLETED INTERVAL	640.0
WELL TYPE	MONITOR		660.0
NORTHING	1137242.9	CASING ELEVATION	4790.2
EASTING	849680.0	DISTANCE FROM FIELD, FT.	0.0
GROUND ELEVATION	4788.2	REFERENCE WELL	---

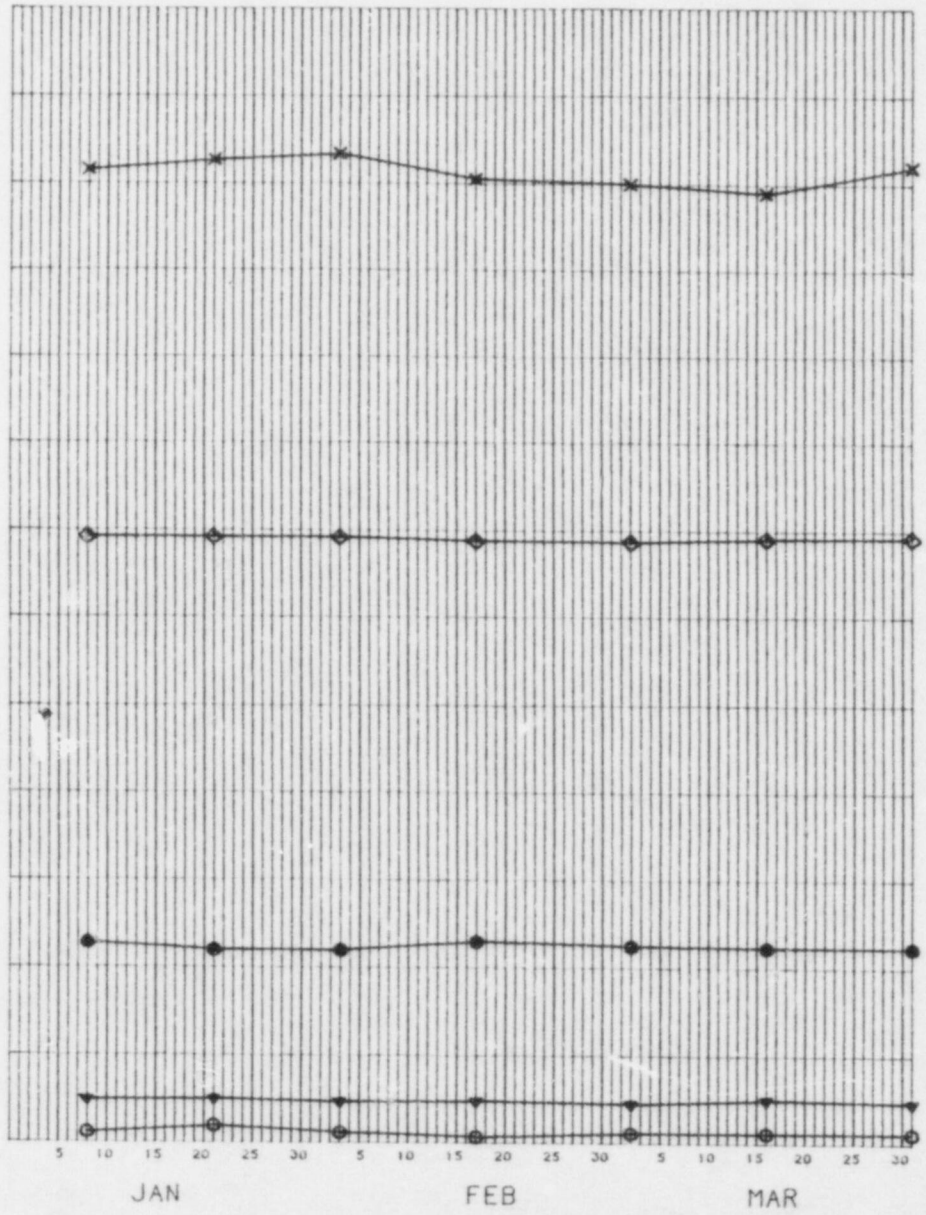
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	10.8	7.9	279.0	501.0		
UCL + 20%	13.0	9.5	334.8	601.2		
SAMPLE DATE						
01/08/87	4.9	1.0	263.0	456.0	4629.2	30.40 S
01/21/87	5.0	2.5	265.3	440.0	4629.2	30.20 S
02/03/87	4.7	1.0	266.7	440.0	4629.2	30.00 S
02/17/87	4.8	0.0	261.0	460.0	4628.8	30.15 R
03/02/87	4.5	1.0	260.0	450.0	4628.7	30.10 R
03/16/87	5.0	1.0	258.0	447.0	4629.1	30.00 S
03/31/87	4.7	1.0	264.0	447.0	4629.2	30.15 S

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL MW-10D

○ TOTAL SO4 (MG/L)	× TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV. MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	280	4680	2400	120
220	260	4670	2200	110
200	240	4660	2000	100
180	220	4650	1800	90
160	200	4640	1600	80
140	180	4630	1400	70
120	160	4620	1200	60
100	140	4610	1000	50
80	120	4600	800	40
60	100	4590	600	30
40	80	4580	400	20
20	60	4570	200	10
0	40	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	WCOW-21	COMPLETED INTERVAL	483.0
WELL TYPE	MONITOR		498.0
NORTHING	1137374.1	CASING ELEVATION	4782.5
EASTING	849756.5	DISTANCE FROM FIELD, FT.	131.2
GROUND ELEVATION	4781.3	REFERENCE WELL	IW-01

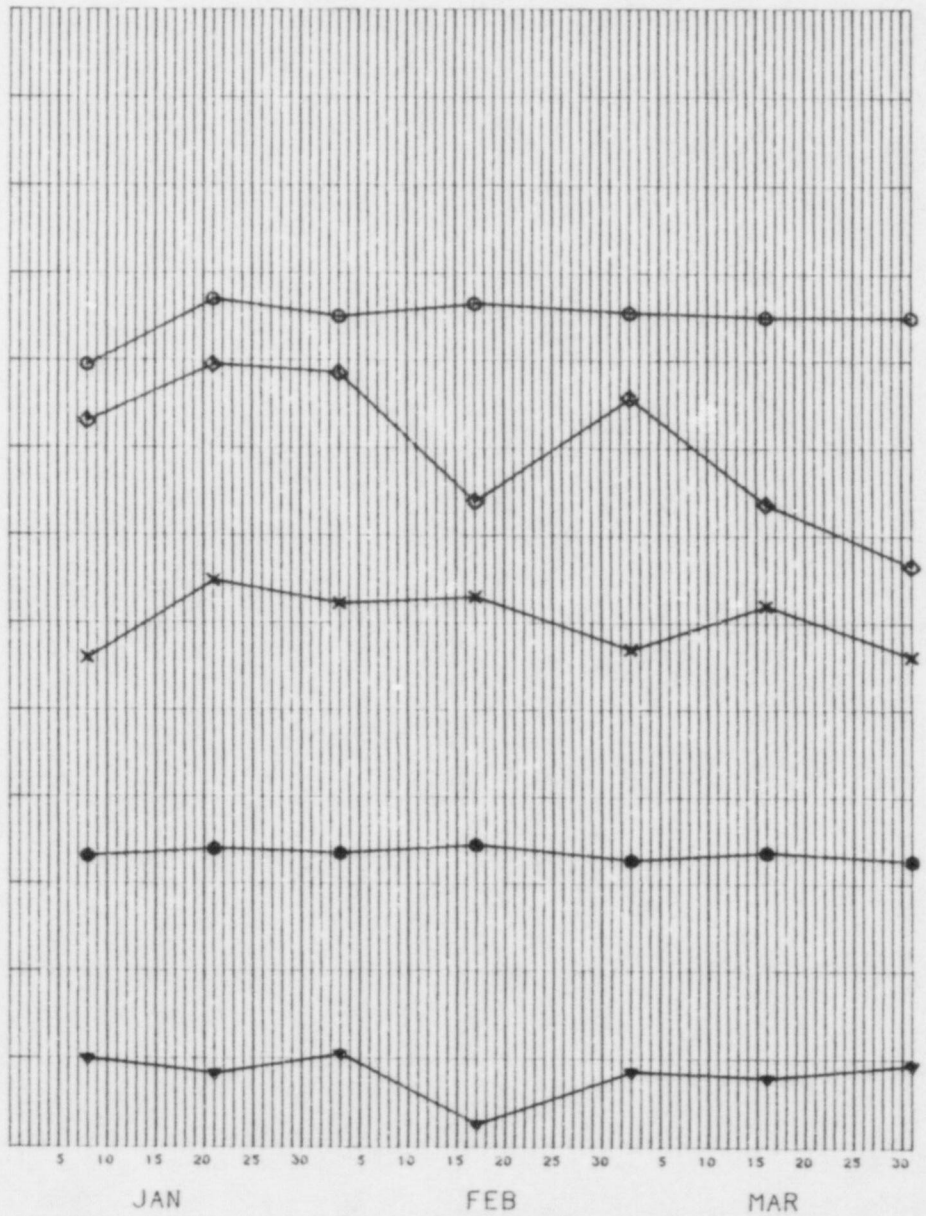
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	19.0	201.0	154.2	763.0		
UCL + 20%	22.8	241.2	185.0	915.6		
SAMPLE DATE						
01/08/87	10.0	179.0	112.0	663.0	4643.0	30.40 S
01/21/87	8.4	194.0	129.7	680.0	4649.5	30.20 S
02/03/87	10.6	190.0	124.5	670.0	4648.5	30.00 S
02/17/87	2.7	193.0	126.0	690.0	4633.9	30.15 R
03/02/87	8.6	191.0	114.0	655.0	4645.7	30.10 R
03/16/87	7.9	190.0	124.0	673.0	4633.6	30.00 S
04/01/87	9.4	190.0	112.4	653.0	4626.6	30.35 R

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL WCOW-21

○ TOTAL SO4 (MG/L)	× TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV.MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	240	4680	2400	120
220	220	4670	2200	110
200	200	4660	2000	100
180	180	4650	1800	90
160	160	4640	1600	80
140	140	4630	1400	70
120	120	4620	1200	60
100	100	4610	1000	50
80	80	4600	800	40
60	60	4590	600	30
40	40	4580	400	20
20	20	4570	200	10
0	0	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	WCOW-22	COMPLETED INTERVAL	421.0
WELL TYPE	MONITOR		477.0
NORTHING	1137247.0	CASING ELEVATION	4794.8
EASTING	849534.8	DISTANCE FROM FIELD, FT.	115.5
GROUND ELEVATION	4792.8	REFERENCE WELL	IW-06

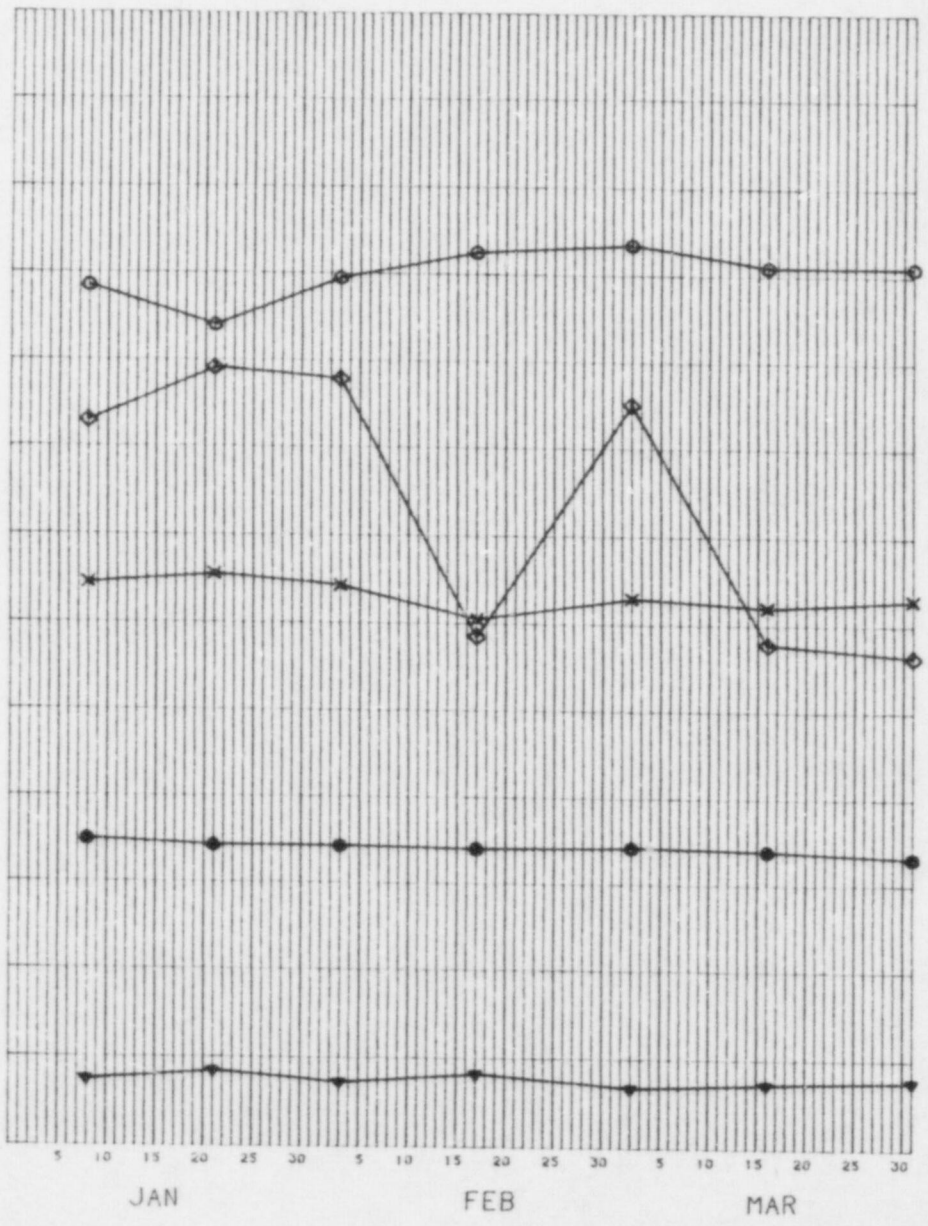
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	14.0	211.0	160.2	741.0		
UCL + 20%	16.8	253.2	192.2	889.2		
SAMPLE DATE						
01/08/87	7.5	197.0	129.0	698.0	4642.9	30.40 S
01/21/87	8.5	188.0	131.1	685.0	4649.1	30.20 S
02/03/87	7.3	199.0	128.6	685.0	4647.9	30.00 S
02/17/87	8.3	205.0	131.0	680.0	4618.5	30.15 R
03/02/87	6.8	207.0	126.0	685.0	4645.1	30.10 R
03/16/87	7.3	202.0	124.0	678.0	4617.8	30.00 S
04/01/87	7.7	202.0	125.9	663.0	4616.4	30.35 R

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL WCOW-22

○ TOTAL SO4 (MG/L)	× TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV. MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	240	4680	2400	120
220	220	4670	2200	110
200	200	4660	2000	100
180	180	4650	1800	90
160	160	4640	1600	80
140	140	4630	1400	70
120	120	4620	1200	60
100	100	4610	1000	50
80	80	4600	800	40
60	60	4590	600	30
40	40	4580	400	20
20	20	4570	200	10
0	0	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

WELL NO.	WCOW-23	COMPLETED INTERVAL	433.0
WELL TYPE	MONITOR		475.0
NORTHING	1137117.0	CASING ELEVATION	4793.5
EASTING	849759.5	DISTANCE FROM FIELD, FT.	144.1
GROUND ELEVATION	4790.3	REFERENCE WELL	IW-04

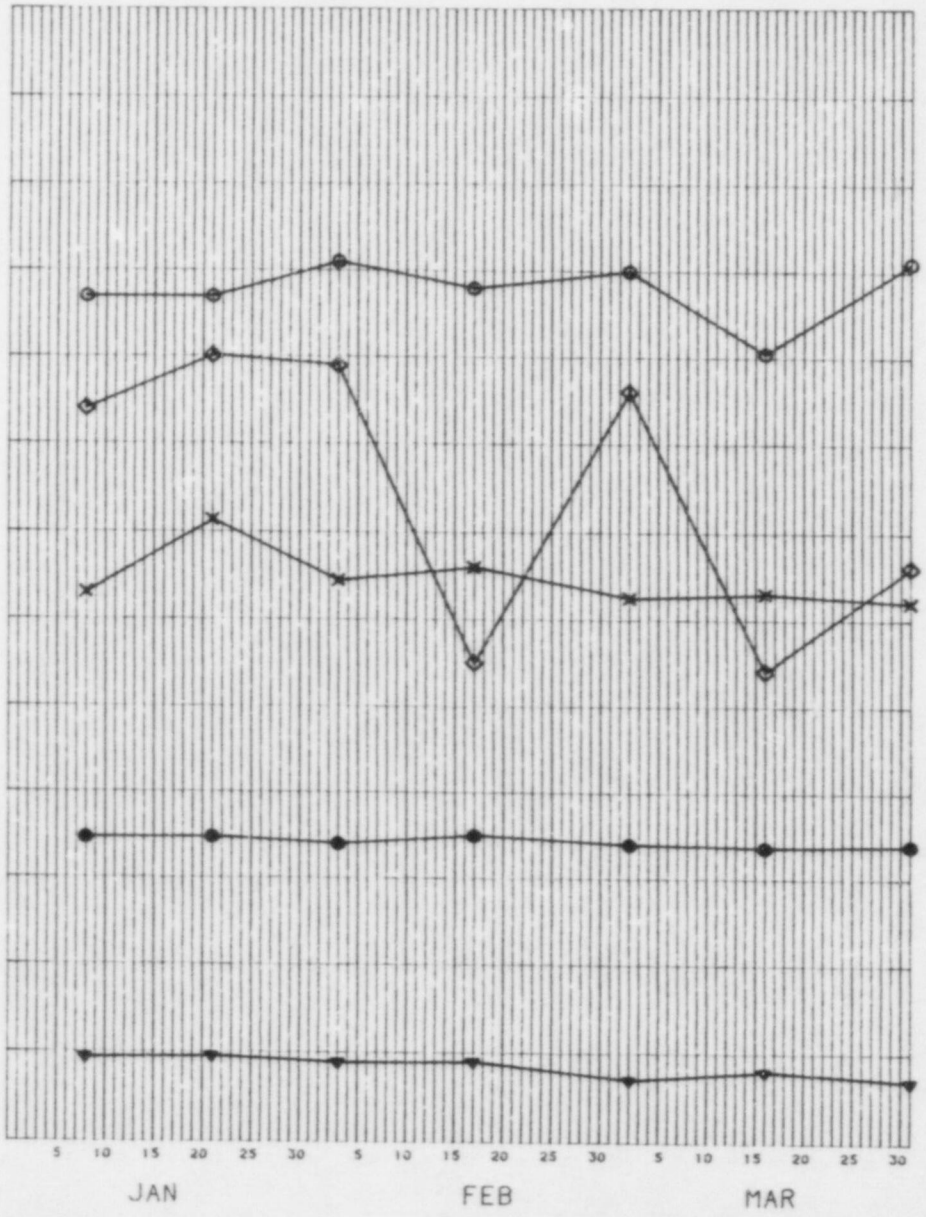
	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	18.0	211.0	157.7	741.0		
UCL + 20%	21.6	253.2	189.2	889.2		
SAMPLE DATE						
01/08/87	9.4	194.0	126.0	693.0	4644.0	30.40 S
01/21/87	9.6	194.0	142.7	695.0	4650.1	30.20 S
02/03/87	8.9	202.0	128.9	680.0	4649.0	30.00 S
02/17/87	9.0	196.0	132.0	700.0	4615.0	30.15 R
03/02/87	7.0	200.0	125.0	680.0	4646.1	30.10 R
03/16/87	8.0	181.0	126.0	673.0	4614.1	30.00 S
04/01/87	6.9	202.0	124.0	678.0	4626.1	30.35 R

* VALUE EXCEEDS UCL
** VALUE EXCEEDS UCL + 20%

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL WCOW-23

○ TOTAL SO4 (MG/L)	× TOTAL CO3 (MG/L)	◇ PIEZOMETRIC SURFACE (ELEV. MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
240	240	4680	2400	120
220	220	4670	2200	110
200	200	4660	2000	100
180	180	4650	1800	90
160	160	4640	1600	80
140	140	4630	1400	70
120	120	4620	1200	60
100	100	4610	1000	50
80	80	4600	800	40
60	60	4590	600	30
40	40	4580	400	20
20	20	4570	200	10
0	0	4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

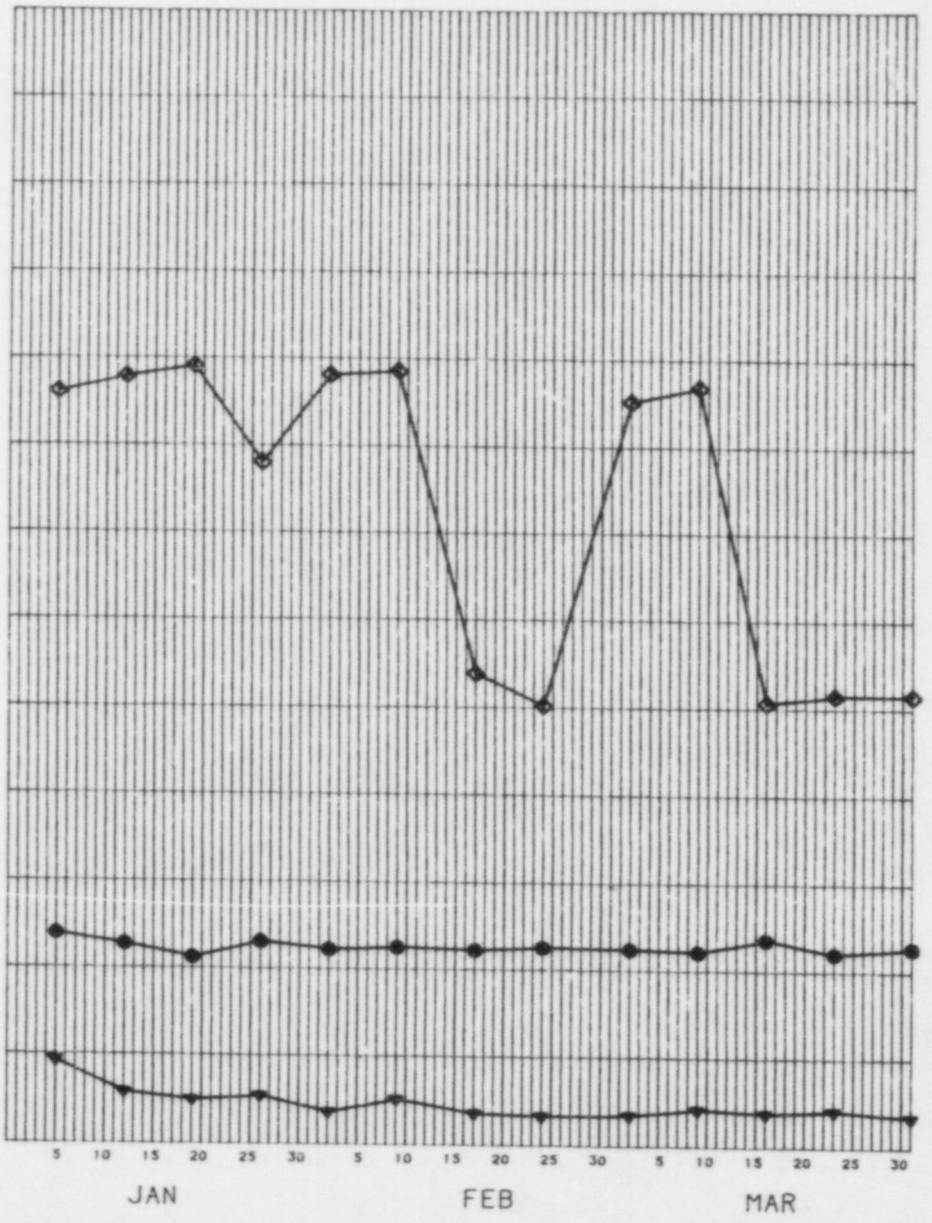
WELL NO.	TW-01	COMPLETED INTERVAL	440.0
WELL TYPE	TREND		466.0
NORTHING	1137339.3	CASING ELEVATION	4789.0
EASTING	849617.0	DISTANCE FROM FIELD, FT.	78.9
GROUND ELEVATION	4786.8	REFERENCE WELL	IW-01

	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	0.0	0.0	0.0	0.0		
UCL + 20%	0.0	0.0	0.0	0.0		
SAMPLE DATE						
01/05/87	18.5			715.0	4646.0	30.15 S
01/12/87	11.6			680.0	4647.8	30.38 S
01/19/87	9.9			635.0	4649.0	30.20 S
01/26/87	10.9			690.0	4638.0	30.20 R
02/02/87	7.3			665.0	4648.0	30.00 R
02/09/87	10.3			673.0	4648.5	30.20 F
02/17/87	7.2			665.0	4613.9	30.15 R
02/24/87	6.7			675.0	4610.2	30.05 R
03/02/87	7.0			670.0	4645.1	30.10 R
03/09/87	8.4			663.0	4646.8	30.30 S
03/16/87	7.6			705.0	4610.6	30.00 S
03/23/87	8.3			660.0	4611.5	30.05 R
03/31/87	7.0			680.0	4626.0	30.15 S

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL TW-01

◇ PIEZOMETRIC SURFACE (ELEV. MSL)	● SPECIFIC CONDUCTANCE (UMHO/CM)	▼ CHLORIDE (MG/L)
4680	3600	240
4670	3300	220
4660	3000	200
4650	2700	180
4640	2400	160
4630	2100	140
4620	1800	120
4610	1500	100
4600	1200	80
4590	900	60
4580	600	40
4570	300	20
4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

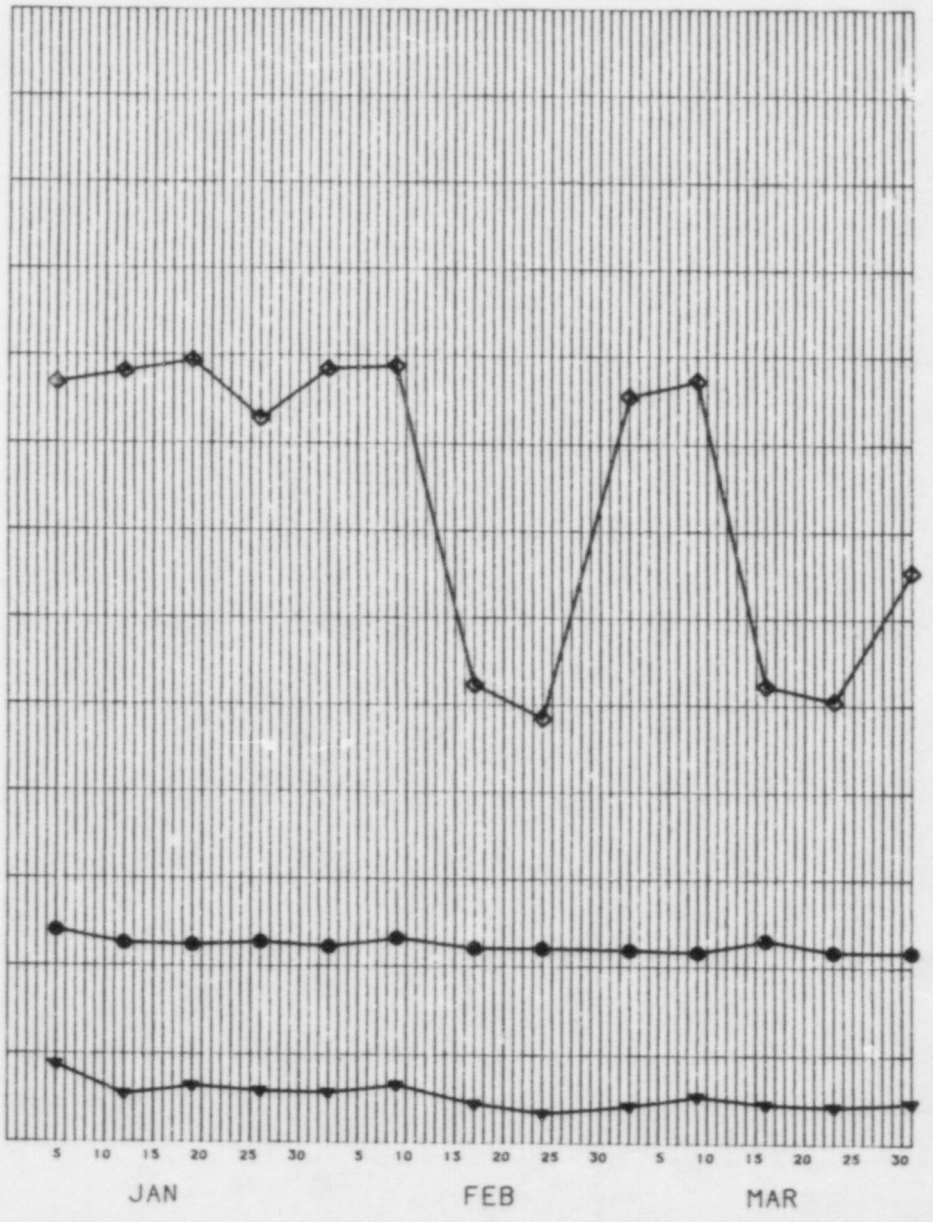
WELL NO.	TW-02	COMPLETED INTERVAL	440.0
WELL TYPE	TREND		480.0
NORTHING	1137338.7	CASING ELEVATION	4788.3
EASTING	849668.4	DISTANCE FROM FIELD, FT.	56.2
GROUND ELEVATION	4785.0	REFERENCE WELL	IW-01

	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	0.0	0.0	0.0	0.0		
UCL + 20%	0.0	0.0	0.0	0.0		
SAMPLE DATE						
01/05/87	17.5			720.0	4646.7	30.15 S
01/12/87	10.8			675.0	4648.0	30.38 S
01/19/87	12.8			670.0	4649.3	30.20 S
01/26/87	11.6			680.0	4642.7	30.20 R
02/02/87	11.3			665.0	4648.3	30.00 R
02/09/87	13.1			695.0	4648.7	30.20 F
02/17/87	8.8			660.0	4612.2	30.15 R
02/24/87	6.7			660.0	4608.4	30.05 R
03/02/87	8.4			655.0	4645.3	30.10 R
03/09/87	10.6			648.0	4647.1	30.30 S
03/16/87	8.8			690.0	4612.1	30.00 S
03/23/87	8.3			650.0	4610.4	30.05 R
03/31/87	9.3			650.0	4625.3	30.15 S

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL TW-02

PIEZOMETRIC SURFACE (ELEV. MSL)	SPECIFIC CONDUCTANCE (UMHO/CM)	CHLORIDE (MG/L)
4680	3600	240
4670	3300	220
4660	3000	200
4650	2700	180
4640	2400	160
4630	2100	140
4620	1800	120
4610	1500	100
4600	1200	80
4590	900	60
4580	600	40
4570	300	20
4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

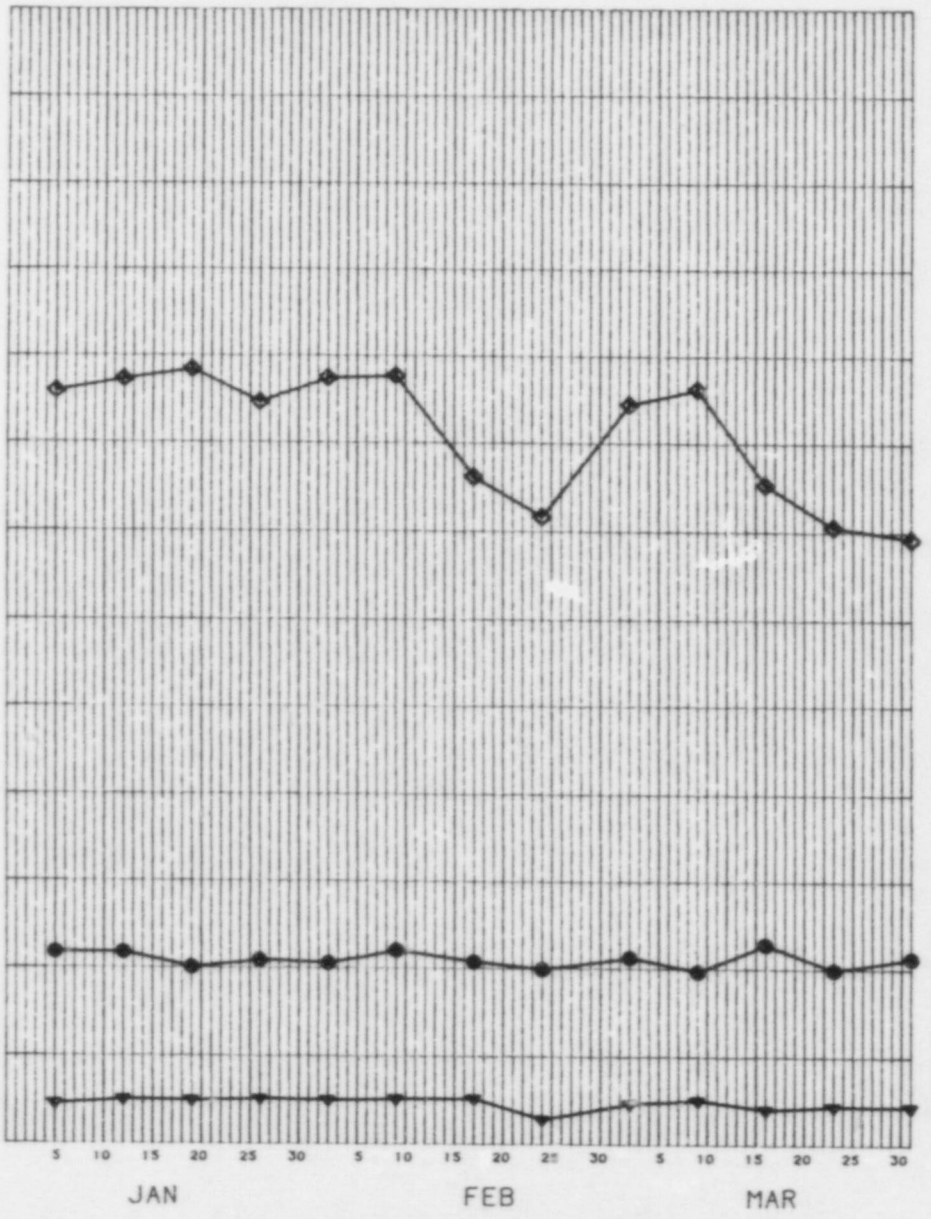
WELL NO.	WCOW-24	COMPLETED INTERVAL	345.0
WELL TYPE	TREND		370.0
NORTHING	1137269.1	CASING ELEVATION	4786.9
EASTING	849727.2	DISTANCE FROM FIELD, FT.	35.5
GROUND ELEVATION	4784.6	REFERENCE WELL	IW-03

	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	0.0	0.0	0.0	0.0		
UCL + 20%	0.0	0.0	0.0	0.0		
SAMPLE DATE						
01/05/87	9.1			650.0	4645.8	30.15 S
01/12/87	10.1			650.0	4647.2	30.38 S
01/19/87	9.9			600.0	4648.3	30.20 S
01/26/87	10.3			625.0	4644.5	30.20 R
02/02/87	10.0			615.0	4647.3	30.00 R
02/09/87	10.3			658.0	4647.6	30.20 F
02/17/87	10.4			620.0	4636.1	30.15 R
02/24/87	5.6			595.0	4631.6	30.05 R
03/02/87	9.3			635.0	4644.3	30.10 R
03/09/87	10.1			588.0	4646.1	30.30 S
03/16/87	8.0			680.0	4635.3	30.00 S
03/23/87	8.8			595.0	4630.5	30.05 R
03/31/87	8.7			635.0	4629.2	30.15 S

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL WCOW-24

PIEZOMETRIC SURFACE (ELEV. MSL)	SPECIFIC CONDUCTANCE (UMHO/CM)	CHLORIDE (MG/L)
4680	3600	240
4670	3300	220
4660	3000	200
4650	2700	180
4640	2400	160
4630	2100	140
4620	1800	120
4610	1500	100
4600	1200	80
4590	900	60
4580	600	40
4570	300	20
4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

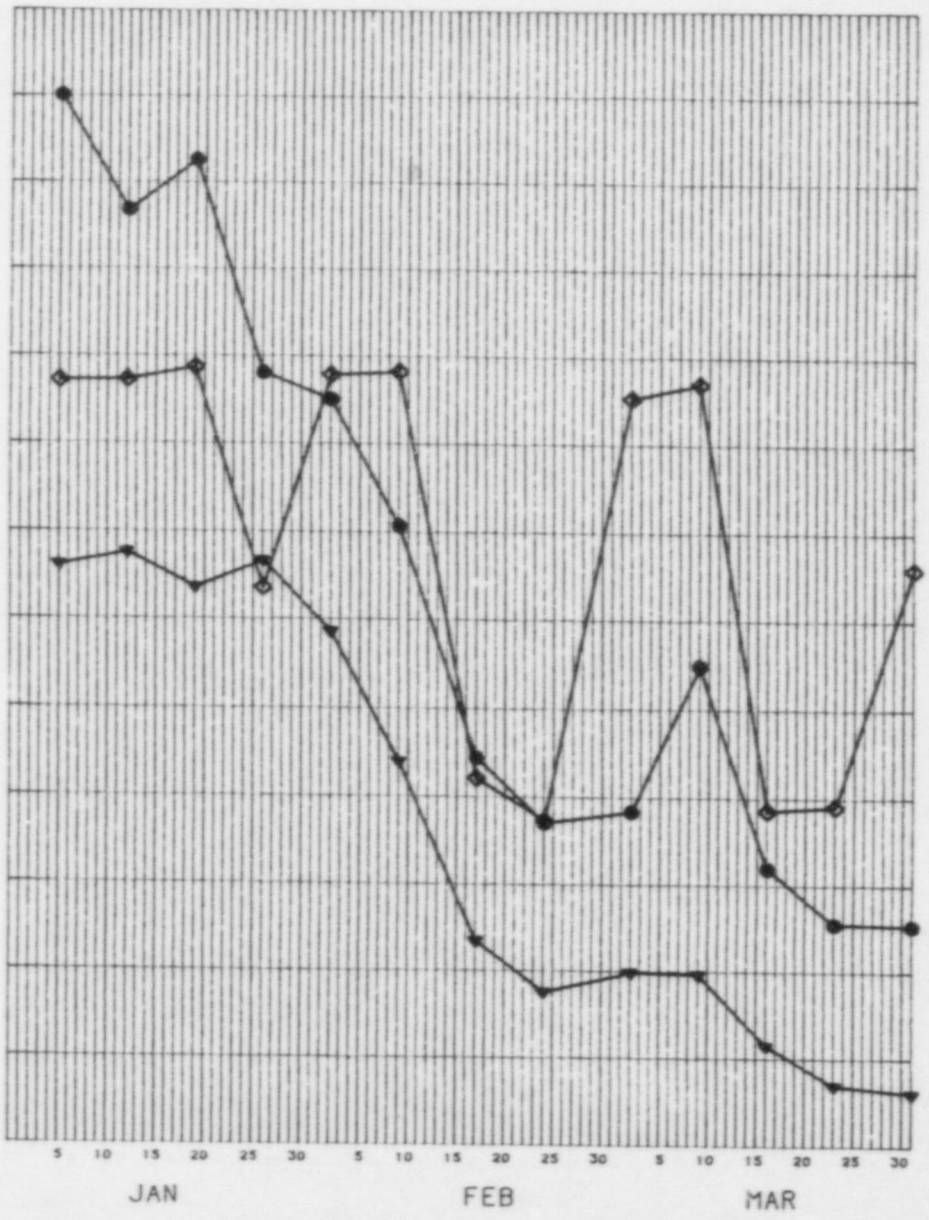
WELL NO.	WCOW-25	COMPLETED INTERVAL	440.0
WELL TYPE	TREND		482.0
NORTHING	1137300.4	CASING ELEVATION	4789.2
EASTING	849650.3	DISTANCE FROM FIELD, FT.	24.1
GROUND ELEVATION	4788.1	REFERENCE WELL	IW-01

	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	0.0	0.0	0.0	0.0		
UCL + 20%	0.0	0.0	0.0	0.0		
SAMPLE DATE						
01/05/87	132.0			3600.0	4647.1	30.15 S
01/12/87	135.0			3200.0	4647.2	30.38 S
01/19/87	127.0			3375.0	4648.6	30.20 S
01/26/87	133.2			2640.0	4623.5	30.20 R
02/02/87	117.0			2550.0	4647.8	30.00 R
02/09/87	87.7			2120.0	4648.2	30.20 F
02/17/87	46.8			1330.0	4602.0	30.15 R
02/24/87	35.0			1110.0	4597.3	30.05 R
03/02/87	39.6			1150.0	4645.3	30.10 R
03/09/87	39.2			1645.0	4647.0	30.30 S
03/16/87	23.0			955.0	4598.5	30.00 S
03/23/87	13.8			765.0	4599.0	30.05 R
03/31/87	12.1			760.0	4625.9	30.15 S

1ST QUARTER 1987 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

WELL WCOW-25

PIEZOMETRIC SURFACE (ELEV. MSL)	SPECIFIC CONDUCTANCE (UMHO/CM)	CHLORIDE (MG/L)
4680	3600	240
4670	3300	220
4660	3000	200
4650	2700	180
4640	2400	160
4630	2100	140
4620	1800	120
4610	1500	100
4600	1200	80
4590	900	60
4580	600	40
4570	300	20
4560	0	0



MALAPAI RESOURCES COMPANY
WILLOW CREEK R & D

MONITOR AND TREND WELL DATA

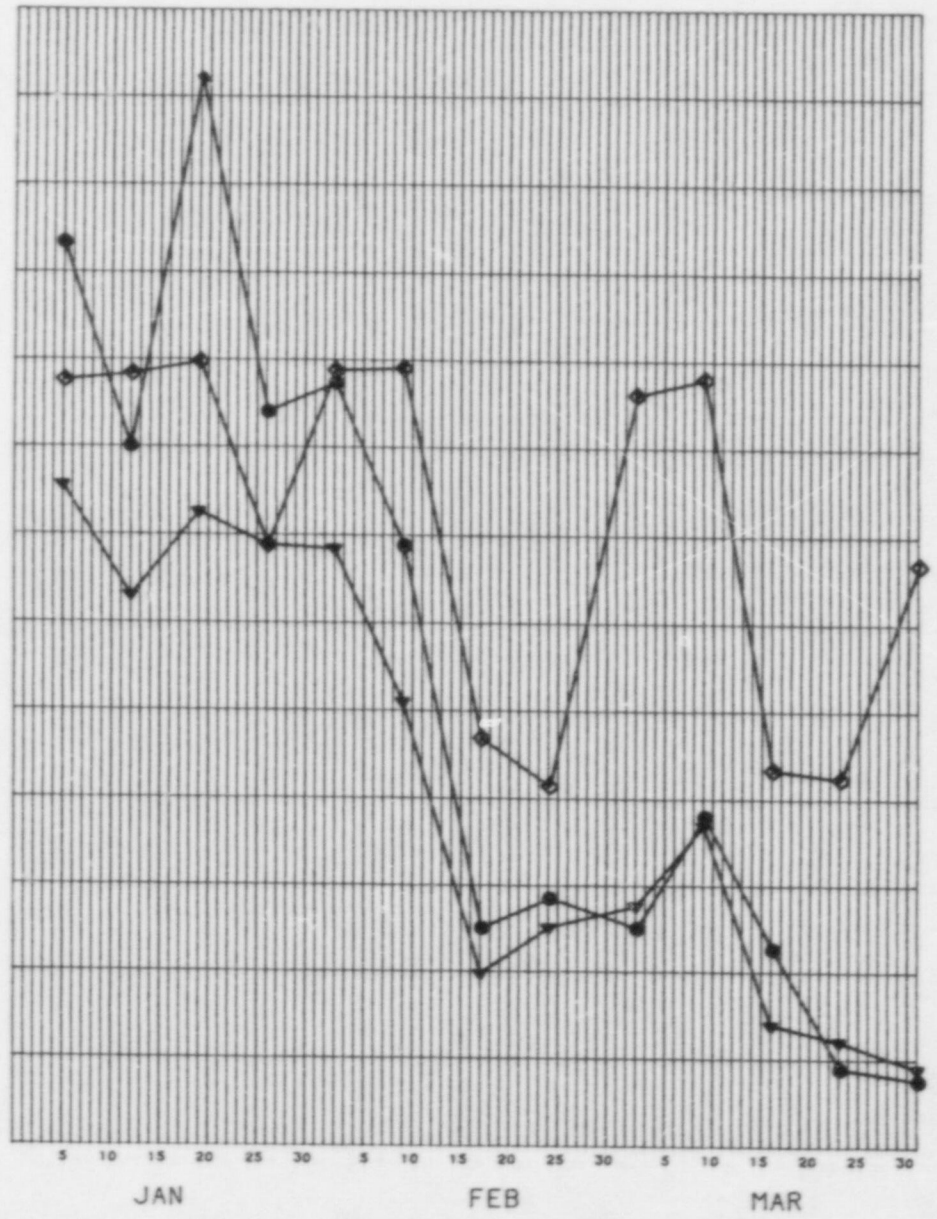
WELL NO.	WCOW-26	COMPLETED INTERVAL	445.0
WELL TYPE	TREND		480.0
NORTHING	1137200.2	CASING ELEVATION	4790.9
EASTING	849684.9	DISTANCE FROM FIELD, FT.	32.7
GROUND ELEVATION	4789.9	REFERENCE WELL	IW-04

	CL (MG/L)	SO4 (MG/L)	TCO3 (MG/L)	COND (UMHO/CM)	PIEZOMETRIC SURFACE (ELEV, MSL)	BAROMETRIC PRESSURE (INCHES-HG) RISING - R FALLING - F STEADY - S
UCL	0.0	0.0	0.0	0.0		
UCL + 20%	0.0	0.0	0.0	0.0		
SAMPLE DATE						
01/05/87	151.0			3800.0	4646.9	30.15 S
01/12/87	126.0			3100.0	4647.7	30.38 S
01/19/87	145.0			4350.0	4649.1	30.20 S
01/26/87	137.6			3200.0	4628.2	30.20 R
02/02/87	136.8			3300.0	4648.1	30.00 R
02/09/87	101.8			2745.0	4648.4	30.20 F
02/17/87	39.4			1430.0	4606.2	30.15 R
02/24/87	50.0			1535.0	4600.8	30.05 R
03/02/87	55.1			1430.0	4645.4	30.10 R
03/09/87	73.8			1820.0	4647.3	30.30 S
03/16/87	27.6			1360.0	4602.7	30.00 S
03/23/87	23.9			950.0	4601.7	30.05 R
03/31/87	17.9			910.0	4626.2	30.15 S

4TH QUARTER 1986 MALAPAI RESOURCES COMPANY: WILLOW CREEK R&D

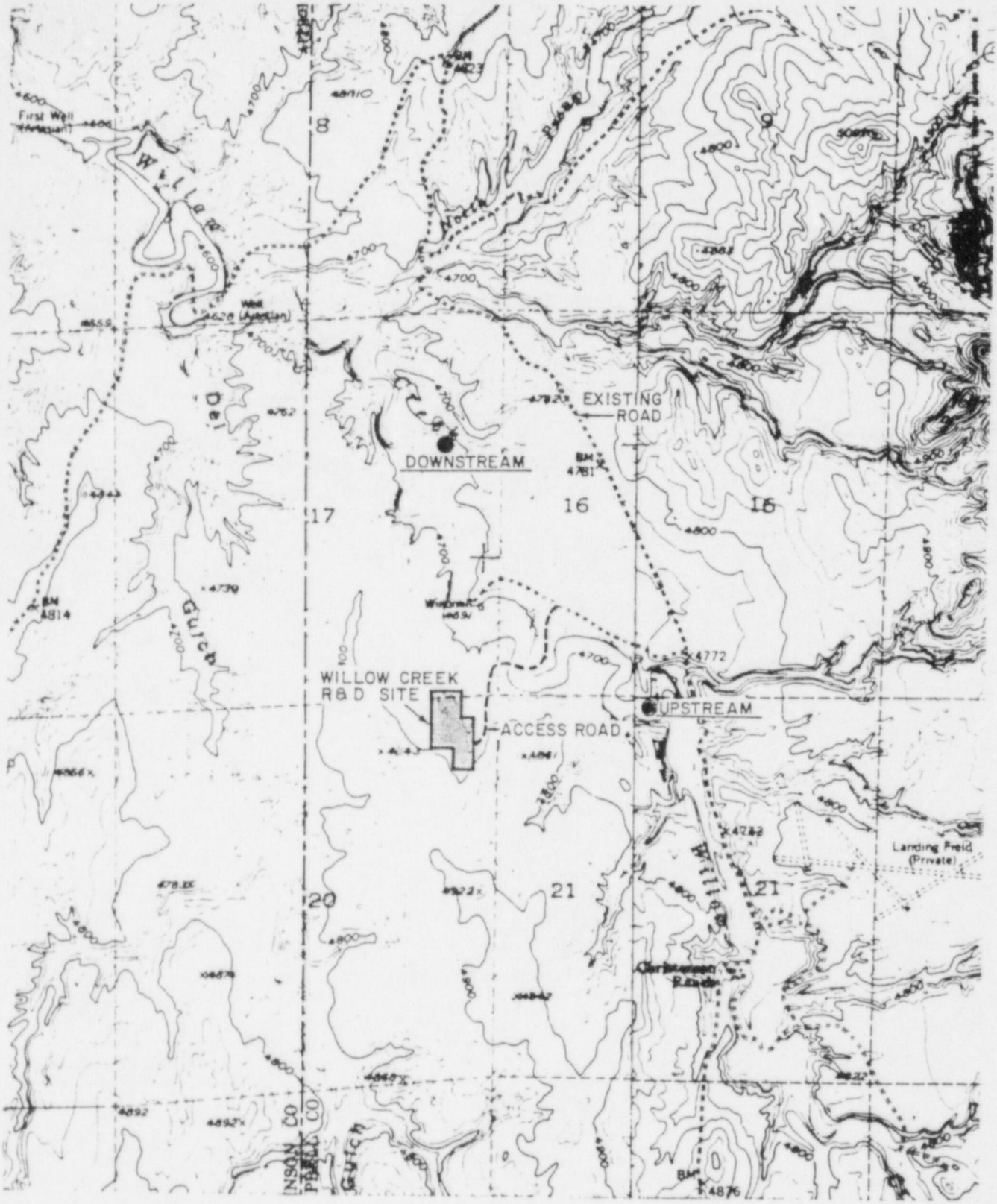
WELL WCOW-26

PIEZOMETRIC SURFACE (ELEV. MSL)	SPECIFIC CONDUCTANCE (UMHO/CM)	CHLORIDE (MG/L)
4680	4300	240
4670	4000	220
4660	3700	200
4650	3400	180
4640	3100	160
4630	2800	140
4620	2500	120
4610	2200	100
4600	1900	80
4590	1600	60
4580	1300	40
4570	1000	20
4560	700	0



APPENDIX II

SURFACE WATER ANALYTICAL DATA



MALAPAI RESOURCES		
WILLOW CREEK PROJECT		
SURFACE WATER SAMPLING LOCATIONS		
	SCALE: 1" = 2000'	FIGURE:
DRAWN BY: P.S.	DATE: 6/5/86	

WATER ANALYSIS REPORT-MALAPAI RESOURCES, INC

Project: Christensen Ranch Willow Creek R & D

Sample I.D.:	Downstream	
Sample Date:	01-27-87	Det.Limit
Report Date:	03-04-87	& Range
Sample Number:	87-0244	

MAJOR IONS mg/l:

Ca	371	0.05
Mg	155	0.01
Na	1050	0.05
K	15.8	0.10
CO3	7.9	0.10
CO3-total	582.0	0.10
HCO3	576.0	0.10
SO4	3200	0.50
Cl	85.3	0.10
NH4 (N)	0.79	0.05
NO2 (N)	0.01	0.01
NO3 (N)	0.10	0.01
F	0.24	0.10
SiO2	11.7	1.00
TDS @ 180 C	5452	1.0
Cond (umho/cm)	5890	1.0
Alk-CaCO3	485.0	0.1
pH (units)	8.47	1-14

TRACE METALS mg/l:

Al	<0.10	0.10
As	0.002	0.001
Ba	<0.10	0.10
B	<0.10	0.10
Cd	<0.01	0.01
Cr	<0.05	0.05
Cu	<0.01	0.01
Fe	0.47	0.05
Pb	<0.05	0.05
Mn	2.04	0.02
Hg	<0.001	0.001
Mo	<0.10	0.10
Ni	<0.05	0.05
Se	0.001	0.001
V	<0.10	0.10
Zn	<0.01	0.01

RADIOMETRIC pCi/l:

U (mg/l)	0.089	0.001
Ra225	1.3	0.10
Ra Prec. +/-	0.5	
Th230	1.4	0.50
Th Prec. +/-	2.1	
Po210	0.5	0.10
Po Prec. +/-	1.0	
Pb210	<0.1	0.10
Pb Prec. +/-		

Q.A. DATA:

Anion meq:	78.80	
Cation meq:	77.68	
A/C Balance:	1.014	0.95-1.05
WYDEQ A/C Bal.%	-0.71	-5 - +5
Calc TDS mg/l:	5189	
TDS A/C Bal:	1.051	0.90-1.10

Q.A. MANAGER: L.A. Harling
ENERGY LABORATORIES, INC.

WATER ANALYSIS REPORT-MALAPAI RESOURCES, INC

Project: Christensen Ranch Willow Creek R & D

SAMPLE I.D.: Willow Creek Downstream Discharge

Sample Date:	02-23-87	Det.Limit
Report Date:	04-07-87	& Range
Sample Number:	87-1340	

MAJOR IONS mg/l:

Ca	336	0.05
Mg	137	0.01
Na	804	0.05
K	11.7	0.10
CO3	0	0.10
CO3-total	813.6	0.10
HCO3	827	0.10
SO4	2164	0.50
Cl	80.7	0.10
NH4 (N)	0.10	0.05
NO2 (N)	<0.01	0.01
NO3 (N)	0.02	0.01
F	<0.1	0.10
SiO2	14.5	1.00
TDS @ 180 C	4160	1.0
Cond (umho/cm)	4800	1.0
Alk-CaCO3	678.0	0.1
pH (units)	7.94	1-14

TRACE METALS mg/l:

Al	<0.10	0.10
As	0.003	0.001
Ba	<0.10	0.10
B	<0.10	0.10
Cd	<0.01	0.01
Co	<0.01	0.01
Cr	<0.05	0.05
Cu	<0.01	0.01
Fe	0.06	0.05
Pb	<0.05	0.05
Mn	0.11	0.01
Hg	<0.001	0.001
Mo	<0.10	0.10
Ni	<0.05	0.05
Se	0.105	0.001
V	<0.10	0.10
Zn	0.01	0.01

RADIOMETRIC pCi/l:

U (mg/l)	0.1980	0.0003
Ra226	0.3	0.20
Ra Prec. +/-	0.3	
Th230	3.0	0.20
Th Prec. +/-	2.0	
Po210	<0.2	1.0
Po Prec. +/-		
Pb210	<1.0	1.0
Pb Prec. +/-		

Q.A. DATA:

Anion meq:	80.92	
Cation meq:	83.49	
A/C Balance:	0.959	0.95-1.05
WYDEQ A/C Bal.%	2.07	-5 - +5
Calc TDS mg/l:	3962	
TDS A/C Bal:	1.050	0.90-1.10

Q.A. MANAGER: L.A. Darling

ENERGY LABORATORIES, INC.

WATER ANALYSIS REPORT-MALAPAI RESOURCES, INC.

Project: Christensen Ranch Willow Creek R & D

Sample I.D.:	Willow Creek Downstream	
Sample Date:	03-30-87	Det.Limit & Range
Report Date:	04-29-87	
Sample Number:	87-2999	

MAJOR IONS mg/l:

Ca	310	0.05
Mg	137	0.01
Na	787	0.05
K	7.7	0.10
CO3	0	0.10
CO3-total	523	0.10
HCO3	637	0.10
SO4	2403	0.50
Cl	36.3	0.10
NH4 (N)	0.39	0.05
NO2 (N)	<0.01	0.01
NO3 (N)	0.03	0.01
F	0.15	0.10
SiO2	10.5	1.00
TDS @ 180 C	4115	1.0
Cond. (umhos/cm)	4551	1.0
Alk-CaCO3	449	0.1
pH (units)	7.33	1-14

TRACE METALS mg/l:

Al	<0.1	0.10
As	<0.001	0.001
Ba	0.1	0.10
B	<0.1	0.10
Cd	<0.01	0.01
Co	<0.01	0.01
Cr	<0.05	0.05
Cu	<0.01	0.01
Fe	0.08	0.05
Pb	<0.05	0.05
Mn	0.21	0.01
Hg	<0.001	0.001
Mo	<0.1	0.10
Ni	<0.05	0.05
Se	0.008	0.001
Ag	<0.1	0.10
Zn	<0.01	0.01

RADIOMETRIC pCi/l:

U (mg/l)	0.167	0.0003
Ra226	2.1	0.20
Ra Prec. +/-	0.8	
Th230	*	0.20
Th Prec. +/-		
Pb210	17.8	1.0
Pb Prec. +/-	4.7	
Po210		1.0
Po Prec. +/-	*	

*Not yet available

Q.A. DATA:

Anion meq:	59.913	
Cation meq:	61.263	
A/C Balance:	0.977	0.95-1.05
MYDED A/C Bal.%	1.19	-5 - +5
Calc TDS mg/l:	3961	
TDS A/C Bal:	1.039	0.90-1.10

Q.A. MANAGER: L.A. Harding

Energy Laboratories, Inc.

WATER ANALYSIS REPORT-MALAPAI RESOURCES, INC

Project: Christensen Ranch Willow Creek R & D

SAMPLE I.D.:	Upstream	
Sample Date:	03-04-87	Det.Limit
Report Date:	04-07-87	& Range
Sample Number:	87-2205	

MAJOR IONS mg/l:

Ca	116	0.05
Mg	37.6	0.01
Na	147	0.05
K	7.7	0.10
CO3	0	0.10
CO3-total	188.4	0.10
HCO3	191	0.10
SO4	550	0.50
Cl	8.4	0.10
NH4 (N)	0.08	0.05
NO2 (N)	<0.01	0.01
NO3 (N)	0.06	0.01
F	<0.1	0.10
SiO2	11.3	1.00
TDS @ 180 C	960	1.0
TSS	36	1.0
Cond (umho/cm)	1452	1.0
Alk-CaCO3	157.0	0.1
pH (units)	7.86	1-14

TRACE METALS mg/l:

Al	<0.1	0.10
As	0.001	0.001
Ba	<0.1	0.10
B	<0.1	0.10
Cd	<0.01	0.01
Co	<0.01	0.01
Cr	<0.05	0.05
Cu	<0.01	0.01
Fe	<0.05	0.05
Pb	<0.05	0.05
Mn	0.09	0.01
Hg	<0.001	0.001
Mo	<0.1	0.10
Ni	<0.05	0.05
Se	<0.001	0.001
V	<0.1	0.10
Zn	<0.01	0.01

RADIOMETRIC pCi/l:

U (mg/l)	0.0390	0.0003
Ra226	3.3	0.20
Ra Prec. +/-	0.8	
Th230	<0.2	0.20
Th Prec. +/-		
Po210	4.5	1.0
Po Prec. +/-	1.3	
Pb210	26.3	1.0
Pb Prec. +/-	7.9	

Q.A. DATA:

Anion meq:	14.83	
Cation meq:	15.53	
A/C Balance:	0.955	0.95-1.05
WYDEQ A/C Bal.%	2.31	-5 - +5
Calc TDS mg/l:	974	
TDS A/C Bal:	0.986	0.90-1.10

Q.A. MANAGER: *L.A. Harline*

ENERGY LABORATORIES, INC.

SURFACE WATER QUALITY

DOWNSTREAM LOCATION
MONTHLY ASSAY
FIELD PARAMETERS

DATE	TEMPERATURE C	CONDUCTIVITY umho/cm	pH	STREAM DISCHARGE RATE cfs
1/27/87	5°C	4500	7.73	1.5
2/23/87	6°C	4734	7.75	0.38
3/30/87	2°C	4550	7.20	0.38

UPSTREAM LOCATION
QUARTERLY ASSAY
FIELD PARAMETERS

3/4/87	3°C	1800	7.9	10.0