PUMPING TESTS AND SUSTAINABILITY ANALYSIS FOR WELLS H1, M1, AND M3, AND EVALUATION OF WATER QUALITY

PROPERTY:

IONE BAND OF THE MIWOK INDIANS CASINO AND HOTEL SITE

SOUTH SIDE OF THE CITY OF PLYMOUTH
AMADOR COUNTY, CALIFORNIA

PREPARED FOR:

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OCTOBER 20, 2004

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1.0 INTRODUCTION

At the request of Analytical Environmental Services (AES), Applied Engineering and Geology, Inc. (AEG) has prepared this *Pumping Tests and Sustainability Analysis for Wells H1, M1, and M3, and Evaluation of Water Quality* (Report) to document the pumping tests conducted by AEG at the Ione Band of Miwok Indians Casino and Hotel Site (Project Site). The Project scope of work included performing a series of pumping tests on wells M1, M3, and H1. The objective of the pumping tests was to determine the recommended long-term yield for these wells. Wells M2 and M4 were each utilized as an observation well for certain tests, but were not included in the scope of work to determine long-term yield.

Work performed and included in this document is as follows:

- Pumping test and substainable yield evaluation for wells H1, M1, and M3;
- Evaluation of DWR Well logs for wells within a two mile radius of the Project Site; and,
- Collection of water samples from wells H1, M1, and M3 for water quality analyses.

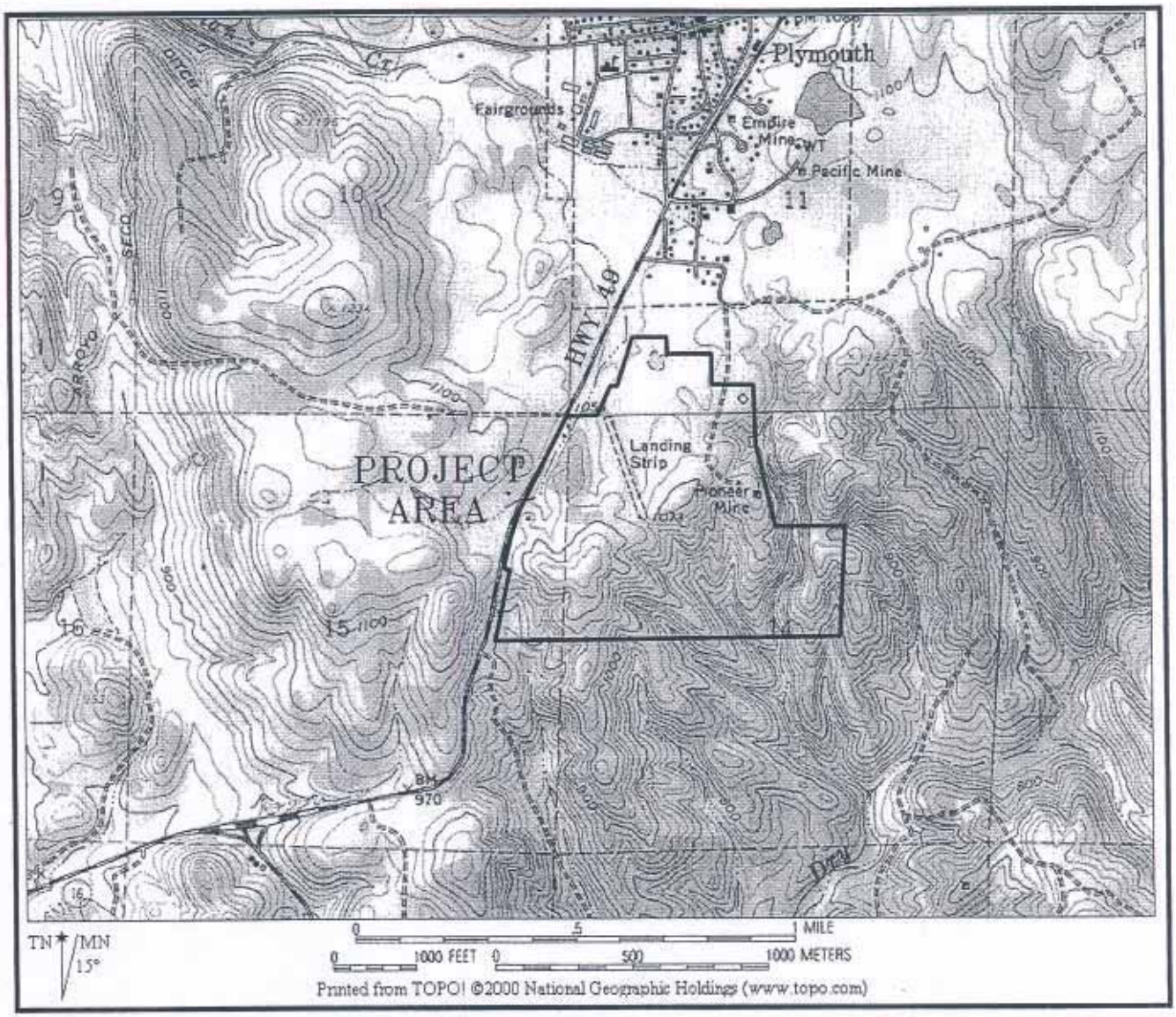
2.0 GENERAL SITE INFORMATION

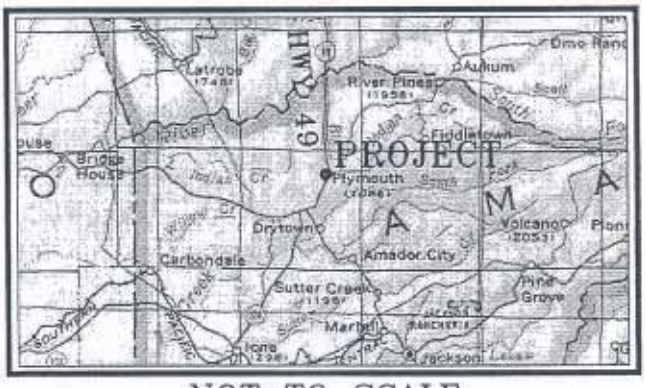
The Ione Rancheria (Project Site) is located on the east side of Highway 49 at the southern limits of the City of Plymouth, Amador County, California (see **Figure 1**). A general layout of the Project Site and the locations of all wells tested are shown on **Figure 2**.

2.1 Geology/Hydrogeology

This Project Site is on the western side of the New Melones Fault Zone and is approximately 2.5 miles east of the Bear Mountain Fault Zone. The onsite geologic materials consist of greenstone along the western edge and Upper Jurassic marine sedimentary and metasedimentary rocks of the Mariposa Formation. These sedimentary and metasedimentary rocks are primarily weathered shale and slate with minor thin beds of sandstone. The soil layer is very thin over most of the Project Site, ranging from less than three inches to a maximum of approximately two feet.

During the placement of backhoe test pits at the western side of the Project Site during the fall of 2003, no ground water was encountered by any of the excavation activities. However, while conducting an inspection of the gullies on the western portion of the Project Site during December 2003, numerous springs were observed. The location of these springs was reported in AEG's *Results of Soil Mantle And Percolation Tests*, dated March 2, 2004.





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1000' 0' 1000' 2000'

SCALE 1"=2000' +/-

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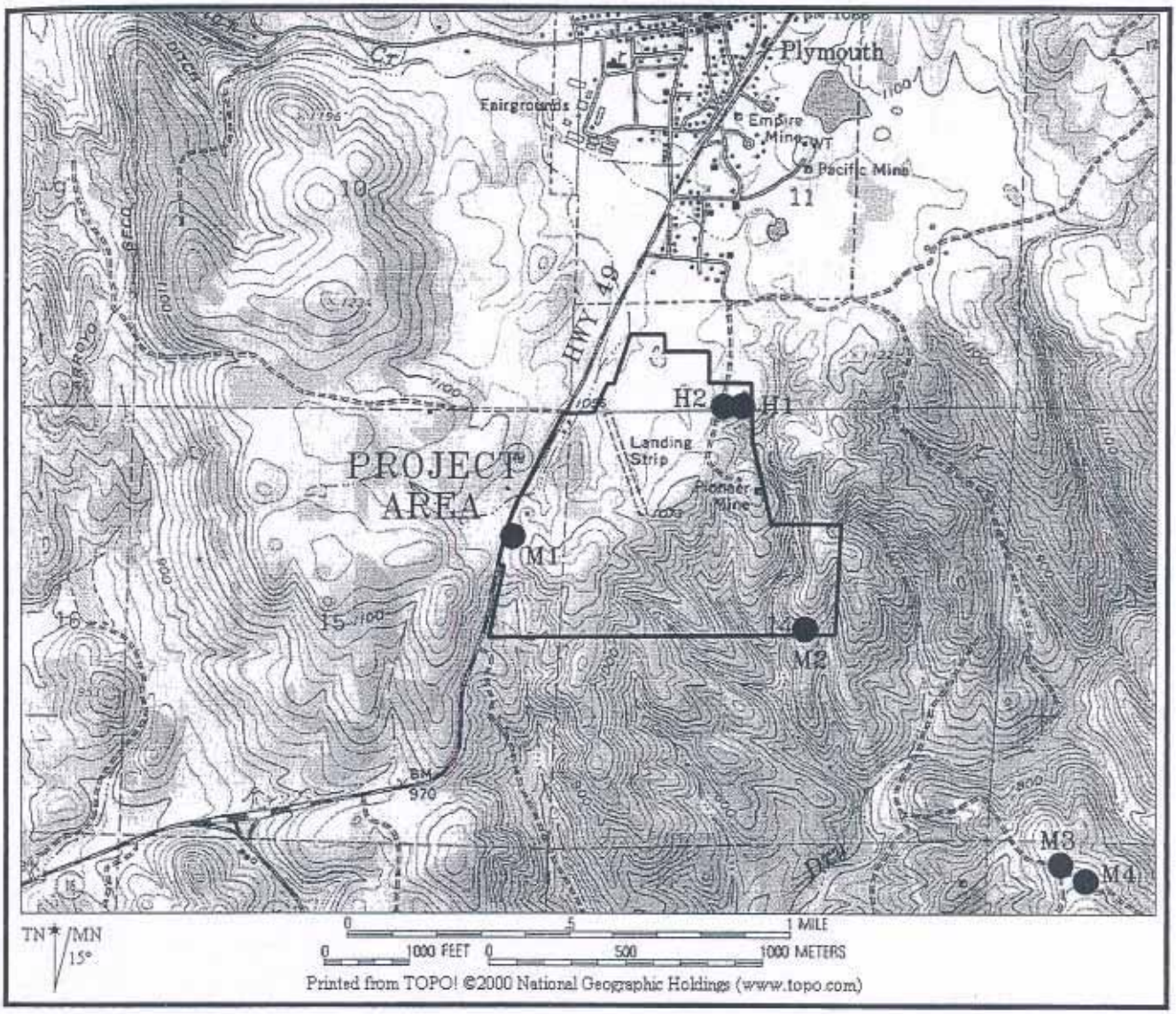
SITE VICINITY MAP
IONE CASINO SITE
PLYMOUTH, AMADOR COUNTY, CALIFORNIA

FIGURE 1



LEGEND

M2 ● APPROXIMATE LOCATION OF DOMESTIC WELLS AND CISTERN LOCATED BY AEG

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SCALE 1"=2000' +/-

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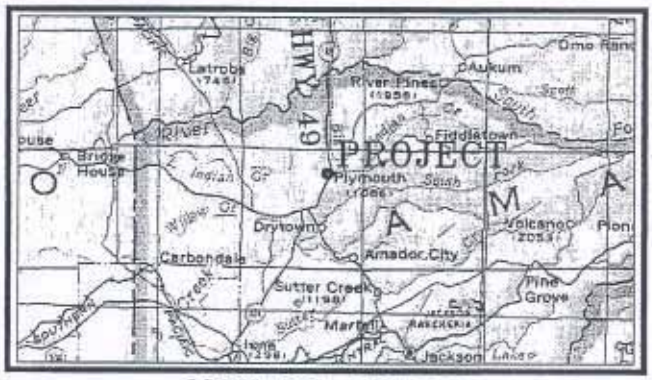

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GENERALIZED SITE MAP
IONE CASINO SITE
PLYMOUTH, AMADOR COUNTY, CALIFORNIA

FIGURE 2

Observed surface water features on the Project Site include several springs in the drainages within the southwest quadrant; a pond in the extreme southwest corner, along Highway 49; a seasonal stream (Dry Creek) and its tributaries; a slough along the western boundary (Highway 49); and a small stock pond in the open field north of the abandoned runway.

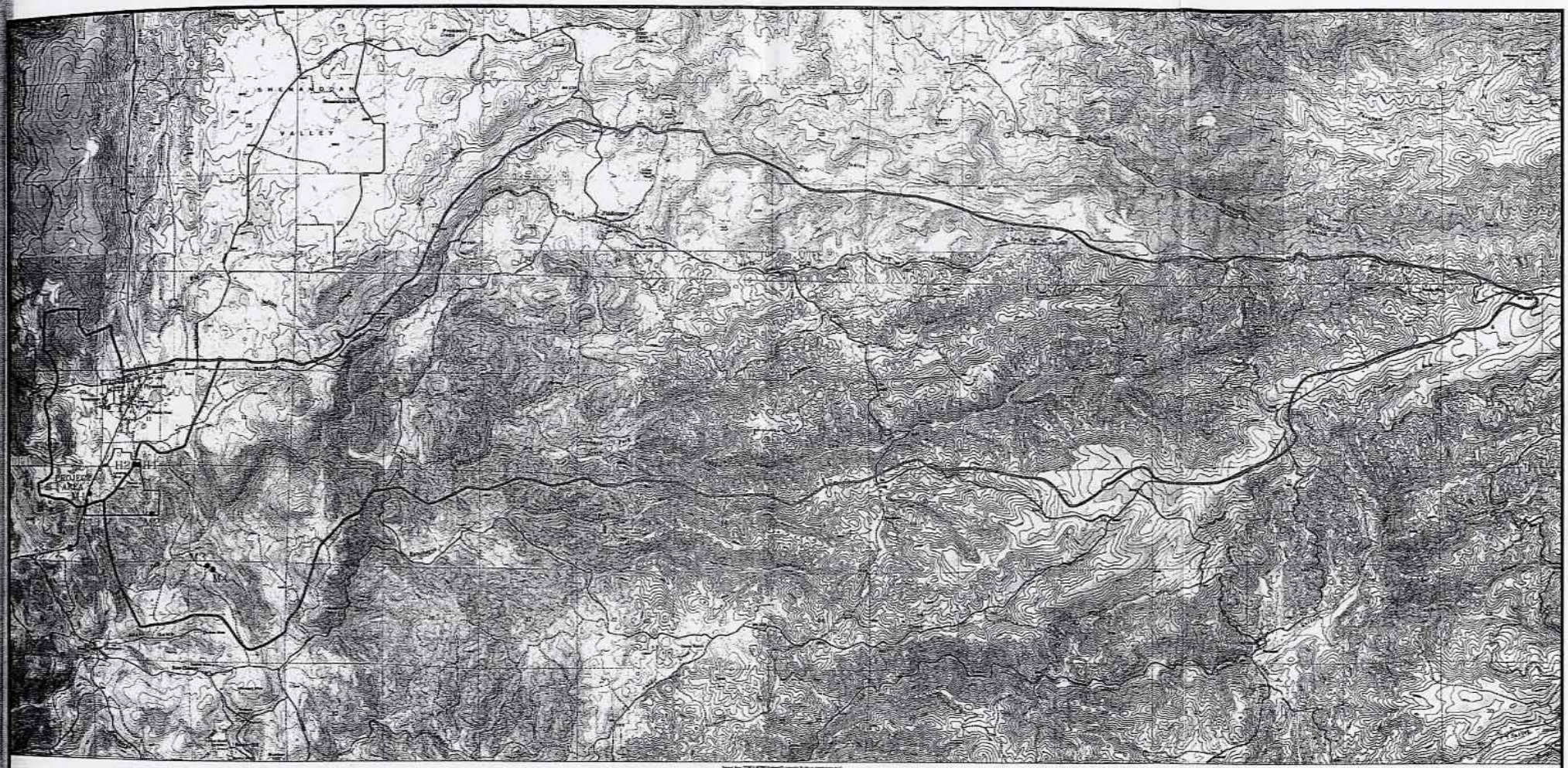
Based on readings collected by AEG in the field, depth to static ground water in the wells within the Project boundaries ranged from approximately 30 feet to 75 feet below ground surface (bgs).

As shown by **Figure 3**, the drainage basin that includes M1 is quite small, and encompasses approximately 1,421 acres (2.2 square miles). The drainage basin that includes wells H1, H2, M2, M3, and M4 is a long and narrow basin that extends approximately 14 miles to the east, and encompasses approximately 35.5 square miles.

Department of Water Resources (DWR) Well Completion Reports (DWR Well Logs) for all water supply wells within a two mile radius of the Project Site were requested from the State of California, Department of Water Resources. Once the DWR Well Logs were received, a simple evaluation of the data was performed. The wells were plotted based on the data provided by the DWR Wells Logs. However, the descriptions given by most drillers to locate the well is very general so only a few were plotted with an exact location. Since most of the wells were only plotted to the closest 40 acre parcel, or to the nearest section (640 acres). A copy of the plot was not included in this report.

Based on the DWR Well Logs, it would appear that there are approximately 27 domestic water producing wells located within the smaller drainage basin that encompasses most of the Town of Plymouth and well M1. These wells vary in depth from approximately 80 feet to 800 feet, with static water levels ranging from 14 feet to just over 200 feet. The wells appear to equally dispersed throughout the drainage basin. The materials encountered vary from slate and shale to greenstone and granitics. With a few exceptions, the higher producing wells appear to be located within granitic material. There are two wells located within Section 11 (the Town of Plymouth) and one in Section 15 (west of the Project Area) that are reported to produce water at a rate greater than 200 gpm.

There are approximately 96 domestic water producing wells within the western end of the watershed that contains wells M2, M3, M4, and H1. The majority of the wells are located on the western side of the Town of Plymouth in Section 12, Township 7N, Range 6E and are within granitic material. These 96 wells vary in total depth from just under 100 feet to over 800 feet, with static water levels ranging from 40 feet to 500 feet below ground surface. Approximately 50 percent of the wells in Section 12 are reported to produce greater than 50 gpm.



LEGEND

APPROXIMATE LOCATION OF DIVIDE BETWEEN SURFACE WATER SHEDS

1/2 0 1/2 1

SCALE 1" = 1 MILE +/-

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S:\AEG DOCUMENTS\IONE\IONE WATER SHED.DWG(22)

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WATERSHED MAP

IONE CASINO SITE

PLYMOUTH, AMADOR COUNTY, CALIFORNIA

FIGURE 3

Based on DWR Well Logs, there are approximately 20 domestic wells within 2000 feet of the Project Area. Fourteen of these wells are located within the smaller drainage basin, and six are located within the larger drainage basin. Twelve of the wells (eight within the smaller basin) are reported to produce less than 15 gpm. Four of the wells (three within the smaller basin) are reported to produce between 16 and 50 gpm. And, four of the wells (three within the smaller basin) were reported to produce greater than 51 gpm. With the exception of H1, the three higher producing wells (51+ gpm) are all located west of the Project Area.

3.0 GROUND WATER INVESTIGATION

3.1 Ground Water Pumping Test

3.1.1 Well Construction Details

Information obtained during the drilling and installation of wells M1 through M4 and well H1 was provided on the DWR Well Logs for the onsite wells. The DWR Well Logs, which are presented in **Appendix A**, provide information relating to lithology encountered during drilling, water strikes, static water level, airlift yield, total depth, and well construction details. Although the information is general, it does provide valuable background information and insight into ground water occurrence. Based on a review of the reports, the following is evident.

- The geology is characterized by shale and slate. The drilling report for well H1 indicates 40 feet of overburden. No overburden is reported in the other well reports. However, results of previous field studies indicate that a thin unsaturated soil layer covers most of the Project Site explored by AEG during previous studies and generally ranges from less than three inches to a maximum of approximately two feet;

- The wells were drilled using the air rotary method to a diameter of 11 inches. They were completed with 6-inch diameter surface casing (grouted in place) and a 4-inch diameter PVC liner that was perforated from the primary water strike to total depth. Well H1 is an exception and was completed as an open hole below the surface casing;

- Airlift yield sustained over a four-hour testing period ranged from 15 to 150 gallons per minute (gpm);

- The primary water strikes occurred from depths of 180 to 600 feet below ground surface (bgs) in bedrock. Due to the low hydraulic conductivity (K) and storativity (S) generally associated with shale and slate, it is apparent that the water is stored and transmitted by fracture flow; and,

- Static water level measured after well completion ranged from 30 to 75 feet bgs, which is well above the water strikes and therefore indicative of confined groundwater conditions.

Well construction details of wells M1, M3, M4 and H1 are summarized in **Table 3-1**.

TABLE 3-1
Well Construction Details

Well	Date Drilled	Total Depth (bgs)	Surface Casing[1]	Blank Casing	Screened Interval (bgs)	Depth to Water Strike (bgs)	Static Water Level[2] (bgs)	Airlift Yield[3] (gpm)
M1	8/10/01	620	6" PVC to 55'	4" PVC liner 0 – 540'	540 - 620	600	60	15
M3	1/16/04	220	6" PVC to 60'	4" PVC liner 0 – 180'	180 – 220	180	30	70
M4	2/20/04	340	6" PVC to 60'	4" PVC liner 0 – 280'	280 - 340	200 (5 gpm) 240 (10 gpm)	45	15
H1	11/3/77	223	6" PVC to 80'	None	Open hole	105 – 107 200 - 205	75	150

1 6" surface casing was grouted in place.
2 Static water level as shown on DWR Well Logs (except for H1, which was measured in the field)
3 Airlift yield obtained from Well Completion Reports, measured prior to well installation. Test duration was four hours.
bgs = below ground surface (in feet).
gpm = gallons per minute

3.1.2 Pump Details

Shown in **Table 3-2** are the details associated with installation of the test pumps in each of the pumped wells.

TABLE 3-2
Pump Installation Details

Well	Total Depth (bgs)	Screened Interval (bgs)	Depth to Water Strike (bgs)	Static Water Level[1] (bgs)	Pump Size (Hp)	Depth to Top of Pump (feet)
M1	620	540 - 620	600	53	5	600
M3	220	180 – 220	180	37	7.5	200

1 Static water level as measured by AEG in the field.
bgs = below ground surface (in feet).
gpm = gallons per minute

3.1.3 Pump Testing Methods

Four types of pumping tests were utilized to obtain information necessary to complete the proposed scope of work. These tests included:

- Step-drawdown tests;
- Constant rate tests;
- Constant yield and drawdown tests; and,
- Recovery tests.

Each type of test is further defined as follows:

Step-Drawdown Tests

Step-drawdown tests were performed to evaluate drawdown behavior (in the pumped well) in response to pumping and identify the optimum yield for the constant rate test. The step-drawdown test involves pumping the well at variable discharge rates, increasing the discharge rate in a step-wise fashion, and measuring discharge rate and water level response for the test duration.

Constant Rate Tests

Constant rate tests were conducted to assess well response to pumping at a constant discharge rate. The pumping tests involved measurement of water levels in the pumping well and observation wells during pumping, and measurement of the discharge rate.

Constant Yield and Drawdown Tests

The constant yield and drawdown tests were generally conducted in instances where water levels did not stabilize within 48 to 72 hours of constant rate pumping. The tests were performed by pumping at a relatively high discharge rate, and then subsequently reducing the discharge rate until the drawdown stabilized. Pumping at the adjusted rate was continued to ensure that stabilization was maintained. Water level in the pumped well and discharge rates were recorded for the duration of the test.

Recovery Tests

Recovery tests involve the measurement of water levels in the pumping and observation wells following the cessation of pumping. Recovery test data collected following constant rate tests were used to estimate hydraulic conductivity (K) and transmissivity (T) and to assess aquifer performance.

3.1.4 Pumping Test Design

Actual test duration was determined in the field based on real-time reviews of the well response to pumping. The wells were tested individually and allowed to recover prior to the start of subsequent tests to avoid difficulties in data interpretation due to potential well interference. The testing of well M3 was an exception due to the slow recovery characteristics of the well.

3.1.5 Measurement of Hydraulic Response

The constant rate test conducted in well M3 included water level measurements in observation wells M2, M4, and H1 to assess the potential for hydraulic communication between the wells. Observation wells were not included for any of the other pumping tests. Water levels were measured manually using an electronic water level indicator. For each measurement, date, time, and depth to water from the top of the well casing (to nearest 1/100 foot) were recorded on field forms. This data was then tabulated for evaluation. Copies of this tabulated data is included in **Appendix B**.

3.1.6 Measurement of Discharge Rate

A real time and cumulative flow meter was used to measure the discharge rate for the pumping tests performed in wells M1 and M3. Due to the high discharge rate during the pumping test at well H1, it was not possible to use a real time and cumulative flow meter since the meters were only calibrated to record flows from five to 50 gpm. Instead, the discharge rate during the pumping test at well H1 was calculated by timing how long it took to discharge five gallons.

3.1.7 Model Used

For the purposes of this report at this Project Site, we will look at the fractured rock above any regional fault zone as an *Equivalent Porous Medium Model*. All techniques used with porous media apply, including evaluating pumping test data to obtain transmissivity, specific capacity, specific yield, etc., drawing of flow nets, and determining capture zones. The *Equivalent Porous Medium Model* is valid when there is a sufficiently high fracture density, which does exist at this Project Site.

3.2 Pumping Test Results and Evaluation

This section presents the pumping test results and analysis. The results include time series water level and discharge rate data. Water level and production rate data were interpreted to develop estimates of aquifer parameters (K and T) and long-term well yield, and to assess the potential for hydraulic communicating between wells.

3.2.1 Pumping Test Schedule

The pumping test program was conducted over a period of nine months, from December 2003 through August 2004. The start and end dates and times and test durations for each test, including the recovery periods, are summarized in **Table 3-3**.

TABLE 3-3
Testing Schedule

Well	Test	Start Date / Time	End Date / Time	Duration (hours)
	Step-Drawdown			
M3	Pumping	07/06/04 14:46	07/06/04 19:00	4.2
	Recovery	07/06/04 19:00	07/07/04 08:30	13.5
	Constant Rate			
H1	Pumping	12/02/03 15:00	12/09/03 13:08	166.1
	Recovery	12/09/03 13:12	01/08/04 08:18	715.1
M3	Pumping	07/07/04 08:30	07/12/04 11:41	123.2
	Recovery	07/12/04 11:41	07/31/04 09:51	454.2
	Constant Yield and Drawdown			
M1	Pumping	12/13/03 13:00	12/16/03 08:22	67.4
	Recovery	12/16/03 08:22	12/16/03 17:00	8.6
M3	Pumping	07/31/04 09:51	08/04/04 12:54	99.0

3.2.2 Pumping Tests Results

The discharge rates used for the constant rate and constant yield and drawdown tests were selected based on airlift yield at the time of drilling for wells M1 and H1. A combination of airlift yield and step-drawdown test results were used to select optimum discharge rates for well M3. A summary of airlift yields (obtained from the DWR Well Logs), test durations, discharge rates, and drawdown at the end of the tests are summarized in **Table 3-4**.

TABLE 3-4
Testing Durations, Discharge Rates, and Drawdowns

Well	Airlift Yield[1] (gpm)	Test	Duration (days)	Discharge Rate (gpm)	Drawdown at Test End (feet)
M1	15	Constant Yield and Drawdown	2.8	Initially 37.9 gpm, reduced to 17 gpm	Stabilized at 480 feet
M3	75	Step Drawdown	0.2	Step 1: 50 gpm for 6 min Step 2: 60 gpm for 188 min Step 3: 70 gpm for 60 min	13.53
		Constant Rate	5.1	75	35.71
		Constant Yield and Drawdown	4.1	Variable, but ~ 50 to 53 gpm for last 25 hours	36.72[2]
H-1	150	Constant Rate	6.9	60	44.48

[1] Airlift yield obtained from DWR Well Logs, measured prior to well installation. Test duration was four hours.

[2] Well had not completely recovered from prior pumping. During the constant yield testing, there was an additional drawdown of 20.77 feet for a total drawdown of 36.72 from static water level.

gpm = gallons per minute

The results of the pumping tests are summarized in tabular format in **Appendix B** and are graphically illustrated in **Appendix C**. The plots present drawdown (in feet) versus time (in minutes) using a normal linear scale. A discussion of test results for individual wells is presented in the following sections. These results form the basis of the calculations of long-term yield presented in **Section 3.2.4**.

Well M1

The constant yield and drawdown test conducted at well M1 resulted in stabilized drawdown of approximately 480 feet for 40.9 hours at a discharge rate of approximately 17 gpm. Water levels recovered relatively rapidly following cessation of pumping. A residual drawdown of 14.8 feet remained after 532 minutes of recovery.

Well M3

During the 70 gpm constant rate test conducted at well M3, it appeared that water levels were beginning to stabilize at a drawdown of approximately 23 feet. However, at approximately 1,800 minutes, a boundary condition was encountered that increased the slope of the drawdown curve. The increase in slope is evident in the plot of drawdown versus time presented in **Appendix C**. The boundary could be attributed to a low hydraulic conductivity (K) fault or a change in lithology, or potentially to a decrease in transmissivity as the fractures that store and transmit water in the confined unit pinch out laterally or become less interconnected. This condition could limit the long-term well yield unless additional sources of recharge are encountered as the radius of influence extends outward under a prolonged pumping scenario. The long-term yield calculations presented in **Section 3.2.4** attempt to address this condition and assume that additional sources of recharge are encountered as the radius of influence extends outward.

The constant rate pumping test results indicate that there is no hydraulic connection between well M3 and wells M4 and H1. Although well M2 does display somewhat of a declining trend during the constant rate test conducted at well M3, it appears likely that this is attributable to natural background declines that are expected in the dry season. A plot of the drawdown at wells M2 and M3 is included in the M3 section of **Appendix C**.

As illustrated on the recovery test plot provided in **Appendix C**, water levels recovered after the constant rate test from over 35 feet of drawdown to approximately 17 feet (residual drawdown) after 214 hours. The recovery plot developed to determine K and T is also included in **Appendix C**. The plot includes t/t' (time since start of pumping/time since pumping stopped) along the x axis and residual drawdown on the y axis. The slow recovery and the shape of the recovery curve (straight line plots to left of the origin [t/t' = 1] of the diagram) indicates incomplete recovery due to the limited extent of the aquifer.

The constant yield and drawdown test revealed a high specific capacity with relatively little drawdown. However, drawdown did not stabilize at a discharge rate of 51 gpm within the testing period. The long-term yield calculations are presented in **Section 3.2.4**.

Well H1

The 60 gpm constant rate test revealed a boundary condition at approximately 2,700 minutes that increased the slope of the drawdown curve. The increase in slope is evident in the plot of drawdown versus time presented in **Appendix C**. The boundary appears to be attributed to dewatering of an upper water strike that was reported in the well completion report at 105 to 107 feet bgs. This condition could affect long-term well performance as water from the upper water strike cascades into the well and aerates the water above the pump. The long-term yield calculations are presented in **Section 3.2.4**.

3.2.3 Aquifer Parameter Estimation

Water level data obtained during the recovery tests conducted following constant rate tests (wells M3 and H1) were evaluated to estimate aquifer parameters (K and T). The analysis was conducted using computer software developed by Waterloo Hydrogeologic titled AquiferTest, Version 2.5. Data input requirements for Aquifer Test include water level data, aquifer thickness, screen interval, discharge rate, and duration of the pumping phase.

The water level response in the monitoring wells is indicative of confined groundwater conditions. Static water levels well above the depth to the first water strike (recorded on the DWR Well Logs) supports this interpretation. Therefore, the data were analyzed using the Theis and Jacob Recovery method.

The results of the aquifer parameter estimation are presented in **Table 3-5**. Graphical representations of the analyses are presented in **Appendix C**. The results indicate K values that range from 4.3 to 0.65 feet per day (feet/day), which is consistent with the range of values typically associated with fractured shale and slate.

TABLE 3-5
Estimated Values of Hydraulic Conductivity (K) and Transmissivity (T)
Based on Recovery Test Data

Well	Aquifer Thickness[1]	Hydraulic Conductivity (K)		Transmissivity (T)	
		(feet/day)	(cm/sec)	($feet^2$/day)	(cm^2/sec)
M3	40	4.3	1.5×10^{-3}	171	1.8
H1	20	6.5×10^{-1}	2.3×10^{-4}	13	1.4×10^{-1}

[1] Aquifer thickness estimated as the well depth minus depth to the main water strike (from DWR Well Logs).
cm/sec = centimeters per second
cm^2/sec = centimeters squared per second

3.2.4 Long-Term Well Yield

The long-term well yield in the context of this report is the rate at which water can be sustainably extracted from a well without undesired reductions in yield. Water quality data and assessments are presented in **Section 3.3** and are not considered further in this assessment of yield.

Long-term well yield, also referred to as "safe well yield" or "perennial well yield", requires the estimation of long term well capacity based on the results of relatively short-term pumping tests. The methodology used for this project is as follows:

> Step 1: Extrapolate drawdown assuming 200 days of continuous pumping. For the constant yield and drawdown tests, the extrapolated drawdown generally approximates the drawdown at the end of the test.

Step 2: Calculate the specific capacity (gpm/ft) [discharge rate (gpm) divided by drawdown (feet)] at 200 days. The 200 days of continuous pumping represents a period where groundwater recharge is at a minimum. It assumes that this minimum recharge period will be followed by the annual recharge period in winter and spring as increased precipitation and snowmelt occurs;

Step 3: Calculate total available drawdown (feet), as the depth to top of the first water strike (or top of well screen) minus the static (non pumping) water level. This is the maximum head that could potentially contribute to well yield;

Step 4: Calculate safe available drawdown, which is the allowable drawdown in the well for pumping. Safe available yield is calculated as the total available drawdown times a safety factor to account for a position for the pump, drought and seasonal water level declines, and future drops in well efficiency during operation. The safety factor is selected based on a qualitative review of recovery data; and,

Step 5: Calculate long-term well yield (gpm) as:

Specific capacity at 200 days (gpm/foot) x safe available drawdown (feet)

The results of these calculations are summarized in **Table 3-6**. Individual calculation sheets are presented in **Appendix D**.

TABLE 3-6
Calculation of Long-Term Well Yield

Well	Step 1	Step 2	Step 3	Step 4	Step 5
	Drawdown extrapolated to 200 days (feet)	Specific capacity at 200 days (gpm/foot)	Total available drawdown (feet)	Safe available drawdown (feet)	Long-term yield[1] (gpm)
M1	480.4	0.0354	487.3	341.11	12.1
M3	50	1.0200	137.6	41.3	42.1
H1	105	0.5714	118.8	71.3	40.7

[1] Due to the difficulties of accurately predicting the behavior of low storativity fractured bedrock aquifers during long-term pumping, these yields represent the upper limits that may be sustained. Refer to the discussion in Section 4.2 for the range of recommended long-term yields.

gpm = gallons per minute.

3.3 Water Quality

Water samples were collected from each of the pumped wells. Samples collected from M1 and H1 were collected on October 29, 2003. Samples collected from M3 were collected on July 12, 2004. These samples were analyzed for CAM 17 Metals, Conventional Chemistry Parameters, and Microbiological Parameters. Copies of the certified analytical laboratory reports are included in **Appendix E**. Results have been tabulated in **Tables 3-7** through **3-9**.

TABLE 3-7
Results of Ground Water Samples Analyzed for CAM 17 Metals
All Results in Parts Per Billion (ppb)

Analyte	M1	M3	H1
Arsenic	<5.0	<5.0	<5.0
Lead	<5.0	<5.0	<5.0
Selenium	<5.0	<5.0	<5.0
Thallium	<10	<10	<10
Antimony	<50	<50	<50
Barium	50	<20	39
Beryllium	<5.0	<5.0	<5.0
Cadmium	<10	<10	<10
Cobalt	<20	<20	<20
Chromium	<20	<20	<20
Copper	440	<20	<20
Molybdenum	<20	<20	<20
Nickel	<20	<20	<20
Silver	<10	<10	<10
Vanadium	<20	<20	<20
Zinc	60	<20	<20
Mercury	<0.20	<0.20	<0.20

TABLE 3-8
Results of Ground Water Samples Analyzed for General Water Quality
All Results in Parts Per Billion (ppb)

Analyte	M1	M3	H1
Total Alkalinity	180	220	630
Bicarbonate as $CaCO_3$	180	220	630
Carbonate as $CaCO_3$	<5.0	<5.0	<5.0
Hydroxide as $CaCO_3$	<5.0	<5.0	<5.0
Chloride	7.0	12	26
Fluoride	0.34	0.21	0.24
Nitrate as NO_3	<2.0	<2.0	<2.0
Sulfate as SO_4	2.2	60	230
Total Sulfides [1]	33,000	- - -	- - -
Total Sulfides [2]	<50	- - -	- - -
MBAS	<0.10	<0.10	<0.10
Specific Conductance	340	480	1400
Calcium	32	60	170
Magnesium	18	32	110
Potassium	3.4	<1.0	1.5
Sodium	23	11	30
Hardness as $CaCO_3$	160	280	860
pH	8.00	6.90	7.20
Total Dissolved Solids (TDS)	200	360	910

- - - = Not analyzed for
1 Sample collected during pumping test
2 Sample collected after pumping test was complete, but before water level in well had recovered.

TABLE 3-9
Results of Water Samples Collected and Analyzed for Total Coliforms and E. Coli

Sample Number	Total Coliforms	E.Coli
M1	Absent	Absent
M3	Absent	Absent
H1	Absent	Absent

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Discussion

The explored Project Site geology is characterized by a generally thin layer of overburden underlain by weathered bedrock consisting of shale and slate. Groundwater at the Project Site primarily occurs under confined conditions at depth in the fractured bedrock zones. The upper portions of the bedrock appear to have low hydraulic conductivity (K), presumably due to the lack of fracturing, and therefore represent a confining layer (aquitard) for the underlying confined unit. Due to the low K and S values typically associated with unfractured shale and slate, the groundwater yield of the confined unit is likely attributed to the ability of interconnected fractures to store and transmit groundwater.

The pumping test results indicate that there is no hydraulic communication between well M3 and wells M4 and H1. Although well M2 does display somewhat of a declining trend during the constant rate test conducted at well M3, it appears likely that this is attributable to natural background declines that are expected in the dry season. The test results also provided estimates of important hydraulic parameters for the confined bedrock unit. The estimates are consistent with the ranges typically encountered in the fractured shale and slate that comprise the confined unit.

4.2 Recommended Long Term Well Yield

The long-term well yields calculated and discussed in **Section 3.2.4** are based on aquifer response to a relatively short period of pumping. Drawdown is extrapolated to 200 days to allow sufficient time for recharge to stabilize drawdown and improve well performance. This approach assumes that sufficient precipitation will occur and that a significant percentage of recharge will reach the aquifer. It also assumes that the interconnected fracture network extends beyond the radius of influence created during the test, and that these fractures have sufficient storage to produce sustainable yields. However, these conditions may not be realized. Recharge may be limited by the thick sequence of relatively low K slate and shale aquitard or recharge may be slow due to distant recharge areas. The fractures that store and transmit water in the confined unit may pinch out laterally or become less interconnected, effectively reducing aquifer transmissivity and limiting well yield. Hydraulic barriers not reached during the testing period (i.e. outside the radius of influence created during the test) may exist, caused by changes in lithology or low K faults, and limit the long-term yield.

To address these remaining degrees of uncertainty inherit in the calculation of long-term well yield in fractured bedrock with low primary porosity and storativity, the calculation and use of a range of recommended long-term well yields is required. A range of recommended long-term well yields was developed based on test results and is presented in **Table 4-1**. The upper limit is the long-term well yields provided in **Section 3.2.4**. The lower limit is established as 70% of the upper limit. The recommended long term well yield presented in **Table 4-1** are best estimates of future well performance. It is recommended that actual long term yield be accurately determined in the first year of production by regularly monitoring water level response to pumping. During this period and based on actual well performance, the need for additional wells can be assessed to meet the required water demands.

TABLE 4-1
Recommended Long-Term Well Yields

Well	Lower Limit (gpm)	Upper Limit (gpm)	Recommended Long-Term Well Yields (gpm)
M1	8.5	12.1	10
M3	29.5	42.1	36
H1	28.5	40.7	35
Total Recommended Yield	68.9	98.4	**81**

gpm = gallons per minute
- - - = Low capacity well (less then five gpm sustainable yield). Use not recommended.

5.0 STATEMENT OF LIABILITY

This *Pumping Tests and Sustainability Analysis for Wells H1, M1, and M3, and Evaluation of Water Quality* (Report) was prepared by Applied Engineering and Geology, Inc. (AEG), at the request of Analytical Environmental Services (Client), using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers, geologists, and scientists practicing in this or similar localities in California at the time this Report was prepared. No other warranty, expressed or implied, is made as to the information and professional advice included in this Report. This Report was written to document testing activities related to estimating the long-term yield of water from certain wells at the Site based on a limited number of observation points and limited duration tests. Further investigation, testing, and data analysis can reduce the inherent uncertainties associated with this type of testing. This Report is based on factual information obtained from Analytical Environmental Services, and others, that has been assumed to be correct, accurate and complete. Applied Engineering and Geology, Inc. does not guarantee the correctness, accuracy, or completeness of those data.

This Report and the data within has not been prepared for use by other parties or uses other than those for which it was intended, and may not contain sufficient information for the purposes of other parties or other uses.

This Report or any part thereof may not be reproduced in any form without written permission from Applied Engineering and Geology, Inc., its Principals, or agents.

Should you have any questions regarding the content of this report, please contact Earl Stephens at 916.645.6014.

Sincerely,

APPLIED ENGINEERING AND GEOLOGY, INC. DOULOS ENVIRONMENTAL, INC.

Earl Stephens RCE 45335
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
EARL R. STEPHENS
No. 45335
Exp. 9/30/06
CIVIL
STATE OF CALIFORNIA

Hal Hansen RG 6697
Principal Geologist

REGISTERED GEOLOGIST
HAL E. HANSEN
No. 6697
9/30/05
STATE OF CALIFORNIA

S:\AEG Documents\Ione\Ione Pumping Tests 2004\R-Ione 2004 #1B (Pumping Test Report).wpd(1)

APPENDIX A

DWR Well Logs for Project Wells

TRIPLICATE
Owner's Copy

Page 1 of 1
Owner's Well No. 1
Date Work Began 8-7-01 Ended 8-10-01
Local Permit Agency AMADOR COUNTY ENVIRONMENTAL HEALTH DEPT.
Permit No. W02138 Permit Date 6-28-01

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 762275

OWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Air Rotary FLUID ___

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION Describe material, grain size, color, etc.
0	100	Black Slate
100	540	Black Slate
540	620	Serpentine

Actual water production depends upon hydrological conditions beyond the control of Contractor, and which are subject to geometric changes in short periods of time. Therefore, Contractor does not warrant the continued production of any quantity or quality of water observed or reported at any stage of or at the conclusion of the project.

TOTAL DEPTH OF BORING 620 (Feet)
TOTAL DEPTH OF COMPLETED WELL 620 (Feet)

WELL OWNER

Name RONALD MATULICH
Mailing Address 7400 HWY. 16
City PLYMOUTH, CA. 95669 STATE ZIP

WELL LOCATION

Address HWY. 49, So. End of Plymouth City Lim
City PLYMOUTH
County AMADOR
APN Book 008 Page 110 Parcel 009-501
Township ___ Range ___ Section ___
Latitude ___ DEC. MIN. SEC. NORTH Longitude ___ DEG. MIN. SEC. WE

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)

WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 600 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 60 (Ft.) & DATE MEASURED ___
ESTIMATED YIELD * 15 (GPM) & TEST TYPE Air Lift
TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN 620 (Ft.)
* May not be representative of a well's long-term yield.

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CODE SUCTION	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	55'	11	X				F480 PVC	X 6"	160	
0	620						PVC LINER	4"	160, Perforated	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE: CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	50'	X Treamied			In
80'	at bottom.				

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME WATER TECH WELL DRILLING (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS P. O. Box 772 CITY PLACERVILLE, CA. STATE 95667 ZIP
Signed [signature] (AUTHORIZED REPRESENTATIVE) DATE SIGNED 8-14-01
C-57 LICENSE NUMBER 596278

M1

TRIPLICATE
Owner's Copy

Page 1 of 1

Owner's Well No. 7

Date Work Began Jan. 13,2004 Ended April 6,2004

Local Permit Agency AMADOR COUNTY HEALTH DEPT.

Permit No. W02839 Permit Date Jan. 12,2004

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0912531

DWR USE ONLY — DO NOT FILL
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (∠) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD AIR ROTARY FLUID ___

DEPTH FROM SURFACE FL	to FL	DESCRIPTION *Describe material, grain size, color, etc.*
0	100	BLACK SLATE
100	300	BLACK SLATE
300	620	BLACK SLATE
620	780	BLACK SLATE
		First water fracture @ 300', 5 GPM
		There was an interuption in well
		drilling @ 620'. Drilling was
		resumed to 780'. Well was lined
		with 4" PVC liner. Well caved in
		300'. Completed well is 480' deep.

Actual water production depends upon hydrological conditions beyond the control of Contractor, and which are subject to dramatic changes in short periods of time. Therefore, Contractor does not warrant the continued production of any quantity or quality of water observed or reported at any stage of or at the conclusion of the project.

TOTAL DEPTH OF BORING 780' (Feet)

TOTAL DEPTH OF COMPLETED WELL 480' (Feet)

WELL OWNER

Name RONALD MATULICH

Mailing Address P. O. BOX 217

CITY DRYTOWN, CA. 95699 STATE

WELL LOCATION

Address HWY. 49

City PLYMOUTH

County AMADOR

APN Book 008 Page 140 Parcel 022

Township ___ Range ___ Section ___

Lat ___ DEG. ___ MIN. ___ SEC. N Long ___ DEG. ___ MIN.

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY

X NEW WELL

MODIFICATION/REPAIR

___ Deepen

___ Other (Specify)

___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

USES (∠)

WATER SUPPLY

___ Domestic X

___ Irrigation ___

MONITORING

TEST WELL

CATHODIC PROTECTION

HEAT EXCHANGE

DIRECT PUSH

INJECTION

VAPOR EXTRACTION

SPARGING

REMEDIATION

OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 300' (FL) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 200 (FL) & DATE MEASURED [illegible] 4-

ESTIMATED YIELD * 5 (GPM) & TEST TYPE AIR LIFT

TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN 780 (FL)

* *May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE FL	to FL	BORE-HOLE DIA. (Inches)	TYPE (∠) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	60'	12	X				F480 PVC	6	160	
0	480						PVC LINER	4	160.	480' PERFORATED.

ANNULAR MATERIAL

DEPTH FROM SURFACE FL	to FL	TYPE CE-MENT (∠)	BEN-TONITE (∠)	FILL (∠)	FILTER PACK (TYPE/SIZE)
0	55'	CEMENT GROUT			

ATTACHMENTS (∠)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME WATER TECH WELL DRILLING
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

P. O. BOX 772 PLACERVILLE, CA. 95667
ADDRESS CITY STATE ZIP

Signed [signature] 4-20-04 596278

TRIPLICATE
Owner's Copy

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instructions Pamphlet

No. 804495

Owner's Well No. 1

Date Work Began Jan. 14, 2004 Ended Jan. 16, 2004

Local Permit Agency AMADOR COUNTY HEALTH DEPT.

Permit No. W02832 Permit Date Dec. 16, 2003

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD AIR ROTARY FLUID

DEPTH FROM SURFACE ft.	to ft.	DESCRIPTION (Describe material, grain size, color, etc.)
0	40	BROWN SHALE
40	220	GREEN SHALE

Actual water production depends upon hydrological conditions beyond the control of contractor, and which are subject to dramatic changes in short periods of time. Therefore, contractor does not warrant the continued production of any quantity or quality of water observed or reported at any stage of or at the conclusion of the project.

TOTAL DEPTH OF BORING 220 (Feet)

TOTAL DEPTH OF COMPLETED WELL 220 (Feet)

WELL OWNER

Name RONALD MATULICH

Mailing Address 7400 HWY. 16

CITY PLYMOUTH, CA. 95669 STATE ZIP

WELL LOCATION

Address HWY. 49

City PLYMOUTH

County AMADOR

APN Book 008 Page 110 Parcel 009-000

Township ___ Range ___ Section ___

Latitude ___ DEG ___ MIN ___ SEC. NORTH Longitude ___ DEG ___ MIN ___ SEC. WEST

LOCATION SKETCH

NORTH

WEST EAST

SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. (and attach a map). Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL

MODIFICATION/REPAIR

___ Deepen

___ Other (Specify)

___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)

WATER SUPPLY

___ Domestic X Public

___ Irrigation ___ Industrial

___ MONITORING

___ TEST WELL

___ CATHODIC PROTECTION

___ HEAT EXCHANGE

___ DIRECT PUSH

___ INJECTION

___ VAPOR EXTRACTION

___ SPARGING

___ REMEDIATION

___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 180' (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 30 (Ft.) & DATE MEASURED 1-16-04

ESTIMATED YIELD * 70 (GPM) & TEST TYPE AIR LIFT

TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN 220 (Ft.)

* May not be representative of a well's long-term yield.

CASING (S)

DEPTH FROM SURFACE ft.	to ft.	BORE-HOLE DIA (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	60	12	X				F480 PVC	6	160	

ANNULAR MATERIAL

DEPTH FROM SURFACE ft.	to ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	60	GROUT PUMPED			
PERFORATED 40' AT BOTTOM					

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME WATER TECH WELL DRILLING
(PERSON, FIRM OR CORPORATION) (TYPED OR PRINTED)

ADDRESS P. O. BOX 772 CITY PLACERVILLE, CA. STATE 95667 ZIP

Signature Fred Trenti (WELL DRILLER/AUTHORIZED REPRESENTATIVE) DATE SIGNED 2-3-04 C-57 LICENSE NUMBER 596278

DWR 188 REV. 11-95 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

DUPLICATE
Driller's Copy

Page: 1 of 1
Owner's Well No. 3
Date Work Began Feb. 19,2004 Ended Feb. 20,2004
Local Permit Agency AMADOR COUNTY HEALTH DEPT.
Permit No. W02851 Permit Date Feb. 11,2004

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instructions Pamphlet

No. 804439

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE (SPECIFY)
DRILLING METHOD AIR ROTARY FLUID

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION (Describe material, grain size, color, etc.)
0	80	BROWN SHALE
80	200	BLACK SLATE
200	340	BLACK SLATE

First water fracture @ 200', 5 GPM
Second water fracture @, 240', 10 GPM

Actual water production, chemical, and hydrological conditions beyond the control of Contractor, and which are subject to dramatic changes in short periods of time. Therefore, Contractor does not warrant the continued production of any quantity or quality of water observed or reported at any stage of or at the conclusion of the project.

TOTAL DEPTH OF BORING: 340 Feet
TOTAL DEPTH OF COMPLETED WELL: 340 Feet

WELL OWNER

Name: RONALD G. MATULICH
Mailing Address: P. O. BOX 217
DRYTOWN, CA. 95699
CITY STATE ZIP

WELL LOCATION

Address: 16711 CAL MINE RD.
City: PLYMOUTH
County: AMADOR
APN Book 08 Page 140 Parcel 014
Township ___ Range ___ Section ___
Latitude ___ ° ___ ' ___ " NORTH Longitude ___ ° ___ ' ___ " WEST
DEG MIN SEC DEG MIN SEC

LOCATION SKETCH

NORTH

COPY

WEST EAST

SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

XX NEW WELL
___ MODIFICATION/REPAIR
___ DESTROY (Describe Procedures and Materials Under DESTRUCTION)

PLANNED USES (✓)

WATER SUPPLY
___ Domestic XX Public
___ Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

1
DEPTH TO FIRST WATER 200' (FT) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 45' (FT) & DATE MEASURED 2-20-04
ESTIMATED YIELD * 15 (GPM) & TEST TYPE Air Lift
TEST LENGTH 4 (Hrs) TOTAL DRAWDOWN ___ (FT)
* May not be representative of a well's long-term yield.

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (inches)	TYPE (✓) BLANK	SCREEN	CONSTRUCTION	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (inches)
0	60	12	X				F480 PVC	6	160	
60	340						PVC LINER	4	160, PERFORATED AT BOTTOM.	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	60'	CONCRETE GROUT PUMPED SEAL.			

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___
ATTACH ADDITIONAL INFORMATION IF IT EXISTS

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME WATER TECH WELL DRILLING
PERSON, FIRM OR CORPORATION (TYPED OR PRINTED)

P. O. BOX 772 PLACERVILLE, CA. 95667
ADDRESS CITY STATE ZIP

Signed Fred Stennett 3-22-04 596278
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ORIGINAL

File with DWR

Notice of Intent No. _____

Local Permit No. or Date _____

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in

No. 052067

State Well No. _____

Other Well No. _____

(1) OWNER: Name Don Vanster

Address P.O. Box 21

City Jackson, CA Zip 95642

(2) LOCATION OF WELL (See instructions):

County Loador Owner's Well Number # 1

Well address if different from above hwy 49 in plymouth

Township 7N Range 10E Section 11

Distance from cities, roads, railroads, fences, etc. _____

town of Plymouth

X well

Highway 49

N

WELL LOCATION SKETCH

(3) TYPE OF WORK:

New Well ☒ Deepening ☐

Reconstruction ☐

Reconditioning ☐

Horizontal Well ☐

Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:

Domestic ☒

Irrigation ☐

Industrial ☐

Test Well ☐

Stock ☐

Municipal ☐

Other ☐

(5) EQUIPMENT:

Rotary ☐ Reverse ☐

Cable ☐ Air ☒

Other ☐ Bucket ☐

(6) GRAVEL PACK:

Yes ☐ No ☒ Size _____

Quantity of bags _____

Placed from _____ ft. to _____ ft.

(7) CASING INSTALLED:

Steel ☐ Plastic ☒ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall
0	60	6"	12

(8) PERFORATIONS:

Type of perforations or size of screen

From ft.	To ft.	Slot size

(9) WELL SEAL:

Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 60 ft.

Were strata sealed against pollution? Yes ☐ No ☒ Interval _____ ft.

Method of sealing Neat Cement grout

(10) WATER LEVELS:

Depth of first water, if known 205' _____ ft.

Standing level after well completion 77 _____ ft.

(11) WELL TESTS:

Was well test made? Yes ☒ No ☐ If yes, by whom? Driller

Type of test Pump ☐ Bailer ☐ Air lift ☒

Depth to water at start of test _____ ft. At end of test _____ ft.

Flow 130 gal/min after 4 hours Water temperature _____

Chemical analysis made? Yes ☐ No ☒ If yes, by whom? _____

Was electric log made? Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth 223 ft. Depth of completed well 223 ft.

from ft.	to ft.	Formation (Describe by color, character, size of material)
0	10	Mine railings
10	40	Overburden
40	50	Slate
50	75	Broken slate
75	105	Hard slate
105	107	Broken slate & quartz (water bearing)
107	200	Hard slate & quartz
200	205	broken slate & quartz (water bearing)
205	223	Hard slate

Work started 11-2 19 77 Completed 11-7 19 77

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Briski Well Drilling Company
(Person, firm, or corporation) (Typed or printed)

Address P.O. Box 727

City San Andreas, CA Zip 95249

License No. 217667 Date of this report 9-20-78

SIGNED _____ (Well Driller)

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

APPENDIX B

Pumping Test Data

Ione Pumping Test Data

Pumped Well is M1

Drawdown in M1

Date	Time	Cumulative Time (min)	Flow Rate (gpm)	DTW (ft)	Drawdown (ft)
12/13	1300	0	0.0	52.7	0
12/13	1304	4	37.9	66.9	14.2
12/13	1305	5	37.1	94	41.3
12/13	1306	6	36.1	115.9	63.2
12/13	1307	7	35.5	136.1	83.4
12/13	1308	8	35.0	151	98.3
12/13	1310	10	33.5	188.1	135.4
12/13	1315	15	30.9	268.8	216.1
12/13	1320	20	29.2	317	264.3
12/13	1325	25	26.7	366.5	313.8
12/13	1330	30	25.2	405.2	352.5
12/13	1335	35	23.9	434.2	381.5
12/13	1340	40	22.8	460.8	408.1
12/13	1345	45	22.3	474.7	422
12/13	1350	50	21.5	491.4	438.7
12/13	1355	55	21.1	500.74	448.04
12/13	1400	60	20.7	509.8	457.1
12/13	1405	65	20.5	514.71	462.01
12/13	1407	67	16.6	513.35	460.65
12/13	1410	70	19.8	514.49	461.79
12/13	1415	75	19.0	513.85	461.15
12/13	1420	80	18.9	513.93	461.23
12/13	1430	90	18.8	513.87	461.17
12/13	1458	118	18.7	514.19	461.49
12/13	1500	120	19.0	515.3	462.6
12/13	1530	150	18.5	516.4	463.7
12/13	1535	155	18.4	516.42	463.72
12/13	1545	165	18.4	516.69	463.99
12/13	1555	175	18.5	517.96	465.26
12/13	1605	180	18.2	517.49	464.79
12/13	1610	185	18.2	517.08	464.38
12/13	1615	190	18.3	517.24	464.54
12/13	1623	198	18.3	517.4	464.7
12/13	1630	205	18.3	517.62	464.92
12/13	1640	215	18.2	517.93	465.23
12/13	1650	225	18.3	518.78	466.08
12/13	1700	235	18.1	519.2	466.5
12/13	1705	240	18.1	519.32	466.62
12/13	1713	248	18.1	519.2	466.5
12/13	1720	255	18.1	519.19	466.49
12/14	1442	1586	17.1	531.75	479.05
12/15	820	2595	17.1	536.04	483.34
12/15	847	2622	17.1	536.06	483.36
12/15	854	2629	16.9	536.02	483.32
12/15	925	2660	16.9	533.29	480.59
12/15	930	2665	16.9	533.33	480.63
12/15	932	2667	16.9	533.05	480.35
12/15	935	2670	16.9	532.9	480.2
12/15	937	2672	17.0	533.86	481.16
12/15	941	2676	17.0	533.1	480.4
12/15	945	2680	17.0	533.12	480.42
12/15	948	2683	17.0	533.13	480.43

12/15	950	2685	17.0	533.01	480.31
12/15	951	2686	17.0	532.64	479.94
12/15	952	2687	17.0	532.68	479.98
12/15	954	2689	17.0	532.7	480
12/15	956	2691	17.0	532.9	480.2
12/15	957	2692	17.0	532.65	479.95
12/15	959	2694	17.0	532.88	480.18
12/15	1000	2695	17.0	532.78	480.08
12/15	1001	2696	17.0	532.9	480.2
12/15	1002	2697	17.0	532.78	480.08
12/15	1006	2701	17.0	532.82	480.12
12/15	1007	2702	17.0	532.7	480
12/15	1008	2703	17.0	552.6	499.9
12/15	1009	2704	17.0	532.6	479.9
12/15	1010	2705	16.9	532.79	480.09
12/15	1012	2707	17.0	532.64	479.94
12/15	1013	2708	17.0	532.65	479.95
12/15	1015	2710	17.0	532.6	479.9
12/15	1024	2719	17.0	532.89	480.19
12/15	1026	2721	16.9	532.5	479.8
12/15	1028	2723	17.0	532.4	479.7
12/15	1030	2725	17.0	532.42	479.72
12/15	1036	2731	17.0	532.34	479.64
12/15	1038	2733	17.0	532.29	479.59
12/15	1042	2737	17.0	532.13	479.43
12/15	1045	2740	17.0	532.2	479.5
12/15	1049	2744	17.0	532.2	479.5
12/15	1052	2747	17.0	532.09	479.39
12/15	1054	2749	17.0	532.08	479.38
12/15	1059	2754	17.0	532	479.3
12/15	1101	2756	17.0	531.9	479.2
12/15	1109	2764	17.0	531.95	479.25
12/15	1112	2767	17.0	531.96	479.26
12/15	1117	2772	17.0	532.2	479.5
12/15	1119	2774	17.0	532.25	479.55
12/15	1138	2793	17.0	532.36	479.66
12/15	1143	2798	17.0	532.69	479.99
12/15	1159	2814	17.0	532.51	479.81
12/15	1206	2821	17.0	532.31	479.61
12/15	1212	2827	17.0	532.6	479.9
12/15	1224	2839	17.0	532.42	479.72
12/15	1228	2843	17.0	532.57	479.87
12/15	1234	2849	17.0	532.5	479.8
12/15	1240	2855	17.0	532.32	479.62
12/15	1246	2861	17.0	532.1	479.4
12/15	1252	2867	17.0	532.16	479.46
12/15	1258	2873	17.0	532.15	479.45
12/15	1320	2895	17.0	532.17	479.47
12/16	822	4037	0.0	533.06	480.36

Ione Pumping Test Data

Pumped Well is M1

Recovery in M1

Date	Time	Cumulative Time (min)	DTW (ft)	Drawdown (ft)
12/16	822	0.0	533.06	480.4
12/16	832	10.0	533.09	480.4
12/16	832	10.3	530.3	477.6
12/16	832	10.7	528	475.3
12/16	833	12.0	527	474.3
12/16	833	12.3	526	473.3
12/16	833	12.5	525	472.3
12/16	833	12.6	522.8	470.1
12/16	833	12.6	522.2	469.5
12/16	833	12.7	521	468.3
12/16	833	12.8	520	467.3
12/16	833	12.8	518.5	465.8
12/16	833	12.9	517.5	464.8
12/16	833	12.9	516	463.3
12/16	834	14.0	515	462.3
12/16	834	14.1	513.5	460.8
12/16	834	14.2	512.5	459.8
12/16	834	14.3	511.5	458.8
12/16	834	14.4	510.5	457.8
12/16	834	14.5	509.5	456.8
12/16	834	14.6	508	455.3
12/16	834	14.7	507.5	454.8
12/16	834	14.8	506.5	453.8
12/16	834	14.8	505.5	452.8
12/16	834	14.9	504	451.3
12/16	834	14.9	503	450.3
12/16	835	16.0	502	449.3
12/16	835	16.1	500.5	447.8
12/16	835	16.2	499.5	446.8
12/16	835	16.2	499	446.3
12/16	835	16.3	498	445.3
12/16	835	16.4	496.5	443.8
12/16	835	16.5	495.5	442.8
12/16	835	16.6	494.5	441.8
12/16	835	16.7	493.5	440.8
12/16	835	16.7	492.5	439.8
12/16	835	16.8	491.5	438.8
12/16	835	16.9	490.5	437.8
12/16	835	16.9	490	437.3
12/16	836	18.0	488.5	435.8
12/16	836	18.1	487.5	434.8
12/16	836	18.2	486.5	433.8
12/16	836	18.2	485.5	432.8
12/16	836	18.3	484.5	431.8
12/16	836	18.4	483.5	430.8
12/16	836	18.5	482.4	429.7
12/16	836	18.6	481.6	428.9
12/16	836	18.7	480.7	428.0
12/16	836	18.7	479.5	426.8
12/16	836	18.9	477.7	425.0
12/16	837	20.0	476.6	423.9
12/16	837	20.1	475.5	422.8

12/16	837	20.2	474.2	421.5
12/16	837	20.2	473	420.3
12/16	837	20.4	472	419.3
12/16	837	20.5	470.7	418.0
12/16	837	20.6	469.6	416.9
12/16	837	20.7	468.3	415.6
12/16	837	20.7	467.1	414.4
12/16	837	20.8	466.1	413.4
12/16	837	20.9	465	412.3
12/16	838	22.0	463.3	410.6
12/16	838	22.2	461.5	408.8
12/16	838	22.3	458.5	405.8
12/16	838	22.5	457.3	404.6
12/16	838	22.7	455.8	403.1
12/16	838	22.8	454.2	401.5
12/16	838	22.9	452.5	399.8
12/16	839	24.0	450.9	398.2
12/16	839	24.2	448.9	396.2
12/16	839	24.4	447.4	394.7
12/16	839	24.5	445.6	392.9
12/16	839	24.6	443.9	391.2
12/16	839	24.7	443	390.3
12/16	839	24.8	441.6	388.9
12/16	839	24.9	440.1	387.4
12/16	840	26.0	439	386.3
12/16	840	26.1	438.4	385.7
12/16	840	26.2	437.2	384.5
12/16	840	26.2	436.1	383.4
12/16	840	26.3	435.1	382.4
12/16	840	26.4	434.1	381.4
12/16	840	26.5	433.1	380.4
12/16	840	26.6	432.2	379.5
12/16	840	26.7	431.1	378.4
12/16	840	26.8	430.1	377.4
12/16	840	26.9	429.1	376.4
12/16	841	28.0	428.3	375.6
12/16	841	28.1	426.6	373.9
12/16	841	28.2	424.8	372.1
12/16	841	28.7	423.3	370.6
12/16	842	29.0	421.6	368.9
12/16	842	29.7	419.5	366.8
12/16	842	29.9	417.4	364.7
12/16	843	31.0	415.5	362.8
12/16	843	31.2	413.7	361.0
12/16	843	31.4	412.8	360.1
12/16	843	31.5	411.5	358.8
12/16	843	31.6	410.1	357.4
12/16	843	31.7	408.6	355.9
12/16	844	33.0	405	352.3
12/16	844	33.2	403.7	351.0
12/16	844	33.3	402	349.3
12/16	844	33.5	400.5	347.8
12/16	844	33.6	398.3	345.6
12/16	844	33.7	396.5	343.8
12/16	845	35.0	394.4	341.7
12/16	845	35.2	392.5	339.8
12/16	845	35.3	391.2	338.5
12/16	845	35.5	389	336.3
12/16	845	35.7	386.9	334.2

12/16	846	37.0	384.3	331.6
12/16	846	37.4	382.5	329.8
12/16	846	37.7	376.7	324.0
12/16	847	39.0	372.6	319.9
12/16	848	40.0	363.7	311.0
12/16	849.5	41.5	350.3	297.6
12/16	850	42.2	342.5	289.8
12/16	851	43.2	332.9	280.2
12/16	851	43.8	327	274.3
12/16	852	44.8	318	265.3
12/16	853	45.9	308.5	255.8
12/16	854	46.7	301.2	248.5
12/16	855	47.8	292.4	239.7
12/16	856	48.8	285.2	232.5
12/16	857	49.9	277	224.3
12/16	858	50.8	270.1	217.4
12/16	859	51.9	262.2	209.5
12/16	900	52.9	254.6	201.9
12/16	901	53.9	248.5	195.8
12/16	903	55.1	240.4	187.7
12/16	904	56.1	234.2	181.5
12/16	905	57.1	228.1	175.4
12/16	906	58.1	222.5	169.8
12/16	907	59.1	217.6	164.9
12/16	908	60.1	213	160.3
12/16	909	61.0	208.2	155.5
12/16	910	62.1	202.7	150.0
12/16	911	63.1	197.6	144.9
12/16	912	64.2	192.8	140.1
12/16	913	65.2	187.9	135.2
12/16	914	66.5	183	130.3
12/16	915	67.3	179	126.3
12/16	916	68.5	175.6	122.9
12/16	917	69.5	172.7	120.0
12/16	918	70.6	169.7	117.0
12/16	919	71.7	166.1	113.4
12/16	920	72.5	163.8	111.1
12/16	921	73.5	160.8	108.1
12/16	922	74.6	157.9	105.2
12/16	923	75.5	155.2	102.5
12/16	924	76.6	152.6	99.9
12/16	925	77.5	150.7	98.0
12/16	926	78.7	148.3	95.6
12/16	927	79.5	147	94.3
12/16	928	80.6	145	92.3
12/16	929	81.7	143.3	90.6
12/16	930	82.5	141.9	89.2
12/16	931	83.5	140.2	87.5
12/16	932	84.5	139	86.3
12/16	933	85.5	137.8	85.1
12/16	934	86.5	136.8	84.1
12/16	935	87.4	135.9	83.2
12/16	936	88.4	134.4	81.7
12/16	937	89.5	133.2	80.5
12/16	938	90.5	132.2	79.5
12/16	939	91.6	131.1	78.4
12/16	940	92.9	130	77.3
12/16	941	93.7	129.4	76.7
12/16	942	94.8	128.8	76.1

12/16	943	95.6	128	75.3
12/16	944	96.7	127.3	74.6
12/16	945	97.5	126.8	74.1
12/16	946	98.4	126.3	73.6
12/16	947	99.6	125.6	72.9
12/16	948	100.6	125.1	72.4
12/16	949	101.3	124.7	72.0
12/16	950	102.5	124.1	71.4
12/16	951	103.6	123.6	70.9
12/16	952	104.9	123.2	70.5
12/16	955	107.0	122.15	69.5
12/16	1000	112.0	120.5	67.8
12/16	1005	117.0	119.1	66.4
12/16	1010	122.0	117.78	65.1
12/16	1015	127.0	116.66	64.0
12/16	1016	128.0	115.59	62.9
12/16	1026	138.0	114.02	61.3
12/16	1030	142.0	112.81	60.1
12/16	1038	150.0	111.34	58.6
12/16	1042	154.0	110.36	57.7
12/16	1118	190.0	103.48	50.8
12/16	1133	205.0	100.68	48.0
12/16	1145	217.0	98.88	46.2
12/16	1403	355.0	81	28.3
12/16	1553	465.0	71.81	19.1
12/16	1700	532.0	67.5	14.8

Ione Pumping Test Data

Pumped Well is M3

Drawdown in M3

Date	Time	Cumulative Time (min)	Flow Rate (gpm)	DTW (ft)	GW ELE (ft)	Drawdown (ft)
07/07/04	8:30:00 AM	0	0.0	42.37	933.63	0
	9:00:00 AM	0	75.0	42.31	933.69	3.79
	9:01:00 AM	1	75.3	43.62	932.38	5.1
	9:02:00 AM	2	75.2	43.84	932.16	5.32
	9:04:00 AM	4	75.2	44.27	931.73	5.75
	9:08:00 AM	8	75.2	44.92	931.08	6.4
	9:15:00 AM	15	75.0	45.72	930.28	7.2
	9:30:00 AM	30	74.9	47.03	928.97	8.51
	10:00:00 AM	60	74.7	48.89	927.11	10.37
	11:00:00 AM	120	74.9	51.82	924.18	13.3
	12:00:00 PM	180	74.5	53.31	922.69	14.79
	2:00:00 PM	300	74.7	55.63	920.37	17.11
	4:00:00 PM	420	74.8	57.00	919.00	18.48
	5:00:00 PM	480	75.3	57.51	918.49	18.99
	7:00:00 PM	600	75.0	58.31	917.69	19.79
	9:00:00 PM	720	74.3	58.92	917.08	20.4
07/08/04	9:00:00 AM	1440	73.7	60.81	915.19	22.29
	11:00:00 AM	1560	75.3	61.14	914.86	22.62
	1:00:00 PM	1680	75.2	61.41	914.59	22.89
	3:00:00 PM	1800	75.2	61.63	914.37	23.11
07/09/04	9:00:00 AM	2160	74.7	63.58	912.42	25.06
	9:00:00 PM	2880	74.3	65.02	910.98	26.5
07/10/04	9:00:00 AM	3600	73.6	66.57	909.43	28.05
07/11/04	9:00:00 AM	5040	73.3	70.33	905.67	31.81
07/12/04	9:00:00 AM	6480	73.1	73.89	902.11	35.37
	11:40:00 AM	6640	74.0	74.23	901.77	35.71

IONE PUMPING TEST

Pumped Well is M3

Recovery in M3

Date	Time (min)	Cumulative Time (min)	Flow Rate (gpm)	DTW (ft)	GW ELE (ft)	Drawdown (ft)
07/12/04	11:40:00 AM	0	74	74.23	901.77	35.71
	11:41:00 AM	1	0	73.36	902.64	34.84
	11:42:00 AM	2	0	73.17	902.83	34.65
	11:43:00 AM	3	0	73.13	902.87	34.61
	11:44:00 AM	4	0	73.07	902.93	34.55
	11:45:00 AM	5	0	72.98	903.02	34.46
	11:46:00 AM	6	0	72.90	903.10	34.38
	11:48:00 AM	8	0	72.78	903.22	34.26
	11:50:00 AM	10	0	72.67	903.33	34.15
	11:52:00 AM	12	0	72.57	903.43	34.05
	11:55:00 AM	15	0	72.42	903.58	33.90
	12:00:00 PM	20	0	72.17	903.83	33.65
	12:10:00 PM	30	0	71.86	904.14	33.34
	12:20:00 PM	40	0	71.57	904.43	33.05
	12:30:00 PM	50	0	71.31	904.69	32.79
	12:40:00 PM	60	0	71.11	904.89	32.59
	12:55:00 PM	75	0	70.83	905.17	32.31
	01:10:00 PM	90	0	70.60	905.40	32.08
	01:30:00 PM	110	0	70.33	905.67	31.81
	01:40:00 PM	120	0	70.21	905.79	31.69
	01:50:00 PM	130	0	70.15	905.85	31.63
	02:40:00 PM	180	0	69.67	906.33	31.15
	03:40:00 PM	240	0	69.17	906.83	30.65
	04:40:00 PM	300	0	68.75	907.25	30.23
	05:40:00 PM	360	0	68.37	907.63	29.85
	06:40:00 PM	420	0	68.08	907.92	29.56
07/13/04	09:00:00 AM	1280	0	65.27	910.73	26.75
	11:00:00 AM	1400	0	65.02	910.98	26.50
07/14/04	09:30:00 AM	2750	0	62.67	913.33	24.15
07/15/04	10:48:00 AM	4268	0	60.87	915.13	22.35
07/16/04	04:53:00 PM	6073	0	59.29	916.71	20.77
07/19/04	09:00:00 AM	9920	0	57.15	918.85	18.63
07/21/04	10:01 AM	12861	0	55.96	920.04	17.44
07/23/04	01:00 PM	15920	0	54.90	921.10	16.38

Ione Pumping Test Data

Pumped Well is M3

Stepped Drawdown in M3

Date	Time (min)	Cumulative Time (min)	Flow Rate (gpm)	DTW (ft)	GW ELE (ft)	Drawdown (ft)
07/06/04	10:03 AM		0	38.18	937.82	0
	11:32 AM		0	38.20	937.80	0.02
	11:46 AM		0	38.20	937.80	0.02
	02:46 PM	0	50.8	39.75	936.25	1.57
	02:48 PM	2	49.8	39.85	936.15	1.67
	02:50 PM	4	49.8	40.08	935.92	1.9
	02:52 PM	6	60.6	40.62	935.38	2.44
	02:54 PM	8	60.0	40.82	935.18	2.64
	02:56 PM	10	59.9	41.03	934.97	2.85
	02:58 PM	12	60.0	41.22	934.78	3.04
	03:00 PM	14	60.2	41.40	934.60	3.22
	03:05 PM	19	59.0	41.86	934.14	3.68
	03:10 PM	24	60.1	42.26	933.74	4.08
	03:15 PM	29	60.0	42.61	933.39	4.43
	03:20 PM	34	60.0	42.97	933.03	4.79
	03:30 PM	44	59.9	43.58	932.42	5.4
	03:40 PM	54	59.8	44.14	931.86	5.96
	03:50 PM	64	60.1	44.67	931.33	6.49
	04:00 PM	74	60.1	45.19	930.81	7.01
	04:17 PM	91	60.0	45.93	930.07	7.75
	04:30 PM	104	60.0	46.47	929.53	8.29
	04:45 PM	119	60.1	47.03	928.97	8.85
	05:00 PM	134	60.2	47.54	928.46	9.36
	05:37 PM	171	60.0	48.62	927.38	10.44
	05:45 PM	179	60.0	48.96	927.04	10.78
	06:00 PM	194	70.1	49.83	926.17	11.65
	06:15 PM	209	70.1	50.39	925.61	12.21
	06:30 PM	224	70.0	50.86	925.14	12.68
	06:45 PM	239	70.0	51.29	924.71	13.11
	07:00 PM	254	70.0	51.71	924.29	13.53
	07:05 PM	259	0	50.11	925.89	11.93
	07:10 PM	264	0	49.67	926.33	11.49
	07:15 PM	269	0	49.33	926.67	11.15
	07:20 PM	274	0	49.11	926.89	10.93
	07:25 PM	279	0	48.88	927.12	10.7
	07:30 PM	284	0	48.66	927.34	10.48
	07:35 PM	289	0	48.46	927.54	10.28
	07:40 PM	294	0	48.25	927.75	10.07
	07:45 PM	299	0	48.14	927.86	9.96
	07:50 PM	304	0	47.99	928.01	9.81
	07:55 PM	309	0	47.83	928.17	9.65
	08:00 PM	314	0	47.70	928.30	9.52
07/07/04	08:30 AM	1064	0	42.37	933.63	4.19

Ione Pumping Test Data

Pumped Well is M3

Observation Well H1

Date	Time (min)	Cumulative Time (min)	Flow Rate (gpm)	DTW (ft)	GW ELE
07/06/04	11:02 AM	0	0	76.43	996.57
	05:21 PM	379	0	76.29	996.71
	08:33 PM	571	0	76.25	996.75
07/07/04	07:53 AM	1251	0	76.82	996.18
	10:29 AM	1407	0	76.42	996.58
	12:38 PM	1536	0	76.36	996.64
	02:40 PM	1658	0	76.32	996.68
	04:40 PM	1778	0	76.27	996.73
	07:41 PM	1959	0	76.23	996.77
07/08/04	09:44 AM	2802	0	76.52	996.48
	11:40 AM	2918	0	76.44	996.56
	01:38 PM	3036	0	76.39	996.61
07/09/04	09:41 AM	4239	0	76.73	996.27
07/10/04	09:55 AM	4253	0	76.89	996.11
07/11/04	11:20 AM	4338	0	76.64	996.36
07/12/04	09:12 AM	5650	0	76.56	996.44
	05:11 PM	6129	0	76.43	996.57
07/13/04	09:59 AM	7137	0	76.85	996.15
	11:34 AM	7232	0	76.76	996.24
07/14/04	10:29 AM	8607	0	76.93	996.07
07/15/04	12:44 PM	10182	0	76.82	996.18
07/16/04	05:24 PM	11902	0	76.80	996.20
07/19/04	10:56 AM	15834	0	77.33	995.67

Ione Pumping Test Data

Pumped Well is M3

Observation Well M2

Date	Time (min)	Cumulative Time (min)	Flow Rate (gpm)	DTW (ft)	GW ELE (ft)
07/06/04	10:48 AM	0	0	74.45	854.55
	04:09 PM	321	0	74.72	854.28
	05:10 PM	382	0	74.74	854.26
	08:17 PM	569	0	74.53	854.47
07/07/04	08:11 AM	1283	0	74.52	854.48
	10:16 AM	1408	0	74.50	854.50
	12:22 PM	1534	0	74.54	854.46
	02:23 PM	1655	0	74.62	854.38
	04:20 PM	1772	0	74.68	854.32
	05:21 PM	1833	0	74.68	854.32
	07:24 PM	1956	0	74.66	854.34
	07:30 PM	1962	0	74.52	854.48
07/08/04	09:29 AM	2801	0	74.59	854.41
	11:24 AM	2916	0	74.58	854.42
	01:24 PM	3036	0	74.58	854.42
	01:28 PM	3040	0	74.64	854.36
07/09/04	09:27 AM	4239	0	74.78	854.22
	09:33 PM	4965	0	74.67	854.33
07/10/04	09:40 AM	5692	0	74.89	854.11
07/11/04	11:02 AM	5774	0	74.94	854.06
07/12/04	09:26 AM	7118	0	75.02	853.98
	03:18 PM	7470	0	74.74	854.26
	03:55 PM	7507	0	74.72	854.28
	04:55 PM	7567	0	74.66	854.34
	05:58 PM	7630	0	74.60	854.40
	06:56 PM	7688	0	74.64	854.36
07/13/04	09:26 AM	8558	0	75.06	853.94
	11:20 AM	8672	0	75.11	853.89
07/14/04	10:03 AM	10035	0	75.15	853.85
07/15/04	11:24 AM	11556	0	75.26	853.74
07/16/04	05:11 PM	13343	0	74.99	854.01
07/19/04	10:14 AM	17246	0	75.11	853.89
07/21/04	09:48 AM	20100	0	75.10	853.90

Ione Pumping Test Data

Pumped Well is M3

Observation Well M4

Date	Time (min)	Cumulative Time (min)	Flow Rate (gpm)	DTW (ft)	GW ELE (ft)
07/06/04	09:59 AM	0	0	43.23	951.77
	11:35 AM	0	0	43.26	951.74
	03:32 PM	237	0	43.42	951.58
	03:52 PM	257	0	43.45	951.55
	04:55 PM	320	0	43.58	951.42
	05:48 PM	373	0	43.69	951.31
	06:32 PM	417	0	43.81	951.19
	07:02 PM	447	0	43.89	951.11
	07:32 PM	477	0	43.95	951.05
	08:02 PM	507	0	44.01	950.99
07/07/04	08:26 AM	1251	0	44.72	950.28
	09:18 AM	1303	0	44.75	950.25
	10:03 AM	1348	0	44.83	950.17
	12:06 PM	1471	0	45.13	949.87
	02:07 PM	1592	0	45.50	949.50
	04:08 PM	1713	0	45.86	949.14
	05:10 PM	1775	0	46.04	948.96
	07:07 PM	1892	0	46.37	948.63
	09:14 PM	2019	0	46.72	948.28
07/08/04	09:14 AM	2739	0	48.74	946.26
	11:09 AM	2854	0	48.98	946.02
	01:08 PM	2973	0	49.23	945.77
	03:10 PM	3095	0	49.48	945.52
07/09/04	09:11 AM	4176	0	51.34	943.66
	09:17 PM	4902	0	52.24	942.76
07/10/04	09:22 AM	5627	0	53.29	941.71
07/11/04	10:10 AM	5675	0	55.43	939.57
07/12/04	09:41 AM	7086	0	57.60	937.40
	11:35 AM	7200	0	57.75	937.25
	11:58 AM	7223	0	57.77	937.23
	12:24 PM	7249	0	57.78	937.22
	12:43 PM	7268	0	57.78	937.22
	12:58 PM	7283	0	57.78	937.22
	01:35 PM	7320	0	57.80	937.20
	02:06 PM	7351	0	57.80	937.20
	03:44 PM	7449	0	57.80	937.20
	04:44 PM	7509	0	57.81	937.19
	05:46 PM	7571	0	57.82	937.18
	06:45 PM	7630	0	57.86	937.14
07/13/04	09:11 AM	8496	0	58.23	936.77
	11:09 AM	8614	0	58.25	936.75
07/14/04	09:44 AM	9969	0	58.25	936.75
07/15/04	11:01 AM	11486	0	58.11	936.89
07/16/04	04:58 PM	13283	0	57.74	937.26
07/19/04	10:29 AM	17214	0	57.63	937.37
07/21/04	10:05 AM	20070	0	57.63	937.37

Ione Pumping Test Data
Pumped Well is H1
Drawdown in H1

Date	Time	Cumulative Time (min)	Flow Rate (gpm)	DTW (ft)	Drawdown (ft)
12/02	1500	0	60	81.17	0
12/02	1504	4	60	83.26	2.09
12/02	1505	5	60	83.36	2.19
12/02	1506	6	60	83.5	2.33
12/02	1507	7	60	83.41	2.24
12/02	1509	9	60	83.47	2.3
12/02	1510	10	60	83.56	2.39
12/02	1513	13	60	83.56	2.39
12/02	1514	14	60	83.61	2.44
12/02	1515	15	60	83.65	2.48
12/02	1516	16	60	83.71	2.54
12/02	1517	17	60	83.74	2.57
12/02	1518	18	60	83.81	2.64
12/02	1519	19	60	83.83	2.66
12/02	1520	20	60	83.85	2.68
12/02	1521	21	60	83.86	2.69
12/02	1522	22	60	83.87	2.7
12/02	1525	25	60	83.95	2.78
12/02	1530	30	60	84.15	2.98
12/02	1535	35	60	84.18	3.01
12/02	1540	40	60	84.32	3.15
12/02	1545	45	60	84.4	3.23
12/02	1550	50	60	84.57	3.4
12/02	1555	55	60	84.68	3.51
12/02	1600	60	60	84.81	3.64
12/02	1605	65	60	84.91	3.74
12/02	1610	70	60	85.01	3.84
12/02	1615	75	60	85.14	3.97
12/02	1620	80	60	85.25	4.08
12/02	1625	85	60	85.36	4.19
12/02	1638	98	60	85.57	4.4
12/03	829	1049	60	95.99	14.82
12/03	839	1059	60	96.05	14.88
12/03	930	1150	60	96.51	15.34
12/03	932	1152	60	96.52	15.35
12/03	934	1154	60	96.52	15.35
12/03	936	1156	60	96.59	15.42
12/03	938	1158	60	96.57	15.4
12/03	940	1160	60	96.61	15.44
12/03	950	1170	60	96.72	15.55
12/03	1000	1180	60	96.75	15.58
12/03	1010	1190	60	96.86	15.69
12/03	1020	1200	60	96.91	15.74
12/03	1030	1210	60	96.92	15.75
12/03	1040	1220	60	97.08	15.91
12/03	1050	1230	60	97.06	15.89
12/03	1100	1240	60	97.11	15.94
12/03	1729	1629	60	99.78	18.61
12/03	1734	1634	60	99.85	18.68
12/04	930	2590	60	98.3	17.13
12/04	1106	2686	60	97.84	16.67

12/04	1111	2691	60	99.89	18.72
12/04	1116	2696	60	100	18.83
12/04	1121	2701	60	100.08	18.91
12/04	1126	2706	60	100.38	19.21
12/04	1136	2716	60	100.41	19.24
12/04	1148	2728	60	100.57	19.4
12/05	805	3945	60	108.87	27.7
12/05	810	3950	60	108.87	27.7
12/05	815	3955	60	108.92	27.75
12/05	1915	4615	60	111.52	30.35
12/06	1135	5595	60	114.02	32.85
12/07	1525	7265	60	120.1	38.93
12/08	824	8284	60	122.84	41.67
12/08	830	8290	60	122.73	41.56
12/08	1115	8455	60	123.28	42.11
12/08	1122	8462	60	123.32	42.15
12/08	1128	8468	60	121.24	40.07
12/08	1128.5	8468.5	60	121.42	40.25
12/08	1129	8469	60	121.39	40.22
12/08	1129.5	8469.5	60	121.32	40.15
12/08	1130	8470	60	121.3	40.13
12/08	1131	8471	60	121.28	40.11
12/08	1132	8472	60	121.26	40.09
12/08	1133.25	8473.25	60	121.25	40.08
12/08	1133.5	8473.5	60	121.22	40.05
12/08	1133.75	8473.75	60	121.21	40.04
12/08	1134	8474	60	121.2	40.03
12/08	1135	8475	60	121.2	40.03
12/08	1136	8476	60	121.18	40.01
12/08	1137	8477	60	121.16	39.99
12/08	1140	8480	60	121.14	39.97
12/08	1142	8482	60	121.11	39.94
12/08	1145	8485	60	121.09	39.92
12/08	1148	8488	60	121.08	39.91
12/08	1149	8489	60	121.07	39.9
12/08	1150	8490	60	121.06	39.89
12/08	1151	8491	60	121.05	39.88
12/08	1152	8492	60	121.04	39.87
12/08	1153	8493	60	121.03	39.86
12/08	1156	8496	60	121.02	39.85
12/08	1157	8497	60	121.01	39.84
12/08	1158	8498	60	121	39.83
12/08	1203	8503	60	120.99	39.82
12/08	1206	8506	60	120.96	39.79
12/08	1207.5	8507.5	60	120.92	39.75
12/08	1209	8509	60	122.55	41.38
12/08	1210	8510	60	122.72	41.55
12/08	1243	8543	60	123.15	41.98
12/08	1255	8555	60	123.22	42.05
12/08	1320	8580	60	123.07	41.9
12/08	1454	8674	60	123.28	42.11
12/08	1504	8684	60	123.38	42.21
12/08	1517	8697	60	123.4	42.23
12/08	1520	8700	60	123.4	42.23
12/08	1524	8704	60	123.4	42.23
12/08	1528	8708	60	123.4	42.23
12/08	1551	8731	60	123.49	42.32

12/08	1633	8773	60	123.5	42.33
12/08	1704	8804	60	123.55	42.38
12/08	1810	8870	60	123.68	42.51
12/09	930	9790	60	123.2	42.03
12/09	1015	9835	60	123.25	42.08
12/09	1020	9840	60	124.6	43.43
12/09	1029	9849	60	125.05	43.88
12/09	1050	9870	60	125.28	44.11
12/09	1108	9888	60	125.32	44.15
12/09	1117	9897	60	125.36	44.19
12/09	1130	9910	60	125.35	44.18
12/09	1200	9940	60	125.5	44.33
12/09	1236	9976	60	125.58	44.41
12/09	1256	9996	60	125.63	44.46
12/09	1308	10008	60	125.65	44.48

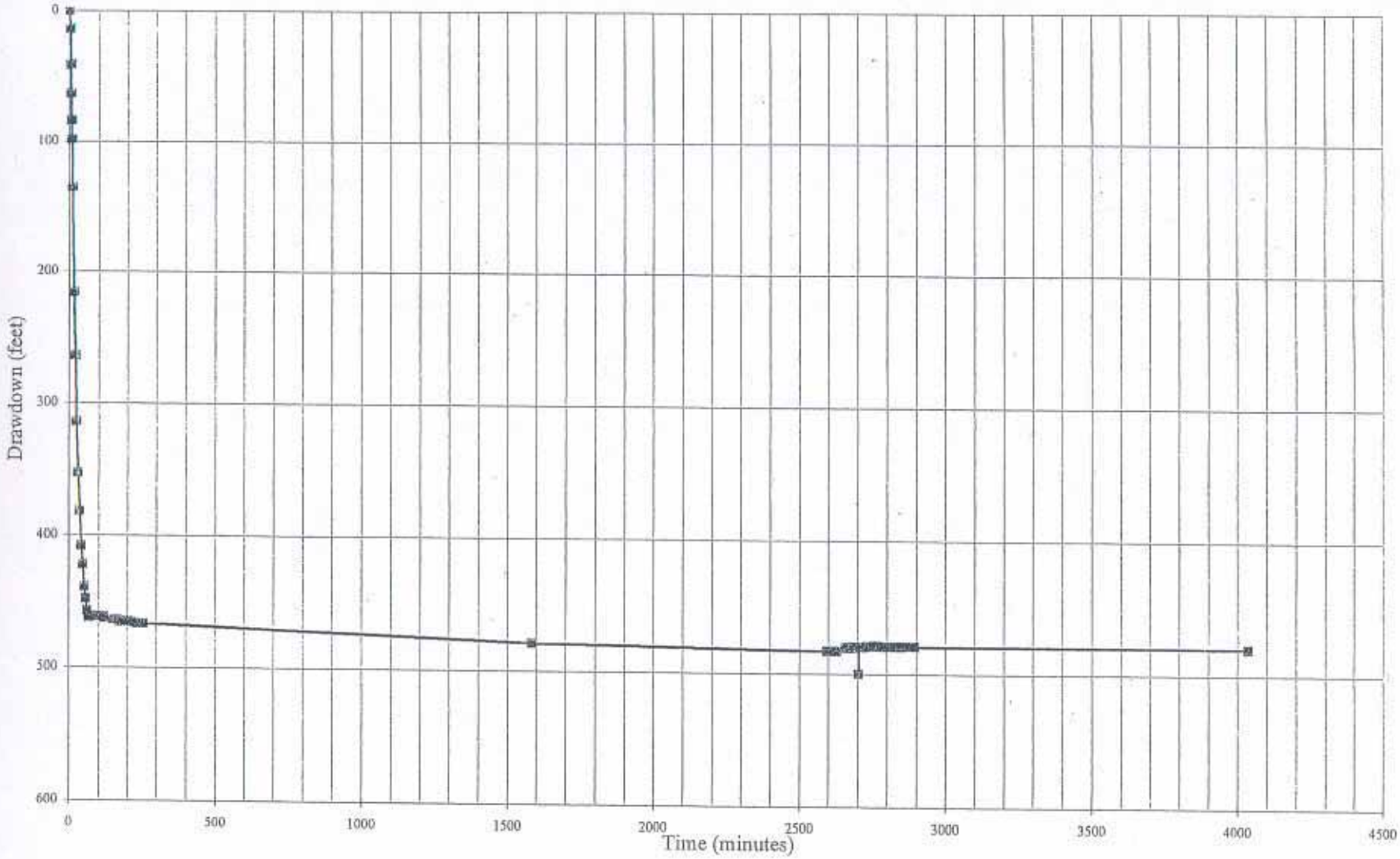
Ione Pumping Test Data
Pumped Well is H1
Recovery in H1

Date	Time	Cumulative Time (min)	Flow Rate (gpm)	DTW (ft)	Drawdown (ft)
12/09	1313	0.0	0	123.6	42.43
12/09	1313	0.2	0	123.83	42.66
12/09	1313	0.3	0	123.95	42.78
12/09	1313	0.5	0	124.01	42.84
12/09	1313	0.7	0	124.1	42.93
12/09	1314	0.9	0	124.08	42.91
12/09	1314	1.8	0	124.08	42.91
12/09	1315	2.3	0	123.95	42.78
12/09	1315	2.6	0	123.95	42.78
12/09	1316	2.8	0	123.95	42.78
12/09	1316	3.2	0	123.92	42.75
12/09	1316	3.6	0	123.92	42.75
12/09	1317	4.1	0	123.89	42.72
12/09	1317	4.5	0	123.87	42.7
12/09	1319	6.3	0	123.85	42.68
12/09	1319	6.8	0	123.84	42.67
12/09	1320	7.3	0	123.84	42.67
12/09	1322	8.8	0	123.82	42.65
12/09	1325	12.6	0	123.77	42.6
12/09	1331	18	0	123.76	42.59
12/09	1339	26	0	123.71	42.54
12/09	1352	39	0	123.61	42.44
12/09	1359	46	0	123.6	42.43
12/09	1404	51	0	123.6	42.43
12/09	1434	81	0	123.48	42.31
12/09	1504	111	0	123.31	42.14
12/09	1609	176	0	123.15	41.98
12/09	1722	249	0	122.9	41.73
12/10	720	1087	0	120.85	39.68
12/10	729	1096	0	120.96	39.79
12/10	1304	1431	0	120.34	39.17
12/10	1501	1548	0	120.22	39.05
12/11	906	2633	0	118.38	37.21
12/11	917	2642	0	118.38	37.21
12/12	756	4001	0	116.54	35.37
12/13	958	5563	0	114.5	33.33
12/14	1516	7321	0	112.44	31.27
12/15	839	8396	0	111.38	30.21
12/19	1312	14429	0	110.94	29.77
12/24	804	21321	0	104.71	23.54
12/29	1145	28742	0	96.54	15.37
01/08	818	42935	0	87.19	6.02

APPENDIX C

Pumping Test Graphical Results

Well M1
Constant Yield and Drawdown Test - 12/13/03
Ione Casino Site, Plymouth, California



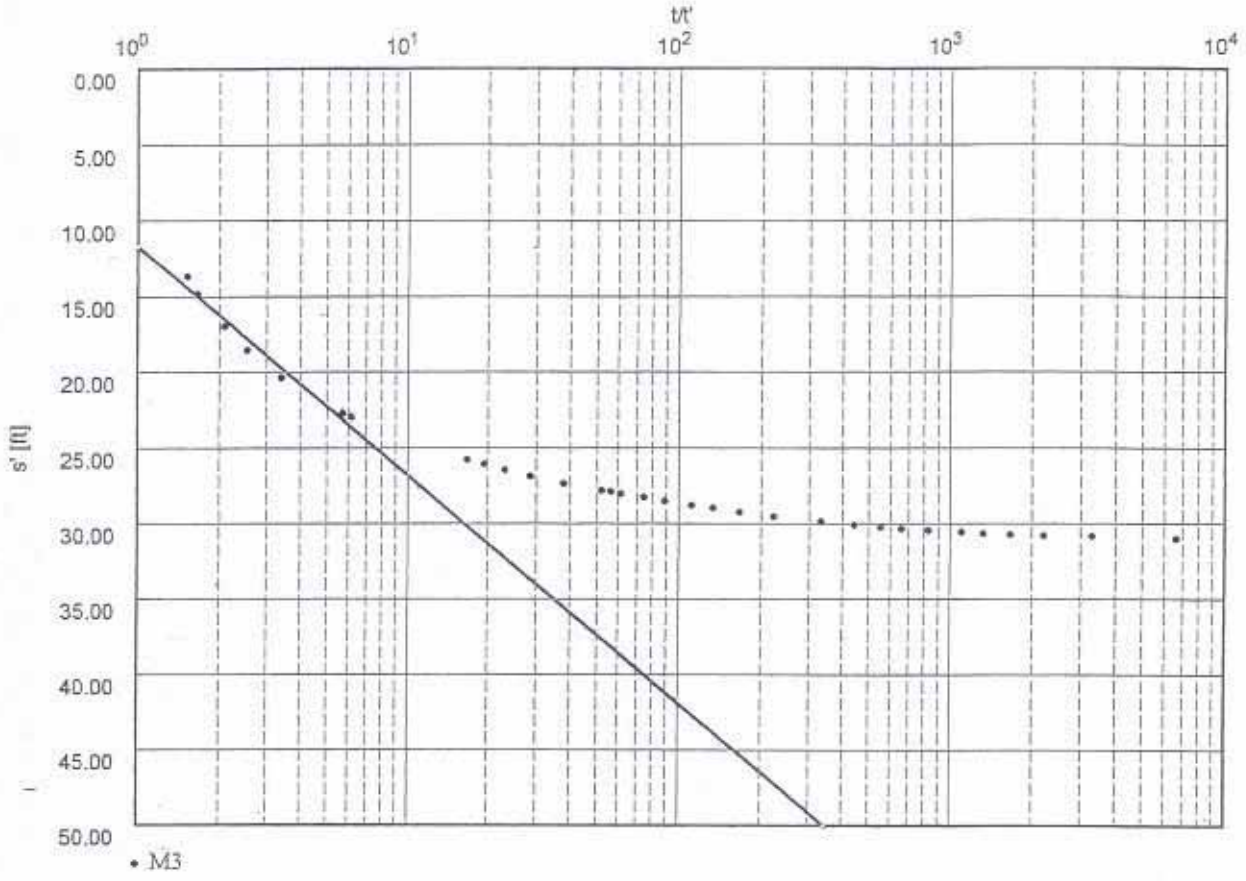
8/1/2004

Chart No.1

Well M1.
Constant Yield and Drawdown Test - Recovery Phase - 12/16/03
Ione Casino Site, Plymouth, California

AEG, Inc. 578 E Street Lincoln, California 95648	Pumping test analysis Recovery method after THEIS & JACOB Confined aquifer	Date: 8-01-04	Page 1
		Project: Ione Casino Site	
		Evaluated by: WLK	

Pumping Test No.	Test conducted on: 7-12-2004
Well M3	
Discharge 73.94 U.S.gal/min	
	Pumping test duration: 6640.00 min



Transmissivity [ft²/min]: 1.19×10^{-1}

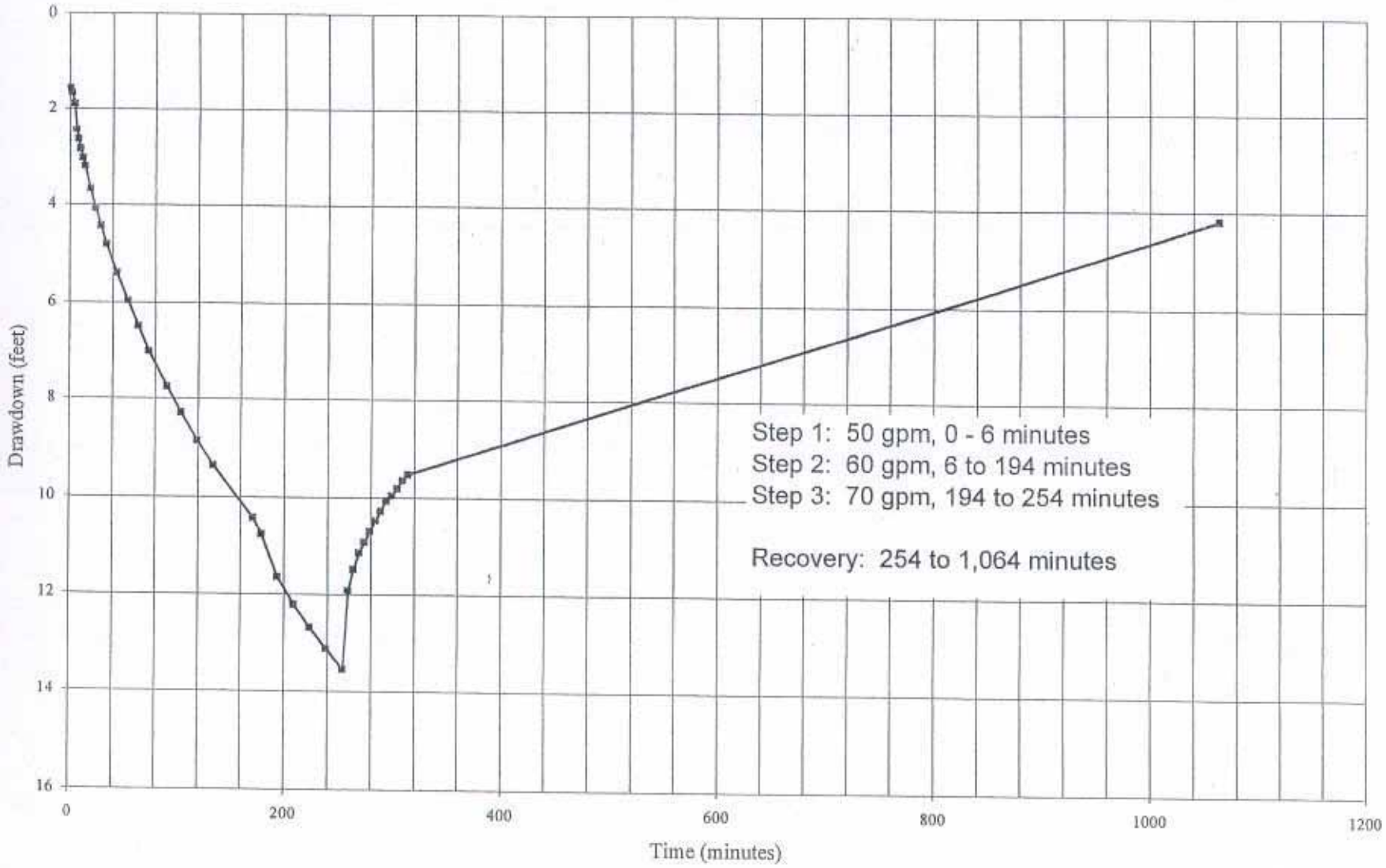
Hydraulic conductivity [ft/min]: 2.99×10^{-3}

Aquifer thickness [ft]: 40.00

Well M3

Step Drawdown Test - Drawdown and Recovery - 07/06/04

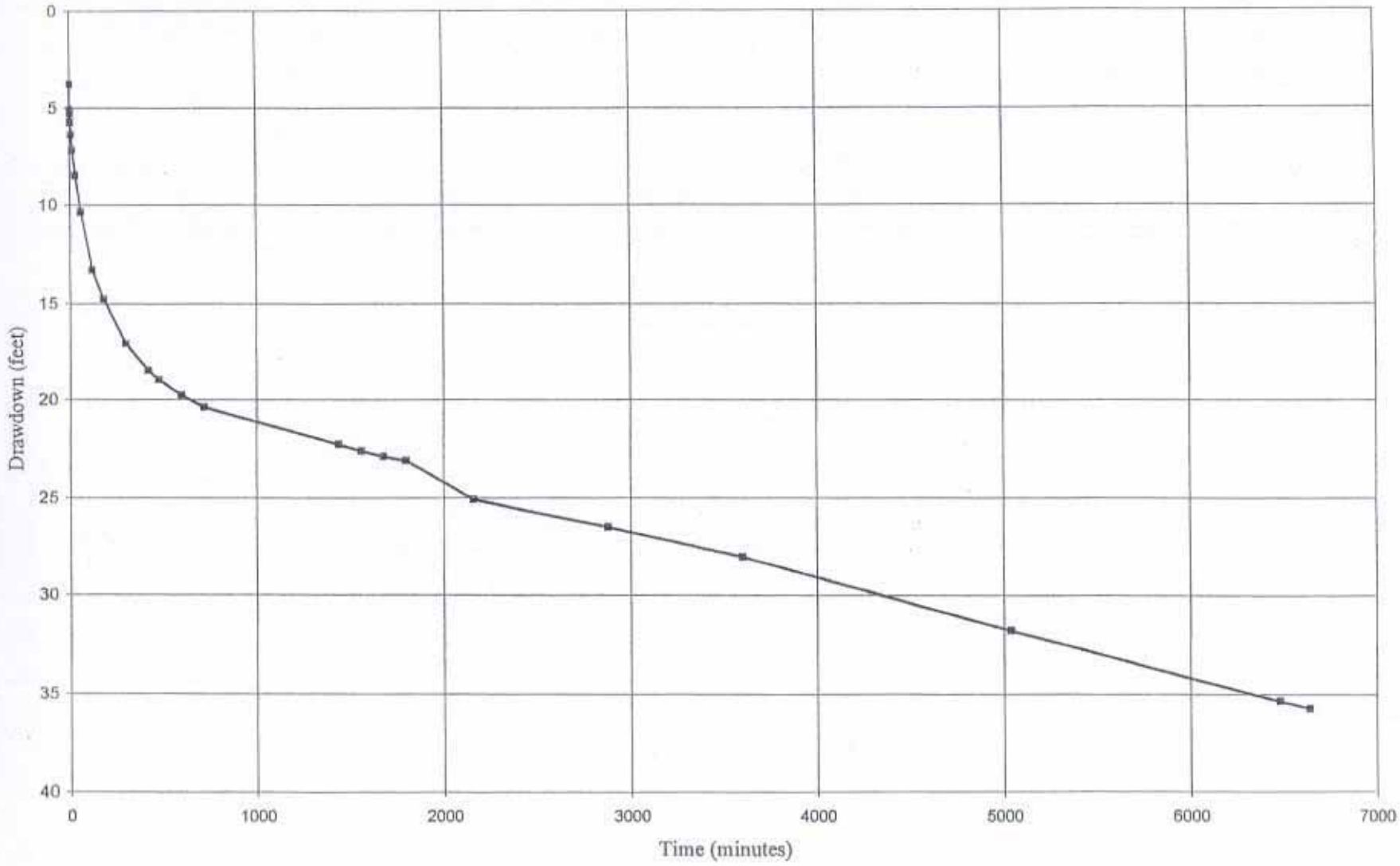
Ione Casino Site, Plymouth, California



Well M3

Constant Rate Test - 07/07/04

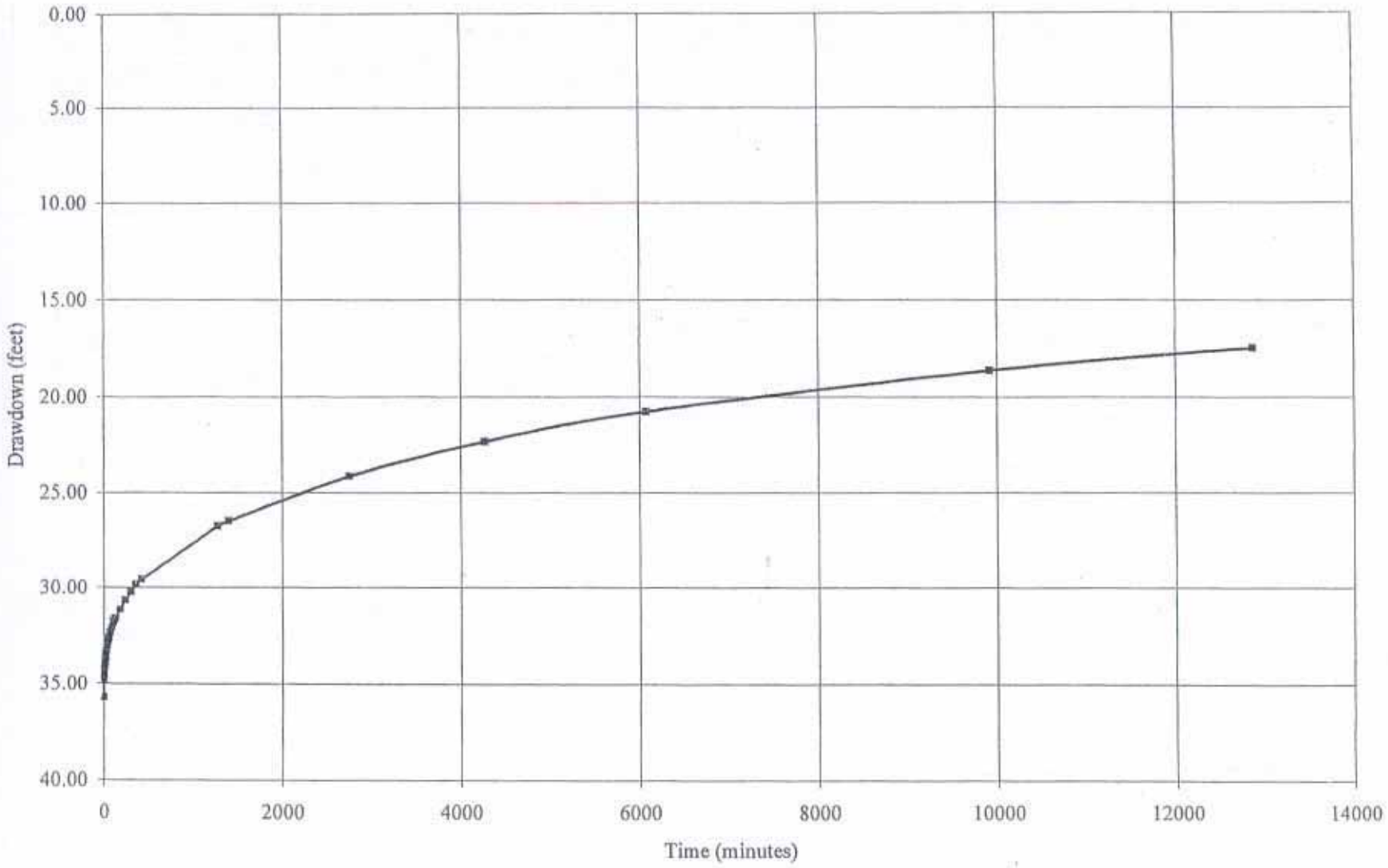
Ione Casino Site, Plymouth, California



8/1/2004

Chart No.5

Well M3
Constant Rate Test - Recovery Phase - 07/21/04
Ione Casino Site, Plymouth, California



Well M3

Constant Rate Test - Drawdown at M-3 (pumped) and M-2 (obs)

Ione Casino Site, Plymouth, California

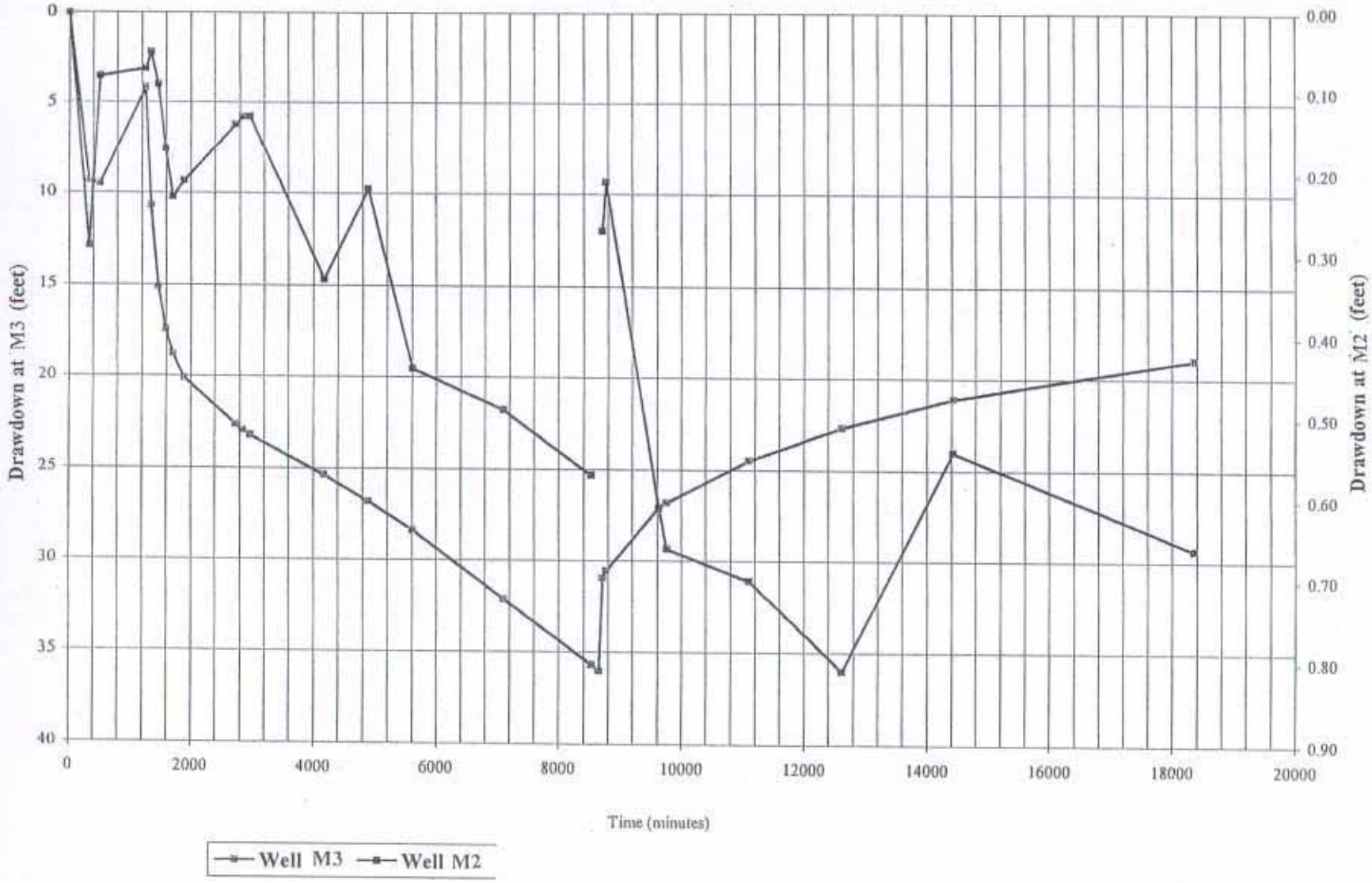
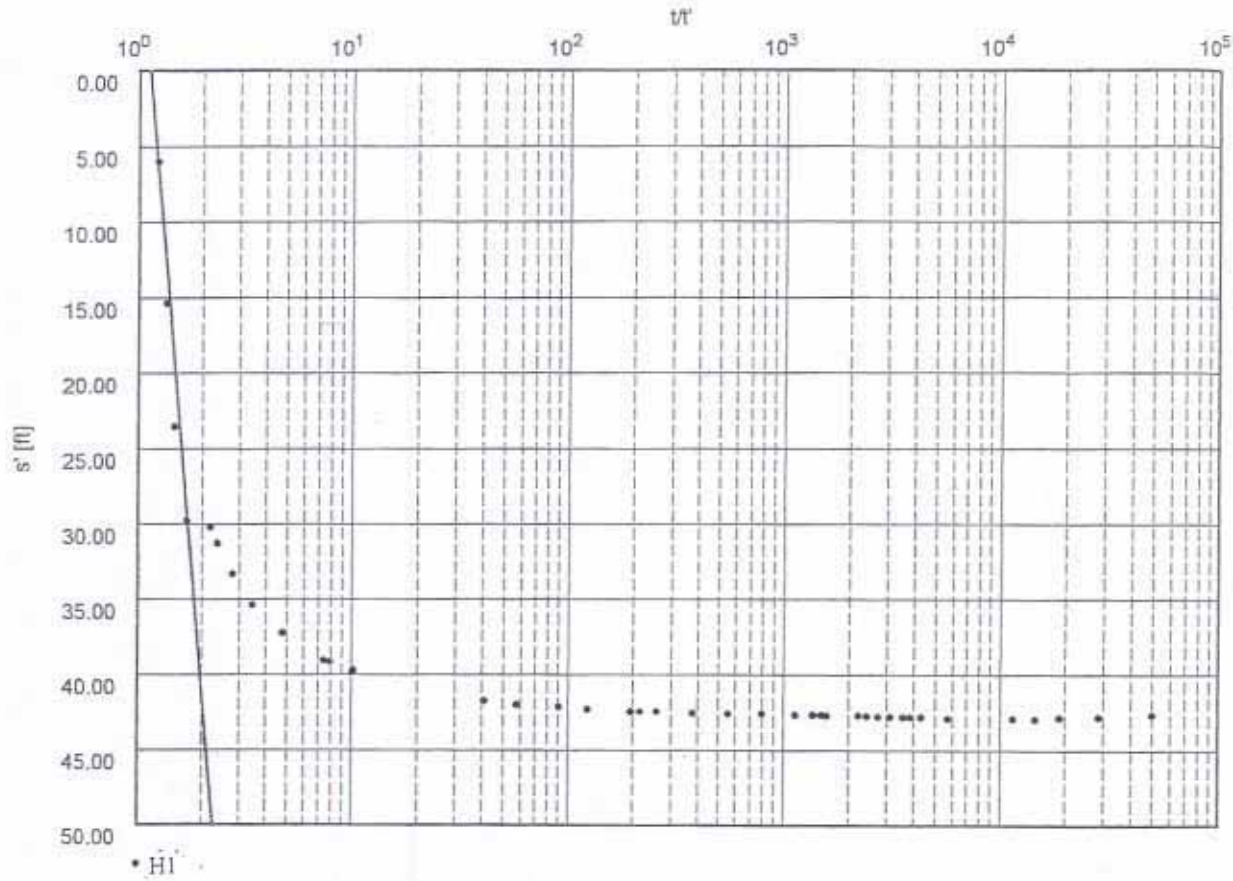


Chart No.7

AEG, Inc. 578 E Street Lincoln, California 95648	Pumping test analysis Recovery method after THEIS & JACOB Confined aquifer	Date: 08-01-04	Page 1
		Project: Ione Casino Site	
		Evaluated by: WLK	

Pumping Test No.	Test conducted on: 12-09-03
Well H1	
Discharge 60.00 U.S.gal/min	
	Pumping test duration: 10008.00 min



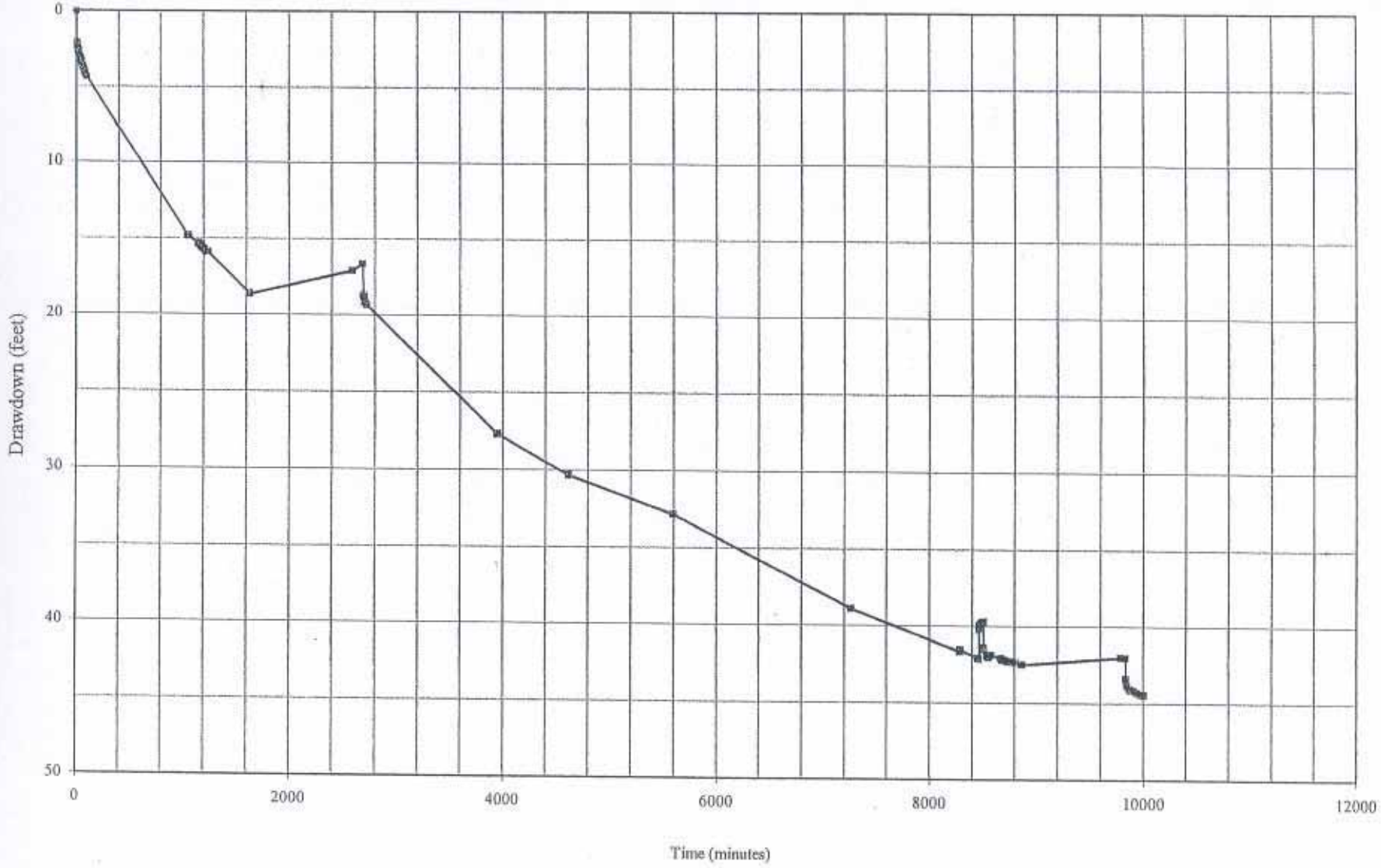
Transmissivity [ft²/min]: 9.03×10^{-3}

Hydraulic conductivity [ft/min]: 4.51×10^{-4}

Aquifer thickness [ft]: 20.00

Chart No. 8

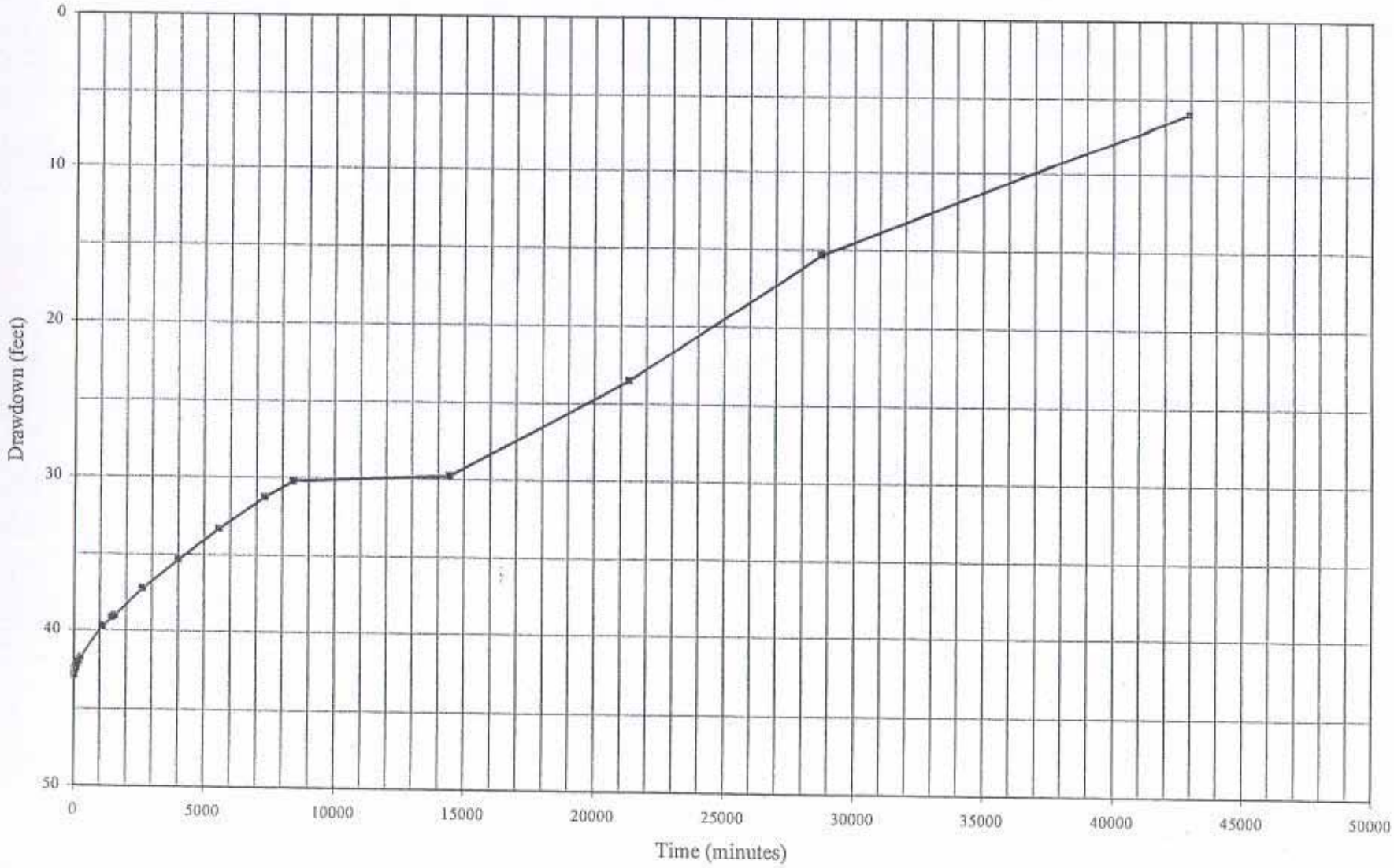
Well H1
Constant Rate Test - 12/02/03
Ione Casino Site, Plymouth, California



8/1/2004

Chart No.9

Well H1
Constant Rate Test - Recovery Phase - 12/09/03
Ione Casino Site, Plymouth, California



APPENDIX D

Calculation of Long-Term Well Yield

Calculation of Long-Term Well Yield
Well M1

Test Methodology:
Pumped dynamic level to top of perforated PVC, reduced flow rate until dynamic level stabilized, and continued pumping.

Test Results:

Static water level at test start (fbtoc):	52.7
Test duration (hours):	67.3
Test flow rate (gpm):	17.0
Duration of stable water levels (hours):	**40.9**
Maximum drawdown at end of test (feet):	480.4

Analysis

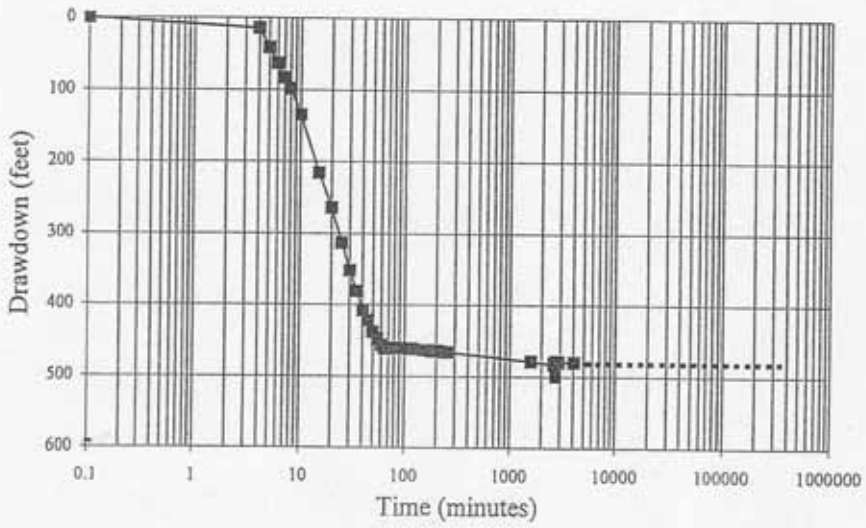
Extrapolated drawdown to 200 days (feet):	480.4
Specific capacity at 200 days (gpm/ft):	0.0354
Top of perforated PVC (fbgs):	540
Total available drawdown (feet):	487.3
Safety Factor Multiplier	0.7
Safe available drawdown (feet):	341.11

Long-term well yield (gpm) = specific capacity at 200 days * safe available drawdown

Long-term well yield (gpm):	**12.1**

Comments:
Flow rate was reduced to 17 gpm to achieve a stable dymamic level. Specific capacity at test end is equivalent to specific capacity at 200 days.

Drawdown extrapolated to 200 days



Calculation of Long-Term Well Yield
Well M3

Test Methodology:
Pumped dynamic level to top of perforated PVC, reduced flow rate in an attempt to stabilize the dynamic level.

Test Results:

Static water level at test start (fbtoc):	42.4
Test duration (hours):	99.1
Test flow rate (gpm):	51.0
Duration of stable water levels (hours):	**Did not stabilize**
Maximum drawdown at end of test (feet):	20.8

Analysis

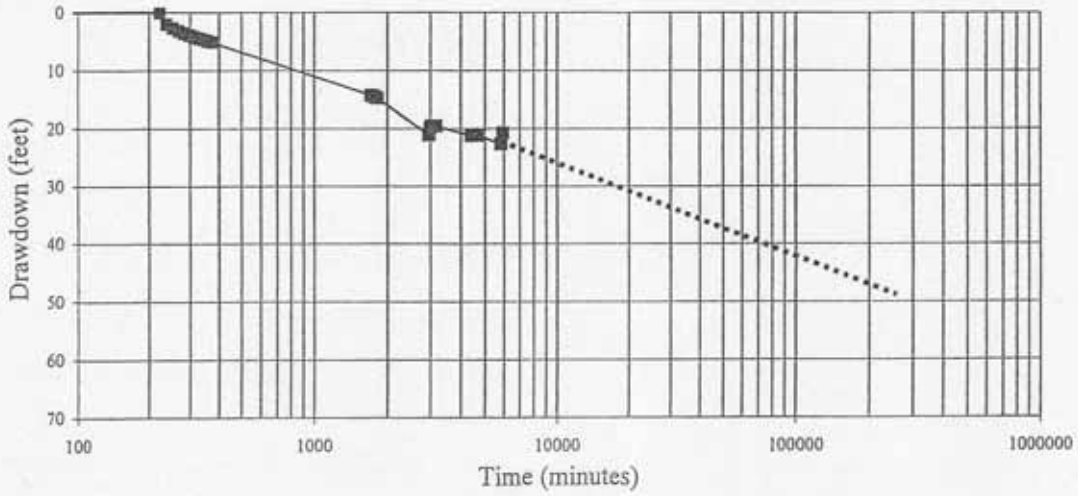
Extrapolated drawdown to 200 days (feet):	50.0
Specific capacity at 200 days (gpm/ft):	1.0200
Top of perforated PVC (fbgs):	180
Total available drawdown (feet):	137.6
Safety Factor Multiplier	0.30
Safe available drawdown (feet):	41.289

Long-term well yield (gpm) = specific capacity at 200 days * safe available drawdown

Long-term well yield (gpm):	42.1

Comments:
Very poor recovery during the constant rate test suggests that the fractures that store and transmit water are being dewatered during pumping; therefore a safety factor of 70% was used to calculate safe available drawdown.

Drawdown extrapolated to 200 days



Calculation of Long-Term Well Yield
Well H1

Test Methodology:
Constant rate test

Test Results:

Static water level at test start (fbtoc):	81.2
Test duration (hours):	166.8
Test flow rate (gpm):	60.0
Duration of stable water levels (hours):	Did not stabilize
Max drawdown end of test (feet):	44.5

Analysis

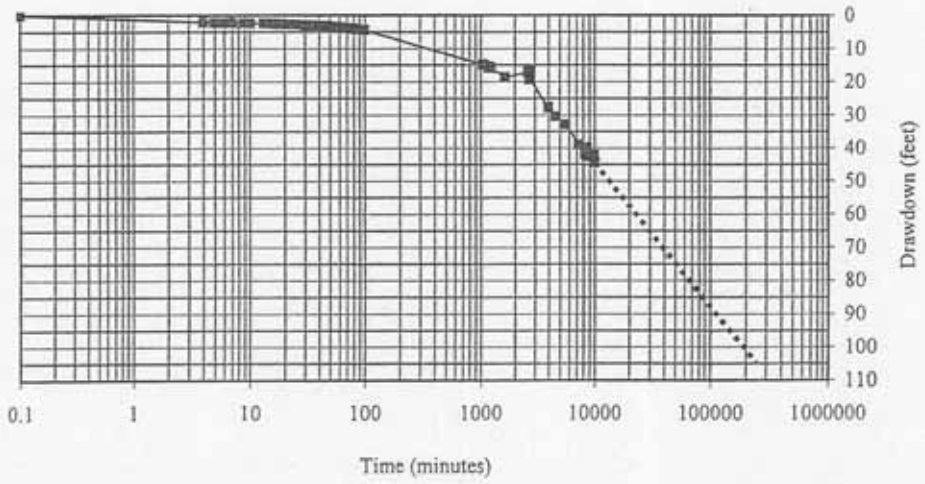
Extrapolated drawdown to 200 days	105.0
Specific capacity at 200 days (gpm/ft):	0.5714
Top of main water strike (fbgs):	200
Total available drawdown (feet):	118.8
Safety factor multiplier:	0.6
Safe available drawdown (feet):	71.298

Long-term well yield (gpm) = specific capacity at 200 days * safe available drawdown

Long-term well yield (gpm):	**40.7**

Comments:
Safety factor increased due to poor recovery characteristics, concern about cascade from upper water strike at 105 to 107' bgs.
Boundary condition apparent at ~ 3000 minutes, at a drawdown of ~ 20 feet.
SWL at test start = ~ 81 feet, so boundary occurs at 101 feet.
Very close to water strike at 105 feet reported by drillers,
so appears boundary is due to dewatering of upper water strike.

Drawdown extrapolated to 200 days



APPENDIX E

Analytical Laboratory Report

ANALYTICAL ENVIRONMENTAL SERVICES

2021 N Street, Suite 200
Sacramento, CA 95814
http://www.analyticalcorp.com
(916) 447-3479 ▪ Fax (916) 447-1665

Fax

To: Earl Stephens **From:** Paul Hann, Associate

Fax No: 916-645-6098 **Date:**

Pages: 7 Including Cover

☐ **Urgent** ☑ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **For Your Information**

Earl,

Here's the water quality data for the Mautlich M3 sample we took a couple of weeks ago.

Paul Hann

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 23, 2004

CLS Work Order #: CNG0325
COC #: 58730

Paul Hann
AES
2021 N Street Ste. 200
Sacramento, CA 95814

Project Name: Ione Water Sampling

Enclosed are the results of analyses for samples received by the laboratory on 07/12/04 13:15. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233.

CLS - Labs

CHAIN OF CUSTODY

CLS ID No.: 1N76525

LOG NO. 58730

PAGE 03/07

REPORT TO:

NAME AND ADDRESS: AES
2021 N street Ste 250

PROJECT MANAGER: Paul Hand PHONE#: (916) 447-3479

PROJECT NAME: Dove water sampling

SAMPLED BY: Paul Hand

JOB DESCRIPTION:

SITE LOCATION: M3

CLIENT JOB NUMBER: 203525

DESTINATION LABORATORY:

☒ CLS (916) 638-7301
3249 FITZGERALD RD.
RANCHO CORDOVA, CA.
95742

☐ OTHER

GEOTRACKER:
EDF REPORT ☐ YES ☐ NO
GLOBAL ID:

COMPOSITE:

FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	CAM 17 metals	General Mineral	E-Coli
7/12/04	11:30	Matulich M3	W	1	500 ml Poly	2,3	X		
			W	1	1L Poly	3		X	
			W	1	100 ml Poly	3,7			X

TURN AROUND TIME: 1 DAY | 2 DAY | 5 DAY | 10 DAY

10 DAY
X
X
X

SPECIAL INSTRUCTIONS

OR

ALT. ID:

INVOICE TO:

P.O. #

QUOTE #

SUSPECTED CONSTITUENTS

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (6) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) = Bact

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
	Paul Hand / AES	7/12/04 / 13:15		

RECD AT LAB BY: DATE / TIME: 7-12-4 1315

CONDITIONS / COMMENTS:

SHIPPED BY: ☐ FED X ☐ UPS ☐ OTHER AIR BILL #

07/27/2004 15:59 9164471655 AES

1 of 1

CALIFORNIA LABORATORY SERVICES

07/23/04 16:02

AES
2021 N Street Ste. 200
Sacramento, CA 95814

Project: Ione Water Sampling
Project Number: 203525
Project Manager: Paul Hann

CLS Work Order #: CNG0325

COC #: 58730

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Matulich M3 (CNG0325-01) Water	**Sampled: 07/12/04 11:30**	**Received: 07/12/04 13:15**							
Arsenic	ND	5.0	µg/L	1	CN05448	07/13/04	07/13/04	EPA 200.8	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	10	"	"	"	"	"	"	
Antimony	ND	50	"	"	CN05450	07/13/04	07/13/04	EPA 200.7	
Barium	ND	20	"	"	"	"	"	"	
Beryllium	ND	5.0	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
Cobalt	ND	20	"	"	"	"	"	"	
Chromium	ND	20	"	"	"	"	"	"	
Copper	ND	20	"	"	"	"	"	"	
Molybdenum	ND	20	"	"	"	"	"	"	
Nickel	ND	20	"	"	"	"	"	"	
Silver	ND	10	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	
Mercury	ND	0.20	"	"	CN05454	07/13/04	07/14/04	EPA 245.1	

CALIFORNIA LABORATORY SERVICES

07/23/04 16:02

AES
2021 N Street Ste. 200
Sacramento, CA 95814

Project: Ione Water Sampling
Project Number: 203525
Project Manager: Paul Hann

CLS Work Order #: CNG0325
COC #: 58730

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Matulich M3 (CNG0325-01) Water	**Sampled: 07/12/04 11:30**		**Received: 07/12/04 13:15**						
Total Alkalinity	220	5.0	mg/L	1	CN05543	07/15/04	07/15/04	EPA 310.1	
Bicarbonate as CaCO3	220	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	ND	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
Chloride	12	0.50	"	"	CN05446	07/13/04	07/13/04	EPA 300.0	
Fluoride	0.21	0.10	"	"	"	"	"	"	
Nitrate as NO3	ND	2.0	"	"	"	"	"	"	
Sulfate as SO4	60	2.5	"	5	"	"	07/13/04	"	
Specific Conductance (EC)	480	1.0	µmhos/cm	1	CN05545	07/15/04	07/15/04	EPA 120.1	
Methylene Blue Active Substances	ND	0.10	mg/L	"	CN05471	07/13/04	07/13/04	EPA 425.1	
Calcium	60	1.0	"	"	CN05376	07/15/04	07/16/04	200.7/2340B	
Magnesium	32	1.0	"	"	"	"	"	"	
Potassium	ND	1.0	"	"	"	"	"	"	
Sodium	11	1.0	"	"	"	"	"	"	
Hardness as CaCO3	280	1.0	"	"	"	"	"	"	
pH	6.90		pH Units	"	CN05437	07/12/04	07/12/04	EPA 150.1	
Total Dissolved Solids	360	10	mg/L	"	CN05499	07/14/04	07/14/04	EPA 160.1	

CALIFORNIA LABORATORY SERVICES

07/23/04 16:02

AES
2021 N Street Ste. 200
Sacramento, CA 95814

Project: Ione Water Sampling
Project Number: 203525
Project Manager: Paul Hann

CLS Work Order #: CNG0325
COC #: 58730

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Matulich M3 (CNG0325-01) Water	**Sampled: 07/12/04 11:30**		**Received: 07/12/04 13:15**						
Total Coliforms	Absent		N/A	1	CN05465	07/12/04	07/13/04	SM 9223	
E. Coli	Absent		"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

07/23/04 16:02

AES 2021 N Street Ste. 200 Sacramento, CA 95814	Project: Ione Water Sampling Project Number: 203525 Project Manager: Paul Hann	CLS Work Order #: CNG0325 COC #: 58730

Notes and Definitions

BT-02	Absent
QM-08	The spike recovery was outside acceptance limits for the LCS or LCSD. The batch was accepted based on acceptable MS/MSD recoveries & RPD's.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

November 12, 2003

CLS Work Order #: CMJ1093
COC #: 35548

Joel Kiff
KIFF Analytical
2795 Second St. Suite 300; Suite D
Davis, CA 95616

Project Name: Ione

Enclosed are the results of analyses for samples received by the laboratory on 10/29/03 18:40. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

11/12/03 15:35

KIFF Analytical
2795 Second St. Suite 300; Suite D
Davis, CA 95616

Project: Ione
Project Number: [none]
Project Manager: Joel Kiff

CLS Work Order #: CMJ1093
COC #: 35548

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
Matulich (CMJ1093-01) Water Sampled: 10/29/03 14:05 Received: 10/29/03 18:40									
Arsenic	ND	5.0	µg/L	1	CJ33117	10/31/03	11/10/03	EPA 6020	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	10	"	"	"	"	"	"	
Antimony	ND	50	"	"	CJ33119	10/31/03	11/01/03	EPA 6010B	
Barium	**50**	20	"	"	"	"	"	"	
Beryllium	ND	5.0	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
Cobalt	ND	20	"	"	"	"	"	"	
Chromium	ND	20	"	"	"	"	"	"	
Copper	**440**	20	"	"	"	"	"	"	
Molybdenum	ND	20	"	"	"	"	"	"	
Nickel	ND	20	"	"	"	"	"	"	
Silver	ND	10	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	**60**	20	"	"	"	"	"	"	
Mercury	ND	0.20	"	"	CK30323	11/03/03	11/04/03	EPA 7470	
Cistern (CMJ1093-02) Water Sampled: 10/29/03 15:10 Received: 10/29/03 18:40									
Arsenic	ND	5.0	µg/L	1	CJ33117	10/31/03	11/10/03	EPA 6020	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	10	"	"	"	"	"	"	
Antimony	ND	50	"	"	CJ33119	10/31/03	11/01/03	EPA 6010B	
Barium	ND	20	"	"	"	"	"	"	
Beryllium	ND	5.0	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
Cobalt	ND	20	"	"	"	"	"	"	
Chromium	ND	20	"	"	"	"	"	"	
Copper	ND	20	"	"	"	"	"	"	
Molybdenum	ND	20	"	"	"	"	"	"	
Nickel	ND	20	"	"	"	"	"	"	
Silver	ND	10	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

11/12/03 15:35

KIFF Analytical
2795 Second St. Suite 300; Suite D
Davis, CA 95616

Project: Ione
Project Number: [none]
Project Manager: Joel Kiff

CLS Work Order #: CMJ1093
COC #: 35548

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Cistern (CMJ1093-02) Water Sampled: 10/29/03 15:10 Received: 10/29/03 18:40									
Mercury (H2)	ND	0.20	µg/L	1	CK30323	11/03/03	11/04/03	EPA 7470	
Haueter (Yellow Pump) (CMJ1093-03) Water Sampled: 10/29/03 16:15 Received: 10/29/03 18:40									
Arsenic	ND	5.0	µg/L	1	CJ33117	10/31/03	11/10/03	EPA 6020	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	10	"	"	"	"	"	"	
Antimony	ND	50	"	"	CJ33119	10/31/03	11/01/03	EPA 6010B	
Barium	**120**	20	"	"	"	"	"	"	
Beryllium	ND	5.0	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
Cobalt	ND	20	"	"	"	"	"	"	
Chromium	ND	20	"	"	"	"	"	"	
Copper	**27**	20	"	"	"	"	"	"	
Molybdenum	ND	20	"	"	"	"	"	"	
Nickel	ND	20	"	"	"	"	"	"	
Silver	ND	10	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	
Mercury (H1)	ND	0.20	"	"	CK30323	11/03/03	11/04/03	EPA 7470	
Haueter (Red Pump House) (CMJ1093-04) Water Sampled: 10/29/03 16:35 Received: 10/29/03 18:40									
Arsenic	ND	5.0	µg/L	1	CJ33117	10/31/03	11/10/03	EPA 6020	
Lead	ND	5.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Thallium	ND	10	"	"	"	"	"	"	
Antimony	ND	50	"	"	CJ33119	10/31/03	11/01/03	EPA 6010B	
Barium	**39**	20	"	"	"	"	"	"	
Beryllium	ND	5.0	"	"	"	"	"	"	
Cadmium	ND	10	"	"	"	"	"	"	
Cobalt	ND	20	"	"	"	"	"	"	
Chromium	ND	20	"	"	"	"	"	"	
Copper	ND	20	"	"	"	"	"	"	
Molybdenum	ND	20	"	"	"	"	"	"	
Nickel	ND	20	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

11/12/03 15:35

KIFF Analytical 2795 Second St. Suite 300; Suite D Davis, CA 95616	Project: Ione Project Number: [none] Project Manager: Joel Kiff	CLS Work Order #: CMJ1093 COC #: 35548

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Haueter (Red Pump House) (CMJ1093-04) Water	**Sampled: 10/29/03 16:35**		**Received: 10/29/03 18:40**						
Silver	ND	10	µg/L	1	CJ33119	10/31/03	11/01/03	EPA 6010B	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	
Mercury	ND	0.20	"	"	CK30323	11/03/03	11/04/03	EPA 7470	

CALIFORNIA LABORATORY SERVICES

11/12/03 15:35

KIFF Analytical
2795 Second St. Suite 300; Suite D
Davis, CA 95616

Project: Ione
Project Number: [none]
Project Manager: Joel Kiff

CLS Work Order #: CMJ1093
COC #: 35548

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Matulich (CMJ1093-01) Water Sampled: 10/29/03 14:05 Received: 10/29/03 18:40									
Total Alkalinity	180	5.0	mg/L	1	CJ33040	10/30/03	10/30/03	EPA 310.1	
Bicarbonate as CaCO3	180	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	ND	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
Chloride	7.0	0.50	"	"	CJ33026	10/30/03	10/30/03	EPA 300.0	
Fluoride	0.34	0.10	"	"	"	"	"	"	
Nitrate as NO3	ND	2.0	"	"	"	"	"	"	
Sulfate as SO4	2.2	0.50	"	"	"	"	"	"	
Specific Conductance (EC)	340	1.0	µmhos/cm	"	CJ33038	10/30/03	10/30/03	EPA 120.1	
Methylene Blue Active Substances	ND	0.10	mg/L	"	CJ33020	10/30/03	10/30/03	EPA 425.1	
Calcium	32	1.0	"	"	CK30404	11/04/03	11/04/03	200.7/2340B	
Magnesium	18	1.0	"	"	"	"	"	"	
Potassium	3.4	1.0	"	"	"	"	"	"	
Sodium	23	1.0	"	"	"	"	"	"	
Hardness as CaCO3	160	1.0	"	"	"	"	"	"	
pH	8.00		pH Units	"	CJ33015	10/30/03	10/30/03	EPA 150.1	
Total Dissolved Solids	200	10	mg/L	"	CK30326	11/03/03	11/03/03	EPA 160.1	
Cistern (CMJ1093-02) Water Sampled: 10/29/03 15:10 Received: 10/29/03 18:40									
Total Alkalinity	180	5.0	mg/L	1	CJ33040	10/30/03	10/30/03	EPA 310.1	
Bicarbonate as CaCO3	180	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	ND	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
Chloride	8.9	0.50	"	"	CJ33026	10/30/03	10/30/03	EPA 300.0	
Fluoride	0.36	0.10	"	"	"	"	"	"	
Nitrate as NO3	ND	2.0	"	"	"	"	"	"	
Sulfate as SO4	29	0.50	"	"	"	"	"	"	
Specific Conductance (EC)	390	1.0	µmhos/cm	"	CJ33038	10/30/03	10/30/03	EPA 120.1	
Methylene Blue Active Substances	ND	0.10	mg/L	"	CJ33020	10/30/03	10/30/03	EPA 425.1	
Calcium	44	1.0	"	"	CK30404	11/04/03	11/04/03	200.7/2340B	
Magnesium	23	1.0	"	"	"	"	"	"	
Potassium	ND	1.0	"	"	"	"	"	"	
Sodium	15	1.0	"	"	"	"	"	"	
Hardness as CaCO3	210	1.0	"	"	"	"	"	"	
pH	7.40		pH Units	"	CJ33015	10/30/03	10/30/03	EPA 150.1	

CALIFORNIA LABORATORY SERVICES

11/12/03 15:35

KIFF Analytical
2795 Second St. Suite 300; Suite D
Davis, CA 95616

Project: Ione
Project Number: [none]
Project Manager: Joel Kiff

CLS Work Order #: CMJ1093
COC #: 35548

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Cistern (CMJ1093-02) Water Sampled: 10/29/03 15:10 Received: 10/29/03 18:40									
Total Dissolved Solids	240	10	mg/L	1	CK30326	11/03/03	11/03/03	EPA 160.1	
Haueter (Yellow Pump) (CMJ1093-03) Water Sampled: 10/29/03 16:15 Received: 10/29/03 18:40									
Total Alkalinity	340	5.0	mg/L	1	CJ33040	10/30/03	10/30/03	EPA 310.1	
Bicarbonate as CaCO3	340	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	ND	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
Chloride	25	0.50	"	"	CJ33026	10/30/03	10/30/03	EPA 300.0	
Fluoride	0.17	0.10	"	"	"	"	"	"	
Nitrate as NO3	ND	2.0	"	"	"	"	"	"	
Sulfate as SO4	250	10	"	20	"	"	"	"	
Specific Conductance (EC)	1000	1.0	µmhos/cm	1	CJ33038	10/30/03	10/30/03	EPA 120.1	
Methylene Blue Active Substances	ND	0.10	mg/L	"	CJ33020	10/30/03	10/30/03	EPA 425.1	
Calcium	160	1.0	"	"	CK30404	11/04/03	11/04/03	200.7/2340B	
Magnesium	53	1.0	"	"	"	"	"	"	
Potassium	2.6	1.0	"	"	"	"	"	"	
Sodium	26	1.0	"	"	"	"	"	"	
Hardness as CaCO3	610	1.0	"	"	"	"	"	"	
pH	7.12		pH Units	"	CJ33015	10/30/03	10/30/03	EPA 150.1	
Total Dissolved Solids	760	10	mg/L	"	CK30326	11/03/03	11/03/03	EPA 160.1	
Haueter (Red Pump House) (CMJ1093-04) Water Sampled: 10/29/03 16:35 Received: 10/29/03 18:40									
Total Alkalinity	630	5.0	mg/L	1	CJ33040	10/30/03	10/30/03	EPA 310.1	
Bicarbonate as CaCO3	630	5.0	"	"	"	"	"	"	
Carbonate as CaCO3	ND	5.0	"	"	"	"	"	"	
Hydroxide as CaCO3	ND	5.0	"	"	"	"	"	"	
Chloride	26	0.50	"	"	CJ33026	10/30/03	10/30/03	EPA 300.0	
Fluoride	0.24	0.10	"	"	"	"	"	"	
Nitrate as NO3	ND	2.0	"	"	"	"	"	"	
Sulfate as SO4	230	10	"	20	"	"	"	"	
Specific Conductance (EC)	1400	1.0	µmhos/cm	1	CJ33038	10/30/03	10/30/03	EPA 120.1	
Methylene Blue Active Substances	ND	0.10	mg/L	"	CJ33020	10/30/03	10/30/03	EPA 425.1	
Calcium	170	1.0	"	"	CK30404	11/04/03	11/04/03	200.7/2340B	
Magnesium	110	1.0	"	"	"	"	11/04/03	"	
Potassium	1.5	1.0	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

11/12/03 15:35

KIFF Analytical	Project: Ione	CLS Work Order #: CMJ1093
2795 Second St. Suite 300; Suite D	Project Number: [none]	COC #: 35548
Davis, CA 95616	Project Manager: Joel Kiff	

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Haueter (Red Pump House) (CMJ1093-04) Water	**Sampled: 10/29/03 16:35**		**Received: 10/29/03 18:40**						
Sodium	30	1.0	mg/L	1	CK30404	11/04/03	11/04/03	200.7/2340B	
Hardness as CaCO3	860	1.0	"	"	"	"	"	"	
pH	7.20		pH Units	"	CJ33015	10/30/03	10/30/03	EPA 150.1	
Total Dissolved Solids	910	10	mg/L	"	CK30326	11/03/03	11/03/03	EPA 160.1	

CALIFORNIA LABORATORY SERVICES

11/12/03 15:35

KIFF Analytical
2795 Second St. Suite 300; Suite D
Davis, CA 95616

Project: Ione
Project Number: [none]
Project Manager: Joel Kiff

CLS Work Order #: CMJ1093
COC #: 35548

Microbiological Parameters by APHA Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Matulich (CMJ1093-01) Water Sampled: 10/29/03 14:05 Received: 10/29/03 18:40									
Total Coliforms	Absent		N/A	1	CJ33103	10/30/03	10/31/03	SM 9223	
E. Coli	Absent		"	"	"	"	"	"	
Cistern (CMJ1093-02) Water Sampled: 10/29/03 15:10 Received: 10/29/03 18:40									
Total Coliforms	Present		N/A	1	CJ33103	10/30/03	10/31/03	SM 9223	
E. Coli	Present		"	"	"	"	"	"	
Haueter (Yellow Pump) (CMJ1093-03) Water Sampled: 10/29/03 16:15 Received: 10/29/03 18:40									
Total Coliforms	Present		N/A	1	CJ33103	10/30/03	10/31/03	SM 9223	
E. Coli	Absent		"	"	"	"	"	"	
Haueter (Red Pump House) (CMJ1093-04) Water Sampled: 10/29/03 16:35 Received: 10/29/03 18:40									
Total Coliforms	Absent		N/A	1	CJ33103	10/30/03	10/31/03	SM 9223	
E. Coli	Absent		"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

11/12/03 15:35

KIFF Analytical 2795 Second St. Suite 300; Suite D Davis, CA 95616	Project: Ione Project Number: [none] Project Manager: Joel Kiff	CLS Work Order #: CMJ1093 COC #: 35548

Notes and Definitions

BT-01	Present
BT-02	Absent
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
QM-08	The spike recovery was outside acceptance limits for the LCS or LCSD. The batch was accepted based on acceptable MS/MSD recoveries & RPD's.
QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

KIFF ANALYTICAL LLC

2795 2nd Street, Suite 300
Davis, CA 95616
Lab: 530.297.4800
Fax: 530.297.4808

Lab No. 35548 Page 1 of 1

Chain-of-Custody Record and Analysis Request

Project Contact (Hardcopy or PDF To): EARL STEPHENS
Company/Address: AEG INC BOX 247
Phone No.: (916)645-6014 FAX No.: (916)645-6058
Project Number: P.O. No:
Project Name: IONE
Project Address:

California EDF Report? ☐ Yes ☐ No
Recommended but not mandatory to complete this section:
Sampling Company Log Code: - - -
Global ID: - - - - - - - - - - -
EDF Deliverable To (Email Address):
Sampler Signature: James Blume

Sample Designation	Sampling Date	Sampling Time	Container: 40 ml VOA	Container: SLEEVE	Container: 1 Liter Amber	Container: 500 mL	Preservative: HCl	Preservative: HNO_3	Preservative: ICE	Preservative: NONE	Matrix: WATER	Matrix: SOIL	BTEX (8021B)	BTEX/TPH Gas/MTBE (8021B/M8015)	TPH as Diesel (M8015)	TPH as Motor Oil (M8015)	TPH Gas/BTEX/MTBE (8260B)	5 Oxygenates/TPH Gas/BTEX (8260B)	7 Oxygenates/TPH Gas/BTEX (8260B)	5 Oxygenates (8260B)	7 Oxygenates (8260B)	Lead Scav. (1,2 DCA & 1,2 EDB - 8260B)	EPA 8260B (Full List)	Volatile Halocarbons (EPA 8260B)	Lead (7421/239.2)	TOTAL (X) W.E.T. (X)	Analysis Request: NITRATE	Analysis Request: GEN MIN (FULL)	Analysis Request: CAM 17	Analysis Request: ECOLI (SM 9223)	TAT: 12 hr / 24 hr / 48 hr / 72 hr / 1 wk - STAT / 2 wks	For Lab Use Only
MATULICH	10/29/13	1405			4	1			X		X																X	X	X	X		-01
CISTERN		1510			4	1			X		X																X	X	X	X		-02
HAUETER (YELLOW PUMP)		1615			4	1			X		X																X	X	X	X		-03
HAUETER (RED PUMPHOUSE)		1635			4	1			X		X																X	X	X	X		-04

Relinquished by:	Date	Time	Received by:	Remarks:
James Blume	10/29/13	1744		
Relinquished by:	Date	Time	Received by:	
Relinquished by:	Date	Time	Received by Laboratory:	Bill to:
	102903	1746	Osama Abdelhamid / Kiff Analytical	AEG

Forms/coc 121001.8s9

Calscience
Environmental
Laboratories, Inc.

December 24, 2003

Joel Kiff
Kiff Analytical
2795 2nd Street, Suite 300
Davis, CA 95616-6593

Subject: **Calscience Work Order No.:** **03-12-1153**
Client Reference: **Ione**

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 12/18/03 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Assurance Program Manual, applicable standard operating procedures, and other related documentation. The original report of any subcontracted analysis is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Calscience Environmental
Laboratories, Inc.
Stephen Nowak
Project Manager

Michael J. Crisostomo
Quality Assurance Manager

Calscience Environmental Laboratories, Inc.

Analytical Report

Kiff Analytical
2795 2nd Street, Suite 300
Davis, CA 95616-6593

Date Received: 12/18/03
Work Order No: 03-12-1153
Preparation: N/A
Method: EPA 376.2

Project: Ione

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Matulich end	03-12-1153-1	12/18/03	Aqueous	N/A	12/22/03	31222SB2

Parameter	Result	RL	DF	Qual	Units
Sulfide, Total	ND	0.050	1		mg/L

Method Blank	099-05-089-1,505	N/A	Aqueous	N/A	12/22/03	31222SB2

Parameter	Result	RL	DF	Qual	Units
Sulfide, Total	ND	0.050	1		mg/L

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Quality Control - Duplicate

Kiff Analytical
2795 2nd Street, Suite 300
Davis, CA 95616-6593

Project: Ione

Date Received: 12/18/03
Work Order No: 03-12-1153
Preparation: N/A
Method: EPA 376.2

Quality Control Sample ID	Matrix	Instrument	Date Prepared:	Date Analyzed:	Duplicate Batch Number
Matulich end	Aqueous	N/A	N/A	12/22/03	31222SD2

Parameter	Sample Conc	DUP Conc	RPD	RPD CL	Qualifiers
Sulfide, Total	ND	ND	NA	0-25	

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 03-12-1153

Qualifier	Definition
ND	Not detected at indicated reporting limit.

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 03 - 12 - 1153

Cooler 1 of 1

SAMPLE RECEIPT FORM

CLIENT: KIF DATE: 12-18-03

TEMPERATURE – SAMPLES RECEIVED BY:

CALSCIENCE COURIER:

_____ Chilled, cooler with temperature blank provided.
_____ Chilled, cooler without temperature blank.
_____ Chilled and placed in cooler with wet ice.
_____ Ambient and placed in cooler with wet ice.
_____ Ambient temperature.
_____ °C Temperature blank.

LABORATORY (Other than Calscience Courier):

4 °C Temperature blank.
_____ °C IR thermometer.
_____ Ambient temperature.

Initial: WB

CUSTODY SEAL INTACT:

Sample(s): _____ Cooler: ✓ No (Not Intact) : _____ Not Applicable (N/A): _____

Initial: WB

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody document(s) received with samples	✓		
Sample container label(s) consistent with custody papers	✓		
Sample container(s) intact and good condition	✓		
Correct containers for analyses requested	✓		
Proper preservation noted on sample label(s)	✓		
VOA vial(s) free of headspace.			✓
Tedlar bag(s) free of condensation			✓

Initial: WB

COMMENTS:

KIFF ANALYTICAL LLC

2795 Second Street, Suite 300
Davis, CA 95616
Lab: 530.297.4800
Fax: 530.297.4808

Cal Science Environmental
7440 Lincoln Way
Garden Grove, CA 92841
714-895-5494

12-1153

Lab No. _____ Page 1 of 1

Chain-of-Custody Record and Analysis Request

Project Contact (Hardcopy or PDF to): Joel Kiff	Geotracker COELT EDD REPORT? ___ YES _X_ NO
Company/Address: Kiff Analytical, LLC	Sampling Company Log Code:
Phone No.:	FAX No.:	Global ID:
Project Number:	P.O. No.: 36313	EDF Deliverable to (Email Address):
Project Name: Ione	E-mail address: inbox@kiffanalytical.com
Project Address:	

Sample Designation	Sampling Date	Sampling Time	Container: Glass Jar	Container: Poly	Container: Amber	Container: Sleeve	Preservative: HCl	Preservative: HNO3	Preservative: ICE	Preservative: NONE	Preservative: NaOH + Zn	Matrix: WATER	Matrix: SOIL	Analysis Request: SULFIDE	December 24, 2003	For Lab Use Only
Matulich end	12/16/03	08:25		X					X		X			X	X	

	Date	Time		
Relinquished by: DW TG - Kiff Analytical	12/17/03	1900	Received by:	Remarks:
Relinquished by:	Date	Time	Received by:	
Relinquished by: CAL OVERNIGHT	12/18-03	8:45	Received by Laboratory: UC	Bill to:

Calscience
Environmental
Laboratories, Inc.

December 16, 2003

Joel Kiff
Kiff Analytical
2795 2nd Street, Suite 300
Davis, CA 95616-6593

Subject: **Calscience Work Order No.:** **03-12-0596**
Client Reference: **Ione**

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 12/10/2003 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Assurance Program Manual, applicable standard operating procedures, and other related documentation. The original report of any subcontracted analysis is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Calscience Environmental
Laboratories, Inc.
Stephen Nowak
Project Manager

Michael J. Crisostomo
Quality Assurance Manager

Calscience Environmental Laboratories, Inc.

Analytical Report

Kiff Analytical
2795 2nd Street, Suite 300
Davis, CA 95616-6593

Date Received: 12/10/03
Work Order No: 03-12-0596
Preparation: N/A
Method: EPA 376.2

Project: Ione

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Haueter Red 2	03-12-0596-1	12/08/03	Aqueous	N/A	12/12/03	31212SB1

Parameter	Result	RL	DF	Qual	Units
Sulfide, Total	33	0.50	10	D	mg/L

Method Blank	099-05-089-1,498	N/A	Aqueous	N/A	12/12/03	31212SB1

Parameter	Result	RL	DF	Qual	Units
Sulfide, Total	ND	0.050	1		mg/L

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Quality Control - Duplicate

Kiff Analytical
2795 2nd Street, Suite 300
Davis, CA 95616-6593

Project: Ione

Date Received: 12/10/03
Work Order No: 03-12-0596
Preparation: N/A
Method: EPA 376.2

Quality Control Sample ID	Matrix	Instrument	Date Prepared:	Date Analyzed:	Duplicate Batch Number
03-12-0758-1	Aqueous	N/A	N/A	12/12/03	31212SD1

Parameter	Sample Conc	DUP Conc	RPD	RPD CL	Qualifiers
Sulfide, Total	ND	ND	NA	0-25	

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 03-12-0596

Qualifier	Definition
D	The sample data was reported from a diluted analysis.
ND	Not detected at indicated reporting limit.

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 03-12-0596

Cooler 1 of 1

SAMPLE RECEIPT FORM

CLIENT: Kiff Analytical DATE: 12-10-03

TEMPERATURE – SAMPLES RECEIVED BY:

CALSCIENCE COURIER:

_____ Chilled, cooler with temperature blank provided.
_____ Chilled, cooler without temperature blank.
_____ Chilled and placed in cooler with wet ice.
_____ Ambient and placed in cooler with wet ice.
_____ Ambient temperature.
_____ °C Temperature blank.

LABORATORY (Other than Calscience Courier):

4 °C Temperature blank.
4 °C IR thermometer.
_____ Ambient temperature.

Initial: MS

CUSTODY SEAL INTACT:

Sample(s): _____ Cooler: ✓ No (Not Intact) : _____ Not Applicable (N/A): _____

Initial: MS

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody document(s) received with samples	✓		
Sample container label(s) consistent with custody papers	✓		
Sample container(s) intact and good condition	✓		
Correct containers for analyses requested	✓		
Proper preservation noted on sample label(s)	✓		
VOA vial(s) free of headspace.			✓
Tedlar bag(s) free of condensation			✓

Initial: MS

COMMENTS:

0596

KIFF ANALYTICAL LLC

2795 Second Street, Suite 300
Davis, CA 95616
Lab: 530.297.4800
Fax: 530.297.4808

Cal Science Environmental
7440 Lincoln Way
Garden Grove, CA 92841
714-895-5494

Lab No. _____ Page 1 of 1

Chain-of-Custody Record and Analysis Request

Project Contact (Hardcopy or PDF to): Joel Kiff	Geotracker COELT EDD REPORT? ___ YES X NO
Company/Address: Kiff Analytical, LLC	Sampling Company Log Code:
Phone No.: / FAX No.:	Global ID:
Project Number: / P.O. No.: 36170	EDF Deliverable to (Email Address):
Project Name: Ione	E-mail address: inbox@kiffanalytical.com
Project Address:	

Sample Designation	Sampling Date	Sampling Time	Container: Glass Jar	Container: Poly	Container: Amber	Container: Sleeve	Container:	Preservative: ZnAC2	Preservative: NaOH	Preservative: ICE	Preservative: NONE	Preservative: H2SO4	Matrix: WATER	Matrix: SOIL	Matrix:	Analysis Request: SULFIDE							December 16, 2003	For Lab Use Only
Haueter Red 2	12/8/03	1115		1				1	1	x			X			X							X	

Relinquished by: Osama Abdalsamie / Kiff Analytical	Date 120903	Time 1630	Received by:	Remarks:
Relinquished by:	Date	Time	Received by:	
Relinquished by:	Date 12/4/03	Time 9:40	Received by Laboratory:	Bill to:

KIFF ANALYTICAL LLC

2795 2nd Street, Suite 300
Davis, CA 95616
Lab: 530.297.4800
Fax: 530.297.4808

Lab No. 36170 Page ____ of ____

Chain-of-Custody Record and Analysis Request

Project Contact (Hardcopy or PDF To): Elgar Stephens
Company/Address: AEG/PO Box 747, Lincoln
Phone No.: 916-645-6014 FAX No.: 916-645-6098
Project Number: P.O. No:
Project Name: Lone
Project Address: Plymouth

California EDF Report? ☐ Yes ☒ No

Recommended but not mandatory to complete this section:
Sampling Company Log Code: - - -
Global ID: - - - - - - - - - - -
EDF Deliverable To (Email Address): aeg@psybar.com
Sampler Signature: Elg- Stephens

Sample Designation	Sampling Date	Sampling Time	Container: 40 ml VOA	Container: SLEEVE	Container: 1 Liter	Container:	Container:	Preservative: HCl	Preservative: HNO_3	Preservative: ICE	Preservative: NONE	Preservative:	Matrix: WATER	Matrix: SOIL	Matrix:
Hester Rod 2	12/8/13	1115			✓					✓		✓			

Analysis Request

BTEX (8021B)	BTEX/TPH Gas/MTBE (8021B/M8015)	TPH as Diesel (M8015)	TPH as Motor Oil (M8015)	TPH Gas/BTEX/MTBE (8260B)	5 Oxygenates/TPH Gas/BTEX (8260B)	7 Oxygenates/TPH Gas/BTEX (8260B)	5 Oxygenates (8250B)	7 Oxygenates (8260B)	Lead Scav. (1,2 DCA & 1,2 EDB - 8260B)	EPA 8260B (Full List)	Volatile Halocarbons (EPA 8260B)	Lead (7421/239.2) TOTAL (X) W.E.T. (X)	Sulfide					
													✓					

TAT: 12 hr/24 hr/48 hr/72 hr/1 wk

For Lab Use Only: 1

Relinquished by:	Date	Time	Received by:
Elgar Stephens			
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:
	12/9/13	1151	Kiff Analytical

Remarks: QA/QC

Bill to: AEG

Distribution: White - Lab, Yellow - File, Pink - Originator

Forms/coc 121001.fh9