

**Longley Lane  
Production Well Number 1  
Construction and Test Pumping  
Summary Report**

**Washoe County  
Department of Water Resources  
January 2006**



**WASHOE COUNTY  
DEPARTMENT OF WATER RESOURCES**

4930 ENERGY WAY RENO, NEVADA 89502

Department of



Water Resources

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## **Summary**

Washoe County has owned and operated the Hidden Valley water system since 1991. Growth in the area supplied by the system required Washoe County to negotiate wholesale water delivery from another water purveyor, Truckee Meadows Water Authority (formerly Sierra Pacific Resources). Continued growth and increasing costs of wholesale water prompted Washoe County to hire a consultant to investigate alternatives for increasing capacity into the Hidden Valley system. The result of the investigation was the recommendation that the County construct a water treatment plant on County property at 3031 Longley Lane (See Location Map, Figure 1). As a component of the treatment plant project, the County investigated the potential of drilling a municipal production well adjacent to the treatment plant to use as a source of additional supply for the treatment plant.

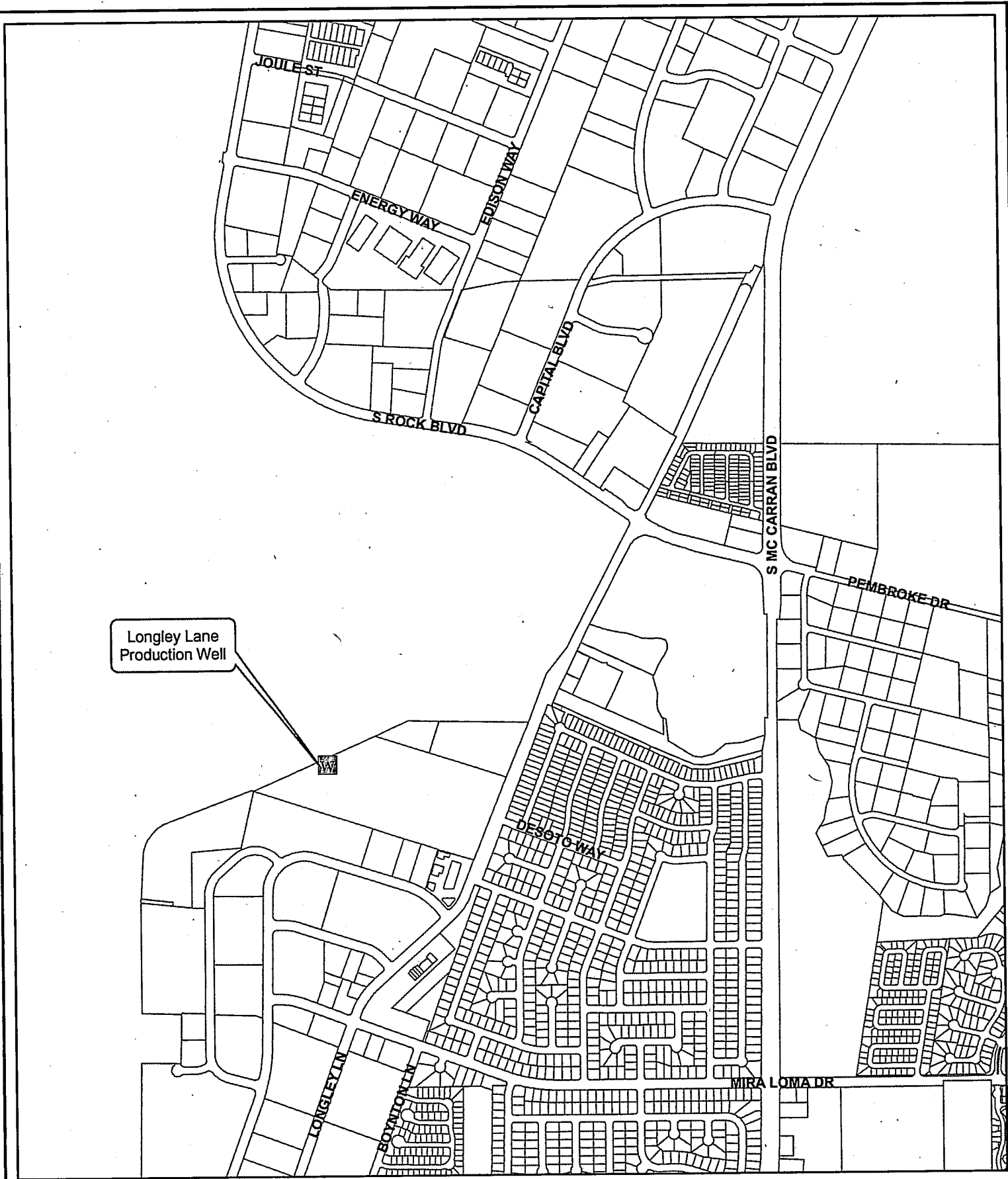
Washoe County hired Eco:Logic Engineering in July 2004 to conduct an investigation of the potential to develop a municipal production water well at the Longley Lane site. Eco:Logic completed the work in August 2005 and provided a Memorandum Report (attached as Appendix 1) detailing the potential for the construction and installation of a municipal production well. The Memorandum Report suggested that a well capable of providing 1,500 to 1,800 gallons per minute could be completed at the Longley Lane site.

Based on the recommendations of Eco:Logic, Washoe County prepared specifications and contract Documents for the construction of an 18-inch diameter production well at the Longley Lane site (Specifications attached as Appendix 2). Construction of the municipal supply well was awarded to Hydro Resources Nevada, Inc: dba Humboldt Drilling and Pump Company. Construction and testing began July 22, 2005 and was completed August 30, 2005 (See as-constructed diagram, Figure 2.)

## **Recommendations**

Based on the test pumping, the production well can be equipped to pump up to 2500 gallons per minute. Data shows the well can pump at this rate for up to 3 months continuous before pumping levels approach the top of the screened interval. Pumping levels at 2500 gallons per minute would be between 120 and 130 feet below ground surface after 3 months of continuous pumping. Simulated drawdowns at 1500 gpm, 2000 gpm and 2500 gpm are shown in Figure 3. The pump intake should be set opposite a blank section of well casing at a depth of 270 feet below ground surface (See as-constructed diagram, Figure 2).

Based on water demand projections, a second well may be drilled on the property in the near future. Based on an anticipated yield of 1500 gpm from each well, collective impacts between the two wells if placed 400 feet apart will not be significant. Maximum pumping levels in each well after 3 months of continuous pumping at 1500 gpm each will be between 100 and 110 feet below ground surface. However, pump intakes should still be set in the blank casing section at 270 feet below ground surface (may be different in future second well).




**Figure 1:  
Longley Lane Production Well  
Location Map**

**Legend**

 **Production Well**


0 0.05 0.1 0.2 0.3 0.4  
Miles




**Department of Water Resources**  
**Utility Service Division**  
Washoe County  
Nevada

Notes: The Scale and configuration of all information shown herein are approximate only and are not intended as a guide for design or survey work. Reproduction is not permitted without prior written permission from the Washoe County Department of Water Resources.

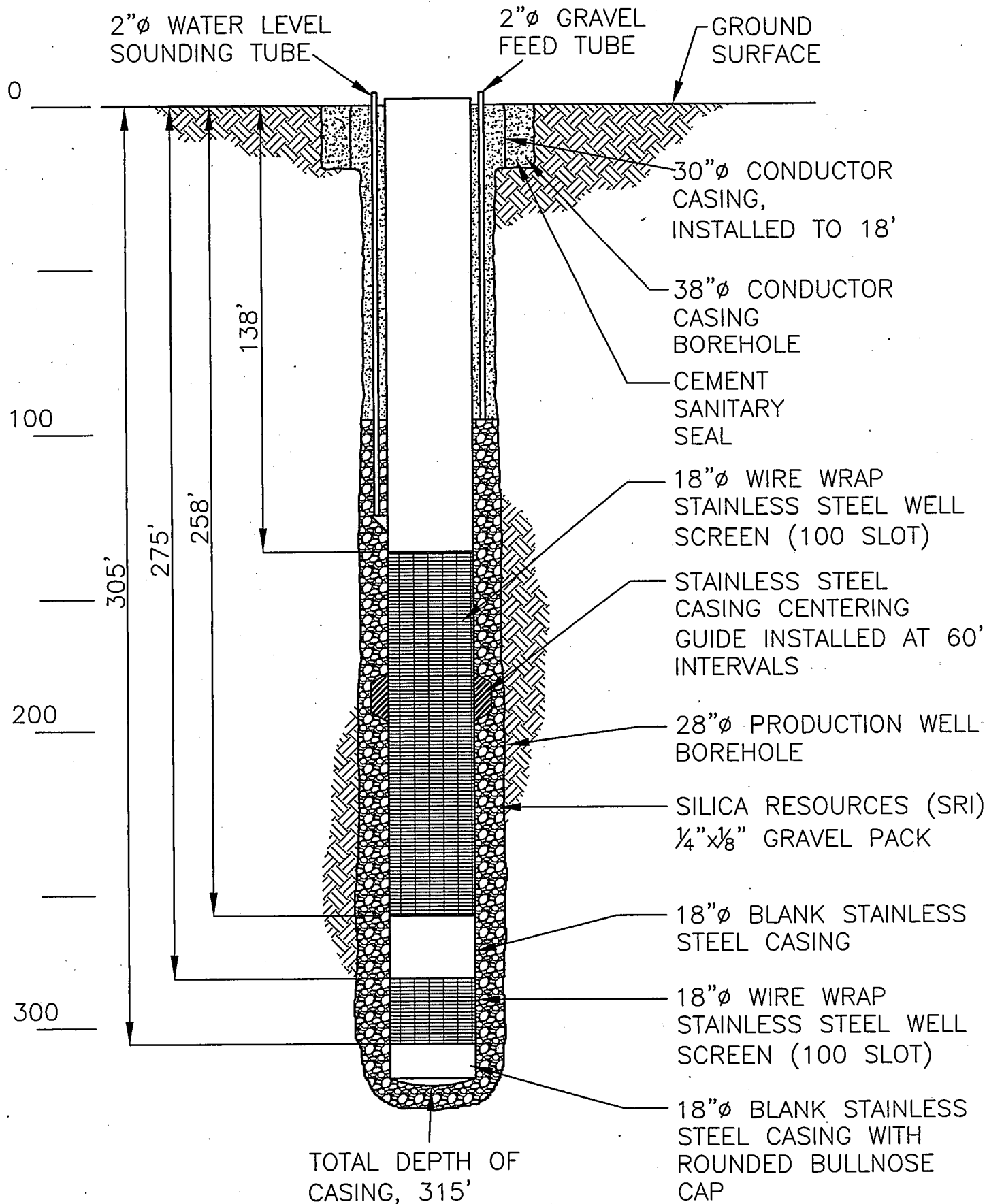
January 2006



#30 Energy Way  
Reno, Nevada 89502  
(775) 954-4600



c:\work\dan\l prodwell\1 locationmap.mxd



Longley Lane Production Well No. 1  
 Simulated Drawdown  
 August 2005

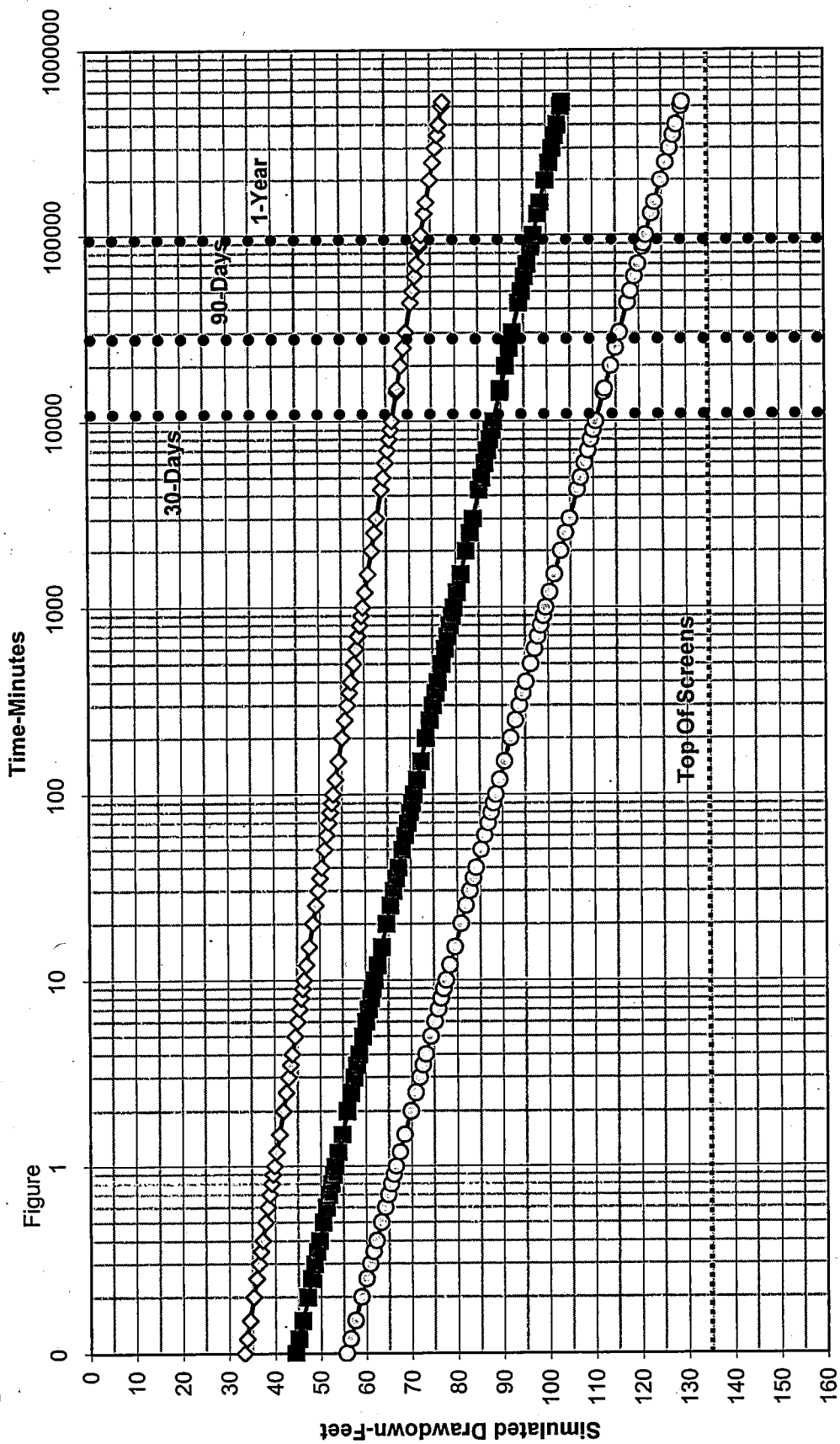


Figure 3

## **Drilling and Construction**

Humboldt Drilling and Pump Company from Winnemucca, Nevada began drilling on July 20, 2005. Washoe County specifications for this project are included as Appendix 2.

The drilling utilized the dual-tube flooded reverse method. Installation began by installing a 30-inch diameter conductor casing to a depth of 17 feet. Drilling of the 28-inch diameter production well borehole began July 23, 2005 and reached total depth of 333 feet on the 26<sup>th</sup> of July 2005. Geologist logs and drillers logs showed a strong correlation to the test hole drilled by Eco-Logic. Drilling encountered alternating layers of sediments ranging from clay to large cobbles and boulders. The Drillers log submitted to the Nevada State Engineer and Washoe County personnel field notes are included in Appendix 3.

Casing installation began at Midnight, July 27<sup>th</sup>, 2005. The well screen and casing are type 304 stainless steel. Screen slot openings were 0.10-inch (100 slot). The well took 21 cubic yards of 1/4x1/8 gravel from SRI Rock and Gravel. Gravel installation continued until gravel reached to about 100 feet from ground surface. The annular space between depths of 50 feet and ground surface was then sealed using cement grout.

## **Development**

Development began July 29<sup>th</sup>, 2005. Rig used a dual packer, air-lift swab for development and continued until August 12, 2005. Nu-Well 220 (trademark) was utilized to enhance development and cleaning of the well. Gravel settled continuously during development and the well produced sand, extending development time. Total air-lift development time was 132.5 hours.

Drillers installed pump for development pumping and testing August 14, 2005. Development pumping continued until August 25, 2005. Pump development continued for a total of 40 hours.

## **Pumping Tests**

### **Step-Drawdown**

Washoe County personnel conducted a 4-step, step-drawdown test at 1500, 2000, 2500, and 2650 gpm on August 26, 2005 (See Figure 4 for well efficiency results from step-drawdown test). Based on the results, well efficiency exceeds 90% at 2000 gpm.

### **Constant Discharge**

A constant discharge test at 2000 gpm began at 8:30 am on August 28, 2005 and ended on August 30, 2005 at 10:30 am (50 hours, 3000 minutes). Aquifer parameters from the pumping test were:

1. Transmissivity = Approximately 60,000 gpd/ft
2. Coefficient of Storage approximately 0.0004

Longley Lane Production Well No. 1  
 Step Drawdown Test, Total Drawdown Graph  
 August 2005

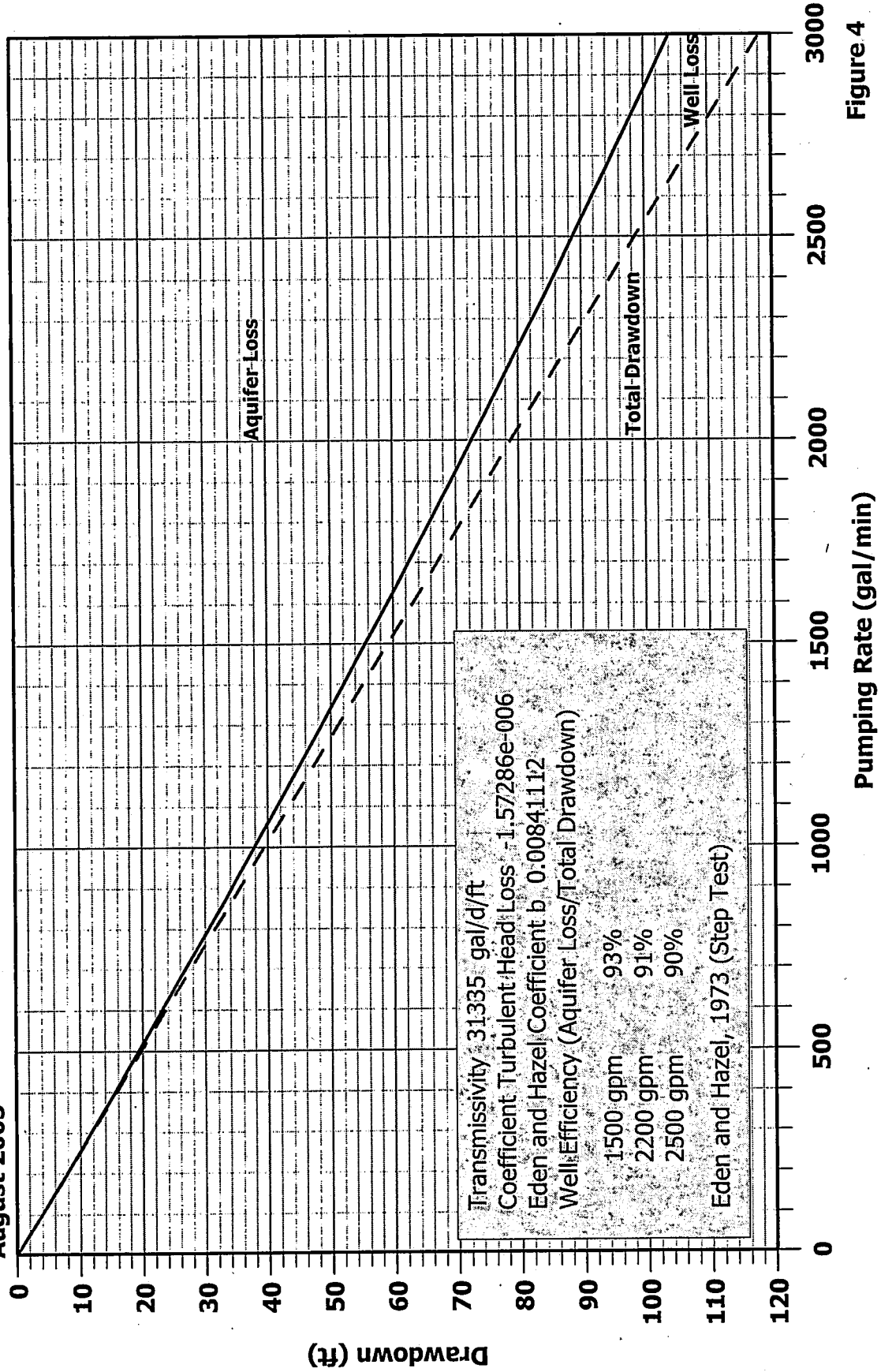


Figure 4

These values indicate a highly transmissive confined aquifer. Field data sheets, summarized hard copies of Electronic data as appendix 4. Electronic files are available at the Washoe County Department of Water Resources (P:ddragan/longley). Drawdown and recovery plots are included as Figure 5 and 6.

### **Plumbness and Alignment**

Welenco completed a wellbore drift and casing alignment survey in the completed well on September 1, 2005. The results of the survey indicated the well met plumbness and alignment specifications. Copies of the surveys are included in appendix 5.

### **Water Quality**

Water quality samples were collected during the constant discharge test and were analyzed by a State of Nevada certified laboratory. Laboratory results indicate the sample had a manganese concentration of 0.12 mg/l, which exceeds the current EPA secondary drinking water standard of 0.05 mg/L for manganese in drinking water. The samples collected met all other applicable drinking water standards. Although the arsenic level of 0.026 mg/L meets the current drinking water standard of 0.05 mg/L it will not meet the 0.01 mg/L standard that becomes effective January 23, 2006. Complete analyses results are included in Appendix 6.

### **Costs**

Contractor costs for the project were \$235,639.24, including development and testing. These costs convert to about \$748.00 per foot for the 315 foot deep well. Invoices for the project are included in Appendix 6.

Longley Lane Production Well No.1  
Constant Discharge Test  
August 2005

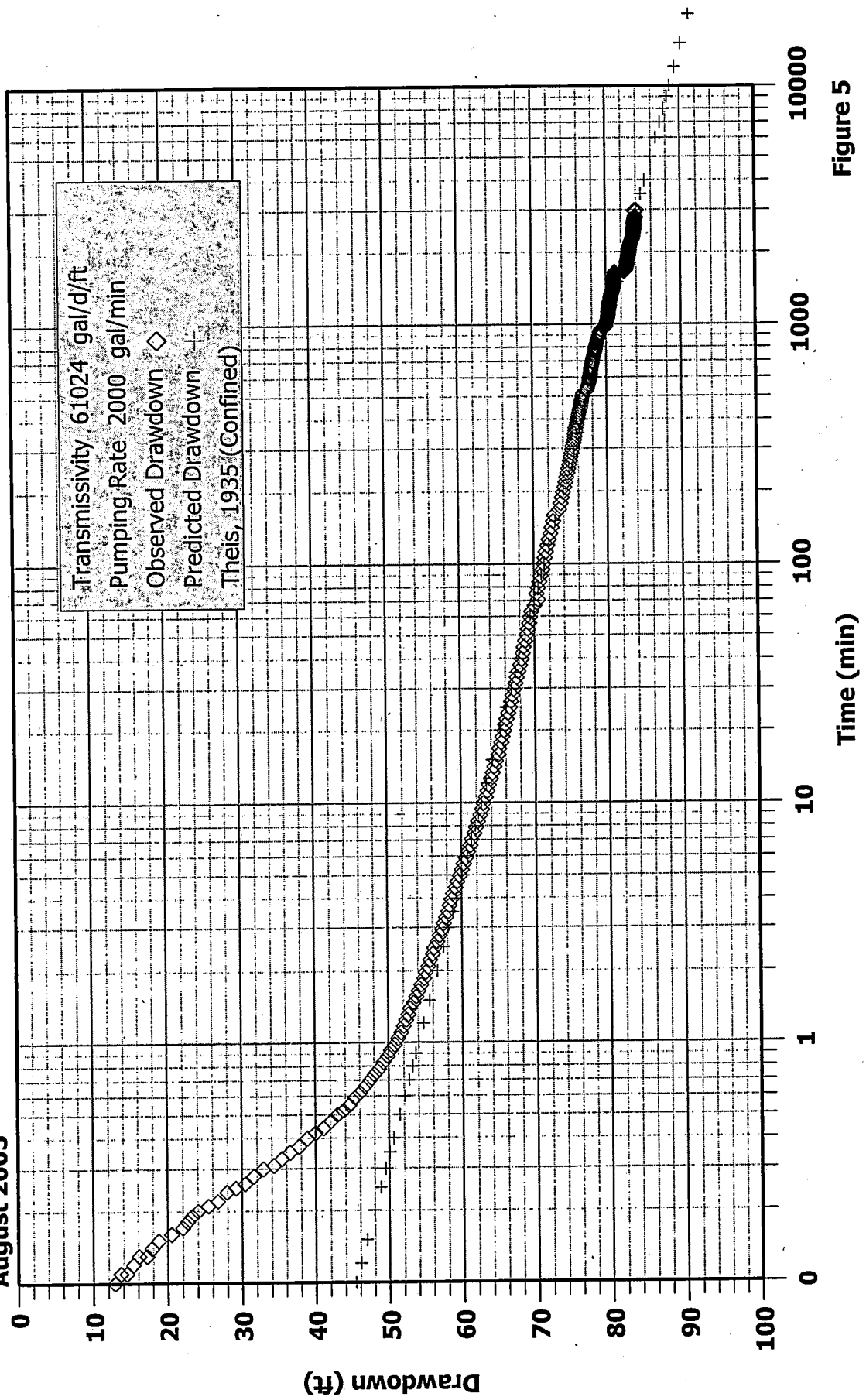


Figure 5

Longley Lane Production Well No.1  
Recovery Test  
August 2005

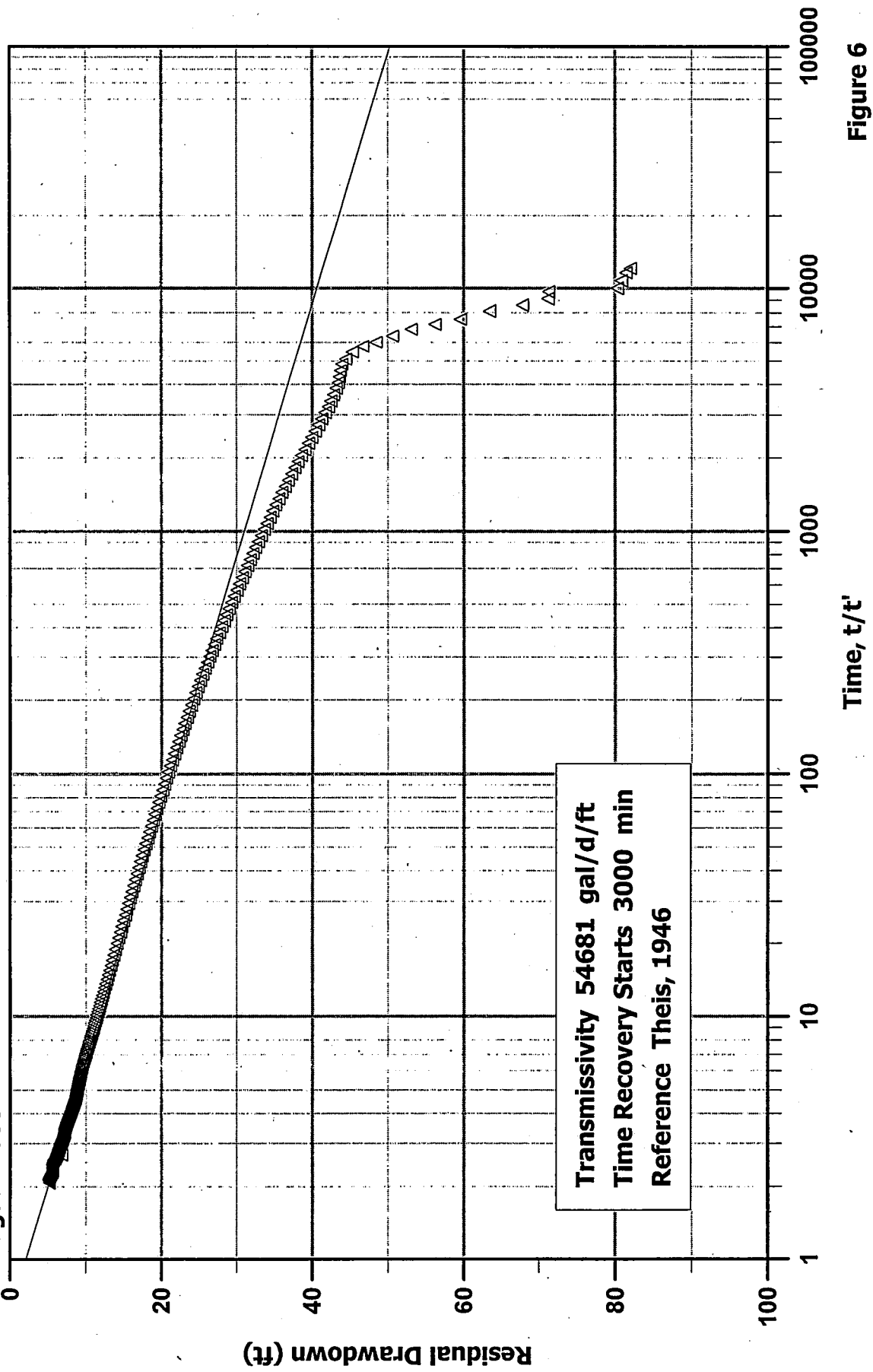


Figure 6

# **APPENDIX 1**

Eco:logic Engineering

Longley Lane Water Treatment Plant  
Monitoring Well  
Construction and Testing

MEMORANDUM REPORT

August 25, 2004

Project Number: WCUD03-003-3.2.1

**Memorandum Report**  
**LONGLEY LANE WATER TREATMENT PLANT**  
**MONITORING WELL**  
**CONSTRUCTION AND TESTING**

Prepared for:

Washoe County Utility Division  
4930 Energy Way  
Reno, Nevada 89520-0027

**August 25, 2004**

Prepared by:

ECO:LOGIC Engineering, LLC  
10381 Double R Boulevard  
Reno, Nevada 89521  
Telephone: 775-827-2311  
Fax: 775-827-2316

**Memorandum Report**

**LONGLEY LANE WATER TREATMENT PLANT  
MONITORING WELL**

**CONSTRUCTION AND TESTING**

Prepared for:

Washoe County Utility Division  
4930 Energy Way  
Reno, Nevada 89520-0027

**August 25, 2004**

Prepared by:

Dale C. Bugenig  
Senior Hydrogeologist  
bugenig@ecologic-eng.com

Reviewed by:

John P. Enloe, P.E.  
Principal

ECO:LOGIC Engineering, LLC  
10381 Double R Boulevard  
Reno, Nevada 89521

Telephone: 775-827-2311  
Fax: 775-827-2316

## INTRODUCTION

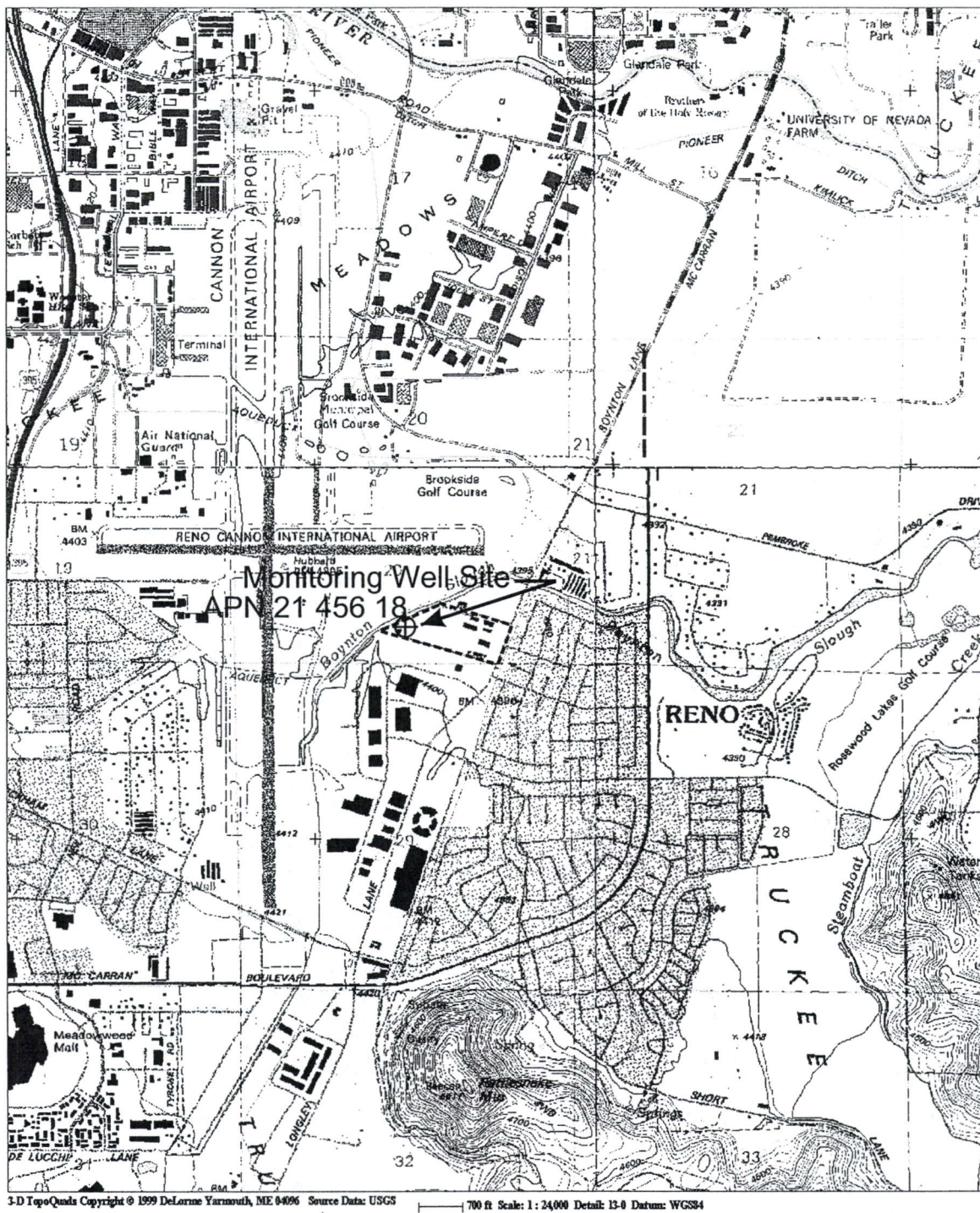
The Longley Lane Water Treatment Plant Monitoring Well is located in Washoe County southeast of the Reno Tahoe International Airport (Figure 1). The well site is within the SE ¼ of Section 20, Township 19 North, Range 20 East, M.D.B.&M. at a location that is within the Washoe County Utility Division corporation yard at 3031 Longley Lane, Reno, Nevada. (Figure 2). The corporation yard is under consideration as a potential site for a regional water treatment plant which will remove iron, manganese, and arsenic from wells operated by the Washoe County Utility Division.

The Longley Lane Water Treatment Plant Monitoring Well was drilled and tested specifically to:

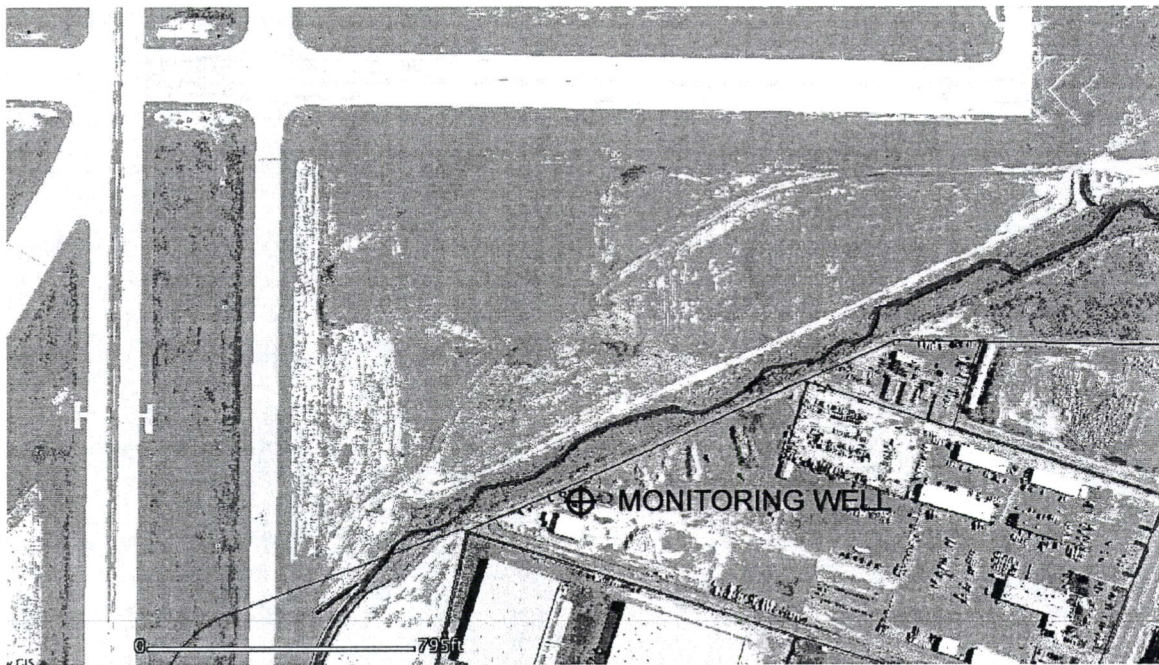
- Assess the chemical quality of the groundwater in the aquifer in the southeast Truckee Meadows. Of particular interest are iron, manganese, and arsenic, the concentrations of which are known to be above the Drinking Water Standards in this area of the Truckee Meadows.
- Evaluate the hydraulic properties of the aquifer materials.
- Assess the potential yield of a production well at this site.
- Provide the design criteria for a subsequent production well, if such a well is warranted.

ECO:LOGIC Consulting Engineers was retained by the Washoe County Utility Division to provide hydrogeologic consulting services relevant to the design of the drilling and sampling program, provide well-site hydrogeologic and quality-assurance services during the drilling program, identify zones in the aquifer to be investigated for groundwater quality and aquifer properties, obtain samples of the groundwater for chemical analysis, and to assess the results of the drilling and testing program. ECO:LOGIC also obtained the monitoring well waiver (M/O-1331) from the Nevada Division of Water Resources needed to construct the well and a temporary NPDES permit (TNEV2004375) from the Nevada Division of Environmental Protection needed to discharge water during test pumping. ECO:LOGIC also coordinated the drilling program with the Washoe County Airport Authority so that air traffic was made aware of the presence of the drill rig.

The monitoring well was drilled and constructed by WDC Exploration of Zamora, California under subcontract to ECO:LOGIC. WDC also provided the test pumping equipment. ECO:LOGIC orchestrated the pumping tests and analyzed the test data to evaluate the hydraulic properties of the aquifer materials. A water sample was collected from the monitoring well near the end of the pumping test and submitted to a State of Nevada certified laboratory for analysis.



**FIGURE 1. WCUD LONGLEY LANE WATER TREATMENT PLANT PROJECT LOCATION MAP.**



**FIGURE 2.**  
**WCUD LONGLEY LANE WATER TREATMENT PLANT MONITORING WELL**  
**LOCATION.**

This report:

- Summarizes the drilling and testing program.
- Presents an evaluation of the hydraulic properties of the aquifer at this locale.
- Discusses the probable yield of a production well at this site.
- Provides the results of chemical analyses of groundwater sampled from the well.
- Presents design recommendations for a production well, should the County elect to complete a production well at this site.
- Assesses the likely interference on other wells in the vicinity that might arise from pumping a production well at this site.

## WELL CONSTRUCTION SUMMARY

The Longley Lane Water Treatment Plant Monitoring Well was drilled by the mud-rotary method. The drilling equipment included a portable drilling mud system consisting of fluid tanks equipped with de-sanders and shaker screens which remove the drill cuttings and suspended solids from the drilling fluid. The mud system helps maintain properties of the drilling fluid which facilitate collection of representative samples of the formation material. These formation samples, or drill cuttings, were obtained from the drilling-fluid returns for each five-foot interval penetrated by the borehole. Select samples of the drill cuttings were analyzed for size and gradation. Drill cuttings were dispersed at the site upon completion of the project. Drilling fluids and turbid water resulting from well development were disposed of at the drying beds at the Truckee Meadows Water Authority's Glendale Water Treatment Plant.

The target depth for the monitoring well was 500 feet. It was drilled in two phases. The first phase entailed drilling a nominal 8-inch diameter pilot hole to the target depth of 500 feet. Upon completion of drilling to the target depth, a suite of borehole geophysical logs was completed. The logging suite included spontaneous potential, point resistance, short- and long-normal resistivity, lateral resistivity, natural gamma radiation, and caliper logs. Copies of the geophysical log printouts are provided in the Appendix. Select geophysical logs are provided for comparison with the lithology and well construction details in Figure 3. The lithologic and borehole geophysical log data were used to design the completed well. The second phase of well construction entailed back-grouting the pilot hole to a depth of 320 feet and reaming the pilot hole to a diameter of 10 5/8 inches to a depth of 320 feet.

### Chronology

- July 14, 2004 – WDC Exploration mobilized drilling equipment to the site.
- July 15 – Ten feet of 12-inch diameter conductor casing were installed and the pilot hole was drilled to a depth of 140 feet.
- July 16 – The 8 1/2-inch diameter pilot hole was advanced to a depth of 440 feet.
- July 17 – The borehole was advanced to the target depth of 500 feet and borehole geophysical logs were acquired.
- July 19 – The borehole was cleaned to the bottom and plugged with neat-cement grout from 320 to 500 feet below the land surface.
- July 20 – The borehole was reamed to a diameter of 10 5/8 inches from the land surface to a depth 320 feet.
- July 21 – The tremie pipe was installed, followed by the 6 5/8-inch diameter well casing. The filter pack was installed to a depth of 135 feet.
- July 22 – The filter pack was placed to a depth of 120 feet, a bentonite/sand grout cutoff was placed from above the filter pack, the sanitary seal was installed, and the temporary conductor casing was removed.
- July 29 – Well development using the drill rig was initiated.
- July 30 – The drilling equipment was demobilized from the project and the development rig was mobilized to the site. The test pump was installed and well development using the test pump was initiated.
- August 2 – Well development using the test pump was completed.
- August 3 – The 4-hour duration step-drawdown test was performed.
- August 4 – The 24-hour duration constant-discharge test started.

ECO:LOGIC Engineering

10381 Double R Boulevard  
Reno, Nevada 89521  
775-827-2311  
775-827-2316 Fax

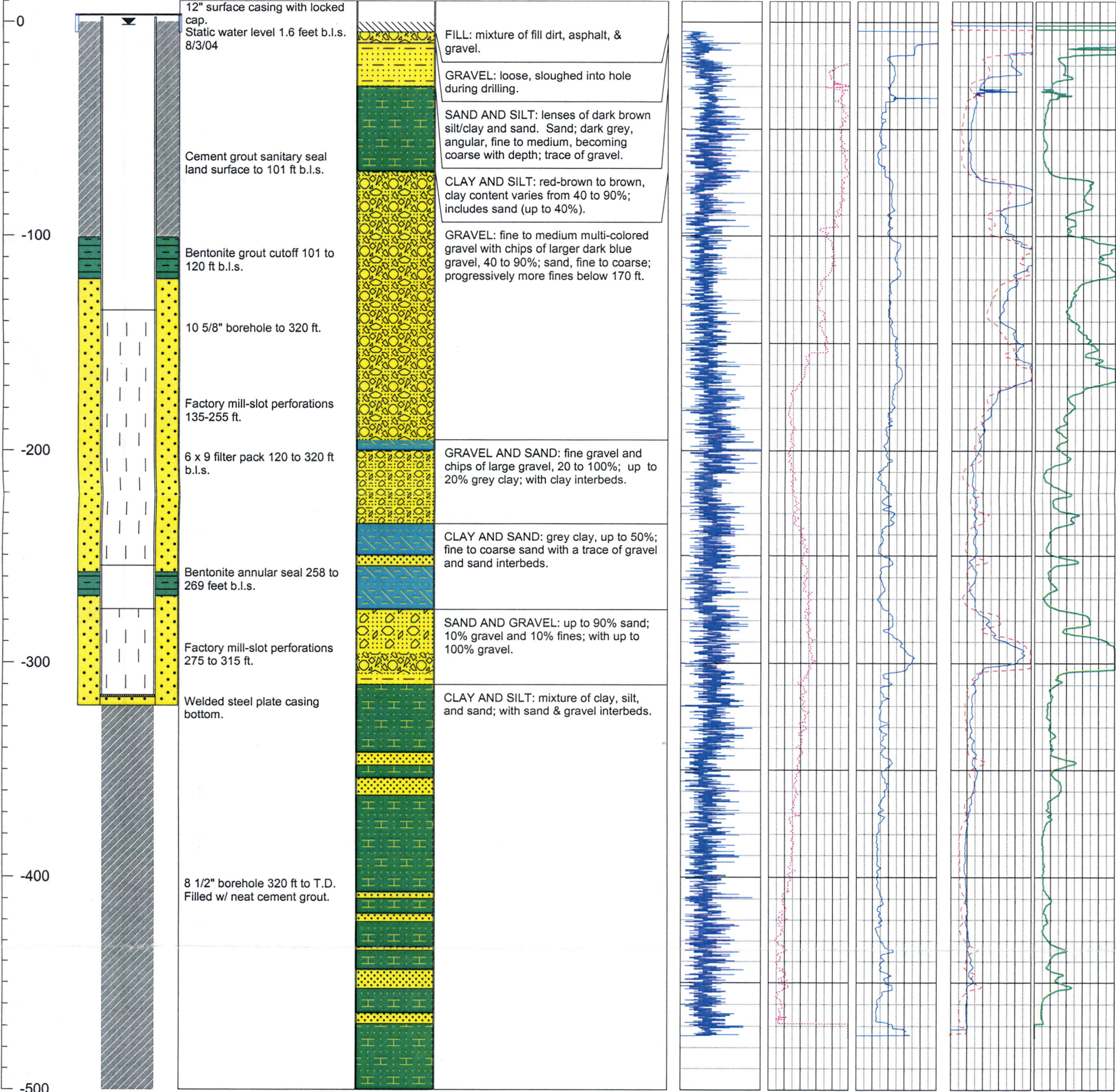
Project: Washoe County Longley Lane Water Treatment Facility  
Location: SE 1/4 Section 20, T.19N., R.20E.  
Well: Longley Lane Monitoring Well  
Borehole Depth: 500 feet Diameter: 10.5" 0 to 320, 8.5" 315 to T.D  
Drilling Contractor: WDC Exploration - Nevada  
Logged by: Bryan Kearney  
Completion Date: 7/20-27/04

Depth (Feet)

Well Construction

Lithology

Borehole Geophysical Logs



August 5 – The constant-discharge test ended.  
August 6 - The test pump was removed from the well.

## **Lithology**

ECO:LOGIC personnel logged the formation samples in the field as the borehole was advanced. The borehole penetrated unconsolidated alluvial deposits comprising gravel, sand, silt and clay, and mixtures of these materials. An abbreviated geologic log is provided in Figure 3 and the complete field lithologic log of the borehole is provided in the appendix.

## **Monitoring Well Construction**

The borehole was completed as a monitoring well. Its final depth and the perforated intervals of the casing were based on a review of the samples of the formation materials penetrated by the borehole and an examination of the borehole geophysical logs. This information suggested that the highly permeable geologic materials were encountered between the depths of approximately 68 and 200 feet below land surface (b.l.s.) with additional permeable strata to a depth of 310 feet b.l.s. Below 310 feet, the formation primarily comprised clay and silt with sand interbeds and occasional gravel. As a result, the lower portion of the borehole was backfilled with neat-cement grout to a depth of 320 feet. The grout was placed by pumping via a tremie pipe. The tremie was raised as the grout displaced the drilling fluid from the borehole.

The monitoring well was constructed with 6 5/8-inch outside diameter 0.188-inch wall-thickness steel well casing to a depth of 315 feet in a 10 5/8-inch diameter borehole to a depth of 320 feet. Factory mill-slot perforations with an aperture width of 3/32-inch were placed in the depth intervals of 135 to 255 and 275 to 315 feet b.l.s. The casing was joined by welding. The annular space surrounding the well screen was filled with a nominal 6-9 mesh size silica-sand filter pack from the bottom of the borehole to a depth of 120 feet b.l.s. An intermediate annular seal was placed between 258 and 269 feet b.l.s. The filter pack and annular seal were installed via a tremie pipe to ensure its proper placement. The tremie was raised as the filter pack filled the annulus. A bentonite grout cutoff was placed above the filter pack. The annular space above a depth of 101 feet was sealed with neat-cement grout placed by pumping through the tremie pipe.

Well construction details are summarized in Table 1 and illustrated in Figures 3.

**TABLE 1.  
LONGLEY LANE WATER TREATMENT PLANT MONITORING WELL  
CONSTRUCTION DETAILS**

Conductor Casing	0 to 10 feet b.l.s.	12 3/4-inch O.D. x 0.250-inch wall thickness steel.
Blank casing	+2 to 135 feet b.l.s. and 255 to 275 feet b.l.s.	6 5/8-inch O.D. x 0.188-inch wall thickness ASTM A 53B steel.
Perforated Interval	135 to 255 feet b.l.s. and 275 to 315 feet b.l.s..	6 5/8-inch O.D. x 0.188-inch wall thickness ASTM A 53B steel w/ 3/32-inch aperture-width factory mill slots
Filter pack	120 to 258 feet b.l.s. and 269 to 320 feet b.l.s.	6 x 9 mesh Colorado Silica Sand. The filter pack was placed using a tremie pipe. Fluid was circulated through the tremie during installation.
Intermediate seal	258 to 269 feet b.l.s.	Mixture of bentonite and sand placed via a tremie.
Grout cutoff	101 to 120 feet b.l.s.	Granular bentonite
Sanitary Seal	Land surface to 100 feet b.l.s.	Neat cement grout in the annulus surrounding the 6 5/8-inch casing from the land surface to 101 feet b.l.s. All grout was placed by pumping via a tremie pipe.
Protective Casing	+2.5 feet to 3.5 feet b.l.s	12-inch diameter steel welded to the conductor casing, equipped w/ locked cap and surrounded by a concrete pad.

### Well Development

The primary reasons for development are to remove residual drilling fluid and restore any damage to the formation that may have resulted from well construction. Formation damage includes plugging of the formation due to invasion of drilling mud or a buildup of a filter cake on the formation/borehole interface.

Well development was initiated after the sanitary seal cured. This initial development work entailed air-lift pumping the well for 7 1/2 hours using the drill-rig mounted air compressor to remove residual drilling fluids. After the residual drilling fluid was removed, the well was alternately surged and pumped with the test pump for 14 hours until the discharge was visibly clean. The drilling fluid and initial water pumped from the well during development were contained on site and later hauled to the drying beds at the Truckee Meadows Water Authority's Glendale Water Treatment Plant.

## WELL TESTING

### TESTING SUMMARY

#### Equipment

Testing of the Longley Lane Water Treatment Plant Monitoring Well was accomplished using a submersible turbine test pump powered by a diesel generator provided by WDC Exploration. The pump bowls were set at a depth of 144 feet b.l.s. The discharge was conveyed to a Boynton Slough under the terms of the temporary NPDES permit obtained from the Nevada Division of Environmental Protection. The pumping rate was controlled with a gate valve and measured with a McCrometer flow meter in the discharge pipe. A stilling well was installed to the top of the pump to facilitate measuring water levels. Water levels in the well were monitored with an In-Situ MiniTROLL™ data logger equipped with a 30 p.s.i.g. pressure transducer. The data logger was accessed through a laptop computer and field data plots were continuously updated as testing progressed.

#### Step Testing

Step testing entails pumping the well at progressively higher rates while monitoring the water levels in the pumped well. The purpose of a step test is to evaluate the performance of the well over a range of pumping rates and to assess the overall hydraulic efficiency of the well. Knowledge of the efficiency of the well helps to assess the performance of a subsequent larger-diameter production well that might be pumped at higher rates.

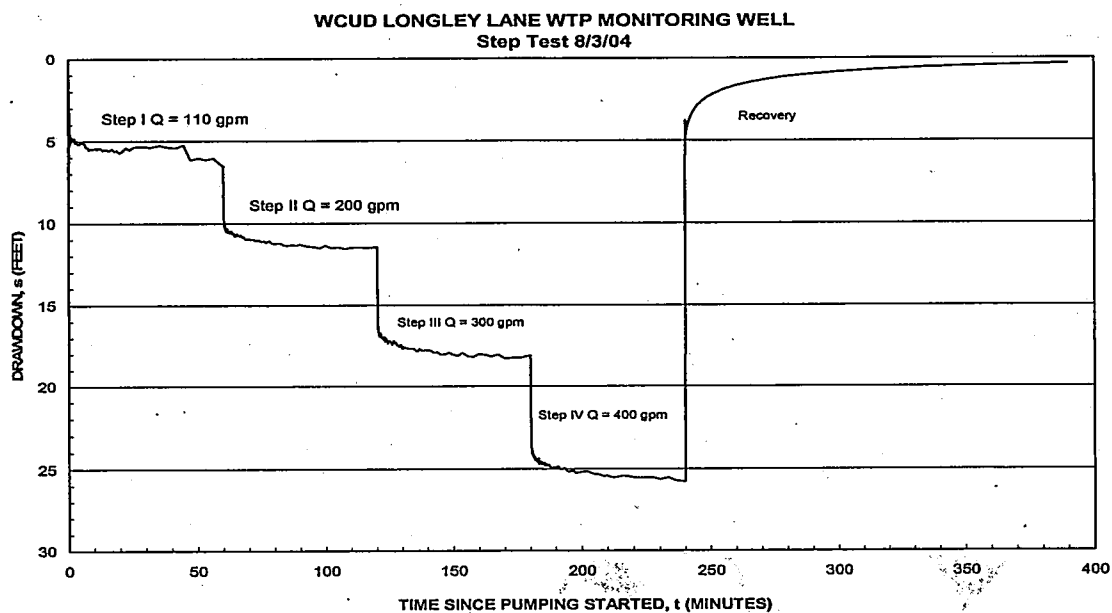
Static water level: 5.9 feet below the top of the stilling well (top of stilling well was 3.3 feet above the land surface).

Testing commenced: 07:20 hrs 8/03/04.

Test duration: 4 hours 2 minutes (242 minutes).

Testing terminated: 11:22 hrs 8/03/04.

The step-drawdown test comprised four steps. The drawdown data are illustrated in Figure 4 and provided in digital format in the Appendix.



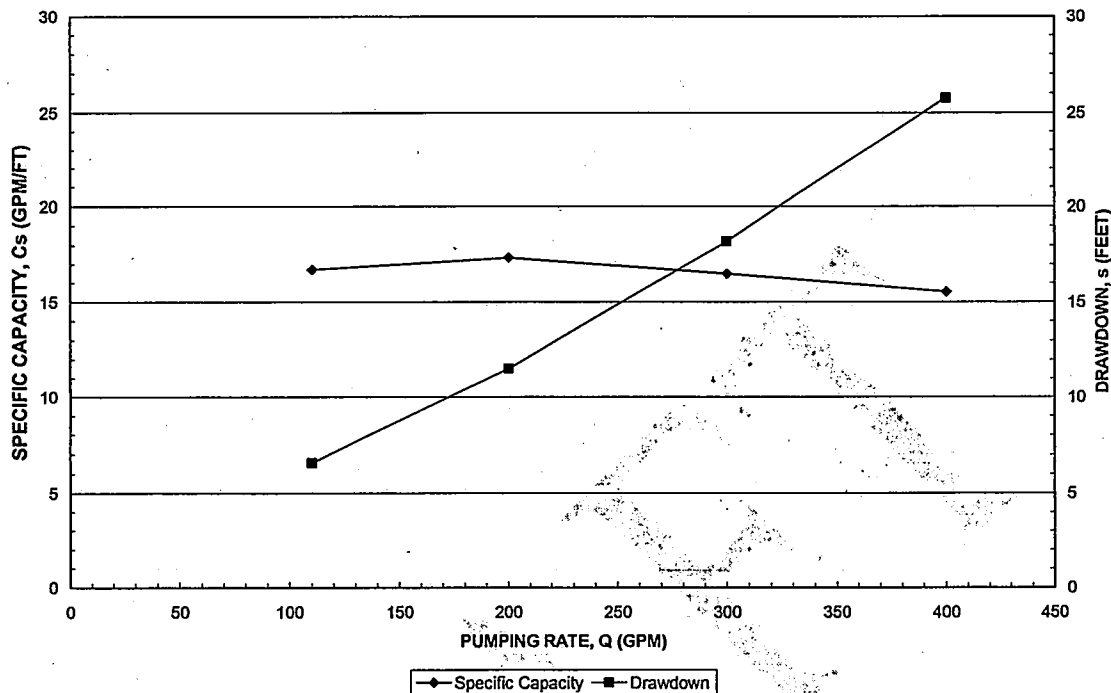
**FIGURE 4. STEP DRAWDOWN TEST DATA.**

The step test is summarized below in Table 2 and Figure 5.

**Table 2**  
**LONGLEY LANE WATER TREATMENT PLANT MONITORING WELL**  
**STEP TEST SUMMARY.**

Step	Duration t (Minutes)	Pumping Rate Q (gpm)	Drawdown s (feet)	Specific Capacity C <sub>s</sub> (gpm/ft)
I	60	110	6.58	16.72
II	60	200	11.53	17.35
III	60	300	18.2	16.48
IV	60	400	25.77	15.52

# LONGLEY LANE MONITORING WELL STEP TEST 8/03/04



**FIGURE 5. STEP TEST SUMMARY**

## **Constant-Discharge Testing**

The purpose of the constant-discharge test is to evaluate the hydraulic characteristics of the aquifer. These parameters influence the long-term performance of a well and are necessary to evaluate the potential impacts on nearby wells due to pumping. The constant-discharge test entailed pumping the monitoring well at a constant rate for 24 hours while monitoring the water level in the pumped well. Constant-discharge testing ensued after the water levels in the well recovered over night following the step test. At the conclusion of the pumping test, water levels in the wells were monitored for a recovery period of approximately 24 hours.

Static water level: 5.8 feet below the top of the stilling well (top of stilling well was 3.3 feet above the land surface).

Pumping commenced: 07:30 hours 8/04/04

Discharge rate: approximately 400 gpm

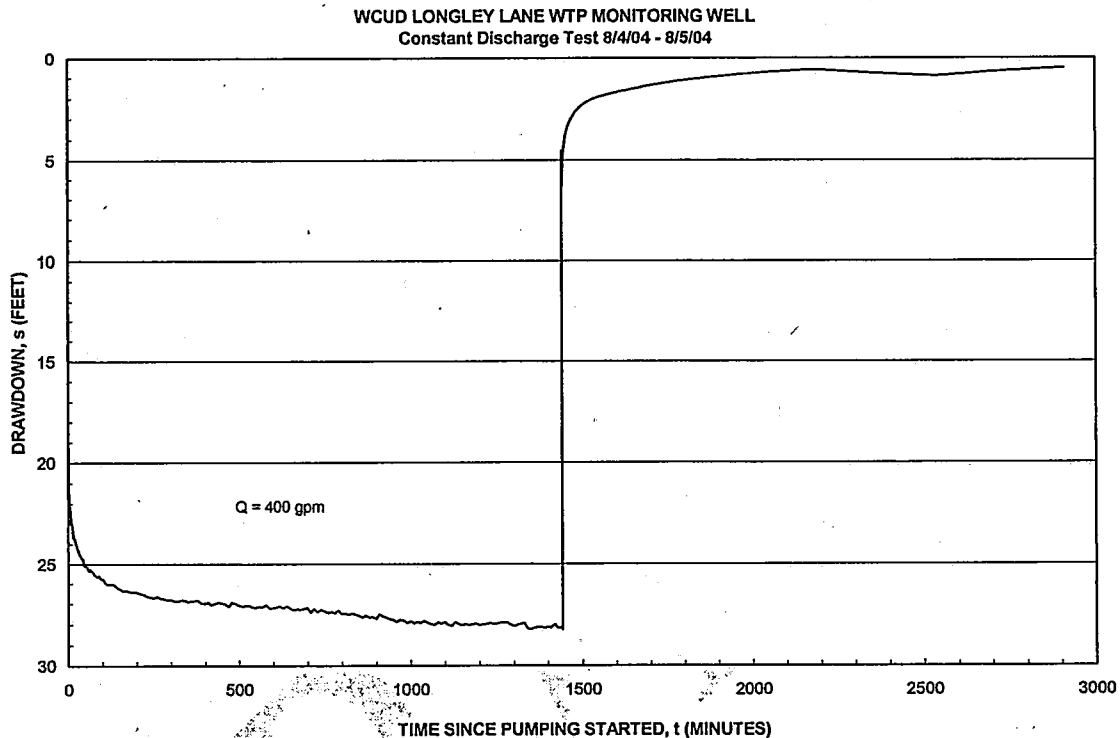
Test duration: 24 hours

Pumping terminated: 07:30 hours 8/05/04

Pumping level at the conclusion of the pumping test: 34.04 feet below the top of the stilling well.

Drawdown in the well at conclusion of test: 28.24 feet

Figure 6, below, shows the drawdown and recovery data for the test. The test data are provided in digital format in the Appendix along with the field data sheets and field data plots.



**FIGURE 6. CONSTANT-DISCHARGE TEST DRAWDOWN DATA.**

### **PUMPING-TEST DATA ANALYSIS**

Analysis of the test data was accomplished in two phases. The first phase entailed a graphical analysis of the data in the field as testing progressed. The second phase entailed numerical inversion of the test data using the computer program WHIP (Well Hydraulics Interpretation Package ver. 3.22: Hydro-Geo Chem, Inc., 1988). The numerical analysis was initiated in the field and completed upon return to the office. The solution was judged to be adequate when both the step test and constant-discharge test data could be simulated using similar aquifer properties. These properties are:

Transmissivity: 6,500 feet<sup>2</sup>/day (49,000 gallons per day per foot width of aquifer)  
Coefficient of storage: 0.0065

These values are indicative of a highly transmissive, semi-confined aquifer.

## Step-Drawdown Testing Results

The results of the step-drawdown test data analysis are illustrated in Figure 7. The figure depicts the observed drawdown in the well and compares it to simulated drawdown calculated on the basis of the average well and aquifer parameters determined from the analysis of the test data.

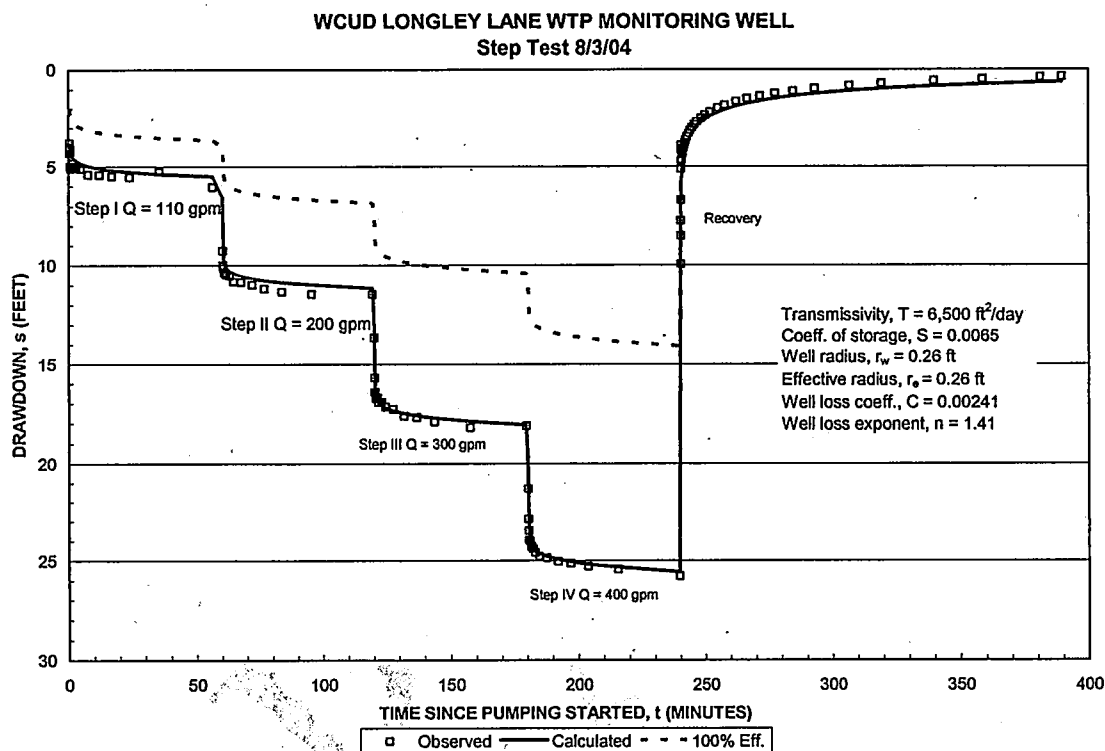


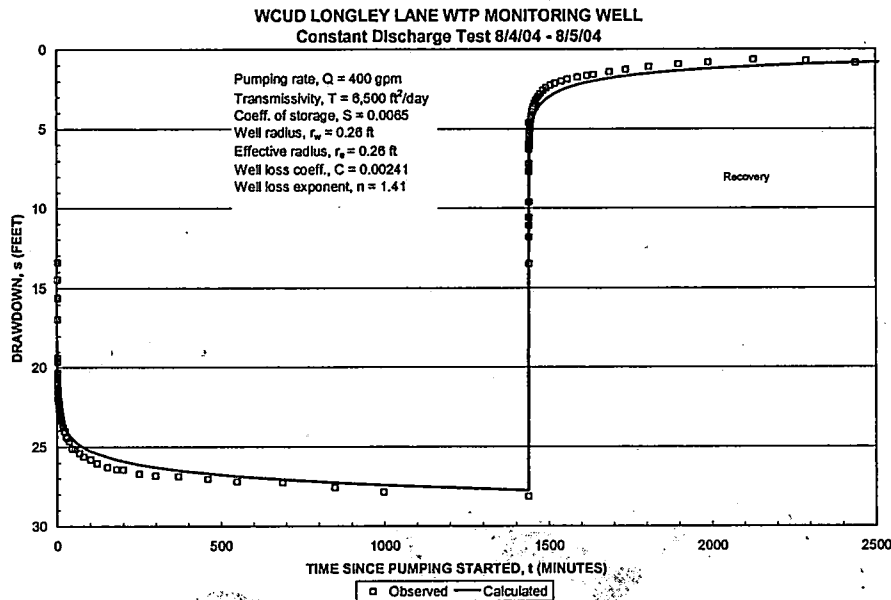
Figure 7 shows a good correlation between the observed data and simulated drawdown. Comparison between the observed drawdown and the theoretical drawdown for a 100% efficient well indicates that the monitoring well is relatively inefficient. Calculated efficiency for  $t \approx 60$  minutes is summarized in Table 3.

**Table 3**  
**LONGLEY LANE WATER TREATMENT PLANT MONITORING WELL EFFICIENCY**

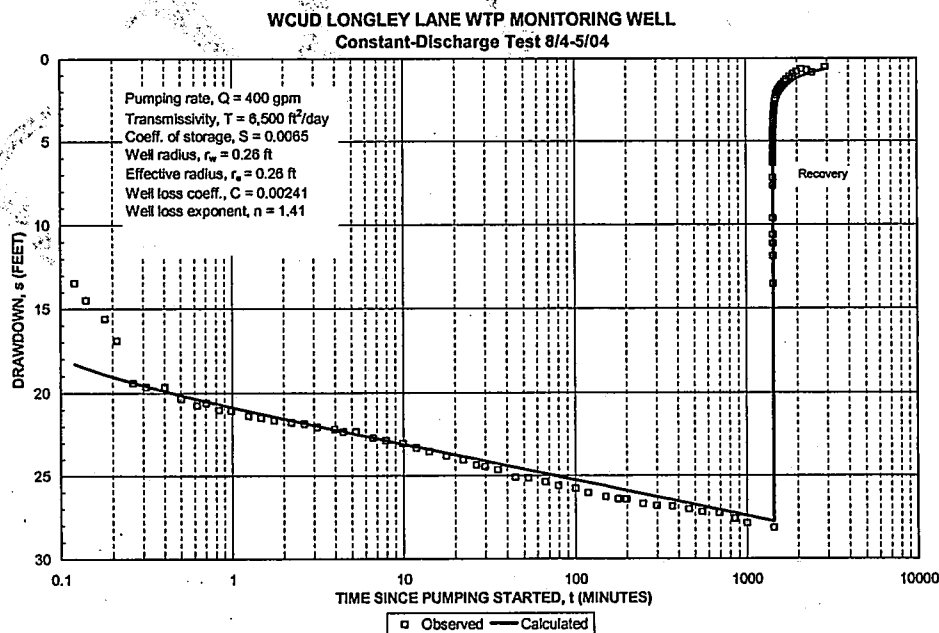
Step	Duration $t$ (minutes)	Pumping Rate $Q$ (gpm)	Calculated Drawdown $s$ (feet)	Theoretical Drawdown at 100% Eff. (feet)	Efficiency %
I	60	110	5.5	3.65	66
II	60	200	11.15	6.48	58
III	60	300	17.88	10.42	58
IV	60	400	25.55	14.08	55

## Constant-Discharge Testing Results

The results of the analysis of the drawdown and recovery data from the constant-discharge test are depicted in Figures 8a and 8b, which provide plots of drawdown versus time using both arithmetic and logarithmic time scales. The plots compare observed and simulated drawdown in the well based on the aquifer and well properties determined from the analysis.



**FIGURE 8a**



**FIGURE 8b**

### LONGLEY LANE WATER TREATMENT PLANT MONITORING WELL CONSTANT-DISCHARGE TEST ANALYSIS RESULTS.

## WATER CHEMISTRY RESULTS

A water sample was collected by ECO:LOGIC on August 5, 2004 near the conclusion of the constant-discharge test. The well was sampled for analysis of major cations, major anions, and trace metals, which include Phase II and V inorganic constituents, Synthetic Organic Chemicals (SOCs), Volatile Organic Chemicals (VOCs), and radionuclides. Additional samples were collected for iron, manganese and arsenic after one, three, and eight hours of pumping and a large bulk sample of the water was collected for an analysis of the treatability of the water by CH2M-HILL.

The water samples were submitted to Sierra Environmental Monitoring, a State of Nevada certified laboratory. The results of the laboratory analyses for iron, manganese, and arsenic are provided in Table 4. The analytical results from last water sample are provided in Table 5 and the laboratory report is provided in the appendix.

The data in Table 4, below, indicate that the concentration of iron was consistently below the secondary drinking water standard, manganese was below the recommended secondary drinking water standard of 0.10 mg/l but greater than the recommended standard of 0.05 mg/l, and arsenic was below the current MCL of 0.50 mg/l, but in excess of the revised MCL which becomes effective in January 2006.

TABLE 4. LONGLEY LANE WATER TREATMENT PLANT MONITORING WELL IRON, MANGANESE AND ARSENIC CONCENTRATION.					
	Concentration (mg/l)				MCL
Date Time	8/4/04 08:30	8/4/04 10:30	8/4/04 15:30	8/5/04 06:00	
Arsenic	0.032	0.033	0.032	0.32	0.50 <sup>a</sup> /0.010 <sup>b</sup>
Iron	0.110	0.07	0.06	<0.05	0.6 <sup>c</sup> /0.3 <sup>d</sup>
Manganese	0.083	0.069	0.061	0.056	0.1 <sup>c</sup> /0.05 <sup>d</sup>
Notes:    a. Primary standard. b. Primary standard, effective January 2006. c. Secondary standard, maximum. d. Secondary standard, recommended.					

*A discussion of the water quality data will be inserted upon receipt of the data.*

Table 5. LONGLEY LANE WATER TREATMENT PLANT MONITORING WELL WATER CHEMISTRY DATA FOR SAMPLE COLLECTED AUGUST 5, 2004.		
ANALYTE	CONCENTRATION (mg/l unless noted otherwise)	MCL (mg/l unless noted otherwise)
<b>Phase II Inorganic Chemicals</b>		
Fluoride		4
Barium		2
Cadmium		0.005
Chromium		0.1
Mercury		0.002
Selenium		0.05
Asbestos (fibers longer than 10 $\mu$ m)	not analyzed	7 million
Nitrate		10 as (N)
Nitrite		1 as (N)
Total Nitrate + Nitrite		10 as (N)
<b>Phase V Inorganic Chemicals</b>		
Antimony		0.006
Beryllium		0.004
Cyanide		0.2
Nickel		0.1
Thallium		0.002
Arsenic		0.010
<b>Secondary Drinking Water Standards</b>		
Chloride		400
Color		15
Copper		1
Foaming Agents (MBAS)		0.5
Iron		0.6
Magnesium		150
Manganese		0.1
Odor (T.O.N.)		3
pH (Std. Units)		6.5-8.5
Silver		0.1
Sulfate		500
Total Dissolved Solids (TDS)		1,000
Zinc		5
Fluoride		2
<b>Radionuclides</b>		
Gross $\alpha$ activity (pCi/l)		15
Radium <sup>226</sup> (pCi/l)		3
Uranium (mg/l)		0.03 (proposed)
Gross $\beta$ activity (pCi/l)		50
<b>Phase I &amp; II Volatile Organic Chemicals</b>		
Vinyl Chloride		0.002
Benzene		0.005
Carbon tetrachloride		0.005
1,2-Dichloroethane		0.005

Trichloroethylene (TCE)		0.005
Para-Dichlorobenzene		0.075
1,1-Dichloroethylene		0.007
1,1,1-Trichloroethane		0.2
cis-1,2-Dichloroethylene		0.07
1,2-Dichloropropane		0.005
Ethylbenzene		0.7
Monochlorobenzene		0.1
o-Dichlorobenzene		0.6
Styrene		0.1
Tetrachloroethylene (PCE)		0.005
Toluene		1
Trans-1,2-Dichloroethylene		0.01
Xylenes (total)		10
<b>Phase V Volatile Organic Chemicals</b>		
Dichloromethane		0.005
1,2,4-Trichlorobenzene		0.07
1,1,2-Trichloroethane		0.005
<b>Phase II Synthetic Organic Chemicals</b>		
Alachlor		0.002
Aldicarb		0.003
Aldicarb sulfoxide		0.004
Aldicarb sulfone		0.002
Atrazine		0.003
Carbofuran		0.04
Chlordane		0.002
Dibromochloropropane		0.0002
2,4-D		0.07
Ethylene dibromide		0.00005
Heptachlor		0.0004
Heptachlor epoxide		0.0002
Lindane		0.0002
Methoxychlor		0.04
Polychlorinated biphenyls		0.0005
Pentachlorophenol		0.001
Toxaphene		0.003
2,4,5-TP		0.05
<b>Disinfection By-Products (interim)</b>		
Chloroform		0.10 (TTHM)

<b>Phase V Synthetic Organic Chemicals</b>		
Benzo[a]pyrene		0.0002
Dalapon		0.2
Di (2-ethylhexyl) adipate		0.4
Di (2-ethylhexyl) phthalate		0.006
Dinoseb		0.007
Diquat		0.02
Endothall		0.1
Endrin		0.002
Glyphosate		0.7
Hexachlorobenzene		0.001
Hexachlorocyclopentadiene		0.05

Oxamyl (Vydate)	n.d	0.2
Picloram	n.d	0.5
Simazine	n.d	0.004
2,3,7,8-TCDD (Dioxin)	Not analyzed	$3 \times 10^{-8}$

Note: n.d. signifies not detected.

## ANALYSIS OF PROBABLE WELL YIELD

### Probable Well Yield

The probable performance of a production well at this locale was evaluated on the basis of the information provided in the monitoring well logs and pumping test results. This evaluation was accomplished through simulations of pumping for a 16-inch diameter, 315 feet deep production well. Pumping rates of 1,500 and 1,800 gpm were simulated to bracket a probable design pumping rate for a production well at this locale. The computer program WHIP (the same program used to analyze the test data) was used to calculate drawdown in the well and the aquifer.

The principal assumptions for the analysis include:

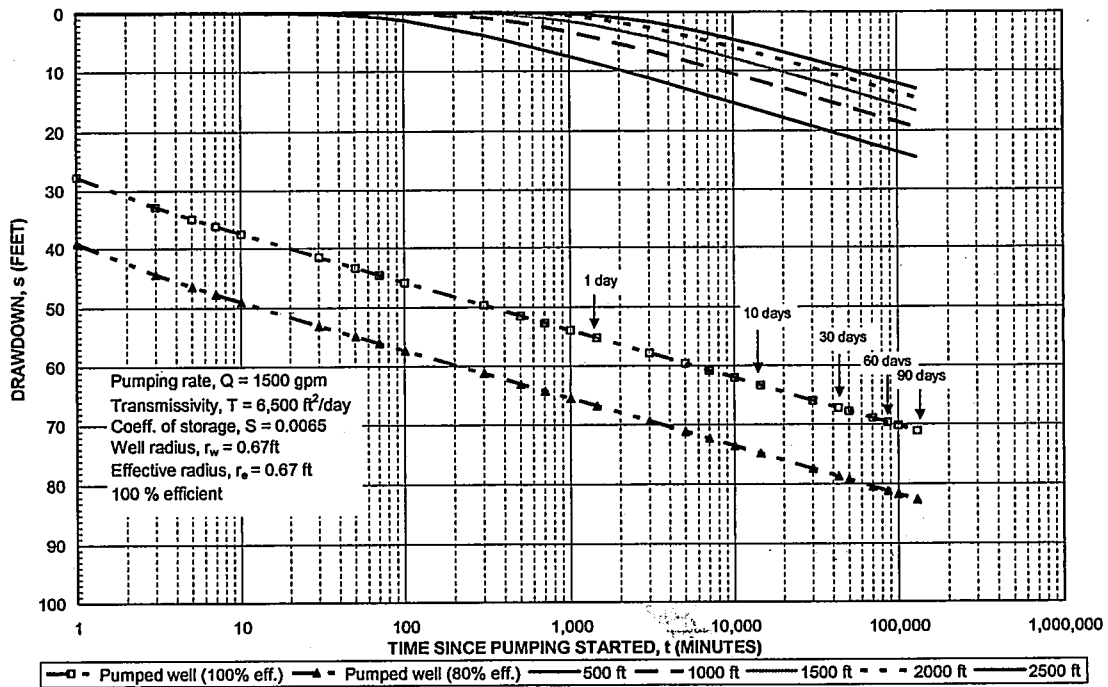
- The well radius is 16 inches.
- The well depth is 315 feet.
- Initial static water level is approximately 3 feet below the land surface.
- Transmissivity is 6,500 feet<sup>2</sup>/day (49,000 gpd/ft).
- Coefficient of storage was assumed to be 0.0065. No increase in storage coefficient as a consequence of delayed yield was invoked.
- The aquifer is uniform, isotropic, and infinite in areal extent.
- No recharge to the aquifer occurs during the simulation period.
- The well is 80% efficient. Properly constructed wells can achieve efficiencies of greater than 90%.
- The well is pumped 24 hours per day, 7 days per week for a period of 90 days.

The results of the simulations are depicted in Figure 9a and 9b. From Figure 9a, it is anticipated that the water level in the aquifer immediately outside of the well casing would be drawn down to a depth of approximately 75 feet below the land surface after 90 continuous days of pumping at a rate of 1,500 gpm and that the pumping level in the well might be expected to approach a depth of 86 feet. The geologic and geophysical logs for the monitoring well indicate that the principal aquifer begins at a depth of 68 feet b.l.s. and that no significant aquitards are present from the top of the aquifer to a depth of 200 feet, so that the pumping level would not be drawn down significantly below the top of the aquifer.

From Figure 9b, it is anticipated that the water level in the aquifer immediately outside of the well casing would be drawn down to a depth of approximately 88 feet below the land surface after 90 continuous days of pumping at a rate of 1,800 gpm and that the pumping level in the well might be expected to approach a depth of 102 feet. It is good practice limit the drawdown in a well completed in an unconfined aquifer to no more than two-thirds of the saturated thickness [Driscoll, 1986]. In this case, less than 10% of the total aquifer thickness would be dewatered in the immediate vicinity of the well, so that dewatering of the aquifer will have little impact on well performance.

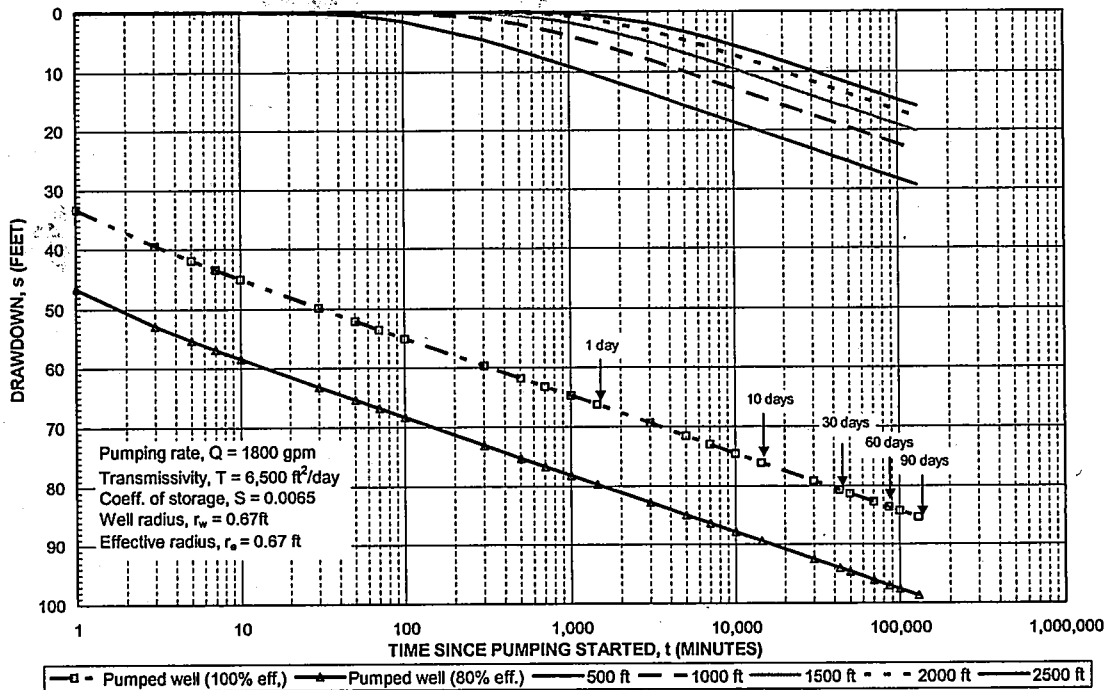
Preliminary plans call for a production well to be located approximately 800 feet east to northeast of the monitoring well site. Conditions in the aquifer might be somewhat different at the proposed production well site and these differences could influence the performance of the production well.

**WCUD LONGLEY LANE WTP  
Projected Drawdown at 1,500 gpm**



**FIGURE 9a.**

**WCUD LONGLEY LANE WTP  
Projected Drawdown at 1,800 gpm**



**FIGURE 9b.**

**PREDICTED PERFORMANCE OF A PRODUCTION WELL AT THE LONGLEY LANE  
WATER TREATMENT PLANT MONITORING WELL SITE.**

H:\Projects-Active\2003\WCUD03-003 Longley Lane WTP\3.2 Addl Eng Services\3.2.1 Longley Test Well\Report\Longley mw report.doc

## POTENTIAL INTERFERENCE EFFECTS

The two simulations of production well performance also included the potential interference from pumping a production well at Longley Lane Water Treatment Plant Monitoring Well site. Interference drawdowns were calculated for distances of 500 feet, 1,000 feet, 1,500, 2,000 feet, and 2,500 feet from the pumped well. These are listed in Table 6.

<b>TABLE 6.</b> <b>PROJECTED INTERFERENCE DRAWDOWN FROM A</b> <b>PRODUCTION WELL AT THE PROPOSED WATER</b> <b>TREATMENT FACILITY.</b>					
Radial Distance, r (feet)					
Drawdown, s (feet)					
Pumping Rate	500	1,000	1,500	2,000	2,500
1500 gpm	24.5	19.6	16.8	14.7	13.2
1,800 gpm	29.4	23.5	20.1	17.7	15.8
Assumes pumping 24 hours/day for 90 days.					

## PRODUCTION WELL DESIGN RECOMMENDATIONS

The available information suggests that it is highly likely that a well capable of providing 1,500 to 1,800 gallons per minute can be completed at the site of the Longley Lane Water Treatment Plant monitoring well. The production well may be located approximately 800 feet to the east or northeast of the monitoring well. Because the water-bearing alluvial deposits in the southeast Truckee Meadows are not uniform, there is a possibility that the conditions for the production well may differ from those at the monitoring well site. Consequently, a pilot hole should be drilled as part of the production well program to confirm the design based on the monitoring well 800 feet away.

Recommendations for the design of a production well at this site include capable of producing 1,500 to 1,800 gallons per minute include:

**Drilling method – Reverse circulation.** This method utilizes relatively clean water as the drilling fluid. It minimizes the potential for formation damage during drilling and results in less time needed to develop the well. The drilling equipment should include portable mud tanks and these should be equipped with de-sanders and shaker screens to maintain a high-quality, low-solids drilling fluid. The pilot hole should also be drilled by the reverse circulation method.

**Well depth – 315 feet.** Completing the well deeper is not expected increase the well yield significantly because the deeper formation materials are less permeable than the sands in the upper portion of the aquifer.

**Casing diameter – 16 5/8 inches outside diameter x 5/16 inch wall thickness..** The optimum casing diameter for wells yielding 800 to 1,800 gpm is 16 inches (Driscoll, 1986). 16 inch diameter well casing easily accommodates a 1,800 gpm pump without being excessively large for a pump capable of 1,500 gpm.

**Borehole diameter – 26 inches.** A minimum diameter of 24 inches is necessary to maintain the proper annular space surrounding the 16-inch diameter well casing plus a 3-inch diameter gravel-fill pipe and 2-inch diameter external sounding

tube. Larger diameters require more materials (filter pack and cement grout for seals) and reduce the efficacy of well development.

**Filter pack – Colorado Silica Sand 6 x 9 mesh size.** This size and gradation represents readily-available materials that will retain the finest size of the permeable formation materials penetrated by the monitoring well borehole (see sieve analyses plots in the appendix).

**Screen aperture-width – 0.090 inches.** The slot size will retain at least 90% of the filter pack.

**Screen type – shaped wire continuous slot well screen, Type 316 stainless steel.** Continuous slot well screen provides the highest percentage of open area per lineal foot screen. Type 316 stainless steel will extend the life of the well screen and enable chemical treatment of the screen to maintain optimum well efficiency, if required. Type 316 stainless steel has the advantage over Type 304 stainless steel because it is resistant to hydrochloric acid-based chemical treatments which may cause stress fracturing of Type 304 steel.

**Screened interval – approximately 100 linear feet** placed below a depth of 135 feet.

**Sanitary seal - land surface to a depth of 100 feet.** A minimum seal depth of 100 feet b.l.s. is required for public water supply wells. Because the formation materials are relatively uniform, a sanitary seal deeper than 100 feet b.l.s. (say 130 feet) does not offer significantly more protection against contamination originating at the land surface.

## SOURCES OF INFORMATION

Driscoll, F.G., Ph.D., 1986. Groundwater and Wells: Johnson Filtration Systems.

Hydro Geo Chem, 1988. Well Hydraulics Interpretation Package, ver. 3.22: computer program for the analysis of pumping test data.

**APPENDIX**

**DRILLER'S REPORT (WELL LOG)**

**WELL CONSTRUCTION SUMMARY**

**GEOLOGIC LOG**

**BOREHOLE GEOPHYSICAL LOGS**

**PUMPING TEST DATA**

**LABORATORY REPORTS**

Log No. \_\_\_\_\_  
Permit No. \_\_\_\_\_  
Basin \_\_\_\_\_

PRINT OR TYPE ONLY -  
DO NOT WRITE ON BACK

### WELL DRILLER'S REPORT

Please complete this form in its entirety in  
accordance with NRS 534.170 and NAC 534.340

NOTICE OF INTENT NO. 53296

1. OWNER Washoe County ADDRESS AT WELL LOCATION 3031  
MAILING ADDRESS 1930 Energy Way Reno NV 89502 20091st Lane Reno Nevada  
2. LOCATION SE 1/4 SW 1/4 Sec. 20 T. 19 N. S. R. 20 E. WASHOE County  
PERMIT NO. MID-1231 Issued by Water Resources Parcel No. \_\_\_\_\_ Subdivision Name \_\_\_\_\_

#### 3. WORK PERFORMED

☒ New Well ☐ Replace ☐ Recondition  
☐ Deepen ☐ Abandon ☐ Other \_\_\_\_\_

#### 4. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test  
☐ Municipal/Industrial ☒ Monitor ☐ Stock

#### 5. WELL TYPE

☐ Cable ☒ Rotary ☐ RVC  
☐ Air ☐ Other \_\_\_\_\_

#### 6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thick-ness
ROAD BASE		0	5	5
Fine sand GRAY	8FT	5	30	25
LITHOMY CLAY		30	70	40
Fine gravel		70	100	30
Large gravel		100	125	25
medium coarse gravel		125	240	115
DARK BROWN CLAY		240	280	40
medium coarse gravel / some silt		280	320	40
DARK BROWN CLAY		320	500	180

#### 8. WELL CONSTRUCTION

Depth Drilled 500 Feet Depth Cased 315 Feet

##### HOLE DIAMETER (BIT SIZE)

10 5/8 Inches From 0 Feet To 10 Feet  
8 1/2 Inches From 10 Feet To 500 Feet  
10 3/4 Inches From 0 Feet To 315 Feet

##### CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
<u>6.2</u>		<u>0.188</u>	<u>0</u>	<u>125</u>
<u>6.2</u>		<u>0.188</u>	<u>255</u>	<u>275</u>

##### Perforations:

Type perforation M.I.  
Size perforation 5/8

From 315 feet to 275 feet  
From 255 feet to 125 feet  
From \_\_\_\_\_ feet to \_\_\_\_\_ feet  
From \_\_\_\_\_ feet to \_\_\_\_\_ feet  
From \_\_\_\_\_ feet to \_\_\_\_\_ feet

Surface Seal: ☒ Yes ☐ No

Depth of Seal 135'

Placement Method: ☒ Pumped  
☐ Poured

##### Seal Type:

☒ Neat Cement  
☐ Cement Grout  
☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No

From 315 feet to 271-254-133 feet

#### 9. WATER LEVEL

Static water level 5.9 feet below land surface

Artesian flow \_\_\_\_\_ G.P.M. \_\_\_\_\_ P.S.I.

Water temperature 60.1 °F Quality CLRA

#### 10. DRILLER'S CERTIFICATION

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

Name WDC EXPLORATION + WELLS Contractor

Address P.O. BOX 141 COUNTY RD 93B ZAMORA, CA 95698 Contractor

Nevada contractor's license number issued by the State Contractor's Board 0012852

Nevada driller's license number issued by the Division of Water Resources, the on-site driller M-2263

Signed WDC By driller performing actual drilling on site or contractor

Date JULY 2004

Date started JULY 15, 2004  
Date completed JULY 23, 2004

#### 7. WELL TEST DATA

TEST METHOD: ☐ Bailer ☒ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
<u>PUMP 100</u>	<u>28'</u>	<u>24 HRS</u>

## CONSTRUCTION SUMMARY FOR WELL LL WWTP-MW

LOCATION OR COORDS.: E 7/2

ELEVATION: GROUND LEVEL 

$5\frac{1}{4}$  Sec 20 T19N R20E

TOP OF CASING 2.97

**DRILLING SUMMARY:**

TOTAL DEPTH 500-feet

BOREHOLE DIAMETER 10 5/8-inch

DRILLER WDC Exploration

RIG STAR 30K

BIT(S)  $8\frac{1}{2}$ " pilot,  $10\frac{5}{8}$ " (reamed)  
tri-cone

DRILLING FLUID bentonite

SURFACE CASING 2.97'-2.03' bgs

**WELL DESIGN:**

BASIS: GEOLOGIC LOG X

BASIS: GEOPHYSICAL LOG X

CASING STRING(S) C=CASING S=SCREEN

+2 -135 CI -

135 - 255 SF -

255-275 CI -

275 - 315 SI -

CASING: C1 6" sch. 40 blank pipe

C2\_\_\_\_\_

C3

C4 \_\_\_\_\_

S1 6" sch 40 mill slot pipe

S2\_\_\_\_\_

S3\_\_\_\_\_

S4\_\_\_\_\_

CENTRALIZERS 155, 235, and  
295 feet

FILTER MATERIAL: Three super  
sacks, 6x9 spheres.

CEMENT 40 sacks - bottom  
35 sacks - sanitary seal

OTHER 8 sacks bent. gel &  
8 sacks Monterey sand - seal

### CONSTRUCTION TIME LOG:

<u>TASK</u>	<u>START</u> <u>DATE TIME</u>	<u>END</u> <u>DATE TIME</u>
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DRILLING:

8 1/2" pilot	7/15/04 10:12	7/17/04 10:38
10 5/8" borehole	7/20/04	7/20/04 12:40

GEOPHYS. LOGGING: 7/17/04 1234 7/17 13:39

CASING:  
6 5/8" Steel 7/21 10:20 7/21 13:10

FILTER  
PLACEMENT: 7/21 1430 7/22 0710

CEMENTING 7/22 0720 7/22 1300

DEVELOPMENT 7/29 17:23 8/2 17:11

OTHER:  
Int: seal 7/21 1530 7/21 1552

WELL DEVELOPMENT:

1. Airlifted w/ 2" tremmie for 7.5 hours H/L.

2. Pumped w/ test pump from 144' for 14 hours H<sup>1</sup>.

4 COMMENTS:

1. W. I. 1.38-595 8/2/04, 6:58



0-5	100-105	200-205	300-305	400-405
5-10	105-110	205-210	305-310	405-410
10-15	110-115	210-215	310-315	410-415
15-20	115-120	215-220	315-320	415-420
20-25	120-125	220-225	320-325	420-425
25-30	125-130	225-230	325-330	425-430
30-35	130-135	230-235	330-335	430-435
35-40	135-140	235-240	335-340	435-440
40-45	140-145	240-245	340-345	440-445
45-50	145-150	245-250	345-350	445-450
50-55	150-155	250-255	350-355	450-455
55-60	155-160	255-260	355-360	455-460
60-65	160-165	260-265	360-365	460-465
65-70	165-170	265-270	365-370	465-470
70-75	170-175	270-275	370-375	470-475
75-80	175-180	275-280	375-380	475-480
80-85	180-185	280-285	380-385	480-485
85-90	185-190	285-290	385-390	485-490
90-95	190-195	290-295	390-395	490-495
95-100	195-200	295-300	395-400	495-500

# LOG OF BOREHOLE

BOREHOLE Longley Lane Monitoring Well

PAGE 1 OF 7

LOC. OR COORDS. <u>N39° 29.573', W119° 45.712'</u>	DRILLER <u>WDC</u>	START DATE <u>7/15/04</u>	FINISH DATE <u>7/17/04</u>
GROUND ELEV. _____		TIME <u>10:12</u>	TIME <u>10:38</u>
TOTAL DEPTH <u>500 - feet</u>	RIG <u>STAR 30K</u>	GEOPHYS. LOG <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
BOREHOLE DIAM. <u>8 1/2 - inch pilot</u>	BIT(S) <u>12" 8 1/2" tri-cone</u>	HOW LEFT _____	
<u>reamed to 10 5/8 (320 feet)</u>	FLUID <u>bentonite</u>		

DEPTH	PEN. RATE	CIRC. RET. LOSS	AIR LIFT Q (GPM)	MATERIAL	SYM-BOL	DESCRIPTION AND COMMENTS
5	<1 ft/min					fill gravel, asphalt, dirt to 3 ft, 3-5 ft = clays/silts 90%, sands 10%
10	11:20					dk. brown clay/silt, hard, slightly moist < 10% sand, trace gravel upper 2 ft., lower (7-10') sand
15	15:02					dk. grey angular sand, fine-med, fairly well sorted
20	13:07					same, 10% silts
25						multicolor sand, coarsening, tr. gravel
30	13:11					sand 80% med., 20% coarse
35						clay/silt 50%, med/fine sand 40%, coarse 10%, trace gravel (clay lens?)
40	13:28					med/coarse sand, sub avg., trace clay
45						clay 50%, med/coarse sand 50%
50	13:40					red/brown clayey silt 80%, fine sand 20%, trace coarse sand/gravel
55						increasing fine sand, trace gravel
60	13:54					increasing clay to 90%, lt. brown
65						increasing sand to 30%
70	14:21					red/brown silts/clays 90%, sand 10% fine
75						brown silts/clays 40%, med. sand 40%
						fine sand 20%
						angular med. sand, qtz-pyrite 50%, dk blue chips 50%

LOCATION 3031 Longley Lane, Reno  
LOGGED BY B. Kearney

PROJECT Longley Lane WTP  
Monitoring Well

# LOG OF BOREHOLE

BOREHOLE Langley Lane Monitoring Well

PAGE 2 OF 7

LOC. OR COORDS.  
N 39° 29.573', W 119° 45.712'  
 GROUND ELEV. \_\_\_\_\_  
 TOTAL DEPTH 500-feet  
 BOREHOLE DIAM. 8 1/2" pilot  
reamed to 10 5/8-inch (320')

DRILLER WDC  
 RIG STAR 30K  
 BIT(S) 8 1/2" tri-axe  
 FLUID benzoinite

START 7/15/04 FINISH 7/17/04  
 DATE 7/15/04 TIME 10:12 10:38  
 GEOPHYS. LOG ☒ YES ☐ NO  
 HOW LEFT \_\_\_\_\_

DEPTH	PEN. RATE	CIRC. RET. LOSS	AIR LIFT Q (GPM)	MATERIAL	SYM-BOL	DESCRIPTION AND COMMENTS
80	14:34					Sand 40%, dk. blue chips 60% (volcs.?)
85						fine gravel, chips
90	15:25					multicolor sand 40%, dk. blue chips 60%
95						fine gravels multicolor, chips dk. blue
						dk blue chips, gravel, some multicolor
						fine sand, some dk. blue chips
100	15:37					fine sand 70%, coarse sand 30%
105						coarse sand 50%, fine gravel angular 50%
						dk. blue, some fine sand
						same
110	16:24					coarse sand 40%, fine/med angular gravel 60%
115						coarse sand 20%, fine gravel 80%
120	16:41					increasing sand to 60%, fine gravel 40%
125						coarse sand 80%, fine gravel 20%
130	17:11					fine/med sand 95%, gravel 5%
135						same, increasing gravel
140	17:27					coarse sand 90%, silt/clay 10%, fine gravel
145	7:48	7/16/04				
150	8:05					same

LOCATION 3031 Langley Lane, Reno  
 LOGGED BY B. Kearney

PROJECT Langley Lane NWTP  
Monitoring Well

# LOG OF BOREHOLE

BOREHOLE Lonley Lane Monitoring Well

PAGE 3 OF 7

LOC. OR COORDS:  
N 39° 29.573' W 119° 45.712'

DRILLER WDC

GROUND ELEV. \_\_\_\_\_

TOTAL DEPTH 500 - feet

RIG STAR 30K

BOREHOLE DIAM. 8 1/2 - inch pilot  
reamed 10 5/8 - inch (320')

BIT(S) 8 1/2 tri-cone

FLUID  Bentonite

	START	FINISH
DATE	<u>7/15/04</u>	<u>7/17/04</u>
TIME	<u>10:12</u>	<u>10:38</u>
GEOPHYS. LOG	<u>X YES</u> <u>NO</u>	
HOW LEFT	_____	

DEPTH	PEN. RATE	CIRC. RET. LOSS	AIR LIFT Q (GPM)	MATERIAL	SYM-BOL	DESCRIPTION AND COMMENTS
155						coarse sand 40%, med. sand 60%, trace fines, trace gravels, multicolored
160	8:17					increasing gravel to 30%
165						coarse sand 90%, gravel 10% chips
170	8:36					fairly well sorted coarse sand, ~100%, tr. gravel
175						increasing fine gravels to 30%
180	8:50					gravel 40%, coarse sand 60%
185						coarse sand chips 90%, fine gravel 10%, dk. blue
190	9:09					dk. blue fine gravel chips 50%, coarse sand 50%
195						same
200	9:13 12:57					dk grey clay 20%, coarse sand 50%, gravel 30%
205						fine gravels & gravel size chips ~100% some sand chips mostly dk blue
210	13:08					increasing sand & sand size chips
215						grey clay 10%, coarse sand 50%, gravel & gravel size chips 40%
220	3:18 13:27					clay to 20%, coarse sand 40%, fine gravel 40%
225						decreasing fines, sand chips 80%, fine gravel 20%

LOCATION 2031 Longley Lane, Reno  
LOGGED BY B. Kearney

PROJECT Longley Lane WWTP  
Monitoring Well

# LOG OF BOREHOLE

BOREHOLE Louley Lane Monitoring Well

PAGE 4 OF 7

LOC. OR COORDS.

N 39° 29.573 W 119° 45.712'

DRILLER WDC

GROUND ELEV. \_\_\_\_\_

TOTAL DEPTH 500 - feet

BOREHOLE DIAM. 8 1/2-inch pilot,  
reamed 10 5/8-inch (320')

RIG STAR 304

BIT(S) 8 1/2" tricone

FLUID  bentonite

START

FINISH

DATE 7/15/04

7/17/04

TIME 10:12

10:38

GEOPHYS. LOG ☒ YES ☐ NO

HOW LEFT \_\_\_\_\_

DEPTH	PEN. RATE	CIRC.		AIR LIFT Q(GPM)	MATERIAL	SYM- BOL	DESCRIPTION AND COMMENTS
		RET.	LOSS				
230	13:44						grey fines 30%, coarse sand 30%, fine gravel 40%
235							clay 50%, sand 20%, fine gravel 30%
240	13:55 14:01						decreasing fines, decreasing gravel, increasing sand
245							fines 50%, coarse sand 40%, fine gravel 10%
250	14:19						fines 50%, coarse sand 20%, fine gravel 30%
255							decreasing fines, increasing coarse sand
260	14:31 14:36						coarse sand > fines
265							grey fines 30%, sand 40%, gravel 30%
270	14:40						increasing fines
275							clay to 80%
280	14:55						same
285							decreasing fines, sand 80%, gravel 20%
290							same
295							fines 10%, sand 90%, fine gravel
300	15:15						same w/ increasing gravel

LOCATION 3031 Louley Lane, Reno  
LOGGED BY B. Kearney

PROJECT Louley Lane WWTP  
Monitoring Well

# LOG OF BOREHOLE

BOREHOLE Longley Lane Monitoring Well

PAGE 5 OF 7

LOC. OR COORDS. N 39° 29.573', W 119° 45.712'

DRILLER WDC

GROUND ELEV. \_\_\_\_\_

START 7/15/04 FINISH 7/17/04

TOTAL DEPTH 500-feet

RIG STAR 30K

TIME 10:12 10:38

BOREHOLE DIAM. 8 1/2-inch pilot  
reamed 10 5/8-inch (320')

BIT(S) 8 1/2" tri-cone

GEOPHYS. LOG ☒ YES ☐ NO

FLUID bentonite

HOW LEFT \_\_\_\_\_

DEPTH	PEN. RATE	CIRC.		AIR LIFT Q(GPM)	MATERIAL	SYM-BOL	DESCRIPTION AND COMMENTS
		RET.	LOSS				
	15:22						
305							finer 10%, sand 80%, fine gravel 10%
310							finer 10%, sand 20%, fine gravel 70%
315							decreasing gravel
320	15:54						finer 40%, sand 20%, gravel 40%
325	16:00						finer 60%, sand 30%, gravel 20%
330							same
335							increasing fines
340	16:22						finer 40%, coarse sand 30%, fine gravel 10%
345	16:29						increasing gravel to 30%
350							
355							increasing clay, increasing gravel
360	16:40						clay 30%, sand 50%, fine gravel 20%
365							increasing clay, decreasing gravel
370							clay 60%, sand 30%, gravel 10%
375							increasing sand

LOCATION 3031 Longley Lane, Reno  
LOGGED BY B. Kearney

PROJECT Longley Lane WWTP  
Monitoring Well

# LOG OF BOREHOLE

BOREHOLE Longley Lane Monitoring Well

PAGE 6 OF 7

LOC. OR COORDS.

N 39° 29:57.3' W 119° 45.712'

DRILLER WDC

GROUND ELEV. \_\_\_\_\_

TOTAL DEPTH 500-feet

BOREHOLE DIAM. 8 1/2-inch pilot  
reamed 10 5/8-inch (320')

RIG STAR 30K

BIT(S) 8 1/2 tri-cone

FLUID  Bentonite

START

DATE 7/15/04

TIME 10:12

FINISH

7/17/04

10:38

GEOPHYS. LOG ☒ YES ☐ NO

HOW LEFT \_\_\_\_\_

DEPTH	PEN. RATE	CIRC. RET.	CIRC. LOSS	AIR LIFT Q (GPM)	MATERIAL	SYMBOL	DESCRIPTION AND COMMENTS
380				17:10 17:20			clay 50%, sand 40%, gravel 10%
385							same
390							clay 80%, sand 10%, gravel 10%
395							same
400				17:47 17:56			clay 50%, sand 10%, trace gravel
405							same
410							increasing sand, clay >> sand
415							sand 40%, clay 50%, gravel 10%
420				18:18 18:21			decreasing sand
425							clay 80%, sand 20%, trace gravel
430							clay 60%, gravel 30%, sand 10%
435							decreasing gravel, increasing sand
440				18:42			clay 80%, sand 20%, trace gravel
445				7/17/04			gravel 80%, clay 20% probably gravel falling into hole!!
450							clay 60%, gravel 40%

LOCATION 3031 Longley Lane, Reno  
LOGGED BY B. Kearney

PROJECT Longley Lane WWTP  
Monitoring Well

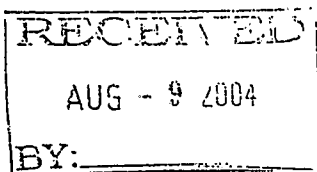
# LOG OF BOREHOLE

**BOREHOLE** Longley Lane Monitoring Well

PAGE 7 OF 7

LOC. OR COORDS. _____ N 39° 29.573' W 119° 45.712'	DRILLER <u>WDC</u>	<u>START</u>	<u>FINISH</u>
GROUND ELEV. _____	_____	DATE <u>7/15/04</u>	<u>7/17/04</u>
TOTAL DEPTH <u>500-feet</u>	_____	TIME <u>10:12</u>	<u>10:38</u>
BOREHOLE DIAM. <u>8 1/2-inch pilot</u>	RIG <u>STAR 30R</u>	GEOPHYS. LOG <u>X</u> YES ___NO	
<u>reamed 10 5/8-inch (to 320')</u>	BIT(S) <u>8 1/2" tricone</u>	HOW LEFT _____	
	FLUID <u>bentonite</u>	_____	

DEPTH	PEN. RATE	CIRC.		AIR LIFT Q (GPM)	MATERIAL	SYM-BOL	DESCRIPTION AND COMMENTS
		RET.	LOSS				
455						///	increasing sand
460						///	clay 60%, sand 20%, gravel 20%
465	21 8 1/2 min					///	increasing clay, still some gravel (likely falling into borehole)
470						///	same, clay stiffer
475						///	
480	10:14 10:23					///	
485						///	increasing sand
490						///	increasing sand to 50%, clay / sand lenses?
495						///	dark clay, stiff
500	10:38					///	clay > sand
borehole completed to 500'							



Sierra  
Environmental  
Monitoring, Inc.

## Laboratory Analysis Report Report ID: 62492

Eco Logic Consulting Engineers  
Attn: Dale Bugenig  
10381 Double R Blvd.  
Reno, NV 89521

Date: 8/9/2004  
Client: ECO-500  
Taken by: B. Kearney  
PO #: 5500001827

Sample ID: S200408-0303      Customer Sample ID: WCUD03-003.3.2.1-1  
Date Sampled: 8/4/2004      Time Sampled: 8:30 AM      Date Received: 8/5/2004

Parameter	Method	Result	Units Of Measure	MCL	Analyst	Date Analyzed
Arsenic - ICP-MS	EPA 200.8	0.032	mg/L	0.01 mg/L	Tretten	8/9/2004
Iron - ICP-OES	EPA 200.7	0.11	mg/L	0.3 mg/L	Li	8/9/2004
Manganese - ICP-MS	EPA 200.8	0.083	mg/L	0.05 mg/L	Tretten	8/9/2004

SAMPLE WATER AS TESTED    DID X DID NOT MEET DRINKING WATER STANDARDS.

Sample ID: S200408-0304      Customer Sample ID: WCUD03-003.3.2.1-2  
Date Sampled: 8/4/2004      Time Sampled: 10:30 AM      Date Received: 8/5/2004

Parameter	Method	Result	Units Of Measure	MCL	Analyst	Date Analyzed
Arsenic - ICP-MS	EPA 200.8	0.033	mg/L	0.01 mg/L	Tretten	8/9/2004
Iron - ICP-OES	EPA 200.7	0.07	mg/L	0.3 mg/L	Li	8/9/2004
Manganese - ICP-MS	EPA 200.8	0.069	mg/L	0.05 mg/L	Tretten	8/9/2004

SAMPLE WATER AS TESTED    DID X DID NOT MEET DRINKING WATER STANDARDS.

Sample ID: S200408-0305      Customer Sample ID: WCUD03-003.3.2.1-3  
Date Sampled: 8/4/2004      Time Sampled: 3:30 PM      Date Received: 8/5/2004

Parameter	Method	Result	Units Of Measure	MCL	Analyst	Date Analyzed
Arsenic - ICP-MS	EPA 200.8	0.032	mg/L	0.01 mg/L	Tretten	8/9/2004
Iron - ICP-OES	EPA 200.7	0.06	mg/L	0.3 mg/L	Li	8/9/2004
Manganese - ICP-MS	EPA 200.8	0.061	mg/L	0.05 mg/L	Tretten	8/9/2004

SAMPLE WATER AS TESTED    DID X DID NOT MEET DRINKING WATER STANDARDS.



Sierra  
Environmental  
Monitoring, Inc.

**Laboratory  
Analysis Report  
Report ID: 62492**

Eco Logic Consulting Engineers  
Attn: Dale Bugenig  
10381 Double R Blvd.  
Reno, NV 89521

Date: 8/9/2004  
Client: ECO-500  
Taken by: B. Kearney  
PO #: 5500001827

Sample ID: S200408-0306  
Customer Sample ID: WCUD03-003.3.2.1-4

Date Sampled: 8/5/2004  
Time Sampled: 6:00 AM  
Date Received: 8/5/2004

Parameter	Method	Result	Units Of Measure	MCL	Analyst	Date Analyzed
Arsenic - ICP-MS	EPA 200.8	0.032	mg/L	0.01 mg/L	Tretten	8/9/2004
Iron - ICP-OES	EPA 200.7	<0.05	mg/L	0.3 mg/L	Li	8/9/2004
Manganese - ICP-MS	EPA 200.8	0.056	mg/L	0.05 mg/L	Tretten	8/9/2004

SAMPLE WATER AS TESTED    DID X DID NOT MEET DRINKING WATER STANDARDS.

Approved By: John Kobza

Sierra Environmental Monitoring, Inc

Date: 8/9/2004

This report is applicable only to the sample received by the laboratory. The liability of the laboratory is limited to the amount paid for this report. This report is for the exclusive use of the client to whom it is addressed and upon the condition that the client assumes all liability for the further distribution of the report or its contents.

## AQUIFER TEST DATA

Washoe County Address 2031 Langley Lane Reno County Washoe State NV  
 Date 8/7/04 Company performing test ECO-LOGIC Measured by P. V. Korman

Well No. Langley Ln. MW Distance from pumping well 0 Type of test 500 - 100 gal/min Test No. 1

Measuring equipment Mini-trak data logger w/ 32 pins TD X / Macrometric 4 meter

Time Data		Water Level Data		Discharge Data		Comments on factors affecting test data
Pump on: Date 8/3 Time 7:20 (L)	Pump off: Date 8/3 Time 11:22 (R)	Static water level 592 ft	Measuring point Top of 4" well	How Q measured Meter	Depth of pump/air line 144'	
Duration of aquifer test:	Pumping Recovery	Elevation of measuring point 4.5' + 3.33'		Previous pumping? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Duration 12 hrs End 8/3	

Date	Clock time	Time since pump started min	Time since pump stopped min	Water level measurement (ft)	Correction or Conversion	Water level change s or s'	Σ Q gal/min x 100 Discharge measurement	Q gpm Rate	Q <sub>10</sub>	
8/3	7:20	0		5.90		—	25808	0		
	7:31	1.04		10.75		4.85		100		
	7:23	3.13		10.98		5.08				
	7:26	5.27		11.00		5.10				
	7:27	7.03		11.30		5.40				
	7:31	10.54		11.33		5.43				
	7:34	13.27		11.47		5.57				
	7:37	16.72		11.38		5.48				
	7:40	19.85		11.62		5.72				
	7:45	25.05		11.26		5.36				
	7:50	29.78		11.24		5.34				
	7:56	35.41		11.16		5.26				
	8:00	39.73		11.30		5.40				
	8:05	44.55		11.15		5.25				8:06 - surged to clear surge
	8:11	50.05		11.95		6.05				
	8:20	59.49		12.09		6.19				pH: 7.6, 15.5°C, 296m

## AQUIFER TEST DATA

Washoe County Address 2221 Longley Lane Reno County Washoe State NV

Date 8/2/02 Company performing test Geo-Logic Measured by B. Kearney

Well No. Longley Lake MW Distance from pumping well 0 Type of test step - 200 gal/min Test No. 4

Measuring equipment Mini-tronik data logger w/20 psi TDX / McCrometer 4" oration

Time Data					Water Level Data				Discharge Data			Comments on factors affecting test data
Pump on: Date	Time	(L)	Pump off: Date	Time	(R)	Static water level	Measuring point	Elevation of measuring point	How Q measured	Depth of pump/air line	Previous pumping? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Pumping	Recovery								Duration	End		
Date	Clock time	Time since pump started	Time since pump stopped	t/r	(Feet)	Water level measurement	Correction or Conversion	Water level	dd Water level change s or s'	$\Sigma Q$ gallons $\times 100$ Discharge measurement	Q Rate	
8/3	8:20	0				12.48			4.58		120	
	8:21	1.04				16.39			5.85			
	8:23	3.05				16.42			17.52			
	8:25	4.97				16.66			17.6			
	8:27	7.03				16.72			17.82			8:26 - 16.6' w/ w/ sampler
	8:30	9.95				16.84			17.94			
	8:34	13.03				16.93			18.03			
	8:36	15.75				16.96			18.06			pH: 7.80, 28.2 $\mu$ , 15.2°C
	8:40	19.89				17.11			18.24	2598'		
	8:45	25.05				17.24			18.34			
	8:50	29.75				17.70			18.3			8:50 - 17.76, 29.7 $\mu$ , 15.0°C
	8:56	35.41				17.35			18.45			9:00 - 2602300 gal
	9:00	39.74				17.25			18.35			9:10 - 2602900 gal
	9:05	44.59				17.37			18.47			
	9:12	50.05				17.36			18.48		210	9:05 - 17.73, 30.5 $\mu$ , 15.0°C
	9:15	55.45				17.37			18.47			

# AQUIFER TEST DATA

County Washoe County Address 3031 Longley Lane, Reno County Washoe State NV

Date 8/3/04 Company performing test UO-LOGIC Measured by B. Kramsey

Well No. Longley Ln. MW Distance from pumping well 0 Type of test STEP - 300 gal/min Test No. 1

Measuring equipment Mini-troll data logger w/ 30 psi TXR / Micrologger H- meter

<b>Time Data</b> Pump on: Date <u>8/3</u> Time <u>7:50</u> (L) Pump off: Date <u>8/3</u> Time <u>11:22</u> (P) Duration of aquifer test: _____ Pumping _____ Recovery _____		<b>Water Level Data</b> Static water level <u>5.90 ft</u> Measuring point <u>top of 5" pipe</u> Elevation of measuring point <u>13.33</u>		<b>Discharge Data</b> How Q measured <u>meter</u> Depth of pump/air line <u>144"</u> Previous pumping? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Duration <u>10 hrs</u> End <u>8/2</u>		Comments on factors affecting test data
---	--	--	--	--	--	---

Date	Clock time	Time test started	Time since pump stopped	1/r	(feet) Water level measurement	Correction or Conversion	Water level	dd Water level change s or s'	$\sum Q$ gallons x 100 Discharge measurement	Q gpm Rate	$\bar{Q}_{AV.}$	
8/3	8:21	0			17.43			1.33	26053	300		
	8:22	1.04			22.6			16.7				
	8:24	2.95			22.85			16.55				
	8:26	4.97			23.08			17.12				8:26-PH: 7.73 306 gpm, 14.7°C
	8:28	7.03			23.24			17.34				9:30 - 2603000 gal
	8:31	9.95			23.58			17.68				
	8:34	12.6			23.55			17.65				
	8:36	12.75			23.44			17.84				9:40 - 2611000 gal
	8:41	19.85			23.66			17.76		300		9:41-PH: 7.72 308 gpm, 14.7°C
	8:46	25.05			23.94			18.02				
	8:50	29.70			24.96			18.06				
	8:56	35.41			24.04			18.14				
	9:00	38.47			24.51			18.01				10:05-PH: 7.65 301 gpm, 14.7°C
	9:05	44.69			24.09			18.19				10:08 - 24.15' w/1. w/sounder
	9:11	50.05			24.19			18.26		305		9:10 - 2620200 gal
	10:20	59.49			24.02			18.12				

# AQUIFER TEST DATA

O Washoe County Address 351 Langley Lane, Reno County Washoe State NV

Date 8/2/84 Company performing test ECN-LOGIC Measured by B. Kromney

Well No. Langley Lane MN Distance from pumping well 2' Type of test step - 500 gal/min Test No. 4

Measuring equipment Mini-tronic data logger w/ 30 psi TV / MCrometer 4" meter

Time Data				Water Level Data				Discharge Data				Comments on factors affecting test data
Pump on: Date <u>8/3</u>		Time <u>7:20</u> (L)		Static water level <u>30.90 ft</u>		How Q measured <u>meter</u>		Depth of pump/air line <u>144'</u>				
Pump off: Date <u>8/3</u>		Time <u>11:22</u> (R)		Measuring point <u>top of casing at 11'</u>		Previous pumping? Yes <u>X</u> No <u></u>		Duration <u>10 hrs</u> End <u>8/2</u>				
Duration of aquifer test:		Recovery		Elevation of measuring point <u>3333'</u>								

Date	Clock time	Time since pump started (L)	Time since pump stopped (R)	Time since last reading (L/R)	Water level measurement (feet)	Correction or Conversion	Water level	Water level change (s or s')	Discharge measurement (gallons per minute)	Rate	
8/3	10:21	0			30.19		18.29		26238	400	
	10:22	1.04			30.15		24.25				
	10:24	2.95			30.48		24.58				
	10:26	4.97			30.59		24.69				
	10:28	6.98			30.52		24.72				10:30 - pit: 7.69, 313.4, 14.7°C
	10:31	9.95			30.86		24.96				
	10:34	12.96			30.85		24.95				
	10:37	15.99			31.01		25.11				
	10:41	19.89			31.07		25.17				
	10:42	20.05			31.22		25.32				
	10:44	22.45			31.22		25.41				10:47 - pit: 7.69, 314.4, 14.7°C
	10:46	25.41			31.33		25.43				10:50 - 31.32, 14.6°C
	11:01	39.74			31.43		25.53			400	11:00 - 2639, 400 gal
	11:05	44.60			31.45		25.55				11:02 - pit: 7.67, 314.4, 14.6°C
	11:11	50.04			31.53		25.63				
	11:17	56.16			31.62		25.72				
	11:27	59.45			31.67		25.77		26483		

## AQUIFER TEST DATA

Location Washoe County Address 3001 Longview, Carson City, Nevada County Washoe State NV  
 Date 8/3/04 Company performing test ECO LOGIC Measured by B. Kearn

Well No. Longview, Lake Mary Distance from pumping well 0 Type of test step recovery Test No. 1

Measuring equipment Ministat data logger

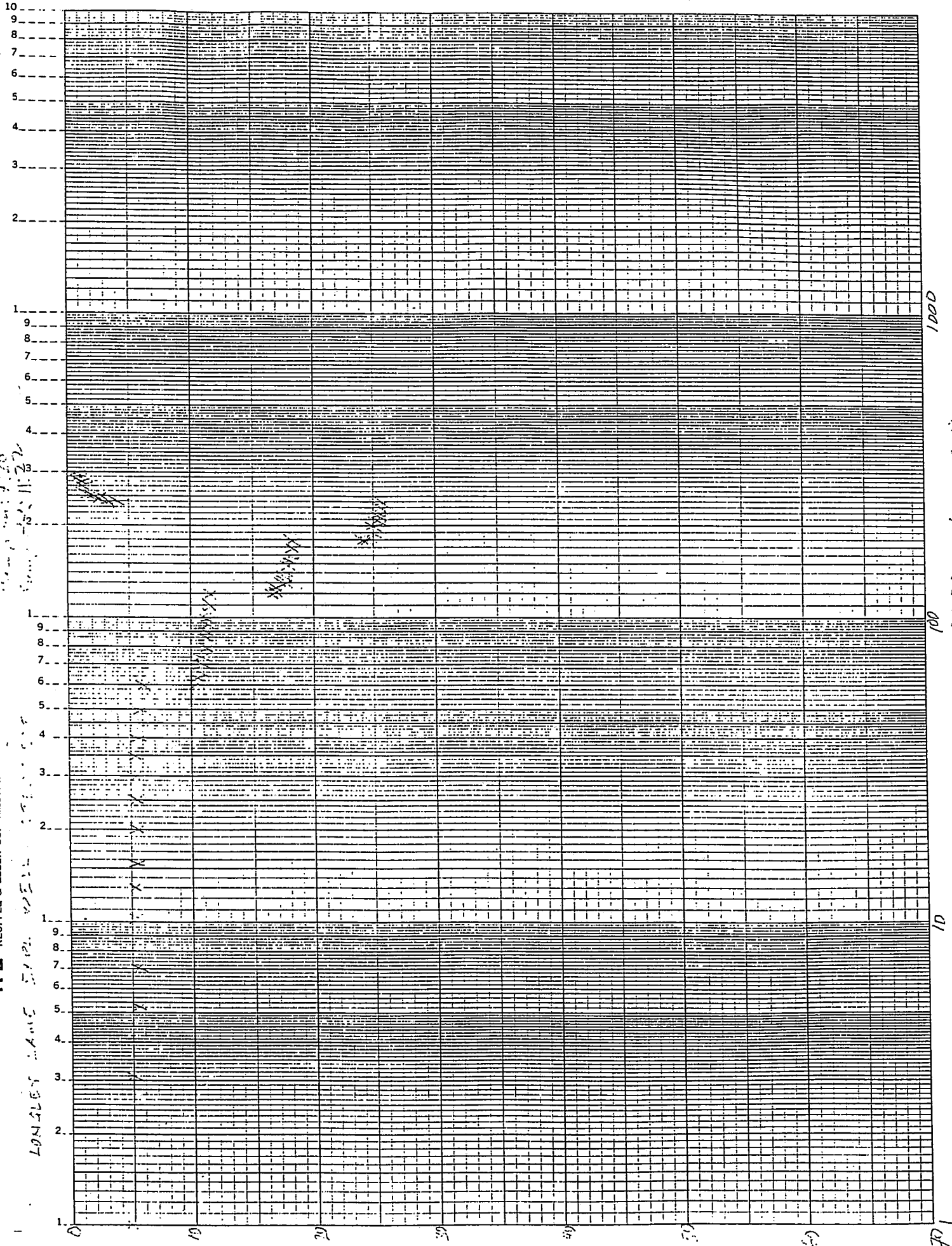
Time Data		Water Level Data		Discharge Data		Comments on factors affecting test data
Pump on: Date <u>8/3</u> Time <u>7:20 (L)</u>		Static water level <u>5.90 feet</u>		How Q measured <u>meter</u>		
Pump off: Date <u>8/3</u> Time <u>11:22 (P)</u>		Measuring point <u>100 ft. 2.2' 1.0'</u>		Depth of pump/air line <u>140'</u>		
Duration of aquifer test: _____		Elevation of measuring point <u>15.1 3.33'</u>		Previous pumping? Yes <u>X</u> No _____		
Pumping _____	Recovery _____			Duration <u>10 hrs</u> End <u>5:12</u>		

Date	Clock time	Time since started	Time since pump stopped	Water level measurement	Correction or Conversion	Water level change	dd REC. Water level change s or s'	Σ Q gallons x 100's	Q gpm	Q cfs	
8/3	11:22	0		31.61		25.7'		26483	0	0	
	11:23	1.04		15.09		4.15					
	11:25	3.16		6.22		3.31					
	11:28	4.97		8.83		2.93					
	11:30	7.09		7.31		2.62					
	11:31	8.63		6.51		2.32					
	11:35	13.28		7.96		2.06					
	11:37	15.40		7.80		1.90					
	11:41	19.60		7.61		1.71					11:47-7.41' v.l. sounded
	11:47	25.55		7.44		1.54					
	11:51	29.70		7.28		1.38					
	11:57	35.41		7.15		1.25					
	12:01	39.74		7.06		1.16					
	12:06	44.60		6.98		1.08					
	12:12	50.05		6.90		1.00					
	12:21	59.49		6.78		0.88					

K&E SEMI-LOGARITHMIC 4 CYCLES X 70 DIVISIONS  
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 6010

LONGER LANE 1000



# AQUIFER TEST DATA

Owner Washoe County Address 2201 Langley Lane, Reno County Washoe State NV

Date 3/1/04 Company performing test UIC LOGIC Measured by B. Kearney, P. Sinclair

Well No. Langley Lane 100 Distance from pumping well 0 Type of test constant Q - 400 gpm Test No. 2

Measuring equipment 1" bore hole data logger

Time Data				Water Level Data				Discharge Data			Comments on factors affecting test data
Pump on: Date <u>3/1/04</u> Time <u>7:20 (L)</u>		Time <u>7:20 (L)</u>		Static water level <u>26.80</u>		How Q measured <u>meter</u>		Depth of pump/air line <u>100'</u>		Previous pumping? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Pump off: Date <u>3/1/04</u> Time <u>7:40 (L)</u>		Time <u>7:40 (L)</u>		Measuring point <u>2201 Langley Lane</u>		Duration <u>30 min</u> End <u>8:12</u>					
Duration of aquifer test: Pumping <u>24 hrs</u> Recovery <u>24 hrs</u>				Elevation of measuring point <u>2225'</u>							
Date	Clock time	Time since pump started t	Time since pump stopped r	t/r	Water level measurement	Correction or Conversion	Water level	Water level change (30 sec)	Σ Q gallons 30 sec Discharge measurement	Rate	
3/1	7:20	0			26.80			—	26483	100	2nd AS sample collected 10:32 am
	7:25	5			26.90			21.06			
	7:30	10			26.91			22.01			
	7:35	15			26.92			22.30			
	7:40	20			26.93			22.76			
	7:45	25			26.94			23.02			
	7:50	30			26.95			23.65			
	7:55	35			26.96			23.70			
	8:00	40			26.97			23.89			
	8:05	45			26.98			24.23			
	8:10	50			26.99			24.44			
	8:15	55			27.00			24.64			
	8:20	60			27.01			24.77			
	8:25	65			27.02			25.09			
	8:30	70			27.03			25.12			
	8:35	75			27.04			25.37			
	8:36	66.76			31.17			25.37			
	8:40	70.72			31.19			25.39			2nd AS sample collected 10:32 am
	8:49	79.35			31.39			25.59			
	8:58	89.04			31.40			25.60			
	9:09	99.2			31.57			25.77			
	9:22	112.1			31.84			26.04			
	9:35	125.8			31.81			26.01			
	9:51	141.2			31.98			26.18			
	9:59	149.5			32.07			26.27			
	10:08	158.4			32.16			26.36			
	10:17	167.8			32.15			26.35			
	10:27	177.7			32.20			26.40			

## AQUIFER TEST DATA

Owner Theresa Conroy Address 431 Longview Lane County Washoe State NV

On 8/4 - 8/5/04 Company performing test LOGIC Measured by D. Sinclair B. Kearney

Well No. 1 Distance from pumping well \_\_\_\_\_ Type of test constant Q - 400 gpd/min Test No. 2

Measuring equipment Model 1000, 1000-1000, 1000-1000, 1000-1000

Time Data				Water Level Data				Discharge Data				Comments on factors affecting test data		
Pump on: Date	Time	(L)	(R)	Static water level	Measuring point	Elevation of measuring point	How Q measured	Depth of pump/air line	Previous pumping? Yes	No	Duration		End	
Pump off: Date	Time													
Duration of aquifer test:														
Pumping	Recovery													
Date	Clock time	Time since pump started	Time since pump stopped				Water level measurement	Correction or Conversion	Water level	Water level change (in ft)		Discharge measurement	Rate	
4/4	10:47	197.7					32.22			26.42				
	11:07	217.7					32.34			26.54				EC = 320 $\mu\text{S}/\text{cm}^1$ , T=15.3°C
	11:27	237.7					32.47			26.67	27527		409	1145 hrs
	11:47	257.7					32.45			26.65	27713		413	1230 hrs
	12:07	277.7					32.56			26.76				
	12:27	297.7					32.56			26.76				32.72 ft, 1319 hrs
	12:47	317.7					32.68			26.88				(sand - TOSW)
	13:07	337.7					32.63			26.83				EC = 321 $\mu\text{S}/\text{cm}^1$ , T=14.8°C
	13:37	367.7					32.64			26.84				pH = 7.64, 1500 hrs.
	14:07	397.7					32.77			26.97				
	14:37	427.7					32.78			26.98	28447		408	1530 hrs
	15:07	457.7					32.82			27.02				3rd. AS sample
	15:37	487.7					32.79			26.99				collected 1535 hrs
	16:07	517.7					32.90			27.10				
	16:37	547.7					32.98			27.18				
	17:07	577.7					32.85			27.05	2893750		409	1730 hrs
	18:07	637.7					32.91			27.11				EC = 322 $\mu\text{S}/\text{cm}^1$ , T=14.1°C
	18:27	657.7					33.10			27.30				pH = 7.65, 1830 hrs
	19:07	697.7					32.98			27.18				
	20:07	757.7					33.24			27.44				
	20:57	807.7					33.27			27.47				21:00 - pH: 7.65, 323 $\mu$ , 14.2°C
	21:07	817.7					33.34			27.51				
	22:07	877.7					33.47			27.67				
	22:37	907.7					33.30			27.50				
	23:07	937.7					33.55			27.75				23:00 - pH: 7.65, 323 $\mu$ , 14.2°C
	23:37	967.7					33.57			27.77	30408		408	23:30 - 3040800 gallons
6/5	0:07	997.7					33.65			27.85				
	1:07	1047.7					33.76			27.96				1:05 - pH: 7.65, 323 $\mu$ , 13.9°C

## AQUIFER TEST DATA

Washoe County Address 3031 Loughey Lane County Washoe State NV

Date 8/4/04 - 8/5/04 Company performing test ECO-LOGIC Measured by B. Kearney

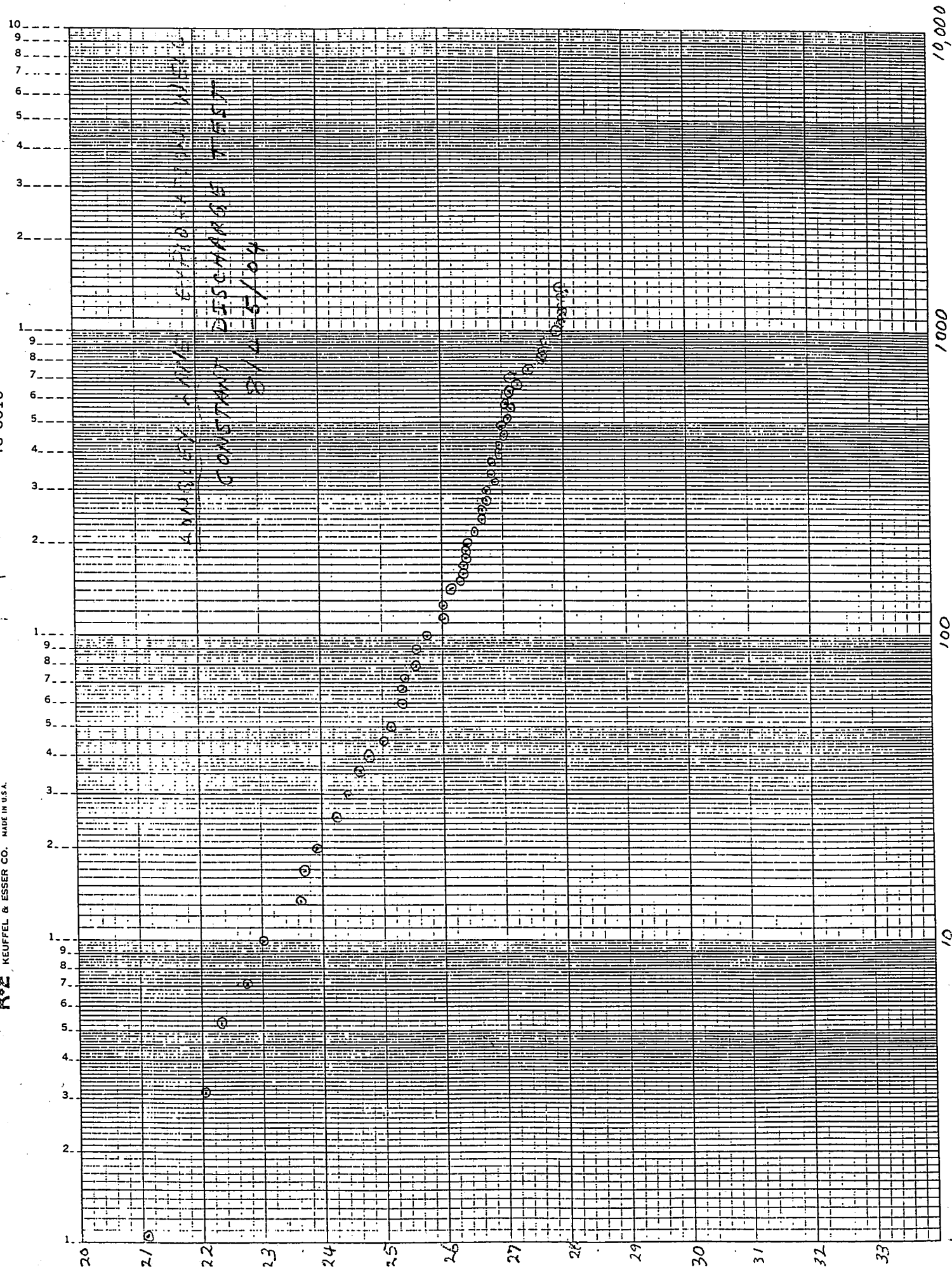
Well No. Longley Lake MW Distance from pumping well 0 Type of test constant Q - 400 gal/min Test No. 2

Measuring equipment Mini-troll data logger w/ 30psi TDX / Mcrometer 4" meter

Time Data		Water Level Data		Discharge Data		Comments on factors affecting test data
Pump on: Date <u>8/4</u>	Time <u>7:30</u> (t)	Static water level <u>5.80'</u>		How Q measured <u>meter</u>		
Pump off: Date <u>8/5</u>	Time <u>7:30</u> (r)	Measuring point <u>top of still well</u>		Depth of pump/air line <u>144'</u>		
Duration of aquifer test:		Elevation of measuring point <u>1543.32</u>		Previous pumping? Yes <u>Y</u> No <u>N</u>		
Pumping <u>24 hrs</u>	Recovery <u>24 hrs</u>			Duration <u>12 hrs</u>	End <u>8/2</u>	

Date	Clock time	Time since pump started r	Time since pump stopped r	t/r	Water level measurement	Correction or Conversion	Water level	Water level change s or s'	$\Sigma Q$ gallons $\times 100$ Discharge measurement	$Q$ gpm Rate	$\bar{Q}_{AV}$	
6/4	1:37	1087			33.75		27.55			400		
	2:07	1117			33.83		28.06					
	2:37	1147			33.84		28.04					
	3:07	1117			33.85		27.55					3:00 - pH: 7.64, 332 $\mu$ , 13.7
	3:37	1207			33.78		27.58		31388		408	w.l. - 33.84' recorded
	4:07	1237			33.74		27.56					3:30 - 31388.00 gallons +
	4:37	1267			33.63		27.89					
	5:07	1297			33.88		28.08					5:00 - pH: 7.65, 331 $\mu$ , 13.5
	5:37	1327			33.73		27.93		31278		408	5:30 - 31878.00 gallons +
	6:07	1357			33.94		28.14					
	6:37	1387			33.96		28.16					
	7:07	1417			33.85		27.95					
	7:27	1437			33.86		28.13					
	7:30								32268			3:00 - 31388.00 gallons +
												at end of test
												basic recovery
												recovery ended 8/6/04, 8
		</										

Surv. off. 7:30 6/5 46 6010



# APPENDIX 2

Contract Documents and Specifications

Longley Lane Production Well

Washoe County Department of Water Resources

**CONTRACT DOCUMENTS  
and  
TECHNICAL SPECIFICATIONS**

**LONGLEY LANE PRODUCTION WELL**

**PWP-WA-2005-191**

**Prepared by:  
Washoe County  
Department of Water Resources  
4930 Energy Way  
Reno, NV 89502**

**April 2005**

**For information regarding this project  
Please call Dan Dragan at 954-4653**

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## ATTACHMENT I

### PUBLIC WORKS INSURANCE SPECIFICATIONS

**NOTICE TO CONTRACTORS**

1. Sealed proposals will be received in the Washoe County Department of Water Resources, 4930 Energy Way Reno, Nevada 89502 until **2:00 p.m. on Tuesday, May 10th, 2005** for the **"LONGLEY LANE PRODUCTION WELL CONSTRUCTION"**. (Such sealed proposals will then be opened publicly at the Washoe County Department of Water Resources at 4930 Energy Way, Reno, Nevada).
2. The work shall consist of drilling one (1) 18.625-inch outside diameter production well including development and testing using the **dual tube flooded reverse circulation rotary method**. The production well will be approximately 315 feet deep. If a pilot borehole is drilled, it must also be completed using the **dual tube flooded reverse circulation rotary method**.
3. No proposal will be considered unless accompanied by cash, cashiers check, certified check, or bid bond, in an amount equal to five percent (5%) of the bid, made payable to the Washoe County Treasurer as provided for in the General Provisions.
4. Specifications with Bid Forms are available for public inspection and may be secured at the Washoe County Department of Water Resources, 4930 Energy Way, Reno, Nevada by prospective bidders, holding a valid State Contractor's License for the type and amount of work specified herein. Contractor must be qualified pursuant to NRS 338.1379 to bid on the contract or must be exempt from meeting such qualifications pursuant to NRS 338.1383.
5. There shall be a nonrefundable deposit of \$10.00 for each set of Specifications.
6. The project Specifications refer to the "Standard Specifications for Public Works Construction", copies of which are available from the Regional Transportation Commission, 2050 Villanova Drive, Reno, Nevada.
7. Attention of the Bidder is particularly called to the nondiscrimination provisions of NRS 338.125 and the Veteran's Preference provisions of NRS 338.130 as both are set forth in the Agreement. In addition, if the contract sum is \$100,000 or more, then the Contractor is required to pay prevailing wages for the work hereunder. Copies of the prevailing wage rates are available at the Washoe County Department of Water Resources.
8. A **pre-bid conference** will be conducted at **2:00 p.m. on Tuesday, May 3rd, 2005**. Attendance at the pre-bid conference is recommended. The conference will be held at the offices of the Washoe County Department of Water Resources, 4930 Energy Way, Reno, Nevada. A site visit will follow the pre-bid conference.

### INSTRUCTIONS TO BIDDERS

Proposals, to be entitled to consideration, must be made in accordance with the "Standard Specifications for Public Works Construction" except where modified by the following instructions:

1. Proposals shall be made on the form provided in these Specifications, and all applicable blank spaces in the form shall be filled in. Numbers for item bid shall be stated both in writing and in figures; the signatures of all persons shall be in longhand; and the completed form shall be without interlineation, alteration or erasure. The form shall be enclosed and sealed in an envelope that is to be marked; **"LONGLEY LANE PRODUCTION WELL CONSTRUCTION"**, and it shall be addressed to the Department of Water Resources, 4930 Energy Way, Reno, Nevada 89502.
2. Proposals shall not contain any recapitulation of the work to be done. No oral, telegraphic or telephone proposals or modifications will be considered.
3. The contract will be awarded to the Contractor who submits the best bid pursuant to NRS 338.
4. Should a bidder find discrepancies in or omissions from, the Drawings or documents, or should he be in doubt as to their meaning, he should at once notify the Owner, who will send a written instruction to all bidders. The Owner will not be responsible for any oral instructions.
5. Any written instructions, bulletins or Drawings issued to bidders by the Owner during the course of bidding shall be covered in the proposal and in closing a contract they will become a part thereof.
6. The Agreement Form attached hereto will be used in executing a contract for this work.
7. No proposal will be considered unless accompanied by cash, cashier's check, certified check, or bid bond, in an amount equal to five percent (5%) of the bid, made payable to the Washoe County Treasurer as provided in the General Provisions.
8. The Agreement shall be signed within ten (10) calendar days after the Contractor has received written notification of the award of the Contract.
9. A Payment Bond and a Performance Bond, each in an amount equal to one hundred percent (100%) of the total contract sum, shall be provided by the successful Contractor in accordance with the General Provisions. Said bonds shall be in favor of Washoe County. Attorneys-in-fact who sign bid bonds, payment and performance bonds, must file with each bond a certified and effectively dated copy of their power of attorney.

Contract Documents and Specifications  
Longley Lane Production Well

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10. The County reserves the right to reject any or all bids. If there are minor irregularities or informalities in any bid or in the bidding process, the County reserves the right to waive provisions of the Specifications relating to said minor irregularities or informalities.
11. Contracts for work under this proposal will obligate the Contractors and Subcontractors not to discriminate in employment practices pursuant to NRS 338.125, and that if applicable based on the Contract amount, Contractors must pay the prevailing wage rates pursuant to "Washoe County Prevailing Wage Rates For Public Works," copies of which are available at the Washoe County Utility Services Division.
12. Before submitting a bid, each bidder must (a) examine the Contract Documents thoroughly; (b) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the work, (c) familiarize himself with federal, state and local laws, ordinances, rules and regulations including the Clean Air Act, Clean Water Act, and Environmental Protection Agency regulations that may in any manner affect cost, progress or performance of the work; and (d) study and carefully correlate Bidder's observations with the Contract Documents.
13. Time of completion shall be forty-five (45) calendar days from the date specified in the "Notice to Proceed."
14. Liquidated damages, as specified in the Agreement, shall be Five Hundred Dollars (\$500.00) per calendar day.
15. Bidders do not need a Washoe County Business License at the time of bidding, but the successful bidder must have a Washoe County Business License to sign the Agreement to perform the work.
16. At the date and time of the bid opening all bidders and listed sub-contractors must be a Nevada Licensed Contractor licensed to do the type and amount of work specified in these documents.
17. Bids will be accepted only on the complete project as outlined in the scope of work. No partial bids will be accepted.
18. The bidder's attention is called to the insurance provisions. The bidder's insurance agent should be contacted prior to the bid to insure that the bidder can comply with these conditions.
19. The bidder's attention is directed to NRS 338.147. The bidders will be responsible for complying with the requirements stated herein and in accordance with NRS 338.147.

**PROPOSAL - SCHEDULE OF ITEMS AND PRICES**

Washoe County Department of Water Resources  
Utility Services Division  
4930 Energy Way  
Reno, NV 89502

Gentlemen:

I (we) hereby submit my (our) proposal for **"LONGLEY LANE PRODUCTION WELL CONSTRUCTION"**.

Having carefully examined the contract documents as described in the Agreement form, together with addenda numbered \_\_\_\_\_ and having examined all the conditions affecting the work, the undersigned proposes to furnish all labor, materials, tools and equipment called for by said documents and to contract for completion of the work as listed in the following Bid Proposal and to comply with all conditions of the Contract Documents.

**PROPOSAL - SCHEDULE OF ITEMS & PRICES**

<u>Item No.</u>	<u>Quantity</u>		<u>Description with Unit Prices In Words</u>	<u>Unit Price</u>	<u>Amount</u>
1.	1	Ea.	Mobilization and demobilization for drilling and testing (1) 18.625-Inch outside diameter production well for the lump sum price of: _____		_____
2.	20	Ft.	Drill one (1) 38-inch minimum diameter borehole to an estimated depth of 20 feet for the conductor casing at: _____ per lineal foot.		_____
3.	20	Ft.	Furnish and install 30-inch diameter steel conductor casing to an estimated depth of 20 feet at" _____ per lineal foot.		_____
4.	295	Ft.	Drill one (1) 28-inch minimum diameter bore hole with the dual tube flooded reverse circulation rotary method to an estimated depth of 295 feet at: _____ per lineal foot.		_____
5.	137	Ft.	Furnish and install 18.625-inch outside diameter blank steel well casing, including attached 2-inch diameter sounding tube, approximately 137 feet at: _____ per foot.		_____

Contract Documents and Specifications  
Longley Lane Production Well

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6. 1 Ea. Mechanical electrical isolating coupling for connection of blank steel casing and stainless steel casing for the lump sum price of:  
\_\_\_\_\_
7. 180 Ft. Furnish and install 18.625-inch outside diameter continuous Slot stainless steel well screen, including 10-foot Casing sump, approximately 180 feet at:  
\_\_\_\_\_ Per foot.
8. 36 Yd<sup>3</sup>. Furnish and install design gravel pack, Estimated 36 yard<sup>3</sup> at:  
\_\_\_\_\_ Per yard<sup>3</sup>.
9. 15 Yd<sup>3</sup>. Furnish and install sanitary grout seals, including 3-inch diameter gravel fill tube, estimated at 15 yard<sup>3</sup> at:  
\_\_\_\_\_ Per yard<sup>3</sup>.
10. 48 Hrs. Air lift development by surging, estimated 48 hours at:  
\_\_\_\_\_ Per hour.
11. 130 Ft. Furnish, install and remove necessary equipment for development and test pumping:  
\_\_\_\_\_ Per linear foot.
12. 24 Hrs. Development by pumping, estimated at 24 hours at:  
\_\_\_\_\_ Per hour

Contract Documents and Specifications  
Longley Lane Production Well

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- |     |    |      |  |                 |          |
|-----|----|------|--|-----------------|----------|
| 13. | 80 | Hrs. | Operate and maintain necessary equipment for<br>test pumping estimated at: | _____           | _____    |
|     |    |      |  | _____ per hour. | _____    |
| 14. | 1  | Each | Provide Gyroscopic Deviation Survey at the<br>lump sum price of :          | _____           | _____    |
| 15. | 1  | Each | Provide video camera log at the lump sum price of:                         | _____           | _____    |
| 16. | 1  | Ea.  | Well disinfection and capping at the lump sum<br>price of :                | _____           | _____    |
| 17. | 20 | Hrs. | Standby hours at Owner's request at<br>the rate of:                        | _____           | _____    |
|     |    |      |  | _____ per hour. | _____    |
| 18. |    | L.S. | Allowances:  |                 |          |
|     |    |      | Lump Sum Price of  |                 |          |
|     |    |      | \$ Fifteen Thousand Dollars  |                 | \$15,000 |

BID TOTAL \_\_\_\_\_

Estimates of quantities of the various items of work and materials, as set forth in the Proposal Form, are approximates only and given solely to be used as a uniform basis for the comparison. Well design and final quantities will be determined within 24 hours after sieve analyses are received by owner. If final quantities vary from the estimates by more than 25 percent, then section 153.00 of the most recent version of the Standard Specifications For Public Works Construction (the orange book) applies.

The unit prices above shall be the basis for determining the amount paid for the completed project including any increased or decreased quantities authorized by the Engineer.

Contract Documents and Specifications  
Longley Lane Production Well

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If the undersigned is notified of the acceptance of his proposal, he agrees to execute the agreement for the work covered in his proposal for the above stated prices as full compensation for furnishing all materials and labor, and doing all of the work, in strict accordance with the Contract Documents, to the satisfaction of the Owner.

The undersigned agrees, upon being notified of the acceptance of his proposal, that he shall execute the above agreement within ten (10) calendar days and commence work within seven (7) calendar days following the date of the Notice to Proceed. The undersigned further agrees to complete the work specified within the time stated in the Notice to Contractors.

The undersigned states that he has a thorough understanding of the conditions embodied in the Contract Documents and Specifications.

Enclosed find cashier's check, certified check, bidders bond or cash in an amount equal to at least five percent (5%) of the amount bid.

The Subcontractors as listed on the following page shall be those utilized for this project unless otherwise approved by the Owner and in compliance with the provisions of NRS 338.141.

NAME OF FIRM: \_\_\_\_\_

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_  
\_\_\_\_\_

DATE: \_\_\_\_\_

NEVADA CONTRACTOR'S LICENSE NO: \_\_\_\_\_

LICENSEE'S MONETARY LIMIT: \_\_\_\_\_

WASHOE COUNTY BUSINESS LICENSE: \_\_\_\_\_

WITNESS: \_\_\_\_\_

### LIST OF SUBCONTRACTORS

List below the name, address, and Contractor's license number of each subcontractor who will provide labor or a portion of the work on the project for which the subcontractor will be paid an amount exceeding 5 percent of the Contractor's total bid. In addition, for each portion of the work to be completed by a subcontractor, list that subcontractor's name, address and Contractor's license number. For each of those listed, also describe the type or kind of work the subcontractor will perform.

<u>KIND OF WORK</u>	<u>NAMES AND ADDRESSES</u>	<u>LICENSE NO.</u>
1. _____ _____ _____	_____ _____ _____	_____  _____
2. _____ _____ _____	_____ _____ _____	_____  _____
3. _____ _____ _____	_____ _____ _____	_____  _____
4. _____ _____ _____	_____ _____ _____	_____  _____

**BID BOND**

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, \_\_\_\_\_

\_\_\_\_\_, as Principal, and \_\_\_\_\_

\_\_\_\_\_  
(legal description and address of Surety)

authorized to do business of Surety in the State of Nevada, as Surety, are held and firmly bound unto Washoe County, as Owner, in the sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), (which is not less than 5% of the contract price) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, and administrators, successors, and assigns.

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 2005.

The conditions of the above obligation is such that whereas the Principal has submitted to Washoe County, a certain bid, attached hereto and hereby made a part hereof, to enter into a Contract in writing for the **"LONGLEY LANE PRODUCTION WELL CONSTRUCTION"**.

Now therefore, if said bid shall be rejected, or in the alternative, if said bid shall be accepted and the Principal shall execute and deliver a Contract in the form of contract attached hereto (properly completed in accordance with said Bid) and shall furnish a Bond for his Faithful Performance of said Contract, and a Bond for the payment of all persons performing labor or furnishing materials in connection therewith, and shall provide and comply with the insurance requirements, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void.

Otherwise, the same shall remain in force and effect, and the sum herein specified paid over to the Owner, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Owner may accept such bid; and said Surety does hereby waive notice of such extension.

In Witness whereof, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their officers, the day and year first set forth above.

**BID BOND (continued)**

(Seal)

Principal \_\_\_\_\_

By \_\_\_\_\_

(Seal)

Surety \_\_\_\_\_

By \_\_\_\_\_

STATE OF NEVADA )

) SS:

COUNTY OF WASHOE )

On this \_\_\_\_\_ day of \_\_\_\_\_, 2005, personally appeared before me, a  
Notary Public, \_\_\_\_\_, who acknowledged to me that he/she  
was the Principal authorized to sign the foregoing Bid Bond.

\_\_\_\_\_  
NOTARY PUBLIC

STATE OF NEVADA )

) SS:

COUNTY OF WASHOE )

On this \_\_\_\_\_ day of \_\_\_\_\_, 2005, personally appeared before me, a  
Notary Public, \_\_\_\_\_, who acknowledged to me that he/she  
was the Surety authorized to sign the foregoing Bid Bond.

\_\_\_\_\_  
NOTARY PUBLIC

Contract Documents and Specifications  
Longley Lane Production Well

GENERAL CONTRACTOR

\_\_\_\_\_  
(Firm Name)

\_\_\_\_\_  
(Nevada Contractors License No.)

\_\_\_\_\_  
(Name of Officer) is authorized to bid and to enter into this Contract for the above listed firm.

The firm is: (check one)

\_\_\_\_\_ a corporation \_\_\_\_\_ a partnership \_\_\_\_\_ sole proprietorship

Principal Officers:

Name

Title

Signature

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Owners Not Listed Above:

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

I \_\_\_\_\_ (Name of Officer) certify that the above lists includes all officers, Owners and financial partners of the above mentioned firm corporate structures to the best of my knowledge.

\_\_\_\_\_  
Signature and Title of Officer

**PREFERENTIAL BID STATUS**

(COMPLETION OF THIS PORTION OF THE PROPOSAL IS OPTIONAL)

In accordance with NRS 338.147, a Bidder that submits copy of a certificate of eligibility to receive a preference in bidding on public works issued to him by the state contractors board shall be deemed to have submitted a better bid than a competing contractor who has not provided a copy of such a valid certificate of eligibility if the amount of his bid is not more than 5 percent higher than the amount bid by the competing bidder.

\_\_\_\_\_ Copy of Certificate of eligibility to receive a preference in bidding is attached.  
(Initial or check if applies)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

Subscribed and sworn to this \_\_\_\_\_ day of \_\_\_\_\_, 2005.

**AFFIDAVIT OF NON-COLLUSION**

STATE OF NEVADA       )  
                                  ) SS:  
COUNTY OF               )

I, \_\_\_\_\_, (Name of Party signing this Affidavit & the  
Proposal Form) \_\_\_\_\_ (Title),  
being duly sworn do depose and say: That \_\_\_\_\_  
(name of person, firm, association or corporation) has not, either directly or indirectly, entered  
into an agreement participated in any collusion, or otherwise taken any action in restraint of free  
competitive bidding in connection with this Contract.

Signature \_\_\_\_\_

Title \_\_\_\_\_

Sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 2005.

Signature \_\_\_\_\_

Title \_\_\_\_\_

**CERTIFICATION REGARDING  
DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS  
PRIMARY COVERED TRANSACTIONS**

- (1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
- (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal, State or Local department or agency.
  - (b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or Local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.
  - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or Local) with commission of any of the offenses enumerated in paragraph (1) (b) of this certification; and
  - (d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or Local) terminated for cause or default.
- (1) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

---

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL

---

TITLE

---

APPLICANT ORGANIZATION

---

DATE SUBMITTED

**Please Note:** This signature page and any pertinent attachments that may be required by these assurances and certifications shall be attached to the applicant's Cost Proposal.

**AGREEMENT FORM**

**LONGLEY LANE PRODUCTION WELL**

THIS AGREEMENT (also herein referred to as "Contract"); is made and entered into this \_\_\_\_ day of \_\_\_\_\_, 2005, by and between Washoe County, a political subdivision of the State of Nevada, acting through the Washoe County Commissioners hereinafter called "OWNER" and \_\_\_\_\_, a General Contractor, Nevada State License No. \_\_\_\_\_ hereinafter called the "CONTRACTOR".

**WITNESSETH:**

That the OWNER and the CONTRACTOR, for the consideration hereinafter named, agree as follows:

**Article 1. Scope of Work**

The Contractor shall furnish all of the materials and perform all of the work described in the Specifications entitled "**LONGLEY LANE PRODUCTION WELL CONSTRUCTION**", prepared by the Department of Water Resources, Utility Services Division, and shall do everything required by this Agreement.

**Article 2. Time of Completion**

The work to be performed under this Agreement shall be completed within FORTY FIVE, (45), calendar days of the "Notice to Proceed."

Should the Contractor fail or refuse to complete the work within the stipulated time, including any authorized extensions of time, there shall be deducted from monies due him, not as a penalty, but as liquidated damages, the sum of Five Hundred Dollars (\$500.00) for each calendar day required to complete the work in addition to the period of time hereinbefore set forth.

**Article 3. Progress Payments**

On or about the first of each month, the Contractor shall make and certify an estimate of the amount and fair value of the work done, and may apply for partial payment therefore. The Contractor shall revise the estimate as the Owner may direct. Whenever the monthly estimate, after approval, shows that the value of the work completed during the previous month exceeds one percent (1%) of the total contract price, the Owner will process a pay request. The Owner will thereupon cause the amount therein to be paid to the Contractor. Such certificate will authorize payment in an amount equal to the value of the work completed less any sums that may be retained by the Owner.

The Owner shall retain ten percent (10%) of such estimated value of the work done as part security for the fulfillment of the Contract and shall pay monthly to the Contractor, while carrying on the work the balance not retained, after deducting therefrom all previous payments.

No partial payment shall be made when, in the judgment of the Owner, the work is not being diligently prosecuted by the Contractor.

The amount of payments withheld as provided herein shall be retained for a period of forty (40) days from the date of filing of the Notice of Completion.

Owner shall pay to Contractor at the end of each quarter this Agreement is in effect, interest for the quarter on the amount withheld at a rate to be determined by Owner in accordance with NRS 338.515. If the amount due the Contractor pursuant to this provision for any quarter is less than Five Hundred Dollars (\$500.00), the Owner may withhold the interest until: (1) the end of a subsequent quarter after which the amount of interest due is Five Hundred Dollars (\$500.00) or more; (2) the end of the fourth consecutive quarter for which no interest has been paid to the Contractor; or (3) the final payment is due under the Agreement; whichever occurs first.

Contractor shall pay the Subcontractors progress payments and pay interest on amounts retained from said progress payments in accordance with the provisions of NRS 338.510 through NRS 338.535.

**Article 4. Acceptance and Final Payment**

As soon as practical following the completion of the work, the Contractor shall make request by letter to the Owner for a final inspection and acceptance of the work, and if, in Owner's opinion, all provisions of the Specifications and Agreement have been satisfied, Owner will cause a Notice of Completion to be filed with the County Recorder.

At the expiration of forty (40) calendar days following the filing of the Notice of Completion, final payment shall be made as follows: After deducting all previous payments from the total value of the work, the remaining balance shall be paid, providing that no claims, liens or outstanding debts have been filed against the work, and the contract is not subject to arbitration or litigation between parties. Notwithstanding the expiration of forty (40) calendar days, the Contractor, upon demand by the Owner, shall submit evidence satisfactory to the Owner that all payrolls, materials, bills, and other indebtedness relating to the work performed, have been paid before final payment is made.

**Article 5. The Contract Sum**

The Owner shall pay the Contractor, as full compensation for furnishing all materials and labor and doing all the work in strict accordance with the Specifications and to the satisfaction of the Owner, the amounts as set forth in the Bid Proposal. This sum is to be paid in the manner and under the conditions hereinbefore specified.

**Article 6. Performance and Payment Bonds**

The Contractor agrees that he will before this Contract becomes effective, furnish the Owner a Faithful Performance Bond and a Labor and Material Payment Bond, furnished by a company or companies acceptable to the Owner, each in an amount equal to one hundred percent (100%) of the total Contract sum.

The Faithful Performance Bond shall be conditioned that the work under the Contract shall be performed in accordance with the specifications and terms of this Agreement and shall guarantee the work for a period of one (1) year.

The Labor and Material Payment Bond shall be conditioned to provide and secure payment for all material, provisions, provender and supplies, teams, trucks and other means of transportation used in, or upon or about the work and for any labor done thereon.

**Article 7. The Contract Documents**

The following is an enumeration of the Contract Documents, and are fully a part of the Contract as if hereto repeated:

1. NOTICE TO CONTRACTORS
2. INSTRUCTION TO BIDDERS
3. BID PROPOSAL-SCHEDULE OF ITEMS AND PRICES
4. BID BOND
5. AFFIDAVIT OF PAYMENTS FOR PREFERENTIAL BID AWARD STATUS
6. AFFIDAVIT OF NON-COLLUSION
7. DEBARMENT CERTIFICATE
8. AGREEMENT FORM
9. FAITHFUL PERFORMANCE BOND
10. LABOR AND MATERIAL PAYMENT BOND
11. SPECIAL CONDITIONS
12. STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1996
13. TECHNICAL SPECIFICATIONS
14. ATTACHMENT I - PUBLIC WORKS CONSTRUCTION INSURANCE SPECIFICATIONS
15. ATTACHMENT II - PREVAILING WAGE RATES
16. ADDENDA \_\_\_\_\_
17. SPECIFICATIONS Prepared by Washoe County, Utility Services Division, titled "Longley Lane Production Well" dated April, 2005.
18. ANY VALIDLY EXECUTED CHANGE ORDER, DIRECTIVES OR AMENDMENTS HERETO

**Article 8. Nondiscrimination:** In accordance with NRS 338.125, in connection with the performance of work under this contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex or age. Such agreements shall include, but not be limited to, the following: Employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. Any violation of such provision by the Contractor shall constitute a material breach of the Contract. Further, Contractor agrees to insert this nondiscrimination provision in all subcontracts hereunder, except subcontracts for standard commercial supplies or raw materials.

**Article 9. Veteran's Preference**

Contractor agrees to give preference as provided in NRS 338.130. If this provision is not complied with, the Contract shall be void, and any failure or refusal to comply with this provision shall render the Contract void.

**Article 10. Prevailing Wage Rates**

In the event that the Contract sum as listed above is One Hundred Thousand Dollars (\$100,000.00) or more, Contractor agrees that he shall pay the prevailing wage rates in effect at the time of the bid and comply with NRS 338. The Contractor shall forfeit, as a penalty to the Owner, not less than \$10 nor more than \$25 for each calendar day or portion thereof that each workman employed:

- 1) Is paid less than the designated rate for any work done under the contract, by the contractor or any subcontractor under him.
- 2) Is not reported to the labor commission and the Owner.

In addition, Contractor shall keep accurate records showing the name, occupation and actual per diem wages and benefits paid to each workman employed by him in connection with this project. The records shall be open to inspection by the Owner, its officers and agents and at all reasonable hours.

**Article 11. Indemnification/Hold Harmless**

Washoe County has established specific indemnification and insurance requirements for agreements/contracts with Contractors to help assure that reasonable insurance coverage is maintained. Indemnification and hold harmless clauses are intended to assure that Contractors accept and are able to pay for the loss liability related to their activities. Attachment 1, pages 1-5, is included by reference. All conditions and requirements identified in this Attachment shall be completed prior to the commencement of any work under this Agreement.

If this provision is not complied with, the Contract shall be void, and any failure or refusal to comply with this provision shall render the Contract void.

**Article 12. Termination**

In addition to other provisions of this Agreement, Owner has the right to terminate the Agreement without cause at any time upon giving Contractor seven (7) days notice in writing. In the event the Agreement is terminated by Owner in accordance with this provision, Owner agrees to pay Contractor for all work satisfactorily completed and for materials installed prior to the date of termination.

Contract Documents and Specifications  
Longley Lane Production Well

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first above written

**WASHOE COUNTY**

\_\_\_\_\_  
Chairman  
Board of County Commissioners

ATTEST:

\_\_\_\_\_  
Amy Harvey, Washoe County Clerk

**CONTRACTOR:**

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

STATE OF NEVADA       )  
                                  ) SS:  
COUNTY OF WASHOE    )

On this \_\_\_\_ day of \_\_\_\_\_, 2005, personally appeared before me, a  
Notary Public, \_\_\_\_\_, who acknowledged to me that he/she  
executed the foregoing Agreement.

\_\_\_\_\_  
NOTARY PUBLIC

**PERFORMANCE AND COMPLETION BOND**  
**FOR PUBLIC WORKS - REQUIRED PURSUANT TO NRS CHAPTER 339**

KNOW ALL MEN BY THESE PRESENTS: That \_\_\_\_\_

\_\_\_\_\_  
(Name and Address [or legal description] of Contractor)

As Principal, hereinafter called "Principal", and \_\_\_\_\_

\_\_\_\_\_  
(Legal Designation and Address of Surety)

authorized to do business of surety in the State of Nevada, as Surety, hereinafter called "Surety", are held and firmly bound unto Washoe County, a political subdivision of the State of Nevada, as Obligee, hereinafter called "Owner", in the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) said sum being 100% of the contract amount payable by the Owner under the terms of the Contract referred to below, for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated \_\_\_\_\_, 2005, entered into a contract with Owner for construction of the **LONGLEY LANE PRODUCTION WELL CONSTRUCTION** which contract and its specifications are attached hereto and by reference made a part hereof, as if fully and completely set out in full herein, and is hereinafter referred to as the "Contract"; and

WHEREAS, said Principal is required by the Nevada Revised Statutes 339.025, and all act amendatory thereof and supplemental thereto, to furnish a bond in connection with said Contract guaranteeing the faithful performance thereof; and

WHEREAS, the Principal under the terms of the Contract agrees to replace and/or repair without cost to the Owner any damage or imperfections due to faulty labor or materials incorporated in said work, including the landscaping, for a period of one (1) year, from and after the date of completion and acceptance by Owner of the work contracted to be performed.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH that if Principal shall well and truly perform and complete in all its parts of the work described in said Contract within the time and in the manner therein specified and shall, for a period of one (1) year from the date of the work contracted to be performed is completed and accepted by Owner, replace and repair any and all defects arising in said work, whether resulting from defective material or workmanship, and shall also observe, perform, fulfill, and keep all and every covenant and agreement in said Contract on the part of the Principal to be kept, performed and complied with within the time and manner therein specified and shall truly and fully comply

Contract Documents and Specifications  
Longley Lane Production Well

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with all guarantees required in said Contract, then this obligation shall become null and void; otherwise, it shall remain and be in full force and effect.

And the said Surety, for value received, hereby stipulates and agrees, if requested to do so by the Owner, to perform and fully complete the work mentioned and described in said Contract, pursuant to the terms, conditions, and covenants thereof, if for any cause, said Principal fails or neglects to so perform and fully complete said work; the said Surety further agrees to commence said work to full completion within twenty (20) days after notice thereof from the Owner, and to fully complete the same with all due diligence and in accordance with the specifications.

Further, Surety for value received, hereby stipulates and agrees that no prepayment or delay in payment and no change, extension, addition, or alteration of the work or any provision of the Contract or in the plans, profiles, detailed drawings, specifications, and no extension of time and no forbearance on the part of the Owner shall operate to release or exonerate the Surety upon this bond, and consent thereto without notice to or consent by Surety is hereby given, and Surety hereby waives provisions of any law relating thereto. It is expressly agreed and understood that this bond is made and executed contemporaneously with the Contract above mentioned, and in consideration of the covenants and agreements therein made and entered into on the part of the Owner; and that the due execution and delivery hereof is condition precedent to liability on the part of the Owner; on said above mentioned Contract. It is further understood and agreed that this bond is made in compliance with NRS 339.025 and all acts amendatory thereof and supplemental thereto; and that all benefits therein set forth inure to the benefits of the Owner.

IN WITNESS WHEREOF, the above bounden Principal and the above bounden Surety have hereunto set their hands and seals, this \_\_\_\_\_ day of \_\_\_\_\_, 2005.

PRINCIPAL: \_\_\_\_\_

By: \_\_\_\_\_  
(Note: Signature to be Notarized)

Type: \_\_\_\_\_

Title: \_\_\_\_\_

State of Nevada Contractor's License #

Subscribed and sworn to before me this

\_\_\_\_\_ day of \_\_\_\_\_, 2005.

\_\_\_\_\_  
Notary Public

Contract Documents and Specifications  
Longley Lane Production Well

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Surety:

\_\_\_\_\_  
Name of Surety

By: \_\_\_\_\_  
(Note: Signature to be Notarized)

Type: \_\_\_\_\_  
Attorney-in-Fact

Amount of Bond Premium (to be filled in by the Surety Company):

\$ \_\_\_\_\_

Subscribed and sworn before me this \_\_\_\_\_ day of \_\_\_\_\_, 2005.

\_\_\_\_\_  
Notary Public

Surety' Licensed Nevada Resident Agent: \_\_\_\_\_

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

By: \_\_\_\_\_  
(Note: Signature to be Notarized)

Type: \_\_\_\_\_

Bond No. \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 2005.

\_\_\_\_\_  
Notary Public

**LABOR AND MATERIAL PAYMENT BOND**  
**FOR PUBLIC WORKS - REQUIRED PURSUANT TO NRS CHAPTER 339**

KNOW ALL MEN BY THESE PRESENTS: That \_\_\_\_\_

\_\_\_\_\_  
(Name and Address [or legal designation] of Contractor)

as principal, hereinafter called "Principal", and \_\_\_\_\_

\_\_\_\_\_  
(Legal designation and address of Surety)

authorized to do business of surety in the State of Nevada, as Surety, hereinafter called "Surety", are held and firmly bound unto Washoe County, a political subdivision of the State of Nevada, as Obligee, hereinafter called "Owner", for the use and benefit of claimants supplying labor or materials to the Principal or to any of the Principal's subcontractors in the prosecution of the work provided for in the Contract referred to below in the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) said sum being 100% of the contract amount payable by the Owner under the terms of the Contract referred to below, for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated \_\_\_\_\_, 2005, entered into contract with Owner for construction of **LONGLEY LANE PRODUCTION WELL CONSTRUCTION** which contract and its specifications are attached hereto and by reference made a part hereof, as if fully and completely set out in full herein, and is hereinafter referred to as the "Contract"; and

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, and shall save and hold harmless and indemnify Owner from and against any and all claims and demands of liens for work performed and materials supplied, then this obligation shall be void; otherwise it shall remain in full force and effect.

THIS BOND is executed for the purpose of complying with the laws of the State of Nevada as contained in Chapter 339 of the Nevada Revised Statutes and all acts amendatory thereof and supplemental thereto, and this Bond shall inure to the benefit of any and all persons who perform labor upon or furnish materials to be used in or furnish appliances, teams or power contributing to the work described in said Contract, in accordance with provisions of Chapter 339 of Nevada Revised Statutes.

Contract Documents and Specifications  
Longley Lane Production Well

Any suit or action brought on this bond shall be maintained in accordance with provisions as set forth in Chapter 339 of Nevada Revised Statutes, and all acts amendatory thereof and supplemental to.

IN WITNESS WHEREOF, the above bounden Principal and the above bounden Surety have hereunto set their hands and seals, this \_\_\_\_\_ day of \_\_\_\_\_, 2005.

PRINCIPAL: \_\_\_\_\_

By: \_\_\_\_\_  
(Note: Signature to be Notarized)

Type: \_\_\_\_\_

Title: \_\_\_\_\_

State of Nevada Contractor's License #

Subscribed and sworn to before me this  
\_\_\_\_\_ day of \_\_\_\_\_, 2005.

\_\_\_\_\_  
Notary Public

Surety:

\_\_\_\_\_  
Name of Surety

By: \_\_\_\_\_  
(Note: Signature to be Notarized)

Type: \_\_\_\_\_

Attorney-in-Fact

Amount of Bond Premium (to be filled in by the Surety Company):

\$ \_\_\_\_\_

Subscribed and sworn before me this \_\_\_\_\_ day of \_\_\_\_\_, 2005.

\_\_\_\_\_  
Notary Public

Surety' Licensed Nevada Resident Agent: \_\_\_\_\_

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Contract Documents and Specifications  
Longley Lane Production Well

By: \_\_\_\_\_  
(Note: Signature to be Notarized)

Type: \_\_\_\_\_

Bond No. \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 2005.

\_\_\_\_\_  
Notary Public

### **GENERAL PROVISIONS**

The "Standard Specifications for Public Works Construction," 1996 edition shall be used for this project. The General Provisions of the "Standard Specifications for Public Works Construction," 1996 edition, shall also apply and be a part of these Contract Documents, except for the Insurance and Arbitration provisions which shall be governed by the terms of Attachment 1.

## **SPECIAL CONDITIONS**

### **1. GENERAL**

This section of the Specifications covers the Special Conditions applicable to the project, which are not covered by the General Provisions or the Well Specifications.

### **2. PRECONSTRUCTION CONFERENCE**

Prior to the commencement of the Work, a pre-construction conference will be held at a mutually agreed time and place. The purpose of the meeting is to designate personnel and establish a working relationship between the parties. Matters requiring coordination will be discussed and procedures for handling such matters established.

The following groups shall attend the conference:

- Contractor and his Superintendent
- Owner and all Resident Project Representatives
- Governmental Representatives as appropriate

The meeting Agenda shall consist of the following topics:

- Contractor's Schedule
- Review and distribution of Contractor's submittals
- Processing Applications for Payment
- Maintaining Documentation
- Critical Work Path
- Field Decisions and Change Orders
- Office and Storage Areas
- Major Equipment Deliveries and Priorities
- Contractor's Assignments for Safety
- Confined Space Entry Safety Plan
- Traffic Control Measures
- Site Visit

### **3. PERMITS, CERTIFICATES, LICENCES**

Contractor shall obtain all necessary administrative approvals including, but not limited to permits, certificates, and licenses required in the performance of his work.

**4. LIQUIDATED DAMAGES**

Should the Contractor fail to complete the work or any part thereof in the time agreed upon in the contract, the Contractor will be subject to liquidated damages of up to \$500 per calendar day for each day after the time has expired. In addition to other possible damages the Owner is authorized to use liquidated damages to pay additional costs for Engineering and/or Inspection, and such other costs as are incurred as a result of the delay in completion of this project within the specified time limit.

**5. COPIES OF DOCUMENTS**

The Owner will furnish to the Contractor up to six (6) copies of the Specifications and Drawings as are reasonably necessary for the execution of the work. Additional copies will be furnished upon request, at the cost of reproduction.

**6. WARNING SIGNS AND BARRICADES**

The Contractor shall provide adequate barriers, warning signs, lights, temporary signals, and other protective devices. All warning devices shall conform to the Manual on Uniform Traffic Control Devices for Streets and Highways published by the U.S. Department of Transportation Federal Highway Administration, current edition.

**7. INTERFERING STRUCTURES AND UTILITIES**

The Contractor will be permitted to use available land belonging to the Owner, on or near the site of the Work for construction purposes, and for the storage of materials and equipment. The location and extent of the areas so used shall be coordinated with the Owner. The Contractor shall immediately move stored materials or equipment if any occasion arises, as determined by the Owner, requiring access to the storage area. Materials or equipment shall not be placed on the property of the Owner until the Owner has agreed to the location to be used for storage.

The Contractor shall exercise all possible caution to prevent damage to existing structures, facilities, and utilities, whether above ground or underground. While the information has been compiled from the best available sources, its completeness and accuracy cannot be guaranteed and it is presented simply as a guide to possible difficulties. The Contractor shall notify all utility offices concerned at least 48 hours in advance of construction operations in which a utility's facilities may be involved. This shall include, but not be limited to above and below ground irrigation, sewer, effluent reuse, water, telephone, electric, oil, gas, and television sources.

It shall be the responsibility of the Contractor to locate and expose all existing underground structures and utilities in advance of borehole drilling. Any structure or utilities damaged by the work shall be repaired or replaced in a condition equal to or better than the condition prior to the damage. Such repair or replacement shall be accomplished at the Contractor's expense without additional compensation from the Owner.

If the Contractor encounters existing structures which would prevent construction, that are not properly shown on the Plans, he shall notify the Owner before continuing with the construction in order that the Owner may make such field revisions as necessary to avoid conflict with the existing structures. If the Contractor shall fail to so notify the Owner when an existing structure is encountered, but shall proceed with the construction despite this interference, he shall do so at his own risk. In particular, when the location of the new construction, as shown on the Plans, will prohibit the restoration of existing structures to their original conditions, he shall notify the Owner so field relocation may be made to avoid the conflict.

#### **8. CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE**

Contractor shall be responsible for all areas of the site and sub-contractors in the performance of the work. The Contractor shall exert full control over the actions of all project personnel. The Contractor has the right to exclude from the site all persons who have no purpose related to the work or inspection. The Contractor may require all project employees, except the Owner's personnel, to observe all regulations, as he requires of his own employees.

The Contractor shall be solely and directly responsible to the Owners and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage which might result from the carrying out of the work to be done under the Contract.

In the event of interruption of either domestic or irrigation water or to other utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority. He shall cooperate with the said authority in restoration of service as promptly as possible and shall bear all costs or repairs. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is received.

Neither the Owner nor its officers or agents shall be responsible for damages to the Contractor as a result of the locations of utilities being other than those shown on the Plans or for the existence of utility lines not shown on the Plans.

**9. CLOSING STREETS AND DRIVEWAYS**

The Contractor shall obey all rules, laws, ordinances, and regulations of the state, county, and city authorities as to the closing or the barricading of public and private roads and streets. Specific reference is made to the "Manual on Uniform Traffic Control Devices, Millennium Edition," pages 6H-26 and 6H-27, "Lane Closure on Low Volume Two-Lane Road."

The work shall be carried out so as to cause a minimum of dislocation of normal commercial procedures. Traffic must be kept open on those roads and streets where detour is possible. The Contractor shall, without further or other order, provide, erect, and maintain, at all times during the progress of temporary suspension of the work, suitable barricades, fences, signs or other adequate protection and shall provide, keep, and maintain such danger lights, signals, and flagmen as may be necessary or ordered by the Owner to insure the safety of the public as well as those engaged in connection with the work. All barricades and obstructions shall be protected by signal lights which shall be kept burning from one hour before sunset until one hour after sunrise and at such other times as vision is obscured by fog, smoke, or dust.

**10. PUBLIC SAFETY AND ACCESS**

During all construction operations, the Contractor shall construct and maintain such facilities as may be required to provide access of all property Owners to their property. No person shall be cut off from access to his residence or place of business for a period exceeding eight (8) hours, unless the Contractor has made a special arrangement with the affected persons. The Contractor in the form of a door hanger shall notify residences, so affected, at least forty-eight (48) hours prior to access being interrupted. Door hangers shall be up-dated by the Contractor daily if needed.

**11. WATER AND POWER**

The Contractor shall be responsible for furnishing all required utilities for construction purposes, including but not limited to water, electrical, power, gas, telephone, and sanitary facilities. The Contractor shall pay all costs involved in securing and using such utilities.

**12. BURNING OF VEGETATION**

No burning of vegetation will be allowed.

**13. DAILY LOGS**

Driller logs showing daily progress are to be kept at the job site and marked daily as the work proceeds. The logs shall be available for inspection by the Hydrogeologist at all times. At the

completion of the work and before final payment, these logs shall be signed by the Contractor and returned to the Hydrogeologist.

#### **14. EASEMENTS**

The drilling site is owned by Washoe County. The Contractor shall confine his construction operations to within an area specified by the Owner or make special arrangements for any additional area required. Any damage to property either inside or outside the limits of the areas provided by the Owner shall be the responsibility of the Contractor.

#### **15. EROSION AND DUST CONTROL**

Contractor will be responsible to control dust along roadways to the drill site and at the drill site. The Contractor will be responsible for controlling and properly routing all water and drilling fluids that are discharged during well drilling, construction, development and aquifer testing. The Contractor will provide if necessary the proper equipment and materials to control discharge and prevent soil erosion. Any private property damaged or destroyed by discharge from well drilling, construction, and development will be repaired, replaced or reimbursed at the expense of the Contractor.

#### **16. DISPOSAL OF MATERIAL**

The Contractor shall be responsible to contain all cuttings, waste materials or other debris from the drilling and construction operation. Materials may be allowed to dry and remain on site. Dried materials shall be collected and stored in piles on site as directed by the Owner. The Contractor conform to requirements of owner for construction of containment basins, drying beds or other structures needed for waste disposal.

#### **17. WORKING HOURS**

Working may continue on a 24-hour per day schedule, however, it is the responsibility of the Contractor to make himself aware of and conform to, all State and Local requirements for noise levels and any other State or Local ordinance that may affect the performance of the work. It will be the responsibility of the Contractor to handle any complaints regarding the 24-hour work schedule.

#### **18. SANITARY FACILITIES**

The Contractor shall provide sanitary facilities at the job sites until all well drilling and construction is completed.

## **19. REFERENCE STANDARDS**

References in the Contract Documents to local codes mean all codes adopted by Washoe County and applicable to the work. Other standard codes that apply to the Work are designated in the specifications. Reference to the standards of any technical society, organization, or association, or to codes of local or state authorities, shall mean the latest standard, code, specification, or tentative standard adopted and published at the date of receipt of bids, unless specifically stated otherwise. Abbreviations used in this document are summarized in **TABLE SC-I**.

**TABLE SC-I                      Abbreviations and Symbols**

AAMA	Architectural Aluminum Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Antifriction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWPA	American Wood Products Association
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
Cs	Commercial Standard
DHI	Door and Hardware Institute
Fed Spec	Federal Specifications
FGMA	Flat Glass Marketing Association
IBBM	Iron Body, Bronze Mounted
IEEE	Institute Electrical and Electronics Engineers
IFI	Industrial Fasteners Institute
IPS	Iron Pipe Size
MIL	Military Specification
NAAMM	National Association of Architectural Metals Manufacturers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPT	National Pipe Thread
PCI	Prestressed Concrete Institute
PS	Product Standard
SAE	Society of Automotive Engineers
SCPRF	Structural Clay Products Research Foundation
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPI	Society of the Plastics Industry
SSPC	Steel Structures Painting Council
UL	Underwriters' Laboratories
USBR	U.S. Bureau of Reclamation

## WELL SPECIFICATIONS

### 1. SCOPE OF WORK, MOBILIZATION AND DEMOBILIZATION

The work to be performed includes the furnishing of all labor, materials, transportation, tools, supplies, plant equipment and appurtenances and incidentals to the project; premiums or bonds and insurance; and for all other work and operations which must be performed or costs incurred before beginning work on various contract items; unless hereinafter specifically excepted, necessary to the complete satisfactory construction, development and testing of a minimum 28-inch diameter borehole, 18.625-inch outside diameter steel cased, gravel envelope well to a depth of approximately 315 feet. All drilling, including the pilot borehole shall be drilled by the dual-wall reverse circulation rotary method. Payment for Mobilization and Demobilization will be made as follows:

When 10% of the total original contract amount is earned from other bid items, 100% of the amount bid for mobilization, or 10% of the total original contract amount, whichever is the least will be paid. Upon completion of all work on the contract, payment of any amount bid for mobilization in excess of 10% of the total original contract amount will be paid. Demobilization shall be considered incidental to mobilization.

### 2. ALLOWANCES

This section covers the furnishing of materials, equipment, and labor for any work not included in the plans, specifications, of Schedule of Items and Prices. Provisions of sections 124.00 and 125.00 of the Standard Specifications for Public Works Construction (SSPWC) apply to work covered by this specification.

A bid item has been established to compensate for any costs allowed as a result of unforeseen interferences, changes to the work, or other items in connection with constructing the improvements, which require work or material by the Contractor in addition to those items included in the Contract. The amount to be included in the Contract for such work shall be as set forth in the Proposal-Schedule of Items and Prices and must be included by the Bidder.

Payment for work covered by this specification and the associated bid item in the Proposal-Schedule of Items and Prices will be as approved by the Owner. Payment will be based on the price negotiated for the additional work, or on a cost accounting basis.

Payment will be made only for additional work performed. Depending upon the amount of additional work authorized and completed at the close of the Contract, the amount bid may be

entirely, partially, or not used. The Contractor shall not perform any work covered under this section until notified by the Owner to proceed.

### **3. CONTRACTOR QUALIFICATION**

The Contractor shall have been engaged in the business of constructing dual wall, flooded reverse circulation rotary method drilled gravel envelope wells of diameter, depth and capacity equivalent to the proposed wells for a period not less than 5 years.

The Contractor shall submit with the bid proposal at least 3 clients for which the Contractor has completed similar wells within the last 2 years. The list shall include the telephone number of a contact person representing the referenced client for which the Contractor has drilled similar wells.

The Contractor shall employ only competent workman for the execution of his work and all such work shall be performed under the direct supervision of an experienced, State of Nevada licensed well driller satisfactory to the owner.

### **4. PERMITS, CERTIFICATES, LAWS AND ORDINANCES**

The Contractor shall, at his own expense, procure all permits, certificates and licenses required of him by law of the execution of his work. He shall comply with all local, County and State regulations necessary for the performance of his work. Specific reference is made to the fact that the drill site is adjacent to Reno-Tahoe International Airport and airport officials must be notified in regards to drilling equipment specifications regarding derrick height.

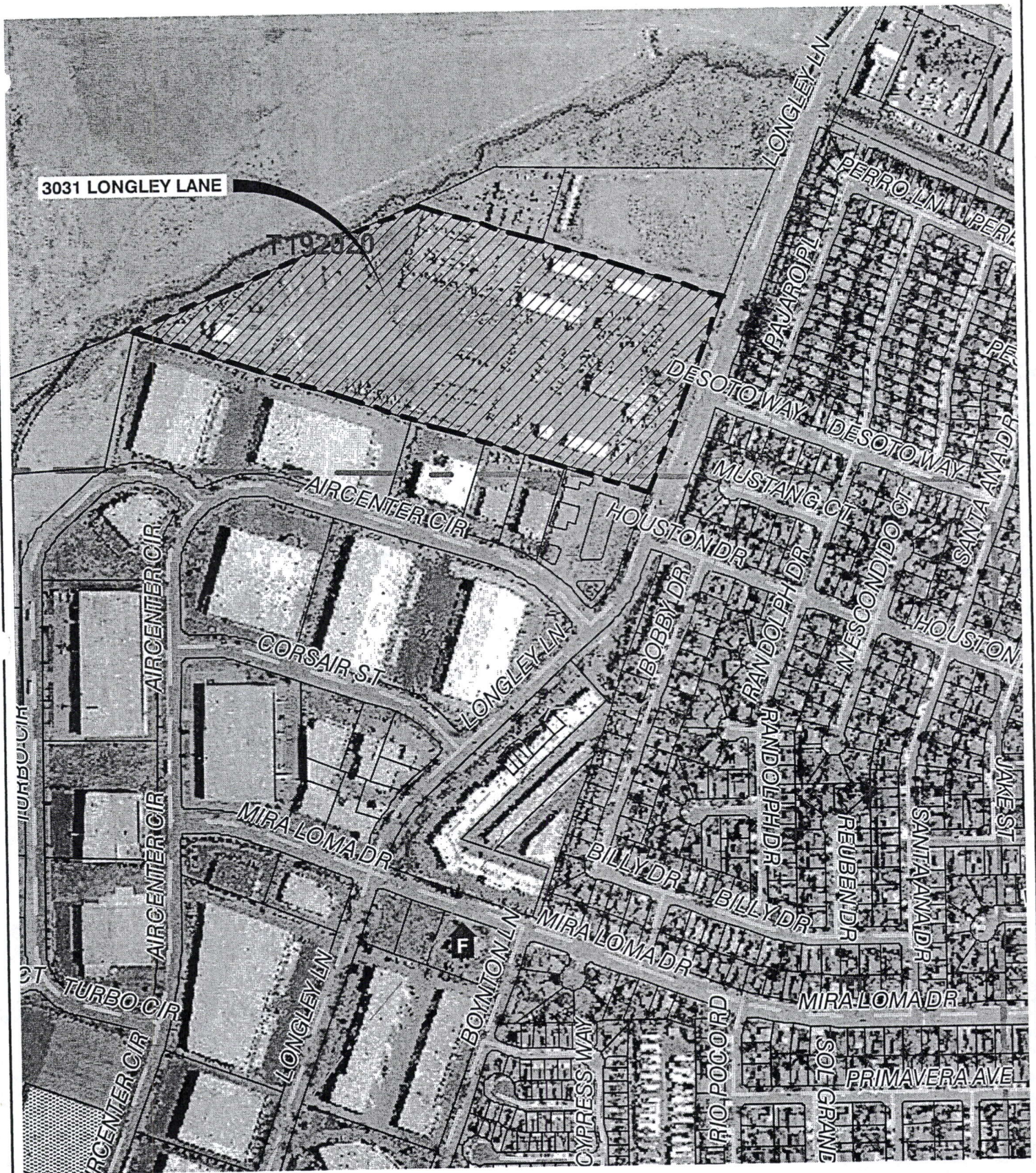
### **5. LOCATIONS AND ACCESS**

The Longley Lane Production well site is located within the Washoe County Utility Division corporation yard at 3031 Longley Lane. A site location and access map is shown in Figure 1. The Contractor shall familiarize himself with surface and subsurface conditions at the drilling site prior to bidding.

### **6. EQUIPMENT AND OPERATING REQUIREMENTS**

The equipment to be furnished shall be approved by the Owner and have excess capacity to construct the well as specified herein; and shall include the following accessory equipment:

- a. Portable, self-contained mud system with operational desanders and shale-shaker.
- b. Mud pressure gauge.



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WATER RESOURCES  
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11130 RENO, NEVADA 89502  
(775) 954-4600



LONGLEY LANE  
PRODUCTION WELL  
LOCATION MAP  
3031 LONGLEY LANE

FIG 1

- c. Weight indicator.
- d. Drill collars for added weight during early stages of drilling.
- e. Plastic sheeting or drip pans will be placed under the drill rig and all motorized equipment associated with drilling operations, development pumping and test pumping to prevent soil contamination by petroleum based products.

## **7. DRILLING FLUID CONTROL**

The Contractor shall develop and maintain a drilling fluid program that addresses mix volumes of all additives, gradual formation fluid loss, loss circulation zones and appropriate methods for measuring all required fluid properties. When it becomes necessary to add clays or chemicals to the drilling fluid, it is the Contractor's responsibility to maintain a mud system containing a minimum of clay and fine sand and to deposit a thin, easily removable filter cake on the face of the borehole. If there should be a conflict between the mud requirements for ease in drilling and the mud requirements for protection of the aquifer, then the ruling requirements shall be those for aquifer protection.

The Contractor will measure basic and complete drilling fluid properties during drilling of the injection well borehole. Basic fluid properties to be monitored shall at least include fluid viscosity and density. Basic fluid properties shall be measured a minimum of every 2 hours during a drilling shift. Complete fluid properties will at least include viscosity, density, sand content, and wall cake thickness. Complete fluid properties shall be monitored a minimum of 2 times a shift or every 100 feet of borehole drilled, whichever occurs first. Fluid properties will be measured using a Marsh Funnel for viscosity, a fluid density balance for density and sand content and a mud cake filter press for wall cake thickness. The Contractor is responsible for providing the necessary equipment and qualified personnel for performing all measurements. Copies of all recorded measurements will be supplied to the Owner.

In the event it is the opinion of the Owner that drilling fluid properties are not being maintained in the best interest of aquifer protection, the Owner may require the Contractor to obtain the services of a qualified mud engineer. The Contractor shall be responsible for any payment required for the services of the mud engineer. A mud engineer shall have the responsibility to maintain mud and loss-circulation properties in a manner meeting goals of aquifer protection. The Contractor shall monitor and maintain the fluid properties as outlined by a mud engineer. In the event the Contractor cannot attain these properties, the mud shall be replaced at no additional cost to the Owner.

## **8. WELL CONSTRUCTION**

Borehole - The production well borehole shall be drilled to the depth specified by the Owner.

Contract Documents and Specifications  
Longley Lane Production Well

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Formation samples shall be taken at 10-foot intervals and at each change in formation during drilling of the test hole. Samples shall be labeled and stored in sample bags provided by the Contractor. The Contractor shall perform grain size analyses on a minimum of two formation samples selected by the Owner. The results of the analyses shall be delivered to the Owner for review within 72 hours of sample collection. No standby time will be paid for the time period required for grain size analysis. Results shall include recommendations for gravel pack size and well screen slot size opening. Final design of the production well will be determined and submitted to the contractor within 24 hours after receipt of the sieve analysis results by the owner. The surface casing borehole shall be a minimum diameter of 38-inches to an anticipated depth of 20 feet. The production well borehole shall be a minimum diameter of 28-inches to an anticipated total depth of 315 feet.

Payment for the 38-inch diameter conductor casing borehole shall be based on a per foot basis as outlined in the "SCHEDULE OF ITEMS AND PRICES" for the total footage drilled at the request of the Owner. No payment shall be made for over drilling as desired by the Contractor.

Payment for the 28-inch diameter production casing borehole shall be based on a per foot basis as outlined in the "SCHEDULE OF ITEMS AND PRICES" for the total footage drilled at the request of the Owner. No payment shall be made for over drilling as desired by the Contractor.

Pipe and Casing – All production and conductor well casing shall be spiral welded, fabricated or mill-type black steel pipe. Steel for fabricated pipe shall conform to ASTM Standard A 139, Grade B with 0.2% copper by ladle analysis, or with steel conforming to ASTM A 242. The production well casing shall have a **18.625-inch outside diameter x 5/16 inch wall thickness**. The conductor well casing shall have a **30-inch outside diameter x 5/16 inch wall thickness**. All production and conductor casing shall be of new, first quality materials and free of defects in workmanship and handling. No reject, sub-grade or limited-use pipe is acceptable.

Payment for well casing shall be at the per foot price for casing installed at the request and approval of the Hydrogeologist as outlined in the "SCHEDULE OF ITEMS AND PRICES".

Well Screen - Well screen shall have an outside diameter of 18.625-inch outside diameter and be wire wrap or continuous slot configuration as manufactured by Roscoe Moss Corporation, US Filter/Johnson Screens or approved equal. Well screen shall be of new, first quality material, free of defects in workmanship or handling. The well screen shall be constructed of **ASTM A778 Type 316 stainless steel** and have a minimum strength of construction recommended by the manufacturer for the depth specified. Final selection for the well screen slot size will be determined from the sieve analysis and recommendations. Final selection shall be specified to the Contractor within 24 hours of receiving the sieve analysis. For bid purposes, the Contractor shall anticipate a design slot size of 100 slot (0.10 inch) in the well. A 10-foot,

Contract Documents and Specifications  
Longley Lane Production Well

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18.625-inch diameter type 316 stainless steel blank casing sump with a semi-elliptical head, including welding collar shall be welded to the bottom of the well screen.

Payment for well screen casing shall be at the per foot price for screen installed at the request and approval of the Engineer as outlined in the "SCHEDULE OF ITEMS AND PRICES".

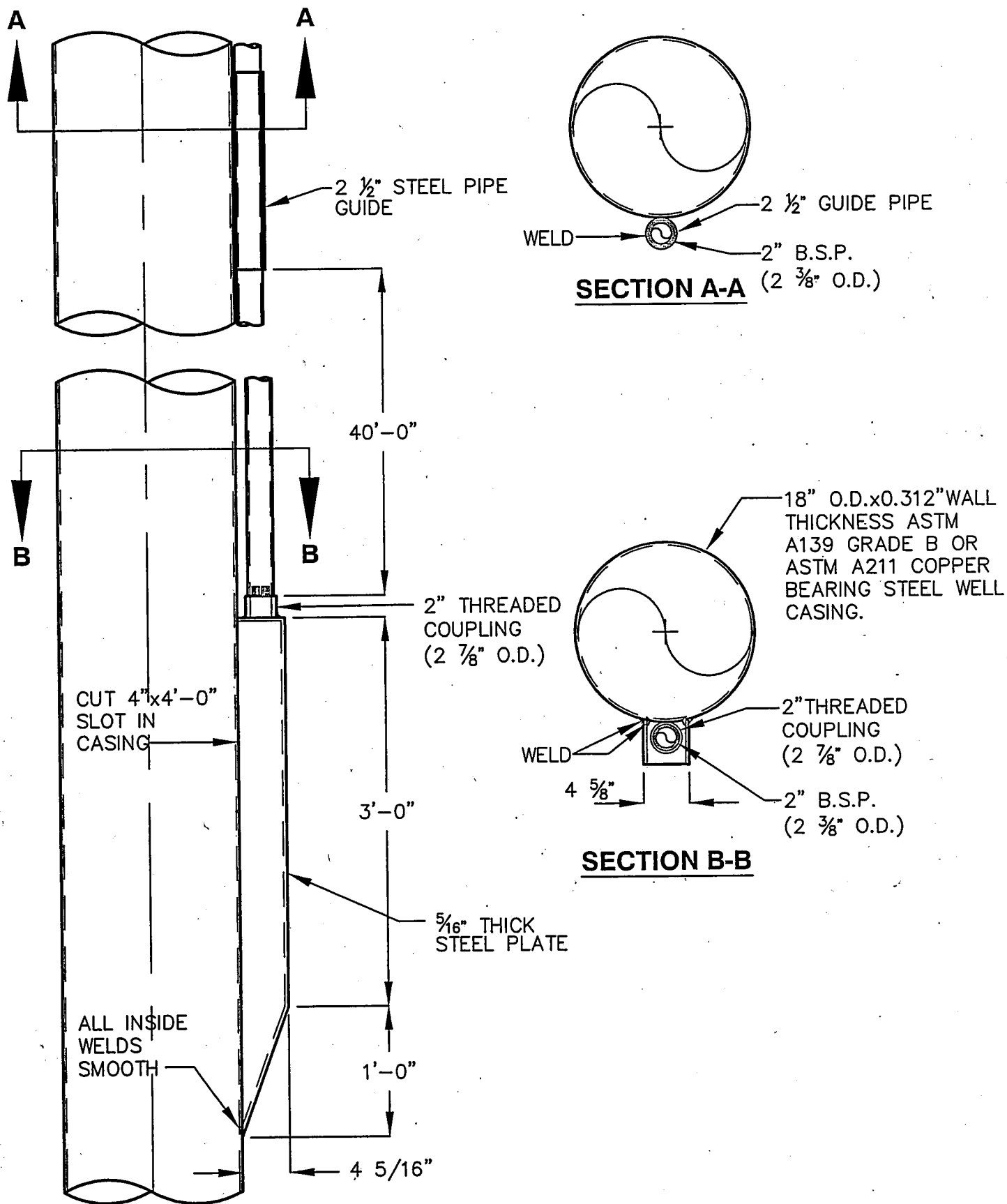
Casing, Screen, Gravel, Sounding Tube and Gravel Feed Tube Installation - The borehole shall be drilled with diligence and without undue delays. The gravel must be at or near the project site so there will be no waiting on gravel once screen and casing have been installed. The reamed well borehole shall be drilled to a minimum diameter of twenty-eight (28) inches.

Casing and screen shall be installed using methods approved by the Owner. The production well casing and screen shall be suspended above the bottom of the hole at a sufficient distance to insure that neither will be supported from the bottom. The suspended casing shall be firmly secured at the surface until gravel seal are permanently installed. The production well casing shall have centering guides approved by the Owner. Centering guides shall be installed at points specified by the Owner but in no case shall be more than 60 feet apart. Welders required for field assembly of well casing and screen shall be qualified in accordance with the latest revision of the section titled, Welding Procedures of the AWA Standard Qualification Procedure. A continuous, **watertight** full fillet weld shall join all sections and centering holes if applicable.

Connections between black steel pipe and stainless shall be in accordance with any special procedures required for connection of dissimilar metals. Contractor shall provide Hydrogeologist a description of proposed materials and mechanical electrical isolating coupling to be used for connection of dissimilar metals prior to installation of well casing. The mechanical electrical isolating coupling shall have an outside diameter of 18.625 inches with a welding collar attached.

Sounding Tube Installation - A 2-inch diameter Sounding tube shall be installed as described in Figure 2 to a depth 5 feet above the top of the well screen. Payment for the Sounding Tube shall be included with the cost for installation of the blank steel well casing.

Gravel - The gravel to be installed shall be composed of sound, durable, well-rounded particles containing no silt, clay, organic matter or deleterious materials. Gravel shall be delivered and stored at the drill site in protective bag containers. It is anticipated that the Contractor shall use Colorado Silica Sand 4 x 8-mesh size or equivalent as gravel pack for the production well. However, final gravel design will be determined within 24 hours after Owner receives results of the sieve analyses. Payment for gravel shall be at the per cubic yard price for gravel installed, as outlined in the "SCHEDULE OF ITEMS AND PRICES".



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11130 RENO, NEVADA 89502  
(775) 954-4600



LONGLEY LANE  
PRODUCTION WELL  
SOUNDING PIPE CONNECTION

FIG 2

Contract Documents and Specifications  
Longley Lane Production Well

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The Contractor shall supply Owner with a gravel invoice, stating quantity and type of gravel delivered.

The Contractor shall have the responsibility to determine when conditions with respect to drilling fluid and hole stability are satisfactory for gravel placement without bridging. Placement of gravel shall be through a tremmie pipe installed to the depth specified by the Owner. Only potable water shall be mixed with the gravel during placement through the tremmie pipe. Shoveling gravel directly into the hole or end dumping with a loader is not allowed. The gravel pack in the injection wells shall be sterilized by mixing a minimum twenty (20) pounds of 65-70%-granulated calcium hypochlorite with the gravel during placement.

The Contractor shall be responsible for placing the gravel in the annulus without bridging. Bridging of gravel pack shall be assumed if gravel packing does not utilize at least 90% of the calculated annular space volume for the total borehole depth. If the gravel bridges, the Contractor shall correct the problem with no damage to the well or drill a new well, complete, at his expense. If the Contractor chooses to drill a new well, he shall be responsible for all costs associated with properly abandoning the existing well.

The Contractor shall install a minimum 3-inch diameter galvanized steel gravel feed tube open to the top of the gravel pack to allow for future addition of gravel if necessary. The gravel feed tube shall be cemented in with the sanitary grout seal and shall be open to allow addition of gravel if necessary after the sanitary grout seal is installed.

Grout Surface Seal Installation - The annular space between the conductor casing, well casing and boreholes shall be sealed with cement grout or neat cement from an anticipated depth of 100 feet to the ground surface (20 feet to surface for conductor casing). The slurry shall be placed by positive displacement through a tremmie pipe or by the Haliburton method. The cement grout or neat cement shall consist of a mixture of 5.2 gallons of clean water mixed with each 94-lb. sack of Portland type C cement (refer to the definitions for the respective type as described in *Regulations for Water Well and Related Drilling, Nevada Department of Conservation and Natural Resources, Division of Water Resources, January 1998, pages 534-4 and 534-5.*) The cement grout shall be thoroughly mixed and free of lumps and stones and run through a protective strainer before pumping into the well. The final mix shall produce a slurry weight of 15.6 lbs./gal. Calcium chloride, bentonite or other additives are not allowed in the neat cement. The seal shall be placed in one continuous operation once the process begins. The sanitary surface seal shall be left undisturbed for a minimum of 24 hours after the final batch or lift of slurry has been placed. No standby time shall be paid during this period.

Payment for grout seal shall be at the "per cubic yard" price installed at the request and approval of the Engineer as outlined in the "SCHEDULE OF ITEMS AND PRICES". The Contractor shall provide an invoice stating the quantity of grout pumped into the annular space.

## 9. AIR LIFT DEVELOPMENT

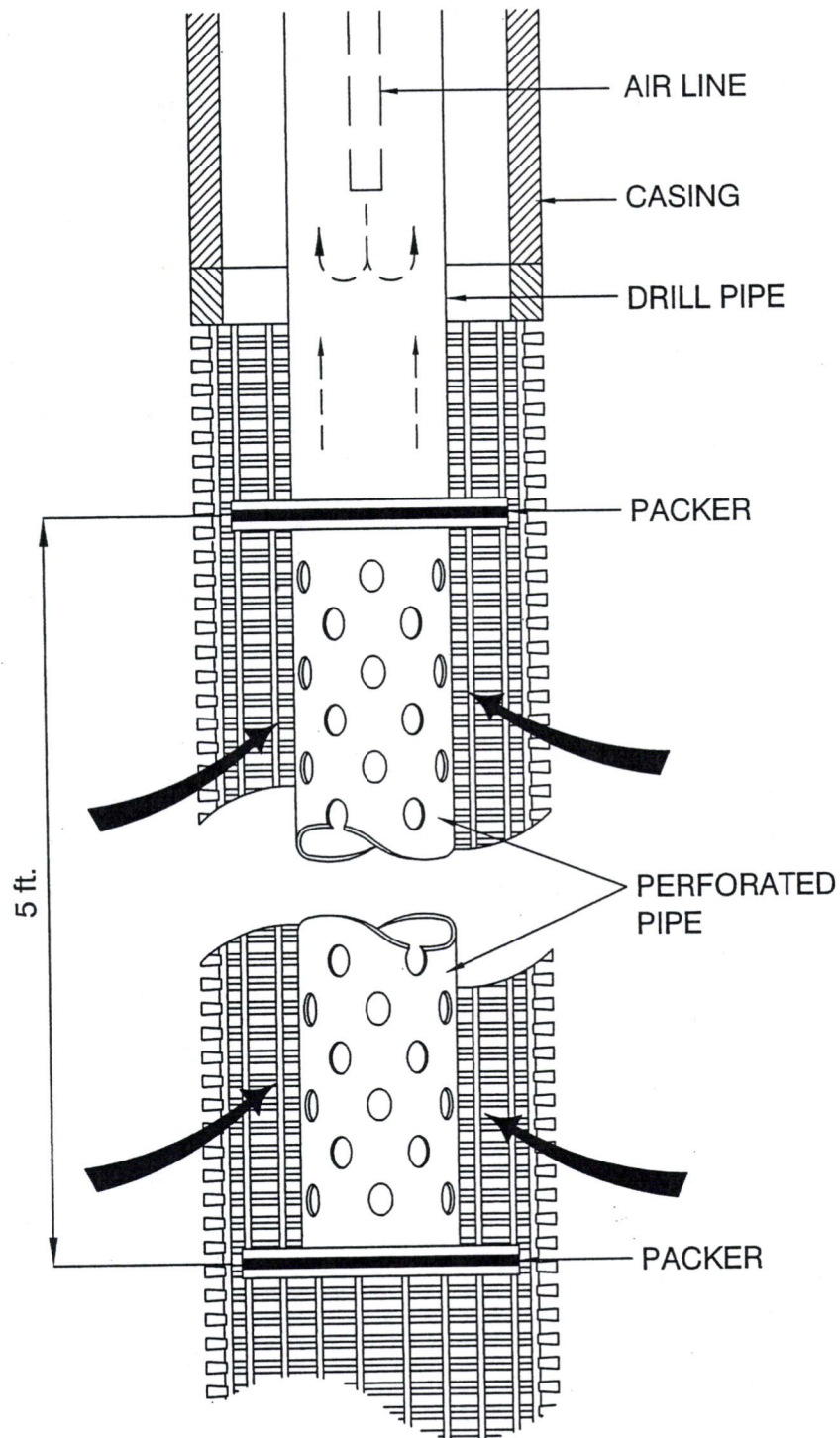
Initial well development shall be by surging. The Contractor shall provide a combination surge/air development tool that is approved by the Owner. The development tool will be comprised of double surge blocks or packers and perforated pipe and fabricated according to the diagram shown in Figure 3. For development tool description and operation, the Contractor is referred to page 515 of *Groundwater and Wells, Second Edition, Fletcher Driscoll, Johnson Filtration Systems*. The compressor for development shall have a minimum capacity to unload a minimum of 250 feet of water from a setting of 300 feet below top of casing. The compressor shall produce a minimum air volume of 400 cubic feet per minute. Contractor shall provide compressor specifications if requested by the Owner. Development by surging shall begin at the top of the screen and shall move downward gradually to the of the bottom of the well.

The Contractor will use a dispersing polymer during airlift development to facilitate breakdown of clay and polymer based fluids remaining from drilling operations. Use of phosphate products such as sodium acid pyrophosphate (SAPP) during well development is not allowed. The Contractor shall use U.S. Filter/Johnson Screens NW-220 dispersing polymer or approved equivalent and apply the dispersant in the quantity necessary to properly develop the well. It is the responsibility of the Contractor to develop the well using the selected product in a manner recommended by the manufacturer for wells of this diameter, depth and formations penetrated. Documentation of proper application volumes, ratios and method of introduction will be supplied to the Owner prior to product use. The dispersant will be mixed thoroughly and allowed to remain in the well undisturbed according to manufacturer recommendation before resuming development. No stand by time will be paid during this period. Well development by surging will continue upon completion of dispersant treatment at ten (10) foot intervals until it is the opinion of the Owner that well development is complete. The Contractor will contain and direct all discharge water produced during well development. Contractor shall sound depth of well upon conclusion of development and remove any sand or debris resulting from the development procedure.

Payment shall be at the hourly rate outlined in the "SCHEDULE OF ITEMS AND PRICES". Payment shall be for actual surging time and shall not include setup or tripping in and out of well.

## 10. PUMP DEVELOPMENT AND PUMPING TEST

**Pump Development** – The Contractor shall furnish, install operate and remove a pump for developing and testing the production well. The test pumping equipment shall include a submersible pump with a capacity of 2000 gallons per minute (gpm) from an estimated maximum pumping level of 130 feet below ground surface. The estimated static water level in the well is 6 feet below ground surface. A "Whisperwatt" or equivalent quiet running



Groundwater and Wells, Johnson Filtration Systems

Contract Documents and Specifications  
Longley Lane Production Well

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generator shall be used as the power source for the pump and furnished with a 110-volt outlet for use by the Owner during testing.

The discharge rate shall be measured during development pumping by an orifice weir and manometer. The discharge piping shall also include a new, easily operable and stable gate valve to control flow rates. All monitoring equipment shall be approved by the Owner before installation. The Contractor shall install a 1-inch diameter PVC stilling well approximately 5 feet above the pump intake when installing the pump. The PVC stilling well shall be open at the bottom and provide easy access for measuring water levels during development and testing.

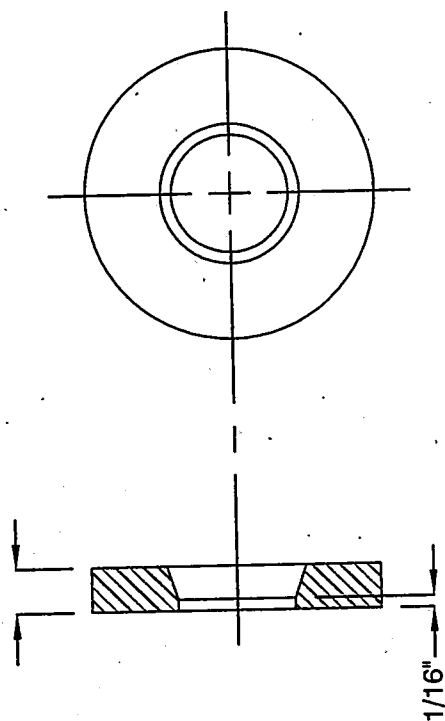
Initial development water containing excess solid material shall be contained on site in containment ponds constructed by the contractor. Once discharge clears to the satisfaction of the owner, discharge water shall be disposed of as described in the following paragraph.

The Contractor shall furnish and install discharge piping of sufficient size and length to convey discharge water from the wellhead and pumping equipment into a drainage ditch approximately 100 feet from the well. The Contractor is required to install, maintain and remove all protective liners or control devices, such as plastic sheeting and straw bales, necessary to minimize bank erosion to the drainage ditch.

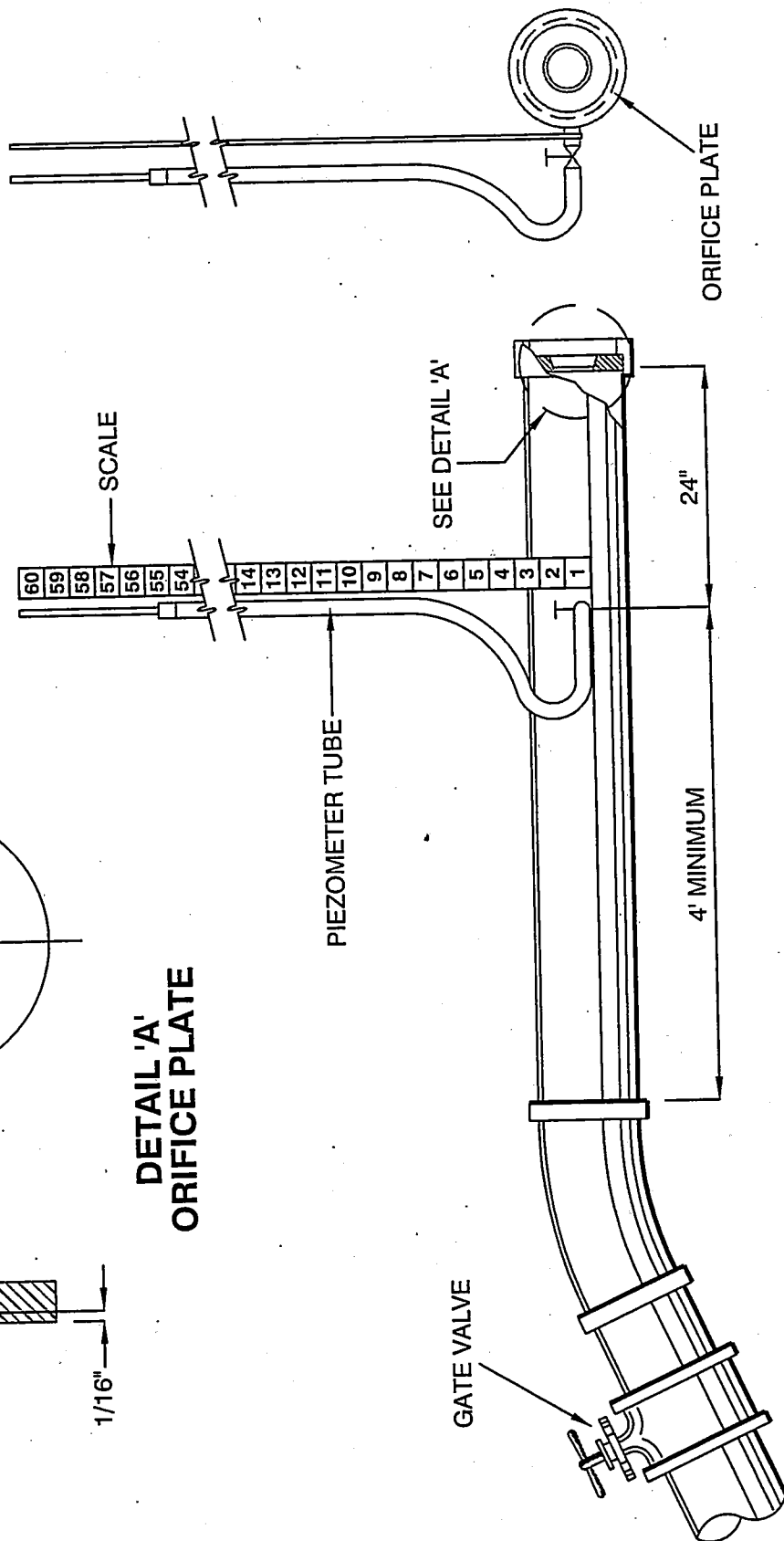
The initial pumping rate shall be restricted and as the water clears, the rate shall be gradually increased until the maximum rate is reached. The Owner shall determine the maximum rate after consideration of the well drawdown and discharge characteristics. At periodic intervals, the pump shall be stopped and water in the pump column shall be allowed to surge back through the pump bowls and into the well. The Contractor shall measure the gravel level in the gravel feed tube during development and add gravel as necessary.

The Owner shall determine when development is complete. Payment for installation and removal of development and pumping test equipment shall be at the per foot rate as outlined in the "SCHEDULE OF ITEMS AND PRICES." Payment for operation and maintenance of development and pumping test equipment shall be at the hourly rate as outlined in the "SCHEDULE OF ITEMS AND PRICES." No standby time will be paid from the end of pumping development to the start of any pumping tests.

**Pumping Tests** – Following development operations the Contractor shall perform a complete pumping test of the production well. The discharge rate shall be measured using an orifice weir and manometer that are assembled according to the construction diagram in Figure 4. The weir dimensions shall include a 10-inch diameter pipe with an 8-inch diameter orifice plate. Installation of necessary appurtenances such as the orifice weir, gate valve, and stilling well shall be approved by the Owner prior to initiation of testing for yield and drawdown. Appurtenances will be evaluated and approved by the Owner based on correct installation,



DETAIL 'A'  
ORIFICE PLATE



quality of equipment and ease of operation. The Contractor shall provide a 1/4-inch, threaded tap into the discharge line to allow attachment of a Rossum Sand Tester. The Owner shall provide and operate the sand-testing device. The Owner shall direct test pumping with the anticipated pumping scenario for the production well to include, but not be limited to the following:

a. **Step Test** – The step test will include a minimum of four different pumping rates between 800 and 2000 gpm. Each rate will be pumped for a minimum of 100 minutes. After step test completion, the well shall be allowed to recover for a minimum of 24 hours before beginning constant discharge test. No standby time will be paid during this period.

b. **Constant Discharge Test** - The constant discharge test must be continuous without interruption for a minimum of 72 hours. At the end of the 72-hour pumping period the pump may not be removed for a period of 36 hours or until approved by the Owner. If the constant discharge test is interrupted by equipment or operational failure before 72 hours of continuous pumping have elapsed, the well shall be allowed to recover before test restart, for at least the amount of time the pump ran before failure. No payment shall be made for a constant discharge test that does not extend for a minimum of 72 hours or the time specified by the Owner.

Equipment installation for all tests shall be ready to operate between 8:00 – 10:00 a.m. If test equipment is not ready to operate prior to 10:00 a.m., the scheduled test will be postponed until 8:00 a.m. the following morning with no bid item hourly rate or standby time being paid for the overnight delay. Actual measurements taken while testing for yield and drawdown will be the responsibility of the Owner. The Contractor shall maintain and operate all equipment and ensure its continuous uninterrupted operation as required.

Payment for development and testing by pumping shall be at the hourly rate specified as outlined in the "SCHEDULE OF ITEMS AND PRICES." The hourly rate does not include the time spent for equipment installation and removal.

## 11. PLUMBNESS AND ALIGNMENT

The Contractor shall guarantee that the well when completed, shall be sufficiently straight and plumb to permit the free installation and operation of a pump to be installed in a 16-inch diameter well casing. The Contractor shall conduct a gyroscopic directional survey of the total depth of the well to verify plumbness and alignment. The Gyroscopic directional tool shall record the measured depth, direction the casing is traveling, and the angle or inclination of the casing. The survey shall be recorded on VHS tape format with readings every 10 feet. The information shall be analyzed and plotted with vertical and horizontal projection prints in a clear and readable format. The Gyroscopic Deviation survey shall be performed by a Contractor experienced in such surveys such as Welenco of Bakersfield, CA or approved equal.

Failure to pass the Gyroscopic Deviation survey plumbness and alignment test shall result in rejection of the subject well. A deviation from plumbness not greater than two-thirds (2/3) the well's inside diameter per 100 feet to the bottom of the well screen is allowed. A deviation greater than this amount will be cause for rejection. No payment shall be made for any portion of the contract if the owner rejects the well. Should the well fail to pass the plumbness and alignment test and have to be abandoned, the Contractor shall be responsible for proper abandonment of the well at no cost to the Owner.

Payment for the Gyroscopic Deviation survey shall be at the lump sum price as outlined in the "SCHEDULE OF ITEMS AND PRICES".

## **12. VIDEO SURVEY**

The Contractor shall conduct a video survey after completion of surging and before disinfection and capping of the well. The video surveying equipment shall include but not be limited to: a submersible video camera unit or tools, video monitoring and video tape recorder specifically designed and constructed for underwater operation and viewing in wells. The video tape recorder shall be in VHS format. Numbers indicating the depth of the camera below the top of casing shall appear continuously on the monitor and be recorded legibly on the videotape.

The video camera tool must have a bottom lens and light source for looking vertically down the well and shall record images in color. The video camera will also have a side-viewing camera and light source for viewing horizontally in the well. The side-viewing camera must be capable of providing images of the entire circumference of the well. Video camera controls must be capable of switching instantaneously between the downhole and side-views. A Contractor experienced in video surveys such as Welenco of Bakersfield, California or approved equal shall perform the video survey. The well shall be sounded for total depth using the video survey and the Contractor shall remove sand or debris from the bottom of the well.

Payment for the video survey shall be at the lump sum price as outlined in the "SCHEDULE OF ITEMS AND PRICES".

## **13. WELL DISINFECTION AND WELL CAP**

After completion of testing and all down-hole surveys, the well shall be disinfected by adding 40 pounds of approximately 65-70 percent granular calcium hypochlorite mixed in solution with potable water and 4 gallons of muriatic acid (12-18% hydrochloric acid) or other approved materials. The chlorinating solution will be introduced into the well below the static water level well through a tremmie pipe and mixed throughout the water column by surge block or other mechanical action.

After testing and approval of the well by the Owner, the well shall be capped in a manner approved by the Owner. The production casing shall be capped with a 0.250-inch minimum thickness steel plate fully welded to the casing. A 2-inch lockable access cap shall be welded to the plate to allow access for measuring the static water level in the well.

#### **14. SITE RESTORATION**

The Contractor shall restore site to original or better condition. Drilling fluids and cuttings may be spread on site, allowed to dry and piled on site at a location specified by the Owner. If after drilling fluids are removed, importation of suitable material is required, it shall be imported and placed at the sole expense of the Contractor. Site restoration shall include compaction of suitable materials in areas planned for future construction of roads, buildings or other structures per Washoe County specifications. It is the responsibility of the Contractor to familiarize himself with any special requirements of site restoration. All site restoration shall be considered incidental to mobilization and demobilization and no additional payment will be made to the Contractor for restoration work.

# **APPENDIX 3**

**Drillers Log and Construction Field Notes**

STATE OF NEVADA  
DIVISION OF WATER RESOURCES  
WELL DRILLER'S REPORT

OFFICE USE ONLY  
Log No. \_\_\_\_\_  
Permit No. \_\_\_\_\_  
Basin \_\_\_\_\_

Please complete this form in its entirety in accordance with NRS 534.170 and NAC 534.340

NOTICE OF INTENT NO. 55490

OWNER Washoe County Dept. of Water Resources  
MAILING ADDRESS 49300 Energy Way  
Reno, NV 89502

ADDRESS AT WELL LOCATION  
3031 Longley Lane  
Reno, NV 89509

2. LOCATION SW 1/4 SE Sec. 20 19 N/S R 20 E Washoe County  
PERMIT NO. 71959 & 71960

Washoe Co # WL050135 Issued By Water Resources Parcel No. Subdivision Name

3. WORK PERFORMED  
☒ New Well ☐ Replace ☐ Recondition ☐ Domestic ☐ Irrigation ☐ Test ☐ Cable ☐ Rotary ☒ RVC  
☐ Deepen ☐ Abandon ☐ Other ☒ Municipal/Industrial ☐ Monitor ☐ Shock ☐ Air ☐ Other

6. LITHOLOGIC LOG  
Material Water Strata From To Thickness  
8. WELL CONSTRUCTION  
Depth Drilled 333 Feet Depth Cased 315 Feet

Material	Water Strata	From	To	Thickness
Top Soil		0	2	2
Sand, Gravel, Cobbles		2	12	10
Sand and Gravel		12	25	13
Sand, Gravel, Clay		25	30	5
Coarse Sand		30	39	9
Sand, Gravel, Clay		39	41	2
Clay, Sand, Some Cobbles		41	48	7
Clay, Sand, Some Cobbles		48	65	17
Sand and Cobbles		65	70	5
Sand and Gravel		70	73	3
Sand, gravel, Cobbles, Boulders		73	86	13
Sand, Gravel, Cobbles, Clay		86	92	6
Sand, Gravel, Big Cobbles		92	118	26
Sand, Gravel, Cobbles, Clay		118	122	4
Clay & Tan Clay, Some Sand		122	128	6
Fine Sand, Small Gravel		128	140	12
Coarse Sand, Small Gravel, Cobbles, Clay		140	173	33
Cobbles, Sand, Gravel		173	184	11
Clay w/Sand, Gravel, Cobbles		184	188	4
Fine, Sand, Clay and Gravel		188	205	17
Sandy Clay		205	208	3
Sand & Cobbles		208	212	4
Sand, Some Clay		212	215	3
Clay		215	220	5
Sand and Cobbles		220	223	3
Sand and Clay		223	230	7
Sand		230	237	7
Clay w/Sand Streaks		237	238	1
Sticky Clay		238	260	22
Hard & Sticky Clay Layers		260	268	8
Sand and Gravel		268	273	5

HOLE DIAMETER (BIT SIZE)  
From To  
36 Inches 0 Feet 18 Feet  
28 Inches 18 Feet 333 Feet  
Inches Feet Feet

CASING SCHEDULE				
Size O.D. (inches)	Weight (pounds)	Wall Thickness (inches)	From (Feet)	To (Feet)
30		3/8	0	18
18 5/8		5/16 Stainless Steel	+2	315
		304 Stainless		

Type Perforation Stainless Steel Wire Wrap  
Size Perforation 0.100  
From 138 feet to 258 feet  
From 275 feet to 305 feet  
From feet to feet  
From feet to feet

Surface Seal: ☒ Yes ☐ No Seal Type: ☐ Neat Cement ☒ Cement Grout ☐ Concrete Grout  
Depth of Seal 100'  
Placement Method: ☒ Pumped ☐ Poured  
Gravel Packed: ☒ Yes ☐ No  
From 100 feet to 333 feet  
From feet to feet

9. WATER LEVEL  
Static Water Level 4.60 feet below land surface  
Artesian flow G.P.M. P.S.I.  
Water temperature Cool F Quality Good

10. DRILLER'S CERTIFICATION  
This well was drilled under my supervision and the report is true to the best of my knowledge.

Date Started July 22 2005  
Date Completed July 29 2005

7. WELL TEST DATA			
TEST METHOD:			
<input type="checkbox"/> BAILER	<input checked="" type="checkbox"/> PUMP	<input type="checkbox"/> AIR LIFT	
	G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
Pumping Level 88.60'	2000	84	54

Name Hydro Resources Nevada Inc. dba Humboldt Drilling and Pump Co.  
Address 4975 West Winnemucca Boulevard  
Winnemucca, Nevada 89445  
NV Contractor's LIC# issued by the State Contractor's Board 56797  
NV Driller's LIC# issued by Div. of Water Resources, on-site driller 2177  
Signed: C. Jaynes - Office Date: 9/22/05

RECEIVED  
SEP 29 2005  
WASHOE COUNTY  
DEPT. OF WATER RESOURCES

Page 2 Continued Lithologic Log

NOTICE OF INTENT NO. 55490

1. OWNER	Washoe County Dept. of Water Resources		ADDRESS AT WELL LOCATION	
MAILING ADDRESS	49300 Energy Way		3031 Longley Lane	
	Reno, NV 89502		Reno, NV 89509	
2. LOCATION	SW 1/4	SE	Sec. 20	19 N/S R 20 E
PERMIT NO.	71959 & 71960		Washoe County	

6. LITHOLOGIC LOG				
Material	Water Strata	From	To	Thickness
Sand, Gravel, Cobbles		273	300	27
Sand, Gravel, Little Clay		300	306	14
Sand		306	325	5
Sand & Clay		325	333	8



**HUMBOLDT DRILLING  
& PUMP CO., INC.**

AGRICULTURAL, MINING, INDUSTRIAL

**Steve Sweat**

Reno Division

Cell: 775 848-9955

Main Off. 775 623-5259  
Fax 775 623-0307

4675 W. Winnemucca Blvd.  
Winnemucca, NV 89445

Dan -  
Bill -  
Evan -

other guys

7/20/05 - Drillers installed  
17 ft of Conductor casing.  
Could not keep hole open  
to 20 ft.

7/21/05 - Drillers grouted in surface  
casing.  
Set pump in monitoring well  
discovered diffusion bags in well

7/22/05 - Placed AA73 lock on  
gate met Driller  
Steve Sweat - cell 775-848-9955

Drillers setting up rig.  
inspected casing & gravel.

7/23/05  
7:30 am - arrived @ site,  
picked up binder, notebook  
8:00 arrived @ site - drillers still  
setting up to drill.

Measured

Casing

Joints	length	Total	Type
3	40.1 ft	120.30	Blank
1	20.05	20.05	"
1	17.10	17.10	"
1	10.10	10.10	w/ Bull Nose
		<u>167.55</u>	

4	20.0	80.0
3	20.0	60.0
1	10.0	10.0
		<u>150.0</u>

- 2.21  
Collar Settings

317.55

2.21

315.34 - Total

Wall Thickness 0.25"

7/23/05 - 31 bags of gravel on site

18 x 2.5 -

3 - 40' Joints spiral weld blank  
18" - stainless (304)

w/ welding  
collars

1 - 20'

1 - 24'

1 - 10'

" w bull nose plug

85 x 2.5

7.21' stainless well screen

1 - 10 "

0.17 collar thickness

2.74

14.7

13.7

12.4

3

2

13

17

91

13

20

174'

Dan Dragan

23 July 05 -  
 - made copies of log from test hole for drillers  
 1:50 PM - Drilling started  
 - Diana Cooper arrived  
 - briefed her on operations  
 - we measured casing? Screen  
 (left page)  
 3:50 STEVE: E-LOG OR CALIBER LOG?  
 4:20 ~8 FT. BROWN SAND, GRAVEL  
 4:45 DAN: DO NOT NEED EITHER LOG.  
 4:50 STEVE LEAVING TO GET MUD TO LINE WELL. SHUT DOWN.  
 6:00 STEVE RETURNED w/ 4 PALLETS OF QUICK GEL.  
 6:30 RESUMED DRILLING WHILE ADDING MUD.  
 7:45 ~30 FEET. BROWN SAND, SMALL CLUMPS OF CLAY, SOME GRAVEL  
 8:21 ATTACHING 20' SECTION  
 8:50 ATTACHING ANOTHER 20' SECTION  
 9:00 NIGHT CREW (BILL + EVAN) TAKE OVER.  
 9:30 SAND, SMALL CLUMPS CLAY, SOME GRAVEL.  
 9:48 DAN DRAGAN ARRIVED.

Joint	Type	Length
1		19' 11.5"
2		19' 11.5"
3		20' 0
4		10' 0
5		20' 0
6		20' 0
7		19' 41.5
<hr/>		
	Sequence	
1	3 Screen	19.90
2	5 "	19.92
3	6 "	19.93
4	2 "	9.91 Bottom Screen
5	7 "	19.93
6	8 "	19.91
7	9 "	19.90
8	10 "	19.90
		149.29
9	Blank	10.47 includes bottom of bull nose plug
10		17.00
11		20.00
12		40.00
13		39.95
14		40.01
		167.43
	Total	316.72

30-67	Sand, silt & clay - varying degrees up to 90% brown clay. Clogging bit. Fine sand mix	
-------	---	--

b7- 4" cobbles, rounded mixed with sand & gravel some clay stringers to less clay @ 70

Quadrant

23 July 05

10.00	pm	-arr	red	or	st	+
-------	----	------	-----	----	----	---

- Drillers @	about	30 f.
--------------	-------	-------

- Driller going slow to ensure plumbness - added bentonite

0100 - 24 July 55

24 July 05

0600 - Down 51 feet, additional joint

0700 - Steve decided to go with in both S  
to drill through clay & 25' w/c

0930 - At about 68 ft, loss circulation  
plugged bit 4" plus rounded cables

10:30 - pulled rod - attempting to push  
rock out of bottom of bit with  
smaller pipe.

10:40 - Drilling restarted

11:00	New	Saint	71	-9
-------	-----	-------	----	----

7-24-05	DIANA HOOPER
---------	--------------

1	Am	Arrived on site
---	----	-----------------

1:15 STEVE: WASH JOIN TO YOU  
WASH ON THE WELL PORT?

1440 DAN + STEVE TALKED ABOUT  
ABOVE QUESTION.

1125	HIF LA. 1/2K OF	COBBLES AT
~ 75	FEET WITH SMALL	AMOUNT

ALSO PULLED ROD TO DISLodge ROCK.  
OUT OF BOTTOM OF BIT. 8" ROCK.

[illegible]

4:22D HYDRAULICS BROKE. DOWN  
INDEFINITELY.

1445	ACK	WTH PART
------	-----	----------

9151	HYPOLIDS WORKING.
------	-------------------

1530	STEEL INSPECTED ROCK BIT AND FOUND BELONGS BACK ON TWO ROTORS. HAS TO GO TO YARD ON
------	---

PARK TO GET A SPARE BIT.  
A STEVE: DEWIED WITH SPARE B

160 STEVE ARRIVED WITH SPARE BIT.

8 JAN 1981	40.01
------------	-------

39.03	BLANK
-------	-------

31-12-12	40,00
----------	-------

3	20.00
---	-------

0.6961 147.3720

Clifford May 1, 1905

12345	1234567
-------	---------

Chapter 11

3661 117725

2011 11/27/2011

BLANK	17.00
-------	-------

SECRET	1980
--------	------

GREEN	9.91	BULL DOG SCIENCE
BLANK	10.47	IN LUDER BOND
		LOI BULL DOG

CKEEN	9,91
11 only	15,17

CHICK	10,411
-------	--------

# Drillers Log

0-2	Topsoil		
2-12	Sand gravel cobbles, rounded		
12-25	Sand, rounded gravel		
25-30	Sand, gravel, 20% clay		
30-39	Coarse sand		
39-41	Sand, rounded gravel to 1" w/ clay layers		
41-48	clay & sand layers some cobbles		
48-65	brown clay, some sand		
65-70	sand & cobbles, rounded up to 5'		
70-73	Sand & gravel		
73-86	Sand, gravel, cobbles, boulders 5' dia		
86-92	Sand, gravel, cobbles w/ small clay layers		
92-118	Sand, gravel (big) cobbles		
118-122	Sand, gravel cobbles, w/ some clay layers		
122-128	Blue & tan clay w/ sand layers		
128-140	Fine sand & small gravels		
140-173	Coarse sand & gravel, cobbles w/ small clay layers		
173-184	Cobbles sand & gravel		
184-188	Cobbles sand & gravel w/ some clay layers		
188-205	Fine sand w/ clay layers, some cobbles		
205-208	Sandy clay		
208-212	Sand & cobbles		
212-215	Sand, some clay		
215-220	clay		
Next Page			

7-24-05 DIANA HODDER

1740	DRILLING AGAIN. GRAVEL		
	SMALL COBBLES (1-2" DIAM) AND		
	SAND, ~75' NO VISIBLE CLAY.		
1900	~ 82' SAME AS ABOVE		
1930	~ 85' Mostly gravel with <sup>fine to coarse</sup> sand		
1950	@ 90' " " " "		
2015	Start @ 90' 92' has less gravel.		
	93' more gravel again		
2105	Some problem, smells like burning rubber. 2110 minor problem, no down time. Clutch was stuck.		
2125	~ 297'		
2220	~ 107' Gravel and sand		
2240	@ 10' ~ 8'/hr.		
0445	~ 180' ~ 10'/hr		
20530	Compressor breaks, need another one.		
Don 0830	Drilling again - 200' - medium to coarse sand		
10:30	Changing to different bit		
10:50	~ 210'		
1115	DRILLING		



7/26/05

0700 - Drillers @ 280-290 - gravel cobbles  
slow drilling - using pilot bit, will  
have to ream

1000 ~ Hit 313'. Discussed well design with  
driller, Steve? Lots of sand and  
gravel.

1200 - Hit TD=333'. Checked plumbness  
with big plumb bob. Looks pretty  
straight. Driller expressed about 2"  
off for entire hole, a mess.  
Will ream bottom 50'. Driller said  
log was accurate for lithology.  
1445 started reaming

1700 - Don arrived - Reaming last 10 feet

1800 - Left site, told drillers to call when  
ready to run casing

2130 - Steve called & said they would be  
ready to run casing in 30 min

2200: arrived @ site, still setting up

2340: Running first joint

7/27/05 - Dawn

0000 - Blank w/ ball nose plug + centralizers  
- stainless steel #10.5

0031 - welding #2 (10 ft screen)

0100 - #3 (20 ft screen)

0130 - #4 (17 ft blank)

0140 - #5 (20 ft screen)

0200 - #6 (20 ft screen)

0220 - #7 (20 ft screen)

0315 - #8 (20 ft screen)

0400 - #9 (20 ft screen)

0430 - #10 (20 ft screen)

#11 the driller asked where to  
locate sounding tube and gravel  
feed tube.

Went to office & located plans  
& returned with answers.

0545 - #11 - 20 ft blank, started attaching  
sounding tube

0620 - #12 - 40 ft blank

#13 40 "

#14 40 "

Well in place.

7/27/05 continued

830 Tremie pipe is going in slowly. Using backhoe to push it into borehole. → 105' h.  
1100 Tremie is in. Steve says butte pipe (flush thread) is a better pipe to use. Then, the tremie can go in before setting the well. Coupling pipe shouldn't be set before the well because the well can catch the coupling and break the pipe. Strength of butte pipe should be compared to coupling pipe. Both types are welded anyway.

1 bag gravel = 1 cu yd, 3,000 pounds.  
32 bags on site.

1445 well took 21 bags = 21 yds<sup>3</sup> of gravel.

Steve called to get grout on site.

July 28<sup>th</sup> - grouted in Sighting Seal

July 29<sup>th</sup> 2005

- Development rig set up and rained out well for 3 hrs.

0900 - Called airport, got 24<sup>hr</sup> contract for access.

10:00 - Pulling line to install

swab - meet pump crew

"Juice", Cory, Steve

Talked with Gary Thompsons about increasing pumping test to 4000 gpm

OKed -

Took air port contact #s to pump crew.

Discussed schedule, use of New Well 220 disperson.

July 30<sup>th</sup>, 2005

Drillers (Pump crew) called @ 7:30 AM, did not have key to enter gate.

Drove to office, got extra key & delivered to driller.

Talked w/ Justin about development and equipment required for test pumping, use of Newell 220 development dispersment.

Well developing good w/ double swabs but still making fine black sand

July 30<sup>th</sup>, 2005

Visited @ 3:00 PM - Development continuing. Talked about development pumping and testing schedule.

July 31, 2005

Visited site @ 11:00 - Development continuing.

Drift 19

August 1<sup>st</sup> - well still making some fine sand

2:00p Drillers called and said they had been pulled off well for emergency repairs for utilities Inc in Sky Ranch.

Aug 3<sup>rd</sup> Drillers back on site, still developing producing fine sand

Aug 7<sup>th</sup> 56 hrs development as of end of today

Aug 5<sup>th</sup> Development +

Aug 8<sup>th</sup> Development

Aug 9<sup>th</sup> Development (2.5 bags gravel)<sup>2.5</sup>

Aug 10<sup>th</sup> Up to 3.5 bags added to well @ 1600.

Aug 11 still air lifting. Not up to forth bag yet.

8/12/05 Pulling air lift equipment.  
will set pump 8/15/05

8/14/05 Pump set - not connected to  
discharge line.

8/15/05 " " " "

" " " "

CTM Shallow (east) well  
WL = 6.19'

TD ~ 13.2'

set Xducer at bottom. Test start  
@ 1500 (15 minutes - Linear)

CTM Deep (west)

WL = 2.46'

set Xducer ~ 65' below WL. Test  
start @ 1515 (15 minutes - Linear)

1520 Pumping well 4.80' below top of  
table. Sounding tube is taped  
shut.

8/24 static WL = 4.17' below sounding tube  
top. Pumping ~ 600 gpm,  
Pumping level 22.15'.  
1000 gpm 38 seconds ~ 680 gpm  
SC ~ 680/18 ~ 38

8/25 Developing since ~ 0900 on 8/24  
Monitoring well = 18.64' and dropping  
Set Xducer 4' + 69' ~ 73' below  
ground. Go for 73' below top of  
casing. Turn on Troll WL = 18.51'

8/25 CTM Shallow WL = 6.20'  
" " Deep = 10.09'

⊗ Cut off some of sounding tube  
to get transducer down ~ 0.59'  
Future measurements, add 0.59' to get  
static = 7.18' to old measuring  
point.

8/26 start step 1 @ 0830 1,500 gpm  
" " 2 @ 1010 2,000 "  
" " 3 @ 1150 2,500 "  
" " 4 @ 1330 3,000 "  
Pump rate is limited to ~ 2650 "  
Bowl may be damaged from water  
level probe. Pump did not have  
screen on bottom to prevent  
debris from entering bowls.  
or cone. Started Longley Extra for recovery  
730

8/27 Longley Pumping Well WL = 5.11'  
1755 MW = 4.63'

8/27 continued

Scheduled MW log test for

8/28/05 @ 0830

71' CTM deep 11' 11'

11' 11' WL = 3.06'

(Stopped old test too). Can not  
do log. Set linear, 10 min.  
intervals.

8/28 0730 Langley pumping well WL = 4.64'

11' MW = 4.02

Win-Situ 2000 extracted files go to

C:\Win-Situ\3.71\DATA\51105

8/30 1000 Langley MW = 24.08

9/1/05 Langley Production well - water  
being added by hose. Apparently  
water is coming soon.

0935 Langley MW = 4.77'

1050 CTM Deep = 3.25'

CTM Shallow =

# **APPENDIX 4**

**Pumping Test Data/Field notes**



# WASHOE COUNTY

DEPARTMENT OF WATER RESOURCES

UTILITY SERVICES DIVISION



## PUMPING TEST DATA

WELL Longley Well  
 PLUMBING / OBSERVATION WELL  
 PUMPING / RECOVERY DATA  
 PAGE 1 OF 1

TYPE OF PUMPING TEST Step  
 HOW Q MEASURED Meter M.P. for WL's \_\_\_\_\_ elev. \_\_\_\_\_  
 HOW WL's MEASURED Sounder and 300psi Transducer DEPTH OF PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_  
 PUMPED WELL NO. \_\_\_\_\_ % SUBMERGENCE: initial \_\_\_\_\_ pumping \_\_\_\_\_  
 RADIUS of PUMPED WELL \_\_\_\_\_ PUMP ON: date 8/26/05 time 0830  
 DISTANCE from PUMPED WELL \_\_\_\_\_ PUMP OFF: date \_\_\_\_\_ time \_\_\_\_\_

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL <u>7.18 below tube</u>				WATER PRODUCT	COMMENTS
CLOCK TIME	ELAPSED TIME			t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'	Q	(NOTE ANY CHANGES IN OBSERVERS)
	mins	hrs	t	t'						
0832	2		2		46.56			39.38	(1500)	totalizer 31104
0834			4		48.66			42.90		
			6		50.08					
			8		51.05					
			10		51.74					
0852			22		54.07					
0858					54.78					
0910			40		56.40			49.22	↑	
0920			50		58.44				↑	
0930			60		58.92					
0940			70		59.30			52.12		Probe went down
0950			80		59.92					hole. New probe
1000			90		60.02					
1007			97		60.31			53.13	SC=	28.23
1013			103		75.24				(12,000)	
1018			108		84.71					
1030			120		88.05			80.87		
1040									Q↓	$\frac{26}{1000} = \frac{60}{24}$
1050									Q↑	(1150) Q↑ 2500
1100									2500 gpm @ 1300	
1110										0830 - 1010 = 1500
1120										1010 - 1150 = 2000
1130										1150 - 1330 = 2500
1150									Q↑ 2,500	
1200					100.57					
1210					101.11					
1215					101.37					
1220					101.67					
1225					101.80					
1230					102.10					
1245					103.16			95.98		
1300					101.63				Q↑	
1310					101.22				Q↑	
1320					103.74				Q↑	
1330										
										Can't pump > ~2600 gpm, RPMs get too high.
										Max is 1700 rpm.
										@ 2,200 gpm, rpm is okay according to Justin



# WASHOE COUNTY

DEPARTMENT OF WATER RESOURCES  
UTILITY SERVICES DIVISION



## PUMPING TEST DATA

WELL Longley Lane Well  
PUMPING/ OBSERVATION WELL  
PUMPING/ RECOVERY DATA  
PAGE 1 OF 2

TYPE OF PUMPING TEST Constant Q  
HOW Q MEASURED Flow Meter M.P. for WL's Sounding Tube elev. \_\_\_\_\_  
HOW WL's MEASURED Sounder + 300 psi Mini-Troll DEPTH OF PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_  
PUMPED WELL NO. \_\_\_\_\_ % SUBMERGENCE: initial \_\_\_\_\_ pumping \_\_\_\_\_  
RADIUS of PUMPED WELL \_\_\_\_\_ PUMP ON: date 8/28/05 time 0830  
DISTANCE from PUMPED WELL \_\_\_\_\_ PUMP OFF: date 8/30/05 time 1030

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 4.60				WATER PRODUCT		COMMENTS
CLOCK TIME	ELAPSED TIME			t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		Q	(NOTE ANY CHANGES IN OBSERVERS)
	mins hrs	t	t'								
0831			1		55.57			50.97		2,000	Totalizer 31787
			2		59.88			55.28			
			3		62.11			57.51			
			4		63.59			58.99			
			5		64.65			60.05			sand=.15
			6		65.49			60.89			
			7		66.18			61.58			
			8		66.90			62.30			
			9		67.42			62.82			
			10		67.83			63.23			sand=.20
			12		68.65			64.05			
			14		69.29			64.69			
			16		69.90			65.30			
			18		70.35			65.75			
			20		70.70			66.10			
			24		71.35			66.75			
			28		71.85			67.25			
0900			30		72.08			67.48			
0916			40		73.18			68.58			
0920			50		73.80			69.20			sand= 0.29
0932			62		74.44			69.84			
0950			80		75.39			70.79			
1000			90		75.80			71.20			
1010			100		75.86			71.26			SC = 28.07
1020			110		76.10			71.50			
1030			120		76.40			71.80			
1100			150		77.20			72.60		Q1@	1113 = 117 minute
1116			166		78.23			73.63			
1130			180		78.51			73.91			
1157			207		78.75			74.15			
1220			230		79.34			74.74			
1230			240		79.56			74.96			
1300			270		79.63			75.03			
1330	-5		300		80.16	TROLL		75.56			Sounder 20.34' different
1440	10		370		80.74	Sounder		76.14			than TROLL
1530	-7		420		81.05	"		76.45			
1600	30		450		81.30	"		76.70			81.43 vs. 81.09
1710	40		520		81.95	"		77.35		Q1@	1700
1800	30		570		82.53	"		77.93			
1830	-10		600		82.68	"		78.08			
2100	30		750		83.33	"		78.73		2000	perfect Q mw
2200			810		83.51	"		78.91			
2300			870		83.78	"		79.18		2000	
2330			900		83.93	"		79.33			
0110			1000		84.85	"		80.25		2000	



WELL Longley Han  
PUMPING / OBSERVATION WELL  
PUMPING / RECOVERY DATA  
PAGE 2 OF 2

Time (minutes)

10,000  
9  
8  
7  
6  
5  
4  
3  
2

1,000  
9  
8  
7  
6  
5  
4  
3  
2

100  
9  
8  
7  
6  
5  
4  
3  
2

DRAWDOWN

Konglet Lane Production  
well

AUG 05

Q = 2000 gpm

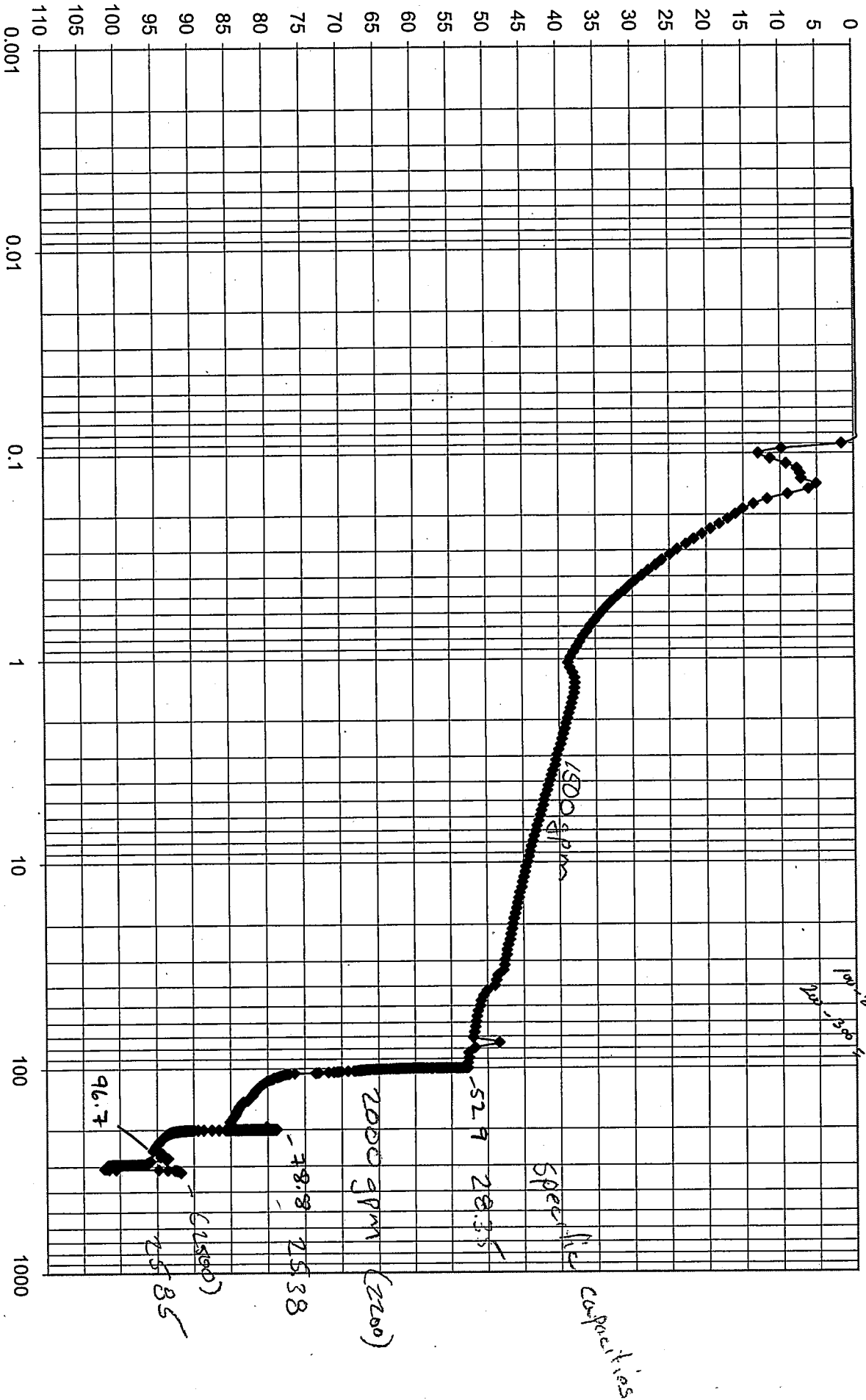
T = 66,000 GPD/ft

10 20 30 40 50 60 70 80 90 100 110 120 130 140

Drawdown (feet)

100,000  
690 days

1,000,000  
694 days



$0 - 100 = 100$   
 $0.01 - 0.02 = 0.01$   
 $0.02 - 0.05 = 0.03$



**DEPARTMENT OF WATER RESOURCES  
UTILITY SERVICES DIVISION**

WELL Longley MW  
PUMPING / OBSERVATION WELL  
PUMPING / RECOVERY DATA  
PAGE 1 OF 1

TYPE OF PUMPING TEST Q Test - Monitoring well

## HOW Q MEASURED

M.P. for WL's Top of inside cas relev.

## HOW WL's MEASURED

DEPTH OF PUMP/AIRLINE J wrt

PUMPED WELL NO.

% SUBMERGENCE: initial \_\_\_\_\_ pumping \_\_\_\_\_

RADIUS of PUMPED WELL

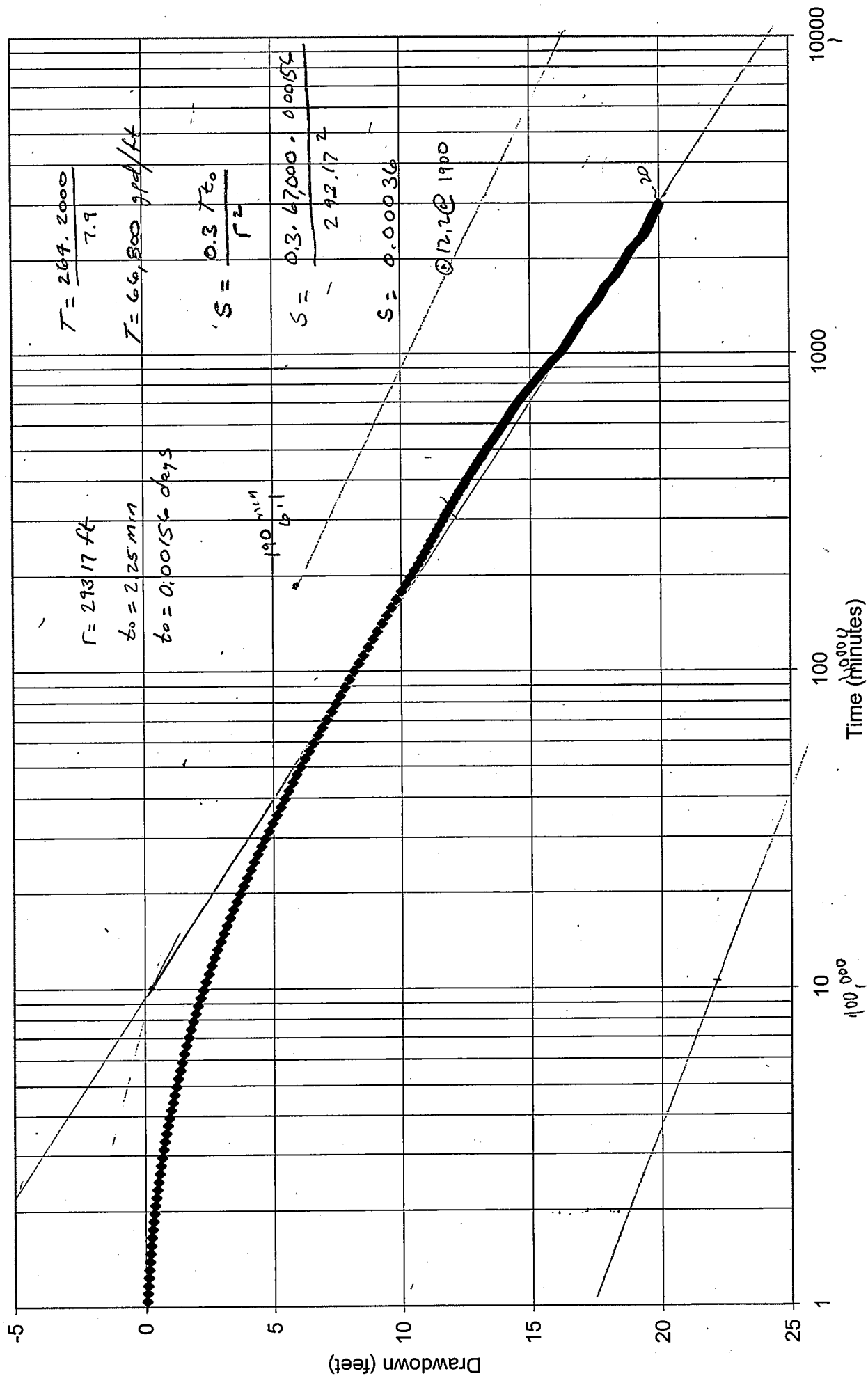
PUMP ON: date 8/28/05 time 0830

DISTANCE from PUMPED WELL 293.17

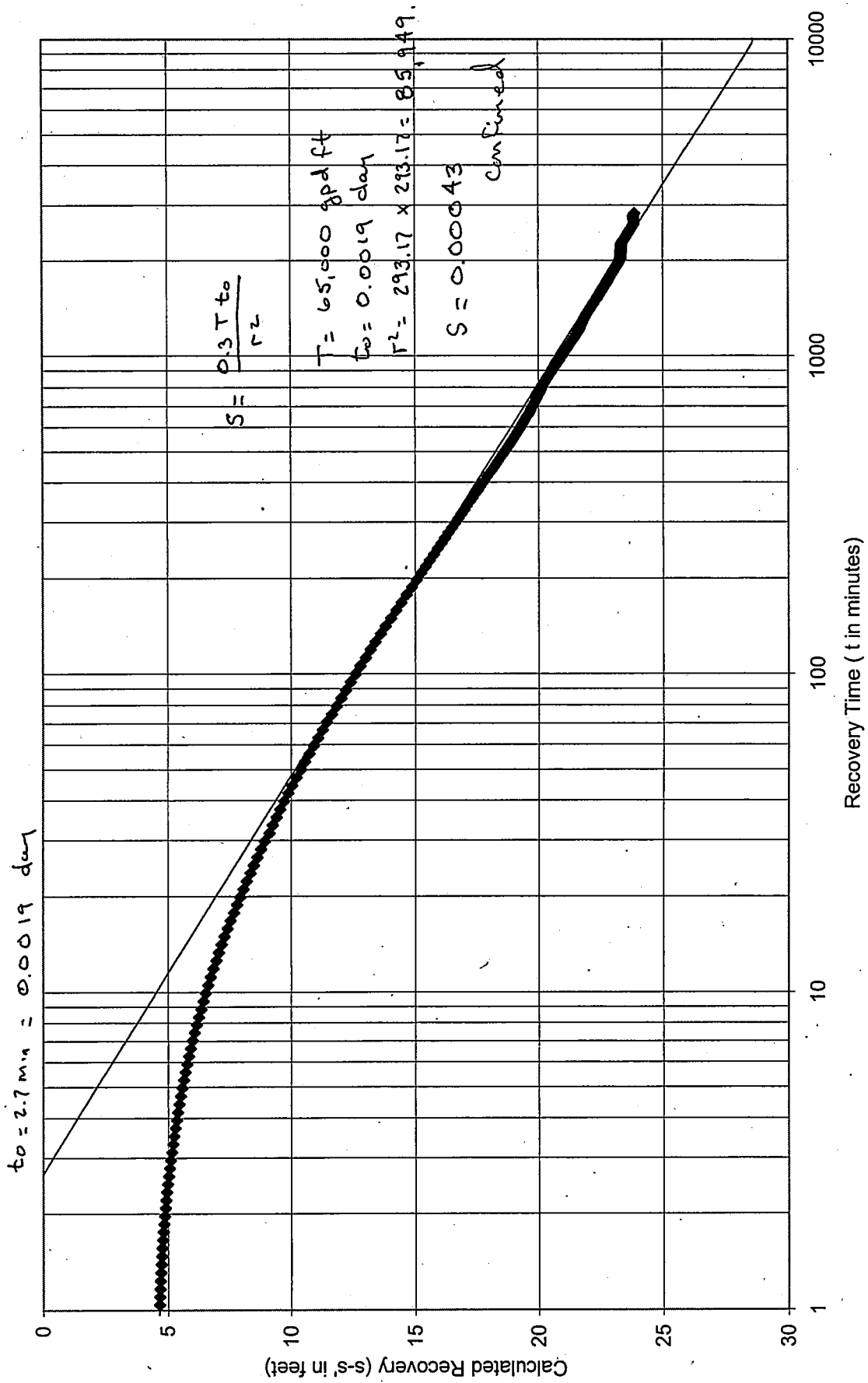
PUMP OFF: date 8/30/ time

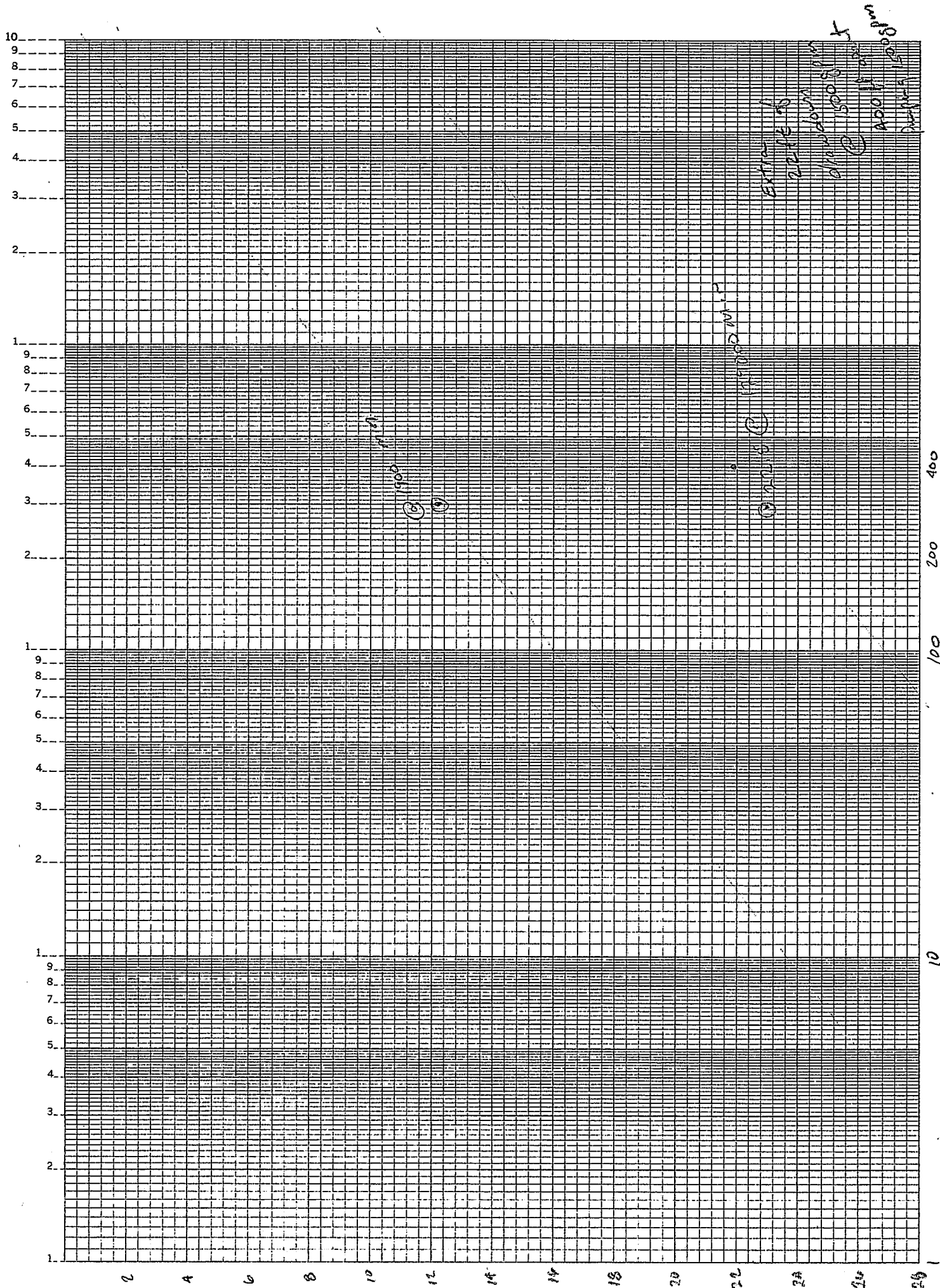
[illegible]

# Longley Lane Monitoring Well



# Longley Monitoring Well - Recovery Data





$$65,000 = \frac{264 \cdot 2500}{\Delta z}$$

$$\Delta z = \frac{264 \cdot 2500}{65,000}$$

$$10.15 = \text{conservative} = 11$$

$$65,000 = \frac{264 \cdot 1500}{\Delta R}$$

$$\Delta = \underline{.6.1}$$

6.5 conservative

@ 22.5 ft drawdown

$$90 \text{ day} = 129,000 \text{ min}$$

@ 129,000 min

@ 1500 gpm

10,000

1,000

100

10

1

10

20

30

40

50

60

70

80

90

100

110

120

130

Longley Lane

PROJECTED DRAWDOWN

@ 2500 GPM

ASSUMPTIONS

T = 65,000 GPD/Ac

AVAILABLE DRAWDOWN = 130 ft

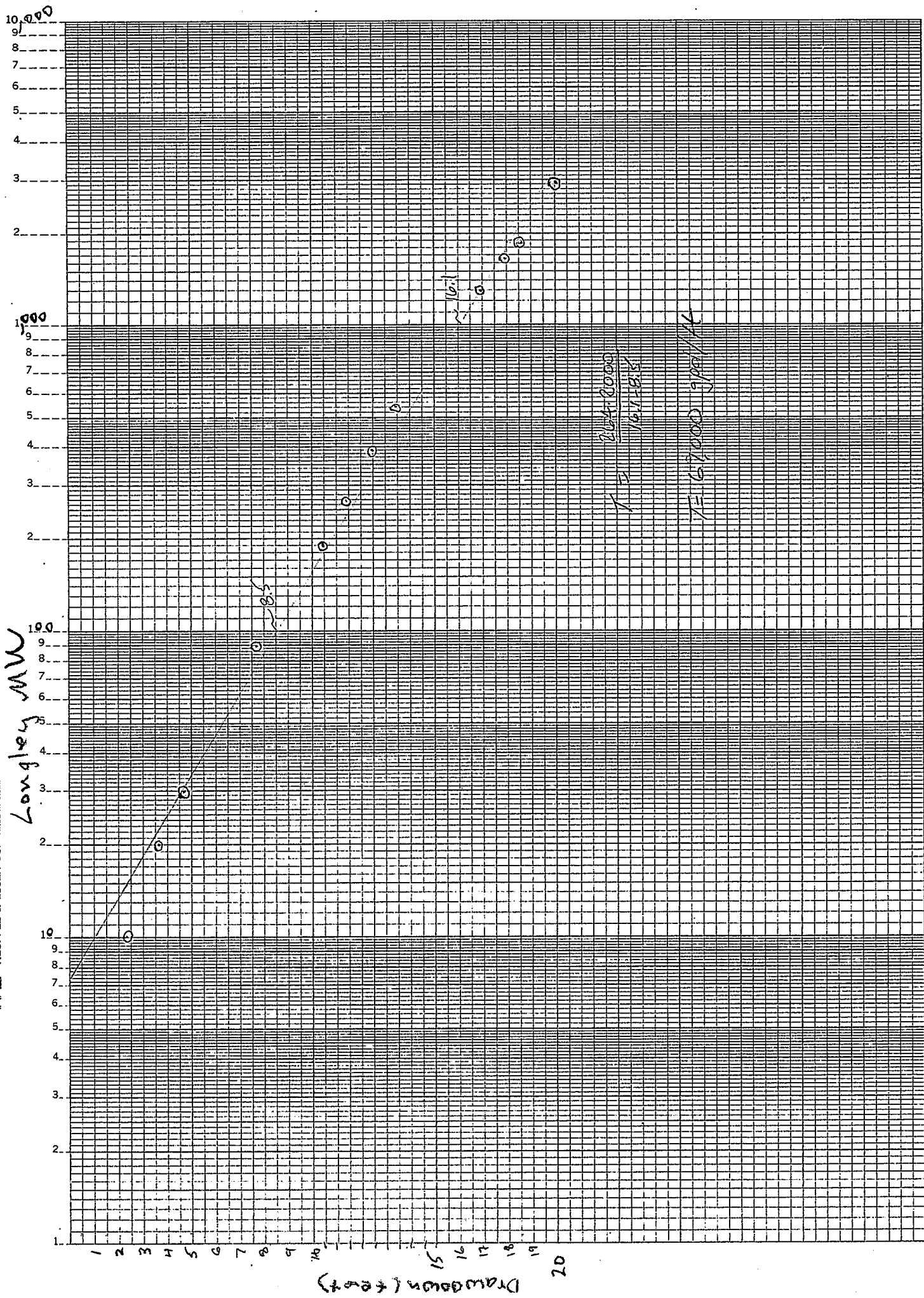
PUMP INTAKE = 270 FT

1,000,000

100,000

46 6010

Longley MW



Time (minutes)

DRAWDOWN  
Pg 1 of 7

In-Situ Inc. MiniTroll Pro

Report generated 8/28/2005 9:27:10

Report from file: C:\Win-Situ3.71\Data\SN05834 2005-08-28 082958 Longley\_ConstQ.bin

DataMgr Version 3.71

Serial number: 5834

Firmware Version 3.09

Unit name: Longley\_Well

Test name: Longley\_ConstQ

Test defined on: 8/15/2005 13:48:32

Test started on: 8/28/2005 8:29:58

Test stopped on: N/A N/A

Test extracted on: N/A

Data gathered using Logarithmic testing

Maximum time Minutes.

Number of data 131

TOTAL DATA SA 131

Channel number [1]

Measurement by Temperature

Channel name: OnBoard Temp

Channel number [2]

Measurement by Pressure

Channel name: wl depth

Sensor Range: 300 PSI.

Specific gravity: 1

Mode: TOC

User-defined ref 4.6 Feet H2O

Referenced on: channel definition.

Pressure head = 133.538 Feet H2O

Static

4.6

Date	Time	ET (min)	Chan[1] Fahrenheit	Chan[2] Feet H2O	Drawdown
8/28/2005	8:29	0	57.37	4.598	-0.002
8/28/2005	8:31	1.0413	57.37	55.9	51.3
8/28/2005	8:32	2.0847	57.35	60.019	55.419
8/28/2005	8:32	2.953	57.33	61.947	57.347
8/28/2005	8:33	3.9463	57.31	63.219	58.619
8/28/2005	8:34	4.973	57.31	64.362	59.762
8/28/2005	8:35	5.9147	57.31	65.168	60.568
8/28/2005	8:36	6.2663	57.31	65.467	60.867
8/28/2005	8:37	7.0347	57.31	65.955	61.355
8/28/2005	8:37	7.8963	57.31	66.535	61.935

8/28/2005 8:38	8.8647	57.31	67.116	62.516
8/28/2005 8:39	9.9497	57.28	67.583	62.983
8/28/2005 8:41	11.8313	57.28	68.295	63.695
8/28/2005 8:44	14.0697	57.28	69.063	64.463
8/28/2005 8:45	15.7913	57.28	69.606	65.006
8/28/2005 8:47	17.723	57.28	70	65.4
8/28/2005 8:49	19.8913	57.28	70.412	65.812
8/28/2005 8:55	25.0547	57.26	71.216	66.616
8/28/2005 8:59	29.7863	57.26	71.759	67.159
8/28/2005 9:05	35.4112	57.26	72.377	67.777
8/28/2005 9:09	39.7397	57.26	72.864	68.264
8/28/2005 9:14	44.5963	57.26	73.127	68.527
8/28/2005 9:20	50.0463	57.26	73.483	68.883
8/28/2005 9:29	59.4913	57.26	73.988	69.388
8/28/2005 9:40	70.718	57.26	75.075	70.475
8/28/2005 9:49	79.3547	57.26	75.075	70.475
8/28/2005 9:59	89.0463	57.26	75.45	70.85
8/28/2005 10:09	99.9197	57.26	75.862	71.262
8/28/2005 10:22	112.1197	57.26	76.181	71.581
8/28/2005 10:28	118.768	57.26	76.368	71.768
8/28/2005 10:43	133.268	57.26	76.799	72.199
8/28/2005 10:51	141.168	57.26	76.968	72.368
8/28/2005 10:59	149.5363	57.26	77.192	72.592
8/28/2005 11:08	158.4013	57.26	77.324	72.724
8/28/2005 11:17	167.7913	57.26	78.017	73.417
8/28/2005 11:27	177.738	57.26	78.223	73.623
8/28/2005 11:37	187.738	57.26	78.373	73.773
8/28/2005 11:47	197.738	57.26	78.56	73.96
8/28/2005 11:57	207.738	57.26	78.748	74.148
8/28/2005 12:07	217.738	57.26	78.897	74.297
8/28/2005 12:17	227.738	57.26	79.01	74.41
8/28/2005 12:27	237.738	57.24	79.177	74.577
8/28/2005 12:37	247.738	57.26	79.291	74.691
8/28/2005 12:47	257.738	57.26	79.422	74.822
8/28/2005 12:57	267.738	57.24	79.514	74.914
8/28/2005 13:07	277.738	57.24	79.626	75.026
8/28/2005 13:17	287.738	57.26	79.759	75.159
8/28/2005 13:27	297.738	57.26	79.853	75.253
8/28/2005 13:37	307.738	57.24	79.889	75.289
8/28/2005 13:47	317.738	57.26	80.003	75.403
8/28/2005 13:57	327.738	57.24	80.132	75.532
8/28/2005 14:07	337.738	57.24	80.188	75.588
8/28/2005 14:17	347.738	57.26	80.172	75.572
8/28/2005 14:27	357.738	57.26	80.265	75.665
8/28/2005 14:37	367.738	57.26	80.321	75.721
8/28/2005 14:47	377.738	57.24	80.451	75.851
8/28/2005 14:57	387.738	57.24	80.47	75.87
8/28/2005 15:07	397.738	57.24	80.563	75.963
8/28/2005 15:17	407.738	57.26	80.659	76.059
8/28/2005 15:27	417.738	57.24	80.713	76.113
8/28/2005 15:37	427.738	57.24	80.807	76.207
8/28/2005 15:47	437.738	57.24	80.863	76.263

8/28/2005 15:57	447.738	57.24	80.975	76.375
8/28/2005 16:07	457.738	57.24	81.032	76.432
8/28/2005 16:17	467.738	57.24	81.088	76.488
8/28/2005 16:27	477.738	57.24	81.125	76.525
8/28/2005 16:37	487.738	57.24	81.2	76.6
8/28/2005 16:47	497.738	57.24	81.256	76.656
8/28/2005 16:57	507.738	57.24	81.313	76.713
8/28/2005 17:07	517.738	57.24	81.369	76.769
8/28/2005 17:17	527.738	57.24	81.894	77.294
8/28/2005 17:27	537.738	57.26	81.952	77.352
8/28/2005 17:37	547.738	57.24	81.987	77.387
8/28/2005 17:47	557.738	57.26	82.101	77.501
8/28/2005 17:57	567.738	57.24	82.156	77.556
8/28/2005 18:07	577.738	57.26	82.214	77.614
8/28/2005 18:17	587.738	57.24	82.231	77.631
8/28/2005 18:27	597.738	57.24	82.287	77.687
8/28/2005 18:37	607.738	57.24	82.324	77.724
8/28/2005 18:47	617.738	57.26	82.401	77.801
8/28/2005 18:57	627.738	57.24	82.381	77.781
8/28/2005 19:07	637.738	57.26	82.42	77.82
8/28/2005 19:17	647.738	57.24	82.437	77.837
8/28/2005 19:27	657.738	57.24	82.456	77.856
8/28/2005 19:37	667.738	57.26	82.514	77.914
8/28/2005 19:47	677.738	57.26	82.551	77.951
8/28/2005 19:57	687.738	57.24	82.606	78.006
8/28/2005 20:07	697.738	57.24	82.624	78.024
8/28/2005 20:17	707.738	57.26	82.701	78.101
8/28/2005 20:27	717.738	57.24	82.737	78.137
8/28/2005 20:37	727.738	57.26	82.813	78.213
8/28/2005 20:47	737.738	57.24	82.868	78.268
8/28/2005 20:57	747.738	57.26	82.926	78.326
8/28/2005 21:07	757.738	57.26	82.982	78.382
8/28/2005 21:17	767.738	57.26	83.02	78.42
8/28/2005 21:27	777.738	57.24	83.074	78.474
8/28/2005 21:37	787.738	57.26	83.095	78.495
8/28/2005 21:47	797.738	57.26	83.132	78.532
8/28/2005 21:57	807.738	57.24	83.149	78.549
8/28/2005 22:07	817.738	57.24	83.224	78.624
8/28/2005 22:17	827.738	57.24	83.261	78.661
8/28/2005 22:27	837.738	57.24	83.355	78.755
8/28/2005 22:37	847.738	57.24	83.336	78.736
8/28/2005 22:47	857.738	57.24	83.374	78.774
8/28/2005 22:57	867.738	57.24	83.486	78.886
8/28/2005 23:07	877.738	57.24	83.524	78.924
8/28/2005 23:17	887.738	57.26	83.544	78.944
8/28/2005 23:27	897.738	57.26	83.6	79
8/28/2005 23:37	907.738	57.24	83.674	79.074
8/28/2005 23:47	917.738	57.26	83.694	79.094
8/28/2005 23:57	927.738	57.26	83.713	79.113
8/29/2005 0:07	937.738	57.24	83.767	79.167
8/29/2005 0:17	947.738	57.26	83.788	79.188
8/29/2005 0:27	957.738	57.26	84.331	79.731

8/29/2005 0:37	967.738	57.26	84.406	79.806
8/29/2005 0:47	977.738	57.26	84.481	79.881
8/29/2005 0:57	987.738	57.24	84.517	79.917
8/29/2005 1:07	997.738	57.26	84.519	79.919
8/29/2005 1:17	1007.738	57.26	84.593	79.993
8/29/2005 1:27	1017.738	57.26	84.631	80.031
8/29/2005 1:37	1027.738	57.26	84.668	80.068
8/29/2005 1:47	1037.738	57.26	84.668	80.068
8/29/2005 1:57	1047.738	57.26	84.762	80.162
8/29/2005 2:07	1057.738	57.26	84.781	80.181
8/29/2005 2:17	1067.738	57.26	84.8	80.2
8/29/2005 2:27	1077.738	57.26	84.781	80.181
8/29/2005 2:37	1087.738	57.26	84.856	80.256
8/29/2005 2:47	1097.738	57.26	84.856	80.256
8/29/2005 2:57	1107.738	57.26	84.893	80.293
8/29/2005 3:07	1117.738	57.26	84.837	80.237
8/29/2005 3:17	1127.738	57.26	84.856	80.256
8/29/2005 3:27	1137.738	57.26	84.875	80.275
8/29/2005 3:37	1147.738	57.26	84.912	80.312
8/29/2005 3:47	1157.738	57.26	84.893	80.293
8/29/2005 3:57	1167.738	57.26	84.987	80.387
8/29/2005 4:07	1177.738	57.26	84.968	80.368
8/29/2005 4:17	1187.738	57.26	84.968	80.368
8/29/2005 4:27	1197.738	57.26	85.043	80.443
8/29/2005 4:37	1207.738	57.26	85.006	80.406
8/29/2005 4:47	1217.738	57.26	84.987	80.387
8/29/2005 4:57	1227.738	57.26	85.024	80.424
8/29/2005 5:07	1237.738	57.26	85.099	80.499
8/29/2005 5:17	1247.738	57.26	85.099	80.499
8/29/2005 5:27	1257.738	57.26	85.156	80.556
8/29/2005 5:37	1267.738	57.26	85.137	80.537
8/29/2005 5:47	1277.738	57.26	85.174	80.574
8/29/2005 5:57	1287.738	57.26	85.212	80.612
8/29/2005 6:07	1297.738	57.26	85.174	80.574
8/29/2005 6:17	1307.738	57.26	85.231	80.631
8/29/2005 6:27	1317.738	57.26	85.249	80.649
8/29/2005 6:37	1327.738	57.26	85.287	80.687
8/29/2005 6:47	1337.738	57.26	85.362	80.762
8/29/2005 6:57	1347.738	57.26	85.324	80.724
8/29/2005 7:07	1357.738	57.26	85.38	80.78
8/29/2005 7:17	1367.738	57.26	85.399	80.799
8/29/2005 7:27	1377.738	57.26	85.474	80.874
8/29/2005 7:37	1387.738	57.26	85.474	80.874
8/29/2005 7:47	1397.738	57.26	85.493	80.893
8/29/2005 7:57	1407.738	57.26	85.512	80.912
8/29/2005 8:07	1417.738	57.26	85.53	80.93
8/29/2005 8:17	1427.738	57.26	85.624	81.024
8/29/2005 8:27	1437.738	57.26	85.568	80.968
8/29/2005 8:37	1447.738	57.26	85.587	80.987
8/29/2005 8:47	1457.738	57.26	85.605	81.005
8/29/2005 8:57	1467.738	57.26	85.643	81.043
8/29/2005 9:07	1477.738	57.26	85.662	81.062

8/29/2005 9:17	1487.738	57.26	85.643	81.043
8/29/2005 9:27	1497.738	57.26	85.605	81.005
8/29/2005 9:37	1507.738	57.26	85.662	81.062
8/29/2005 9:47	1517.738	57.26	85.662	81.062
8/29/2005 9:57	1527.738	57.26	85.624	81.024
8/29/2005 10:07	1537.738	57.26	85.643	81.043
8/29/2005 10:17	1547.738	57.26	85.662	81.062
8/29/2005 10:27	1557.738	57.26	85.662	81.062
8/29/2005 10:37	1567.738	57.26	85.718	81.118
8/29/2005 10:47	1577.738	57.26	85.718	81.118
8/29/2005 10:57	1587.738	57.26	85.699	81.099
8/29/2005 11:07	1597.738	57.26	85.755	81.155
8/29/2005 11:17	1607.738	57.26	85.736	81.136
8/29/2005 11:27	1617.738	57.26	85.736	81.136
8/29/2005 11:37	1627.738	57.26	85.736	81.136
8/29/2005 11:47	1637.738	57.26	85.755	81.155
8/29/2005 11:57	1647.738	57.26	85.774	81.174
8/29/2005 12:07	1657.738	57.26	87.048	82.448
8/29/2005 12:17	1667.738	57.26	87.142	82.542
8/29/2005 12:27	1677.738	57.26	87.179	82.579
8/29/2005 12:37	1687.738	57.26	87.236	82.636
8/29/2005 12:47	1697.738	57.26	87.236	82.636
8/29/2005 12:57	1707.738	57.26	87.254	82.654
8/29/2005 13:07	1717.738	57.26	87.31	82.71
8/29/2005 13:17	1727.738	57.26	87.348	82.748
8/29/2005 13:27	1737.738	57.26	87.31	82.71
8/29/2005 13:37	1747.738	57.26	87.367	82.767
8/29/2005 13:47	1757.738	57.26	87.348	82.748
8/29/2005 13:57	1767.738	57.26	87.348	82.748
8/29/2005 14:07	1777.738	57.26	87.442	82.842
8/29/2005 14:17	1787.738	57.26	87.385	82.785
8/29/2005 14:27	1797.738	57.26	87.423	82.823
8/29/2005 14:37	1807.738	57.26	87.404	82.804
8/29/2005 14:47	1817.738	57.26	87.404	82.804
8/29/2005 14:57	1827.738	57.26	87.46	82.86
8/29/2005 15:07	1837.738	57.26	87.442	82.842
8/29/2005 15:17	1847.738	57.26	87.498	82.898
8/29/2005 15:27	1857.738	57.28	87.481	82.881
8/29/2005 15:37	1867.738	57.26	87.498	82.898
8/29/2005 15:47	1877.738	57.28	87.518	82.918
8/29/2005 15:57	1887.738	57.28	87.556	82.956
8/29/2005 16:07	1897.738	57.26	87.535	82.935
8/29/2005 16:17	1907.738	57.26	87.592	82.992
8/29/2005 16:27	1917.738	57.26	87.592	82.992
8/29/2005 16:37	1927.738	57.26	87.592	82.992
8/29/2005 16:47	1937.738	57.26	87.61	83.01
8/29/2005 16:57	1947.738	57.26	87.629	83.029
8/29/2005 17:07	1957.738	57.26	87.61	83.01
8/29/2005 17:17	1967.738	57.26	87.666	83.066
8/29/2005 17:27	1977.738	57.26	87.685	83.085
8/29/2005 17:37	1987.738	57.26	87.666	83.066
8/29/2005 17:47	1997.738	57.26	87.685	83.085

8/29/2005 17:57	2007.738	57.26	87.704	83.104
8/29/2005 18:07	2017.738	57.26	87.685	83.085
8/29/2005 18:17	2027.738	57.26	87.76	83.16
8/29/2005 18:27	2037.738	57.26	87.704	83.104
8/29/2005 18:37	2047.738	57.26	87.666	83.066
8/29/2005 18:47	2057.738	57.26	87.704	83.104
8/29/2005 18:57	2067.738	57.26	87.704	83.104
8/29/2005 19:07	2077.738	57.26	87.741	83.141
8/29/2005 19:17	2087.738	57.26	87.76	83.16
8/29/2005 19:27	2097.738	57.26	87.76	83.16
8/29/2005 19:37	2107.738	57.26	87.723	83.123
8/29/2005 19:47	2117.738	57.28	87.781	83.181
8/29/2005 19:57	2127.738	57.26	87.835	83.235
8/29/2005 20:07	2137.738	57.26	87.816	83.216
8/29/2005 20:17	2147.738	57.26	87.835	83.235
8/29/2005 20:27	2157.738	57.26	87.873	83.273
8/29/2005 20:37	2167.738	57.26	87.929	83.329
8/29/2005 20:47	2177.738	57.26	87.854	83.254
8/29/2005 20:57	2187.738	57.26	87.929	83.329
8/29/2005 21:07	2197.738	57.26	87.966	83.366
8/29/2005 21:17	2207.738	57.26	87.966	83.366
8/29/2005 21:27	2217.738	57.26	88.004	83.404
8/29/2005 21:37	2227.738	57.26	88.041	83.441
8/29/2005 21:47	2237.738	57.28	88.043	83.443
8/29/2005 21:57	2247.738	57.26	88.097	83.497
8/29/2005 22:07	2257.738	57.26	88.154	83.554
8/29/2005 22:17	2267.738	57.26	88.097	83.497
8/29/2005 22:27	2277.738	57.26	88.116	83.516
8/29/2005 22:37	2287.738	57.26	88.154	83.554
8/29/2005 22:47	2297.738	57.26	88.154	83.554
8/29/2005 22:57	2307.738	57.28	88.193	83.593
8/29/2005 23:07	2317.738	57.28	88.249	83.649
8/29/2005 23:17	2327.738	57.26	88.191	83.591
8/29/2005 23:27	2337.738	57.26	88.21	83.61
8/29/2005 23:37	2347.738	57.26	88.247	83.647
8/29/2005 23:47	2357.738	57.28	88.249	83.649
8/29/2005 23:57	2367.738	57.26	88.229	83.629
8/30/2005 0:07	2377.738	57.28	88.23	83.63
8/30/2005 0:17	2387.738	57.26	88.266	83.666
8/30/2005 0:27	2397.738	57.26	88.304	83.704
8/30/2005 0:37	2407.738	57.26	88.266	83.666
8/30/2005 0:47	2417.738	57.26	88.285	83.685
8/30/2005 0:57	2427.738	57.26	88.322	83.722
8/30/2005 1:07	2437.738	57.28	88.287	83.687
8/30/2005 1:17	2447.738	57.26	88.304	83.704
8/30/2005 1:27	2457.738	57.26	88.304	83.704
8/30/2005 1:37	2467.738	57.26	88.379	83.779
8/30/2005 1:47	2477.738	57.28	88.324	83.724
8/30/2005 1:57	2487.738	57.26	88.304	83.704
8/30/2005 2:07	2497.738	57.26	88.341	83.741
8/30/2005 2:17	2507.738	57.28	88.362	83.762
8/30/2005 2:27	2517.738	57.26	88.341	83.741

8/30/2005 2:37	2527.738	57.28	88.324	83.724
8/30/2005 2:47	2537.738	57.28	88.305	83.705
8/30/2005 2:57	2547.738	57.28	88.324	83.724
8/30/2005 3:07	2557.738	57.26	88.397	83.797
8/30/2005 3:17	2567.738	57.26	88.416	83.816
8/30/2005 3:27	2577.738	57.28	88.399	83.799
8/30/2005 3:37	2587.738	57.28	88.418	83.818
8/30/2005 3:47	2597.738	57.28	88.399	83.799
8/30/2005 3:57	2607.738	57.28	88.437	83.837
8/30/2005 4:07	2617.738	57.28	88.399	83.799
8/30/2005 4:17	2627.738	57.28	88.38	83.78
8/30/2005 4:27	2637.738	57.28	88.362	83.762
8/30/2005 4:37	2647.738	57.28	88.399	83.799
8/30/2005 4:47	2657.738	57.28	88.362	83.762
8/30/2005 4:57	2667.738	57.28	88.418	83.818
8/30/2005 5:07	2677.738	57.28	88.418	83.818
8/30/2005 5:17	2687.738	57.28	88.418	83.818
8/30/2005 5:27	2697.738	57.28	88.38	83.78
8/30/2005 5:37	2707.738	57.28	88.418	83.818
8/30/2005 5:47	2717.738	57.28	88.418	83.818
8/30/2005 5:57	2727.738	57.28	88.474	83.874
8/30/2005 6:07	2737.738	57.28	88.437	83.837
8/30/2005 6:17	2747.738	57.28	88.474	83.874
8/30/2005 6:27	2757.738	57.28	88.437	83.837
8/30/2005 6:37	2767.738	57.28	88.474	83.874
8/30/2005 6:47	2777.738	57.28	88.493	83.893
8/30/2005 6:57	2787.738	57.28	88.568	83.968
8/30/2005 7:07	2797.738	57.28	88.511	83.911
8/30/2005 7:17	2807.738	57.28	88.549	83.949
8/30/2005 7:27	2817.738	57.28	88.549	83.949
8/30/2005 7:37	2827.738	57.28	88.53	83.93
8/30/2005 9:27	2937.738	57.28	88.549	83.949
8/30/2005 9:37	2947.738	57.28	88.511	83.911
8/30/2005 9:47	2957.738	57.28	88.474	83.874
8/30/2005 9:57	2967.738	57.28	88.474	83.874
8/30/2005 10:07	2977.738	57.28	88.474	83.874
8/30/2005 10:17	2987.738	57.28	88.455	83.855
8/30/2005 10:27	2997.738	57.28	88.68	84.08

Recovery

Pg 1 of 7

In-Situ Inc.

MiniTroll Pro

Report generated:

8/31/2005

9:08:37

Report from file: C:\Win-Situ3.71\Data\SN05834 2005-08-30 102957 Longley\_REC.bin

DataMgr Version

3.71

Serial number:

5834

Firmware Version

3.09

Unit name:

Longley\_Well

Test name:

Longley\_REC

Test defined on:

8/15/2005

13:49:25

Test started on:

8/30/2005

10:29:57

Test stopped on:

N/A

N/A

Test extracted on: N/A

Data gathered using Logarithmic testing

Maximum time between data poi Minutes.

Number of data samples: 267

TOTAL DATA SAMPLES

267

Channel number [1]

Measurement type:

Temperature

Channel name:

OnBoard Temp

Channel number [2]

Measurement type:

Pressure

Channel name:

wl depth

Sensor Range:

300 PSI.

Specific gravity:

1

Mode:

TOC

User-defined reference:

4.6

Feet H2O

Referenced on:

channel definition.

Static=

4.60

Pressure head at reference:

133.538

Feet H2O

Max DD=

84.04

Time	Time t'	Time	Chan[2]	Recovery	%
t	ET (min)	t/t'	Feet H2O	feet (s')	Recovery
8/30/2005 10:29	3000.000	0.000100	30000000	88.643	84.043
8/30/2005 10:30	3000.496	0.4963	6045.731	48.405	43.805
8/30/2005 10:31	3001.041	1.0413	2882.014	41.257	36.657
8/30/2005 10:31	3001.968	1.968	1525.39	36.424	31.824
8/30/2005 10:33	3003.946	3.9463	761.2058	31.763	27.163
8/30/2005 10:34	3004.973	4.973	604.2576	30.353	25.753
8/30/2005 10:35	3005.915	5.9147	508.2108	29.302	24.702
8/30/2005 10:36	3007.035	7.0347	427.4574	28.326	23.726
8/30/2005 10:37	3007.896	7.8963	380.9248	27.669	23.069
8/30/2005 10:38	3008.865	8.8647	339.4209	27.032	22.432

8/30/2005 10:39	3009.950	9.9497	302.5166	26.414	21.814	74.04
8/30/2005 10:41	3011.831	11.8313	254.5647	25.457	20.857	75.18
8/30/2005 10:44	3014.070	14.0697	214.2242	24.558	19.958	76.25
8/30/2005 10:45	3015.791	15.7913	190.978	23.977	19.377	76.94
8/30/2005 10:47	3017.723	17.723	170.2716	23.396	18.796	77.64
8/30/2005 10:49	3019.891	19.8913	151.8197	22.833	18.233	78.31
8/30/2005 10:52	3022.325	22.3247	135.3803	22.271	17.671	78.97
8/30/2005 10:53	3023.650	23.6497	127.8515	21.99	17.39	79.31
8/30/2005 10:56	3026.543	26.543	114.0241	21.447	16.847	79.95
8/30/2005 10:58	3028.118	28.118	107.6932	21.166	16.566	80.29
8/30/2005 10:59	3029.786	29.7863	101.7174	20.922	16.322	80.58
8/30/2005 11:05	3035.411	35.4112	85.71896	20.134	15.534	81.52
8/30/2005 11:09	3039.740	39.7397	76.49126	19.628	15.028	82.12
8/30/2005 11:14	3044.596	44.5963	68.27015	19.122	14.522	82.72
8/30/2005 11:20	3050.046	50.0463	60.94449	18.635	14.035	83.30
8/30/2005 11:26	3056.160	56.1597	54.41909	18.167	13.567	83.86
8/30/2005 11:29	3059.491	59.4913	51.42754	17.922	13.322	84.15
8/30/2005 11:36	3066.758	66.758	45.93843	17.437	12.837	84.73
8/30/2005 11:40	3070.718	70.718	43.42201	17.21	12.61	85.00
8/30/2005 11:44	3074.911	74.9113	41.04736	16.985	12.385	85.26
8/30/2005 11:49	3079.355	79.3547	38.80494	16.76	12.16	85.53
8/30/2005 11:54	3084.061	84.0613	36.68824	16.536	11.936	85.80
8/30/2005 11:59	3089.046	89.0463	34.69034	16.311	11.711	86.07
8/30/2005 12:04	3094.326	94.3263	32.80449	16.067	11.467	86.36
8/30/2005 12:09	3099.920	99.9197	31.02411	15.843	11.243	86.62
8/30/2005 12:15	3105.845	105.8447	29.34341	15.637	11.037	86.87
8/30/2005 12:22	3112.120	112.1197	27.75712	15.393	10.793	87.16
8/30/2005 12:28	3118.768	118.768	26.25933	15.206	10.606	87.38
8/30/2005 12:35	3125.810	125.8097	24.84554	14.962	10.362	87.67
8/30/2005 12:43	3133.268	133.268	23.51103	14.738	10.138	87.94
8/30/2005 12:51	3141.168	141.168	22.25128	14.532	9.932	88.18
8/30/2005 12:59	3149.536	149.5363	21.06202	14.307	9.707	88.45
8/30/2005 13:08	3158.401	158.4013	19.93924	14.101	9.501	88.70
8/30/2005 13:17	3167.791	167.7913	18.87935	13.876	9.276	88.96
8/30/2005 13:27	3177.738	177.738	17.87878	13.67	9.07	89.21
8/30/2005 13:37	3187.738	187.738	16.97972	13.445	8.845	89.48
8/30/2005 13:47	3197.738	197.738	16.17159	13.258	8.658	89.70
8/30/2005 13:57	3207.738	207.738	15.44127	13.071	8.471	89.92
8/30/2005 14:07	3217.738	217.738	14.77803	12.902	8.302	90.12
8/30/2005 14:17	3227.738	227.738	14.17303	12.752	8.152	90.30
8/30/2005 14:27	3237.738	237.738	13.61893	12.584	7.984	90.50
8/30/2005 14:37	3247.738	247.738	13.10957	12.434	7.834	90.68
8/30/2005 14:47	3257.738	257.738	12.63973	12.303	7.703	90.83
8/30/2005 14:57	3267.738	267.738	12.20498	12.153	7.553	91.01
8/30/2005 15:07	3277.738	277.738	11.80155	12.022	7.422	91.17
8/30/2005 15:17	3287.738	287.738	11.42615	11.891	7.291	91.32
8/30/2005 15:27	3297.738	297.738	11.07597	11.778	7.178	91.46
8/30/2005 15:37	3307.738	307.738	10.74855	11.666	7.066	91.59
8/30/2005 15:47	3317.738	317.738	10.44174	11.535	6.935	91.75
8/30/2005 15:57	3327.738	327.738	10.15365	11.423	6.823	91.88
8/30/2005 16:07	3337.738	337.738	9.882625	11.329	6.729	91.99
8/30/2005 16:17	3347.738	347.738	9.627185	11.217	6.617	92.13

8/30/2005 16:27	3357.738	357.738	9.386026	11.104	6.504	92.26
8/30/2005 16:37	3367.738	367.738	9.157982	11.011	6.411	92.37
8/30/2005 16:47	3377.738	377.738	8.942013	10.917	6.317	92.48
8/30/2005 16:57	3387.738	387.738	8.737183	10.823	6.223	92.60
8/30/2005 17:07	3397.738	397.738	8.542654	10.73	6.13	92.71
8/30/2005 17:17	3407.738	407.738	8.357666	10.636	6.036	92.82
8/30/2005 17:27	3417.738	417.738	8.181535	10.561	5.961	92.91
8/30/2005 17:37	3427.738	427.738	8.013639	10.486	5.886	93.00
8/30/2005 17:47	3437.738	437.738	7.853415	10.393	5.793	93.11
8/30/2005 17:57	3447.738	447.738	7.700347	10.299	5.699	93.22
8/30/2005 18:07	3457.738	457.738	7.553968	10.243	5.643	93.29
8/30/2005 18:17	3467.738	467.738	7.413847	10.149	5.549	93.40
8/30/2005 18:27	3477.738	477.738	7.279593	10.074	5.474	93.49
8/30/2005 18:37	3487.738	487.738	7.150843	10.018	5.418	93.55
8/30/2005 18:47	3497.738	497.738	7.027267	9.943	5.343	93.64
8/30/2005 18:57	3507.738	507.738	6.908559	9.868	5.268	93.73
8/30/2005 19:07	3517.738	517.738	6.794437	9.793	5.193	93.82
8/30/2005 19:17	3527.738	527.738	6.684639	9.737	5.137	93.89
8/30/2005 19:27	3537.738	537.738	6.578925	9.681	5.081	93.95
8/30/2005 19:37	3547.738	547.738	6.477071	9.606	5.006	94.04
8/30/2005 19:47	3557.738	557.738	6.37887	9.531	4.931	94.13
8/30/2005 19:57	3567.738	567.738	6.284128	9.475	4.875	94.20
8/30/2005 20:07	3577.738	577.738	6.192665	9.437	4.837	94.24
8/30/2005 20:17	3587.738	587.738	6.104315	9.4	4.8	94.29
8/30/2005 20:27	3597.738	597.738	6.018921	9.344	4.744	94.36
8/30/2005 20:37	3607.738	607.738	5.936338	9.306	4.706	94.40
8/30/2005 20:47	3617.738	617.738	5.856428	9.271	4.671	94.44
8/30/2005 20:57	3627.738	627.738	5.779064	9.231	4.631	94.49
8/30/2005 21:07	3637.738	637.738	5.704126	9.175	4.575	94.56
8/30/2005 21:17	3647.738	647.738	5.631502	9.138	4.538	94.60
8/30/2005 21:27	3657.738	657.738	5.561087	9.102	4.502	94.64
8/30/2005 21:37	3667.738	667.738	5.49278	9.102	4.502	94.64
8/30/2005 21:47	3677.738	677.738	5.426489	9.046	4.446	94.71
8/30/2005 21:57	3687.738	687.738	5.362126	9.009	4.409	94.75
8/30/2005 22:07	3697.738	697.738	5.299608	8.99	4.39	94.78
8/30/2005 22:17	3707.738	707.738	5.238857	8.953	4.353	94.82
8/30/2005 22:27	3717.738	717.738	5.179798	8.915	4.315	94.87
8/30/2005 22:37	3727.738	727.738	5.122363	8.896	4.296	94.89
8/30/2005 22:47	3737.738	737.738	5.066484	8.859	4.259	94.93
8/30/2005 22:57	3747.738	747.738	5.0121	8.84	4.24	94.95
8/30/2005 23:07	3757.738	757.738	4.959152	8.803	4.203	95.00
8/30/2005 23:17	3767.738	767.738	4.907583	8.784	4.184	95.02
8/30/2005 23:27	3777.738	777.738	4.85734	8.765	4.165	95.04
8/30/2005 23:37	3787.738	787.738	4.808373	8.728	4.128	95.09
8/30/2005 23:47	3797.738	797.738	4.760633	8.69	4.09	95.13
8/30/2005 23:57	3807.738	807.738	4.714076	8.672	4.072	95.15
8/31/2005 0:07	3817.738	817.738	4.668657	8.634	4.034	95.20
8/31/2005 0:17	3827.738	827.738	4.624335	8.597	3.997	95.24
8/31/2005 0:27	3837.738	837.738	4.581072	8.559	3.959	95.29
8/31/2005 0:37	3847.738	847.738	4.538829	8.522	3.922	95.33
8/31/2005 0:47	3857.738	857.738	4.497572	8.468	3.868	95.40
8/31/2005 0:57	3867.738	867.738	4.457265	8.449	3.849	95.42

8/31/2005 1:07	3877.738	877.738	4.417876	8.393	3.793	95.49
8/31/2005 1:17	3887.738	887.738	4.379375	8.355	3.755	95.53
8/31/2005 1:27	3897.738	897.738	4.341732	8.318	3.718	95.58
8/31/2005 1:37	3907.738	907.738	4.304918	8.262	3.662	95.64
8/31/2005 1:47	3917.738	917.738	4.268907	8.243	3.643	95.67
8/31/2005 1:57	3927.738	927.738	4.233672	8.187	3.587	95.73
8/31/2005 2:07	3937.738	937.738	4.199188	8.149	3.549	95.78
8/31/2005 2:17	3947.738	947.738	4.165432	8.112	3.512	95.82
8/31/2005 2:27	3957.738	957.738	4.132381	8.076	3.476	95.86
8/31/2005 2:37	3967.738	967.738	4.100013	8.02	3.42	95.93
8/31/2005 2:47	3977.738	977.738	4.068307	8.001	3.401	95.95
8/31/2005 2:57	3987.738	987.738	4.037243	7.964	3.364	96.00
8/31/2005 3:07	3997.738	997.738	4.006801	7.926	3.326	96.04
8/31/2005 3:17	4007.738	1007.738	3.976964	7.87	3.27	96.11
8/31/2005 3:27	4017.738	1017.738	3.947713	7.852	3.252	96.13
8/31/2005 3:37	4027.738	1027.738	3.919032	7.795	3.195	96.20
8/31/2005 3:47	4037.738	1037.738	3.890903	7.779	3.179	96.22
8/31/2005 3:57	4047.738	1047.738	3.863311	7.739	3.139	96.27
8/31/2005 4:07	4057.738	1057.738	3.836241	7.722	3.122	96.29
8/31/2005 4:17	4067.738	1067.738	3.809678	7.683	3.083	96.33
8/31/2005 4:27	4077.738	1077.738	3.783608	7.648	3.048	96.37
8/31/2005 4:37	4087.738	1087.738	3.758017	7.591	2.991	96.44
8/31/2005 4:47	4097.738	1097.738	3.732893	7.573	2.973	96.46
8/31/2005 4:57	4107.738	1107.738	3.708222	7.554	2.954	96.49
8/31/2005 5:07	4117.738	1117.738	3.683992	7.5	2.9	96.55
8/31/2005 5:17	4127.738	1127.738	3.660192	7.462	2.862	96.59
8/31/2005 5:27	4137.738	1137.738	3.636811	7.443	2.843	96.62
8/31/2005 5:37	4147.738	1147.738	3.613837	7.425	2.825	96.64
8/31/2005 5:47	4157.738	1157.738	3.59126	7.387	2.787	96.68
8/31/2005 5:57	4167.738	1167.738	3.569069	7.369	2.769	96.71
8/31/2005 6:07	4177.738	1177.738	3.547256	7.352	2.752	96.73
8/31/2005 6:17	4187.738	1187.738	3.52581	7.318	2.718	96.77
8/31/2005 6:27	4197.738	1197.738	3.504721	7.281	2.681	96.81
8/31/2005 6:37	4207.738	1207.738	3.483982	7.26	2.66	96.83
8/31/2005 6:47	4217.738	1217.738	3.463584	7.258	2.658	96.84
8/31/2005 6:57	4227.738	1227.738	3.443518	7.229	2.629	96.87
8/31/2005 7:07	4237.738	1237.738	3.423776	7.229	2.629	96.87
8/31/2005 7:17	4247.738	1247.738	3.404351	7.231	2.631	96.87
8/31/2005 7:27	4257.738	1257.738	3.385234	7.212	2.612	96.89
8/31/2005 7:37	4267.738	1267.738	3.36642	7.218	2.618	96.88
8/31/2005 7:47	4277.738	1277.738	3.347899	7.218	2.618	96.88
8/31/2005 7:57	4287.738	1287.738	3.329666	7.199	2.599	96.91
8/31/2005 8:07	4297.738	1297.738	3.311715	7.184	2.584	96.93
8/31/2005 8:17	4307.738	1307.738	3.294037	7.164	2.564	96.95
8/31/2005 8:27	4317.738	1317.738	3.276629	7.162	2.562	96.95
8/31/2005 8:37	4327.738	1327.738	3.259482	7.124	2.524	97.00
8/31/2005 8:47	4337.738	1337.738	3.242592	7.091	2.491	97.04
8/31/2005 8:57	4347.738	1347.738	3.225952	7.076	2.476	97.05
8/31/2005 9:07	4357.738	1357.738	3.209557	7.055	2.455	97.08
8/31/2005 9:17	4367.738	1367.738	3.193403	7.038	2.438	97.10
8/31/2005 9:27	4377.738	1377.738	3.177482	7.003	2.403	97.14
8/31/2005 9:37	4387.738	1387.738	3.161791	6.978	2.378	97.17

8/31/2005 9:47	4397.738	1397.738	3.146325	6.945	2.345	97.21
8/31/2005 9:57	4407.738	1407.738	3.131078	6.945	2.345	97.21
8/31/2005 10:07	4417.738	1417.738	3.116047	6.907	2.307	97.25
8/31/2005 10:17	4427.738	1427.738	3.101226	6.868	2.268	97.30
8/31/2005 10:27	4437.738	1437.738	3.086611	6.836	2.236	97.34
8/31/2005 10:37	4447.738	1447.738	3.072198	6.834	2.234	97.34
8/31/2005 10:47	4457.738	1457.738	3.057983	6.799	2.199	97.38
8/31/2005 10:57	4467.738	1467.738	3.043962	6.778	2.178	97.41
8/31/2005 11:07	4477.738	1477.738	3.03013	6.76	2.16	97.43
8/31/2005 11:17	4487.738	1487.738	3.016484	6.724	2.124	97.47
8/31/2005 11:27	4497.738	1497.738	3.003021	6.693	2.093	97.51
8/31/2005 11:37	4507.738	1507.738	2.989736	6.693	2.093	97.51
8/31/2005 11:47	4517.738	1517.738	2.976626	6.653	2.053	97.56
8/31/2005 11:57	4527.738	1527.738	2.963687	6.634	2.034	97.58
8/31/2005 12:07	4537.738	1537.738	2.950918	6.622	2.022	97.59
8/31/2005 12:17	4547.738	1547.738	2.938313	6.586	1.986	97.64
8/31/2005 12:27	4557.738	1557.738	2.925869	6.586	1.986	97.64
8/31/2005 12:37	4567.738	1567.738	2.913585	6.545	1.945	97.69
8/31/2005 12:47	4577.738	1577.738	2.901456	6.537	1.937	97.70
8/31/2005 12:57	4587.738	1587.738	2.889481	6.501	1.901	97.74
8/31/2005 13:07	4597.738	1597.738	2.877655	6.472	1.872	97.77
8/31/2005 13:17	4607.738	1607.738	2.865976	6.47	1.87	97.77
8/31/2005 13:27	4617.738	1617.738	2.854441	6.449	1.849	97.80
8/31/2005 13:37	4627.738	1627.738	2.843048	6.418	1.818	97.84
8/31/2005 13:47	4637.738	1637.738	2.831795	6.424	1.824	97.83
8/31/2005 13:57	4647.738	1647.738	2.820678	6.386	1.786	97.87
8/31/2005 14:07	4657.738	1657.738	2.809695	6.376	1.776	97.89
8/31/2005 14:17	4667.738	1667.738	2.798844	6.361	1.761	97.90
8/31/2005 14:27	4677.738	1677.738	2.788122	6.345	1.745	97.92
8/31/2005 14:37	4687.738	1687.738	2.777527	6.324	1.724	97.95
8/31/2005 14:47	4697.738	1697.738	2.767057	6.288	1.688	97.99
8/31/2005 14:57	4707.738	1707.738	2.75671	6.301	1.701	97.98
8/31/2005 15:07	4717.738	1717.738	2.746483	6.249	1.649	98.04
8/31/2005 15:17	4727.738	1727.738	2.736374	6.23	1.63	98.06
8/31/2005 15:27	4737.738	1737.738	2.726382	6.218	1.618	98.07
8/31/2005 15:37	4747.738	1747.738	2.716504	6.18	1.58	98.12
8/31/2005 15:47	4757.738	1757.738	2.706739	6.193	1.593	98.10
8/31/2005 15:57	4767.738	1767.738	2.697084	6.821	2.221	97.36
8/31/2005 16:07	4777.738	1777.738	2.687538	6.126	1.526	98.18
8/31/2005 16:17	4787.738	1787.738	2.678098	6.103	1.503	98.21
8/31/2005 16:27	4797.738	1797.738	2.668764	6.086	1.486	98.23
8/31/2005 16:37	4807.738	1807.738	2.659533	6.07	1.47	98.25
8/31/2005 16:47	4817.738	1817.738	2.650403	6.051	1.451	98.27
8/31/2005 16:57	4827.738	1827.738	2.641373	6.051	1.451	98.27
8/31/2005 17:07	4837.738	1837.738	2.632442	6.015	1.415	98.32
8/31/2005 17:17	4847.738	1847.738	2.623607	6.008	1.408	98.32
8/31/2005 17:27	4857.738	1857.738	2.614867	5.993	1.393	98.34
8/31/2005 17:37	4867.738	1867.738	2.606221	5.974	1.374	98.37
8/31/2005 17:47	4877.738	1877.738	2.597667	5.955	1.355	98.39
8/31/2005 17:57	4887.738	1887.738	2.589204	5.824	1.224	98.54
8/31/2005 18:07	4897.738	1897.738	2.580829	5.8	1.2	98.57
8/31/2005 18:17	4907.738	1907.738	2.572543	5.769	1.169	98.61

8/31/2005 18:27	4917.738	1917.738	2.564343	5.746	1.146	98.64
8/31/2005 18:37	4927.738	1927.738	2.556228	5.722	1.122	98.66
8/31/2005 18:47	4937.738	1937.738	2.548197	5.705	1.105	98.69
8/31/2005 18:57	4947.738	1947.738	2.540248	5.68	1.08	98.71
8/31/2005 19:07	4957.738	1957.738	2.532381	5.663	1.063	98.74
8/31/2005 19:17	4967.738	1967.738	2.524593	5.659	1.059	98.74
8/31/2005 19:27	4977.738	1977.738	2.516884	5.643	1.043	98.76
8/31/2005 19:37	4987.738	1987.738	2.509253	5.626	1.026	98.78
8/31/2005 19:47	4997.738	1997.738	2.501698	5.621	1.021	98.79
8/31/2005 19:57	5007.738	2007.738	2.494219	5.612	1.012	98.80
8/31/2005 20:07	5017.738	2017.738	2.486813	5.606	1.006	98.80
8/31/2005 20:17	5027.738	2027.738	2.479481	5.601	1.001	98.81
8/31/2005 20:27	5037.738	2037.738	2.472221	5.596	0.996	98.81
8/31/2005 20:37	5047.738	2047.738	2.465031	5.587	0.987	98.83
8/31/2005 20:47	5057.738	2057.738	2.457912	5.593	0.993	98.82
8/31/2005 20:57	5067.738	2067.738	2.450861	5.599	0.999	98.81
8/31/2005 21:07	5077.738	2077.738	2.443878	5.605	1.005	98.80
8/31/2005 21:17	5087.738	2087.738	2.436962	5.609	1.009	98.80
8/31/2005 21:27	5097.738	2097.738	2.430112	5.598	0.998	98.81
8/31/2005 21:37	5107.738	2107.738	2.423327	5.617	1.017	98.79
8/31/2005 21:47	5117.738	2117.738	2.416606	5.625	1.025	98.78
8/31/2005 21:57	5127.738	2127.738	2.409948	5.608	1.008	98.80
8/31/2005 22:07	5137.738	2137.738	2.403353	5.629	1.029	98.78
8/31/2005 22:17	5147.738	2147.738	2.396818	5.635	1.035	98.77
8/31/2005 22:27	5157.738	2157.738	2.390345	5.622	1.022	98.78
8/31/2005 22:37	5167.738	2167.738	2.383931	5.624	1.024	98.78
8/31/2005 22:47	5177.738	2177.738	2.377576	5.63	1.03	98.77
8/31/2005 22:57	5187.738	2187.738	2.371279	5.636	1.036	98.77
8/31/2005 23:07	5197.738	2197.738	2.36504	5.646	1.046	98.76
8/31/2005 23:17	5207.738	2207.738	2.358857	5.639	1.039	98.76
8/31/2005 23:27	5217.738	2217.738	2.35273	5.655	1.055	98.74
8/31/2005 23:37	5227.738	2227.738	2.346657	5.633	1.033	98.77
8/31/2005 23:47	5237.738	2237.738	2.34064	5.635	1.035	98.77
8/31/2005 23:57	5247.738	2247.738	2.334675	5.648	1.048	98.75
9/1/2005 0:07	5257.738	2257.738	2.328764	5.64	1.04	98.76
9/1/2005 0:17	5267.738	2267.738	2.322904	5.623	1.023	98.78
9/1/2005 0:27	5277.738	2277.738	2.317096	5.601	1.001	98.81
9/1/2005 0:37	5287.738	2287.738	2.311339	5.609	1.009	98.80
9/1/2005 0:47	5297.738	2297.738	2.305632	5.593	0.993	98.82
9/1/2005 0:57	5307.738	2307.738	2.299974	5.568	0.968	98.85
9/1/2005 1:07	5317.738	2317.738	2.294365	5.547	0.947	98.87
9/1/2005 1:17	5327.738	2327.738	2.288805	5.54	0.94	98.88
9/1/2005 1:27	5337.738	2337.738	2.283292	5.517	0.917	98.91
9/1/2005 1:37	5347.738	2347.738	2.277826	5.506	0.906	98.92
9/1/2005 1:47	5357.738	2357.738	2.272406	5.471	0.871	98.96
9/1/2005 1:57	5367.738	2367.738	2.267032	5.466	0.866	98.97
9/1/2005 2:07	5377.738	2377.738	2.261703	5.435	0.835	99.01
9/1/2005 2:17	5387.738	2387.738	2.256419	5.422	0.822	99.02
9/1/2005 2:27	5397.738	2397.738	2.251179	5.407	0.807	99.04
9/1/2005 2:37	5407.738	2407.738	2.245983	5.397	0.797	99.05
9/1/2005 2:47	5417.738	2417.738	2.240829	5.38	0.78	99.07
9/1/2005 2:57	5427.738	2427.738	2.235718	5.351	0.751	99.11

9/1/2005 3:07	5437.738	2437.738	2.230649	5.338	0.738	99.12
9/1/2005 3:17	5447.738	2447.738	2.225621	5.323	0.723	99.14
9/1/2005 3:27	5457.738	2457.738	2.220635	5.306	0.706	99.16
9/1/2005 3:37	5467.738	2467.738	2.215688	5.294	0.694	99.17
9/1/2005 3:47	5477.738	2477.738	2.210782	5.294	0.694	99.17
9/1/2005 3:57	5487.738	2487.738	2.205915	5.26	0.66	99.21
9/1/2005 4:07	5497.738	2497.738	2.201087	5.25	0.65	99.23
9/1/2005 4:17	5507.738	2507.738	2.196297	5.231	0.631	99.25
9/1/2005 4:27	5517.738	2517.738	2.191546	5.196	0.596	99.29
9/1/2005 4:37	5527.738	2527.738	2.186832	5.216	0.616	99.27
9/1/2005 4:47	5537.738	2537.738	2.182155	5.187	0.587	99.30
9/1/2005 4:57	5547.738	2547.738	2.177515	5.183	0.583	99.31
9/1/2005 5:07	5557.738	2557.738	2.172911	5.152	0.552	99.34
9/1/2005 5:17	5567.738	2567.738	2.168343	5.154	0.554	99.34
9/1/2005 5:27	5577.738	2577.738	2.163811	5.141	0.541	99.36
9/1/2005 5:37	5587.738	2587.738	2.159314	5.12	0.52	99.38
9/1/2005 5:47	5597.738	2597.738	2.154851	5.106	0.506	99.40
9/1/2005 5:57	5607.738	2607.738	2.150422	5.11	0.51	99.39
9/1/2005 6:07	5617.738	2617.738	2.146028	5.091	0.491	99.42
9/1/2005 6:17	5627.738	2627.738	2.141666	5.099	0.499	99.41
9/1/2005 6:27	5637.738	2637.738	2.137338	5.099	0.499	99.41
9/1/2005 6:37	5647.738	2647.738	2.133043	5.101	0.501	99.40
9/1/2005 6:47	5657.738	2657.738	2.128779	5.161	0.561	99.33
9/1/2005 6:57	5667.738	2667.738	2.124548	5.157	0.557	99.34
9/1/2005 7:07	5677.738	2677.738	2.120349	5.157	0.557	99.34
9/1/2005 7:17	5687.738	2687.738	2.11618	5.159	0.559	99.33
9/1/2005 7:27	5697.738	2697.738	2.112043	5.18	0.58	99.31
9/1/2005 7:37	5707.738	2707.738	2.107936	5.165	0.565	99.33
9/1/2005 7:47	5717.738	2717.738	2.103859	5.167	0.567	99.33
9/1/2005 7:57	5727.738	2727.738	2.099812	5.171	0.571	99.32
9/1/2005 8:07	5737.738	2737.738	2.095795	5.179	0.579	99.31
9/1/2005 8:17	5747.738	2747.738	2.091807	5.183	0.583	99.31
9/1/2005 8:27	5757.738	2757.738	2.087848	5.21	0.61	99.27
9/1/2005 8:37	5767.738	2767.738	2.083918	5.227	0.627	99.25
9/1/2005 8:47	5777.738	2777.738	2.080015	5.231	0.631	99.25
9/1/2005 8:57	5787.738	2787.738	2.076141	5.216	0.616	99.27
9/1/2005 9:07	5797.738	2797.738	2.072295	5.183	0.583	99.31

# **APPENDIX 5**

## **Plumbness and Alignment Surveys**

# Drift-Pac<sup>TM</sup>

## Casing Alignment Interpretation Package

Prepared Especially For

**Washoe County Water Co.**

**Longley Lane Well**

**September 1, 2005**

This Plumbness and Alignment Interpretation Package represents our best efforts to provide a correct interpretation. This package is prepared for informational purposes only and is based on our best interpretation of The American Water Works Association, ANSI/AWWA A100-97, Appendix D - "Plumbness and Alignment - Procedure Testing", Dated February 1, 1998. According to the Standard, this procedure is for informational purposes only and is not a part of AWWA A-100. Therefore, Welenco does not guarantee the reliability of this procedure and cannot be held responsible for any errors in this procedure. The data used in our interpretation was not obtained using the AWWA "Apparatus Required For Plumbness and Alignment Tests". Since all interpretations are opinions based on mathematical calculations, and inferences from electrical or other types of measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by Customer resulting from any interpretation made by this document. Welenco does not warrant or guarantee the accuracy of the data, specifically including (but without limitations) the accuracy of data transmitted by electronic process, and Welenco will not be responsible for accidental or intentional interception of such data by third parties. Welenco employees are not empowered to change or otherwise modify the attached interpretation. By accepting this Plumbness and Alignment Interpretation Package, the Customer agrees to the foregoing, and to the General Terms and Conditions of Welenco.

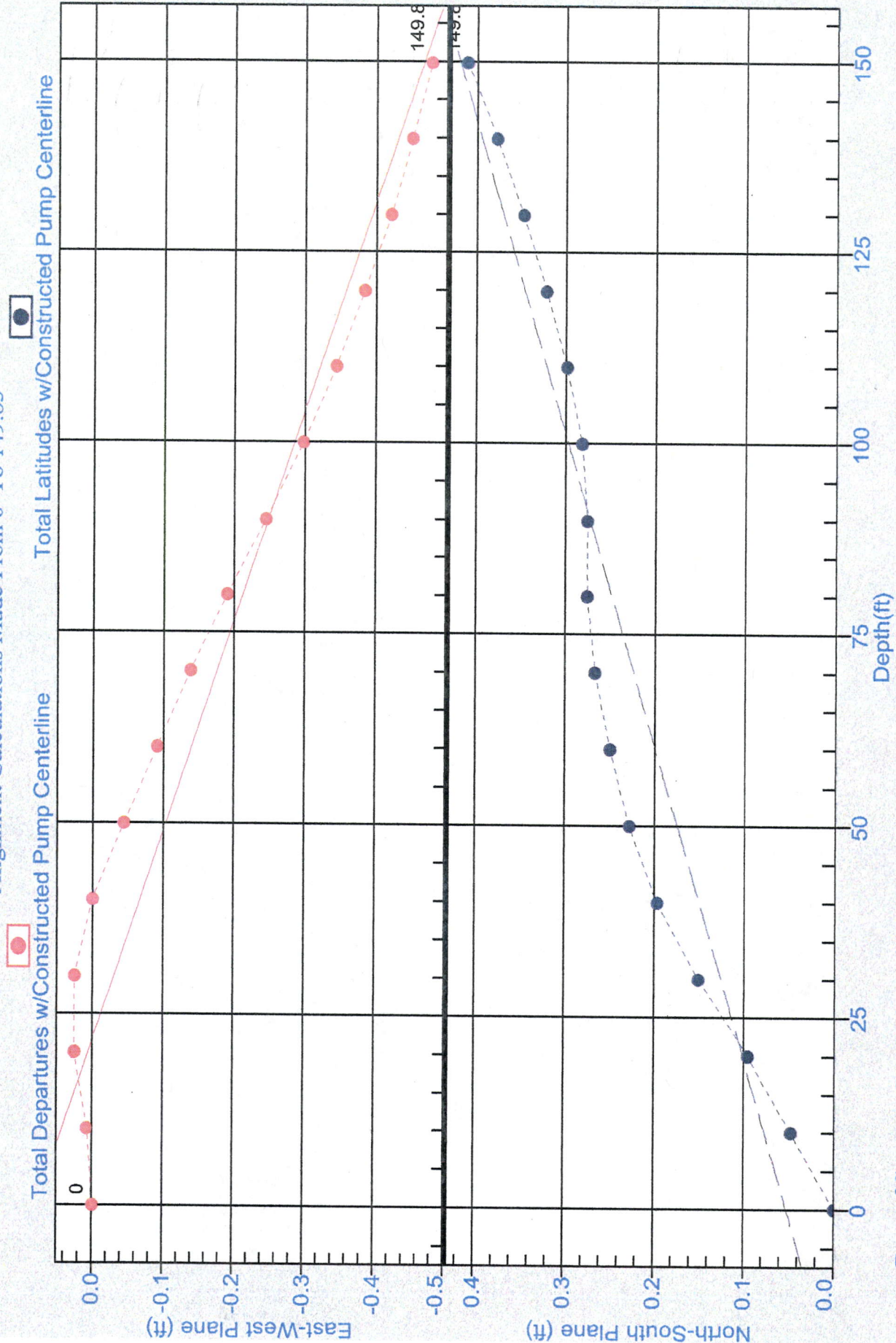
 **welenco**

# Washoe County Water Co.

Longley Lane Well

DRIFT-PAC Straightness/Alignment Calculations

Constructed Pump Centerline (Well Centerline/Straightness) View Used To Calculate Actual Drift and Effective Diameter  
Alignment Calculations Made From 0' To 149.85'



Date of Survey: September 1, 2005

Welenco, Inc. (800) 445-9914

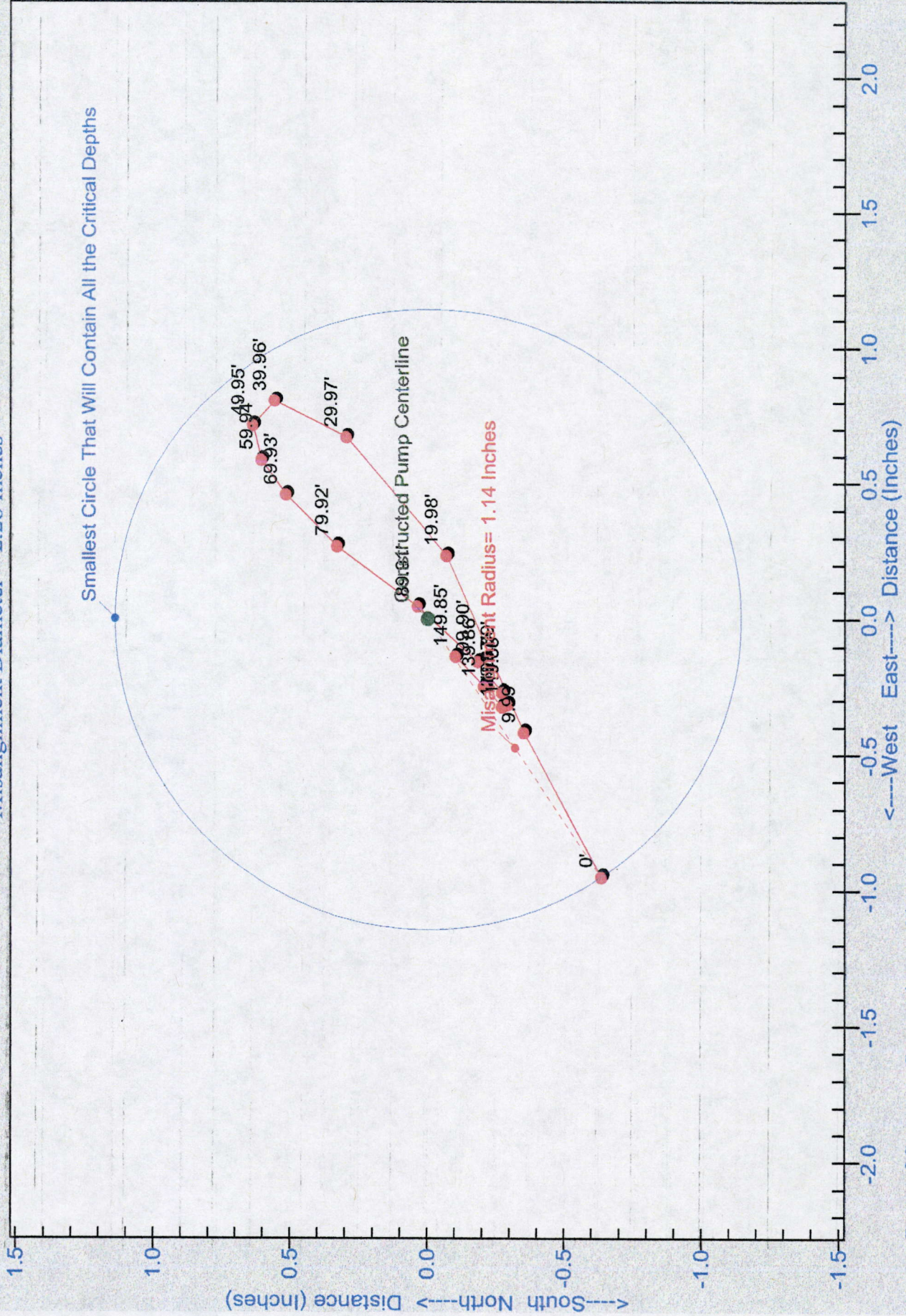
Balanced Tangential Calculation Method

# Washoe County Water Co.

Longley Lane Well

Drift-Pac Straightness/Alignment View

Misalignment Diameter = 2.28 Inches



Date of Survey: September 1, 2005

Welenco, Inc. (800) 445-9914

Balanced Tangential Calculation Method

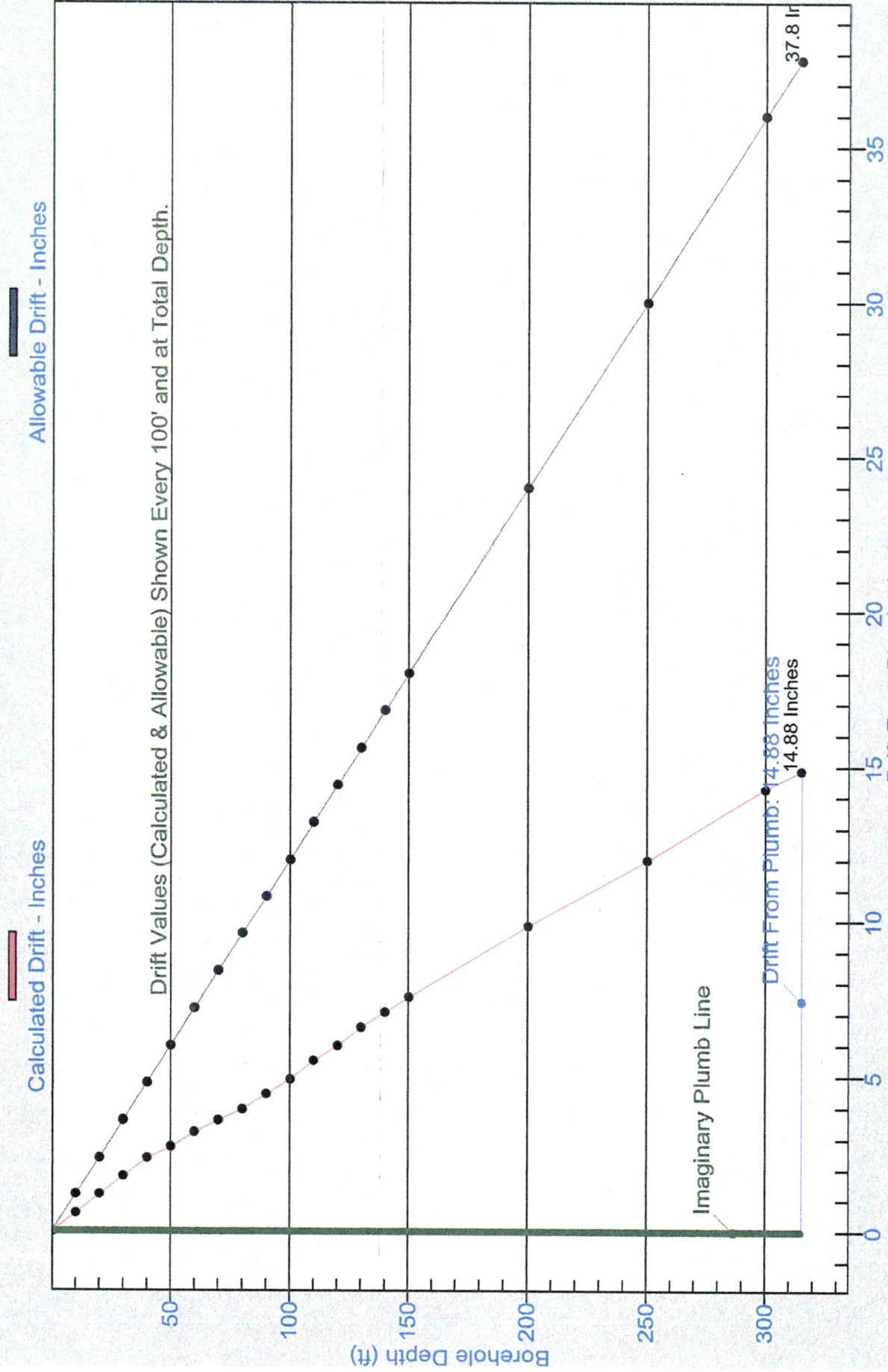
# Washoe County Water Co.

Longley Lane Well

Drift-Pac Plumbness and AWWA Standard A-100 Plot

Maximum AWWA Allowable Drift = 37.8 Inches for 18 Inch Casing

Maximum Calculated Drift = 14.88 Inches



Date of Survey: September 1, 2005

Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

# Washoe County Water Co.

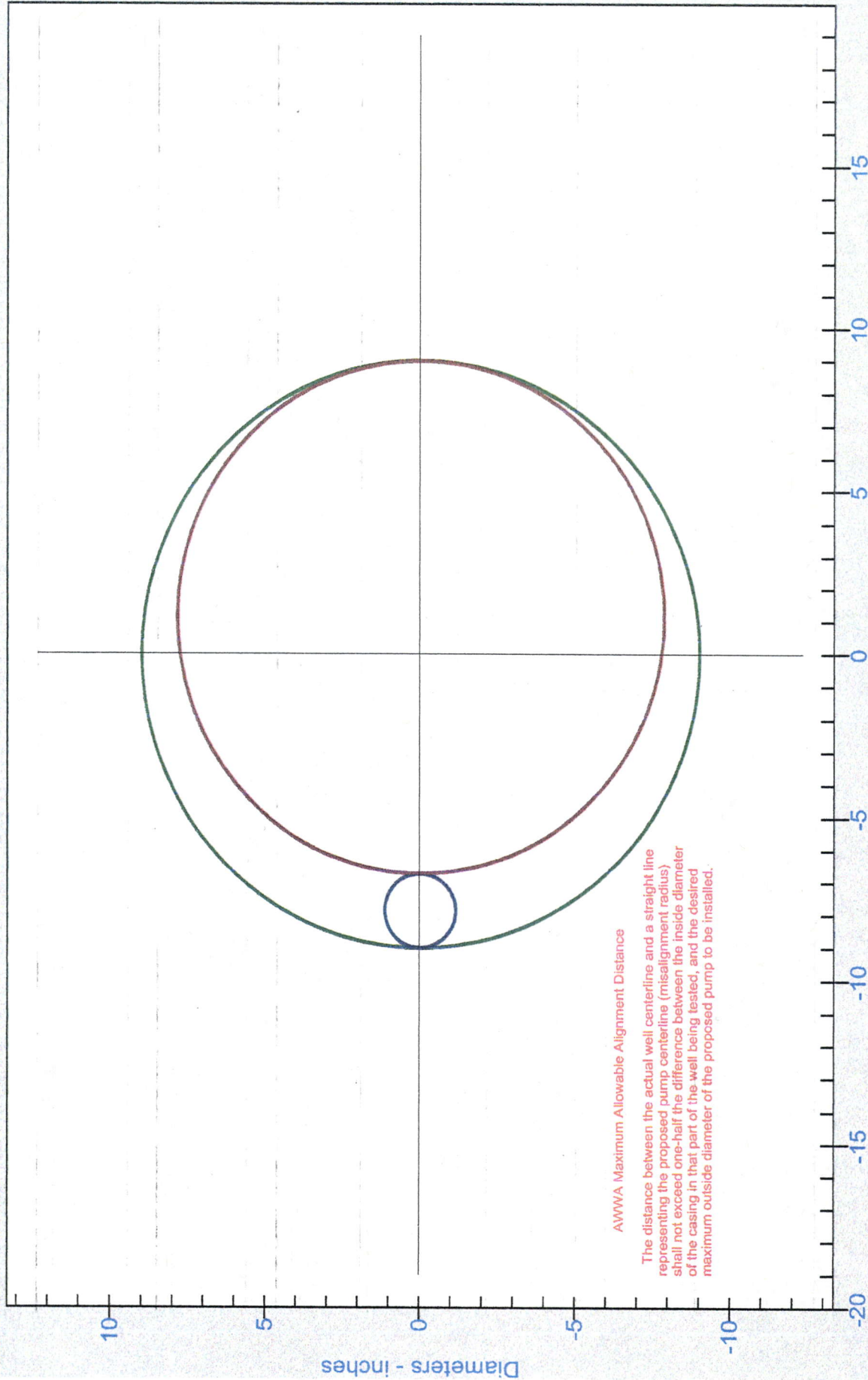
Longley Lane Well

Drift-Pac Misalignment/Effective Diameter Relationship

Green circle = Desired Casing Size of 18 Inches

Blue circle = Misalignment diameter of 2.28 Inches (See Note Below)

Red circle = Effective Diameter of 15.72 Inches From 0' To 149.85'



Date of Survey: September 1, 2005

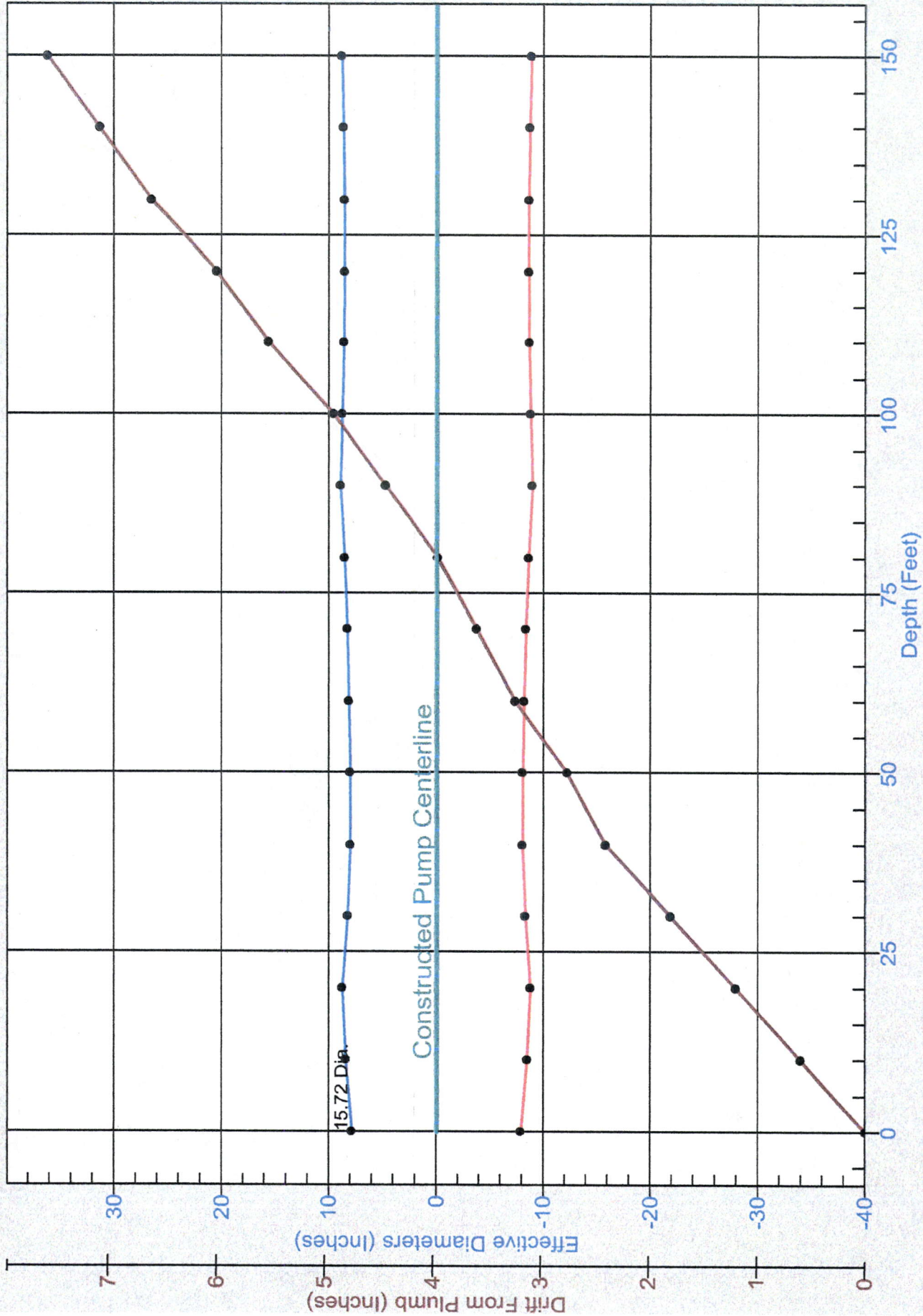
Balanced Tangential Calculation Method

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# Washoe County Water Co.

Longley Lane Well

Drift-Pac Vertical Plane of Effective Diameters vs. Drift From Plumb



Date of Survey: September 1, 2005

Balanced Tangential Calculation Method  
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# Drift-Pac<sup>TM</sup>

## Wellbore DRIFT Interpretation Package

Prepared Especially For

**Washoe County Water Co.**

**Longley Lane Well**

**September 1, 2005**

This Deviation and Directional Interpretation Package represents our best efforts to provide a correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical or other types of measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by Customer resulting from any interpretation made by this document. Welenco does not warrant or guarantee the accuracy of the data, specifically including (but without limitations) the accuracy of data transmitted by electronic process, and Welenco will not be responsible for accidental or intentional interception of such data by third parties. Welenco employees are not empowered to change or otherwise modify the attached interpretation. By accepting this Deviation and Directional Interpretation Package, the Customer agrees to the foregoing, and to the General Terms and Conditions of Welenco.

 **welenco**

Company Washoe County Water Co. County Washoe State NV  
 Well Number Longley Lane Well Date of Survey September 1, 2005 Magnetic Declination Used  
 Field Washoe Co. Corp. Yard Recorded By M.F. Sharpless  
 Equipment No. L22 Job Number 4769 welenco Office Salinas Witness Vanhoozer  
 Location  
 Remarks

Tool Number 1058

Gyroscopic

Tool Number

Dogleg Calculation Method

Balanced Tangential Method

Drift Calculation Method

Measured Information			Closure Calculations			Rectangular Coordinates			Dogleg Severity			
Measured Depth, Feet	Inclination, Degrees From Vertical	Azimuth, Degrees True	Course Deviation, Feet	True Vertical Depth, Feet	Drift Distance, Feet	Drift Bearing Degrees, True	Latitude, Feet	Departure, Feet	Total Latitude, Feet	Total Departure, Feet	Dogleg Severity, Degs/20 Feet	Dogleg Severity, Degs/100 Feet
0.00	0.30	350	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
10.00	0.29	30	0.05	9.99	0.05	9.60	0.05	0.01	0.05	0.01		
20.00	0.30	12	0.05	19.98	0.10	15.30	0.05	0.02	0.10	0.03		
30.00	0.34	350	0.05	29.97	0.15	9.90	0.06	0.00	0.15	0.03		
40.00	0.30	310	0.05	39.96	0.20	0.20	0.05	-0.03	0.20	0.00		
50.00	0.32	300	0.05	49.95	0.23	349.30	0.03	-0.04	0.23	-0.04		
60.00	0.28	290	0.05	59.94	0.27	340.20	0.02	-0.05	0.25	-0.09		
70.00	0.29	290	0.05	69.93	0.30	332.90	0.02	-0.05	0.27	-0.14		
80.00	0.32	270	0.05	79.92	0.33	325.60	0.01	-0.05	0.28	-0.19		
90.00	0.31	270	0.05	89.91	0.37	318.50	0.00	-0.06	0.28	-0.24		
100.00	0.31	283	0.05	99.90	0.41	313.50	0.01	-0.05	0.28	-0.30		
110.00	0.26	300	0.05	109.89	0.46	311.10	0.02	-0.05	0.30	-0.34		
120.00	0.27	300	0.05	119.88	0.50	310.10	0.02	-0.04	0.32	-0.38		
130.00	0.25	310	0.05	129.87	0.55	309.60	0.03	-0.04	0.35	-0.42		
140.00	0.24	320	0.04	139.86	0.59	310.00	0.03	-0.03	0.38	-0.45		
150.00	0.25	320	0.04	149.85	0.63	310.70	0.03	-0.03	0.41	-0.48		
200.00	0.25	270	0.20	199.84	0.82	307.00	0.08	-0.18	0.50	-0.66		
250.00	0.21	290	0.20	249.83	1.00	301.70	0.03	-0.20	0.53	-0.85		
300.00	0.22	300	0.19	299.82	1.19	300.70	0.08	-0.17	0.61	-1.02		
315.00	0.23	330	0.06	314.81	1.24	301.30	0.04	-0.04	0.65	-1.06		

TVDD in Feet 314.81

Final Closure Distance in Feet 1.24

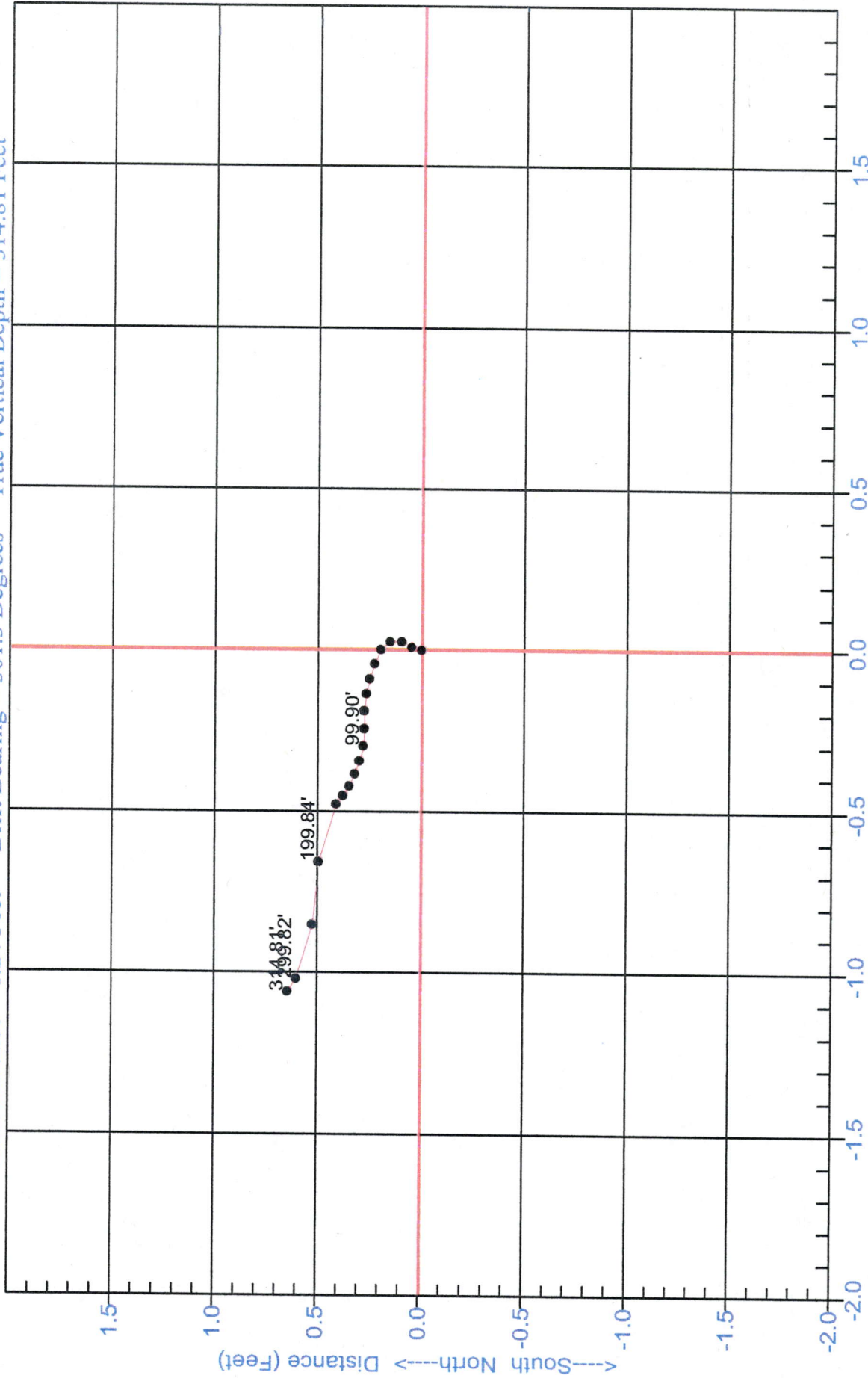
Final Closure Bearing in Degrees 301.30

# Washoe County Water Co.

Longley Lane Well

DRIFT-PAC PLAN VIEW

Drift Distance = 1.24 Feet      Drift Bearing = 301.3 Degrees      True Vertical Depth = 314.81 Feet



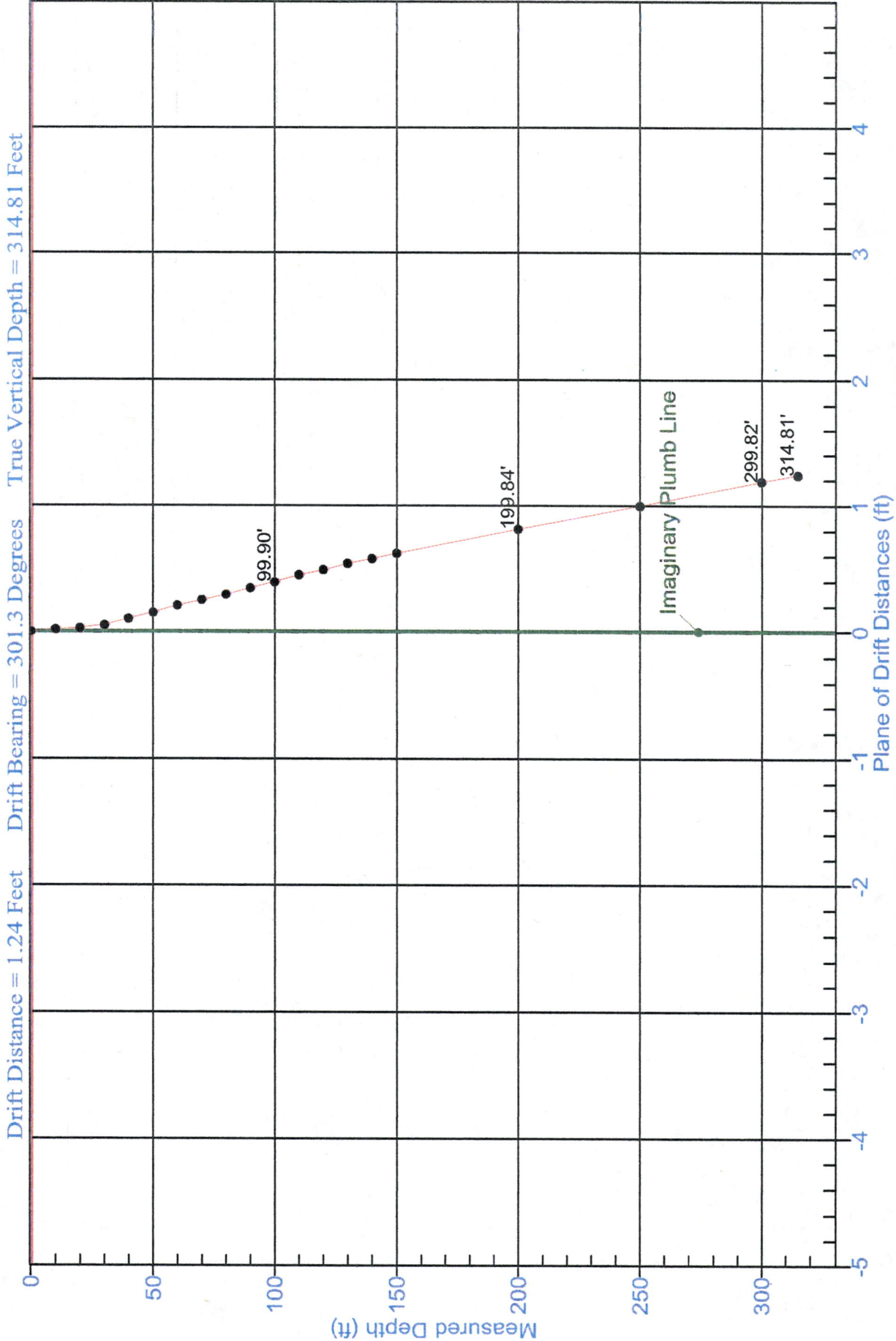
Tool Type: Gyroscopic Tool with Serial Number 1058

Date of Survey: September 1, 2005

Balanced Tangential Calculation Method

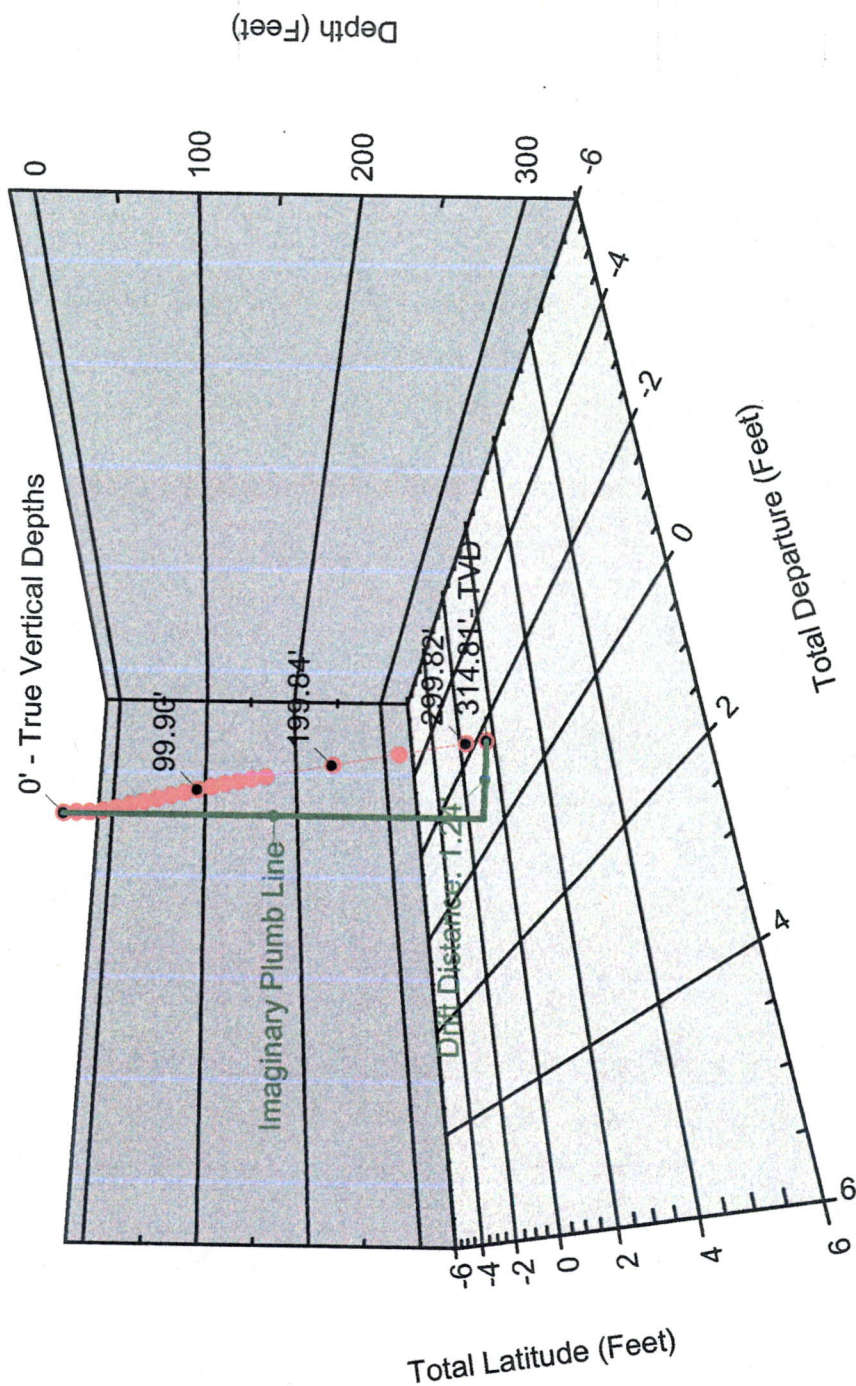
Copyright by Welenco, Inc. (800) 445-9914

# **Washoe County Water Co.** Longley Lane Well DRIFT-PAC PLANE OF DRIFT VIEW



DRIFT-PAC 3D PROJECTION VIEW

Drift Distance = 1.24 Feet	Drift Bearing = 301.3 Degrees	True Vertical Depth = 314.81 Feet
----------------------------	-------------------------------	-----------------------------------

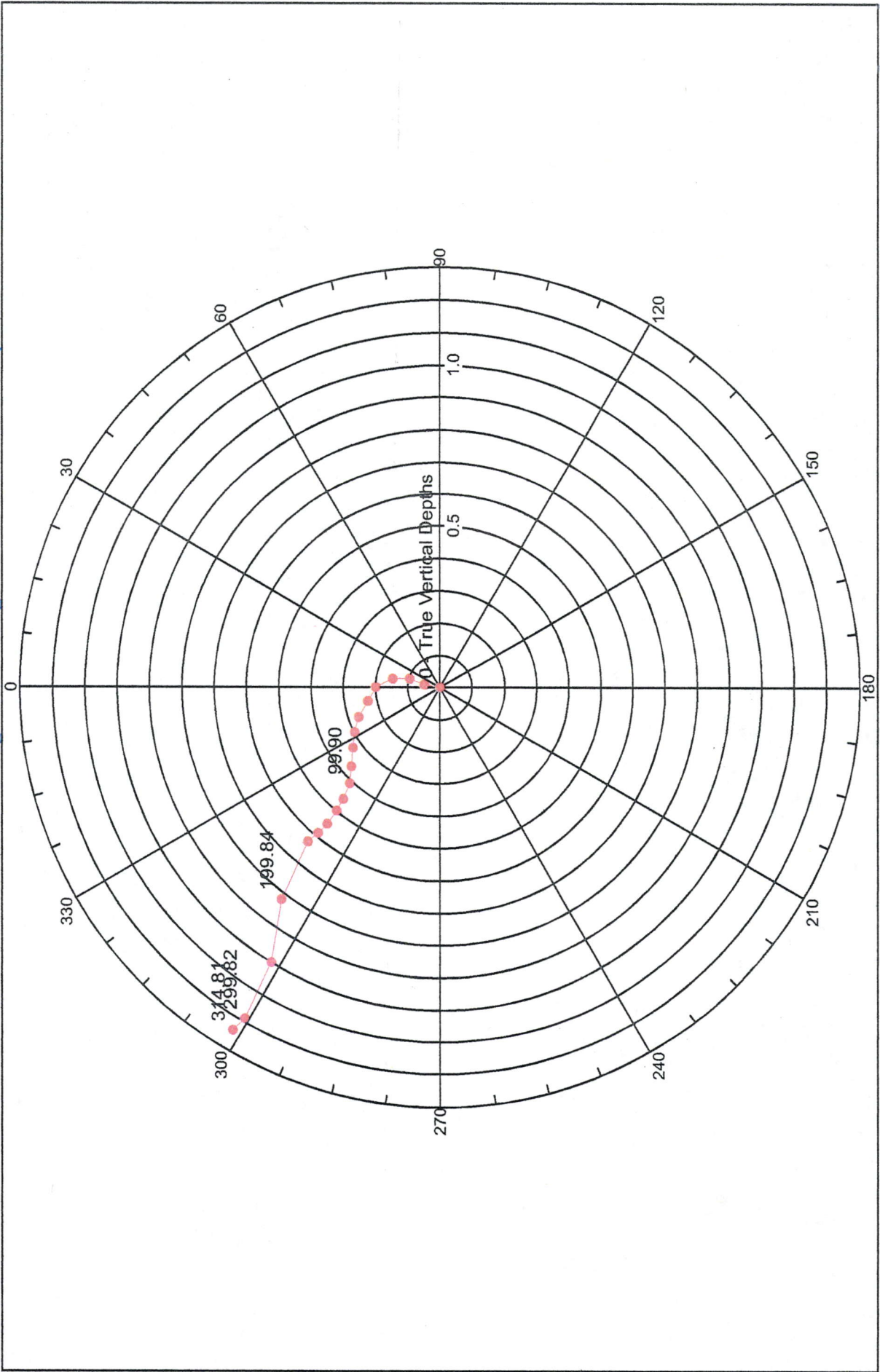


Tool Type: Gyroscopic Tool with Serial Number 1058  
Date of Survey: September 1, 2005  
Balanced Tangential Calculation Method  
Copyright by Welenco, Inc. (800) 445-9914

# Washoe County Water Co.

Longley Lane Well  
Drift-Pac Polar View

Drift Distance = 1.24 Feet    Drift Bearing = 301.3 Degrees    True Vertical Depth = 314.81 Feet



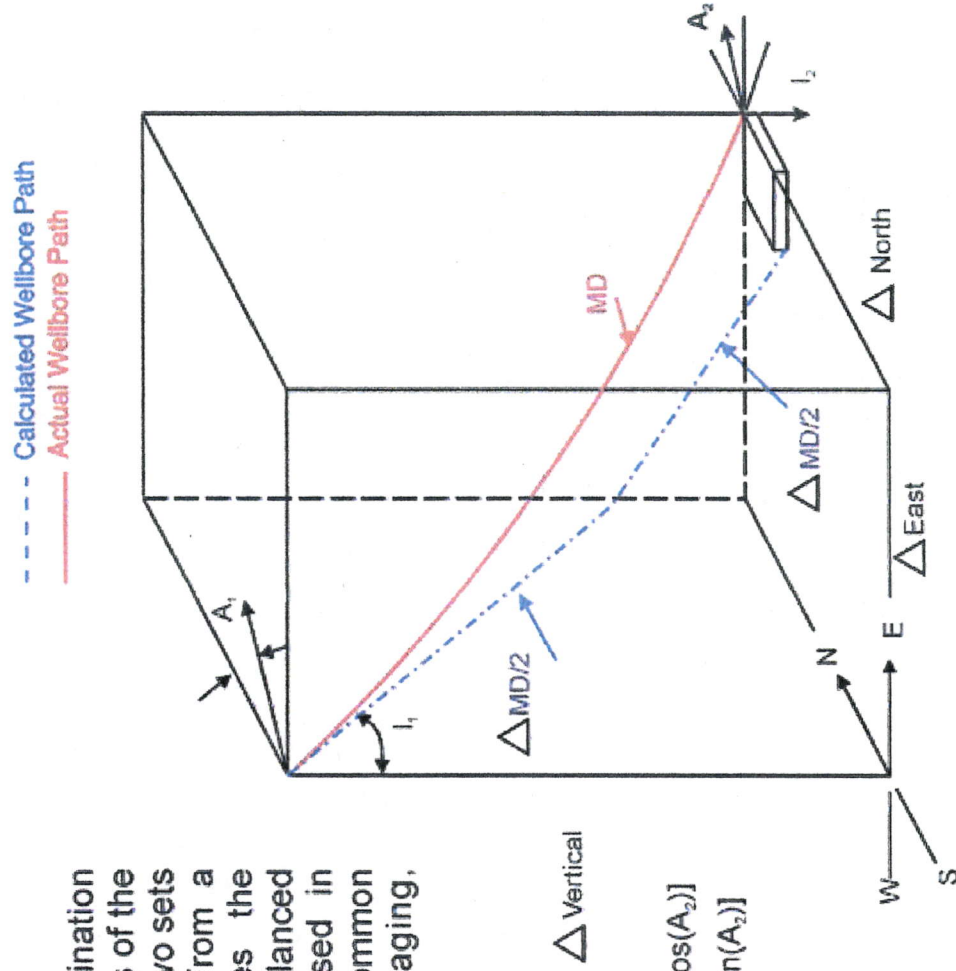
Date of Survey: September 1, 2005

Welenco, Inc. (800) 445-9914

Balanced Tangential Calculation Method

## Balanced Tangential Method

The Balanced Tangential Method uses the inclination and direction angles at the upper and lower ends of the course length in a manner so as to balance the two sets of measured angles over a course length. From a theoretical standpoint, this method combines the trigonometric functions to provide the average balanced inclination and direction angles, which are used in standard computational procedures. Other common names for this method are Vector Averaging, Acceleration, and Trapezoidal.



$$\begin{aligned}\Delta \text{ North} &= [\Delta MD/2] \times [\sin(I_1) \times \cos(A_1) + \sin(I_2) \times \cos(A_2)] \\ \Delta \text{ East} &= [\Delta MD/2] \times [\sin(I_1) \times \sin(A_1) + \sin(I_2) \times \sin(A_2)] \\ \Delta \text{ Vertical} &= [\Delta MD/2] \times [\cos(I_1) + \cos(I_2)]\end{aligned}$$

# APPENDIX 6

Water Quality Information

# Laboratory Report

## Report ID: 70467



Sierra  
Environmental  
Monitoring, Inc.

Washoe County Dept. of Water Resources  
Attn: John Hulett  
4930 Energy Way  
Reno, NV 89520

Date: 10/12/2005  
Client: WAS-500  
Taken by: J. Hulett  
PO #: 5500001829

Dear John Hulett,

It is the policy of Sierra Environmental Monitoring, Inc to strictly adhere to a comprehensive Quality Assurance Plan that insures the data presented in this report are both accurate and precise. Sierra Environmental Monitoring, Inc. maintains accreditation in the State of Nevada (NV-15) and the State of California (ELAP 2526).

The data presented in this report were obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged with appropriate explanation in the Analysis Report section of this Laboratory Report.

### General Comments:

- There are no general comments for this report.

### Individual Sample Comments:

- There are no specific comments that are associated with these samples.

Approved By:

Sierra Environmental Monitoring, Inc.

Date:

10/12/2005

This report is applicable only to the sample received by the laboratory. The liability of the laboratory is limited to the amount paid for this report. This report is for the exclusive use of the client to whom it is addressed and upon the condition that the client assumes all liability for the further distribution of the report or its contents.

# Laboratory Report

## Report ID: 70467



Sierra  
Environmental  
Monitoring, Inc.

Washoe County Dept. of Water Resources  
Attn: John Hulett  
4930 Energy Way  
Reno, NV 89520

Date: 10/12/2005  
Client: WAS-500  
Taken by: J. Hulett  
PO #: 5500001829

## Analysis Report

Sample ID:	Customer Sample ID	Date Sampled	Time Sampled	Date Received
S200508-1685	Longley Lane Well	8/29/2005	3:00 PM	8/29/2005

Parameter	Method	Result	Units	MCL	Analyst	Date Analyzed	Data Flag
Alkalinity, Total	SM 2320 B	150	mg/L CaCO <sub>3</sub>		Pacheco	8/31/2005	
Alkalinity/Bicarbonate	SM 2320 B	150	mg/L CaCO <sub>3</sub>		Pacheco	8/31/2005	
Alkalinity/Carbonate	SM 2320 B	<2	mg/L CaCO <sub>3</sub>		Pacheco	8/31/2005	
Alkalinity/Hydroxide	SM 2320 B	<2	mg/L CaCO <sub>3</sub>		Pacheco	8/31/2005	
Aluminum - ICP-OES	EPA 200.7	<0.05	mg/L	0.05 to 0.2 mg/L	Keller	9/1/2005	
Antimony - ICP-MS	EPA 200.8	<0.001	mg/L	0.006 mg/L	Layman	9/2/2005	
Arsenic - ICP-MS	EPA 200.8	0.026	mg/L	0.01 mg/L	Layman	9/2/2005	
Barium - ICP-MS	EPA 200.8	0.066	mg/L	2.0 mg/L	Layman	9/2/2005	
Beryllium - ICP-MS	EPA 200.8	<0.001	mg/L	0.004 mg/L	Layman	9/2/2005	
Cadmium - ICP-MS	EPA 200.8	<0.001	mg/L	0.005 mg/L	Layman	9/2/2005	
Calcium - ICP-OES	EPA 200.7	28	mg/L		Keller	9/1/2005	
Carbamates (ML531) (EPA 531.1)	Subcontract	See Report				9/27/2005	
Chloride - Ion Chromatography	EPA 300.0	2.2	mg/L	250 mg/L	Henderson	8/30/2005	
Chromium - ICP-MS	EPA 200.8	<0.002	mg/L	0.1 mg/L	Layman	9/2/2005	B
Color Apparent	EPA 110.2	<5	Color Units	15	Osterreicher	8/29/2005	
Copper - ICP-MS	EPA 200.8	<0.001	mg/L	1.0 mg/L	Layman	9/2/2005	
Cyanide, Total	SM 4500 CN C	<0.005	mg/L	0.2 mg/L	Kobza	8/30/2005	
Diquat (EPA 549.2)	Subcontract	See Report				9/27/2005	
EDB-DBC (EPA 504.1)	Subcontract	See Report				9/27/2005	
Endothall (EPA 548.1)	Subcontract	See Report				9/27/2005	
Fluoride - Ion Chromatography	EPA 300.0	0.3	mg/L	2.0/4.0 mg/L	Henderson	8/30/2005	
Glyphosate (EPA 547)	Subcontract	See Report				9/27/2005	
Gross Alpha and Beta Radiological	Subcontract	See Report				10/11/2005	
Herbicides (NPS3) (EPA 515.1)	Subcontract	See Report				9/27/2005	
Iron - ICP-OES	EPA 200.7	0.1	mg/L	0.3 mg/L	Keller	9/1/2005	B
Lead - ICP-MS	EPA 200.8	<0.001	mg/L	0.015 mg/L	Layman	9/2/2005	
Magnesium - ICP-OES	EPA 200.7	12	mg/L	125 mg/L	Keller	9/1/2005	
Manganese - ICP-MS	EPA 200.8	0.12	mg/L	0.05 mg/L	Layman	9/2/2005	
MBAS Surfactants	SM 5540 C	<0.05	mg/L	0.5 mg/L	Osterreicher	8/29/2005	
Mercury - AA Cold Vapor	EPA 245.1	<0.0002	mg/L	0.002 mg/L	Kleinworth	8/31/2005	
Nickel - ICP-MS	EPA 200.8	<0.001	mg/L	0.1 mg/L	Layman	9/2/2005	
Nitrate-N - Ion Chromatography	EPA 300.0	0.26	mg/L N	10 mg/L as N	Henderson	8/30/2005	
Nitrite-N - Ion Chromatography	EPA 300.0	<0.05	mg/L N	1 mg/L as N	Henderson	8/30/2005	
NO <sub>3</sub> + NO <sub>2</sub>	EPA 300.0	<0.31	mg/L N		Henderson	8/30/2005	

# Laboratory Report

## Report ID: 70467



**Sierra  
Environmental  
Monitoring, Inc.**

Washoe County Dept. of Water Resources  
Attn: John Hulett  
4930 Energy Way  
Reno, NV 89520

Date: 10/12/2005  
Client: WAS-500  
Taken by: J. Hulett  
PO #: 5500001829

## Analysis Report

<b>Sample ID:</b>	<b>Customer Sample ID</b>	<b>Date Sampled</b>	<b>Time Sampled</b>	<b>Date Received</b>
S200508-1685	Longley Lane Well	8/29/2005	3:00 PM	8/29/2005

Parameter	Method	Result	Units	MCL	Analyst	Date Analyzed	Data Flag
Odor	SM 2150	0	T.O.N.	3 T.O.N.	Osterreicher	8/29/2005	
Pesticides and PCBs (PESTSDW) (E	Subcontract	See Report				9/27/2005	
pH	SM 4500 H+B	8.11	pH Units	6.5 to 8.5	Pacheco	8/31/2005	
pH - Temperature	SM 4500 H+B	20.6	°C		Pacheco	8/31/2005	
Potassium - ICP-OES	EPA 200.7	6.3	mg/L		Keller	9/1/2005	
Radium 226 - Radiological	Subcontract	See Report				10/11/2005	
Radium 228 - Radiological	Subcontract	See Report				10/11/2005	
Radon	Subcontract	See Report				9/29/2005	
Selenium - ICP-MS	EPA 200.8	<0.005	mg/L	0.05 mg/L	Layman	9/2/2005	
Silver - ICP-MS	EPA 200.8	<0.001	mg/L	0.1 mg/L	Layman	9/2/2005	
Sodium - ICP-OES	EPA 200.7	18	mg/L		Keller	9/1/2005	
Sulfate - Ion Chromatography	EPA 300.0	8.8	mg/L	500 mg/L	Henderson	8/30/2005	
SVOCs (ML525) (EPA 525)	Subcontract	See Report				9/27/2005	
Thallium - ICP-MS	EPA 200.8	<0.0005	mg/L	0.002 mg/L	Layman	9/2/2005	
Total Dissolved Solids	SM 2540 C	220	mg/L	500/1000 mg/L	Pacheco	8/30/2005	
Total Recoverable Metals - Acid Dig	EPA 200.2	Completed			Kleinworth	8/31/2005	
Turbidity	SM 2130 B	0.2	NTU		Pacheco	8/30/2005	
Uranium - ICP-MS	EPA 200.8	0.002	mg/L	0.03 mg/L	Layman	9/2/2005	
Vanadium - ICP-MS	EPA 200.8	0.004	mg/L		Layman	9/2/2005	
VOCs (VOASDWA) (EPA 524.2)	Subcontract	See Report				9/27/2005	
Zinc - ICP-MS	EPA 200.8	<0.02	mg/L	5 mg/L	Layman	9/2/2005	B

SAMPLE WATER AS TESTED   DID     X   DID NOT MEET DRINKING WATER STANDARDS for Arsenic + Manganese

### Data Flag Legend:

B - Element or compound also found in associated Method Blank.

# Laboratory Report

Report ID: 70467



Sierra  
Environmental  
Monitoring, Inc.

Washoe County Dept. of Water Resources  
Attn: John Hulett  
4930 Energy Way  
Reno, NV 89520

Date: 10/12/2005  
Client: WAS-500  
Taken by: J. Hulett  
PO #: 5500001829

## Quality Control Report

Parameter	LCS, % Recovery	MS, % Recovery	MSD, % Recovery	RPD, %	Method Blank
Alkalinity, Total	103.0			1.98	
Alkalinity/Bicarbonate				1.98	
Alkalinity/Carbonate				0.00	
Alkalinity/Hydroxide				0.00	
Aluminum - ICP-OES	100.0	107.0	107.0	0.19	<0.05 mg/L
Antimony - ICP-MS	104.0	109.0	109.0	0.00	<0.001 mg/L
Arsenic - ICP-MS	102.0	108.0	109.0	0.92	<0.001 mg/L
Barium - ICP-MS	103.0	106.0	108.0	1.86	<0.001 mg/L
Beryllium - ICP-MS	103.0	101.0	102.0	0.99	<0.001 mg/L
Cadmium - ICP-MS	101.0	106.0	106.0	0.00	<0.001 mg/L
Calcium - ICP-OES	99.0	96.0	101.0	4.56	<0.5 mg/L
Chloride - Ion Chromatography	99.0	101.0	96.0	5.08	<0.5 mg/L
Chromium - ICP-MS	99.0	104.0	105.0	0.96	<0.002 mg/L
Copper - ICP-MS	101.0	107.0	108.0	0.93	<0.001 mg/L
Cyanide, Total	85.0	90.0			<0.005 mg/L
Fluoride - Ion Chromatography	100.0	106.0	100.0	5.83	<0.1 mg/L
Iron - ICP-OES	101.0	106.0	106.0	0.38	<0.1 mg/L
Lead - ICP-MS	101.0	107.0	108.0	0.93	<0.001 mg/L
Magnesium - ICP-OES	99.0	102.0	103.0	0.98	<0.5 mg/L
Manganese - ICP-MS	99.0	105.0	106.0	0.94	<0.001 mg/L
MBAS Surfactants	91.0				<0.05 mg/L
Mercury - AA Cold Vapor	99.0	100.0	106.0	5.91	<0.0002 mg/L
Nickel - ICP-MS	102.0	105.0	106.0	0.95	<0.001 mg/L
Nitrate-N - Ion Chromatography	100.0	103.0	99.0	3.94	<0.05 mg/L
Nitrite-N - Ion Chromatography	96.0	105.0	100.0	4.87	<0.05 mg/L
NO3 + NO2					
pH				0.00	
pH - Temperature				0.00	
Potassium - ICP-OES	100.0	103.0	105.0	1.92	<0.5 mg/L
Selenium - ICP-MS	100.0	109.0	110.0	1.64	<0.005 mg/L

# Laboratory Report

Report ID: 70467



Sierra  
Environmental  
Monitoring, Inc.

Washoe County Dept. of Water Resources  
Attn: John Hulett  
4930 Energy Way  
Reno, NV 89520

Date: 10/12/2005  
Client: WAS-500  
Taken by: J. Hulett  
PO #: 5500001829

## Quality Control Report

Parameter	LCS, % Recovery	MS, % Recovery	MSD, % Recovery	RPD, %	Method Blank
Silver - ICP-MS	100.0	104.0	109.0	4.69	<0.001 mg/L
Sodium - ICP-OES	98.0	101.0	107.0	5.77	<0.5 mg/L
Sulfate - Ion Chromatography	96.0	88.0	85.0	3.47	<0.2 mg/L
Thallium - ICP-MS	100.0	105.0	106.0	0.95	<0.0005 mg/L
Total Dissolved Solids		96.0		1.55	<10 mg/L
Turbidity	95.0			12.77	
Uranium - ICP-MS	98.0	104.0	105.0	0.96	<0.001 mg/L
Vanadium - ICP-MS	99.0	104.0	107.0	2.84	<0.001 mg/L
Zinc - ICP-MS	101.0	103.0	104.0	0.97	<0.02 mg/L

Legend: LCS- Laboratory Control Standard  
RPD- Relative Percent Difference

MS- Matrix Spike

MSD- Matrix Spike Duplicate

# BSK ANALYTICAL LABORATORIES

BSK Submission Number: 2005082564

09/19/2005

John Kobza  
Sierra Environmental Monitoring  
1135 Financial Blvd  
Reno, NV 89502



Dear John Kobza,

Thank you for selecting BSK Analytical Laboratories for your analytical testing needs. We have prepared this report in response to your request for analytical services. Please find enclosed the following sections for your complete laboratory report, each uniquely paginated:

CASE NARRATIVE: An overview of the work performed.

CERTIFICATE OF ANALYSIS: Analytical results.

QUALITY CONTROL (QC) SUMMARY: QC supporting the results presented herein.

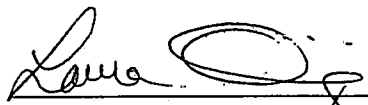
REPORT OF SAMPLE INTEGRITY

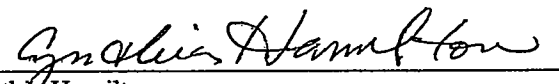
CHAIN OF CUSTODY FORM

**Certification:** I certify that this data package is in compliance with NELAC Standards for applicable analyses under NELAP Certificate #04227CA, and is in compliance with ELAP Standards for applicable certified analyses under ELAP Certificate #1180, except for the conditions listed.

If additional clarification of any information is required, please contact your Client Services Representative, Laura Quiring, at (800) 877-8310 or (559) 497-2888.

BSK ANALYTICAL LABORATORIES

  
\_\_\_\_\_  
Laura Quiring  
Client Services Representative

  
\_\_\_\_\_  
Cynthia Hamilton  
Quality Assurance Specialist

FOR YOUR INFORMATION: THIS REPORT WAS PREPARED BY BSK ANALYTICAL LABORATORIES

## BSK Submission Number: 2005082564

The sample(s) was received, prepared, and analyzed within the method specified holding times unless otherwise noted on the Certificate of Analysis. Samples, when shipped, arrived within acceptable temperature requirements of 0° to 6° Celsius unless otherwise noted on the Report of Sample Integrity. Samples collected by BSK Analytical Laboratories were collected in accordance with the BSK Sampling and Collection Standard Operating Procedures.

All analytical quality controls are within established method criteria except when noted in the Quality Control section or on the Certificate of Analysis. All positive results for EPA Methods 504.1, 502.2, and 524.2 require the analysis of a Field Reagent Blank (FRB) to confirm that the results are not a contamination error from field sampling steps. If Field Reagent Blanks were not submitted with the samples, this method requirement has not been performed. QC samples may include analytes not requested in this submission.

## SAMPLE RESULT INFORMATION

<u>ORDER</u>	<u>TEST</u>	<u>ANALYTE</u>	<u>COMMENT</u>
628094	EPA 531.1		Surrogate recovery was biased high in this run. Results were accepted as sample was ND.
628094	EPA 547		Surrogate recovery was biased high in this run. As sample was ND, the data were accepted.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1

# BSK ANALYTICAL LABORATORIES

John Kobza  
Sierra Environmental Monitoring  
1135 Financial Blvd  
Reno, NV 89502

BSK Submission #: 2005082564

BSK Sample ID #: 628094

Project ID:

Project Desc:

Submission Comments:

Sample Type: Liquid

Sample Description: S200508-1685 Longley Lane Well

Sample Comments:

## Certificate of Analysis

NELAP Certificate #04227CA

ELAP Certificate #1180



Report Issue Date: 09/19/2005

Date Sampled: 08/29/2005

Time Sampled: 1500

Date Received: 08/31/2005

### Organics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date/Time	Analysis Date/Time
Dibromochloropropane	EPA 504.1	ND	µg/L	0.01	1	0.01	09/10/05	09/12/05
Ethylene dibromide	EPA 504.1	ND	µg/L	0.02	1	0.02	09/10/05	09/12/05
Aldrin	EPA 505	ND	µg/L	0.075	1	0.075	09/01/05	09/07/05
Chlordane	EPA 505	ND	µg/L	0.1	1	0.1	09/01/05	09/07/05
Chlorothalonil (Daconil, Bravo)	EPA 505	ND	µg/L	5.0	1	5.0	09/01/05	09/07/05
Dieldrin	EPA 505	ND	µg/L	0.02	1	0.02	09/01/05	09/07/05
Endrin	EPA 505	ND	µg/L	0.1	1	0.1	09/01/05	09/07/05
Heptachlor	EPA 505	ND	µg/L	0.01	1	0.01	09/01/05	09/07/05
Heptachlor epoxide	EPA 505	ND	µg/L	0.01	1	0.01	09/01/05	09/07/05
Hexachlorobenzene	EPA 505	ND	µg/L	0.50	1	0.50	09/01/05	09/07/05
Hexachlorocyclopentadiene	EPA 505	ND	µg/L	1.0	1	1.0	09/01/05	09/07/05
Lindane	EPA 505	ND	µg/L	0.2	1	0.2	09/01/05	09/07/05
Methoxychlor	EPA 505	ND	µg/L	10	1	10	09/01/05	09/07/05
PCBs: Arochlor Screen	EPA 505	ND	µg/L	0.5	1	0.5	09/01/05	09/07/05
Toxaphene	EPA 505	ND	µg/L	1.0	1	1.0	09/01/05	09/07/05
Trifluralin	EPA 505	ND	µg/L	1.0	1	1.0	09/01/05	09/07/05
2,4,5-T	EPA 515.3	ND	µg/L	1.0	1	1.0	09/08/05	09/09/05
2,4,5-TP (Silvex)	EPA 515.3	ND	µg/L	1.0	1	1.0	09/08/05	09/09/05
2,4-D	EPA 515.3	ND	µg/L	10	1	10	09/08/05	09/09/05
Bentazon (Basagran)	EPA 515.3	ND	µg/L	2.0	1	2.0	09/08/05	09/09/05
Dalapon	EPA 515.3	ND	µg/L	10	1	10	09/08/05	09/09/05
Dicamba (Banvel)	EPA 515.3	ND	µg/L	1.5	1	1.5	09/08/05	09/09/05
Dinoseb (DNBP)	EPA 515.3	ND	µg/L	2.0	1	2.0	09/08/05	09/09/05
Pentachlorophenol (PCP)	EPA 515.3	ND	µg/L	0.2	1	0.2	09/08/05	09/09/05
Picloram	EPA 515.3	ND	µg/L	1.0	1	1.0	09/08/05	09/09/05
1,1,1,2-Tetrachloroethane	EPA 524.2	ND	µg/L	0.5	1	0.5	09/06/05	09/06/05
1,1,1-Trichloroethane	EPA 524.2	ND	µg/L	0.5	1	0.5	09/06/05	09/06/05
1,1,2,2-Tetrachloroethane	EPA 524.2	ND	µg/L	0.5	1	0.5	09/06/05	09/06/05
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 524.2	ND	µg/L	10	1	10	09/06/05	09/06/05

mg/L: Milligrams/Liter (ppm)

mg/Kg: Milligrams/Kilogram (ppm)

µg/L: Micrograms/Liter (ppb)

µg/Kg: Micrograms/Kilogram (ppb)

%Rec: Percent Recovered (surrogates)

PQL: Practical Quantitation Limit

DLR: Detection Limit for Reporting  
: PQL x Dilution

ND: None Detected at DLR

pCi/L: Picocurie per Liter

H: Analyzed outside of hold time

P: Preliminary result

S: Suspect result. See Case Narrative for comments.

E: Analysis performed by External laboratory.

See External Laboratory Report attachments.

Report Authentication Code:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



**Fax 559-485-6935**



# BSK ANALYTICAL LABORATORIES

John Kobza  
Sierra Environmental Monitoring  
1135 Financial Blvd  
Reno, NV 89502

BSK Submission #: 2005082564

BSK Sample ID #: 628094

Project ID:

Project Desc:

Submission Comments:

Sample Type: Liquid

Sample Description: S200508-1685 Longley Lane Well

Sample Comments:

## Certificate of Analysis

NELAP Certificate #04227CA

ELAP Certificate #1180



Report Issue Date: 09/19/2005

Date Sampled: 08/29/2005

Time Sampled: 1500

Date Received: 08/31/2005

### Organics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date/Time	Analysis Date/Time
Molinate (Ordram)	EPA 525.2	ND	µg/L	2.0	1	2.0	09/03/05	09/07/05
Prometryn (Caparol)	EPA 525.2	ND	µg/L	2.0	1	2.0	09/03/05	09/07/05
Propachlor	EPA 525.2	ND	µg/L	0.5	1	0.5	09/03/05	09/07/05
Simazine (Princep)	EPA 525.2	ND	µg/L	1.0	1	1.0	09/03/05	09/07/05
Thiobencarb (Bolero)	EPA 525.2	ND	µg/L	1.0	1	1.0	09/03/05	09/07/05
3-Hydroxycarbofuran	EPA 531.1	ND	µg/L	3.0	1	3.0	09/08/05	09/08/05
Aldicarb	EPA 531.1	ND	µg/L	3.0	1	3.0	09/08/05	09/08/05
Aldicarb Sulfone	EPA 531.1	ND	µg/L	2.0	1	2.0	09/08/05	09/08/05
Aldicarb Sulfoxide	EPA 531.1	ND	µg/L	3.0	1	3.0	09/08/05	09/08/05
Carbaryl	EPA 531.1	ND	µg/L	5.0	1	5.0	09/08/05	09/08/05
Carbofuran	EPA 531.1	ND	µg/L	5.0	1	5.0	09/08/05	09/08/05
Methomyl	EPA 531.1	ND	µg/L	2.0	1	2.0	09/08/05	09/08/05
Oxamyl	EPA 531.1	ND	µg/L	20.0	1	20	09/08/05	09/08/05
Glyphosate	EPA 547	ND	µg/L	25	1	25	09/09/05	09/14/05
Endothall	EPA 548.1	ND	µg/L	45	1	45	09/05/05	09/12/05
Diquat	EPA 549.2	ND	µg/L	4	1	4	09/01/05	09/01/05

### Surrogate

Bromoform	EPA 504.1	120	% Rec	-	1	N/A	09/10/05	09/12/05
Tetrachloro-m-xylene	EPA 505	93	% Rec	-	1	N/A	09/01/05	09/07/05
DCPAA	EPA 515.3	100	% Rec	-	1	N/A	09/08/05	09/09/05
1,2-Dichlorobenzene-d4	EPA 524.2	100	% Rec	-	1	N/A	09/06/05	09/06/05
4-Bromofluorobenzene	EPA 524.2	95	% Rec	-	1	N/A	09/06/05	09/06/05
1,3-Dimethyl-2-nitrobenzene	EPA 525.2	100	% Rec	-	1	N/A	09/03/05	09/07/05
BDMC	EPA 531.1	140	% Rec	-	1	N/A	09/08/05	09/08/05
AMPA	EPA 547	170	% Rec	-	1	N/A	09/09/05	09/14/05

mg/L: Milligrams/Liter (ppm)  
mg/Kg: Milligrams/Kilogram (ppm)  
µg/L: Micrograms/Liter (ppb)  
µg/Kg: Micrograms/Kilogram (ppb)  
%Rec: Percent Recovered (surrogates)

PQL: Practical Quantitation Limit  
DLR: Detection Limit for Reporting  
: PQL x Dilution  
ND: None Detected at DLR  
pCi/L: Picocurie per Liter

H: Analyzed outside of hold time  
P: Preliminary result  
S: Suspect result. See Case Narrative for comments.  
E: Analysis performed by External laboratory.  
See External Laboratory Report attachments.

Report Authentication Code:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

Page 5 of 5

# BSK ANALYTICAL LABORATORIES



## QC Summary Report

09/19/2005



BSK Submission : 2005082564  
Client : Sierra Environmental Monitorin  
Date Submitted : 08/31/2005  
Project ID :

NELAP Certificate #04227CA  
ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 98767



Analyst Initials: DANB

Method Number: 549.2

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Diquat	LCS	N/A	34.9	µg/L	87		40	ND	150	50	09/01/05	Acceptable
Diquat	LCSD	N/A	31.4	µg/L	78	10	40	ND	150	50	09/01/05	Acceptable
Diquat	LDUP	627412	0	µg/L	N/A			ND	50	N/A	09/01/05	Acceptable
Diquat	MS	627355	24.5	µg/L	61		40	ND	150	50	09/01/05	Acceptable
Diquat	MSD	627355	17.7	µg/L	44	32	40	ND	150	50	09/01/05	OOS-Low
Diquat	RBLK	N/A	0	µg/L	< 4				4	N/A	09/01/05	Acceptable

Run	Test	Analyte	Comment
98767	549.2	Diquat	MSD recovery was affected by the matrix.

StarLims Run 98767 includes the following BSK Sample ID# :

627355 627412 627420 627961 628094 628996 628997 628998 628999 629000 629001

BSK StarLims Run #: 98951



Analyst Initials: MICHAELK

Method Number: 5242

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
1,1-Dichloroethene	LCS	N/A	4.63	µg/L	92		5	ND	130	70	09/06/05	Acceptable
Benzene	LCS	N/A	4.53	µg/L	90		5	ND	130	70	09/06/05	Acceptable
Bromoform	LCS	N/A	4.6	µg/L	92		5	ND	130	70	09/06/05	Acceptable
Chlorobenzene	LCS	N/A	4.92	µg/L	98		5	ND	130	70	09/06/05	Acceptable
Methyl-t-Butyl Ether	LCS	N/A	9.85	µg/L	98		10	ND	130	70	09/06/05	Acceptable
Tetrachloroethene (PCE)	LCS	N/A	4.7	µg/L	94		5	ND	130	70	09/06/05	Acceptable
Toluene	LCS	N/A	4.51	µg/L	90		5	ND	130	70	09/06/05	Acceptable
Trichloroethene (TCE)	LCS	N/A	4.34	µg/L	86		5	ND	130	70	09/06/05	Acceptable
1,1-Dichloroethene	LCSD	N/A	4.71	µg/L	94	1.8	5	ND	130	70	09/06/05	Acceptable
Benzene	LCSD	N/A	4.84	µg/L	96	6.7	5	ND	130	70	09/06/05	Acceptable
Bromoform	LCSD	N/A	4.94	µg/L	98	7.1	5	ND	130	70	09/06/05	Acceptable
Chlorobenzene	LCSD	N/A	4.93	µg/L	98	0.2	5	ND	130	70	09/06/05	Acceptable
Methyl-t-Butyl Ether	LCSD	N/A	10.35	µg/L	103	5	10	ND	130	70	09/06/05	Acceptable
Tetrachloroethene (PCE)	LCSD	N/A	4.77	µg/L	95	1.4	5	ND	130	70	09/06/05	Acceptable
Toluene	LCSD	N/A	4.65	µg/L	93	3	5	ND	130	70	09/06/05	Acceptable
Trichloroethene (TCE)	LCSD	N/A	4.62	µg/L	92	6.2	5	ND	130	70	09/06/05	Acceptable
1,1,1,2-Tetrachloroethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,1,1-Trichloroethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,1,2,2-Tetrachloroethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,1,2-Trichloro-1,2,2-Trifluoroethan	RBLK	N/A	0	µg/L	< 10				10	N/A	09/06/05	Acceptable

%Rec: Percent Recovered  
RPD: Relative Percent Difference  
UCL: Upper Control Limit  
LCL: Lower Control Limit  
LCS: Laboratory Control Sample  
LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD

OOS-High: QC Result Above UCL  
OOS-Low: QC Result Below LCL  
MS: Matrix Spike  
MSD: Matrix Spike Duplicate  
RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

# BSK ANALYTICAL LABORATORIES

## QC Summary Report

09/19/2005

BSK Submission : 2005082564  
Client : Sierra Environmental Monitorin  
Date Submitted : 08/31/2005  
Project ID :

NELAP Certificate #04227CA  
ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 98951

Analyst Initials: MICHAELK

Method Number: 5242

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
1,1,2-Trichloroethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,1-Dichloro-2-propanone	RBLK	N/A	0	µg/L	< 10				10	N/A	09/06/05	Acceptable
1,1-Dichloroethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,1-Dichloroethene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,1-Dichloropropene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,2,3-Trichlorobenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,2,3-Trichloropropane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,2,4-Trichlorobenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,2,4-Trimethylbenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,2-Dibromo-3-chloropropane (DBCP)	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,2-Dichlorobenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,2-Dichloroethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,2-Dichloropropane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,3,5-Trimethylbenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,3-Dichlorobenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,3-Dichloropropane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1,4-Dichlorobenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
1-Chlorobutane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
2,2-Dichloropropane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
2-Butanone	RBLK	N/A	0	µg/L	< 10				10	N/A	09/06/05	Acceptable
2-Chlorotoluene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
2-Hexanone	RBLK	N/A	0	µg/L	< 10				10	N/A	09/06/05	Acceptable
3-Chloropropene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
4-Chlorotoluene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
4-Methyl-2-pentanone	RBLK	N/A	0	µg/L	< 10				10	N/A	09/06/05	Acceptable
Acetone	RBLK	N/A	0	µg/L	< 10				10	N/A	09/06/05	Acceptable
Benzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Bromobenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Bromochloromethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Bromodichloromethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Bromoform	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Bromomethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Carbon Disulfide	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Carbontetrachloride	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Chlorobenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Chloroethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Chloroform	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable

%Rec: Percent Recovered  
RPD: Relative Percent Difference  
UCL: Upper Control Limit  
LCL: Lower Control Limit  
LCS: Laboratory Control Sample  
LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD

OOS-High: QC Result Above UCL  
OOS-Low: QC Result Below LCL  
MS: Matrix Spike  
MSD: Matrix Spike Duplicate  
RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

QC Summary Report

09/19/2005



BSK Submission : 2005082564  
Client : Sierra Environmental Monitorin  
Date Submitted : 08/31/2005  
Project ID :

NELAP Certificate #04227CA  
ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 98951



Analyst Initials: MICHAELK

Method Number: 5242

## Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Chloromethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
cis-1,2-Dichloroethene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
cis-1,3-Dichloropropene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Dibromochloromethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Dibromomethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Dichlorodifluoromethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Diethyl ether	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Ethyl t-Butyl Ether	RBLK	N/A	0	µg/L	< 3.0				3.0	N/A	09/06/05	Acceptable
Ethylbenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Ethylmethacrylate	RBLK	N/A	0	µg/L	< 5.0				5.0	N/A	09/06/05	Acceptable
Hexachlorobutadiene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Hexachloroethane	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Iodomethane	RBLK	N/A	0	µg/L	< 5.0				5.0	N/A	09/06/05	Acceptable
Isopropylbenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
m,p-Xylenes	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Methyl-t-Butyl Ether	RBLK	N/A	0	µg/L	< 3.0				3.0	N/A	09/06/05	Acceptable
Methylacrylate	RBLK	N/A	0	µg/L	< 5.0				5.0	N/A	09/06/05	Acceptable
Methylene Chloride	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Methylmethacrylate	RBLK	N/A	0	µg/L	< 5.0				5.0	N/A	09/06/05	Acceptable
n-Butylbenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
n-Propylbenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Naphthalene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Nitrobenzene	RBLK	N/A	0	µg/L	< 10				10	N/A	09/06/05	Acceptable
o-Xylene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
p-Isopropyltoluene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
sec-Butylbenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Styrene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
t-Amyl Methyl Ether	RBLK	N/A	0	µg/L	< 3.0				3.0	N/A	09/06/05	Acceptable
tert-Butylbenzene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Tetrachloroethene (PCE)	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Toluene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Total 1,3-Dichloropropene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Total Trihalomethanes	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Total Xylene Isomers	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
trans-1,2-Dichloroethene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
trans-1,3-Dichloropropene	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Trichloroethene (TCE)	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable

%Rec: Percent Recovered  
RPD: Relative Percent Difference  
UCL: Upper Control Limit  
LCL: Lower Control Limit  
LCS: Laboratory Control Sample  
LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD  
OOS-High: QC Result Above UCL  
OOS-Low: QC Result Below LCL  
MS: Matrix Spike  
MSD: Matrix Spike Duplicate  
RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

# BSK ANALYTICAL LABORATORIES

## QC Summary Report

09/19/2005

BSK Submission : 2005082564  
Client : Sierra Environmental Monitorin  
Date Submitted : 08/31/2005  
Project ID :

NELAP Certificate #04227CA  
ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 98951

Analyst Initials: MICHAELK

Method Number: 5242

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Trichlorofluoromethane	RBLK	N/A	0	µg/L	< 5.0				5.0	N/A	09/06/05	Acceptable
Vinyl Chloride	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable

### Surrogate Results

Analyte	QC Type	Surr. Result	UCL	LCL	Date	
1,2-Dichlorobenzene-d4	LCS	N/A 99 % Rec	100	130	70	09/06/05 Acceptable
4-Bromofluorobenzene	LCS	N/A 97 % Rec	96	130	70	09/06/05 Acceptable
1,2-Dichlorobenzene-d4	LCSD	N/A 98 % Rec	100	130	70	09/06/05 Acceptable
4-Bromofluorobenzene	LCSD	N/A 97 % Rec	96	130	70	09/06/05 Acceptable
1,2-Dichlorobenzene-d4	RBLK	N/A 100 % Rec	N/A	N/A	09/06/05	Acceptable
4-Bromofluorobenzene	RBLK	N/A 96 % Rec	N/A	N/A	09/06/05	Acceptable

StarLims Run 98951 includes the following BSK Sample ID# :

627355 627406 627420 627505 627506 627961 628094 628142 629750 630091 630092 630093

BSK StarLims Run #: 98954

Analyst Initials: DANB

Method Number: 525

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Alachlor (Alanex)	LCS	N/A	5.32	µg/L	106		5	ND	130	70	09/06/05	Acceptable
Benzo(a)pyrene	LCS	N/A	3.2	µg/L	106		3	ND	130	70	09/06/05	Acceptable
bis(2-ethylhexyl) adipate	LCS	N/A	5.51	µg/L	110		5	ND	130	70	09/06/05	Acceptable
bis(2-ethylhexyl) phthalate	LCS	N/A	5.81	µg/L	116		5	ND	130	70	09/06/05	Acceptable
Butachlor	LCS	N/A	3.57	µg/L	119		3	ND	130	70	09/06/05	Acceptable
Diazinon	LCS	N/A	3.31	µg/L	66		5	ND	110	10	09/06/05	Acceptable
Metolachlor	LCS	N/A	5.43	µg/L	108		5	ND	130	70	09/06/05	Acceptable
Molinate (Ordram)	LCS	N/A	5.25	µg/L	105		5	ND	130	70	09/06/05	Acceptable
Prometryn (Caparol)	LCS	N/A	5.53	µg/L	110		5	ND	130	70	09/06/05	Acceptable
Propachlor	LCS	N/A	5.39	µg/L	107		5	ND	130	70	09/06/05	Acceptable
Thiobencarb (Bolero)	LCS	N/A	5.19	µg/L	103		5	ND	130	70	09/06/05	Acceptable
Alachlor (Alanex)	LCSD	N/A	5.46	µg/L	109	2.6	5	ND	130	70	09/06/05	Acceptable
Benzo(a)pyrene	LCSD	N/A	3.1	µg/L	103	3.1	3	ND	130	70	09/06/05	Acceptable
bis(2-ethylhexyl) adipate	LCSD	N/A	5.22	µg/L	104	5.4	5	ND	130	70	09/06/05	Acceptable
bis(2-ethylhexyl) phthalate	LCSD	N/A	5.87	µg/L	117	1	5	ND	130	70	09/06/05	Acceptable
Butachlor	LCSD	N/A	3.42	µg/L	113	4.2	3	ND	130	70	09/06/05	Acceptable

%Rec: Percent Recovered  
RPD: Relative Percent Difference  
UCL: Upper Control Limit  
LCL: Lower Control Limit  
LCS: Laboratory Control Sample  
LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD

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OOS-Low: QC Result Below LCL

MS: Matrix Spike

MSD: Matrix Spike Duplicate

RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

## QC Summary Report

09/19/2005



BSK Submission : 2005082564  
 Client : Sierra Environmental Monitorin  
 Date Submitted : 08/31/2005  
 Project ID :

NELAP Certificate #04227CA  
 ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 98954

Analyst Initials: DANB

Method Number: 525

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Diazinon	LCSD	N/A	3.42	µg/L	68	3.2	5	ND	110	10	09/06/05	Acceptable
Metolachlor	LCSD	N/A	5.16	µg/L	103	5	5	ND	130	70	09/06/05	Acceptable
Molinate (Ordram)	LCSD	N/A	5.38	µg/L	107	2.4	5	ND	130	70	09/06/05	Acceptable
Prometryn (Caparol)	LCSD	N/A	5.66	µg/L	113	2.3	5	ND	130	70	09/06/05	Acceptable
Propachlor	LCSD	N/A	5.56	µg/L	111	3.1	5	ND	130	70	09/06/05	Acceptable
Thiobencarb (Bolero)	LCSD	N/A	5.3	µg/L	106	2	5	ND	130	70	09/06/05	Acceptable
Alachlor (Alanex)	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Atrazine (AAtrex)	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Benzo(a)pyrene	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
bis(2-ethylhexyl) adipate	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
bis(2-ethylhexyl) phthalate	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Bromacil (Hyvar)	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Butachlor	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Diazinon	LDUP	626500	0	µg/L	N/A			ND	20	N/A	09/07/05	Acceptable
Dimethoate (Cygon)	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Metolachlor	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Metribuzin	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Molinate (Ordram)	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Prometryn (Caparol)	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Propachlor	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Simazine (Princep)	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Thiobencarb (Bolero)	LDUP	626500	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Alachlor (Alanex)	MS	626433	5.24	µg/L	104		5	ND	130	70	09/07/05	Acceptable
Benzo(a)pyrene	MS	626433	0.98	µg/L	32		3	ND	130	70	09/07/05	OOS-Low
bis(2-ethylhexyl) adipate	MS	626433	5.53	µg/L	110		5	ND	130	70	09/07/05	Acceptable
bis(2-ethylhexyl) phthalate	MS	626433	5.84	µg/L	116		5	ND	130	70	09/07/05	Acceptable
Butachlor	MS	626433	3.26	µg/L	108		3	ND	130	70	09/07/05	Acceptable
Diazinon	MS	626433	4.29	µg/L	85		5	ND	110	10	09/07/05	Acceptable
Metolachlor	MS	626433	5.06	µg/L	101		5	ND	130	70	09/07/05	Acceptable
Molinate (Ordram)	MS	626433	5.25	µg/L	105		5	ND	130	70	09/07/05	Acceptable
Prometryn (Caparol)	MS	626433	5.47	µg/L	109		5	ND	130	70	09/07/05	Acceptable
Propachlor	MS	626433	5.35	µg/L	106		5	ND	130	70	09/07/05	Acceptable
Thiobencarb (Bolero)	MS	626433	5.03	µg/L	100		5	ND	130	70	09/07/05	Acceptable
Alachlor (Alanex)	RBLK	N/A	0	µg/L	< 1.0				1.0	N/A	09/06/05	Acceptable
Atrazine (AAtrex)	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Benzo(a)pyrene	RBLK	N/A	0	µg/L	< 0.1				0.1	N/A	09/06/05	Acceptable
bis(2-ethylhexyl) adipate	RBLK	N/A	0	µg/L	< 3.0				3.0	N/A	09/06/05	Acceptable

%Rec: Percent Recovered  
 RPD: Relative Percent Difference  
 UCL: Upper Control Limit  
 LCL: Lower Control Limit  
 LCS: Laboratory Control Sample  
 LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD

OOS-High: QC Result Above UCL

OOS-Low: QC Result Below LCL

MS: Matrix Spike

MSD: Matrix Spike Duplicate

RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

# BSK ANALYTICAL LABORATORIES

QC Summary Report

09/19/2005



BSK Submission : 2005082564  
Client : Sierra Environmental Monitorin  
Date Submitted : 08/31/2005  
Project ID :

NELAP Certificate #04227CA  
ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 98954

Analyst Initials: DANB

Method Number: 525

## Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
bis(2-ethylhexyl) phthalate	RBLK	N/A	0	µg/L	< 3.0				3.0	N/A	09/06/05	Acceptable
Bromacil (Hyvar)	RBLK	N/A	0	µg/L	< 10				10	N/A	09/06/05	Acceptable
Butachlor	RBLK	N/A	0	µg/L	< 0.38				0.38	N/A	09/06/05	Acceptable
Diazinon	RBLK	N/A	0	µg/L	< 0.25				0.25	N/A	09/06/05	Acceptable
Dimethoate (Cygon)	RBLK	N/A	0	µg/L	< 10				10	N/A	09/06/05	Acceptable
Metolachlor	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Metribuzin	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Molinate (Ordram)	RBLK	N/A	0	µg/L	< 2.0				2.0	N/A	09/06/05	Acceptable
Prometryn (Caparol)	RBLK	N/A	0	µg/L	< 2.0				2.0	N/A	09/06/05	Acceptable
Propachlor	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/06/05	Acceptable
Simazine (Princep)	RBLK	N/A	0	µg/L	< 1.0				1.0	N/A	09/06/05	Acceptable
Thiobencarb (Bolero)	RBLK	N/A	0	µg/L	< 1.0				1.0	N/A	09/06/05	Acceptable

Run	Test	Analyte	Comment
98954	525	Benzoapyrene	MS recovery was affected by the matrix.

## Surrogate Results

Analyte	QC Type		Surr. Result		UCL	LCL	Date	
1,3-Dimethyl-2-nitrobenzene	LCS	N/A	106.3	%Rec	110	130	70	09/06/05 Acceptable
1,3-Dimethyl-2-nitrobenzene	LCSD	N/A	108.9	%Rec	110	130	70	09/06/05 Acceptable
1,3-Dimethyl-2-nitrobenzene	LDUP	626500	103.7	%Rec	100	130	70	09/07/05 Acceptable
1,3-Dimethyl-2-nitrobenzene	MS	626433	110.0	%Rec	110	130	70	09/07/05 Acceptable
1,3-Dimethyl-2-nitrobenzene	RBLK	N/A	114.5	%Rec	N/A	N/A	09/06/05	Acceptable

StarLims Run 98954 includes the following BSK Sample ID# :

626433 626500 626508 626585 626592 626627 626628 626642 627961 628094 630086 630087 630088 630089 630090

BSK StarLims Run #: 99095

Analyst Initials: RACHELM

Method Number: 505

## Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Aldrin	LCS	N/A	0.181	µg/L	103		0.175	ND	130	70	09/07/05	Acceptable
Chlorothalonil (Daconil, Bravo)	LCS	N/A	1.707	µg/L	97		1.75	ND	130	70	09/07/05	Acceptable
Dieldrin	LCS	N/A	0.174	µg/L	99		0.175	ND	130	70	09/07/05	Acceptable
Endrin	LCS	N/A	0.166	µg/L	94		0.175	ND	130	70	09/07/05	Acceptable
Heptachlor	LCS	N/A	0.179	µg/L	102		0.175	ND	130	70	09/07/05	Acceptable
Heptachlor epoxide	LCS	N/A	0.176	µg/L	100		0.175	ND	130	70	09/07/05	Acceptable

%Rec: Percent Recovered  
RPD: Relative Percent Difference  
UCL: Upper Control Limit  
LCL: Lower Control Limit  
LCS: Laboratory Control Sample  
LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD

OOS-High: QC Result Above UCL  
OOS-Low: QC Result Below LCL  
MS: Matrix Spike  
MSD: Matrix Spike Duplicate  
RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

## QC Summary Report

09/19/2005

BSK Submission: 2005082564  
Client: Sierra Environmental Monitorin  
Date Submitted: 08/31/2005  
Project ID:

NELAP Certificate #04227CA  
ELAP Certificate #1180

Project Desc:

BSK StarLims Run #: 99095

Analyst Initials: RACHELM

Method Number: 505

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Hexachlorobenzene	LCS	N/A	0.739	µg/L	105		0.7	ND	130	70	09/07/05	Acceptable
Hexachlorocyclopentadiene	LCS	N/A	0.626	µg/L	120		0.52	ND	130	70	09/07/05	Acceptable
Lindane	LCS	N/A	0.178	µg/L	101		0.175	ND	130	70	09/07/05	Acceptable
Methoxychlor	LCS	N/A	0.166	µg/L	94		0.175	ND	130	70	09/07/05	Acceptable
Aldrin	LCSD	N/A	0.180	µg/L	102	0.56	0.175	ND	130	70	09/07/05	Acceptable
Chlorothalonil (Daconil,Bravo)	LCSD	N/A	1.727	µg/L	98	1.1	1.75	ND	130	70	09/07/05	Acceptable
Dieldrin	LCSD	N/A	0.173	µg/L	98	0.58	0.175	ND	130	70	09/07/05	Acceptable
Endrin	LCSD	N/A	0.168	µg/L	96	1.1	0.175	ND	130	70	09/07/05	Acceptable
Heptachlor	LCSD	N/A	0.182	µg/L	104	1.7	0.175	ND	130	70	09/07/05	Acceptable
Heptachlor epoxide	LCSD	N/A	0.176	µg/L	100	0.0	0.175	ND	130	70	09/07/05	Acceptable
Hexachlorobenzene	LCSD	N/A	0.758	µg/L	108	2.6	0.7	ND	130	70	09/07/05	Acceptable
Hexachlorocyclopentadiene	LCSD	N/A	0.572	µg/L	109	9	0.52	ND	130	70	09/07/05	Acceptable
Lindane	LCSD	N/A	0.178	µg/L	101	0.0	0.175	ND	130	70	09/07/05	Acceptable
Methoxychlor	LCSD	N/A	0.167	µg/L	95	0.61	0.175	ND	130	70	09/07/05	Acceptable
Aldrin	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Chlordane	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Chlorothalonil (Daconil,Bravo)	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Dieldrin	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Endrin	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Heptachlor	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Heptachlor epoxide	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Hexachlorobenzene	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Hexachlorocyclopentadiene	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Lindane	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Methoxychlor	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
PCBs: Arochlor Screen	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Toxaphene	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Trifluralin	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/07/05	Acceptable
Aldrin	MS	627355	0.175	µg/L	100		0.175	ND	130	70	09/07/05	Acceptable
Chlorothalonil (Daconil,Bravo)	MS	627355	1.662	µg/L	94		1.75	ND	130	70	09/07/05	Acceptable
Dieldrin	MS	627355	0.183	µg/L	104		0.175	ND	130	70	09/07/05	Acceptable
Endrin	MS	627355	0.172	µg/L	98		0.175	ND	130	70	09/07/05	Acceptable
Heptachlor	MS	627355	0.178	µg/L	101		0.175	ND	130	70	09/07/05	Acceptable
Heptachlor epoxide	MS	627355	0.171	µg/L	97		0.175	ND	130	70	09/07/05	Acceptable
Hexachlorobenzene	MS	627355	0.765	µg/L	109		0.7	ND	130	70	09/07/05	Acceptable
Hexachlorocyclopentadiene	MS	627355	0.594	µg/L	114		0.52	ND	130	70	09/07/05	Acceptable
Lindane	MS	627355	0.178	µg/L	101		0.175	ND	130	70	09/07/05	Acceptable

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## QC Summary Report

09/19/2005

BSK Submission : 2005082564  
Client : Sierra Environmental Monitorin  
Date Submitted : 08/31/2005  
Project ID :

NELAP Certificate #04227CA  
ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 99095

Analyst Initials: RACHELM

Method Number: 505

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Methoxychlor	MS	627355	0.160	µg/L	91		0.175	ND	130	70	09/07/05	Acceptable
Aldrin	RBLK	N/A	0	µg/L	< 0.075				0.075	N/A	09/07/05	Acceptable
Chlordane	RBLK	N/A	0	µg/L	< 0.1				0.1	N/A	09/07/05	Acceptable
Chlorothalonil (Daconil, Bravo)	RBLK	N/A	0	µg/L	< 5.0				5.0	N/A	09/07/05	Acceptable
Dieldrin	RBLK	N/A	0	µg/L	< 0.02				0.02	N/A	09/07/05	Acceptable
Endrin	RBLK	N/A	0	µg/L	< 0.1				0.1	N/A	09/07/05	Acceptable
Heptachlor	RBLK	N/A	0	µg/L	< 0.01				0.01	N/A	09/07/05	Acceptable
Heptachlor epoxide	RBLK	N/A	0	µg/L	< 0.01				0.01	N/A	09/07/05	Acceptable
Hexachlorobenzene	RBLK	N/A	0	µg/L	< 0.50				0.50	N/A	09/07/05	Acceptable
Hexachlorocyclopentadiene	RBLK	N/A	0	µg/L	< 1.0				1.0	N/A	09/07/05	Acceptable
Lindane	RBLK	N/A	0	µg/L	< 0.2				0.2	N/A	09/07/05	Acceptable
Methoxychlor	RBLK	N/A	0	µg/L	< 10				10	N/A	09/07/05	Acceptable
PCBs: Arochlor Screen	RBLK	N/A	0	µg/L	< 0.5				0.5	N/A	09/07/05	Acceptable
Toxaphene	RBLK	N/A	0	µg/L	< 1.0				1.0	N/A	09/07/05	Acceptable
Trifluralin	RBLK	N/A	0	µg/L	< 1.0				1.0	N/A	09/07/05	Acceptable

### Surrogate Results

Analyte	QC Type		Surr. Result		UCL	LCL	Date	
Tetrachloro-m-xylene	LCS	N/A	88.3 % Rec		90	130	70	09/07/05 Acceptable
Tetrachloro-m-xylene	LCSD	N/A	84.3 % Rec		90	130	70	09/07/05 Acceptable
Tetrachloro-m-xylene	LDUP	628094	91.8 % Rec		93	130	70	09/07/05 Acceptable
Tetrachloro-m-xylene	MS	627355	87.9 % Rec		90	130	70	09/07/05 Acceptable
Tetrachloro-m-xylene	RBLK	N/A	90 % Rec		N/A	N/A	09/07/05	Acceptable

StarLims Run 99095 includes the following BSK Sample ID#:

627355 627412 627420 627961 628094 631371 631372 631378 631379 631380

BSK StarLims Run #: 99215

Analyst Initials: MICHAELK

Method Number: 504.1

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Dibromochloropropane	LCS	N/A	0.260	µg/L	104		0.25	ND	130	70	09/12/05	Acceptable
Ethylenedibromide	LCS	N/A	0.258	µg/L	102		0.25	ND	130	70	09/12/05	Acceptable
Dibromochloropropane	LCSD	N/A	0.254	µg/L	101	2.3	0.25	ND	130	70	09/12/05	Acceptable
Ethylenedibromide	LCSD	N/A	0.253	µg/L	100	2	0.25	ND	130	70	09/12/05	Acceptable

%Rec: Percent Recovered  
RPD: Relative Percent Difference  
UCL: Upper Control Limit  
LCL: Lower Control Limit  
LCS: Laboratory Control Sample  
LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD  
OOS-High: QC Result Above UCL  
OOS-Low: QC Result Below LCL  
MS: Matrix Spike  
MSD: Matrix Spike Duplicate  
RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

# BSK ANALYTICAL LABORATORIES

## QC Summary Report

09/19/2005

BSK Submission : 2005082564  
Client : Sierra Environmental Monitorin  
Date Submitted : 08/31/2005  
Project ID :

NELAP Certificate #04227CA  
ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 99215

Analyst Initials: MICHAELK

Method Number: 504.1

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Dibromochloropropane	LDUP	631600	0.182	µg/L	1			0.18	30	N/A	09/12/05	Acceptable
Ethylenedibromide	LDUP	631600	0	µg/L	N/A			ND	30	N/A	09/12/05	Acceptable
Dibromochloropropane	MS	627761	0.253	µg/L	99		0.25	ND	130	70	09/12/05	Acceptable
Ethylenedibromide	MS	627761	0.265	µg/L	105		0.25	ND	130	70	09/12/05	Acceptable
Dibromochloropropane	RBLK	N/A	0	µg/L	< 0.01				0.01	N/A	09/12/05	Acceptable
Ethylenedibromide	RBLK	N/A	0.001	µg/L	< 0.02				0.02	N/A	09/12/05	Acceptable

Run	Test	Analyte	Comment
99215	504.1	DBCP	MS recovery was affected by the matrix.

### Surrogate Results

Analyte	QC Type	Surr. Result	UCL	LCL	Date	
Bromoform	LCS	N/A 111 % Rec	110	130	70	09/12/05 Acceptable
Bromoform	LCSD	N/A 107 % Rec	110	130	70	09/12/05 Acceptable
Bromoform	LDUP	631600 111 % Rec	120	130	70	09/12/05 Acceptable
Bromoform	MS	627761 109 % Rec	120	130	70	09/12/05 Acceptable
Bromoform	RBLK	N/A 109 % Rec	N/A	N/A	09/12/05	Acceptable

StarLims Run 99215 includes the following BSK Sample ID# :

627761 627762 627818 627819 627835 627961 628094 628314 628315 631600 632423 632424 632425 632426 632427

BSK StarLims Run #: 99221

Analyst Initials: RACHELM

Method Number: 5153

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
2,4,5-T	LCS	N/A	3.33	µg/L	111		3	ND	130	70	09/09/05	Acceptable
2,4,5-TP (Silvex)	LCS	N/A	3.52	µg/L	117		3	ND	130	70	09/09/05	Acceptable
2,4-D	LCS	N/A	35.40	µg/L	118		30	ND	130	70	09/09/05	Acceptable
Bentazon (Basagran)	LCS	N/A	6.39	µg/L	106		6	ND	130	70	09/09/05	Acceptable
Dalapon	LCS	N/A	30.61	µg/L	102		30	ND	130	70	09/09/05	Acceptable
Dicamba (Banvel)	LCS	N/A	4.74	µg/L	108		4.38	ND	130	70	09/09/05	Acceptable
Dinoseb (DNBP)	LCS	N/A	6.84	µg/L	113		6	ND	130	70	09/09/05	Acceptable
Pentachlorophenol (PCP)	LCS	N/A	0.63	µg/L	105		0.6	ND	130	70	09/09/05	Acceptable
Picloram	LCS	N/A	3.39	µg/L	113		3	ND	130	70	09/09/05	Acceptable
2,4,5-T	LCSD	N/A	3.4	µg/L	113	2	3	ND	130	70	09/09/05	Acceptable
2,4,5-TP (Silvex)	LCSD	N/A	3.63	µg/L	121	3	3	ND	130	70	09/09/05	Acceptable
2,4-D	LCSD	N/A	36.67	µg/L	122	3.6	30	ND	130	70	09/09/05	Acceptable

%Rec: Percent Recovered  
RPD: Relative Percent Difference  
UCL: Upper Control Limit  
LCL: Lower Control Limit  
LCS: Laboratory Control Sample  
LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD  
OOS-High: QC Result Above UCL  
OOS-Low: QC Result Below LCL  
MS: Matrix Spike  
MSD: Matrix Spike Duplicate  
RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

## QC Summary Report

09/19/2005

BSK Submission : 2005082564  
 Client : Sierra Environmental Monitorin  
 Date Submitted : 08/31/2005  
 Project ID :

NELAP Certificate #04227CA  
 ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 99221

Analyst Initials: RACHELM

Method Number: 5153

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Bentazon (Basagran)	LCSD	N/A	6.61	µg/L	110	3.3	6	ND	130	70	09/09/05	Acceptable
Dalapon	LCSD	N/A	32.54	µg/L	108	6.1	30	ND	130	70	09/09/05	Acceptable
Dicamba (Banvel)	LCSD	N/A	4.96	µg/L	113	4.6	4.38	ND	130	70	09/09/05	Acceptable
Dinoseb (DNBP)	LCSD	N/A	6.85	µg/L	114	0.14	6	ND	130	70	09/09/05	Acceptable
Pentachlorophenol (PCP)	LCSD	N/A	0.65	µg/L	108	3.1	0.6	ND	130	70	09/09/05	Acceptable
Picloram	LCSD	N/A	3.48	µg/L	115	2.7	3	ND	130	70	09/09/05	Acceptable
2,4,5-T	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/09/05	Acceptable
2,4,5-TP (Silvex)	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/09/05	Acceptable
2,4-D	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/09/05	Acceptable
Bentazon (Basagran)	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/09/05	Acceptable
Dalapon	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/09/05	Acceptable
Dicamba (Banvel)	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/09/05	Acceptable
Dinoseb (DNBP)	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/09/05	Acceptable
Pentachlorophenol (PCP)	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/09/05	Acceptable
Picloram	LDUP	628094	0	µg/L	N/A			ND	30	N/A	09/09/05	Acceptable
2,4,5-T	MS	627961	3.24	µg/L	108		3	ND	130	70	09/09/05	Acceptable
2,4,5-TP (Silvex)	MS	627961	3.41	µg/L	113		3	ND	130	70	09/09/05	Acceptable
2,4-D	MS	627961	34.04	µg/L	113		30	ND	130	70	09/09/05	Acceptable
Bentazon (Basagran)	MS	627961	6.44	µg/L	107		6	ND	130	70	09/09/05	Acceptable
Dalapon	MS	627961	29.09	µg/L	96		30	ND	130	70	09/09/05	Acceptable
Dicamba (Banvel)	MS	627961	4.63	µg/L	105		4.38	ND	130	70	09/09/05	Acceptable
Dinoseb (DNBP)	MS	627961	6.57	µg/L	109		6	ND	130	70	09/09/05	Acceptable
Pentachlorophenol (PCP)	MS	627961	0.62	µg/L	103		0.6	ND	130	70	09/09/05	Acceptable
Picloram	MS	627961	3.37	µg/L	112		3	ND	130	70	09/09/05	Acceptable
2,4,5-T	MSD	627961	3.29	µg/L	109	1.6	3	ND	130	70	09/09/05	Acceptable
2,4,5-TP (Silvex)	MSD	627961	3.46	µg/L	115	1.4	3	ND	130	70	09/09/05	Acceptable
2,4-D	MSD	627961	34.65	µg/L	115	1.8	30	ND	130	70	09/09/05	Acceptable
Bentazon (Basagran)	MSD	627961	6.35	µg/L	105	1.4	6	ND	130	70	09/09/05	Acceptable
Dalapon	MSD	627961	30.96	µg/L	103	6.2	30	ND	130	70	09/09/05	Acceptable
Dicamba (Banvel)	MSD	627961	4.83	µg/L	110	4.2	4.38	ND	130	70	09/09/05	Acceptable
Dinoseb (DNBP)	MSD	627961	6.59	µg/L	109	0.3	6	ND	130	70	09/09/05	Acceptable
Pentachlorophenol (PCP)	MSD	627961	3.43	µg/L	114	140	3	ND	130	70	09/09/05	Acceptable
2,4,5-T	RBLK	N/A	0	µg/L	< 1.0				1.0	N/A	09/09/05	Acceptable
2,4,5-TP (Silvex)	RBLK	N/A	0	µg/L	< 1.0				1.0	N/A	09/09/05	Acceptable
2,4-D	RBLK	N/A	0	µg/L	< 10				10	N/A	09/09/05	Acceptable
Bentazon (Basagran)	RBLK	N/A	0	µg/L	< 2.0				2.0	N/A	09/09/05	Acceptable
Dalapon	RBLK	N/A	0	µg/L	< 10				10	N/A	09/09/05	Acceptable

%Rec: Percent Recovered  
 RPD: Relative Percent Difference  
 UCL: Upper Control Limit  
 LCL: Lower Control Limit  
 LCS: Laboratory Control Sample  
 LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD  
 OOS-High: QC Result Above UCL  
 OOS-Low: QC Result Below LCL  
 MS: Matrix Spike  
 MSD: Matrix Spike Duplicate  
 RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

# BSK ANALYTICAL LABORATORIES

## QC Summary Report

09/19/2005



BSK Submission : 2005082564  
 Client : Sierra Environmental Monitorin  
 Date Submitted : 08/31/2005  
 Project ID :

NELAP Certificate #04227CA  
 ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 99221



Analyst Initials: RACHELM

Method Number: 5153

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date
Dicamba (Banvel)	RBLK	N/A	0	µg/L	< 1.5				1.5	N/A	09/09/05 Acceptable
Dinoseb (DNBP)	RBLK	N/A	0	µg/L	< 2.0				2.0	N/A	09/09/05 Acceptable
Pentachlorophenol (PCP)	RBLK	N/A	0	µg/L	< 0.2				0.2	N/A	09/09/05 Acceptable
Picloram	RBLK	N/A	0	µg/L	< 1.0				1.0	N/A	09/09/05 Acceptable

### Surrogate Results

Analyte	QC Type	Surr. Result	UCL	LCL	Date
DCPAA	LCS	N/A 107 % Rec	100	130	70 09/09/05 Acceptable
DCPAA	LCSD	N/A 113 % Rec	100	130	70 09/09/05 Acceptable
DCPAA	LDUP	628094 107 % Rec	100	130	70 09/09/05 Acceptable
DCPAA	MS	627961 108 % Rec	100	130	70 09/09/05 Acceptable
DCPAA	MSD	627961 102 % Rec	100	130	70 09/09/05 Acceptable
DCPAA	RBLK	N/A 104 % Rec	N/A	N/A	09/09/05 Acceptable

StarLims Run 99221 includes the following BSK Sample ID#:

627961 628094 628788 629220 629221 629784 632470 632471 632472 632473 632474 632475

BSK StarLims Run #: 99241



Analyst Initials: JENNIFERD

Method Number: 531.1

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date
3-Hydroxycarbofuran	LCS	N/A	30.49	µg/L	101		30	ND	130	70	09/08/05 Acceptable
Aldicarb	LCS	N/A	30.95	µg/L	103		30	ND	130	70	09/08/05 Acceptable
Aldicarb Sulfone	LCS	N/A	31.07	µg/L	103		30	ND	130	70	09/08/05 Acceptable
Aldicarb Sulfoxide	LCS	N/A	30.06	µg/L	100		30	ND	130	70	09/08/05 Acceptable
Carbaryl	LCS	N/A	31.96	µg/L	106		30	ND	130	70	09/08/05 Acceptable
Carbofuran	LCS	N/A	30.77	µg/L	102		30	ND	130	70	09/08/05 Acceptable
Methomyl	LCS	N/A	30.32	µg/L	101		30	ND	130	70	09/08/05 Acceptable
Oxamyl	LCS	N/A	28.86	µg/L	96		30	ND	130	70	09/08/05 Acceptable
3-Hydroxycarbofuran	LCSD	N/A	31.55	µg/L	105	3.4	30	ND	130	70	09/08/05 Acceptable
Aldicarb	LCSD	N/A	31.84	µg/L	106	2.9	30	ND	130	70	09/08/05 Acceptable
Aldicarb Sulfone	LCSD	N/A	31.42	µg/L	104	1.1	30	ND	130	70	09/08/05 Acceptable
Aldicarb Sulfoxide	LCSD	N/A	30.81	µg/L	102	2.4	30	ND	130	70	09/08/05 Acceptable
Carbaryl	LCSD	N/A	31.84	µg/L	106	0.37	30	ND	130	70	09/08/05 Acceptable
Carbofuran	LCSD	N/A	29.04	µg/L	96	5.8	30	ND	130	70	09/08/05 Acceptable

%Rec: Percent Recovered  
 RPD: Relative Percent Difference  
 UCL: Upper Control Limit  
 LCL: Lower Control Limit  
 LCS: Laboratory Control Sample  
 LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD  
 OOS-High: QC Result Above UCL  
 OOS-Low: QC Result Below LCL  
 MS: Matrix Spike  
 MSD: Matrix Spike Duplicate  
 RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

# BSK ANALYTICAL LABORATORIES

## QC Summary Report

09/19/2005

BSK Submission : 2005082564  
Client : Sierra Environmental Monitorin  
Date Submitted : 08/31/2005  
Project ID :

NELAP Certificate #04227CA  
ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 99241

Analyst Initials: JENNIFERD

Method Number: 531.1

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date	
Methomyl	LCSD	N/A	30.35	µg/L	101	0.098	30	ND	130	70	09/08/05	Acceptable
Oxamyl	LCSD	N/A	30.14	µg/L	100	4.3	30	ND	130	70	09/08/05	Acceptable
3-Hydroxycarbofuran	LDUP	629220	0	µg/L	N/A			ND	30	N/A	09/08/05	Acceptable
Aldicarb	LDUP	629220	0	µg/L	N/A			ND	30	N/A	09/08/05	Acceptable
Aldicarb Sulfone	LDUP	629220	0	µg/L	N/A			ND	30	N/A	09/08/05	Acceptable
Aldicarb Sulfoxide	LDUP	629220	0	µg/L	N/A			ND	30	N/A	09/08/05	Acceptable
Carbaryl	LDUP	629220	0	µg/L	N/A			ND	30	N/A	09/08/05	Acceptable
Carbofuran	LDUP	629220	0	µg/L	N/A			ND	30	N/A	09/08/05	Acceptable
Methomyl	LDUP	629220	0	µg/L	N/A			ND	30	N/A	09/08/05	Acceptable
Oxamyl	LDUP	629220	0	µg/L	N/A			ND	30	N/A	09/08/05	Acceptable
3-Hydroxycarbofuran	MS	626627	31.43	µg/L	104		30	ND	130	70	09/08/05	Acceptable
Aldicarb	MS	626627	32.32	µg/L	107		30	ND	130	70	09/08/05	Acceptable
Aldicarb Sulfone	MS	626627	31.40	µg/L	104		30	ND	130	70	09/08/05	Acceptable
Aldicarb Sulfoxide	MS	626627	31.06	µg/L	103		30	ND	130	70	09/08/05	Acceptable
Carbaryl	MS	626627	31.75	µg/L	105		30	ND	130	70	09/08/05	Acceptable
Carbofuran	MS	626627	29.82	µg/L	99		30	ND	130	70	09/08/05	Acceptable
Methomyl	MS	626627	31.04	µg/L	103		30	ND	130	70	09/08/05	Acceptable
Oxamyl	MS	626627	31.33	µg/L	104		30	ND	130	70	09/08/05	Acceptable
3-Hydroxycarbofuran	MSD	626627	31.50	µg/L	105	0.22	30	ND	130	70	09/08/05	Acceptable
Aldicarb	MSD	626627	30.94	µg/L	103	4.3	30	ND	130	70	09/08/05	Acceptable
Aldicarb Sulfone	MSD	626627	30.63	µg/L	102	2.4	30	ND	130	70	09/08/05	Acceptable
Aldicarb Sulfoxide	MSD	626627	30.80	µg/L	102	0.85	30	ND	130	70	09/08/05	Acceptable
Carbaryl	MSD	626627	32.68	µg/L	108	2.9	30	ND	130	70	09/08/05	Acceptable
Carbofuran	MSD	626627	30.21	µg/L	100	1.2	30	ND	130	70	09/08/05	Acceptable
Methomyl	MSD	626627	31.35	µg/L	104	1	30	ND	130	70	09/08/05	Acceptable
Oxamyl	MSD	626627	31.83	µg/L	106	1.6	30	ND	130	70	09/08/05	Acceptable
3-Hydroxycarbofuran	RBLK	N/A	0	µg/L	< 3.0				3.0	N/A	09/08/05	Acceptable
Aldicarb	RBLK	N/A	0	µg/L	< 3.0				3.0	N/A	09/08/05	Acceptable
Aldicarb Sulfone	RBLK	N/A	0	µg/L	< 2.0				2.0	N/A	09/08/05	Acceptable
Aldicarb Sulfoxide	RBLK	N/A	0	µg/L	< 3.0				3.0	N/A	09/08/05	Acceptable
Carbaryl	RBLK	N/A	0	µg/L	< 5.0				5.0	N/A	09/08/05	Acceptable
Carbofuran	RBLK	N/A	0	µg/L	< 5.0				5.0	N/A	09/08/05	Acceptable
Methomyl	RBLK	N/A	0	µg/L	< 2.0				2.0	N/A	09/08/05	Acceptable
Oxamyl	RBLK	N/A	0	µg/L	< 20				20	N/A	09/08/05	Acceptable

%Rec: Percent Recovered  
RPD: Relative Percent Difference  
UCL: Upper Control Limit  
LCL: Lower Control Limit  
LCS: Laboratory Control Sample  
LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD  
OOS-High: QC Result Above UCL  
OOS-Low: QC Result Below LCL  
MS: Matrix Spike  
MSD: Matrix Spike Duplicate  
RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

# BSK ANALYTICAL LABORATORIES

## QC Summary Report

09/19/2005



NELAP Certificate #04227CA  
ELAP Certificate #1180

BSK Submission : 2005082564  
Client : Sierra Environmental Monitorin  
Date Submitted : 08/31/2005  
Project ID :

Project Desc :

BSK StarLims Run #: 99241



Analyst Initials: JENNIFERD

Method Number: 531.1

### Surrogate Results

Analyte	QC Type	Surr. Result	UCL	LCL	Date
BDMC	LCS	N/A 109 % Rec	120	130	70 09/08/05 Acceptable
BDMC	LCSD	N/A 107 % Rec	120	130	70 09/08/05 Acceptable
BDMC	LDUP	629220 141 % Rec	150	130	70 09/08/05 OOS-High
BDMC	MS	626627 118 % Rec	130	130	70 09/08/05 Acceptable
BDMC	MSD	626627 118 % Rec	130	130	70 09/08/05 Acceptable
BDMC	RBLK	N/A 116 % Rec	N/A	N/A	09/08/05 Acceptable

StarLims Run 99241 includes the following BSK Sample ID# :

626499 626627 626628 627355 627412 627420 627961 628094 628788 629220 632560 632561 632562 632563 632564 632565

BSK StarLims Run #: 99244



Analyst Initials: DANB

Method Number: 548

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date
Endothall	LCS	N/A	75.9	µg/L	75		100	ND	141	34	09/12/05 Acceptable
Endothall	LCSD	N/A	101.3	µg/L	101	28	100	ND	141	34	09/12/05 Acceptable
Endothall	LDUP	629221	0	µg/L	N/A			ND	50	N/A	09/12/05 Acceptable
Endothall	MS	628094	86	µg/L	86		100	ND	141	34	09/12/05 Acceptable
Endothall	MSD	628094	72.8	µg/L	72	16	100	ND	141	34	09/12/05 Acceptable
Endothall	RBLK	N/A	0	µg/L	< 45				45	N/A	09/12/05 Acceptable

StarLims Run 99244 includes the following BSK Sample ID# :

628094 628136 628788 629220 629221 632597 632598 632599 632600 632601 632602

BSK StarLims Run #: 99550



Analyst Initials: JENNIFERD

Method Number: 547

### Analyte Results

Analyte	QC Type	Matrix Spike ID	Result	Units	% Rec or RPD	Spike RPD	Spk Conc	Matrix Conc	UCL	LCL	Date
Glyphosate	LCS	N/A	226.1	µg/L	113		200	ND	130	70	09/14/05 Acceptable
Glyphosate	LCSD	N/A	228.2	µg/L	114	0.93	200	ND	130	70	09/14/05 Acceptable
Glyphosate	LDUP	630730	8.3	µg/L	N/A			ND	30	N/A	09/14/05 Acceptable
Glyphosate	MS	627820	238.6	µg/L	119		200	ND	130	70	09/14/05 Acceptable
Glyphosate	MSD	627820	238.2	µg/L	119	0.16	200	ND	130	70	09/14/05 Acceptable
Glyphosate	RBLK	N/A	0	µg/L	< 25				25	N/A	09/14/05 Acceptable

%Rec: Percent Recovered  
RPD: Relative Percent Difference  
UCL: Upper Control Limit  
LCL: Lower Control Limit  
LCS: Laboratory Control Sample  
LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD  
OOS-High: QC Result Above UCL  
OOS-Low: QC Result Below LCL  
MS: Matrix Spike  
MSD: Matrix Spike Duplicate  
RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

# BSK ANALYTICAL LABORATORIES



## QC Summary Report

09/19/2005

BSK Submission : 2005082564  
Client : Sierra Environmental Monitorin  
Date Submitted : 08/31/2005  
Project ID :

NELAP Certificate #04227CA  
ELAP Certificate #1180

Project Desc :

BSK StarLims Run #: 99550



Analyst Initials: JENNIFERD

Method Number: 547

### Surrogate Results

Analyte	QC Type		Surr. Result		UCL	LCL	Date	
AMPA	LCS	N/A	152.3 % Rec		140	130	70 09/14/05	OOS-High
AMPA	LCSD	N/A	153.1 % Rec		140	130	70 09/14/05	OOS-High
AMPA	LDUP	630730	130.4 % Rec		120	130	70 09/14/05	OOS-High
AMPA	MS	627820	158.1 % Rec		160	130	70 09/14/05	OOS-High
AMPA	MSD	627820	161.5 % Rec		160	130	70 09/14/05	OOS-High
AMPA	RBLK	N/A	143.6 % Rec		N/A	N/A	09/14/05	OOS-High

StarLims Run 99550 includes the following BSK Sample ID# :

627820 627821 627961 628094 629220 629221 629738 629739 629784 630730 635056 635057 635058 635059 635060 635061

Approved by:

*Cynthia Hamilton*

%Rec: Percent Recovered  
RPD: Relative Percent Difference  
UCL: Upper Control Limit  
LCL: Lower Control Limit  
LCS: Laboratory Control Sample  
LCSD: Laboratory Control Sample Duplicate

Parent Sample: Sample used as background matrix for MS/MSD  
OOS-High: QC Result Above UCL  
OOS-Low: QC Result Below LCL  
MS: Matrix Spike  
MSD: Matrix Spike Duplicate  
RBLK: Reagent (Method) Blank

Surrogate results for QC standards are not evaluated for acceptability (due to definition of a surrogate standard)

# Sample Integrity

3. 1 of 2

CLII

005082564

08/31/2005

Date Received

8/31/05

P

SIERRA ENV

TAT: Standard

831013



## Section 1- Sampled Same Day

Sample Transport: Walk In SJVC BSK-Courier Transported In: Ice Chest Box Hand

Has chilling process begun? Y N Samples Received: Chilled to Touch / Ambient / On Ice

## Section 2- Sampled Previously

Sample Transport: CAO UPS SJVC Walk-In BSK-Courier GSO Fed Exp. Other:

No. Coolers/Ice Chests: 1 Temperature(s): 4

Was Temperature In Range: Y N Received On Ice: Wet Blue

Describe type of packing materials: Bubble Wrap Foam Packing Peanuts Paper Other:

Were ice chest custody seals present? Y N Intact: Y N

## Section 3- COC Info.

	Completed		Info From Container		Completed		Info From Container
	Yes	No			Yes	No	
Was COC Received	✓			Analysis Requested	✓		
Date Sampled	✓			Any hold times less than 72hr	✓		
Time Sampled	✓			Client Name	✓		
Sample ID	✓			Address	✓		
Special Storage/Handling Ins.		✓		Telephone #	✓		

## Section 4- Bottles / Analysis

	Yes	No	N/A	Comment
Did all bottles arrive unbroken and intact?:	✓			
Were bottle custody seals present?		✓		
Were bottle custody seals intact?	✓			
Did all bottle labels agree with COC?:	✓			
Were correct containers used for the tests requested?:	✓			
Were correct preservations used for the tests requested?:	✓			
Was a sufficient amount of sample sent for tests indicated?:	✓			
Were bubbles present in VOA Vials?: (Volatile Methods Only)		✓		
Were Ascorbic Acid Bottles received with the VOAs		✓		

## Section 5- Comments / Discrepancies

Sample(s) Split/Preserve: Yes (No) Container: Preservation: Init.:

Was Client Service Rep. notified of discrepancies: Yes (No) N/A CSR: Notified By: N

Explanations / Comments

Report Comment Entered:



# Sierra Environmental Monitoring, Inc.

1135 Financial Blvd. - Reno - Nevada - 89502

Phone: (775) 857-2400 Fax: (775) 857-2404 Email: sem@sem-analytical.com

BSK Lab

2005082564

SIERRA ENV

831013

08/31/2005

Today Report

TAT: Standard

PO #05-759

Sampled By: J. Hulett



Date Sampled	Time Sampled	Sample Type	Sample Identification	Analyses Requested	Remarks	Turn Around Time
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	Carbamates (ML531) (EPA 531.1)	AD Sample	Normal
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	Diquat (EPA 549.2)		Normal
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	EDB-DBC (EPA 504.1)	Pos. Sec	Normal
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	Endothall (EPA 548.1)		Normal
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	Glyphosate (EPA 547)		Normal
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	Herbicides (NPS3) (EPA 515.1)		Normal
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	Pesticides and PCBs (PESTSDW) (EPA 508)		Normal
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	SVOCs (ML525) (EPA 525)		Normal
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	VOCs (VOASDWA) (EPA 524.2)		Normal

Signature	Print Name	Company	Date	Time
	J. Hulett	SEM	8/30/05	15:30
Received By:				
Relinquished By:				
Received By:		BSK	8/31/05	07:35



# MWH Laboratories

A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100  
Monrovia, California 91016-3829  
Tel: 626 386 1100  
Fax: 626 386 1101  
1 800 566 LABS (1 800 566 5227)

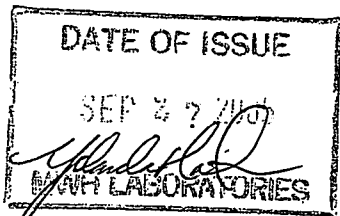
## Laboratory Report

for

Sierra Environmental Monitoring, Inc.  
1135 Financial Blvd.

Reno , NV 89502

Attention: John Kobza  
Fax: (775) 857-2404



YOM Yolanda Martin  
Project Manager



Report#: 155614  
DRINKING

Laboratory certifies that the test results meet all NELAC requirements unless noted in the Comments section or the Case Narrative. Following the cover page are QC Report, QC Summary, Data Report, Hits Report, totaling 4 page[s].

# Sierra Environmental Monitoring, Inc.

1135 Financial Blvd. - Reno - Nevada - 89502



Phone: (775) 857-2400 Fax: (775) 857-2404 Email: sem@sem-analytical.com

MWH Laboratory Sub-Contract Chain of Custody Report

PO #05-757

Sampled By: J. Hulet Compliance:

Date Sampled	Time Sampled	Sample Type	Sample Identification	Analyses Requested	Remarks	Turn Around Time
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	Radon		Normal

Signature	Print Name	Company	Date	Time
Relinquished By: 	J. Hulet	SEM	8/30/05	1530
Received By: 	J. Hulet	SEM	8/30/05	0800
Relinquished By:				
Received By:				

MWH Laboratories  
750 Royal Oaks Drive, Monrovia, CA 91016  
PHONE: 626-386-1100/FAX: 626-386-1101

ACKNOWLEDGMENT OF SAMPLES RECEIVED

Sierra Environmental Monitoring, Inc.  
1135 Financial Blvd.  
Reno, NV 89502  
Attn: John Kobza  
Phone: (775) 857-2400

Customer Code: SIERRAENV  
Group#: 155614  
Project#: DRINKING  
Proj Mgr: Yolanda Martin  
Phone: (626) 386-1104

The following samples were received from you on 08/31/05. They have been scheduled for the tests listed beside each sample. If this information is incorrect, please contact your service representative. Thank you for using MWH Laboratories.

Sample#	Sample Id.	Matrix	Sample Date
	Tests Scheduled		
2508310057	S200508-1685-LONGLEY LANE WELL Water		29-aug-2005 15:00:00
	@RN		

Test Acronym Description

Test Acronym	Description
@RN	Radon 222



# MWH Laboratories

A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100  
Monrovia, California 91016-3829  
Tel: 626 386 1100  
Fax: 626 386 1101  
1 800 566 LABS (1 800 566 5227)

Laboratory  
Hits Report  
#155614

Sierra Environmental Monitoring,  
Inc.  
John Kobza  
1135 Financial Blvd.  
Reno , NV 89502

Samples Received  
31-aug-2005 14:46:06

Analyzed	Sample#	Sample ID	Result	Federal MCL	UNITS	MRL
	2508310057	S200508-1685-LONGLEY LANE WELL				
09/01/05	Radon 222		470		pCi/l	50
09/01/05	Radon 222, Two Sigma Error		23		pCi/l	

SUMMARY OF POSITIVE DATA ONLY.



# MWH Laboratories

A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100  
Monrovia, California 91016-3629  
Tel: 626 386 1100  
Fax: 626 386 1101  
1 800 566 LABS (1 800 566 5227)

Laboratory  
Data Report  
#155614

Sierra Environmental Monitoring,  
Inc.  
John Kobza  
1135 Financial Blvd.  
Reno , NV 89502

Samples Received

08/31/05

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
----------	----------	---------	--------	---------	--------	-------	-----	----------

S200508-1685-LONGLEY LANE WELL (2508310057)

Sampled on 08/29/05 15:00

## Radon 222

09/01/05 18:40	287470	( SM7500RN	) Radon 222	470	pCi/l	50	1
09/01/05 18:40	287470	( SM7500RN	) Radon 222, Two Sigma Error	23	pCi/l	0	1



# MWH Laboratories

A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100  
Monrovia, California 91016-3629  
Tel: 626 386 1100  
Fax: 626 386 1101  
1 800 566 LABS (1 800 566 5227)

Laboratory  
QC Summary  
#155614

Sierra Environmental Monitoring,  
Inc.

QC Ref #287470 - Radon 222

Analysis Date: 09/01/2005

2508310057

S200508-1685-LONGLEY LANE Analyzed by: yyc



# MWH Laboratories

A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100  
Monrovia, California 91016-3829  
Tel: 626 386 1100  
Fax: 626 386 1101  
1 800 566 LABS (1 800 566 5227)

Laboratory  
QC Report  
#155614

Sierra Environmental Monitoring,  
Inc.

QC Ref #287470

Radon 222

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS1	Radon 222	200	217	PCIL	108.5	( 80-120 )	
LCS2	Radon 222	200	223	PCIL	111.5	( 80-120 )	2.7
MBLK	Radon 222	ND	<50	PCIL			

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.  
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates  
are advisory only, unless otherwise specified in the method.

**GENERAL ENGINEERING LABORATORIES, LLC**  
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Certificate of Analysis Report**  
for

SEMI001 Sierra Environmental Monitoring, Inc.  
Client SDG: 144518 GEL Work Order: 144518

The Qualifiers in this report are defined as follows:

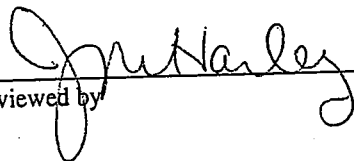
- \*\* Indicates the analyte is a surrogate compound.
- < Result is less than amount reported.
- > Result is greater than amount reported.
- B Target analyte was detected in the sample as well as the associated blank.
- BD Results below the MDC or low tracer recovery.
- E Concentration of the target analyte exceeds the instrument calibration range.
- H Analytical holding time exceeded.
- J Indicates an estimated value.
- P The response between the confirmation and the primary columns is >40% Different.
- R Sample results are rejected.
- U Target analyte was analyzed for but not detected above the MDL or LOD.
- UI Uncertain identification for gamma spectroscopy.
- X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
- Y QC Samples were not spiked with this compound.
- Z Paint Filter qualifier: Particulates passed through the filter. No free liquids were observed.
- d The 2:1 depletion requirement was not met for this sample
- h Sample preparation or preservation holding time exceeded.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

\*\* Indicates the analyte is a surrogate compound.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Joanne Harley.

Reviewed by



**GENERAL ENGINEERING LABORATORIES, LLC**  
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Certificate of Analysis**

Company : Sierra Env. Monitoring, Inc  
Address : 1135 Financial Boulevard  
Reno, Nevada 89502

Report Date: October 4, 2005

Contact: Mr. John Kobza

Project: Routine Analytical

Client Sample ID: S200508-1685-Longley Lane Well  
Sample ID: 144518001  
Matrix: Drinking Water (Potable)  
Collect Date: 29-AUG-05 15:00  
Receive Date: 01-SEP-05  
Collector: Client

Project: SEMI102000  
Client ID: SEMI001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gross Alpha/Beta in Drinking Water EPA 900.0</i>												
Alpha	U	0.235	+/-1.02	1.97	3.00	pCi/L		ATH2	09/20/05	1211	461279	1
Beta		4.73	+/-1.51	2.61	4.00	pCi/L						
<i>Radium-228 in Drinking Water EPA 904.0</i>												
Radium-228	U	-0.0112	+/-0.203	0.455	1.00	pCi/L		DAJ1	09/29/05	1257	459716	2
<b>Rad Radium-226</b>												
<i>Radium-226 in Drinking Water EPA 903.1 (De-emanati</i>												
Radium-226	U	0.239	+/-0.215	0.319	1.00	pCi/L		JMB1	09/21/05	1135	461006	3

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	EPA 900.0	
2	EPA 904.0	
3	EPA 903.1	

Surrogate/Tracer recovery	Test	Recovery %	Acceptable Limits
Radium-228	Radium-228 in Drinking Water EPA 904.0	73	(25%-125%)

# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: October 4, 2005  
Page 1 of 2

Sierra Env. Monitoring, Inc  
1135 Financial Boulevard  
Reno, Nevada

Contact: Mr. John Kobza

Workorder: 144518

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch 459716											
QC1200928690 144383002 DUP											
Radium-228		U	0.090	U	0.018	pCi/L	0	(0%-20%)	DAJ1	09/29/05	12:57
			+/-0.185		+/-0.191						
QC1200928692 LCS	9.77				12.0	pCi/L	123	(75%-125%)		09/29/05	13:39
Radium-228					+/-1.13						
QC1200928689 MB				U	0.00212	pCi/L				09/29/05	12:57
Radium-228					+/-0.182						
QC1200928691 144383002 MS	27.6	U	0.090		34.4	pCi/L	125	(75%-125%)		09/29/05	13:39
Radium-228			+/-0.185		+/-3.05						
Batch 461279											
QC1200932371 144383001 DUP											
Alpha			6.64		9.57	pCi/L	36*	(0%-20%)	ATH2	09/20/05	13:59
			+/-2.74		+/-4.27						
Beta			8.26		10.3	pCi/L	22*	(0%-20%)			
			+/-2.91		+/-4.27						
QC1200932372 144519008 DUP											
Alpha		U	1.49		2.73	pCi/L	59*	(0%-20%)			
			+/-1.36		+/-1.46						
Beta			6.77		6.45	pCi/L	5	(0%-20%)			
			+/-1.94		+/-1.88						
QC1200932375 LCS	71.9				76.4	pCi/L	106	(75%-125%)		09/20/05	14:17
Alpha					+/-7.42						
Beta	208				223	pCi/L	107	(75%-125%)			
					+/-10.4						
QC1200932370 MB										09/20/05	13:59
Alpha				U	-0.398	pCi/L					
					+/-0.846						
Beta				U	-1.12	pCi/L					
					+/-1.28						
QC1200932373 144519008 MS	71.9	U	1.49		63.2	pCi/L	88	(75%-125%)		09/20/05	14:17
Alpha			+/-1.36		+/-9.14						
Beta	208		6.77		240	pCi/L	112	(75%-125%)			
			+/-1.94		+/-11.2						
QC1200932374 144519008 MSD	71.9	U	1.49		57.1	pCi/L	10	79			
Alpha			+/-1.36		+/-8.30						
Beta	208		6.77		199	pCi/L	19	92			
			+/-1.94		+/-10.2						
Rad Ra-226											

**GENERAL ENGINEERING LABORATORIES, LLC**  
2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

**QC Summary**

Workorder: 144518

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Ra-226											
Batch 461006											
QC1200931737 144627001 DUP											
Radium-226		U	0.168	U	0.196	pCi/L	15	(0%-20%)	JMB1	09/21/05	11:35
			+/-0.257		+/-0.263						
QC1200931739 LCS											
Radium-226	24.1				25.0	pCi/L	103	(75%-125%)		09/21/05	09:55
					+/-1.71						
QC1200931736 MB											
Radium-226		U		0.0543	pCi/L					09/21/05	11:35
				+/-0.168							
QC1200931738 144627001 MS											
Radium-226	24.1	U	0.168		26.9	pCi/L	112	(75%-125%)		09/21/05	09:55
			+/-0.257		+/-1.68						

Notes:

The Qualifiers in this report are defined as follows:

- \*\* Indicates the analyte is a surrogate compound.
- B Target analyte was detected in the sample as well as the associated blank.
- BD Results below the MDC or low tracer recovery.
- E Concentration of the target analyte exceeds the instrument calibration range.
- H Analytical holding time exceeded.
- J Indicates an estimated value.
- U Target analyte was analyzed for but not detected above the MDL or LOD.
- UI Uncertain identification for gamma spectroscopy.
- X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
- d The 2:1 depletion requirement was not met for this sample
- h Sample preparation or preservation holding time exceeded.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

# Sierra Environmental Monitoring, Inc.

1135 Financial Blvd. - Reno - Nevada - 89502



Phone: (775) 857-2400 Fax: (775) 857-2404 Email: sem@sem-analytical.com

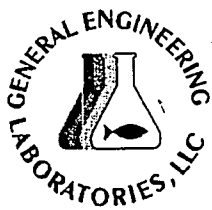
## General Engineering Sub-Contract Chain of Custody Report

PO #05-758

Sampled By: J. Hulett Compliance:

Date Sampled	Time Sampled	Sample Type	Sample Identification	Analyses Requested	Remarks	Turn Around Time
8/29/2005	3:00:00 PM	Drinking Water	144510% S200508-1685 - Longley Lane Well	Gross Alpha and Beta Radiological		Normal
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	Radium 226 - Radiological		Normal
8/29/2005	3:00:00 PM	Drinking Water	S200508-1685 - Longley Lane Well	Radium 228 - Radiological		Normal

Signature	Print Name	Company	Date	Time
Relinquished By: 	R. M. Miles	SEM	8.30.05	1530
Received By: 	J. Hulett	SEM	9.1.05	915
Relinquished By:				
Received By:				



# SAMPLE RECEIPT & REVIEW FORM

PM use only

Client: <u>Sierra Environmental</u>	SDG/ARCOC/Work Order: _____
Date Received: <u>9.1.05</u>	PM(A) Review (ensure non-conforming items are resolved prior to signing): <u>[Signature]</u>
Received By: <u>[Signature]</u>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Circle Applicable: seals broken damaged container leaking container other (describe)
2 Samples requiring cold preservation within (4 +/- 2 C)? Record preservation method.		<input checked="" type="checkbox"/>		Circle Coolant # ice bags blue ice dry ice none other (describe) <u>25.0°</u>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken damaged container leaking container other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH:
6 VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7 Are Encore containers present? (If yes, immediately deliver to VOA laboratory)			<input checked="" type="checkbox"/>	
8 Samples received within holding time?	<input checked="" type="checkbox"/>			Id's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected: <u>4 per id Longley</u> <u>2 per w/ well #5</u>
12 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Air Bill ,Tracking #'s, & Additional Comments				<u>12 873 907 12 4819 0947</u>
Suspected Hazard Information	Non-Regulated	Regulated	High Level	RSO RAD Receipt # _____ *If > x2 area background is observed on samples identified as "non-regulated/non-radioactive", contact the Radiation Safety group for further investigation.
A Radiological Classification?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Maximum Counts Observed*: <u>30 cpm</u>
B PCB Regulated?	<input checked="" type="checkbox"/>			Comments:
C Shipped as DOT Hazardous Material? If yes, contact Waste Manager or ESH Manager.	<input checked="" type="checkbox"/>			Hazard Class Shipped: UN#:
PM (or PMA) review of Hazard classification:				<u>[Signature]</u> Initials <u>89/1</u> Date:

70467



**SIERRA ENVIRONMENTAL MONITORING, INC.**

4125 FINANCIAL BOULEVARD - RENO - NEVADA - 89502

... 257 2400 FAX: (775) 857 - 2404 E-Mail [sem@sem-analytical.com](mailto:sem@sem-analytical.com)

PHONE: (775) 857-2400	FAX: (775) 857-2404	E-Mail: <a href="mailto:semin@semin-arizona.com">semin@semin-arizona.com</a>
		Purchase Order

Client Name: Alashoe County DWR

Address 11977 E. 2nd Ave.

City Alv State IL Zip 89502  
Report Attention: John Zlotoff

Sampled by: T. J. L.

Signature: [Signature]

Date	Time	Sample	Sample Identification	Preservative*
				See Key Below

Sampled	1-05	1	Longley Lane Well
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[illegible][illegible]

Signature			
Print Name			
Company			
Company			

Relinquished By: <u>                    </u>	11/11	10:10
11/11	11/11	10:10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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 Approved By:

[illegible]


Received By:	

Received by:			
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[illegible][illegible]

Received By Laboratory: CELL 8/21/03

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
Hazardous samples will be reported unless other arrangements are made.																																																																																																			

**Custody Seal Intact**  
Samples are discarded 30 days after results are reported unless otherwise arranged. The analytical results associated with this COC apply only to the samples as SEM COC

Yes	_____	Yes	_____
No	_____	No	_____
None	_____	None	_____

they are received by the laboratory. The liability of the laboratory is limited to the amount of the credit.

**Sample Temperature**

**Sample Temperature**

**Permits:** Net utility days or appropriate permits.

**\*+WFV:** Complete Type: 1=Drinking Water, 2=Surface Water, 3=Ground Water, 4=Waste Water, 5=Soli, 6=RCRA, 7=Other

\* KEY: sample type: 1=Drinking  
Preservative: 1=NaOH, 2=NaOH + ZnOAC, 3=HNO<sub>3</sub>, 4=H<sub>2</sub>SO<sub>4</sub>, 5=Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, 6=None, 7=Other  
Drinking type: 1=NaOH, 2=NaOH + ZnOAC, 3=HNO<sub>3</sub>, 4=H<sub>2</sub>SO<sub>4</sub>, 5=Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, 6=None, 7=Other

	Precipitation
Degrees C	

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# **APPENDIX 7**

**Final Cost-Invoice**

HUMBOLDT DRILLING & PUMP CO., INC.  
4975 WEST WINNEMUCCA BLVD  
WINNEMUCCA, NV 89445

Voice: 775-623-5259  
Fax: 775-623-0307

REVIEWED BY	<i>[Signature]</i>
DATE	10-7-05
VENDOR #	106240
ACCT. #	WR813120.61-781002
APPROVAL	<i>[Signature]</i>

**Invoice**  
Invoice Number: 083105-11  
Invoice Date: Aug 31, 2005  
Page: 1

Sold To:

WASHOE COUNTY DEPT. OF WATER RESOURCES  
4930 ENERGY WAY  
RENO, NV 89502

Job Description

LONGLEY LANE PRODUCTION WELL  
PWP-WA-2005-191  
HDP JOB # 345

Customer ID	Customer PO	Payment Terms	
WASHOE COUNTY	53X4553	Net 30 Days	
Sales Rep ID	Shipping Method	Ship Date	Due Date
	Hand Deliver		9/30/05

Quantity	Item	Description	Unit Price	Extension
1.00		ITEM 1, MOB AND DEMOB	24,200.00	24,200.00
18.00		ITEM 2, DRILL 38" BOREHOLE	100.00	1,800.00
18.00		ITEM 3, FURNISH AND INSTALL 30" CONDUCTOR	207.00	3,726.00
297.00		ITEM 4, DRILL 28" BOREHOLE	75.00	22,275.00
137.00		ITEM 5, FURNISH AND INSTALL 18.625" OD BLANK CASING WITH 2" SOUNDING TUBE	435.00	59,595.00
180.00		ITEM 7, FURNISH AND INSTALL STAINLESS STEEL SCREEN	329.17	59,250.60
36.00		ITEM 8, FURNISH AND INSTALL GRAVEL	550.00	19,800.00
23.00		ITEM 9, FURNISH AND INSTALL GROUT	272.00	6,256.00
132.50		ITEM 10, AIR LIFT DEVELOPMENT	300.00	39,750.00
130.00		ITEM 11, FURNISH AND INSTALL TEST PUMP EQUIPMENT	15.00	1,950.00
40.00		ITEM 12, PUMP DEVELOPMENT	200.00	8,000.00
56.50		ITEM 13, TEST PUMPING	200.00	11,300.00
1.00		ITEM 14, GYROSCOPIC SURVEY	2,500.00	2,500.00
1.00		ITEM 15, CAMERA SHOT	1,000.00	1,000.00
1.00		ITEM 16, WELL DISENFECTION	1,000.00	1,000.00

PLEASE REMIT PAYMENT TO:

HUMBOLDT DRILLING & PUMP CO  
DEPT 891  
P.O. BOX 4346  
HOUSTON, TX 77210-4346

Subtotal	262,402.60
Sales Tax	
Freight	
Total Invoice Amount	262,402.60
Payment/Credit Applied	
<b>TOTAL</b>	262,402.60

Check/Credit Memo No:

Overdue invoices are subject to late charges.

HUMBOLDT DRILLING & PUMP CO., INC.  
4975 WEST WINNEMUCCA BLVD  
WINNEMUCCA, NV 89445

# Credit Memo

Credit Memo Number:  
CM083105-10

Credit Date:  
Aug 31, 2005

Page:  
1

Voice: 775-623-5259  
Fax: 775-623-0307

Duplicate

Credit To:  
WASHOE COUNTY DEPT. OF WATER RESOURCES  
4930 ENERGY WAY  
RENO, NV 89502

Customer ID	Customer PO	Sales Rep ID
WASHOE COUNTY	55X4553	

Quantity	Item	Description	Unit Price	Extension
-137.00		CREDIT FOR USING 304SS INSTEAD OF 316SS AS BID		
		ITEM 5, STAINLESS STEEL BLANK CASING	65.28	-8,943.36
-180.00		ITEM 7, STAINLESS STEEL SCREEN	49.00	-8,820.00
		CREDIT FOR USING SRI 1/4 X 1/8 GRAVEL INSTEAD OF 4 X 8 COLORADO SILICA AS BID		
-36.00		ITEM 8, GRAVEL	250.00	-9,000.00

REVIEWED BY *W. D. Dwyer*

DATE *10-7-05*

VENDOR # *WR813120.61-281002*

ACCT. # *106240*

APPROVAL *Paula*

Subtotal -26,763.36  
Sales Tax  
Freight

Invoice No:

TOTAL -26,763.36

Overdue invoices are subject to late charges.

*Close after invoice & CM*