9/14/95 237.68'

DA

1506-00045

Mt Rose #5

Mt. Rose #5

Cinder Well

CONSTRUCTION AND TESTING SUMMARY

MRSA WELL #7

MAY, 1991

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS

UTILITY DIVISION

P.O. BOX 11130 RENO, NEVADA 89520

Cinder Well

Mt. Rose #5

CONSTRUCTION AND TESTING SUMMARY

MRSA WELL #7

MAY, 1991

Prepared by:
WASHOE COUNTY UTILITY DIVISION
1195-B CORPORATE BLVD.
P.O. BOX 11130
RENO, NEVADA 89520

July 02.

Dragan, Dan

To: Coffman, Jesse
Cc: Collins, John; Ruefer, Jeanne
Subject: Mt. Rose No.5

Jess,

I talked with Dan Trampe of Carson Pump and today the static water level in well No. 5 is about 260 feet. That is consistent with what we would expect to see. Dan also said he has been unsuccessful in two attempts to "fish out" the dropped pump. He was able to hook on to it and lift it about 50 feet but it dropped off again. He thinks he will have to come out of the hole and make a new tool.

One recommendation I have is to reset the pump about 40 feet deeper than it was (assuming we can get this pump out). Dan said it was set at 340 and we could go to 380 without entering the top of the screens. I think it would be a good idea to do this because Number 6 is now on line. There is likely to be some interference effects between wells so we should take advantage of the pump coming out of the hole anyway (hopefully!).

Thanks
Dan

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SUMMARY AND RECOMMENDATIONS

The Mt. Rose Service Area Well #7 (MRSA Well #7) is constructed of 12 inch diameter casing to a total depth of 800 feet. The screened interval consists of wire wrapped well screen from 400 to 780 feet. A 20 foot blank sump pipe runs from 780 to 800 feet. A static water level of 230.70 feet was measured after recovery and completion of well development.

A step drawdown test and constant discharge test were conducted on the MRSA Well #7. After completion of the final step at 700 gpm, the well had an efficiency of 36%. The constant discharge test ran for 45 continuous hours at 625 gpm. A drawdown of 12.62 feet with a pumping level of 244.22 feet was measured after 42.5 hours of testing.

The well had a specific capacity of 49.5 gpm/ft after 42.5 hours of pumping. No apparent boundaries were encountered during constant discharge testing. Water quality analyses show that well water constituents meet State of Nevada primary and secondary drinking water standards.

Desired design yield for the MRSA Well #7 is 700 gpm. We recommend a pump intake setting of 320 feet. A pumping level of 260 feet is projected after 48 hours of continuous pumping at 700 gpm.

257.70 p.c. 21 July 97

@ 840 gpm – had been Running 4 hrs

Static from 9/14/95 237.58

~20 ft drawdown @ 840 gpm

$$20\overline{)840} = 42 \text{ gpm/ft}$$

$$\begin{array}{r} 80 \\ \hline 40 \end{array}$$

INTRODUCTION

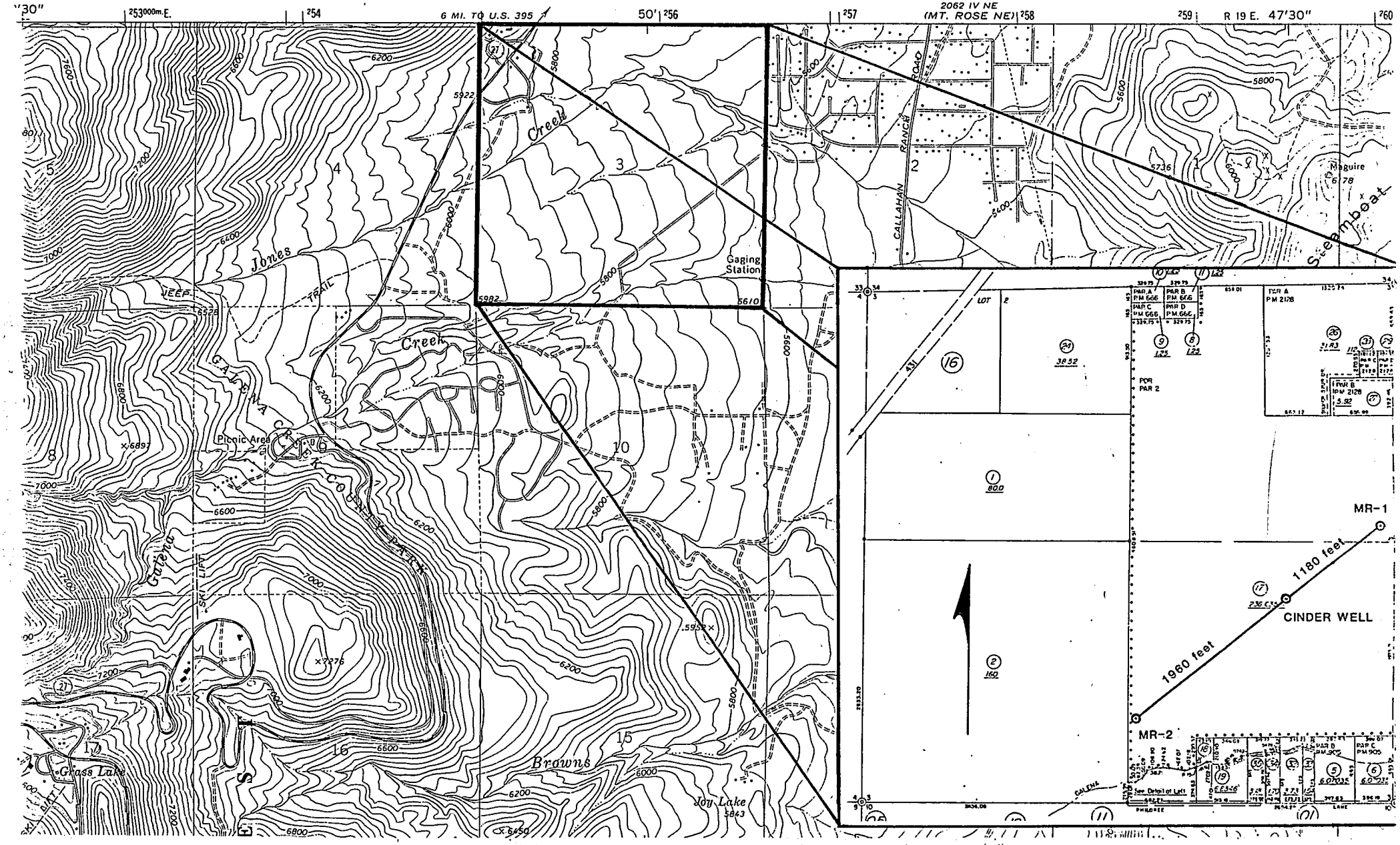
During the summer of 1990, Washoe County purchased Mount Rose Water Company. The water company supplies potable water to Galena Forest Estates and several homes in the Callahan Ranch area. Well yields within the existing system were diminishing, generating a need for additional supply.

Two exploratory holes were drilled to help locate an optimum site for a supply well. The exploratory holes were completed as observation wells MR-1 and MR-2. A municipal well was constructed near the Galena Forest Estates pipeline off of Mountain Meadow Road. The MRSA Well #7 is designed to augment existing sources in conjunction with the Replacement Well on Shawna Circle. The locations of the MRSA Well #7 and MR-1 and MR-2 observation wells are shown in Figure 1.

Design, construction supervision, data collection and analyses were conducted by Washoe County Utility Division hydrogeologists. Construction and testing of MRSA Well #7 was done by Lang Exploratory Drilling Company of Salt Lake City, Utah. The well was constructed during December of 1990. Pumping tests were conducted in January of 1991.

FIGURE 1
LOCATION MAP

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



BOREHOLE DRILLING AND LITHOLOGY
OBSERVATION WELLS

BOREHOLE DRILLING

The MR-1 observation well was drilled from 0 to 20 feet with a 12-1/4 inch Tri-Cone Roller carbide bit. An 8 inch nominal borehole was drilled from 20 to 639 feet using a 7-7/8 inch Tri-Cone Roller carbide bit. The well was drilled using the direct rotary mud method. Drilling operations were performed with a Driltech DH-1 top head drive rotary rig.

Observation well MR-2 was drilled from 0 to 20 feet with a 12-1/4 inch Tri-Cone Roller carbide bit. An 8 inch nominal size borehole was drilled from 20 to 238 feet using a 7-7/8 inch Tri-Cone Roller carbide bit. The well was drilled using the direct rotary mud method from 0 to 238 feet. Drilling from 238 to 611 feet was done using the dual tube flooded reverse method with a 6-1/4 inch Lang Flat Bottom bit. The change in drilling methods was required because of excessive loss of circulation.

The drilling fluid used while drilling MR-1, consisted of high yield bentonite clay. High yield bentonite clay drilling fluid was used at MR-2, with synthetic organic polymers being added during periods of lost circulation. An auxiliary mud tank and cyclone desander were used to keep the drilling fluid clean at both wells

LITHOLOGY

Formations at MR-1 consisted of poorly sorted silt, sand, gravel and clay stringers from 0 to 375 feet. A poorly sorted cemented sand and gravel formation is found from 375 to 590 feet. Blue/Black andesite was encountered from 590 to 608 feet. The 608 to 640 feet section of borehole returns to cemented sand and gravel. The geologist's log of MR-1 is shown in Table 1.

Formations at MR-2 consisted of poorly sorted volcanic and granitic sand, gravel and clay stringers from 0 to 190 feet. Volcanic and granitic sand, gravel and cobbles with clay stringers are found from 190 to 582 feet. Heavy loss of circulation was encountered from 218 to 240 feet. Hard, angular volcanic cuttings are found from 582 to 640 feet. The geologist's log of MR-2 is shown in Table 2.

Borehole geophysics at both observation wells included electric and temperature logs. Apparent resistivity was measured using short and long normal electrodes along with a single point resistance device. A spontaneous potential curve was included in the logging. Well logging of MR-1 was done by Geo-Hydo-Data of Tehachapi, California. Welenco of Bakersfield, California did the well logging of MR-2. Figure 2 is the electric log of MR-1. Figure 3 is the electric log of MR-2.

TABLE 1
GEOLOGIST'S LOG
MR-1 OBSERVATION WELL

DEPTH	SAMPLE DESCRIPTION
0 - 20 Ft.	Poorly Sorted Sand, Gravel, Cobbles and Boulders
20 - 75 Ft.	Sandy and Gravely Clay
75 - 77 Ft.	Clayey Silt
77 - 98 Ft.	Silt, Sand and Gravel with Clay Balls
98 - 105 Ft.	Gravel Lense
105 - 182 Ft.	Silt, Sand and Gravel with Clay Balls
182 - 185 Ft.	Cobble Zone
185 - 191 Ft.	Granitic rich Silty Clay
191 - 247 Ft.	Mixed Volcanic and Granitic Clayey Sand
247 - 257 Ft.	Reddish Clayey Silt
257 - 290 Ft.	Granitic Detritus altering to Clayey Silt
290 - 320 Ft.	Silty Clay mixed with Sands & Gravels
320 - 325 Ft.	Volcanic Gravel Lense
325 - 375 Ft.	Silty Clay mixed with Sands & Gravels
375 - 377 Ft.	Volcanic Boulder
377 - 590 Ft.	Cemented (?) Volcanic/Granitic Silt, Sand & Gravel
590 - 608 Ft.	Blue/Black Andesite
608 - 640 Ft.	Cemented (?) Vocanic rich Silt, Sand and Gravel

TABLE 2
GEOLOGIST'S LOG
MR-2 OBSERVATION WELL

DEPTH	SAMPLE DESCRIPTION
0 - 40 Ft.	Volcanic Sand, Gravel and Boulders
40 - 60 Ft.	Granitic Silt, Sand and Gravel with Clay matrix
60 - 110 Ft.	Volcanic Sand & Gravel with Silty CLay
110 - 120 Ft.	Purple/Red Volcanic Sand, Gravel and Cobbles
120 - 150 Ft.	Volcanic Sand and Gravel with minor Clay
150 - 190 Ft.	Well Sorted Granitic Sand
190 - 254 Ft.	Volcanic Sand and Gravel with Clay Lenses
	218 - 240 Ft. Heavy loss of circulation
254 - 327 Ft.	Granitic rich Sand & Gravel with Silty Clay
327 - 400 Ft.	Volcanic rich Sand & Gravel with Silty CLay
400 - 471 Ft.	Volcanic Cobbles with Clayey Sand
471 - 582 Ft.	Volcanic Sand, Gravel & Cobbles with Silty Clay
582 - 587 Ft.	Dark, Hard Volcanic Cuttings
587 - 610 Ft.	Volcanic Sand and Gravel with Silt
610 - 640 Ft.	Red, Hard, Angular Volcanics

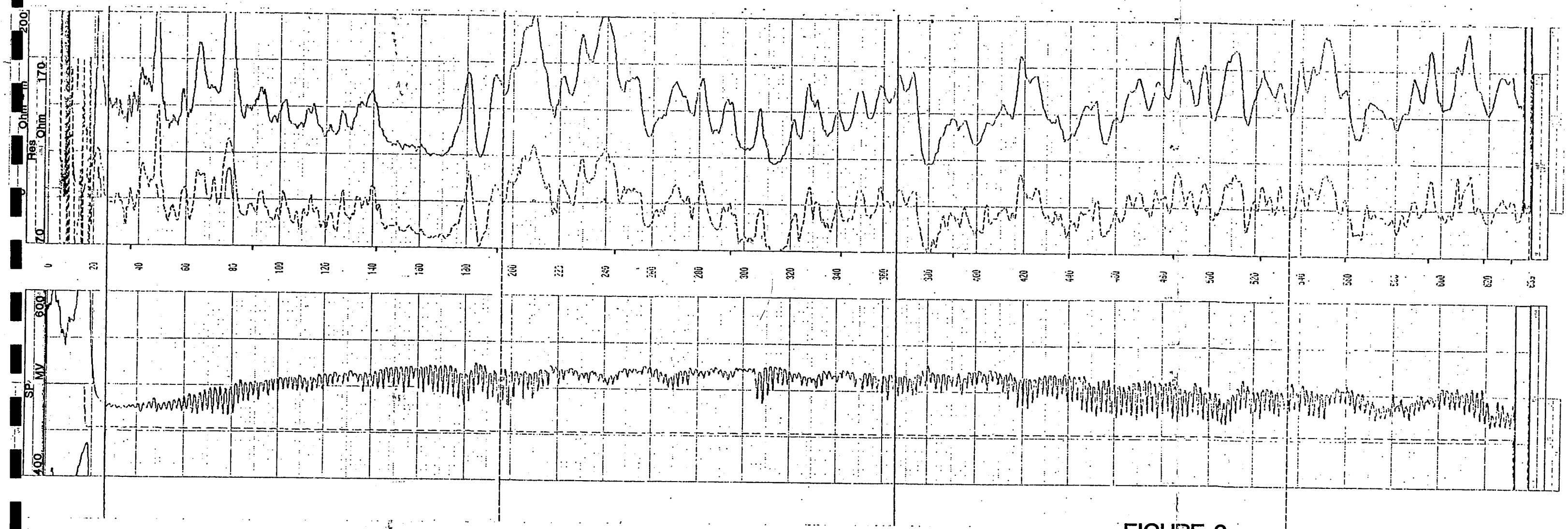


FIGURE 2

MR – 1 Observation Well

Electric Log

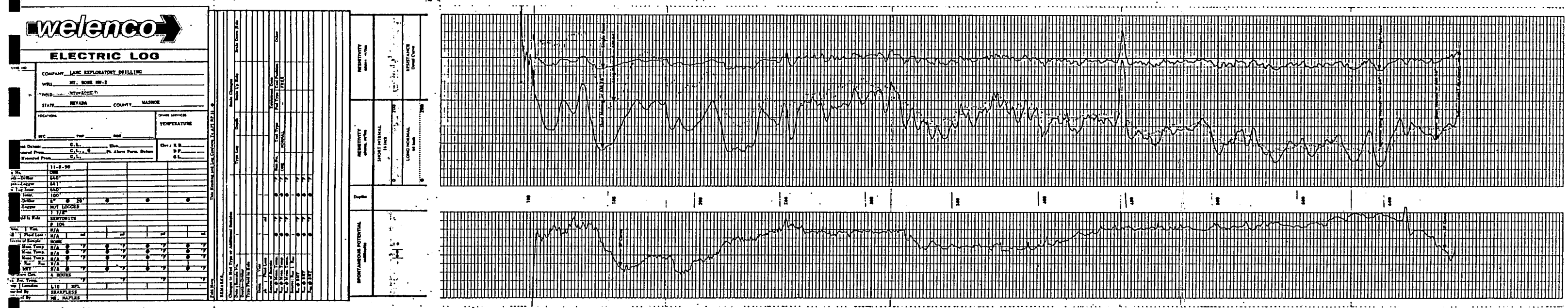


FIGURE 3

MR – 2 Observation Well

Electric Log

BOREHOLE DRILLING AND LITHOLOGY
MRSA WELL #7

BOREHOLE DRILLING

A 6-1/4 inch borehole was drilled from 0 to 800 feet by the dual tube flooded reverse drilling method. A 6-1/4 inch Lang Flat Bottom Tri-Cone carbide tooth bit was used during pilot hole drilling. Drilling was accomplished with a Driltech Dh-1 top head drive rotary rig.

Drilling fluid consisted of high yield bentonite clay with minor amounts of a synthetic organic polymer additive. An auxiliary mud tank equipped with a cyclone desander and sand shaker minimized re-circulation of drilling cuttings. Tank impellers prevented floculation of the bentonite in the drilling fluid.

LITHOLOGY

Borehole formations consisted of moderate to poorly sorted volcanic and granitic sand, gravel and cobbles from 0 to 565 feet. Vesiculated red and grey cinders were encountered from 565 to 800 feet. The poorly sorted alluvium contributed minimal amounts of water during drilling whereas the cinder zone contributed voluminous amounts. The geologist's log of MRSA Well #7 is shown in Table 3.

Borehole geophysics consisted of electric logging only. Apparent resistivity was measured using short normal and long normal electrodes along with a single point resistance device. A spontaneous potential curve was included in the electric logging. Borehole obstructions and sluffing prohibited complete logging of the pilot hole. A section of the borehole from 320 to 520 feet was successfully logged. The well logging was done by Welenco of Bakersfield, California. Figure 4 is the partial electric log of the pilot hole.

Sieve analysis was not conducted on any of the lithologic samples collected while drilling MRSA Well #7. A 1/4 inch by 1/8 inch size gravel was selected for the filter pack material. A screen slot size of 0.090 inch was selected to maintain a filter pack retention of 80 to 90%.

TABLE 3
GEOLOGIST'S LOG
MRSA WELL #7

DEPTH	SAMPLE DESCRIPTION
0 - 40 Ft.	Poorly Sorted Volcanic Detritus
40 - 125 Ft.	Mixed Volcanic / Granitic Sands and Gravels
125 - 140 Ft.	Poorly Sorted Volcanic Detritus
140 - 300 Ft.	Fine - Medium Grained Volcanic Sands with Clay
300 - 420 Ft.	Moderately Sorted, Fine - Coarse Grained, Mixed Volcanic and Granitic Sands
420 - 425 Ft.	Volcanic Boulder
425 - 452 Ft.	Granitic and Red Volcanic Sands and Gravels
452 - 460 Ft.	Iron Stained Volcanic and Granitic Cobbles
460 - 528 Ft.	Poorly Sorted Volcanic and Granitic Sand, Gravel and Cobbles
528 - 565 Ft.	Angular Cuttings. Volcanic Cobbles and Boulders
565 - 660 Ft.	Red Volcanic Cinders. Heavy H_2O Increase
660 - 754 Ft.	Black Volcanic Cinders
754 - 800 Ft.	Vesiculated Grey Volcanic Cinders, Increasingly Red with Depth

screen 400

screen 780

WELENCO

COMPANY LANG EXPLORATORY DRILLING
WELL MT. ROSE MW-3
FIELD MT. ROSE
COUNTY WASHOE STATE NEVADA COUNTRY USA
LOCATION

SECTION TOWNSHIP RANGE API NUM
Permanent Datum D.T. ; Elevation Elev.: K.B.
Log Measured From D.T. , 3.5' Above Perm. Datum D.F.
Drilling Meas From D.T. G.L.

Run No.	1	2	3
Date	11-19-98		
Depth - Driller	800'		
Depth - Logger	518'		
Btm Log Interval	517'		
Top Log Interval	320'		
Casing - Driller	7" @ 20'		
Casing - Logger	-		
Bitsize	6 1/8"		
Type Fluid in Hole	BENTONITE-EZ MUD		
Dens. / Visc.	UD N/A /	/	/
pH / Fluid Loss	N/A /	/	/
Source of Sample	PIT		
Rm @ Meas. Temp	13.3 @ 75 F	@	@
Rmf @ Meas. Temp	13.3 @ 75 F	@	@
Rmc @ Meas. Temp	N/A @	@	@
Source: Rmf / Rmc	MEAS / .	/	/
Rm @ BHT	N/A @	@	@
Max. Rec. Temp.	N/A		

REMARKS :

OTHER SERVICES: NONE
EQUIP/LOC: L84/BFL
RECORDED BY: D.L. CRAIG
WITNESSED BY: ED EVANS
TOOL TYPE: NORMALS(L84)
TIME SINCE CIRC: 2 HRS
LINE SPEED: 30 FPM
SP SCALE: 5 MV/DIV
NORMALS SCALE: 0-200 & 200-400 OHMM

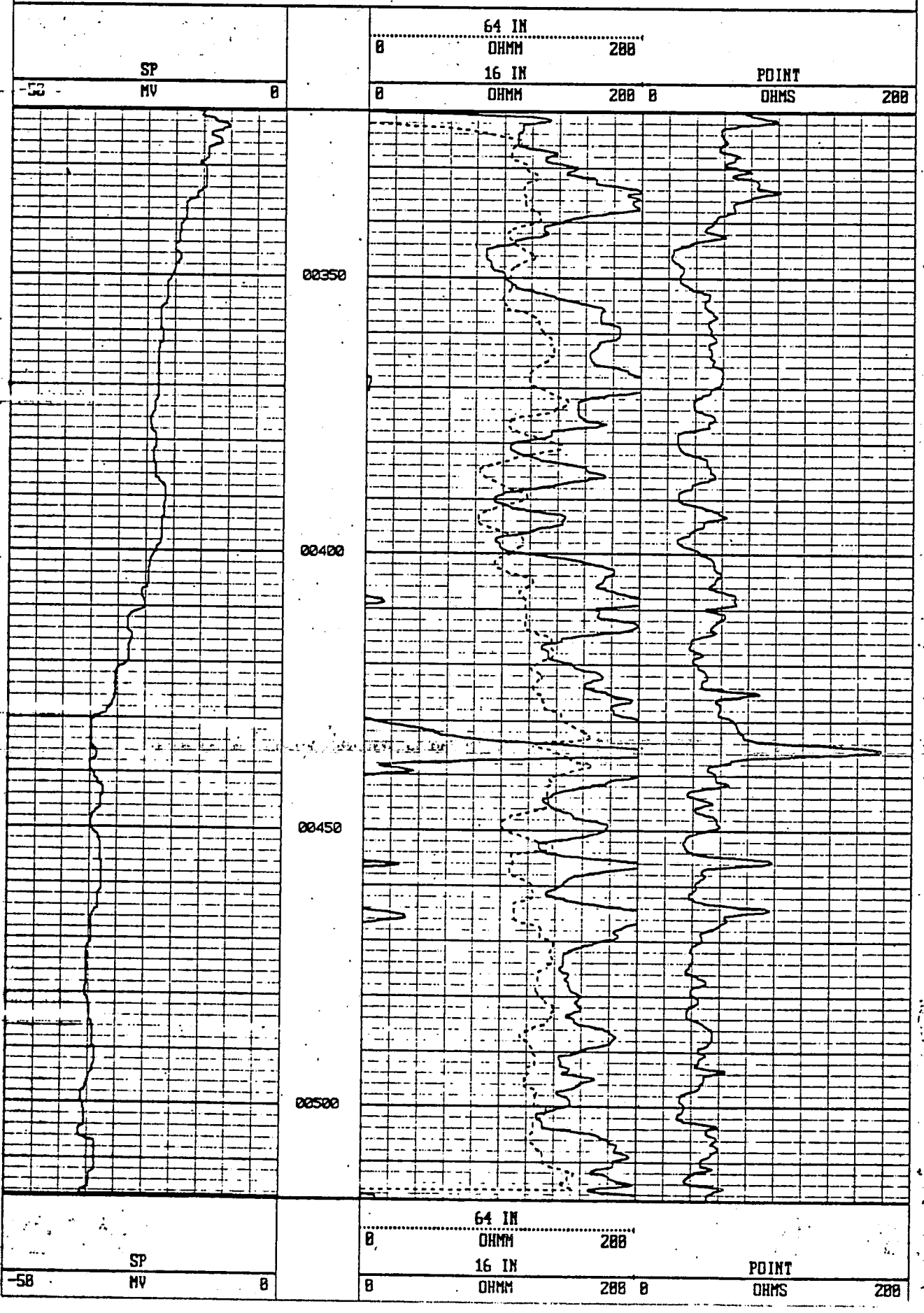
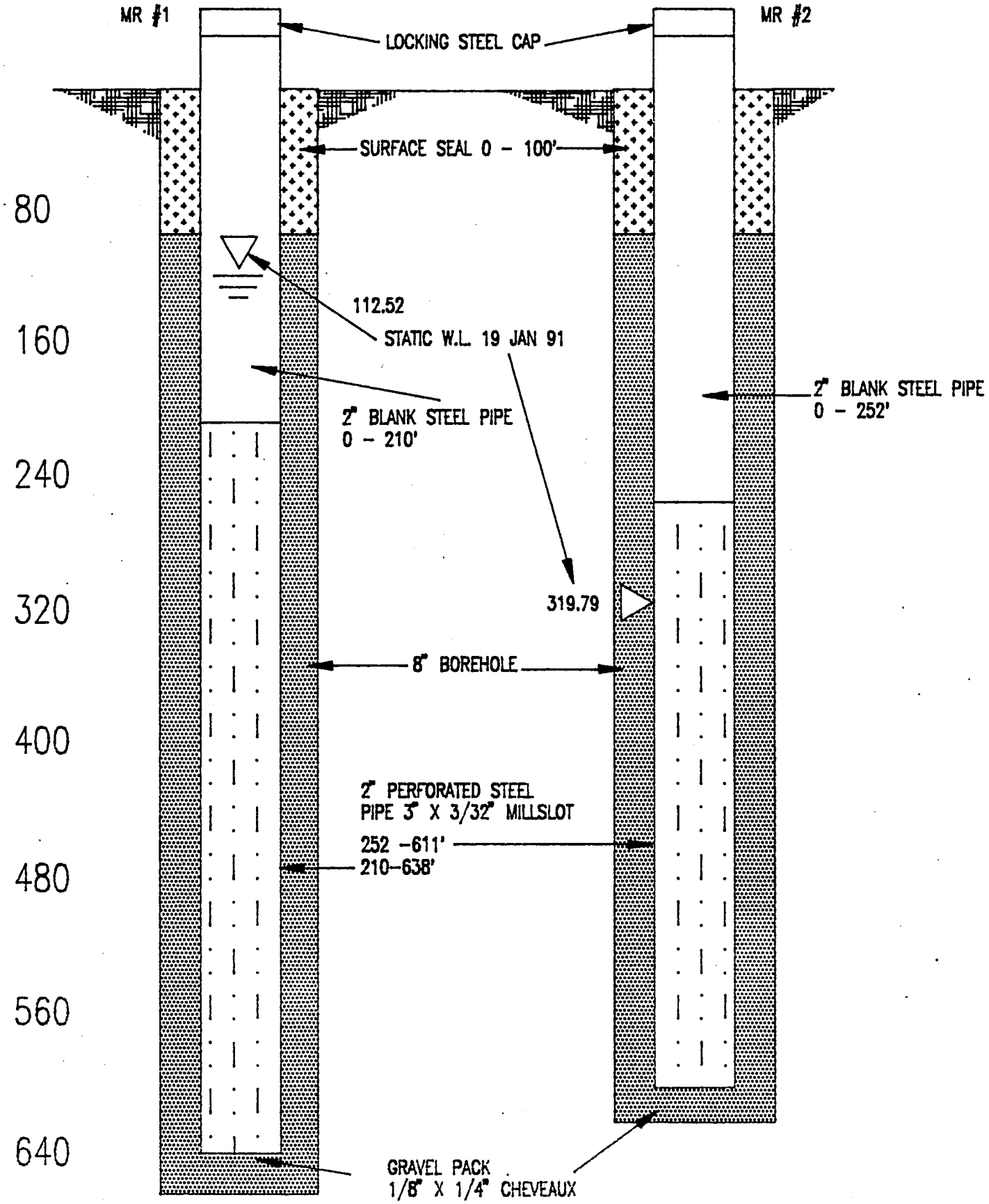


FIGURE 4
MRSA Well #7
Electric Log

FIGURE 5
FINALIZED CONSTRUCTION
MT.ROSE MONITORING WELLS
DEC 1991



WELL CONSTRUCTION
OBSERVATION WELLS

WELL CASING

At MR-1, a 20 foot length of 8 inch casing was grouted in place prior to drilling the hole. This was to help maintain rig stability and to prevent surface erosion around the borehole. 2 inch galvanized steel pipe was set in the borehole from 0 to 638 feet. Blank steel pipe was installed from 0 to 210 feet. Perforated pipe with 3/32" X 3" millslots was installed from 210 to 638 feet. All pipe lengths were connected using threaded couplings. A steel cap was screwed on the bottom of the pipe.

At MR-2, a 20 foot length of 8 inch casing was grouted in place prior to drilling to provide rig stability. 2 inch galvanized steel pipe was set in the borehole from 0 to 611 feet. Blank steel pipe was installed from 0 to 253 feet. Perforated pipe with 3/32" X 3" millslots was installed from 253 to 611 feet. All pipe lengths were connected using threaded couplings. A steel cap was screwed on the bottom of the pipe.

A finalized construction diagram for both observation wells is shown in Figure 5.

GRAVEL PACK

The filter pack material used in MR-1 and MR-2 is a siliceous pea gravel from Paiute Pit in Fernley, Nevada. An auxiliary mixer, pumping into a tremie pipe set 20 feet above the borehole bottom, was used to place the filter pack in the annular space. Clean water was mixed and pumped with the gravel to prevent bridging.

SANITARY SURFACE SEAL

A neat cement sanitary surface seal was installed to a depth of 100 feet below ground level in both observation wells. The neat cement was mixed on site in a mud mixer and pumped through a tremie pipe placed 10 feet above the top of the filter pack. Calcium Chloride was added to the grout to shorten the time required for hardening.

WELL DEVELOPMENT

Both observation wells were developed by air lifting until the discharge was clean. Air lift development at each well was accomplished by slowly unloading drilling fluid a section of the well at a time, starting from the top. Each observation well was developed for 10 hours.

WELL CONSTRUCTION
MRSA WELL #7

BOREHOLE REAMING AND CASING INSTALLATION

A 10 foot section of 41 inch surface casing was grouted in place for rig stability prior to borehole reaming. The 6-1/4 inch pilot hole was enlarged from 0 to 100 feet using a 32 inch Lang Flat Bottom bit attached to a 20 foot stabilizer. A 22 inch diameter Lang Flat Bottom bit was used to ream the hole from 100 to 800 feet. The well was drilled by the dual tube flooded reverse method. Drilling operations were performed on a Lang modified top head rotary rig. The drilling fluid was bentonite clay which was kept clean using an auxiliary mud tank and cyclone desander.

A 24 inch diameter conductor casing was installed from +1 to 100 feet. The conductor casing was grouted in place using neat cement. The grout was mixed on site in a mud mixer and pumped through a tremie pipe placed at the bottom of the annular space. An initial tank of cement was pumped and allowed to gel for 1 hour. The annulus was grouted in a series of lifts with each lift being allowed to strengthen prior to addition of the next.

12 inch low carbon steel production casing was installed from +2 to 800 feet. Blank steel casing was installed from +2 to 400 feet. 90 slot (0.090 inch) wire wrap well screen was installed from 400 to 780 feet. A 20 foot blank steel sump pipe with a bottom plate was installed from 780 to 800 feet. Casing and screen joints were fully butt welded. Centralizers were welded to the production casing at: 80, 140, 240, 320, 400, 480, 560, 640, 720 and 800 feet. A 1 inch diameter steel sounding tube was installed in the gravel pack to a depth of 398 feet. A finalized construction diagram is shown in Figure 6.

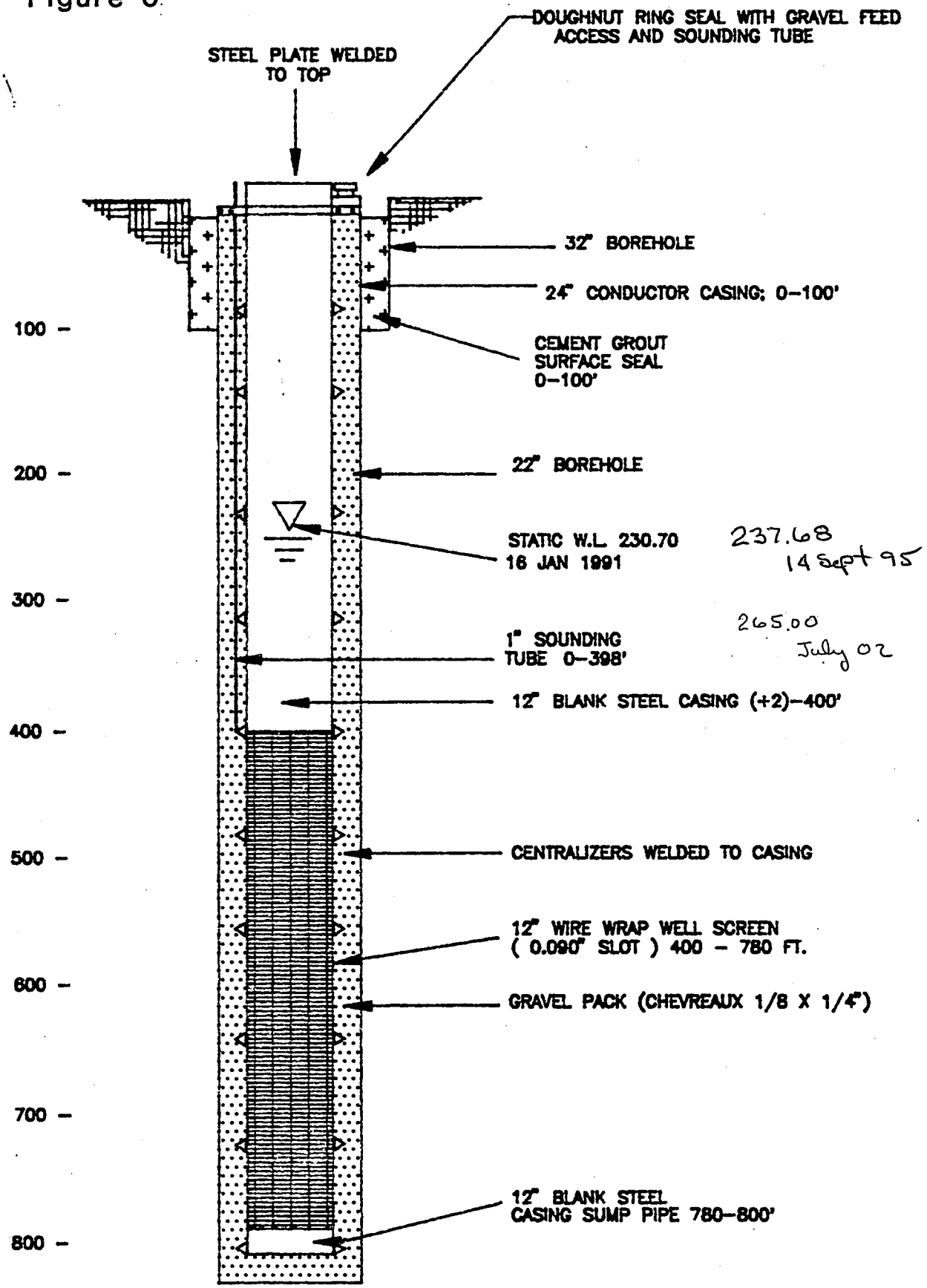
GRAVEL PACK

The filter pack material is a clean, siliceous gravel provided by Chevreaux Brothers of Auburn, California. The filter pack was emplaced using a reverse circulation suction method. Dual tube drill column was set 20 feet above the production casing bottom. Clean water was added from the top into the annular space and circulated similar to reverse circulation drilling. The filter pack was added to the annulus and drawn down and distributed around the casing by suction. To ensure casing alignment, the production casing was held in suspension above the borehole bottom.

WELL DEVELOPMENT

The well was developed by air lifting after placement of the gravel pack. 20 foot sections were agitated by slowly rotating a jetting tool up and down the interval. Periodically, the air supply was shut off to surge the well. Air lift development lasted for 55 hours. After installation of the test pump, the well was developed by pumping for 14 hours. Surging intervals of pumping for 30 minutes and off for 5 minutes were used.

MRSA WELL #7
DEC. 1990
Figure 6



TEST PUMPING

PUMPING TEST EQUIPMENT

The pump test was conducted using a line shaft turbine pump consisting of a direct drive motor and 28 stage bowl assembly. Power was supplied by a portable diesel engine. The pump bowls were set at 380 feet using a 6 inch diameter pump column.

The discharge rate was measured using a 6 inch horizontal discharge pipe with a 4-1/2 inch orifice plate. A manometer and vertical scale were used to read head in inches. The head measurements were used with a rating table to find discharge rates in gallons per minute. Flow rate was held constant during testing by a gate valve installed at the discharge head. A temporary ditch connected to a dry creek drainage was used to disperse well discharge during pumping.

Water levels in the test well were measured in a 1 inch PVC sounding tube to the nearest 1/100th foot. The sounding tube was set from the top of the well casing to 10 feet above the pump bowls. An electric sounder was used to measure water levels in the pumping and observation wells. A Rossum Sand Tester was installed behind the gate valve.

PUMPING TESTS PERFORMED

The pump tests conducted and corresponding test periods for each are shown in Table 4.

Table 4
PUMP TESTS PERFORMED

TEST	DATE	TEST START (hrs)	TEST END (hrs)	DURATION (min)	DISCHARGE (gpm)
Step Drawdown	1/16/91	0825	1505	400	450 to 700
Constant Discharge	1/17/91	0830	0530	2700	625
Recovery	1/19/91	0530	0745	3015	0

STEP DRAWDOWN TEST

The step drawdown data were analyzed according to the method of Jacob (1947). Well efficiencies were calculated using the equations:

$$a.\quad Sw = BQ + CQ^2$$

$$b.\quad \text{Efficiency} = 1/1+(C/B)Q$$

Table 5 summarizes the step drawdown data analysis:

Table 5
STEP DRAWDOWN ANALYSIS

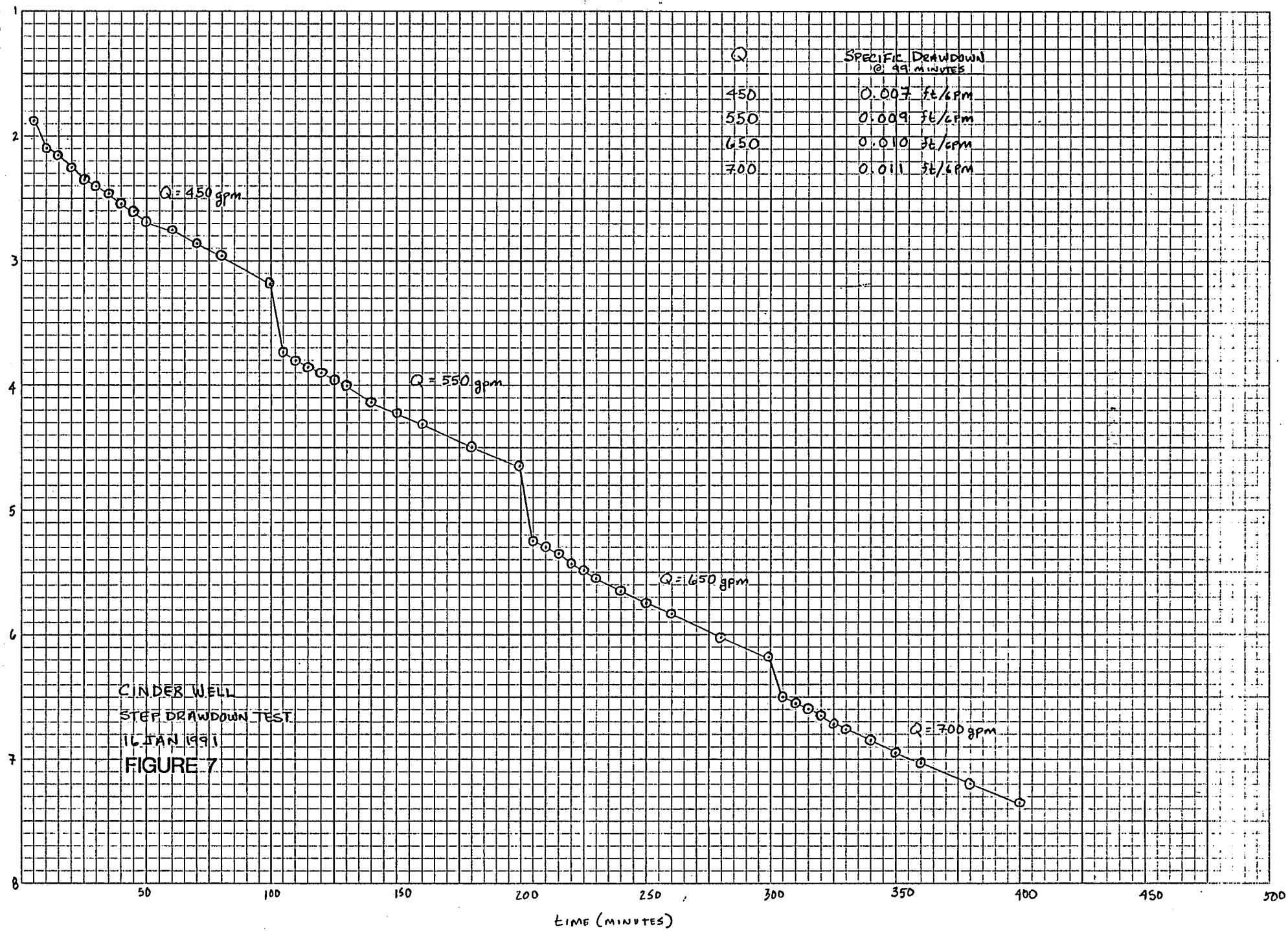
STEP (n)	WELL YIELD: Q (gpm)	DURATION (min)	DRAWDOWN: s (feet)	Q/s (gpm/ft)	EFFICIENCY (%)
1	450	100	3.20	140.63	46
2	550	100	4.66	118.03	41
3	650	100	6.18	105.18	37
4	700	100	7.35	95.24	36

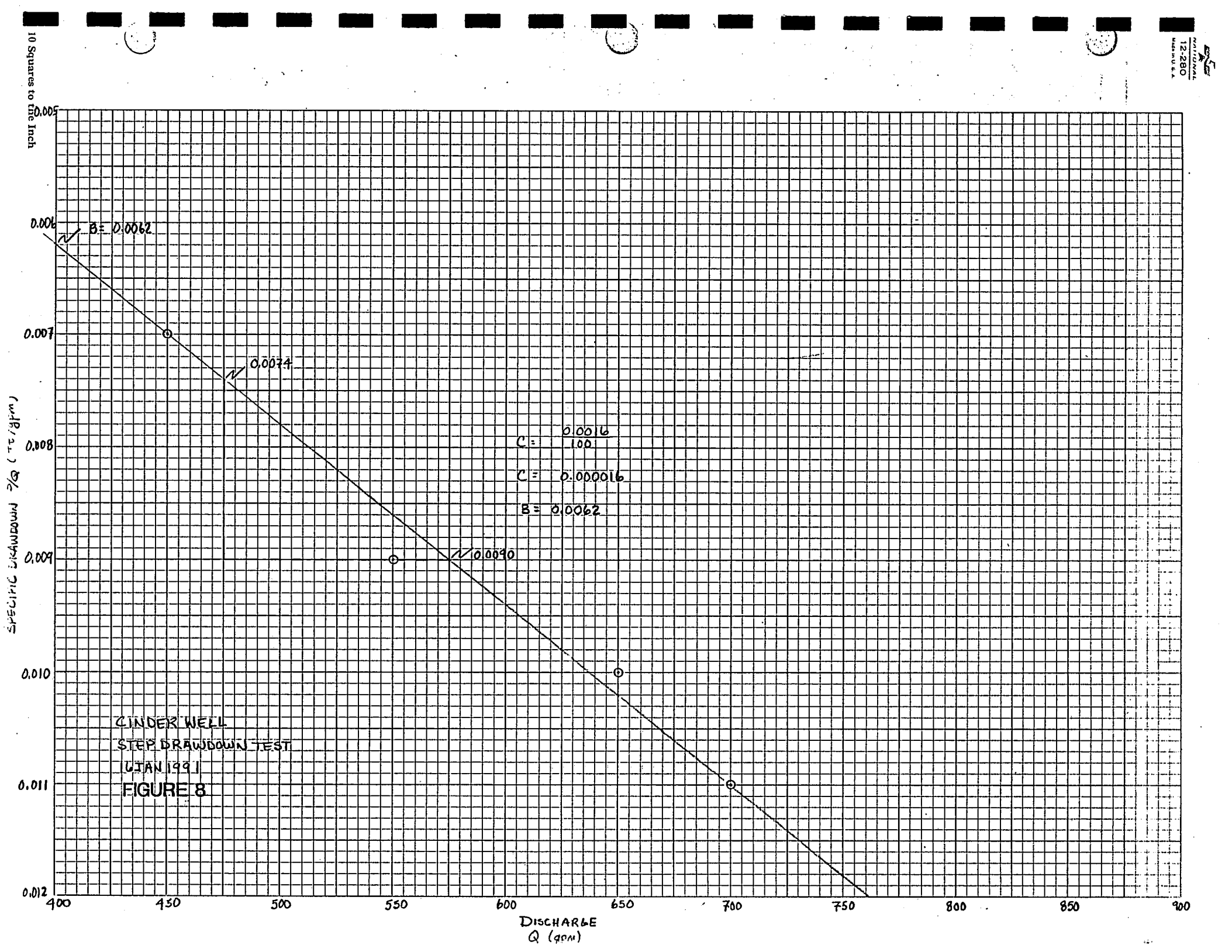
A drawdown versus time plot of the step drawdown test is shown in Figure 7. Graphic solutions for well efficiency are shown in Figures 8 and 9.

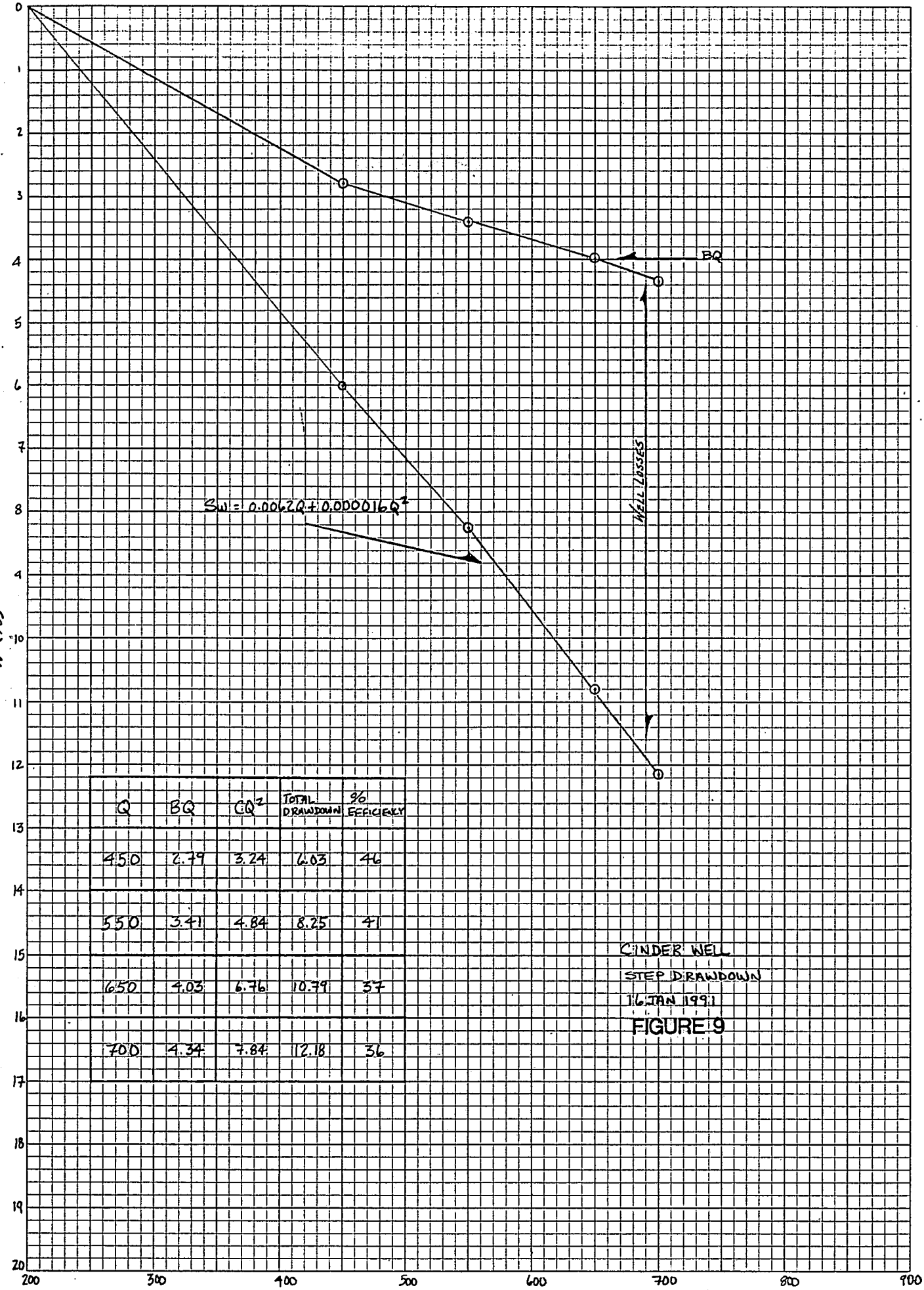
CONSTANT DISCHARGE TEST

The constant discharge test ran for 45 hours of a scheduled 72 hour period at 625 gallons per minute. The test was terminated due to equipment failure. Recovery measurements were started within 1 hour of well shut off. Data was collected from observation wells MR-1 and MR-2. MR-1 is located 1180 feet downslope from the test well, while MR-2 is located 1960 feet upslope. The constant discharge and recovery data were analyzed using the Cooper-Jacob modification of the Theis equation.

After 42.5 hours of pumping, drawdown was 12.62 feet with a pumping level of 244.22 feet. Minimal and fluctuating drawdown occurred in the two observation wells during pumping and recovery. Their erratic response made it difficult to obtain reliable values for observation well transmissivity and storativity.


10 Squares to the Inch
NATIONAL 12-280
Q
SPECIFIC DRAWDOWN @ 99 MINUTES
450 0.007 ft/GPM
550 0.009 ft/GPM
650 0.010 ft/GPM
700 0.011 ft/GPM
Q = 450 gpm
Q = 550 gpm
Q = 650 gpm
Q = 700 gpm
CINDER WELL
STEP DRAWDOWN TEST
16 JAN 1991
FIGURE 7
1
2
3
4
5
6
7
8
50
100
150
200
250
300
350
400
450
500
TIME (MINUTES)


10 Squares to the Inch
0.005
0.006
0.007
0.008
0.009
0.010
0.011
0.012
B = 0.0062
0.0074
0.0090
C = 0.0016 / 100
C = 0.000016
B = 0.0062
CINDER WELL
STEP DRAWDOWN TEST
(JAN 1991)
FIGURE 8
400
450
500
550
600
650
700
750
800
850
900
DISCHARGE
Q (gpm)
SPECIFIC DRAWDOWN s/Q (ft/gpm)



Q	BQ	CQ^2	TOTAL DRAWDOWN	% EFFICIENCY
450	2.79	3.24	6.03	46
550	3.41	4.84	8.25	41
650	4.03	6.76	10.79	37
700	4.34	7.84	12.18	36

CINDER WELL
STEP DRAWDOWN
16 JAN 1991

FIGURE 9

10 Squares to the Inch

A Rossum Sand Tester was used to quantify sand production. The well produced less than 1.0 part per million of sand during the first hour of pumping. Sand production did not increase over the remainder of the test.

Aquifer transmissivity and storativity were calculated using pumping and recovery data from the test well. A transmissivity of 22,150 gpd/ft and storativity of 0.0005 were obtained. Interpretation of borehole cuttings in conjunction with the coefficient of storage and low well efficiency, indicate that the vesiculated cinder aquifer is partially or completely confined.

Time versus drawdown graphs for the test and observation wells are shown in Figures 10, 11 and 12. Residual drawdown versus t/t' graphs for the test well and observation wells are shown in Figures 13, 14 and 15.

RECOMMENDATION

The desired design pumping rate for the MRSA Well #7 is 700 gpm. We recommend that the pump intake be set at 320 feet below top of casing. The well would have a predicted pumping level of 260 feet after 48 hours of continuous pumping at 700 gpm.

Δs: 7.5 FT./CYCLE
Q: 625 GPM
T: 264 Q/Δs
T: 22,000 GPD/FT
TIME (MINUTES)
DRAWDOWN (FEET)
FIGURE 10
MRSA WELL #7
CONSTANT DISCHARGE TEST
9 - 17 - 19 JAN 1991
SEMI-LOGARITHMIC, 5 CYCLES X 10 TO THE INCH
5TH LINES ACCENTED

FIGURE 11
MR – 1 OBSERVATION WELL
MRSA-WELL #7
CONSTANT DISCHARGE TEST
17 – 19 JAN 1991
TIME (MINUTES)
DRAWDOWN (FEET)
10000
1000
100
10
1
-0.40
-0.30
-0.20
-0.10
0
0.10
0.20
0.30
SEMI-LOGARITHMIC, 5 CYCLES X 10 TO THE INCH
5TH LINES ACCENTED

FIGURE 12
MR - 2 OBSERVATION WELL
MRSA WELL #7 CONSTANT DISCHARGE TEST
17 - 19 JAN 1991

SEMI-LOGARITHMIC. 5 CYCLES X 10 TO THE INCH
5TH LINES ACCENTED

FIGURE 14
MR - 1 OBSERVATION WELL
MRSA WELL #7
CONSTANT Q RECOVERY TEST
19 - 21 JAN 1991
RESIDUAL DRAWDOWN (FEET)
t / t' (MINUTES)
0.0
0.10
0.20
0.30
10000
1000
100
10
1
SEMI-LOGARITHMIC, 5 CYCLES X 10 TO THE INCH
5TH LINES ACCENTED

SEMI-LOGARITHMIC, 5 CYCLES X 10 TO THE INCH
5TH LINES ACCENTED

WATER QUALITY

SAMPLING TECHNIQUE

The test well was turned on and pumped for 45 minutes after completion of the recovery test. A sample was then collected for water quality analyses. A one gallon sample was collected at the orifice plate opening on the discharge pipe in a clean plastic container. Two separate aliquots were taken from the initial sample and preserved in nitric and sulfuric acid. The samples were kept refrigerated until delivery for testing at the Nevada State Health Laboratory.

RESULTS

The water quality analyses show that the MRSA Well #7 will provide potable water that meets State of Nevada primary and secondary drinking water standards. Total dissolved solids in the well were measured at 146 parts per million (ppm). Well water hardness is 80 ppm and can be considered moderately hard.

A Ryznar Stability Index value of 9.1 was calculated using the following formula:

$$I = S - C - pH$$

The factors S and C are derived graphically using total dissolved solids, methyl orange alkalinity and calcium ion concentrations. The median value in the index is 7. Ryznar Stability Index values over 7 are considered corrosive with values under 7 indicating incrustation. The MRSA Well #7 value of 9.1 in conjunction with a pH of 7.45, indicate the well water is slightly corrosive. The water quality analyses report for the test well is found in Table 6. Tables 7 and 8 contain the water quality analyses reports for MR-1and MR-2 observation wells.

(PLEASE PRINT OR TYPE)

NEVADA STATE HEALTH LABORATORY
NEVADA DIVISION OF HEALTH
1660 N. Virginia Street
Reno, Nevada 89503
(702) 789-0335

Table 6

090990

RECEIVED MAR 1991 WASHOE COUNTY UTILITY DIVISION

WATER CHEMISTRY ANALYSIS

Attn: Fees may apply to some types of samples.

All of the information below must be filled in or the analysis will not be performed.

TYPE OF ANALYSIS:

☐ Check here for ROUTINE DOMESTIC ANALYSIS.
Circle the constituents needed for PARTIAL ANALYSIS.

PWS

State NV County WASHOE
Township 17 Range 19 Section
General Location WEST OF CALLAHAN RANCH, EAST OF GALENA FOREST EST
Source Address "CINDER" WELL

SAMPLING INSTRUCTIONS:

The sample submitted must be representative of the source. Spring and surface water samples should be as free of dirt and debris as possible. Wells should be pumped thoroughly before sampling, changing the water in the casing at least three times. Product water from filters should be sampled after running for about ten (10) minutes.

Sampled by TERRI SVETICH/ED EVANS Date 1/21/91
Owner WASHOE CO. UTILITY DIV Phone 785-4743
Address POBOX ~~9857~~ 11130
City RENO State NV 89520

REASON FOR ANALYSIS:

☐ Loan
☐ Personal health reasons
☐ Purchase of the property
☐ Rental or sale of property
☐ Subdivision approval
☑ Other SDWA

USE OF WATER:

☑ Domestic drinking water
☐ Geothermal
☐ Industrial or mining
☐ Irrigation
☐ Other
Initials

REPORT TO:

TERRI SVETICH
Name SAME AS ABOVE W.C. UTILITY DIVISION
Address POBOX ~~9857~~ 11130
City RENO
State NV Zip 89520

SOURCE OF WATER:

Filter ☐ Yes ☑ No
Public ☑ Yes ☐ No
Spring
Well ✓ Depth 800 ft.
Hot Cold
IN USE ☐ Yes ☑ No

Type
Name
Surface
Casing diameter 12" in.
Casing depth 800 ft.

The results below are representative only of the sample submitted to this laboratory.

FOR LABORATORY USE ONLY

0.0789 171 0.71 30.5 5.3 0.0 -528 90990

Constituent	ppm	Constituent	ppm	Constituent	ppm	Constituent	S.U.	PRINT OTHER DESIRED CONSTITUENTS BELOW: Constituent	ppm
T.D.S. @ 103° C.	146	Chloride	0	Iron	0.05	Color	3	Cd	<0.001
Hardness	80	Nitrate	2.5	Manganese	0.01	Turbidity	0.2	Cr	<0.005
Calcium	17	Alkalinity	106	Copper	0.00	pH	7.45	Ag	<0.005
Magnesium	9	Bicarbonate	129	Zinc	0.00	EC	206	Hg	<0.0005
Sodium	9	Carbonate	0	Barium	0.07	RECEIVED		Pb	<0.005
Potassium	4	Fluoride	0.06	Boron	0.0	MAR 05 1991		Se	<0.001
Sulfate	0	Arsenic	<.003	Silica	65				
MBAS	<0.1			GROSS ALPHA	<3pCi/l				
				GROSS BETA	<3pCi/l	2-22-91			

Chemical quality meets the State of Nevada Drinking Water Standards

Fee B.11
Collected by
PWS I.D.
SDWA—Pri. ✓ Sec.
1st 2nd 3rd
Date Rec'd 9/29/90 Init.

ppm = parts per million, milligrams per liter
S.U. = Standard Units

Remarks PUMP TEST OF THE "CINDER" WELL FUTURE SUPPLY TO THE MT ROSE WATER SERVICE

T.C. 2.4.91 Eng 2-14-91

WELL HAD BEEN PUMPING FOR NEARLY 48 HRS WHEN THE PUMP WENT DOWN; SAMPLE WAS TAKEN AFTER WELL HAD RECOVERED & PUMP WAS RESTARTED

O-1561 (Rev. 11-85)

Sierra Environmental Monitoring Inc.
47 Glen Carran Circle
Sparks, NV 89431
(702)356-3868

Laboratory Analysis Report

Date : 11/29/90
Invoice #: 3811
Client # : WAS-314 PO#: 111510
Name : Washoe County Utility Div.
Address : P.O. Box 11130
City : Reno State: NV Zip: 89520
Taken by : W.C.U.D. - DAN DRAGON

Sample	Collection Date	Time	ALKALINITY MG/L CAC03	COLOR C.U.	pH S.U.	TOTAL DISSOL. MG/L	NITRATE-N MG/L	ARSENIC MG/L	BARIUM MG/L
TEST HOLE #1	11/02/90	:	82	> 20	8.2	168	2.4 NO3	0.002	<0.3

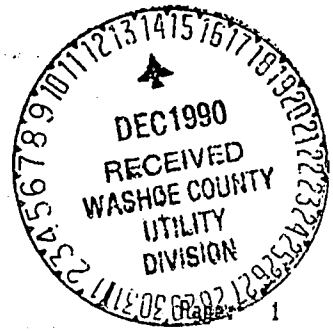
Sample	Collection Date	Time	BORON MG/L	CALCIUM MG/L	COPPER MG/L	IRON MG/L	MAGNESIUM MG/L	MANGANESE MG/L	POTASSIUM MG/L
TEST HOLE #1	11/02/90	:	< 0.1	15.9	<0.02	0.44	5.2	0.05	5.9

Sample	Collection Date	Time	SODIUM MG/L	ZINC MG/L	CHLORIDE MG/L	FLUORIDE MG/L	SILICA MG/L	SULFATE MG/L	MBAS MG/L
TEST HOLE #1	11/02/90	:	14.5	0.01	17	0.1	18	9	< 0.05

Table 7
MR-1 Observation Well Water Quality Report

Approved By: _____

Sierra Environmental Monitoring Inc.
47 Glen Carran Circle
Sparks, NV 89431
(702)356-3868



Laboratory Analysis Report

Page: 1

Date : 12/13/90
Invoice #: 3878
Client # : WAS-314 PO#: 111510
Name : Washoe County Utility Div.
Address : P.O. Box 11130
City : Reno State: NV Zip: 89520
Taken by : Washoe Cty Utility-D. Dragon

Sample	Collection Date	Time	ALKALINITY MG/L CAC03	COLOR C.U.	pH S.U.	TOTAL DISSOL. MG/L	NITRATE-N MG/L	ARSENIC MG/L	BARIUM MG/L
MR #2	11/26/90	:	120	10	8.2	260	1.8 NO3	0.002	<0.3

Sample	Collection Date	Time	BORON MG/L	CALCIUM MG/L	COPPER MG/L	IRON MG/L	MAGNESIUM MG/L	MANGANESE MG/L	POTASSIUM MG/L
MR #2	11/26/90	:	< 0.1	18.4	<0.02	2.38	6.2	0.03	5.9

Sample	Collection Date	Time	SODIUM MG/L	ZINC MG/L	CHLORIDE MG/L	FLUORIDE MG/L	SILICA MG/L	SULFATE MG/L	MBAS MG/L
MR #2	11/26/90	:	16.6	0.01	20	0.1	82	<3	< 0.05

Table 8
MR-2 Observation Well
Water Quality Analysis

Approved By: _____

APPENDIX I
WELL DRILLER'S REPORT
SUBMITTED TO THE STATE OF NEVADA,
DEPARTMENT OF WATER RESOURCES

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLER'S REPORT

Please complete this form in its entirety

RECEIVED JAN 1991 WASHOE COUNTY UTILITY DIVISION

OFFICE USE ONLY
Log No.
Permit No.
Basin

PRINT OR TYPE ONLY

NOTICE OF INTENT NO. 16288

1. OWNER WASHOE COUNTY PUBLIC WORKS
MAILING ADDRESS PO BOX 11130
RENO, NV. 89520
ADDRESS AT WELL LOCATION MIN. MEADOW RD.

2. LOCATION NE ¼ SE ¼ Sec. 3 T. 17 N/XX R. 19 E. WASHOE County
PERMIT NO. WAIVER # M/O-334 (Issued by Water Resources) | 47-040-17 (Parcel No.) | N/A (Subdivision Name)

3. TYPE OF WORK
New Well XX Recondition ☐
Deepen ☐ Other ☐

4. PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐
Municipal XX Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary XX
Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
MIXED DEIRTUS		0	40	40
GRANITIC VOLCANIC SAND & GRAVEL		40	125	85
FINE TO MED SAND W/SILT		125	300	175
FINE TO COARSE SAND, VOLCANIC & GRANITIC	X	300	420	120
VOLCANIC BOULDER		420	425	5
VOLCANIC SANDS & GRAVELS	X	425	452	27
IRON STAINED COBBLES	XX	452	460	8
MIXED VOLCANIC SANDS & GRAVELS, COBBLES	X	460	528	68
VOLCANIC COBBLES & BOULDERS	X	528	565	37
RED CINDER	XX	565	650	85
BLACK CINDERS	XX	650	750	100
VOLCANICS IN RED CINDER	XX	750	802	52

Date started NOVEMBER 28, 19 90
Date completed DECEMBER 11, 19 90

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours

8. WELL CONSTRUCTION
Diameter 32 inches Total depth 802 feet
22 inches
inches
Casing record 24" 95 IB/ET .375"
Weight per foot 12" 50 IB/FT Thickness .375"

Diameter	From	To
24 inches	+2 feet	100 feet
12 inches	+2 feet	400 feet
12 inches	780 feet	802 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes XX No ☐ Type NEAT CEMENT
Depth of seal 100 feet
Gravel packed: Yes XX No ☐
Gravel packed from 0 feet to 800 feet

Perforations:
Type perforation SCREEN
Size perforation .090
From 400 feet to 780 feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet

9. WATER LEVEL
Static water level 244 feet below land surface
Flow N/A G.P.M. N/A P.S.I.
Water temperature COOL °F Quality

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name LANG EXPLORATORY DRILLING (Contractor)
Address 2286 W. 1500 S., S.L.C., UT. 84104 (Contractor)
Nevada contractor's license number issued by the State Contractor's Board 0021976
Nevada contractor's driller's number issued by the Division of Water Resources 1365
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1716
Signed [signature] (By driller performing actual drilling on site or contractor)
Date DECEMBER 11, 1990

(Rev. 11-85) USE ADDITIONAL SHEETS IF NECESSARY (O)-627

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

STATE OF NEVADA
DIVISION OF WATER RESOURCES

OFFICE USE ONLY
Log No.
Permit No.
Basin

MW-1
PRINT OR TYPE ONLY

WELL DRILLER'S REPORT

Please complete this form in its entirety.

NOTICE OF INTENT NO. 16277

1. OWNER WASHOE COUNTY UTILITY DEPARTMENT
MAILING ADDRESS PO BOX 11130
RENO, NV. 89520
ADDRESS AT WELL LOCATION MOUNT ROSE

2. LOCATION SE ¼ NE ¼ Sec. 3 T 17 N/S R 19 E WASHOE County
PERMIT NO. 55172T (Issued by Water Resources) N/A (Parcel No.) N/A (Subdivision Name)

3. TYPE OF WORK: New Well ☒ Recondition ☐ Deepen ☐ Other ☐

4. PROPOSED USE: Domestic ☐ Irrigation ☐ Test ☒ Municipal ☐ Industrial ☐ Stock ☐

5. TYPE WELL: Cable ☐ Rotary ☒ Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
COBBLES & BOULDERS W/.				
SILT SAND MATRIX		0	50	50
MIXED SILT SAND, GRAVEL &				
CLAY		50	78	28
CLAY		78	80	2
CLAYEY GRAVEL		80	100	20
GRAVEL BOULDERS		100	110	10
MIXED SILT, GRAVEL & CLAY		110	180	70
BOULDERS		180	185	5
CLAY		185	190	5
SILTY, SANDY & CLAY,				
SOME SAND & GRAVEL		190	250	60
MOSTLY CLAY, SOME SAND		250	290	40
MOSTLY SAND, SOME GRAVELS				
& CLAYS		290	325	35
SILT, SAND, GRAVEL &				
OCCASIONAL BOULDERS		325	590	265
BLUE & BLACK VOLCANIC ROCK		590	620	30
SILTY SAND & CLAY		620	640	20

Date started OCTOBER 29, 19 90
Date completed NOVEMBER 4, 19 90

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours

8. WELL CONSTRUCTION
Diameter 12-1/4 inches Total depth 639 feet
7-7/8 inches
inches
Casing record 8" 30 IB/FT .322"
Weight per foot 2" 3.5 IB/FT Thickness .154"

Diameter	From	To
8 inches	0 feet	20 feet
2 inches	0 feet	638 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☒ No ☐ Type NEAT CEMENT
Depth of seal 100 feet
Gravel packed: Yes ☒ No ☐
Gravel packed from 100 feet to 639 feet

Perforations:
Type perforation SLOTS 3" LONG X 3" APART
Size perforation 3/32"
From 210 feet to 638 feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet

9. WATER LEVEL
Static water level 122 feet below land surface
Flow N/A G.P.M. N/A P.S.I.
Water temperature 48 °F Quality

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name LANG EXPLORATORY DRILLING (Contractor)
Address 2286 W. 1500 S., S.L.C., UT., 84104 (Contractor)
Nevada contractor's license number issued by the State Contractor's Board 0021976
Nevada contractor's driller's number issued by the Division of Water Resources 1365
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1716
Signed [signature] (By driller performing actual drilling on site or contractor)
Date NOVEMBER 4, 1990

(Rev. 11-85) USE ADDITIONAL SHEETS IF NECESSARY (O)-627

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

STATE OF NEVADA
DIVISION OF WATER RESOURCES

OFFICE USE ONLY
Log No.
Permit No.
Basin

MW-2
PRINT OR TYPE ONLY.

WELL DRILLER'S REPORT

Please complete this form in its entirety

NOTICE OF INTENT NO. 16278

1. OWNER WASHOE COUNTY UTILITY DEPARTMENT
MAILING ADDRESS PO BOX 11130
RENO, NV. 89520
ADDRESS AT WELL LOCATION MOUNT ROSE

2. LOCATION SE ¼ SW ¼ Sec. 3 T. 17 N/S R 19 E. WASHOE County
PERMIT NO. 55173T (Issued by Water Resources) N/A (Parcel No.) N/A (Subdivision Name)

3. TYPE OF WORK: New Well [X] Recondition [ ] Deepen [ ] Other [ ]

4. PROPOSED USE: Domestic [ ] Irrigation [ ] Test [X] Municipal [ ] Industrial [ ] Stock [ ]

5. TYPE WELL: Cable [ ] Rotary [X] Other [ ]

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
SANDS, GRAVELS, BOULDERS		0	40	40
SILTS, SAND, GRAVELS W/				
CLAY MATRIX		40	60	20
SANDS, GRAVELS, CLAYS		60	110	50
SANDS, GRAVEL, COBBLES		110	120	10
GRANITIC SANDS, GRAVELS,				
SOME CLAYS		120	150	30
CLEAN GRANITIC SANDS		150	190	40
SANDS, CLAYS, GRAVELS,				
SOME VOLCANICS		190	254	64
SAND, GRAVELS, CLAYS		254	327	73
VOLCANIC SANDS & GRAVELS		327	400	73
VOLCANIC COBBLES,				
BOULDERS, SOME SAND & CLAYS		400	471	71
SAND, GRAVEL, COBBLES		471	582	111
VERY HARD VOLCANIC		582	587	5
VOLCANIC SAND & GRAVELS		587	611	24

Date started NOVEMBER 4, 19 90
Date completed NOVEMBER 11, 19 90

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours

8. WELL CONSTRUCTION
Diameter 12-1/4 inches Total depth 611 feet
7-7/8 inches
6-1/4 inches
Casing record 8" 30 LB/FT .322"
Weight per foot 2" 3.5 LB/FT Thickness .154"

Diameter	From	To
8 inches	20 feet	0 feet
2 inches	0 feet	611 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes [X] No [ ] Type NEAT CEMENT
Depth of seal 100 feet
Gravel packed: Yes [X] No [ ]
Gravel packed from 611 feet to 100 feet

Perforations:
Type perforation SLOTS 3" LONG X 3" APART
Size perforation 3/32"
From 252' 6" feet to 611' feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet

9. WATER LEVEL
Static water level 321 feet below land surface
Flow N/A G.P.M. N/A P.S.I.
Water temperature 60 °F Quality

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name LANG EXPLORATORY DRILLING (Contractor)
Address 2286 W. 1500 S., S.L.C., UT. 84104 (Contractor)
Nevada contractor's license number issued by the State Contractor's Board 0021976
Nevada contractor's driller's number issued by the Division of Water Resources 1365
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1716
Signed David HAAS
By driller performing actual drilling on site or contractor
Date NOVEMBER 11, 1990

(Rev. 11-85) USE ADDITIONAL SHEETS IF NECESSARY (O)-627

APPENDIX II
PUMP TEST DATA

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Cinder Well
PUMPING/OBSERVATION WELL
PUMPING/RECOVERY DATA
PAGE 1 OF 2

TYPE of PUMPING TEST Step Drawdown
HOW Q MEASURED 6" x 4½" Orifice Weir
HOW WL's MEASURED Electric Sounder
PUMPED WELL NO. _____
RADIUS of PUMPED WELL _____
DISTANCE from PUMPED WELL _____

M.P. for WL's PVC S.W. elev. _____
DEPTH of PUMP/AIRLINE _____ wrt _____
% SUBMERGENCE: initial _____ ; pumping _____
PUMP ON: date 16 JAN 91 time 0825
PUMP OFF: date 16 JAN 91 time 1505

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 230.70'					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'	Q/s	H"	Q	(NOTE ANY CHANGES IN OBSERVERS)
		2			232.53			1.83	[illegible]	24¼	450	STEP I 1600 RPM
		3			232.54			1.84				
		4			232.57			1.87				
		5			232.57			1.87				
		6			232.62			1.92				
		7			232.63			1.93				
		8			232.71			2.01				
		9			232.74			2.04				
		10			232.80			2.10				Q↑
		12			232.83			2.13		24¼		
		14			232.85			2.15				
		16			232.89			2.19				
		18			232.92			2.22				
		20			232.94			2.24				
		25			233.05			2.35				Q↑
		30			233.10			2.40				
		35			233.17			2.47				
		40			233.24			2.54				
		45			233.30			2.60				
		50			233.40			2.70				
0925		60			233.46			2.76				
0935		70			233.58			2.88		24¼		
0945		80			233.67			2.97				
1004		99			233.90			3.20	140.6			
												STEP II
1443		3			234.39			3.69	149.1	36½	550	
1.45		5			234.43			3.73				
		7			234.45			3.75				
1.50	1015	10			234.49			3.79				
1.55	1020	15			234.55			3.85				
	1025	20			234.60			3.90				
2.05	1030	25			234.66			3.96				
10	1035	30			234.71			4.01				
20	1045	40			234.83			4.13				
2.30	1055	50			234.92			4.22				
.40	1105	60			235.02			4.32				
.00	1125	80			235.20			4.50				
3.15	1144 [illegible]	99			235.36			4.66	118			
2.15	1145											
UTIE-165												

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Cinder Well
PUMPING/OBSERVATION WELL
PUMPING/RECOVERY DATA
PAGE 2 OF 2

TYPE of PUMPING TEST STEP DRAWDOWN
HOW Q MEASURED 6"x4 1/2" ORIFICE WEIR — M.P. for WL's PVC S.W. — elev.
HOW WL's MEASURED SOLINST 300' SOUNDER — DEPTH of PUMP/AIRLINE — wrt
PUMPED WELL NO. — % SUBMERGENCE: initial ; pumping
RADIUS of PUMPED WELL — PUMP ON: date 16JAN9 time 0825
DISTANCE from PUMPED WELL — PUMP OFF: date 16JAN9 time 1505

TIME t= at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 230.70'					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'	Q/s	H"	Q	(NOTE ANY CHANGES IN OBSERVERS)
3.23		3			235.91			5.21		51	650	STEP III RPM ~ 1100
3.25		5			235.94			5.24				20 PSI
27		7			235.96			5.26				
3.30	1155	10			236.01			5.31				
35	1200	15			236.06			5.36				
40	1205	20			236.13			5.43				
3.45	1210	25			236.19			5.49				
.50	1215	30			236.24			5.54				
4.0	1225	40			236.35			5.65				
4.10	1235	50			236.44			5.74	113.2			Q↓
.20	1245	60			236.53			5.83				
.40	1305	80			236.73			6.03				
4.59	1324	99			236.88			6.18	105.2			
.0	1325									59	700	STEP IV 1975 RPM
5.03	1328	3			237.19			6.49				NO PSI ON PRESSURE GAUGE
5.05	1330	5			237.21			6.51				
.07	1332	7			237.24			6.54				
5.10	1335	10			237.26			6.56				
.15	1340	15			237.30			6.60				
.20	1345	20			237.36			6.66				
5.25	1350	25			237.42			6.72				
.30	1355	30			237.47			6.77				
.40	1405	40			237.55			6.85		59		
5.56	1415	50			237.64			6.94	100.9			
6.0	1425	60			237.73			7.03				
6.2	1445	80			237.90			7.20				
6.46	1505	100			238.05			7.35	95.2			

UTIL-16

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Cinder Well
(PUMPING) OBSERVATION WELL
(PUMPING) RECOVERY DATA
PAGE 1 OF 2

TYPE of PUMPING TEST Constant Q
HOW Q MEASURED 6"×4½" Orifice
HOW WL's MEASURED Solinst Electric Sounder
PUMPED WELL NO. Cinder Well
RADIUS of PUMPED WELL
DISTANCE from PUMPED WELL

M.P. for WL's PVC S. Well elev.
DEPTH of PUMP/AIRLINE wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 17JAN91 time 0830
PUMP OFF: date 19JAN91 time 0530

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 231.60					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	(S) or S'		H"	Q	(NOTE ANY CHANGES IN OBSERVERS)
	/	1			234.00			2.40		47	625	
	/	2			234.22			2.62				
	/	3			234.28			2.68				
	/	4			234.32			2.72				
	/	5			234.36			2.76				
	/	6			234.41			2.81				Q↑
	/	7			234.44			2.84				
	/	8			234.48			2.88				
	/	9			234.51			2.91				
0840	/	10			234.53			2.93				
	/	12			234.59			2.99				
	/	14			234.64			3.04				
0846	/	16			234.69			3.09				
	/	18			234.74			3.14				
0850	/	20			234.80			3.20		47¼-½		Q↑
0855	/	25			234.89			3.29				
0900	/	30			234.98			3.38				START ROSSUM SAND TESTER
0905	/	35			235.08			3.48				
	/	40			235.15			3.55				
0915	/	45			235.24			3.64				
0920	/	50			235.31			3.71				
0930	0/1	60			235.46			3.86				
0940	/	70			235.59			3.99		47¼-47½		Q↓
0950	/	80			235.71			4.11				
1000	30/1	90			235.83			4.23				
1010	/	100			235.95			4.35				
1030	0/2	120			236.20			4.60				
1043	13/2	133			236.34			4.74				
1102	32/2	152			236.49			4.89				
1121	51/2	171			236.74			5.04				
1141	11/3	191			236.86			5.16				Q↑ PULLED PROBE CLEANED OFF SOME OIL
1200	30/3	210			237.04			5.44				
1220	50/3	230			237.28			5.68		47-47¼		
1250	20/4	260			237.37			5.77				NEW PROBE SINCE OIL IN STILLING WELL. ACTAT
1333	3/5	303			237.69			6.09		47-47¼		
1400	30/5	330			237.89			6.29				
1430	2/6	362			238.05			6.45		47"		
1500	30/6	390			238.22			6.62				
1533	3/7	423			238.41			6.81				Q↑
1601	31/7	451			238.58			6.98				

UTIL-16

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Cinder Well
(PUMPING) / OBSERVATION WELL
(PUMPING) / RECOVERY DATA
PAGE 2 OF 2

TYPE of PUMPING TEST Constant Q
HOW Q MEASURED 6" x 4½" orifice weir
HOW WL's MEASURED Solnist Electric Sounder
PUMPED WELL NO. Cinder Well
RADIUS of PUMPED WELL
DISTANCE from PUMPED WELL

M.P. for WL's PVC S. Well elev.
DEPTH of PUMP/AIRLINE wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 17JAN91 time 0830
PUMP OFF: date 19JAN91 time 0530

TIME t= at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 231.60					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
1700		510			238.90			7.3				
1800		570			239.17			7.57		47"		WOW
1900		630			239.36			7.78		46 3/4		
2000		690			239.71			8.11		47"		
2100		750			239.99			8.39		47		
2200		810			240.21			8.61		≈47¼		
2356		926			240.63			9.03		47		
0300		1110			241.23			9.63		47		
0604		1294			241.68			10.08				
0900	30/24	1470			242.18			10.58		46½		Q↑
1206	30/27	1650			242.63			11.03		47"		
1500	30/30	1830			242.92			11.32				Q↑
1900	30/34	2070			243.32			11.72		47"		Q↑
2312	30/38	2322			243.87			12.27		47"		Problems with Sounder, Q↑
0300		2550			244.22			12.62		47"		

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WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL MRose MW #1
PUMPING / OBSERVATION WELL
~~PUMPING~~ / RECOVERY DATA
PAGE 1 OF 1

TYPE of PUMPING TEST Constant Q
HOW Q MEASURED orifice plate
HOW WL's MEASURED Solinst
PUMPED WELL NO. Cinder Well
RADIUS of PUMPED WELL
DISTANCE from PUMPED WELL

M.P. for WL's top edge 6" elev.
DEPTH of PUMP/AIRLINE wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date Jan 17, 91 time 0830
PUMP OFF: date 19JAN91 time 0530

TIME t= at t'=0					WATER LEVEL DATA STATIC WATER LEVEL (112.12) 112.52					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins / hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		b.p.	Q	(NOTE ANY CHANGES IN OBSERVERS)
0834		4		6"	112.50	(112.10) 2"		-.02		30.47	.00	
		6			112.50	(112.10)		-.02				
0840		10			112.49			-.03				
		12			112.49			-.03				
		15			112.48			-.04				
0850		20			112.48			-.04				
		45			112.46			-.06				
0920		50			112.46			-.06				
0935		65			112.45			-.07				
0959		89			112.44			-.08		.49	-.10	
1026		116			112.42			-.10				
1055		145			112.40			-.12		.46	-.11	
1133		183			112.38			-.14				
1213		223			112.36			-.16		.42	-.11	
1318		288			112.33			-.19		.38	-.09	
1414		344			112.30			-.22				
1516		406			112.29			-.23		.34	-.08	
1616		466			112.29			-.23				
1716		526			112.28			-.24		.34	-.09	
1816		586			112.27			-.25				
1933		663			112.27			-.25		.36	-.13	
2133		783			112.28			-.24	0.01	.36	-.14	
2348		918			112.29			-.23	0.07	.34	-.08	
0317		1127			112.27			-.25		.32	-.08	
0622		1312			112.24			-.28	0.11	.26	-.04	
0920		1490			112.26			-.26		.21	+.04	ALL SWITCHES, PROBES, SOLINST TOO FOR ISD'
1214		1664			112.32			-.20	.32	.13	+.18	
1515		1845			112.28			-.24	.37	.01	.23	
1919		2089			112.32			-.20	.42	.04	.29	
2327		2337			112.40			-.12		.11	.29	
0316		2566			112.41			-.11		.15	.25	
												0.01" Hg = 0.0113 ft
												Δ P = ↓ W.L.
												MW1

UTIL-16

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL MR #2
PUMPING / OBSERVATION WELL
PUMPING / RECOVERY DATA
PAGE 1 OF 1

TYPE of PUMPING TEST Constant Q
HOW Q MEASURED orifice plate
HOW WL's MEASURED Powers Sounder (Lang)
PUMPED WELL NO. Cinder Well
RADIUS of PUMPED WELL
DISTANCE from PUMPED WELL

M.P. for WL's top of 6" plate elev.
DEPTH of PUMP/AIRLINE wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date Jan 17,91 time 0830
PUMP OFF: date 19JAN91 time 0530

TIME t=			at t'=0		WATER LEVEL DATA STATIC WATER LEVEL (319.20) 319.79 76 17 59					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		b.p.	Q Δ	(NOTE ANY CHANGES IN OBSERVERS)
		0		6"	319.79	(319.20) 2"				30.47	.00	
		25		6"	319.76	(319.17) 2"		-.03				
		30			319.77			-.02				
		35			319.78			-.01				
		40			319.81	?						
		55			319.77	|		-.02				
		60			319.78			-.01				
		83			319.80			+.01		.49		
1021		111			319.82			.03				
1050		140			319.82			.03		.46		
1129		179			319.83			.04				
1207		217			319.81	-.19		.02		.42		
1311		281			319.82	-.18		.03		.38		
1407		337			319.79	-.21		.00				
1509		399			319.79			.00	D	.34	-.15	
1610		460			319.80	-.20		.01				
1710		520			319.82	-.18		.03	.03	.34	-.12	
1810		580			319.81			.02				
1920		650			319.82			.03	.05	.36	-.10	
2114		764			319.86			.07	.09	.36	-.06	
2342		912			319.87			.08	.08	.34	-.07	
0310		1120			319.87			.08	.10	.32	-.05	
0616		1306			319.86			.07	.23	.26	+.08	
0914		1484			319.85	-.15		.06	.30	.21	+.15	
1208		1658			319.82			.03	.42	.13	.27	
1509		1839			319.77	-.23		-.02	.51	.01	.36	
1912		2082			319.79			.00	.49	.04	.34	
2321		2331			319.92			0.13	.54	.11	.39	
0309		2559			319.90			0.11	.52	.15	.37	
												MW2

9JAN

UTIL-16

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL CINDER WELL
(PUMPING) / OBSERVATION WELL
PUMPING / (RECOVERY DATA)
PAGE 1 OF 1

TYPE of PUMPING TEST CONSTANT Q
HOW Q MEASURED 6" x 4½" ORIFICE
HOW WL's MEASURED SOLNIST ELECTRIC SOUNDER
PUMPED WELL NO. _____
RADIUS of PUMPED WELL _____
DISTANCE from PUMPED WELL _____

M.P. for WL's PVC S. WELL elev. _____
DEPTH of PUMP/AIRLINE _____ wrt _____
% SUBMERGENCE: initial _____ ; pumping _____
PUMP ON: date 17JAN91 time 0830
PUMP OFF: date 19 JAN 91 time 5:30

5:30 PM TIME t=2700 at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 231.60					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins / hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
19JAN 0622		2752	52	53	240.39			8.79				They knocked on the door @ 6:00 & said the had broken down @ 5:30
0623		2753	53	52	240.36			8.76				
0625		2755	55	50	240.36			8.76				I came out tried to get reading had problem with probe, went and got the probe from lower sit, brought it back, got the 1st reading. Called Ed about 6:38. He said he'll call Mike.
0627		2757	57	48	240.33			8.73				
0628		2758	58	48	240.30			8.70				
0629		2759	59	47	240.28			8.68				
0630		2760	60	46	240.28			8.68				
0631		2761	61	45	240.26			8.66				
0632		2762	62	44	240.24			8.64				
0633		2763	63	44	240.22			8.62				
0634		2764	64	43	240.20			8.60				
0636		2766	66	42	240.20			8.60				
0638		2768	68	41	240.16			8.56				
0640		2770	70	40	240.12			8.52				
0650		2780	80	35	240.04			8.44				
0700		2790	90	31	240.02			8.42				
0710		2800	100	28	239.78			8.18				
0730		2820	120	24	239.62			8.02				
0750		2840	140	20	239.42			7.82				
0810		2860	160	18	239.29			7.69				
0830		2880	180	16	239.12			7.52				
0900		2910	210	14	238.90			7.30				
0927		2937	237	12	238.76			7.16				
1000		2970	270	11	238.49			6.89				
1045		3015	315	9.6	238.25			6.65				
1130		3060	360	8.5	237.90			6.30				
1230		3120	420	7.4	237.66			6.06				
1325		3175	475	6.7	237.53			5.93				
1530		3300	600	5.5	236.94			5.34				
1730		3420	720	4.75	236.44			4.84				
1940		3550	850	4.2	235.98			4.38				
2130		3660	960	3.8	235.68			4.08				
20JAN 0008		3813	1113	3.4	235.30			3.70				
0365		3995	1295	3.1	234.88			3.28				
0710		4240	1540	2.8	234.32			2.72			-	
1230		4560	1860	2.4	233.75			2.15				
1600		4770	2070	2.3	233.55			1.95				
2200		5130	2430	2.1	233.20			1.60				
0750		5720	3020	1.9	232.70			1.10				

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WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Mt Rose MW#1
PUMPING / OBSERVATION WELL
PUMPING / RECOVERY DATA
PAGE 1 OF 1

TYPE of PUMPING TEST Constant Q
HOW Q MEASURED 6" x 4" Orifice Weir
HOW WL's MEASURED ACTAT Sounder
PUMPED WELL NO. Cinder Well
RADIUS of PUMPED WELL
DISTANCE from PUMPED WELL

M.P. for WL's top edge 6" elev.
DEPTH of PUMP/AIRLINE wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 17 JAN 91 time 0830
PUMP OFF: date 19 JAN 91 time 5:30

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 112.52					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins / hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		30.47	00.00 Q	(NOTE ANY CHANGES IN OBSERVERS)
0757		2847	147	19.4	112.62			-0.10		30.19	.22	
0837		2887	187	15.4	112.64			-0.12		.21	.18	
0850		2900	200	14.5	112.68			-0.16		.22	.12	
0933		2943	243	12.1	112.71			-0.19		.22	.09	
1043		3013	313	9.6	112.82			-0.30			.01	
1143		3073	373	8.2	112.78			-0.26			.05	
1237		3127	427	7.3	112.77			-0.25		.17	.09	
1329		3179	479	6.6	112.80			-0.28				
1525		3295	595	5.5	112.73			-0.21		.18	.12	
1725		3415	715	4.8	112.75			-0.23		.20	.08	
2140		3670	970	3.8	112.81			-0.29		.23	.02	
0015		3825	1125	3.4	112.81			-0.29		.23	.02	
0320		4010	1310	3.1	112.77			-0.25		.19	.07	
0725		4255	1555	2.7	112.77			-0.25		.20	.08	
1222		4552	1852	2.5	112.75			-0.23		.13	.15	
1558		4768	2068	2.3	112.71			-0.19		.09		
2205		5135	2435	2.1	112.75			-0.23		.18		
21 JAN 0745		5715	3015	1.9	112.71			-0.19				
												MW #1

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WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL MR #2
PUMPING / OBSERVATION WELL
PUMPING / RECOVERY DATA
PAGE 1 OF 1

TYPE of PUMPING TEST Constant Q
HOW Q MEASURED 6" x 4½" Orifice
HOW WL's MEASURED Power Sounder (Lang)
PUMPED WELL NO. Cinder Well
RADIUS of PUMPED WELL
DISTANCE from PUMPED WELL

M.P. for WL's top of 6" Plate elev.
DEPTH of PUMP/AIRLINE wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 17JAN91 time 0830
PUMP OFF: date 19JAN91 time 5:30

TIME t = 2700 at t' = 0					WATER LEVEL DATA STATIC WATER LEVEL 319.79					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
17JAN 0739		2829	129	22	319.89			0.10				
0815		2865	165	17.4	319.89			0.10				
0905		2915	215	13.6	319.89			0.10				
1005		2975	275	10.8	319.97			0.18				
1100		3030	330	9.2	319.97	"		0.18				
1200		3090	390	7.9	319.93	"		0.14				
1245		3135	435	7.2	319.90			0.11				
1537		3307	607	5.4	319.88	"		0.09				
1710		3400	700	4.9	319.87	"		0.08				
2135		3665	965	3.8	319.85			0.06				
20JAN 0010		3820	1120	3.4	319.82			0.03				
0315		4005	1305	3.1	319.78			-0.01				
0716		4246	1546	2.7	319.72			-0.07				
1233		4563	1863	2.4	319.66			-0.13				
2215	1	5145	2445	2.1	319.66			-0.13				
0820		5750	3050	1.9	319.73			-0.06				

MW2

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APPENDIX III
VIDEO SURVEY LOG

welenco

WELL SURVEY REPORT

JOB NO 17226

Customer LANG EXPLORATORY DRILLING
Address 2286 WEST 1500 SOUTH
City SALT LAKE State UTAH Zip 84104
Request By GENE / MAPEL Cust Order No
Copy To
Reason for Survey

Type Survey COLOR VIDEO Run No 1
Well No Date 2-1-91
Location CINDER WELL
Power Meter No
Zero Datum GL

WELL PROFILE	DEPTH	REMARKS	VTR
	0	12' STEEL MINOR RUST	
	226	FLUID TOP DARK OIL SCUM	
	240	CLOUDY DEBRIS NO VISIBILITY	
	397	PIPE CHANGE	
	398	SCREEN TOP VIS CLEARS	
	400	MINOR PLUGGING 90 SLOT	
	417	CONNECTION JOHNSON	
	437	CONNECTION	
	457	CONNECTION	
	477	CONNECTON	
	497	" MINOR PLUGGING	
	517	"	
	537	"	
	557	"	
	574	PLUGGING INCREASING	
	577		
	596	CONNECTION	
	616	"	
	636	"	
	656	"	
	676	"	
	696	"	

Static Water Level 230 FT
Pump Bowl Setting FT
Survey Total Depth 800 FT
Well Record Total Depth FT

NOTE
Video tapes of television surveys will be erased after one year from the date of the survey unless otherwise arranged

SCREEN = 400 700 800 SUMP PIPE

welenco

WELL SURVEY REPORT

JOB NO 17226

Customer LANG EXPLORATORY DRILLING
Address
City State Zip
Request By Cust Order No
Copy To
Reason for Survey

Type Survey COCON VIDEO Run No 1
Well No Date 2-1-91
Location
Power Meter No
Zero Datum

WELL PROFILE	DEPTH	REMARKS	VTR
	716	CONNECTION	
	736	CONNECTION	
	756	CONNECTION	
	775	BOTTOM	
		CLOUDY MINOR ENCRUSTED	
	793	BOTTOM SOFT DEBRIS DARK	

Static Water Level FT
Pump Bowl Setting FT
Survey Total Depth FT
Well Record Total Depth FT

NOTE
Video tapes of television surveys will be erased after one year from the date of the survey unless otherwise arranged

APPENDIX IV
BID PROPOSAL

BID PROPOSAL

ITEM	APPROX QUANTITY	DESCRIPTION OF ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT PRICES	TOTAL
		MOBILIZATION AND DEMOBILIZATION		
1.	2	Mobilization and Demobilization including all materials, labor, equipment for completion of two test wells as described in Specifications for the lump sum price of One thousand eight hundred per well.	$1,800.00	$3,600.00
2.	3	Mobilization and Demobilization including all materials, labor, equipment for completion of three municipal water wells as described in Specifications for the lump sum price of Two thousand four hundred and fifty dollars per well.	2,450.00	7,350.00
		MOUNT ROSE TEST DRILLING		
1.	1200 LF	Drill minimum 8-inch diameter pilot bore, Mount Rose locations, approximately 600 foot per test hole at Twelve dollars per lineal foot.	12.00	14,400.00 7,200.00
2.	2	Geophysical Logs of pilot bores for the price of One thousand four hundred forty dollars per log	1,440.00	2,880.00
3.	800 ft.	Furnish and install 2-inch diameter slotted steel pipe estimate at 400 feet per test hole at Three dollars and sixty cents per foot.	3.60	2,880.00
4.	400 ft.	Furnish and install 2-inch diameter steel pipe estimated at 200 feet per test hole at One dollar and eighty cents per foot.	1.80	720.00
5.	15 yds^3	Furnish and install gravel pack, estimated at 7.5yds^3 per test hole at One hundred one & fifty-seven cents per yd^3	101.57	1,523.55

6.	200 ft.	Furnish and install grout sanitary seal estimated at 100 feet per test well at Eleven dollars & Twenty-five cents per foot.	$ 11.25	$ 2,250.00
7.	20 hrs.	Furnish and install necessary equipment for air-development of 2-inch diameter monitoring wells estimated at 10 hours per test well at Two hundred twenty dollars per hour.	220.00	4,400.00
		MARVIN PICOLLO SCHOOL LOCATION, PRODUCTION WELL		
1.	105 ft.	Drill 32-inch MINIMUM diameter conductor casing borehole, PICOLLO SCHOOL location, approximately 105 feet at One hundred twenty-seven dollars per lineal ft.	127.00	13,335.00
2.	100 ft.	Furnish and install blank 24-inch diameter conductor casing, PICOLLO SCHOOL approximately 100 feet Forty-five dollars per lineal ft.	45.00	4,500.00
3.	100 ft.	Furnish and install sanitary grout seal PICOLLO SCHOOL location approximately 100 feet at Thirty-eight dollars per lineal ft.	38.00	3,800.00
4.	250 ft.	Drill 22-inch minimum diameter production casing borehole, PICOLLO SCHOOL, Approximately 250 ft. at Sixty dollars per lineal ft.	60.00	15,000.00
5.	150 ft.	Furnish and install 12-inch diameter blank production casing, PICOLLO SCHOOL location, approximately 150 feet at Twenty-two dol dollars per lineal ft.	22.00	3,300.00

BID PROPOSAL

ITEM	APPROX QUANTITY	DESCRIPTION OF ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT PRICE	TOTAL
6.	200 ft.	Furnish and install 12-inch diameter wire-wrap well screen, PICOLLO SCHOOL location, approximately 200 feet at Fifty-three dollars per lineal ft.	$ 53.00	$10,600.00
7.	200 ft.	Furnish and install 1-inch diameter water-level sounding tube, PICOLLO SCHOOL location, approximately 200 ft. at One dollar & twenty cents per lineal ft.	1.20	240.00
8.	35 yds^3	Furnish and install design gravel pack, PICOLLO SCHOOL location, estimated 35 yds^3 at One hundred twenty dollars per yd^3	120.00	4,200.00
9.	1 ea.	Furnish and install casing clamp and doughnut ring seal, PICOLLO SCHOOL location, for the lump sum price of Five hundred twenty dollars each.	520.00	520.00
10.	100 hrs.	Development by bailing and swabbing, PICOLLO SCHOOL location, estimated 100 hours at Two hundred twenty dollars per hour	220.00	22,000.00
11.	100 hrs.	Furnish, install, operate and remove necessary equipment, PICOLLO SCHOOL location, including discharge piping for development pumping estimated 100 hrs. at One hundred twenty per hour.	120.00	12,000.00 1,200.00
12.	90 hrs.	Furnish, install, operate and remove necessary equipment, PICOLLO SCHOOL location, for test pumping at estimate 90 hours at One hundred twenty dollars per hour.	120.00	10,800.00
13.	1 ea.	Well disinfection and capping, at the lump sum price of Eight hundred dollars	800.00	800.00

14.	1 ea.	VHS video log of completed production well PICOLLO SCHOOL at the lump sum price of Four hundred fifty dollars per log.	$ 450.00	$ 450.00

MOUNT ROSE LOCATION, PRODUCTION WELLS

1.	350 ft.	Drill 8-inch minimum diameter pilot hole at MT. ROSE, Well No. 2 location, approximately 350 feet at Twelve dollars per lineal ft.	12.00	4,200.00
2.	1 ea.	Geophysical log of pilot bore for the price of One thousand four hundred forty each.	1,440.00	1,440.00
3.	210 ft.	Drill 32-inch MINIMUM diameter conductor casing borehole, MOUNT ROSE locations, approximately 105 feet at each site at One hundred twenty seven dollars per lineal ft.	127.00	26,670.00
4.	200 ft.	Furnish and install blank 24-inch diameter conductor casing, MOUNT ROSE locations approximately 100 feet per site at Forty-five dollars per lineal ft.	45.00	9,000.00
5.	200 ft.	Furnish and install sanitary grout seal MOUNT ROSE locations approximately 100 feet per site at Thirty-eight dollars per lineal ft.	38.00	7,600.00
6.	750 ft.	Drill 22-inch minimum diameter production casing borehole, MOUNT ROSE locations, Approximately 500 ft. at Location No. 1 and 250 feet at Location No. 2 at Seventy-eight dollars per lineal ft.	78.00	58,500.00

BID PROPOSAL

ITEM	APPROX QUANTITY	DESCRIPTION OF ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT PRICE	TOTAL
7.	500 ft.	Furnish and install 12-inch diameter blank production casing, MOUNT ROSE locations, approximately 350 feet at Location No. 1 and 150 feet at Location No. 2 at Twenty-two dollars per lineal ft.	$ 22.00	$11,000.00
8.	450 ft.	Furnish and install 12-inch diameter wire-wrap well screen, MOUNT ROSE locations, approximately 250 feet at Location No. 1 and 200 feet at Location No. 2 at Fifty-three dollars per lineal ft.	53.00	23,850.00
9.	500 ft.	Furnish and install 1-inch diameter water-level sounding tube, MOUNT ROSE locations, approximately 400 ft. at Location No. 1 and 150 feet at Location No. 2 at One dollar & twenty cents per lineal ft.	1.20	600.00
10.	95 yds^3	Furnish and install design gravel pack, MOUNT ROSE locations, estimated 95 yds^3 at One hundred one & fifty-seven cents per yd^3	101.57	9,649.15
11.	2 ea.	Furnish and install casing clamp and doughnut ring seal, MOUNT ROSE locations for the price of Five hundred twenty dollars each.	520.00	1,040.00
12.	150 hrs.	Development by bailing and swabbing, MOUNT ROSE locations, estimated 150 hours at Two hundred twenty dollars per hour	220.00	33,000.00

13.	150 hrs.	Furnish, install, operate and remove necessary equipment, MOUNT ROSE locations, including discharge piping for development pumping. Estimated 150 hours at One hundred twenty dollars per hour.	$120.00	18,000.00
14.	160 hrs.	Furnish, install, operate and remove necessary equipment, MOUNT ROSE locations, for test pumping at One hundred twenty dollars per hour.	120.00	19,200.00
15.	2 ea.	Well disinfection and capping at the lump sum price of Eight hundred dollars	800.00	1600.00 800.00
16.	2 ea.	VHS video logs of completed production wells MOUNT ROSE Location for the lump sum price of Four hundred dollars per log.	400.00	800.00 400.00

TOTAL BID	WRITTEN IN WORDS	TOTAL
	Three hundred forty-eight thousand, four hundred ninety-seven & seventy cents	367,697.70 $348,497.70

_____ complete.

Name, Address and Telephone Number of Bidding Company

Lang Exploratory Drilling

2286 West 1500 South

Salt Lake City, Utah 84104

(801) 973-6667

Authorized Signature Representing Bidding Company

Randy Mayer

Contract Manager
Title