LIGHTNING "W" MUNICIPAL WELL CONSTRUCTION AND TESTING REPORT January, 1996 Washoe County Utility Division

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DAN's Ed
Reservoir Well 150ct 98 -
                      Meter 192852 00
                      Hours 031590
State W.L. = about 52 feet (doesn't match test pumping data)
                                                                                            10 Sapa
anick test
                                                                                         1. - 86.0
                                                                                         2. - 90.7
 RES. WELL 8/29/00 WELL ON 0815 128.10 Ft., PUMPING LEVEL.
                                                                                         3 - 93.2
                     PUMPINLE 100 gpm
                                                                                          4 - 94.4
                                                                                          5- 95.6
 14/14/01 17+2 55.62' SIDE OFEN ING CASING.
                                                                                            - 96.4
        OFF Ag 74.79" TOC, REMOVED GREEN CASINGCOVER
                                                                                          8 - 976.
        OFF RESWELL 74.82 TO PVC
                                                                                          10 - 98.3
RESERVOIR
WELL 7/3/00
meter
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WASHOE COUNTY

63.16 State

26278700

hours

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

P.O. BOX 11130 RENO, NEVADA 89520





LIGHTNING "W"

MUNICIPAL WELL CONSTRUCTION

AND TESTING REPORT

January, 1996

Washoe County Utility Division



DEPARTMENT OF WATER RESOURCES UTILITY SERVICES DIVISION

Lightning W update WELL "upper "or "Ay Well

PUMPING / OBSERVATION WELL PUMPING / RECOVERY DATA

PAGE _____ OF _____



<u> </u>	
TYPE OF PUMPING TEST Discharge into system	
HOW Q MEASURED	M.P. for WL's Through Top Vent elev.
HOW WL'S MEASURED	DEPTH OF PUMP/AIRLINE wrt
PUMPED WELL NO.	% SUBMERGENCE: initialpumping
RADIUS of PUMPED WELL	PUMP ON: date 21 Oct 98 time
DISTANCE from PUMPED WELL	PUMP OFF: date time

Γ		TIME	<u> </u>		WATER LEVEL DATA							
1	t =		ť=C)	WATER LEVEL DATA STATIC WATER LEVEL 50.49						TER DUCT	COMMENTS
CLOCK TIME	EL/ mins	APSED T	IME t'	t /ť	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'			Q	(NOTE ANY CHANGES
LIIVIL	IIIS				57.95	CONTRICTIONS	LEVEL	7.46	 			IN OBSERVERS)
		2		 	58.73				 			M: I meter = 067248 00
		3		 	59. /o			8.24	 			An Meter 123000
		7						8.61		-	· · · · · · · ·	Hrs 780.3
		5			59.40			8.91				100 al /40 500
		5			59 55 59.76			9.66		-		
		1			59.95			9.27	 			
		8			60.00			9.46	 			
· · · · · · · · · · · · · · · · · · ·		9			60.15	· . ·		9.51	 			
		10			60.30			9.66	 -	<u> </u>		
		10			00,30	off		9.81	ļ			
		ı.			52.95	047		 	<u> </u>			
		2			52.34				<u> </u>	<u> </u>		
		3.			52.06					 		
		4			51.85				 	-		
		5							 			
-		6			51,78							
		7	,-		51.61				 			
		В			51.55							
		9			51.50 51.40							
		10.			51.36				 			
		10.			21.36				 			th tee a li
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DEPARTMENT OF WATER RESOURCES UTILITY SERVICES DIVISION

	update		
WELL.	Reservoir	well	(New Well 1994
	NG / OBSERVATIO		
PUMPI	NG / RECOVERY I	DATA	
PAGE	/ OF		



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TYPE OF PUMPING TEST Check up Test	
HOW Q MEASURED <u>Meter</u>	M.P. for WL's Top of 3/4" PUC elev.
HOW WL'S MEASURED	DEPTH OF PUMP/AIRLINE wrt
PUMPED WELL NO	% SUBMERGENCE: initial pumping
RADIUS of PUMPED WELL	PUMP ON: date time
DISTANCE from PUMPED WELL	PUMP OFF: date time

DISTANCE from PUMPED WELL						.	PUMP OFF: date time					time
Γ		TIME	_			NAATED LE	7/51 5	ATA				
TIME t = at t'=0					OTATIO	WATER LE		AIA La hout	90 feet	ΓER	COMMENTS	
<u> </u>	=	aı	l=C	,	SIAIIC	WATER LEVEL	52.00	higher	than 1994	PRO	DUCT	OOMMENTO
CLOCK TIME	EL/ mins hrs	APSED T	ME t'	t /ť	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'	0/2		Q	(NOTE ANY CHANGES IN OBSERVERS)
												Flow meter = 19285200
											_	Hours 031590
		/			86.0			34.0				FLOW EST @ 105 gpm
		2			90.7			38.7				<u> </u>
ļ		3		·	93.2			41.2				
<u> </u>		4	-		94.4			42.4				· · · · · · · · · · · · · · · · · · ·
		5			95.6			43.6	ļ <u>.</u>			
	$\overline{}$	6			96.4			44.4	<u> </u>			
		7			97.1			45.1				
		8			97.6			45.6	<u> </u>			
		9			97.9			45.9	-		-	
		JO			98.3			46.3	2.26			
												Recovered Quickly
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SUMMARY OF EVENTS

Development of a municipal water supply for the Lightning W ranch began in 1992. Initially, the Developer submitted construction information on existing wells requesting the County evaluate the suitability of the wells for M&I use. With the exception of the "Sheldon" well, none of the wells met the sanitary seal requirements for use as an M&I supply.

The County conducted a 72 hour pumping test and ran water quality analyses on the Sheldon well in Oct, 1993. The results were favorable and the County was willing to accept the well as a M&I supply for the ranch development. However, for unknown reasons Lightning W withdrew the Sheldon well for consideration.

Lightning W elected to convert an existing Agricultural Well (Corral Well) to meet M&I sanitary seal requirements. Nevada Drilling Inc. completed the conversion in March, 1994. Wahsoe County personnel conducted a 72 hour pumping test on the well and found that sand production from the well did not meet municipal standards. Lightning W attempted to redevelop the well to meet standards. During redevelopment, the bottom plate on the well conversion was knocked off and the condition of the well became questionable. Washoe County required a camera log to determine the condition of the well. The log showed the well to be in good condition and another test pumping was run in July 1994.

Based on the retest of the Corral Well the recommended sustained yield was determined to be 90 gallons per minute. However, water quality analyses results from the well showed the water did not meet drinking water standards for uranium. The Corral well was withdrawn from consideration.

During June 1994 and new well (Reservoir Well) was constructed specifically for municipal supply. The well was drilled to a depth of 400 feet and a 10-day pumping test was run by Washoe County Personnel in December, 1994. The recommended sustained yield based on the pumping test data was 90 gallons per minute. The water from the well met current drinking water standards and was equipped in 1995 to supply the development.

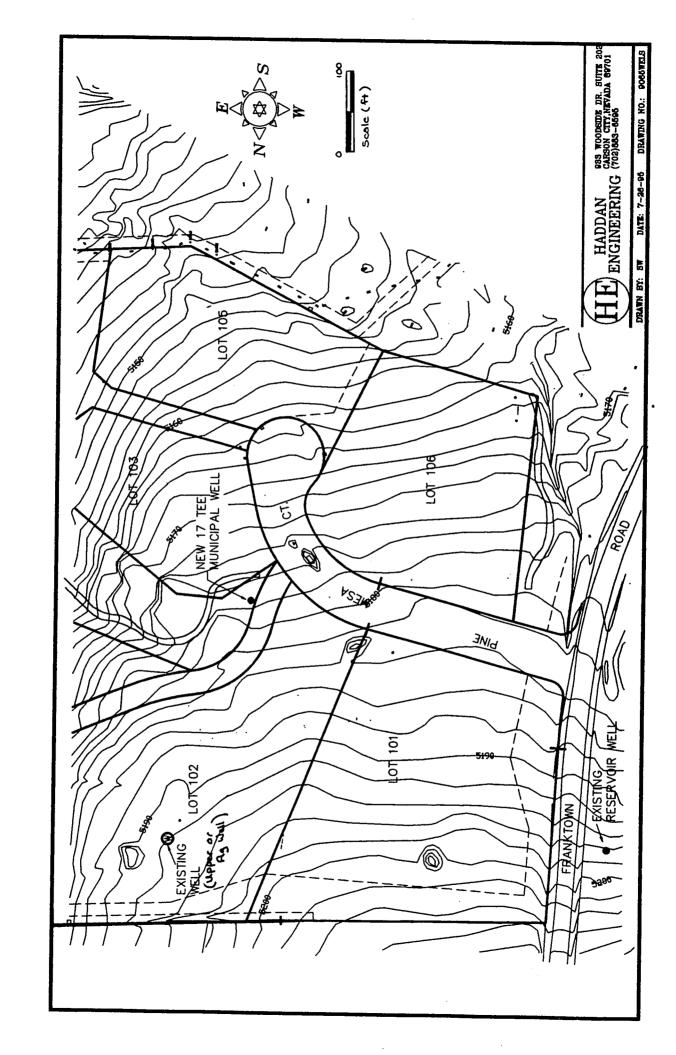
Municipal supplies require a backup source, which generated a need for another well capable of about 110 gallons per minute. Lightning W Ranch undertook a drilling program that consisted of three test holes with one being completed as a well (17th tee Well). While the 17th Tee well had sufficient yield to supply the project, the uranium content exceeded drinking water standards. The well was withdrawn from consideration as a municipal source.

Lightning W elected to "convert," the "Upper Well" to meet sanitary seal standards. The conversion took place during July of 1995. The test pumping indicated the yield and water quality of the water from the well would be satisfactory as a municipal supply. Based on the test pumping data, the well would be capable of about 200 gallons per minute on a sustained basis. Lightning W requested the well be equipped to provide a "dual Purpose," Municipal well and a back up supply for irrigation. The well is currently being equipped under those guidelines.

Because the Municipal Supply wells (Reservoir Well and Upper Well) are in close proximity of two Agricultural use wells (17th Tee and Corral Wells) and potentially high sources of uranium, the County requested limitations on the pumping of the agricultural wells. A letter of understanding was created that set the limitations on pumping.

This report contains the following (noting that the Upper Well aka Ag well and that the New Well aka Reservoir aka Studebaker Well):

- A location map showing the locations for the Reservoir Well, the Upper Well and the 17th Tee well.
- Test Pumping data and graphs for the Reservoir Well and the Upper Well
- As Constructed diagram for the Reservoir Well.
- Pump requirements and Specifications for the Upper Well (CES Engineering).
- Upper or "Ag" well pumping test and report from CES Engineering.
- Diagrams of Upper or "Ag" well before and after modifications.
- Memos from Dan Dragan to John Collins describing recommended Yields of Reservoir and Ag Wells (7 December 1994 and 27 June 1995).
- Copy of "Letter of Understanding" and Correspondence concerning Pumping of the 17th Tee well.
- Report of retest of Ag well after modifications.
- CES evaluation of the test pumping data from the Reservoir well ("New Well").
- Drillers Log of Reservoir Well (Nevada Drilling).
- Water quality analyses results for Reservoir Well and Upper or "Ag" well



WASHOE COUNTY Runpe 380' DEPARTMENT OF PUBLIC WORKS

RESERVOIR WELL WELL Lightning W

PUMPING	OBSERVAT	YON WE
PUMPING	RECOVERY	DATA
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EPARIMENT OF PUBLIC WORKS	PUMPING	TECT	DAT
ITILITY DIVISION	PUMPING	IESI	DAI

TYPE of PUMPING TEST Step Test	PAGE OF
HOW Q MEASURED 3"x 4" or: fice weir	M.P. for WL's
HOW WL's MEASURED	DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO.	
RADIUS of PUMPED WELL	PLIMP ON: date /5/OU 94 time 1000

PUMP ON: date 25 Action PUMP OF date 11											1) 15/94 time				
TIME WATER LEVEL DATA t = at t'=0 STATIC WATER LEVEL 145.90											ER UCT.	COMMENTS			
OCK	ELAPS mins hrs	SED TI	ME t'	t/t ¹	READING	CONVEDEIONE	WATER	S or S'	Q		(NOTE ANY CHANGES IN OBSERVERS)				
000		١										6"=108 gpm			
		2.5			192.47			46,57				2 103 9 Dec			
		3										QV V			
		4			187.25			41,35	•						
		\$4.5		1	186.49		···	40.59			6"				
		6			186.24			40.34							
		7			186.43			40,53							
		8			186.65			40.75							
		q			/87.39			41.49			6"	01			
		10			188.32			42.42							
		1211			188.73			42.83			0 1/2"				
		12			189.30			43.40				64			
		14			188.71			42.81							
		16			188.75			42,85							
		18			188.95			43.05							
		20			191.29			45.39				Qr			
		25			192,15			46.25				Sand into			
		36			191.27			45.37							
		35			191.17			45.27				Me 37 min.			
		46			19137			45,47							
		50			A1.56			45.66				. QAC 47 min down			
				•		TEP 2 State	ر	147.24							
		5			198.38			51,14			91/2"	= 130 pm			
		6.5			200.24			53.02							
		8			200,73			53,49							
		Q			203.17			55,93				31			
		12-			205.19			57.95							
		14		<u> </u>	206.52			59.28				at .			
		18			204.15			5691				•			
		20			204.21			56.97				Q1			
		25			205.91			58.67							
		30			205.89			58.65			: '				
		35			206.21			58.97							
		40			206.55			59.31		٠					
		45			206.05			58.81							
		50			207.74		-	60,50							
						•					13"	151 gp~			
	55	5			218,30			71.06							
	69	10			224.65			77.41			14-15"				
	66	16			221.11			73,87							

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

PUMPING TEST DATA

WELL RESERVOIR WELL
PUMPING/OBSERVATION WELL
PUMPING/RECOVERY DATA
PAGE Z OF Z

TYPE of PUMPING TEST STEP TEST	
HOW Q MEASURED 3"x4" ORIFICE WEIR	M.P. for WL's TOP B" CASING BIEV
HOW WL'S MEASURED ACTIVE 300	DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO.	. % SUBMERGENCE: initial; pumping
RADIUS of PUMPED WELL	PUMP ON: date 11/15/94 time 1000
DISTANCE from PUMPED WELL	PUMP OFF: date _1)15/94 time

TIME 10 1 1-0 STATE MATER LEVEL DATA STATE MATER LEVEL LAG 10 CLOCK ELAPSED TIME TIME 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	DIS	TANCE	from F	PUMPE	WELL		PUMP OFF: date _!\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\								
70 20 222.29 75.05 75 26 221.72 74.48 QT 89 30 221.68 79.74 95 35 127.53 80.29 90 40 229.65 82.41 100 50 50 239.25 92.01 101 239.68 92.44 89 115 15 241.28 94.04 QT 17 m 13/2 118 20 243.11 95.87 119 30 244.69 97.45 17/2 119 40 245.27 98.03 P5.12 17/2 119 40 245.27 98.03 P5.12 105 119 50 50 241.72 99.03 P5.12 105	t =		الماهما	'=0									COMMENTS		
70 20 222.29 75.05 75 26 221.72 74.48 QT 89 30 221.68 79.74 95 35 127.53 80.29 90 40 229.65 82.41 100 50 50 239.25 92.01 101 239.68 92.44 89 115 15 241.28 94.04 QT 17 m 13/2 118 20 243.11 95.87 119 30 244.69 97.45 17/2 119 40 245.27 98.03 P5.12 17/2 119 40 245.27 98.03 P5.12 105 119 50 50 241.72 99.03 P5.12 105	CLOCK TIME	TLAP	SED TI	ME t'	t/t [']	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	©or S'		<mark>አ</mark> ሮ)	Q	(NOTE ANY CHANGES IN OBSERVERS)		
75 26 21.72 74.48 QT 80 30 721.48 79.74 85 35 1.27.53 80.29 90 40 229.65 82.41 100 50 730.79 83.55 1171/2 175 Q=PM 100 50 730.79 93.55 115 15 241.28 94.04 QT 17 713/2 118 20 243.11 95.87 119 30 244.61 97.45 17/2 119 40 245.27 98.03 P51.6 17/2 119 40 245.27 98.03 P51.6 105 119 40 245.27 98.03 P51.6 105 115 5 241.27 99.03 P51.6 105 115 15 245.44 99.04 QT 17 713/2 119 40 245.27 99.03 P51.6 105 115 5 245.44 99.03 P51.6 105 115 5 245.45 94 98.70 99.03 115 15 245.47 99.03 P51.6 105 116 10 270.00 122.76 P51.6 107 119 20 271.27 130.02 13		70				222.29			75.05						
10			25			221,72			I I				QT		
100 40 219.65 82.41 83.55 171/2 175 Q = 175 q pm 83.55 171/2 175 Q = 175 q pm 100 10 239.68 92.44 100 10 243.11 95.87 96.28 130.03 135 244.69 97.45 171/2 175 Q = 201 q pm 155 50 245.27 98.03 97.45 171/2 175 245.94 99.48 23" 201 Q = 201 q pm 155 50 246.72 99.48 23" 201 Q = 201 q pm 155 50 246.72 99.48 23" 201 Q = 201 q pm 150 30 274.11 160.03 176.87			30			226.98			79.74						
100 50 730.79 83.55 171/2 175 Q=175 apm 105 5 239.25 92.01 FLOW STAULT, MANDEMETER. 110 10 239.68 92.444 1000			35			127.53			80.29						
STEP 4 STEP 5 S			40			229.65									
10	<u></u>	100	50			230.79			83,55						
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15			10			239.68			92,44				i :		
135 25			15			241.28			94.04						
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140 40 245.27 98.03 PSIE 105 145 45 245.94 98.70 99.48 150 50 246.72 99.48 153 5 267.35 120.11 QT 160 10 270.00 122.76 PSIE 2 170 20 274.11 126.87 QT 180 30 277.27 130.02 132.26 185 35 279.50 132.26			30			244.22			96,98				Q [†]		
145 45 245.41 48.70 48.70 150 50 246.72 49.48 23" 201 Q = 201 \(\text{pm} \)	<u></u>		3 5			244.69			97.45		171/2				
145 45 245.94 98.70 99.48			40			245.27			98.03				PSIE 105		
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155 5 267.35 120.11 QT 160 10 270.00 122.76 PS 1 Q 179 20 274.11 126.87 QT 180 30 277.27 130.03 185 35 279.50 132.26 132.26		150	50			246.72									
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Reservoir Well

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DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

WELL LIGHTNING "W"		WELL
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PUMPING RECOVERY DA	CAT	
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TYPE of PUMPING TEST CONSTANT Q	PAGE / OF
HOW Q MEASURED ORIFICE WEIR	M.D. for W.
HOW WES MEASUREDELECTRIC SOUNDETE	DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO.	. % SUBMERGENCE: initial
RADIUS of PUMPED WELL	PUMP ON: date 11/16/94 time 0950
DISTANCE from PUMPED WELL	PUMP OFF: date 11/26/94 time 0730

1927	DISTANCE from PUMPED WELL PUMP OFF : d							date 11/26/	2 <u>4</u> ti	me0730		
TIME PUPPES	. t =	0730	at t	'=0			WATER LEVEL	144.90			COMMENTS	
0729 114279 124279 282.95 137.05 137.05 14261 14261 202.45 205-2.05 58.05 14261 14261 202.45 205-2.05 58.05 14261 14261 202.45 205-2.05 58.05 14261 14261 202.45 205-2.05 142.25 142.18 142-2.82 147.28 142.18 142-2.82 147.28 142.18 142-2.82 147.00	TIME	mins hrs	1	t'	1/1	READING			S or (S)		Q	(NOTE ANY CHANGES IN
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11262 2 133 195 - 2.82 47.28 47.28 1924 3 47.74 165.60 40.70 40.70 1924 4 5564 161.95 165 - 3.05 37.05 1924 4 5564 161.95 165 - 3.05 37.05 1924 7 2038 178.30 180 - 0.0 35.10 1924 7 2038 178.30 180 - 2.17 32.93 1924 1924 1925 177.46 170 - 2.17 32.93 1924 1922 12 189 174.90 170 - 2.10 32.50 1922 12 189 174.90 170 - 3.10 32.50 1922 12 189 174.90 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 18 372 174.27 170 - 3.43 31.67 1923 170	0731	237	14261	1	14261	202.95	205-2.05		58.05			
1324 4 3566 181.95 185 - 3.05 37.05 37.05 1926 5 255 180.00 35.10 33.40 33.40 33.40 32.43 32.43 32.43 32.43 32.43 32.43 32.43 32.43 32.43 32.43 32.50 32	'		14262	2	7131	192.18	195-2.82					
0735	<u> </u>		14263	3	4754	185.60			40.70			
1921 7	 		14264	4	3566	181.95	185 - 3.05		37.05			
1016 8 1784 177.83 180-7.17 32.93 1014 9 1585 137.40 190-7.60 32.50 32.50 1014 9 1585 137.40 190-7.60 32.50 32.50 10272 12 1189 176.90 190-3.10 32.00 10272 12 1189 176.90 190-3.10 32.00 10274 14 1020 176.57 190-3.43 31.67 10276 16 892 176.27 190-3.43 31.67 10276 16 892 176.27 190-3.43 31.67 10276 16 892 176.27 190-3.43 31.67 10276 20 714 175.73 130-4.21 20.83 20.75 10285 25 571 175.23 150-4.21 20.83 20.93 10285 25 571 175.23 150-4.21 20.83 20.93 10285 25 571 175.23 150-4.21 20.93 2	0735		14265	5	2853	180.00			35,10			
1434 9 1585 177. 40 170. 2.60 32.50 0.740 597 14270 10 1427 177.48 3 32.00 14272 12 189 176.90 190. 3.10 32.00 14274 14 1020 176.57 170. 3.47 31.67 14276 16 892 176.27 190. 3.47 31.67 14276 16 892 176.27 190. 3.43 31.37 14278 18 743 175.97 180. 4.07 31.67 14276 16 892 176.27 190. 4.07 31.67 14276 16 892 176.27 190. 4.07 31.67 14276 16 892 176.27 190. 4.07 31.67 14276 16 714 175.73 180. 4.07 30.33 14285 25 571 175.23 180. 4.77 30.33 14285 25 571 175.23 180. 4.77 30.33 14295 35 40.8 174.15 21.55 14295 35 40.8 174.15 21.55 2810 22.31 14300 10 25.8 174.16 22.28 1815 14305 44 318 173.85 228.95 1820 32.51 14300 10 25.6 173.60 26.70 0.830 14320 60 23.9 177.32 26.42 0.840 32.51 14330 10 25.51 175.25 27.25 0.850 32.91 14360 10 16.91 171.35 27.25 0.930 140.30 140.6 180.6 171.85 26.95 0.930 140.30 140.6 180.6 171.85 26.95 0.930 140.30 140.6 190.6 171.35 25.55 0.930 140.0 140.0 140.0 170.45 25.21 0.940 14400 140.0 160.9 171.35 26.97 0.940 14400 20.0 23.8 169.74 24.84 32.0% 160.07 110 22.41 14600 240.0 23.8 169.74 24.52 1130 32.41 14500 240.0 23.8 169.74 24.52 1130 32.41 14500 240.0 23.8 169.74 24.17 110 32.41 14500 240.0 25.8 168.79 23.63 23.63 12.10 24.11 14500 240.0 25.8 169.74 24.17 12.10 24.11 14500 240.0 25.8 169.74 24.17 12.10 24.11 14500 240.0 25.8 169.74 24.17 12.10 32.41 14500 240.0 25.8 169.74 24.17 12.10 32.41 14500 240.0 25.8 169.74 24.17 12.10 32.41 14500 240.0 25.8 169.74 24.17 12.10 24.11 14500 240.0 25.8 169.74 24.17 12.10 24.11 14.250 24.0	ı		14267	 	2038	178.30	180 -1.70		33.40			
0746 527 14270 1D 1427 177.48 } 19272 12 1189 176.90 190-3.10 32.00 19274 14 10 1020 174.57 190-3.43 31.67 19276 16 892 174.27 190-3.33 31.67 19276 16 892 174.27 190-3.33 31.07 0750 238 19280 20 714 175.73 180-4.03 31.07 0755 19285 25 571 175.23 180-4.71 30.33 31.07 0755 19285 25 571 175.23 180-4.71 30.33 31.07 0800 19210 30 976 174.82 22.88 124.16 124.16 124.	 		141268	8	1784	177.83	180-7.17		32.93			
19272 12 189 176.90 190-3.10 32.00 19274 14 1020 176.57 170-3.43 31.67 19276 16 892 174.27 193-3.43 31.37 19278 18 773 135.47 180-4.03 31.67 2750 238 19280 20 714 175.73 130-4.21 70.83 70.83 2755 19285 25 571 175.23 180-4.77 30.33 30.33 19275 35 19285 25 571 175.23 180-4.77 30.33 30.33 19285 25 571 175.23 180-4.77 30.33 30.33 19295 35 1938 174.14 24.55 24.55 19295 35 1938 174.14 24.28 24.28 24.28 19295 35 1938 174.14 24.28 24.28 24.28 19205 1930 10 236 173.35 28.95 28.70 1920 2738 1938 10 50 236 173.36 28.70 28.70 1923 1923 70 205 172.84 27.94 27.94 0850 279 1939 30 179.3 172.46 175-2.54 27.25 27.56 28.007 1938 1938 120.1436 171.35 26.95 27.97 1938 1938 120.1436 171.35 26.95 27.97 1938 1938 120.1436 171.35 25.57 25.57 27.58 27.58 27.59 27.58 27.59 27.50	ļ		14269	9	1585	177.40	170- 2.60		37.50			
14274	0740	537	14270	10	1427	177.48	3		•			
14276 16 892 176.27 149.23.73 31.37 14278 18 743 175.97 180.4.03 31.07 0750 238 14280 20 714 175.73 130.4.27 70.83 0755 14285 25 571 175.23 180.4.77 30.33 0800 14210 30 476 774.82 29.95 0810 22.33 14300 40 75.8 174.18 29.55 0810 22.33 14300 40 75.8 174.18 29.28 0810 22.33 14300 50 286 173.60 28.70 0820 29.38 14710 50 286 173.60 28.70 0830 18320 60 239 173.32 28.42 0840 50.38 14730 70 205 172.84 27.94 0850 29 14350 100 143.6 171.85 27.25 0910 29.39 14350 100 143.6 171.85 26.95 0930 14360 100 143.6 171.85 26.95 0930 14360 100 143.6 171.85 26.95 0930 14380 100 143.6 171.85 26.95 0930 14380 100 143.6 171.85 26.95 0930 14380 100 143.6 171.85 25.99 0910 29.39 14380 100 143.6 171.85 25.99 0910 29.40 14400 140 102.9 170.89 0100 29.40 14400 140 102.9 170.89 0100 29.40 14400 140 102.9 170.89 0100 29.40 14400 140 100 100.1 100.1 050 9.40 14400 140 100.1 100.1 050 9.41 14460 140 160.9 170.89 0100 29.40 14400 140 160.9 170.89 0100 29.40 14400 140 160.9 170.99 0100 29.40 14400 140 160.90 170.11 050 29.41 14460 200 72.3 169.74 29.85 0100 29.41 14460 200 72.3 169.74 29.85 0100 29.41 14460 200 72.3 169.74 29.85 0100 29.41 14460 200 72.3 169.74 29.85 0100 29.41 14460 200 20.3 169.74 29.85 0100 29.41 14460 200 20.3 169.74 29.85 0100 29.41 14460 20.0 20.3 169.74 29.85 0100 29.41 14460 20.0 20.3 169.74 29.85 0100 29.41 14460 20.0 20.3 169.85 0100 29.41 14460 20.0 20.3 169.85 0100 29.41 14460 20.0 20.3 169.85 0100 29.41 14460 20.0 20.3 169.85	l		14272	1	1189		190- 3.10		32.00			
14718 18 793 175.77 180.4.03 31.07 31.07 0760 238 14280 20 714 175.73 135.4.27 30.83 0755 14285 25 571 175.23 180.4.07 30.33 0.755 14285 25 571 175.23 180.4.77 30.33 0.755 14285 25 571 175.23 180.4.77 30.33 0.755 14285 25 571 175.23 180.4.77 30.33 0.755	<u> </u>		14274	14	1020	176.57	170 - 3.43		31.67			
0750 238 14280 20 714 175.23 135-4.21 30.83 0755 14285 25 571 175.23 186-4.77 30.83 0755 14285 25 571 175.23 186-4.77 30.83 0860 14210 30 476 174.82 21.95 0810 20.33 14300 40 35.8 174.45 22.55 0810 20.33 14300 40 35.8 174.45 22.89 0815 14305 46 318 173.85 28.95 0816 20.33 14300 50 286 173.60 28.95 0830 14320 60 239 173.32 28.42 0840 20.38 14330 70 205 172.84 27.94 0850 200 14350 90 179.3 172.46 175-2.54 27.56 80.0% redown a 19.30 14.35 20 1			14276		892	176.27	140-3.73		31.37			
0755 14285 25 571 175.23 180-4.77 30.33 29.92 14210 30 476 174.82 29.95 29.95 29.28 29.29 29.28 29.2				 	793	175.97	180- 4.03		31.07			
880 1/210 30 476 174.82 29.92 29.95 29.28	0750	238	<u>14280</u>	20	714	175.73	130- 4.27		30.83			
14295 35 408 174,45 29.58 29.28 0816 2238 14300 40 258 174,18 29.28 28.95 27.94 27.25 27			14285	25	571	175.23	180-4.77		30.33			
0910 2 338 14300 40 358 174.18 29.28 28.95	0800		14290	30	476	174.82			29.92			
6815 14305 46 318 173.85 28.95 6820 3° 238 14310 60 286 173.60 26.70 0830 14320 60 239 173.32 28.42 0840 5° 238 14330 70 205 172.84 27.94 0850 239 14340 80 179.3 172.46 175.2,54 27.25 0910 2° 29 14360 100 193.6 171.85 26.95 0930 19380 120 119.8 171.35 26.45 0910 2° 29 14400 140 102.9 170.89 25.99 0930 1940 14400 140 102.9 170.89 25.99 1010 2° 240 14400 180 90.2 170.11 25.21 1030 140 14400 180 90.2 170.11 25.21 1030 14400 180 90.2 170.11 25.21 1030 14400 180 90.2 170.11 24.352	ı				408	174.45			29.55			
8820 3° 158 14310 50 286 173.60 28.70 0830 14320 60 239 173.32 0840 5° 238 14330 70 205 172.84 0850 239 14350 90 159.4 172.46 175-2,54 27.56 0930 1639 14350 90 159.4 172.15 0910 20 219 14360 100 143.6 171.85 0930 40 239 14380 120 119.8 171.35 0930 40 239 14380 120 119.8 171.35 09450 240 14400 140 102.9 170.89 1010 20 240 1440 180 80.2 170.11 1030 40 240 1440 180 80.2 170.11 1050 241 14460 200 72.3 169.74 1130 40 241 14460 200 72.3 169.74 1130 40 241 14500 240 60.4 169.07 1150 242 14520 260 55.8 168.79 1210 20 242 14520 260 55.8 168.79 1210 20 242 14520 260 55.8 168.79 1210 20 242 14540 280 51.9 168.53 23.63	0810	22238	14300	40	358	174.18			29.28			
0830 14320 60 239 173.32 28.42 27.94 27.94 0850 239 14340 80 179.3 172.46 175-2,54 27.25					318	173.85			28.95			
0840 5°238 14330 70 205 172.84 27.94 27.94 0850 239 14340 80 179.3 172.46 175-2.54 27.56 80.0% recovery 12.39 14340 80 179.3 172.15 27.25 0910 2939 14360 100 143.6 171.85 26.95 0930 49.39 14380 120 119.8 171.35 26.45	820	238	14310	50	286	173.60			28.70			
0850 239 14340 80 179.3 172.46 175-2.54 27.56 80.0% recovery 1239 14350 90 159.4 172.15 27.25 27				60	239	173.32			28.42			
0850	0840		14330	סד	205	172,84			27.94			
0910 30 14360 100 143.6 171.85 eq30 40 239 14380 120 119.8 171.35 eq450 240 14400 140 160 90.1 170.45 1010 20 40 1440 180 80.2 170.11 ep50 241 14460 200 72.3 169.74 1110 20 41 14480 200 60.4 169.07 1130 40 41 14500 240 60.4 169.07 1150 242 14520 260 55.8 168.79 1210 20 41540 280 51.9 168.53 123.63		239	14340		179.3	172.46	175-2,54		27.56			80.0% recovery
0930 40 739 14380 120 119,8 171.35	 	239	14350						27.25			3
0450 240 14460 140 162.9 170.89 1010 20 40 14420 160 90.1 170.45 1030 40 14440 180 80.2 170.11 1050 241 14460 200 72.3 169.74 1110 20 41 14480 220 65.8 169.42 1130 40 241 14500 240 60.4 169.07 1150 242 14520 260 55.8 168.79 1210 20 42 14540 280 51.9 168.53 123.63	0910	239	14360	100	143.6	171.85			26.95			
10 0 240 14420 160 90.1 170.45 25.55 81.5% YECONOV II. 1030 40 14440 180 80.2 170.11 25.21 1500 241 14460 200 72.3 169.74 24.52 1130 40 14460 24		239	14380	120	119.8	171.35			26.45			
1030 40 14440 180 80.2 170.11 25.21 25.0 1650 241 14460 200 72.3 169.74 24.84 82.0% recovered 1110 201 14480 220 65.8 169.42 24.52 24.52 24.17 150 242 14520 240 60.4 169.07 24.17 150 242 14520 240 55.8 168.79 23.89 1210 201 14540 280 51.9 168.53 23.63		240	14400	140					25.99			
1030 1944 1944 180 80.2 170.11 25.21 25.21 24.84 32.0 % recovered 110 2°241 14460 200 12.3 169.74 24.52 24.52 24.50 241 14500 240 60.4 169.07 241.17 150 242 14520 260 55.8 168.79 23.89 1210 2°242 14540 280 51.9 168.53 23.63 23.63		240	14420	160		170.45			25.55			81.5% YELOURY IS
11 10 2241 14480 220 65.8 169.42 24.52 24.52 1130 40241 14500 240 60.4 169.07 24.17 150 242 14520 260 55.8 168.79 23.89 1210 2242 14540 280 51.9 168.53 23.63	1030	240	14440	180					25.21			0
1130 40 14 14500 240 60.4 169.07 24.17 1150 242 14520 260 55.8 168.79 23.89 1210 2242 14540 280 51.9 168.53 23.63	650	20/1	14460	200		T			24,84			82.0 % recoveny
1150 0242 14520 260 55.8 168.79 23.89 1210 20 242 14540 280 51.9 168.53 23.63	1110	241	14480	220	65.8				24.52			
1210 242 14540 280 51.9 168.53	19 1	241	14500	240	60.4	169.07			24.17			
	1150	242	14520	260	55.8	168,79			23.89		I	
11/730 11/6/10 700 1/95 1/4 00 1	1210	242	14540	280	51.9				23.63			
19 300 46.3 (63.28 170-1.71 23.38 93.1% recovery	1230	242	14560	300	48.5	/48.28	170-1.72		23.38			83.1% recovery
1300 243 14590 336 144.2 167.88	1300	243	14590	330	44.2	1			22.98			3
1330 40243 14620 360 40.6 167.52 22.62	133.0	1243	14620	360	40.6				22.62			
1400 19244 14650 390 37.6 167.17 22.27	1400	244	14650	390	37.6							
1430 40 744 14680 420 350 166 27 2197 2197	11430	ا 44 وسرا	14680	420	320	146 27	I	1	7197	1 1	Į.	011.0

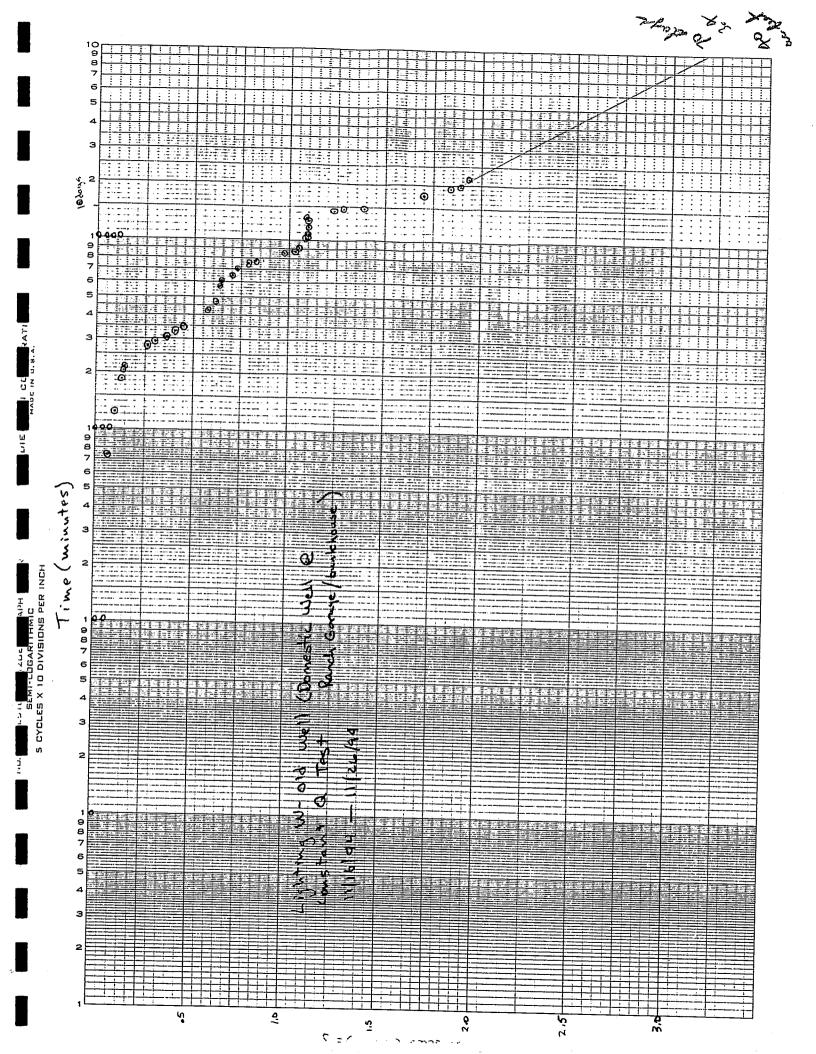
DEPARTMENT OF PUBLIC WORKS

WELL Lightning W-new	well
PUMPING OBSERVATION WELL	
PUMPING/RECOVERY DATA	
PAGE 2 OF	

HOW Q MEASURED 3'x4' HOW WL'S MEASURED 2\eartiece PUMPED WELL NO RADIUS of PUMPED WELL	PUMPING TEST stant Q orifice weir tric sounder	M.P. for WL's DEPTH of PUMP/ % SUBMERGENCE PUMP ON: date	PUMPING/E PAGE AIRLINE initialtills/944tills/94	; pumping ime0950	- -
TIME t= 14260 at t'=0	WATER LEVEL DATA		WATER PRODUCT.	COMMENTS	
NOCK ELAPSED TIME	READING CONVERSIONS WATER CORRECTIONS LEVEL	S or(S')		(NOTE ANY CHANGES IN OBSERVERS)	1

DIS	TANCE	trom F	OMPEL	WELL				PUMP OFF: d	ate 11/26/94	/ ti	me <u>0730</u>
† =	14260	ME at t	=0	,	WATER LEVEL DATA STATIC WATER LEVEL 144.90				WATER PRODUCT.		COMMENTS
CLOCK TIME	nas hrs	SED TI	t,	1/1	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	S or(S')		Q	(NOTE ANY CHANGES IN OBSERVERS)
1500			450	32.7	166.62			21.72		Æ	max.S= 138,05
153 p	40245	14740	480	30.7	166.30			21.40	, design of		
1600	246	14770	510	29.0	166.00			21,10	4		84.7% recover.
1650	247	14820	560		165.68			20.78	1		
720	2247	14850	590	25.2	165.40			20.50	i. L		85.2% reasery
1800	10 248	14890	630	23.6	165.05			20.15	•		C
1900		14950	690	21.7	164.60			19.70			85.7% reevery
2000				20.0				19.26			86.%
			810		163.73			18.83	ja .		
2200			870		163.39			18.49			
2400	254		990		162.61			17.71			
0200			1110		167.86			16.96			
2410		<u> </u>	1240		161.27			16.37			
0550		15600	1340	11.6	160.73			15.83	1		
0830	/	15760	1500	10.5	159.83			14.93			89% KEC EE
1100		15910	1650	9.6	159.20			14.30	i)		
1330	_	16060	1800	8.9	158.54			13.64		ì	90%
1630		16240	1980	8.2	157.90			13.00			90.5%
2200		16570	2310	7.2	156.86			11.96			91.3% recovers
0650	\angle	17100	2840	6.0	155.42			10.52			
1310	_	17480	3220	5.4	154.35			9.45			93.2% recovery
1800		17770	3510	5.1	153.64			8.74			5
0725		18575	4315	4.3	151.85			6.95		•	95.0% recovery
1730	\angle	19 180	4920	3.9	150.76			5.86			3
0720	\angle	20010	5750	3.5	149.27			4.37			96.870 recovery
1850	\angle		6440		148.23			3.33			3
0725	\angle	21455	7195	3.0	147.16			2.26			98 % RECOVERY
1415		21865	7605	2.9	146.23	?		1.33			99.0% recovery
											3
	_									1	
											···
	_										
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	$\overline{}$							·			

0 10= 175 for first 1600 mm LIGHTWING W-NEW WELL = 130 For Duration RECOVERY DATA 0 0 0 0 0 0 0 O 000 Ð 00 ္စစ



DEPARTMENT OF PUBLIC WORKS

WELL DOMESTIC WELL
PUMPING OBSERVATION WELL PUMPING RECOVERY DATA
PUMPING/ RECOVERY DATA
DAGE 1 OF 3

UTILITY DIVISION	PUMPING	TEST DATA	PUMPING/R	RECOVERY DATA
TYPE of PUMPING TEST	ONSTANT Q		PAGE 1	0F 2
HOW Q MEASURED	RIFICE 3"X4"	M.P. for WL's	4th STEP	— elev. ————
PUMPED WELL NO		% SUBMERGEN	NCE: initial	; pumping
DISTANCE from PUMPED WEL				
TIME t= at t'=0	WATER LEVEL 7	1.48	WATER PRODUCT.	COMMENTS
LOCK ELAPSED TIME	PEADING CONVERSIONS	WATER Secol		(NOTE ANY CHANGES IN

DIS	TAIVUE	Trom F	UMPE	WELL	- PUMP OFF : date					time		
† =	:	ME at t	=0		STATIC	WATER LEVEL DATA STATIC WATER LEVEL 71.48				WATER PRODUCT		COMMENTS
CLOCK	ELAP mins hrs	SED TI	ME. †'	t/t ¹	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
09/2		2			71.48			0				
0914		4			71,48			0				
0916		6			71.48			0				
0918		8			71,48			0	•			
0920		10			71,48			0				
0925		15										
0930		20										
0935												
·					-							
0950		Rest	art									
1000		10			71,50			-				
10 10		20			71.50							
ا		30			71.50							
		53			71.50							
1130		100			71.50							
1215		145			71.51							
1340		230			71.52							
	36 3	336			71.52							
	40 6	400			71.52							
	0 9	540			71.53							
2050	0 11	৮৫০			71.54							
2210	20/2	740			71.56			0.06				
23 20	30 13	810			71.56							
1 0200	10 16	970			71.57							
0610	20 20				71.58			6.10				
0805	15 22	1335			71.56			•				
1130		1540			71.58							
	5030	1850			71.61			0.13				
1800	10 32	1930			71.61			0.13				EE
2000		2050			71.62			0.14				<u> </u>
	10 36	2170			71.63			0.15				
0745	55 45	2755			71.74	1		0.26				
1010	20 48	2960			71.78			0.30			 	
1300		3070			71.84			0.36				
.1610	20 54	3260			71.88			0.40				
	5 ⁵ 51				71 92			0.44				
0830	40 70	W2 40	-		72.05			0.57				
1700	10 79	4750			72.10			0.62				
0830	40 99	5680			72.14			0.62				
14.45					72 16			÷ 1, 0				
		1	'	•	1	ŗ	'	.,	'	'	•	· ·

WASHOE COUNTY WELL DOMESTIC WELL **DEPARTMENT OF PUBLIC WORKS** PUMPING OBSERVATION WELL PUMPING RECOVERY DATA PUMPING TEST DATA **UTILITY DIVISION** TYPE of PUMPING TEST _____CONSTANT Q PAGE 2 OF 2 - M.P. for WL's 4Th STEP elev. -HOW Q MEASURED HOW WL'S MEASURED ______ Wrt _____ Wrt _____ SUBMERGENCE: initial _____; pumping ___ PUMPED WELL NO. ____ RADIUS of PUMPED WELL PUMP ON: date 11/16/94 time 0950 DISTANCE from PUMPED WELL __ TIME WATER LEVEL DATA WATER COMMENTS at t'=0 STATIC WATER LEVEL 71.48 PRODUCT. CLOCK ELAPSED TIME CONVERSIONS CORRECTIONS WATER (NOTE ANY CHANGES IN OBSERVERS) t / t' READING (S) or S' LEVEL 2240 50 108 6530 72.18 0.70 0825 35 118 7,115 72.21 0.73 125 7500 0.79 1450 72.27 9 129 7740 72.31 0.83 ²⁵ 141 8485 72.45 0.97 1450 2149 8940 72.51 1.03 154 9240 72.53 195D 1.05 168 10,080 0950 72,57 1,09 700 10 175 10,510 72.58 1.10 2030 40 178 10,720 72.58 1.10 0725 35 189 11,375 72.59 1.31 20 AA 11,960 72,58 סוך/ 1.10 0630 40212 12760 72.58 1.10 1030 40 216 13000 72.56 1,08 0935 45239 14385 125 72.72 Vecovery 1.24 ABarametric pressure? 10 242 14530 270 72.76 1.28 1510 20245 14720 460 72.83 1.35 1810 14900 640 72.87 1.39 17,500 3240 73.18 1330 1.70 73.3Z 1735 19185 4925 1.84 0725 19955 5755 73.37 1.89 73.36 7725 21395 7195 1,88 1400 21790 7590 73,38 1.90

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

WELL A	Lahtha	a W	<u>Nen</u>	سورر
PUMPIN	GYOBSERV GYRECOVE	VATION V	/ELL	
PUMPIN	RECOVE	RY DATA	\ _	
PAGE _	_1_ 0F _	4		

TYPE of PUMPING TEST Constant Flow	PAGE 1 OF 4
HOW Q MEASURED 3x4 orifice wein	M.D. for William
HOW WE'S MEASURED ETECTIVE SOLVED	DEPTH of DIMP/AID INC
PUMPED WELL NO NEW WY!	9/ OUDMEDOCALOG
RADIOS OF FOMFED WELL	PUMP ON: date <u>1116/94)</u> time 0450
DISTANCE from PUMPED WELL	PUMP OFF: date time

DIS	STANCE	from	PUMPE	WELI	L	PUMP OFF : date					time		
1=	TIME t = at t'=0 CLOCK ELAPSED TIME t = mins nrs t t' t/t'				STATIO	WATER LEVEL DATA STATIC WATER LEVEL 144.90			WAT PROD	ER	COMMENTS		
CLOCK	mins hr	SED II	ME t'	t/t'	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	S or S'		Q	(NOTE ANY CHANGES IN OBSERVERS)		
0150		0								1750	2 m= 171/2"		
		5			222.00			77.10		- 91	/M-1//2		
0957		7			224.30			79.40		†			
		8	<u> </u>		224.48			79.58					
		9	<u> </u>		225.40			80.50					
1000	\angle	10		<u> </u>	225.83			80.93					
		12	ļ <u>.</u>		226.62			81.72					
		14			227.92			83.02					
		16			228.83			83.93					
<u> </u>		18			229.70			84.80					
1010		20	<u>.</u>		230.35			85.45			•		
<u> </u>	/	25			231.89			86.99					
		31			233.18			88.28					
<u> </u>		36			234,25			89.35					
<u> </u>		41			234.47			89.57			Q.T		
<u> </u>		45			235.60			90.70		-	L.I sand		
	<u>/</u> ,	50			236.30			91,40					
1050		62			<i>2</i> 37.95	240-2.05		93.05					
ļ		70			239,58			94.68					
<u> </u>		80			241.03			96.13			Q.T		
1120		90			242.28			97.38					
1130		100			243.00			98.10			QA.		
1150		120			244.81			99.91					
1212		142				250.3.25		101.85			SPCOP 1.72		
1240		170			248.56			103.66			Neet Tape Measure !!		
1250		180				250-11"		105.02			Q1		
1310	\leftarrow	200				251+7.7"		106.74					
1330		220		$\overline{}$		252+6,5"		107.64			5and = . 1 Q1		
1350	20 4	240				255-1.25		108.85			Q1		
		260			155.77			110.87					
1430	-4	280	.			256+3.5"		111.39					
1450	30	300			257.10	257+ 1.211		1/2.20			Q1 e 1505		
1520	5	330			258.54			113.64					
1550	30/	360		Į.	259.05			114.15			Q↑		
1620		390			260.37			115.47			5230 KWH 6hrs		
					260.15			115.25		101/2	0 1		
1750 1845		480			26204			117.14					
1936	.6		\longrightarrow		263.28			118 38			97		
2020					265.39			120.49			Officett getting		
	10	الرديا	l	1	266 33	ŀ	, 1	121 42	1 1	1	MA		

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

WELL LIGHTNINGW	NEW WELL
PUMPING/OBSERVATION PUMPINGY RECOVERY DA	WELL
PUMPINGY RECOVERY DA	ΤΔ

OTILITI DIVISION	OMIT INTO TEST	PUMPING RECOVERY	ΠΔΤΔ
TYPE of PUMPING TEST Constant @		PAGE 2. OF 4	
HOW Q MEASURED 3 X4 orifice	blete	up as we too of well plate.	-
HOW WL'S MEASURED _ CLECTRIC SOUND	er	DEPTH of PUMP/AIRLINE wet	
PUMPED WELL NO. New Je U		% SUBMERGENCE: initial	olog
RADIUS of PUMPED WELL 8" diama	ter	PUMP ON : date 11/11/94 time 095	<i>\$</i> 3
DISTANCE from PUMPED WELL		PUMP OFF : date time	

CLOCK FLAPSED TIME 1/1 PREADING CONVERSIONS WATER LEVEL SORS' Q (NOTE A OBS) 2120 30 11 690 267.64 122.74 1744 4 2220 30 12 750 268.86 123.96 17/4 4 2330 40 13 820 270.84 125.94 17/4 4 0040 50 14 890 272.15 127.25 17/2 0206 10 16 970 273.66 128.76 4 17/2 0405 15 18 1095 275.10 130.20 17/4 4	MMENTS ANY CHANGES IN SERVERS)
TIME MIPB 1 1 1 1 1 1 1 1 1	NY CHANGES IN
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
2330 40 13 820 270.84 125.94 1714 4 0040 50 14 890 272.15 127.25 1712 0206 10 16 970 273.66 128.76 41712 0405 15 18 1095 275.10 130.20 1714 4	
0206 10 16 970 273.66 128.76 2171/2 0405 15 18 1095 275.10 130.20 171/4 A	
0405 15 18 1095 275. 10 130.20 17/4 1	
10.00 10.000 10.000 11.00	
0620 30 20 1230 278.50 133.60 1744 1	
0815 25 22 1345 281.56 136.66 174-178 EE QT	@ 0715 0 10%-17
1000 24 1450 283.78 138.98	
1110 20 25 1520 285,53 140.63	
1230 90 26 1600 288.12 290-1.88 143.22 . 10 2 1150	9/5=1.22
1455 799.32	
1330 40 27 1000 Reduced Q TO 130 gpm = 91/2"	
1334 1064 4 250.00 105,10 91/2'	
1339 1669 9 24000 95.10	
1355 1685 25 246.20 101.30	
1705 45 247.80 102.90	
1430 40 28 1720 247.68 102.78	
1520 3029 1770 247.62 102 72	
1630 730 1840 24747 107 57	
1730 31 1900 247.30 102.40 QA	
1930 90 33 2020 248.21 103.31 155	
2130 40 35 2140 248.88 103.98 91/2" 910 101	б
2330 40 37 2260 249.40 104.50 91/2	
0230 40 2440 250.15 105.25 912	
0500 10 43 2590 250.70 105.80 94 10	
0730 44 45 2740 252.46 107.56	
1000 10 48 2890 253.06 108.16	
1230 +50 3040 253.50 /08.60 1253-te	mblor!!
1500 53 3190 253.77 108.87 9 1/4 QA	
1600 1054 3250 254.83 109.93 91/2	
1900 10 57 3430 255.96 111.06 91/2	
2100 59 3550 256.46 111.56 91/2	
256.66 111.78 972	
10400 40 5470 251.65 (11.75) 972	
0725 30 4170 257.90 113.00 91/2 010 01	50
1020 30 72 4350 258.72 113.82 91/2	
1250 75 4500 259.17	
1520 30 77 4650 259.40 114.50 "	
1940 30 RI 4910 260 00 11510 117.	

DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION

PUMPING TEST DATA

WELL LIGHTNING W (New well)
PUMPING/OBSERVATION WELL
PUMPING/RECOVERY DATA

1		COMPAND RECOVERY DATA
TYPE of PUMPING TEST .	CONSTANT Q	PAGE 3 OF 4
HOW Q MEASURED _	3"x4" orifice plate weir	- M.P. for WL's
HOW WL'S MEASURED _	electric sounder	DEPTH of PUMP/AIRLINE wrt
RADIUS of PUMPED WEL	L	PUMP ON : date
DISTANCE from PUMPED	WELL	PUMP OFF : date time

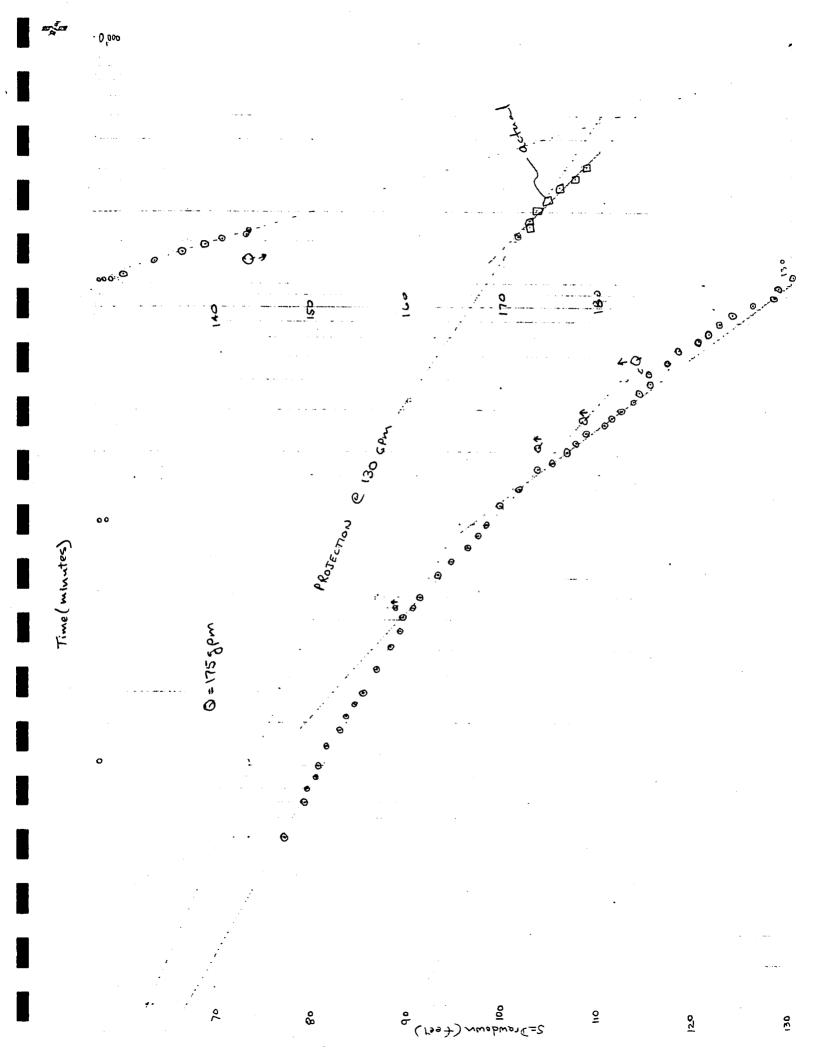
	DIS	TANCE	from F	UMPEC	WELL				PUMP OFF :	date	ti	me	-
	TIME t = at t'=0 CLOCK ELAPSED TIME						WATER LEVEL DATA STATIC WATER LEVEL 144.90					COMMENTS	
	CLOCK TIME	mins hrs	SED TI	ME t'	t/t¹	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	(Sors'		Q	(NOTE ANY CHANGES IN OBSERVERS)	
1	1940	52/8\	4910			260.00			115.10		91/2	KWH 7779 (USE 0)	1.5
i	2110		5000			260.25			115.35		9 1/2	IN 76 ha)	1
	2350		5160			260.38			115.48		91/2		1
بر	0245	\setminus	5335			261.02			116.12	•	91/2		1
	0540		5510			261.50			116.60		491/2		1
	0740		5630			262.26			117.36		9/2	KWH 8176	1.4
	1050	0/97	5820			262.91			118.01		91/2		1
	1450	0/5	6060			263.59			118.69		91/2	Q ok e 1700	1
	1850	0/05	6300			263.62			118.72		9/14		1
	2300	10 109	6550			264.87			119.97		91/2"		1
M	0345	55/113	6835			251.96			107.06			QTE 0300 MANNETEN	1
	0530	40 115	6940			263.10			118.20			@ 0330 MANOMETER IS CLOU	1,
	2930		7180			265.21			120.31		91/2"	FLOW 8-81/2" DISCHARGE LOS	
1	1250	0/	7380			266. 17			121.27		<u> </u>	DISCOCORED.	1
	1650	^	7620			266.15			121.25		91/4	QŤ	1
1	1800		7690			267.70			122,50		91/2		1
	2050	2	7860		,	267 44			122.54		91/4	QΨ	1
	2250		7980			267.97			123.07		91/2		1
L	0150		8160			268.40		_	123.50		914	QI	
	0450		8340			268.76			123.86		914	Q1	
1	0750	•	8520			270.95			126.05		91/2		ĺ
	1150		8760			271,21	275-3.79		126,31		11		ł
	1650	0/5	9060			271.73	2/3-3./4		126.33				ł
	1950	_	9300	l		272.35			127.45		LI		1
1			9420			27275		<u>.</u>	127.86		11		
		2/10				272.98			128.08		\ \ \ \ \ \		
	M15	25 162	9740			272.62	772		127.72				
		25/166				275.13	-				9112-93/	Sensitivity on sounder was	°" ::
	12 15	25 170	1703	_		276.03			130.23		472-172	. Q♥	
	1/430	40 174	10,225			277.05			131.13		01/2"	QT @ 1600 EE	1
1	2050		•			276.77			131.87		7 12		
		0 181	10,740			277.42			132.52		91/2	EE	ł
	0250	0 185	ממו וו	 		278.15			132.25		912		
		20 188				276.43	7		131.53		91/2	,	
		20 193				277.34	•		132.44			***************************************	l
		20/	11000								91/2"	PE Q1 @ 1015	
	1910	20/197	11840	 		278.80	<u></u>		133,90		91/2	Q12 1800	
	7150	0 204	12080			279.50			134.60			Qta wee bit \$ 2100	
0115-10	0150	0 208	12240	_		283.00		<u> </u>			291/2	CX 1 a wee site Find	
1:	טנוט	200	14 700			LO3.16			138.26		127.2		

WASHOE COUNTY DEPARTMENT OF PUBLIC WORKS UTILITY DIVISION PUMPING T

WELL Lightning W (you w	e11)
PUMPING OBSERVATION WELL	,
PUMPING RECOVERY DATA	
PAGE_4 OF 4	

1 0111 114	PUMPING RECOVERY DATA
TYPE of PUMPING TESTCONSTANT Q	PAGE 4 OF 4
HOW Q MEASURED 3" x 4" ORIFICE WEIR	M.P. for WL's TOP OF CASING Blev.
HOW WL'S MEASUREDELECTRIC SOUNDER	DEPTH of PUMP/AIRLINE wrt
PUMPED WELL NO LIGHTNING W NEW WELL	% SUBMERGENCE: initial; pumping
RADIUS of PUMPED WELL	PUMP ON: date 11/16/44 time 0950
DISTANCE from PUMPED WELL	PUMP OFF : date time

	DISTANCE from PUMPED WELL							PUMP OFF : date time						
	TIME t = at t'=0 CLOCK ELAPSED TIME TIME mins t t' t/t'					WATER LEVEL DATA STATIC WATER LEVEL 144.90					WATER PRODUCT.		COMMENTS	
	CLOCK TIME	ELAP:	SED TII	ME t'	t/t ^L	READING	CONVERSIONS CORRECTIONS	WATER LEVEL	⑤br S¹			Q	(NOTE ANY CHANGES IN OBSERVERS)	
	0620	30212	12750			2.84.53			139.63			934	Q jumps to 12"	
	0640											91/2	adi Q 1 1 51	
	0800	10 214	12850			278.58			133.68				Q+ 6745 EE	
	1200	10 218	13090			279.60			134.70			91/2	Q+ @ 1200 SE	
ĺ	1600	222	13330			280.98			136.08			91/2	EE QT VERY LICHTUR	
	2000	10 224	13570			282.28			137.38			9/2		
	2400	10/230	13810			282.68			137.78			912	QoK	
,	0400	10 234	14050			282.84			137.94			91/2	Qok	
	0729	33 237 40 237	14259			282.95			138,05					
	0730	40/237	14260			shut	of-f							
		\angle				_								
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t			1		(,		1	,	ı	,	1	



264.175 = 1400

374

2nd T 40 = 71.5

244.130 = 1400 X

264 .130 = 2000

264.130 = 3200

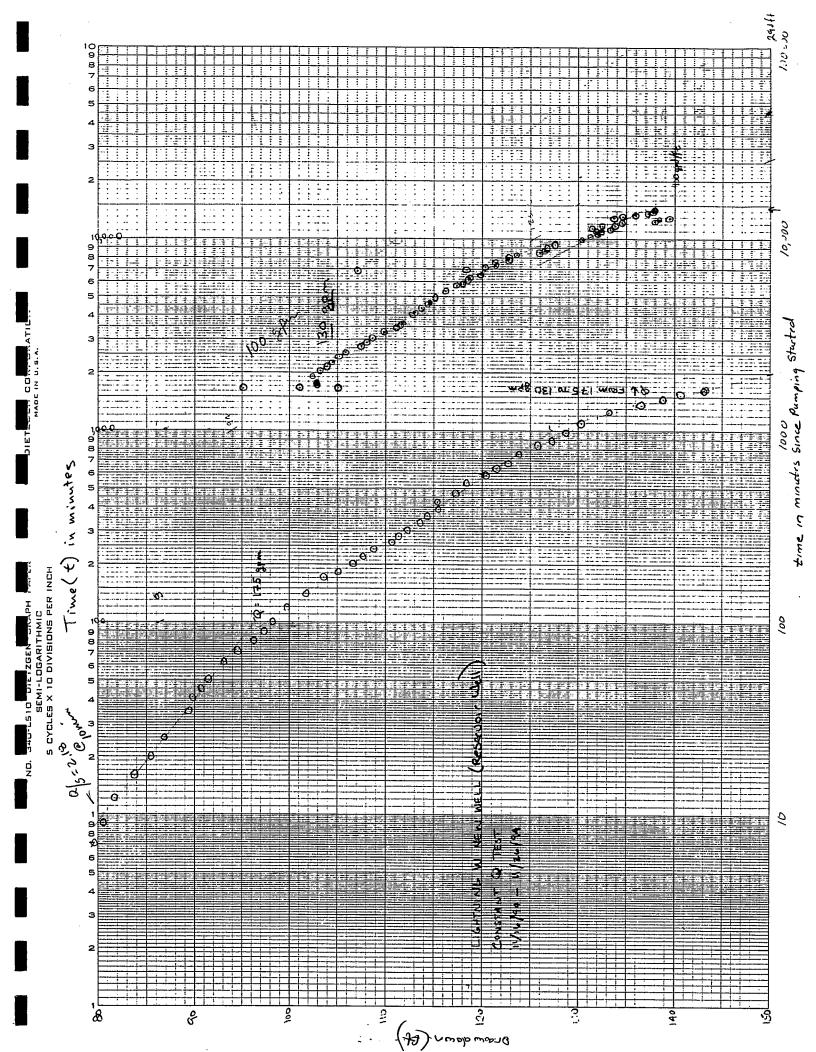
x = 10.7

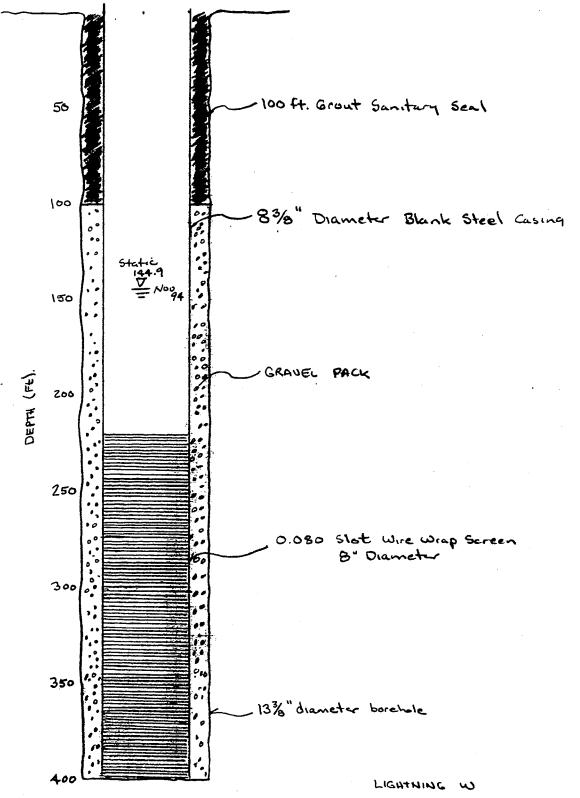
23 = 2000

1st T de 95.5-81 = 19.5

3,200

24.175





AS CONST.

#1 July 07 rim. mail

MEMO



1105 TERMINAL WAY, SUITE 304 RENO, NEVADA 89502 702-786-5873

Page 1 of 1

Date: July 20, 1995

THEING DINISHING CES Job No.: 94116.43

SUBJECT:

Pump for Lightening W Upper (Ag) Well APPROVED BY " WITH REGARD TO

TO:

Bob Weise Ted Brown

FROM:

Tom Kelly

The pump for the Upper Well must meet a TDH of 430 to 435 ft (Assuming 3-inch diameter column pipe) at 110 gpm while pumping to the domestic water system. For open delivery to the golf course system, the TDH and Q depends on the actual drawdown in the well. It appears a Berkeley 10 stage,6T-150 pump with 3.69-inch impellers and 25 Hp motor will meet the required conditions. See attached calculations and cut sheets. The operating capacity of the pump needs to be confirmed with the pump supplier prior to ordering.

With this pump, the efficiency at 110 gpm will be 60 to 65% during flow to the domestic water system. Flow to the golf course will be from about 150 to 200 gpm depending on the drawdown in the well. The well drawdown at pumping rates in excess of 110 gpm has not been determined. Pumping to the golf course at rates higher than 110 gpm will help establish the ultimate capacity of the well.

The largest diameter of the pump and motor is at the pump bowl measuring from the outside of the pump bowl to outside of wire guard. For the specified pump the measurement is 5.81 inches. This will leave 0.44 (.22 inches each side) inches between the pump and inside of the 6-inch nominal diameter casing.

In addition to the pump, the well is to be equipped with a Monitor or Maas Pitless Unit. It is also suggested that a low water electrode or the Franklin Subtrol unit be installed in case the water level drops to the pump intake during higher pumping rates. A 44" water best stilled with the religion prior to ordering in case they have any concerns or input.

Consulting Engineering Services, Inc.



9 2	is, inc.	JOB # 94/16, 43
OWNER	Lightening U)	7/19 19 95 COMP. BY TLK
PROJECT	WELL PAMP	CK'D BY
SUBJECT	PUMP REQUIREMENTS	PAGE / OF Z

DATA:

FROM UTILITY DIVISION (John Bronder)

TANK PAO ELEU: 5389.6 Height: 24 ft.

WELL HOUSE F.G. : ~ 5196 PUMP:

340' -> Pump Intake 275' Pumping Level

TDH w/23' of water in tank. cale. TDH = 493 fs.

PUMP supplied for project is fixes w/+p#=530==

FROM Date for Upper Well (Ag Well)

Q = 110 gpm @ Pumping Level of 193ft.

Set pump @ 360ft.

At pumping love = 330 et à pumping to etmospiene Q = 155 4pm.

Consulting Engineering Services, Inc.



PROJECT Well Pump

SUBJECT Pump Requirements

JOB # 94/16 : 43 7/19 19 95 COMP. BY TZL

PAGE ZOF Z

360 ft, 3" pump coli @ 110qpm. @ 0.025 ct/ct. → 9 ft.

9" Propeller Meter @ 110qpm.

735 ± 1. 4" NVC Pipe @ 110qpm. @ 0.008 ft/ft → 6 ft

80 ft. 4" PIRE @ 200 qpm. @ 0.025 → 2 ft.

18 Ft. +10% 2

ZOFE.

WATERSURFACE, TUNK @ D=23ft. 54/3

RUMPING LEUGL ELEU. - 4999

414 St.

20

Thu = 434-25

10 stage Berkeley 6T-150, 3.6.7' Imp. → 110 gpm. @-43'/stage
430 ft.

W/ Open discharge to Go/f Course.

TDH = 360 to 0.025 th + (193 to 330 ft)

1ft

202 ft to 339 ft. See on 0=155 to 200 pm

PUNIA FIT

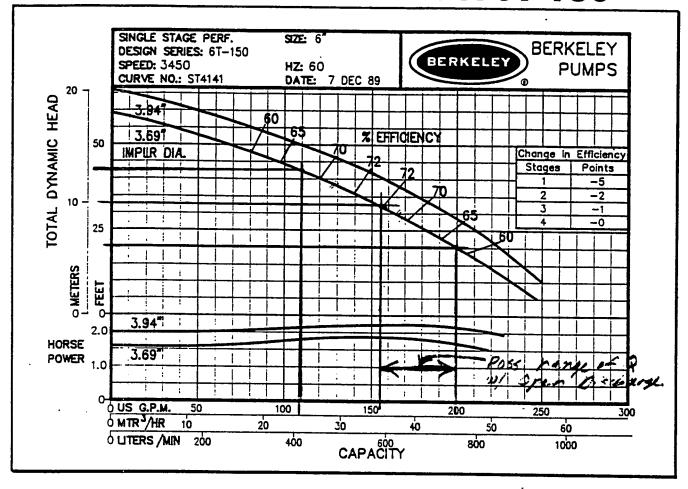
Upper casing: 6"nomina &, 55" 0.0, 5= 7/6"

I.O. = 65 - 2(3) = 6 4" = 6.25"

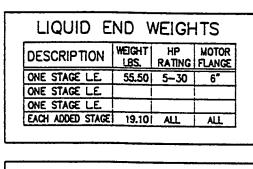
Pump Bowls Q quart . 7 5.91"

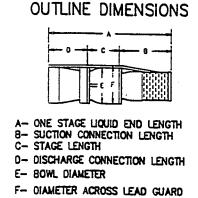
0.44 = 0.35" 15"

Submersible Turbine Model 6T-150



Specifications





_				CU	RVE N	o. <u>ST</u> 4	1141	_
	TYPE: THRUS	ENCL	OSED	LER EYE A	REA	A 5.76 L/Ft of	Sq. in. HEAD.	
	11/	APELLE	R No.		IMPELI	ER Dic	J.	
		M04238]		4.53° @	42° (3.9	4")	
	-		_					
<u> </u>								
Γ			BOV	VL D	ATA			7
	BOWL	No. <u>M</u>	04461 EADE	PUMP	SHAFT	Dia.	1"* IPT (Female	ا
	MAX.	PRESSU	RE: 580	psi; *	MAX.	IZE 3. N	PT (Vale) NG: 60	"
NO.	TE: For	each ada	litional s	toge add	٦, ٦,	HP	MOTOR	7
Α.	8	C	_0_	Ε	F	RATING		
19.63	11.00	5.00	3.63	5.38	5.81	5-30	6*	
		!						

REVISED 31 May 90

Lightning W Ranch upper Well

Pump = Franklin Electric

Model 2366156020

Serial = 89 0017

HP = 25

KW = 18.5

Volts = 460/380

RPH = 3450/2875

HZ = 60/50

Amps = 33.5/40.0

Min flow Ft/Sec 0.5

Continuous Duty

336332930 3c95

Installed in Upper 96

11 stage pump - 34" Sounding tube placed in this 7' of intake. One IT 3" pipe then check valve. 8 more its Them another check valve.

Another 8 Its to pitless - Total 17 ea 3" by 21' galanized.



SUBMERSIBLE PUMP FOR LIGHTNING 'W' RANCH WELL HOUSE

AUGUST 8, 1994

LIGHTNING 'W' RANCH OWNER:

ENGINEER: WASHOE COUNTY UTILITY DIVISION 1195B CORPORATE BLVD. TELEPHONE: RENO, NV. 89520

CONTACT: **MR. PAUL ORPHAN**

TELEPHONE: (702) 785-4743

RESOURCE DEVELOPMENT CO. 2305 GLENDALE AVE, SUITE #10 CONTRACTOR:

SPARKS, NEVADA 89431

CONTACT: MR. DOUG. ALLEN

TELEPONE: (702) 356-8004

PREPARED BY: HAYS PUMPS, INC.

2081 FRONTIER TRAIL

ANDERSON, CA 96007 USA

CONTACT: MR. TOM A. BLANDIN

(916) 365-2555 TELEPHONE:

SUBMITTAL A

ACTION

NO EXCEPTIO MAKE CHAME

AMEND and R

REJECTED - F

Office of Washod Utility Divis



Manufacturers of Pumps and Supplies 2081 Frontier Trail Anderson, CA 96007 (916) 365-2555 **ACCESSORIES**

Sheet No. 1109.00 Effective 1-1-92 Supersedes 4-85

ORDER DESK:

CALIFORNIA (800) 446-4800

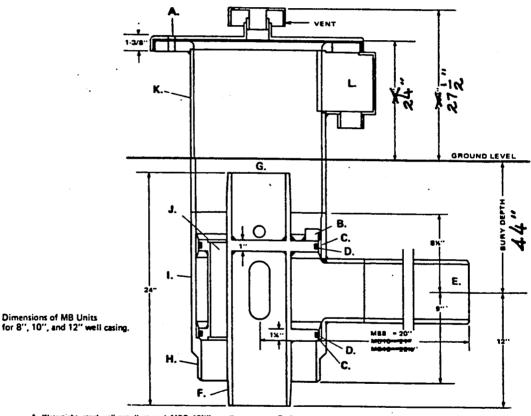
NATIONAL (800) 222-HAYS

FACSIMILE: (916) 365-7798

MAASS INDUSTRIAL PITLESS ADAPTERS

HEAVY DUTY (HD) MB PITLESS ADAPTER

For8" to 24" + Well Casting 2" to 12" spool pipe and discharge. Model MB, HD Units are designed for deeper settings, turbine units, and booster pump stations; available with NPT or API threads. All MB units feature 304 S.S. O-Ring seats.



- Watertight, steel well cap illustrated, MBB, 15%" cap dia; MB10, 10%", app dia; MB10, 21%", app dia; Cops have six 11/16" holes in cap with 5/8" bolts and 1/8" neoprene gestats. Air vent with screen, 2" NPT Coupling in center of cap.
 - Mice and Make grainable with east already-model and
- 8. Centering blocks (4) 90° apart.
- C. 304 Stainless Steel O-Ring Seats.
- D. O-Rings, Suns N, 3/8" cross section.
- E. Discharge schedule 80 pipe, can be provided with transition sleeve, threaded or flanged ends.
- F. Spool pipe is sch. 80. Available threaded NPT an Afficient
- G. Male thread for lift pipe same size as drop pipe for equal strength.
- H. Butt weld casing end illustrated. Optional male or family
- f. Housing is %" Walf.
- J. Two wire access holes 180⁰ spart. Seeled wire conmections available.
- K. Upper casing barrel can be provided by installer or factory.
- L. Electrical junction box, 5%"W, 5%"D, 8"H, 2" NPT Cptg. Spool discharge openings 100% or greater than spool pipe used.

Nominal Well Casing Size	(r)	-18"	<u>,</u>	16"	100
Spool Housing	10%" O D. x %" Wall	134" O.O X" Well	14" O D. 2 %" Wall	18" O D. x X" Wall	22" O.D. # %" Wall
Upper Casing Barrel	10%" O.D. x 3/8" Wall	1214 O.O 38*****	- 14" O.D. = 3/8" Wall	18" Q.O. 1-9/8" Watt	22" O.D. x 3/8" Wall
Sizes	DROP Pipe-3"	-\$*	4		10"
Options/-0-ess	T .5 .5"	-	4", 5", 7"	5", 6", 7"	6", 7", 8", 12"

- Material Steel Housing and spool with 304 S.S. O-Ring Seats.
- Pitless Unit costed with epoxy (FDA approved for potable weter).

Manufactured Up to Quality Submersible Turbine Pumps

BRONZE IMPELLERS WITH CAST IRON BOWLS

Thrust Screw - Brass, adjustable, with stainless lock nut and washer.

Bearing - Extra-long, bronze bearing for shaft stabilization and minimal shaft friction loss.

Impeller Lock Collet - Taper fitted steel collet secures impeller to shaft.

Impeller - One-piece cast bronze impellers are close-tolerance machined for maximum efficiency and performance. Precision balancing eliminates vibration and wear.

Bowl - Close grain cast iron. Bolted construction on 8" and 10" bowls for easy assembly. Enlarged water passages for greater performance 8" and 10" bowls are epoxy-lined

Intermediate Bowl Bearing - Brass bearing stabilizes bowl shaft and absorbs shock. Abrasion-resistant and replaceable.

Bowl Shaft - High grade stainless shaft in precision ground and polished to reduce friction and increase service life.

Sand Collar - Bronze sand collar shields inlet bearing from abrasive wear. Stainless steel set screw locks collar to shaft.

Inlet Adapter - Elongated full-flow cast iron bracket is designed to give precision pump and motor alignment. Fits standard NEMA motors.

Strainer Screen - Screen provides maximum / water flow and protects against entrance of foreign material.

Inlet Bearing - Bronze bearing stabilizes lower portion of bowl shaft.

Shaft Coupling - Rugged splined or keyed coupling assures positive drive.



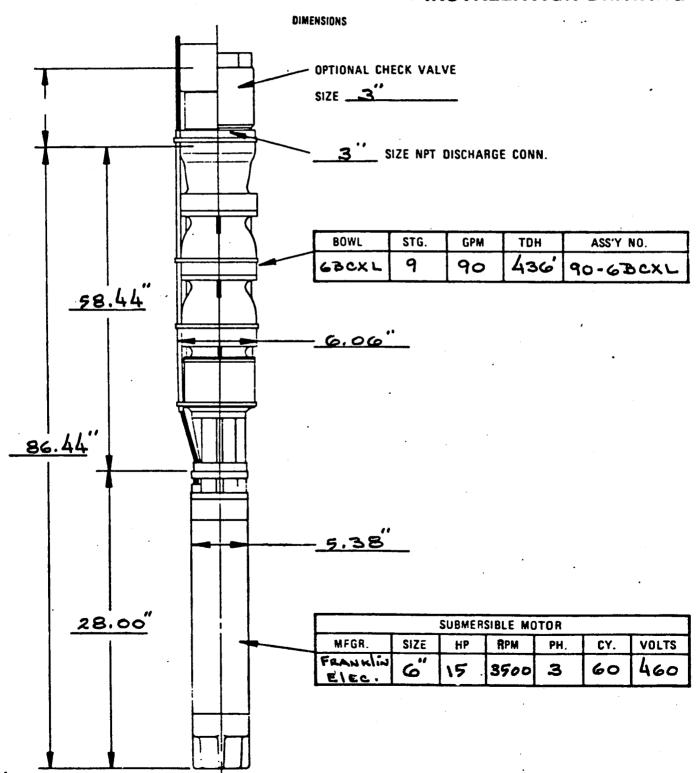
2081 Frontier Trail Anderson, California 96007 Phone: (916) 365-2555

Fax: (916) 365-7798



Reservoir Will

SUBMERSIBLE BOWL & MOTOR INSTALLATION DRAWING



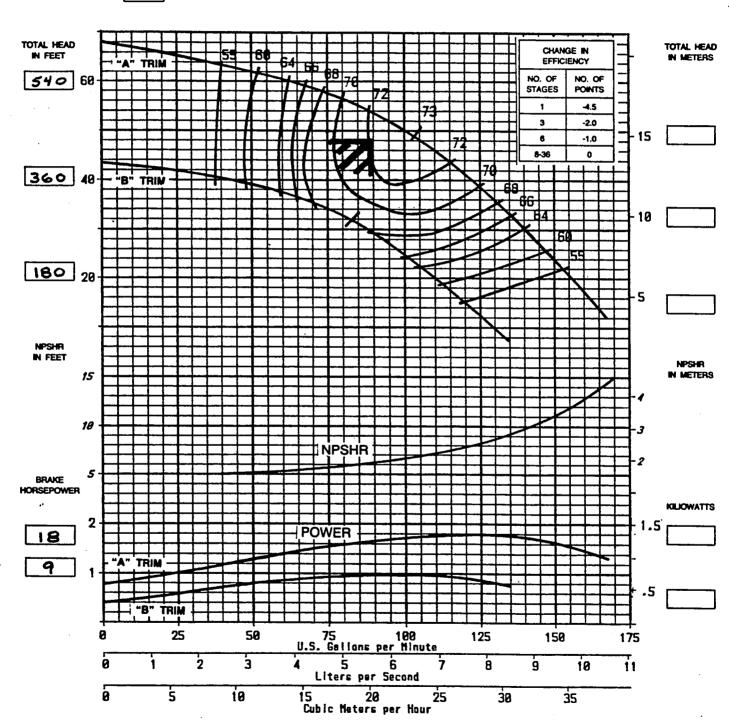
Reservoir Well

Section 4
Page 3.0
Curve No. 360603
Effective May 1983
Supersedes October 1976

MODEL 6BCXL ENCLOSED IMPELLER STANDARD CONSTRUCTION

3500 RPM SINGLE STAGE PERFORMANCE

9 STAGES REQUIRED



Pump hydraulic performance is based on handling cold clear, fresh nonaerated water, free of foreign materials.

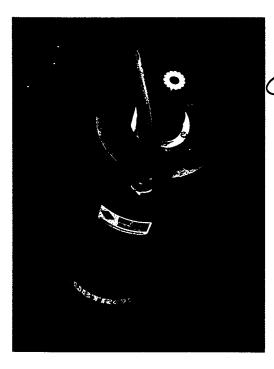
tem No.: CORRAL WELL

Capacity: 90 GPM TDH 436 FT. Bowl HP 13.8 Bowl Efficiency 72.1 %

Product Data



SUPER-6" SUBMERSIBLE MOTORS



SPECIAL OPTIONS

■ Ni-Resist Construction

For all salt water pumping applieations such as non-acid mine dewatering and reverse osmosis. For offshore drilling and production platforms and seawater pumping applications. Also in situ leach mining pumping using high pH leaching solutions.

■ #316 Stainless Steel Construction

For in situ leach mining and reverse osmosis using acid processes, also low pH and other chemical pumping applications.

■ World-Wide Adaptability

All standard voltage and hertz ratings are offered. Consult factory for availability. Three lead configuration suitable for reduced voltage auto-transformer starting. Available in 6 lead Wye(Star)—Delta configuration.

5 through 60 horsepower
Single & three phase 200, 230, 460/380 575 volts
60 and 50 hertz

APPLICATION DATA

These motors are built for dependable operation in 6" diameter or larger water wells. Temperature and time rating continuous in 86°F(30°C) water at 1/2 ft./sec. flow past motor. Rotation: ** facing shaft end. 3ø, electrically and mechanically reversible.

For further information, refer to Service Data Page 263 SD— "Submersible Motors: Application, Installation, Maintenance Manual."

BASIC FEATURES

- Corrosion-Resistant Construction
- Stainless Steel Splined Shaft
- Hermetically-Sealed Windings
- Anti-Track Self Healing Resin System
- Water Lubrication
- Filter Check Valve
- Kingsbury-type Thrust Bearing
- Pressure Equalizing Diaphragm
- Sand Fighter Slinger
- Removable Water-Bloc Lead Connector
- U.L. 778 Recognized

SPECIAL FEATURES

- Copper Bar Rotor
- Rotary Face Type Seal
- Three Phase Equipped for SUBTROL-PLUS: SUBTROL PLUS sensors standard in 40 60 Hp ratings, optional in 5 30 Hp Three Phase. SUBTROL-PLUS protection system enhances motor protection.
- Tapered Thrust Housing.

 Facilitates installation in well. Thrust housing bolts to motor and eliminates threading housing on and off. Also eliminates pinning and drilling the housing, resulting in easier servicing of motor (5 through 40 hp.).

GROUNDED CENTRILINE® 140 - FLAT HEAVY TYPE-TW

JACKETED THERMOPLASTIC PVC SUBMERSIBLE PUMPING SYSTEM ELECTRIC CABLE SPARK TESTED AT UL REQUIRED VOLTAGE

0.407	AWG SI	ZE AND	CONDUCTOR	COPPER	INSULATION	JACKET	APPROXIMATI	E CABLE
PART NUMBER	NUMB	ER OF	CONDUCTOR STRANDING	CONTENT LB./MFT.	NOMINAL THICKNESS	NOMINAL THICKNESS	DIMENSIONS (INCHES)	WEIGHT (LB./MFT.)
77089	12/2	W/GR	19 STR x 0.0305"	59.4	0.045	0.045	0.290°x0.660°	159.2
77090	10/2	W/GR	19 STR x 0.0385*	94.2	0.045	0.045*	0.310"x0.729"	208.4
	1		7 STR			I		
77119	14/3	W/GR	x 0.0242*	49.6	0.045	0.045	0.270"x0.772"	163.2
77095	12/3	W/GR	19 STR x 0.0305"	79.2	0.045	0.045*	0.290"x0.852"	209.8
77096	10/3	W/GR	19 STR x 0.0385"	125.6	0.045	0.045	0.310"x0.944"	275.6
77097	8/3	W/GR	19 STR x 0.0295"	181.4	0.045	0.045	0.340"x1.030"	358.8
77108	6/3	W/GR	19 STR x 0.0372*	269.6	0.060	0.045	0.410"x1.240"	531.6
77109	4/3	W/GR	19 STR x 0.0469°	428.9	0.060	0.045	0.455*x1.405*	744.8
77110	2/3	W/GR	19 STR x 0.0591°	681.8	0.060"	0.045	0.520"x1.661"	1082.7

CENTRILINE® 140 cable, manufactured in Claremore, Oklahoma, is in accordance with UL 83 specification for 60°C Type TW cable. Cables feature a solid or stranded copper conductor, bare, with a moisture-resistant plastic insulation. Conductors are individually colored black, red and yellow. These insulated conductors are assembled parallel in a flat configuration and covered with a tough black thermoplastic jacket.

UL Listed - UL File E-105720

UL printing of each conductor is as follows:

CENTRILINE® 140 HD PVC JACKET SUBMERSIBLE PUMP CABLE TYPE TW AWG 600 VOLT (UL)

140°F



600 VOLT

&FLOMATIC

DUCTILE IRON CHECK VALVES... STRONG ENOUGH TO SUPPORT LARGE PUMPS

OPERATION:

The ductile iron 80 series check valves are an in-line poppet style valve designed to prevent flow reversal. When pumping from a well, water is allowed through the valve and then automatically closes when the pump is shut off to prevent backflow.

APPLICATION:

Flomatic's ductile iron series is specifically designed for use with submersible pumps or other applications where it is necessary for the check valve to be installed in the well casing. However, it will provide excellent service in any application where a conventional check valve is required. It is recommended for use in vertical mounting. Please request Bulletin 810 for general installation instructions.

BENEFITS:

- Low Headloss
- Maintains Water Column in well pipe
- Prevents Pump Reversal
- Minimizes Water Hammer

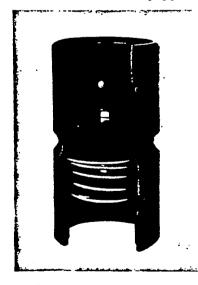
VALVE BODY TENSILE STRENGTH:

When a check valve is installed vertically in a riser pipe, the weight of the pipe, water column and pump below is hanging on the valve body. In deeper settings, the tensile stress on a valve placed near the surface can be high. In the table to the right are the recommended maximum weights that each valve size will safely hold. These values have been determined by actual tests conducted by an independent testing laboratory. Note that these are not valve pressure ratings.

	IM WEIGHT
SIZE	LBS.
-5.	
→ 3.	70,000
	105,000
5*	105,000
6*	105,000
8"	. 105,000
10"	105,000

MODEL 80DI

High strength ductile iron body. Threaded female × female connection. Features a Buna-N seal, stainless steel spring & fasteners. Ductile iron poppet or bronze poppet.



MATERIALS:

½" Lead-in Before Threads*

Body Ductile Iron—ASTM-A395-74

Follower** Ductile Iron—ASTM-A536-84

Poppet Assembly Bolt/Nut ... 18-8 Stainless Steel Spring ... 18-8 Stainless Steel Finish ... Painted (lead-free)

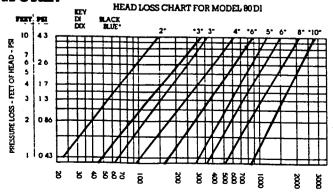
*5", 6", 8" DI & 6" & 10" DIX **2" Follower—Bronze

SIZE	PART NO.	WGT.
-6.	7997	6.0-
3.	7938	10.0
4	7039	19.0-
5*	4088	48.0
6*	4089	63.0
8*	4090	92.0

PRESSURE/TEMPERATURE:

Pressure Max: 400 PSI

Temperature Max: 180F (80C)



FLOW IN GALLONS PER MINUTE

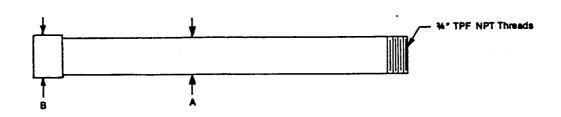


Manufacturers of Pumps and Supplies

2081 Frontier Trail Anderson, CA 96007 (916) 365-2555

SUBMERSIBLE PUMPS

Threaded Column Pipe Dimensions



Column Size	Pipe O.D. (in.) A	Wali Thickness (in.)	Weight Per Ft. (lb./ft.)	Coupling O.D. (in.) B	Maximum Setting (feet)
3	3.5	.216	7.58	. 4.00	1200
4	4.5	.237	10.79	5.00	1100
5	5.563	.258	14.62	6.25	1100
6	6.625	.280	18.97	7.31	1000
8	8.625	.277	24.70	9.50	900
10	10.75	.279	31.20	11.75	800
12	12.75	.330	43.77	13.94	700
14	14.0	.375	54.57	15.00	700

1. Unless otherwise specified, pipe will be supplied in random lengths.

June 26, 1995

Robert L. Weise Lightning W Ranch 7300 Franktown Road Carson City, NV 89704



94116.43

RE: "Ag" Well Pumping Test, Lightning W Ranch.

Dear Mr. Weise:

I have completed an analysis of the data obtained from the pumping tests of the "Ag" Well at the Lightning W Ranch which was performed in late April and early May, 1995. A three hour step-drawdown test and a three-day constant-discharge test were performed. The testing program is summarized below. Issues of interest to your project discussed in the report include:

- the projected performance of the Ag Well when used as a source of water to supply to the Lightning W Ranch residential development,
- the projected performance of the Ag Well when used as a source of water supply to the golf course,
- the anticipated interference in the Reservoir Well due to pumping the Ag Well, and
- the content of sand in the discharge from the Ag Well.

Test chronology

April 19, 1995 Pressure transducers were installed in the Ag Well and 17th Tee test hole. Commenced collecting background water level data with Hermit^{t.m.} data logger. Commenced manual measurements at the

Reservoir Well with a water-level sounder.

April 20, 1995 Commenced step-drawdown test at 1000 hours. Aborted test at 1039

hours due to pin-hole leak in the pump column. The pump column was raised and the hole was welded shut. Step-drawdown testing resumed at 1330 hours. Terminated step-drawdown test at 1630 hours. The pipeline from the well to the orifice sprung a leak during the third and final step. Arrangements were made to repair the leak before

starting the constant-discharge test.

April 27, 1995 Repairs to the pipeline were completed. Water levels in the Ag Well,

17th Tee test hole, and Reservoir Well were measured in the interim.

Bob Weise June 26, 1995 page 2 of 9

April 28, 1995

Constant-discharge pumping test commenced at 1600 hours. Pumping rate was approximately 600 gallons per minute (gpm) on start up and was reduced to approximately 300 gpm within about 30 seconds. Pumping rate was held essentially constant at 299 gpm for the duration of the test.

April 30, 1995

Mike Widmer (Washoe County Utility Division) reviewed the data from the first 48 hours of the test at the site. Because a "linear flow" response was observed in the data from the Ag Well, the test was extended for another day.

May 1, 1995

Water samples were collected from the sample tap at the well head at 1845 hours. To reduce the back-pressure at the well head, the valve used to regulate the discharge was opened and the pumping rate increased so that samples for synthetic and volatile organic compounds were not aerated during sampling. The constant-discharge test was terminated at 1900 hours. Recovery of water levels in the Ag Well and 17th Tee test hole were recorded by the Hermit. Periodic measurements were made manually in the Reservoir Well.

May 5, 1995

Recovery portion of the test was terminated at 0906 hours. Pressure transducers and Hermit were removed from the site.

Background water level data for the Ag Well and 17th Tee test hole are plotted in an accompanying figure. These data showed daily fluctuations in the 17th Tee test hole data and a general rise in water level prior to the start of the constant-discharge test. The rising water-level trend ceased just before the start of the constant-discharge test. For unknown reasons, the daily fluctuations in water levels from the 17th Tee did not occur during the constant-discharge test, but may be related to a change in the weather that occurred at that time.

Analysis of test data

Step-drawdown test

The depth to water in the Ag Well prior to testing was measured at 93.95 feet below the top of the well casing. The data from the step-drawdown test are summarized below.



Bob Weise June 26, 1995 page 3 of 9

Step	Duration t (minutes)	Pumping rate Q (gpm)	Drawdow n s (feet)	Specific Capacity C, (gpm/ft)
I	60	125	3.4	36.8
II	60	220	10.7	20.6
III	60	350*	22.1	15.8

^{*} note -discharge is approximate due to a leak which developed in the pipe line.

A plot of the step-drawdown test data is provided as an attachment as are the field data sheets.

Constant-discharge test

Slightly less than eight days elapsed between the end of the step-drawdown test and the start of the constant-discharge test the afternoon of April 28, 1995. The delay was caused by the amount of time it took to repair leaks in the pipeline used to convey water away from the well. The orifice we used to accurately measure the discharge was placed at the end of this pipeline. The repairs were necessary to ensure accurate measurement of the well discharge as well as prevent erosion and damage to the golf course. During this period, water level data from the Ag Well and 17th Tee test hole were logged by the Hermit.

Water levels prior to the start of testing were:

93.47 feet below the top of casing (T.O.C.) in the Ag Well,

78.35 feet below T.O.C. in the 17th Tee test hole, and

104.25 feet below the top of the stilling well in the Reservoir Well.

Constant-discharge testing commenced 1600 hours 4/28/95. The pumping rate for the constant-discharge test was maintained at 299 gpm throughout the test. The constant-discharge test was terminated at 1900 hours 5/1/95.

Drawdown at the conclusion of pumping was:



Bob Weise June 26, 1995 page 4 of 9

62.3 feet in the Ag Well, a pumping water level of 155.8 feet below the top of casing. Note that drawdown increased briefly at the end of the test to 69.5 feet when the pumping rate was increased during collection of the water samples.

18.2 feet in 17th Tee test hole.

3.8 feet in the Reservoir Well.

After the pump was shut off, the water levels were monitored for three days and 14 hours before the transducers were removed from the wells.

Drawdown data for the Ag Well, 17th Tee test hole, and Reservoir Well are provided in the accompanying data plots and field data sheets. A plot of calculated recovery for the Ag Well and 17th Tee test hole is also provided.

Results

The pumping test data from the Ag Well suggest the well intersects a finite-length fracture in the granitic rocks. The linear plot of drawdown versus square root of time indicates groundwater flows perpendicular to the fracture instead of radially toward the pumping well. This major fracture can be viewed as an "extended well". This same behavior was observed in the test of the Reservoir Well and is consistent with our understanding of the hydrogeology of the site and its environs. That is, the wells derive groundwater from granitic rock. These rocks are often fractured and drillers' reports for wells at the Lightning W indicate most wells intercept fractures at various depths. Faults in the rocks have been identified in the area and the fractures are probably related to these faults. The faults are important because, in consolidated rocks, they typically act as conduits for groundwater flow and associated fractures increase the overall ability of the rocks to transmit groundwater.

From the graph of drawdown versus square-root of time, it is apparent that the 17th Tee test hole and Reservoir Well are not completed in the same extended well (principal fracture) as the Ag Well. If they had, the slopes of the plots of the observation well data would have been parallel to the plot of the Ag Well data. In addition, after correcting for well losses, all three plots should have passed through the origin of the graph (the point where time and drawdown are equal to zero). The graph also shows a delay between the start of the test and the response in the observation wells. The magnitude of the delay is related to the distance between the observation wells and the Ag Well fracture. That is, the closer well responded sooner than the farther well.

The orientation of the extended well (fracture) penetrated by the Ag Well was determined from the observation well data. It appears to trend approximately south 70° west. Assuming



Bob Weise June 26, 1995 page 5 of 9

this orientation is correct, the 17th Tee test hole may be located approximately 240 feet southeast of the fracture. Likewise, the Reservoir Well appears to be located approximately 500 feet southeast of the fracture. By comparison, the radial distances from the Ag Well to the two observation wells are 320 and 570 feet, respectively. The calculations in support of this conclusion are provided as an attachment.

The calculated extended well (fault or fracture) orientation is different from what I expected, but it is roughly parallel to other faults mapped in the mountains 0.8 to one mile south of the Ag Well (Trexler, 1977) and, therefore, does not appear to be unrealistic. Additional observation wells might have been useful to better pinpoint its location, but they were not available for the test. The fault's (fracture) location is relatively important for two reasons. First, it is counterproductive to complete two wells in the same fracture. This is a lot like placing two pumps in one well in that you could not be expected to pump more water than the fracture will yield. Second, we need to know the distance other wells are from the fracture in order to predict potential interference between wells.

The data from the Ag Well were examined according to the method of Jenkins & Prentice (1982) which describes linear flow to a fracture. Their "linear flow" theory explains that for "large" time or "large" distances from the well, the behavior of the well approaches that described by the Theis equation which characterizes the more typical case where groundwater flow to a well is radial. For the pumped well in a fracture-dominated aquifer, the time at which radial-flow conditions take over is dictated by the aquifer diffusivity (transmissivity divided by coefficient of storage) and short-term well performance is depicted by the linear flow theory. For the observation wells, the time at which radial flow conditions prevail is determined by the diffusivity and distance from the fracture. The farther a well is from the fracture, the sooner it will approach radial flow behavior. It will take longer for radial flow behavior to manifest itself in the pumped well located in the fracture.

Other linear flow theory (Z. San; 1986) does not agree with Jenkins & Prentice and suggests the drawdown never departs from the linear flow response at large time. In light of these divergent theory, I ran a simplified numerical model of a fracture in a uniform aquifer. The simulation showed a flattening of the drawdown curve some time after pumping started. This departure from linear flow occurred sooner in the more distant wells and was directly related to the length of the fracture. The model results are of limited use however, because, by its nature, the model could not simulate what happens in the pumped well itself, only in the nearby aquifer. To simulate the response in the pumped well requires an analytical solution. Unfortunately, I could not find an analytical solution to the problem in the literature and I was unable to derive the equation myself. Even if I did, the County might be skeptical of any predictions of well performance based on unproven theory.



Bob Weise June 26, 1995 page 6 of 9

At my request, Brit Jacobson, associate professor of hydrology at UNR, is looking into expanding the linear flow theory of Jenkins and Prentice to include a departure from linear flow conditions at "large" time in the pumped well. She has not finished this problem, but we plan to revisit the test data once she completes the puzzle.

The data collected from the observation wells (17th Tee test hole and Reservoir Well) suggest the granitic rocks exhibit "dual porosity" behavior. That is, the aquifer may be represented by randomly distributed fractures and porous blocks or interlayered porous blocks and fractures. When pumping starts, there is an initial elastic response in the fractures that is followed by draining of the porous blocks. This is a variation of the radial flow behavior described by the Theis equation and at "large" time, the response also approaches the Theis solution.

The observation well data were analyzed by the method developed by Streltsova-Adams (1978). Values for the aquifer properties are summarized below.

Well	Transmissivity, T (Ft²/day)	Coefficient of Storage, S (dimensionless)
17th Tee Test Hole	2,082	0.0045
Reservoir Well	790	0.0010

The values for coefficient of storage suggest the aquifer is semi-confined. This means it is locally confined but becomes unconfined some distance away from the well. To me, this suggests the fractures extend to the land surface where they are recharged by snowmelt in the mountains above the Lightning W. The two values for transmissivity suggest the aquifer is horizontally anisotropic; that is, the aquifer transmissivity is not uniform in every direction. The calculated transmissivity is higher in the vicinity of the 17th Tee which appears to be closer to the suspected fracture(s) intercepted by the Ag Well. Transmissivity is less at the Reservoir Well which seems to be farther away. If the fracture is a fault, then I would expect the transmissivity to be greater closer to the fault and parallel to it. Faulting usually fractures the nearby rocks, rendering them more permeable than the same rocks farther away. For this reason, the data appear to be consistent with the geology at this locale.

Projected performance of the Ag Well

The Ag Well has historically been pumped as a source of irrigation water supply to the ranch. Wayne Cirone (personal communication) reports that the well is typically pumped continuously at 280 to 290 gpm for most of the irrigation season. The pumping level in the



Bob Weise June 26, 1995 page 7 of 9

well under these conditions is unknown, but presumably remains above the pump setting of 320 feet below land surface due to a lack of observed air entrained in the discharge from the well.

The most conservative means to project the performance of the Ag well beyond the three days the well was tested is to apply the linear flow methodology. Assuming continuous pumping at 299 gpm for 90 days, the drawdown in the well, including well loss, is computed to be 265 feet, a pumping water level of 365 feet below land surface. However, this calculated value is inconsistent with the observed performance of the well at approximately 300 gpm whereby the drawdown in the well apparently has never approached the 320 foot deep pump setting. Perhaps the behavior of the well departs from linear flow conditions consistent with the results of the simplified numerical model that I ran. Alternatively, steady-state conditions, where the discharge from the well is balanced by groundwater flow through the aquifer, may be achieved.

Using the aforementioned conservative approach, the calculated drawdown in the Ag Well after 90 days of continuous pumping at 110 gpm is 98-feet, a pumping water level of approximately 193 feet below land surface. The supporting calculation is provided as an attachment.

Calculated interference between wells

Predicting the interference between pumping wells is a little more straightforward than predicting the performance of a pumped well in this area. The interference (drawdown) in the Reservoir Well due to pumping the Ag Well was calculated from the equation for drawdown in a dual porosity aquifer (Streltsova-Adams, 1978). Assuming the Ag Well is pumped for 90 consecutive days, 24 hours per day at 110 gpm, the interference in the Reservoir Well is calculated to be 12.4 feet, in the absence of recharge. The calculation of drawdown at 110 gpm is provided as an attachment. Because drawdown at the same point in space and time is directly proportional to the pumping rate, the interference in the Reservoir Well at any pumping rate 90 days after pumping starts can be advanced from the 90-day drawdown at 110 gpm. Therefore, the calculated 90-day interference at 200 gpm is 22.6 feet. At 300 gpm, the interference would be expected to be 33.8 feet.

Sand content

The content of sand in the discharge from the Ag Well was measured on three occasions. The first series of measurements were made during the aborted step-drawdown test. The second series were measured during the step-drawdown test. In each instance, the sand content was less than 5 parts per million (p.p.m.) within four minutes after start-up of the pump. As a comparison, the Washoe County Utility Division limits the sand content during



Bob Weise June 26, 1995 page 8 of 9

the first five minutes of pumping to a maximum of 5 p.p.m. The detailed sand content data from the step-drawdown test were provided in the memorandum date 4/21/95, a copy of which was provided to Dan Dragan. Sand content was also measured during the constant-discharge test. Sand content during the first minute of pumping was measured at 5.3 p.p.m. with a Rossum Sand Tester. After the first minute of pumping, the sand content was less than 1 p.p.m. for the remainder of the test. The measurements of sand in the discharge are provided in the attached field data sheets.

Summary

- 1. The pumping water level in the Ag Well after 90 days of continuous pumping at 110 gpm is projected to be 193 feet below land surface, a drawdown of 98 feet.
- 2. The pumping water level in the Ag Well after 90 days of continuous pumping at 300 gpm is projected to be 365 feet below land surface, a drawdown of 265 feet.
- 3. The calculated drawdown (interference) in the Reservoir Well due to pumping the Ag well continuously at 110 gpm for 90 days is 12.4 feet.
- 4. The calculated drawdown (interference) in the Reservoir Well due to pumping the Ag well continuously at 300 gpm for 90 days is 33.8 feet.
- 5. The sand content in the discharge from the Ag Well is less than the 5 p.p.m. limit imposed by Washoe County Utility Division for the first five minutes after the pump comes on and less than 1 p.p.m. after that time.

Given these results, it is apparent the Ag Well is capable of meeting the target pumping rate of 110 gpm. It is also apparent that the pumping water level will sooner or later be drawn down below the top of the perforations no matter what rate the well is pumped. However, if the production pump is set at a depth of 320 to 360 feet consistent with the past and current pump setting, there should be no problem with air in the discharge as the recent testing and historical use of the well can attest.

Also, given the test results and historical use, a case can be made that the Ag Well has capacity over and above the 110 gpm needed to supply the residential use at the Lightning W Ranch. One way to document the long term performance of the well at higher pumping rates may be to equip it with the production pump once it has been modified to meet current construction standards, pump it at a higher rate for an extended period of time, and closely monitor the pumping water level. Because it will take several years for the residential use to increase to the point where this well is needed, ample time is available to perform what amounts to an extended test of the well. The water discharged from the well

Bob Weise June 26, 1995 page 9 of 9

during this period could be purchased from the County by the Lightning W Golf Course and used for irrigation purposes.

Ray Kruth and I looked into the performance of 6-inch pumps capable of discharging 110 gpm to the storage tank. There appear to be pumps which are capable of meeting the domestic needs of the project when pumping into the system and which will discharge more than 250 gpm when pumping "open discharge." However, we have not investigated them in much detail, nor has our engineering staff looked into the intricacies of conjunctive use of the well because we have not addressed such an operational scheme with the County. However, we understand the County previously indicated an interest in selling irrigation water to the golf course. If they are still amenable to the concept, we are prepared to assist you and them with the design and engineering of the system.

I apologize for the strong technical content of this letter. I included it in the report because it is germane to the approach I took to the evaluate the performance of the Ag Well and its possible effect on the Reservoir Well. Thank you for the opportunity to assist you with your water supply project. I also would like to express my appreciation to Wayne Cirone for helping me run the test and for the use of his trailer as a field office. Please do not hesitate to contact me if you have any questions.

Sincerely,

CONSULTING ENGINEERING SERVICES, INC.

DALE C. BUGENIG

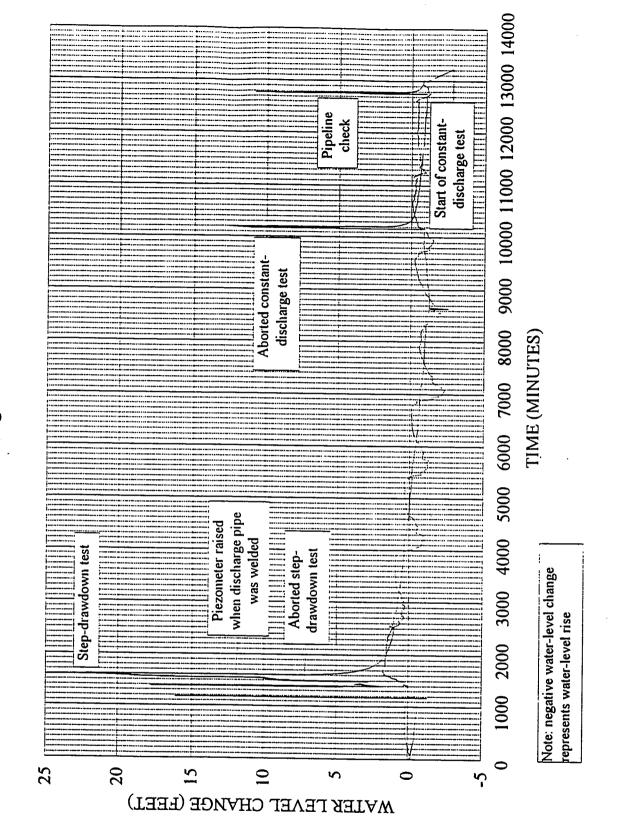
attachments

cc: Ted Brown

Dan Dragan



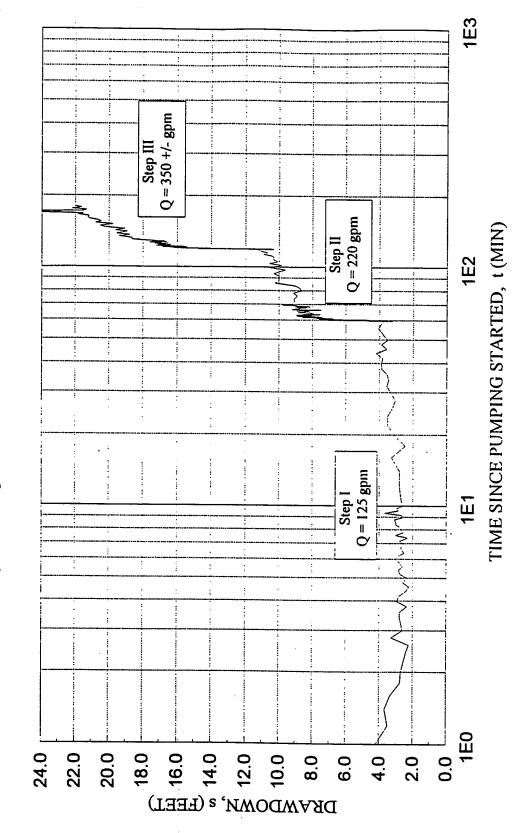
LIGHTNING W RANCH Water Levels for Ag & 17th Tee Wells



3B 5/17/95

LIGHTNING W RANCH

Ag Well Step-drawdown Test 4/20/95



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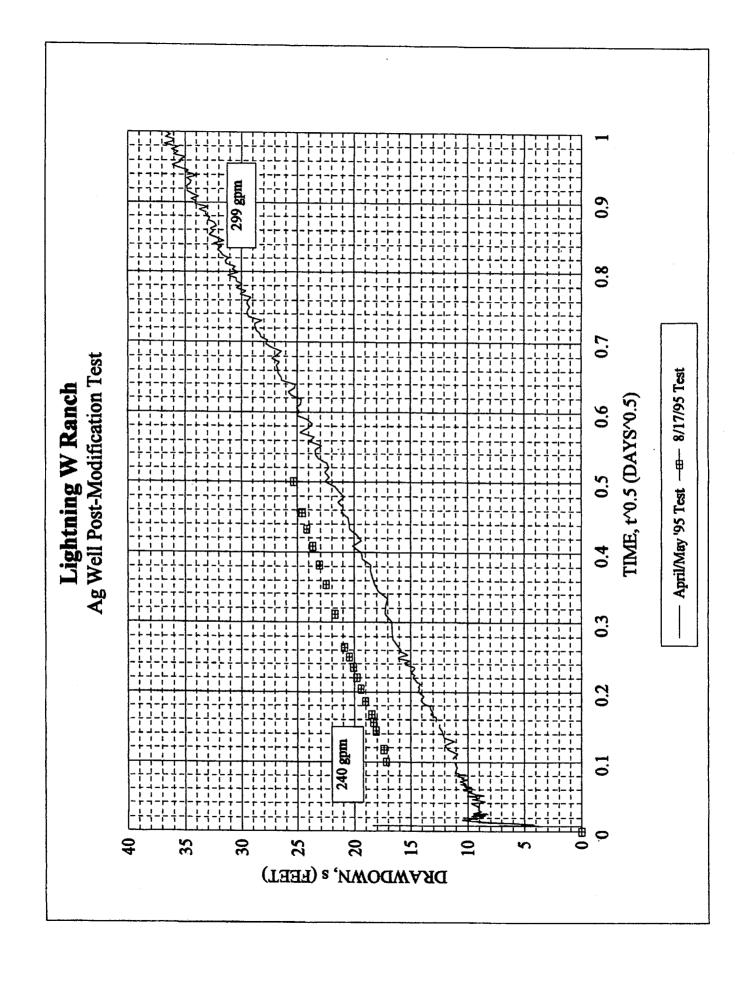
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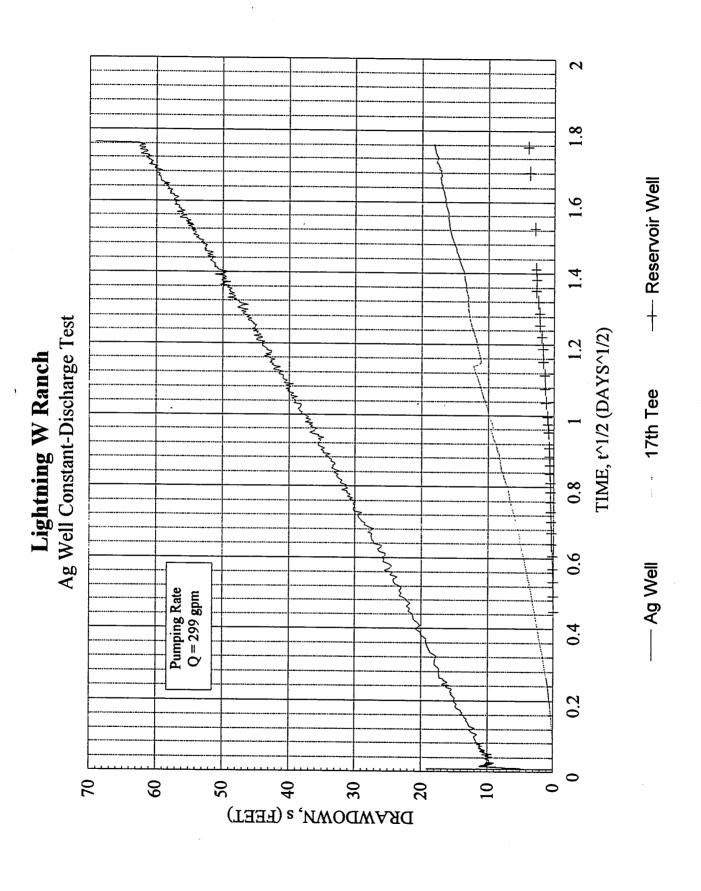


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Ag Wall AQUIFER TEST DATA

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---- Ag Well

Consulting Engineering Services, Inc.

OWNER Lightmag W Ranch

DATE_	5/12/95
 COMP.	BY DER

JOB # 94116.43

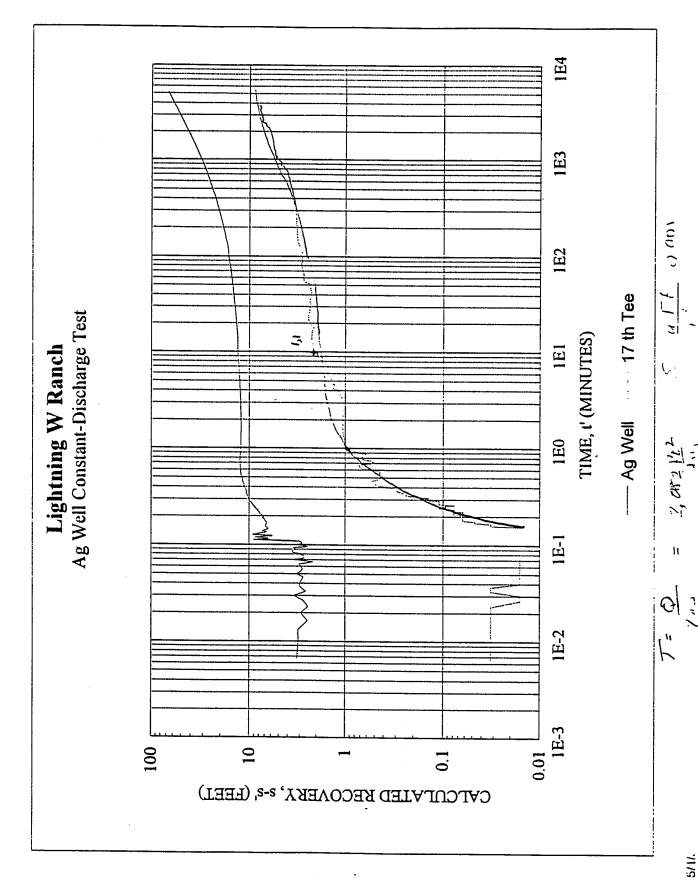
PROJECT Ag Wall Pumping Test CK'D BY _______ CK'D BY ______ SUBJECT ____ Analysis of test data ______ PAGE _/ OF 2

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CONSULTING ENGINEERING SERVICES, INC.

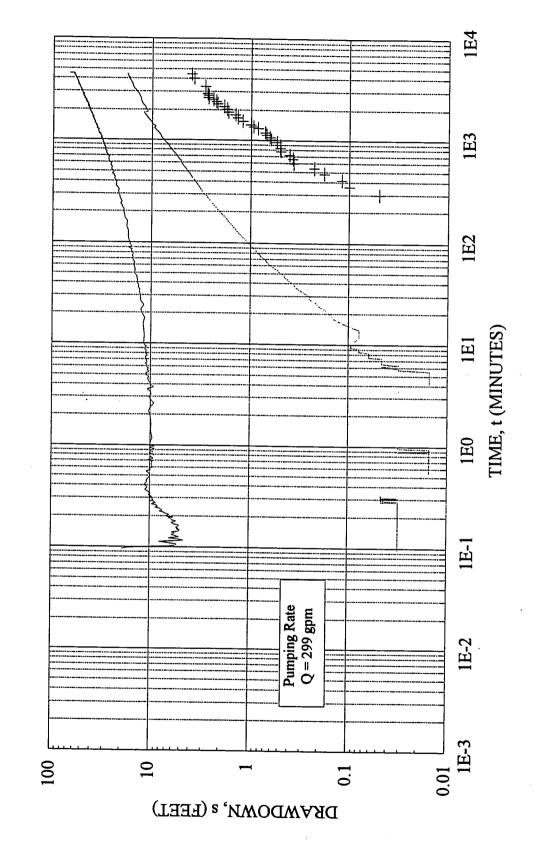
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OWNER	Lightning	WRanch			_ COMP. BY	De 3
PROJECT	Ag Well	Pumpin= 7	rz:t	7.0.00 n.o.c.	CK'D BY_	
SUBJECT	Analysis	of test	data		PAGE	OF
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JOB # <u>74116.43</u>



DCB 5/11.

Lightning W RanchAg Well Constant-Discharge Test



----- 17th Tee --- Reservoir

Ag Well

CONSULTING ENGINEERING SERVICES, INC.

		DATE <u>ょ</u>	16/95
OWNER	Lightning W Ranch	COMP. BY_	ACE
	Ag Well Pumping Test		
	Analysis of Reservoir Well data	PAGE	OF

JOB # 94//6.43

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Match	Point					
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				1985. Prac udwater m	odelling:	
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Consulting Engineering Services, Inc.

	DATE 6/12/95
OWNER Lightning W Ranch	وے در COMP. BY
PROJECT Ag Well Test	CK'D BY
SUBJECT Predicted drendown in the As Well	

JOB # <u>94116.43</u>

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FROM TH	E PLOT OF	s us. 7 t	AG WE	L TEST		
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元	PROPORTIONA	L	THAT ING K	7.1.5		
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WELL 6:	152 = 60°					
	KE N = 2 L LOSS: I	5 FT				
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s. C =	5 FT (57,561 FT	- 104r) ²	1.5/ ~10-9	DAY L FTT		
@ 110 <i>G</i>	•					
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CONSULTING ENGINEERING SERVICES, INC.

OWNER Lightning W Ranch

DATE 5/16	/95
 COMP. BY	DCB
CKID DV	

JOB # 94116,43

PROJECT	Ag Well				CK'D B	1
	<i>J</i>	•			00	·
SUBJECT	Calculated	in fluence	211	Rasaryou Wall	DACE	OF

SUBJECT <u>Calculated</u>	influence	on Reservoir Well	PAGE	_OF
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/u = 2	555					
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·	Ь					
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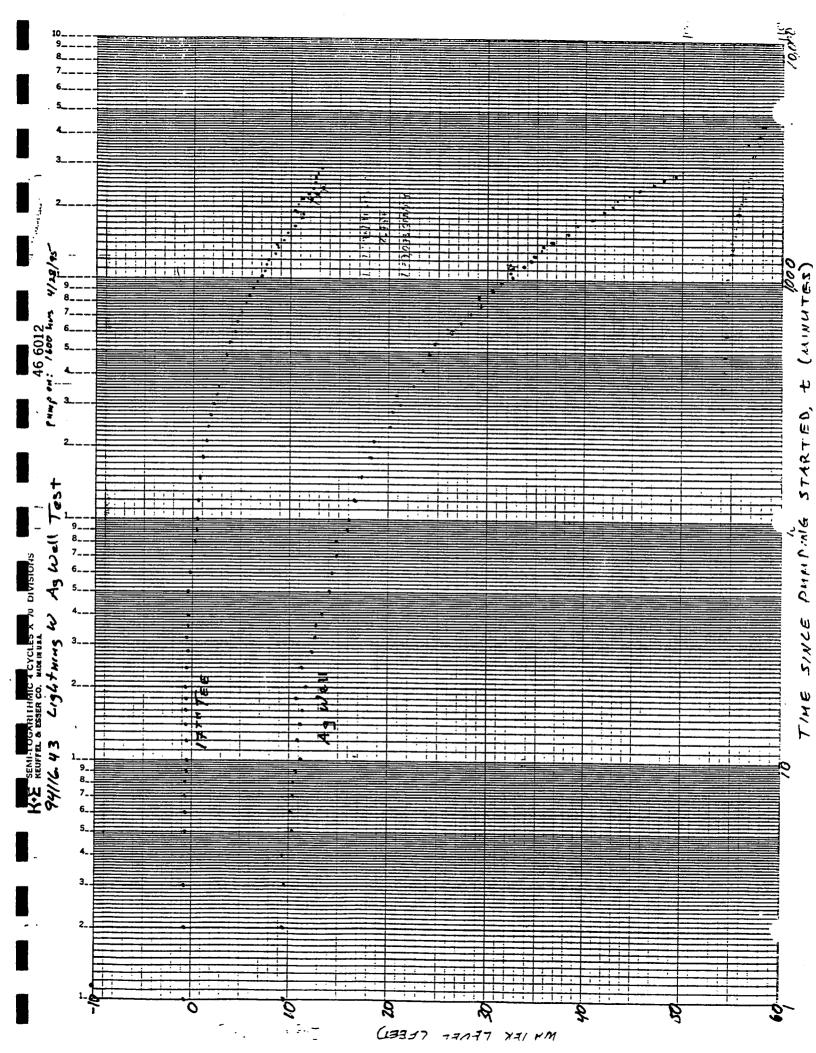
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AG WELL AQUIFER TEST DATA

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Pump	on: Date off: Date on of aq	e //	Time		(r'.)	Static wa Measurin				Depth of pur	porair line						
	ping			very _		Elevation	of meas	suring po	oint		5 <u>***</u> E						
_		Time since pump started	d p							H	7	\$	Obs well - 17 TH TEE &				
		Tim fince p	Time since pump stopped			Water level	ction		Water level	Disebers	(312m)	المعداد)					
— Date	Clock	1	<u>=</u>	t/t		measure- ment	Correction or Conversion	Water level	change s or s'	measure- ment	Rate	Gard					
1/18	1900	1812				18.19				551/2	300		steady It. Rain				
/	1930					1823							partial clearing				
	2000					20.15				54%	298.1	310					
	2030					20.43					27031	270					
	2170					21.16				C1 3/4	297:7		Clear our need & winds				
	2122					20.91											
	2222					22.55				9%	297		Clear overhead of rain to the				
		420				2241				1-74 /2	292	315					
		430				24.04				Jy 3/2	296.3		જની ર				
127		540				24.70				5=1/9	299.1		STYPH JIMAS & 1050, Jight Foin 20100				
	9320	600				24.38				55 1/8	2201		Clearing LKW. OBSERVELE				
	חפבים					27.26				55 %	299,1		WIM & LCHESSIM				
	0400	720				28.25				551/2	300	325	light Lugarest. Light wine				
	2:70	780				2935				56	301		Adi Q				
		840				29.14	•			553/4	300	325	Dutie 3 learn in int wing post Q				
	072					30.46				543/4	2973	310	clouds moise a from vest				
	7300					31.44				54 1/4	297.3	320	RAINI				
	0790	1020				32.45				55%	£98.8		Rinn				
	1900	19:3				32,23				55	198, ≤		Claurine :				
	1100	1140				33,75				543/1	297.8		ACT Q				
	1200	1200				3435				551/4	299		Prathy Oloredy -				
	1300	1260		·		34.86				ょこと	277,1		Raining 1				
	1400	1320				ৰ্ক্য, 43				55 3/2	299.5						
	1:777	1230				35.62	_			-5 1/B	298.3		aritile w/ mecominant				
	1400	1440				36.69				- ز-ي	193,5		7944, 2244 = 3.05 m.				
	1800	15120				38.21				5:1/2	<u>:</u> 99.1		strong winds a shoulds				
	2000	1430				<i>2</i> 9.12				55 1/2	<u>.</u> 34.1		permit oleaning				
	2200	1550				40.33				5-34	:9:						
	2400	1222		-		12.0	Ī			55 4	• :::		Wines				

As Well AQUIFER TEST DATA

Owne	r <u> </u>	134	+nin	3	W	· · · · · · · · · · · · · · · · · · ·	Addre	ess	7300	Fr	anktown	. Rd	County _	Weshie	_StateNY
- بەربى ا	4/	123-			Cor	npany per	forming	test	< E S	<u> </u>	 ,,		Meas	ured by	\$ wc
Well N	lo	19		· · · · · · · · · · · · · · · · · · ·	Dist	ance from	pumpin	g well		Тур	e of test	Constan.	t. Disch	-arge .	Test No
											" orifice				
Pump Pump	on: Dat off: Dat	Time	Data /95 Time Time				Wate ater level	r Level	Data チ _ム		How Q meas	Discharge Da		Comment	s on factors
Pun	ping _	ioner te	_ Reco	very_			Elevation of measuring point					/Sana E	uq <u>420 4/28</u>		
Date	Clock	Time since pump started	Time since pump	e/e		Water level messure- ment	Correction or Conversion	Water level	Water level change s or s'		(mcher) Discharge measurement	(apm)		OLS WEITS;	17th Tee Reseroir
/30	0200	2040				42.86					55 1/4	279		9 0 920 4 45.2	
		2160				43 24					55	278.5		PARTY MOUGH -	CAIM
		2280				44.69					543/1	2973			
		2400				45.13			1		541/2	717.7	-	111.0	
	i	2520				42.09	-				543/4	277	 	Adj &	
		2640				48,04					55/2	297.1		A 4 2	······
•		2760				49.31					772	278.2		D 26: 2: 147673	
		23.00				50.04					7.	i		Adr Q = 1632	
-		3340				53,80					55 1/2	2991		Total sond ≈ O.	
1.		3720				56.61					543/4			PAIN	
<u>/ ' </u>		4080				59.08					53	2783		ADJIC OC	COLLINA SIGE
	ľ	4320				61,51									
	y <u>y</u>	معد ٦				7					547	73=.3		C 1/2/2	· - 12 -
	1900													Sample/3 Incl. is to 5 Incl. is to 5 Incl. is to 5 Test Test Test 4 S Find Stage	tuspein cax:
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AQUIFER TEST DATA Dwner Lightning W. Address 7300 Franktow- Rd County Washuz State VIV Company performing lest CES Measured by DC 3 & WC Vell No. 17 TES Distance from pumping well 320 Type of test Courting Discharge Test No. 4 Measuring equipment Harris w/ 57 SolTDX. Time Data Water Level Data Discharge Data Pump on: Date 4/23/** Time 1637 (t.)
Pump off: Date Time (t.)
Duration of aquifer test: How Q measured ________ Static water level 78:351 Comments on factors Depth of pump/air line ___ affecting test data Previous pumping? Yes _____ No ____ ____ Recovery _ Elevation of measuring point _ _ End __ Pumping __ Duration _ Time
since pump
started
Time
since pump Correction or Conversion Water Water level Discharge level change Clock Water measuremeasuretime t ۲ t/t ment ievel s or s' ment Rate -0-23 1600 0.25 1601 -0.26 1602 -7. =4 1503 ٠, 1404 -1602 2,=: -11.22 1606 1407 カテこ 3 1603 -0, =17 1407 1610 9 5% 1512 1614 14 クッシャ 16 2.45 1613 -0.62 1620 ーク・ごう 1624 2.5 1632 1636 -0012 0.19 1640 10 16:5 -0128 1 . rec well - 104 251 -1).15 1700 1710 1,23 30 1720 0.07 ar 1730 0.12 012/ 100 1740 0.50 1500

2.31

Ag Well AQUIFER TEST DATA

ner		1.3	4+,	1123	W	· · · · · · · · · · · · · · · · · · ·	_ Addre	ss	737	2	Frankt	own Rd	County _	Washus State MV		
<u> </u>	4	128-			_ Com	pany perf	orming t	est	CE.	2			Meas	ured by DER W.C.		
weil No	s/	7 TH	TE	Ē	_ Dista	ince from	pumping	well	320'	_ Туре	e of test	Const	ant. D.s	charge Test No. 4		
3\$U	rıng equ	upment	·	Hz	rm.	د 4	/ -	50	154	73	×		· · · · · · · · · · · · · · · · · · ·			
omp o	Time Data np on: Date 4/28/25 Time 4699 (t.) np off: Date Time (t') ation of aquifer test:					Static wa	ter level		0.73		How O measi	Discharge Date of the Date of		Comments on factors affecting test data		
Pum	bing —	uifer tes	it: _ Reco	very		Elevation	• .				Duration	E	nd			
E te	Clock time	Time since pump started	Time since pump stopped	t/t		Water level measure- ment	Correction or Conversion	Water level	Water level change s or s'		Discharge measure- ment	Rate				
128		180				1.09				-				res. well = 154,101		
_		210				1.39										
		240				1.67								res, well = 174.09/		
		2=7				1.72										
		300				2.16								res well = 194.151		
		330				2,39						·				
		360				2.60								res. vai : 194,201		
		4217				302								res. well = 194.22		
_		480				2,44								rzz. well : 174281		
74	0177					3.38								142 mail = 104/23.		
	i	600				4.37								25 weil = 04.47		
		660				4.63								Red are 1 - 10-11-48		
	ממנים					5.02								165 med = 194,21		
		FSD				5.44								THE WILL 104,00		
		847				5.89		-						168 Well 104,51		
	0700					6.15								Res well 104.61		
		760				6.59				-				Res areil 104.65		
-		1020				7,01								NS WEII :04.93		
	i	1080				1.37								" 104.75		
		1140				7,59							<u> </u>	" 104.80		
	1	1220	_			7.94								104.82		
		1260				8.41		<u> </u>								
		1320				8.72					 			201 WOI = 124.75"		
<u> </u>		1380				8.66				*				rezweii =/05.057		
_		1440	<u> </u>			9.14							İ	18: 2211 =125 N		
		1500	-			9.71					<u> </u>	 	 	res wen - 102.51		
		1550				10.40					<u> </u>	-		res. well = 105-46		
	i	1350	1			11.10					<u>:</u>	 		ros . nett = 108.34		
		. 7.5				-		!			•	-		112		

Ag Wall AQUIFER TEST DATA

Owner		94+n	,ng !	W	" · .	··	Addre	ess	7300	Frank town	RA	County _	State AV
٠ _	4/	2 7-			_ Con	npany per	forming (test	<u>८६८</u>			Mea	sured by DCB + NC
										Type of test	Consta	4+ 4,2=	haraa Test No. 4
leasu	ring eq	uipmen	ıt	1761	w. 	<u>ω/</u> .	<u>ر کر د</u>	3	エシメ				
uratio	n of aq	Time e <u>4/18/</u> e puifer tes	st:			Static wa Measurin Elevation	iter level ig point .		, 73	How Q measi Depth of pur Previous puri	Discharge Daured np/air line nping? Yes E	No	Comments on factors affecting test data
Date	Clock	Time since pump started	Time since pump stopped	t/ť		Water level measure- ment	Correction or Conversion	Water level	Water level change	Oischarge measure- ment	Rate		
	2220	2-110				10.87							12es well - 35,05
	i -	2160				11.15							Res west - 105.77
						11.89							ies well .06. =9
		2230											745 weil 106.35
	i -	1,400				12.23							ILLE WELL ICH : Z
		2520		· ·							<u> </u>		Leswell 106,31
	1200	2-40				12,56		· · ·	·			<u> </u>	A 7654. 7'1. 2
	1400	2760			<u> </u>	12.70							252 - 706 = 106 = 71
-	1600	i			!	/3.12				·	<u> </u>	<u> </u>	187. WEN = 176.34
	2400	3360				15.11							res well = 107.02
,	2632	3720			ļ	15.86					<u> </u>	<u> </u>	1
	1200	4:00				16.46							141: WELL 07 188
	1800	משנוט				1741							1 2 u/c 1 = 10 % 10
		<u> </u>											
													5/2 /25 well - 108.27 8:00
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CONSULTINO SHIRINGERONS GERNICES, INC



1106 TEPRINAL WAY, BUTTE 304 RENO, NEWADA 88602 YOU-YOU-GETS

MEMO

Pages: 1

File: lwag01.mem

Date: April 21, 1995 Job No: 94116.43

From: Dale C. Bugenig

PROJECT:

Lightning W Ranch

SUBJECT:

Ag Well Step-drawdown Test 4/20/95, Preliminary Results.

TO:

Bob Weise, Ted Brown, Dan Dragan, File

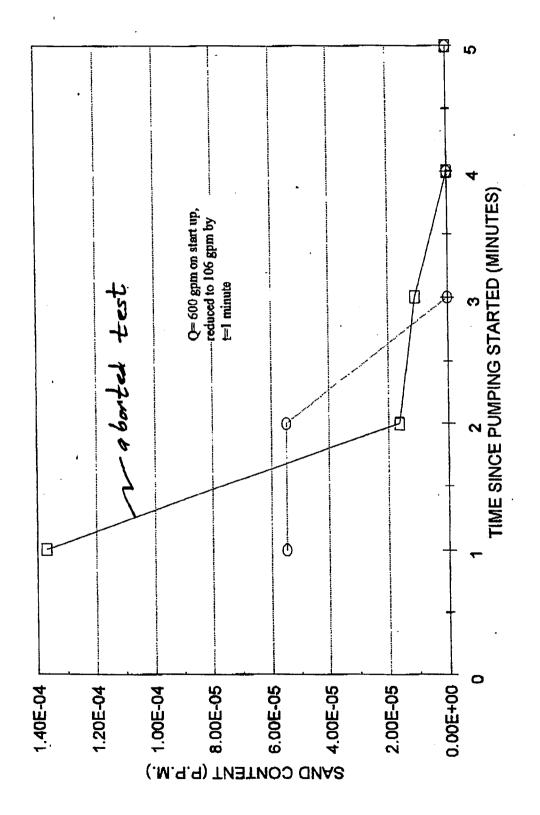
A short step-drawdown test was performed 4/20/95. A copy of the field data is attached. Four steps were planned, but only three steps were performed because the discharge line spring a leak during the third step. The pumping rate for the third step was estimated from the meter since the flow measurement made by the orifice did not account for loss of water due to the leak. The pumping rate for the third step is, therefore, less accurate than for Steps I and II.

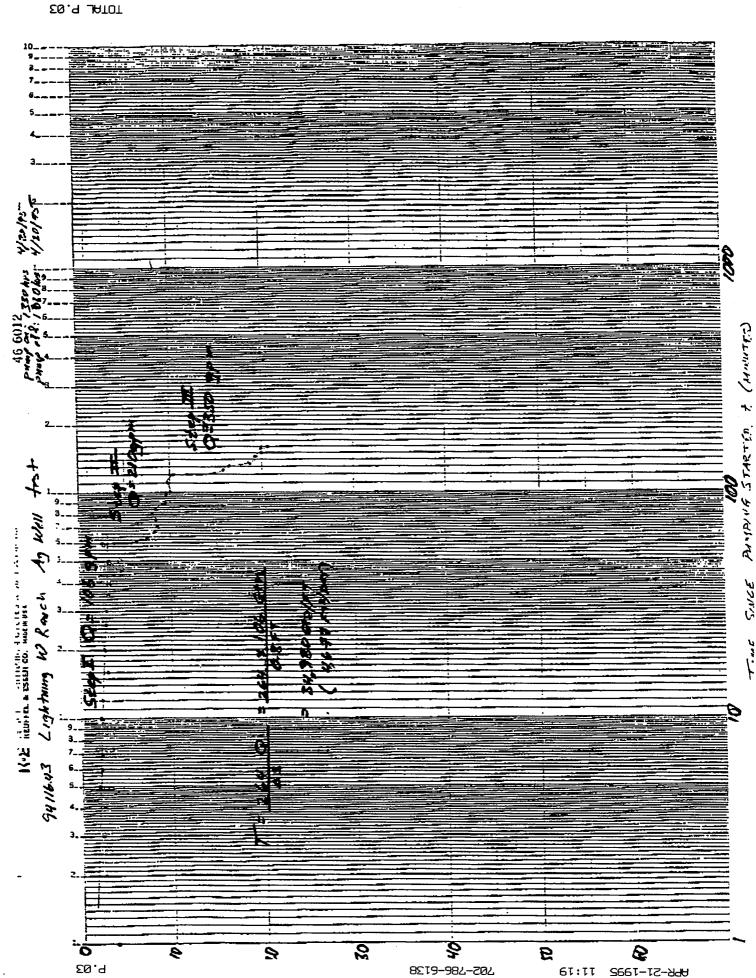
Step	Pumping rate Q (gpm)	Drawdown s (feet)	Specific Capacity C, (gpm/ft)
I	106	2.81	37.7
п	210	10.56	19.9
Ш	350	22.1	15.8

The data tabulated above are preliminary. A final interpretation will be performed after downloading all of the data collected by the Hermit once the constant-discharge test has been completed. The constant-discharge test will commence after the leaks in the discharge are fixed.

Sand content was measured twice. The first set of measurements were taken during an aborted test which preceded the step-drawdown test. This test was stopped to weld a pinhole leak in the pump column. The second set of measurements were taken at the start of the step-drawdown test. In each case, the discharge of the well was 600 gpm on start-up and it took up to a minute to close the valve sufficiently to regulate the discharge to 106 gpm. The data show that after an initial slug of sand, the sand content is less than 5 ppm within four minutes of start-up (refer to the figure). The concentration is reported as "zero" because the amount of sand collected by the sand tester in one minute is too small to measure.

LIGHTNING W RANCH Ag Well Test 4/20/95





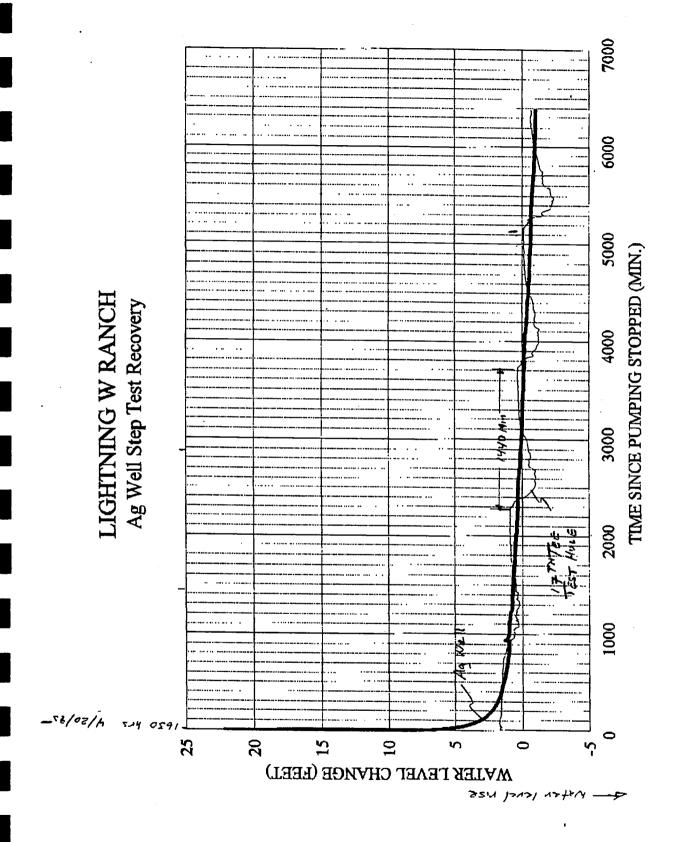


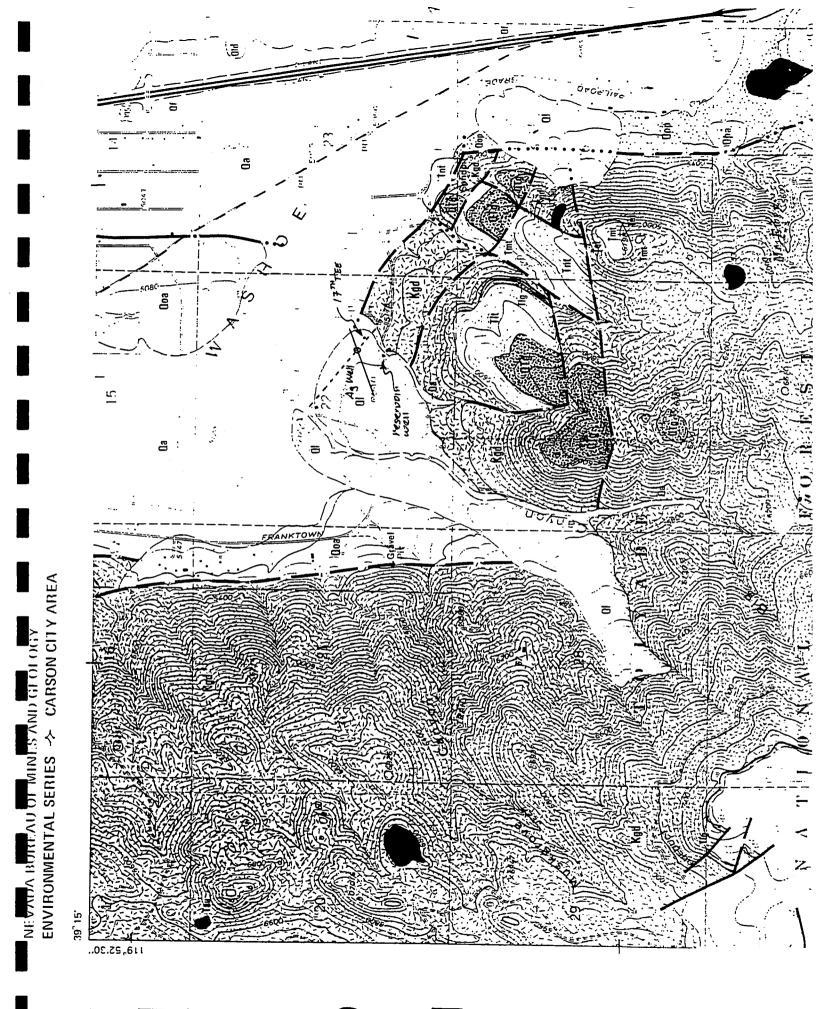
FAX TRANSMITTAL

1105 TERMINAL WAY, SUITE 304 RENO, NEVADA 88502 702-786-5873

CES, INC. FAX NO. (702) 786-6138

FAX TO: <u>W.C. U.D.</u>	FAX NO. 84-6-7310
ATTN: Dan Dragan	DATE: 4/25/95-
FROM: D. Bugenia CES, INC:	PROJECT NO. 74//L.43
SUBJECT: LIGHTHING W - Aq We	
The following FAX consists of pages, ir	ncluding this cover page.
Don	•
Dan, EXI - a copy of Recor Note the finatuations in	en deta
Note the fluctuations in	the data for
the 17th Tec Test Hole. In	teresting!
	Des"
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P.S. I'll let you know when	n the C.O.
test starts.	
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ENVIRONMENTAL

JOB # 94114.43

Consulting Engineering Services, Inc.



	DATE_	6/25	195	
OWNER LIGHTHING W RANCH	COMP.	BY_	DLR	'
PROJECT WARRA SURVIN	CK'D E			
SUBJECT AG WELL MODIFICATIONS	PAGE		OF	

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Consulting Engineering Services, Inc.



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WASHOE COUNTY

"To Protect and To Serve"

UTILITY DIVISION
DEPARTMENT OF PUBLIC WORKS
John M. Collins, Chief Sanitary Engineer

1195-B CORPORATE BOULEVARD POST OFFICE BOX 11130 RENO, NEVADA 89520-0027 PHONE: (702) 856-7300 FAX: (702) 856-7310

7 December 1994

MEMO TO: John Collins, Paul Orphan

FROM: Dan Dragan

SUBJECT: Lightning W, "New Well" pumping recommendations

Based on the data collected from our 10-day constant discharge test and the subsequent 24-hour test on the nearby irrigation well, I recommend the new well be equipped to pump 90 gallons per minute. At that rate, the maximum expected pumping level will be about 275 feet below ground surface. At drawdowns below 280 feet we began to notice some cloudiness in the discharge, therefore I do not recommend pumping levels below 275 feet.

This pumping rate allows drawdown to drop as much as 55 feet below the top of the screened interval. It also is based on a continuous peak pumping period of up to 69 days.

The pump intake should be set at 340 feet to allow for long term water level declines should they occur. A 3/4-inch diameter stilling well needs to be installed with the permanent pump to allow us to monitor water levels in the well.

As a side note, if we were to not allow pumping levels to drop below the top of the screened interval, the well could not be equipped to pump more than 30 gallons per minute. Pumping below the screened interval may cause:

- 1. Higher incrustation rates
- 2. Increased corrosion
- 3. Sand pumping
- 4. Air entrainment

CES engineering conducted an analysis of the data and concurred with my estimates of pumping levels in the well at various rates and time intervals.



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UTILITY DIVISION
DEPARTMENT OF PUBLIC WORKS
John M. Collins, Chief Sanitary Engineer

1195-B CORPORATE BOULEVARD POST OFFICE BOX 11130 RENO, NEVADA 89520-0027 PHONE: (702) 856-7300 FAX: (702) 856-7310

27 June 1995

MEMO TO: John Collins, Paul Orphan, Jack Ferris

FROM: Dan Dragan

SUBJECT: Lightning "W" Ag well, report from CES

The attached report details a test pumping and analyses of data conducted by Dale Bugenig of CES. The conclusion is that the well should easily meet the 110 gpm demand for the M&I portion of the project. The test pumping analyses actually show a more pessimistic performance of the well than historical pumping indicates. In other words, the predicted drawdowns from the test pumping are more than have occurred from historical irrigation pumping.

Dale suggests to Bob that the well be equipped and pumped for an "extended period" to resolve the difference between the predicted drawdowns and the historical performance. We may get a request from Bob to equip the well at a higher rate than 110 gpm and supply him irrigation water for the growing season. Dale suggests this as a way to run the "extended test" and also put the water to good use.

However, the well still needs to go through the "conversion" (diagram attached), to meet surface seal standards. I plan to request another test pumping after the conversion and additional water quality testing.

My only other concern is the number of wells located in such a small area and not knowing the full pumping scenario that may occur in the future. Dale did an interference analysis but did not include any pumping from the new "17th Tee" well. I do not know what Lightning W has planned for the 17th Tee well.

I will update you after the well conversion has taken place.

c: Mike Widmer



WASHOE COUNTY

"To Protect and To Serve"



1195-B CORPORATE BOULEVARD POST OFFICE BOX 11130 RENO, NEVADA 89520-0027 PHONE: (702) 856-7300 FAX: (702) 856-731c

UTILITY DIVISION
DEPARTMENT OF PUBLIC WORKS
John M. Collins, Chief Sanitary Engineer

October 9, 1995

Robert L. Weise Lightning W Ranch 7300 Franktown Road Carson City, Nevada 89704

Subject:

Letter of Understanding Regarding Pumping of the 17th Tee

Well at Lightning W Ranch

Dear Mr. Weise:

Staff has reviewed the Letter of Understanding you sent and made some changes. In your proposed Letter of Understanding you proposed a limit of 85% of the standard for Uranium as the criteria for shutting off the 17th Tee Well. There is no standard specifically for Uranium. Uranium is an Alpha emitter and is considered in the determination of compliance with gross alpha, for which there is a standard. We therefore propose in the Letter of Understanding that the 17th Tee Well be shut off whenever any constituent reaches 85% of Nevada standards for drinking water.

In the first year of operation we plan to sample the Upper and Reservoir Wells on a quarterly basis for radionuclides and general inorganic minerals. The frequency in subsequent years may be reduced. Lightning W will be responsible for the cost of the first year analyses.

The Reservoir and Upper Wells will be equipped with a sensor to monitor pumping levels. The sensors will be tied to our telemetry system and will allow us to monitor the levels from our office. We will notify your office if the pumping levels are approaching the levels described in the Letter of Understanding.

After you have reviewed the attached revised Letter of Understanding, please execute, have your signature notarized and return the letter to our office as soon as possible. If you have any comments or questions please call either Mr. Dan Dragan or Mr. Paul Orphan at 856-7300.

Sincerely,

OHN M. COLLINS, P.E. Chief Sanitary Engineer

JMC:llr Attachment

cc: C

Craig V. McConnell, Public Works Director Paul C. Orphan, Senior Utility Engineer E. Terri Svetich, P.E.

Dan Dragam, Hydrology Supervisor

August 18, 1995

Dan Dragan Washoe County Utility Division P.O. Box 11130 Reno, NV 89520



94116.31

RE: Lightning W Ranch - Ag Well Performance Test, 8/17/95.

Dear Dan:

The Ag Well at the Lightning W Ranch was test pumped by Consulting Engineering Services, Inc. on August 17, 1995. The purpose of the test was to determine whether the modifications made to the well had an adverse effect on its performance. The test results are summarized below. Copies of the field data sheet and a plot of the data are provided for your review.

Static water level - 101.65 feet below reference point (top of stilling well ≈ 1.9 feet above land surface.

Test commenced - 1500 hours 8/17/95.

Pumping rate - 238.9 to 240.2 gallons per minute.

Test ended - 2100 hours 8/17/95.

Test duration - six (6) hours.

Pumping water level at conclusion of test - 127.10 feet below reference point (drawdown = 25.45 feet).

The test was terminated after six hours when it became apparent that the well or aquifer was not damaged by the installation of the liner and sanitary seal. Comparison of the plots of drawdown versus square root of time for the April/May '95 and the 8/17/95 tests shows the slopes of the lines to be proportional to the pumping rate just as it should be.

I am not sure why the initial drawdown at 240 gpm was greater than the initial drawdown at 299 gpm. I would have expected exactly the opposite. This apparent decrease in effective well diameter or efficiency would have been anticipated if the liner was placed opposite perforations but, as you know, the liner is above the perforations and the static water level. Tom Dae, formerly of Layne Western, once told me that wells sometimes behave differently when pump settings are changed. I have never believed this to be so, but there may be some truth in what he said.

Dan Dragan August 18, 1995 page 2 of 2

At the conclusion of the test, Bob Weise instructed me to leave the pump running so they can use the water from the well for golf course irrigation. Wayne Cirone will monitor the pumping water level and report the data to me weekly. I will forward the weekly reports to you as I receive them. I collected a water sample near the end of the test. It will be analyzed for major cations, anions, iron, manganese, arsenic, and radio nuclides. Results should be available by about August 25th.

Please do not hesitate to call me if you have any questions or comments regarding this latest test.

Sincerely,

CONSULTING ENGINEERING SERVICES, INC.

DALE C. BUGENIG

DCB/kh

attachments cc: Bob Weise Ted Brown



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Our Job No. M.

CONSULTING ENGINEERING SERVICES, INC. 1105 TERMINAL WAY, SUITE 304 RENO, NEVADA 89502 (702) 786-5873

DAN DRAGAN
WASHOE CO. UTILITY DIV.

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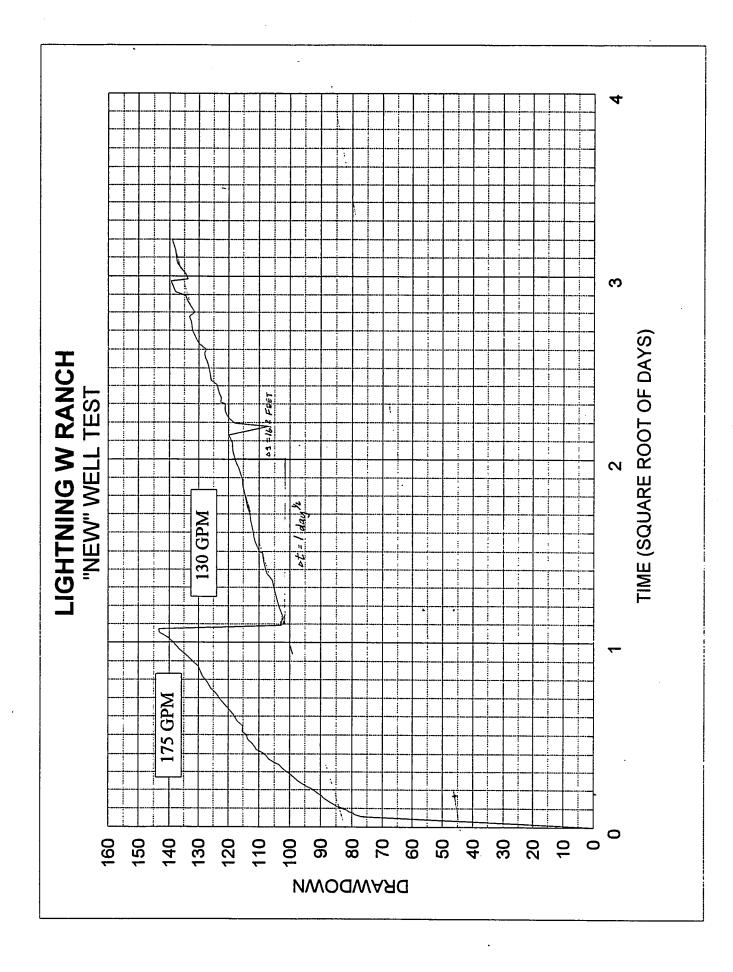
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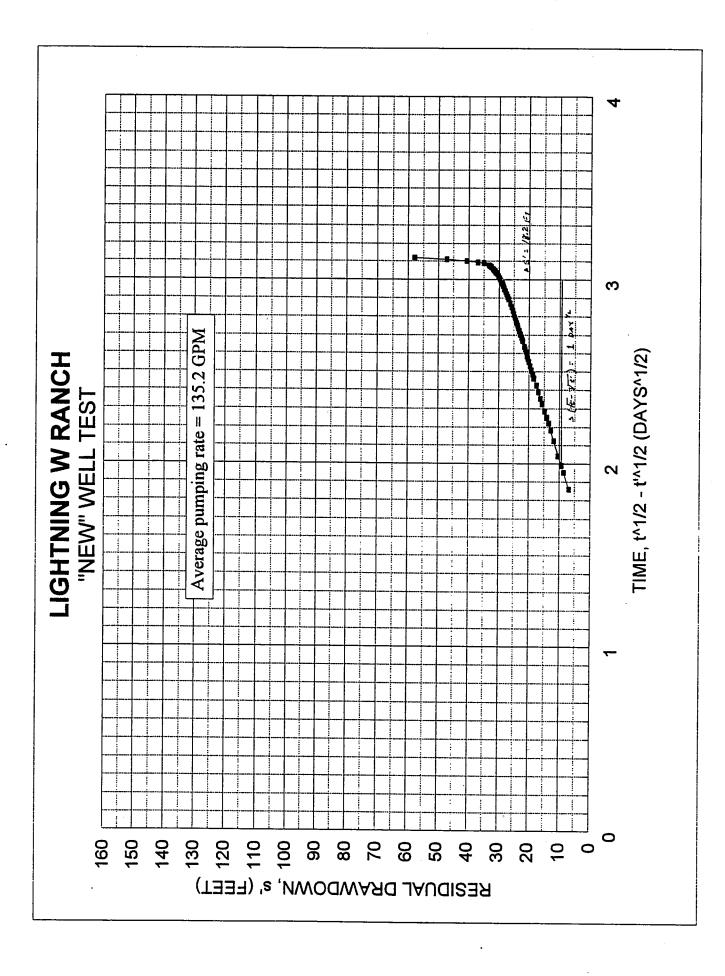
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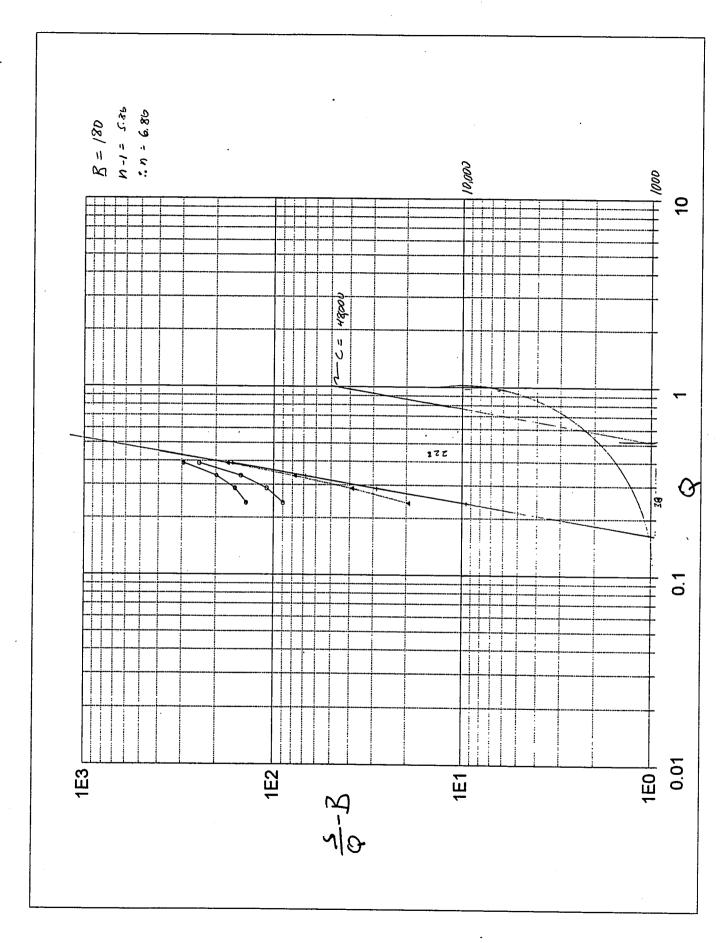
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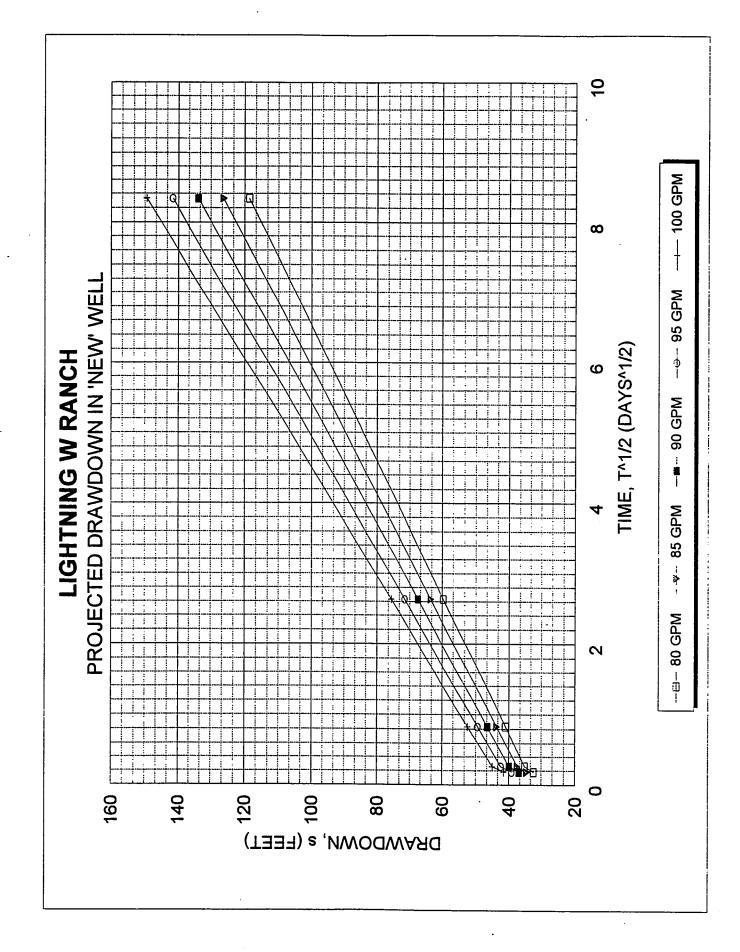
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PROJECTED DRAWDOWN IN "NEW" WELL AT LIGHTNING W RANCH

	TE TIME		DRAWDOWN FEET						
GPM CF	S I	MIN	DAYS^1/2	€ PM	80	85	90	95	100
80 0.	178	50	0.19	32.	43	34.62	36.88	39.24	41.72
85 0.	189	100	0.26	35.	16	37.52	39.95	42.48	45.13
90 0.	201	1000	0.83	41.	06	43.78	46.58	49.48	52.50
95 0.	212	10000	2.64	59.	71	63.60	67.56	71.63	75.82
100 0.	223	100000	8.33	118.	69	126.26	133.91	141.66	149.54

50 MINUTE DRAWDOWN = BQ + CQ^n

B = 180

C = 48,000

n = 6.86

Q is the pumping rate in cubic feet per second

DRAWDOWN FOR t > 50 MINUTES

 $s = 50 MIN DRAWDOWN + ((Q x t^1/2)/ 1488))$

Q is the pumping rate in cubic feet per day

1292

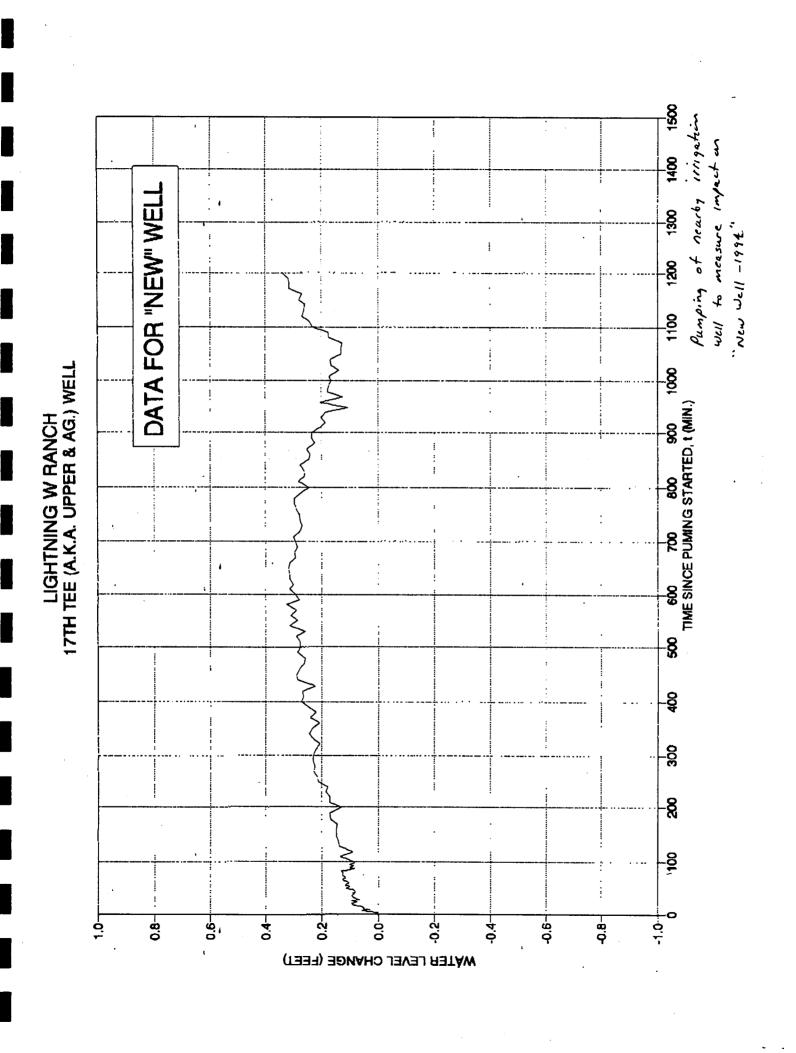
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DEC-02-1384



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

LOS NO. 4621
Log No. 46211
Permit No
Dasin

PRINT OR TYPE ONLY Please complete this form in its entirety in DO NOT WRITE ON BACK accordance with NRS 534.170 and NAC 534.340 NOTICE OF INTENT NO. 26481 TOWN RO TOO FILLURATION FRANK TOWN LOCATION SY MASHDE PERMIT NO 57466 SBIBLE Subdivision Name WELL TYPE PROPOSED USE WORK PERFORMED Cable A Rotary RVC ☐ Irrigation ☐ Test Replace Chrecondition
Abandon Other..... New Well
Deepen Domestic 🖺 Air Municipal/Industrial Monitor ☐ Stock WELL CONSTRUCTION LITHOLOGIC LOG Depth Drilled 400 Feet Depth Cased. 4100 Thick-Material Prom HOLB DIAMETER (BIT SIZE) 2 SAUDL MAN Poor Q2 Peat Inches. Inches BLOW W. MINDE 53/2 Inches .Pcct.. OG WINDS CASING SCHEDULE **CAY** A 18 3 18 Wali Thickness From (Feet) (Feet) Weight/I4. (Inches) 2.2 1 2 657143 Perforations: Type perforation... Size perforation... From 220 feet to feet leet From. .feet From. ..feet feet to From. Scal Type: □ No Surface Scal: Neat Cement. Depth of Scal. Coment Grout
Concrete Grout Placement Method: Pumped D Poured Yes Gravel Packed: □ No From 180 feet to. WATER LEVEL feet below land surface Static water level Artesian flow... Water temperature Cala 121 . F Quality... DRILLER'S CERTIFICATION This well was drilled under my supervision and the report is true to the 19**9**4 Date started. best of my knowledge. Date completed... NEVADA WELL TEST DATA ☐ Bailer ☐ Pump 🗱 Air Liß 🗈 TEST METHOD: Draw Down (Feet Below Static) Time (Hours) O.P.M. Nevada contractor's license number issued by the State Contractor's Board.... Novada driller's license number issued by the Division of Water Resources, the Signed

USE ADDITIONAL SHEETS IF NECESSARY

19 1994 B4:51 PM

(Rev. 3-91)

57'E1 1'88 207 : .ON BUOH9

FROM: NEVADA-CADVFAX

Ag or Upper Well WQ

ANALYTICAL CHEMISTS

October 10, 1995

LAB No: SP 505743-1

Lightning W Ranch 19 Lightning W Ranch

RE: Radiological Analysis

Carson City, NV 89704

Sample Site: Ag Well (95-6936)

Description: Ag Well (95-6936) Sampled by:

Type of Sample: Ground Water

Sampled | : August 17, 1995 Received : August 21, 1995

Completed : August 22, 1995 QA/QC ID# : 50574301- A

Apalytical Results

CONSTITUENT	EPA METHOD	UNITS	RESULTS ERROR				
Gross Alpha Gross Beta Total Radium Uranium	900.0 900.0 900.1 908.0	pCi/L pCi/L pCi/L pCi/L		± 2 ± 2 ± 1 ± 4			

pCi/L = pico Curies per Liter pCi/ml = pico Curies pe Preservatives: (1) Cool 4°C Containers: (a) Plastic pCi/ml = pico Curies per milliliter

If you have any questions, please call.

Michel M. Franco, B.A. Radiochemistry Lab Manager

MMF/DHN:c1

FGL ENVIRONMENTAL

Darrell H. Nelson, B.S. Laboratory Director

MGHTIVNG"W" AG WELL

CHEMAX Laboratories, Inc.

AKA UF

UPPER WELL

Analytical and Environmental Chemists
EPA Lab ID #NV004

(702) 355-0202 Fax (702) 355-0817

LABORATORY REPORT

Report To:

Lightning "W" Ranch

7300 Franktown Road

Carson City, NV 89701

Lab Report No.:

13408

Account No.:

LITEW

Telephone:

882-1241

Fax:

882-2388

Work Authorized By:

Date Sampled:

Ted Brown

05/01/95

Date Submitted:

05/02/95

Number of Samples:

3

Sampled By:

Client

Source:

Ag Well 95-3948 thru 3951

Your Reference:

Chen

Chemax Control No.

Notes:

Parameter	Results
рН	8.00
Alkalinity, mg/L as CaCO ₃	86
Bicarbonate, mg/L	105
Carbonate, mg/L	0
Color, CU	0-5
Turbidity, NTU	0.23
Hardness, mg/L as CaCO ₃	57
Total Dissolved Solids, mg/L	150
Chloride, mg/L	1.4
Fluoride, mg/L	<0.1
Sulfate, mg/L	<5
Nitrate Nitrogen, mg/L	<1

Remarks:

Analysis By:

Eckert/Joyce/Lettice/Nannini

Date: 05/17/95

Approved By:

Date: 05/17/95

Page 1 of 3

CHEMAX Laboratories, Inc.

Analytical and Environmental Chemists
EPA Lab ID #NV004

(702) 355-0202 Fax (702) 355-0817

LABORATORY REPORT

Report To:

Lightning "W" Ranch

Lab Report No.:

13408

Source: Ag Well

Parameter	Results
Arsenic, mg/L	<0.005
Barium, mg/L	<0.1
Cadmium, mg/L	<0.0005
Chromium, mg/L	<0.025
Lead, mg/L	<0.005
Mercury, mg/L	<0.001
Selenium, mg/L	<0.005
Silver, mg/L	<0.025
Sodium, mg/L	11
Potassium, mg/L	4.4
Calcium, mg/L	16
Magnesium, mg/L	4.7
Aluminum, mg/L	<0.025
Iron, mg/L	<0.05
Manganese, mg/L	<0.03
Copper, mg/L	<0.025
Zinc, mg/L	<0.05
MBAS, mg/L	<0.1

Remarks:

Analysis By: Eckert/Faulstich/Joyce/Knudsen/Lettice

olin A. Zett

Date: 05/17/95

Approved By:

Date: 05/18/95

Page 2 of 3 992 Spice Islands Drive. Sparks. Nevada 89431 • P.O. Box 21122. Reno. Nevada 89515



Alpha Analytical, Inc.

255 Glendale Avenue, Suite 21 Sparks, Nevada 89431

(702) 355-1044

FAX: 702-355-0406 1-800-283-1183

Boise, Idaho (208) 336-4145

Las Vegas, Nevada (702) 386-6747

ANALYTICAL REPORT

Client ID: Lightning W Lab ID: Max050295-01 Sampled: 05/01/95 Received: 05/02/95

Chemax Laboratories 992 Spice Island Dr. Sparks NV 89431

Attn: Max

National Primary Drinking Water Phase II and Phase V Regulated and Unregualted Synthetic Organic Compounds (SOC's)

EPA		Concer	n Det	EPA		Concen	Det
Method Contaminant		ug/L	<u>Limit</u>	Metho	d Contaminant	ug/L	Limit
Analy	zed: <u>05/10/95</u>	_			ed: <u>05/12/95</u>		
504	1. 1,2-Dibromo-3-			515.1	1. Dalapon	ND	1.0
	Chloropropane (DBCP)	ND	0.02	515.1	2. Dicamba	ND	1.0
504	2. 1,2-Dibromoethane(EDB)	ND	0.01	515.1	3. Dinoseb	ND	0.20
				515.1	4. 2,4-D	ND	0.10
Analy	zed: <u>05/18/95</u>			515.1	5. Picloram	ND	0.10
505	1. Alachlor	ND	0.20	515.1	6. Pentachlorophenol	ND	0.04
505	2. Aldrin	ND	0.20	515.1	7. 2,4,5-TP (Silvex)	ND ·	0.20
505	3. Chlordane (Technical)	ND	0.20				
505	4. Dieldrin	ND	0.20	Analyz	ed: <u>05/10/95</u>		
505	5. Endrin	ND	0.01	525*	1. Benzo(a)pyrene	ND	0.02
505	6. Heptachlor	ND	0.04	525*	2. Bis(2-ethylhexyl)		
505	7. Heptachlor Epoxide	ND	0.02		phthalate	ND	0.60
505	8. Hexachlorobenzene	ND	0.10	525*	3. Bis(2-ethylhexyl)		
505	Hexachlorocyclopentadiene	ND	0.10		adipate	ND	0.60
505	10. Lindane	ND	0.02		•		
505	Methoxychlor	ND	0.10	Analyz	ed: <u>05/06/95</u>		
505	12. Aroclor-1016 (Screen)	ND	0.08	531.1	1. Aldicarb	ND	0.50
505	13. Aroclor-1221 (Screen)	ND	20	531.1	2. Aldicarb Sulfoxide	ND	0.50
505	14. Aroclor-1232 (Screen)	ND	0.50	531.1	3. Aldicarb Sulfone	ND	0.80
505	15. Aroclor-1242 (Screen)	ND	0.30	531.1	4. Carbaryl	ND	1.0
505	16. Aroclor-1248 (Screen)	ND	0.10	531.1	5. Carbofuran	ND	0.90
505	17. Aroclor-1254 (Screen)	ND	0.10	531.1	6. 3-Hydroxycarbofuran	ND	1.0
505	18. Aroclor-1260 (Screen)	ND	0.20	531.1	7. Methomyl	ND	1.0
505	Toxaphene	ND	1.0	531.1	8. Oxamyl	ND	2.0
					•		
Analyzed: 05/13/95			_	Analyz	ed: <u>05/04/95</u>		
507	1. Atrazine	ND	0.10	547	1. Glyphosate	ND	6.0
507	2. Butachlor	ND	1.0				
507	3. Metolachlor	ND	1.0	Analyzo	ed: <u>05/10/95</u>		
507	4. Metribuzin	ND	1.0	548	1. Endothall	ND	9.0
507	5. Propachlor	ND	1.0				
507	6. Simazine	ND	0.07	Analyzo	ed: <u>05/12/95</u>		
				549	1.Diquat	ND	0.40
ND - 1	Not Detected				-		

ND - Not Detected

* - Analysis performed at Aqua Techonolgical Laboratories, Inc.

Approved By: Roger L. Scholl, Ph.D.

Laboratory Director

Date:



255 Glendale Avenue, Suite 21 Sparks, Nevada 89431 (702) 355-1044

FAX: 702-355-0406 1-800-283-1183 Boise, Idaho (208) 336-4145

Las Vegas, Nevada (702) 386-6747

ANALYTICAL REPORT

Chemax Laboratories 992 Spice Island Dr.

Sparks NV 89431

Job#:

Phone: 355-0202

Attn: Max-Noel Shen

Sampled: 05/01/95 Received: 05/02/95

Alpha Analytical Number: MAX050295-01

Client I.D. Number: Lightning W

Analyzed: 05/04/95

Report of GC/MS Analysis for SDWA VOLATILES PLUS LISTS 1 AND 3 UNREGULATED COMPOUNDS EPA 524.2

8 Regulated Volatile Organic Compounds (VOC's) (Phase I) 1. Benzene 2. Vinyl Chloride 3. Carbon tetrachloride ND 0.50 ug/L 31. p-Chlorotoluene 32. Dibromomethane	ND	0.50 ug/L
4. 1,2-Dichloroethane 5. Trichloroethylene 6. p-Dichlorobenzene 7. 1,1-Dichloroethylene 8. 1,1,1-Trichloroethane 10. Regulated Volatile Organic Compounds 9. cis-1,2-Dichloropropane 11. Ethylbenzene 12. Monochlorobenzene 13. o-Dichloroethylene 14. Styrene 15. Tetrachloroethylene 16. Toluene 17. trans-1,2-Dichloroethylene 18. Xylenes (total) 3 Regulated Volatile Organic Compounds (VOC's) 19. Dichloromethane 20. 1,1,2-Trichloroethylene 19. Dichloromethane 20. 1,1,2-Trichloroethylene 20. 1,1,2-Trichloroethylene 20. 1,1,2-Trichloroethylene 21. 1,2,4-Trichloroethane 22. Bromobenzene 23. Bromodichloromethane 24. Bromoform 25. Bromodichloromethane 26. Bromomethane 27. ND 28. Bromomethane 28. Bromodichloromethane 29. Dichloromethane 20. D.50 ug/L 21. D.50 ug/L 22. Bromobenzene 23. D.50 ug/L 24. Bromoform 25. D.50 ug/L 26. Bromomethane 27. Dichloromethane 28. D.50 ug/L 29. Dichloromethane 29. D.50 ug/L 29. Dichloromethane 29. D.50 ug/L 29. Dichloromethane 29. D.50 ug/L 29. Dichloromethane 29. D.50 ug/L 29. Dichloromethane 29. D.50 ug/L 29. Bromobenzene 29. Dichloromethane 29. D.50 ug/L 29. Bromobenzene 29. Dichloromethane 29. D.50 ug/L 29. Bromobenzene 29. Dichloromethane 29. D.50 ug/L 29. Bromobenzene 29. Dichloromethane 29. D.50 ug/L 29. Bromobenzene 29. Dichloromethane 29. Dichloromethane 29. Dichloromethane 29. Dichloromethane 29. Dichloromethane 29. Dichloromethane 29. Dichloromethane 29. Dichloromethane 29. Dichloromethane 29. Dichloromethane 29. Dichloromethane 20. D.50 ug/L 20. Dichloromethane 20. D.50 ug/L 20. Dichloromethane 20. D.50 ug/L 21. D.50 ug/L 22. Bromobenzene 23. Dichloromethane 24. Dichloromethane 25. Dichlo	ne ND ND	0.50 ug/L 0.50 ug/L

ND - Not Detected

Approved By:

Roger L Scholl, Ph.D. Laboratory Director Date:

5/19/95

Reservoir or Well" WQ



255 Glendale Avenue, Suite 21 Sparks, Nevada 89431

(702) 355-1044 FAX: 702-355-0406 1-800-283-1183

Boise, Idalion 1208) 336-4 **(cs**

Las Vegas, Nevada (702) 386-6747

Analytical Repo For The

National Primary Drinking Water Phase Regulated and Unregulated Synthetic Organic Compounds (SOC's)

Client ID: New Well

Lab ID: MAX112294-01

Sampled: 11/22/94 Received: 11/22/94 Analyzed: 12/02/94

Chemax

992 Spice Island Dr

Sparks NV 89431 Attn: Max Sheen

Job: Lightning W Ranch

Contaminant	Concentration Ug/L	Detection Limit ug/L	EPA Hethod
Alachlor	ND	0.20	505
Aldrin	ND	0.20	505
Chlordane (Technical)	ND	0.20	
Dieldrin	ND	0.20	505
Endrin	ND	0.01	505
Heptachlor	ND	0.04	505
Heptachlor Epoxide	ND	0.02	505
Hexachlorobenzene	ND		505
Hexachlorocyclopentadiene	ND	0.10	505
Lindane	ND	0.10	505
Methoxychlor	ND	0.02	505
Aroclor-1016 (Screen)		0.10	505
Aroclor-1221 (Screen)	ND	0.08	505
Aroclor-1232 (Screen)	ND .	20	505
Aroclor-1242 (Screen)	MD ND	0.50	505
Aroclor-1248 (Screen)	MD	0.30	505
Aroclor-1254 (Screen)	MD MD	0.10	505
	ND	0.10	505
Aroclor-1260 (Screen)	ND ND	0.20	505
Toxaphene D - Not Detected	ND	1.0	505

Approved By:

Roger Z. Scholl, Ph.D. Laboratory Director

CHEMAX Laboratories, Ing

Analytical and Environmental Chemists EPA Lab ID #NV004

 $(702)\ 355-0202$ FAX (702) 355-0817

LABORATOR

Report To:

Lightning "W" Ranch

7300 Franktown Road

Carson City, NV 89701

Ted Brown

11/22/94

New Well

94-9401 thru 9403

Telephone:

882-1241

Work Authorized By:

Date Sampled:

Number of Samples:

Source:

Chemax Control No.

Notes:

AKA DEBAKER OR OR DOR

Lab Report No.:

12726

Account No.:

LITEW

882-2388

Date Submitted:

11/22/94

Sampled By:

Washoe County Utilities Dist

Your Reference:

Parameter	Results
рН	7.04
Alkalinity, mg/L as CaCO ₃	104
Bicarbonate, mg/L	127
Carbonate, mg/L	0
Color, CU	0-5
Turbidity, NTU	0.49
Hardness, mg/L as CaCO ₃	87
Total Dissolved Solids, mg/L	180
Chloride, mg/L	12
Fluoride, mg/L	<0.1
Sulfate, mg/L	<5
Nitrate Nitrogen, mg/L	<1

Remarks:

Analysis By:

Eckert/Joyce/Lettice/Nannini

Date: 12/06/94

Approved By:

Date: 12/07/94

den A. Zettere Page 1 of 3 992 Spice Islands Drive, Sparks, Nevada 89431 • P.O. Box 21122, Reno, Nevada 89515 CHEMAX Laboratories, Inc.

Analytical and Environmental Chemists EPA Lab ID #NV004

(702) 355-0202 FAX (702) 355-0817

LABORATORY

Report To:

Lightning "W" Ranch

Source:

New Well

Lab Report No.:

12726

Parameter	Results
Arsenic, mg/L	. <0.005
Barium, mg/L	0.10
Cadmium, mg/L	< 0.0005
Chromium, mg/L	<0.025
Lead, mg/L	< 0.005
Mercury, mg/L	<0.001
Selenium, mg/L	< 0.005
Silver, mg/L	<0.025
Sodium, mg/L	14
Potassium, mg/L	3.4
Calcium, mg/L	21
Magnesium, mg/L	8.5
Aluminum, mg/L	<0.025
Iron, mg/L	0.078
Manganese, mg/L	<0.03
Copper, mg/L	<0.025
Zinc, mg/L	<0.05
MBAS, mg/L	- <0.01

Remarks:

Analysis By: Eckert/Faulstich/Knudsen/Lettice/Steele

Date: 12/06/94

Approved By: (olin A. Zettie

Date: 12/07/94

992 Spice Islands Drive, Sparks, Nevada 89431 • P.O. Box 21122, Reno, Nevada 89515

CHEMAX Laboratories, Inc.

Analytical and Environmental Chemists EPA Lab ID #NV004

(702) 355-0202 FAX (702) 355-0817

LABORATOR

Report To:

Lightning "W" Ranch

Source:

New Well

Lab Report No.:

12726

Parameter	Results	
CATION - ANION BALANCE Cations, meq/L Anions, meq/L % Error	2.44 2.42 0.50	
Gross Alpha	See FGL Environmental Report	
Gross Beta	See FGL Environmental Report	
EPA 504	See Alpha Analytical Report	
EPA 524.2	See Alpha Analytical Report	
EPA 505	See Alpha Analytical Report	
EPA 525.1	See FGL Environmental Report	
EPA 507	See Alpha Analytical Report	
EPA 531.1	See Alpha Analytical Report	
EPA 515.1	See Alpha Analytical Report	
EPA 549	See Alpha Analytical Report	
EPA 548	See Alpha Analytical Report	
EPA 547	See Alpha Analytical Report	

Remarks:

Analysis By: Alpha/FGL Environmental

olu A. Zettus

Date: 12/06/94

Approved By:

Date: 12/07/94

Page 3 of 3

992 Spice Islands Drive, Sparks, Nevada 89431 • P.O. Box 21122, Reno, Nevada 89515



ANALYTICAL CHEMIS

December 5, 1994

Alpha Analytical 255 Glendale Avenue, Suite 21 Sparks, NV 89431

LAB No: SP 407225-1

RE: Organic Analysis Matrix: Drinking Water

Sampling Site: MAX112294-01 Sample Description: New Well Sampled by : Alpha Analytical Container : Amber Glass TFE-Cap

Sampled : November 22, 1994 Received: November 23, 1994 Extracted: November 23, 1994 Analyzed : November 28, 1994

QA/QC ID# : SP 94112300Í

Preservatives:

EPA METHOD 525

CONSTITUENT	SAMPLE DLR ug/L	MCL ug/L	SAMPLE RESULTS ug/L	LAB BLANK DLR RESULTS ug/L ug/L
Benzo(a)pyrene Hexachlorocyclopentadiene bis(2-Ethylhexyl)adipate bis(2-Ethylhexyl)phthalate	0.02 0.1 0.6 0.6	0.2 50 400 4	ND ND ND ND	0.02 ND 0.1 ND 0.6 ND 0.6 ND
SURROGATE	SA AR	MPLE % REC		LAB BLANK AR % REC.
Perylene-d12	50-150	94		50-150 67

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.) ug/L = Micrograms Per Liter (ppb) ND = Not Detected at or above the DLR. AR = Acceptable Range ◆ = DLR adjusted because of dilutions, concentrations, or limited sample.

If you have any questions, please call.

FGL ENVIRONMENTAL

&€11y A. Dunnahoo, B.S.

Organic Laboratory Manager

Darrell H. Nelson, B.S. Laboratory Director

KAD/DHN:tld



ANALYTICAL CHEMIST

December 5, 1994

Alpha Analytical 255 Glendale Avenue, Suite Sparks, NV 89431

LAB No: SP 407225-1

RE: Radiological Analysis

Sample Site: MAX112294-01

Description: New Well Sampled by : Alpha Analytical Type of Sample: Drinking Water

Sampled : November 22, 1994 Received : November 23, 1994 Completed: November 29, 1994

QA/QC ID# : 40722501- A

Analytical Results

CONSTITUENT	EPA METHOD	UNITS	RESULTS ERROR	MCL
Gross Alpha	900.0	pCi/L	11 ± 2	
Gross Beta	900.0	pCi/L	3 ± 3	
Uranium	908.0	pCi/L	9 ± 2	

pCi/L = pico Curies per Liter pCi/ml = pico Curies per milliliter Preservatives: (1) Cool 4°C (2) HNO3 pH < 2 Containers: (a) Plastic

If you have any questions, please call.

FGL ENVIRONMENTAL

Michel M. Franco, B.A.

Radiochemistry Lab Manager

MMF/DHN:tld

Darrell H. Nelson, B.S. Laboratory Director



255 Glendale Avenue, Suite 21 Sparks, Nevada 89431 (702) 355-1044

FAX: 702-355-0406 1-800-283-1183

Boise, Idaho (208) 336-4145

ANALYTICAL REPOR

Las Vegas, Nevada (702) 386-6747

Chemax Laboratories

992 Spice Island Dr. Sparks NV 89431

Job#: Lightning "W" Ranch

Phone: 355-0202

Attn: Max-Noel Shen

Sampled: 11/22/94 Received: 11/22/94

Alpha Analytical Number: MAX112294-01

Client I.D. Number: New Well

Analyzed: 12/01/94

Report of GC/MS Analysis for SDWA VOLATILES PLUS LISTS 1 AND 3 UNREGULATED COMPOUNDS EPA 524.2

Detected

Approved By: /

Roger L. Scholl, Ph.D. Laboratory Director

leholl Date: 12



255 Glendale Avenue, Suite 21

Sparks, Nevada 89431

(702) 355-1044 FAX: 702-355-0406

1-800-283-1183

Boise, Idah (208) 336-41

Las Vegas, Nevada (702) 386-6747

Analytical Repor

For The National Primary Drinking Water Phase and Phase V Regulated and Unregulated Synthetic Organic Compounds (SOC's)

Client ID: New Well

Lab ID: MAX112294-01 Sampled: 11/22/94

Received: 11/22/94

Analyzed: 11/29-12/12/94

Chemax

992 Spice Island Dr.

Sparks NV 89431 Attn: Max Sheen

Job: Lightning W Ranch

Contaminant	Concentration ug/L	Detection Limit	EPA Method	
1,2-Dibromo-3-Chloropropane (DBCP)	ND	0.02	504	
1,2-Dibromoethane (EDB)	ND	0.01	504	
Atrazine	ND	0.10	507	
Butachlor	ND	1.0	507	
Metolachlor	ND	1.0	507	
Metribuzin	ND	1.0	507	
Propachlor	ND	1.0	507	
Simazine	ND	0.07	507	
Aldicarb	ND	0.50	531.1	
Aldicarb Sulfoxide	ND	0.50	531.1	
Aldicarb Sulfone	ND	0.80	531.1	
Carbofuran	ND	0.90	531.1	
Oxamyl	ND	2.0	531.1	
Glyphosate	ND .	6.0	547	
Endothall	ND	9.0	548	
Diquat ID - Not Detected	ND	0.40	549	

This replaces the report signed on 12/15/94. Note:

Approved By:

Roger Z. Scholl, Ph.D.

Laboratory Director

f. Scholl Date: 12/21/94



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is Vegas, Nevada (702) 386-6747

Analytical Report For The

National Primary Drinking Water Phase II and Phase V Regulated and Unregulated Synthetic Organic Compounds (SOC's)

Client ID: New Well Lab ID: MAX112294-01

Sampled: 11/22/94 Received: 11/22/94

Analyzed: 12/15/94

Chemax

992 Spice Island Sparks NV 89431 Attn: Max Sheen

Job: Lightning "W" Ranch

Contaminant	Concentration ug/L	Detection Limit Ug/L	EPA Method	
Dalapon	ND	1.0		
Dicamba	ND	1.0	515.1	
Dinoseb	ND	0,20	515.1	
2,4-D	. ND	0.10	515.1	
richloram	ND	0.10	515.1	
entachlorophenol	ND	0.04	515.1	
4.5-IP (Silvex)	ND ND	0.20	515.1	

Approved By:

Walter Hinchman

Quality Control Officer

Date: 12/16/94

8/1/01 RES. WELL 91.38 RECOVERING 17th Tee 76.78 HOLE IN CASING AS WELL COULD NOT MASSURE 8/31/01 17th Tee 84'S.W.L. P.S. 400' PLATE: 290 @ 3:00 pm P.L.: 177'