SPANISH SPRINGS VALLEY
MONITORING WELL CONSTRUCTION
AUGUST - OCTOBER 1993

WASHOE COUNTY
DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION
P.O. BOX 11130 RENO, NEVADA 89520

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

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Summary

In 1992, Washoe County in cooperation with The Nevada Division of Water Resources and The United States Geological Survey (USGS) began a water resource study of Spanish Springs Valley. Washoe County was committed under the agreement to construct monitoring wells in selected valley areas. Additional monitoring wells were needed for ground water elevations, water quality sampling points and to determine geology.

Well drilling began in August, 1993 and was completed in October, 1993. Ten 2-1/2 inch diameter monitoring wells were constructed to depths between 168 and 649 feet. A monitoring well location map is shown in Figure 1.

Two potential production well sites were found at SSP2 and SSP4. The wells penetrate a fractured, volcanic aquifer that could produce high well yields. Water quality analyses were done at SSP2 and SSP4. Lead was initially measured in SSP2 at 0.015 ppm. A second water quality analyses measured the Lead concentration in SSP2 at 0.008 ppm. A residual product from drilling is the probable cause of lead in the well. SSP2 and SSP4 met primary and secondary drinking water standards in all other parameters tested.

Drilling Operations

Monitoring well construction was done by Humboldt Drilling and Pump Company of Winnemucca, NV. An Ingersoll-Rand Model RO-300 table drive rotary drilling rig was used for borehole drilling. 7-7/8 inch boreholes were drilled at sites SSP2-10 using the mud rotary method. All 7- 7/8 inch boreholes were drilled with tri-cone button bits. SSP1 was drilled using a down hole Halco air hammer with a 6-1/4 inch rock bit.

The drilling fluid consisted of high yield bentonite clay mixed with clean water in a portable mud pit. The auxiliary pit was equipped with a shale shaker and de-sanding cones to prevent circulation of borehole cuttings and maintain mud density. The drilling foam used during air drilling consisted of clean water and commercial surfactant.

Formation samples were collected during borehole drilling at ten foot intervals. Borehole geophysics were conducted at six well sites and consisted of guarded resistivity, long and short normal electric, natural gamma, caliper, and sonic logs. Design, construction supervision and sampling were done by Washoe County Utility Division personnel. Borehole logging was done by Century Geophysical Corporation, Las Vegas office.

Well Construction

All monitoring wells were constructed using 2-1/2 inch galvanized steel pipe with steel caps threaded on the bottom. Perforated pipe with five 3/32" X 3" inch mill slots per foot was used in all

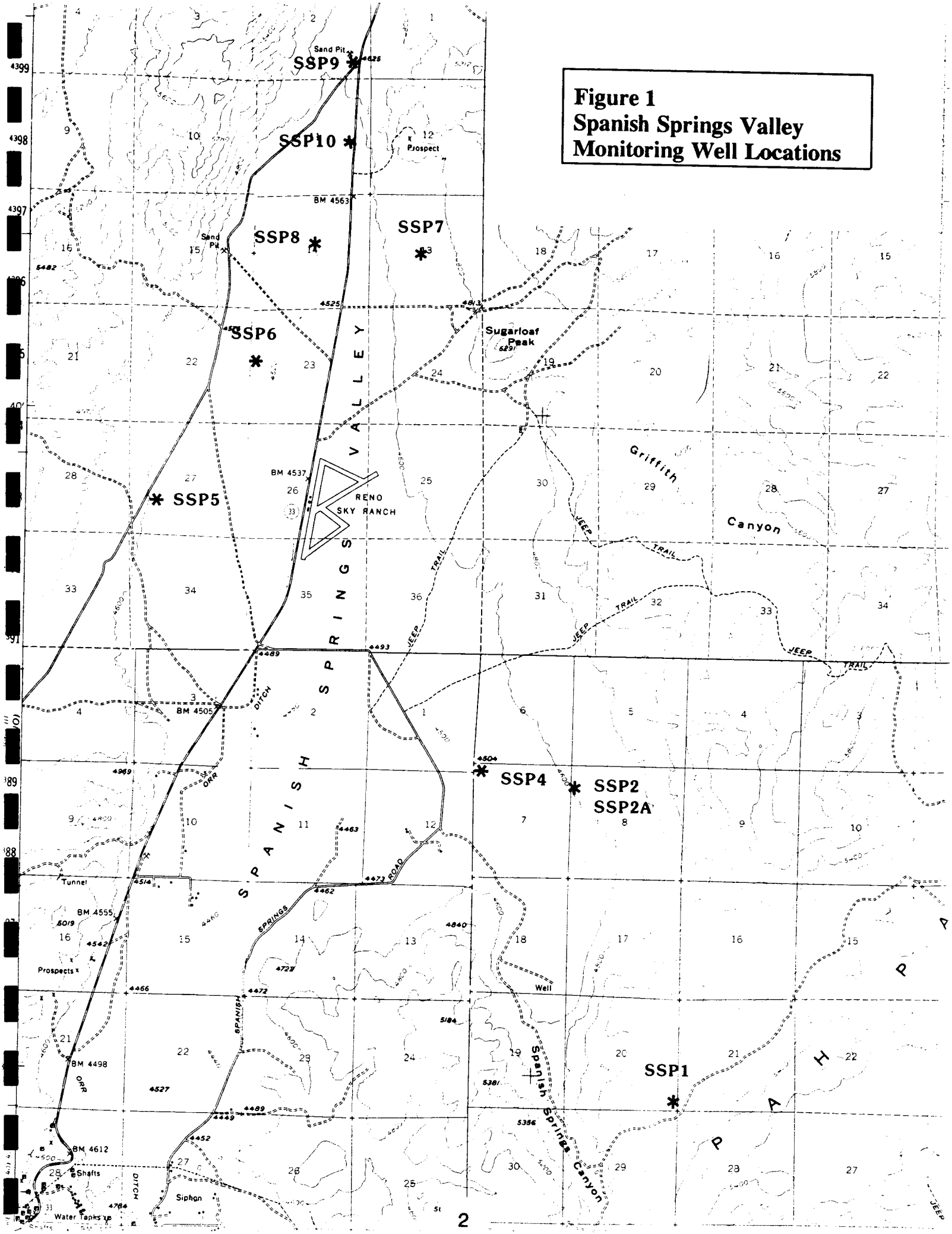


Figure 1
Spanish Springs Valley
Monitoring Well Locations

wells. All pipe joints were connected using threaded couplings. All wells were installed with a gravel envelope consisting of well rounded, siliceous 1/4" X 1/8" gravel supplied by Chevreaux Gravel, Auburn, California. Neat cement sanitary seals were installed with a grout pump and tremmie pipe. A six inch diameter protective casing and locking cap were cemented in place at each well head.

All monitoring wells were developed by air after the sanitary seals had hardened for a minimum of 24 hours. Air lift development was accomplished using an auxiliary air compressor, one inch steel discharge line and a five foot perforated jetting tool. Each well was developed until each slotted interval was surged and discharge was clear. A well construction summary is found in Table 1.

Table 1
Construction Summary

Well	Total Depth (Ft.)	Casing Depth (Ft.)	Slotted Interval (Ft.)	Grout Seal (Ft.)	Static W.L. (Ft.)
SSP1	665	649	334-649	50	--
SSP2	550	485	233-485	215	124.85
SSP2A	182	168	98-168	70	126.15
SSP4	565	544	250-544	53	21.26
SSP5	260	233	128-233	60	109.95
SSP6	220	208	124-208	60	62.86
SSP7	370	356	167-356	60	214.02
SSP8	240	229	103-229	57	58.17
SSP9	440	418	229-418	52	178.14
SSP10	260	250	103-247	58	95.08

Lithology Description

Nine monitoring wells were constructed in Spanish Springs Valley. Monitoring well SSP1 was constructed in the Dry Lakes area of the Pah Rah Range, southeast of the valley. SSP2A,5,6,8, and 10 were completed in basin fill. Wells SSP4,7 and 9 were completed in unconsolidated and consolidated formations. SSP1 and 2 were completed in bedrock. Formation logs for each well are found in the appendix. A lithologic and borehole geophysics brief for each well is found in the following outline.

SSP1

Colluvium of red, scoriated volcanic gravel and red clay was found from 0 to 40 feet. Tertiary basalt of the Lousetown formation (Bell and Bonham, 1987) was drilled from 40 to 665 feet. Weathered, volcanic tuff with tuffaceous clay was found between 250 to 283 feet. Penetration of saturated volcanics was estimated between 550 to 600 feet. The borehole produced an estimated 1 gpm at the end of drilling. Borehole geophysics were not done at SSP1.

SSP2

Alluvium was found between 0 to 184 feet. A sticky, lacustrine clay exists from 106 to 184 feet. Basalt fragments with silty clay was found between 184 to 195 feet. Lousetown formation basalt was drilled from 195 to 550 feet. A zone of fractured, scoriated basalt was found from 425 to 550 feet. The drilling rate was rapid through this layer with substantial drilling fluid loss occurring. The volcanic bedrock is the primary aquifer penetrated by the well. SSP2 was completed as a bedrock monitoring well with a grout seal extending from 0 to 215 feet.

Borehole geophysics run were guarded resistivity, sonic, natural gamma and caliper logs. The guarded resistivity shows low porosity alluvial material with 10 to 30 ohm-m resistance from 0 to 184 feet. The basalt has a resistance between 15 and 90 ohm-m. A volcanic tuff found from 310 to 378 feet has a low 10 ohm-m resistance indicating clay alteration. The sonic log shows fractured bedrock between 200 to 315 feet and 450 to 550 feet. The borehole caved in after logging between 490 and 550 feet.

The site is considered favorable for production well development. Air lift development regularly produced surges with a discharge stream that filled the two inch eductor line. The borehole heaving suggests a potential high yield water bearing formation in the well. Geophysical logs for SSP2 are shown in Figure 2.

SSP2A

The well was completed in alluvium and clay overlaying the basalt found in SSP2. The well was designed to verify a vertical hydraulic gradient with SSP2. Static water levels show a upward vertical gradient of 0.70 feet from SSP2A to SSP2. The higher water level in the bedrock monitoring well is a result of artesian pressure. The saturated alluvium in SSP2A is either perched water above the clay aquitard or a result of vertical leakage from the fractured volcanics. Leakage is possible since the aquitard is thinning near the site. Well yield was very minor during development.

SSP4

Volcanic /granitic sand and gravel with silty clay lenses exists from 0 to 118 feet. Brown and blue/gray lacustrine clay was found from 118 to 425 feet. Fractured and scoriated Lousetown formation was drilled from 435 to 565 feet. The Tertiary volcanic bedrock is the main aquifer penetrated by the well.

Borehole geophysics run were guarded resistivity, sonic, natural gamma and caliper logs. The guarded resistivity shows alluvium with 10 to 35 ohm-m resistance from 0 to 118 feet. The lacustrine clay unit from 118 to 435 feet has constant 10 ohm-m resistance. The fractured volcanics have a resistance of 25 to 100 ohm-m. The sonic log shows distinct fracturing after 425 feet. The volcanic bedrock drilled in SSP4 is slightly harder than bedrock found at SSP2. Geophysical logs for SSP4 are shown in Figure 3.

Figure 2
Geophysical Logs & Well Construction
Monitoring Well SSP2

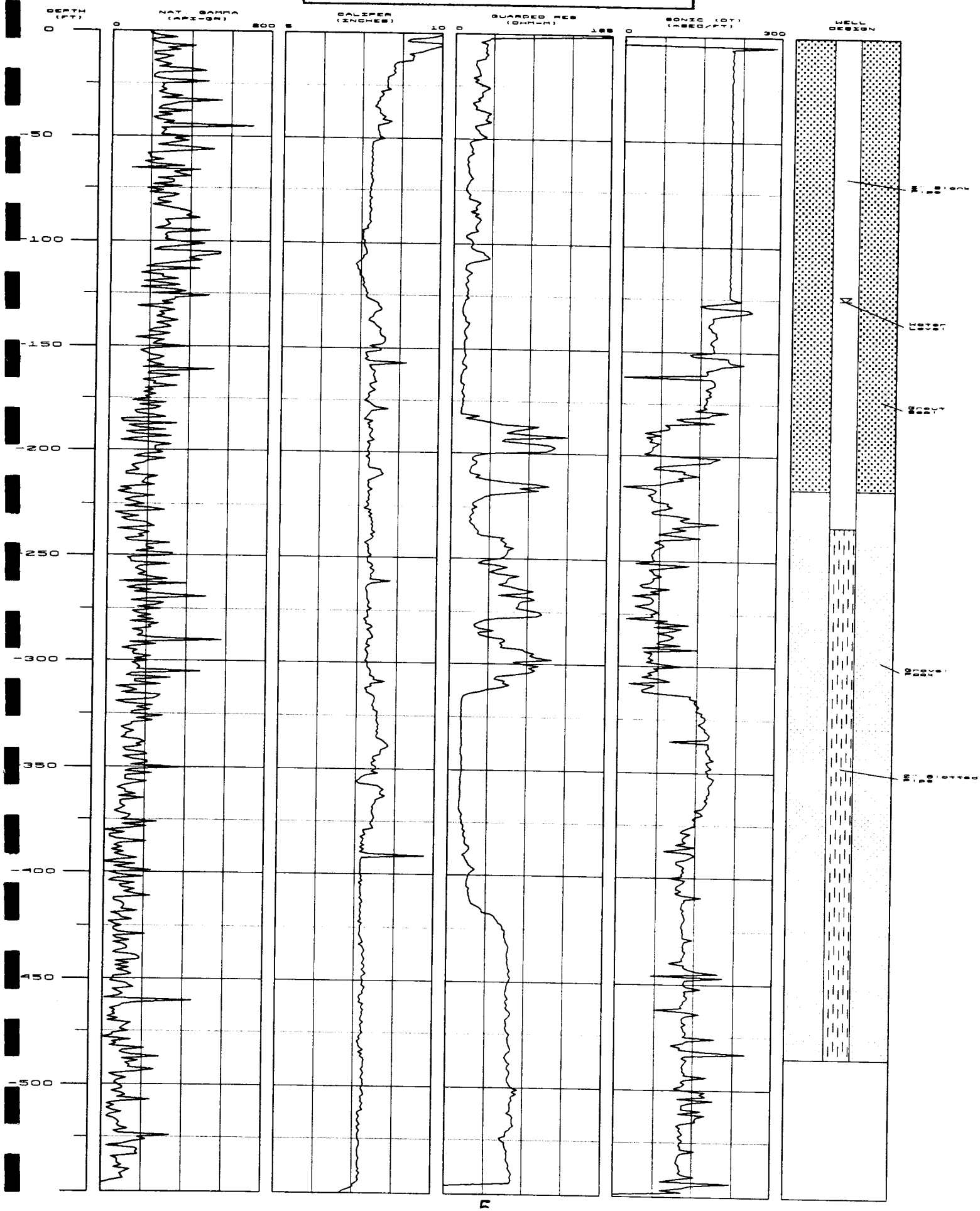
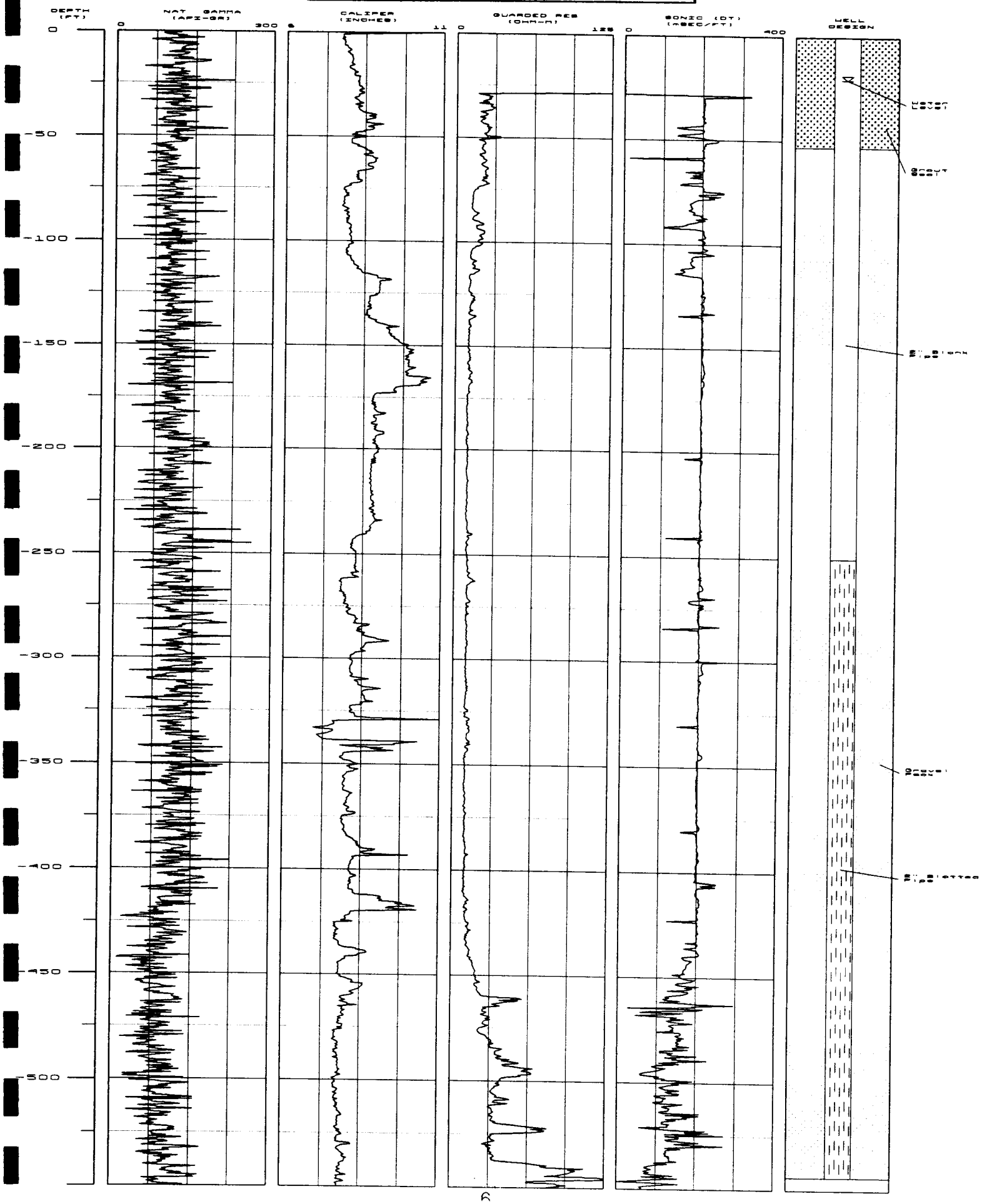


Figure 3
Geophysical Logs & Well Construction
Monitoring Well SSP4



The well site is considered favorable for a production well. The well often produced discharge surges that filled the two inch eductor line used for development. The development rig was unable to air lift the hole below 510 feet because the volume of water in the well exceeded the lifting capacity of the air lift compressor. The high static water level, thick clay above fractured volcanics and the discharge obtained during development, indicate a confined aquifer that may produce high well yields.

SSP5

The well is completed in alluvium from 0 - 233 feet. The alluvium consists of volcanic and granitic sand with thin lenses of silty clay. A volcanic gravel and volcanic/granitic sand layer was found between 125 to 144 feet. This could be the major water bearing layer in the well. Well yield was minor during development.

Borehole geophysics run were 16 and 64 inch electric resistivity, sonic, natural gamma and caliper logs. The 16 and 64 inch resistivity log shows alluvial material with 20 to 60 ohm-m resistance from 110 to 260 feet. The natural gamma log shows alternating clay and sand lenses. The geophysics show the well is completed in low porosity alluvium. Geophysical logs for SSP5 are shown in Figure 4.

SSP6

Alluvium consisting of sand and clay layers was found from 0 to 170 feet. A layer of well sorted, compacted sand was encountered from 170 to 190 feet. Tertiary sediments exist west of the well site (Bell and Bonham, 1987). This layer may be a Tertiary sandstone. The drilling mud thinned after drilling through a soft zone in the sand-sandstone unit at 180 feet, indicating water production. The well cleaned up rapidly during development with discharge estimated at 20 gpm.

Borehole geophysics conducted were 16 and 64 inch electric resistivity, sonic, natural gamma and caliper logs. The electric resistivity logs show low porosity material with 10 to 25 ohm-m resistance from 60 to 220 feet. The log shows a slight resistivity increase where the fluid loss occurred near 190 feet. The gamma log shows a low gamma unit layer after the "soft zone" at 180 feet. Geophysical logs for SSP6 are shown in Figure 5.

SSP7

Fine to coarse alluvium consisting of decomposed granodiorite with thin, silty clay lenses was drilled from 0 to 133 feet. Granodiorite with intermittent fractures exists from 133 to 370 feet. The fractures often contained white, non-competent, altered feldspar clay. Drilling fluid loss occurred between 250 to 260 feet. Well discharge was minor during development.

FIGURE 4
GEOPHYSICAL LOGS & WELL CONSTRUCTION
MONITORING WELL SSP5

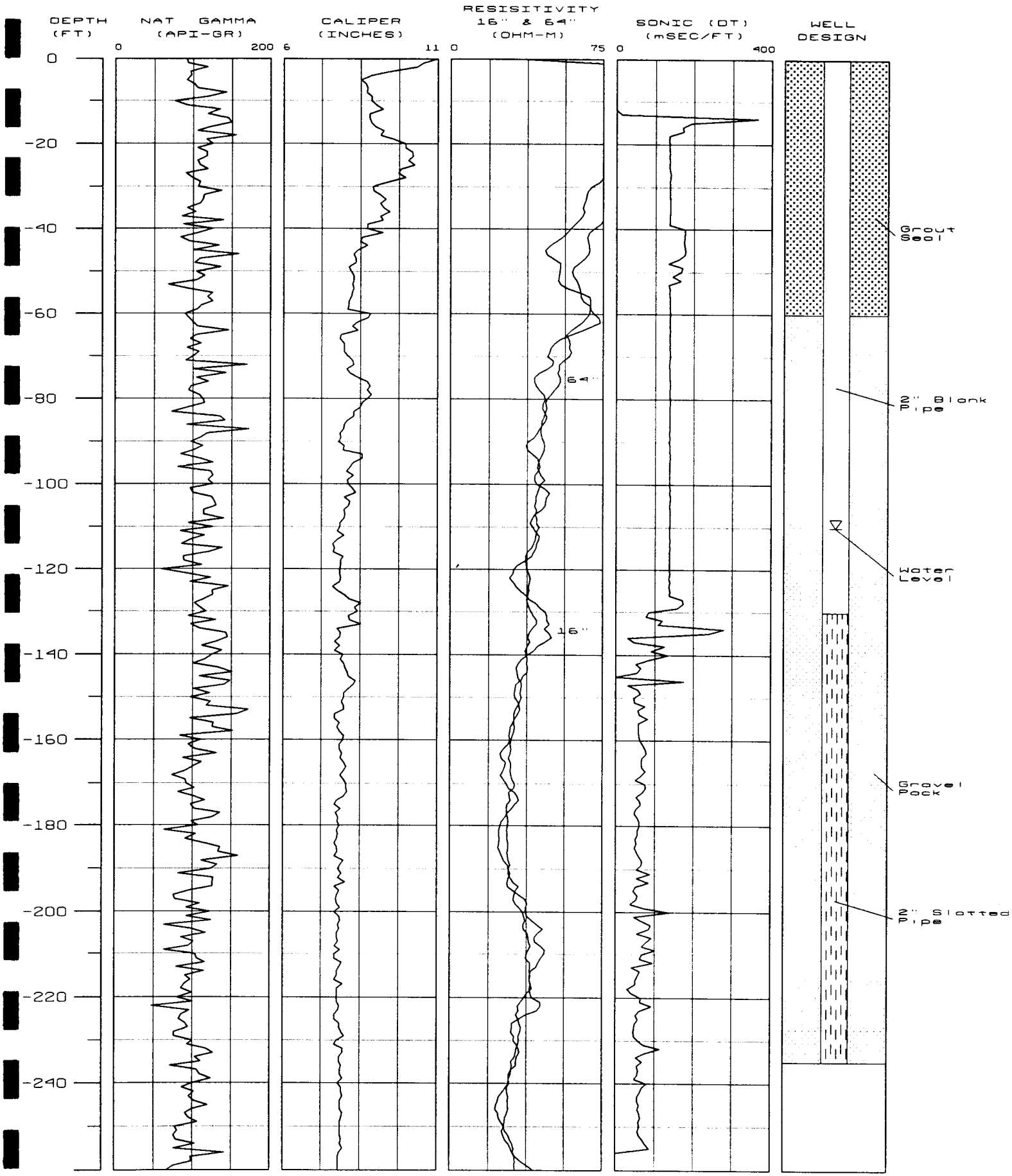
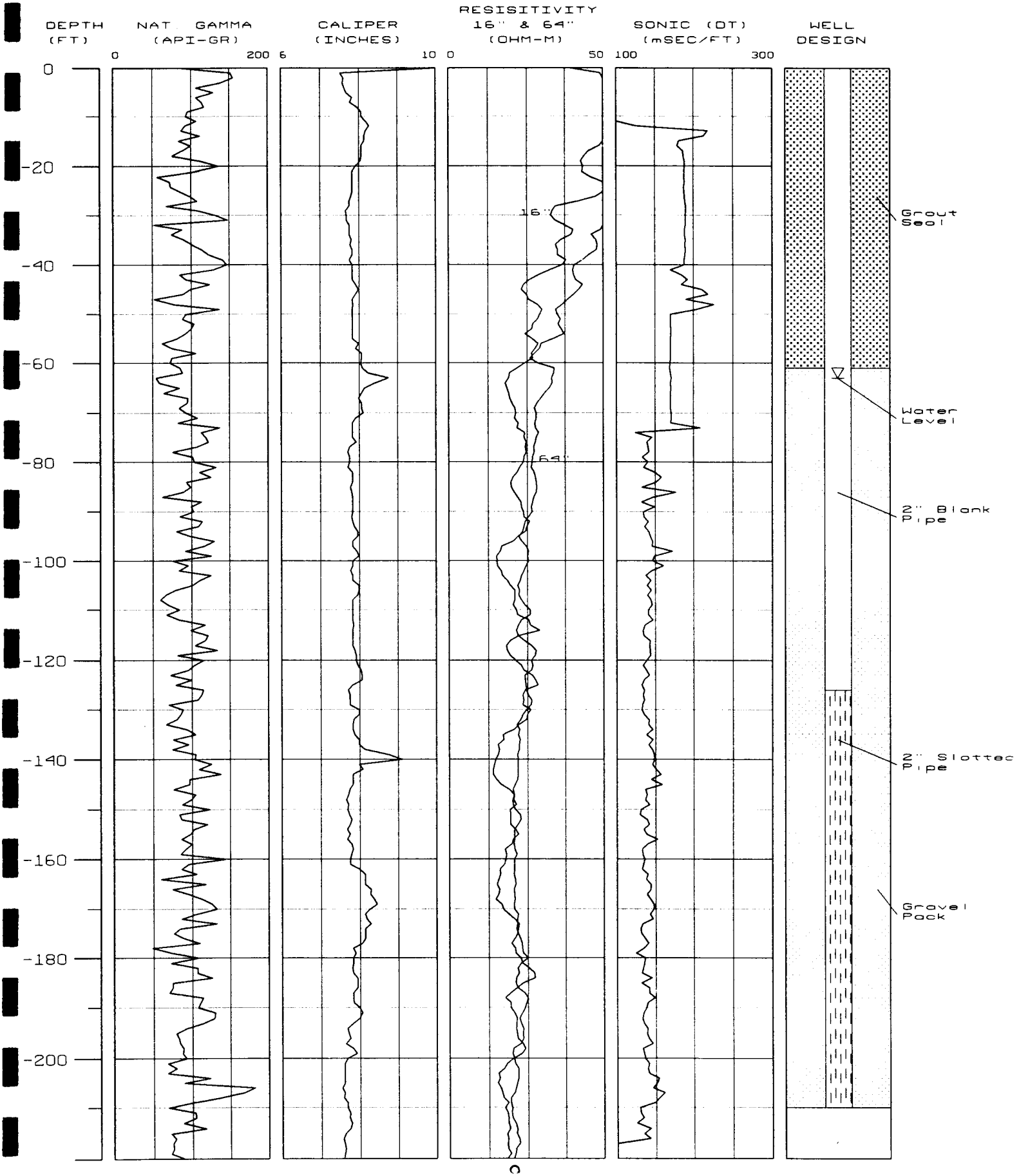


FIGURE 5
GEOPHYSICAL LOGS & WELL CONSTRUCTION
MONITORING WELL SSP6



SSP8

Granitic and volcanic sand with fine silt was found from 0 to 20 feet. A brown, sticky clay was found from 20 to 50 feet. Layers of silty clay and sand are found from 50 to 240 feet. Substantial fluid loss occurred in a well rounded sand layer between 123 and 130 feet. This may be the major water bearing layer in the well. SSP8 cleaned up rapidly during development and had a well yield similar to SSP6.

Borehole geophysics conducted were guarded resistivity, sonic, natural gamma, and caliper logs. The guarded resistivity logs show low porosity, clay rich material with 5 to 25 ohm-m resistance throughout the borehole. Higher resistivity kicks after 180 feet indicate water bearing layers. The natural gamma log shows distinct low gamma unit readings in a coarse sand and silty clay layer between 180 and 190 feet. Geophysical logs for SSP8 are shown in Figure 6.

SSP9

Granitic sand and weathered volcanic tuff gravel were found from 0 to 27 feet. A fractured volcanic tuff exists between 27 and 157 feet. Substantial fluid loss occurred near 190 feet, coinciding with the water level in the well. A thick unit of multi-colored, sticky lacustrine clay was found from 190 to 360 feet. A tuffaceous clay found from 360 to 470 feet contains lenses of weathered quartz. Fractured volcanic tuff was drilled from 407 to 440 feet and appears to be a major water bearing unit in the well. Discharge during development was fair.

Borehole geophysics conducted were guarded electric resistivity, sonic, natural gamma, and caliper logs. The fractured volcanics between 27 to 157 feet have a 40 to 100 ohm-m resistance. The volcanic tuff at 407 feet shows a harder 10 to 40 ohm-m resistivity than the upper tuff. Fractures in both volcanic units are visible in the sonic log. Clay formations have a consistent 10 to 15 ohm-m resistivity. Geophysical logs for SSP9 are shown in Figure 7.

SSP10

Alluvial material composed of granitic sand, gravel and silty clay was found from 0 to 91 feet. Fractured volcanic tuff exists from 91 to 150 feet. A green lacustrine clay alternating with granitic sand lenses was found from 150 to 260 feet. The alternating sand and clay layers indicate formation in a shallow lacustrine environment. Well discharge during development was fair. Borehole geophysics were not done at SSP10.

Cross Section A - A′

Cross section A - A′ shows a conceptual view of the Tertiary volcanic aquifer and lacustrine clay aquitard penetrated by SSP2

FIGURE 6
GEOPHYSICAL LOGS & WELL CONSTRUCTION
MONITORING WELL SSP8

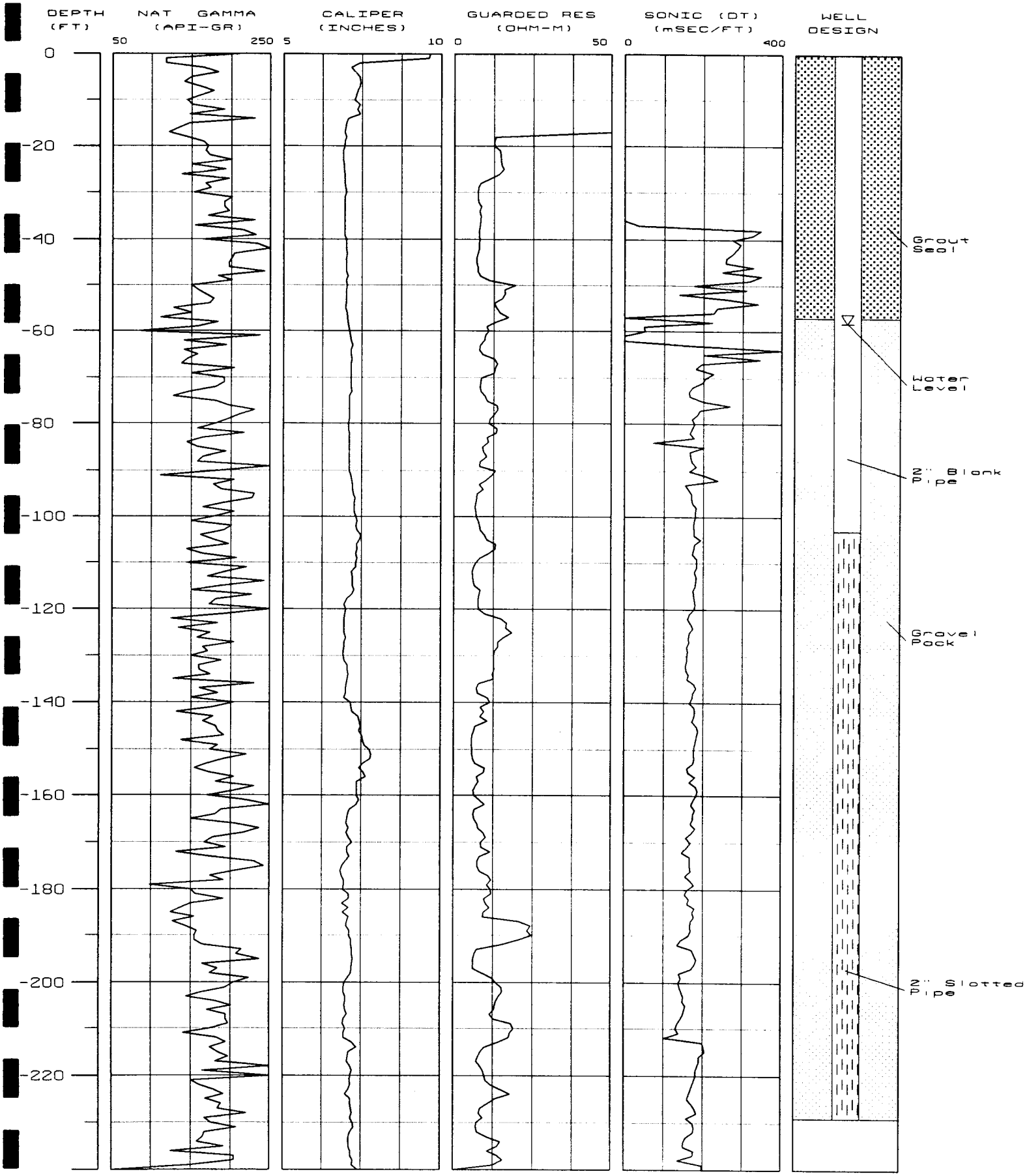
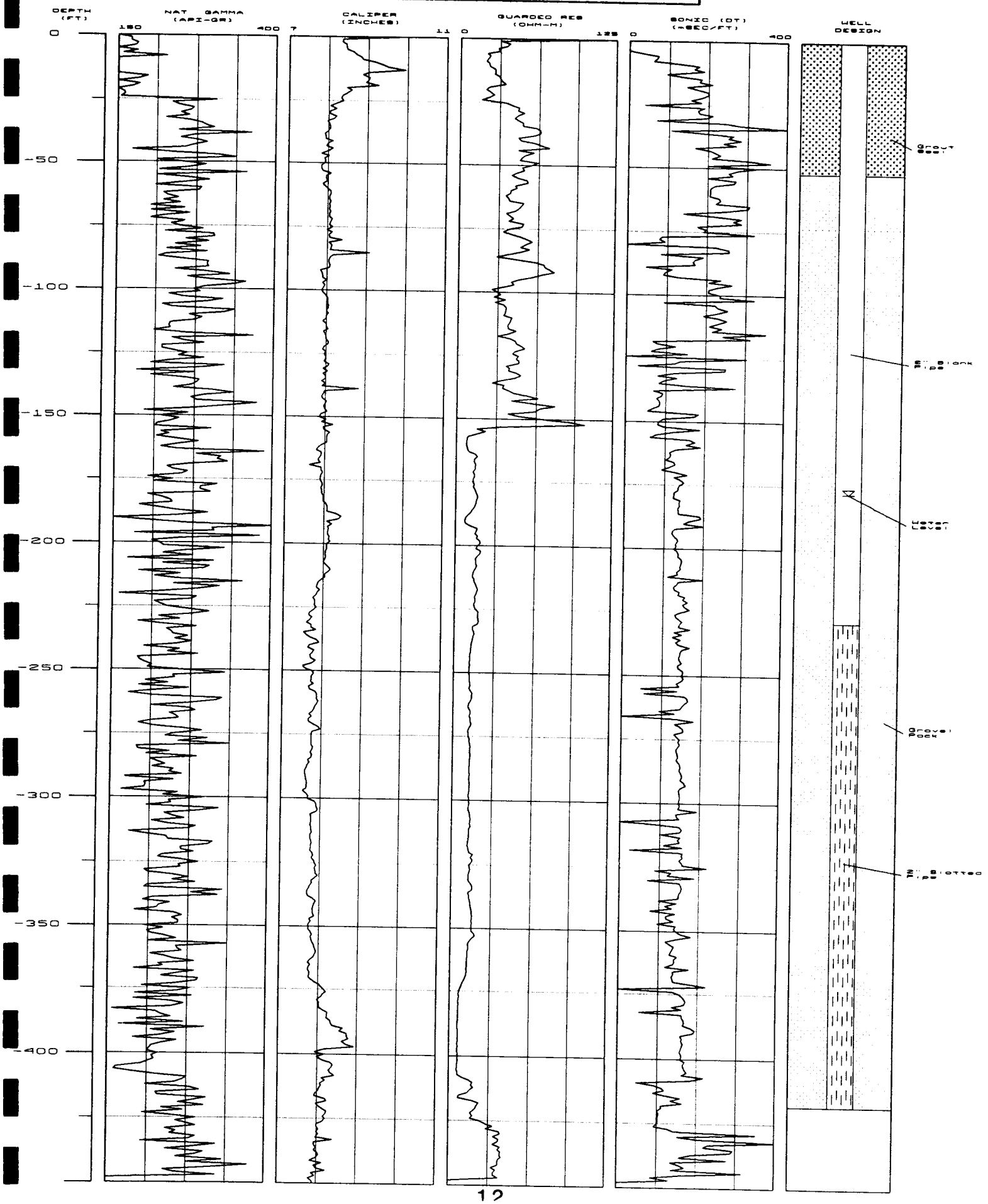


Figure 7
Geophysical Logs & Well Construction
Monitoring Well SSP9



and SSP4. A location map with related faulting is shown in Figure 8. Cross section A - A′ is shown in Figure 9.

The cross section shows a dip-slip offset in the Tertiary volcanic bedrock of nearly 350 feet. The vertical offset was created by normal block faulting of the Tertiary volcanics. The faulted volcanics were eroded and covered by colluvium composed of basalt, scoriated volcanics and fine sediment originating from the Pah Rah Range.

The volcanic colluvium was covered by a thick clay unit deposited in a lacustrine environment. Thinning of the clay unit at SSP2 indicates a transition from lake to shoreline. Alluvium composed of sand, gravel and clay was deposited after the lacustrine environment disappeared. The clay and alluvium are slightly uplifted near SSP2, a result of occasional movement along the existing fault zone.

The piezometric surface between SSP2 and SSP4 is included on the cross section. The surface gradient is flat between the wells indicating the volcanic aquifer is very permeable. The location of the wells' piezometric surface above the clay aquitard indicates confining pressure.

Water Quality

Water quality samples were collected at SSP2 and SSP4 since both wells are considered potential municipal well sites. Samples were collected using a Grundfos submersible sampling pump after each well had been purged 3 times its casing volume . The water samples were analyzed by the Nevada State Health Laboratory.

SSP2 initially met drinking water standards in all constituents except Lead (Pb) which was measured at 0.015 ppm. This level initiates treatment actions under the Lead and Copper Rule of the current Safe Water Drinking Act. A second analyses measured Lead in the well at 0.008 ppm. A casing residue that can be eventually removed from the well by pumping, is considered the source of lead. SSP4 met State of Nevada primary and secondary drinking water standards in all constituents. Complete water quality analyses for each well are found in the appendix. A general water quality summary for each well is found in Table 2.

Table 2
Water Quality Summary

Well	TDS	N	SO4	Cl	HCO3	Fe	Na	K	Ca	Fl	As
SSP2	203	1.4	27	9	88	0.24	54	5	7	0.34	0.007
SSP4	175	0.0	13	7	95	0.12	61	0	1	0.26	0.009

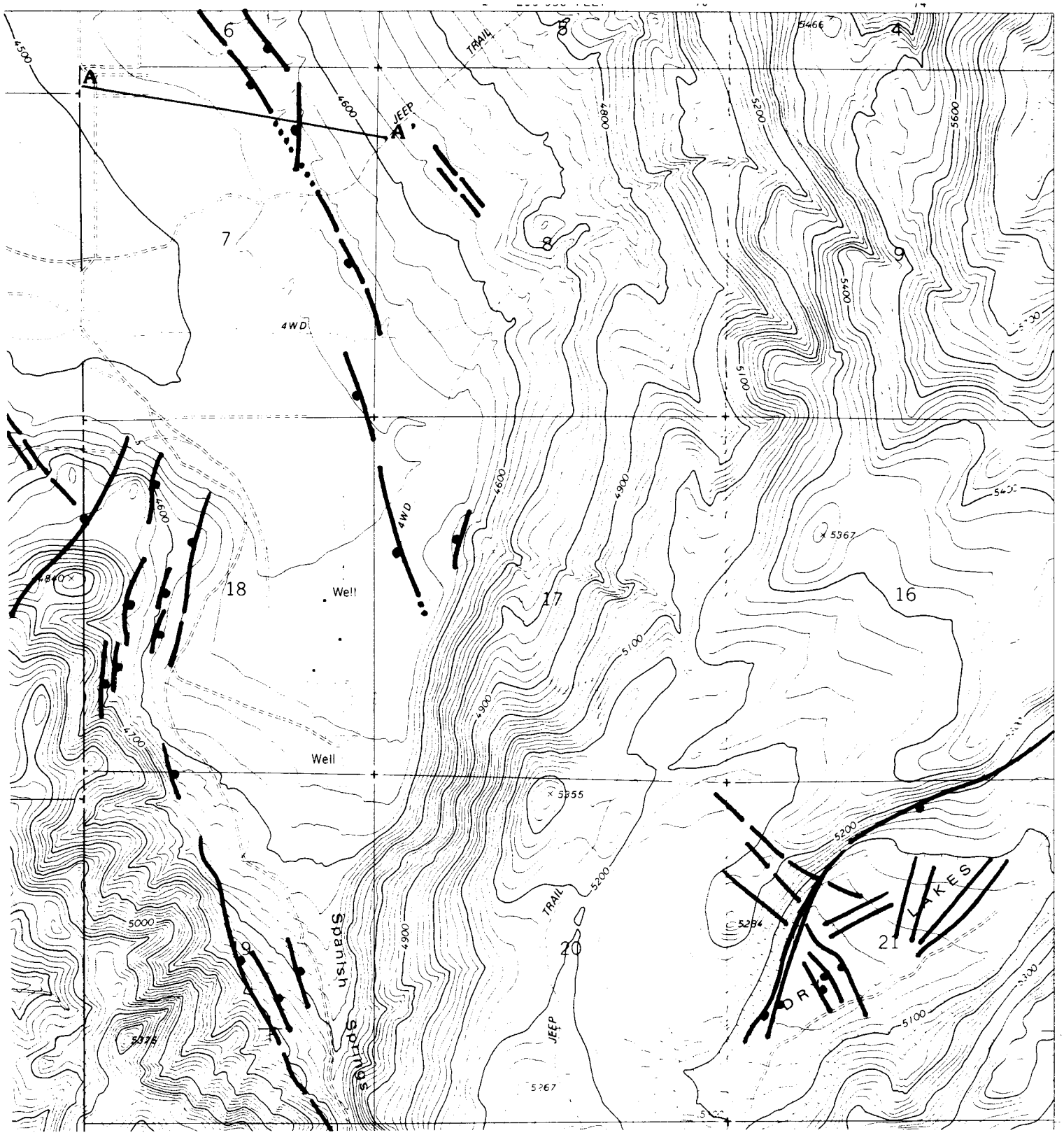


Figure 8
Cross section A-A' with related faulting. (Modified Bell and Bonham 1987).

Figure 9
SPANISH SPRINGS VALLEY
GEOLOGIC CROSS SECTION A-A'

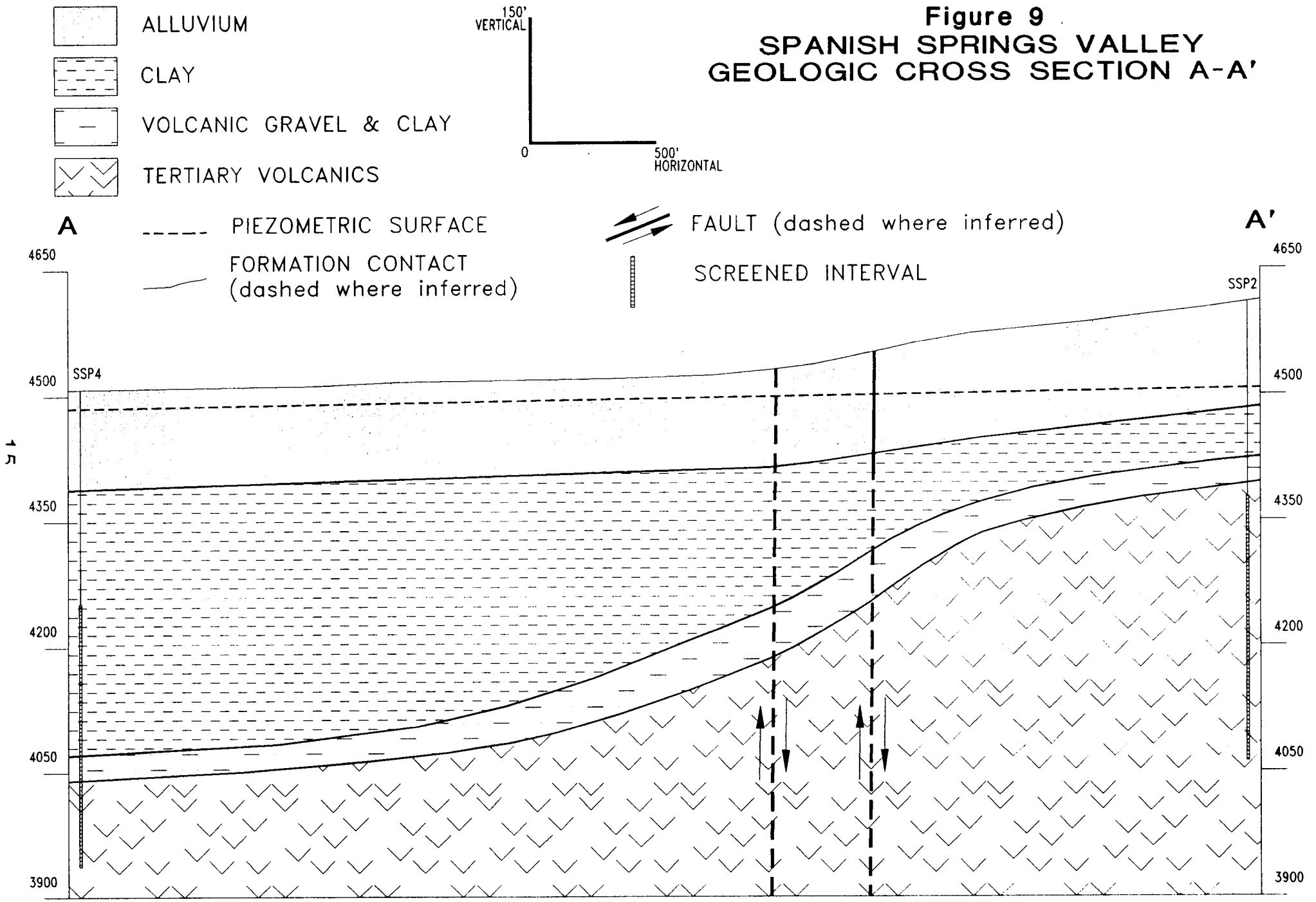


Figure 10 is a Piper diagram for SSP2 and SSP4. The diagram shows that both wells are completed in an aquifer containing Sodium - Potassium Bicarbonate waters.

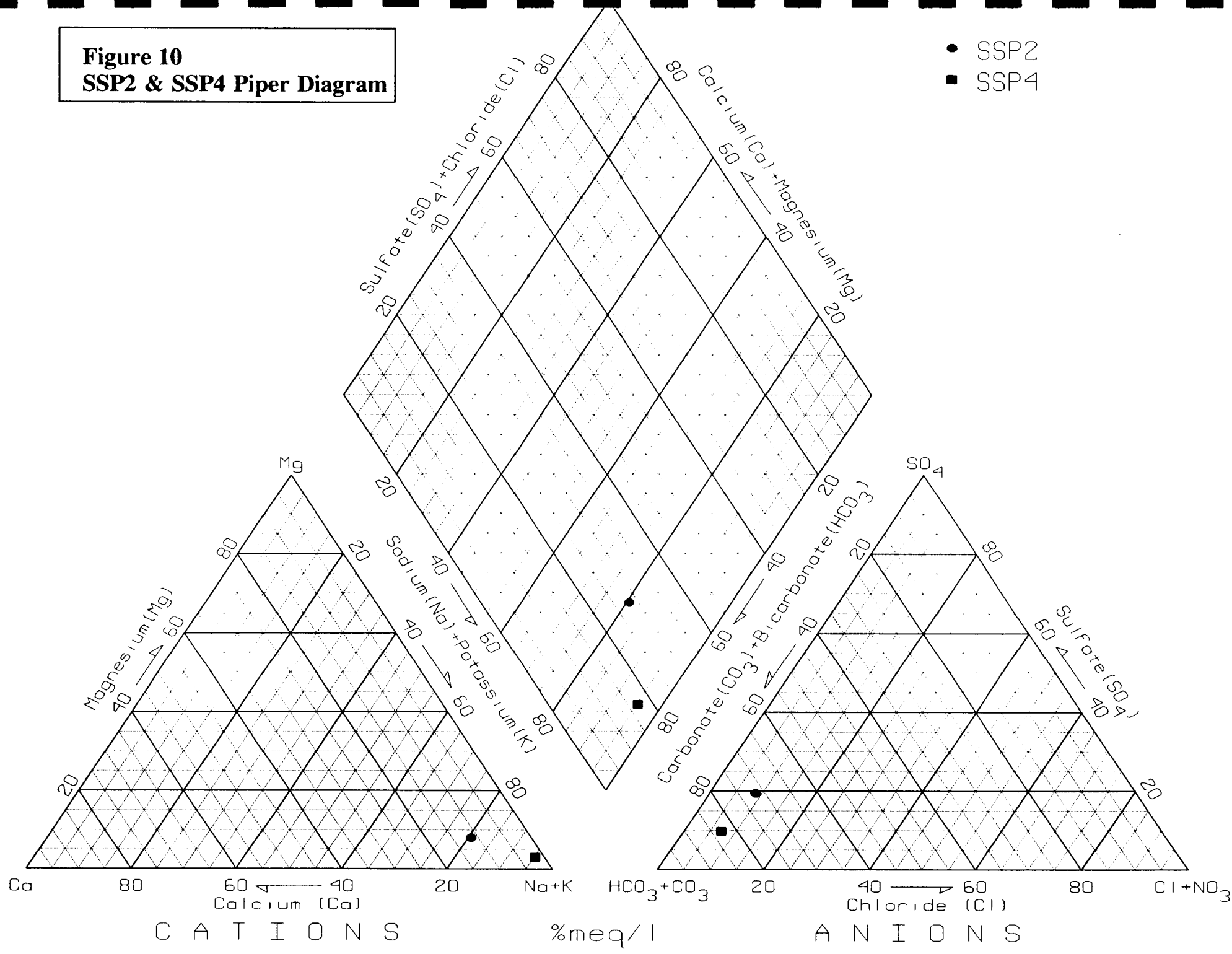
Conclusions

The monitoring wells in west to northwest Spanish Springs Valley, are completed in low permeability basin fill. SSP5 was not drilled deep enough to verify if sand rich basin fill found at Desert Springs #4 extends north. The volcanic tuff found in SSP9 and granodiorite found in SSP7 had low well yields during development. Wells SSP6 and 8 had better well yield than SSP5,7 and 9. This is due to their location in the central portion of the valley where saturated basin fill is more extensive.

Wells SSP2 and SSP4 were completed in a apparent confined volcanic aquifer that could be used for future production well locations. The location is desirable since it is upgradient and approximately 2 miles southeast of developed areas where ground water contamination is a concern. The presence of lead in SSP4 is site specific an not representative of aquifer hydrochemistry.

Further development of the fractured volcanics at SSP2 and SSP4 should be considered. The potential for developing a high yield production well field that would have small affect on existing wells appears feasible. Well development at SSP2 and SSP4 may provide Washoe County with production wells similar to the "Big Well".

Figure 10
SSP2 & SSP4 Piper Diagram



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Formation Log
Monitoring Well SSP1

Depth (Ft.)	Sample Description
0 - 10	Dry Red Silty Clay
10 - 40	Red Clay with Red Scoriated Volcanic Rock
40 - 85	Red/Brown Basalt
85 - 95	Red Basalt with Red Clay
95 - 250	Red/Brown Weathered Basalt
250 - 260	Red Volcanic Tuff with Red Clay
260 - 283	Orange Tuffaceous Clay
283 - 295	Red/Brown Basalt
295 - 485	Weathered Brown Basalt
485 - 635	Red Scoriated Basalt
635 - 665	Black Basalt

Formation Log
Monitoring Well SSP2

Depth (Ft.)	Sample Description
0 - 5	Volcanic Cobbles and Sand
5 - 15	Angular Volcanic Sand and Gravel
15 - 20	Dry, Brown Clay with Volcanic Sand
20 - 33	Coarse Volcanic/Granitic Sand
33 - 38	Brown Clay with Fine Sand
38 - 50	Coarse Granitic/Volcanic Sand
50 - 58	Brown, Sandy Clay with Volcanic Sand
58 - 67	Brown, Silty Clay
67 - 86	Tan Clay with Volcanic/Granitic Sand
86 - 94	Volcanic/Quartz Rich Granitic Sand
94 - 100	Brown, Silty Clay with Volcanic Sand
100 - 106	Rounded, Medium Grained Volcanic Sand
106 - 184	Tan/Brown, Silty Clay
184 - 195	Angular Basalt with Tan/Gray Clay
195 - 213	Red Volcanic Fragments with Red Clay
213 - 225	Basalt
225 - 235	Brown Clay with Basalt Fragments
235 - 277	Basalt
277 - 285	Red, Scoriated Volcanics with Basalt
285 - 310	Basalt
310 - 378	Orange, Tuffaceous Clay with Basalt Gravel
378 - 425	Red/Brown, Scoriated Volcanic Fragments
425 - 550	Fractured, Scoriated Basalt

Formation Log
Monitoring Well SSP2A

Depth (Ft.)	Sample Description
0 - 5	Coarse Granitic/Volcanic Sand
5 - 18	Volcanic Sand and Basalt Gravel
18 - 25	Granitic Sand with Brown, Silty Clay
25 - 36	Fine, Well Rounded Volcanic Sand
36 - 42	Tan, Silty Clay with Coarse Volcanic Sand
42 - 52	Medium Grained Granitic/Volcanic Sand
52 - 55	Tan, Silty Clay with Volcanic Sand
55 - 58	Coarse Volcanic/Granitic Sand
58 - 69	Brown, Silty Clay
69 - 74	Volcanic Sand with Brown, Silty Clay
74 - 82	Tan Clay with Volcanic Sand Lenses
82 - 98	Coarse Volcanic/Granitic Sand
98 - 107	Brown, Silty Clay with Volcanic Sand
107 - 118	Volcanic/Granitic Sand with Gray Clay
118 - 160	Tan/Brown, Sticky Clay
160 - 163	Brown Sandy Clay with Volcanic Sand
163 - 184	Brown Clay

Formation Log
Monitoring Well SSP4

Depth (Ft.)	Sample Description
0 - 18	Fine Volcanic/Granitic Sand
18 - 26	Granitic/Volcanic Sand with Brown Clay
26 - 28	Olive Green/Tan Clay with Sand
28 - 47	Quartz Rich, Well Rounded Granitic Sand
47 - 50	Gray, Silty Clay
50 - 76	Granitic Sand and Small Gravel with Brown, Sandy Clay Lenses
76 - 93	Tan Silty, Dry Clay with Sand Lenses
93 - 105	Coarse, Quartz Rich Volcanic Sand
105 - 112	Tan, Silty Clay with Volcanic Sand Lenses
112 - 118	Medium Grained Volcanic Sand with Tan, Silty Clay Lenses
118 - 265	Brown/Gray and Blue, Slick, Sticky Clay
265 - 275	Fine Volcanic Sand with Blue/Gray Clay
275 - 418	Blue/Gray, Slick, Sticky Clay
418 - 425	Brown, Silty Clay
425 - 435	Basalt/Volcanic Sand with Brown, Dry Clay
435 - 457	Red, Scoriated Volcanics with Red Clay
457 - 465	Fractured, Black Basalt
465 - 470	Red, Scoriated Volcanic and Basalt Fragments with Red Clay
470 - 487	Red, Scoriated Volanics with Red Clay
487 - 498	Basalt
498 - 519	Red, Scoriated Volcanics with Red Clay
519 - 565	Fractured Basalt

Formation Log
Monitoring Well SSP5

Depth (Ft.)	Sample Description
0 - 5	Fine Sand and Silt
5 - 15	Medium Grained Volcanic/Granitic Sand
15 - 20	Well Rounded Granitic Sand with Brown Clay
20 - 42	Quartz/Granitic Sand with Volcanic Gravel
42 - 46	Volcanic/Granitic Sand with Brown Clay
46 - 65	Volcanic/Granitic Sand with Small Gravel
65 - 76	Volcanic/Granitic Sand with Brown Clay
76 - 79	Brown, Sticky Clay
79 - 104	Granitic Sand with Brown Silty Clay
104 - 110	Granitic Sand with Brown Clay and Angular Basalt Gravel
110 - 125	Granitic Sand with Brown Silty Clay Lenses
125 - 144	Granitic Sand with Volcanic Gravel
144 - 178	Granitic/Volcanic Sand with Tuff Fragments
178 - 205	Granitic Sand with Brown Silty Clay
205 - 222	Fine Sand with Brown Silty Clay Lenses
222 - 240	Volcanic/Granitic Sand with Tuff Fragments
240 - 260	Granitic/Felsic Volcanic Sand with Brown Silty Clay

Formation Log
Monitoring Well SSP6

Depth (Ft.)	Sample Description
0 - 16	Fine Sand and Silt
16 - 20	Brown, Sticky Sandy Clay
20 - 26	Coarse Grained Granitic/Volcanic Sand
26 - 32	Brown Silty Clay
32 - 40	Volcanic Sand and Gravel with Silty Clay
40 - 46	Brown Silty Clay
46 - 52	Granitic Sand with Brown Sticky Clay
52 - 90	Brown Sticky Clay with Sand Lenses
90 - 98	Granitic Quartz Rich Sand
98 - 108	Brown Sticky Clay
108 - 114	Granitic Sand with Silty Clay
114 - 119	Brown Silty Clay
119 - 138	Granitic Sand with Brown Silty Clay
138 - 143	Brown Slick, Sticky Clay
143 - 148	Granitic Sand with Brown Silty Clay
148 - 163	Well Sorted Granitic/Felsic Volcanic Sand
163 - 170	Felsic Sand with Brown Silty Clay
170 - 190	Compacted Fine Mafic/Felsic Well Rounded Sand. Possible Tertiary Sediment.
190 - 193	Granitic/Volcanic Sand with Brown Clay
193 - 220	Granitic/ Felsic Volcanic Sand

Formation Log
Monitoring Well SSP7

Depth (Ft.)	Sample Description
0 - 5	Fine Sand and Silt
5 - 25	Coarse Quartz Rich Granitic Sand
25 - 29	Granitic/Felsic Volcanic Fine Gravel
29 - 52	Coarse Granitic Sand
52 - 64	Coarse Granitic Sand with Brown Silty Clay
64 - 72	Brown Silty Clay with Granitic Sand
72 - 85	Red/Brown Silty Clay with Coarse Sand
85 - 95	Tan Silty Clay with Felsic Volcanic Sand
95 - 105	White Granitic Sand with Brown Silty Clay
105 - 120	Fine Grained Decomposed Granodiorite
120 - 128	Decomposed Granodiorite with Tan Clay
128 - 133	Granodiorite Sand with Subangular Quartz and Biotite Flakes
133 - 183	Hard, Compacted Decomposed Granodiorite, or Granodiorite Outcrop
183 - 250	Granodiorite Cuttings with White, Mushy Altered Feldspar Clay
250 - 260	Large Drilling Fluid Loss
260 - 330	Granodiorite with Minor Altered Feldspar Clay
330 - 340	Granodiorite with White Altered Feldspar Clay
340 - 370	Granodiorite with Minor Alteration Clay

Formation Log
Monitoring Well SSP8

Depth (Ft.)	Sample Description
0 - 5	Fine Silt and Clay
5 - 20	Granitic/Volcanic Sand with Tan Silty Clay
20 - 50	Tan/Brown Slick Clay
50 - 77	Brown Silty Clay with Volcanic Sand and Small Volcanic Gravel
77 - 90	Granitic Sand and Small Volcanic Gravel with Gray Silty Clay
90 - 98	Brown Silty Clay with Volcanic/Granitic Sand
98 - 103	Hard Tan/Brown Clay
103 - 123	Brown Clay with Volcanic/Granitic Sand
123 - 130	Well Rounded Felsic Volcanic/Granitic Sand Large Fluid Loss at 130 ft
130 - 153	Tan, Silty, Semi-Dry Clay
153 - 168	Tan, Silty, Clay with Felsic Volcanic Sand
168 - 175	Tan Slick, Silty Clay
175 - 192	Tan, Sandy Clay with Coarse Volcanic/Granitic Sand
192 - 200	Brown, Slick Clay
200 - 226	Granitic/Volcanic Sand with Tan Silty Clay
226 - 240	Brown Sandy Clay with Granitic Sand

Formation Log
Monitoring Well SSP9

Depth (Ft.)	Sample Description
0 - 15	Decomposed Granitic Sand and Gravel
15 - 27	Granitic Sand with Red Stained Volcanic Sand and Gravel
27 - 70	Gray Rhyolite/Volcanic Tuff
70 - 140	Tan Rhyolite/Volcanic Tuff
140 - 157	Gray Rhyolite/Volcanic Tuff
157 - 190	Brown and Gray Clay with Angular Volcanic Gravel and Sand
190 - 225	Tan Clay with Orange Stained Weathered Tuff and Orange Alteration Clay
225 - 240	Blue - Gray, Sticky Clay
240 - 266	Brown/Gray, Sticky Clay
266 - 274	Green/Gray, Slick Clay with Green Volcanic Sand
274 - 300	Tan, Sticky Clay
300 - 335	Red/Gray, Sticky Clay
335 - 360	Tan/Gray, Sticky Clay
360 - 365	Red/Gray Tuffaceous Clay with Tuff
365 - 370	Tan Weathered Tuff with Red Discoloration
370 - 375	Poorly Sorted Volcanic/Quartz Granitic Sand and Small Volcanic Gravel
375 - 407	Gray Tuffaceous Clay with Quartz and Weathered Gray Tuff Fragments
407 - 422	Gray/Tan Fractured Rhyolite/Volcanic Tuff with Orange Staining
422 - 440	Gray Rhyolite/Volcanic Tuff

Formation Log
Monitoring Well SSP10

Depth (Ft.)	Sample Description
0 - 10	Coarse Granitic Sand
10 - 30	Granitic Sand and Gravel with Silt
30 - 50	Coarse Granitic/Volcanic Sand
50 - 62	Brown Silty Clay
62 - 82	Coarse Granitic/Volcanic Sand
82 - 91	Brown Silty Clay
91 - 150	Tan Rhyolite/Volcanic Tuff with Red Staining
150 - 200	Tan/Olive Green Clay with Quartz Rich Granitic Sand
200 - 220	Tan/Green Sandy Clay
220 - 238	Quartz Rich Granitic Sand with Green Clay
238 - 258	Olive Green Clay
258 - 262	Olive Green Clay Quartz Rich Granitic Sand

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STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLER'S REPORT

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

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Basin

NOTICE OF INTENT NO. 24091

1. OWNER Washoe County Utility Division
MAILING ADDRESS P.O. Box 11130 Reno, NV 89520
ADDRESS AT WELL LOCATION Spanish Springs Site #9

2. LOCATION SE ¼ SE ¼ Sec. T 21 N/S R 20 E Washoe County
PERMIT NO. NA (Issued by Water Resources) | NA (Parcel No.) | NA (Subdivision Name)

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

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

5. WELL TYPE
☐ Cable ☒ Rotary ☐ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Decomposed granite		0	15	15
Granite sand/gravel		15	27	12
Gray volcanic tuff		27	70	43
Tan volcanic tuff		70	140	70
Gray volcanic tuff		140	157	17
Brown/gray clay		157	190	33
Tan clay		190	225	35
Blue-gray clay		225	240	15
Brown/gray/red clay		240	370	130
volcanic sand		370	375	5
White tuff clay		375	405	30
Gray volcanic tuff		405	440	35

Date started September 15, 19 93
Date completed September 17, 19 93

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
did not measure		Air or Rig

8. WELL CONSTRUCTION
Depth Drilled 440 Feet Depth Cased 420 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
7 7/8 Inches	0 Feet	420 Feet
Inches	Feet	Feet
Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
2"		Galvanized	+2	231

Perforations:
Type perforation Slotted
Size perforation 1/8 x 2½
From 231 feet to 420 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 52'
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☒ Neat Cement ☐ Cement Grout ☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 52 feet to 420 feet

9. WATER LEVEL
Static water level 178.14' feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature cold °F Quality good

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

Name Humboldt Drilling & Pump Co., Inc. (Contractor)
Address P.O. Box 590 (Contractor)
Winnemucca, NV 89446

Nevada contractor's license number issued by the State Contractor's Board 015234
Nevada driller's license number issued by the Division of Water Resources, the on-site driller T-1195-1

Signed C. B. Eyler (By driller performing actual drilling on site or contractor)
Date 11-1-93

(Rev. 3-91)

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NOTICE OF INTENT NO. 24093

1. OWNER Washoe County Utility Division
MAILING ADDRESS P.O. Box 11130 Reno, NV 89520
ADDRESS AT WELL LOCATION Spanish Springs Site #8

2. LOCATION SW ¼ NE ¼ Sec. 14 T. 21 N/S R. 20 E. Washoe County
PERMIT NO. NA (Issued by Water Resources) | NA (Parcel No.) | NA (Subdivision Name)

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

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

5. WELL TYPE
☐ Cable ☒ Rotary ☐ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Silt & clay		0	5	5
Granite & clay		5	20	15
Brown clay		20	50	30
Brown clay/fine sand		50	77	27
Granitic sand/clay		77	90	13
Brown clay/sand		90	98	8
Hard brown clay		98	103	5
Brown clay/sand		103	123	20
Granitic sand		123	130	7
Tan clay		130	153	23
Tan clay/sand		153	192	39
Brown clay		192	200	8
Granitic sand		200	218	18
Tan clay		218	222	4
Granitic sand		222	226	4
Brown clay/sand		226	240	14

Date started September 13, 19 93
Date completed September 14, 19 93

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
did not measure		Air on Rig

8. WELL CONSTRUCTION
Depth Drilled 240 Feet Depth Cased 230 Feet

HOLE DIAMETER (BIT SIZE)

		From	To
7 7/8	Inches	0 Feet	240 Feet
	Inches	Feet	Feet
	Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
2		Galvanized	+2	105

Perforations:
Type perforation Slotted
Size perforation 1/8 X 2½
From 105 feet to 230 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 57'
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☒ Neat Cement ☐ Cement Grout ☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 57 feet to 240 feet

9. WATER LEVEL
Static water level 58.17 feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature cold °F Quality good

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name Humboldt Drilling & Pump Co., Inc. (Contractor)
Address P.O. Box 590 (Contractor)
Winnemucca, NV 89446
Nevada contractor's license number issued by the State Contractor's Board 015234
Nevada driller's license number issued by the Division of Water Resources, the on-site driller T-1195-1
Signed (By driller performing actual drilling on site or contractor)
Date 11-1-93

(Rev. 3-91)

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NOTICE OF INTENT NO. 24096

1. OWNER Washoe County Utility Division
MAILING ADDRESS P.O. Box 11130, Reno, NV 89520
ADDRESS AT WELL LOCATION Spanish Springs Site #6 SSP

2. LOCATION SW ¼ NW ¼ Sec. 23 T. 21 N/S R. 20 E/W Washoe County
PERMIT NO. NA (Issued by Water Resources) | Parcel No. NA | Subdivision Name NA

3. WORK PERFORMED: ☒ New Well ☐ Replace ☐ Recondition ☐ Deepen ☐ Abandon ☐ Other

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

5. WELL TYPE: ☐ Cable ☒ Rotary ☐ RVC ☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Fine sand/silt		0	16	16
Brown clay		16	20	4
Granite/volcanic sand		20	26	6
Brown silty clay		26	32	6
Granitic sand		32	40	8
Brown silty clay		40	46	6
Granitic sand/clay		46	52	6
Brown clay/sand		52	90	38
Granitic sand		90	98	8
Brown clay		98	108	10
Granitic sand		108	130	22
Granitic sand/clay		130	138	8
Brown clay		138	143	5
Granitic sand/clay		143	170	27
Compacted granitic sand		170	210	40

Date started August 26, 19 93
Date completed August 28, 19 93

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☑ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
did not measure		Air on Rig

8. WELL CONSTRUCTION
Depth Drilled 210 Feet Depth Cased 210 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
7 7/8 Inches	0 Feet	210 Feet
Inches	Feet	Feet
Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
2"		Galvanized	+2	126

Perforations:
Type perforation Slotted pipe
Size perforation 1/8 X 2½ 4 per foot
From 126 feet to 310 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 61'
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☒ Neat Cement ☐ Cement Grout ☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 61 feet to 210 feet

9. WATER LEVEL
Static water level 62.86 feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature cold °F Quality good

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name Humboldt Drilling & Pump Co., Inc. (Contractor)
Address P.O. Box 590 (Contractor)
Winnemucca, NV 89446
Nevada contractor's license number issued by the State Contractor's Board 015234
Nevada driller's license number issued by the Division of Water Resources, the on-site driller T-1195-1
Signed (By driller performing actual drilling on site or contractor)
Date 11-1-93

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NOTICE OF INTENT NO. 24098

1. OWNER Washoe County Utility Division
MAILING ADDRESS P.O. Box 11130, Reno, NV 89520
ADDRESS AT WELL LOCATION Spanish Springs Site #5

2. LOCATION NE ¼ SW ¼ Sec. 27 T. 21 N/S R. 20 E. Washoe County
PERMIT NO. NA (Issued by Water Resources) | NA (Parcel No.) | NA (Subdivision Name)

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

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

5. WELL TYPE
☐ Cable ☒ Rotary ☐ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Fine sand/silt		0	5	5
Granitic sand		5	46	41
Granitic sand/sm gravel		46	65	19
Granitic sand/brn clay		65	70	5
Granitic sand		70	75	5
Brown clay/sand		75	80	5
Granitic sand		80	96	16
Granitic sand/brn clay		96	125	29
Granitic sand		125	144	19
Granitic sand/brn clay		144	205	61
Granitic sand		205	210	5
Granitic sand/brn clay		210	222	12
Granitic sand		222	240	18
Granitic sand/brn clay		240	250	10

Date started August 23, 1993.
Date completed August 25, 1993.

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
did not measure		air on Rig

8. WELL CONSTRUCTION
Depth Drilled 250 Feet Depth Cased 235 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
7 7/8 Inches	0 Feet	250 Feet
Inches	Feet	Feet
Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
2"		galvanized	+2	130

Perforations:
Type perforation Slotted pipe
Size perforation 1/8 X 2½ 4 per foot
From 130 feet to 235 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 60'
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☒ Neat Cement ☐ Cement Grout ☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 60 feet to 235 feet

9. WATER LEVEL
Static water level 109.95 feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature cold °F Quality good

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

Name Humboldt Drilling & Pump Co., Inc. (Contractor)
Address P.O. Box 590 (Contractor)
Winnemucca, NV 89446
Nevada contractor's license number issued by the State Contractor's Board 015234
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1195-1
Signed (By driller performing actual drilling on site or contractor)
Date 11-1-93

(Rev. 3-91)

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NOTICE OF INTENT NO. 24092

1. OWNER Washoe County Utility Division
MAILING ADDRESS P.O. Box 11130
Reno, NV 89520

ADDRESS AT WELL LOCATION
Spanish Springs
SSP 10

2. LOCATION NE ¼ SE ¼ Sec. 11 T 21 (N)S R 20 E Washoe County

PERMIT NO. (Issued by Water Resources) | Parcel No. | Subdivision Name

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

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

5. WELL TYPE
☐ Cable ☒ Rotary ☐ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Coarse sand		0	20	20
Silt, sand & gravel		20	30	10
Granitic-volcanic sand		30	50	20
Brown silty clay		50	62	12
Granitic sand		62	82	20
Brown silty clay		82	91	9
Tan royolite/tuff		91	150	59
Tan-green clay/sand		150	190	40
Quartz sand		190	200	10
Tan-green clay/sand		200	220	20
Quartz/clay		220	238	18
Green clay		238	260	22

Date started September 17, 19 93
Date completed September 20, 19 93

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
did not measure		Air on Rig 2 hrs.

8. WELL CONSTRUCTION
Depth Drilled 260 Feet Depth Cased 252 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
7 7/8 Inches	0 Feet	260 Feet
Inches	Feet	Feet
Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
2		galvanized	+2	105

Perforations:
Type perforation Slotted
Size perforation 1/8 X 2 1/2
From 105 feet to 252 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 58'
Placement Method: ☒ Pumped ☐ Poured

Seal Type:
☒ Neat Cement
☐ Cement Grout
☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 58 feet to 252 feet

9. WATER LEVEL
Static water level 95.08' feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature cold °F Quality good

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

Name Humboldt Drilling & Pump Co., Inc. (Contractor)
Address P.O. Box 590 (Contractor)
Winnemucca, NV 89446

Nevada contractor's license number issued by the State Contractor's Board 015234
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1914

Signed C. E. Eagle (By driller performing actual drilling on site or contractor)
Date 12-7-93

(Rev. 3-91)

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NOTICE OF INTENT NO 24099

1. OWNER Washoe County Utility Division
MAILING ADDRESS P.O. Box 11130
Reno, NV 89520

ADDRESS AT WELL LOCATION
Spanish Springs Site# SSP1

2. LOCATION SE ¼ SE ¼ Sec. 20 T. 20 (N)S R. 21 E. Washoe County

PERMIT NO. (Issued by Water Resources) | Parcel No. | Subdivision Name

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

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

5. WELL TYPE
☐ Cable ☒ Rotary ☐ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Dry red silty clay		0	10	10
Red clay/red volcanic		10	40	30
Red/brown basalt		40	85	45
Red basalt/red clay		85	95	10
Red/brown basalt		95	250	155
Red volcanic tuff/clay		250	260	10
Orange tuff clay		260	283	20
Red/brown basalt		283	295	12
Weathered brown basalt		295	485	190
Red basalt		485	635	150
Black basalt		635	665	30

Date started October 20, 19 93
Date completed October 22, 19 93

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
did not measure		AIR ON Rig 2hrs

8. WELL CONSTRUCTION
Depth Drilled 665 Feet Depth Cased 651 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
7 7/8 Inches	0 Feet	665 Feet
Inches	Feet	Feet
Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
2		galvanized	+2	336

Perforations:
Type perforation Slotted pipe
Size perforation 1/8 X2 1/2 4 per foot
From 336 feet to 651 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 50'
Placement Method: ☒ Pumped ☐ Poured

Seal Type:
☒ Neat Cement
☐ Cement Grout
☐ Concrete Grout

Gravel Packed: ☐ Yes ☒ No
From feet to feet

9. WATER LEVEL
Static water level 535' feet below land surface
Artesian flow - G.P.M. - P.S.I.
Water temperature cold °F Quality good

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

Name Humboldt Drilling & Pump Co., Inc. (Contractor)
Address P.O. Box 590 (Contractor)
Winnemucca, NV 89446

Nevada contractor's license number issued by the State Contractor's Board 015234
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1195

Signed C. E. Eppler (By driller performing actual drilling on site or contractor)
Date 12-7-93

(Rev. 3-91)

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NOTICE OF INTENT NO. 24097

1. OWNER Washoe County Utility Division
MAILING ADDRESS P.O. Box 11130
Reno, NV 89520

ADDRESS AT WELL LOCATION
Spanish Springs SSP2

2. LOCATION ~~NE~~ NW ¼ ~~NE~~ NW ¼ Sec. 18 T. 20 (N)S R. ~~20~~ 21 E Washoe County

PERMIT NO. (Issued by Water Resources) | Parcel No. | Subdivision Name

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

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

5. WELL TYPE
☐ Cable ☒ Rotary ☐ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Coarse sand		0	5	5
Volcanic sand & gravel		5	15	10
Sand w/brown clay		15	20	5
Volcanic/granitic sand		20	33	13
Brown clay w/sand		33	38	5
Granitic/volcanic sand		38	50	12
Brown clay w/sand		50	58	8
Brown silty clay		58	67	9
Tan clay w/sand		67	86	19
Volcanic/granitic sand		86	94	8
Brown clay w/sand		94	100	6
Volcanic sand		100	106	6
Tan/brown clay		106	187	81
Weathered black basalt		187	205	18
Red cinder w/red clay		205	213	8
Gray basalt		213	225	12
BRown clay w/basalt		225	235	10
Gray basalt		235	277	42
Red cinder w/red clay		277	285	8
Gray basalt		285	310	25
Tan clay w/basalt fragments		310	378	68
Red/brown cinder w/clay		378	425	47
Black scoriated basalt		425	550	125

Date started October 25, 1993
Date completed October 27, 1993

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
did not test		Air on rig 2hr.

8. WELL CONSTRUCTION
Depth Drilled 550 Feet Depth Cased 490 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
7 7/8 Inches	0 Feet	350 Feet
Inches	Feet	Feet
Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
2		galvanized	+2	252

Perforations:
Type perforation Slotted
Size perforation 1/8 X 2 1/2 4 per foot
From 252 feet to 490 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 215'
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☒ Neat Cement ☐ Cement Grout ☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 215 feet to 490 feet

9. WATER LEVEL
Static water level 124.85' feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature cold °F Quality good

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

Name Humboldt Drilling & Pump Co., Inc. (Contractor)
Address P.O. Box 590 (Contractor)
Winnemucca, NV 889446

Nevada contractor's license number issued by the State Contractor's Board 015234
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1914

Signed C. E. [signature] (By driller performing actual drilling on site or contractor)
Date 12-7-93

(Rev. 3-91)

USE ADDITIONAL SHEETS IF NECESSARY

(O)-627

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

PRINT OR TYPE ONLY
DO NOT WRITE ON BACK

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLER'S REPORT

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

OFFICE USE ONLY
Log No.
Permit No.
Basin

NOTICE OF INTENT NO. 24110

1. OWNER Washoe County Utility Division
MAILING ADDRESS P.O. Box 11130
Reno, NV 89520

ADDRESS AT WELL LOCATION
Spanish Springs SSP2A

2. LOCATION NW ¼ NW ¼ Sec. 8 T 20 N/S R 21 E Washoe County

PERMIT NO. (Issued by Water Resources) | Parcel No. | Subdivision Name

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

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

5. WELL TYPE
☐ Cable ☒ Rotary ☐ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Coarse sand		0	5	5
Volcanic sand & gravel		5	18	13
Sand w/brown clay		18	25	7
Volcanic/granitic sand		25	36	11
Brown clay w/sand		36	42	6
Granitic/volcanic sand		42	48	6
Brown clay w/sand		48	55	7
Coarse sand		55	58	3
Brown silty clay		58	69	11
Volcanic sand		69	74	5
Tan clay w/sand		74	82	8
Volcanic/granitic sand		82	98	16
Brown clay w/sand		98	107	9
Sand w/gray clay		107	118	11
Tan/brown clay		118	184	66
Weathered brown basalt		184	185	1

8. WELL CONSTRUCTION
Depth Drilled 185 Feet Depth Cased 185 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
7 7/8 Inches	0 Feet	185 Feet
Inches	Feet	Feet
Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
2		galvanized	+2	101

Perforations:
Type perforation Slotted
Size perforation 1/8 X 2 1/2 4 per foot
From 101 feet to 185 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 67
Placement Method: ☒ Pumped ☐ Poured

Seal Type:
☒ Neat Cement
☐ Cement Grout
☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 67 feet to 185 feet

9. WATER LEVEL
Static water level 126.15' feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature cold °F Quality good

Date started October 23, 19 93
Date completed October 25, 19 93

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☐ Air Lift

	G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
did not measure			Air on Rig 2hrs

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

Name Humboldt Drilling & Pump Co., Inc. (Contractor)
Address P.O. Box 590 (Contractor)
Winnemucca, NV 89446

Nevada contractor's license number issued by the State Contractor's Board 015234

Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1914

Signed C. C. Eppler (By driller performing actual drilling on site or contractor)
Date 12-7-93

(Rev. 3-91)

USE ADDITIONAL SHEETS IF NECESSARY

(O)-627

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

PRINT OR TYPE ONLY
DO NOT WRITE ON BACK

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLER'S REPORT

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

OFFICE USE ONLY
Log No.
Permit No.
Basin

NOTICE OF INTENT NO. 24095

1. OWNER Washoe County Utility Division
MAILING ADDRESS P.O. Box 11130
Reno, NV 89520

ADDRESS AT WELL LOCATION
Spanish Springs SSP4

2. LOCATION SE NW ¼ NE NW ¼ Sec. 12 T. 20 (N)S R 20 21 E Washoe County
PERMIT NO. (Issued by Water Resources) | Parcel No. | Subdivision Name

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

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

5. WELL TYPE
☐ Cable ☒ Rotary ☐ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Fine sand		0	18	18
Coarse sand		18	26	8
Green clay w/sand		26	28	2
Granitic sand		28	47	19
Gray silty clay		47	50	3
Granitic sand/small gravel		50	76	26
Tan clay		76	96	20
Coarse volcanic sand		96	105	9
Tan silty clay		105	112	7
Granitic sand		112	118	6
Brown clay		118	126	8
Gray/brown clay		126	265	139
Gray clay w/sand		265	275	10
Blue/gray clay		275	418	143
Brown silty clay		418	425	7
Brown clay w/basalt sand		425	435	10
Red cinder w/red clay		435	457	22
Fractured coarse basalt		457	465	8
Red cinder		465	487	22
Basalt		487	498	11
Red cinder w/red clay		498	519	21
Weathered basalt		519	565	46

Date started October 27, 19 93
Date completed October 30, 19 93

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
did not measure		air on rig 2 hrs

8. WELL CONSTRUCTION
Depth Drilled 565 Feet Depth Cased 546 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
7 7/8 Inches	0 Feet	565 Feet
Inches	Feet	Feet
Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
2		galvanized	+2	252

Perforations:
Type perforation Slotted
Size perforation 1/8 X 2 1/2 4 per foot
From 252 feet to 546 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 55'
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☐ Neat Cement ☐ Cement Grout ☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 55 feet to 546 feet

9. WATER LEVEL
Static water level 21.24' feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature cold °F Quality good

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

Name Humboldt Drilling & Pump Co., Inc. (Contractor)
Address P.O. Box 590 (Contractor)
Winnemucca, NV 89446

Nevada contractor's license number issued by the State Contractor's Board 015234
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1914

Signed C. A. Eyle (By driller performing actual drilling on site or contractor)
Date 12-7-93

(Rev. 3-91)

USE ADDITIONAL SHEETS IF NECESSARY

(O)-627

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

PRINT OR TYPE ONLY
DO NOT WRITE ON BACK

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLER'S REPORT

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

OFFICE USE ONLY
Log No.
Permit No.
Basin

NOTICE OF INTENT NO. 24094

1. OWNER Washoe County Utility Division
MAILING ADDRESS P.O. Box 11130, Reno, NV 89520
ADDRESS AT WELL LOCATION Spanish Springs Site #7

2. LOCATION NE ¼ SW ¼ Sec. 13 T. 21 (N)S R. 20 E. Washoe County
PERMIT NO. NA (Issued by Water Resources) | NA (Parcel No.) | NA (Subdivision Name)

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

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

5. WELL TYPE
☐ Cable ☒ Rotary ☐ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Fine sand & silt		0	5	5
Coarse granite sand		5	52	47
Granitic sand/clay		52	64	12
Brown silty clay/sand		64	72	8
Brn/red silty clay		72	85	13
Tan silty clay/sand		85	95	10
White sand/clay		95	105	10
Decomposed granodiorite		105	190	85
Granodiorite/white clay		190	250	60
Lost circulation		250	270	20
Granodiorite		270	330	60
ranodiorite/white clay		330	360	30

Date started August 29, 19 93
Date completed September 1, 19 93

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
did	←	did not Test
		Air on Rig

8. WELL CONSTRUCTION
Depth Drilled 360 Feet Depth Cased 360 Feet

HOLE DIAMETER (BIT SIZE)

	Inches	From Feet	To Feet
	7 7/8	0	360

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
2		Galvanized	+2	169

Perforations:
Type perforation Slotted pipe
Size perforation 1/8 X 2½
From 169 feet to 360 feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 60
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☒ Neat Cement ☐ Cement Grout ☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 60 feet to 360 feet

9. WATER LEVEL
Static water level 214.02' feet below land surface
Artesian flow ____ G.P.M. ____ P.S.I.
Water temperature cold °F Quality good

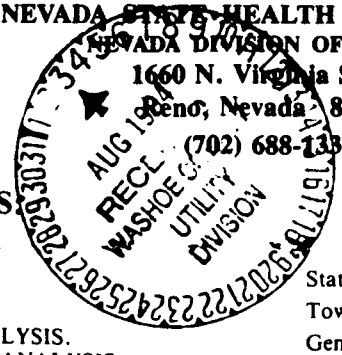
10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name Humboldt Drilling & Pump Co., Inc. (Contractor)
Address P.O. Box 590 (Contractor)
Winnemucca, NV 89446
Nevada contractor's license number issued by the State Contractor's Board 015234
Nevada driller's license number issued by the Division of Water Resources, the on-site driller T-1195-1
Signed [signature] (By driller performing actual drilling on site or contractor)
Date 11-1-93

USE ADDITIONAL SHEETS IF NECESSARY

(Rev. 3-91) (O)-627

IN TRIPLICATE
(PLEASE PRINT OR TYPE)

NEVADA STATE HEALTH LABORATORY
NEVADA DIVISION OF HEALTH
1660 N. Virginia Street
Reno, Nevada 89503
(702) 688-1335



SAMPLE ID:
SSP2
114170

WATER CHEMISTRY ANALYSIS

Attn: Fees may apply to some types of samples.

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

State NEVADA County WASHOE
Township 20N Range 21E Section 8
General Location SPANISH SPRINGS VALLEY
Source Address 1 MILE EAST OF SPANISH SPRINGS ROAD

TYPE OF ANALYSIS:

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

SAMPLING INSTRUCTIONS:

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

Sampled by ED EVANS Date 7/6/94
Owner WASHOE COUNTY Phone 856-7300
Address P.O. BOX 11130
City RENO State NV

REASON FOR ANALYSIS:

☐ Loan
☐ Personal health reasons
☐ Purchase of the property
☐ Rental or sale of property
☐ Subdivision approval
☒ Other BASELINE WATER QUALITY

USE OF WATER:

☐ Domestic drinking water
☐ Geothermal
☐ Industrial or mining
☐ Irrigation
☒ Other MONITORING WELL
Initials SSP2

REPORT TO:

Name ED EVANS : WCUD
Address P.O. BOX 11130
City RENO
State NV Zip 89520

SOURCE OF WATER:

Filter ☐ Yes ☒ No
Public ☐ Yes ☒ No
Spring ____ Well X Depth 550 ft.
Hot ____ Cold X
IN USE ☐ Yes ☒ No

Type ____
Name ____
Surface ____
Casing diameter 2 in.
Casing depth 485 ft.

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

FOR LABORATORY USE ONLY

-.1641 (161

Constituent	ppm	Constituent	ppm	Constituent	ppm	Constituent	S.U.
T.D.S. @ 103° C.	160	Chloride	10	Iron	.09	Color	3
Hardness	23	Nitrate -N	1.3	Manganese	.01	Turbidity	3.2
Calcium	6	Alkalinity	90	Copper	0.00	pH	9.03
Magnesium	2	Bicarbonate	76	Zinc	2.56	EC	246
Sodium	42	Carbonate	17	Barium	.02	SI@20C	.26
Potassium	5	Fluoride	.24	Boron	0.0		
Sulfate	19	Arsenic	.004	Silica	33		

.65 15.5 4.5 .7 -254 114170

RECEIVED
JUL 26 1994
BUREAU OF PROTECTION SERVICES
Carson City

PRINT OTHER DESIRED CONSTITUENTS BELOW

Constituent	ppm
Cd	<0.001
Cr	<0.005
Pb	0.008
Hg	<0.000
Se	<0.001
Ag	<0.00

Fee ____
Collected by ____
PWS I.D. ____
SDWA—Pri ____ Sec. ____
1st ____ 2nd ____ 3rd ____
Date Rec'd 7/6/94 Init. ____

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

Remarks KR
P.O.# 006367

O-1561 (Rev 4-92)

IN TRIPLICATE
(PLEASE PRINT OR TYPE)

NEVADA STATE HEALTH LABORATORY
NEVADA DIVISION OF HEALTH
1660 N. Virginia Street
Reno, Nevada 89503
(702) 688-1335

SAMPLE: SSP4

110084

WATER CHEMISTRY ANALYSIS:

Attn: Fees may apply to some types of samples.

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

State NEVADA County WASHOE
Township 20N Range 21E Section 7
General Location SPANISH SPRINGS VALLEY
Source Address 1/2 MILE EAST SPANISH SPRINGS ROAD

TYPE OF ANALYSIS:

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

SAMPLING INSTRUCTIONS:

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

Sampled by ED EVANS Date 1/13/94
Owner WASHOE COUNTY Phone 785-4743
Address P.O. BOX 11130
City RENO State NV

REPORT TO:

Name ED EVANS : WASHOE COUNTY UTILITY DIV.
Address P.O. BOX 11130
City RENO
State NV Zip 89520

REASON FOR ANALYSIS:

- ☐ Loan
- ☐ Personal health reasons
- ☐ Purchase of the property
- ☐ Rental or sale of property
- ☐ Subdivision approval
- ☒ Other BASELINE H_2O QUALITY

USE OF WATER:

- ☐ Domestic drinking water
- ☐ Geothermal
- ☐ Industrial or mining
- ☐ Irrigation
- ☒ Other MONITORING WELL

Initials MONITORING WELL SSP4

SOURCE OF WATER:

Filter ☐ Yes ☒ No
Public ☐ Yes ☒ No
Spring ____ Well X Depth 565 ft.
Hot ____ Cold X
IN USE ☐ Yes ☒ No

Type ____
Name ____
Surface ____
Casing diameter 2 in.
Casing depth 545 ft.

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

FOR LABORATORY USE ONLY

Constituent	ppm	Constituent	ppm	Constituent	ppm	Constituent	S.U.
0.0228	178	0.65	13.9	5.7	0.9	1829	110084
T.D.S. @ 103° C.	175	Chloride	7	Iron	0.12	Color	5
Hardness	7	Nitrate -N	0.0	Manganese	0.01	Turbidity	1.6
Calcium	1	Alkalinity	114	Copper	0.00	pH	9.26
Magnesium	1	Bicarbonate	95	Zinc	0.49	EC	271
Sodium	61	Carbonate	22	Barium	0.03	SI@20C	-0.20
Potassium	0	Fluoride	0.26	Boron	0.1	RECEIVED	
Sulfate	13	Arsenic	0.009	Silica	30	FEB 28 1994	
				Gross Alpha	K3 Pu/c	Gross RADIATION PROTECTION SERVICES	
				Gross Beta	K3 Pu/c		

PRINT OTHER DESIRED CONSTITUENTS BELOW

Constituent	ppm
Cd	<0.001
Cr	<0.005
Pb	<0.005
Hg	<0.0005
Se	<0.001
Ag	<0.005
MBAS	<0.1

Fee ____
Collected by ____
I.D. ____
SDWA—Pri. ____ Sec. ____
1st ____ 2nd ____ 3rd ____
Date Rec'd ____ Init. ____

Pulled 1/21/94

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

Remarks PO# 137892 Eng 2/24/94

KR

1/26/94

Eng

O-1561 (Rev. 4-92)

SPANISH SPRINGS MONITORING WELL CONSTRUCTION
BID RESULTS
JUNE 8, 1993

				HUMBOLDT DRILLING		NEVADA DRILLING		SARGENT DRILLING		BEYLIK DRILLING	
ITEM	DESCRIPTION	QUANTITY	UNIT	PRICE	TOTAL	PRICE	TOTAL	PRICE	TOTAL	PRICE	TOTAL
SECTION 1											
1	MOBILIZTION/DEMOBILIZATION	10	EACH	$ 1100.00	$ 11,000.00	$ 1,777.00	$ 17,770.00	$3,000.00	$ 30,000.00	$2,400.00	$ 24,000.00
2	STANDBY TIME	40	HOUR	$ 125.00	$ 5,000.00	$ 60.00	$ 2,400.00	$ 190.00	$ 7,600.00	$ 250.00	$ 10,000.00
SECTION 2											
1	DRILL 7 5/8 INCH BOREHOLE	3500	L.F.	$ 11.15	$ 39,025.00	$ 14.50	$ 50,750.00	$ 13.00	$ 45,500.00	$ 30.00	$105,000.00
2	GEOPHYSICAL LOGS	5	EACH	$ 2200.00	$ 11,000.00	$ 2,000.00	$ 10,000.00	$1,400.00	$ 7,000.00	$3,500.00	$ 17,500.00
3	2 INCH SLOTTED STEEL PIPE	2000	FEET	$ 6.45	$ 12,900.00	$ 4.80	$ 9,600.00	$ 5.50	$ 11,000.00	$ 16.00	$ 32,000.00
4	2 INCH BLANK STEEL PIPE	1500	FEET	$ 4.10	$ 6,150.00	$ 3.50	$ 5,250.00	$ 3.50	$ 5,250.00	$ 13.00	$ 19,500.00
5	GRAVEL PACK	40	CU.YD.	$ 110.00	$ 4,400.00	$ 110.00	$ 4,400.00	$ 125.00	$ 5,000.00	$ 160.00	$ 6,400.00
6	GROUT SANITARY SEAL	1000	FEET	$ 3.60	$ 3,600.00	$ 11.00	$ 11,000.00	$ 5.00	$ 5,000.00	$ 5.00	$ 5,000.00
7	AIR DEVELOPMENT	100	HOUR	$ 250.00	$ 25,000.00	$ 150.00	$ 15,000.00	$ 240.00	$ 24,000.00	$ 150.00	$ 15,000.00
8	PROTECTIVE WELL CAP	10	EACH	$ 165.00	$ 1,650.00	$ 83.00	$ 830.00	$ 350.00	$ 3,500.00	$ 350.00	$ 3,500.00
			TOTAL		$ 119,725.00		$ 127,000.00		$ 143,850.00		$ 237,900.00

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

WASHOE COUNTY UTILITY DIV.
ED EVANS
P.O. BOX 11130
RENO NV 89520

Date : 2/26/96
Client : WAS-314
Taken by: CLIENT-E. EVANS
Report : 15610
PO# : 154415

SECOND SAMPLE 2/15/96

Sample	Collected Date	Time	TOTAL DISSOL. SOLIDS MG/L	NITRATE-N MG/L	ARSENIC AA HYDRIDE MG/L	CHLORIDE MG/L		
SSP5	2/15/96	10:30	334	6.8N	0.13	27		
SSP6	2/15/96	11:25	325	3.2N	0.017	42		
SSP8	2/15/96	12:05	408	28N	0.051	60		
SSP10	2/15/96	12:50	312	5.6N	0.032	36		

Approved By: _____

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404

William F. Pillsbury
President

John C. Seher
Manager

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

WASHOE COUNTY UTILITY DIV.
ED EVANS
P.O. BOX 11130
RENO NV 89520

Date : 1/17/96
Client : WAS-314
Taken by: CLIENT-E. EVANS
Report : 15327
PO# : 017333/017334

~~FIRST~~ SAMPLE 1/4/96

Sample	Collected Date	Time	ALKALINITY MG/L CACO3	PH S.U.	TOTAL DISSOL. SOLIDS MG/L	NITRATE-N MG/L	ARSENIC AA HYDRIDE MG/L	BARIUM ICP MG/L
SSP5	1/04/96	10:05	136B	7.73	340	6.3N	0.064	0.06
SSP6	1/04/96	11:10	124B	7.70	334	3.3N	0.018	< 0.01
SSP8	1/04/96	14:30	96B	7.74	446	22N	0.039	0.02
SSP10	1/04/96	13:30	96B	7.65	326	5.3N	0.033	0.05

Sample	Collected Date	Time	CALCIUM ICP MG/L	CHROMIUM ICP MG/L	COPPER, ICP MG/L	IRON, ICP MG/L	MAGNESIUM ICP MG/L	MANGANESE ICP MG/L
SSP5	1/04/96	10:05	19	< 0.02	< 0.02	0.02	3.0	< 0.01
SSP6	1/04/96	11:10	57	< 0.02	< 0.02	0.03	9.4	< 0.01
SSP8	1/04/96	14:30	62	< 0.02	< 0.02	< 0.02	15	< 0.01
SSP10	1/04/96	13:30	35	< 0.02	< 0.02	< 0.02	9.2	< 0.01

Sample	Collected Date	Time	MERCURY AA COLD VAPOR MG/L	NICKEL ICP MG/L	POTASSIUM ICP MG/L	SELENIUM AA HYDRIDE MG/L	SODIUM ICP MG/L	ZINC ICP MG/L
SSP5	1/04/96	10:05	<0.0005	< 0.04	4.0	<0.001	86	0.94
SSP6	1/04/96	11:10	<0.0005	< 0.04	6.8	<0.001	27	6.0
SSP8	1/04/96	14:30	<0.0005	< 0.04	7.5	<0.001	33	0.75
SSP10	1/04/96	13:30	<0.0005	< 0.04	5.0	<0.001	45	0.79

Sample	Collected Date	Time	LEAD AA FURNACE MG/L	CADMIUM AA FURNACE MG/L	SILVER AA FURNACE MG/L	CHLORIDE MG/L	FLUORIDE MG/L	SULFATE MG/L
SSP5	1/04/96	10:05	0.003	<0.0002	<0.0005	24	1.8	49
SSP6	1/04/96	11:10	0.007	<0.0002	<0.0005	35	0.2	50
SSP8	1/04/96	14:30	<0.002	<0.0002	<0.0005	49	0.2	42
SSP10	1/04/96	13:30	<0.002	<0.0002	<0.0005	31	0.4	66

Sample	Collected Date	Time	THALLIUM AA FURNACE MG/L	BERYLLIUM AA FURNACE MG/L	ANTIMONY AA FURNACE MG/L

Continued on Next Page

Approved By: John Seher

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

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404

William F. Pillsbury
President

John C. Seher
Manager

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

WASHOE COUNTY UTILITY DIV.
ED EVANS
P.O. BOX 11130
RENO NV 89520

Date : 1/17/96
Client : WAS-314
Taken by: CLIENT-E. EVANS
Report : 15327
PO# : 017333/017334

Sample	Collected Date	Time	THALLIUM AA FURNACE MG/L	BERYLLIUM AA FURNACE MG/L	ANTIMONY AA FURNACE MG/L			
SSP5	1/04/96	10:05	<0.0005	<0.0002	<0.002			
SSP6	1/04/96	11:10	<0.0005	<0.0002	<0.002			
SSP8	1/04/96	14:30	<0.0005	<0.0002	<0.002			
SSP10	1/04/96	13:30	<0.0005	<0.0002	<0.002			

Approved By: _____

William F. Pillsbury
President

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404

John C. Seher
Manager

PARED IN COOPERATION WITH THE U.S. GEOLOGICAL SURVEY

Qa
Ta - Alta
Tl - Louseto...

VISTA QUADRANG
MAP 4Hg GEOLOGIC M/