

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

office use only
Log No. 76931
Permit No.
Basin 27
NOTICE OF INTENT NO 40284
3875 So Virginia ST

1. OWNER **Golden Road Motor Inn Inc** ADDRESS AT WELL LOCATION
MAILING ADDRESS **3800 S Virginia St**
Reno, NV
2. Location **NW 1/4 NE 1/4 Sec 25 T 19N R 19E** **Washoe County**
PERMIT NO. V04561 PARCEL NO. 024-040-05 SUBDIVISION NAME

3. WORK PERFORMED			4. PROPOSED USE			5. WELL TYPE		
New Well	Replace	Recondition	Domestic	Irrigation	Test	Cable	Rotary	RVC
Deepen	<input checked="" type="checkbox"/> Abandon	Other	Municipal/Industrial	Monitor	Stock	Air	Other	Mud

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
The well was cleaned to bottom, 640 foot.				0
A trimmie was installed to bottom & 6.4 yds of neat cement was pumped.				0
The trimmie was cement in.				0
Cement was tagged at 457'.				0
Explosives were set from 220' to 360 at 20' intervals in order to perforate the casing.				0
A trimmie was set to 440' and 13 yds of neat cement was pumped.				0
We did get returns.				0

8. WELL CONSTRUCTION

Depth Drilled	640 feet	Depth Cased	640 feet
HOLE DIAMETER (BIT SIZE)			
	From	To	
0	inches	0	feet
0	inches		feet
0	inches		feet
CASING SCHEDULE			
Size O.D.	Weight/Ft.	Wall Thickness	From To
0	(Inches)	(Pounds)	(Feet) Feet
0	8 5/8	22.4	.250 +1 1/2 '640
Perforations:			
0	Type Perforation		
0	Size perforation		
0	From	feet to	feet
0	From	feet to	feet
0	From	feet to	feet
0	From	feet to	feet
0	From	feet to	feet
0	Surface Seal	<input checked="" type="checkbox"/> YES No	Seal Type:
0	Depth of Seal	feet	<input checked="" type="checkbox"/> Neat Cement
0		<input checked="" type="checkbox"/> Pumped	Cement Grout
0		Poured	Concrete Grout
0	Gravel Packed:	Yes No	
0	From	feet to feet	

9. WATER LEVEL

Static water level	0	feet below land surface
Artesian flow	45 GPM	0 P.S.I.
Water Temperature	104	Degrees F Quality

Date started **2-26 -99**
Date completed **3-3 -99**

7. WELL TEST DATA

TEST METHOD:	Bailer	Pump	Air Lift
G.P.M.	Draw Down (Feet Below Static)		Time (hours)

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name **McKay Drilling, Inc.**
2290 Pioneer Drive
Reno, NV 89509
NV Contractors No. **14170**
NV Driller's Lic (on site) **1511**
Signed [Signature]
By driller performing actual drilling on site or contractor
Date **3-18 -99**

RECORDED
99 MAR 24 AM 11:11
COUNTY CLERK



Introduction

This report describes plugging and abandoning (P&A) the Alamo Ranch well, an artesian well located at the former Alamo Ranch, 3875 South Virginia Street, Reno, Nevada. According to published reports, the well was drilled in a natural hot spring area (Moana Springs: T19N, R19E, sec. 25.) around the turn of the century. At the time, the property was owned by John Sparks, former Governor of Nevada. Warm water was used on the property for space-heating, bathing, and aquaculture.

In 1985, the wellhead was open and the static water level in the casing was about 1 foot higher than ground level, but it was not flowing. A temperature profile was completed and a maximum temperature of 107°F was recorded. In 1985, there were no visible warm springs at the site, but in the early 1990's, the well began to flow naturally and the top was welded shut to contain the flow. Within the last year, a natural spring appeared (50 feet north of the well head) and flows at less than 1 gpm at a temperature of 98°F. Hot springs were known to exist in the Moana Lane area, but had ceased to flow in recent years as geothermal development in the area increased. Five years of above average rainfall may have helped to re-establish spring flow in the area. Alternatively, the overpressure may be the result of geothermal fluid injection in nearby wells. It is unknown whether the re-activated spring is the result of fluid injection or natural causes.

The present owners, Atlantis Casino, filed a claim of vested water rights (file no.04561) on this well in 1986 and intend to develop a Spa at the Casino using the warm water directly. The old well is poorly constructed and not completed according to modern specifications. The well-head obstructs the planned development and must be removed. The well was plugged and abandoned according to Division of Water Resources specifications.

Planning

On February 5, 1999, a meeting was held at the well site with the owners, the drilling contractor (McKay) and Thomas Gallagher, engineering with the Nevada Division of Water Resources. After initial discussions, a plan to abandon the well was developed and included the following:

1. Remove the welded top from the well;
2. Complete a temperature-depth profile in the well;
3. Document the well construction;
4. Map the well head location;
5. Run a sand line to total depth to ascertain the casing diameter;
6. Perforate the well in various locations;
7. Install trimmie tube to TD; and
8. Pump neat cement into the well until it returns to the surface.

On February 19, the three-inch steel cap was loosened from the south side of the well head and water began to spray, under pressure, before the top was fully removed. Because there were no valves on the wellhead to control the flow, a decision was made to postpone opening the well until a method to control the water flow could be developed. Initial temperature of the flow from the well was 56.5°F.

On February 25, the cap was completely removed from the side of the well casing and the well flowed naturally at a rate of 20 gpm through a 1½ inch dia. Hersey flow meter. The top of the casing was cut off and the water level was observed be about 1 foot above the 3 inch pipe. The flowmeter was removed and the well flowed through the 3 inch pipe at flowmeter.

Initial observations

1. The surface casing is old, possibly cast iron. The top is 9½ in. dia. Where the casing enters the ground it is larger, perhaps 12 in dia. Two side-pipes (3 in. dia., capped) protrude from the 12 in. casing to the north and south, about 12 inches above the ground.
2. When the side-pipe cap was removed at 9:15 AM, artesian flow was measured at 20 gpm through a Hersey flow meter. The meter was eventually removed because it produced a slight flow restriction. Flow was later measured (timed volume) from a four inch pipe discharging into a five gallon pail. This produced a flow of about 38 gpm. Temperature rose slowly from 75°F to (eventually) 104°F.

The water was clear, non-turbid, with no discernible odor. A 1½ liter water sample was collected for chemical analysis. Flow remained constant until 4:00 PM when the well was shut in.

3. The small spring located 50 feet north of the well head flows at about 1 gpm at a constant temperature of about 98°F. Neither spring flow nor temperature were affected by the well discharge.
4. Various diameter casing tools were run in the well to determine well depth, diameters, and volume of cement required for plugging. A six in. (6") diameter tool was run on a sand line to 460 feet. This was followed with an eight in. (8") diameter tool which was run to 275 feet.
5. A temperature depth profile was completed in the flowing well to a depth of 525 feet. Surface temperature is 104°F and bottom hole temperature is 107°F. The profile shows a positive gradient to a depth of 340 feet, followed by an isothermal zone to about 450 feet, followed by a positive gradient to TD. It appears that the artesian flow originates at - 350 feet. Lithology from a nearby test well shows medium- to coarse-grained sand with 10% clay occurs at this depth and could be the principal aquifer. The cause of the overpressure may be due to natural processes or to injection of geothermal fluids to the north. The degree of uncertainty is high due to a lack of appropriate data.
6. Assuming the hole is 8-inch diameter to TD, the volume is 9 cubic yards. If the hole is assumed to be 12-inch diameter (effective diameter), the volume is 16 cubic yards. It is reasonable to assume that the true, effective diameter is between these two numbers and the estimated volume needed is about 12 cubic yards of neat cement.

After discussions with DWR, a plug and abandon strategy was developed. The well would first be cleaned-out by bailing to true bottom, a trimmie tube would be set to the bottom and neat cement slurry would be pumped in stages to cut off the artesian flow, which was believed to originate at the 350 ft. depth. Following cut-off of artesian flow, the casing would be perforated and the casing would be filled with neat cement. Initial estimates of the well volume ranged from 8 to 12 cubic yards, depending upon the down-hole conditions.

Procedure

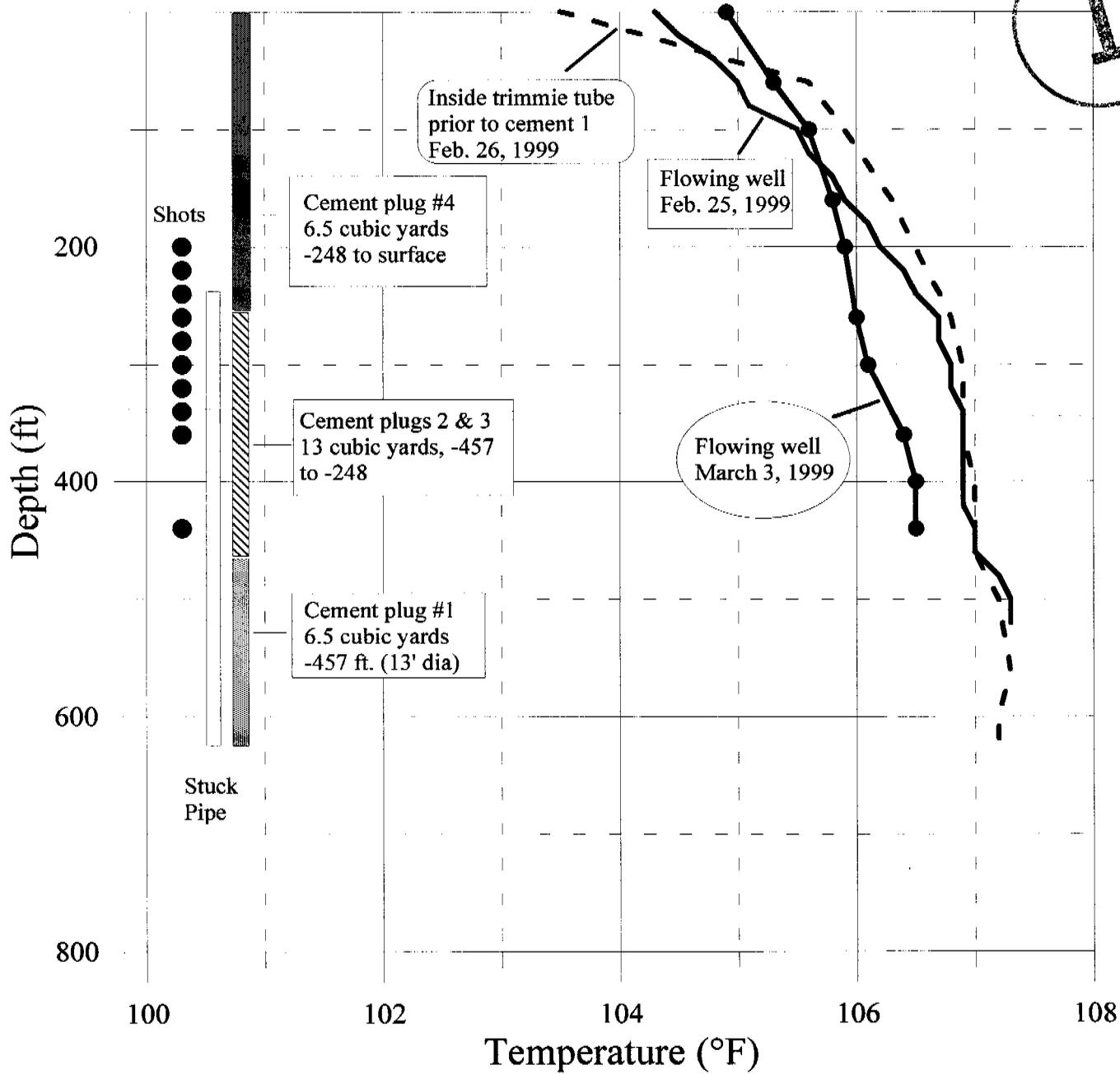
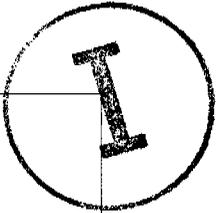
On February 26, the well was cleaned out by bailing in stages to 640 feet. Bottom materials were sampled and included rust from the old casing, bits of wood, and , eventually, a sandy clay bottom. The well flow increased to 45 gpm with cleanout (timed flow into a pail), but the adjacent warm spring was not affected. A trimmie tube was set to 640. A temperature profile was conducted prior to the arrival of the first cement truck.

The first cement truck began pumping neat cement (4.97 gallons of water per 94 lb. bag) at 4:20 PM and completed pumping 6.4 cubic yards at 4:45 PM. shows the effect of cementing on the well and spring flow. The well flow was considerably reduced but there was no effect on the spring. The cement was tagged at 457 feet, and, due to several factors, the trimmie tube became differentially stuck in the cement and could not be removed.

On March 2, a one pound explosive charge was set and detonated to remove the stuck pipe, but it was not successful. The blast increased water flow from well, but again had no impact on spring flow. The stuck pipe would not permit the use of a perforating tool, so a decision was then made to perforate the upper casing with explosives.

On March 3, a series of explosives were set from -220 to -360 at 20 foot intervals in order to rip through the old casing to allow cement to fully seal the annulus of the well. The charges were successfully detonated. The well flow continued at 30 to 40 gpm, and the spring was not affected.

With the casing perforated, the trimmie tube was backed-off, and 11 joints (21 ft./joint) were removed. Another trimmie tube was set to 440 feet, the top of the first cement job. Two truck-loads (13 cubic yards) of cement were pumped into the well through the trimmie. The cement was tagged at 248 feet and the trimmie was reset to 240 feet. A final truckload of cement (#4) was pumped until returns appeared at the surface. The trimmie tube was pulled and the water level in the casing was measured at minus 25 feet. The surface casing was cut and cement was pumped into the well bore and annulus. During the cement job, there was no impact on the spring flow. The well was called sealed at 3:00 PM.



Summary of Alamo Ranch well temperature profiles, cement plugs, and perforations. Feb., Mar. 1999. Well is flowing 40 gpm during probes.