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WATER RESOURCES
WESTERN REGION

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Mr. Dave Tuthill
Western Region Manager
State of Idaho
Department of Water Resources
2735 Airport Way
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Dave;

As you are aware, I have been investigating the hydrogeology of the Stewart Gulch area for Joe Terteling. I have carried out several hydraulic tests using area wells. Two of these tests utilized the Terteling "Windsock" well as the pumping well (Figure 1). An impeller-type flow-meter was installed in the mainline of the Windsock well prior to a two-week constant-discharge test of the well. During this testing, the discharge was also run through a 6-inch, circular orifice- weir equipped with a 4-inch orifice plate and manometer (Figure 2). Although the flow-meter came 'factory-calibrated', Joe asked me to field-check this equipment against my orifice-weir measurements and to furnish you the information so that IDWR has confidence in the accuracy of the Windsock well readings. The weir was installed horizontal with appropriate distances and clearances to orifice-plate and manometer. Pumped water was discharged to atmosphere with over three-feet of unimpeded freefall. The four-inch orifice-plate was machined, with square and true edges to one-sixteenth-inch-thickness around the circumference of the hole,with the sharp (unchamfered) edge upstream. Manometer tube was machined flush with the inside of the pipe.

On 4/13/1994, Dan Brown and I conducted a field-calibration of the newly installed flow-meter using the setup described above. Also present during the procedure were Ed Young, Joe Terteling, and Tom Terteling. Orifice-weir/flowmeter comparative data are tabulated below. Variance between flow-meter and orifice-weir ranges between 1-to-4 percent. Some amount of leakage was present in the plumbing between flow-meter and weir. A conservative estimate (to the high side) of the leakage is five gpm. At most, leakage would increase variance between the two measuring devices by one percentage point. This seems, to me, to be reasonable agreement.

A return trip, to check the totalizer, revealed that the gallons-pumped totalizer was not operating. At this time the flow-meter was returned to McCrometer for warranteed service. On 8/3/1994, I reinstalled the reconditioned flow-meter and confirmed that the totalizer was operative. The factory calibration/certification from McCrometer is attached.

Table 1. Comparison of discharge rate using flow-meter and circular orifice-weir for the Terteling "Windsock" well 4/13/94.

Orifice weir fluctuation (inches)	**Orifice weir piezometer** (gpm)	**Flowmeter needle** (gpm)	**Flowmeter fluctuation** (gpm)
18 - 19	265	260	250 - 270
22 - 23	302	290	280 - 300
30.5 - 31.5	349	345	335 - 355
39 - 41	401	385	375 - 395

The measuring port for the Windsock well is a small 0.5-inch plastic tube extending 0.65-feet above the pump-base (Figure 3). Owing to the extremely tight clearances in the 12-inch casing (two submersible pump-columns and cables in addition to the line-shaft column), I am not certain that the measuring tube is inside of the 12-inch casing or whether it is placed into an annular-space between two casings. During some early hydraulic-testing, I was uncertain of the accuracy of the water-levels measured within the plastic tube. Fortunately, the Windsock well is equipped with a one-quarter-inch plastic airline which is taped to the pump-column inside the 12-inch casing. Under, both, pumping and non-pumping situations, the water-levels measured in the plastic-tube correspond with pressure readings of the air-line. For this reason, I believe that all previous measurements, taken through the plastic tube are representative of the water-level in the well. Electric-tape measurements become difficult inside of the tube below 206 feet. This may be due to some constriction during installation or taping of the tube to the pump-column. Steel-tape measurements are readily obtainable below 206 feet.

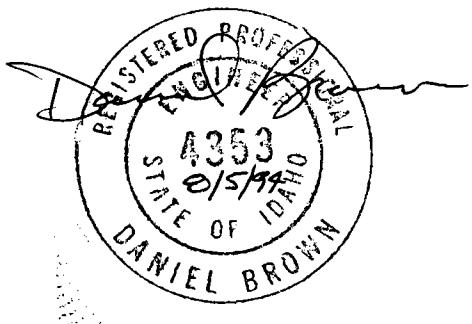
Reconstruction of the Terteling "Motorcycle Club" well (Figure 1) has just been effected. At such time as a pump is placed into the Motorcycle Club well, an appropriate measuring port, airline, and flow-measuring device will be part of that installation.

If you have any further questions concerning the above, please feel free to call me.

Sincerely;

Edward Squires

c: Joe Terteling
Tom Terteling
Steve Lester
Ed Young
Ken Neeley



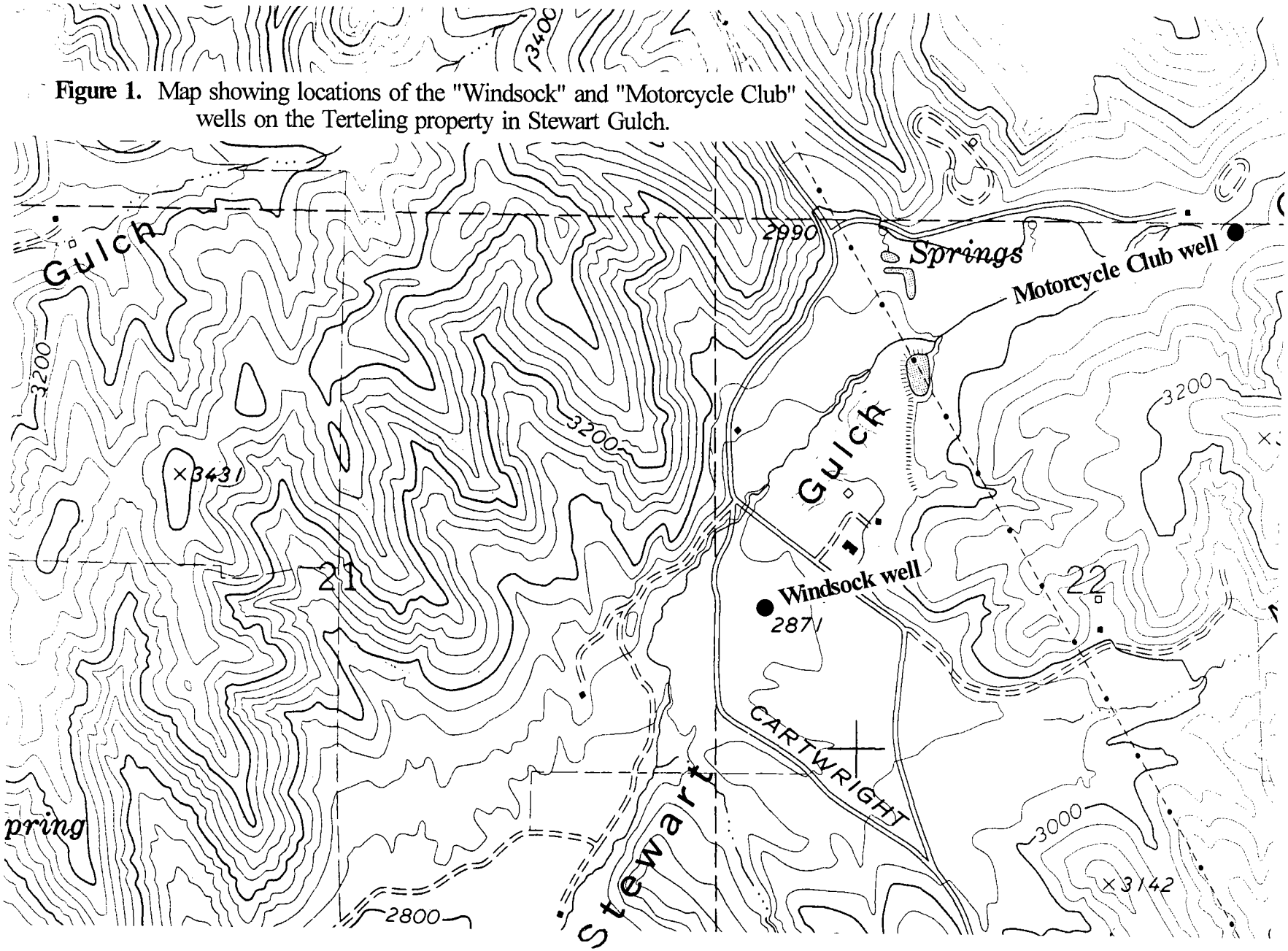


Figure 1. Map showing locations of the "Windsock" and "Motorcycle Club" wells on the Terteling property in Stewart Gulch.

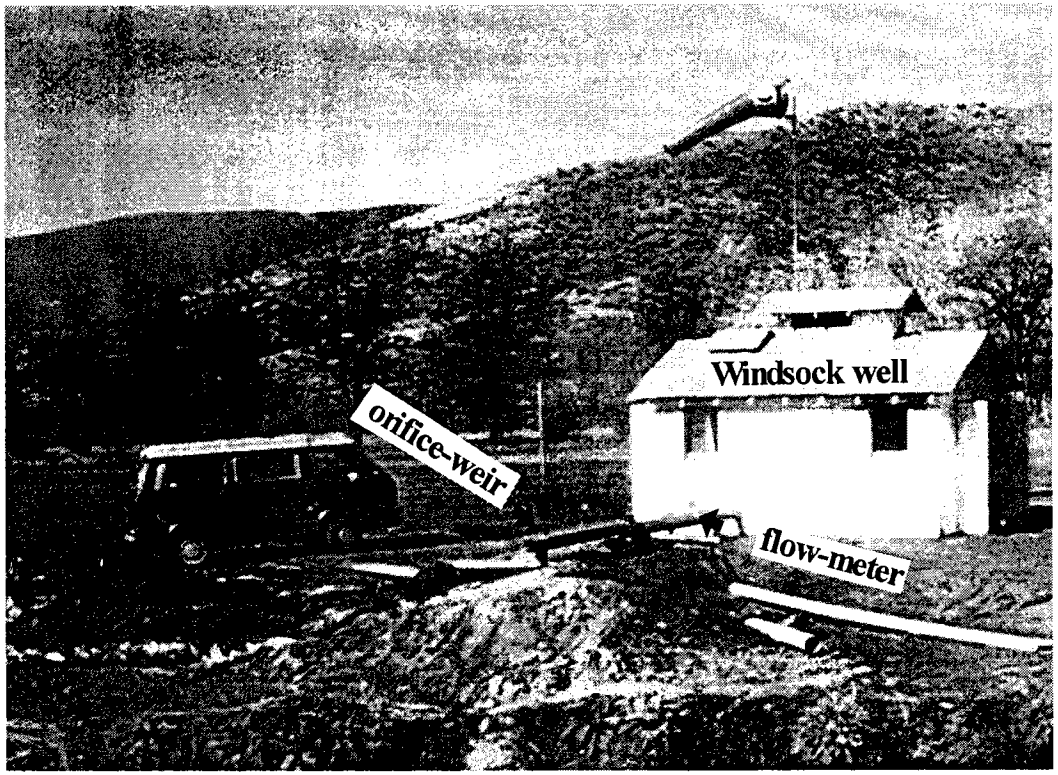
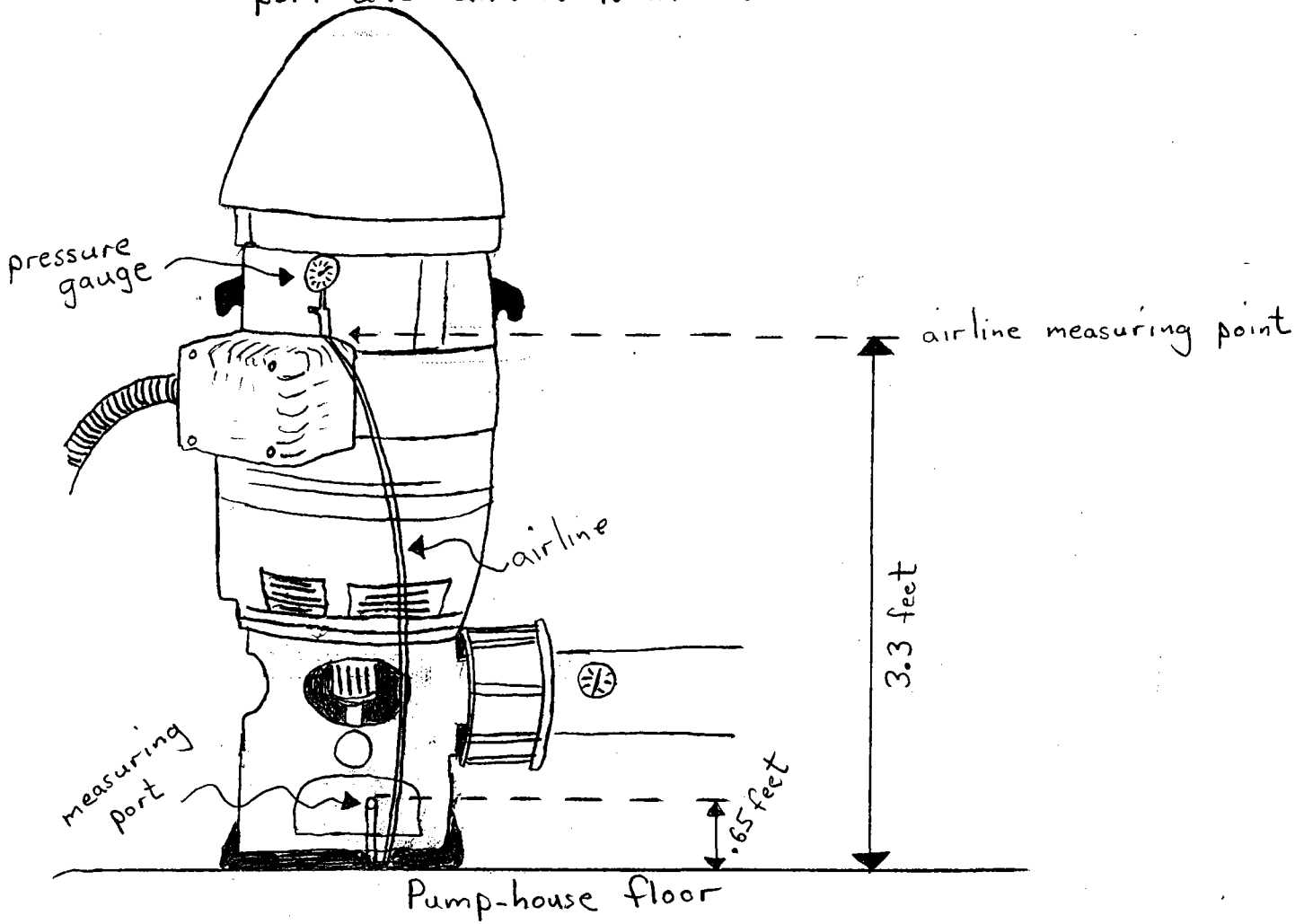


Figure 2. Configuration of circular orifice-weir discharge during hydraulic-testing of the Terteling "Windsock" well during April of 1994.

Figure 3. Sketch of Terteling "Windsock" well-pump showing measuring port and airline locations.



Wilbert

Attachment. A.

meter reads gpm directly - flow rate
gpm x 100 - totalizer
@ field 10/6/94 with Watermaster

McCrometer Meter Record:

Meter Serial Number: 93-6-8143 Meter Model Number: M0306 Size: 6" ID: 6.065 <OD:****.***>	Sold to: THE TERTELING CO. Invoice: _____ Dated: _____
Reading in GAL totalizing in GAL	Ship to: SAME Built: _____ Shipped: _____
Register Model Number: R1106-03	Ratio: 675 x 100.0000
Transmitter Part#: _____	Electronics Part#: _____
Cable Part#: D0104-00 [Cable Length: 12.2" Liner: 10.0"]	
< Extension Part#:	[Extension Length: 0.0"] >
Bearing Part#: B0100-80	< Openflow Data: _____ >

Certified Test Record:

Propeller Model Number: P0106-52 Test Date: 7-26-94
Material of Propeller: POLYP.

Meter Constant: 6750.000
Area Difference: 99.7948

Test Stand Used: I

[ID: 6.070", 907 gallons/test, 10 counts/rev.]

	TIME (in minutes)	COUNTS [TC: 6736]	COUNTS[raw]	FLOWRATE (in GPM)	ACCURACY (in percent)
1	0.806	6692.00	60696.441	1125.31	99.34

comments: 1 PT.CERT.

Tested by: MV (Date: 7-26-94)

Certified by:	Date: 7.26.94