

2.1.2



6607300-2

INTEROFFICE CORRESPONDENCE

date October 9, 1978
to C. A. Allen
from D. W. Allman *DWA*
subject DECLINE IN WELLHEAD TEMPERATURE WHILE PUMPING RRGE-1
ON 12/10/75 - DWA-2-78

A decline of as much as 9 °F was observed when the well was pumped following free flowing of RRGE-1 overnight at a rate of 550 gpm (see attached sheet for Test 103). After free flowing and prior to injection, the wellhead temperature was 274 °F, which is the highest recorded temperature during the test. The well was shut in for 26 minutes prior to pumping. The pump was then turned on and the wellhead temperature declined 2 °F and remained at 272 °F for at least three hours (11:45) while the discharge declined from 1370+ gpm to 1027 gpm. The next temperature reading indicated a temperature of 268 °F at 1330, a decline of 4 °F below the previously recorded 272 °F. By 1420, the wellhead temperature declined to 265 °F, a decline of 7 °F below the 272 °F pump discharge temperature and 9 °F below the free flow temperature of 274 °F. Bypassing back into the well began at 1430. By 1450 the temperature increased 5 °F to 270 °F. This increase in temperature following the decrease in discharge from 1010 gpm to 640 gpm lends considerable credence to the supposition that the relative temperatures observed are valid.

The data suggest that declining wellhead temperatures can be expected when pumping water levels are at depths less than ~ 586 ft. Drawdowns of this magnitude are apparently inducing relatively cool water to enter the wellbore. A test (105) at lower flow rates (953-879 gpm) of 5920 minutes (4.11 d) duration beginning 2/2/76 did not result in a temperature decline. During this test, the drawdown was 64 psi or 158 ft. less than in Test 103. During Test 105 the duration and magnitude of the drawdown were not sufficient to induce cool water to enter the wellbore. Perhaps in the intervening period between Test 103 and Test 105, sufficient hot water from the major producing zone entered an overlying zone that yielded cool water during Test 103 such that during Test 105 only relatively hot water was induced to enter the wellbore from the original

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cool water producing zone. If this is the case, then well RRGE-1 may yield hot water for several months with pumping water levels approaching 586 ft. before relatively cool water would reach the borehole.

If the anomalous temperature decline during Test 103 is believed to be worthy of additional investigation, the following techniques are recommended for consideration:

1. Temperature, borehole fluid resistivity, and continuous flowmeter logs should be run with the well shut in and then flowing at a maximum constant rate without inducing borehole flashing.

2. A packer set in the lower reach of the casing below the two sections of casing milled out could be used to ascertain whether the casing has developed significant leaks.

3. Set an inflatable packer at various positions in the casing and open borehole and conduct short-term flow tests while temperature logging in the drill pipe used to set the packer.

4. Perhaps a temperature log could be run while pumping the well. By placing pipe alongside the pump column, entanglement of the logging cable and the pump column could be prevented.

sw

Attachment:
Data sheet

cc: D. Goldman
Central File

100-101

TEST NO. 103
 DATE: 12/10/75

FORM ANC-650 (REV. 12-72)

START TIME: 0840 (Pump On)

AEROJET NUCLEAR COMPANY

Flow RATE PRESS. DISCH. TEMP. PUMP. DISCH.
 WELLSHO PRESS PRESS DISCH.

E.T.	QAP	QF	PWH	PDT	FW	APR WEL	PPD	TPI	TPD	AMF
HRS	PSIG	GPM	PSIG	PSIG	lb/ft ³	ft	PSIG	°F	°F	AMPS
0810	1.6	550	40	225	—	—	—	—	274	—
2814	SHUT-IN									
2830	0	0	160	2882	(BAD)	—	—	—	—	—
0840	Pump On									
0845	10	1370	32	60	58.18	69.3	45	—	270	69
0850	7.6	1190	30	45	58.18	37.1	48	—	272	68
0855	7.1	1153	28	42	58.18	34.7	48	—	272	67
0900	6.8	1129	28	40	58.18	29.7	48	—	272	66.8
0905	6.6	1110	26	40	58.18	34.6	48	—	272	66.8
0915	6.05	1065	26	42	58.18	39.6	62	—	272	66.8
0930	5.95	1057	26	42	58.18	39.6	62	—	272	66.8
1000	5.20	1043	25	41	58.18	39.6	62	—	272	66.8
1030	5.75	1040	25	41	58.18	39.6	60	—	272	66.8
1100	5.65	1030	25	41	58.18	39.6	60	—	272	66.8
1145	5.6	1027	25	42	58.18	42.1	60	—	272	66
1330	5.45	1012	25	38	58.35	32.1	60	—	268	66
1420	5.40	1010	24	38	58.35	34.6	60	—	265	66
1430	BEGIN BYPASSING									
1450	2.2	640	34	102	58.22	192.9	98	—	270	70
1520	1.5	520	35	250	58.22	556.5	120	—	270	68
1700	0	0	150	340	58.22	779.1	510	—	—	—