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Title: HYDROTHERMAL INJECTION PROGRAM
PHASE I TEST DATA INDEX

Organization: PHYSICAL & BIOLOGICAL SCIENCES DIVISION
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GEOSCIENCES SECTION

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HYDROTHERMAL INJECTION PROGRAM
PHASE I TEST DATA INDEX

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SUMMARY

The primary objective of the test sequence was to acquire the experimental data necessary to develop a technique for characterizing the fracture dominated Raft River geothermal reservoir. During each test, the geothermal injectant fluid was innoculated with a known concentration of secondary tracers. Tracer concentrations were monitored during the backflow stage. This experimental process has been labeled the "Huff-Puff" technique.

RRGP-5 injection system piping and pond were used as supply and disposal routes. (Figure 1). The injection supply water from RRGE-3 could be passed into the pond through spargers or valved directly to the suction side of the injection pump. The injection pump was also used as a method of disposal for backflow or warm-up flow fluids which had collected in the RRGP-5 pond. RRGP-5 fluids could also backflow directly to RRGI-7 pond to be reinjected downwell RRGI-7.

Tracers were mixed and injected from three large mixing tanks (Figure 1) downstream from the injection pump. Some problems occurred during the injection of $MgCl_2$ due to the plugging of filters and thus temporarily interrupting the flow of tracer into the injectant fluid. Tracer samples were collected through a cooling coil located in the chemistry trailer. A low volume cooling coil was attached to a continuous flow loop with the flow rate of 4 gpm. This helped cut down on lag time between fluid injection and sampling and provided an effective method of disposal into the lined pond at RRGP-5.

Samples collected at Raft River were analyzed in the field for the indicated species using the following methods: alkalinity by titration, conductivity by conductance cell; fluorescein by fluorometer; magnesium and calcium by atomic absorption spectrophotometer (AA); boron by colorimetric techniques; chloride, bromide, pH, thiocyanate and iodide by selective ion electrode (SIE).

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HYDROTHERMAL INJECTION PROGRAM PHASE I TEST DATA INDEX

INTRODUCTION

The intent of this report is to supply an index of the data available for analysis. The format of the report is in table form, with information pertaining to tracers data sampled, methods of recording and analytical methods combined with the units in which the data are recorded.

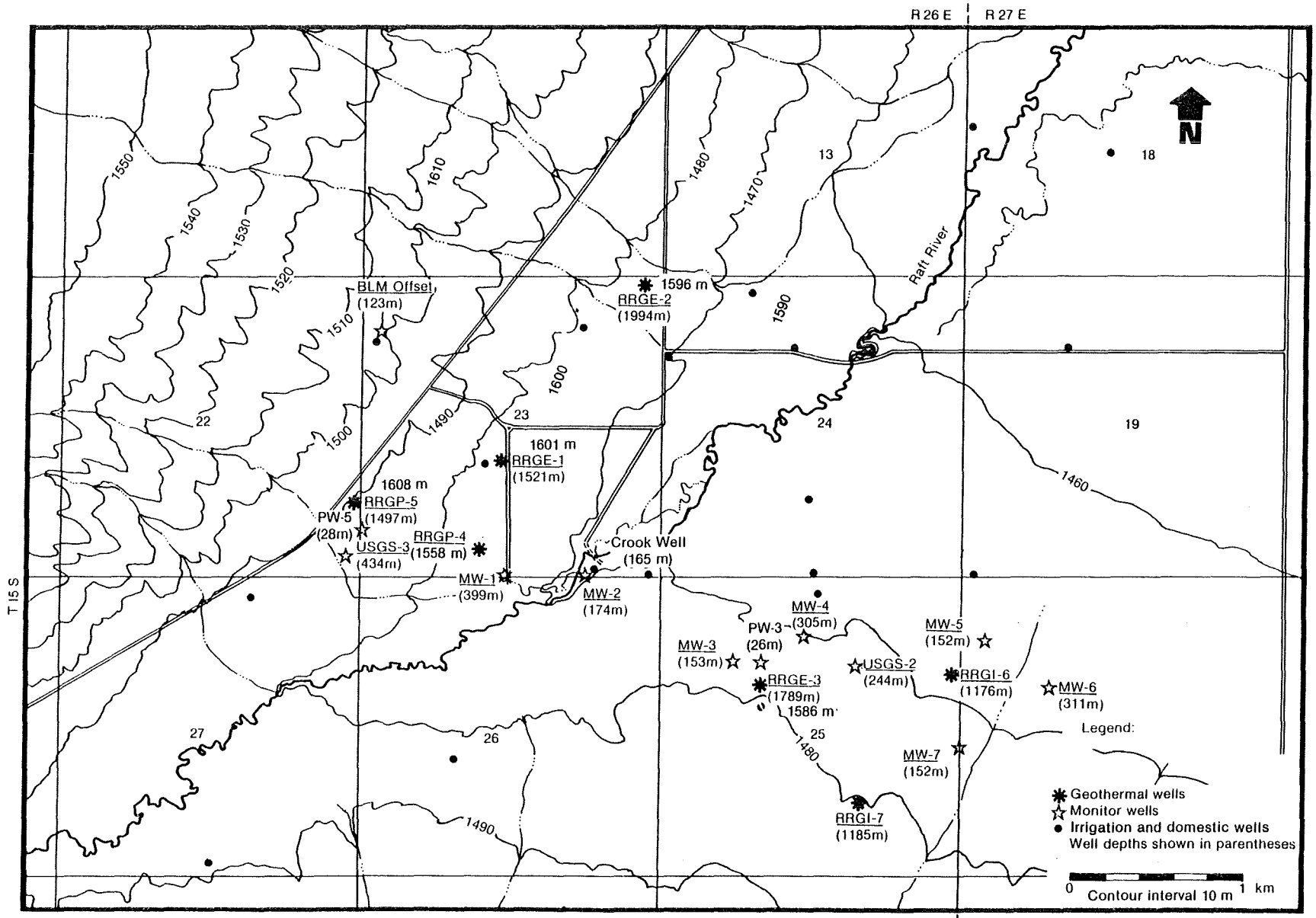
There are nine separate test files, one for each of the tests. The file names consist of location, test number and date. The files are listed in hours, with zero time simultaneous with the injection start time for each test. Each file contains pretest and posttest data as well as actual test time data (Table 1). For example, if there are 20 hours of pretest data, the file start time will be listed as a - (minus) 20.

The files on the actual tests contain RRGP-5 well-head pressure, temperature (surface and downhole), injection and backflow rates and duration, tracers used (Table 2), and water analysis, both those preformed on site and in the laboratory. Downhole conductivity/temperature logs, spinner and caliper logs run during different phases of the tests are also available. On the final test, data was recorded at RRGE-1 which is incorporated in the file along with data from RRGP-5. However, the well-head pressure was put into the RRMONITOR82 file, as RRGE-1 is included in the monitoring system.

Appendix A is a listing of data excluded from the Data Base due to either duplication or spurious quality.

The Appendix B (unattached) contains examples of data collected during the series of test in a graphic format accompanied with code sheets of each test listing record identifiers, data sampled, analytical or recorder methods and units.

The file on the monitoring system, RRMONITOR82, presents data obtained from RRGE-1, RRMW-1 USGS-3, RRGP-4, RRPW-5 and BLM-OFFSET well. These data are reported in either psia of head pressure or water level below the measuring point. This file has a zerotime on 09/01/82 at 00:00 hours.



Raft River Well Locations

Figure 2

TABLE 1. TABLE OF FILES AND START TIME

Test Title	File Start Time Name	File Start Time Date	Real	Test Start Time Pretest (Hours)	Test Start Time Injection (Hours)	Test Start Time Backflow (Hours)
2A1	RR2A1820909	Sept 09	09:00	-30.0	0:00	1.18
2A2	RR2A2820913	Sept 13	12:00	-44.94	0:00	4.37
2C	RR2C820921	Sept 21	00:00	-10.0	0:00	48.58
4A	RR4A820928	Sept 28	00:00	-58.58	0:00	29.93
4B	RR4B821003	Oct 03	12:00	-97.0	0:00	4.52
4C	RR4C821008	Oct 08	12:00	-6.00	0:00	14.33
4D	RR4D821013	Oct 13	00:00	-9.05	0:00	51.95
2D	RR2D821018	Oct 18	00:00	-13.5	0:00	98.33
5	RR5821106	Nov 06	00:00	-10.08	0:00	479.92
N/A	RRMONITOR82	Sept 01	00:00	N/A	N/A	N/A

TABLE 3. TEST 2A1
File Name: RR2A1820909 Date: 09-09-82
Start Time: Real--09:00; File Start Time: -30.0

Record Name	#	Data Sampled	Recorder or Method	Units
RR5-PH-DL	1	pH	Data logger	millivolts
RR5-COND-DL	2	Conductivity	Data logger	µmho/cm
RR5-Redox-DL	3	Oxidation-reduction	Data logger	millivolts
RR5-TEMP-DL	4	Temperature	Data logger	°F
RR5-NA-ICP	5	Sodium	ICP	ppm
RR5-K-ICP	6	Potassium	ICP	ppm
RR5-CA-ICP	7	Calcium	ICP	ppm
RR5-MG-ICP	8	Magnesium	ICP	ppm
RR5-FE-ICP	9	Iron	ICP	ppm
RR5-SIO2-ICP	10	Silica	ICP	ppm
RR5-SR-ICP	11	Strontium	ICP	ppm
RR5-LI-ICP	12	Lithium	ICP	ppm
RR5-B-ICP	13	Boron	ICP	ppm
RR5-TDS-ICP	14	TDS	Evaporation and weighing	ppm
RR5-SO4-ICP	15	Sulfate	Gravimetric	ppm
RR5-CL-ICP	16	Chloride	Titration	ppm
RR5-F-ICP	17	Fluoride	SIE	ppm
RR5-WP-D	18	Wellhead pressure	Digiquartz	psia
RR5-WQ-SC	19	Well flow	Strip charts	±gpm
RR5-TEMP-M	20	Temperature	Manually recorded	°F
RR5-B-TR	21	Boron	Colorimetrically	ppm
RR5-I-TR	22	Iodide	SIE	ppm
RR5-MG-TR	23	Magnesium	AA	ppm

TABLE 4. TEST 2A2
File Name: RR2A2820913 Date: 09-13-82
Start Time: Real--12:00; File Test Time: -44.94

Record Name	#	Data Sampled	Recorder or Method	Units
RR5-COND-DH4640	1	Downhole Conductivity	Stripchart	%
RR5-TEMP-DH4640	2	Downhole Temperature	Stripchart	%
RR5-NA-ICP	3	Sodium	ICP	ppm
RR5-K-ICP	4	Potassium	ICP	ppm
RR5-CA-ICP	5	Calcium	ICP	ppm
RR5-MG-ICP	6	Magnesium	ICP	ppm
RR5-FE-ICP	7	Iron	ICP	ppm
RR5-SIO2-ICP	8	Silica	ICP	ppm
RR5-SR-ICP	9	Strontium	ICP	ppm
RR5-LI-ICP	10	Lithium	ICP	ppm
RR5-B-ICP	11	Boron	ICP	ppm
RR5-TDS-ICP	12	TDS	Evaporation and weighing	ppm
RR5-SO4-ICP	13	Sulfate	Gravimetric	ppm
RR5-CL-ICP	14	Chloride	Titration	ppm
RR5-F-ICP	15	Fluoride	SIE	ppm
RR5-TEMP-M	16	Temperature	Manually recorded	°F
RR5-WP-D	17	Wellhead pressure	Digiquartz	psia
RR5-WQ-SC	18	Wellflow	Strip chart	±gpm
RR5-TEMP-SC	19	Temperature	Strip chart	°F
RR5-I-TR	20	Iodide	SIE	ppm
RR5-PH-TS	21	pH	SIE	standard
RR5-COND-TS	22	Conductivity	Conductance cell	µmho/cm
RR5-ALK-TS	23	Alkalinity	Titration	ppm
RR5-PH-DL	24	pH	Data logger	millivolts
RR5-COND-DL	25	Conductivity	Data logger	µmho/cm
RR5-Redox-DL	26	Oxidation-reduction	Data logger	millivolts
RR5-TEMP-DL	27	Temperature	Data logger	°F

TABLE 4B. DOWNHOLE LOGS VERSUS DEPTH--TEST 2A2
File RR2A2820913

Record Name	#	Time	Data	Depth Logged	Units
0916 X CAL DHT-U	28	10:00	XY caliper	4830' to 4600'	inches-diameter
0916 Y CAL DHT-U	29	10:00	XY caliper	4830' to 4600'	inches-diameter

The above logs were recorded on stripcharts; the record name has the date and logging direction incorporated into it, however, the logging speed was not indicated. There was no flow during logging time.

0916 X CAL DHT - U

date

direction
U - up
D - down

TABLE 5A. SEQUENCE OF MAJOR OPERATIONS--TEST 2C

Date	Time File/Real	
Sept 21	-10.0/00:00	RRGP-5 shut in
	zerotime/10:00	Initiated injection down well RRGP-5 water from RRGP-3 (150 gpm)
	0.03/10:02	Tracer pump B on--pump quit due to plugged suction line.
	0.37/10:22	Restart on tracer pump B
	2.20/12:12	Ran downhole conductivity and temperature logs: 4637' to 4820--75'/min-down (Table 5B--Records 34 and 35)
	2.23/12:14	4820' to 4750'--25'/min-up (Table 5B--Records 36 and 37)
	2.28/12:17	4750' to 4830'--50'/min-down (Table 5B--Records 38 and 39)
	2.33/12:20	4830' to 4765'--25'/min-up (Table 5B--Records 32 and 33)
	2.38/12:23	4770' to 4820'--25'/min-down (Table 5B--Records 40 and 41)
	2.43/12:26	4820' to 4770'--25'/min-up (Table 5B--Records 42 and 43)
	2.53/12:32	4740' to 4830'--25'/min-down (Table 5B--Records 28 and 29)
	2.60/12:36	4830' to 4740'--25'/min-up (Table 5B--Records 30 and 31) conductivity and temperature logs completed
	4.75/14:45	Valved out in-line conductivity, pH and oxidation-reduction probes due to malfunction
	5.17/15:10	Valved probes back in
	10.0/20:00	Problems with tracer pump--repaired and functioning properly
Sept 22	30.0/16:00	Tracer tank B filter plugged--repaired

TABLE 5B. DOWNHOLE LOGS VERSUS DEPTH--TEST 2C
File RR2C820921

Record Name	#	Time	Data	Depth Logged	Units
0921 CON DHT-25D	28	12:32	Conductivity	4740' to 4830'	%
0921 TEM DHT-25D	29	12:32	Temperature	4740' to 4830'	°F
0921 CON DHT-25U	30	12:36	Conductivity	4830' to 4740'	%
0921 TEM DHT-25U	31	12:36	Temperature	4830' to 4740'	°F
0921 CON DHT-25U	32	12:20	Conductivity	4830' to 4765'	%
0921 TEM DHT-25U	33	12:20	Temperature	4830' to 4765'	°F
0921 CON DHT-75D	34	12:12	Conductivity	4637' to 4820'	%
0921 TEM DHT-75D	35	12:12	Temperature	4637' to 4820'	°F
0921 CON DHT-25U	36	12:14	Conductivity	4820' to 4750'	%
0921 TEM DHT-25U	37	12:14	Temperature	4820' to 4750'	°F
0921 CON DHT-50D	38	12:17	Conductivity	4750' to 4830'	%
0921 TEM DHT-50D	39	12:17	Temperature	4750' to 4830'	°F
0921 CON DHT-25D	40	12:23	Conductivity	4770' to 4820'	%
0921 TEM DHT-25D	41	12:23	Temperature	4770' to 4820'	°F
0921 CON DHT-25U	42	12:26	Conductivity	4820' to 4770'	%
0921 TEM DHT-25U	43	12:26	Temperature	4820' to 4770'	°F
0922 TEM DHT-30U	44	17:00	Temperature	4835' to 0'	°F
0927 TEM DHT-20D	45	15:30	Temperature	4600' to 4838'	°F

The above logs were recorded on stripcharts. The record name has the date and logging speed and direction incorporated into it.

0921 CON DHT-25D

speed & direction

date ft/min D - down
U - up

TABLE 6A. SEQUENCE OF MAJOR OPERATIONS--TEST 4A
RR4A820928

Date	Time	
	File/Real	
Sept 28	-58.58/00:00	RRGP-5 backflow to RRGI-7 pond (25 gpm)
Sept 29	-28.65/05:55	Increased backflow from RRGP-5 to 30 gpm
	-16.65/17:55	Diverted RRGP-5 backflow to RRGP-5 pond to warm up system
Sept 30	-0.23/10:20	Initiate injection down well RRGP-5, water from RRGE-3 (150 gpm)
	-0.17/10:24	Injection stopped--problems with instrumentation--blew rupture disc at RRGE-3
	zerotime/10:34	Initiate injection down well RRGP-5 water from RRGE-3 (150 gpm)
	0.07/10:38	Tracer pump on
	1.32/11:53	Tracer pump off
	2.38/12:57	Completed injection down well; shut in RRGP-5
Oct 01	29.93/16:30	Initiate backflow from RRGP-5 to lined pond
	30.23/16:48	Problems with in-line conductivity probe--getting it repaired
	30.55/17:07	Conductivity probe now working
Oct 02	45.93/08:30	Completed backflow; shut in RRGP-5
	51.46/14:02	Initiate backflow from RRGP-5 to lined pond to keep system warm (undetermined amount)

Objective:

Determine whether a natural hydrological flow system was removing injected solutions from the immediate vicinity of injection well.

TABLE 7A. SEQUENCE OF MAJOR OPERATIONS--TEST 4B

Date	Time File/Real	
Oct 03	-97.0/12:00	Backflow from RRGP-5 to RRGI-7 pond to keep system warm--(undeterminable small amount)
Oct 04	-83.02/01:59	Increased backflow from RRGP-5 to 25 gpm
	-76.25/08:45	Decreased backflow from RRGP-5 to 15 gpm
	-70.05/15:00	Ran temperature log on RRGP-5 3000' to 4300'--10'/min-down (Table 7B--Record 30)
	-68.05/16:57	Diverted backflow to lined pond at RRGP-5 and increased to 100 gpm
	-68.0/17:00	Ran temperature log on RRGP-5 4300' to 3000'--20'/min-up (Table 7B--Record 31)
	-66.62/18:23	Shut in RRGP-5
	-66.5/18:30	Initiate small backflow from RRGP-5 to lined pond (undetermined amount)
Oct 05	-53.0/08:00	Backflow from RRGP-5 to RRGI-7 pond (25 gpm)
Oct 07	-0.05/12:57	Shut in RRGP-5
	zerotime/13:00	Initiate injection down well RRGP-5, water from RRGE-3 (150 gpm)
	0.02/13:01	Tracer pump B on
	1.52/14:31	Tracer pump B off
	2.52/15:31	Completed injection down well RRGP-5
	4.52/17:31	Initiate backflow from RRGP-5 to lined pond (150 gpm)
	5.00/18:00	Diverted backflow to RRGI-7 pond
Oct 08	19.62/08:37	Decreased backflow to RRGI-7 and to 16 gpm
	21.90/10:54	Diverted backflow to RRGP-5 lined pond and increased to 30 gpm

Objective:

Determine whether a natural hydrological flow system was removing injected solutions from the immediate vicinity of the injection well.

TABLE 8. TEST 4C
File Name: RR4C821008 Date: 10-08-82
Start Time: Real--12:00; File Start Time: -6.00

Record Name	#	Data Sampled	Recorder or Method	Units
RR5-NA-ICP	1	Sodium	ICP	ppm
RR5-K-ICP	2	Potassium	ICP	ppm
RR5-CA-ICP	3	Calcium	ICP	ppm
RR5-MG-ICP	4	Magnesium	ICP	ppm
RR5-FE-ICP	5	Iron	ICP	ppm
RR5-SIO2-ICP	6	Silica	ICP	ppm
RR5-SR-ICP	7	Strontium	ICP	ppm
RR5-LI-ICP	8	Lithium	ICP	ppm
RR5-B-ICP	9	Boron	ICP	ppm
RR5-HCO3-ICP	10	Bicarbonate	Titration	ppm
RR5-SO4-ICP	11	Sulfate	Gravimetric	ppm
RR5-CL-ICP	12	Chloride	Titration	ppm
RR5-F-ICP	13	Fluoride	SIE	ppm
RR5-TDS-ICP	14	TDS	Evaporation and weighing	ppm
RR5-PH-ICP	15	pH	SIE	standard
RR5-TEMP-M	16	Temperature	Manually recorded	°F
RR5-WP-D	17	Wellhead pressure	Digiquartz	psia
RR5-WQ-SC	18	Well flow	Stripchart	±gpm
RR5-TEMP-SC	19	Temperature	Stripchart	°F
RR5-I-TR	20	Iodide	SIE	ppm
RR5-PH-TS	21	pH	SIE	standard
RR5-COND-TS	22	Conductivity	Conductance cell	µmho/cm
RR5-ALK-TS	23	Alkalinity	Titration	ppm
RR5-PH-DL	24	pH	Data logger	millivolts
RR5-COND-DL	25	Conductivity	Data logger	µmho/cm
RR5-REDOX-DL	26	Oxidation-reduction	Data logger	millivolts
RR5-TEMP-DL	27	Temperature	Data logger	°F

TABLE 9. TEST 4D
File Name: RR4D821013 Date: 10-13-82
Start Time: Real--00:00; File Start Time: -9.05

Record Name	#	Data Sampled	Recorder or Method	Units
RR5-PH-DL	1	pH	Data logger	millivolts
RR5-COND-DL	2	Conductivity	Data logger	µmho/cm
RR5-REDOX-DL	3	Oxidation-reduction	Data logger	millivolts
RR5-TEMP-DL	4	Temperature	Data logger	°F
RR5-NA-ICP	5	Sodium	ICP	ppm
RR5-K-ICP	6	Potassium	ICP	ppm
RR5-CA-ICP	7	Calcium	ICP	ppm
RR5-MG-ICP	8	Magnesium	ICP	ppm
RR5-FE-ICP	9	Iron	ICP	ppm
RR5-SIO2-ICP	10	Silica	ICP	ppm
RR5-SR-ICP	11	Strontium	ICP	ppm
RR5-LI-ICP	12	Lithium	ICP	ppm
RR5-B-ICP	13	Boron	ICP	ppm
RR5-HCO3-ICP	14	Bicarbonate	Titration	ppm
RR5-SO4-ICP	15	Sulfate	Gravimetric	ppm
RR5-CL-ICP	16	Chloride	Titration	ppm
RR5-F-ICP	17	Fluoride	SIE	ppm
RR5-TDS-ICP	18	TDS	Evaporation and weighing	ppm
RR5-PH-ICP	19	pH	SIE	standard
RR5-TEMP-M	20	Temperature	Manually recorded	°F
RR5-TEMP-SC	21	Temperature	Stripchart	°F
RR5-BR-TR	22	Bromide	SIE	ppm
RR5-FLUOR-TR	23	Fluorescein	Fluorometer	ppm
RR5-PH-TS	24	pH	SIE	standard
RR5-COND-TS	25	Conductivity	Conductance cell	µmho/cm
RR5-ALK-TS	26	Alkalinity	Titration	ppm
RR5-WP-D	27	Wellhead pressure	Digiquartz	psia
RR5-WQ-SC	28	Well flow	Stripcharts	±gpm

TABLE 9B. DOWNHOLE LOGS VERSUS DEPTH--TEST 4D
File RR4D821013

Record Name	#	Time	Data	Depth Logged	Units
1013 CON DHT-10D	29	17:31	Conductivity	4600' to 4840'	µmho/cm
1013 TEM DHT-10D	30	17:31	Temperature	4600' to 4840'	°F
1014 CON DHT-15D	31	00:30	Conductivity	4600' to 4842'	µmho/cm
1014 TEM DHT-15D	32	00:30	Temperature	4600' to 4842'	°F
1014 CON DHT-15D	33	06:52	Conductivity	4600' to 4842'	µmho/cm
1014 TEM DHT-15D	34	06:52	Temperature	4600' to 4842'	°F
1015 CON DHT-15D	35	00:15	Conductivity	4600' to 4842'	µmho/cm
1015 TEM DHT-15D	36	00:15	Temperature	4600' to 4842'	°F
1015 CON DHT-15D	37	10:46	Conductivity	4600' to 4840'	µmho/cm
1015 TEM DHT-15D	38	10:46	Temperature	4600' to 4840'	°F

The above logs were recorded on stripcharts, the record name has the date, logging speed and direction incorporated into it. The well was shut in during logging.

1013 CON DHT - 10D

date speed & direction

ft/min D - down
U - up

TABLE 10A. SEQUENCE OF MAJOR OPERATIONS--TEST 2D

Date	Time	
	File/Real	
Oct 18	-13.5/00:00	RRGP-5 backflow to RRGI-7 pond (150 gpm)
	-9.5/04:00	Shut in RRGP-5 backflow to RRGI-7--started small warmup flow through piping system to lined pond at RRGP-5
	-2.75/10:45	RRGP-5 shut in
	zerotime/13:30	Initiate injection down well RRGP-5, water from RRGE-3 (155 gpm)
	0.02/13:31	Tracer pump on--pump off
	0.08/13:35	Tracer pump on
	0.27/13:46	Tracer pump off
	3.60/16:06	Problems with automatic valve 5AV6-5 valve keeps searching causing the injection flow to vary--placed 5AV6-5 valve in manual mode--still having problems with 5AV6-5 valve--flow is varying 10 to 15 gpm
Oct 19	24.08/13:35	Tracer pump on
	24.28/13:47	Tracer pump off
Oct 20	48.08/13:35	Tracer pump on
	48.25/13:45	Tracer pump off
	53.0/18:30	Ran spinner logs on RRGP-5: 4600' to 4820'--20 ft/min-down (Table 10B--Record 31)
	53.18/18:41	4820' to 4600'--20 ft/min-up (Table 10B--Record 32) spinner logs completed
Oct 22	92.5/10:00	Tracer pump on
	98.27/15:46	Tracer pump off
	98.33/15:50	Completed injection down well RRGP-5
	98.42/15:55	Backflow started from RRGP-5 to lined pond (145 gpm)
Oct 25	196.0/17:30	Ran temperature logs on RRGP-5: 4600' to 4840'--15 ft/min-down (Table 10B--Record 35)
	196.27/17:46	4840' to 4600'--15 ft/min-up (Table 10B--Record 36) temperature logs completed

TABLE 10B. DOWNHOLE LOGS VERSUS DEPTH--TEST 2D
File RR2D821018

Record Name	#	Time	Data	Depth Logged	Units
1020 SPF DHT-20D	31	18:30	Spinner	4600' to 4820'	%
1020 SPF DHT-20U	32	18:41	Spinner	4820' to 4600'	%
1029 SPF DHT-20D	33	10:30	Spinner	4600' to 4820'	%
1029 SPF DHT-10U	34	10:41	Spinner	4820' to 4600'	%
1025 TEM DHT-15D	35	17:30	Temperature	4600' to 4840'	°F
1025 TEM DHT-15U	36	17:46	Temperature	4840' to 4600'	°F
1029 XCAL DHT-U	37	16:00	Caliper	4700' to 0'	inches-diameter
1029 YCAL DHT-U	38	16:00	Caliper	4700' to 0'	inches-diameter

The above logs were recorded by stripchart, the record name has the date and logging speed and direction incorporated into it.

1020 SPF DHT - 20D

date speed and direction

ft/min D - down
U - up

TABLE 11. (continued)

Record Name	#	Data Sampled	Recorder or Method	Units
RR5-SO4-ICP	41	Sulfate	Gravimetric	ppm
RR5-CL-ICP	42	Chloride	Titration	ppm
RR5-F-ICP	43	Fluoride	SIE	ppm
RR5-TDS-ICP	44	TDS	Evaporation and weighing	ppm
RR5-PH-ICP	45	pH	SIE	standard
RR5-TEMP-M	46	Temperature	Manually recorded	°F
RR5-WP-D	47	Wellhead pressure	Digiquartz	psia
RR5-WQ-SC	48	Well flow	Stripchart	±gpm
RR5-I-TR	49	Iodide	SIE	ppm
RR5-FLUOR-TR	50	Fluorescein	Fluorometer	ppm
RR5-BR-TR	51	Bromide	SIE	ppm
RR5-I-TR	52	Iodide	SIE	ppm
RR5-FLUOR-TR	53	Fluorescein	Fluorometer	ppm
RR5-RHODA-TR	54	Rhodamine-B	Spectrophotometer	ppm
RR5-CL-ICP	55	Chloride	SIE	ppm
RR1-WQ-SC	56	Well flow	Stripchart	±gpm
RR1-TEMP-SC	57	Temperature	Stripchart	°F

TABLE 11A. (continued)

Date	Time	RRGP-5 and RRGE-1
	File/Real	
Nov 30	581.43/15:31	RRGE-1 shut in
Dec 01	599.62/09:42	RRGP-5 shut in--prep for Pulse test
	600.00/10:05	Backflow from RRGP-5 (75 gpm)
	600.02/10:06	RRGP-5 shut in
	600.07/10:09	Backflow from RRGP-5 (75 gpm) -- Pulse Test 1
	600.38/10:28	RRGP-5 shut in
	600.57/10:39	Backflow from RRGP-5 (125 gpm) -- Pulse Test 2
	600.83/10:55	RRGP-5 shut in
	600.98/11:04	Backflow from RRGP-5 (222 gpm) decreased to 162 gpm
	601.00/11:05	Increased to 175 gpm
	601.02/11:06	RRGP-5 shut in
	601.07/11:09	Backflow from RRGP-5 (250 gpm) decreased to 170
	601.09/11:10	RRGP-5 shut in
	601.15/11:14	Backflow from RRGP-5 (170 gpm) -- Pulse Test 3
	601.53/11:37	RRGP-5 shut in
	601.70/11:47	Backflow from RRGP-5 (225 gpm) -- Pulse Test 4
	601.98/12:04	RRGP-5 shut in
	603.95/14:02	Backflow from RRGP-5 (276 gpm) -- Pulse Test 5
	604.50/14:35	RRGP-5 shut in
	604.73/14:49	Backflow from RRGP-5 (325 gpm) -- Pulse Test 6
	604.77/14:51	RRGP-5 shut in

APPENDIX A

LISTING OF DATA EXCLUDED FROM DATA BASE

APPENDIX A -- LISTING OF DATA NOT INCLUDED IN DATA BASE

Test	Data	Reason	References	
			File Name	Record
2A1	Flow	Duplication	RR2A1820909	RR5-WQ-SC
2A1	Pressure	Duplication	RR2A1820909	RR5-WP-D
2A1	Conductivity	Duplication	RR2A1820909	RR5-COND-DL
2A1	pH	Duplication	RR2A1820909	RR5-PH-DL
2A1	Oxidation-reduction	Duplication	RR2A1820909	RR5-Redox-DL
2A1	Temperature	Instrument failed	RR2A1820909	RR5-TEMP-M
2A2	Flow	Duplication	RR2A2820913	RR5-WQ-SC
2A2	Pressure	Duplication	RR2A2820913	RR5-WP-D
2A2	Conductivity	Duplication	RR2A2820913	RR5-COND-DL
2A2	pH	Duplication	RR2A2820913	RR5-PH-DL
2A2	Oxidation-reduction	Duplication	RR2A2820913	RR5-Redox-DL
2A2	Conductivity	Spurious	N/A	N/A
2A2	Temperature	Spurious	N/A	N/A
2C	Flow	Duplication	RR2C820921	RR5-WQ-SC
2C	Pressure	Duplication	RR2C820921	RR5-WP-D
2C	Conductivity	Duplication	RR2C820921	RR5-COND-DL
2C	pH	Duplication	RR2C820921	RR5-PH-DL
2C	Oxidation-reduction	Duplication	RR2C820921	RR5-Redox-DL
2C	Conductivity	Spurious	N/A	N/A
2C	Temperature	Spurious	N/A	N/A
2D	Flow	Duplication	RR2D821018	RR5-WQ-SC
2D	Pressure	Duplication	RR2D821018	RR5-WP-D
2D	Conductivity	Duplication	RR2D821018	RR5-COND-DL
2D	pH	Duplication	RR2D821018	RR5-PH-DL
2D	Oxidation-reduction	Duplication	RR2D821018	RR5-Redox-DL
2D	Conductivity	Spurious	N/A	N/A
2D	Temperature	Spurious	N/A	N/A
4A	Flow	Duplication	RR4A820928	RR5-WQ-SC
4A	Pressure	Duplication	RR4A820928	RR5-WP-D
4A	Conductivity	Duplication	RR4A820928	RR5-COND-DL
4A	pH	Duplication	RR4A820928	RR5-PH-DL
4A	Oxidation-reduction	Duplication	RR4A820928	RR5-Redox-DL
4A	Conductivity	Spurious	N/A	N/A
4A	Temperature	Spurious	N/A	N/A
4B	Flow	Duplication	RR4B821003	RR5-WQ-SC
4B	Pressure	Duplication	RR4B821003	RR5-WP-D
4B	Conductivity	Duplication	RR4B821003	RR5-COND-DL
4B	pH	Duplication	RR4B821003	RR5-PH-DL
4B	Oxidation-reduction	Duplication	RR4B821003	RR5-Redox-DL
4B	Conductivity	Spurious	N/A	N/A
4B	Temperature	Spurious	N/A	N/A

APPENDIX B

RAFT RIVER TEST DATA