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By
Henry P. Heasler

June 1984

Work Performed Under Contract No. FC07-79ID12026

University of Wyoming
Laramie, Wyoming

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CHEMICAL ANALYSES OF SELECTED THERMAL SPRINGS AND WELLS IN WYOMING

by

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Explanation

This report presents basic chemical data for 27 selected thermal well and springs in Wyoming. The samples were gathered from 1979 through 1982 by personnel of the Wyoming Geothermal Resource Assessment Group in an effort to define geothermal resources in Wyoming.

Table 1 presents basic data for the 27 analyzed samples. These data generally include location, temperature, flow, date analyzed, and a description of what the sample is from. Table 2 lists the chemical analyses for the sample. In Table 2, samples 1 through 16 were analyzed at the Department of Geology and Geophysics by Dr. Steve Boese and samples 17 thorugh 27 were analyzed by the Wyoming Department of Agriculture, Division of Laboratories.

Table 1. Basic Data for Analyzed Springs and Wells

Sample No.	Latitude	Longitude	Temp. (°C)	Flow (l/m)	Date Analyzed	Description
1	43° 44.5'	107° 44.1'	32	57	7/81	Flowing well named Scorpoin near Thermopolis
2	43° 40.3'	108° 12.2'	53	3792	7/81	Flowing well named Sacajawea near Thermopolis
3	44° 44.9'	108° 11.3'	20	6813	7/81	Little Sheep Mountain Hot Springs
4	43° 39.2'	108° 11.6'	56	11000	7/81	Big Spring at Thermopolis
5	43° 39.2'	108° 11.6'	55	0	7/81	Black Sulphur Hot Spring at Thermopolis
6	44° 22.3'	107° 58.7'	31		7/81	Discharge from a treater at Torchlight Dome oil field
7	44° 59.6'	108° 24.7'	28		7/81	Crosby irrigation well (pumped)
8	43° 43.9'	107° 42.4'	38	57	7/81	Water Creek well
9	43° 39.2'	108° 11.6'	53	760	7/81	White Sulphur Hot Spring at Thermopolis
10	42° 33.0'	106° 43.0'	46	1325	7/81	Flowing well near Alcova Dam
11	44° 29.5'	107° 59.3'			7/81	Water well in the Big Horn Basin
12	44° 46.1'	108° 16.5'			7/81	Pumped water well in the Big Horn Basin
13	43° 41.6'	108° 18.6'	64	0	6/82	Geothermal test well near Thermopolis
14	43° 43.6'	108° 20.5'	73	0	6/82	Geothermal test well near Thermopolis
15	43° 39.6'	108° 12.6'	55	0	6/82	Geothermal test well near Thermopolis
16	43° 39.2'	108° 11.6'	56	11000	6/82	Big Spring at Thermopolis
17	44° 30.7'	109° 9.4'	28	76	10/79	Needle Hot Springs near Cody
18	44° 30.8'	109° 6.9'	34		10/79	De Maris Hot Springs near Cody
19	44° 30.8'	109° 6.9'	34		10/79	DeMaris Hot Springs near Cody
20	44° 30.6'	109° 6.8'	34		10/79	Pumped well for Cody Spa
21	44° 30.8'	109° 7.7'	34	114-303	10/79	Shoshone Hot Springs near Cody
22	44° 41.7'	107° 55.9'	32	1325	2/81	Irrigation Well in the eastern Big Horn Basin
23	43° 38.0'	109° 13.4'	25		4/81	Non-flowing well near Thermopolis
24	44° 44.5'	109° 19.4'	8		4/81	Large spring in pond in Shoshone Nat'l Forest
25	42° 7.2'	107° 25.3'	37	21	4/81	Pettygrew No. 1
26	41° 36.3'	107° 17.4'	32	1301	4/81	Miller Well No. 1
27	41° 16.3'	107° 37.4'	26	751	4/81	Bureau of Land Management Well

Table 2. Chemical Analyses for Springs and Wells (values reported in ppm)

Sample No.[1]	Na	K	B	Ca	Mg	Si	HCO_3	F	Cl	P	NO_3	N	SO_4	pH	TDS
1	500	1.62		0	0			.72	9.26	<.5	<.5		3.97		
2	270	54		397	77.8			2.86	338	<.5	<.5		802		
3	4.74	1.14		59	23.6			.52	2.04	<.5	<.5		77.6		
4	238	47		314	63.5			3.28	326	<.5	<.5		648		
5	268	50		310	64.3			3.38	378	<.5	<.5		708		
6	30	2.26		560	18.1			1.99	40.4	<.5	<.5		42.2		
7	1.69	9		530	23			1.56	1.46	<.5	<.5		43.8		
8	380	1.55		0	0			.67	5.41	<.5	<.5		407		
9	257	50		357	70.4			2.87	360	<.5	<.5		778		
10	181	12.1		140	18.6			2.32	279	<.5	<.5		361		
11	260	9.9		680	13			1.29	231	<.5	<.5		5520		
12	88	12.0		530	241			1.74	2.20	<.5	<.5		2150		
13	253	42.6		280	61.3			3.0	287				646	7.64	
14	212	42.6		263	60.6			3.1	205				632	7.67	
15	257	42.5		336	93.6			3.1	260				911	7.77	
16	233	42.5		320	68.5			3.7	239				631	7.70	
17	24	10	.3	210	34	17	800	1.3	6		.1		118	6.9	876
18	43	22	.6	380	78	19	1100	1.6	21		0		470	6.7	1740
19	45	21	.6	410	82	24	1200	2.8	28		0		480	6.5	1690
20	42	22	.5	420	78	19	1100	1.5	22		0		470	6.6	1700
21	38	18	.5	390	68	17	1100	1.5	18		1.0		360	6.5	1530
22	150	4.4	.27	5	3	16	170	2.2	26		0		160	8.8	428
23	270	35	1.0	340	66	34	620	4.5	360		.1		760	6.6	2300
24	3	.6	.11	52	20	11	210	.5	5.2		1.3		35	7.8	264
25	1000	4.3	1.6	5	1.8	19	2200	5.1	120		.1		0	9.2	2470
26	340	1.4	1.2	3	.6	22	830	2.9	34		.2		0	8.7	848
27	470	4.1	1.0	9	40	15	1300	4.8	51		.1		1.6	8.5	1300

[1]Samples 1-16 were analyzed at the Department of Geology and Geophysics, University of Wyoming, Laramie, Wyoming by Dr. Steve Boese. Samples 17-27 were analyzed by the Wyoming Department of Agriculture, Division of Laboratories, Laramie, Wyoming

Table 2. (Continued)

Sample No.	Cu	Cr	Ni	Fe	Cd	Zn	Mn	Pb	Ag	As	Se	Hg	Ba
1	<.05	<.05	<.1	.34	<.05	<.02	<.05	<.2	<.05				
2	<.05	<.05	<.1	.02	<.05	<.02	.05	<.2	<.05				
3	<.05	<.05	<.1	< .02	<.05	<.02	<.05	<.2	<.05				
4	<.05	<.05	<.1	.30	<.05	<.02	.07	<.2	<.05				
5	<.05	<.05	<.1	< .02	<.05	<.02	<.05	<.2	<.05				
6	<.05	<.05	<.1	< .02	<.05	<.02	<.05	<.2	<.05				
7	<.05	<.05	<.1	.02	<.05	<.02	<.05	<.2	<.05				
8	<.05	<.05	<.1	1.50	<.05	.04	<.05	<.2	<.05				
9	<.05	<.05	<.1	.02	<.05	.08	<.05	<.2	<.05				
10	<.05	<.05	<.1	.23	<.05	<.02	<.05	<.2	<.05				
11	<.05	.14	<.1	1.50	<.05	.62	.13	.24	.06				
12	<.05	.05	<.1	2.00	<.05	.88	.11	<.2	<.05				
13	<.05	.08	<.1	1.3	<.05	.04	<.05	<.2	<.05				
14	<.05	.07	<.1	1.4	<.05	.03	<.05	<.2	<.05				
15	<.05	.06	<.1	.7	<.05	.05	<.05	<.2	<.05				
16	<.05	.05	<.1	.05	<.05	.03	<.05	<.2	<.05				
17	<.05	<.1	<.1	.1	<.01	<.02	.09	<.2	<.05	<.005	<.005	<.001	<.1
18	<.05	<.1	<.1	.02	<.01	<.02	.06	<.2	<.05	<.005	<.005	<	<.1
19	<.05	<.05	<.1	.2	<.03	<.02	.06	<.2	<.05	<.005	<.005	<.001	<.1
20	<.05	<.1	<.1	.2	<.01	<.02	<.05	<.2	<.05	<.005	<.005	<.001	<.1
21	<.05	<.1	<.1	.1	<.01	<.02	.06	<.2	<.05	<.005	<.005	<.001	<.1
22	<.04	<.05	<.1	< .1	<.03	.02	.05	<.2	<.05	<.005	<.005	<.001	<.1
23	.2	<.05	<.1	1.3	<.03	.30	.06	<.2	<.05	<.005	<.005	<.001	<.1
24	<.04	<.05	<.1	< .1	<.03	.22	<.05	<.2	<.05	<.005	<.005	.002	<.1
25	<.04	<.05	<.1	< .1	<.03	<.02	<.05	<.2	<.05	<.005	<.005	<.001	2.0
26	<.04	<.05	<.1	< .1	<.03	<.02	.06	<.2	<.05	<.005	<.005	<.001	<.1
27	<.04	<.05	<.1	.2	<.03	.03	.06	<.2	<.5	<.005	<.005	<.001	.5