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Title of article An evaluation of exploration methods for low-temperature geothermal systems in the Artesian City area, Idaho

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see GSA Bulletin v. 94, p. 58 - 79

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TABLE 2. - BASIC HYDROLOGIC DATA FROM WELLS IN THE ROCK CREEK HILLS AREA, T. 11, 12 S., R. 18-21 E., AUGUST-SEPTEMBER, 1980

LOCATION	DATA BASE	TOTAL DEPTH (M)	SURFACE ELEV (M)	DEPTH TO WATER (M)	WATER LEVEL (M)	AQUIFER	OPEN TOP (M)	HOLE BTM (M)	TEMP (C)	NOTES	HYDROTHERMAL GRADIENT (C/KM)
11. 18. 01. ABB	LOG	85. 3	1248. 2	59. 7	1188. 7	QTB	64. 3	85. 3	17. 8	CHEM	112. 0
11. 18. 07. BAB	OBS	48. 8	1197. 9	8. 8	1189. 1	QTB	5. 8	48. 8			
11. 18. 08. ADD	LOG	88. 4	1216. 2	21. 3	1194. 9	QTB	21. 3	88. 4	13. 3	CHEM	71. 1
11. 18. 08. CCD	OBS		1213. 4	19. 8	1193. 6	QTB					
11. 18. 09. CDC			1237. 5	40. 5	1197. 0	QTB					
11. 18. 16. DAA		42. 7	1237. 5	27. 7	1209. 8	QTB					
11. 18. 28. BBB			1228. 3	18. 3	1210. 0	QTB		45. 7	16. 7	CHEM	
11. 18. 33. CCC	LOG	68. 6	1270. 4	27. 4	1243. 0	TIV	33. 5	68. 6			
11. 18. 34. DCA		426. 7R	1292. 4	27. 4R	1265. 0R	TIV	121. 9	426. 7	35. 6	CHEM	95. 5
11. 18. 35. DCB		298. 7R	1292. 4R	15. 2R	1277. 2R	TIV			39. 4R		
11. 18. 36. BCD		309. 4R	1264. 9			TIV			29. 4R		
11. 19. 08. CCD	LOG	251. 2	1275. 6	93. 6R	1182. 0R	QTB			20. 6	1979	
11. 19. 13. CCC	OBS	82. 3	1271. 9	49. 4	1222. 5		10. 7	82. 3			
11. 19. 14. CCD	LOG	253. 9	1277. 1			QTB, TIV			21. 1		
11. 19. 17. AAB	OBS	262. 1	1289. 0	99. 7R	1189. 3R	QTB	99. 7	262. 1	17. 2	1979	43. 1
11. 19. 19. ADA			1269. 5	60. 4	1209. 1						
11. 19. 19. DAA	LOG	245. 4	1263. 4			QAL, QTB, TIV			17. 2	CHEM	
11. 19. 19. DAD	OBS	169. 2	1263. 4	45. 7	1217. 7	QAL, QTB, TIV					
11. 19. 20. DDD			1267. 4						22. 2		
11. 19. 21. BCC	OBS	327. 7	1268. 6	62. 2	1206. 4		157. 0	327. 7	22. 2		52. 8
11. 19. 21. CDD		163. 1	1270. 1						26. 1		
11. 19. 23. ABC	LOG	223. 7	1268. 0			QTB, TIV	149. 4	223. 7	20. 6		60. 0
11. 19. 26. ACC	LOG	254. 5	1279. 2	60. 4	1218. 8	QTB, TIV			26. 1	CHEM	
11. 19. 26. CDD	LOG	338. 9	1283. 5			QTB, TIV			26. 1		
11. 19. 26. DCC	LOG	226. 2	1283. 5			QTB, TIV			17. 2		
11. 19. 26. DCD	LOG	227. 7	1283. 5			QTB, TIV			17. 8		
11. 19. 27. BCD	LOG	202. 7	1275. 6	51. 8	1223. 8	QTB, TIV					
11. 19. 27. BDD	LOG	329. 8	1277. 1	56. 7	1219. 3	QTB, TIV			23. 9		
11. 19. 30. CD	LOG		1268. 0	42. 7R	1225. 3R	QAL, TIV			23. 9	1978	
11. 19. 31. ACC	LOG	365. 8	1272. 2			TIV	170. 7	184. 4	22. 2	1977	72. 1
11. 19. 31. ADD	OBS	106. 7	1279. 6	45. 4	1234. 2	QAL, TIV			16. 7		
11. 19. 31. CCB			1277. 1						18. 3		
11. 19. 31. CDD		198. 1	1282. 3						28. 3		
11. 19. 31. DCD		123. 4R	1284. 7						24. 4		

11.19.31. DDD		144.8R	1290.8						28.3		
11.19.32. AAD			1274.1	54.3	1219.8						
11.19.33. BDD	LOG	336.2	1278.6			TIV			30.0		
11.19.33. DDD		190.5	1291.7						31.1	CHEM	
11.19.35. ACD	LOG	277.4	1287.8	54.9R	1232.9R	QTB,TIV	152.4	277.4	17.2		36.3
11.19.35. DDC		294.1	1293.9	61.0R	1232.9R				24.4		
11.19.36. DCC			1291.4						22.2		
11.19.36. DCD	LOG	137.2	1289.3	47.2	1242.1	QAL, QTB,TIV	47.2	137.2	18.3	CHEM	96.5
11.20.10. DCC	OBS	76.2	1272.5	47.9	1224.6	QTB				1978	
11.20.21. ABC	OBS	46.9	1269.2	22.9	1246.3	QTB	6.1	46.9			
11.20.21. DCB	OBS	85.3	1270.4	26.8	1243.6	QTB	48.5	85.3	18.9	CHEM	142.0
11.20.29. BCC			1271.0	27.4	1243.6				13.9		
11.20.29. BDA		61.0	1271.0						12.8		
11.20.29. BDD			1272.2	27.1	1245.1						
11.20.29. CDD	OBS	106.7	1276.8	29.9	1246.9	QTB	29.9	106.7	16.1		98.1
11.20.29. DAA			1274.1	30.2	1243.9				14.4		
11.20.30. ABC		62.5	1268.0	12.5	1255.5						
11.20.30. DDD	LOG	255.4	1275.3	40.2	1235.1	QTB,TIV	76.2	152.4			
							252.1	255.4			
11.20.31. AAD	LOG	232.6	1277.1	39.6	1237.5	QTB,TIV	39.6	232.6	15.0		41.1
11.20.31. DAB	LOG	304.8	1280.2	42.7	1237.5	QTB,TIV	42.7	304.8	15.6		35.7
11.20.31. DDD			1287.8						15.0		
11.20.32. BAD	LOG	60.4	1278.9			TIV	50.9	60.4	17.8		150.9
11.20.32. CAD	LOG	105.1	1284.4	39.3	1245.1	QTB			15.0		
11.20.32. CCC	OBS	112.5	1286.6	49.7	1236.9		8.2	112.5			
11.20.33. ADA	LOG	310.9	1289.0	57.0	1232.0	P	48.8	182.9	22.8R		
							219.5	310.9			
11.20.33. DAD	OBS	207.3	1287.8	54.9	1232.9						
11.20.34. ACD			1292.0						18.9		
11.20.34. CAB		309.4R	1294.2	61.0R	1233.0R						
11.21.02. DDD			1332.0			QTB			16.7		
11.21.05. DDD	OBS	134.7	1299.1	127.4	1171.7	QTB	127.4	134.7	18.3	CHEM	67.9
11.21.11. ADA	OBS		1336.5	143.0	1193.5	QTB			16.1	CHEM	
11.21.14. AAD			1345.7			QTB			16.7		
11.21.23. CBB		225.6R	1338.1	146.3R	1191.8R	QTB					
11.21.23. DA		320.0R	1333.5	140.2R	1193.3R	QTB					
11.21.26. DAD			1333.5						16.1		
11.21.33. BBB			1317.7						17.2		
11.21.36. AAA			1329.8						17.2		

TABLE 2. CONTINUED

LOCATION	DATA BASE	TOTAL DEPTH (M)	SURFACE ELEV (M)	DEPTH TO WATER (M)	WATER LEVEL (M)	AQUIFER	OPEN TOP (M)	HOLE BTM (M)	TEMP (C)	NOTES	HYDROTHERMAL GRADIENT C/KM
12. 18. 01. BAB		230. 1	1271. 0	+	+	TIV			36. 7		
12. 18. 01. BAD		7. 9	1274. 1	7. 3	1266. 8	GAL			19. 4		
12. 18. 04. ABD	LOG	259. 1	1285. 0	+	+	TIV	137. 1	259. 1	32. 2	CHEM	
12. 18. 12. BAB		32. 0R	1287. 8	6. 4R	1281. 4R	GAL					
12. 18. 12. CBB		27. 4R	1292. 4			GAL			22. 8	CHEM	
12. 18. 13. BCC		29. 0R	1298. 4	3. 7R	1294. 7R	GAL					
12. 18. 24. BAB	LOG	173. 7	1328. 9			TIV	20. 4	111. 3	24. 4		227. 8
12. 18. 24. BBB		243. 8R	1316. 7			GAL, TIV			22. 8		
12. 18. 24. BCC		14. 6	1310. 6	3. 0	1307. 6	GAL					
12. 19. 02. ACD		365. 8R	1306. 4						31. 1		
12. 19. 02. BBC	OBS	228. 6	1300. 9	96. 0	1204. 9						
12. 19. 02. DAA	LOG	198. 1	1304. 5	76. 2R	1228. 3R	TIV	100. 6	192. 0	33. 9		167. 0
12. 19. 03. ACD		274. 3R	1306. 4						29. 4R		
12. 19. 05. CBD	LOG	304. 8	1309. 1	57. 3R	1251. 8R	TIV	156. 1	170. 7	35. 6		
							248. 4	262. 1			
							298. 7	304. 8			
12. 19. 06. ADD	LOG	245. 1	1298. 4			TIV	138. 4	245. 1	35. 6		137. 0
12. 19. 06. DCB	LOG	231. 6	1306. 7			GAL, TIV	6. 1	231. 6	25. 0	CHEM	
12. 19. 06. DDD	LOG	234. 1	1316. 7	62. 5R	1254. 2R	TIV	62. 5	85. 3	35. 0		
							173. 7	176. 8			
							221. 0	234. 1			
12. 19. 07. ACB	LOG	243. 8	1321. 9			TIV	162. 2	169. 2	31. 1		
							196. 0	202. 4			
							212. 1	239. 3			
12. 19. 12. CDB			1327. 4						35. 0		
12. 19. 24. BBA	LOG	244. 1	1350. 3	85. 3R	1265. 0R	TIV			33. 9	CHEM	
12. 20. 01. BDD	LOG	579. 1	1309. 1	81. 4R	1228. 3R	QTB, TIV				1975	
12. 20. 03. CAC	LOG	204. 2	1319. 8			TIV	190. 5	204. 2	32. 2	CHEM	116. 0
12. 20. 03. CDD		457. 2R	1321. 3						32. 2		
12. 20. 04. DCC	LOG	414. 5	1319. 8			TIV, P	185. 0	191. 1	30. 0	CHEM	
							330. 1	335. 3			
12. 20. 05. CCD	LOG	274. 3	1319. 8	111. 3R	1208. 5R	P	221. 0	236. 2	23. 3	CHEM	60. 8
12. 20. 05. DBD		178. 3	1316. 7			P			26. 1		
12. 20. 06. BBD			1292. 4						38. 9	CHEM	

12.20.06.BCC			1304.8						35.0	
12.20.11.ADC	LOG	487.7	1322.2			QTB,TIV	67.4	308.5	29.4R	1975
							347.2	397.8		
							417.6	487.7		
12.20.11.CCD	LOG	274.3	1332.0			TIV	262.1	274.3	31.1R	
12.20.12.DCC1	LOG	313.9	1330.8			TIV	83.8	105.2	26.7R	
							144.8	182.3		
12.20.12.DCC2	LOG	363.6	1330.8	112.8R	1218.0R	TIV			31.1R	
12.20.25.BCA	OBS	361.2	1409.7	87.8	1321.9	P	242.3	361.2		
12.21.01.AAA		306.6R	1324.4						24.4	CHEM
12.21.02.DAA	OBS	285.3	1329.2	121.6	1207.8	TIV	276.5	285.3		
12.21.08.CCC			1327.7						13.9	CHEM
12.21.18.CBC	LOG	533.4	1328.9	82.3R	1246.6R	TIV	349.0	351.1		1973
12.21.19.DCC		381.0R	1365.5						38.9	CHEM
12.21.25.CCC	OBS	364.5	1344.2	106.4	1237.8	TIV	57.3	364.5		
12.21.28.BDD		304.8R	1350.3						18.3	CHEM
12.21.31.BDB	LOG	392.3	1396.0	112.2R	1283.8R	P	362.4	364.8	32.2R	1974

* HYDROTHERMAL GRADIENT (DEG °C/KM): NOT A TRUE THERMAL GRADIENT. RATIO OF TEMPERATURE OF PRODUCED WATER LESS MEAN ANNUAL AIR TEMPERATURE (9.4 DEG °C) TO MEAN DEPTH OF OPEN HOLE.

DATA FOLLOWED BY LETTER "R" ARE EITHER REPORTED BY WELL OWNERS OR NOTED IN DRILLERS' LOGS.

WATER LEVELS MEASURED NEAR END OF PUMPING SEASON, AUGUST-SEPTEMBER, 1980. REPORTED WATER LEVELS ARE FALL 1980 VALUES UNLESS DATED IN NOTE COLUMN; CROSSES INDICATE FLOWING HOLES.

CHEM INDICATES LOCATIONS OF CHEMICAL SAMPLES TAKEN FOR THIS STUDY.

QAL = QUATERNARY VALLEY FILL, LOESS, AND MOUNTAIN FRONT FAN DEPOSITS
QTB = QUATERNARY AND TERTIARY BASALT OF SNAKE RIVER PLAIN AND PRE-BASALT FAN DEPOSITS
TIV = TERTIARY IDAVADA VOLCANIC ROCKS AND MIOCENE FAN DEPOSITS
P = PALEOZOIC MARINE ROCKS

TABLE 3. Water Analysis, Artesian City Area

a. Rock Creek Hills: Cold Springs

ESL Sample No.	6	9	38	42	43	44	88	89
Reference[a]	This study	This study	1	1	1	1	This study	This study
Location[b]	12.18.34.abb	15.19.5.ca	13.19.8.c	14.18.10	14.20.22	14.21.16.b	12.20.32.ccd	13.18.10.db
Name	Shellrock	F. S. Spring					Mike's Cabin	Fifth Fork Spring
Well Depth(m)	SPRING	SPRING	SPRING	SPRING	SPRING	SPRING	SPRING	SPRING
Temperature(°C)	16.7	5.0	15.6	11.1	4.4	11.1	8.9	25.6
pH	7.4	6.9	7.2	6.4	6.2	7.3	6.7	7.8
Concentrations (mg/l)								
Total Dissolved Solids	190	105	121	91	81	183	192	161
SiO_2	46.9	42.7	42	67	49	50	43	15
Na	11	3	7.4	2.5	4.6	18	10	8
K	2.50	3	2.1	4.7	1.9	1.6	6	3
Ca	22	3	21	3.4	1.8	25	7	18
Mg	4	1	3.7	0.4	0.00	5.9	3	6
Al	0.6	<0.625					<0.625	<0.625
CO_3								
HCO_3	82	23	98	25	15	109	69	122
SO_4	9	3	3.5	2.0	0.6	13	7	5
Cl	6	6	1.0	1.5	1.0	1.7	11	6
F	0.2	0.1	0.2	0.4	0.1	0.2	0.2	0.2
NO_3			0.1	1.0	2.8	1.0		
Fe	0.28	<0.025	0.00	0.04	0.01	0.01	0.09	<0.025
PO_4								
B	<0.125	<0.125					<0.125	<0.125
Li	<0.050	<0.050					<0.050	<0.050
Sr	0.09	0.02					0.05	0.45
Zn	0.2	<0.125					0.3	<0.125
Sn	0.2	<0.125					<0.125	<0.125
W	<0.125	<0.125					<0.125	<0.125
Geothermometers (°C)								
T(Na-K-Ca)[c]	34	63	27	72	64	25	80	39
T(Na-K-Ca-Mg)[d]				72			62	
T(Alpha-Crst.)[e]	49	44	44	65	50	51	45	
T(Chalcedony)[e]								
T(Quartz,Cond.)[e]								53
Collection Date[f]	8/7/80	8/7/80	9/4/56	9/1/56	9/1/56	9/1/56	8/27/80	8/26/80

Water Analysis, Artesian City Area

b. Rock Creek Hills: Non-Thermal Wells

ESL Sample No.	5	12	16	18	31	40	65	78
Reference[a]	This study	1,2	1,2	1,2	1	1	3	This study
Location[b]	12.18.12.cbb	11.19.21.da	12.19.6.cd	13.21.6.aa	11.20.26.ab	13.21.21.b	14.17.5.ba	12.20.5.cdc
Name	Crockett							Tugaw
Well Depth(m)	UNKNOWN	163	369	UNKNOWN	147	18	UNKNOWN	274
Temperature(°C)	22.8	26.7	27.2	22	18.9	16.7	11.1	23.0
pH	7.4	7.5				7.3	7.4	7.8
Concentrations(mg/l)								
Total Dissolved Solids	206	191	186	206	229	171		148
SiO_2	38.4	71	77	62	66	50		13
Na	11	21[g]	19[g]	17[g]	21[g]	6.6	28	11
K	5					8.3	6.3	5
Ca	24	22	19	29	36	26	22	24
Mg	3	3.9	3.6	8.6	8.7	4.9	7.1	8
Al	<0.625							<0.625
CO_3				12				
HCO_3	109	108	93	119	164	130	148	151
SO_4	18	9.5	8.2	13	13	2.8	10	11
Cl	5	12	12	6.2	16	3.5	11	10
F	0.4	0.4	1.9			0.2		0.4
NO_3		0.6			1.2	0.3	1.2	
Fe	<0.025			0.07		0.01		<0.025
PO_4								
B	0.125						0.07	<0.125
Li	0.050							<0.050
Sr	0.28							0.38
Zn	<0.125							<0.125
Sn	<0.125							0.2
W	<0.125							<0.125
Geothermometers(°C)								
T(Na-K-Ca)[c]	50					58	68	50
T(Na-K-Ca-Mg)[d]								
T(Alpha-Crst.)[e]	40	68	72	62	65	51		
T(Chalcedony)[e]								
T(Quartz,Cond.)[e]								48
Collection Date[f]	8/6/80	5/17/54	9/26/52	4/22	52	9/4/56	1/18/57	8/24/80

~~TABLE 3 Cont.~~. Water Analysis, Artesian City Area

c. Rock Creek Hills: Thermal Water

ESL Sample No.	3	4	10	11	13	14	15	17
Reference[a]	This study	This study	2,3	2,4	1,2	1,2	1,2	1,2
Location[b]	11.18.34.dca	12.18.4.abd	12.17.31.ab	13.17.6.ab	11.19.33.dd	11.20.34.cc	12.18.1.bb	12.20.5.cc
Name	Gray	Davis						
Well Depth(m)	UNKNOWN	UNKNOWN	SPRING	UNKNOWN	191	>74	230	91
Temperature(°C)	35.6	32.2	37.2	36	32.2	31.1	37.8	28.4
pH	7.5	7.8	7.7	7.6	7.6	7.5	7.6	
Concentrations(mg/l)								
Total Dissolved Solids	194	180	275	241	195	209	168	175
SiO_2	53.4	53.4	22		59	28	60	18
Na	17	17	41	44	15	11	17	229
K	8	7	10	11.7	8.0	7.4	5.4	
Ca	17	17	33	28	25	43	17	29
Mg	2	2	14	13	4.1	8.9	2.1	8.2
Al	<0.625	<0.625						
CO_3								
HCO_3	85	94	270	252	118	186	90	160
SO_4	7	6	16	15	11	13	6.3	9.7
Cl	10	11	5	5	13	4.5	9.0	9.0
F	0.6	0.7	1.9		0.4	0.7	0.6	
NO_3			0.1	0.0	1.6	0.6	4.8	0.6
Fe	<0.025	<0.025			0.03	0.05	0.00	
PO_4								
B	<0.125	<0.125			0.03	0.05	0.07	
Li	<0.050	<0.050						
Sr	0.14	0.16						
Zn	<0.125	<0.125						
Sn	<0.125	<0.125						
W	<0.125	0.5						
Geothermometers(°C)								
T(Na-K-Ca)[c]	76	71	78	88	66	51	63	
T(Na-K-Ca-Mg)[d]	76	71	53	48				
T(Alpha-Crst.)[e]	54	54			59		60	
T(Chalcedony)[e]						45		
T(Quartz,Cond.)[e]			67					60
Collection Date[f]	8/5/80	8/5/80	8/31/56	8/18/61	9/25/52	9/25/52	3/21/52	9/25/52

ESL Sample No.	53	54	55	77	79	82	84	86	87
Reference[a]	5	5	5	This study	This study	This study	This study	This study	This study
Location[b]	11.19.33.ddd	12.17.31.bab	12.18.1.bba	12.19.24.bba	12.20.6.bbd	12.21.19.dcc	11.19.33.ddd	12.20.3.cac	12.20.4.dcc
Name		Nat-Soo-Pah		Tugaw	Coiner	Van Tassell	Degner	Yamane	Yamane
Well Depth(m)	189	SPRING	236	244	UNKNOWN	UNKNOWN	UNKNOWN	204	415
Temperature(°C)	33.0	36.0	38.0	33.9	39.0	39.0	31.0	32.2	30.0
pH	6.6	7.6	7.6	7.5	7.9	7.7	7.3	7.7	7.2
Concentrations(mg/l)									
Total Dissolved Solids	209	280	176	168	218	192	162	196	160
SiO_2	63	19	67	47	15	13	43	15	23
Na	17	43	16	13	21	7	14	12	7
K	8.6	11	6	6	9	4	7	6	3
Ca	27	34	18	16	25	31	23	34	23
Mg	3.9	14	2	3	6	6	3	10	6
Al				<0.625	<0.625	<0.625	<0.625	<0.625	<0.625
CO_3									
HCO_3	118	266	95	93	173	157	118	198	115
SO_4	12	18	9.3	9	12	12	11	15	9
Cl	15	8	8	16	9	8	18	11	11
F	0.3	1.9	0.6	0.3	0.8	0.3	0.3	0.6	0.3
NO_3	1	0.02	0.63						
Fe				<0.025	<0.025	<0.025	<0.025	0.04	<0.025
PO_4	0.04	0.01	0.26						
B				<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Li				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Sr				0.15	0.55	0.61	0.26	0.37	0.15
Zn				<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Sn				<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
W				<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
Geothermometers(°C)									
T(Na-K-Ca)[c]	68	81	65	65	73	36	63	50	34
T(Na-K-Ca-Mg)[d]		54			73				
T(Alpha-Crst.)[e]	62		65	49			45		
T(Chalcedony)[e]									37
T(Quartz,Cond.)[e]		62			53	48		53	
Collection Date[f]	5/25/72	7/25/72	7/25/72	8/25/80	8/23/80	9/4/80	9/6/80	9/4/80	9/4/80

TABLE 3 Cont. Water Analysis, Artesian City Area

(9)

d. Lowlands

ESL Sample No.	1	2	7	8	24	26	27	28
Reference[a]	This study	This study	This study	This study	1	1	1	1
Location[b]	11.18.1.abb	11.18.28.bbb	11.19.26.acc	12.19.6.caa	11.19.18.da	11.19.26.ad	11.19.30.dc	11.19.30.dc
Name	Schroth	O'Marra	Savage	Creed Concern				
Well Depth(m)	85	46	255	UNKNOWN	131	48	91	213
Temperature(°C)	17.8	16.7	26.1	25.0		16.7	12.8	11.7
pH	8.1	7.8	7.6	7.9	7.6	7.3	7.4	7.4
Concentrations(mg/l)								
Total Dissolved Solids	376	324	290	282	854	266	731	806
SiO_2	29.9	46.9	51.2	66.2	58	60	57	56
Na	34	23	23	21	72[g]	20[g]	65	72
K	3	6	12	9			12	12
Ca	47	45	40	39	138	38	134	149
Mg	29	10	7	5	34	11	20	23
Al	<0.625	<0.625	<0.625	<0.625				
CO_3								
HCO_3	259	145	132	103	240	120	248	276
SO_4	50	37	31	29	223	30	252	270
Cl	33	30	33	28	144	37	60	78
F	0.7	0.4	0.6	0.5	0.2	0.2	0.3	0.2
NO_3					9.7	1.1	8.3	10
Fe	<0.025	<0.025	<0.025	<0.025			0.05	0.04
PO_4								
B	<0.125	<0.125	<0.125	<0.125			0.06	0.06
Li	<0.050	<0.050	<0.050	<0.050				
Sr	0.33	0.20	0.43	0.18				
Zn	0.7	<0.125	<0.125	0.5				
Sn	<0.125	<0.125	<0.125	<0.125				
W	<0.125	<0.125	<0.125	<0.125				
Geothermometers(°C)								
T(Na-K-Ca)[c]	35	51	74	64			60	58
T(Na-K-Ca-Mg)[d]			74					
T(Alpha-Crst.)[e]	29	49	53	65	58	60	58	57
T(Chalcedony)[e]								
T(Quartz,Cond.)[e]								
Collection Date[f]	8/7/80	8/5/80	8/7/80	8/7/80	5/17/54	5/17/54	9/26/52	9/26/52

32	34	41	57	58	59	60	61
1	1	1	3	3	3	3	3
11.20.29.cd	11.22.25.bc	13.22.21.cc	11.17.9.ca	11.17.16.ba	11.17.23.cc	11.17.23.dc	11.17.25.bb
107	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
16.1	11.1	11.1	16.7	21.1	14.5	14.5	17.8
7.8	7.7	7.2	8.0	8.1	8.1	8.0	8.1
547							
38							
29[9]	12	17	213	78	182	38	111
	6	1.5	10	3.9	11	9.4	12
96	55	56	74	34	113	48	132
29	12	25	92	33	94	11	51
					6		
175	163	69	328	136	320	123	196
68	24	8.3	458	135	466	72	320
141	40	17	190	70	226	50	182
0.1	2.1	2.2	0.2				
10	3	3.6	34	6.8	15	6.8	16
	0.0	0.12		0.16	0.30	0.00	0.14
	41	11	78	55	71	67	65
			i		i		
39							
5/17/54	5/1/59	5/1/59	8/31/56	1/18/57	1/18/57	1/18/57	1/18/57

TABLE 3 Cont. Water Analysis, Artesian City Area

d. Lowlands (Cont.)

ESL Sample No.	62	63	66	67	68	69	70	72
Reference[a]	3	3	4	4	4	4	4	This study
Location[b]	11.17.28.aa	12.17.18.cc	11.17.23.ad	11.17.25.dd	11.17.26.ab	12.17.17.bc	12.17.18.dd	11.18.8.add
Name								Savage
Well Depth(m)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	88
Temperature(°C)	15.6	12.2	19	17	21	14	13	13.3
pH	8.0	7.7	7.6	7.7	7.4	7.5	7.5	7.9
Concentrations(mg/l)								
Total Dissolved Solids					466	768	736	604
SiO_2								34
Na	70	107	69	41	53	106	117	79
K	6.3	13	10.2	10.9	10.9	22	21	5
Ca	54	135	68	59	85	78	61	62
Mg	28	42	25	7.1	13.7	51	50	32
Al								<0.625
CO_3								
HCO_3	121	323	156	149	162	288	312	335
SO_4	104	167	164	90	130	211	194	164
Cl	113	168	89	50	83	136	126	50
F								0.5
NO_3	14	57	8.7	6.2	9.9	22	13.6	
Fe								<0.025
PO_4								
B	0.14	0.16	0.00	0.00	0.00	0.00	0.15	0.2
Li								<0.050
Sr								0.44
Zn								<0.125
Sn								<0.125
W								<0.125
Geothermometers(°C)								
T(Na-K-Ca)[c]	59	67	69	68	64	96	196	51
T(Na-K-Ca-Mg)[d]						30	i	
T(Alpha-Crst.)[e]								35
T(Chalcedony)[e]								
T(Quartz,Cond.)[e]								
Collection Date[f]	1/18/57	1/18/57	6/8/61	12/7/60	6/8/61	6/8/61	6/8/61	8/26/80

73	74	75	76	81	83
This study	This study	This study	This study	This study	This study
11.19.19.daa	11.19.36.dcd	11.21.5.dad	11.21.11.ada	12.21.8.ccc	12.21.28.bdd
Savage	Kirkpatrick	Bradshaw	Carter	Ore-Ida	Van Tassell
245	137	135	UNKNOWN	UNKNOWN	UNKNOWN
17.0	18.0	18.3	16.1	14.0	18.3
7.7	7.4	7.4	7.7	7.7	7.3
872	562	244	474	286	360
44	49	34	34	34	21
50	36	19	25	8	13
10	13	5	7	4	3
151	81	36	85	54	57
27	15	15	16	9	7
<0.625	<0.625	<0.625	<0.625	<0.625	<0.625
266	171	150	246	192	143
226	78	42	67	23	38
151	124	40	74	37	62
0.2	0.3	0.2	0.3	0.2	
0.04	<0.025	<0.025	<0.025	<0.025	<0.025
<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
0.71	0.74	0.26	0.37	0.39	0.36
<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
<0.125	<0.125	<0.125	<0.125	<0.125	<0.125
50	66	48	44	28	24
56	50	35	35	35	
					33
8/22/80	8/23/80	8/25/80	8/25/80	9/4/80	9/4/80

TABLE 3 Cont. Water Analysis, Artesian City Area

e. Other

ESL Sample No.	30	80	85
Reference[a]	1	This study	This study
Location[b]	11.20.10.dc	12.21.1.aaa	11.20.21.dcb
Name		Cheney	Simplot
Well Depth(m)	55	UNKNOWN	85
Temperature(°C)	13.9	24.4	15.0
pH	7.7	7.8	7.6
Concentrations(mg/l)			
Total Dissolved Solids	676	300	542
SiO_2	47	53	30
Na	137[g]	31	51
K		10	6
Ca	54	30	66
Mg	36	3	34
Al		<0.625	<0.625
CO_3			
HCO_3	426	170	435
SO_4	127	15	77
Cl	59	23	43
F	0.3	1.2	0.6
NO_3	20		
Fe		<0.025	0.03
PO_4			
B		<0.125	<0.125
Li		<0.050	<0.050
Sr		0.16	0.49
Zn		<0.125	0.5
Sn		<0.125	<0.125
W		<0.125	<0.125
Geothermometers(°C)			
T(Na-K-Ca)[c]		77	51
T(Na-K-Ca-Mg)[d]		77	
T(Alpha-Crst.)[e]	49	54	30
T(Chalcedony)[e]			
T(Quartz,Cond.)[e]			
Collection Date[f]	5/17/54	8/25/80	9/4/80

FOOTNOTES TABLE 3, a to e

[a] Reference: 1) Crosthwaite, 1969a; 2) Ross, 1971; 3) Fowler, 1960; 4) Crosthwaite, 1969b; 5) Young and Mitchell, 1973

[b] All wells and springs are located south of the Idaho Baseline and east of the Meridan.

[c] Calculated using the methods of Fournier and Truesdell (1974)

[d] Calculated using the methods of Fournier and Potter (1979)

[e] Calculated using the methods of Fournier (1977)

[f] Month/day/year or month/year

[g] Na+K

[h] Elements analyzed for but present at concentrations less than ICPQ limits of quantitative detection (Christensen and others, 1980) include: Ti, P, Ba, V, Cr, Mn, Co, Ni, Cu, Mo, Pb, Zn, Cd, Aq, Au, As, Sb, Bi, U, Te, Be, Zr, La, Ce, Th.

[i] R>50, therefore it is assumed that the water comes from a relatively cool underground environment at a temperature approximately equal to the measured water temperature, irrespective of a high calculated Na-K-Ca temperature (Fournier and Potter, 1979).

TABLE 4. Water Analysis, Oakley Area

ESL Sample No.	19	20	21	22	23	50	51	52
Reference[a]	1,2	1,2	1,2	1,2	1,2	1	3	3
Location[b]	14.21.34.ab	14.21.4.b	15.21.25.dc	14.22.27.dd	14.22.27.dd	15.22.18.c	14.21.34.bdc	14.22.27.dcb
Name								Oakley Warm
Well Depth (m)	300	260	742	UNKNOWN	UNKNOWN	SPRING	UNKNOWN	SPRING
Temperature (°C)	44.5	41.1	41.7	45.6	48.9	18.9	43.0	47.0
pH					9.4	7.9	8.0	9.6
Concentrations (mg/l)								
Total Dissolved Solids	198	180	344	308	295	312	210	295
SiO_2	79	45	64	78	76	82	47	70
Na	41[g]	43[g]	106[g]	84[g]	87	24	44	87
K					2.5	11	9.6	2.2
Ca	5	9.4	4.0	2.7	2.1	45	14	2.7
Mg	1.4	1.5	1.2	0.9	0.0	6.7	1.1	0
Al								
CO_3	23	3	46	19	16			29
HCO_3	61	98	159	69	67	169	144	43
SO_4	12	27	22	26	23	14	15	22
Cl	4.8	11	17	52	54	40	7	53
F					6.8	0.1	1.3	8
NO_3	tr	tr	tr	0.23	0.1	1.4	0.01	0.04
Fe	0.05	0.06	0.07	0.06	0.01			
PO_4							0.01	0.03
B					0.1			
Li								
Sr								
Zn								
Sn								
W								
Geothermometers (°C)								
T(Na-K-Ca)[c]					128	69	97	92
T(Na-K-Ca-Mg)[d]							97	
T(Alpha-Crst.)[e]	74	47	63	73	72	76	49	68
T(Chalcedony)[e]								
T(Quartz, Cond.)[e]								
Collection Date[f]	3/22	3/22	3/22	12/21	9/3/56	9/3/56	7/26/72	10/26/72

a Reference: (1) Crosthwaite, 1969a; (2) Ross, 1971; (3) Young and Mitchell, 1973.

b All wells and springs are located south of the Idaho Baseline and east of the Meridan.

c Calculated using the methods of Fournier and Truesdell (1974).

d Calculated using the methods of Fournier and Potter (1979).

e Calculated using the methods of Fournier (1977).

f Month/day/year or month/year

g Na+K

h Elements analyzed for but present at concentrations less than ICPQ limits of quantitative detection (Christensen and others, 1980) include: Ti, P, Ba, V, Cr, Mn, Co, Ni, Cu, Mo, Pb, Zn, Cd, Aq, Au, As, Sb, Bi, U, Te, Be, Zr, La, Ce, Th.