

# WELL CONSTRUCTION SUMMARY

LOCATION or COORDS: 6N 50E 27ac

ELEVATION: GROUND LEVEL 5522

TOP OF CASING 5521

## DRILLING SUMMARY:

TOTAL DEPTH 505' 2 1/2"  
 BOREHOLE DIAMETER 12 1/4" reamed to 17 1/2"  
 DRILLER Dennis Mitchell  
 RIG CP-RT-1800  
 BIT(S) 12 1/4" tricone 17 1/2" hdeopen r tricone  
 DRILLING FLUID benzoinic  
 SURFACE CASING 22" ID TD 36' 7"  
26" x 26" line pipe

## WELL DESIGN:

BASIS: GEOLOGIC LOG  GEOPHYSICAL LOG   
 CASING STRING(S): C=CASING S=SCREEN  

0 - 325	C	-
325 - 345	S	-
345 - 365	C	-
365 - 405	S	-
405 - 425	C	-
425 - 485	S	-
485 - 505	C	-

CASING: C1 0 - 325  
 C2 345 - 365  
 C3 405 - 425  
 C4 485 - 505  
 SCREEN: S1 325 - 345  
 S2 365 - 405  
 S3 425 - 485  
 S4

CENTRALIZERS 105' 205' 365' 405'

FILTER MATERIAL 8-12 rounded, washed aggregate free sand, 1/4" - 3/8" gravel  
 CEMENT grout - benzoinic + cement 7:1  
 OTHER

## CONSTRUCTION TIME LOG:

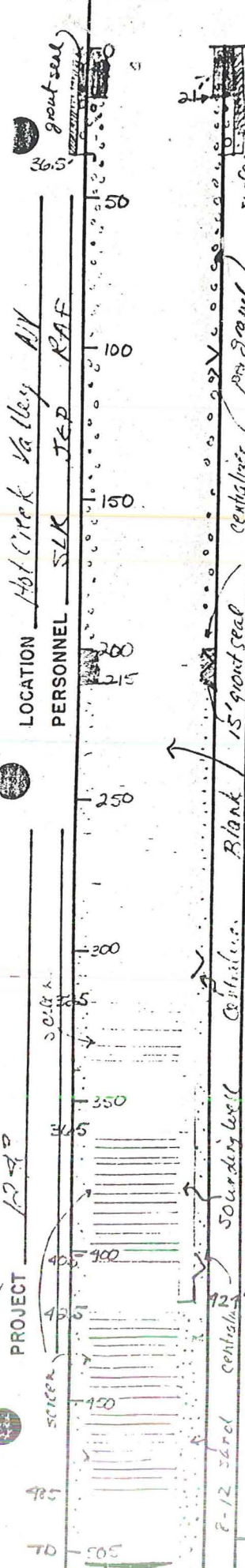
TASK	START		FINISH	
	DATE	TIME	DATE	TIME
DRILLING: pilot	8-27	1020	8-28	2008
(surface) reamed	8-29	0100	8-29	0352
(pilot) reamed	8-29	2250	8-30	1950
GEOPHYS. LOGGING:	8-28	2205	8-28	2300
CASING: surface 22"	8-29	0900	8-29	0920
test 10"	8-31	1200	9-1	1940
Gravel pack 8-12	9-2	1845	9-2	5200
FILTER PLACEMENT: 5' gravel	9-3	0900	9-3	0945
CEMENTING:	9-3	0200	9-3	0230
DEVELOPMENT:	9-3	1200	9-3	1940
OTHER:				

## WELL DEVELOPMENT

Airlift at 320' to 430' with <20 ppm muddy, random lugs  
 Airlift at 450', >600 ppm for 2 hrs  
 Airlift 470' to 502' ~ 700 ppm for 2 hrs with water very opaque some sand still suspended.

## COMMENTS:

test casing: black 10" ID, 10 3/4" O.D. 3/8" SW (10.725 OD x 0.362) ~20' old - 90' sections screen 60 mesh Johnson 10' 2.0" ID, 2 1/2" O.D. 1/4" SW observation 2" ID, 2 1/2" O.D. 1/4" SW, work 21', 21' filter cut, standard 1/2 x 3" 9 joint in 6" cups reaming



LOC. or COORDS. <u>6N/50E 27ac</u>	DRILLER <u>Dean Mitche</u>	START DATE <u>8-27-80</u>	FINISH DATE <u>8-28-80</u>
GROUND ELEV. <u>5,522 ft</u>		TIME <u>1030</u>	<u>2:00?</u>
TOTAL DEPTH <u>510 ft</u>	RIG <u>CP RT-1800</u>	GEOPHYS. LOG <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
BOREHOLE DIAM. <u>1 1/4 inch pilot</u>	BIT(S) <u>1 1/4 inch Tricone</u>	HOW LEFT <u>closed</u>	
	FLUID <u>Bentonite</u>		

LOCATION Hwy 20, Valley, Idaho  
LOGGED BY FAV

PROJECT 012-20 Shallow Aquifer  
11/1/80

DEPTH	PENE RATE	CIRC RET LOSS	AIRLIFT Q (gpm)	MATERIAL	SYM-BOL	DESCRIPTION and COMMENTS
0'				Gravel w/ Sand		Gravel w/ Sand (0'-10' X) brn (u7.0YR 5/2) (d7.5YR 7/2) cl to f sd 40% (carb 22%, Qz 10%, f to v. f. frag) gul 60%, up to 1mm (carb 9%, Qz 5%) ps; sd-subang to md; gul-ang to submd; str. class; n. pi; not silty; no conc. mod HCl rxn.
10'	40 4/hr			Gravel w/ Sand		Gravel w/ Sand (10'-20' X) brn (u7.5YR 7/4) (d7.5YR 7/4) cl 10%; c to f sd 20% (carb 20%, Qz 20%, minor constituents 5%) gul 70%, up to 200 mic (carb 85%, minor constituents 15%) ps; sd-ang to submd; gul-subang to submd; str. class; n. pi; not silty; no conc. mod HCl rxn. Ang. frags. mod. ind. of 2 hrs
20'	37 4/hr			Gravel w/ Sand		Gravel w/ Sand (20'-30') same as above; except sand increases to 30%, and gul decreases to 60%, gul up to 15 mm
30'	12 4/hr			Gravel w/ Sand		Gravel w/ Sand (30'-40') same as above except there is no cl, some increased to 40%, and gul size is up to 25 mm and angular to submd
40'				Gravel w/ Sand		Gravel w/ Sand (40'-50') same as above; sd 20%, gul 70% up to 20 mm
50'	50 4/hr			Gravel w/ Sand		Gravel w/ Sand (50'-60') same as above.
60'				Gravel w/ Sand		Gravel w/ Sand (60'-70') same as above - well rounded pieces of shale appearing in sample - 5 to 10 mm size. Qz in sand size fraction decreased to 10%, minor constituents including v. f. frags. increased to 20%.
70'				Gravel w/ Sand		Gravel w/ Sand (70'-80') same as above except gul decreases to 60%, sand increases to 40%. Shale pieces still present, but fewer in number.
80'				Gravel w/ Sand		
90'				Gravel w/ Sand		
100'	110 4/hr			Gravel w/ Sand		
110'				Gravel w/ Sand		
120'	120 4/hr			Gravel w/ Sand		
130'				Gravel w/ Sand		
140'				Gravel w/ Sand		
150'	50 4/hr			Gravel w/ Sand		
160'	40 4/hr			Gravel w/ Sand		
170'				Gravel w/ Sand		
180'				Gravel w/ Sand		
190'				Gravel w/ Sand		
200'				Gravel w/ Sand		



HC-57-2

LOC. or COORDS. <u>T601 R. 5th. sm 27th</u>	DRILLER <u>W. J. ...</u>	START DATE <u>8-27-80</u>	FINISH DATE <u>8-28-80</u>
GROUND ELEV. <u>5522.54</u>		TIME <u>1030</u>	<u>208</u>
TOTAL DEPTH <u>510 ft</u>	RIG <u>CPT-1200</u>	GEOPHYS. LOG <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
BOREHOLE DIAM. <u>1 1/4 inch</u>	BIT(S) <u>1 1/4 inch</u>	HOW LEFT <u>open</u>	
	FLUID <u>Water</u>		

LOCATION Hot Creek Valley, Nevada  
 LOGGED BY R.E.S.

PROJECT QUS-20  
 DATE 8-27-80

DEPTH	PENE RATE	CIRC RET LOSS	AIRLIFT Q (gpm)	MATERIAL	SYM-BOL	DESCRIPTION and COMMENTS
60	54 ft/hr			Sand w/ Gravel		Sand w/ Gravel (80'-90') ( ) brn (7.5 YR 5/2) (d7.5 L 7/1) cs to f sd 70% (carb 60%, Qz 15%, minor constituents 25% includes vol. frags) gul 30%, up to 12mm (carb 80%, Qz (chert) 5%, minor constituents 15%), p.s.; sd-subang to subang; gul-ang to subang; structureless; n.p.; not stky; no consol; mod Hcl rxn. Any chips prob. indication of Bldrs.
70	73 ft/hr			Gravel w/ some Sand		Gravel w/ some Sand (90'-110') ( ) brn (7.5 YR 5/2) (d7.5 L 7/0) cs to med sd 25% (carb 20%, Qz 10%, minor constituents 20% includes stuffs) gul 75%, up to 10mm (carb 70%, Qz (chert) 5%, other constituents, including stuffs, 25%); m.s.; sd-subang to subang; gul-ang to subang; structureless; n.p.; not stky; no consol; mod Hcl rxn. Any chips prob. indication of Bldrs.
100	73 ft/hr			Gravel w/ some Sand		Gravel w/ some Sand (110'-120') same as above except sd increases to 35% and gul decreases to 65%.
110	73 ft/hr			Gravel w/ sand		(120'-130') no sample... Log indicates Bldrs.
120	65 ft/hr			Gravel w/ some Gravel		Gravel w/ some Gravel (130'-140') ( ) brn (7.5 YR 5/4) (d7.5 L 6/2) cs to med sd 35% (carb 20%, Qz 15%, minor constituents 15%), gul 65%, up to 17mm (carb 65%, chert 5%, tuff 20%, minor constituents 5%), m.s.; sd-subang to subang; gul-ang to subang; structureless; n.p.; not stky; no consol; mod Hcl rxn. Any chips prob. indication of Bldrs.
130	71 ft/hr			Gravel w/ sand		Sand w/ some Gravel (140'-150') ( ) brn (7.5 YR 5/2) (d7.5 L 7/0) cs to f sd 80% (carb 60%, Qz 20%, tuff 10%, other constituents 10%), gul 20%, up to 13mm (carb 50%, tuff 40%, chert 5%, other constituents 5%) p.s.; sd-subang to subang; gul-ang to subang; structureless; n.p.; not stky; no consol; mod Hcl rxn.
140	86 ft/hr			Sand w/ some Gravel		Sand w/ some Gravel (150'-160') same as above except sd increases to 85% and gul decreases to 15%.



HC-5-T-2

LOC. or COORDS. Trail, 2000  
 GROUND ELEV. 5,522 feet  
 TOTAL DEPTH 510 ft  
 BOREHOLE DIAM. 12 1/2 inch pilot

DRILLER Dave L...  
 RIG CDP-1200  
 BIT(S) 12 1/2 inch  
 FLUID Water

START DATE 7-27-80 FINISH DATE 8-28-80  
 TIME 120  
 GEOPHYS. LOG  YES  NO  
 HOW LEFT Open

LOCATION Trail, 2000  
 LOGGED BY [Signature]  
 PROJECT 12-3-70 Shallow Aquifer in Valley

DEPTH	PENE. RATE	CIRC. REC. LOSS	AIRLIFT Q (gpm)	MATERIAL	SYM-BOL	DESCRIPTION and COMMENTS
160'	26 9 1/4 hr			Sand w/ some gravel		Sand w/ some Gravel (140'-190') ( ) brn (w 7.5 YR 5/2) (d 7.5 YR 7/2) as to sd 85% carb 60%, Qz 20%, tuff 10%, minor constituents 10%, gul 15% up to 13mm (carb 50%, tuff 40%, chert 5%, other constituents 5%) ms; sd-subang. to subang; gul - ang to subang; structureless; n.p.; not sticky; no congl; mod HCl cm.
170'	16 3 hr			Sand w/ little gravel		Sand w/ little Gravel (170'-180') same as above except sd increases to 95% and gul decreases to 5%, gul size up to 7mm
180'	10 2 1/4 hr			Sand w/ little Gravel		Sand w/ little Gravel (180'-190') same as above except gul is 10% sd is 90%, and gul size is up to 11mm
190'	46 7 1/4 hr			Gravel w/ sand		Gravel w/ Sand (190'-230') ( ) brn (w 5 YR 4 1/2) (d 7.5 YR 7/2) as to med sd 40% (carb 60%, tuff 10%, Qz 20%, minor constituents 10%) gul 60%, up to 15mm (carb 55%, tuff 35%, Qz (chert) 5%, minor constituents 5%) p.s.; sd - subang to subang; gul - ang to subang; structureless; n.p.; not sticky; no congl; mod HCl cm. Any chips. prob. ind. calc. a. l. l. d. r. e.
				Gravel w/ Sand		Gravel w/ Sand (200'-210') same as above
				Gravel w/ Sand		Gravel w/ Sand (210'-220') same as above
				Gravel w/ Sand		Gravel w/ Sand (220'-230') same as above except chert in gravel increases to 10%
				Gravel w/ Sand		Sand w/ little Gravel (230'-300') ( ) brn (w 7.5 YR 4 1/2) (d 7.5 YR 7/2) as to sd 95% (carb 60%, Qz 20%, tuff 10%, minor constituents 10%) gul 5% up to 10mm (carb 50%, tuff 30%, chert 10%, minor constituents 10%) ms; sd - ang to med; gul - ang to subang; structureless; n.p.; not sticky; no congl; mod HCl cm.
				Gravel w/ Sand		
				Gravel w/ Sand		
				Sand w/ little gravel		

LOC. or COORDS. <u>TG-1, R 500 ft 2700</u>	DRILLER <u>Dean Mitchell</u>	START DATE <u>2-27-80</u>	FINISH DATE <u>2-28-80</u>
GROUND ELEV. <u>5520 ft</u>		TIME <u>1020</u>	<u>2002</u>
TOTAL DEPTH <u>510 ft</u>	RIG <u>CP RT-1200</u>	GEOPHYS. LOG <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
BOREHOLE DIAM. <u>12 1/2 inch pilot</u>	BIT(S) <u>1 1/2 inch 70 cone</u>	HOW LEFT <u>drilled</u>	
	FLUID <u>Water</u>		

LOCATION Hot Creek Valley, Nevada  
 LOGGED BY DL

PROJECT 1000 20 Shallow aquifer  
YUL-10-80 5110

DEPTH	PENE RATE	CIRC RET LOSS	AIRLIFT Q (gpm)	MATERIAL	SYM BOL	DESCRIPTION and COMMENTS
240'	28 1/4 hr			Sand w/ v. little Gravel		Sand w/ v. little Gravel (230'-300') (brn (w/ 7.5 YR 4/2) (47.5 YR 6/6) cs to f sd 95% (carb 60%, Qz 20%, tuff 10%, minor constituents 10%) gul 2% up to 10mm (carb 50%, tuff 30%, chert 10%, minor constituents 10%) m.s.; sd rang to rnd; gul - ang to subrnd; structureless; n.p.; not stky; no consol; mod to r m.
260'				Sand w/ v. little Gravel		Sand w/ v. little Gravel (250'-260') same as above
				Sand w/ v. little Gravel		Sand w/ v. little Gravel (260'-270') same as above
				Sand w/ v. little Gravel		Sand w/ v. little Gravel (270'-280') same as above
				Sand w/ v. little Gravel		Sand w/ v. little Gravel (280'-290') same as above
290'	11.75 1/4 hr			Sand w/ v. little Gravel		Clay Sand (290'-330') v. pale brn (w/ 10 YR 7/3) (d 10 YR 8/3) clay 30% cs to f sd - 70% (carb 50%, Qz chert) 25% tuff 15% minor constituents 10% m.s.; sd - ang to subrnd; structureless; s.p.; s. stky; no consol; mod 4.5 r m. Note: clay content based on geophysical logs & unwashed samples.
300'	9 1/4 hr			Sand w/ v. little Gravel		Clay Sand (300'-310') same as above
310'	60 1/4 hr			Sand w/ v. little Gravel		Clay Sand (310'-320') same as above
320'				Sand w/ v. little Gravel		
330'				Sand w/ v. little Gravel		
340'				Sand w/ v. little Gravel		
350'				Sand w/ v. little Gravel		
360'				Sand w/ v. little Gravel		
370'				Sand w/ v. little Gravel		
380'				Sand w/ v. little Gravel		
390'				Sand w/ v. little Gravel		
400'				Sand w/ v. little Gravel		
410'				Sand w/ v. little Gravel		
420'				Sand w/ v. little Gravel		
430'				Sand w/ v. little Gravel		
440'				Sand w/ v. little Gravel		
450'				Sand w/ v. little Gravel		
460'				Sand w/ v. little Gravel		
470'				Sand w/ v. little Gravel		
480'				Sand w/ v. little Gravel		
490'				Sand w/ v. little Gravel		
500'				Sand w/ v. little Gravel		
510'				Sand w/ v. little Gravel		

LOC. or COORDS. THURSDAY 11/27/80  
 GROUND ELEV. 5522 ft  
 TOTAL DEPTH 510 ft  
 BOREHOLE DIAM. 2 1/4 inch pilot

DRILLER Don Mitchell  
 RIG CPPT-1200  
 BIT(S) 12 1/2 inch Tri-cone  
 FLUID Baronite

START DATE 11-27-80 FINISH DATE 11-28-80  
 TIME 1020 3008  
 GEOPHYS. LOG  YES  NO  
 HOW LEFT 10:00

LOCATION Get your 21 from [unclear]  
 LOGGED BY [unclear]  
 PROJECT [unclear]

DEPTH	PENE RATE	CIRC RET LOSS	AIRLIFT Q (gpm)	MATERIAL	SYM-BOL	DESCRIPTION and COMMENTS
320'	86 ft/hr			Clay Sand		Clay Sand (290'-330') ( ) v. pale brn (w/10YR 7/3) (d 10YR 8/3) clay 30% cs to fsd 70% (carb 50%, Qz (chert) 25%, tuff 15%, minor constituents 10%) m.s; sd-ang to submd; strucless; s.p.; s. stky; inconsol; mod. HCl rxn; Note: clay content based on geophysical logs and unwashed samples.
330'	77 ft/hr			Sandy Clay		Sandy Clay (330'-340') ( ) v. pale brn (w/10YR 7/3) (d 10YR 8/3) clay 6.5% cs to fsd 40% (carb 60%, Qz (chert) 20%, tuff 10%, minor constituents 10%) m.s; sd-ang to submd; strucless; n.p.; stky; no consol; mod. HCl rxn; Note: clay content based on geophysical logs and unwashed samples.
340'	61 ft/hr			Clay Sand		Clay Sand (340'-350') ( ) v. pale brn (w/10YR 7/3) (d 10YR 8/3) clay 30% cs to fsd 70% (carb 60%, Qz (chert) 20%, tuff 10%, minor constituents 10%) m.s; sd-ang to submd; strucless; s.p.; stky; no consol; mod. HCl rxn; Note: clay content based on geophysical logs and unwashed samples.
350'	57 ft/hr			Sand		Sand (350'-510') ( ) pale brn (10YR 6/3) (d 10YR 8/3) C 15% cs to 85% (carb 55%, Qz (m.s) 20%, tuff 15%, minor constituents 10%) m.s; sd-ang to md; strucless; n.p.; s. stky; no consol; mod. HCl rxn. Note: clay content based on geophysical logs and unwashed samples.
360'						Clay Sand (360'-370') ( ) same as above except clay increases to 30%, and sand decreases to 30%.
370'	75 ft/hr			Sand		Sand (370'-380') ( ) same as above, except sand is 85%, clay is 15%.
380'						Sand (380'-390') ( ) same as above.
390'	70 ft/hr			Sand		Sand (390'-400') ( ) same as above.
400'						
410'						
420'						
430'						
440'						
450'						
460'						
470'						
480'						
490'						
500'						
510'						



LOC. or COORDS. 7412 on [unclear]

DRILLER Leon [unclear]

START	FINISH
DATE <u>7-27-70</u>	<u>7-28-70</u>
TIME <u>12:00</u>	<u>2:00</u>
GEOPHYS. LOG <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
HOW LEFT <u>440'</u>	

GROUND ELEV. 5500 feet

TOTAL DEPTH 510'

BOREHOLE DIAM. 12 1/4 inch pilot

RIG CPRT-1200

BIT(S) 12 1/4 inch Tri-cone

FLUID Water

LOCATION Hot Creek 1 1/2 miles above  
 LOGGED BY FAH SER

PROJECT USGS 90 [unclear]  
5/10

DEPTH	PENE. RATE	CIRC. RET. LOSS	AIRLIFT Q (gpm)	MATERIAL	SYM-BOL	DESCRIPTION and COMMENTS
400'	58 ft/hr			Sand		Sand (350'-510') pale brn (w/10% R 6/3) (d/d R 6/4) Cl 15% cs to fsd 85% (carb 55%, Qz (chert) 20%, tuff 15%; minor constituents 10%) msi; sd - ang to rnd; structureless, n. pi; not stky; no consol; mod HCl rxn; Note: clay content based on geophysical logs and wash samples.
410'				Sand		Sand (410'-420') same as above
	40 ft/hr			Sand		Sand (420'-430') ( ) same as above, except sand increases to 95%, and clay decreases to 5%.
420'				Sand		Sand (430'-440') same as above, sd 95%, cl 5%.
	37 ft/hr			Sand		Sand (440'-450') ( ) same as above, except for trace (<1%) gravel, up to 6 mm.
430'				Sand		Sand (450'-460') same as above
	40 ft/hr			Sand		Sand (460'-470') same as above
440'				Sand		Sand (470'-480') same as above
	34 ft/hr			Sand		
450'				Sand		
	33 ft/hr			Sand		
460'				Sand		
	31 ft/hr			Sand		
470'				Sand		
	37 ft/hr			Sand		
480'				Sand		

# LOG OF BOREHOLE

BOREHOLE HC-ST-2

PAGE 7 OF 7

LOC. or COORDS. T6N, R50E, section  
 GROUND ELEV. 5522 ft  
 TOTAL DEPTH 510 ft  
 BOREHOLE DIAM. 12 1/4 inch pilot

DRILLER Dean Mitchell  
 RIG CPT-1200  
 BIT(S) 12 1/4 inch Tri-cone  
 FLUID Brine

START DATE 2-27-80 FINISH DATE 2-28-80  
 TIME 1120 2008  
 GEOPHYS. LOG  YES  NO  
 HOW LEFT cased

LOCATION East of ...  
 LOGGED BY ...  
 PROJECT ...

DEPTH	PENE RATE	CIRC RET LOSS	AIRLIFT Q (gpm)	MATERIAL	SYM-BOL	DESCRIPTION and COMMENTS
480'	40 9 1/2 hr			Sand		Sand (350'-510') ( ) pale tan (w/ 10% R 6/2) (d 10 YR 6/4) Cl 5% CS 4 med sd 95% (carb. 45%, quartz 25%, feld 20%, minor constituents 10%) m. s; sd-angle subrnd; strucless; np; not stky; no cnsol; mod HCl soln. Note: clay content based on geophysical logs and unwashed samples.
490'	34 9 1/2 hr			Sand		Sand (490'-500') same as above, except for trace (4.1%) gravel.
500'	34 9 1/2 hr			Sand		Sand (500'-510') same as above, except sand size now ranges from cs to med 95%
510' TD						



HC-S-T-2 HOT CREEK VALLEY

Table 3. Inorganic Water Chemistry.

<u>Time of Collection</u>	2100.	0900
<u>Date of Collection</u>	9/30/80	10/4/80
<u>Constituent</u>	<u>Concentration, in mg/l</u>	
Calcium	41.0	41.0
Magnesium	18.6	18.6
Sodium	20.8	20.8
Potassium	2.4	2.4
Alkalinity as HCO <sub>3</sub>	170.0	171.0
Chloride	8.7	8.6
Sulfate	65.5	67.5
Nitrate as N	0.73	0.73
Fluoride	0.16	0.17
Silica	28	27
Total Dissolved Solids, (Residue at 180° C)	284	239

Analyst: Cranmer Engineering, Inc., Grass Valley, California.

Tritium Analysis

<sup>3</sup> H (pCi/l ± σ)	0 ± 100	0 ± 100
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Analyst: James M. Montgomery, Inc., Pasadena, California.