

The HYDRODYNAMICS Group
studies in mass and energy transport in the earth

FDA Compliance Report:

Arrowhead Spring Complex No. 7

San Bernardino National Forest

Submitted to:

The Perrier Group

May 30, 1997

Michael J. King, CHG.
John D. Bredehoeft, Ph.D., NAE

The HYDRODYNAMICS Group
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1.0 INTRODUCTION

The Arrowhead No. 7 Spring is currently licensed by the State of California Department of Health Services (DHS), Food and Drug Branch to operate as a Private Water Source (License No.'s 86070 to 86073 - Appendix A). The United States Food and Drug Administration (FDA) was specific in its new regulations that cover spring water sources. The objective of this study was to conduct hydraulic and chemical testing of the Arrowhead No. 7 Spring and bore-holes No. 7, 7A, 7B, and 7C (collectively referred to as the Arrowhead Complex 7) to determine compliance with FDA regulations. The location of the Arrowhead Complex 7 is shown on Plate 1. This report describes Arrowhead Complex 7, and presents the results of our compliance evaluation.

1.1 FDA Regulations

FDA spring regulations are defined in the Federal Register, Department of Health and Human Services, Federal Food and Drug Administration, Volume 60, No. 218, (Monday November 13, 1995) 21CFR Part 103, 129, 165, and 184 Doc. No. 88P-0030, RIN 0910-AA11 Beverages-Bottled Water, Code 165.110(a)(2)(vi), Sections 48, 53, and 54.

1.2 Approach to Demonstrate FDA Compliance

Our approach was to inspect the Arrowhead Complex 7 to confirm the existence of a natural spring, and at the same time inspect the local hydrogeology. We reviewed historical data to confirm that the spring has flowed for a long time. Water samples were collected and analyzed to confirm similarity of the spring and bore-hole(s) water. Hydraulic tests and monitoring were conducted to demonstrate a hydraulic connection between bore-holes 7, 7A, 7B, 7C and Spring 7. The following tests on specific bore-holes were performed:

- Bore-hole 7 - February 26 to 27, 1997
- Bore-holes 7B and 7C - March 17, 1997
- Bore-holes 7A and 7B - March 18, 1997

1.3 Previous Site Studies

John F. Mann, Jr., consulting geologist and hydrologist, worked for the Arrowhead Drinking Water Company from 1964 to 1988. During this period he prepared consultant reports describing the geology and hydrogeology of the Arrowhead Springs, which include Complex 7. Perrier's current Arrowhead Springs are described in his report of April 1, 1988 entitled *The Arrowhead Springs*. Historical spring flow records, bore-hole drilling reports, and spring site plans were made available by Perrier.

2.0 SETTING

The Arrowhead Spring tunnels were collection galleries developed in the 1930s. They were driven into both the decomposed and hard granite at the sites of natural springs. There are three tunnels--No.s 2, 3, and 7. Horizontal bore-holes were later drilled near the tunnels - No.'s 1, 7, 7A, 7B, 7C, and 8 (Plate 1). Both the springs and bore-holes drain by gravity into a pipeline that runs down the mountain to the Waterman Canyon water storage tank and truck loading facilities. A chronology of the development at Complex 7 is presented in Table 1.

2.1 Complex 7 Location

The Arrowhead Complex 7 is situated in Township 2 North, Range 3 West, in the southeast $1/4$ of the southeast $1/4$ of the northwest $1/4$ of Section 30, in San Bernardino County, California (Plate 1). The land is located within the boundaries of the San Bernardino National Forest, which is under the administrative jurisdiction of the U.S. Forest Service. Site access is from an undeveloped service trail off of "Rim of the World Drive" (State Route 18, Plate 1).

2.2 Physiography

The Arrowhead Springs are located in the San Bernadino Mountains. The upper springs, including Complex 7, are on a steep southern slope (64% slope) of Strawberry Peak. Arrowhead Complex 7 is at an elevation of approximately 4,900 feet, and is adjacent to a

tributary ravine of Strawberry Creek at the head of Coldwater Canyon (Plate 1). Complex 7 is located approximately 1,000 feet down slope from State Route 18, and is about 700 feet lower in elevation (Plate 1).

The detailed topography of Arrowhead Complex 7 is shown on Plate 2. Bore-holes 7, 7A, 7B, and 7 C are housed in a concrete block structure located about 60 feet down slope from the Spring No. 7 tunnel, and are approximately 10 feet lower in elevation. The mountain drops off on a steep slope below the bore-holes. There is shrub oak vegetation in the vicinity of the site.

2.3 Geology

The San Bernardino Mountains in the vicinity of Arrowhead Complex 7 are entirely crystalline rock, composed mainly of granite and metamorphic rock of the so-called "basement complex." The San Andreas Fault runs along the base of the San Bernardino Mountains, approximately 5 miles to the southwest; the fault in this area trends west-northwest to east-southeast.

The driller's bore-hole logs for Complex 7 indicate the site is underlain by decomposed granite to a depth of about 20 feet; underlying that is highly fractured granite with clay grus lenses (Appendix B). A geologic profile of the site is shown on Plate 3. There is almost no residual or colluvial soils at the site; however, the granite near the surface is decomposed.

2.3 Hydrostratigraphy

The water-bearing materials are the decomposed granite and the fractured crystalline granite. The water-bearing characteristics of these materials are dependent on the degree of weathering and the presence of fractures. The matrix permeability is so small as to be negligible. Spring No. 7 is situated in the decomposed granite. The Complex 7 bore-holes produce water from the highly fractured granite.

3.0 SPRING

At Complex 7 the natural spring (No. 7) is in a hand dug tunnel that was driven horizontally into decomposed granite for approximately 30 feet. An "as-built" construction diagram of the tunnel is presented on Plate 2. Water flows into the tunnel through a gravel bed on the floor (Plate 4). The discharge flows through a concrete weir into a 4-inch diameter pipeline (Plate 4). The pipeline runs down the ravine just west of the Complex 7 bore-hole enclosure.

The historical records of spring flow are presented in Table 2. Prior to 1945 spring and bore-hole flows were not recorded. We recorded spring flows that ranged from 2 to 20 gallons per minute (gpm), with an average of 4 gpm, from February, 1997 until April, 1997.

4.0 SPRING BORE-HOLE DEVELOPMENTS

A total of 8 bore-holes have been drilled at the Arrowhead Complex 7. A summary of bore-hole construction is provided in Table 3. The current production is from bore-holes: 7 and "new" 7A, 7B, and 7C (Plates 2, 5, 6, 7 and 8). Driller's logs for these bore-holes are provided in Appendix B. Original bore-holes 7A, 7B and 7C have been abandoned. Bore-hole 7D was a dry hole and abandoned. All the bore-holes have similar construction, and consist of a 2 ⁷/₈-inch diameter horizontal bore-hole drilled into the mountain at an elevation below the spring. The bore-holes were lined with 2-inch diameter, schedule 40, galvanized blank casing, with a 2-inch diameter, ³/₁₆-inch slot, schedule 40, galvanized, screen attached to the end of the casing. Each bore-hole was pressure grout sealed along the entire length of the blank casing. The depths of the bore-holes and lengths of seals are summarized in Table 3.

5.0 SPRING-WELL HYDRAULIC CONNECTION

The flow of Arrowhead Spring No. 7 flow was monitored continuously during testing of the bore-holes; bore-holes 7, 7A, 7B, and 7C were opened and allowed to flow. These tests were designed and conducted to demonstrate the hydraulic connection between the bore-holes and the spring.

5.1 Spring and Bore Hole Monitoring

Both the discharge of Arrowhead No. 7 Spring and bore-hole No. 7 were monitored from February 25 through April 15, 1997 (Appendix C). During this period, the Spring No. 7 flow rate was measured using a 1/2 inch diameter Signet flow meter. The bore-hole 7 flow rate was measured using a 2 inch diameter Signet flow meter. Data was recorded at 15 minute intervals on a Unidata Data Logger. Data was monitored on-site; the data logger could also be accessed using a cellular phone computer modem. Flow data for the other bore-holes at Complex 7 was obtained from totalizing flow meters on each bore-hole.

5.2 Testing

The results of four tests are shown on the following plates:

Plate 8: Bore-hole 7 - February 26 to 27, 1997

Plate 9: Bore-holes 7B and 7C - March 17, 1997

Plate 10: Bore-holes 7A and 7B - March 18, 1997

The hydraulic testing demonstrates a hydraulic connection between bore-holes 7, 7A, 7B, 7C and Spring No. 7. The Spring No. 7 flow quickly drops below the accuracy of the Signet flow meter (1 1/2 gpm) when bore-hole No.'s 7, 7A, and 7B were turned on, as illustrated on Plates 8, 9, and 10. Spring No. 7 quickly recovered when bore-hole flows were reduced or turned off, as shown on Plates 8, 9, and 10. The testing clearly demonstrates that Spring No. 7 and the bore-holes are hydraulically connected.

6.0 SPRING-WELL CHEMISTRY

Water quality samples were collected from Spring No. 7 and the Complex 7 bore-holes. The water samples were collected in accordance with state-of-the-practice protocols. Samples were submitted to EPA certified laboratories for analysis. Results of analysis are summarized in Table 4, and provided in Appendix D.

6.1 Spring and Bore Hole Water Quality

The quality of Arrowhead No. 7 Spring and Complex 7 bore-hole waters are within the Federal FDA and California DHS drinking water standards for a public water supply (Table 4).

6.2 Piper Diagrams

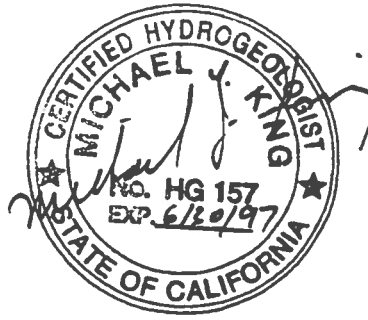
For the purposes of comparison the major ion content of the water is plotted on a Piper Diagram; this is shown on Plate 11. The Piper Diagram shows that the waters have similar chemical composition. The similarity of chemical composition indicates the same ground-water source.

7.0 FDA COMPLIANCE

The Arrowhead Complex 7 complies with the FDA and DHS regulations regarding spring water sources. Our study determined the following:

1. Spring tunnel No. 7 is a natural spring.
2. Flow at Spring No. 7 has been recorded since 1945.
3. Complex 7 bore-holes are in hydraulic connection to the Spring No. 7.
4. The chemical similarity of the waters, as shown by the Piper Diagram, indicates the same ground-water source for both spring and the bore-holes.

Michael J. King



Michael J. King, R.G., C.E.G., C.HG.
C.HG. No. 157
Expires 6/30/99

John D. Bredehoeft

John D. Bredehoeft, PhD., N.A.E.
Principal

REFERENCES

Department of Health and Human Services, Federal Food and Drug Administration, Volume 60, No. 218, (Monday November 13, 1995) 21CFR Part 103, 129, 165, and 184 Doc. No. 88P-0030, RIN 0910-AA11 Beverages-Bottled Water, Code 165.110(a)(2)(vi), Sections 48, 53, and 54.

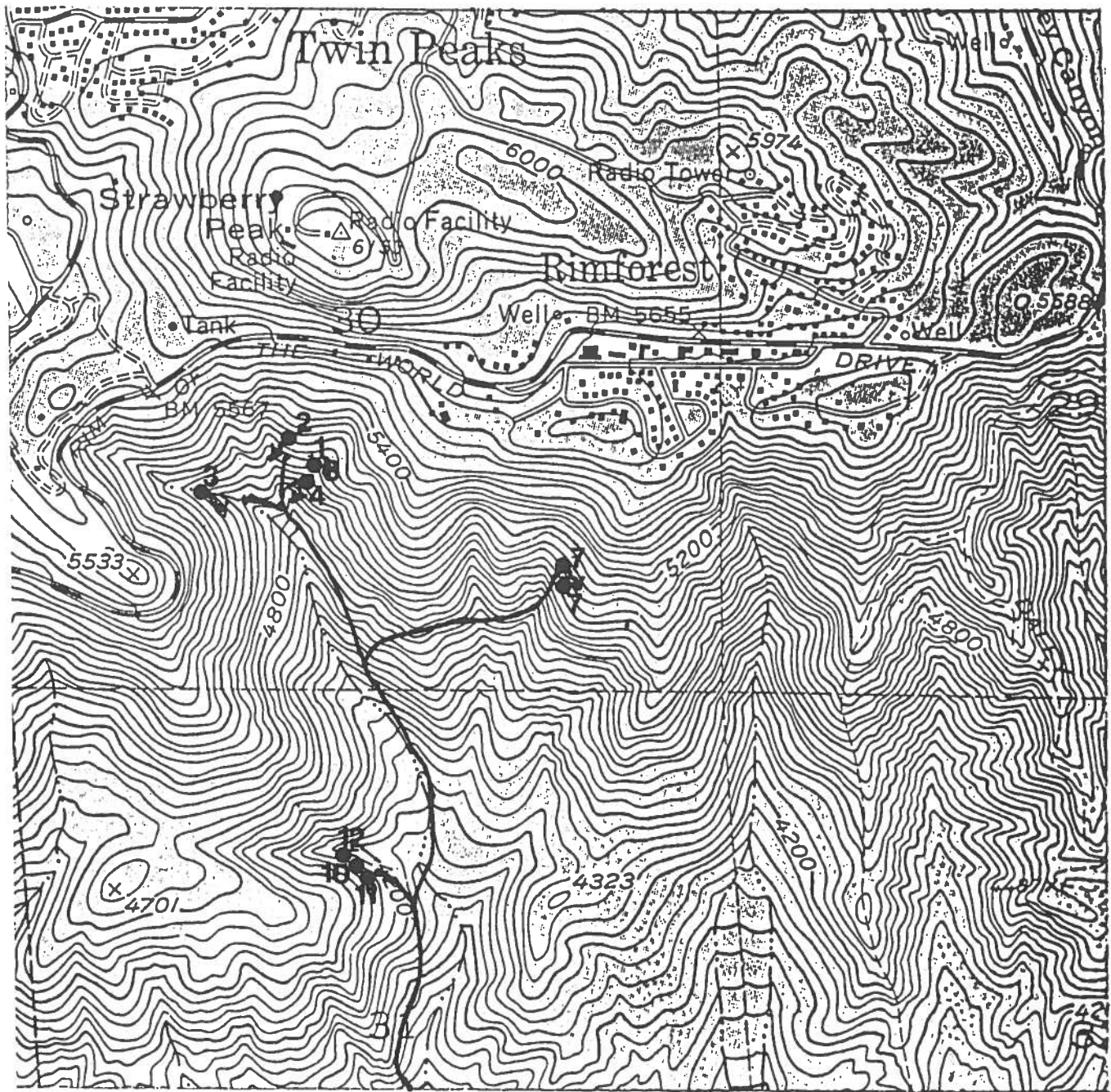
Mann, John F. Jr., 1964, Geologic and Hydrologic Report For The Area Of The Arrowhead And Puritas Springs, Consultant's Report to Arrowhead and Puritas Waters, Inc., April 6.

Mann, John F. Jr., 1977, Consultant's Letter Report to Arrowhead and Puritas Waters, Inc., September 12.




Mann, John F. Jr., 1987, Consultant's Letter Report to Arrowhead Drinking Water Company, Inc., March 28.

Mann, John F. Jr., 1988, The Arrowhead Springs, Consultant's Report to Arrowhead Drinking Water Company, Inc., April 1.

U.S. Geological Survey Topographical Map 1967 Photo Revised 1988: Harrison Mountain, California, Quadrangle, Ref. 34117-B2-TF-024.



Scale (feet)
Contour Interval 40 feet

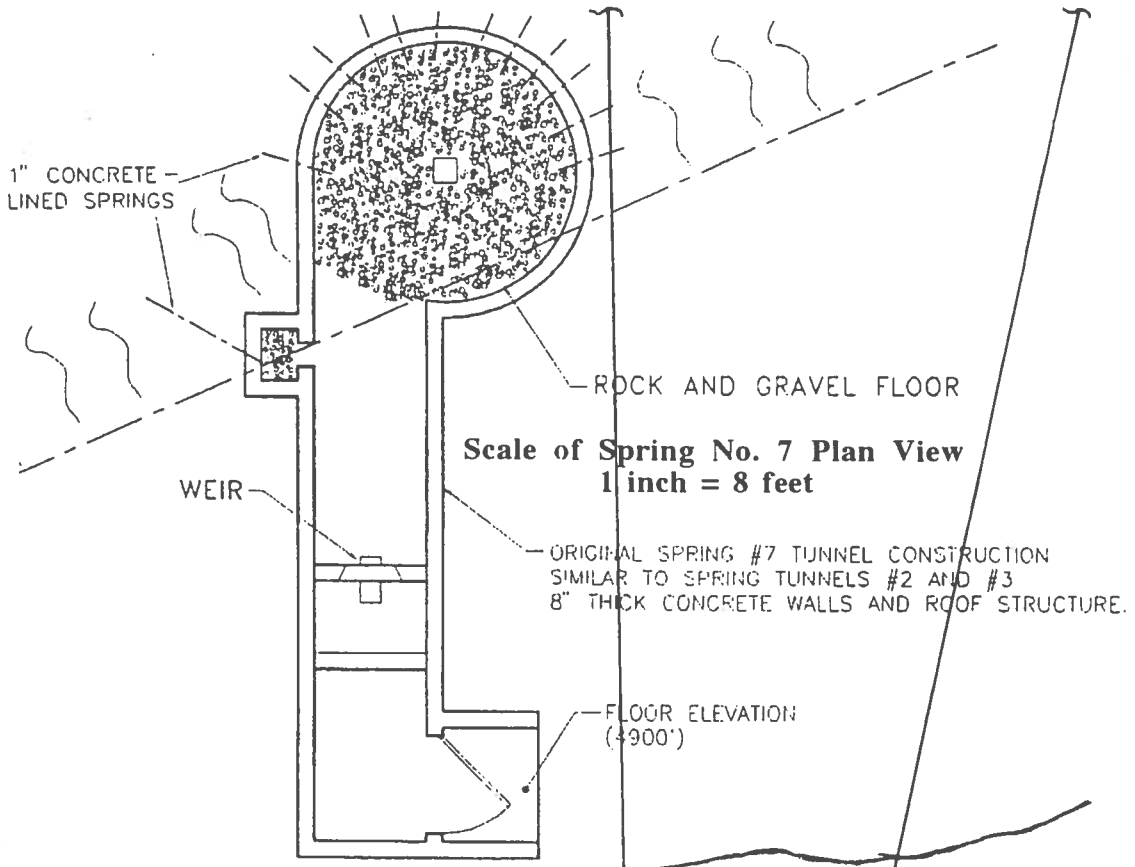
-  7 Spring
-  1 Bore-hole
-  4-inch diameter pipeline

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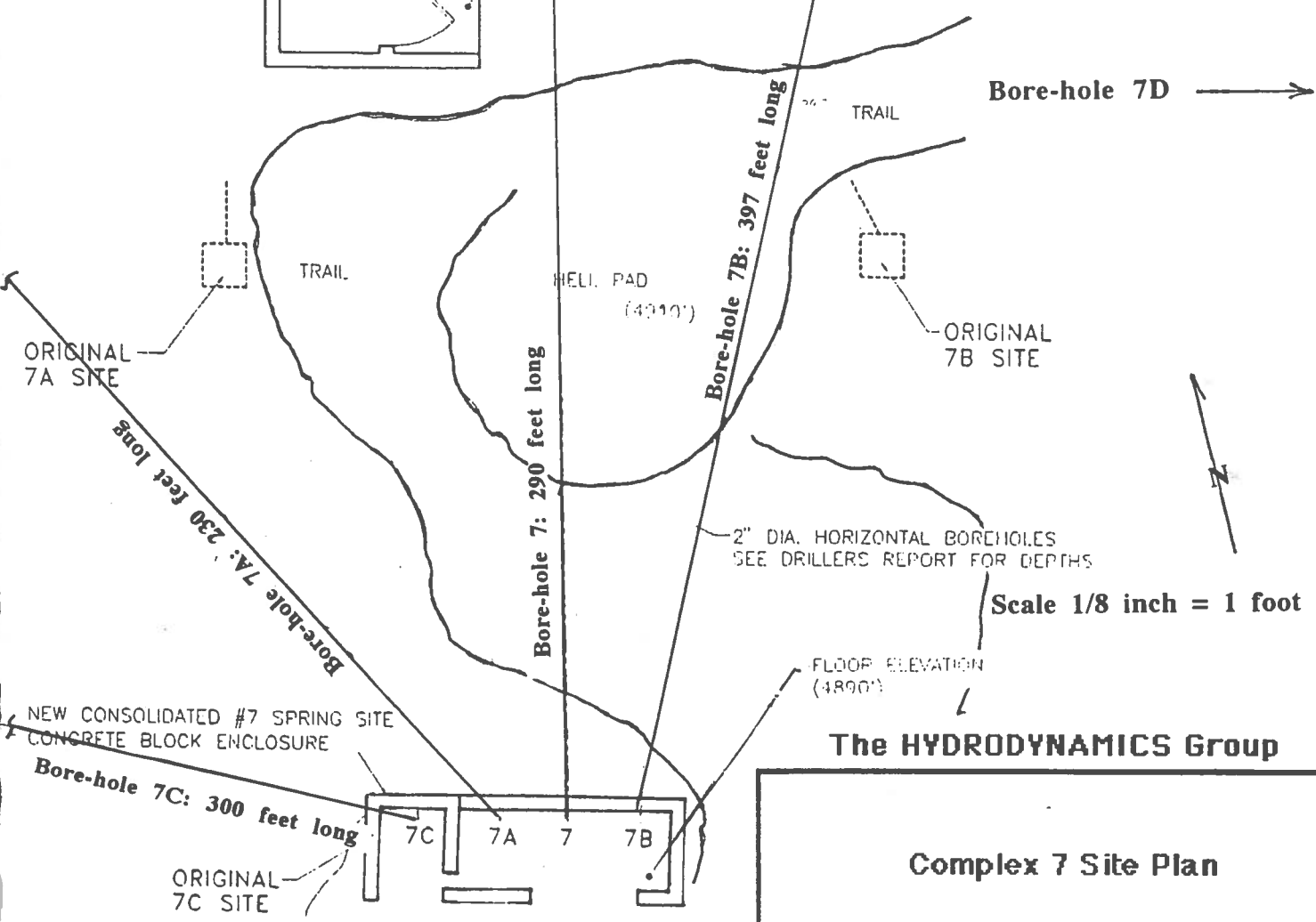
Arrowhead Spring Development
Location Map

Adapted from U.S. Geological Survey Map:
Harrison Mountain, CA Quadrangle

Plate 1



Scale of Spring No. 7 Plan View
1 inch = 8 feet



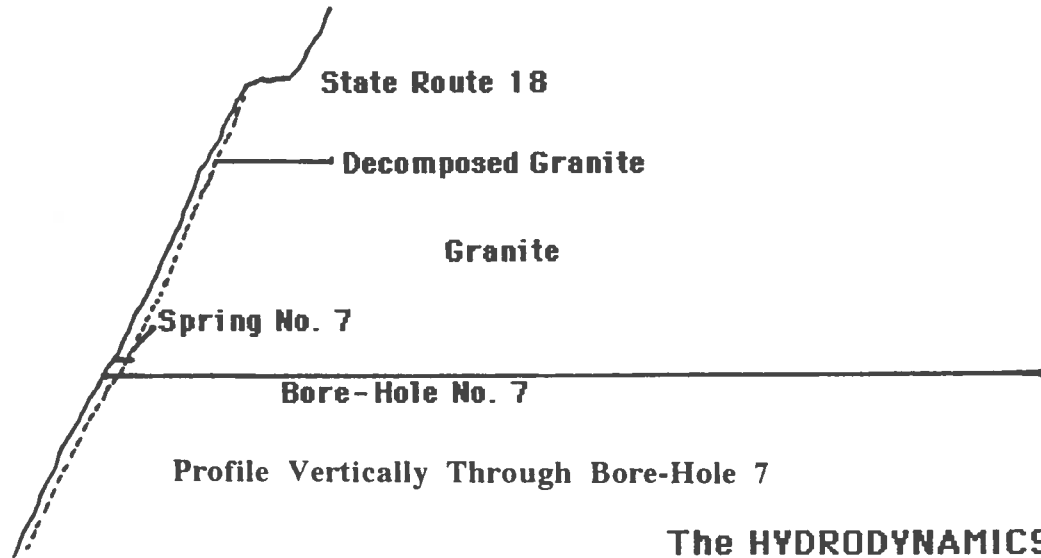
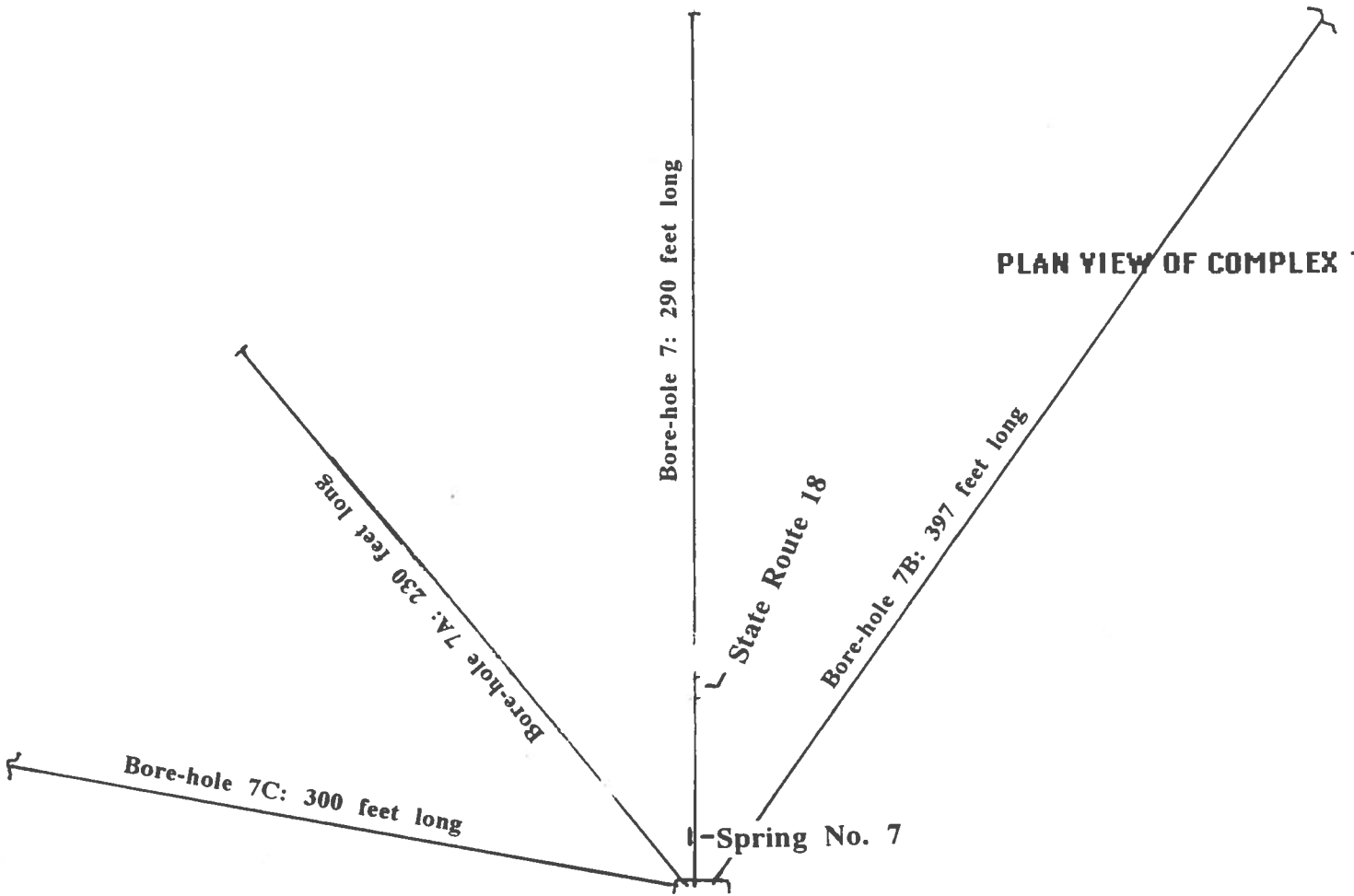
Bore-hole 7D →

Scale 1/8 inch = 1 foot

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Complex 7 Site Plan

PLAN VIEW OF COMPLEX 7

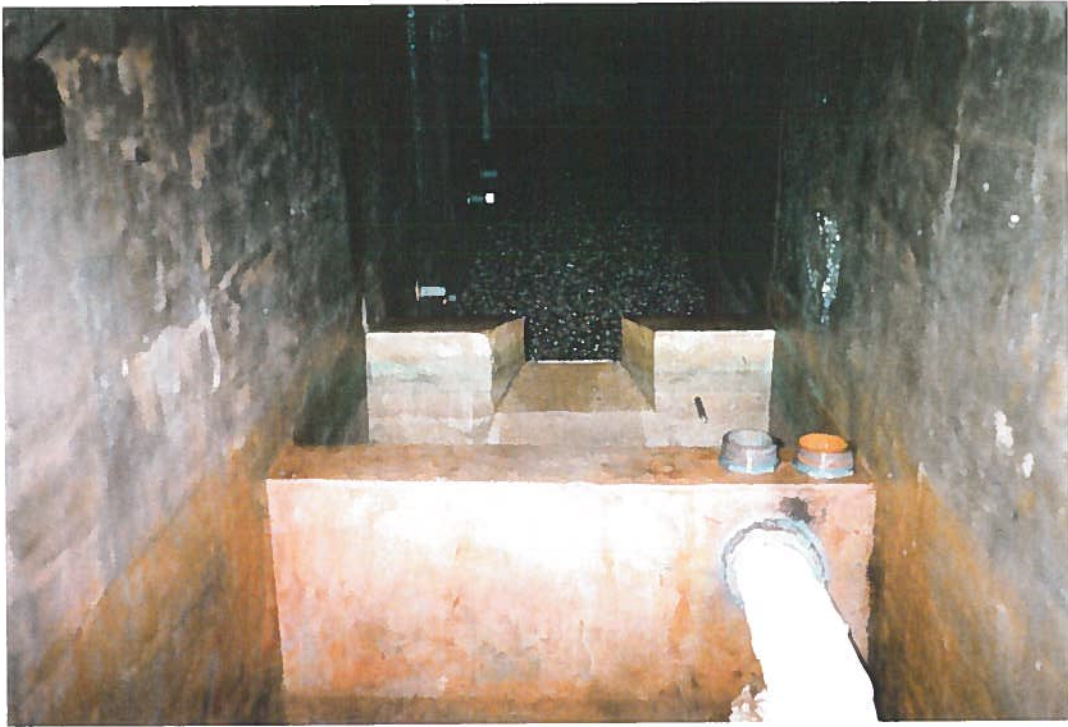


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Complex 7 Geologic Site Profile

Horizontal & Vertical Scales 1 inch = 600 feet

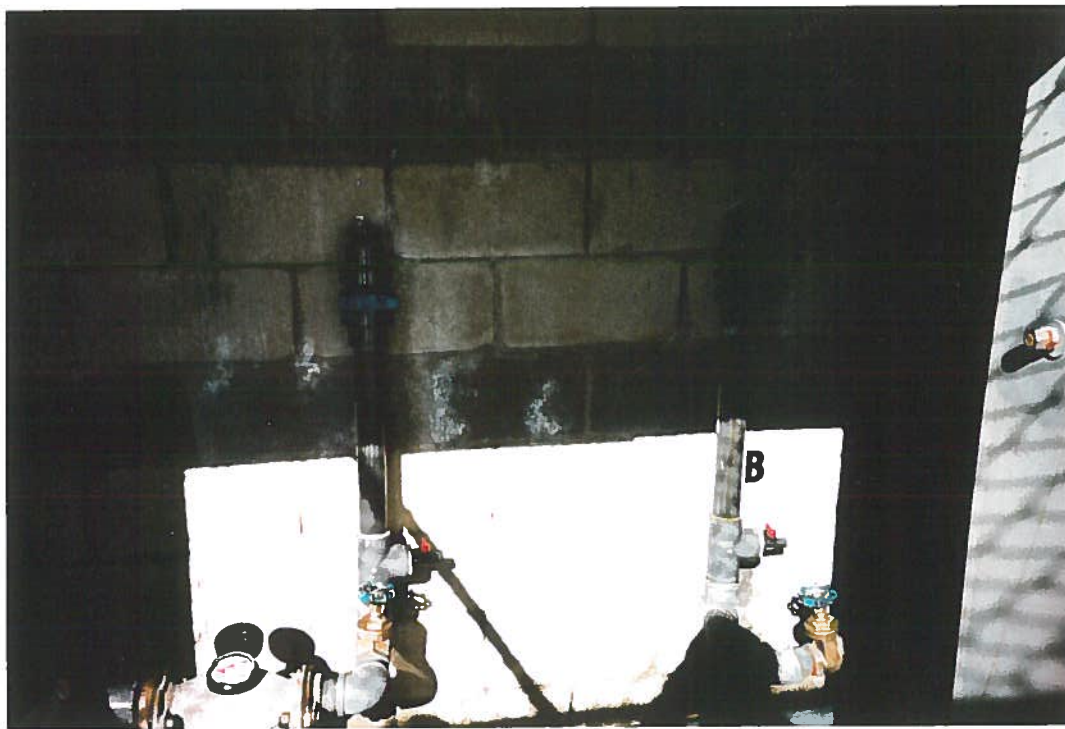
Plate 3



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Complex 7 Spring Tunnel

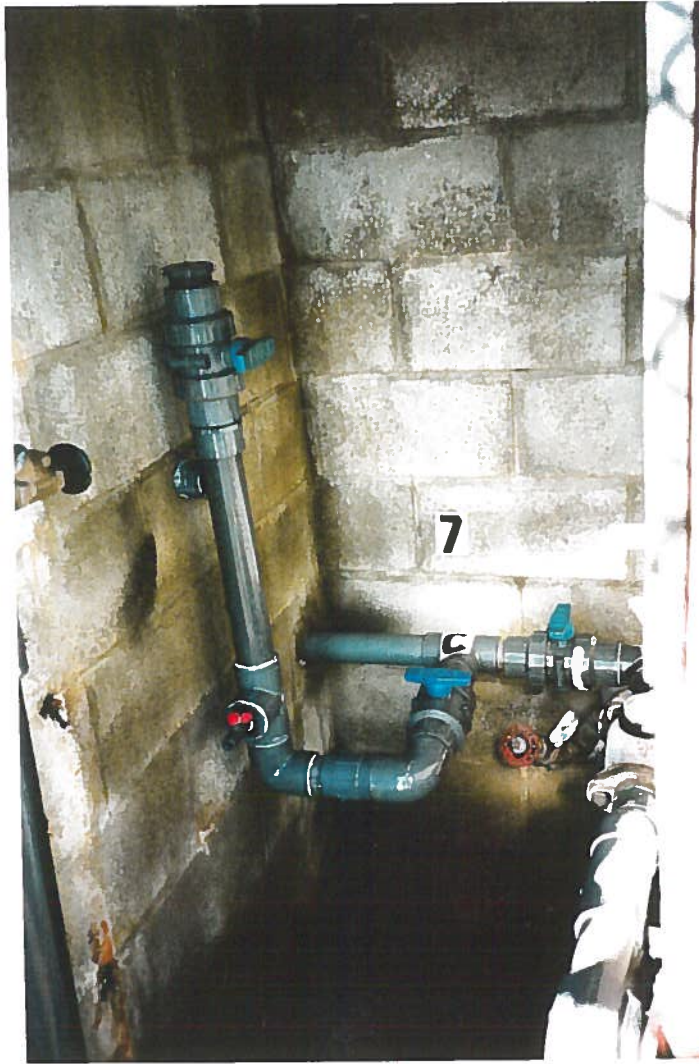
Plate 4



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**Complex 7 Bore-Holes
7A, 7, 7B**

Plate 5



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**Complex 7 Bore-Hole
7C**

Plate 6



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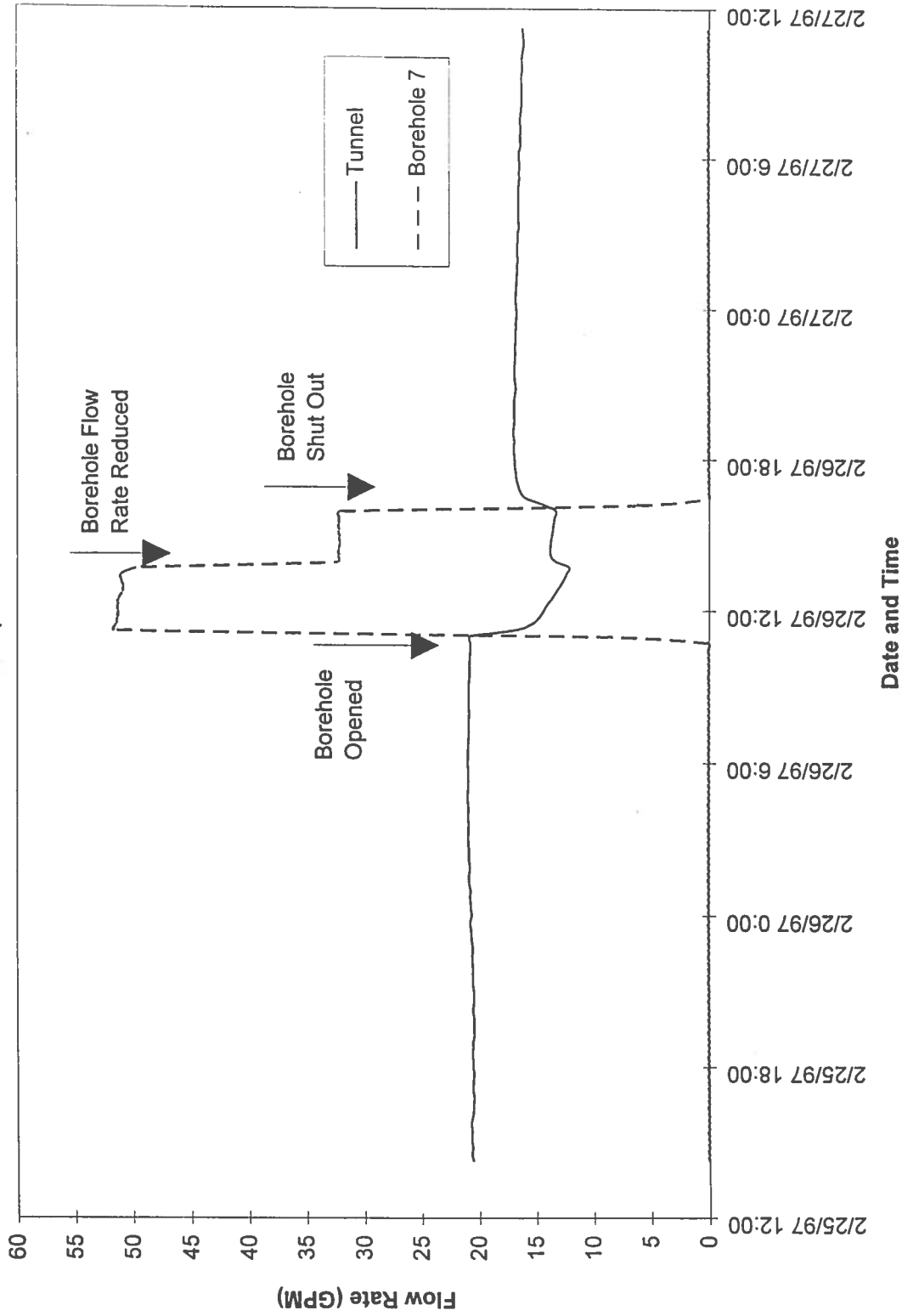
**Complex 7
Spring & Bore-Hole 7
Instrumentation**

Plate 7

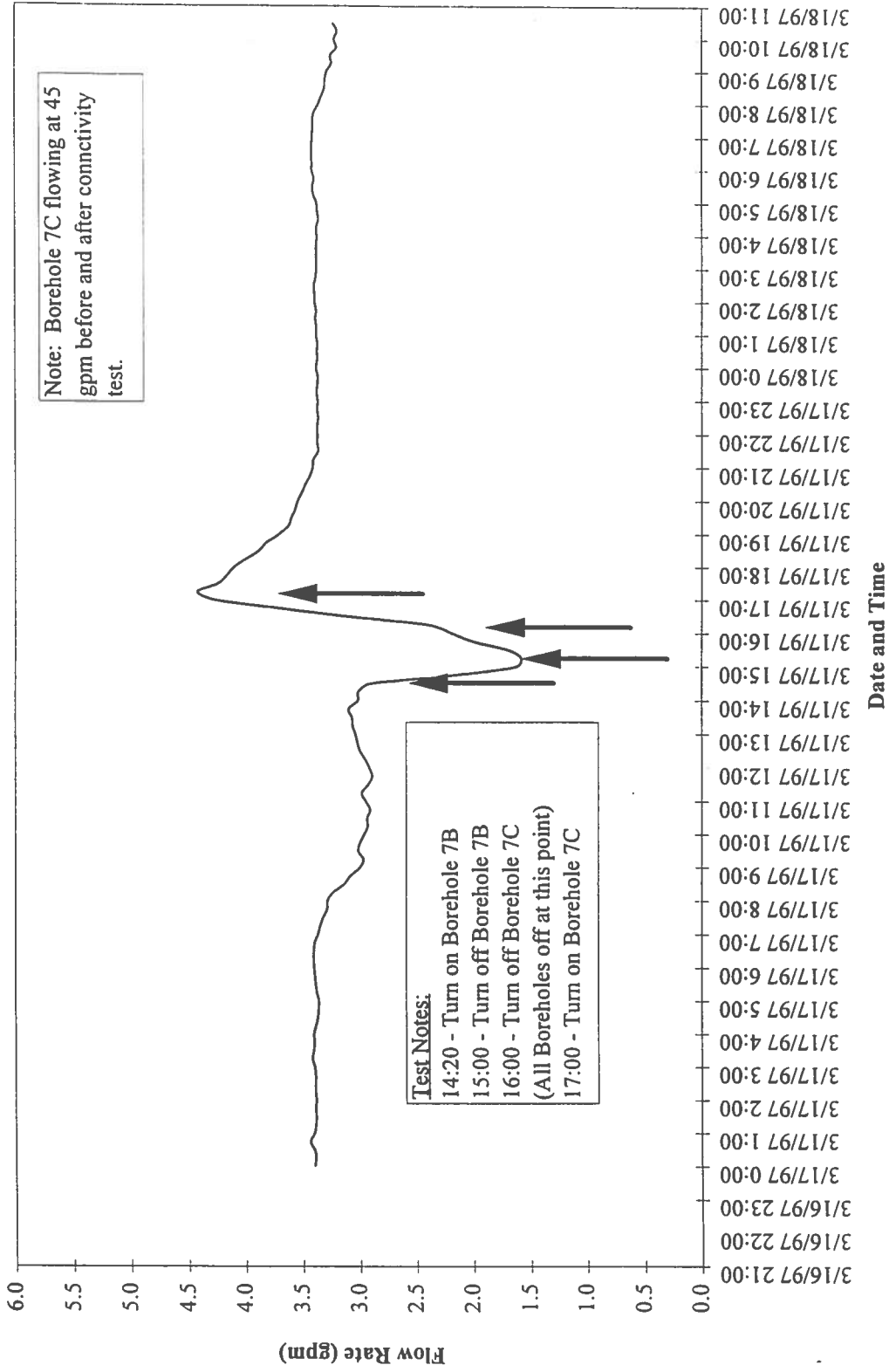
Bore-hole No. 7 and Spring No. 7

Flow Rates

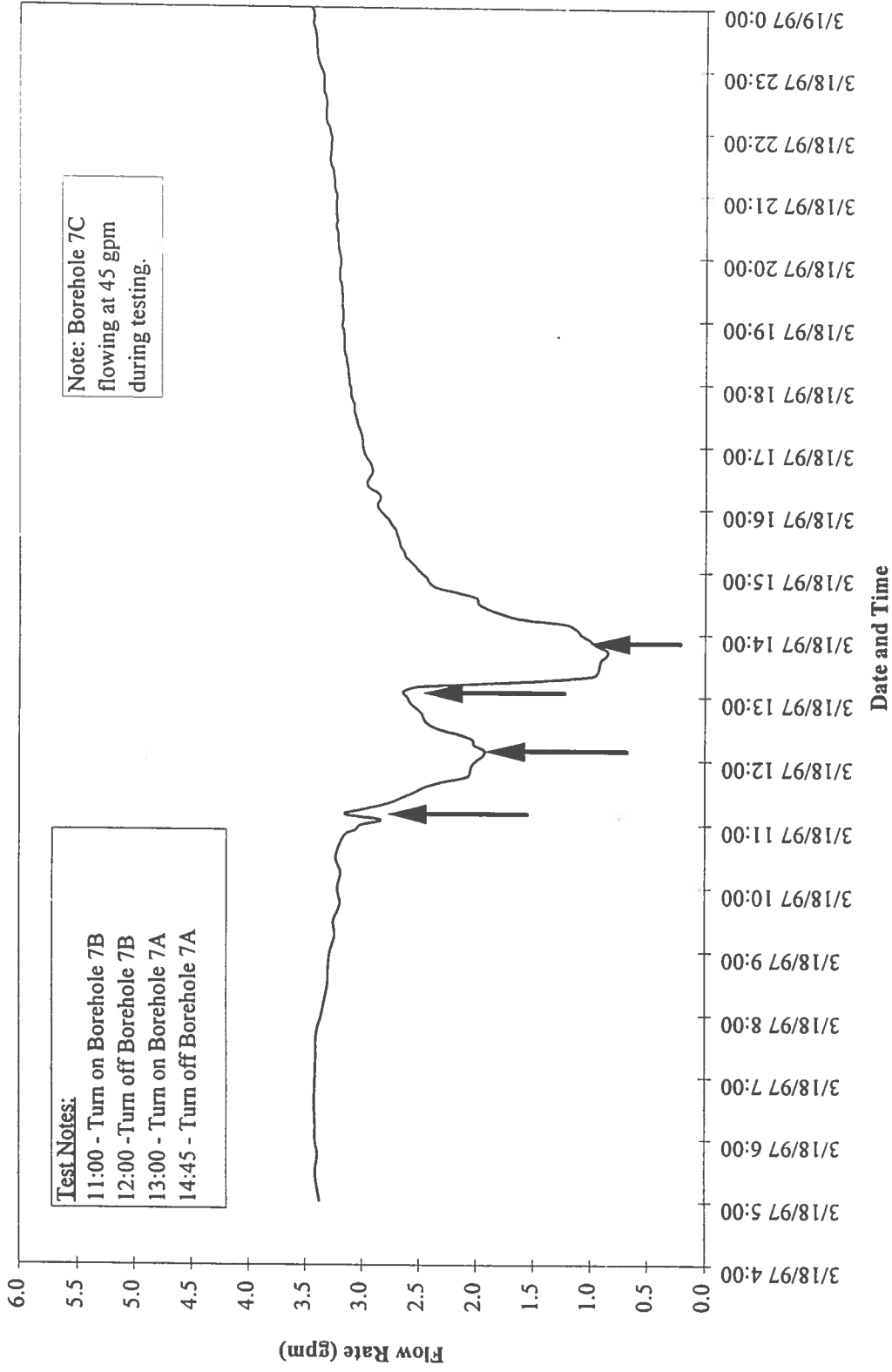
February 25 to February 27, 1997



Spring No. 7 Flow Rate
 March 17, 1997
 Connectivity Testing



Spring No. 7 Flow Rate
March 18, 1997
Connectivity Testing



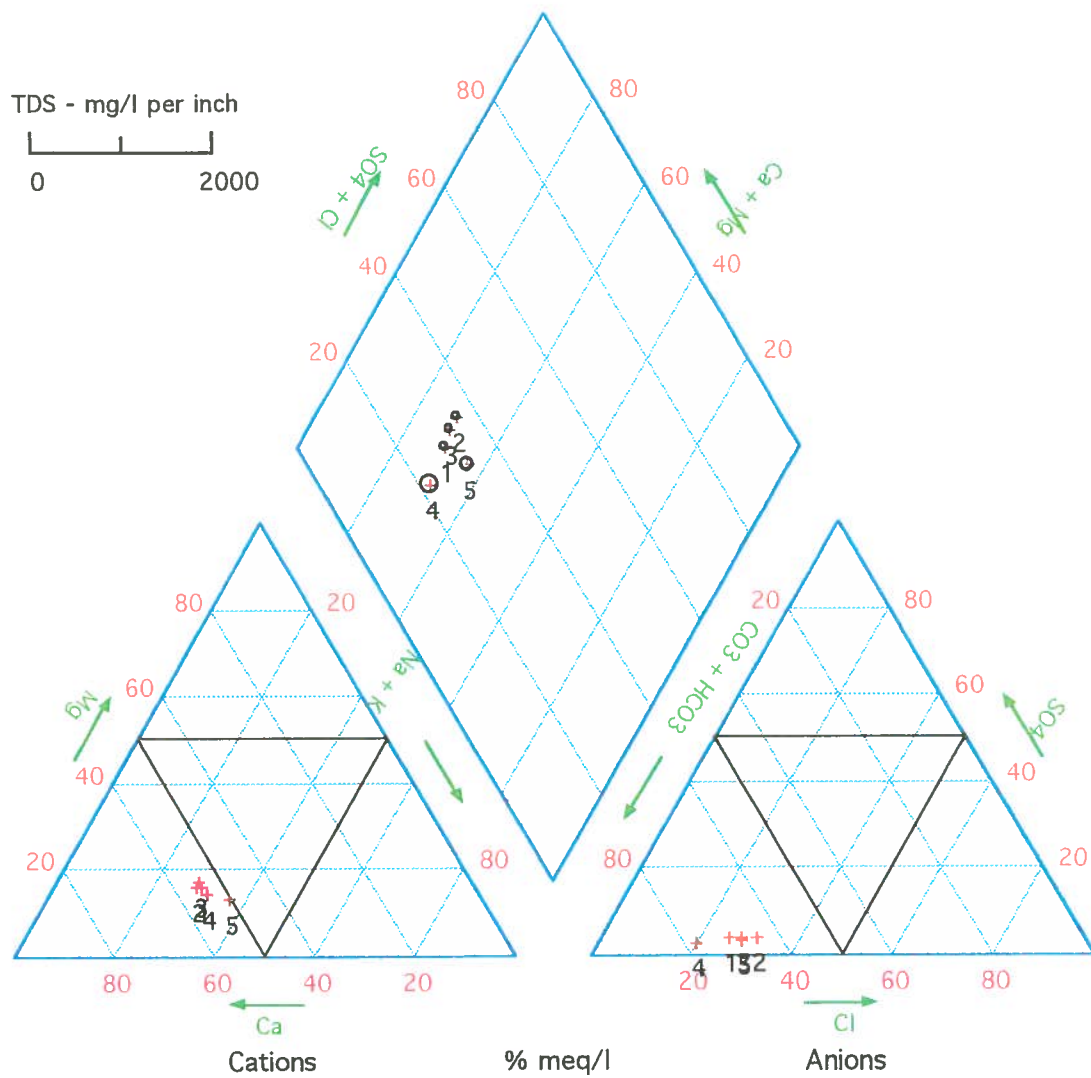


Plate 11. Arrowhead Complex 7 Piper Diagram

No.	TDS	Sample	No.	TDS	Sample
1	136	Spring No. 7			
2	139	Bore-Hole No. 7			
3	136	Bore-Hole No. 7A			
4	220	Bore-hole No. 7B			
5	169	Bore-hole No. 7C			

**Table 1. Arrowhead Complex 7
Chronology of Development**

Date	Event
1930's	Spring No. 7 tunnel constructed
1945	Springs flow recorded annually
Jun-50	Original bore-holes 7A & 7B Constructed
1961	Original bore-hole 7C constructed (formerly named new 7A)
	Original bore-hole 7A & 7B - no flow
1962	Bore-hole 7D drilled - dry hole & abandoned
1962 to 1983	Original bore-hole 7C turned on and off periodically
Apr-85	Spring No. 7 tunnel rehabilitated
	Bore-holes turned off - Springs flowing 18,000 gallons per day (gpd)
May-85	Spring No. 7 flowing at about 28,000 gpd
Aug-92	Original bore-hole 7A & 7B abandoned
9/6/92	New bore-hole 7A constructed
9/10/92	New bore-hole 7B constructed
9/27/92	Bore-hole 7 constructed
7/18/93	New bore-hole 7C constructed
1992 to 1997	Complex 7 bore-holes flowing
Feb-97	Spring No. 7 flowing during hydraulic testing

Table 2. Arrowhead Complex No. 7
Annual Spring and Bore-Hole Flow Volumes
(Acre-Feet Per Year)

YEAR	SPRING NO. 7	BORE-HOLES						
		7	Original 7A	Original 7B	Original 7C	New 7A	New 7B	New 7C
1947	41.44							
1948	26.95							
1949	29.12							
1950	18.86		7.51	9.39	8.23			
1951	0.00		13.44	16.80	0.00			
1052	0.00		26.88	32.48	0.00			
1953	0.00		21.34	22.46	0.00			
1954	0.00		21.28	23.52	0.00			
1955	0.00		19.04	21.25	0.00			
1956	0.00		15.68	17.92	0.00			
1957	0.00		15.90	17.83	0.00			
1958	0.00		36.25	36.53	0.00			
1959	0.00		27.31	22.52	0.00			
1960	0.00		19.24	12.61	0.00			
1961	0.00		3.74	3.82	27.00			
1962	0.00		7.21	6.38	6.81			
1963	0.00		0.88	2.67	32.21			
1964	0.00		0.00	0.00	20.81			
1965	0.00		8.03	7.14	7.56			
1966	0.00		35.76	10.45	0.00			
1967	0.00		49.67	0.00	0.00			
1968	0.00		49.88	0.00	0.00			
1969	0.00		56.27	0.00	0.00			
1970	0.00		33.04	9.70	0.00			
1971	0.00		0.00	0.00	36.16			
1972	ND		ND	ND	ND			
1973	0.00		26.24	13.75	3.72			
1974	0.00		15.40	15.60	0.00			
1975	0.00		15.80	15.90	7.42			
1976	0.00		5.75	1.72	28.47			
1977	0.00		15.40	15.60	0.00			
1978	0.00		27.04	0.00	2.00			
1979	0.00		19.81	0.00	24.48			
1980	0.00		1.20	2.00	3.30			
1981	0.00		4.06	18.00	30.04			
1982	0.00		6.60	10.70	28.20			
1983	0.00		44.90	1.30	4.40			
1984	0.00		24.60	0.40	44.20			
1985	7.27		9.90	5.32	13.48			
1986	22.56		9.90	8.29	3.91			
1987	1.24		6.87	6.27	46.16			
1988	0.00		0.00	0.00	51.46			
1989	0.00		0.00	0.00	1.30			
1990	0.00		0.00	0.00	36.08			
1991	0.00		0.00	0.00	37.89			
1992	0.00	6.60			32.90	6.10	2.80	
1993	0.00	36.80				36.00	24.10	13.40
1994	0.00	33.60				29.10	17.20	18.30
1995	0.00	28.10				24.00	17.90	23.90
1996	0.00	28.80				26.30	16.80	17.60

ND = No Data Available

**Table 3. Arrowhead Complex No. 7
Bore-Hole Construction History**

Bore-Hole No.	Date Constructed	Seal Length (feet)	Bore-hole Length (ft.)	Status
Orginal 7A	Jun-50	unknown	unknown	Abandoned
Orginal 7B	Jun-50	unknown	unknown	Abandoned
Orginal 7C	1961	unknown	157	Abandoned
7D	1962		95	Abandoned
7	9/27/92	126	290	In Use
New 7A	9/6/92	95	230	In Use
New 7B	9/10/92	121	397	In Use
New 7C	97/18/93	167.6	300	In Use

TABLE 4. Complex 7 SPRING DEVELOPMENT
SUMMARY OF CHEMICAL ANALYSIS

Method of Analysis No. M214 & M215 EPA 200.7	Constituent	Federal Max Levels <2 MPN/100 ml	Spring No. 7 2/19/97	Bore-Holes		
				7 3/21/96	7A 3/21/96	7B 3/21/96
	e.coli		ND	ND	ND	ND
	Aluminum	0.20	ND	ND	ND	ND
	Antimony		ND	ND	ND	ND
	Arsenic	0.05	ND	ND	ND	ND
	Barium	2.00	ND	ND	ND	ND
	Beryllium	0.00	ND	ND	ND	ND
	Cadmium	0.01	ND	ND	ND	ND
	Calcium	NR	21.40	22.04	21.73	24.54
	Chromium	0.10	ND	ND	ND	ND
	Copper	1.00	ND	ND	ND	ND
	Iron	0.30	ND	ND	ND	ND
	Lead	0.01	ND	ND	ND	ND
	Magnesium	NR	3.90	4.20	3.53	3.92
	Manganese	0.05	ND	ND	ND	ND
	Mercury	0.00	ND	ND	ND	ND
	Nickel	0.10	ND	ND	ND	ND
	Potassium	NR	1.60	1.61	1.66	1.68
	Selenium		ND	ND	ND	ND
	Silver	0.10	ND	ND	ND	ND
	Sodium	NR	12.43	12.25	13.27	19.28
	Thallium	0.00	ND	ND	ND	ND
	Zinc	5.00	ND	ND	ND	ND
	Fluoride	2.40	ND	ND	ND	ND
EPA Method 340.2	Total Alkalinity	NR	63.00	61.00	53.00	76.00
EPA Method 310.1	Bicarbonate Alkalinity	NR	76.86	74.42	153.00	92.72
	Carbonate Alkalinity		ND	ND	ND	ND
EPA Method 300	Bromide	NR	ND	ND	ND	ND
	Chloride	250.00	16.22	17.78	22.27	22.54
	Nitrate	45.00	1.95	2.08		1.92
	Phosphate		ND	ND	2.89	0.14
	Silica	NR	34.00	34.60	35.22	32.83
	Sulfate	250.00	3.30	3.73	4.10	3.92
	pH	NR	6.97	6.78	6.76	7.41
EPA Method 150.1	Electric Conductivity	250 umhos/cm	213.62	205.20	210.27	252.72
EPA Method 120.1	Total Hardness	NR	69.50	72.30	68.80	77.40
EPA Method 130.2	Total Dissolved Solids	NR	128.00	158.00	153.00	157.00
EPA Method 160.1	Color	NR	ND	ND	ND	ND
EPA Method 110.2	Odor	NR	ND	ND	ND	ND
EPA Method 140.1	Turbidity	5.00	ND	ND	ND	ND
EPA Method 180.1						

Concentrations reported in mg/L unless otherwise specified.
 ND = concentration below detection limit for method of analysis
 NR = no required standard

APPENDIX A
DHS Certification Documents

DEPARTMENT OF HEALTH SERVICES

714/744 P Street (MS-357)
P.O. Box 942732
Sacramento, CA 94234-7320
(916) 327-8041
(916) 322-6326 FAX



May 7, 1997

Mr. Art Ramirez
Great Spring Waters of America
601 E. Potrero Grande Drive
Monterey Park, CA 91754

Dear Mr. Ramirez:

This is in response to your request by facsimile to Ms. Laura Flores, dated April 23, 1997, for a letter confirming your firm's sources which are currently licensed in California.

Water from your firm's 12 spring sites, located on Arrowhead property in the San Bernadino Mountains along the south slopes of Strawberry Canyon two miles south-west of Rim Forrest, was classified on September 13, 1994 as spring water pursuant to the Health and Safety Code Section 1111¹⁰(a)(8). The classification is currently effective. The sources are designated by your firm as #1, #1A, #2, #3, #7, #7A, #7B, #7C, #8, #10, #11 and #12. The 1994 determination for the classification was based on our inspection of the sites and the information submitted by you including the analysis of water and hydrogeological study reports.

If you have questions or should require additional information, please call me at (916) 327-8041.

Sincerely,

A handwritten signature in cursive script that reads "Chang R. Lee".

Chang R. Lee, Ph.D.
Food and Drug Scientist
Food and Drug Branch

DEPARTMENT OF HEALTH SERVICES
FOOD AND DRUG BRANCH

PRIVATE WATER SOURCE OPERATOR LICENSE

GREAT SPRING WATERS OF AMERICA - #7
STRAMBERRY CANYON
RIM FOREST, CA 91754



LICENSE NO: 85070 EXPIRATION DATE: 12/31/97

THE PERSON NAMED HEREIN IS LICENSED TO OPERATE A PRIVATE WATER SOURCE FROM THE ISSUE DATE TO AND INCLUDING THE EXPIRATION DATE. THIS LICENSE IS ISSUED IN ACCORDANCE WITH THE PROVISIONS OF DIVISION 104, PART 5, CHAPTER 5, ARTICLE 12, OF THE CALIFORNIA HEALTH AND SAFETY CODE AND IS NOT TRANSFERABLE TO ANY OTHER PERSON OR PLACE

ISSUE DATE: 03/21/97

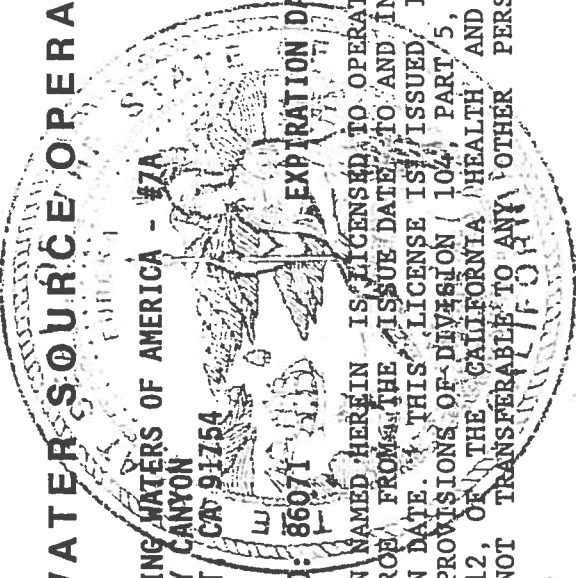
DISTRICT: 37

DEPARTMENT OF HEALTH SERVICES
FOOD AND DRUG BRANCH

PRIVATE WATER SOURCE OPERATOR LICENSE

GREAT SPRING WATERS OF AMERICA - #7A
STRAWBERRY CANYON
RIM FOREST CA 91754

LICENSE NO: 86071 EXPIRATION DATE: 12/31/97



THE PERSON NAMED HEREIN IS LICENSED TO OPERATE A PRIVATE WATER SOURCE FROM THE ISSUE DATE TO AND INCLUDING THE EXPIRATION DATE. THIS LICENSE IS ISSUED IN ACCORDANCE WITH THE PROVISIONS OF DIVISION 104, PART 5, CHAPTER 5, ARTICLE 12, OF THE CALIFORNIA HEALTH AND SAFETY CODE AND IS NOT TRANSFERABLE TO ANY OTHER PERSON OR PLACE

ISSUE DATE: 03/21/97

DISTRICT: 37

DEPARTMENT OF HEALTH SERVICES
FOOD AND DRUG BRANCH

PRIVATE WATER SOURCE OPERATOR LICENSE

GREAT SPRING WATERS OF AMERICA - #7B
STRAWBERRY CANYON
RIM FOREST
CAV 91754



LICENSE NO: 86072 EXPIRATION DATE: 12/31/97

THE PERSON NAMED HEREIN IS LICENSED TO OPERATE A PRIVATE WATER SOURCE FROM THE ISSUE DATE TO AND INCLUDING THE EXPIRATION DATE. THIS LICENSE IS ISSUED IN ACCORDANCE WITH THE PROVISIONS OF DIVISION 104, PART 5, CHAPTER 5, ARTICLE 12, OF THE CALIFORNIA HEALTH AND SAFETY CODE AND IS NOT TRANSFERABLE TO ANY OTHER PERSON OR PLACE

ISSUE DATE: 03/21/97

DISTRICT: 37

DEPARTMENT OF HEALTH SERVICES
FOOD AND DRUG BRANCH

PRIVATE WATER SOURCE OPERATOR LICENSE

GREAT SPRING WATERS OF AMERICA - #7C
STRAMBERRY CANYON
RIM FOREST CA 91754



LICENSE NO: 86073 EXPIRATION DATE: 12/31/97

THE PERSON NAMED HERIN IS LICENSED TO OPERATE A PRIVATE WATER SOURCE FROM THE ISSUE DATE TO AND INCLUDING THE EXPIRATION DATE. THIS LICENSE IS ISSUED IN ACCORDANCE WITH THE PROVISIONS OF DIVISION 104, PART 5, CHAPTER 5, ARTICLE 12, OF THE CALIFORNIA HEALTH AND SAFETY CODE AND IS NOT TRANSFERABLE TO ANY OTHER PERSON OR PLACE

ISSUE DATE: 03/21/97

DISTRICT: 37

APPENDIX B
Well Construction Records

County of San Bernardino - Environmental Public Works Agency
DEPARTMENT OF ENVIRONMENTAL HEALTH SERVICES
385 North Arrowhead Avenue, San Bernardino, CA 92415 0160

#1

DO NOT FILL IN

Permit Number _____
 Expiration _____
 FF _____
 FA _____
 SN _____

WELL PERMIT
(Please Print)

DO NOT FILL IN

Date _____
 Amount \$ _____
 Receipt Number _____
 By _____

COUNTY RECORDS SHOW LEGAL
OWNER TO BE GOVERNMENT

1. OWNER: Name Arrowhead Drinking Water
 Mailing Address 6015 Estrella Grande Dr
 City Montrose Park Zip 91754
 Site Address SE 1/4, Sec 30
 City Prim Forest Zip _____
 Telephone Number (714) 858-5394

Items 6 through 10 to be estimated for new wells, exact for all other wells.

5. ANNULAR SEAL: Seal Depth 1000 ft.
 Furnished by: Owner Contractor
 Driven Conductor Dia. _____ in., Wall (Gage) _____
 Sealing Material Grout, Thickness _____ in.

2. WELL DRILLER:
 Contractor Spring Water Systems
 Date Start 8/18/92
 Date Complete 8/30/92

6. DEPTH OF WELL (feet):
 Proposed 3000 Existing _____
 DIAMETER OF BORE (in.): 2"

7. CASING INSTALLED:

<input checked="" type="checkbox"/> Steel	<input type="checkbox"/> Plastic	<input type="checkbox"/> Other	
From (ft.)	To (ft.)	Dia. (in.)	Wall (Gage)
<u>0</u>	<u>1000</u>	<u>2"</u>	<u>5/16 galv.</u>

3. WELL USE (check):
 Community Horizontal Other
 Individual Test
 Agricultural Monitoring
 Dairy Public Water Supply

GRAVEL PACK: Yes No
 From _____ to _____ ft.

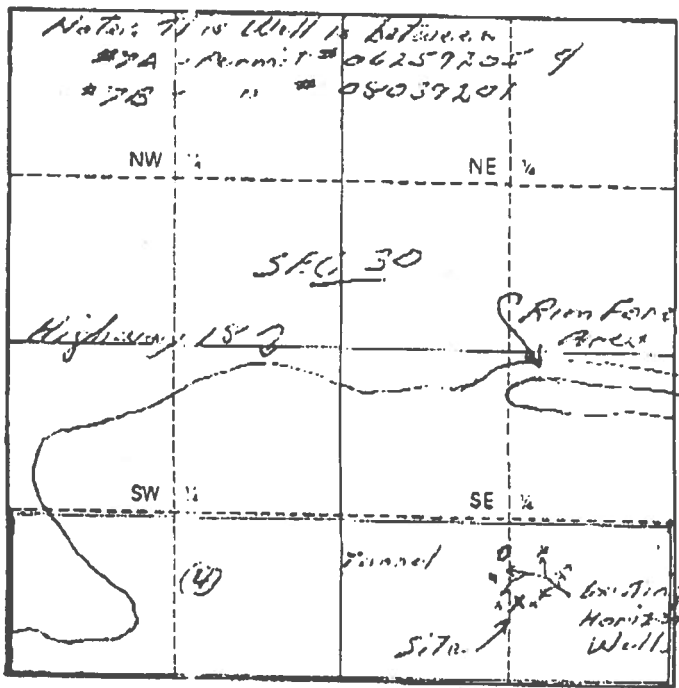
4. TYPE OF WORK (check):
 New Reconstruction Destruction

8. PERFORATIONS (if applicable):
 From 1000 to 3000 ft.

9. SEALED ZONES (if applicable):
 From _____ to _____ ft.

SECTION MAP - DO NOT FILL IN

Scale: 1 inch = 1/4 mile



10. LOCATION INFORMATION: 51-1D

(a) Township 2 N/S Range 3 W/W
 Section 30

(b) Assessor's Parcel No. 0236-031-04

(c) Solid or liquid waste disposal site within two miles?
 Yes No
 Location _____

(Continue on reverse side)

NO M.A.V.

DO NOT FILL IN

Seal _____
 Cap _____
 Chuck Valve _____
 Electricals _____
 Slab _____
 Tag _____
 Building and Safety Notified _____

TRIPPLICATE
Owner's Copy

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

Page 1 of 1
Owner's Well No. New 7
Date Work Began 8/29/72 Ended 7/21/72
Local Permit Agency San Bernardino Co. Environment 73 H-114
Permit No. 85241207 Permit Date 8/17/72

No. **485775**

DWR USE ONLY - DO NOT FILL IN -

STATE WELL NO./STATION NO.

LATITUDE _____ LONGITUDE _____

APN/HS-OTHER _____

GEOLOGIC LOG

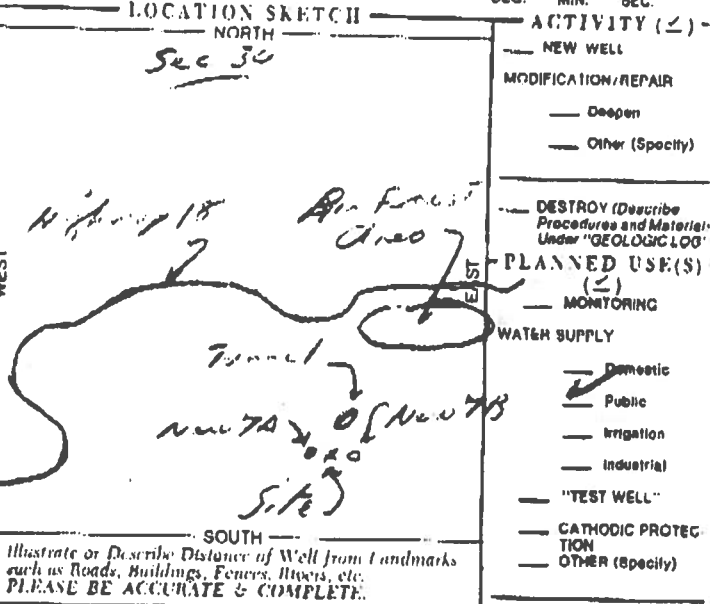
ORIENTATION (Z)		DEPTH TO FIRST WATER - (FT) BELOW SURFACE	DESCRIPTION
VERTICAL	HORIZONTAL	ANGLE (SPECIFY)	
DEPTH FROM SURFACE			
Fl.	to Fl.		
0	20		1/2" sand & gravel
20	110		1/2" sand & gravel
110	176		1/2" sand & gravel
176	187		Fractured bed
187	238		1/2" sand & gravel
238	269		1/2" sand & gravel
269	270		1/2" sand & gravel

WELL OWNER

Name Arrowhead Springs Water Co.
Mailing Address 601 E. 12th St. Arrowhead Springs, CA 91754
CITY Arrowhead Springs STATE CA ZIP 91754

WELL LOCATION

Address 100 SE 1/4 of Sec 30
City Arrowhead Springs
County San Bernardino
APN Book 2336 Page 051 Parcel 09
Township 2N Range 7W Section 30
Latitude 34 11 10 NORTH Longitude 117 30 31 WEST



DRILLING METHOD R-Taylor Core FLUID _____

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL NA (ft.) & DATE MEASURED NA
ESTIMATED YIELD 45 (GPM) & TEST TYPE 1 hour
TEST LENGTH 48 (Hrs.) TOTAL DRAWDOWN NA (ft.)

* May not be representative of a well's long-term yield

TOTAL DEPTH OF BORING 270 (Feet)
TOTAL DEPTH OF COMPLETED WELL 270 (Feet)

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	TYPE (Z)	CASING(S)			
			MATERIAL GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	12 1/2	2 1/2"	Galv	2	5/16"	
12 1/2	18 1/2	4"	Galv	1 1/2	5/16"	3/16" HD.
18 1/2	27 0	12"	Galv	1 1/4	1/4"	1/16" HD.

DEPTH FROM SURFACE	ANNULAR MATERIAL			
	CEMENT (Z)	BEN-TONITE (Z)	FILL (Z)	FILTER PACK (TYPE/SIZE)
0	12 1/2			Gravel under pressure

- ATTACHMENTS (Z)**
- Geologic Log
 - Well Construction Diagram
 - Geophysical Log(s)
 - Soil/Water Chemical Analysis
 - Other _____

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Spring Water Systems
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 1325 W. 12th St. Arrowhead Springs, CA 91754
CITY Arrowhead Springs STATE CA ZIP 91754

7A

DO NOT FILL IN

Permit Number 06259205
 Expiration 6-2-93
 FF _____
 FA _____
 SN _____

WELL PERMIT
 (Please Print)

DO NOT FILL IN

Date 6-16-92
 Amount \$ 342.00
 Receipt Number 751219
 By Spring Water Sup. CR #1896

1. OWNER: Name Remedial Drinking Water Co.
 Mailing Address 225 So. Main, San Bern Co.
 City San Bern Co. Zip 92400
 Site Address 56 1/2 Ave. 80
 City San Bern Co. Zip _____
 Telephone Number (951) 580-5322

Items 6 through 10 to be estimated for new wells, exact for all other wells.

5. ANNULAR SEAL: Seal Depth 1000 ft.
 Furnished by: Owner Contractor
 Driven Conductor Dia. _____ in., Wall (Gage) _____
 Sealing Material Grout, Thickness _____ in.

2. WELL DRILLER:
 Contractor Spring Water Sup. Co. Name
 Date Start 6-2-92
 Date Complete 6-2-92

6. DEPTH OF WELL (feet):
 Proposed 330 Existing _____
 DIAMETER OF BORE (in.): 2.0

7. CASING INSTALLED:
 Steel Plastic Other

From (ft.)	To (ft.)	Dia. (in.)	Wall (Gage)
<u>0</u>	<u>1000</u>	<u>2.0</u>	<u>Std. Gage</u>

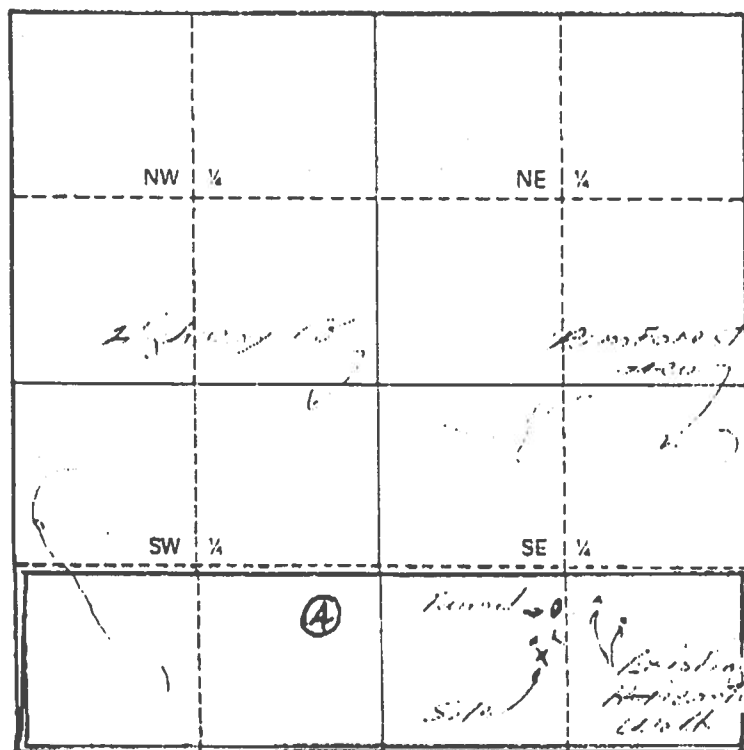
3. WELL USE (check):
 Community Horizontal Other
 Individual Test
 Agricultural Monitoring
 Dairy Public Water Supply

GRAVEL PACK: Yes No
 From _____ to _____ ft.

4. TYPE OF WORK (check):
 New Reconstruction Destruction

8. PERFORATIONS (if applicable):
 From 1000 to 3300 ft.

SECTION MAP - DO NOT FILL IN Scale: 1 inch = 1/4 mile



9. SEALED ZONES (if applicable):
 From _____ to _____ ft.

10. LOCATION INFORMATION: 93-D6
 (a) Township 2 N Range 3 W
 Section 32
 (b) Assessor's Parcel No. 0336-031-04
 (c) Solid or liquid waste disposal site within two miles?
 Yes No
 Location _____

(Continue on reverse side)

DO NOT FILL IN

Seal _____
 Cap _____
 Check Valve _____
 Electricals _____
 Slab _____
 Tag _____
 Building and Safety Notified _____

TRIPPLICATE
Owner's Copy

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

OWNER USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO. _____

LATITUDE _____ LONGITUDE _____

APN/MS/OTHER _____

Page 1 of 1
Owner's Well No. New 7A
Date Work Began 7/7/92 Ended 9/4/92
Local Permit Agency San Bernardino Co. Environmental Health
Permit No. 06259205 Permit Date 6/16/92

No. **485773**

GEOLOGIC LOG

ORIENTATION (Z) VERTICAL HORIZONTAL ANGLE _____ (SPECIFY)
DEPTH TO FIRST WATER 96 (FEET) BELOW SURFACE

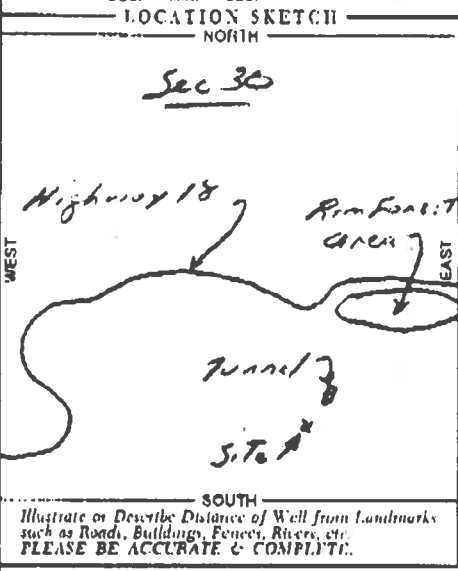
DEPTH FROM SURFACE		DESCRIPTION
Fl	To	
0	30	Decomposed Granite
30	90	Alt. Med. & Hard Rk.
90	96	Clayey Med Rk. & Clay
96	110	Fractured Med. Rk.
110	139	Med & Hard Rk.
139	152	Hard Rk.
152	187	Alt Med & Hard Rk.
187	230	Alt Med. & Hard Rk. (Fractured)

WELL OWNER

Name Arrowhead Drinking Water Co.
Mailing Address 601 E. Rios Grande Dr
Monterey Park Ca. 91754
CITY _____ STATE _____ ZIP _____

WELL LOCATION

Address In SE 1/4 of Sec 30
City S. of Rim Forest
County San Bernardino
APN Book 0336 Page 031 Parcel 04
Township 3N Range 3W Section 30
Latitude 34 13 30 NORTH Longitude 117 13 30 WEST



ACTIVITY (Z)

NEW WELL

MODIFICATION/REPAIR

Deepen
 Other (Specify) _____

DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (Z)

MONITORING

WATER SUPPLY

Domestic
 Public
 Irrigation
 Industrial

"TEST WELL"

CATHODIC PROTECTION
 OTHER (Specify) _____

DRILLING METHOD Rotary Core FLUID _____

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL NA (FEET) & DATE MEASURED NA

ESTIMATED YIELD 100 (GPM) & TEST TYPE Flow

TEST LENGTH 500 (FTS.) TOTAL DRAWDOWN NA (FEET) 35 ft

* May not be representative of a well's long term yield

TOTAL DEPTH OF BORING 230 (Feet)
TOTAL DEPTH OF COMPLETED WELL 230 (Feet)

DEPTH FROM SURFACE	BORE-HOLE DIA (Inches)	CASING(S)						DEPTH FROM SURFACE	ANNULAR MATERIAL			
		TYPE (Z)	MATERIAL/GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	FL. TO FL.		CE-MENT (Z)	BEN-TONITE (Z)	FILL (Z)	FILTER PACK (TYPE/SIZE)
0	95	2 1/8	Std Galv.	2	3/16"	3/16"	0	95				Grout pack
93.6	117.6	2	Galv.	1 1/2	3/16"	3/16"						grout pack
176.6	230	2	Galv.	1 1/4	1/16"	1/16"						grout pack

ATTACHMENTS (Z)

Geologic Log
 Well Construction Diagram
 Geophysical Log(s)
 Rad/Water Chemical Analyses
 Other _____

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Spring Water Systems
(PERSON, FIRM, OR CORPORATION) (TYPE OR PRINTED)

ADDRESS 1828 Old Waterman Gr Rd San Bern Co. Ca. 92404
CITY _____ STATE _____ ZIP _____

Signed Steve P. Nelson DATE SIGNED 10/1/92 304075
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

County of San Bernardino - Environmental Public Works Agency
DEPARTMENT OF ENVIRONMENTAL HEALTH SERVICES
385 North Arrowhead Avenue, San Bernardino, CA 92415-0160

7B

DO NOT FILL IN

Permit Number 08034201
 Expiration 8-3-93
 FF _____
 FA _____
 SN _____

WELL PERMIT
(Please Print)

DO NOT FILL IN

Date 7-21-92
 Amount \$ 370.00
 Receipt Number 760369
 By Spring Water Systems CA #1910

1. OWNER: Name Arrowhead Drinking Water Co.
 Mailing Address 1000 North Arrowhead Dr.
 City Arrowhead Park Zip 92754
 Site Address 500 W. Sun St.
 City San Gabriel CA Zip _____
 Telephone Number (213) 555-8394

Items 6 through 10 to be estimated for new wells, exact for all other wells.

5. ANNULAR SEAL: Seal Depth 100 ft.
 Furnished by: Owner Contractor
 Driven Conductor Dia. _____ in., Wall (Gage) _____
 Sealing Material Cement, Thickness _____ in.

2. WELL DRILLER:
 Contractor Spring Water Systems
 Date Start 7/21/92
 Date Complete 8/12/92

6. DEPTH OF WELL (feet):
 Proposed 300 Existing _____
 DIAMETER OF BORE (in.): 2"

3. WELL USE (check):
 Community Horizontal Other
 Individual Test
 Agricultural Monitoring
 Dairy Public Water Supply

7. CASING INSTALLED:
 Steel Plastic Other

From (ft.)	To (ft.)	Dia. (in.)	Wall (Gage)
<u>0</u>	<u>100</u>	<u>2"</u>	<u>57lb galv.</u>

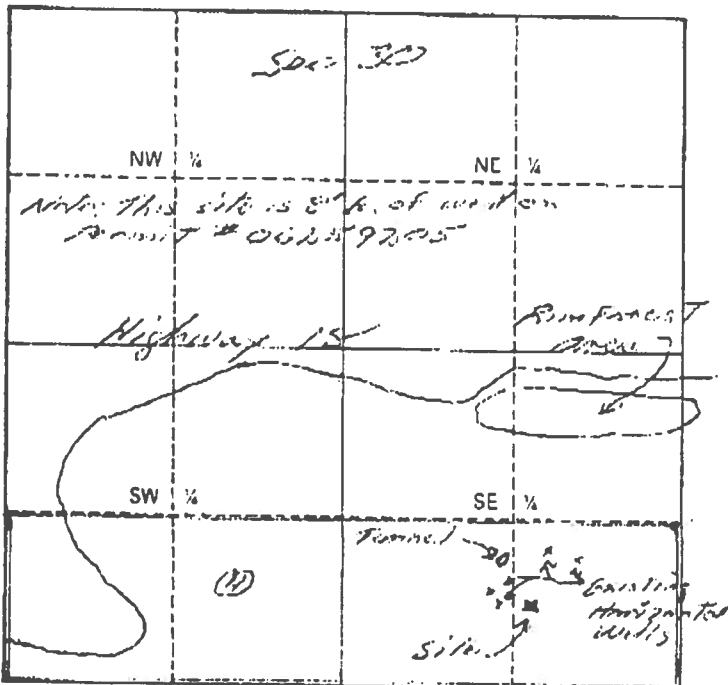
GRAVEL PACK: Yes No
 From _____ to _____ ft.

4. TYPE OF WORK (check):
 New Reconstruction Destruction

8. PERFORATIONS (if applicable):
 From 100 to 300 ft.

9. SEALED ZONES (if applicable):
 From _____ to _____ ft.

SECTION MAP - DO NOT FILL IN Scale: 1 inch = 1/4 mile



10. LOCATION INFORMATION: 93-06

(a) Township 2 NRS Range 3 EW
 Section 30

(b) Assessor's Parcel No. 0330-031-004

(c) Solid or liquid waste disposal site within two miles?
 Yes No
 Location _____

(Continue on reverse side)

DO NOT FILL IN

Seal _____
 Cap _____
 Check Valve _____
 Electricals _____
 Slab _____
 Tag _____
 Building and Safety Notified _____

TRIPPLICATE
Owner's Copy

Page 1 of 1

Owner's Well No. New 7B

Date Work Began 7/21/92 Ended 9/11/92 No. 485774

Local Permit Agency San Bernardino Co. Environmental Health

Permit No. 05059301 Permit Date 7/21/92

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

— DWR USE ONLY — DO NOT FILL IN —

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN, TRS, OTHER

GEOLOGIC LOG

ORIENTATION (Z)		VERTICAL	HORIZONTAL	ANGLE	(SPECIFY)
DEPTH FROM SURFACE		DEPTH TO FIRST WATER <u>138</u> (Ft) BELOW SURFACE			
Ft	to	Ft	DESCRIPTION		
0	28		Describe material, grain size, color, etc.		
28	120	217	Mud & Hard Rk.		
120	121		Clay		
121	137	589	Silt & clay Mud Rk.		
137	150		Mud silt & Hard Rk.		
150	199		Mud & Hard Rk.		
199	206		Mud Rk.		
206	214		Mud Rk.		
214	245		Silt & clay Mud Rk.		
245	340		Mud Rk.		
340	397		Silt.		

WELL OWNER

Name Granada Springs Water Co.

Mailing Address 601 E. Patricia Grande Dr

Monte Vista Park Co. 91754

CITY STATE ZIP

WELL LOCATION

Address 7th SE 1/4 of Sec 30

City S. of Ran Forest

County San Bernardino

APN Book 0236 Page 031 Parcel 04

Township 2N Range 34E Section 30

Latitude 34 13 30 NORTH Longitude 117 13 52 WEST

DEG. MIN. SEC. DEG. MIN. SEC.

LOCATION SKETCH

WEST EAST

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

Sec 30

Highway 18

River

7th St

Monte Vista Park

to site

ACTIVITY (Z)

NEW WELL

MODIFICATION/REPAIR

— Deepen

— Other (Specify)

DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (Z)

MONITORING

WATER SUPPLY

Domestic

Public

Irrigation

Industrial

"TEST WELL"

CATHODIC PROTECTION

OTHER (Specify)

DRILLING METHOD Rotary Core FLUID

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL NA (Ft) & DATE MEASURED NA

ESTIMATED YIELD 45 (GPM) & TEST TYPE Flow

TEST LENGTH 22 (Ft) TOTAL DRAWDOWN NA (Ft) 25g

* May not be representative of a well's long-term yield.

TOTAL DEPTH OF BORING 397 (Feet)

TOTAL DEPTH OF COMPLETED WELL 317 (Feet)

DEPTH FROM SURFACE	RORE HOLE DIA. (Inches)	CASING(S)						DEPTH FROM SURFACE	ANNULAR MATERIAL			
		TYPE (Z)	MATERIAL GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	CEMENT (Z)		BEN-TONITE (Z)	FILL (Z)	FILTER PACK (TYPE/SIZE)	
0	121	2 1/2	Galu.	2	5/8"		0	121				Gravel and pressure.
119.8	252.8	2	Galu.	1 1/2	5/8"							
252.8	397	1 1/2	Galu.	1 1/4	1/2"	3/4" x 1/2"						

ATTACHMENTS (Z)

Geologic Log

Well Construction Diagram

Geophysical Log(s)

Soil-Water Chemical Analyses

Other

ATTACH ADDITIONAL INFORMATION IF IT EXISTS

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Spring Water Systems

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 1828 Old Vista Way CITY San Bern Co STATE CA ZIP 92404

Signed [Signature] DATE SIGNED 10/1/92 C.S. LICENSE NUMBER 304075

WELL DRILLER/ADJUSTER SIGNATURE

DUPLICATE
Driller's Copy

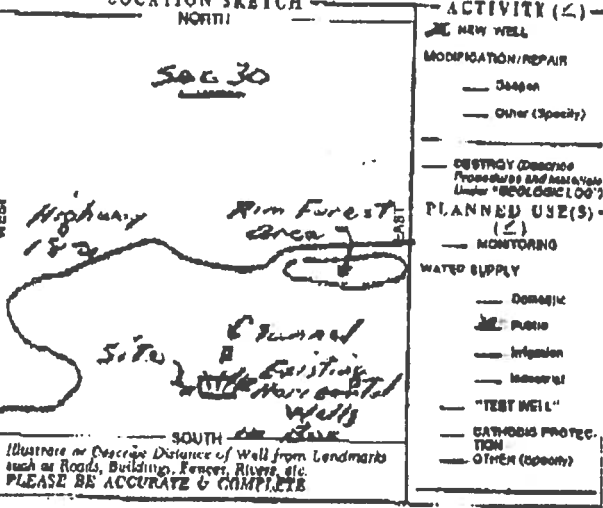
STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

Page 1 of 1
Owner's Well No. 7C
Date Work Began 4/21/93 Ended 7/15/93 No. 485779
Local Permit Agency San Bernardino Fairmount of Health
Permit No. 2124501 Permit Date 4/21/93

STATE WELL NO./STATION NO.
LATITUDE
LONGITUDE
APN/RS/DIR-EN

GEOLOGIC LOG
ORIENTATION: VERTICAL HORIZONTAL ANGLE (SPECIFY):
DEPTH TO FIRST WATER 190 (ft) BELOW SURFACE
DESCRIPTION
Describe material, grain size, color, etc.
0-5 Overburden
5-34 Decomposed Granite
34-117 Hard Hard Rk.
117-165 ALT. Hard & Hard Rk.
165-190 ALT. Hard & Hard Rk.
190-246 Hard Hard & Hard Rk.
246-257 Soft & Hard Rk.
257-261 Hard Rk.
261-300 ALT. Hard Hard & Hard Rk.

WELL OWNER
Name Arrowhead Drinking Water Co.
Mailing Address 6060 Paterson Circle Dr.
Montebello Ca 91754
WELL LOCATION
Address In SE 1/4 of Sec 30
City S. of Rim Forest
County San Bernardino
APN Book 2336 Page 031 Parcel 04
Township 2N Range 3W Section 30
Latitude 34 13 30 NORTH Longitude 117 13 52 WEST



- ACTIVITY ()
 NEW WELL
MODIFICATION/REPAIR
— Season
— Other (Specify)
DESTROY Describe Procedures and materials Under "GEOLOGIC LOG"
PLANNED USE(S) ()
— MONITORING
WATER SUPPLY
— Domestic
 Pestic
— Irrigation
— Industrial
"TEST WELL"
CATHODIC PROTECTION
OTHER (Specify)

DRILLING METHOD Rotary Core FLUID
WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH OF STATIC WATER LEVEL 416 (ft) & DATE MEASURED NA
ESTIMATED YIELD 60 (GPM) & TEST TYPE Flow
TEST LENGTH 24 (hrs.) TOTAL DRAWDOWN NA (ft.)
* May not be representative of a well's long-term yield.

TOTAL DEPTH OF BORING 300 (feet)
TOTAL DEPTH OF COMPLETED WELL 300 (feet)

DEPTH FROM SURFACE Ft. to Ft.	BORE- HOLE DIA. (inches)	CASING(S)				MATERIAL / GRADE	INTERNAL DIAMETER (inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (inches)	DEPTH FROM SURFACE Ft. to Ft.	ANNULAR MATERIAL			
		TYPE ()	SCREEN	CLUSTER	PIPE						CE- MENT ()	BEN- TONITE ()	FILL ()	FILTER PACK (TYPE/SIZE)
0-167.6	2 1/2					Std. Galv	2	5/8 x 40		0-167.6				Grout and Pebbles
167.6-240	2					Galv	1 3/4	5/8 x 40	3/4" holes					
240-300	1 1/2					Galv	1 1/4	5/8 x 40	3/4" holes					

- ATTACHMENTS ()
— Geologic Log
— Well Construction Diagram
— Geophysical Log(s)
— Soil/Water Chemical Analysis
— Other

CERTIFICATION STATEMENT
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME Spring Water Systems
(PERSON, FIRM OR CORPORATION (TYPED OR PRINTED))
ADDRESS 1621 1/2 Old Waterman Exp. Rd. San Bern Co 91754
Signature Harold P. Nelson Date Signed 4/26/93 Job No. 104025
WELL COMPLETION REPORT

7C 6/93

APPENDIX C
Hydraulic Testing Data

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
2/25/97 14:15	307.8	0.2
2/25/97 14:30	309.8	0.0
2/25/97 14:45	308.9	0.0
2/25/97 15:00	310.0	0.0
2/25/97 15:15	309.8	0.0
2/25/97 15:30	309.5	0.0
2/25/97 15:45	310.5	0.0
2/25/97 16:00	309.0	0.0
2/25/97 16:15	307.3	0.0
2/25/97 16:30	307.3	0.0
2/25/97 16:45	306.8	0.0
2/25/97 17:00	307.9	0.0
2/25/97 17:15	308.1	0.0
2/25/97 17:30	307.5	0.0
2/25/97 17:45	306.9	0.0
2/25/97 18:00	308.2	0.0
2/25/97 18:15	307.8	0.0
2/25/97 18:30	308.9	0.0
2/25/97 18:45	308.3	0.0
2/25/97 19:00	308.0	0.0
2/25/97 19:15	306.3	0.0
2/25/97 19:30	306.8	0.0
2/25/97 19:45	306.7	0.0
2/25/97 20:00	306.7	0.0
2/25/97 20:15	308.3	0.0
2/25/97 20:30	307.2	0.0
2/25/97 20:45	306.7	0.0
2/25/97 21:00	306.7	0.0
2/25/97 21:15	307.9	0.0
2/25/97 21:30	308.2	0.0
2/25/97 21:45	308.2	0.0
2/25/97 22:00	308.2	0.0
2/25/97 22:15	309.0	0.0
2/25/97 22:30	308.6	0.0
2/25/97 22:45	308.1	0.0
2/25/97 23:00	309.4	0.0
2/25/97 23:15	309.8	0.0
2/25/97 23:30	310.2	0.0
2/25/97 23:45	311.3	0.0
2/26/97 0:00	309.4	0.0
2/26/97 0:15	310.2	0.0
2/26/97 0:30	310.7	0.0
2/26/97 0:45	311.2	0.0
2/26/97 1:00	310.5	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
2/26/97 1:15	312.3	0.0
2/26/97 1:30	312.9	0.0
2/26/97 1:45	311.8	0.0
2/26/97 2:00	311.6	0.0
2/26/97 2:15	312.7	0.0
2/26/97 2:30	312.8	0.0
2/26/97 2:45	313.3	0.0
2/26/97 3:00	313.9	0.0
2/26/97 3:15	313.4	0.0
2/26/97 3:30	313.5	0.0
2/26/97 3:45	313.6	0.0
2/26/97 4:00	313.9	0.0
2/26/97 4:15	313.5	0.0
2/26/97 4:30	314.7	0.0
2/26/97 4:45	314.6	0.0
2/26/97 5:00	314.0	0.0
2/26/97 5:15	313.9	0.0
2/26/97 5:30	313.8	0.0
2/26/97 5:45	313.9	0.0
2/26/97 6:00	314.5	0.0
2/26/97 6:15	314.3	0.0
2/26/97 6:30	314.3	0.0
2/26/97 6:45	313.8	0.0
2/26/97 7:00	313.4	0.0
2/26/97 7:15	313.1	0.0
2/26/97 7:30	313.1	0.0
2/26/97 7:45	313.0	0.0
2/26/97 8:00	312.8	0.0
2/26/97 8:15	313.4	0.0
2/26/97 8:30	313.6	0.0
2/26/97 8:45	313.6	0.0
2/26/97 9:00	313.5	0.0
2/26/97 9:15	312.8	0.0
2/26/97 9:30	312.6	0.0
2/26/97 9:45	312.3	0.0
2/26/97 10:00	312.0	0.0
2/26/97 10:15	311.7	0.0
2/26/97 10:30	311.4	0.0
2/26/97 10:45	311.5	0.0
2/26/97 11:00	311.3	126.0
2/26/97 11:15	251.2	773.2
2/26/97 11:30	229.9	770.3
2/26/97 11:45	220.8	769.0
2/26/97 12:00	215.6	768.0
2/26/97 12:15	211.0	768.5

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
2/26/97 12:30	204.1	767.6
2/26/97 12:45	199.0	762.8
2/26/97 13:00	194.0	761.3
2/26/97 13:15	189.0	763.5
2/26/97 13:30	185.0	763.8
2/26/97 13:45	181.7	739.1
2/26/97 14:00	200.1	482.8
2/26/97 14:15	206.2	482.4
2/26/97 14:30	206.8	482.2
2/26/97 14:45	205.9	480.2
2/26/97 15:00	204.5	481.5
2/26/97 15:15	203.0	482.1
2/26/97 15:30	202.1	482.1
2/26/97 15:45	200.6	481.2
2/26/97 16:00	199.7	480.9
2/26/97 16:15	216.6	93.7
2/26/97 16:30	240.0	0.0
2/26/97 16:45	245.9	0.0
2/26/97 17:00	248.9	0.0
2/26/97 17:15	251.0	0.0
2/26/97 17:30	251.6	0.0
2/26/97 17:45	253.1	0.0
2/26/97 18:00	253.0	0.0
2/26/97 18:15	254.0	0.0
2/26/97 18:30	254.1	0.0
2/26/97 18:45	253.6	0.0
2/26/97 19:00	254.8	0.0
2/26/97 19:15	254.6	0.0
2/26/97 19:30	253.5	0.0
2/26/97 19:45	253.8	0.0
2/26/97 20:00	253.7	0.0
2/26/97 20:15	253.9	0.0
2/26/97 20:30	253.3	0.0
2/26/97 20:45	251.6	0.0
2/26/97 21:00	252.2	0.0
2/26/97 21:15	253.0	0.0
2/26/97 21:30	253.5	0.0
2/26/97 21:45	253.1	0.0
2/26/97 22:00	252.5	0.0
2/26/97 22:15	252.0	0.0
2/26/97 22:30	252.4	0.0
2/26/97 22:45	251.6	0.0
2/26/97 23:00	252.0	0.0
2/26/97 23:15	251.2	0.0
2/26/97 23:30	251.3	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
2/26/97 23:45	250.3	0.0
2/27/97 0:00	250.6	0.0
2/27/97 0:15	251.3	0.0
2/27/97 0:30	251.8	0.0
2/27/97 0:45	251.0	0.0
2/27/97 1:00	250.8	0.0
2/27/97 1:15	250.2	0.0
2/27/97 1:30	250.0	0.0
2/27/97 1:45	249.9	0.0
2/27/97 2:00	249.0	0.0
2/27/97 2:15	249.8	0.0
2/27/97 2:30	249.8	0.0
2/27/97 2:45	248.9	0.0
2/27/97 3:00	249.4	0.0
2/27/97 3:15	247.4	0.0
2/27/97 3:30	247.7	0.0
2/27/97 3:45	248.1	0.0
2/27/97 4:00	248.3	0.0
2/27/97 4:15	248.2	0.0
2/27/97 4:30	248.3	0.0
2/27/97 4:45	247.9	0.0
2/27/97 5:00	247.3	0.0
2/27/97 5:15	246.9	0.0
2/27/97 5:30	247.1	0.0
2/27/97 5:45	246.5	0.0
2/27/97 6:00	247.2	0.0
2/27/97 6:15	247.3	0.0
2/27/97 6:30	245.2	0.0
2/27/97 6:45	245.6	0.0
2/27/97 7:00	245.4	0.0
2/27/97 7:15	245.1	0.0
2/27/97 7:30	245.9	0.0
2/27/97 7:45	244.8	0.0
2/27/97 8:00	244.4	0.0
2/27/97 8:15	243.7	0.0
2/27/97 8:30	243.8	0.0
2/27/97 8:45	243.9	0.0
2/27/97 9:00	244.0	0.0
2/27/97 9:15	244.2	0.0
2/27/97 9:30	243.3	0.0
2/27/97 9:45	243.3	0.0
2/27/97 10:00	243.5	0.0
2/27/97 10:15	242.5	0.0
2/27/97 10:30	241.1	0.0
2/27/97 10:45	241.0	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
2/27/97 11:00	241.8	0.0
2/27/97 11:15	242.8	0.0
2/27/97 12:00	208.5	0.0
2/27/97 12:15	209.1	0.0
2/27/97 12:30	209.2	0.0
2/27/97 12:45	208.4	0.0
2/27/97 13:00	206.7	0.0
2/27/97 13:15	207.3	0.0
2/27/97 13:30	207.2	0.0
2/27/97 13:45	207.5	0.0
2/27/97 14:00	207.6	0.0
2/27/97 14:15	207.5	0.0
2/27/97 14:30	207.1	0.0
2/27/97 14:45	206.9	0.0
2/27/97 15:00	206.8	0.0
2/27/97 15:15	206.8	0.0
2/27/97 15:30	206.4	0.0
2/27/97 15:45	206.1	0.0
2/27/97 16:00	206.4	0.0
2/27/97 16:15	206.2	0.0
2/27/97 16:30	205.1	0.0
2/27/97 16:45	204.7	0.0
2/27/97 17:00	205.3	0.0
2/27/97 17:15	204.5	0.0
2/27/97 17:30	204.6	0.0
2/27/97 17:45	204.2	0.0
2/27/97 18:00	203.8	0.0
2/27/97 18:15	203.5	0.0
2/27/97 18:30	203.4	0.0
2/27/97 18:45	203.4	0.0
2/27/97 19:00	202.9	0.0
2/27/97 19:15	202.2	0.0
2/27/97 19:30	202.5	0.0
2/27/97 19:45	202.1	0.0
2/27/97 20:00	201.6	0.0
2/27/97 20:15	201.5	0.0
2/27/97 20:30	200.9	0.0
2/27/97 20:45	200.3	0.0
2/27/97 21:00	200.5	0.0
2/27/97 21:15	200.0	0.0
2/27/97 21:30	199.7	0.0
2/27/97 21:45	199.0	0.0
2/27/97 22:00	198.9	0.0
2/27/97 22:15	198.5	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
2/27/97 22:30	197.6	0.0
2/27/97 22:45	197.4	0.0
2/27/97 23:00	197.6	0.0
2/27/97 23:15	197.6	0.0
2/27/97 23:30	197.3	0.0
2/27/97 23:45	196.6	0.0
2/28/97 0:00	196.2	0.0
2/28/97 0:15	195.4	0.0
2/28/97 0:30	195.2	0.0
2/28/97 0:45	195.3	0.0
2/28/97 1:00	195.1	0.0
2/28/97 1:15	194.6	0.0
2/28/97 1:30	194.1	0.0
2/28/97 1:45	194.0	0.0
2/28/97 2:00	193.8	0.0
2/28/97 2:15	193.2	0.0
2/28/97 2:30	193.2	0.0
2/28/97 2:45	193.2	0.0
2/28/97 3:00	193.0	0.0
2/28/97 3:15	192.8	0.0
2/28/97 3:30	192.2	0.0
2/28/97 3:45	191.7	0.0
2/28/97 4:00	191.5	0.0
2/28/97 4:15	191.5	0.0
2/28/97 4:30	191.1	0.0
2/28/97 4:45	190.3	0.0
2/28/97 5:00	189.9	0.0
2/28/97 5:15	189.8	0.0
2/28/97 5:30	189.4	0.0
2/28/97 5:45	188.9	0.0
2/28/97 6:00	188.6	0.0
2/28/97 6:15	188.3	0.0
2/28/97 6:30	187.8	0.0
2/28/97 6:45	187.5	0.0
2/28/97 7:00	187.1	0.0
2/28/97 7:15	186.5	0.0
2/28/97 7:30	185.9	0.0
2/28/97 7:45	185.0	0.0
2/28/97 8:00	185.0	0.0
2/28/97 8:15	184.5	0.0
2/28/97 8:30	184.4	0.0
2/28/97 8:45	183.7	0.0
2/28/97 9:00	183.4	0.0
2/28/97 9:15	182.8	0.0
2/28/97 9:30	182.5	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
3/16/97 8:15	57.0	0.0
3/16/97 8:30	56.9	0.0
3/16/97 8:45	56.3	0.0
3/16/97 9:00	56.0	0.0
3/16/97 9:15	55.8	0.0
3/16/97 9:30	55.6	0.0
3/16/97 9:45	55.7	0.0
3/16/97 10:00	56.2	0.0
3/16/97 10:15	56.4	0.0
3/16/97 10:30	56.3	0.0
3/16/97 10:45	56.2	0.0
3/16/97 11:00	55.8	0.0
3/16/97 11:15	55.3	0.0
3/16/97 11:30	55.3	0.0
3/16/97 11:45	55.5	0.0
3/16/97 12:00	55.6	0.0
3/16/97 12:15	55.7	0.0
3/16/97 12:30	56.1	0.0
3/16/97 12:45	55.7	0.0
3/16/97 13:00	55.7	0.0
3/16/97 13:15	55.8	0.0
3/16/97 13:30	55.9	0.0
3/16/97 13:45	55.6	0.0
3/16/97 14:00	56.2	0.0
3/16/97 14:15	56.0	0.0
3/16/97 14:30	55.3	0.0
3/16/97 14:45	55.5	0.0
3/16/97 15:00	55.5	0.0
3/16/97 15:15	55.2	0.0
3/16/97 15:30	55.3	0.0
3/16/97 15:45	55.2	0.0
3/16/97 16:00	54.6	0.0
3/16/97 16:15	54.7	0.0
3/16/97 16:30	54.9	0.0
3/16/97 16:45	55.1	0.0
3/16/97 17:00	55.1	0.0
3/16/97 17:15	55.0	0.0
3/16/97 17:30	54.9	0.0
3/16/97 17:45	54.5	0.0
3/16/97 18:00	54.0	0.0
3/16/97 18:15	53.5	0.0
3/16/97 18:30	53.5	0.0
3/16/97 18:45	53.6	0.0
3/16/97 19:00	52.6	0.0
3/16/97 19:15	52.3	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
3/16/97 19:30	51.9	0.0
3/16/97 19:45	51.7	0.0
3/16/97 20:00	51.8	0.0
3/16/97 20:15	51.7	0.0
3/16/97 20:30	51.2	0.0
3/16/97 20:45	50.8	0.0
3/16/97 21:00	50.9	0.0
3/16/97 21:15	50.7	0.0
3/16/97 21:30	50.4	0.0
3/16/97 21:45	50.3	0.0
3/16/97 22:00	50.7	0.0
3/16/97 22:15	50.6	0.0
3/16/97 22:30	50.8	0.0
3/16/97 22:45	50.7	0.0
3/16/97 23:00	51.3	0.0
3/16/97 23:15	51.0	0.0
3/16/97 23:30	50.9	0.0
3/16/97 23:45	50.6	0.0
3/17/97 0:00	51.0	0.0
3/17/97 0:15	50.8	0.0
3/17/97 0:30	50.9	0.0
3/17/97 0:45	51.5	0.0
3/17/97 1:00	51.0	0.0
3/17/97 1:15	50.8	0.0
3/17/97 1:30	50.7	0.0
3/17/97 1:45	50.8	0.0
3/17/97 2:00	50.7	0.0
3/17/97 2:15	50.8	0.0
3/17/97 2:30	50.8	0.0
3/17/97 2:45	50.8	0.0
3/17/97 3:00	50.9	0.0
3/17/97 3:15	51.2	0.0
3/17/97 3:30	51.0	0.0
3/17/97 3:45	50.9	0.0
3/17/97 4:00	51.0	0.0
3/17/97 4:15	50.7	0.0
3/17/97 4:30	50.5	0.0
3/17/97 4:45	50.4	0.0
3/17/97 5:00	50.3	0.0
3/17/97 5:15	50.6	0.0
3/17/97 5:30	50.7	0.0
3/17/97 5:45	50.8	0.0
3/17/97 6:00	51.0	0.0
3/17/97 6:15	51.0	0.0
3/17/97 6:30	51.0	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
3/17/97 6:45	50.9	0.0
3/17/97 7:00	50.4	0.0
3/17/97 7:15	50.1	0.0
3/17/97 7:30	49.8	0.0
3/17/97 7:45	49.2	0.0
3/17/97 8:00	49.2	0.0
3/17/97 8:15	48.4	0.0
3/17/97 8:30	47.0	0.0
3/17/97 8:45	46.2	0.0
3/17/97 9:00	44.9	0.0
3/17/97 9:15	44.5	0.0
3/17/97 9:30	45.2	0.0
3/17/97 9:45	44.9	0.0
3/17/97 10:00	44.4	0.0
3/17/97 10:15	44.0	0.0
3/17/97 10:30	44.0	0.0
3/17/97 10:45	43.6	0.0
3/17/97 11:00	44.1	0.0
3/17/97 11:15	44.7	0.0
3/17/97 11:30	43.9	0.0
3/17/97 11:45	43.3	0.0
3/17/97 12:00	43.7	0.0
3/17/97 12:15	44.3	0.0
3/17/97 12:30	44.9	0.0
3/17/97 12:45	45.3	0.0
3/17/97 13:00	45.5	0.0
3/17/97 13:15	45.9	0.0
3/17/97 13:30	46.0	0.0
3/17/97 13:45	46.4	0.0
3/17/97 14:00	45.2	0.0
3/17/97 14:15	45.1	0.0
3/17/97 14:30	43.6	0.1
3/17/97 14:45	32.6	0.0
3/17/97 15:00	24.3	0.0
3/17/97 15:15	23.7	0.0
3/17/97 15:30	25.4	0.0
3/17/97 15:45	29.9	0.0
3/17/97 16:00	32.8	0.0
3/17/97 16:15	35.9	0.0
3/17/97 16:30	46.1	0.0
3/17/97 16:45	55.4	0.0
3/17/97 17:00	64.0	0.0
3/17/97 17:15	66.3	0.0
3/17/97 17:30	63.6	0.0
3/17/97 17:45	62.5	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
3/17/97 18:00	61.5	0.0
3/17/97 18:15	59.8	0.0
3/17/97 18:30	58.2	0.0
3/17/97 18:45	57.2	0.0
3/17/97 19:00	55.5	0.0
3/17/97 19:15	54.3	0.0
3/17/97 19:30	53.9	0.0
3/17/97 19:45	53.4	0.0
3/17/97 20:00	53.1	0.0
3/17/97 20:15	52.5	0.0
3/17/97 20:30	52.1	0.0
3/17/97 20:45	51.5	0.0
3/17/97 21:00	51.1	0.0
3/17/97 21:15	51.0	0.0
3/17/97 21:30	50.4	0.0
3/17/97 21:45	50.5	0.0
3/17/97 22:00	50.5	0.0
3/17/97 22:15	50.5	0.0
3/17/97 22:30	50.3	0.0
3/17/97 22:45	50.5	0.0
3/17/97 23:00	50.4	0.0
3/17/97 23:15	50.5	0.0
3/17/97 23:30	50.4	0.0
3/17/97 23:45	50.4	0.0
3/18/97 0:00	50.6	0.0
3/18/97 0:15	50.5	0.0
3/18/97 0:30	50.5	0.0
3/18/97 0:45	50.4	0.0
3/18/97 1:00	50.6	0.0
3/18/97 1:15	50.6	0.0
3/18/97 1:30	50.7	0.0
3/18/97 1:45	50.6	0.0
3/18/97 2:00	50.8	0.0
3/18/97 2:15	50.8	0.0
3/18/97 2:30	50.9	0.0
3/18/97 2:45	50.7	0.0
3/18/97 3:00	50.6	0.0
3/18/97 3:15	50.6	0.0
3/18/97 3:30	50.6	0.0
3/18/97 3:45	50.6	0.0
3/18/97 4:00	50.5	0.0
3/18/97 4:15	50.6	0.0
3/18/97 4:30	50.3	0.0
3/18/97 4:45	50.5	0.0
3/18/97 5:00	50.6	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
3/18/97 5:15	51.0	0.0
3/18/97 5:30	51.1	0.0
3/18/97 5:45	50.9	0.0
3/18/97 6:00	51.2	0.0
3/18/97 6:15	51.2	0.0
3/18/97 6:30	51.3	0.0
3/18/97 6:45	51.2	0.0
3/18/97 7:00	51.1	0.0
3/18/97 7:15	51.1	0.0
3/18/97 7:30	51.1	0.0
3/18/97 7:45	50.9	0.0
3/18/97 8:00	50.3	0.0
3/18/97 8:15	49.9	0.0
3/18/97 8:30	49.5	0.0
3/18/97 8:45	49.4	0.0
3/18/97 9:00	49.2	0.0
3/18/97 9:15	48.6	0.0
3/18/97 9:30	48.7	0.0
3/18/97 9:45	47.9	0.0
3/18/97 10:00	48.2	0.0
3/18/97 10:15	47.8	0.0
3/18/97 10:30	48.4	0.0
3/18/97 10:50	15.8	0.0
3/18/97 10:55	15.3	0.0
3/18/97 11:00	15.0	0.0
3/18/97 11:05	14.2	0.0
3/18/97 11:10	15.8	0.0
3/18/97 11:15	14.9	0.0
3/18/97 11:20	13.9	0.0
3/18/97 11:25	13.3	0.0
3/18/97 11:30	12.7	0.0
3/18/97 11:35	12.3	0.0
3/18/97 11:40	11.5	0.0
3/18/97 11:45	10.4	0.0
3/18/97 11:50	10.2	0.0
3/18/97 11:55	10.2	0.0
3/18/97 12:00	10.0	0.0
3/18/97 12:05	9.7	0.0
3/18/97 12:10	9.6	0.0
3/18/97 12:15	10.1	0.0
3/18/97 12:20	10.1	0.0
3/18/97 12:25	10.8	0.0
3/18/97 12:30	11.7	0.0
3/18/97 12:35	12.1	0.0
3/18/97 12:40	12.3	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
3/18/97 12:45	12.4	0.0
3/18/97 12:50	12.7	0.0
3/18/97 12:55	12.9	0.0
3/18/97 13:00	13.0	0.0
3/18/97 13:05	13.2	0.0
3/18/97 13:10	12.5	0.0
3/18/97 13:15	7.8	0.0
3/18/97 13:20	4.9	0.0
3/18/97 13:25	4.7	0.0
3/18/97 13:30	4.6	0.0
3/18/97 13:35	4.6	0.0
3/18/97 13:40	4.3	0.0
3/18/97 13:45	4.3	0.0
3/18/97 13:50	4.8	0.0
3/18/97 13:55	5.0	0.0
3/18/97 14:00	5.4	0.0
3/18/97 14:05	5.6	0.0
3/18/97 14:10	6.1	0.0
3/18/97 14:15	8.0	0.0
3/18/97 14:20	8.9	0.0
3/18/97 14:25	9.5	0.0
3/18/97 14:30	9.9	0.0
3/18/97 14:35	10.0	0.0
3/18/97 14:40	10.8	0.0
3/18/97 14:45	11.7	0.0
3/18/97 14:50	12.1	0.0
3/18/97 14:55	12.2	0.0
3/18/97 15:00	12.4	0.0
3/18/97 15:05	12.7	0.0
3/18/97 15:10	12.9	0.0
3/18/97 15:15	13.1	0.0
3/18/97 15:20	13.2	0.0
3/18/97 15:25	13.3	0.0
3/18/97 15:30	13.4	0.0
3/18/97 15:35	13.5	0.0
3/18/97 15:40	13.6	0.0
3/18/97 15:45	13.7	0.0
3/18/97 15:50	13.8	0.0
3/18/97 15:55	14.1	0.0
3/18/97 16:00	14.3	0.0
3/18/97 16:05	14.4	0.0
3/18/97 16:10	14.2	0.0
3/18/97 16:15	14.3	0.0
3/18/97 16:20	14.7	0.0
3/18/97 16:25	14.8	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
3/18/97 16:30	14.7	0.0
3/18/97 16:35	14.6	0.0
3/18/97 16:40	14.6	0.0
3/18/97 16:45	14.7	0.0
3/18/97 16:50	14.9	0.0
3/18/97 16:55	14.9	0.0
3/18/97 17:00	15.0	0.0
3/18/97 17:05	15.0	0.0
3/18/97 17:10	15.0	0.0
3/18/97 17:15	15.1	0.0
3/18/97 17:20	15.2	0.0
3/18/97 17:25	15.3	0.0
3/18/97 17:30	15.3	0.0
3/18/97 17:35	15.4	0.0
3/18/97 17:40	15.4	0.0
3/18/97 17:45	15.5	0.0
3/18/97 17:50	15.5	0.0
3/18/97 17:55	15.5	0.0
3/18/97 18:00	15.6	0.0
3/18/97 18:05	15.6	0.0
3/18/97 18:10	15.6	0.0
3/18/97 18:15	15.7	0.0
3/18/97 18:20	15.7	0.0
3/18/97 18:25	15.7	0.0
3/18/97 18:30	15.8	0.0
3/18/97 18:35	15.8	0.0
3/18/97 18:40	15.8	0.0
3/18/97 18:45	15.8	0.0
3/18/97 18:50	15.8	0.0
3/18/97 18:55	15.9	0.0
3/18/97 19:00	15.9	0.0
3/18/97 19:05	15.9	0.0
3/18/97 19:10	15.9	0.0
3/18/97 19:15	15.9	0.0
3/18/97 19:20	15.9	0.0
3/18/97 19:25	15.9	0.0
3/18/97 19:30	15.9	0.0
3/18/97 19:35	16.0	0.0
3/18/97 19:40	16.0	0.0
3/18/97 19:45	16.0	0.0
3/18/97 19:50	16.0	0.0
3/18/97 19:55	16.0	0.0
3/18/97 20:00	16.0	0.0
3/18/97 20:05	16.0	0.0
3/18/97 20:10	16.1	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
3/18/97 20:15	16.1	0.0
3/18/97 20:20	16.1	0.0
3/18/97 20:25	16.1	0.0
3/18/97 20:30	16.2	0.0
3/18/97 20:35	16.1	0.0
3/18/97 20:40	16.2	0.0
3/18/97 20:45	16.2	0.0
3/18/97 20:50	16.2	0.0
3/18/97 20:55	16.2	0.0
3/18/97 21:00	16.2	0.0
3/18/97 21:05	16.2	0.0
3/18/97 21:10	16.3	0.0
3/18/97 21:15	16.3	0.0
3/18/97 21:20	16.3	0.0
3/18/97 21:25	16.3	0.0
3/18/97 21:30	16.4	0.0
3/18/97 21:35	16.5	0.0
3/18/97 21:40	16.4	0.0
3/18/97 21:45	16.4	0.0
3/18/97 21:50	16.4	0.0
3/18/97 21:55	16.4	0.0
3/18/97 22:00	16.4	0.0
3/18/97 22:05	16.5	0.0
3/18/97 22:10	16.6	0.0
3/18/97 22:15	16.6	0.0
3/18/97 22:20	16.6	0.0
3/18/97 22:25	16.6	0.0
3/18/97 22:30	16.6	0.0
3/18/97 22:35	16.7	0.0
3/18/97 22:40	16.7	0.0
3/18/97 22:45	16.7	0.0
3/18/97 22:50	16.7	0.0
3/18/97 22:55	16.7	0.0
3/18/97 23:00	16.8	0.0
3/18/97 23:05	16.9	0.0
3/18/97 23:10	17.0	0.0
3/18/97 23:15	17.0	0.0
3/18/97 23:20	17.0	0.0
3/18/97 23:25	17.1	0.0
3/18/97 23:30	17.1	0.0
3/18/97 23:35	17.1	0.0
3/18/97 23:40	17.1	0.0
3/18/97 23:45	17.2	0.0
3/18/97 23:50	17.2	0.0
3/18/97 23:55	17.2	0.0

Complex 7

Date/time	Tunnel Flow (gallons per log interval)	Borehole 7 Flow (gallons per log interval)
3/19/97 0:00	17.3	0.0
3/19/97 0:05	17.3	0.0
3/19/97 0:10	17.4	0.0
3/19/97 0:15	17.6	0.0
3/19/97 0:20	17.6	0.0
3/19/97 0:25	17.6	0.0
3/19/97 0:30	17.6	0.0
3/19/97 0:35	17.6	0.0
3/19/97 0:40	17.7	0.0
3/19/97 0:45	17.7	0.0
3/19/97 0:50	17.8	0.0
3/19/97 0:55	17.8	0.0
3/19/97 1:00	17.9	0.0
3/19/97 1:05	17.9	0.0
3/19/97 1:10	17.9	0.0
3/19/97 1:15	17.9	0.0
3/19/97 1:20	18.0	0.0
3/19/97 1:25	18.0	0.0
3/19/97 1:30	18.1	0.0
3/19/97 1:35	18.3	0.0
3/19/97 1:40	18.3	0.0
3/19/97 1:45	18.4	0.0
3/19/97 1:50	18.4	0.0
3/19/97 1:55	18.4	0.0
3/19/97 2:00	18.5	0.0
3/19/97 2:05	18.6	0.0
3/19/97 2:10	18.7	0.0
3/19/97 2:15	18.8	0.0
3/19/97 2:20	18.8	0.0
3/19/97 2:25	19.0	0.0
3/19/97 2:30	19.0	0.0
3/19/97 2:35	19.1	0.0
3/19/97 2:40	19.2	0.0
3/19/97 2:45	19.3	0.0
3/19/97 2:50	19.3	0.0
3/19/97 2:55	19.3	0.0
3/19/97 3:00	19.4	0.0
3/19/97 3:05	19.4	0.0
3/19/97 3:10	19.4	0.0
3/19/97 3:15	19.4	0.0
3/19/97 3:20	19.4	0.0
3/19/97 3:25	19.5	0.0
3/19/97 3:30	19.5	0.0
3/19/97 3:35	19.5	0.0

APPENDIX D
Water Quality Analytical Data

C O N F I D E N T I A L

Analysis Id : 16631 999
 Investigation: ARROWHEAD #7 TUNNEL
 Date sampled : 02-19-97 1 gal.
 Condition : Room Temp.
 Received by : Pam
 Received Dt : 02-20-97 Due Date Page 1

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
ANIONS					
Bicarbonate	1.0000	NR	NR	76.8600	mg/l
Chloride	.5000	250.0000	50.0000	16.2200	mg/l
Fluoride	.1000	2.4000	2.0000	ND	mg/l
Nitrate (NO3-N)	1.0000	10.0000	5.0000	1.9500	mg/l
Phosphate (P04-P)	.0500	NR	NR	ND	mg/l
Silica	.5000	NR	NR	34.0000	mg/l
Sulfate	.5000	250.0000	50.0000	3.3000	mg/l
Nitrite	.1000	1.0000	1.0000	ND	mg/l
Bromide	.1000	NR	NR	ND	mg/l
CATIONS					
Aluminum	.0100	.2000	.0500	ND	mg/l
Arsenic	.0050	.0500	.0050	ND	mg/l
Barium	.0100	2.0000	.5000	ND	mg/l
Cadmium	.0010	.0050	.0050	ND	mg/l
Calcium	.5000	NR	75.0000	21.4000	mg/l
Chromium	.0020	.1000	.0050	ND	mg/l
Copper	.0050	1.0000	.1000	ND	mg/l
Iron	.0100	.3000	.0300	ND	mg/l
Lead	.0010	.0050	.0050	ND	mg/l
Magnesium	.0500	NR	25.0000	3.9000	mg/l
Manganese	.0030	.0500	.0050	ND	mg/l
Mercury	.0010	.0020	.0010	ND	mg/l
Potassium	.0100	NR	10.0000	1.6000	mg/l
Selenium	.0050	.0100	.0050	ND	mg/l
Silver	.0050	.1000	.0050	ND	mg/l
Sodium	.1000	NR	21.0000	12.4300	mg/l
Zinc	.0250	5.0000	1.0000	ND	mg/l
Beryllium	.0005	.0040	.0040	ND	mg/l
Antimony	.0010	.0060	.0060	ND	mg/l
Nickel	.0010	.1000	.1000	ND	mg/l
Thallium	.0005	.0020	.0020	ND	mg/l
SECONDARY QUALITY FACTORS					
TDS, Evaporated	.5000	NR	250.0000	128.0000	mg/l
Total Alkalinity	1.0000	NR	200.0000	63.0000	mg/l
Total Hardness	.5000	NR	200.0000	69.5000	mg/l
pH	.0000	NR	NR	6.9700	pH

Arrowhead Quality Services Laboratory

Patricia L. Valenton
 Chemist

Michael A. Chisj
 Laboratory Manager

C O N F I D E N T I A L

Analysis Id : 12645 1420 Arrowhead Spring 7-A (New)
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 1gal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Collected by : Bill
 Received Dt : 03-22-96 Due Date Page 1

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
24.2					
Benzene	.0400	5.0000	.5000	ND	ug/l
Bromobenzene	.1000	NR	.5000	ND	ug/l
Bromochloromethane	.1000	NR	.5000	.1000	ug/l
Bromodichloromethane	.0800	100.0000	2.0000	1.4800	ug/l
Bromoform	.1200	100.0000	2.0000	1.1300	ug/l
Bromomethane	.1000	NR	.5000	ND	ug/l
n-Butylbenzene	.1000	NR	.5000	ND	ug/l
m-Butylbenzene	.1000	NR	.5000	ND	ug/l
tert-Butylbenzene	.1000	NR	.5000	ND	ug/l
Carbon Tetrachloride	.2100	5.0000	.5000	ND	ug/l
Chlorobenzene	.1000	NR	.5000	ND	ug/l
Chloroethane	.1000	NR	.5000	ND	ug/l
Chloroform	.0300	100.0000	2.0000	1.0800	ug/l
Chloromethane	.1000	NR	.5000	ND	ug/l
Chlorotoluene	.1000	NR	.5000	ND	ug/l
Chlorotoluene	.1000	NR	.5000	ND	ug/l
Bromochloromethane	.0500	100.0000	2.0000	1.1300	ug/l
Bromochloropropane (DBCP)	.0200	.2000	.2000	ND	ug/l
1,1-Dibromoethane	.0100	.0500	.0500	ND	ug/l
Bromomethane	.1000	NR	.5000	ND	ug/l
o-Dichlorobenzene (o-DCB)	.1000	600.0000	.5000	ND	ug/l
m-Dichlorobenzene (m-DCB)	.1000	600.0000	.5000	ND	ug/l
p-Dichlorobenzene (p-DCB)	.0300	75.0000	.5000	ND	ug/l
Chlorodifluoromethane	.1000	NR	.5000	ND	ug/l
1,1-Dichloroethane (1,1-DCA)	.1000	NR	.5000	ND	ug/l
1,2-Dichloroethane (1,2-DCA)	.0600	5.0000	.5000	ND	ug/l
1,1-Dichloroethene	.1000	7.0000	.5000	ND	ug/l
1,2-Dichloroethene	.1000	70.0000	.5000	ND	ug/l
trans-1,2-Dichloroethene	.1000	100.0000	.5000	ND	ug/l
2,2-Dichloropropane	.1000	5.0000	.5000	ND	ug/l
1,1-Dichloropropane	.1000	NR	.5000	ND	ug/l
1,2-Dichloropropane	.1000	NR	.5000	ND	ug/l
1,1-Dichloropropene	.1000	NR	.5000	ND	ug/l
2,2-Dichloropropene Total	.1000	NR	.5000	ND	ug/l
Styrene	.1000	700.0000	.5000	ND	ug/l
1,2-Dichlorobutadiene	.1000	NR	.5000	ND	ug/l
Isopropylbenzene	.1000	NR	.5000	ND	ug/l
Isopropyltoluene	.1000	NR	.5000	ND	ug/l
1,1,2,2-Tetrachloroethane	.1000	5.0000	.5000	ND	ug/l
Phthalene	.1000	NR	.5000	ND	ug/l
Propylbenzene	.1000	NR	.5000	ND	ug/l
Styrene	.1000	100.0000	.5000	ND	ug/l
1,2-Tetrachloroethane	.1000	NR	.5000	ND	ug/l
2,2-Tetrachloroethane	.1000	NR	.5000	ND	ug/l

None Detected NR - None Required NA - Not Analyzed
 Lvl Found exceeds Fed or PGA mcl. ** - Exceeds both Fed and PGA mcl.

C O N F I D E N T I A L

Analysis Id : 12645 1420 Arrowhead Spring 7-A (New)
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 gal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Received by : Bill
 Received Dt : 03-22-96 Due Date Page 2

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
Tetrachloroethene	.1000	5.0000	.5000	.1000	ug/l
Benzene	.1100	1000.0000	.5000	ND	ug/l
Total Trihalomethanes*	.1000	100.0000	2.0000	4.8200	ug/l *
1,2,3-Trichlorobenzene	.1000	NR	.5000	ND	ug/l
1,2,4-Trichlorobenzene	.1000	9.0000	.5000	ND	ug/l
1,1,1-Trichloroethane (1,1,1-TCA)	.1000	200.0000	.5000	ND	ug/l
1,1,2-Trichloroethane (1,1,2-TCA)	.1000	5.0000	.5000	ND	ug/l
Trichloroethene (TCE)	.1000	5.0000	.5000	ND	ug/l
Trichlorofluoromethane (Freon)	.1000	150.0000	.5000	ND	ug/l
1,2,3-Trichloropropane	.1000	NR	.5000	ND	ug/l
1,2,4-Trimethylbenzene	.1000	NR	.5000	ND	ug/l
1,3,5-Trimethylbenzene	.1000	NR	.5000	ND	ug/l
Vinyl Chloride (VC)	.1000	2.0000	.5000	ND	ug/l
Stylenes, Total (m,p & O)	.1000	0000.0000	.5000	ND	ug/l
1,3-Dichloropropene	.1000	NR	.5000	ND	ug/l
1,3-Dichloropropene ISOMERS	.1000	NR	.5000	ND	ug/l
Bicarbonate	1.0000	NR	NR	74.4200	mg/l
Carbonate	1.0000	NR	NR	ND	mg/l
Chloride	.5000	250.0000	50.0000	17.7800	mg/l
Fluoride	.1000	2.4000	2.0000	ND	mg/l
Fluoride (Added)	.1000	1.7000	1.1000		mg/l
Nitrate (NO3-N)	1.0000	10.0000	5.0000	2.0800	mg/l
Phosphate (P04-P)	.0500	NR	NR	ND	mg/l
Silica	.5000	NR	NR	34.6000	mg/l
Sulfate	.5000	250.0000	50.0000	3.6400	mg/l
Sulfite	.1000	1.0000	1.0000	ND	mg/l
Selenide	.1000	NR	NR	ND	mg/L
ISOMERS					
Aluminum	.0100	.2000	.0500	ND	mg/l
Arsenic	.0050	.0500	.0050	ND	mg/l
Barium	.0100	2.0000	.5000	ND	mg/l
Bismuth	.0010	.0050	.0050	ND	mg/l
Calcium	.5000	NR	75.0000	22.0400	mg/l
Chromium	.0010	.1000	.0050	ND	mg/l
Copper	.0050	1.0000	.1000	ND	mg/l
Iron	.0100	.3000	.0500	ND	mg/l
Lead	.0020	.0050	.0050	ND	mg/l
Magnesium	.0500	NR	25.0000	4.2000	mg/l
Manganese	.0030	.0500	.0050	ND	mg/l
Mercury	.0010	.0020	.0010	ND	mg/l
Potassium	.0100	NR	10.0000	1.6100	mg/l

ND - None Detected NR - None Required NA - Not Analyzed
 * - Lvl Found exceeds Fed or PGA mcl. ** - Exceeds both Fed and PGA mcl.

C O N F I D E N T I A L

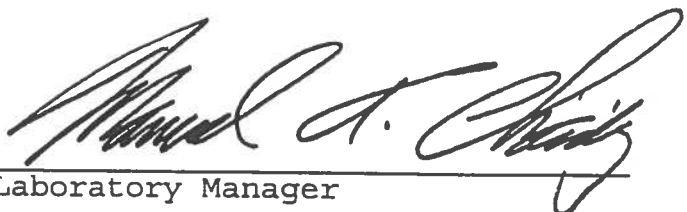
Analysis Id : 12645 1420 Arrowhead Spring 7-A (New)
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 1gal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Collected by : Bill
 Received Dt : 03-22-96 Due Date Page 3

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
Selenium	.0050	.0100	.0050	ND	mg/l
Copper	.0050	.1000	.0050	ND	mg/l
Lead	.1000	NR	21.0000	12.2500	mg/l
Zinc	.0500	5.0000	1.0000	ND	mg/l
Strontium	.0005	.0040	.0040	ND	mg/L
Antimony	.0010	.0060	.0060	ND	mg/L
Mercury	.0010	.1000	.1000	ND	mg/L
Barium	.0005	.0020	.0020	ND	mg/L
SECONDARY QUALITY FACTORS					
Coliforms	1.0000	2.2000	1.0000	ND	c/100
Color	5.0000	15.0000	5.0000	ND	units
Conductivity	1.0000	NR	NR	205.2000	uS/cm
Chloride	1.0000	3.0000	3.0000	ND	T.O.N
Benolphtalein	1.0000	NR	NR	ND	mg/l
Product	1.0000	NR	100.0000		C/ML
Source	1.0000	NR	100.0000	ND	C/ML
OS, Evaporated	.5000	NR	250.0000	158.0000	mg/l
Total Alkalinity	1.0000	NR	200.0000	61.0000	mg/l
Total Hardness	.5000	NR	200.0000	72.3000	mg/l
Turbidity Product	.1000	5.0000	.2000		ntu
Turbidity Source	.1000	5.0000	.4000	ND	ntu
Flow Rate	.0000	NR	NR	6.7800	pH
Flow Rate	NR	NR	NR		gal/m
Flow Rate	NR	NR	NR	ND	units
Flow Rate	1.0000	NR	NR	ND	CFU/M
Flow Rate	1.0000	NR	NR	ND	CFU/M
Pseudomonas aeruginosa	1.0000	NR	1.0000	ND	MPN

Arrowhead Quality Services Laboratory



 Chemist



 Laboratory Manager

C O N F I D E N T I A L

Analysis Id : 12646 1421 Arrowhead Spring 7-B (New)
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 gal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Received by : Bill
 Received Dt : 03-22-96 Due Date Page 1

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
524.2					
Benzene	.0400	5.0000	.5000	ND	ug/l
Bromobenzene	.1000	NR	.5000	ND	ug/l
Bromochloromethane	.1000	NR	.5000	ND	ug/l
Bromodichloromethane	.0800	100.0000	2.0000	1.3500	ug/l
Bromoform	.1200	100.0000	2.0000	ND	ug/l
Bromomethane	.1000	NR	.5000	ND	ug/l
n-Butylbenzene	.1000	NR	.5000	ND	ug/l
m-Butylbenzene	.1000	NR	.5000	ND	ug/l
tert-Butylbenzene	.1000	NR	.5000	ND	ug/l
Carbon Tetrachloride	.2100	5.0000	.5000	ND	ug/l
Chlorobenzene	.1000	NR	.5000	ND	ug/l
Chloroethane	.1000	NR	.5000	ND	ug/l
Chloroform	.0300	100.0000	2.0000	.9200	ug/l
Chloromethane	.1000	NR	.5000	ND	ug/l
Chlorotoluene	.1000	NR	.5000	ND	ug/l
o-Chlorotoluene	.1000	NR	.5000	ND	ug/l
Dibromochloromethane	.0500	100.0000	2.0000	.8500	ug/l
Dibromochloropropane (DBCP)	.0200	.2000	.2000	ND	ug/l
1,2-Dibromoethane	.0100	.0500	.0500	ND	ug/l
Dibromomethane	.1000	NR	.5000	ND	ug/l
1,2-Dichlorobenzene (o-DCB)	.1000	600.0000	.5000	ND	ug/l
1,3-Dichlorobenzene (m-DCB)	.1000	600.0000	.5000	ND	ug/l
1,4-Dichlorobenzene (p-DCB)	.0300	75.0000	.5000	ND	ug/l
Dichlorodifluoromethane	.1000	NR	.5000	ND	ug/l
1,1-Dichloroethane (1,1-DCA)	.1000	NR	.5000	ND	ug/l
1,2-Dichloroethane (1,2-DCA)	.0600	5.0000	.5000	ND	ug/l
1,1-Dichloroethene	.1000	7.0000	.5000	ND	ug/l
trans-1,2-Dichloroethene	.1000	70.0000	.5000	ND	ug/l
cis-1,2-Dichloroethene	.1000	100.0000	.5000	ND	ug/l
1,2-Dichloropropane	.1000	5.0000	.5000	ND	ug/l
1,3-Dichloropropane	.1000	NR	.5000	ND	ug/l
1,1-Dichloropropane	.1000	NR	.5000	ND	ug/l
1,1-Dichloropropene	.1000	NR	.5000	ND	ug/l
1,3-Dichloropropene Total	.1000	NR	.5000	ND	ug/l
Toluene	.1000	700.0000	.5000	ND	ug/l
Hexachlorobutadiene	.1000	NR	.5000	ND	ug/l
Isopropylbenzene	.1000	NR	.5000	ND	ug/l
Isopropyltoluene	.1000	NR	.5000	ND	ug/l
Ethylene chloride	.1000	5.0000	.5000	ND	ug/l
Naphthalene	.1000	NR	.5000	ND	ug/l
n-Propylbenzene	.1000	NR	.5000	ND	ug/l
Styrene	.1000	100.0000	.5000	ND	ug/l
1,1,2-Tetrachloroethane	.1000	NR	.5000	ND	ug/l
1,1,2,2-Tetrachloroethane	.1000	NR	.5000	ND	ug/l

ND - None Detected NR - None Required NA - Not Analyzed
 * - Lvl Found exceeds Fed or PGA mcl. ** - Exceeds both Fed and PGA mcl.

C O N F I D E N T I A L

Analysis Id : 12646 1421 Arrowhead Spring 7-B (New)
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 1gal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Collected by : Bill
 Received Dt : 03-22-96 Due Date Page 2

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
1,1,1-Trichloroethene	.1000	5.0000	.5000	ND	ug/l
Benzene	.1100	1000.0000	.5000	ND	ug/l
Total Trihalomethanes*	.1000	100.0000	2.0000	3.1200	ug/l *
1,2,3-Trichlorobenzene	.1000	NR	.5000	ND	ug/l
1,2,4-Trichlorobenzene	.1000	9.0000	.5000	ND	ug/l
1,1,1-Trichloroethane (1,1,1-TCA)	.1000	200.0000	.5000	.2600	ug/l
1,1,2-Trichloroethane (1,1,2-TCA)	.1000	5.0000	.5000	ND	ug/l
Trichloroethene (TCE)	.1000	5.0000	.5000	ND	ug/l
Trichlorofluoromethane (Freon)	.1000	150.0000	.5000	ND	ug/l
1,2,3-Trichloropropane	.1000	NR	.5000	ND	ug/l
1,2,4-Trimethylbenzene	.1000	NR	.5000	ND	ug/l
1,3,5-Trimethylbenzene	.1000	NR	.5000	ND	ug/l
Methyl Chloride (VC)	.1000	2.0000	.5000	ND	ug/l
Oxylenes, Total (m,p & O)	.1000	10000.0000	.5000	ND	ug/l
trans-1,3-Dichloropropene	.1000	NR	.5000	ND	ug/l
cis-1,3-Dichloropropene	.1000	NR	.5000	ND	ug/l
ANIONS					
Bicarbonate	1.0000	NR	NR	153.0000	mg/l
Carbonate	1.0000	NR	NR	ND	mg/l
Chloride	.5000	250.0000	50.0000	22.2700	mg/l
Fluoride	.1000	2.4000	2.0000	ND	mg/l
Hydroxide (Added)	.1000	1.7000	1.1000		mg/l
Nitrate (NO3-N)	1.0000	10.0000	5.0000	2.8900	mg/l
Phosphate (PO4-P)	.0500	NR	NR	ND	mg/l
Silica	.5000	NR	NR	35.2200	mg/l
Sulfate	.5000	250.0000	50.0000	4.1000	mg/l
Sulfite	.1000	1.0000	1.0000	ND	mg/l
Thiomide	.1000	NR	NR	ND	mg/L
CATIONS					
Aluminum	.0100	.2000	.0500	ND	mg/l
Arsenic	.0050	.0500	.0050	ND	mg/l
Barium	.0100	2.0000	.5000	ND	mg/l
Cadmium	.0010	.0050	.0050	ND	mg/l
Calcium	.5000	NR	75.0000	21.7300	mg/l
Chromium	.0010	.1000	.0050	ND	mg/l
Copper	.0050	1.0000	.1000	ND	mg/l
Iron	.0100	.3000	.0500	ND	mg/l
Lead	.0020	.0050	.0050	ND	mg/l
Magnesium	.0500	NR	25.0000	3.5300	mg/l
Manganese	.0030	.0500	.0050	ND	mg/l
Nickel	.0010	.0020	.0010	ND	mg/l
Potassium	.0100	NR	10.0000	1.6600	mg/l

ND - None Detected NR - None Required NA - Not Analyzed
 * - Lvl Found exceeds Fed or PGA mcl. ** - Exceeds both Fed and PGA mcl.

C O N F I D E N T I A L

Analysis Id : 12646 1421 Arrowhead Spring 7-B (New)
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 lgal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Analyzed by : Bill
 Received Dt : 03-22-96 Due Date Page 3

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
Selenium	.0050	.0100	.0050	ND	mg/l
Silver	.0050	.1000	.0050	ND	mg/l
Sodium	.1000	NR	21.0000	13.2700	mg/l
Zinc	.0500	5.0000	1.0000	ND	mg/l
Strontium	.0005	.0040	.0040	ND	mg/L
Antimony	.0010	.0060	.0060	ND	mg/L
Nickel	.0010	.1000	.1000	ND	mg/L
Gallium	.0005	.0020	.0020	ND	mg/L
SECONDARY QUALITY FACTORS					
Turbidity	1.0000	2.2000	1.0000	ND	c/100
Color	5.0000	15.0000	5.0000	ND	units
Conductivity	1.0000	NR	NR	210.1700	uS/cm
Chloride	1.0000	3.0000	3.0000	ND	T.O.N
Benolphtalein	1.0000	NR	NR	ND	mg/l
Product	1.0000	NR	100.0000		C/ML
Source	1.0000	NR	100.0000	ND	C/ML
DS, Evaporated	.5000	NR	250.0000	153.0000	mg/l
Total Alkalinity	1.0000	NR	200.0000	53.0000	mg/l
Total Hardness	.5000	NR	200.0000	68.8000	mg/l
Turbidity Product	.1000	5.0000	.2000		ntu
Turbidity Source	.1000	5.0000	.4000	ND	ntu
Flow Rate	.0000	NR	NR	6.7600	pH
LOGAE	NR	NR	NR		gal/m
FAST	NR	NR	NR	ND	units
STAD	1.0000	NR	NR	ND	CFU/M
STAD	1.0000	NR	NR	ND	CFU/M
Pseudomonas aeruginosa	1.0000	NR	1.0000	ND	MPN

Arrowhead Quality Services Laboratory

Bill

 Chemist

Michael T. Chazy

 Laboratory Manager

C O N F I D E N T I A L

Analysis Id : 12647 1422 Arrowhead Spring 7 (New)
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 1gal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Collected by : Bill
 Received Dt : 03-22-96 Due Date Page 1

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
24.2					
Benzene	.0400	5.0000	.5000	ND	ug/l
Bromobenzene	.1000	NR	.5000	ND	ug/l
Bromochloromethane	.1000	NR	.5000	.1100	ug/l
Bromodichloromethane	.0800	100.0000	2.0000	1.5100	ug/l
Bromoform	.1200	100.0000	2.0000	ND	ug/l
Bromomethane	.1000	NR	.5000	ND	ug/l
n-Butylbenzene	.1000	NR	.5000	ND	ug/l
m-Butylbenzene	.1000	NR	.5000	ND	ug/l
p-Butylbenzene	.1000	NR	.5000	ND	ug/l
Carbon Tetrachloride	.2100	5.0000	.5000	ND	ug/l
Chlorobenzene	.1000	NR	.5000	ND	ug/l
Chloroethane	.1000	NR	.5000	ND	ug/l
Chloroform	.0300	100.0000	2.0000	1.0100	ug/l
Chloromethane	.1000	NR	.5000	ND	ug/l
Chlorotoluene	.1000	NR	.5000	ND	ug/l
Chlorotoluene	.1000	NR	.5000	ND	ug/l
Dibromochloromethane	.0500	100.0000	2.0000	1.0200	ug/l
Dibromochloropropane (DBCP)	.0200	.2000	.2000	ND	ug/l
Dibromoethane	.0100	.0500	.0500	ND	ug/l
Dibromomethane	.1000	NR	.5000	ND	ug/l
o-Dichlorobenzene (o-DCB)	.1000	600.0000	.5000	ND	ug/l
m-Dichlorobenzene (m-DCB)	.1000	600.0000	.5000	ND	ug/l
p-Dichlorobenzene (p-DCB)	.0300	75.0000	.5000	ND	ug/l
Dichlorodifluoromethane	.1000	NR	.5000	ND	ug/l
1,1-Dichloroethane (1,1-DCA)	.1000	NR	.5000	ND	ug/l
1,2-Dichloroethane (1,2-DCA)	.0600	5.0000	.5000	ND	ug/l
1,1-Dichloroethene	.1000	7.0000	.5000	ND	ug/l
trans-1,2-Dichloroethene	.1000	70.0000	.5000	ND	ug/l
1,2-Dichloropropane	.1000	100.0000	.5000	ND	ug/l
2,2-Dichloropropane	.1000	5.0000	.5000	ND	ug/l
1,1-Dichloropropane	.1000	NR	.5000	ND	ug/l
1,2-Dichloropropane	.1000	NR	.5000	ND	ug/l
1,3-Dichloropropane	.1000	NR	.5000	ND	ug/l
1,3-Dichloropropene Total	.1000	NR	.5000	ND	ug/l
Styrene	.1000	700.0000	.5000	ND	ug/l
1,2,3-Trichlorobutadiene	.1000	NR	.5000	ND	ug/l
Isopropylbenzene	.1000	NR	.5000	ND	ug/l
Isopropyltoluene	.1000	NR	.5000	ND	ug/l
Phenylene chloride	.1000	5.0000	.5000	ND	ug/l
Phthalene	.1000	NR	.5000	ND	ug/l
Propylbenzene	.1000	NR	.5000	ND	ug/l
Styrene	.1000	100.0000	.5000	ND	ug/l
1,1,1,2-Tetrachloroethane	.1000	NR	.5000	ND	ug/l
1,1,2,2-Tetrachloroethane	.1000	NR	.5000	ND	ug/l

None Detected NR - None Required NA - Not Analyzed
 * - Lvl Found exceeds Fed or PGA mcl. ** - Exceeds both Fed and PGA mcl.

C O N F I D E N T I A L

Analysis Id : 12647 1422 Arrowhead Spring 7 (New)
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 gal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Received by : Bill
 Received Dt : 03-22-96 Due Date Page 2

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
Tetrachloroethene	.1000	5.0000	.5000	ND	ug/l
Benzene	.1100	1000.0000	.5000	ND	ug/l
Total Trihalomethanes*	.1000	100.0000	2.0000	3.5400	ug/l
1,2,3-Trichlorobenzene	.1000	NR	.5000	ND	ug/l
1,2,4-Trichlorobenzene	.1000	9.0000	.5000	ND	ug/l
1,1,1-Trichloroethane (1,1,1-TCA)	.1000	200.0000	.5000	.3700	ug/l
1,1,2-Trichloroethane (1,1,2-TCA)	.1000	5.0000	.5000	ND	ug/l
Trichloroethene (TCE)	.1000	5.0000	.5000	ND	ug/l
Trichlorofluoromethane (Freon)	.1000	150.0000	.5000	ND	ug/l
1,2,3-Trichloropropane	.1000	NR	.5000	ND	ug/l
1,2,4-Trimethylbenzene	.1000	NR	.5000	ND	ug/l
1,3,5-Trimethylbenzene	.1000	NR	.5000	ND	ug/l
Vinyl Chloride (VC)	.1000	2.0000	.5000	ND	ug/l
Oxylenes, Total (m,p & O)	.1000	0000.0000	.5000	ND	ug/l
cis-1,3-Dichloropropene	.1000	NR	.5000	ND	ug/l
trans-1,3-Dichloropropene	.1000	NR	.5000	ND	ug/l
ANIONS					
Bicarbonate	1.0000	NR	NR	73.2000	mg/l
Carbonate	1.0000	NR	NR	ND	mg/l
Chloride	.5000	250.0000	50.0000	20.2800	mg/l
Fluoride	.1000	2.4000	2.0000	ND	mg/l
Fluoride (Added)	.1000	1.7000	1.1000		mg/l
Nitrate (NO3-N)	1.0000	10.0000	5.0000	2.6300	mg/l
Phosphate (PO4-P)	.0500	NR	NR	ND	mg/l
Silica	.5000	NR	NR	34.0500	mg/l
Sulfate	.5000	250.0000	50.0000	3.7300	mg/l
Nitrite	.1000	1.0000	1.0000	ND	mg/l
Bromide	.1000	NR	NR	ND	mg/L
CATIONS					
Aluminum	.0100	.2000	.0500	ND	mg/l
Arsenic	.0050	.0500	.0050	ND	mg/l
Barium	.0100	2.0000	.5000	ND	mg/l
Cadmium	.0010	.0050	.0050	ND	mg/l
Calcium	.5000	NR	75.0000	22.9900	mg/l
Chromium	.0010	.1000	.0050	ND	mg/l
Copper	.0050	1.0000	.1000	ND	mg/l
Iron	.0100	.3000	.0500	ND	mg/l
Lead	.0020	.0050	.0050	ND	mg/l
Magnesium	.0500	NR	25.0000	4.1100	mg/l
Manganese	.0030	.0500	.0050	ND	mg/l
Mercury	.0010	.0020	.0010	ND	mg/l
Potassium	.0100	NR	10.0000	1.6700	mg/l

ND - None Detected NR - None Required NA - Not Analyzed
 * - Lvl Found exceeds Fed or PGA mcl. ** - Exceeds both Fed and PGA mcl.

C O N F I D E N T I A L

Analysis Id : 12647 1422 Arrowhead Spring 7 (New)
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 1gal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Collected by : Bill
 Received Dt : 03-22-96 Due Date Page 3

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
Selenium	.0050	.0100	.0050	ND	mg/l
Silver	.0050	.1000	.0050	ND	mg/l
Sodium	.1000	NR	21.0000	12.5800	mg/l
Zinc	.0500	5.0000	1.0000	ND	mg/l
Strontium	.0005	.0040	.0040	ND	mg/L
Antimony	.0010	.0060	.0060	ND	mg/L
Nickel	.0010	.1000	.1000	ND	mg/L
Barium	.0005	.0020	.0020	ND	mg/L
SECONDARY QUALITY FACTORS					
Coliforms	1.0000	2.2000	1.0000	ND	c/100
Color	5.0000	15.0000	5.0000	ND	units
Conductivity	1.0000	NR	NR	213.6200	uS/cm
Chloride	1.0000	3.0000	3.0000	ND	T.O.N
Benolphtalein	1.0000	NR	NR	ND	mg/l
Free Product	1.0000	NR	100.0000		C/ML
Free Source	1.0000	NR	100.0000	ND	C/ML
DS, Evaporated	.5000	NR	250.0000	150.0000	mg/l
Total Alkalinity	1.0000	NR	200.0000	60.0000	mg/l
Total Hardness	.5000	NR	200.0000	74.3000	mg/l
Turbidity Product	.1000	5.0000	.2000		ntu
Turbidity Source	.1000	5.0000	.4000	ND	ntu
Flow Rate	.0000	NR	NR	7.3200	pH
LGAE	NR	NR	NR		gal/m
FAST	NR	NR	NR	ND	units
CFU	1.0000	NR	NR	ND	CFU/M
CFU	1.0000	NR	NR	ND	CFU/M
Pseudomonas aeruginosa	1.0000	NR	1.0000	ND	MPN

Arrowhead Quality Services Laboratory



 Chemist



 Laboratory Manager

C O N F I D E N T I A L

analysis Id : 12648 1424 Arrowhead Spring New 7C
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 1gal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Received by : Bill
 Received Dt : 03-22-96 Due Date Page 1

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
24.2					
Benzene	.0400	5.0000	.5000	ND	ug/l
Bromobenzene	.1000	NR	.5000	ND	ug/l
Bromochloromethane	.1000	NR	.5000	ND	ug/l
Bromodichloromethane	.0800	100.0000	2.0000	.7100	ug/l
Bromoform	.1200	100.0000	2.0000	ND	ug/l
Bromomethane	.1000	NR	.5000	ND	ug/l
n-Butylbenzene	.1000	NR	.5000	ND	ug/l
m-Butylbenzene	.1000	NR	.5000	ND	ug/l
tert-Butylbenzene	.1000	NR	.5000	ND	ug/l
Carbon Tetrachloride	.2100	5.0000	.5000	ND	ug/l
Chlorobenzene	.1000	NR	.5000	ND	ug/l
Chloroethane	.1000	NR	.5000	ND	ug/l
Chloroform	.0300	100.0000	2.0000	.5700	ug/l
Chloromethane	.1000	NR	.5000	ND	ug/l
Chlorotoluene	.1000	NR	.5000	ND	ug/l
o-Chlorotoluene	.1000	NR	.5000	ND	ug/l
m-Chlorotoluene	.0500	100.0000	2.0000	.4900	ug/l
o-Chloropropene (DBCP)	.0200	.2000	.2000	ND	ug/l
1,2-Dibromoethane	.0100	.0500	.0500	ND	ug/l
Dibromomethane	.1000	NR	.5000	ND	ug/l
o-Dichlorobenzene (o-DCB)	.1000	600.0000	.5000	ND	ug/l
m-Dichlorobenzene (m-DCB)	.1000	600.0000	.5000	ND	ug/l
p-Dichlorobenzene (p-DCB)	.0300	75.0000	.5000	ND	ug/l
Dichlorodifluoromethane	.1000	NR	.5000	ND	ug/l
1,1-Dichloroethane (1,1-DCA)	.1000	NR	.5000	ND	ug/l
1,2-Dichloroethane (1,2-DCA)	.0600	5.0000	.5000	ND	ug/l
1,1-Dichloroethene	.1000	7.0000	.5000	ND	ug/l
1,2-Dichloroethene	.1000	70.0000	.5000	ND	ug/l
trans-1,2-Dichloroethene	.1000	100.0000	.5000	ND	ug/l
1,2-Dichloropropane	.1000	5.0000	.5000	ND	ug/l
1,1-Dichloropropane	.1000	NR	.5000	ND	ug/l
1,2-Dichloropropane	.1000	NR	.5000	ND	ug/l
1,1-Dichloropropene	.1000	NR	.5000	ND	ug/l
1,2-Dichloropropene Total	.1000	NR	.5000	ND	ug/l
Toluene	.1000	700.0000	.5000	ND	ug/l
Hexachlorobutadiene	.1000	NR	.5000	ND	ug/l
Isopropylbenzene	.1000	NR	.5000	ND	ug/l
o-Isopropyltoluene	.1000	NR	.5000	ND	ug/l
1,1,1-Trichloroethylene chloride	.1000	5.0000	.5000	ND	ug/l
Naphthalene	.1000	NR	.5000	ND	ug/l
o-Propylbenzene	.1000	NR	.5000	ND	ug/l
Styrene	.1000	100.0000	.5000	ND	ug/l
1,1,1,2-Tetrachloroethane	.1000	NR	.5000	ND	ug/l
1,1,2,2-Tetrachloroethane	.1000	NR	.5000	ND	ug/l

ND - None Detected NR - None Required NA - Not Analyzed
 * - Lvl Found exceeds Fed or PGA mcl. ** - Exceeds both Fed and PGA mcl.

C O N F I D E N T I A L

Analysis Id : 12648 1424 Arrowhead Spring New 7C
 Investigation: QUARTERLY (SPRING)
 Date sampled : 03-21-96 2 1gal, 2 4oz, 2 VOC vials
 Condition : Blue Ice pack
 Received by : Bill
 Received Dt : 03-22-96 Due Date Page 2

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
tetrachloroethene	.1000	5.0000	.5000	ND	ug/l
Benzene	.1100	1000.0000	.5000	ND	ug/l
Total Trihalomethanes*	.1000	100.0000	2.0000	1.7700	ug/l
1,2,3-Trichlorobenzene	.1000	NR	.5000	ND	ug/l
1,3,4-Trichlorobenzene	.1000	9.0000	.5000	ND	ug/l
1,1,1-Trichloroethane	.1000	200.0000	.5000	.1300	ug/l
1,1,1-TCA)					
1,1,2-Trichloroethane	.1000	5.0000	.5000	ND	ug/l
1,1,2-TCA)					
Trichloroethene (TCE)	.1000	5.0000	.5000	ND	ug/l
Trichlorofluoromethane (Freon	.1000	150.0000	.5000	ND	ug/l
1,2,3-Trichloropropane	.1000	NR	.5000	ND	ug/l
1,2,4-Trimethylbenzene	.1000	NR	.5000	ND	ug/l
1,3,5-Trimethylbenzene	.1000	NR	.5000	ND	ug/l
Vinyl Chloride (VC)	.1000	2.0000	.5000	ND	ug/l
Alkenes, Total (m,p & O)	.1000	0000.0000	.5000	ND	ug/l
trans-1,3-Dichloropropene	.1000	NR	.5000	ND	ug/l
cis-1,3-Dichloropropene	.1000	NR	.5000	ND	ug/l
ANIONS					
Bicarbonate	1.0000	NR	NR	92.7200	mg/l
Carbonate	1.0000	NR	NR	ND	mg/l
Chloride	.5000	250.0000	50.0000	22.5400	mg/l
Fluoride	.1000	2.4000	2.0000	.1000	mg/l
Fluoride (Added)	.1000	1.7000	1.1000		mg/l
Nitrate (NO3-N)	1.0000	10.0000	5.0000	1.9200	mg/l
Phosphate (PO4-P)	.0500	NR	NR	.1400	mg/l
Silica	.5000	NR	NR	32.8300	mg/l
Sulfate	.5000	250.0000	50.0000	3.9200	mg/l
Sulfite	.1000	1.0000	1.0000	ND	mg/l
Thiomide	.1000	NR	NR	ND	mg/L
METALS					
Aluminum	.0100	.2000	.0500	ND	mg/l
Arsenic	.0050	.0500	.0050	ND	mg/l
Barium	.0100	2.0000	.5000	ND	mg/l
Bismuth	.0010	.0050	.0050	ND	mg/l
Calcium	.5000	NR	75.0000	24.5400	mg/l
Cromium	.0010	.1000	.0050	ND	mg/l
Copper	.0050	1.0000	.1000	ND	mg/l
Cadmium	.0100	.3000	.0500	ND	mg/l
Lead	.0020	.0050	.0050	ND	mg/l
Magnesium	.0500	NR	25.0000	3.9200	mg/l
Manganese	.0030	.0500	.0050	ND	mg/l
Mercury	.0010	.0020	.0010	ND	mg/l
Potassium	.0100	NR	10.0000	1.6800	mg/l


) - None Detected NR - None Required NA - Not Analyzed
 * - Lvl Found exceeds Fed or PGA mcl. ** - Exceeds both Fed and PGA mcl.

C O N F I D E N T I A L

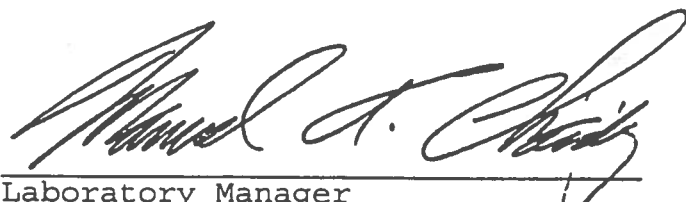
analysis Id : 12648 1424 Arrowhead Spring New 7C
 investigation: QUARTERLY (SPRING)
 date sampled : 03-21-96 2 1gal, 2 4oz, 2 VOC vials
 condition : Blue Ice pack
 analyzed by : Bill
 received Dt : 03-22-96 Due Date Page 3

Constituents.....	Minimum Detection Level	Fed Max Contam Level	PGA Max Contam Level	Level Found	Unit
Arsenium	.0050	.0100	.0050	ND	mg/l
Copper	.0050	.1000	.0050	ND	mg/l
Cadmium	.1000	NR	21.0000	19.2800	mg/l
Chromium	.0500	5.0000	1.0000	ND	mg/l
Strontium	.0005	.0040	.0040	ND	mg/L
Antimony	.0010	.0060	.0060	ND	mg/L
Nickel	.0010	.1000	.1000	ND	mg/L
Barium	.0005	.0020	.0020	ND	mg/L
SECONDARY QUALITY FACTORS					
Bacteria	1.0000	2.2000	1.0000	ND	c/100
Color	5.0000	15.0000	5.0000	ND	units
Conductivity	1.0000	NR	NR	252.7200	uS/cm
Dissolved Oxygen	1.0000	3.0000	3.0000	ND	T.O.N
Phenolphthalein	1.0000	NR	NR	ND	mg/l
Free Product	1.0000	NR	100.0000		C/ML
Free Source	1.0000	NR	100.0000	ND	C/ML
DS, Evaporated	.5000	NR	250.0000	157.0000	mg/l
Total Alkalinity	1.0000	NR	200.0000	76.0000	mg/l
Total Hardness	.5000	NR	200.0000	77.4000	mg/l
Turbidity Product	.1000	5.0000	.2000		ntu
Turbidity Source	.1000	5.0000	.4000	ND	ntu
pH	.0000	NR	NR	7.4100	pH
Flow Rate	NR	NR	NR		gal/m
LGAE	NR	NR	NR	ND	units
Faust	1.0000	NR	NR	ND	CFU/M
Coli	1.0000	NR	NR	ND	CFU/M
Pseudomonas aeruginosa	1.0000	NR	1.0000	ND	MPN

Arrowhead Quality Services Laboratory



 Chemist



 Laboratory Manager