HYDROGEOLOGIC INVESTIGATIONS OF THE HOMESTAKE LODE AND COTTONWOOD MINERAL CLAIMS WATER TUNNELS

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1.0 EXECUTIVE SUMMARY

The Homestake group of claims is located on the northwest side of Continental Mountain, approximately 3.75 miles north-northeast of Cave Creek, in Maricopa County, Arizona (see Figure 1). The Chattman family owns 17.07 acres of the Homestake Lode, and all of the Cottonwood Claim. The Trimble family owns 3.56 acres in the northeast portion of the Homestake Lode.

Three water tunnels are located on the Chattman's property in Section 11, Township 6 North, Range 4 East. The terms water tunnels and adits are used interchangeably in this report. An adit is defined in the *Glossary of Geology and Related Sciences* to be "a nearly horizontal passage from the surface by which a mine is entered and unwatered." Two adits are found at a relative elevation of 3092 feet on the Cottonwood Claim and are referred to as upper adit #1 and upper adit #2 . The access to upper adit #1 was permanently closed prior to 1986, but the rear part of the tunnel has remained open. The mouth of the upper adit #2 was closed in 1986 to form a cistern for collection of groundwater. Originally, the two upper tunnels were approximately 15 feet apart with dimensions of 5 feet by 7 feet by 40 feet deep. The Lower Water Tunnel, which is found on the Homestake Lode, occurs at a relative elevation of 2960 feet. Two cisterns were constructed in this adit. This tunnel was reported as an improvement in the 1949 mining claim survey as being 5 feet by 7 feet by 140 feet deep. When the water tunnels are referred to by area, their names are capitalized.

In both the Upper and Lower Adits, groundwater is found where the Precambrian Schist is faulted. These faults probably occurred 15.4 million years ago when the Gold Hill Granite was intruded into the overlying Precambrian Schist. At that time, both formations were buried at a great depth. These two units have been deeply eroded in the relatively recent geologic past to form the low-lying hills in that geomorphic region known as the Transition Zone which lies between the Colorado Plateau of Northern Arizona, and the Mountain and Range Province of Southern Arizona.

For billions of years, groundwater has accumulated in the cracks and crevasses in the Precambrian bedrock. Wells drilled into this schist, whether vertical or horizontal, may or may not produce groundwater. If a well bore were to intersect a fault in the Continental

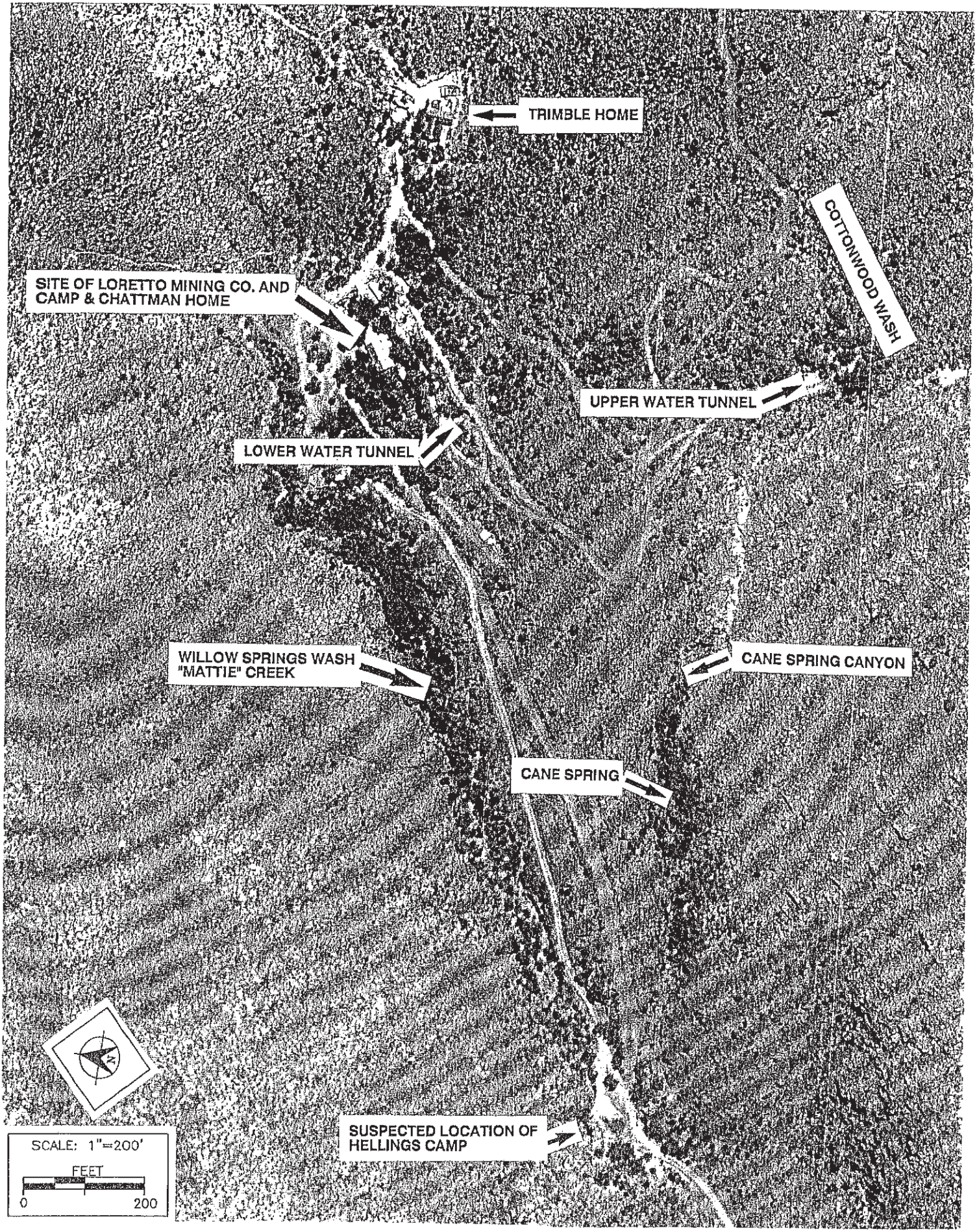

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FIGURE 2
6/9/86 FLIGHT #30-24
CAPLAB INC., TUCSON, ARIZONA
APPROXIMATE STUDY AREA

Water from the Upper Tunnel was and is the Trimble's sole source of supply. Prior to the Chattman's purchase of the two mining claims, Talbott had metered and charged the Trimble's for the use of the water (Jeffie Talbott, deposition taken on January 14, 1997). The water has not been metered by the Chattman's since they took possession of the property, nor have the Trimble's been charged for use of the water over the past 11 years. Tensions between the Chattman's and Trimble's have grown over water and property boundaries and, in 1996, the Trimble's filed a suit against the Chattman's alleging, among other things, that the water which emanated from the Upper Tunnel was surface water and that they had the right to take and use 40 percent of the water which was produced from this adit annually.

On March 15, 1997, a Kent C700 water meter was installed on the water line that runs from the upper reservoir to the Trimble's holding tank. During the latter part of March, the Trimble's water use averaged approximately 1500 gallons per day (gpd). Since the first of April, their use has increased to approximately 3000 gpd.

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FIGURE 1
LOCATION MAP
NEW RIVER MESA, ARIZONA &
CAVE CREEK, ARIZONA 7.5
MINUTE QUADRANGLES

3.0 GROUNDWATER VS SURFACE WATER

The *Glossary of Geology and Related Sciences* defines groundwater as phreatic water. The term phreatic is derived from the Greek word meaning well, i.e., well water. Phreatic water is a "term that has been applied both to water that occurs under water-table conditions...and to all water in the zone of saturation..." Bouwer (1978) defines groundwater as "that portion of the water beneath the surface of the earth that can be collected with wells, tunnels, or drainage galleries, or that flows naturally to the earth's surface via seeps or springs." He further states that "Not all underground water is groundwater. If a hole is dug, moist or even saturated soil may be encountered. As along as this water does not seep freely into the hole, however, it is not groundwater. True groundwater is reached only when water begins to flow into the hole. Since the air in the hole is at atmospheric pressure, the pressure in the groundwater must be above atmospheric pressure if it is to flow freely into the hole. By the same token, the underground water that did not flow into the hole must be less than atmospheric pressure. Thus what distinguishes groundwater from the rest of the underground water is that its pressure is greater than atmospheric pressure. Since such water moves freely under the force of gravity into wells, it is also called free water or gravitational water."

Arizona Revised Statute (ARS) § 45-101.5 defines groundwater in the following way: "Groundwater" means water under the surface of the earth, regardless of the geologic *structure*[1] in which it is standing or moving. Groundwater does not include water flowing in underground streams with ascertainable beds and banks.

On the other hand, ARS § 45-101.9 defines surface water to mean "the waters of all sources, flowing in streams, canyons, ravines, or other natural channels, or in definite underground channels, whether perennial, or intermittent, floodwater, wastewater, or surplus water, and of lakes, ponds, and springs on the surface."

[1] Italics is not in original definition, but is provided by author to emphasize the point that geologic structures such as the faults which have been identified in these water tunnels produce groundwater, not surface water.

ARS § 45-181 provides the following definitions in regard to surface water:

"Beneficial use" includes, but is not limited to, use for domestic, municipal, recreation, wildlife, including fish, agriculture, mining, stock watering, and power purposes.

"Person" means any individual, partnership, association, public or private corporation, city or other municipality, county or state agency, a recognized Indian tribe, and the United States of America when claiming water rights established under the laws of this state.

"Public waters" or "water" means waters of all sources flowing in streams, canyons, ravines, or other natural channels or in definite underground channels, whether perennial or intermittent, flood, waste, or surplus water, and of lakes, ponds, and springs on the surface.

ARS § 45-402.43 defines a well as follows:

"Well" means a man-made opening in the earth through which water may be withdrawn or obtained from beneath the surface of the earth, except as provided in Section 45-591.01.

The exclusion noted above refers to wells drilled for production of oil, gas, or helium pursuant to the provisions of Title 27.

Statutorily, as well as technically, one could only conclude that the water produced in these man-made openings is groundwater.

4.0 MINING HISTORY

Prior to 1876, gold and silver were sporadically mined on Continental Mountain, when the Apache Indians were not raiding the area in an attempt to protect their land (Carlson, op. cite). By 1876, the presence of Federal troops located at Fort McDowell was adequate to restrict Indian movements and development occurred throughout the region. About this time, a large number of claims on the mountain were acquired by William B. Hellings, one of them being the Golden Star Mine, which had been staked only a few months earlier by Joseph A. Lawrence (Carlson, op. cite). This mine was also known as the Continental Mine and was the most promising of all Hellings' properties. Apparently, Hellings was more of an entrepreneur than a miner, and the mining activity on his claims declined because of poor management and a lack of ore. This appears to have been the norm for most of the mines in the area, with the exception of those controlled by two Civil War veterans, Philes and Fleming. The gold they produced from their claims never made either of them rich, but they were actively engaged in mining in the Cave Creek Mining District for a period of approximately 43 years. Philes' home, which later became the site of Sierra Vista Guest Ranch, was located in the southwest quarter of the northwest quarter of Section 11, Township 6 North, Range 4 East and Fleming's property was in the southwest quarter of the northeast quarter of the same section. Both probably survived because the springs on their homesites provided adequate water to grow vegetables, citrus and nuts, not because of the minerals they laboriously and painfully extracted from the ground.

Characteristic of most of the claims in the Cave Creek Mining District, the Homestake Lode and Cottonwood Claim have changed hands a number of times. Carlson (op. cite.) has recounted the following history. Hellings, who owned the Homestake group of claims, allowed his company to go into bankruptcy twice, once buying it back for one-tenth of its value. Philes owned the Homestake claims for a while in the late 1880's, before selling them to W. H. Bondurant who formed the Loretto Mining Company in the early 1900's. In 1910, the Illizona Company was founded and 20 miners were hired to work double shifts at a camp

approximately one-fifth of a mile east of Hellings' original camp. A fire destroyed the stamp mill on the Homestake Lode in 1913, and the company closed its operations with many unpaid bills. Philes regained the property, then sold it to the Steele family the same year. In 1917, a group of miners attempted to reopen the Golden Reef Mine, as it was then named, on top of Continental Mountain, but the results were similar to that experienced by all others over the past 40 some-odd years. It closed not long after it opened. Tungsten and mercury became the minerals sought on Continental Mountain during World Wars I and II; however, at the end of each war, the miners left the hills for other work.

The Homestake Lode and the Cottonwood Claim were acquired by the Steele family around 1913 and patented on February 18, 1955. Russell Talbott, Maude L. Steele's nephew, moved onto these two claims in 1950 and later sold the majority of the land to the Chattman's in 1986, 100 years after mining activity was initiated on Continental Mountain.

5.0 GEOLOGIC SETTING

The oldest rocks recognized in the area are those classified as the Precambrian meta-argillite-phyllite complex. This unit has been correlated with either the Yavapai Series in West-Central Arizona (Kenny, 1986) or the Alder Group in East-Central Arizona (Karlstrom, et al., 1987), as reported by Droon and Péwé in 1991. In the subject area, the complex is a schist, a fine-grained metamorphic unit that varies in color from gray through dark maroon to brown and on to dark olive green. These Precambrian sediments were laid down in a very large trough which extended diagonally northeastward across the North American continent (Daman and Giletti, 1961).

Deposition of this unit was followed by "a long period of major structural deformation, the Mazatzal Revolution, which culminated with large plutonic intrusions of granitic to gabbroic composition" (Wilson, 1962). These igneous intrusives occur south and east of the subject property (east side of Black Mountain and in the Boulders area) and, undoubtedly, have had a profound metamorphic influence on the Precambrian sediments around Continental Mountain.

During the extreme latter part of the Laramide Revolution, the Gold Hill Granite was intruded into the meta-argillite-phyllite complex further deforming and metamorphosing it. Based on a potassiuim-argon (K-Ar) date of 15.4 million years obtained by Droon and Péwé (op. cite.) from the Gold Hill area, the granitic intrusion occurred during Miocene time. Subsequently, erosion which occurred during the Pliocene-Pleistocene time frame, approximately 2 million years ago, removed the overlying formations, thereby exposing the Gold Hill Granite.

When the Gold Hill Granite was intruded into the meta-argillite-phyllite complex, it further thermally altered this unit, while at the same time structurally faulting it and bowing the complex in such a way that the pseudo bedding plains of the schist appear to parallel the surface of the granitic intrusion. In the study area adjacent to the boundary of the Gold Hill Granite, the apparent dip of the Precambrian beds is almost 75°. Faults in the schist in the

vicinity of the Upper and Lower Adits are inclined at angles of 30°. Groundwater percolates down along the pseudo bedding planes until it reaches a fault plane, then moves along the fault in response to gravity flow. A structural geologic analysis of the study site is being prepared and will be provided as an addendum to this report.

Since emplacement some 15.4 million years ago, the surface of the granite has become quite weathered. Where the Gold Hill Formation is exposed at the surface, the outer surface of this plutonic intrusion has been removed (eroded). The overlying Precambrian sediments appear to be draped symmetrically around the granite where the two formations occur in surface outcrops (see Figure 4 below).

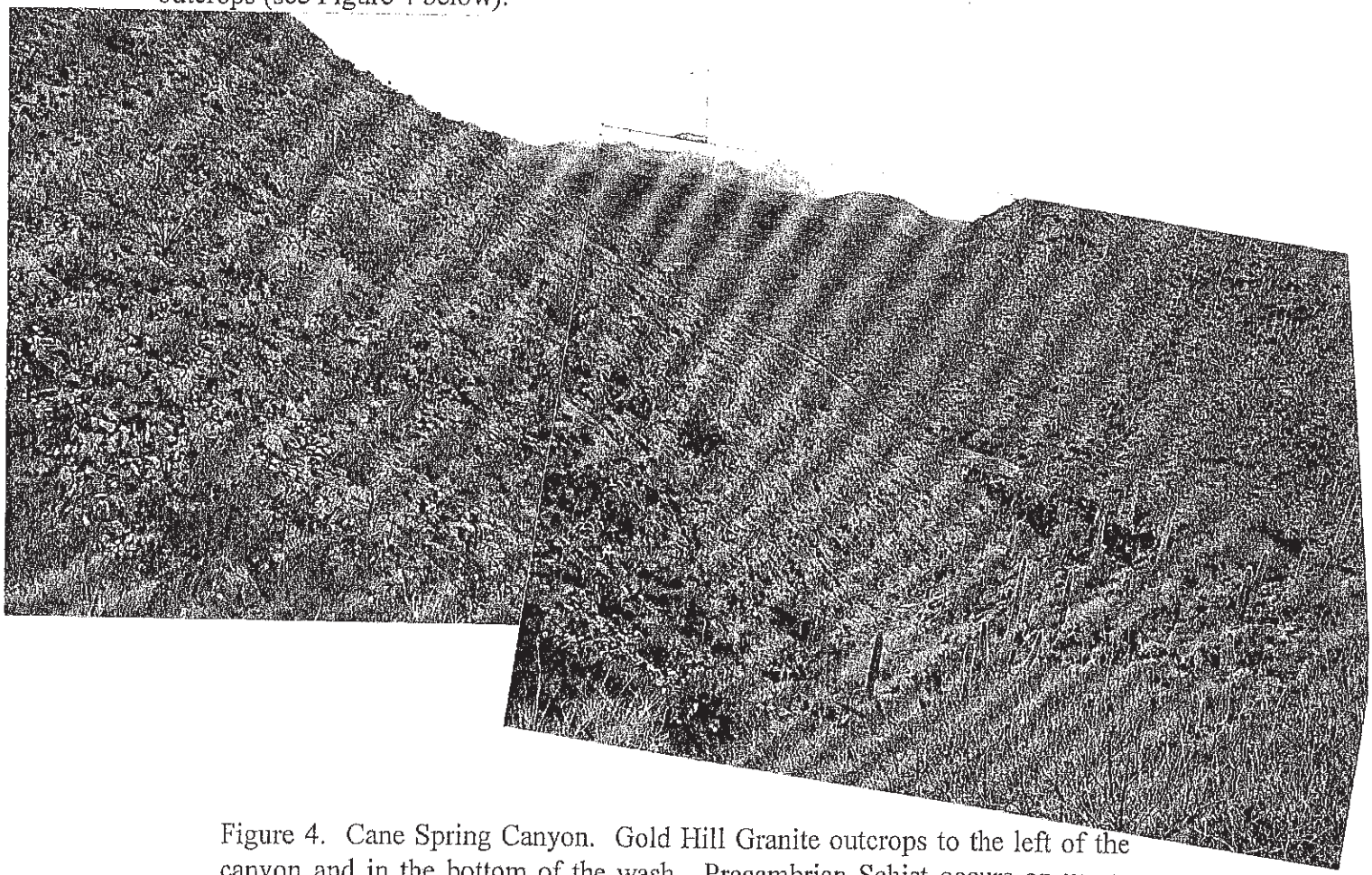

Figure 4. Cane Spring Canyon. Gold Hill Granite outcrops to the left of the canyon and in the bottom of the wash. Precambrian Schist occurs on upper right side of the wash as a dark-colored rock. Hills in background are composed of Precambrian Schist.

6.0 ADIT INVESTIGATIONS

6.1 Field Investigations

Field studies were carried out on February 27 and 28, 1997, March 21, 1997, April 5, and April 28, 1997. The adits were opened and inspected, flow from the Upper Adit was measured, water quality samples were taken, and geohydrologic features were investigated.

During the morning of February 27th, while the Upper Adit was being inspected, a cold front moved through the Cave Creek area and the outside temperature dropped into the lower 30's. The air temperature inside the Upper Tunnel was constant at 68 degrees Fahrenheit (° F). At mid-day, it started to rain and, by 4:30 p.m. on the 27th, the outside temperature was in the upper 60's. In the Lower Tunnel, the air temperature was recorded at 67° F at 11:05 a.m. The outside temperature did not seem to have any affect on the temperature inside the tunnels. Rainfall was light in the morning of the 27th, moderate to heavy in the afternoon and into the morning of the 28th, light until noon, then heavy again in the afternoon. Rainfall measured by W. H. Allen at a site 2.75 miles south of the subject property (see Figure 1) was 1.7 inches over this 36-hour period.

On the morning of the 28th, geohydrologic investigations were conducted upslope from the Upper Tunnel. A small wash (Cottonwood Wash) lies 40 feet south of the Upper Tunnel and runs from high up on Continental Mountain down toward the west where it intersects Cane Spring Canyon (see Figures 2 and 3, as well as Map #1 in pocket). Cottonwood Wash was named by this author for the large cottonwood tree that existed at the Upper Adit. No water was flowing in Cottonwood Wash, despite the heavy rain which had preceded the field investigation. The wash was followed 350 feet upslope to the east. At that point, water was flowing in Cottonwood Wash at a rate of 26 to 35 gallons per minute (gpm), or approximately 0.07 cubic feet/second. In a distance of less than 20 feet, all flow in the channel ceased; the water had percolated into the bed of the wash. The bedrock over which the stream flows is the Precambrian Schist. The contact between the schist and the granite occurs approximately

100 feet southwest of the place where the water seeps into the channel. Inflow into the bed of the channel appeared to be a possible source of the groundwater which occurs in the Upper Tunnel. Two facts illustrate why this is not the case. One, this wash only flows in response to rainfall adequate to produce runoff. Production of groundwater in the Upper Adit is at a relatively sustained rate of 4.52 gpm. Therefore, over a year, inflow from this stream channel could only account for around 10 percent of the water which is produced by the Upper Adit. It is also obvious from the above-noted observation regarding stream channel recharge that the water produced by the Upper Adit must come from a substantial groundwater source and not from local stream flow losses. Two, topographical surveys and geological analysis of the faults noted in the Upper and Lower Adits show that there are at least two separate faults in the study area and that the one which intersects the Lower Adit, when projected to the surface, is likely the recipient of the water which is recharged by stream flow in Cottonwood Wash.

The Upper and Lower Water Tunnels were constructed prior to 1926. The Upper Tunnel occurs at an elevation of 3092 feet and runs 41 feet from the original ground surface to its terminus. This tunnel supplies water for the Trimble's domestic and irrigation use, as well as for the Chattman's livestock and irrigation. It also serves as a back-up for the Chattman's domestic supply. The entrance to the Lower Adit is approximately 580 feet north-northwest of the Upper Tunnel, occurs at an elevation of 2960 feet (Map #2), and is 126 feet deep (see Figure 5). This water tunnel provides the domestic water supply for the Chattman's household and some outside irrigation use. (Stephen Slyder found a 21.15-foot difference between the original USGS topographic survey and the subsequent surveys shown on Maps 1 and 2. The translateral datum was too high on these recent maps, i.e., 21.15 feet above the USGS elevations, but is presented on the uncorrected datum for relative comparison of the two maps.)

The entrance to Upper Adit #2 was sealed by a concrete block wall to form a cistern in 1986. Water flows from the enclosed cistern into a 4-inch diameter plastic pipe, through a sand filter, then into a reservoir which has exterior dimensions of 8 feet by 26 feet. Its average depth is 7.75 feet (Figure 6). As constructed, it holds 9,595 gallons. The fall to the Trimble's holding tank is approximately 130 feet.

The Lower Adit has two cisterns. One is a 2-foot high block wall that is located approximately 24 feet from the back of the adit (Figure 7). Groundwater flows from the fault, into the cistern, over this wall, along the surface of the adit for 50 feet, to a point where the adit opening is closed off by another block wall (Figure 8), forming the second cistern. The Lower Adit is connected by pipe to the Chattman's domestic water supply system.

6.2 Geologic Site Conditions

6.2.1 Upper Adit

Originally, two adits were excavated at this site. It is suspected that the southernmost one, upper adit #1, was constructed 10 feet stratigraphically above the contact between the Gold Hill Granite and the Precambrian Schist as a prospect for tungsten and/or mercury ore. The entrance to this adit was closed many years ago by Talbott. This tunnel produces very little water. The back part of this adit is still open and connected by a small hole to the primary adit, upper adit #2, which lies 5 feet lower in elevation (Figure 9). The primary adit is also developed entirely in schist. Its entrance is approximately 20 feet stratigraphically above the granite/schist contact. The fault which the adit intersects has a strike of N 80° E and dips 30° to the north (Figure 10). Water issues from a section of a crack at the rear of the tunnel which is approximately 3 feet long (Figure 11). The schist is fairly friable but the adit walls and roof appear stable. Where the water flows from the crack, the schist is covered with a thin surface coating of calcium carbonate. A residue, which is thought to be organic in nature, has accumulated along the surface of the fault and trails down over the flowstone in two distinct

bands that range from 2 to 6 inches in width. In the first 14 feet beyond the cistern wall, tree roots extend down into the water. No roots were observed within seven feet of the back wall of the tunnel.

6.2.2 Lower Adit

This adit is also developed entirely in the Precambrian Schist. Approximately 14 feet from the back wall of the adit, a fault plane is noted in the ceiling and walls of the adit (Figure 12). This fault plane is inclined at an angle of 30° and has a strike of E 5° S. The eastern wall of the adit has a large flowstone deposit. Along the exposed alignment of the fault, tree or plant roots extend like a curtain from the roof of the adit into the water in the innermost cistern. What is thought to be an organic residue covers a substantial portion of the eastern side of the adit.

6.3 Hydrology and Water Quality

6.3.1 Upper Adit

The Upper Water Tunnel intersects a groundwater discharge zone that produces a flow of 4.515 gpm, or 6,501.6 gpd. Water flows from the fault plane at the rear of the adit into a cistern that was formed by a concrete block wall constructed at the entrance of the tunnel. On February 27, 1997, the water level in the cistern had been lowered to facilitate the tunnel's inspection. After the physical inspection, the valve on the pipe leading to the reservoir was closed to allow the cistern to refill and the reservoir level to decline. The interior dimensions of the reservoir are 6.6 feet by 24.7 feet by an average depth of 7.75 feet. It has a free water surface of 165.5 square feet and holds 9,594.07 gallons. The cistern was allowed to fill overnight while the water level in the reservoir fell to approximately 4.5 feet below the top of the structure. At 8:00 a.m. on the morning of February 28, the pipe valve on the line running into the reservoir was opened and the flow from the cistern to the reservoir was allowed to

stabilize. At 9:00 a.m., the reservoir outlet valve was closed and measurements of the water surface level were initiated. Four measurements were made of the rising water level over the course of 8 hours and 11 minutes. Assuming a relatively constant rate of groundwater production throughout the year, this water tunnel will provide 6,501.6 gallons daily, or 7.283 acre-feet of water annually.

The secondary adit is connected to the primary adit by a hole in the roof of the primary adit. This hole is 14 feet from the outer cistern wall. Some water moves from the secondary adit to the lower one, but the amount of water produced by the upper adit #1 is minimal.

Water quality samples were taken from both the Upper and Lower Adits on February 27, 1997 for analysis of Primary and Secondary Drinking Water Quality Standards. Table 1 provides a synopsis of previous tests which were run on February 25, 1987 and September 15, 1989, as well as the current data. Field determinations of temperature, pH, and conductivity were made when the samples were collected. These data are also included in Table 1. None of the tests exceeded the maximum contamination levels set for drinking water by the Environmental Protection Agency, except the total coliform levels. E. coli were not detected in any of the samples which were run during this study. On March 27, 1997, new samples were taken to try to explain why there was such a significant difference between the coliform samples collected from the Upper and Lower Adits on February 27, 1997. Five water quality samples were taken. One sample was obtained from both the Upper and Lower Adit's cistern surface at the front of each water tunnel. Two samples were taken from the free-falling water at the rear of each tunnel. Total coliform levels were 170 Most Probable Number (MPN) per 100 milliliters (ml) from the upper cistern and 17 MPN/100 ml from the lower cistern. Both free-water surface samples collected from the rear of each tunnel recorded 2 or less MPN/100 ml. Coliform levels go up dramatically as the water moves from the back

Table 1 - Water Quality Analysis

		Upper Adit			Lower Adit			
Analysis Performed	Maximum Contaminate Level	2/25/87 (Watercheck National Testing Laboratory)	9/15/89 (Amalgamated Technologies)	2/27/97 (American Environmental Network)	2/25/87 (Watercheck National Testing Laboratory)	9/15/89 (Amalgamated Technologies)	2/27/97 (American Environmental Network)	Comment
Inorganic Chemicals and Carbonate ($CaCO_3$)	-	-	-	< 1.0	Not sampled	-	< 1.0	
Bicarbonate ($CaCO_3$)	-	-	-	242.0	Not sampled	-	269.0	
Hydroxide ($CaCO_3$)	-	-	-	<1.0	Not sampled	-	< 1.0	
Total Alkalinity (as $CaCO_3$)	No MCL	180.0	220.0	242.0	Not sampled	250.0	269.0	
Chloride (EPA 325.2)	250.0+	10.0	13.0	-	Not sampled	14.0	-	OK
Fluoride (EPA 340.2)	4.0	4.0	2.5	3.09	Not sampled	2.5	3.17	OK
Nitrate as N (EPA 353.2)	10.0	< 1.0	1.0	1.37	Not sampled	1.0	1.08	OK
Sulfate (EPA 375.2)	250+	< 20.0	< 20.0	11.0	Not sampled	< 20.0	10.0	OK
Petroleum Hydrocarbons (418.1)	-	-	-	-	Not sampled	-	< 1.0	OK
pH (EPA 150.1)	6.5 - 8.5+	7.1	7.8	7.5	Not sampled	7.8	7.7	OK
Total Dissolved Solids (160.1)	500.0+	360.0	370.0	290.0	Not sampled	377.0	320.0	OK
Total Coliform (MPN/100 ml)	1.0	3.0	0.0	11.0*	Not sampled	0.0	< 2.0	?
Heavy Metals								
Arsenic (EPA 206.2/7060)	0.05	< 0.002	0.005	< 0.003	Not sampled	0.006	0.006	OK
Barium (EPA 200.7/6010)	2.0	< 0.3	< 0.3	0.011	Not sampled	< 0.3	0.013	OK
Cadmium (EPA 213.2/7131)	0.005	< 0.002	0.004	< 0.0005	Not sampled	< 0.002	< 0.0005	OK
Chromium (EPA 200.7/6010)	0.1	0.005	< 0.004	< 0.010	Not sampled	< 0.004	< 0.010	OK
Copper (EPA 200.7/6010)	1.0+	< 0.004	0.120	< 0.010	Not sampled	0.080	< 0.010	OK
Iron (EPA 200.7/6010)	0.3+	0.580	0.100	< 0.050	Not sampled	0.21	< 0.050	OK
Lead (EPA 239.2/7421)	0.02+	0.014	< 0.010	< 0.002	Not sampled	< 0.010	< 0.002	OK
Magnesium (EPA 200.7/6010)	-	-	-	13.2	Not sampled	-	16.8	
Manganese (EPA 200.7/6010)	0.05+	0.056	< 0.004	> 0.010	Not sampled	< 0.004	< 0.010	OK
Mercury (EPA 245.1/7470)	0.002	< 0.0002	< 0.0002	-	Not sampled	< 0.0002	-	OK
Nickel	0.1	< 0.02	< 0.02	-	Not sampled	< 0.02	-	OK
Selenium (EPA 270.2/7740)	0.05	< 0.002	< 0.002	< 0.005	Not sampled	< 0.002	< 0.005	OK
Silver (EPA 200.7/6010)	0.05+	< 0.002	< 0.002	< 0.010	Not sampled	< 0.002	< 0.010	OK
Sodium (EPA 200.7/6010)	No MCL	13.0	45.0	34.6	Not sampled	48.0	42.7	OK
Zinc (EPA 200.7/6010)	5.0+	< 0.004	0.092	< 0.050	Not sampled	0.050	< 0.050	OK
Field Determinations								
Water Temperature				68° F			69.1° F	
pH				6.78			6.69	
Conductivity				510 µ/cm			550 µ/cm	

* Indicates exceedance of maximum contaminate level as recommended by the EPA or other entities which administer water quality contaminate levels. Total coliform level is high, but fecal coliform is less than 2.

+ 1987 MCL standard; remainder are 1997 standards.

of the tunnel to the front. This was the case in the first round of sampling, when a reading of 11 MPN/100 ml was recorded at the Upper Adit (sample was taken from the cistern) and a reading of less than 2 MPN/100 ml was obtained from the free-falling water at the back of the Lower Tunnel. In spite of the fact that all samples had a E. coli readings of less than 2 MPN/100 ml, the level of detection for this test, the total coliform counts are considered significant. A water sample was also taken inside the Chattman's house from the drinking water side of the system. That had a total coliform reading of less than 2 MPN/100 ml. These data are also contained in Appendix 1.

A third round of samples were collected on April 28 to further define the problem related to the high coliform counts that were obtained from the cisterns. In this sampling round, samples were collected from the upper reservoir, the outer cistern in the Lower Adit, and from the outlet side of the Chattman's reservoir by their home. First, a presence-absence coliform test was run. All three had positive coliform tests, but tested negatively for E. coli. Speciation tests were then run on these samples to determine the types of coliform which are appearing in the cistern and reservoirs. These tests shown the presence of Serratia marcescens, Enterobacter clocae, Citrobacter freundii, and Citrobacter diversus. The genus Citrobacter is a member of the Salmonelleae tribe and the Enterobacter and Serratia are from the Klebsielleae. These coliform are frequently found in damp areas, can multiply on wood, and may produce slime (Greenberg, 1992). Klebsielleae may also become established in sediments of a water supply system. It is recommended that the adits be cleaned of all roots and reservoirs and adits be chlorinated periodically to eliminate these bacteria.

6.3.2 Lower Adit

The water temperature and the air temperature in both tunnels is approximately the same (68° F). The water temperature is slightly cooler than that recently obtained in a long-term drawdown test conducted by ASL six miles west of the subject site (74° F) or of that produced from a domestic well (71° F) several miles south of Continental Mountain. Dr. Chattman has informed ASL that the water temperature is fairly constant throughout the year (personal

communication on April 5, 1997). This was confirmed by Stephen Slyder (personal communication, May 13, 1997). Total dissolved solids are slightly higher in the groundwater tested from the Lower Adit than in the Upper Adit. This is related to a slight increase in the bicarbonate and sodium fraction.

No attempt was made to define the water production from the Lower Adit. This water tunnel is not involved in the law suit. Its production is not a matter of importance at this time.

6.4 *Water Use from Upper Adit*

The earliest official map of Section 11, Township 6 North, Range 4 East is the one prepared in 1911 by Roscoe C. Ham, U. S. Deputy Surveyor, Government Land Office. This survey describes the northern part of the township as being "well watered, containing several springs." Ham also described running water in Fleming Springs Wash, but he did not describe any springs in the northeast quarter of Section 11.

Discussions with Earle Slyder (personal communication, April 5, 1997) revealed that the upper adit #1, which was constructed just above the contact between the Gold Hill Granite and the Precambrian Schist, was probably a tungsten or a mercury prospect. Toward the back of the adit, a flow of water was encountered. Earle Slyder stated that the upper adit #2, to the north, was drilled to provide drainage for the higher adit. This accounts for the hole in the upper part of the lower tunnel which intersects the southernmost tunnel (see Figure 8). It would appear that the upper adit #2 has intercepted most, if not all, of the flow which originally emanated from the back of the higher tunnel because no flow through the hole from the upper adit #1 was occurring at the time when the upper adit #2 was inspected.

The mineral survey, which was conducted in 1949, shows a pipeline running from the Lower Adit to the cook shack and the house (Figure 3). A pipeline from the Upper Adit originates south of the two adits. It did not enter either adit as the pipeline from the Lower Tunnel did. The mineral survey map also indicates that the terminus of the pipeline from the Upper Adit

area is north of the Homestake Lode, i.e., water from this source had been used outside of both claims prior to 1949. A surface water right was filed by D. G. Hudson in 1947 on a site designated as Cedar Spring, which was located in the northwest quarter, northeast quarter Section 11, Township 6 North, Range 4 East (Arizona Department of Water Resources). The designated place of use was in Section 2. Cedar Spring was not the name that was given to the Upper Tunnel, but it is obvious that the water required to water 500 head of cows and horses must have originated from the area around the Upper Adit. There are cedar trees around the site today, so it is probable that Hudson designated the water coming from the tunnels as Cedar Spring. The *Glossary of Geology and Related Sciences* defines a spring to be "A place where, *without the agency of man*[2], water flows from a rock or soil upon the land or into a body of surface water." This definition was formulated by O. E. Meinzer in 1923.

It appears that no field investigations were made by the Water Rights Division of the State Land Department prior to issuing a Certificate of Water Right on the Hudson filing, therefore the fact that Hudson claimed this was a spring when it actually wasn't was not contested.

On June 29, 1979, Russell Talbott filed two Statements of Claim of Right to Use Public Water of the State (#36-28441 and #36-28442) with the Arizona State Land Department. In file #36-28841, he does not identify a source of water, nor is he specific with regard to the location, only identifying it as being in the northeast quarter of Section 11, Township 6 North, Range 4 East. His filing makes no reference to a "cottonwood" spring, nor does his attached map. File #36-28442 is for water rights in Section 15, Township 6 North, Range 4 East.

In 1969, Stephen Slyder, a nephew of the Tablott's who is now a registered professional surveyor, visited the Tablott's and spent some time at the Upper Adit site. He remembers a large cottonwood tree growing in an area south of the two adits, but no spring existed at this site (personal communication, April 5, 1997). The stump of the cottonwood was located on May 3, 1997 when the topographic survey was conducted by Slyder.

[2] Italics provided by author.

Discussions with Earle Slyder (personal communication, April 5, 1997) indicated that the groundwater from the Upper Adit had also been used for mining purposes west of the Chattman's property; however, that appears to have been a use that was not authorized by Maude Steele and was quickly terminated.

When the Trimble's built their home on the Homestake Lode, they were granted no water rights by Russell Talbott. As noted earlier in this report, the Talbott's metered the groundwater taken by the Trimble's from the Upper Adit and charged them for its use. Physical records no longer exist quantifying the amount of groundwater which was taken from the Upper Adit between 1977 and 1986 by either the Trimble's or the Talbott's. In order to determine the Trimble's current use, a Kent C700 meter was installed on the Trimble's line below the junction with the Chattman's last take-out point (see Map #1 in the pocket). This meter was installed on March 16, 1997. The following table (Table 2) summarizes Trimble's average water use on a daily basis. A high reading of 3025 gpd was recorded between May 1 and May 5, 1997. A low use of 610.3 gpd occurred between April 5 and April 8, 1997. Through May 12, 1997, the average daily use by Trimble has been 2,154 gpd.

The Arizona Department of Water Resources, in its Phoenix AMA Second Management Plan, recommended a groundwater use of around 190 gallons per person per day. This assumes that water-intensive vegetation will be irrigated, and 900 square feet of lawn are in place. It is generally accepted that water use on outlying properties, such as are represented by the Trimble's, will be somewhat higher than the norm, but not 5.7 times higher!

The Chattman's filed well registration notices on the Upper and Lower Adits on June 22, 1995. The filing numbers are 55-807092 and 55-807093, respectively.

7.0 CONCLUSIONS

1. Water which is produced from both adits is groundwater. It percolates down from the surface and intersects a fault zone, causing the water to move along that plane at an angle to the original bedding planes.

2. The faults in the schist are probably related to the emplacement of the Gold Hill Granite which occurred 15.4 million years ago.

3. It is likely that groundwater has been moving along these planes since shortly after the faults first formed.

4. The "unroofing" of the Gold Hill Granite, which began in the Plio-Pliestocene time frame (approximately two million years ago), has caused some of these older faults to be exposed at the surface. Other faults have probably occurred more recently as a result of isostatic adjustment. ARS § 45-101.5 specificaly states that water moving along these types of structural features in the subsurface is groundwater. Where groundwater is forced to the surface along a fault line, or as a result of any previously-noted boundary condition, it may be exposed as a seep or, alternatively, as a spring.

5. Vegetative evidence points to the conclusion that a seep existed immediately south of upper adit #1 prior to the construction of either adit. A seep exists in the same location today. Phreatophytes (arrow weed and some reeds) are found at the seep, as are some cedar trees. At one time, a large cottonwood tree grew at this site. Groundwater is slowly moving along the contact between the granite and the schist in the subsurface. It is possible that this seep had been developed and was the source of the water which Hudson filed on in 1947. If that were the case, the surface water right would have been lost after five years of non-use. The water supply which has developed when the tunnels were excavated was from an entirely different source—groundwater.

6. If a vertical well were drilled directly above the back of the Upper Tunnel into the schist, it would have encountered groundwater at a depth of 25 feet below the surface. The fact that the well is horizontal, not vertical, makes no difference with regard to the classification of the type of water which is produced.

8.0 REFERENCES

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APPENDIX 1

Water Quality Data for Samples Taken in 1997

American Environmental Network (Arizona), Inc.

AEN I.D. 702363

March 24, 1997

ASL Hydrologic & Environmental Services
1130 E. Missouri Avenue
Suite 110
Phoenix, AZ 85014

Project Name/Number: Chatman/281.01

Attention: Jeff Inwood

On 02/27/97, American Environmental Network (Arizona), Inc., received a request to analyze aqueous sample(s). The sample(s) were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Total Coliform analysis was performed by Aquatic Consulting & Testing, Inc., 1525 W. University Drive, Suite 106, Tempe, AZ 85281 (See Attachment 1).

The ion balances for client samples UC-1 and LC-1 are outside AEN acceptance limits; however, silicon and potassium were not requested. The TDS/EC ratio could not be reported since electrical conductance was not requested.

The metals "W" flag indicates the matrix spike was out of control limits due to sample matrix interference, however, the lab control sample was acceptable, which validates the digestion and analytical process.

The metals "E" flag indicates the reanalysis confirmed the presence of interference.

EPA method 8270 analysis was added on 3/5/97 for sample LC-1.

9830 S. 51st Street, Suite B-113 • Phoenix, AZ 85044 • (602) 496-4400 • Fax (602) 496-4101

If you have any questions or comments, please do not hesitate to contact us at (602) 496-4400.

Marcia A. Smith for:
Project Manager

MAS/ms

Enclosure

ADHS License No. AZ0061
Sherman McCutcheon, General Manager

American Environmental Network (Arizona), Inc.

CLIENT : ASL HYDROLOGIC & ENV. SERVICES
PROJECT # : 281.01
PROJECT NAME : CHATMAN
ATI I.D. : 702363

DATE RECEIVED : 02/27/97
REPORT DATE : 03/25/97

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	UC-1	AQUEOUS	02/27/97
02	LC-1	AQUEOUS	02/27/97

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	2

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

American Environmental Network (Arizona), Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 702363

CLIENT : ASL HYDROLOGIC & ENV. SERVICES
PROJECT # : 281.01
PROJECT NAME : CHATMAN

DATE RECEIVED : 02/27/97
REPORT DATE : 03/25/97

PARAMETER	UNITS	01	02
CARBONATE (CACO3)	MG/L	<1	<1
BICARBONATE (CACO3)	MG/L	242	269
HYDROXIDE (CACO3)	MG/L	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	242	269
CHLORIDE (EPA 325.2)	MG/L	15	18
FLUORIDE (EPA 340.2)	MG/L	3.09	3.17
NITRATE AS N (EPA 353.2)	MG/L	1.37	1.08
PETROLEUM HYDROCARBONS,418.1	MG/L	-	<1
PH (EPA 150.1)	UNITS	7.5	7.7
SULFATE (EPA 375.2)	MG/L	11	10
T. DISSOLVED SOLIDS (160.1)	MG/L	290	320

American Environmental Network (Arizona), Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : ASL HYDROLOGIC & ENV. SERVICES
PROJECT # : 281.01
PROJECT NAME : CHATMAN

ATI I.D. : 702363

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	70233801	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		80	80	0	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		80	80	0	NA	NA	NA
CHLORIDE	MG/L	70317003	7	7	0	17	10	100
FLUORIDE	MG/L	70300109	0.32	0.32	0	0.63	0.30	103
NITRATE AS NITROGEN	MG/L	70233801	0.11	0.11	0	2.13	2.00	101
PETROLEUM HYDROCARBONS	MG/L	70233201	<1	<1	NA	11	11	100
PH	UNITS	70233801	7.8	7.8	0	NA	NA	NA
SULFATE	MG/L	70227603	70	70	0	170	100	100
TOTAL DISSOLVED SOLIDS	MG/L	70236301	290	290	0	NA	NA	NA

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

American Environmental Network (Arizona), Inc.

METALS RESULTS

ATI I.D. : 702363

CLIENT : ASL HYDROLOGIC & ENV. SERVICES
PROJECT # : 281.01
PROJECT NAME : CHATMAN

DATE RECEIVED : 02/27/97
REPORT DATE : 03/25/97

PARAMETER	UNITS	01	02
SILVER (EPA 200.7/6010)	MG/L	<0.010	<0.010
ARSENIC (EPA 206.2/7060)	MG/L	<0.003	0.006
BARIUM (EPA 200.7/6010)	MG/L	0.011	0.013
CALCIUM (EPA 200.7/6010)	MG/L	44.6	49.4
CADMIUM (EPA 213.2/7131)	MG/L	<0.0005	<0.0005
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010
COPPER (EPA 200.7/6010)	MG/L	<0.010	<0.010
IRON (EPA 200.7/6010)	MG/L	<0.050	<0.050
HARDNESS, TOTAL (200.7/6010)	MG/L	166	193
MERCURY (EPA 245.1/7470)	MG/L	<0.0002	<0.0002
MAGNESIUM (EPA 200.7/6010)	MG/L	13.2	16.8
MANGANESE (EPA 200.7/6010)	MG/L	<0.010	<0.010
SODIUM (EPA 200.7/6010)	MG/L	34.6	42.7
LEAD (EPA 239.2/7421)	MG/L	<0.002	<0.002
SELENIUM (EPA 270.2/7740)	MG/L	<0.005	<0.005
ZINC (EPA 200.7/6010)	MG/L	<0.050	<0.050

American Environmental Network (Arizona), Inc.

METALS - QUALITY CONTROL

CLIENT : ASL HYDROLOGIC & ENV. SERVICES
PROJECT # : 281.01
PROJECT NAME : CHATMAN

ATI I.D. : 702363

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	70300101	<0.010	<0.010	NA	0.472	0.500	94
ARSENIC	MG/L	70234511	<0.015	<0.015	NA	0.016	0.250	6*E
BARIUM	MG/L	70300101	0.014	0.014	0	1.02	1.00	101
CALCIUM	MG/L	70301201	64.3	63.9	0.6	114	50.0	99
CADMIUM	MG/L	70234511	0.0015	0.0017	12	0.0065	0.0050	100
CHROMIUM	MG/L	70300101	<0.010	<0.010	NA	1.01	1.00	101
COPPER	MG/L	70300101	<0.010	<0.010	NA	0.498	0.500	100
IRON	MG/L	70349903	0.851	0.814	4	1.72	1.00	87
HARDNESS	MG/L	70349903	274	272	0.7	NA	NA	NA
MERCURY	MG/L	70236302	<0.0002	<0.0002	NA	0.0024	0.0025	96
MAGNESIUM	MG/L	70301201	27.5	27.2	1	52.4	25.0	100
MANGANESE	MG/L	70300101	0.022	0.021	5	1.07	1.00	105
SODIUM	MG/L	70301201	84.7	79.8	6	138	50.0	107
LEAD	MG/L	70234511	<0.010	<0.010	NA	0.228*W	0.250	91*W
SELENIUM	MG/L	70234511	<0.025	<0.025	NA	0.305*W	0.250	122*W
ZINC	MG/L	70300101	<0.050	<0.050	NA	0.548	0.500	110

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

* Result out of limits due to sample matrix interference

American Environmental Network (Arizona), Inc.

GCMS - RESULTS

ATI I.D. : 70236302

TEST : SEMI-VOLATILE ORGANICS (EPA 8270)

CLIENT	: ASL HYDROLOGIC & ENV. SERVICES	DATE SAMPLED	: 02/27/97
PROJECT #	: 281.01	DATE RECEIVED	: 02/27/97
PROJECT NAME	: CHATMAN	DATE EXTRACTED	: 03/06/97
CLIENT I.D.	: LC-1	DATE ANALYZED	: 03/18/97
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
N-NITROSODIMETHYLAMINE	<10
PHENOL	<10
ANILINE	<10
BIS(2-CHLOROETHYL)ETHER	<10
2-CHLOROPHENOL	<10
1,3-DICHLOROBENZENE	<10
1,4-DICHLOROBENZENE	<10
BENZYL ALCOHOL	<10
1,2-DICHLOROBENZENE	<10
2-METHYLPHENOL	<10
BIS(2-CHLOROISOPROPYL)ETHER	<10
4-METHYLPHENOL	<10
N-NITROSO-DI-N-PROPYLAMINE	<10
HEXACHLOROETHANE	<10
NITROBENZENE	<10
ISOPHORONE	<10
2-NITROPHENOL	<10
2,4-DIMETHYLPHENOL	<20
BENZOIC ACID	<50
BIS(2-CHLOROETHOXY)METHANE	<10
2,4-DICHLOROPHENOL	<10
1,2,4-TRICHLOROBENZENE	<10
NAPHTHALENE	<10
4-CHLOROANILINE	<10
HEXACHLOROBUTADIENE	<10
4-CHLORO-3-METHYLPHENOL	<10
2-METHYLNAPHTHALENE	<10
HEXACHLOROCYCLOPENTADIENE	<50
2,4,6-TRICHLOROPHENOL	<10
2,4,5-TRICHLOROPHENOL	<10
2-CHLORONAPHTHALENE	<10
2-NITROANILINE	<10
DIMETHYLPHTHALATE	<10
ACENAPHTHYLENE	<10
3-NITROANILINE	<10
ACENAPHTHENE	<10
2,4-DINITROPHENOL	<20
4-NITROPHENOL	<10
DIBENZOFURAN	<10
2,4-DINITROTOLUENE	<10
2,6-DINITROTOLUENE	<10

GCMS - RESULTS

ATI I.D. : 70236302

TEST : SEMI-VOLATILE ORGANICS (EPA 8270)

COMPOUNDS	RESULTS
DIETHYLPHTHALATE	<10
4-CHLOROPHENYL-PHENYLETHER	<10
FLUORENE	<10
4-NITROANILINE	<10
4,6-DINITRO-2-METHYLPHENOL	<10
N-NITROSODIPHENYLAMINE	<10
4-BROMOPHENYL-PHENYLETHER	<10
HEXACHLOROBENZENE	<10
PENTACHLOROPHENOL	<10
PHENANTHRENE	<10
ANTHRACENE	<10
DI-N-BUTYLPHTHALATE	<10
FLUORANTHENE	<10
BENZIDINE	<50
PYRENE	<10
BUTYLBENZYLPHTHALATE	<10
3,3'-DICHLOROBENZIDINE	<10
BENZO(a)ANTHRACENE	<10
BIS(2-ETHYLHEXYL)PHTHALATE	<10
CHRYSENE	<10
DI-N-OCTYLPHTHALATE	<10
BENZO(b)FLUORANTHENE	<10
BENZO(k)FLUORANTHENE	<10
BENZO(a)PYRENE	<10
INDENO(1,2,3-cd)PYRENE	<10
DIBENZO(a,h)ANTHRACENE	<10
BENZO(g,h,i)PERYLENE	<10

SURROGATE PERCENT RECOVERIES

NITROBENZENE-D5 (%)	87
2-FLUOROBIPHENYL (%)	80
TERPHENYL (%)	91
PHENOL-D6 (%)	85
2-FLUOROPHENOL (%)	79
2,4,6-TRIBROMOPHENOL (%)	80

American Environmental Network (Arizona), Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : SEMI-VOLATILE ORGANICS (EPA 8270)

CLIENT	: ASL HYDROLOGIC & ENV. SERVICES	ATI I.D.	: 702363
PROJECT #	: 281.01	DATE EXTRACTED	: 03/06/97
PROJECT NAME	: CHATMAN	DATE ANALYZED	: 03/13/97
CLIENT I.D.	: REAGENT BLANK	UNITS	: UG/L
		DILUTION FACTOR	: N/A

COMPOUNDS	RESULTS
N-NITROSODIMETHYLAMINE	<10
PHENOL	<10
ANILINE	<10
BIS(2-CHLOROETHYL)ETHER	<10
2-CHLOROPHENOL	<10
1,3-DICHLOROBENZENE	<10
1,4-DICHLOROBENZENE	<10
BENZYL ALCOHOL	<10
1,2-DICHLOROBENZENE	<10
2-METHYLPHENOL	<10
BIS(2-CHLOROISOPROPYL)ETHER	<10
4-METHYLPHENOL	<10
N-NITROSO-DI-N-PROPYLAMINE	<10
HEXACHLOROETHANE	<10
NITROBENZENE	<10
ISOPHORONE	<10
2-NITROPHENOL	<10
2,4-DIMETHYLPHENOL	<20
BENZOIC ACID	<50
BIS(2-CHLOROETHOXY)METHANE	<10
2,4-DICHLOROPHENOL	<10
1,2,4-TRICHLOROBENZENE	<10
NAPHTHALENE	<10
4-CHLOROANILINE	<10
HEXACHLOROBUTADIENE	<10
4-CHLORO-3-METHYLPHENOL	<10
2-METHYLNAPHTHALENE	<10
HEXACHLOROCYCLOPENTADIENE	<50
2,4,6-TRICHLOROPHENOL	<10
2,4,5-TRICHLOROPHENOL	<10
2-CHLORONAPHTHALENE	<10
2-NITROANILINE	<10
DIMETHYLPHTHALATE	<10
ACENAPHTHYLENE	<10
3-NITROANILINE	<10
ACENAPHTHENE	<10
2,4-DINITROPHENOL	<20
4-NITROPHENOL	<10
DIBENZOFURAN	<10
2,4-DINITROTOLUENE	<10
2,6-DINITROTOLUENE	<10
DIETHYLPHTHALATE	<10
4-CHLOROPHENYL-PHENYLETHER	<10

GCMS - RESULTS

REAGENT BLANK

ATI I.D. : 702363

TEST : SEMI-VOLATILE ORGANICS (EPA 8270)

COMPOUNDS	RESULTS
FLUORENE	<10
4-NITROANILINE	<10
4,6-DINITRO-2-METHYLPHENOL	<10
N-NITROSODIPHENYLAMINE	<10
4-BROMOPHENYL-PHENYLETHER	<10
HEXACHLOROBENZENE	<10
PENTACHLOROPHENOL	<10
PHENANTHRENE	<10
ANTHRACENE	<10
DI-N-BUTYLPHTHALATE	<10
FLUORANTHENE	<10
BENZIDINE	<50
PYRENE	<10
BUTYLBENZYLPHTHALATE	<10
3,3'-DICHLOROBENZIDINE	<10
BENZO(a)ANTHRACENE	<10
BIS(2-ETHYLHEXYL)PHTHALATE	<10
CHRYSENE	<10
DI-N-OCTYLPHTHALATE	<10
BENZO(b)FLUORANTHENE	<10
BENZO(k)FLUORANTHENE	<10
BENZO(a)PYRENE	<10
INDENO(1,2,3-cd)PYRENE	<10
DIBENZO(a,h)ANTHRACENE	<10
BENZO(g,h,i)PERYLENE	<10

SURROGATE PERCENT RECOVERIES

NITROBENZENE-D5 (%)	89
2-FLUOROBIPHENYL (%)	85
TERPHENYL (%)	94
PHENOL-D6 (%)	71
2-FLUOROPHENOL (%)	85
2,4,6-TRIBROMOPHENOL (%)	94

American Environmental Network (Arizona), Inc.

QUALITY CONTROL DATA

ATI I.D. : 702363

TEST : SEMI-VOLATILE ORGANICS (EPA 8270)

CLIENT : ASL HYDROLOGIC & ENV. SERVICES
PROJECT # : 281.01
PROJECT NAME : CHATMAN
REF I.D. : 70349907

DATE ANALYZED : 03/14/97
SAMPLE MATRIX : AQUEOUS
UNITS : UG/L

COMPOUNDS	SAMPLE RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
1,2,4-TRICHLOROBENZENE	<10	50	39	78	37	74	5
ACENAPHTHENE	<10	50	42	84	40	80	5
2,4-DINITROTOLUENE	<10	50	43	86	38	76	12
PYRENE	<10	50	45	90	42	84	7
N-NITROSO-DI-N-PROPYL AMINE	<10	50	46	92	44	88	4
1,4-DICHLOROBENZENE	<10	50	38	76	36	72	5
PENTACHLOROPHENOL	<10	100	70	70	71	71	1
PHENOL	<10	100	73	73	68	68	7
2-CHLOROPHENOL	<10	100	80	80	76	76	5
4-CHLORO-3-METHYLPHENOL	<10	100	82	82	79	79	4
4-NITROPHENOL	<10	100	91	91	92	92	1

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$

DATE OF ANALYSIS

ACCESSION #: 702363

SAMPLE ID	TEST AND METHOD NUMBER	DATE OF ANALYSIS	ANALYST
70236301-2	ALKALINITY (EPA 310.1)	3/5/97	DH
70236301-2	ARSENIC (EPA 206.2/7060)	3/7/97	MN
70236301-2	BARIUM (EPA 200.7/6010)	3/4/97	KJ
70236301-2	CADMIUM (EPA 213.2/7131)	3/7/97	MN
70236301-2	CALCIUM (EPA 200.7/6010)	3/10/97	JLC
70236301-2	CHLORIDE (EPA 325.2)	3/13/97	CM
70236301-2	CHROMIUM (EPA 200.7/6010)	3/4/97	KJ
70236301-2	COPPER (EPA 200.7/6010)	3/4/97	KJ
70236301-2	FLUORIDE (EPA 340.2)	3/4/97	DH
70236301-2	HARDNESS, TOTAL (200.7/6010)	3/10/97	JLC
70236301-2	IRON (EPA 200.7/6010)	3/4/97	KJ
70236301-2	LEAD (EPA 239.2/7421)	3/6/97	MN
70236301-2	MAGNESIUM (EPA 200.7/6010)	3/10/97	JLC
70236301-2	MANGANESE (EPA 200.7/6010)	3/4/97	KJ
70236301-2	MERCURY (245.2/7470)	3/14/97	MN
70236301-2	NITRATE AS N (EPA 353.2)	3/6/97	TLP
70236302	PETROLEUM HYDROCARBONS, IR	2/28/97	PW
70236301-2	PH (EPA 150.1)	3/5/97	DH
70236301-2	SELENIUM (EPA 270.2/7740)	3/4/97	MN
70236301-2	SILVER (EPA 200.7/6010)	3/4/97	KJ
70236301-2	SODIUM (EPA 200.7/6010)	3/10/97	JLC
70236301-2	SULFATE (EPA 375.2)	3/6/97	CM
70236301-2	T. DISSOLVED SOLIDS (160.1)	2/28/97	DH
70236301-2	ZINC (EPA 200.7/6010)	3/4/97	KJ

REFERENCES: Methods for Chemical Analysis of Water and Wastes, March 1983, EPA-600 4-79-020

DATE: 03-17-97

ION BALANCE

AEN ACCESSION NUMBER: 70236301
SAMPLE IDENTIFICATION: UC-1
CLIENT: ASL HYDROLOGIC & ENV. SERVICES

ANIONS	RESULT MG/L	FACTOR ME/L	TOTAL	
ALKALINITY (AS $CaCO_3$)	242.000	0.02000	4.84000	
CHLORIDE	15.000	0.02821	0.42315	
FLUORIDE	3.090	0.05264	0.16266	
NITRATE AS N (NO_3(NO_3-N X 4.43)	1.370	0.01613	0.09789	
SiO_3 (SILICON X 2.71)	NA	0.02629	0.00000	
SULFATE	11.000	0.02082	0.22902	
		TOTAL ANIONS		5.752722

CATIONS	RESULT	FACTOR	TOTAL	
CALCIUM	44.600	0.04990	2.22554	
POTASSIUM	NA	0.02558	0.00000	
MAGNESIUM	13.200	0.08229	1.08623	
SODIUM	34.600	0.04350	1.50516	
		TOTAL CATIONS		4.816868
		%RPD (<10%)*		17.71
TOTAL ANIONS/CATIONS	(CALCULATED)	268.060		
TOTAL DISSOLVED SOLIDS	(ANALYZED)	290	%RPD (<15%)*	-7.86
ELECTRICAL COND.		NA	TDS/EC RATIO (0.65+/-0.10)	

* If either Total Cations or Total Anions <10, then the %RPD Limit is not applicable.

DATE: 03-17-97

ION BALANCE

AEN ACCESSION NUMBER: 70236302
SAMPLE IDENTIFICATION: LC-1
CLIENT: ASL HYDROLOGIC & ENV. SERVICES

ANIONS	RESULT MG/L	FACTOR ME/L	TOTAL	
ALKALINITY (AS $CaCO_3$)	269.000	0.02000	5.38000	
CHLORIDE	18.000	0.02821	0.50778	
FLUORIDE	3.170	0.05264	0.16687	
NITRATE AS N (NO_3(NO_3-N X 4.43)	1.080	0.01613	0.07717	
SiO_3 (SILICON X 2.71)	NA	0.02629	0.00000	
SULFATE	10.000	0.02082	0.20820	
		TOTAL ANIONS		6.340021

CATIONS	RESULT	FACTOR	TOTAL	
CALCIUM	49.400	0.04990	2.46506	
POTASSIUM	NA	0.02558	0.00000	
MAGNESIUM	16.800	0.08229	1.38247	
SODIUM	42.700	0.04350	1.85745	
		TOTAL CATIONS		5.704982
		%RPD (<10%)*		10.54
TOTAL ANIONS/CATIONS	(CALCULATED)	302.550		
TOTAL DISSOLVED SOLIDS	(ANALYZED)	320	%RPD (<15%)*	-5.61
ELECTRICAL COND.		NA	TDS/EC RATIO (0.65+/-0.10)	

* If either Total Cations or Total Anions <10, then the %RPD Limit is not applicable.

American Environmental Network (Arizona), Inc.

CHAIN OF CUSTODY

DATE 2/22/97 PAGE 1 OF 1

AEN LAB I.D. 702363

REPORT: Attn. to: Jeff Inwood

COMPANY: ASL Hydrologic + Env. Srvs

ADDRESS: 1130 E. Missouri # #110 Phx 85022

PHONE: 263-9522

FAX: 263-7765

BILL TO: Same

COMPANY:

ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	COMPOSITE OR GRAB	Petroleum Hydrocarbons (418.1)	(MOD.8015) Fuel Fingerprint	(M8015) Gas	(BLS-191) Diesel	BTXE/MTBE (8020/602)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	Volatiles 502.2 (SDWA/UST)	Pesticides/PCB (608/8080/505/508)	Herbicides (615/8150/515)	Semi-Volatiles GC/MS (Tics/No Tics)	Volatile Organics GC/MS (624/8240/8260)	Polynuclear Aromatics (610/8310)	To	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	Total Coliform	AZ Primary Drinking Standards	AZ Secondary Drinking Standards	NUMBER OF CONTAINERS
UC-1	2/27/97	9:05A	H_2O	1	G																		X	X	3
LC-1	2/27/97	11:05A	H_2O	2	G	X																X	X	X	10

PROJECT INFORMATION

PROJ. NO.: 281.01

PROJ. NAME: Chatman

P.O. NO.:

SHIPPED VIA:

☐ UST (72 hr. ext.) ☐ NPDES ☐ SDWA ☐ RCRA ☐ OTHER

SAMPLE RECEIPT

NO. CONTAINERS: 13

CUSTODY SEALS: (Y) / N / NA

RECEIVED INTACT: (Y) / N / NA

RECEIVED ICE: (Y) / N / NA

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEKS

Comments: Hold 8015 and 8270 samples

SAMPLED & RELINQUISHED BY: 1.

Signature: [signature] Time: 4:05p

Printed Name: Jeff Inwood Date: 2/27/97

Company: ASL Phone: 263-9522

RELINQUISHED BY: 2.

Signature: [signature] Time: 455

Printed Name: Marguerite Olmsted Date: 2/27/97

Company: ASL

RELINQUISHED BY: 3.

Signature: Time:

Printed Name: Date:

Company:

RECEIVED BY: 1.

Signature: [signature] Time: 405

Printed Name: Marguerite Olmsted Date: 2/27/97

Company: ASL

RECEIVED BY: 2.

Signature: Time:

Printed Name: Date:

Company:

RECEIVED BY: (LAB) 3.

Signature: [signature] Time: 1655

Printed Name: Melanie Giancuzzo Date: 2/27/97

American Environmental Network

AQUATIC CONSULTING & TESTING, INC.

1525 W. University Drive, Suite 106
P.O. Box 1510
Tempe, Arizona 85281
Phone: (602) 921-8044 • FAX: (602) 921-0049

Lic. No. AZ0003

LABORATORY REPORT

CLIENT: American Environmental Network
9830 S. 51st Street, Suite B-113
Phoenix, AZ 85044

DATE SUBMITTED: 02/28/97@0830
DATE REPORTED: 03/02/97

ATTN: Marcia Smith

PO#: ---

SUBMITTED BY: Top Speed Delivery
SAMPLE TYPE: Aqueous
SAMPLE DATE: See C.O.C
METHOD NO.: SM 9221B (Multiple Tube)

RESULTS

Client Sample I.D.	Analysis Date	AC & T Lab Number	Total Coliform, MPN/100 mL
702363-02	02/28-03/02/97@1000	9702899	<2 *

* Fecal coliform = <2 MPN/100mL.

Reviewed by: Frederick A. Amalfi

Frederick A. Amalfi, Ph.D.
Laboratory Director

File No. 9702899.XLS

American Environmental Network (Arizona), Inc.

Interlab Chain of Custody

DATE 2/27/97 PAGE 1 OF 1

PROJECT MANAGER: Marga Smith

COMPANY: American Environmental Network (Arizona), Inc.

ADDRESS: 9830 S. 51st Street, Suite B-113
Phoenix, Arizona 85044
(602) 496-4400

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	NUMBER OF CONTAINERS	AIR - O_2, CO_2, METHANE, CO, N_2	GROSS ALPHA / BETA	RADIUM 226 / 228	ISOTOPIC URANIUM	RADON 222	SURFACTANTS (MBAS)	FECAL COLIFORM	TOTAL COLIFORM	BOD	COD	VOLATILE ORGANICS ( )	EPA 610 / 8310	EPA 547	EPA 548	EPA 549	EPA 1613	EPA 525	ASBESTOS	KARL FISHER % MOISTURE	SULFIDE	TOC	TOX
7023163-2	2/27/97	1105	AQ	9702899	1								X													

mp11

PROJECT INFORMATION

PROJECT NUMBER: 7023163

PROJECT NAME:

QC LEVEL: (STD) IV

TAT: X STANDARD ☐ RUSH!

AEN WORKORDER #

DUE DATE:

TIME:

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	1
CHAIN OF CUSTODY SEALS	
INTACT?	
RECEIVED GOOD COND. / (COLD)	
LAB NUMBER	

SAMPLES SENT TO:

- PENSACOLA
- PORTLAND
- AQUATIC X
- CORE
- ALBUQUERQUE
- ATEL
- WEST COAST
- FORT COLLINS

RELINQUISHED BY: 1.
Signature: Melanie Giangrito Time: 805
Printed Name: Melanie Giangrito Date: 2/28/97
American Environmental Network Phoenix

RECEIVED BY: 1.
Signature: Time: 805
Printed Name: L Bradley Date: 2/28/97
Company: TSD

RELINQUISHED BY: 2.
Signature: Time: 830
Printed Name: L Bradley Date: 2/28
Company: TSD

RECEIVED BY: (LAB) 2.
Signature: Cathy Greer Time: 0830
Printed Name: Date: 2-28-97
Company: Agriatic

AEN Labs: Albuquerque (505) 344-3777 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Columbia (410) 730-8525 • Pleasant Hill (510) 930-9090 DISTRIBUTION: White, Canary - AEN (Arizona), Inc. • Pink - ORIGINATOR

American Environmental Network (Arizona), Inc.

AEN I.D. 703338

April 2, 1997

ASL Hydrologic & Environmental Services
1130 E. Missouri Avenue
Suite 110
Phoenix, AZ 85014

Project Name/Number: Chatman/281.01

Attention: Bill Allen

On 03/21/97, American Environmental Network (Arizona), Inc., received a request to analyze aqueous sample(s). The sample(s) were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Total Coliform analysis was performed by Aquatic Consulting & Testing, Inc., 1525 W. University Drive, Suite 106, Tempe, AZ 85281 (See Attachment 1).

EPA method 8270 analysis was cancelled on 03/26/97 for sample LA-3.

If you have any questions or comments, please do not hesitate to contact us at (602) 496-4400.

Marcia A. Smith
Project Manager

MAS/jmf

Enclosure

ADHS License No. AZ0061
Sherman McCutcheon, General Manager

American Environmental Network (Arizona), Inc.

CLIENT : ASL HYDROLOGIC & ENV. SERVICES
PROJECT # : 281.01
PROJECT NAME : CHATMAN
ATI I.D. : 703338

DATE RECEIVED : 03/21/97
REPORT DATE : 04/02/97

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	UA-1	AQUEOUS	03/21/97
02	UA-2	AQUEOUS	03/21/97
03	LA-1	AQUEOUS	03/21/97
04	LA-2	AQUEOUS	03/21/97
05	LA-3	AQUEOUS	03/21/97

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	5

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

American Environmental Network (Arizona), Inc.

CHAIN OF CUSTODY

DATE 3/20/9 PAGE 1 OF 1

AEN LAB I.D. 703338

REPORT: Attn. to: Bill Allen

COMPANY: ASL Hydro & Envirn Services
ADDRESS: 1130 E. Missouri, Suite 110
Phoenix, AZ 85014
PHONE: 263-9522
FAX: 263-7765

BILL TO: SAME
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	COMPOSITE FOR RADIAN	TOTAL COLIFORMS	Petroleum Hydrocarbons (418.1)	(MOD.8015) Fuel Fingerprint	(M8015) Gas	(BLS-191) Diesel	BTXE/MTBE (8020/602)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	Volatiles 502.2 (SDWA/UST)	Pesticides/PCB (608/8080/505/508)	Herbicides (615/8150/515)	Semi-Volatiles GC/MS (Tics/No Tics)	Volatile Organics GC/MS (624/8240/8260)	Polynuclear Aromatics (610/8310)	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
UA-1	3/21/97	8:25	H_2O	1		X																1
UA-2	3/21/97	8:35	H_2O	2		X																1
LA-1	3/21/97	9:15	H_2O	3		X																1
LA-2	3/21/97	9:25	H_2O	4		X																1
LA-3	3/21/97	9:20	H_2O	5													X					1

PROJECT INFORMATION

PROJ. NO.: 281.01
PROJ. NAME: Chatman
P.O. NO.:
SHIPPED VIA:

☐ UST (72 hr. ext.) ☐ NPDES ☐ SDWA ☐ RCRA ☐ OTHER

SAMPLE RECEIPT

NO. CONTAINERS: 5
CUSTODY SEALS: Y / N / (NA)
RECEIVED INTACT: (Y) / N / NA
RECEIVED ICE: (Y) / N / NA

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEKS

Comments: semi-volatile analysis of floating solids

SAMPLED & RELINQUISHED BY: 1.

Signature: Jennifer Back Time: 11:40
Printed Name: Jennifer Back Date: 3/21/97
Company: ASL Phone: 263-9522

RELINQUISHED BY: 2.

Signature: [illegible] Time: 1250
Printed Name: [illegible] Date: 3/21/97
Company: ASL

RELINQUISHED BY: 3.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 1.

Signature: [illegible] Time: 1140
Printed Name: [illegible] Date: 3/21/97
Company: ASL

RECEIVED BY: 2.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 3.

Signature: [illegible] Time: 1250
Printed Name: [illegible] Date: 3/21/97
American Environmental Network

AEN Labs: Albuquerque (505) 344-3777 • Columbia (410) 730-8525 • Pensacola (904) 474-1001 • Pleasant Hill (510) 930-9090 • Portland (503) 684-0447

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AQUATIC CONSULTING & TESTING, INC.

1525 W. University Drive, Suite 106
P.O. Box 1510
Tempe, Arizona 85281
Phone: (602) 921-8044 • FAX: (602) 921-0049

Lic. No. AZ0003

LABORATORY REPORT

CLIENT: American Environmental Network
9830 S. 51st Street, Suite B-113
Phoenix, AZ 85044

DATE SUBMITTED: 03/21/97@1505
DATE REPORTED: 03/27/97

ATTN: Marcia Smith

PO#: ---

SUBMITTED BY: Top Speed Delivery
SAMPLE TYPE: Aqueous
SAMPLE DATE: See C.O.C
METHOD NO.: SM 9221B (Multiple Tube)

RESULTS

Client Sample I.D.	Analysis Date	AC & T Lab Number	Total Coliform, MPN/100 mL
703338-01	03/21-25/97@1500	9703880	170 *
703338-02	03/21-23/97@1500	9703881	<2 *
703338-03	03/21-25/97@1500	9703882	17 *
703338-04	03/21-25/97@1500	9703883	2 *

* Fecal negative = <2 MPN/100mL

Reviewed by:

Frederick A. Amalfi, Ph.D.
Laboratory Director

File No. 9703880.XLS

American Environmental Network (Arizona), Inc.

Interlab Chain of Custody

DATE 3/21/97 PAGE 1 OF 1

PROJECT MANAGER: MARCIA SMITH

COMPANY: American Environmental Network (Arizona), Inc.

ADDRESS: 9830 S. 51st Street, Suite B-113
Phoenix, Arizona 85044
(602) 496-4400

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	NUMBER OF CONTAINERS	TOTAL COLIFORM	BOD	COD	VOLATILE ORGANICS ( )	EPA 610 / 8310	EPA 547	EPA 548	EPA 549	EPA 1613	EPA 525	ASBESTOS	KARL FISHER % MOISTURE	SULFIDE	TOC	TOX
7C3338-01	3/21/97	0825	AQ		1	X		970		388	80									
-02		0835			1	X					81									
-03		0915			1	X					82									
-04		0925			1	X					83									

PROJECT INFORMATION

PROJECT NUMBER: 7C3338

PROJECT NAME:

LEVEL: (STD) IV

T: ☑ STANDARD ☐ RUSH!

N WORKORDER #

DUE DATE:

TIME:

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS	
INTACT?	
RECEIVED GOOD COND. / COLD	
LAB NUMBER	

SAMPLES SENT TO:

PENSACOLA	
PORTLAND	
AQUATIC	X
CORE	
ALBUQUERQUE	
ATEL	
WEST COAST	
FORT COLLINS	

RELINQUISHED BY: 1.
Signature: Marcia Smith Time: 1445
Printed Name: MARCIA SMITH Date: 3/21/97
American Environmental Network
Phoenix

RECEIVED BY: 1.
Signature: Melanie Giangrasso Time: 1445
Printed Name: Melanie Giangrasso Date: 3/21/97
Company: AEN

RELINQUISHED BY: 2.
Signature: Melanie Giangrasso Time: 1505
Printed Name: Melanie Giangrasso Date: 3/21/97
Company: AEN

RECEIVED BY: (LAB) 2.
Signature: Christin Time: 1505
Printed Name: Christin Date: 3/21/97
Company: ACT

Labs: Albuquerque (505) 344-3777 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Columbia (410) 730-8525 • Pleasant Hill (510) 930-9090 DISTRIBUTION: White, Canary - AEN (Arizona), Inc. • Pink - ORIGINATOR

American Environmental Network (Arizona), Inc.

AEN I.D. 704069

April 21, 1997

ASL Hydrologic & Environmental Services
1130 E. Missouri Avenue
Suite 110
Phoenix, AZ 85014

Project Name/Number: Chatman/281.01

Attention: Bill Allen

On 04/08/97, American Environmental Network (Arizona), Inc., received a request to analyze aqueous sample(s). The sample(s) were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Total Coliform analysis was performed by Aquatic Consulting & Testing, Inc., 1525 W. University Drive, Suite 106, Tempe, AZ 85281 (See Attachment 1).

If you have any questions or comments, please do not hesitate to contact us at (602) 496-4400.

Marcia Smith
Project Manager

MS/vl

Enclosure

ADHS License No. AZ0061
Sherman McCutcheon, General Manager

American Environmental Network (Arizona), Inc.

CLIENT : ASL HYDROLOGIC & ENV. SERVICES
PROJECT # : 281.01
PROJECT NAME : CHATMAN
ATI I.D. : 704069

DATE RECEIVED : 04/08/97
REPORT DATE : 04/18/97

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	CHATT 281.01	AQUEOUS	04/08/97

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	1

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

American Environmental Network (Arizona), Inc.

CHAIN OF CUSTODY

DATE 4/8/97 PAGE 1 OF 1

AEN LAB I.D. 704069

REPORT: Attn. to: BILL ALLEN

COMPANY: ASL Hydrologic + ENV Services
ADDRESS: 1130 E Missouri Ave #110
PHOENIX, AZ 85014
PHONE: (602) 263-9522
FAX: 263-7765

BILL TO: Same
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	COMPOSITE OR GRAB	TOTAL Coliform	Petroleum Hydrocarbons (418.1)	(MOD.8015) Fuel Fingerprint	(M8015) Gas	(BLS-191) Diesel	BTXE/MTBE (8020/602)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	Volatiles 502.2 (SDWA/UST)	Pesticides/PCB (608/8080/505/508)	Herbicides (615/8150/515)	Semi-Volatiles GC/MS (Tics/No Tics)	Volatile Organics GC/MS (624/8240/8260)	Polynuclear Aromatics (610/8310)	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
CHATT 28.01	4/8/97	6:20pm	H_2O	1	X	X																1

PROJECT INFORMATION

PROJ. NO.: 28.01
PROJ. NAME: CHATMN
P.O. NO.:
SHIPPED VIA:

☐ UST (72 hr. ext.) ☐ NPDES ☐ SDWA ☐ RCRA ☐ OTHER

SAMPLE RECEIPT

NO. CONTAINERS
CUSTODY SEALS Y / N / (NA)
RECEIVED INTACT (Y) N / NA
RECEIVED ICE (Y) N / NA

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEKS

Comments:

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: William H. Allen Time: 7:30	Signature: Time: 8:15	Signature: Time:
Printed Name: William H. Allen Date:	Printed Name: Date:	Printed Name: Date:
Company: ASL Phone: 263-9522	Company: ASL	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time: 730	Signature: Time:	Signature: Time: 8:15
Printed Name: Date: 4/8/97	Printed Name: Date:	Printed Name: Date: 4/8/97
Company: ASL	Company:	American Environmental Network

AEN Labs: Albuquerque (505) 344-3777 • Columbia (410) 720-8525 • Pensacola (904) 474-1001 • Pleasant Hill (510) 930-9090 • Portland (503) 681-0117

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PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY

AQUATIC CONSULTING & TESTING, INC.

1525 W. University Drive, Suite 106
P.O. Box 1510
Tempe, Arizona 85281
Phone: (602) 921-8044 • FAX: (602) 921-0049

Lic. No. AZ0003

LABORATORY REPORT

Client: American Environmental Network
9830 S. 51st Street
Suite B-113
Phoenix, AZ 85044

Attn: Marcia Smith

Date Submitted: 04/08/97
Date Reported: 04/15/97

Sample Type: Aqueous
Sample Date: 04/08/97
Sample Time: 06:20

Client ID: 704069-01
AC&T Lab No.: BC02803

RESULTS

Parameter	Analysis Start Date	Analysis End Date	Method No.	Result	Unit
Total Coliform	04/08/97	04/10/97	SM 9221B	<2	MPN/100 mL

Reviewed by: Frederick A. Amalfi
Frederick A. Amalfi, Ph.D.
Laboratory Director

RB

American Environmental Network (Arizona), Inc.

Chain of Custody

DATE 4/8/97 PAGE 1 OF 1

PROJECT MANAGER: Marcia Smith

COMPANY: American Environmental Network (Arizona), Inc.

ADDRESS: 9830 S. 51st Street, Suite B-113
Phoenix, Arizona 85044
(602) 496-4400

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	NUMBER OF CONTAINERS	AIR – O_2, CO_2, METHANE, CO, N_2	GROSS ALPHA / BETA	RADIUM 226 / 228	ISOTOPIC URANIUM	RADON 222	SURFACTANTS (MBAS)	FECAL COLIFORM	TOTAL COLIFORM	BOD	COD	VOLATILE ORGANICS ( )	EPA 610 / 8310	EPA 547	EPA 548	EPA 549	EPA 1613	EPA 525	/	ASBESTOS	KARL FISHER % MOISTURE	SULFIDE	TOC	TOX
704069-01	4/8/97	620AM	AQ	85031	1								X														

PROJECT INFORMATION

PROJECT NUMBER: 704069
PROJECT NAME: ASLH
QC LEVEL: STD. IV
TAT: STANDARD RUSH!
AEN WORKORDER #:

DUE DATE:
TIME:

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	1
CHAIN OF CUSTODY SEALS	
INTACT?	
RECEIVED GOOD COND. / COLD	
LAB NUMBER	

SAMPLES SENT TO:
PENSACOLA
PORTLAND
AQUATIC X
CORE
ALBUQUERQUE
ATEL
WEST COAST
FORT COLLINS

RELINQUISHED BY: 1.
Signature: Heather L Oschger Time: 9:35
Printed Name: Heather L Oschger Date: 4/8/97
American Environmental Network
Phoenix

RECEIVED BY: 1.
Signature: T Wenge Time: 9:36
Printed Name: T WENGE Date: 4-8-97
Company: TOP SPEED

RELINQUISHED BY: 2.
Signature: T Wenge Time: 9:47
Printed Name: T WENGE Date: 4-8-97
Company: TOP SPEED

RECEIVED BY: (LAB) 2.
Signature: Cathy Green Time: 0947
Printed Name: Date: 4-8-97
Company: Aquatic

AEN Labs: Albuquerque (505) 344-3777 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Columbia (410) 730-8525 • Pleasant Hill (510) 930-9090 DISTRIBUTION: White, Canary - AEN (Arizona), Inc. Pink - ORIGINATOR

AEROTECH LABORATORIES, INC.

ASL Hydrologic & Enviro Serv.
1130 E. Missouri Suite 110
Phoenix, AZ 85014
Attn: Bill Allen

Received: 04/28/97
Reported: 05/06/97
FDA Reg: 2010538
Lab ID: 3-704-476-1

SAMPLE IDENTIFICATION: Upper Reservoir

METHODS:

1. Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992.
2. Manual of Clinical Microbiology, 5th edition, American Society for Microbiology, 1995.

RESULTS:

PARAMETER	METHOD	RESULT	UNITS	ANALYZED
Coliforms	Colilert	1	Per 100 ml	04-28-97
Escherichia Coli	Colilert	0	Per 100 ml	04-28-97
Organism ID	---	*Serratia marcescens*	---	04-28-97

INTERPRETATION:

A result of zero [0] for both coliform and Escherichia coli means that the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). If a result is [1] for one or both of the tests, the water does not meet the requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Approved - David L. Fetveit

Final Review - Erik M. Bolin

Vladimir D. Bolin - Laboratory Director

AEROTECH LABORATORIES, INC.

ASL Hydrologic & Enviro Serv.
1130 E. Missouri Suite 110
Phoenix, AZ 85014
Attn: Bill Allen

Received: 04/28/97
Reported: 05/06/97
FDA Reg: 2010538
Lab ID: 3-704-476-2

SAMPLE IDENTIFICATION: Lower Reservoir

METHODS:

1. Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992.
2. Manual of Clinical Microbiology, 5th edition, American Society for Microbiology, 1995.

RESULTS:

PARAMETER	METHOD	RESULT	UNITS	ANALYZED
Coliforms	Colilert	1	Per 100 ml	04-28-97
Escherichia Coli	Colilert	0	Per 100 ml	04-28-97
Organism ID	---	*Enterobacter clocae* *Citrobacter freundii*	---	04-28-97

INTERPRETATION:

A result of zero [0] for both coliform and Escherichia coli means that the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). If a result is [1] for one or both of the tests, the water does not meet the requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Approved - David L. Fetveit

Final Review - Erik M. Bolin

Vladimir D. Bolin - Laboratory Director

AEROTECH LABORATORIES, INC.

ASL Hydrologic & Enviro Serv.
1130 E. Missouri Suite 110
Phoenix, AZ 85014
Attn: Bill Allen

Received: 04/28/97
Reported: 05/06/97
FDA Reg: 2010538
Lab ID: 3-704-476-3

SAMPLE IDENTIFICATION: Lower Adit

METHODS:

1. Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992.
2. Manual of Clinical Microbiology, 5th edition, American Society for Microbiology, 1995.

RESULTS:

PARAMETER	METHOD	RESULT	UNITS	ANALYZED
Coliforms	Colilert	1	Per 100 ml	04-28-97
Escherichia Coli	Colilert	0	Per 100 ml	04-28-97
Organism ID	---	*Citrobacter diversus*	---	04-28-97

INTERPRETATION:

A result of zero [0] for both coliform and Escherichia coli means that the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). If a result is [1] for one or both of the tests, the water does not meet the requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Approved - David L. Fetveit

Final Review - Erik M. Bolin

Vladimir D. Bolin - Laboratory Director