

Data on Stream-Water and Bed-Sediment Quality in the Vicinity of Leviathan Mine, Alpine County, California, and Douglas County, Nevada, September 1998

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CONVERSION FACTORS, VERTICAL DATUM, AND WATER-QUALITY ABBREVIATIONS

| Multiply | By | To obtain |
|--|---------|------------------------|
| foot (ft) | 0.3048 | meter |
| cubic foot per second (ft ³ /s) | 0.02832 | cubic meter per second |
| inch (in.) | 25.40 | millimeter |
| mile (mi) | 1.609 | kilometer |
| gallon per day (gal/d) | 3.785 | liter per day |

Temperature: Degree Celsius (°C) can be converted to degrees Fahrenheit (°F) by using the formula °F = [1.8(°C)] + 32. Degrees Fahrenheit can be converted to degrees Celsius by using the formula °C = 0.556 (°F - 32).

Sea level: In this report, “sea level” refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929, formerly called “Sea-Level Datum of 1929”), which is derived from a general adjustment of the first-order leveling networks of the United States and Canada.

Water-quality and related units used in this report:

| | |
|------|----------------------|
| mg/L | milligrams per liter |
| ng/L | nanograms per liter |
| ng/g | nanograms per gram |
| µg/g | micrograms per gram |
| µg/L | micrograms per liter |
| µm | micrometers |

Data on Stream-Water and Bed-Sediment Quality in the Vicinity of Leviathan Mine, Alpine County, California, and Douglas County, Nevada, September 1998

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Abstract

The U.S. Geological Survey (USGS) conducted a chemical assessment of streams in the Leviathan Mine and adjacent areas in September 1998. On-site measurements of streamflow, pH, dissolved oxygen, temperature, specific conductance, and at most sites alkalinity, bicarbonate, and carbonate were made at 14 sites. Water samples were collected for chemical analyses of nutrients, major ions, trace elements, and organic carbon. Bed-sediment samples of fine-grained sediment in representative depositional areas at each sampling location were collected for chemical analyses of major and trace elements, total carbon, inorganic carbon, and organic carbon.

INTRODUCTION

Leviathan Mine (fig. 1) is an inactive sulfur mine on the eastern slopes of the Sierra Nevada, in Alpine County, California. Metal-laden, acidic mine waters have drained from the site for many years, both during and after mining activity, impacting fish and other wildlife in Leviathan Creek, Aspen Creek, and Bryant Creek, which are tributaries to the East Fork Carson River. Underground mining of native sulfur and copper sulfate began on the site in the 1860's and continued intermittently until 1941. Open pit mining of sulfur occurred from 1953 to 1962 (Clark, 1977). Atlantic Richfield Company was the last private owner of the mine. The site is now owned by the State of California and managed by the Lahontan Regional Water Quality Control Board. Leviathan Creek and Mountaineer

Creek join to form Bryant Creek, which discharges to the East Fork Carson River. Additional background information can be found in a report by Hammermeister and Walmsley (1985).

PURPOSE AND SCOPE

The purpose of this report is to document surface water-quality and bed-sediment quality data collected in September 1998 from streams in the vicinity of Leviathan Mine. These data were collected during an assessment of the degree and extent of contamination from mining activities at Leviathan Mine. Water and bed-sediment samples were collected at 14 sites (fig. 1, table 1). Tables are at back.

METHODS OF STUDY

On-site measurements included streamflow, pH, dissolved oxygen, water temperature, specific conductance, and at most sites alkalinity, bicarbonate, and carbonate. Water samples were analyzed at the USGS National Water Quality Laboratory (NWQL) in Arvada, Colorado, for nutrients, major ions, trace elements, and organic carbon. Bed-sediment samples were analyzed at USGS Geologic Division Branch of Geochemistry Laboratory in Lakewood, Colorado, for trace elements, total carbon, inorganic carbon, and organic carbon. Methylmercury analyses were done by the USGS Mercury Research Laboratory in Middleton, Wisconsin.

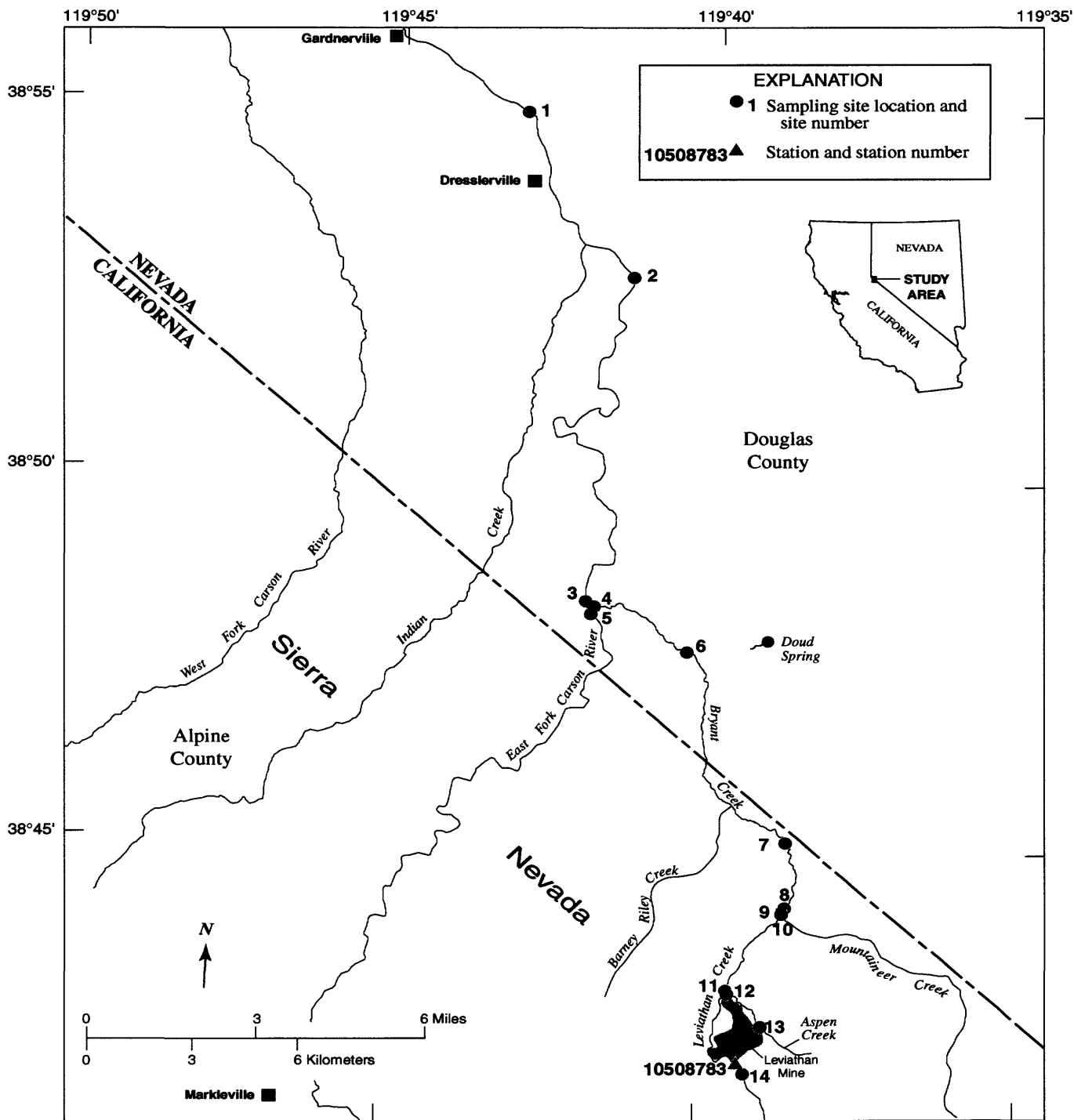


Figure 1. Surface-water sampling sites in the vicinity of Leviathan Mine, Alpine County, California, and Douglas County, Nevada. Site numbers correspond with those in table 1.

Sampling Procedures

Sampling sites (fig. 1, table 1) were selected on the basis of available hydrologic data from the USGS. For these sites, water samples were collected in the stream channel and bottom-sediment samples were collected from depositional areas within the stream. All equipment and containers were washed with laboratory-grade detergent, rinsed with trace-element-free deionized water, 5-percent hydrochloric acid, again with the deionized water, and then rinsed with native stream water prior to sampling at each site.

Water Column

Measurements of water temperature, specific conductance, pH, dissolved oxygen, alkalinity, bicarbonate, and carbonate were made in the field using the procedures of the U.S. Geological Survey (1998). Streamflow measurements were done using the procedures described by Rantz (1982). Water samples were collected using the equal-width-increment sampling method (Shelton, 1994). The samples collected at each vertical were combined, thoroughly mixed, and split using a Teflon cone splitter to obtain representative subsamples for subsequent analysis (Shelton, 1994; Olson and DeWild, 1999). Field personnel wore plastic gloves and followed ultra-clean technique during sampling (Shelton, 1994). Water samples, with the exception of methylmercury, were shipped to the NWQL for analyses. Concentrations of major ions and nutrients were analyzed according to methods described by Fishman and Friedman (1989). Concentrations of trace elements in filtered water samples were analyzed according to methods described by Garbarino and Taylor (1994) and Struzeski and others (1996). Concentrations of trace elements in whole-water (total) samples were analyzed according to methods described by Garbarino and Struzeski (1998) and Garbarino (2000). Organic carbon was analyzed according to methods described by Brenton and Arnett (1993) and Burkhardt and others (1997). Details of analytical procedures for methylmercury analyses in water are given by Olsen and others (1997) and Olson and DeWild (1999). Samples for methylmercury determinations were withdrawn from a cone splitter (Capel and Larson, 1996) into an acid-rinsed Teflon bottle contained in double zip-lock bags as received from the laboratory. The

sample was frozen with dry ice, and shipped frozen within 24 hours of collection to the USGS Mercury Research Laboratory.

Bed Sediment

Bed-sediment samples were collected using the National Water Quality Assessment Program (NAWQA) trace-element sampling protocols (Shelton and Capel, 1994). Three composite samples were collected from each site in the study area. A composite sample consisted of five subsamples collected from the top 1 inch of sediment in depositional areas such as pools, in the lee of boulders and trees, or along stream channel margins. Field personnel wore plastic gloves and used a pre-cleaned Teflon scoop to collect sediment from the stream bottom. The samples were placed into a glass bowl. The sediment was mixed and wet-sieved through 63- μ m nylon cloth using native water into a 500-mL polyethylene jar. Sediment samples were sent to the USGS Geologic Division Branch of Geochemistry Laboratory for analysis of major and trace elements, total carbon, inorganic carbon, and organic carbon. Samples for methylmercury determinations were frozen with dry ice in the field and shipped to the USGS Mercury Research Laboratory within 24 hours of collection.

Bed-sediment samples were prepared for trace-element analysis using total acid digestion. In the laboratory, the composite samples from each site were air dried, pulverized, and mixed to ensure a homogenous sample. Two subsamples were digested with different acids depending upon the trace elements to be analyzed. Selenium concentrations were determined using hydride generation atomic-absorption spectrophotometry (Hageman and Welsch, 1996). Mercury concentrations were determined using continuous-flow, cold vapor atomic-absorption spectrometry (O'Leary and others, 1996). Sulfur concentrations were determined by combustion (Curry, 1996b). Carbon concentrations were determined by combustion (Curry, 1996a) and coulometric titration (Papp and others, 1996). All other trace-element concentrations, except methylmercury, were determined using inductively coupled plasma-mass spectrometry (Briggs and Meier, 1999). Details of analytical procedures used by the USGS mercury research laboratory for total methylmercury in sediment are given by Olson and others (1997) and Olson and Dewild (1999).

Quality Assurance Procedures

Quality assurance procedures of the USGS NAWQA program were followed (Mueller and others, 1997) and for water samples included the collection of a replicate water sample at one site, and two field blanks. The NWQL followed quality assurance practices described by Pritt and Raese (1995) and Pirkey and Glodt (1998). Bed-sediment samples were collected and analyzed in triplicate at each site. The USGS Geologic Division Branch of Geochemistry Laboratory followed quality assurance practices described by Arbogast (1990). Replicate samples allow evaluation of variability introduced by sampling procedures. Replicate samples are a set of environmental samples collected in such a manner that the samples are thought to be essentially identical in composition. Field blanks consist of trace-element free water that is subjected to all aspects of sample collection, field processing, preservation, transportation, and laboratory handling as an environmental sample.

REVIEW OF DATA

Major ion, nutrient, trace-element, and organic carbon concentrations in water samples are listed in table 2. Major- and trace-element and carbon concentrations in bed-sediment samples are listed in table 3. Field blank data are listed in table 4. Field blank samples indicate no contamination was introduced by sampling or analytical procedures. A replicate sample collected at site 14 (table 2) indicates that a reproducible sample could be collected using procedures described in this report. Discrepancies in the data reflect the limits of precision and accuracy for the laboratory analytical procedures used. The less-than (<) values reported with analytes in water samples are reported when an analyte either is not detected or is detected at a concentration less than the method detection limit. The minimum reporting level is defined as the smallest measured concentration of a substance that can be reliably measured by using a given analytical

method (Timme, 1995). The estimated (E) value is reported for data where the analyte was detected above the method detection limit, but below the minimum reporting level (Childress and others, 1999). For these situations, the compound has passed all criteria used to identify its presence, and only the concentration is estimated (Connor and others, 1998). In the water sample from site 11 (table 2), the dissolved-solids concentration was greater than that allowable by the analytical procedure for trace elements, thus, the sample was diluted 10-fold prior to analyses. This dilution resulted in minimum reporting levels 10 times greater than other samples. In a few instances (table 2), the concentration of a specific element was greater in the dissolved sample than the unfiltered (total) sample. In these instances, differences may be due to analytical errors or normal variance in analytical results. Differences in replicate bed-sediment data were likely due to natural variability in the stream and in sample collection.

SUMMARY

The U.S. Geological Survey conducted a chemical assessment of streams in the Leviathan Mine and adjacent areas in September 1998. The purpose of this study was to assess the degree and extent of surface water contamination due to activities at Leviathan Mine. Water-column and bed-sediment samples were collected and analyzed according to U.S. Geological Survey procedures. On-site measurements of stream-flow, pH, dissolved oxygen, temperature, specific conductance, and at most sites alkalinity, bicarbonate, and carbonate were made at 14 sites. Water samples were collected for chemical analyses of nutrients, major ions, trace elements, and organic carbon. Bed-sediment samples were collected for chemical analyses of major and trace elements, total carbon, inorganic carbon, and organic carbon. Field blanks and a replicate sample were collected to assure the quality of the environmental sample data.

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TABLE 1. Location of sites in the vicinity of Leviathan Mine where water-quality and bed-sediment samples were collected, September 22-25, 1998
[Latitude and longitude are relative to Navigational Reference Datum, 1927]

| Site Number (fig. 1) | USGS Station Number | Station Name | Latitude (degrees, minutes, seconds) | Longitude (degrees, minutes, seconds) |
|----------------------------|---------------------------|---|---|--|
| 1 | 10309089 | East Fork Carson River at River View Drive Bridge near Dresslerville, NV | 38° 55' 25" | 119° 43' 01" |
| 2 | 10309010 | East Fork Carson River near Dresslerville, NV | 38° 52' 42" | 119° 41' 18" |
| 3 | 10308900 | East Fork Carson River below Bryant Creek near Gardnerville, NV | 38° 48' 17" | 119° 42' 03" |
| 4 | 10308875 | Bryant Creek above East Fork Carson River near Gardnerville, NV | 38° 48' 13" | 119° 41' 47" |
| 5 | 10308525 | East Fork Carson River above Bryant Creek near Gardnerville, NV | 38° 48' 07" | 119° 41' 49" |
| 6 | 10308800 | Bryant Creek near Gardnerville, NV ¹ | 38° 47' 38" | 119° 40' 18" |
| 7 | 384505119384001 | Bryant Creek above Barney Riley Creek near Markleeville CA | 38° 45' 05" | 119° 38' 40" |
| 8 | 10308794 | Bryant Creek below Mountaineer Creek near Markleeville, CA | 38° 44' 12" | 119° 38' 39" |
| 9 | 384407119384201 | Leviathan Creek above Mountaineer Creek near Markleeville CA | 38° 44' 07" | 119° 38' 42" |
| 10 | 384407119384101 | Mountaineer Creek above Leviathan Creek near Markleeville, CA | 38° 44' 07" | 119° 38' 41" |
| 11 | 384303119393901 | Leviathan Creek above Aspen Creek near Markleeville, CA | 38° 43' 03" | 119° 39' 39" |
| 12 | 384301119393001 | Aspen Creek above Leviathan Creek near Markleeville, CA | 38° 43' 01" | 119° 39' 30" |
| 13 | 384235119385001 | Aspen Creek above Leviathan Mine near Markleeville, CA | 38° 42' 35" | 119° 38' 50" |
| 14 | 384157119391301 | Leviathan Creek 1200 feet upstream of Station 10308783 above Leviathan Mine | 38° 41' 57" | 119° 39' 13" |

¹ Upstream from confluence of outflow from Doud Spring and Bryant Creek.

TABLE 2. Concentrations of major ions, nutrients, trace elements, and organic carbon in water samples collected in the vicinity of Leviathan Mine, September 1998

[Abbreviations and symbols: E, estimated; deg C, degrees Celsius; inst., instantaneous; ng/L, nanograms per liter; µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25 degrees Celsius; NGVD, National Geodetic Vertical Datum; mm of Hg, millimeters of mercury; --, no data; <, less than. Minimum reporting levels are in parenthesis below constituent name]

| SITE NUMBER (fig. 1) | STATION NUMBER | USGS STATION NAME | DATE | TIME | ELEV. OF LAND CHARGE, SURFACE DATUM | | DIS- INST. | SPE- CIFIC CON- DUCTANCE | | PH | TEMPER- ATURE | | BARO- METRIC PRES- SURE |
|-------------------------|-----------------|--|----------|------|-------------------------------------|------|------------|--------------------------|-------|-----|------------------|-------------|-------------------------|
| | | | | | FEET | NGVD | | PER ANCE | µS/cm | | FIELD STAND- ARD | WATER DEG C | |
| 1 | 10309089 | EAST FORK CARSON RIVER AT RIVER VIEW DRIVE BRIDGE NEAR DRESSLERVILLE | 09-22-98 | 1300 | 4820 | 66 | 161 | 152 | 161 | 8.4 | 16.5 | 640 | |
| 2 | 10309010 | EAST FORK CARSON RIVER NEAR DRESSLERVILLE, NV | 09-23-98 | 1150 | 4910 | 147 | 152 | 143 | 152 | 8.1 | 15.0 | 635 | |
| 3 | 10308900 | EAST FORK CARSON RIVER BELOW BRYANT CREEK NEAR GARDNERVILLE, NV | 09-24-98 | 1200 | 5100 | 162 | 143 | 470 | 143 | 7.4 | 13.0 | 634 | |
| 4 | 10308875 | BRYANT CREEK ABOVE EAST FORK CARSON RIVER NEAR GARDNERVILLE, NV | 09-24-98 | 1400 | 5140 | 4.3 | 142 | 158 | 142 | 8.1 | 16.0 | 634 | |
| 5 | 10308525 | EAST FORK CARSON RIVER ABOVE BRYANT CREEK NEAR GARDNERVILLE, NV | 09-24-98 | 1200 | 5110 | 158 | 142 | 158 | 142 | 7.8 | 13.5 | 630 | |
| 6 | 10308800 | BRYANT CREEK NEAR GARDNERVILLE, NV | 09-25-98 | 1045 | 5450 | 4.8 | 290 | 333 | 290 | 8.3 | 11.5 | 626 | |
| 7 | 384505119384001 | BRYANT CREEK ABOVE BARNEY RILEY CREEK NEAR MARKLEEVILLE CA | 09-25-98 | 1410 | 5985 | 2.7 | 333 | 709 | 333 | 7.9 | 9.5 | 611 | |
| 8 | 10308794 | BRYANT CREEK BELOW MOUNTAINEER CREEK NEAR MARKLEEVILLE, CA | 09-23-98 | 1110 | 6320 | 2.7 | 347 | 76 | 347 | 7.6 | 9.5 | 611 | |
| 9 | 384407119384201 | LEVIATHAN CREEK ABOVE MOUNTAINEER CREEK NEAR MARKLEEVILLE CA | 09-22-98 | 1600 | 6280 | 1.76 | 709 | 153 | 709 | 3.7 | 12.5 | 607 | |
| 10 | 384407119384101 | MOUNTAINEER CREEK ABOVE LEVIATHAN CREEK NEAR MARKLEEVILLE CA | 09-22-98 | 1415 | 6300 | 1.4 | 153 | 133 | 153 | 8.4 | 10.5 | 610 | |
| 11 | 384303119393901 | LEVIATHAN CREEK ABOVE ASPEN CREEK NEAR MARKLEEVILLE, CA | 09-23-98 | 1445 | 6640 | .33 | 1320 | 185 | 133 | 3.8 | 12.0 | 601 | |
| 12 | 384301119393001 | ASPEN CREEK ABOVE LEVIATHAN CREEK NEAR MARKLEEVILLE, CA | 09-28-98 | 1130 | 7150 | .29 | 185 | 133 | 185 | 7.8 | 11.5 | 587 | |
| 13 | 384235119385001 | ASPEN CREEK ABOVE LEVIATHAN MINE NEAR MARKLEEVILLE, CA | 09-28-98 | 1130 | 7150 | .29 | 185 | 133 | 185 | 7.8 | 11.5 | 587 | |
| 14 | 384157119391301 | LEVIATHAN CREEK 1200 FEET UPSTREAM OF SITE 10308783 ABOVE LEVIATHAN MINE | 09-25-98 | 1200 | 7200 | .18 | 133 | 133 | 133 | 7.9 | 6.5 | 585 | |
| 14 | 384157119391301 | LEVIATHAN CREEK 1200 FEET UPSTREAM OF SITE 10308783 ABOVE LEVIATHAN MINE | 09-25-98 | 1200 | 7200 | .18 | 133 | 133 | 133 | 7.9 | 6.5 | 585 | |

| SITE NUMBER (fig. 1) | DATE | OXYGEN DIS- SOLVED | PER- CENT SATUR- ATION | CALCIUM mg/L | MAGNE- SIUM, DIS- SOLVED | SODIUM, DIS- SOLVED | SODIUM, AD- TION RATIO | POTAS- SIUM, DIS- SOLVED | BICAR- BONATE, DIS- SOLVED | CAR- BONATE, DIS- SOLVED | ALKAL- LITY, DIS- SOLVED | SULFATE mg/L | CHLO- RIDE, DIS- SOLVED | FLUO- RIDE, DIS- SOLVED | SILICA, DIS- SOLVED | SOLIDS, RESIDUE AT 180 DEG C |
|-------------------------|----------|--------------------------|------------------------------|-----------------|--------------------------------|------------------------|---------------------------|--------------------------------|----------------------------------|--------------------------------|--------------------------------|-----------------|-------------------------------|-------------------------------|---------------------------|---------------------------------------|
| | | | | | | | | | | | | | | | | |
| 1 | 09-22-98 | 9.2 | 113 | 16 | 4.2 | 10 | .6 | 1.9 | 67 | 1 | 57 | <0.1 | 15 | 3.6 | <0.1 | 25 |
| 2 | 09-23-98 | 9.7 | 116 | 15 | 3.8 | 9.8 | .6 | 1.7 | 67 | <1 | 55 | <0.1 | 14 | 3.3 | -- | 25 |
| 3 | 09-24-98 | 8.1 | 93 | 14 | 3.6 | 8.8 | .6 | 5.4 | 65 | <1 | 53 | <0.1 | 13 | 3.3 | <0.1 | 24 |
| 4 | 09-24-98 | 7.3 | 89 | 47 | 15 | 21 | .6 | 5.3 | 149 | <1 | 124 | <0.1 | 180 | 2.4 | 0.2 | 53 |
| 5 | 09-24-98 | 9.3 | 108 | 14 | 3.8 | 9.2 | .6 | 1.8 | 62 | <1 | 51 | <0.1 | 13 | 3.1 | <0.1 | 24 |
| 6 | 09-25-98 | 8.7 | 98 | 32 | 10 | 8.9 | .4 | 3.8 | 55 | <1 | 47 | <0.1 | 81 | 1.6 | 0.2 | 39 |
| 7 | 09-25-98 | 8.9 | 98 | 38 | 11 | 8.5 | .3 | 3.1 | 61 | <1 | 50 | <0.1 | 110 | 1.5 | 0.2 | 34 |
| 8 | 09-23-98 | 8.7 | 95 | 39 | 11 | 8.5 | .3 | 3.0 | 50 | <1 | 41 | <0.1 | 110 | 1.3 | 0.3 | 37 |
| 9 | 09-22-98 | 7.7 | 91 | 110 | 27 | 12 | .3 | 4.9 | -- | -- | -- | 1.8 | 450 | 1.2 | -- | 37 |
| 10 | 09-22-98 | 8.5 | 95 | 17 | 6.0 | 6.8 | .4 | 2.3 | -- | -- | -- | <0.1 | .9 | <0.1 | 40 | -- |
| 11 | 09-23-98 | 7.7 | 92 | 140 | 39 | 16 | .3 | 6.8 | -- | -- | -- | 4.3 | 760 | 1.3 | 0.6 | 40 |
| 12 | 09-28-98 | 8.9 | 102 | 69 | 18 | 10 | .3 | 4.9 | 2 | <1 | 2 | 0.2 | 260 | 1.3 | 0.5 | 31 |
| 13 | 09-28-98 | 7.6 | 91 | 24 | 5.3 | 9.3 | .4 | .8 | 116 | <1 | 95 | <0.1 | 1.1 | .8 | <0.1 | 26 |
| 14 | 09-25-98 | 9.5 | 101 | 13 | 4.3 | 7.8 | .5 | 3.4 | 74 | <1 | 61 | <0.1 | 4.5 | 1.7 | -- | 43 |
| 14 | 09-25-98 | 9.5 | 101 | 13 | 4.3 | 7.9 | .5 | 3.7 | 75 | <1 | 62 | <0.1 | 4.2 | 1.8 | <0.1 | 43 |

TABLE 2. Concentrations of major ions, nutrients, trace elements, and organic carbon in water samples in the vicinity of Leviathan Mine, September 1998 -- continued

| SITE NUMBER (fig. 1) | DATE | SOLIDS, SUM OF CONSTITUENTS, | | NITRO- GEN, NITRO- GEN, NO2+NO3 | | NITRO- GEN, AM- MONIA | | NITRO- GEN, AM- MONIA + ORGANIC | | PHOS- PHORUS ORTHODIS- | | ALUM- INUM, DIS- | | ALUM- INUM, DIS- | | ANTI- MONY, DIS- | | ARSENIC, TOTAL | |
|-------------------------|----------|------------------------------------|-------|---|-------|--------------------------------|------|---|-------|------------------------------|-------|------------------------|-------|------------------------|------|------------------------|------|-------------------|------|
| | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| 1 | 09-22-98 | 111 | <0.01 | 0.06 | <0.02 | <0.02 | <0.1 | <0.1 | <0.05 | 1.1 | 0.02 | 160 | 27 | <1.4 | <1.0 | <1.0 | 9.1 | | |
| 2 | 09-23-98 | 105 | <0.01 | 0.07 | <0.02 | <0.02 | <0.1 | <0.1 | <0.05 | <0.05 | 0.02 | 170 | 28 | <1.4 | <1.0 | <1.0 | 190 | | |
| 3 | 09-24-98 | 104 | <0.01 | 0.09 | <0.02 | <0.02 | <0.1 | <0.1 | E0.04 | <0.05 | 0.01 | 250 | 14 | <1.4 | <1.0 | <1.0 | 26 | | |
| 4 | 09-24-98 | 394 | <0.01 | 0.06 | <0.02 | <0.02 | <0.1 | <0.1 | <0.05 | <0.05 | <0.01 | 850 | 260 | <1.4 | <1.0 | <1.0 | 75 | | |
| 5 | 09-24-98 | 100 | <0.01 | 0.07 | <0.02 | <0.02 | <0.1 | <0.1 | E0.05 | <0.05 | <0.01 | 290 | 9.0 | <1.4 | <1.0 | <1.0 | 150 | | |
| 6 | 09-25-98 | 205 | <0.01 | 0.20 | <0.02 | <0.02 | <0.1 | <0.1 | 0.11 | <0.05 | <0.01 | 3400 | 66 | <1.4 | <1.0 | <1.0 | 19 | | |
| 7 | 09-25-98 | 236 | <0.01 | 0.12 | <0.02 | <0.02 | <0.1 | <0.1 | 0.05 | <0.05 | <0.01 | 1500 | 35 | <1.4 | <1.0 | <1.0 | 140 | | |
| 8 | 09-23-98 | 243 | <0.01 | 0.18 | <0.02 | <0.02 | <0.1 | <0.1 | E0.04 | <0.05 | <0.01 | 1500 | 42 | <1.4 | <1.0 | <1.0 | 5.3 | | |
| 9 | 09-22-98 | 655 | <0.01 | 0.08 | 0.02 | 0.02 | <0.1 | <0.1 | <0.05 | <0.05 | <0.01 | 5300 | 5400 | <1.4 | <1.0 | <1.0 | 100 | | |
| 10 | 09-22-98 | -- | <0.01 | 0.20 | <0.02 | <0.02 | <0.1 | <0.1 | E0.04 | <0.05 | 0.04 | 70 | <1.0 | <1.4 | <1.0 | <1.0 | 21 | | |
| 11 | 09-23-98 | 1070 | <0.01 | 0.08 | 0.12 | 0.12 | <0.1 | <0.1 | 0.06 | <0.05 | 0.01 | 12000 | 12000 | <1.4 | <1.0 | <1.0 | 91 | | |
| 12 | 09-28-98 | 402 | <0.01 | <0.05 | <0.02 | <0.02 | <0.1 | <0.1 | <0.05 | <0.05 | <0.01 | 2000 | 350 | <1.4 | <1.0 | <1.0 | 39 | | |
| 13 | 09-28-98 | 128 | <0.01 | 0.52 | <0.02 | <0.02 | <0.1 | <0.1 | <0.05 | <0.05 | 0.02 | 110 | 2.8 | <1.4 | <1.0 | <1.0 | 61 | | |
| 14 | 09-25-98 | 115 | <0.01 | 0.05 | <0.02 | <0.02 | <0.1 | <0.1 | 0.09 | 0.09 | 0.08 | 100 | 3.1 | <1.4 | <1.0 | <1.0 | 8.6 | | |
| 14 | 09-25-98 | 116 | <0.01 | 0.06 | <0.02 | <0.02 | <0.1 | <0.1 | 0.10 | 0.09 | 0.08 | 110 | 3.4 | <1.4 | <1.0 | <1.0 | 12 | | |

| SITE NUMBER (fig. 1) | DATE | ARSENIC, DIS- | | BARIUM, DIS- | | BERYL- LIUM, DIS- | | BORON, DIS- | | CADMIUM, DIS- | | CHRO- MIUM, DIS- | | COBALT, DIS- | | COPPER, DIS- | |
|-------------------------|----------|------------------|------|-----------------|-------|-------------------------|------|----------------|------|------------------|------|------------------------|------|-----------------|------|-----------------|------|
| | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| 1 | 09-22-98 | 6.8 | 32 | 31 | <0.14 | <1.0 | <1.0 | 140 | <0.1 | <1.0 | <1.0 | <1.0 | 0.19 | <1.0 | 1.0 | <1.0 | |
| 2 | 09-23-98 | 6.8 | 30 | 29 | <0.14 | <1.0 | <1.0 | 132 | <0.1 | <1.0 | <1.0 | <1.0 | .29 | <1.0 | 0.8 | <1.0 | |
| 3 | 09-24-98 | 6.5 | 30 | 28 | <0.14 | <1.0 | <1.0 | 123 | <0.1 | <1.0 | <1.0 | <1.0 | .29 | <1.0 | 0.8 | <1.0 | |
| 4 | 09-24-98 | 2.7 | 30 | 29 | 0.22 | <1.0 | <1.0 | 46 | 0.1 | <1.0 | <1.0 | <1.0 | 3.6 | 2.5 | 2.2 | 1.6 | |
| 5 | 09-24-98 | 6.8 | 32 | 28 | <0.14 | <1.0 | <1.0 | 128 | <0.1 | <1.0 | <1.0 | <1.0 | .30 | <1.0 | 1.0 | <1.0 | |
| 6 | 09-25-98 | 1.2 | 78 | 34 | 0.38 | <1.0 | <1.0 | 29 | 0.2 | <1.0 | <1.0 | <1.0 | 14 | 4.7 | 22 | 1.7 | |
| 7 | 09-25-98 | <1.0 | 41 | 30 | 0.40 | <1.0 | <1.0 | 21 | 0.2 | <1.0 | <1.0 | <1.0 | 25 | 18 | 12 | 1.9 | |
| 8 | 09-23-98 | <1.0 | 32 | 30 | 0.36 | <1.0 | <1.0 | 28 | 0.2 | <1.0 | <1.0 | <1.0 | 31 | 29 | 11 | 2.4 | |
| 9 | 09-22-98 | <1.0 | 38 | 39 | 1.2 | <1.0 | <1.0 | 58 | 0.4 | <1.0 | <1.0 | <1.0 | 110 | 109 | 34 | 35 | |
| 10 | 09-22-98 | 1.2 | 28 | 28 | <0.14 | <1.0 | <1.0 | E9 | <0.1 | <1.0 | <1.0 | <1.0 | .13 | <1.0 | <0.6 | <1.0 | |
| 11 | 09-23-98 | 20 | 47 | 47 | 1.9 | <1.0 | <1.0 | 70 | <1 | <1.0 | <1.0 | <1.0 | 270 | 280 | <6.0 | 16 | |
| 12 | 09-28-98 | <1.0 | 29 | 30 | 0.69 | <1.0 | <1.0 | 39 | 0.3 | <1.0 | <1.0 | <1.0 | 20 | 20 | 60 | 51 | |
| 13 | 09-28-98 | <1.0 | 11 | 9.8 | <0.14 | <1.0 | <1.0 | <16 | <1 | <1.0 | <1.0 | <1.0 | .21 | <1.0 | 0.6 | <1.0 | |
| 14 | 09-25-98 | 1.8 | 64 | 65 | <0.14 | <1.0 | <1.0 | E11 | <0.1 | <1.0 | <1.0 | <1.0 | .15 | <1.0 | 0.6 | <1.0 | |
| 14 | 09-25-98 | 1.8 | 66 | 65 | <0.14 | <1.0 | <1.0 | <16 | <0.1 | <1.0 | <1.0 | <1.0 | .15 | <1.0 | 0.7 | <1.0 | |

TABLE 2. Concentrations of major ions, nutrients, trace elements, and organic carbon in water samples in the vicinity of Leviathan Mine, September 1998 -- continued

| SITE NUMBER (fig. 1) | DATE | IRON, | | LEAD, | | MANGA- NESE, | | MERCURY, | | MOLYB- DENUM, | | NICKEL, | | SELE- NIUM, | |
|-------------------------|----------|--------------------------------|---|---------------------------------|--|----------------------------------|--|---------------------------------|--|---------------------------------|--|-------------------------------|--|---------------------------------|--|
| | | TOTAL µg/L AS FE (10) | DIS- SOLVED µg/L AS FE (10) | TOTAL µg/L AS PB (0.1) | DIS- SOLVED µg/L AS PB (1.0) | TOTAL µg/L AS MN (0.12) | DIS- SOLVED µg/L AS MN (1.0) | TOTAL µg/L AS HG (0.1) | DIS- SOLVED µg/L AS HG (0.1) | TOTAL µg/L AS MO (0.8) | DIS- SOLVED µg/L AS MO (1.0) | TOTAL µg/L AS NI (1) | DIS- SOLVED µg/L AS NI (1.0) | TOTAL µg/L AS SE (4.0) | DIS- SOLVED µg/L AS SE (4.0) |
| 1 | 09-22-98 | 520 | 31 | 0.1 | <1.0 | 15 | 7.8 | <0.1 | <0.1 | <0.8 | <1.0 | 1 | <1.0 | <4.0 | <4.0 |
| 2 | 09-23-98 | 220 | 33 | 0.1 | <1.0 | 15 | 7.4 | <0.1 | <0.1 | <0.8 | <1.0 | 1 | <1.0 | <4.0 | <4.0 |
| 3 | 09-24-98 | 170 | 22 | 0.2 | <1.0 | 28 | 13 | <0.1 | <0.1 | <0.8 | <1.0 | 1 | <1.0 | <4.0 | <4.0 |
| 4 | 09-24-98 | 200 | 110 | <0.1 | <1.0 | 180 | 150 | <0.1 | <0.1 | <8 | <1.0 | 13 | 12 | <4.0 | <4.0 |
| 5 | 09-24-98 | 300 | 27 | 0.3 | <1.0 | 31 | 13 | <0.1 | <0.1 | <0.8 | <1.0 | <1 | <1.0 | <4.0 | <4.0 |
| 6 | 09-25-98 | 8000 | 24 | 2.4 | <1.0 | 430 | 280 | <0.1 | <0.1 | <0.8 | <1.0 | 43 | 19 | <4.0 | <4.0 |
| 7 | 09-25-98 | 4800 | 35 | 0.3 | <1.0 | 770 | 710 | <0.1 | <0.1 | <8 | <1.0 | 55 | 40 | <4.0 | <4.0 |
| 8 | 09-23-98 | 1900 | 330 | <0.1 | <1.0 | 890 | 920 | <0.1 | <0.1 | <0.8 | <1.0 | 67 | 63 | <4.0 | <4.0 |
| 9 | 09-22-98 | 5500 | 4300 | <0.1 | <1.0 | 3400 | 3500 | <0.1 | <0.1 | <0.8 | <1.0 | 230 | 231 | 5.4 | 5.4 |
| 10 | 09-22-98 | 120 | B9 | <0.1 | <1.0 | 9.5 | 2.7 | <0.1 | <0.1 | <0.8 | <1.0 | <1 | <1.0 | <4.0 | <4.0 |
| 11 | 09-23-98 | 57000 | 51000 | <10 | <10 | 6700 | 6900 | <0.1 | <0.1 | <8 | <10 | 560 | 590 | <40 | <40 |
| 12 | 09-28-98 | 170 | 55 | <0.1 | <1.0 | 1500 | 1500 | <0.1 | <0.1 | <0.8 | <1.0 | 44 | 44 | 8.0 | 8.0 |
| 13 | 09-28-98 | 120 | B8 | 0.1 | <1.0 | 14 | 1.9 | <0.1 | <0.1 | <0.8 | <1.0 | <1 | <1.0 | <4.0 | <4.0 |
| 14 | 09-25-98 | 340 | 60 | <0.1 | <1.0 | 16 | 13 | <0.1 | <0.1 | <0.8 | <1.0 | <1 | <1.0 | <4.0 | <4.0 |
| 14 | 09-25-98 | 200 | 60 | <0.1 | <1.0 | 16 | 13 | <0.1 | <0.1 | <0.8 | <1.0 | <1 | <1.0 | <4.0 | <4.0 |

| SITE NUMBER (fig. 1) | DATE | SILVER, | | STRON- TIUM, | | THAL- LIUM, | | VANA- DIUM, | | ZINC, | | URANIUM, NATURAL, | | CARBON, ORGANIC | |
|-------------------------|----------|---------------------------------|--|--------------------------------|--|---------------------------------|--|---------------------------------|--|---------------------------------|--|--------------------------------|---|--------------------------------|---|
| | | TOTAL µg/L AS AG (1.4) | DIS- SOLVED µg/L AS AG (1.0) | TOTAL µg/L AS SR (10) | DIS- SOLVED µg/L AS SR (1.0) | TOTAL µg/L AS TL (0.5) | DIS- SOLVED µg/L AS TL (0.5) | TOTAL µg/L AS V (10.0) | DIS- SOLVED µg/L AS V (10.0) | TOTAL µg/L AS ZN (1.0) | DIS- SOLVED µg/L AS ZN (1.0) | TOTAL µg/L AS U (1.0) | DIS- SOLVED µg/L AS U (1.0) | TOTAL mg/L AS C (0.1) | DIS- SOLVED mg/L AS C (0.1) |
| 1 | 09-22-98 | <2.0 | <1.4 | <1.0 | 380 | 210 | 0.9 | <10 | <10 | 1.3 | <1.0 | 0.6 | <1.0 | 1.5 | 1.3 |
| 2 | 09-23-98 | <2.0 | <1.4 | <1.0 | 210 | 200 | <0.5 | <10 | <10 | 1.5 | <1.0 | 0.6 | <1.0 | 1.8 | 1.2 |
| 3 | 09-24-98 | <2.0 | <1.4 | <1.0 | 210 | -- | <0.5 | <10 | <10 | 1.4 | <1.0 | 0.6 | <1.0 | 1.8 | 1.2 |
| 4 | 09-24-98 | <2.0 | <1.4 | <1.0 | 210 | 410 | 0.8 | <10 | <10 | 8.6 | <1.0 | <0.4 | <1.0 | 1.6 | 1.3 |
| 5 | 09-24-98 | <2.0 | <1.4 | <1.0 | 190 | 200 | <0.5 | <10 | <10 | 2.0 | <1.0 | 0.6 | <1.0 | 1.9 | 1.3 |
| 6 | 09-25-98 | <2.0 | <1.4 | <1.0 | 220 | 280 | 1.3 | <10 | <10 | 21 | <1.0 | 1.1 | <1.0 | 3.0 | 0.9 |
| 7 | 09-25-98 | <2.0 | <1.4 | <1.0 | 340 | 340 | 0.9 | <10 | <10 | 19 | <1.0 | 0.5 | <1.0 | 2.0 | 0.8 |
| 8 | 09-23-98 | <2.0 | <1.4 | <1.0 | 320 | 340 | 1.4 | <10 | <10 | 22 | <1.0 | 0.5 | <1.0 | 1.5 | 0.6 |
| 9 | 09-22-98 | 4.3 | <1.4 | <1.0 | 670 | 650 | 5.0 | <10 | <10 | 72 | <1.0 | 0.6 | <1.0 | 0.9 | 0.8 |
| 10 | 09-22-98 | <2.0 | <1.4 | <1.0 | 220 | 220 | <0.5 | <10 | <10 | <1.0 | <1.0 | 0.4 | <1.0 | 1.5 | 0.9 |
| 11 | 09-23-98 | <2.0 | <1.4 | <10 | 880 | 960 | 9.5 | B6 | 120 | 130 | <1.0 | <10 | <1.0 | 0.9 | 0.9 |
| 12 | 09-28-98 | 7.7 | <1.4 | <1.0 | 410 | 410 | 2.1 | <10 | <10 | 55 | <1.0 | 0.5 | <1.0 | 0.8 | 0.9 |
| 13 | 09-28-98 | <2.0 | <1.4 | <1.0 | 280 | 290 | <0.5 | <10 | <10 | 1.5 | <1.0 | <0.4 | <1.0 | 1.4 | 0.6 |
| 14 | 09-25-98 | <2.0 | <1.4 | <1.0 | 180 | 210 | <0.5 | <10 | <10 | 1.7 | <1.0 | <0.4 | <1.0 | 3.5 | 2.9 |
| 14 | 09-25-98 | <2.0 | <1.4 | <1.0 | 180 | 210 | <0.5 | <10 | <10 | <1.0 | <1.0 | <0.4 | <1.0 | 3.7 | 2.7 |

TABLE 3. Concentrations of major and trace elements and carbon in the less than 63-micrometer fraction of bed-sediment samples from streams in the vicinity of Leviathan Mine, September 1998

[Abbreviations and symbols: µg/g, micrograms per gram; ng/g, nanograms per gram; --, no data; <, less than. Minimum reporting levels are in parenthesis below constituent name]

| SITE NUMBER (fig. 1) | USGS STATION NUMBER | STATION NAME | DATE | TIME | ALUM- INUM | | ANTI- MONY | ARSENIC BARIUM | | BERYL- LIUM | | BISMUTH µg/g (1.0) |
|-------------------------|------------------------|--|----------|------|--------------------|------------------|---------------|----------------|---------------|----------------|---------------|--------------------------|
| | | | | | PERCENT (0.005) | PERCENT (0.1) | | µg/g (0.1) | µg/g (1.0) | µg/g (0.1) | µg/g (1.0) | |
| 1 | 10309089 | EAST FORK CARSON RIVER AT RIVER VIEW DRIVE BRIDGE NEAR DRESSLERVILLE | 09-22-98 | 1300 | 9.0 | 2 | 21 | 1000 | 2 | <1 | <1 | |
| | | | 09-22-98 | 1301 | 8.9 | 2 | 20 | 980 | 2 | <1 | <1 | |
| | | | 09-22-98 | 1302 | 9.0 | 2 | 20 | 990 | 2 | <1 | <1 | |
| 2 | 10309010 | EAST FORK CARSON RIVER NEAR DRESSLERVILLE, NV | 09-23-98 | 1150 | 9.5 | 1 | 16 | 960 | 2 | <1 | <1 | |
| | | | 09-23-98 | 1151 | 9.9 | 1 | 16 | 1000 | 2 | <1 | <1 | |
| | | | 09-23-98 | 1152 | 10 | 1 | 19 | 970 | 1 | <1 | <1 | |
| 3 | 10308900 | EAST FORK CARSON RIVER BELOW BRYANT CREEK NEAR GARDNERVILLE, NV | 09-24-98 | 1200 | 9.4 | 2 | 20 | 980 | 1 | <1 | <1 | |
| | | | 09-24-98 | 1201 | 9.8 | 2 | 21 | 1000 | 2 | <1 | <1 | |
| | | | 09-24-98 | 1202 | 9.8 | 2 | 19 | 1000 | 2 | <1 | <1 | |
| 4 | 10308875 | BRYANT CREEK ABOVE EAST FORK CARSON RIVER NEAR GARDNERVILLE, NV | 09-24-98 | 1400 | 8.0 | 2 | 230 | 910 | 5 | 3 | 3 | |
| | | | 09-24-98 | 1401 | 8.9 | 3 | 110 | 1100 | 3 | 3 | 3 | |
| | | | 09-24-98 | 1402 | 8.9 | 3 | 86 | 1200 | 3 | 4 | 4 | |
| 5 | 10308525 | EAST FORK CARSON RIVER ABOVE BRYANT CREEK NEAR GARDNERVILLE, NV | 09-24-98 | 1200 | 9.8 | 1 | 17 | 980 | 2 | <1 | <1 | |
| | | | 09-24-98 | 1201 | 9.8 | 1 | 16 | 1000 | 1 | <1 | <1 | |
| | | | 09-24-98 | 1202 | 9.9 | 1 | 16 | 990 | 1 | <1 | <1 | |
| 6 | 10308800 | BRYANT CREEK NEAR GARDNERVILLE, NV | 09-25-98 | 1045 | 8.4 | 3 | 130 | 950 | 3 | 3 | 3 | |
| | | | 09-25-98 | 1046 | 8.6 | 3 | 140 | 960 | 3 | 3 | 3 | |
| | | | 09-25-98 | 1047 | 8.7 | 3 | 150 | 970 | 4 | 3 | 3 | |
| 7 | 384505119384001 | BRYANT CREEK ABOVE BARNEY RILEY CREEK NEAR MARKLEEVILLE CA | 09-25-98 | 1410 | 8.8 | 3 | 110 | 900 | 3 | 3 | 3 | |
| | | | 09-25-98 | 1411 | 8.4 | 2 | 120 | 880 | 5 | 2 | 2 | |
| | | | 09-25-98 | 1412 | 8.1 | 3 | 110 | 880 | 5 | 2 | 2 | |
| 8 | 10308794 | BRYANT CREEK BELOW MOUNTAINEER CREEK NEAR MARKLEEVILLE, CA | 09-23-98 | 1110 | 8.0 | 2 | 99 | 880 | 5 | 2 | 2 | |
| | | | 09-23-98 | 1111 | 7.9 | 3 | 110 | 750 | 5 | 2 | 2 | |
| | | | 09-23-98 | 1112 | 8.2 | 3 | 130 | 850 | 6 | 3 | 3 | |
| 9 | 384407119384201 | LEVIATHAN CREEK ABOVE MOUNTAINEER CREEK NEAR MARKLEEVILLE CA | 09-22-98 | 1600 | 8.0 | 1 | 200 | 720 | 1 | 2 | 2 | |
| | | | 09-22-98 | 1601 | 6.9 | 1 | 280 | 580 | 0.9 | 3 | 3 | |
| | | | 09-22-98 | 1602 | 6.8 | 1 | 220 | 670 | 0.9 | 2 | 2 | |
| 10 | 384407119384101 | MOUNTAINEER CREEK ABOVE LEVIATHAN CREEK NEAR MARKLEEVILLE CA | 09-22-98 | 1200 | 8.6 | 3 | 9.3 | 990 | 2 | <1 | <1 | |
| | | | 09-22-98 | 1201 | 8.7 | 3 | 12 | 1000 | 2 | <1 | <1 | |
| | | | 09-22-98 | 1202 | 8.6 | 3 | 9.9 | 970 | 1 | <1 | <1 | |
| 11 | 384303119393901 | LEVIATHAN CREEK ABOVE ASPEN CREEK NEAR MARKLEEVILLE, CA | 09-23-98 | 1445 | 1.5 | 5 | 560 | 140 | 0.4 | <1 | <1 | |
| | | | 09-23-98 | 1446 | .73 | .5 | 600 | 63 | <0.1 | <1 | <1 | |
| | | | 09-23-98 | 1447 | .93 | .5 | 680 | 78 | 0.2 | <1 | <1 | |
| 12 | 384301119393001 | ASPEN CREEK ABOVE LEVIATHAN CREEK NEAR MARKLEEVILLE, CA | 09-28-98 | 1340 | 9.9 | 2 | 43 | 840 | 3 | 3 | 3 | |
| | | | 09-28-98 | 1341 | 10 | 2 | 55 | 800 | 3 | 3 | 3 | |
| | | | 09-28-98 | 1342 | 9.5 | 2 | 43 | 840 | 3 | 2 | 2 | |
| 13 | 384235119385001 | ASPEN CREEK ABOVE LEVIATHAN MINE NEAR MARKLEEVILLE, CA | 09-28-98 | 1130 | 7.5 | 1 | 21 | 970 | 2 | 1 | 1 | |
| | | | 09-28-98 | 1131 | 8.0 | 1 | 20 | 1000 | 1 | 1 | 1 | |
| | | | 09-28-98 | 1132 | 7.6 | 1 | 15 | 1000 | 1 | 2 | 2 | |
| 14 | 384157119391301 | LEVIATHAN CREEK 1200 FT UPSTREAM OF SITE 10308783 ABOVE LEVIATHAN MINE | 09-25-98 | 1130 | 9.6 | 2 | 18 | 1100 | 1 | 1 | 1 | |
| | | | 09-25-98 | 1131 | 9.8 | 2 | 25 | 1100 | 2 | 2 | 2 | |
| | | | 09-25-98 | 1132 | 9.6 | 2 | 20 | 1100 | 2 | 1 | 1 | |

TABLE 3. Concentrations of trace elements and carbon in the less than 63-micrometer fraction of bed-sediment samples from streams in the vicinity of Leviathan Mine, September 1998 -- continued

| SITE NUMBER (fig. 1) | DATE | CADMIUM µg/g (0.1) | CALCIUM PERCENT (0.005) | CERIUM µg/g (1.0) | CHRO- MITUM µg/g (1.0) | COBALT µg/g (1.0) | COPPER µg/g (1.0) | EURO- PIUM µg/g (1.0) | GALLIUM µg/g (1.0) | GOLD µg/g (1.0) | HOLMIUM µg/g (1.0) | IRON PERCENT (0.005) | LANTHA- NUM µg/g (1.0) | LEAD µg/g (1.0) | LITHIUM µg/g (1.0) | MAGNE- SIUM PERCENT (0.005) |
|-------------------------|----------|--------------------------|-------------------------------|-------------------------|---------------------------------|-------------------------|-------------------------|--------------------------------|--------------------------|-----------------------|--------------------------|----------------------------|---------------------------------|-----------------------|--------------------------|--------------------------------------|
| 1 | 09-22-98 | .2 | 2.8 | 63 | 34 | 25 | 38 | 2 | 19 | <1 | 1 | 5.1 | 34 | 17 | 30 | 2.5 |
| | 09-22-98 | .3 | 2.7 | 61 | 33 | 23 | 36 | 2 | 18 | <1 | 1 | 5.0 | 33 | 17 | 30 | 2.4 |
| | 09-22-98 | .2 | 2.6 | 63 | 35 | 24 | 38 | 2 | 19 | <1 | 1 | 5.1 | 35 | 17 | 30 | 2.3 |
| 2 | 09-23-98 | .2 | 2.9 | 58 | 35 | 24 | 34 | 1 | 19 | <1 | <1 | 4.8 | 31 | 16 | 30 | 2.3 |
| | 09-23-98 | .2 | 3.1 | 59 | 36 | 24 | 34 | 1 | 19 | <1 | <1 | 4.9 | 30 | 16 | 30 | 2.4 |
| | 09-23-98 | .2 | 3.0 | 58 | 36 | 25 | 35 | 1 | 20 | <1 | <1 | 5.0 | 30 | 16 | 30 | 2.4 |
| 3 | 09-24-98 | .2 | 3.1 | 56 | 36 | 23 | 35 | 2 | 19 | <1 | 1 | 4.9 | 30 | 16 | 30 | 2.4 |
| | 09-24-98 | .1 | 3.2 | 58 | 38 | 24 | 36 | 2 | 20 | <1 | 1 | 5.1 | 32 | 16 | 30 | 2.5 |
| | 09-24-98 | .2 | 3.2 | 58 | 36 | 25 | 36 | 2 | 20 | <1 | 1 | 5.2 | 32 | 16 | 30 | 2.6 |
| 4 | 09-24-98 | 1.9 | 1.8 | 76 | 63 | 190 | 100 | 2 | 13 | <1 | 2 | 7.1 | 38 | 15 | 20 | .82 |
| | 09-24-98 | 1.5 | 2.1 | 73 | 86 | 100 | 110 | 2 | 18 | <1 | 1 | 5.9 | 39 | 21 | 20 | 1.0 |
| | 09-24-98 | 1.2 | 2.2 | 73 | 95 | 90 | 96 | 2 | 18 | <1 | 1 | 6.1 | 39 | 21 | 20 | 1.1 |
| 5 | 09-24-98 | .2 | 3.2 | 57 | 36 | 24 | 34 | 1 | 19 | <1 | <1 | 4.8 | 30 | 16 | 30 | 2.5 |
| | 09-24-98 | .2 | 3.2 | 58 | 36 | 24 | 34 | 1 | 19 | <1 | <1 | 4.9 | 30 | 16 | 30 | 2.4 |
| | 09-24-98 | .2 | 3.2 | 56 | 34 | 23 | 33 | 1 | 19 | <1 | <1 | 4.8 | 29 | 16 | 30 | 2.5 |
| 6 | 09-25-98 | 1.7 | 2.0 | 72 | 72 | 230 | 160 | 2 | 15 | <1 | 2 | 7.1 | 37 | 18 | 20 | .96 |
| | 09-25-98 | 1.7 | 2.1 | 74 | 72 | 230 | 170 | 2 | 16 | <1 | 2 | 7.3 | 38 | 18 | 20 | .99 |
| | 09-25-98 | 1.7 | 2.2 | 79 | 74 | 230 | 180 | 3 | 16 | <1 | 2 | 6.9 | 39 | 16 | 20 | 1.0 |
| 7 | 09-25-98 | 1.2 | 1.9 | 78 | 64 | 74 | 180 | 2 | 16 | <1 | 2 | 7.5 | 41 | 18 | 20 | .97 |
| | 09-25-98 | 1.5 | 2.0 | 89 | 52 | 240 | 200 | 3 | 14 | <1 | 3 | 8.8 | 43 | 16 | 20 | .84 |
| | 09-25-98 | 1.3 | 2.0 | 82 | 52 | 170 | 190 | 3 | 14 | <1 | 2 | 8.7 | 41 | 15 | 20 | .84 |
| 8 | 09-23-98 | 1.2 | 2.0 | 84 | 52 | 150 | 200 | 3 | 14 | <1 | 2 | 9.8 | 41 | 15 | 20 | .85 |
| | 09-23-98 | 1.4 | 1.9 | 80 | 48 | 110 | 190 | 3 | 13 | <1 | 2 | 10 | 39 | 23 | 20 | .78 |
| | 09-23-98 | .9 | 1.8 | 88 | 54 | 130 | 200 | 3 | 13 | <1 | 3 | 8.8 | 42 | 16 | 20 | .85 |
| 9 | 09-22-98 | .1 | 1.6 | 47 | 59 | 18 | 90 | 1 | 16 | <1 | <1 | 16 | 23 | 14 | 20 | .94 |
| | 09-22-98 | .1 | 1.3 | 35 | 59 | 15 | 79 | <1 | 13 | <1 | <1 | 22 | 18 | 13 | 10 | .78 |
| | 09-22-98 | .1 | 1.5 | 39 | 55 | 15 | 78 | 1 | 13 | <1 | <1 | 18 | 19 | 13 | 10 | .81 |
| 10 | 09-22-98 | .2 | 2.6 | 61 | 53 | 22 | 38 | 2 | 18 | <1 | 1 | 5.0 | 33 | 15 | 20 | 1.0 |
| | 09-22-98 | .2 | 2.7 | 62 | 54 | 22 | 39 | 2 | 18 | <1 | 1 | 5.1 | 34 | 15 | 20 | 1.0 |
| | 09-22-98 | .2 | 2.7 | 63 | 53 | 22 | 38 | 2 | 18 | <1 | 1 | 5.0 | 34 | 15 | 20 | 1.0 |
| 11 | 09-23-98 | <1 | .23 | 11 | 35 | 6 | 40 | <1 | 3 | <1 | <1 | 39 | 6 | 4 | 6 | .22 |
| | 09-23-98 | <1 | .12 | 6 | 33 | 3 | 10 | <1 | 2 | <1 | <1 | 44 | 3 | 2 | 4 | .089 |
| | 09-23-98 | <1 | .16 | 7 | 41 | 4 | 13 | <1 | 2 | <1 | <1 | 44 | 3 | 2 | 3 | .12 |
| 12 | 09-28-98 | .2 | 1.8 | 66 | 60 | 30 | 260 | 2 | 18 | <1 | 2 | 5.4 | 36 | 16 | 30 | 1.5 |
| | 09-28-98 | .2 | 1.6 | 66 | 60 | 35 | 400 | 2 | 18 | <1 | 2 | 5.5 | 34 | 16 | 30 | 1.5 |
| | 09-28-98 | .3 | 1.7 | 65 | 63 | 32 | 290 | 2 | 17 | <1 | 2 | 5.1 | 35 | 16 | 30 | 1.5 |
| 13 | 09-28-98 | .2 | 1.8 | 50 | 30 | 12 | 18 | 1 | 16 | <1 | <1 | 2.8 | 29 | 19 | 20 | .51 |
| | 09-28-98 | .2 | 1.8 | 49 | 31 | 11 | 18 | 1 | 16 | <1 | <1 | 2.8 | 28 | 19 | 20 | .52 |
| | 09-28-98 | .1 | 1.8 | 50 | 31 | 11 | 17 | 1 | 17 | <1 | <1 | 2.7 | 28 | 19 | 20 | .51 |
| 14 | 09-25-98 | .2 | 1.9 | 70 | 62 | 17 | 41 | 2 | 20 | <1 | 1 | 4.1 | 39 | 23 | 30 | .83 |
| | 09-25-98 | .2 | 1.7 | 70 | 60 | 18 | 51 | 2 | 20 | <1 | <1 | 4.1 | 39 | 28 | 30 | .90 |
| | 09-25-98 | .2 | 1.8 | 69 | 60 | 18 | 40 | 2 | 20 | <1 | 1 | 4.1 | 37 | 24 | 30 | .81 |

TABLE 3. Concentrations of trace elements and carbon in the less than 63-micrometer fraction of bed-sediment samples from streams in the vicinity of Leviathan Mine, September 1998 -- continued

| SITE NUMBER (fig. 1) | DATE | MANGA- NESE µg/g (4.0) | MERCURY µg/g (0.020) | METHYL- MERCURY ng/g (0.1) | MOLYB- DENUM µg/g (0.5) | NEODYM- IUM µg/g (1.0) | NICKEL µg/g (2.0) | NIOBUM µg/g (4.0) | PHOS- PHORUS PERCENT (0.005) | POTAS- SIUM PERCENT (0.005) | SCAN- DIUM µg/g (2.0) | SELE- NIUM µg/g (0.1) | SILVER µg/g (0.1) | SODIUM PERCENT (0.005) | STRON- TIUM µg/g (2.0) |
|-------------------------|----------|---------------------------------|----------------------------|-------------------------------------|----------------------------------|---------------------------------|-------------------------|-------------------------|---------------------------------------|--------------------------------------|--------------------------------|--------------------------------|-------------------------|------------------------------|---------------------------------|
| 1 | 09-22-98 | 1200 | .06 | 7.5 | .7 | 31 | 25 | 6 | .15 | 1.4 | 15 | .1 | <.1 | 1.8 | 630 |
| | 09-22-98 | 990 | .06 | -- | .6 | 31 | 24 | 6 | .14 | 1.4 | 15 | .1 | <.1 | 1.8 | 610 |
| | 09-22-98 | 1000 | .07 | -- | .7 | 31 | 25 | 6 | .15 | 1.4 | 16 | .2 | <.1 | 1.7 | 610 |
| 2 | 09-23-98 | 1200 | .05 | 3.2 | .7 | 29 | 25 | 7 | .14 | 1.3 | 14 | .1 | <.1 | 1.8 | 650 |
| | 09-23-98 | 1200 | .06 | -- | .7 | 29 | 25 | 8 | .15 | 1.3 | 15 | .1 | <.1 | 2.0 | 680 |
| | 09-23-98 | 1200 | .06 | -- | .7 | 29 | 25 | 8 | .15 | 1.3 | 15 | .1 | <.1 | 2.0 | 680 |
| 3 | 09-24-98 | 1100 | .17 | 4.2 | .7 | 27 | 22 | 6 | .14 | 1.4 | 14 | .1 | <.1 | 2.0 | 690 |
| | 09-24-98 | 1100 | .05 | 4.2 | .7 | 29 | 24 | 6 | .14 | 1.4 | 15 | .1 | <.1 | 2.0 | 700 |
| | 09-24-98 | 1200 | .05 | -- | .6 | 29 | 23 | 6 | .14 | 1.4 | 16 | .1 | <.1 | 2.0 | 710 |
| 4 | 09-24-98 | 4900 | .47 | 22 | 2 | 43 | 240 | 4 | .24 | .86 | 11 | 2.7 | <.1 | .79 | 580 |
| | 09-24-98 | 1200 | .58 | -- | 2 | 36 | 150 | 6 | .16 | 1.2 | 14 | 3.0 | <.1 | 1.2 | 720 |
| | 09-24-98 | 1400 | .61 | -- | 2 | 35 | 130 | 6 | .14 | 1.2 | 15 | 3.3 | <.1 | 1.3 | 720 |
| 5 | 09-24-98 | 1200 | .06 | 0.88 | .7 | 28 | 25 | 7 | .14 | 1.3 | 14 | .1 | <.1 | 2.0 | 670 |
| | 09-24-98 | 1200 | .04 | -- | .7 | 28 | 24 | 8 | .14 | 1.3 | 14 | .1 | <.1 | 2.0 | 690 |
| | 09-24-98 | 1200 | .03 | -- | .7 | 27 | 24 | 8 | .14 | 1.3 | 13 | .1 | <.1 | 2.1 | 700 |
| 6 | 09-25-98 | 2200 | .47 | 12 | 1 | 39 | 320 | 6 | .17 | 1.1 | 13 | 4.0 | .4 | 1.2 | 620 |
| | 09-25-98 | 2700 | .50 | -- | 1 | 40 | 330 | 5 | .17 | 1.1 | 13 | 4.0 | .2 | 1.2 | 630 |
| | 09-25-98 | 3600 | .43 | -- | 1 | 44 | 330 | 5 | .17 | 1.1 | 13 | 3.9 | <.1 | 1.2 | 640 |
| 7 | 09-25-98 | 1000 | .65 | 4.4 | 1 | 42 | 120 | 5 | .16 | 1.1 | 13 | 4.1 | <.1 | 1.2 | 640 |
| | 09-25-98 | 4900 | .40 | -- | 1 | 51 | 390 | 4 | .16 | 1.0 | 11 | 3.4 | <.1 | 1.1 | 580 |
| | 09-25-98 | 2200 | .39 | -- | .9 | 47 | 260 | 5 | .16 | 1.0 | 11 | 3.5 | <.1 | 1.2 | 570 |
| 8 | 09-23-98 | 3500 | .47 | 3.2 | 1 | 46 | 250 | 5 | .16 | .97 | 11 | 2.6 | <.1 | 1.2 | 580 |
| | 09-23-98 | 2500 | .30 | -- | .9 | 45 | 190 | 4 | .16 | .92 | 10 | 2.5 | <.1 | 1.1 | 510 |
| | 09-23-98 | 2800 | .47 | -- | 1 | 50 | 210 | 4 | .16 | .94 | 11 | 1.2 | <.1 | 1.0 | 540 |
| 9 | 09-22-98 | 590 | .31 | 0.13 | 1 | 25 | 23 | 5 | .14 | 1.0 | 12 | 3.4 | <.1 | 1.2 | 510 |
| | 09-22-98 | 390 | .37 | -- | 1 | 18 | 20 | 4 | .14 | .86 | 9 | 4.0 | <.1 | .97 | 430 |
| | 09-22-98 | 410 | .30 | -- | 1 | 21 | 20 | 5 | .14 | .91 | 10 | 3.7 | <.1 | 1.1 | 450 |
| 10 | 09-22-98 | 980 | .03 | 2.4 | .7 | 30 | 22 | 6 | .14 | 1.3 | 14 | .3 | <.1 | 1.7 | 700 |
| | 09-22-98 | 970 | .04 | -- | .7 | 31 | 22 | 6 | .14 | 1.3 | 14 | .3 | <.1 | 1.8 | 730 |
| | 09-22-98 | 820 | .04 | -- | .7 | 31 | 22 | 6 | .14 | 1.3 | 14 | .4 | <.1 | 1.7 | 700 |
| 11 | 09-23-98 | 160 | .17 | 0.17 | .8 | 6 | 10 | <4 | .082 | .18 | <2 | 1.2 | <.1 | .097 | 71 |
| | 09-23-98 | 73 | .10 | -- | .7 | 3 | 5 | <4 | .079 | .08 | <2 | 1.0 | <.1 | .049 | 39 |
| | 09-23-98 | 86 | .14 | -- | .8 | 4 | 6 | <4 | .099 | .10 | <2 | 1.2 | <.1 | .063 | 51 |
| 12 | 09-28-98 | 930 | .25 | 0.18 | .8 | 36 | 40 | 7 | .12 | 1.5 | 16 | 1.5 | <.1 | .94 | 440 |
| | 09-28-98 | 1100 | .46 | -- | 1 | 38 | 43 | 7 | .12 | 1.4 | 16 | 2.2 | <.1 | .88 | 470 |
| | 09-28-98 | 1100 | .50 | -- | 1 | 37 | 42 | 10 | .11 | 1.2 | 16 | 2.2 | .1 | .85 | 460 |
| 13 | 09-28-98 | 850 | .13 | 0.42 | .6 | 23 | 10 | 7 | .13 | 1.5 | 9 | .9 | <.1 | 1.4 | 540 |
| | 09-28-98 | 710 | .12 | -- | .7 | 23 | 10 | 7 | .12 | 1.6 | 9 | .9 | <.1 | 1.6 | 560 |
| | 09-28-98 | 490 | .12 | -- | .6 | 24 | 10 | 7 | .13 | 1.5 | 9 | .9 | <.1 | 1.6 | 560 |
| 14 | 09-25-98 | 980 | .14 | 0.81 | 1 | 38 | 32 | 9 | .12 | 1.4 | 12 | 1.4 | <.1 | 1.4 | 670 |
| | 09-25-98 | 1100 | .24 | -- | 2 | 37 | 41 | 9 | .13 | 1.4 | 14 | 1.8 | <.1 | 1.3 | 680 |
| | 09-25-98 | 1200 | .18 | -- | 1 | 36 | 32 | 9 | .13 | 1.3 | 12 | 1.4 | <.1 | 1.4 | 670 |

TABLE 3. Concentrations of trace elements and carbon in the less than 63-micrometer fraction of bed-sediment samples from streams in the vicinity of Leviathan Mine, September 1998 -- continued

| SITE NUMBER (fig. 1) | DATE | SULFUR Hg/g (0.05) | TANTA- LUM Hg/g (1.0) | THAL- LUM Hg/g (1.0) | THORIUM Hg/g (1.0) | TIN Hg/g (1.0) | TITANIUM, PERCENT (0.005) | URANIUM Hg/g (0.1) | VANADIUM Hg/g (2.0) | YTTRIUM Hg/g (1.0) | YTTERBIUM Hg/g (1.0) | ZINC Hg/g (2.0) | CARBON, ORGANIC PERCENT (0.01) | CARBON, INORGANIC PERCENT (0.01) | CARBON, ORGANIC + INORGANIC PERCENT (0.01) |
|-------------------------|----------|--------------------------|--------------------------------|-------------------------------|--------------------------|----------------------|---------------------------------|--------------------------|---------------------------|--------------------------|----------------------------|-----------------------|---|---|--|
| 1 | 09-22-98 | <.05 | <1 | <1 | 7.3 | 2 | .67 | 2.8 | 140 | 18 | 2 | 96 | 1.64 | 1.66 | .02 |
| | 09-22-98 | <.05 | <1 | <1 | 7.4 | 2 | .65 | 2.8 | 130 | 18 | 2 | 94 | 1.57 | 1.58 | .01 |
| | 09-22-98 | <.05 | <1 | <1 | 7.7 | 2 | .67 | 2.9 | 140 | 19 | 2 | 99 | 2.00 | 2.02 | .02 |
| 2 | 09-23-98 | <.05 | <1 | <1 | 7.0 | 2 | .51 | 2.3 | 130 | 18 | 2 | 88 | 1.45 | 1.47 | .02 |
| | 09-23-98 | <.05 | 1 | <1 | 7.1 | 2 | .52 | 2.3 | 130 | 19 | 2 | 91 | 1.36 | 1.38 | .02 |
| | 09-23-98 | <.05 | 1 | <1 | 7.1 | 2 | .52 | 2.3 | 130 | 19 | 2 | 94 | 1.42 | 1.43 | .01 |
| 3 | 09-24-98 | <.05 | <1 | <1 | 6.7 | 2 | .67 | 2.3 | 140 | 16 | 2 | 95 | .89 | .91 | .02 |
| | 09-24-98 | <.05 | <1 | <1 | 6.7 | 10 | .69 | 2.6 | 140 | 17 | 2 | 96 | 1.12 | 1.14 | .02 |
| | 09-24-98 | <.05 | <1 | <1 | 6.6 | 2 | .69 | 2.7 | 140 | 18 | 2 | 97 | 1.16 | 1.18 | .02 |
| 4 | 09-24-98 | .31 | <1 | 7 | 7.9 | 2 | .48 | 4.1 | 130 | 37 | 3 | 280 | 3.80 | 3.89 | .09 |
| | 09-24-98 | .32 | <1 | 6 | 10 | 2 | .73 | 4.4 | 180 | 23 | 2 | 160 | 2.62 | 2.65 | .03 |
| | 09-24-98 | .28 | <1 | 6 | 12 | 2 | .85 | 4.2 | 200 | 22 | 2 | 160 | 2.22 | 2.24 | .02 |
| 5 | 09-24-98 | <.05 | <1 | <1 | 7.2 | 2 | .52 | 2.2 | 130 | 18 | 2 | 94 | 1.03 | 1.04 | .01 |
| | 09-24-98 | <.05 | <1 | <1 | 7.0 | 2 | .52 | 2.2 | 130 | 18 | 2 | 88 | .92 | .93 | .01 |
| | 09-24-98 | <.05 | <1 | <1 | 7.0 | 2 | .51 | 2.1 | 130 | 17 | 2 | 88 | .84 | .85 | .01 |
| 6 | 09-25-98 | .36 | <1 | 7 | 8.1 | 3 | .64 | 5.0 | 160 | 30 | 3 | 220 | 3.59 | 3.64 | .05 |
| | 09-25-98 | .29 | <1 | 8 | 8.4 | 2 | .63 | 5.3 | 160 | 32 | 3 | 220 | 3.82 | 3.87 | .05 |
| | 09-25-98 | .18 | <1 | 7 | 7.8 | 2 | .63 | 5.4 | 170 | 35 | 3 | 230 | 3.58 | 3.65 | .07 |
| 7 | 09-25-98 | .16 | <1 | 8 | 8.8 | 2 | .64 | 4.9 | 170 | 32 | 3 | 160 | 2.94 | 2.98 | .04 |
| | 09-25-98 | .21 | <1 | 9 | 7.5 | 2 | .54 | 5.0 | 150 | 47 | 4 | 290 | 3.55 | 3.65 | .10 |
| | 09-25-98 | .21 | <1 | 8 | 6.9 | 2 | .56 | 4.9 | 140 | 42 | 4 | 260 | 3.78 | 3.86 | .08 |
| 8 | 09-23-98 | .12 | <1 | 7 | 7.4 | 2 | .56 | 5.4 | 160 | 43 | 3 | 230 | 3.23 | 3.31 | .08 |
| | 09-23-98 | .15 | <1 | 7 | 6.4 | 3 | .50 | 5.5 | 150 | 43 | 3 | 230 | 3.71 | 3.79 | .08 |
| | 09-23-98 | .14 | <1 | 6 | 7.3 | 3 | .54 | 5.6 | 150 | 47 | 4 | 220 | 3.46 | 3.53 | .07 |
| 9 | 09-22-98 | 1.15 | <1 | 4 | 6.8 | 2 | .46 | 2.5 | 160 | 15 | 2 | 85 | 1.86 | 1.87 | .01 |
| | 09-22-98 | 1.73 | <1 | 4 | 5.9 | 2 | .38 | 1.9 | 150 | 10 | 1 | 68 | 1.84 | 1.85 | .01 |
| | 09-22-98 | 1.45 | <1 | 4 | 6.2 | 2 | .42 | 2.0 | 150 | 12 | 1 | 70 | 1.89 | 1.90 | .01 |
| 10 | 09-22-98 | .06 | <1 | <1 | 7.5 | 2 | .79 | 3.6 | 170 | 18 | 2 | 100 | 4.30 | 4.32 | .02 |
| | 09-22-98 | .06 | <1 | <1 | 7.6 | 2 | .80 | 3.7 | 170 | 18 | 2 | 100 | 4.23 | 4.25 | .02 |
| | 09-22-98 | .07 | <1 | <1 | 7.6 | 2 | .78 | 4.1 | 170 | 19 | 2 | 100 | 4.97 | 4.99 | .02 |
| 11 | 09-23-98 | 4.51 | <1 | 1 | 1.9 | 2 | .093 | .7 | 130 | 4 | <1 | 21 | 1.00 | 1.01 | .01 |
| | 09-23-98 | 4.95 | <1 | <1 | <1 | <1 | .038 | .3 | 130 | 1 | <1 | 7 | 1.00 | 1.01 | .01 |
| | 09-23-98 | 4.80 | <1 | 1 | 1.1 | <1 | .053 | .3 | 160 | 1 | <1 | 9 | 1.14 | 1.15 | .01 |
| 12 | 09-28-98 | .09 | <1 | 3 | 13 | 3 | .71 | 4.8 | 150 | 33 | 3 | 140 | .76 | .77 | .01 |
| | 09-28-98 | .13 | <1 | 4 | 12 | 2 | .70 | 5.8 | 150 | 36 | 3 | 150 | .99 | 1.00 | .01 |
| | 09-28-98 | .12 | 2 | 3 | 12 | 3 | .53 | 4.5 | 140 | 33 | 3 | 130 | .90 | .91 | .01 |
| 13 | 09-28-98 | .14 | <1 | <1 | 7.2 | 3 | .60 | 3.4 | 97 | 14 | 1 | 86 | 7.94 | 7.99 | .05 |
| | 09-28-98 | .13 | <1 | <1 | 6.5 | 3 | .65 | 3.3 | 100 | 14 | 1 | 84 | 6.81 | 6.83 | .02 |
| | 09-28-98 | .14 | <1 | <1 | 6.6 | 2 | .64 | 3.2 | 96 | 13 | 1 | 87 | 6.82 | 6.84 | .02 |
| 14 | 09-25-98 | .08 | <1 | 1 | 10 | 2 | .53 | 3.7 | 120 | 22 | 2 | 100 | 2.54 | 2.55 | .01 |
| | 09-25-98 | .09 | <1 | 2 | 11 | 3 | .54 | 3.7 | 120 | 20 | 2 | 100 | 2.26 | 2.27 | .01 |
| | 09-25-98 | .08 | <1 | 1 | 9.9 | 2 | .51 | 3.7 | 120 | 22 | 2 | 100 | 2.69 | 2.71 | .02 |

TABLE 4. Field blank data collected during sampling of water in vicinity of Leviathan Mine, September 1998

[Abbreviations and symbols: E, estimated; mg/L, milligrams per liter; µg/L, micrograms per liter; --, no data; <, less than. Minimum reporting levels are in parenthesis below constituent name]

| SITE NUMBER (fig. 1) | USGS STATION NUMBER | STATION NAME | DATE | TIME | SAMPLE TYPE | CALCIUM DISSOLVED mg/L AS CA (0.02) | MAGNESIUM DISSOLVED mg/L AS MG (0.004) |
|-------------------------|------------------------|--|---------|------|-------------|--|---|
| 1 | 10309089 | EAST FORK CARSON RIVER AT RIVER VIEW DRIVE BRIDGE NEAR DRESSLERVILLE | 9-22-98 | 1131 | FIELD BLANK | <0.02 | E.002 |
| 10 | 384407119384101 | MOUNTAINEER CREEK ABOVE LEVIATHAN CREEK NEAR MARKLEEVILLE, CA | 9-22-98 | 1438 | FIELD BLANK | <0.02 | <0.04 |

| SITE NUMBER (fig. 1) | SODIUM, DISSOLVED mg/L AS NA (0.06) | POTASSIUM, DISSOLVED mg/L AS K (0.1) | SULFATE DISSOLVED mg/L AS SO4 (0.1) | CHLORIDE, DISSOLVED mg/L AS CL (0.1) | FLUORIDE, DISSOLVED mg/L AS F (0.1) | SILICA, DISSOLVED mg/L AS SiO2 (0.1) | NITROGEN, NITRITE DISSOLVED mg/L AS N (0.01) | NITROGEN, NO2+NO3 DISSOLVED mg/L AS N (0.05) | NITROGEN, AMMONIA DISSOLVED mg/L AS N (0.02) | NITROGEN AMMONIA + ORGANIC TOTAL mg/L AS N (0.1) |
|-------------------------|--|---|--|---|--|---|--|--|--|---|
| 1 | <0.6 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 | <0.01 | 0.06 | <0.02 | <0.1 |
| 10 | <0.6 | <0.1 | <0.1 | 0.1 | -- | -- | <0.01 | 0.06 | <0.02 | <0.1 |

| SITE NUM- BER (fig. 1) | NITROGEN AMMONIA + ORGANIC DISSOLVED mg/L AS N (0.1) | PHOS- PHORUS TOTAL mg/L AS P (0.05) | PHOS- PHORUS DISSOLVED mg/L AS P (0.05) | PHOS- PHORUS ORTHOPHOS- PHATE DISSOLVED mg/L AS P (0.01) | ALUMINUM, TOTAL µg/L AS AL (2.0) | ALUMINUM, DISSOLVED µg/L AS AL (1.0) | ANTIMONY, TOTAL µg/L AS SB (1.4) | ANTIMONY, DISSOLVED µg/L AS SB (1.0) | ARSENIC, TOTAL µg/L AS AS (1.0) | ARSENIC, DISSOLVED µg/L AS AS (1.0) |
|------------------------------|---|---|---|--|---|---|---|---|--|--|
| 1 | <0.1 | <0.05 | 0.16 | <0.01 | 5.2 | 6.4 | <1.4 | <1.0 | 3.0 | <1.0 |
| 10 | <0.1 | <0.05 | <0.05 | <0.01 | 3.4 | <1.0 | <1.4 | <1.0 | <1.0 | <1.0 |

| SITE NUM- BER (fig. 1) | BARIUM, TOTAL µg/L AS BA (0.16) | BARIUM, DISSOLVED µg/L AS BA (1.0) | BERYLLIUM, TOTAL µg/L AS BE (0.14) | BERYLLIUM, DISSOLVED µg/L AS BE (1.0) | BORON, DISSOLVED µg/L AS B (16) | CADMIUM TOTAL µg/L AS CD (0.1) | CADMIUM DISSOLVED µg/L AS CD (1.0) | CHROMIUM, TOTAL µg/L AS CR (4) | CHROMIUM, DISSOLVED µg/L AS CR (1.0) | COBALT, TOTAL µg/L AS CO (0.08) |
|------------------------------|--|---|---|--|--|---|---|---|---|--|
| 1 | 0.18 | <1.0 | <0.14 | <1.0 | <16 | <0.1 | <1.0 | <4 | <1.0 | <0.08 |
| 10 | <0.16 | <1.0 | <0.14 | <1.0 | <16 | <0.1 | <1.0 | <4 | <1.0 | <0.08 |

TABLE 4. Quality assurance data collected during sampling of water and bed sediment in vicinity of Leviathan Mine, September 1998 --- continued

| SITE NUM- BER (fig. 1) | COBALT, DISSOLVED µg/L AS CO (1.0) | COPPER, TOTAL µg/L AS CU (0.6) | COPPER, DISSOLVED µg/L AS CU (1.0) | IRON, TOTAL µg/L AS FE (10) | IRON, DISSOLVED µg/L AS FE (10) | LEAD, TOTAL µg/L AS PB (0.1) | LEAD, DISSOLVED µg/L AS PB (1.0) | MANGANESE, TOTAL µg/L AS MN (0.12) | MANGANESE, DISSOLVED µg/L AS MN (1.0) | MERCURY, TOTAL µg/L AS HG (0.1) |
|------------------------------|---|---|---|--------------------------------------|--|---------------------------------------|---|---|--|--|
| 1 | <1.0 | <0.6 | <1.0 | 11 | <10 | <0.1 | <1.0 | <0.12 | <1.0 | <0.1 |
| 10 | <1.0 | <0.6 | <1.0 | 12 | <10 | <0.1 | <1.0 | <0.12 | <1.0 | <0.1 |

| SITE NUM- BER (fig. 1) | MERCURY, DISSOLVED µg/L AS HG (0.1) | MERCURY, METHYL, TOTAL NG/L (0.010) | MOLYBDENUM, TOTAL µg/L AS MO (0.8) | MOLYBDENUM, DISSOLVED µg/L AS MO (1.0) | NICKEL, TOTAL µg/L AS NI (1) | NICKEL, DISSOLVED µg/L AS NI (1.0) | SELENIUM, TOTAL µg/L AS SE (4.0) | SELENIUM, DISSOLVED µg/L AS SE (2.0) | SILVER, TOTAL µg/L AS AG (1.4) | SILVER, DISSOLVED µg/L AS AG (1.0) |
|------------------------------|--|---|---|---|---------------------------------------|---|---|---|---|---|
| 1 | <0.1 | 0.016 | <0.8 | <1.0 | <1 | <1.0 | <4.0 | <2.0 | <1.4 | <1.0 |
| 10 | <0.1 | -- | <0.8 | <1.0 | <1 | <1.0 | <4.0 | <2.0 | <1.4 | <1.0 |

| SITE NUM- BER (fig. 1) | STRONTIUM TOTAL µg/L AS SR (0.08) | STRONTIUM DISSOLVED µg/L AS SR (1.0) | THALLIUM, DISSOLVED µg/L AS TL (0.5) | TITANIUM TOTAL µg/L AS TI (0.6) | VANADIUM, DISSOLVED µg/L AS V (10) | ZINC, TOTAL µg/L AS ZN (1.0) | ZINC, DISSOLVED µg/L AS ZN (1.0) | URANIUM TOTAL µg/L AS U308 (0.4) | URANIUM NATURAL DISSOLVED µg/L AS U (1.0) | CARBON, ORGANIC DISSOLVED mg/L AS C (0.1) |
|------------------------------|--|---|---|--|---|---------------------------------------|---|---|---|---|
| 1 | < 0.08 | <1.0 | 0.7 | <0.6 | <10 | <1.0 | <1.0 | <0.4 | <1.0 | 0.6 |
| 10 | 20 | <1.0 | <0.5 | <0.6 | <10 | <1.0 | <1.0 | <0.4 | <1.0 | -- |