Hydrologic Data for Leviathan Mine and Vicinity, Alpine County, California, 1981-83

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U.S. GEOLOGICAL SURVEY

Open-File Report 85-160

Prepared in cooperation with the
CALIFORNIA REGIONAL WATER QUALITY
CONTROL BOARD, LAHONTAN REGION

Carson City, Nevada
1985

UNITED STATES DEPARTMENT OF THE INTERIOR

DONALD PAUL HODEL, Secretary

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CONVERSION FACTORS AND ABBREVIATIONS

"Inch-pound" units of measure used in this report may be converted to International System (metric) units by using the following factors:

Multiply	*By*	*To obtain*
Acres	0.4047	Square hectometers (hm^2)
Cubic feet per second (ft^3/s)	28.32	Liters per second (L/s)
Feet (ft)	0.3048	Meters (m)
Gallons (gal)	3.785	Liters (L)
Inches (in.)	25.40	Millimeters (mm)
Inches per minute (in./min)	25.40	Millimeters per minute (mm/min)
Miles (mi)	1.609	Kilometers (km)
Pounds per day (lb/d)	5.250	Milligrams per second (mg/s)
Tons	0.9072	Metric tons (t)

For temperature, degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) by using the formula °F = [(1.8)(°C)] + 32.

ALTITUDE DATUM

The term "National Geodetic Vertical Datum of 1929" replaces the formerly used term "mean sea level" to describe the datum for altitude measurements. The geodetic datum is derived from a general adjustment of the first-order leveling networks of both the United States and Canada. For convenience in this report, the datum also is referred to as "sea level."

HYDROLOGIC DATA FOR LEVIATHAN MINE AND VICINITY,

ALPINE COUNTY, CALIFORNIA, 1981-83

By Dale P. Hammermeister and Stephen J. Walmsley

ABSTRACT

The U.S. Geological Survey collected basic hydrologic data during 1981-83 to facilitate the geohydrologic evaluation of the Leviathan Mine area and the design of a pollution-abatement project. Surface-water field data included one or more measurements of pH, water temperature, and specific conductance at 45 sites in and adjacent to the mine area. At nine of these sites, daily data on discharge, specific conductance, and water temperature were collected during parts of 1981-82 by using electronic monitor-recorder systems. Ground-water field data included one or more of the water-quality measurements listed above at 71 piezometers in the mine area. Borehole geophysical data included neutron-moisture, neutron-porosity, gamma-gamma density, natural-gamma, and temperature logs at three sites. Mineralogic and hydrologic data were obtained for cores taken from nine test holes. One or more surface-water samples from 26 sites were analyzed for major cations, major anions, and a wide range of minor inorganic constituents. Single ground-water samples from 36 piezometers were analyzed for the same array of major and minor constituents.

INTRODUCTION

Leviathan Mine is an inactive open-pit sulfur mine on the eastern slopes of the Sierra Nevada near Markleeville, in Alpine County, Calif. (figure 1). The history of Leviathan Mine is well documented in previous studies of the site. A comprehensive list of the studies appears in the reference section of Skelly and Loy (1979). Underground mining began at the site in the 1860's to supply copper sulfate for the refining of silver ore at the Comstock mines in and near Virginia City, Nev. The sulfur mine was inactive from 1872 until 1935, when Texas Gulf Sulfur Company began underground mining. An extensive system of tunnels, drifts, and rises was constructed in this ore body between 1935 and 1941, when mining again stopped. In 1951, the mine was purchased by The Anaconda Company to supply sulfur for the processing of copper ore at their Weed Heights Mine near Yerington, Nev. According to Brown and Caldwell (1983), approximately 22 million tons of overburden waste above the sulfur ore body was removed and dumped at expedient locations adjacent to the mine. This over-burden waste contained substantial quantities of sulfide minerals. These waste-covered areas are still largely devoid of vegetation. Excavation of the overburden and ore body resulted in a large open pit occupying an area of approximately 50 acres (figure 2). Some of the underground mine works still remain beneath the southern end of the open pit, and a tunnel (No. 5) near the "throat" of the open pit discharges polluted water that appears to represent drainage from the southern part of the pit.

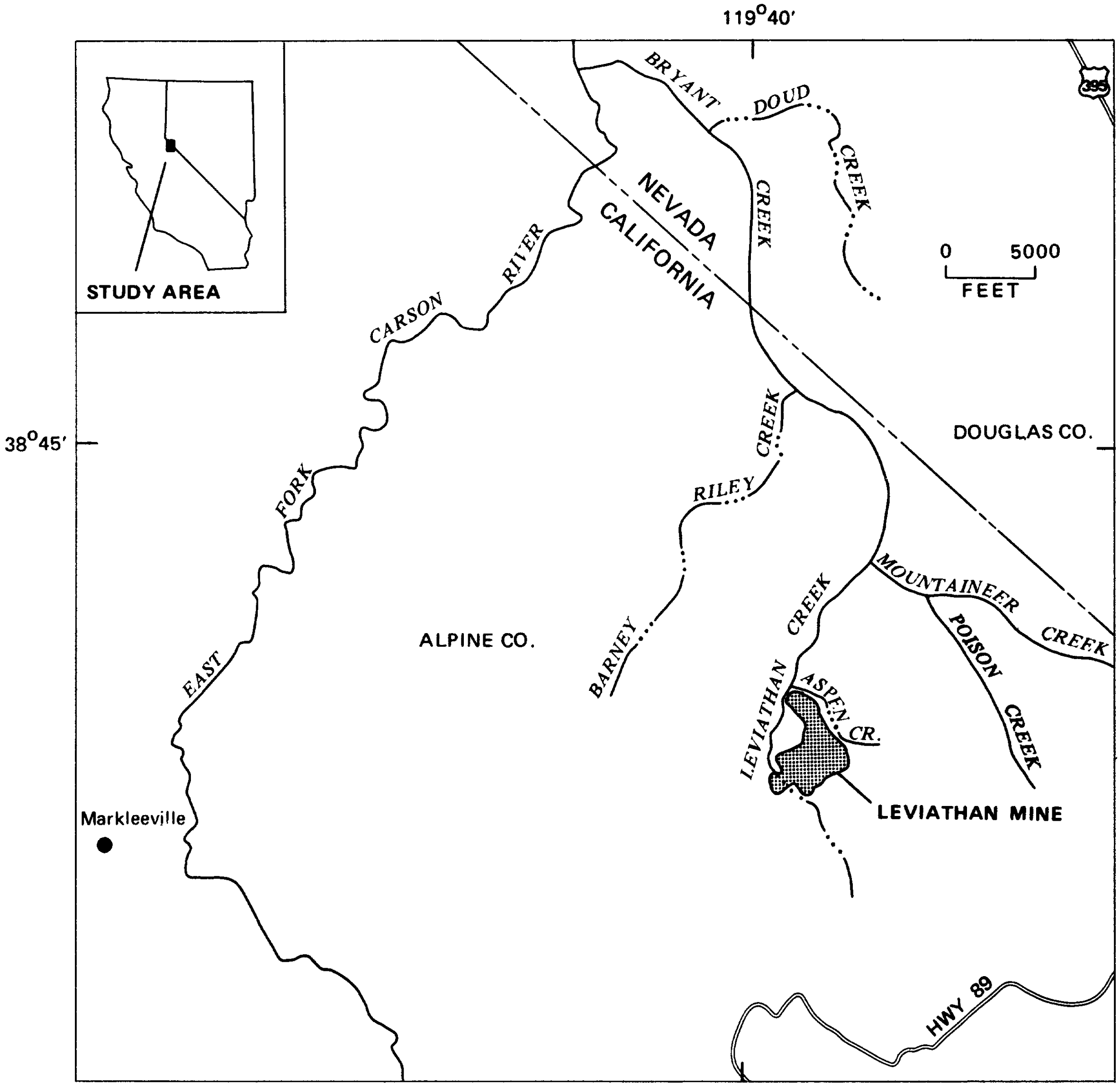

FIGURE 1.--Location of Leviathan Mine.

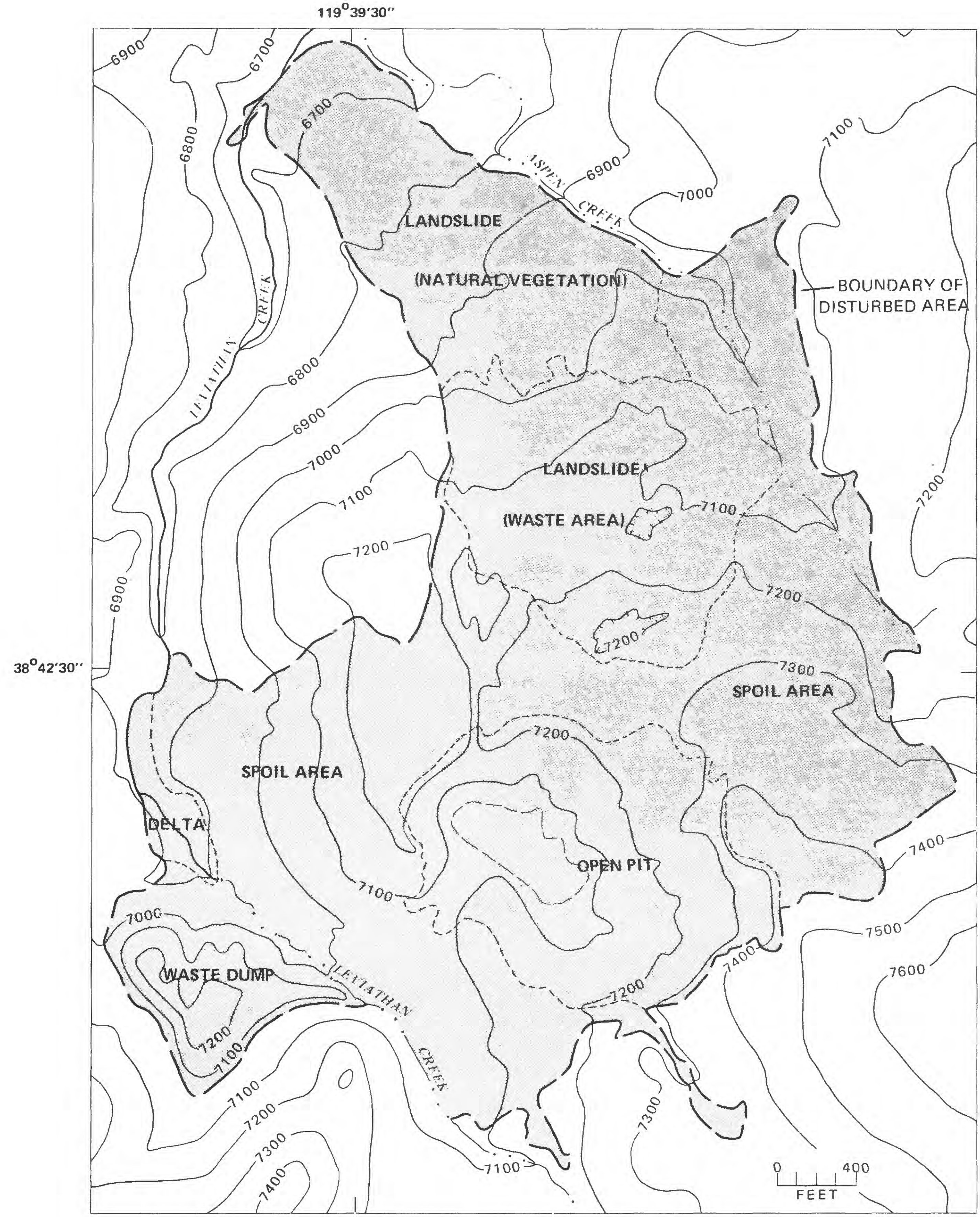

FIGURE 2.--Major features of Leviathan Mine. Contour interval 100 feet. Datum is sea level.

In addition to the open pit and tunnel network, several other features in the mine area are of importance. North of the pit is a large active landslide covered partly by native vegetation (34 acres) and partly by overburden and mining waste (70 acres). West of the pit is a waste dump consisting of several million cubic yards of rock (26 acres in plain view) excavated mainly from the lower zone of the open pit (Brown and Caldwell, 1983). A relatively flat waste-fill area north of the waste dump is referred to as the "delta area" in this report.

The following information concerning the water quality of Leviathan, Aspen, and Bryant Creeks has been summarized from a previous study by Skelly and Loy (1979). Leviathan Creek flows directly through parts of the mine-waste material and becomes contaminated by (1) direct contact with waste, (2) numerous polluted seeps, (3) surface discharges from the open pit and tunnel 5, and (4) sediment from the active landslide on the northern part of the mine site that continually encroaches on the creek. Aspen Creek, which flows into Leviathan Creek near the north boundary of the mine site, becomes contaminated to a lesser degree from seeps as it passes along the edge of the waste material there. Leviathan Creek above the mine site supports a population of fish and other aquatic life typical of unpolluted streams in the eastern Sierra Nevada. However, from a point near where Leviathan Creek enters the mine area to the point where the Leviathan Creek and Bryant Creek drainages enter the East Fork of the Carson River, approximately 10 miles downstream (figure 1), the water quality is severely degraded and the creek does not support fish. In addition, other beneficial uses such as irrigation and stock and wildlife watering have been severely limited or eliminated.

In 1980, the California Regional Water Quality Control Board, Lahontan Region (hereafter referred to as the Regional Board), was awarded a grant to develop a pollution-abatement project that would restore the water quality of the Leviathan and Bryant Creek drainages to conditions resembling as closely as possible those that presumably existed prior to mining activities. Considerable water-quality data and a lesser amount of hydrologic data were collected at the mine by various government agencies and consultants from the mid 1950's through the late 1970's. These data were compiled in a study regarding the feasibilty of pollution abatement made by Skelley and Loy (1979). A review of the data indicated that they were insufficient to serve as a basis for the design of a pollution-abatement project.

In 1981, the U.S. Geological Survey (USGS) and the Regional Board entered into a cooperative contract in which the USGS agreed to develop a hydrologic data base to facilitate (1) the geohydrologic evaluation of the mine and adjacent areas and (2) the design of an effective pollution-abatement project.

The objectives of the USGS study were to collect data on:

1. Streamflow, to characterize the surface-water quantities at the mine site and in the Leviathan Creek and Bryant Creek drainages;

2. Surface-water quality at the mine and in the Leviathan and Bryant Creek drainages, to determine the effects of dilution from tributaries, snowmelt, and rainfall;

3. Ground-water hydrology and subsurface geophysics, to characterize the shallow ground-water system at the mine; and

4. Ground-water chemistry and subsurface mineralogy, to define the major geochemical processes producing acid mine discharge and to aid in the determination of pollution source areas.

Surface-water field data collected by the USGS included one or more measurements of discharge, pH, water temperature, and specific conductance at 45 sites. In addition, one or more samples of surface water from 26 of the sites were analyzed for major cations, anions, and a wide range of minor constituents. Ground-water field data included the following measurements at 50 piezometers in the mine area: Depth to water, pH, water temperature, and specific conductance. Geophysical measurements included neutron-moisture, neutron-porosity, gamma-gamma density, natural-gamma, and temperature logs in three test holes. Mineralogic and hydrologic data were obtained from test-hole cores. Finally, single ground-water samples from 36 piezometers were analyzed for the same major and minor chemical constituents as the surface-water samples.

The USGS began surface-water sampling at only five sites; during the study, the number of sites was expanded considerably (figures 3 and 4, table 1; all tables appear in the section titled "Hydrologic Data," starting on page 19). No open wells suitable for ground-water sampling were present at the mine site prior to the USGS study. To meet the objectives of this study, therefore, the USGS designed and installed 60 piezometers, 4 neutron-probe holes, and 4 suction-lysimeter holes in the mine area (figure 5). Twenty-six of the piezometers were installed at the base of the waste dump. Approximately 200 feet of split-spoon drive core and 20 feet of diamond-drilled rock core were taken from selected depths in some of these holes for mineralogic and hydrologic analysis.

Precipitation and other climatic characteristics at the mine have been discussed by Brown and Caldwell (1983). Geologic units and structural features have been described in detail by Herbst and Sciacca (1982). Previous water-quality and hydrologic studies have been summarized by Skelley and Loy (1979). As a result, these topics are not discussed in this report.

Considerable valuable assistance was provided during the study by Kerry T. Garcia, Richard J. La Camera, Valerie L. Schacher, and Robert R. Squires, U.S. Geological Survey, Carson City, Nev.

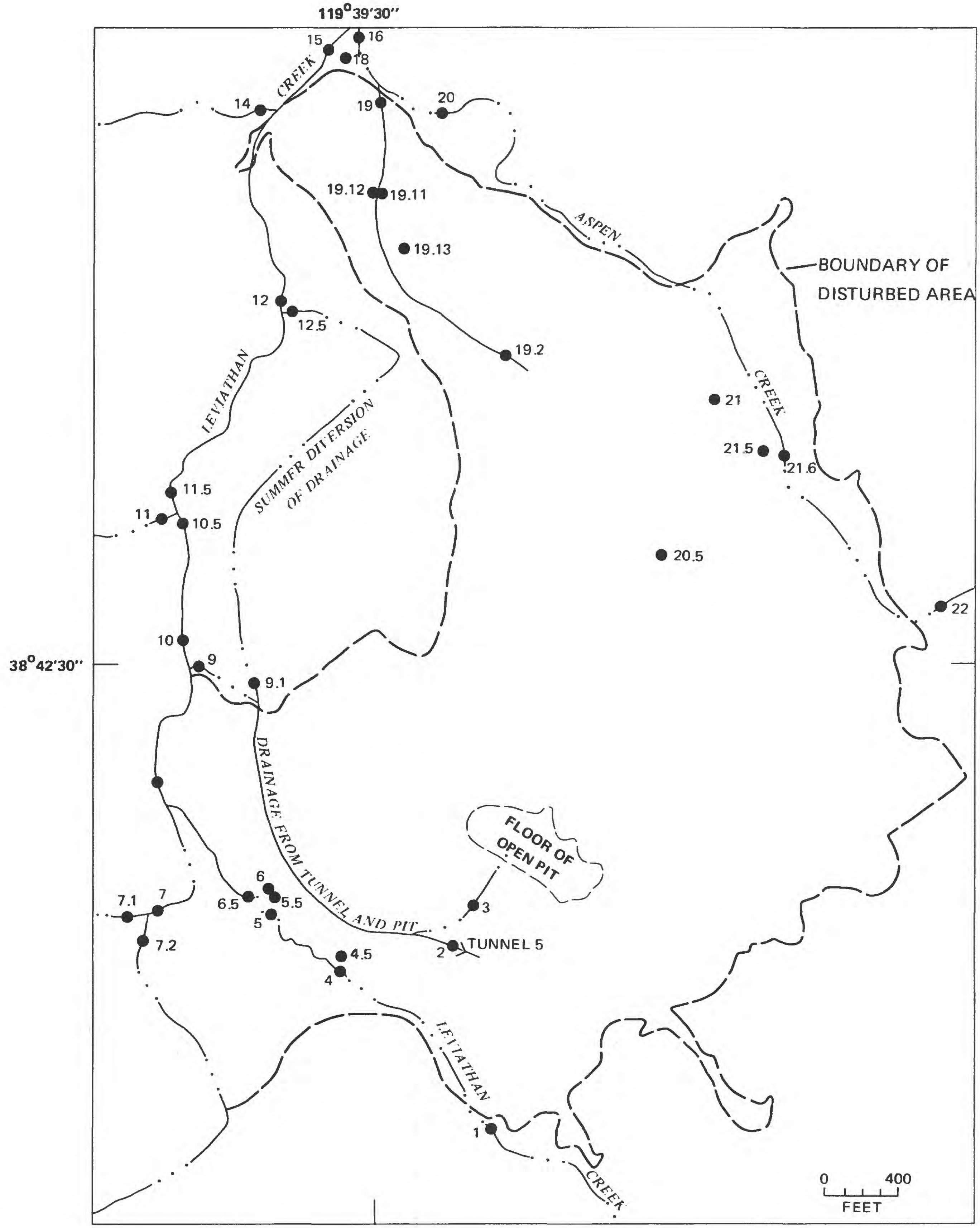

FIGURE 3.--Surface-water sampling sites in the mine area. Site numbers correspond with those in table 1.

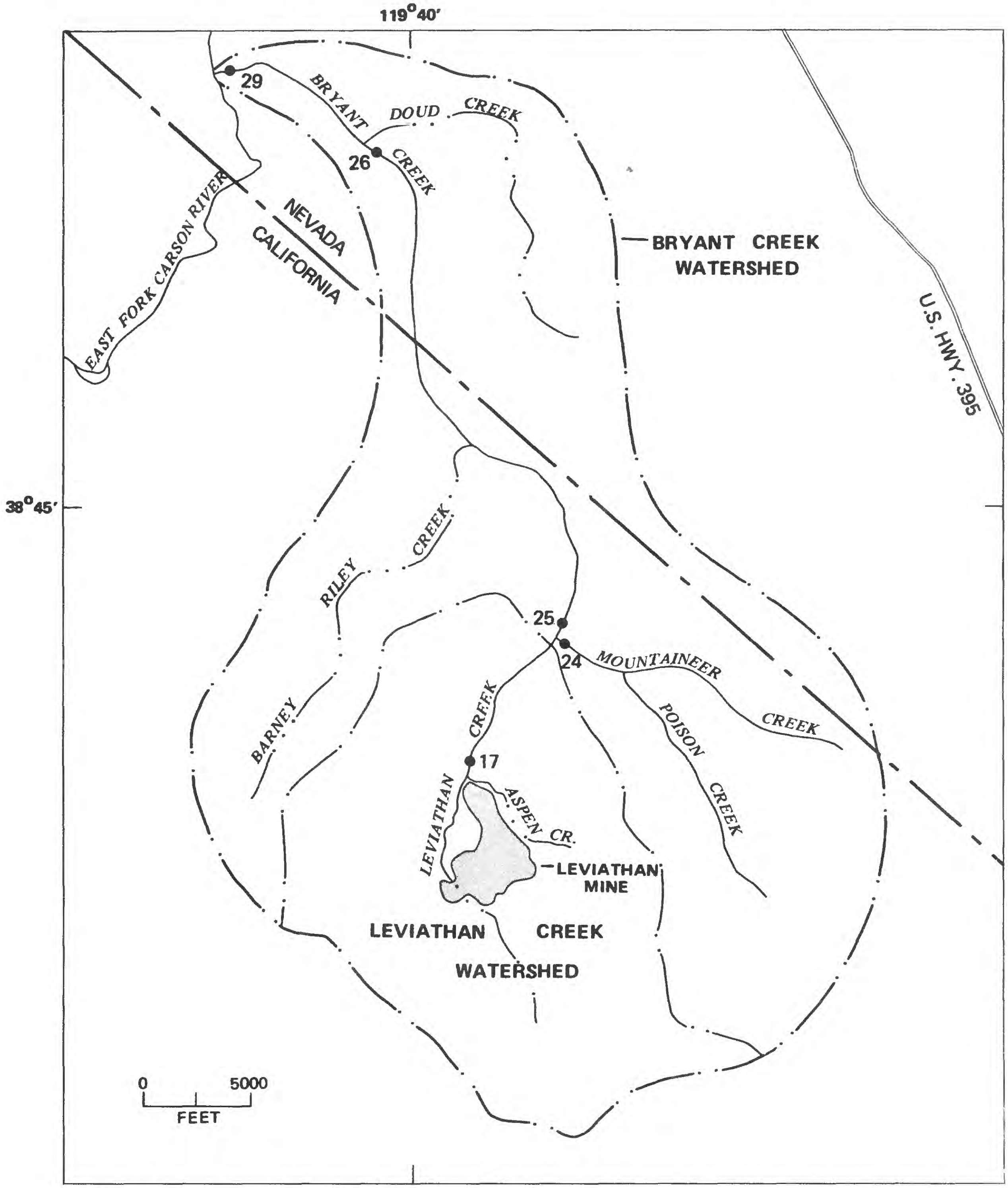

FIGURE 4.--Surface-water sampling sites downstream from the mine area. Site numbers correspond with those in table 1.

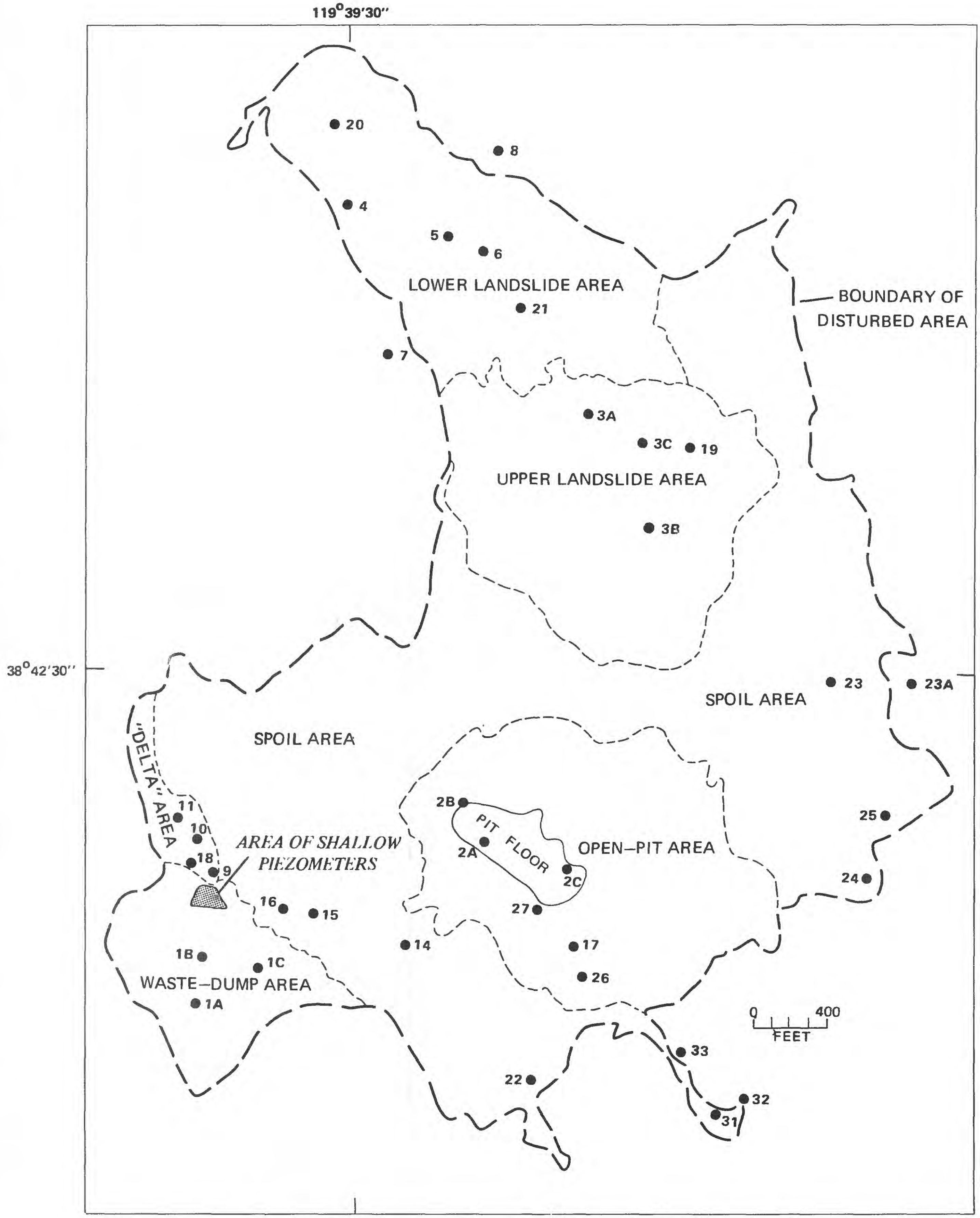

FIGURE 5.--Test holes drilled with the CME-750 rig, and shallow piezometers at base of waste dump. Test-hole numbers correspond with those in table 81; piezometers are listed in table 82.

DATA ON SURFACE WATER

The main goal of this part of the study was to determine seasonal changes in quantity and quality over the major parts of two water years--1981 and 1982.[1] More specifically, this study attempted to measure the variation of discharge, specific conductance, water temperature, chemical composition, and solute loads at several sites in the Leviathian Creek and Bryant Creek drainages and at important seeps in the mine area. Also, sediment concentrations were measured and benthic invertebrates were identified and counted at selected stream sites during high- and low-flow periods.

Brown and Caldwell (1983) have estimated that precipitation at Leviathan Mine totaled 9 inches during 1981 and 20 inches during 1982. They further estimate that the mean annual precipitation is approximately 15 inches. Thus, 1981 was drier and 1982 was wetter than normal.

Chemical Analysis of Surface-Water Samples

Water samples were collected periodically from the mine area and elsewhere in the Leviathan Creek and Bryant Creek drainages for chemical analysis. The analyses included laboratory determinations for dissolved and total-recoverable concentrations of selected constituents, along with measurements of specific conductance, total acidity and alkalinity, and pH. Field analyses made at the time of sample collection included measurements of pH, specific conductance, and water temperature. All samples were collected and treated by using standard USGS methods (Skougstad and others, 1979). The types of containers and treatment procedures for the several groups of determinations are listed in table 2.

After collection, samples were sent as soon as possible to the USGS Central Laboratory in Arvada, Colo., for analysis. The methods and precisions of analysis for the dissolved inorganic constituents are described by Erdmann and others (1982). ICP (inductively coupled plasma spectroscopy) was used for the analysis of most dissolved and total-recoverable[2] components. All possible

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[1] The USGS "water year" is the 12-month period from October 1 through September 30, designated by the calendar year in which it ends. Thus, water year 1981 began October 1, 1980, and ended September 30, 1981.

[2] The term "total recoverable" refers to the amount of a given constituent that is in solution after a sample of bottom material or water plus suspended sediment has been digested by a method (usually involving an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment employed, and the determination therefore is generally thought to represent something less than the "total" amount (that is, at least 95 percent) of the constituent sought in both the liquid and solid phases of the sample.

interferences were not determined in the ICP analysis for total-recoverable components. Therefore, those results embody some uncertainty. Virtually all total-recoverable concentrations appear reasonable in magnitude, however, when compared to their companion dissolved values.

Comprehensive analyses for 26 sites are listed in table 3. Dissolved, total-recoverable, and suspended-recoverable data for selected constituents at several sites are listed in tables 4-25. These data were obtained during periods of spring runoff, summer base flow, and winter low flow (tables 4-8, 9-17, and 18-25, respectively). The dissolved and total-recoverable concentrations were determined analytically, and the suspended-recoverable values were then calculated by difference. The dissolved concentration of a constituent should be less than or, at the most, equal to the companion total-recoverable value when the two samples are collected at about the same time, assuming bank-to-bank homeogeneity and a lack of short-term change in dissolved-solids concentrations at the sampling site. Despite this, tables 4-25 include some dissolved values that are greater than their companion total-recoverable values. In tables 4-8, the relation between companion values is only qualitative because the "dissolved" and "total" samples were collected as much as 12 days apart during a period of variable flow. In tables 9-25, in contrast, discrepancies presumably reflect the limits of precision and accuracy for the laboratory analytical procedures used because the two samples were collected at about the same time.

Acidity and Sulfate Loads

Monthly field measurements of discharge, pH, water temperature, and specific conductance were made from February through October 1982 at as many as 30 locations to aid in the identification of pollution-source areas. On five of those occasions between March and July, samples were also collected for laboratory analysis of total acidity and sulfate. Acidity and sulfate loads were calculated at each site by using the analytical results and discharge data. Field data, laboratory data, and load calculations for each of the five visits are listed in tables 26-30.

Collection and Analysis of Bottom-Material Samples

Samples of stream-bottom material were collected at three gaging stations in the Leviathan Creek and Bryant Creek drainages on May 12, 1983. Procedures for sampling fluvial bed material described by Guy and Norman (1970) were used. Samples were analyzed for a wide range of inorganic constituents by the USGS Central Laboratory. Methods of analysis and precision of the measurements are discussed by Erdmann and others (1982). The results of these analyses are listed in table 31.

Collection and Analysis of Suspended-Sediment Samples

Samples were collected for analysis of suspended-sediment concentration at selected locations during both high- and low-discharge conditions by using a model DH-48 depth-integrating sampler. Methods of sample collection are described in detail by Guy and Norman (1970). Sediment concentrations were determined at the USGS laboratory in Boise, Idaho, by using procedures described by Guy (1969). The results are listed in table 32.

Benthic-Invertebrate Survey

Benthic-invertebrate samples were collected at six sites during the spring and fall of 1982. The samples were obtained by using a Surber stream-bottom sampler, as described by Greeson and others (1977). Sample analysis was done by Harner-White, Ecological Consultants, Littleton, Colo. Tables 33-36 present data on organism density, and tables 37-40 list biomass values by taxonomic group and site.

Water-Quality Surveys of Landslide Area

Two water-quality surveys were made in the landslide area. The first, on May 24, 1982, dealt with the entire landslide area. The second survey, on July 12, 1982, concentrated on the lower part of the landslide. Samples were taken from several sites not previously sampled. The field water-quality measurements are summarized in tables 41 (May) and 42 (July), and the slide-area sites for both surveys are described in table 1.

Measurements at Gaging Stations

Stage, specific conductance, and water temperature were monitored at nine stream-gaging stations in the mine area and elsewhere in the Leviathan Creek and Bryant Creek drainages (table 43, figures 3 and 4). Stage is defined as the height of the water surface above an established datum. Stage was determined by a float in a stilling well. The height of the float was recorded every 15 minutes by a Fisher-Porter digital tape recorder.[1] Discharge was determined from stage-discharge relationships developed for each station. Onsite discharge measurements were made by using a Pygmy current meter. On several occasions, peak flows flooded some gaging stations, and discharges during these periods were estimated by indirect methods.

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[1] The use of trade names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

Stage-discharge relations at the gaging stations changed with time as a result of changes in stream-channel features due to scour and fill processes and the presence of debris and ice. In general, a base stage-discharge relation was initially used at each station, and any deviation ("shift") from this relation with time was determined by plotting new stage-discharge data. The methods and equipment used to determine discharge in this study are discussed in more detail by Carter and Davidian (1968).

Specific conductance and water temperature were monitored by using appropriate sensing probes connected to a USGS controller-and-timer unit. These data were recorded every 15 minutes on a Stevens digital-tape recorder. Water-quality and stage data on digital tapes were transcribed into a central USGS computer for processing into tabular form.

Visits were made to gaging stations by USGS personnel approximately once a month to service equipment, check the calibration of probes, make discharge, water-temperature, specific-conductance, and pH measurements, and to collect samples for chemical analysis (aspects of water-quality sample collection and analysis are discussed in the earlier section titled "Chemical analysis of surface-water samples"). Monthly gaging-station visits sometimes were not possible due to excessive snow in the winter and muddy access roads in the fall and spring. Temperature, specific conductance, and pH were measured by standard meters and methods. The values were then compared to those obtained from monitor probes. If monitor-probe values deviated from manually obtained field values, the former were adjusted by a computer program. The specific conductance probe was recalibrated in the field against known standards approximately every 6 months. Recalibration of the temperature probes proved to be unnecessary. Finally, specific-conductance and temperature probes were cleaned during each visit.

The results of monitoring efforts at the gaging stations during water years 1981-82 are listed in tables 44-80. Table 43 provides an index to the monitoring data.

TEST-HOLE INSTALLATION

Drilling and Coring

As mentioned previously, no wells suitable for ground-water sampling were present at the mine site prior to the USGS study. To collect ground-water information to help characterize hydrology and geochemistry of shallow ground water at the site, the USGS designed and supervised a drilling and coring program during the summer and early fall of 1982. Fifty-seven test holes (49 piezometers, 4 neutron-probe holes, and 4 suction-lysimeter holes; see figure 5) were drilled with an all-terrain CME-750 drilling rig. Also, three existing test holes (numbers 31, 32, and 33), which were blocked, were reopened and deepened.

Most piezometers and lysimeter holes were drilled with a 7¼-inch OD (outside-diameter) hollow-stem auger. Where conditions were not suitable for augering, air-rotary methods were used with a 3½-inch OD tri-cone bit.

All neutron-probe holes were drilled with a 2¼-inch tri-cone bit by using air as the drilling fluid. A USGS hydrologist supervised and logged the drilling of all test holes.

Approximately 200 feet of split-spoon drive core was taken at intervals selected by the USGS, by using a 3-inch ID (inside-diameter) modified California sampler and both 2- and 2½-inch ID standard split-spoon samplers. Core samples were collected in brass or plastic liners within the drive samplers. The ends of the core liners were capped and sealed immediately after removal from the sampler, to help preserve existing moisture conditions. Approximately 20 feet of core was taken from bedrock in selected holes with an NW diamond-bit core barrel. These rock-core samples were labeled and placed in core boxes.

The location, altitude, depth, and perforated interval for test holes is listed in table 81. Test-hole numbers ending in "N" and "L" indicate neutron-probe and lysimeter holes, respectively. All other test-hole numbers refer to piezometers.

Casing and Backfilling Procedures

Piezometers consisted of 2-inch schedule-40 PVC (polyvinyl chloride) pipe with 0.04- and, in some holes, 0.10-inch-slot screens (the 0.10-inch screens were mistakenly substituted for 0.04-inch screens in approximately 15 piezometers). The annular space around the well screens was packed with Monterey sand. The screens were isolated from the material above the sand by a 2-foot interval of bentonite. The remaining annular space was backfilled to within 1 foot of land surface with unconsolidated material available at the surface. The top foot was filled with alternating 3-inch layers of bentonite and surface material. Holes 23 and 26 were dry holes and therefore were not cased.

Neutron-probe holes were cased with 2-inch schedule-40 PVC pipe. In most holes, the annular space between the casing and the walls of the approximately 2½-inch holes was limited. Nonetheless, an attempt was made to backfill this narrow annular space with 200-mesh silica sand. Lysimeter holes were not cased, but were covered carefully at land surface to prevent surface material from cascading into the holes.

Installation of Shallow Piezometers at Base of Waste Dump

In addition to test holes drilled with a CME-750 rig, 26 shallow piezometers were augered by hand at the base of the waste dump (figure 5) to help characterize shallow ground-water flow entering the delta area from the dump. The piezometers were in five rows, with each row parallel to a hillslope altitude contour. Piezometers were spaced approximately 2 feet apart along the contour. The downslope distance between rows 1 and 2 and between rows 4 and 5 was 30 feet; between rows 2 and 3 and rows 3 and 4, it was 60 feet. The depth of piezometers varied from about 4 to 14 feet. All piezometers, except those in row 5, were constructed from ¾-inch schedule-40 PVC pipe with the bottom 4 inches perforated with 1/16-inch drill holes and wrapped in nylon window screen. Those in row 5 were constructed from 2-inch schedule-40 PVC pipe with the bottom 18 inches made up of 0.04-inch-slot well screen. The annular space outside the perforations or screen was packed with sand and isolated from materials above by a 6-inch layer of bentonite. The rest of the annular space was backfilled with surface-waste material to within 1 foot of land surface. The remaining foot was then filled with alternating layers of bentonite and waste material. The depths and altitudes of these piezometers are given in table 82.

Cleaning Out Piezometers

Before sampling, an attempt was made to remove sediment from the piezometers. The sediment consisted of fine-grained material from outside the screens or perforations and, in some holes, fine sand from the sand pack. Several feet or more of sediment accumulated in piezometers where 0.10-inch well screen was mistakenly substituted for 0.04-inch screen. Air injection and a jet pump were employed to rid these holes of sediment. Both methods proved unsuccessful. All commercially available submersible pumps were too large to fit down the 2-inch PVC piezometer casing. As an alternative, bailing with a 1½-inch PVC pipe and three-way flap valve proved most successful in removing the sediment. In most holes, however, the sediment was not completely removed. Therefore, water samples collected for field and laboratory analysis contained some sediment. Most sediment was successfully removed from the smaller diameter hand-augered piezometers at the base of the waste dump by a vacuum pump and "sand-trap" apparatus.

DATA ON GROUND WATER

The main objectives of this part of the study were the following:

1. Measure depth to water, pH, specific conductance, and water temperature in piezometers in the shallow ground-water system at the mine site.

2. Determine the chemical composition of ground-water samples from representative piezometers in and upgradient from the mine site.

3. Measure hydraulic conductivities at these piezometers.

4. Run geophysical logs in neutron-probe holes to aid in the determination of lithology, density, porosity, and water content in the unsaturated zone.

5. Measure selected hydrologic and mineralogic properties on cores from piezometer and neutron-probe holes.

Water-Quality and Water-Level Data from Piezometers

Water samples were collected from 71 piezometers during the 1982 water year. Most of the samples were collected by bailing. An effort was made to obtain a sample that was representative of aquifer conditions outside the zone of influence that results from the presence of a piezometer. In this regard, an attempt was made to empty the piezometer and then collect a sample of "fresh" inflowing ground water. When a piezometer could not be emptied, the bailer was lowered to the bottom of the hole and at least 5 gallons of water was removed before a sample was collected.

Ground-water samples from piezometers were analyzed in the field for pH, specific conductance, and water temperature. During one of the visits, samples were also collected from 36 representative piezometers for the laboratory analysis of the same comprehensive array of dissolved chemical constituents determined in surface-water samples. Before a water-quality sample was collected, a water-level depth was measured by using a chalked steel tape. Field methods for the measurement of pH, specific conductance, and temperature were the same as those described for surface-water samples, except that water temperature was measured with a down-hole thermistor probe. In addition, dissolved oxygen concentration was measured in 14 test holes using a down-hole polarographic probe with an attached submersible stirrer. Methods of sample treatment and handling for laboratory chemical analysis were also the same as those described for surface-water samples. Field water-quality measurements and water-level data are summarized in tables 82-84. The results of the laboratory analyses and field measurements for samples from the selected piezometers are listed in table 85.

Hydraulic-Conductivity Measurements in Piezometers

Hydraulic conductivities were determined in piezometers by using variable-head tests (U.S. Department of the Navy, 1961). These tests involved reducing the piezometric head by bailing, and then recording the head recovery with time. Two methods were applied to calculate hydraulic conductivity, depending on the water-level change in the piezometer and the resulting geometry of the cavity being refilled with water. The method most commonly used was applied to head measurements made above the piezometer perforations. A second, alternative method was applied to head measurements made at or below the uppermost perforation. The general equation is:

$$k = \frac{A}{F(t_2 - t_1)} \ln \frac{h_1}{h_2} ,$$

where k = mean hydraulic conductivity,
A = cross-sectional area of the casing,
F = slope factor at the intake point, and
h_1 and h_2 = head measurements at times t_1, and t_2, respectively.

Methods of calculation and theory are described in detail by Cedergren (1977). A USGS subcontractor (Resource Concepts, Inc.) made hydraulic-conductivity tests on piezometers drilled by the CME-750 rig. The USGS measured conductivities in the hand-augered piezometers at the base of the waste dump. The results of these tests are summarized in tables 86 and 87.

Geophysical Logs of Neutron-Probe Holes

In the fall of 1982, an array of geophysical logs was run on test holes 1AN, 1BN, and 1CN by the USGS Borehole Geophysical Services Unit, Lakewood, Colo. These logs included neutron-moisture, neutron-porosity, gamma-gamma density, natural gamma, and temperature. Detailed information concerning equipment, calibration, and interpretation of logs is given by Keys and MacCary (1971). (Heavy rainfall made the access road to test hole 3CN impassable; therefore, the hole was not logged.)

Neutron-moisture and neutron-porosity logs are mainly used for the estimation of moisture content and total porosity below the water table. Both logs give indications of hydrogen content (generally dominated by the hydrogen component of water molecules), but the techniques differ primarily in the source strength and energy of neutrons detected. Neutron-porosity loggers sense hydrogen content farther out into the surrounding geologic materials than do neutron-moisture loggers and, therefore, are influenced less by the annulus between the casing and the borehole wall. Calibration curves for the neutron-porosity and neutron-moisture loggers used are given in figures 6 and 7, respectively. (Figures 6-23 appear in the section titled "Hydrologic Data," starting on page 146.) The porosity index on the vertical axis of figure 6 is equivalent to water content by volume (that is, the volume of water per unit volume of rock). The neutron-porosity and neutron-moisture logs for holes 1AN, 1BN, and 1CN are given in figures 8-13.

Gamma-gamma density logs are records of the intensity of gamma radiation from a source after it is back-scattered and attenuated within the borehole and surrounding geologic materials. The logs can be used for the determination of lithology, bulk density, and porosity. In this study, they were used to give an indication of bulk density. The calibration curve for this purpose is given in figure 14. Gamma-gamma logs measured in the three test holes are shown in figures 15-17.

Natural-gamma logs are records of the amount of natural radiation that is emitted by rocks. The logs generally are used for the identification of lithology and also for stratigraphic correlation. Their intended purpose for this study was to attempt to identify zones of greater clay content and to correlate these zones from hole to hole. Natural-gamma logs for the three holes are given in figures 18-20.

Temperature logs are continuous records of the thermal gradient of the fluid in the borehole, which may or may not be representative of the temperature in the surrounding geologic materials. If the fluid is in thermal equilibrium with the adjacent materials, the temperature log gives the geothermal gradient. Normally, geothermal gradients are on the order of 0.7°C of increase per 100 feet of depth, and are largely a function of the thermal conductivity of the geologic materials. Because the waste materials penetrated in this study contain significant quantities of elemental sulfur and sulfides, however, the heat generated from oxidation reactions was expected to strongly affect the temperature gradient. In this study, temperature logs (figures 21-23) were run to gain further information about the extent and rate of heat-generating oxidation reactions.

Hydrologic and Mineralogic Properties of Cores

As mentioned above, approximately 200 feet of split-spoon drive core was taken at intervals chosen by the USGS during the drilling of piezometer and neutron-probe holes with the CME-750 rig. The core samples were subjected to water-content and bulk-density measurements in the USGS laboratory at Carson City, Nev. Cores were prepared for these measurements by carefully trimming flat the top and bottom surfaces of a segment contained in a brass or plastic liner. The cores were then unwrapped and trimmed in a humidified glove box to minimize evaporation. Water-content determinations were then made by using standard oven-drying methods (Gardner, 1965). The bulk density of each sample was then calculated from the oven-dry weight of the sample and the volume of the brass or plastic liner. These results are summarized in table 88.

Selected samples of core were subjected to mineralogical analyses with the intent of obtaining information to help delineate major geochemical processes producing the acid mine drainage. X-ray diffraction was used by the USGS Marine Geology Mineralogy Laboratory, Menlo Park, Calif., for both general-mineralogy and clay-mineralogy analyses. The general-mineralogy analysis employed a semiquantitative method on bulk samples (including all size fractions). Clay-mineral analysis employed a quantitative method on the size fraction smaller than 2 micrometers. The results of these analyses are summarized in tables 89 and 90.

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HYDROLOGIC DATA

TABLE 1.--Surface-water sampling sites

Site number	Gaging-station number	Description
1	10308783	Leviathan Creek above Leviathan Mine
2	10308784	Seep at Leviathan Mine tunnel 5
3	10308785	Drainage from Leviathan Mine open pit
4	--	Leviathan Creek between sites 1 and 5
4.5	--	Intermittent seep entering Leviathan Creek below site 4
5	--	Leviathan Creek above site 5.5 in gully next to tailings dump
5.5	--	Seep 50 feet southeast of site 6
6	10308787	Seep below crusher adjacent to Leviathan Creek above delta area
6.5	--	Leviathan Creek 50 feet below inflow from site 6
7	10308786	Intermittent stream along northwest side of Leviathan Mine tailings dump
7.1	--	Intermittent stream from west above site 7
7.2	--	Intermittent stream along west side of tailings dump
8	--	Leviathan Creek at north end of delta below inflow from site 7
9	--	Drainage from pit and tunnel
9.1	--	Summer diversion of drainage from pit and tunnel on road above site 9
10	10308788	Leviathan Creek below inflow from pit and tunnel
10.5	--	Leviathan Creek above eastward-draining stream
11	--	Eastward-draining stream (informally known as 4-L Creek)
11.5	--	Leviathan Creek below eastward-draining stream
12	--	Leviathan Creek above south side of slide and below summer diversion of pit and tunnel drainage
12.5	--	Summer diversion of drainage from pit and tunnel
14	--	Intermittent stream entering Leviathan Creek opposite toe of slide
15	--	Leviathan Creek above Aspen Creek
16	--	Aspen Creek above Leviathan Creek
17	10308790	Leviathan Creek below Aspen Creek
18	--	Seep entering Aspen Creek from lower slide area
18.1	--	Discharge flowing down west toe of slide, 70 feet from base
18.2	--	Above pond at base of west toe
19	--	Seep entering Aspen Creek (drains central lower part of slide)
19.05	--	Discharge just above fallen tree, 160 feet below and northwest of site 19.11
19.11	--	North fork of seep of site 19 below temporary road and 8-inch PVC culvert on slide
19.12	--	South fork of seep of site 19 below temporary road and twin 8-inch PVC culvert on slide

TABLE 1.--Surface-water sampling sites--Continued

Site number	Gaging-station number	Description
19.13	--	Seep from slide above concrete water-tank remnant at old trailer-park site
19.14	--	South fork of discharge on center of slide, 70 feet southwest of concrete structure, where discharge reemerges
19.15	--	South branch of south fork of discharge as it reemerges, 30 feet southeast of site 19.14
19.16	--	South fork of discharge, where it percolates into ground 60 feet above site 19.14
19.17	--	North fork at fallen tree; 70 feet above site 19.13
19.18	--	Between sites 19.17 and 19.2 in saturated meadow area
19.2	--	Drainage from pond on central part of slide
20	--	Aspen Creek above 2-foot corrugated metal pipe at loop road near north-central part of slide
20.5	--	Seep from north side of pit rim, above ponds in overburden south of Aspen Creek
21	--	Seep from contact between overburden and slide opposite old town site
21.5	--	Seep from north edge of slide across Aspen Creek from center of old town site
21.6	--	Aspen Creek above inflow from site 21.5
22	--	Aspen Creek above 1.5-foot corrugated metal pipe adjacent to large steel water tank
24	--	Mountaineer Creek above confluence with Leviathan Creek
25	10308794	Bryant Creek below confluence of Leviathan and Mountaineer Creeks
26	10308800	Bryant Creek above Doud Creek
29	--	Bryant Creek above East Fork Carson River

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TABLE 2.—Sample containers and methods of sample treatment for various types of laboratory analysis

Type of analysis	Container	Treatment[1]
Laboratory pH, specific conductance, total acidity, and total alkalinity	250-mL polyethylene bottle, field-rinsed	None
Dissolved major anions	250-mL polyethylene bottle, field-rinsed	Filtered
Dissolved major and trace constituents exclusive of anions	500-mL polyethylene bottle, acid-rinsed	Filtered and acidified
Total recoverable major and trace constituents exclusive of anions	500-mL polyethylene bottle, acid-rinsed	Acidified
Dissolved thallium	250-mL Teflon bottle, acid-rinsed	Filtered and acidified

[1]Filtration: 0.45-micrometer pore size. Acidification: 1 milliliter of nitric acid per 250 milliliters of sample.

TABLE 3.--Analyses of surface-water quality, 1981-83

Analyses	Site #1.									
	Date Collected									
	03-19-81	04-07-81	04-21-81	05-15-81	06-10-81	07-07-81	08-25-81	09-15-81	10-08-81	11-12-81
Acidity as H mg/l	0.2	0.2	0.2							
pH (Lab) units										
pH (Field) units	6.4	5.3	6.2	8.0	8.3	7.8	7.9		7.9	8.0
Specific Conductance (Field)		130		130		210	170	160	150	150
Specific Conductance (Lab)										
Discharge (Q)	.26	.75	1.6	.50	.24	.05	.06	.05	.09	.08
Water Temp. ^{o}C	1.0	3.0	10.5	7.5	9.0	12.5	11.0	11.0	3.5	3.5
Aluminum mg/l										
Antimony ug/l										
Arsenic ug/l										
Barium ug/l	70	80	60	70	120	80	70	74	71	70
Beryllium ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bismuth ug/l										
Boron ug/l										
Cadmium ug/l										
Calcium mg/l	14	13	12	13	14	16	16	15	14	13
Chloride mg/l										
Chromium ug/l										
Cobalt ug/l	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Copper ug/l	<10	<10	<10	12	<10	<10	<10	<10	<10	<10
Iron (Fe^{+2}) mg/l										
Iron (Fe^{+2}+Fe^{+3}) mg/l	.13	.096	.75	4.7	.20	.11	.47	.15	.17	.20
Lead ug/l	27	62	<10	<10	<10	<10	<10	<10	<10	<10
Lithium ug/l	<4	<4	<4	<4	20	10	<4	<4	<4	7
Magnesium mg/l	4.3	4.0	3.2	3.7	4.1	4.9	5.4	5.0	4.7	4.3
Manganese ug/l	13	18	20	46	21	10	21	19	54	18
Mercury ug/l										
Molybdenum ug/l	<10	<10	<10	<10	<10	<10	<10	15	<10	<10
Nickel ug/l										
Potassium mg/l	2.2	2.8	2.2	2.0	2.6	3.6	3.4	4.6	3.6	
Selenium ug/l										
Silica mg/l	39	38	36	39	41	44	45	45	44	46
Sodium mg/l	8.5	8.4	7.6	7.7	8.5	8.9	10	10	8.7	8.0
Strontium ug/l	210	220	190	210	230	240	250	230	210	200
Sulfate mg/l	13	15	49	58	0.1	1.0	1.0	5	5	25
Tellurium ug/l										
Thallium ug/l										
Titanium ug/l										
Vanadium ug/l	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
Zinc ug/l	21	11	48	17	41	14	6	<3	9	<3

TABLE 3.--Analyses of surface-water quality, 1981-83--**Continued**

Analyses	Site #1.							Site #2.	
	Date Collected								
	12-02-81	01-27-82	03-26-82	04-16-82	04-28-82	08-11-82	04-25-83	03-19-81	04-07-81
Acidity as H mg/l								111	99
pH (Lab) units			6.1		7.9	8.2	7.8		
pH (Field) units		8.1			7.9	8.0	8.1	2.4	2.5
Specific Conductance (Field)	150	140	110		81	140	140		
Specific Conductance (Lab)	150	141	119		75	163			
Discharge (Q)	.09	.26	1.2	7.6	12	.14	1.21	.03	.05
Water Temp. ^{o}C	0.5	0.0	8.0	6.5	9.5	11.0	2.0	12.0	13.0
Aluminum mg/l	<.01	.02	.70	4.1	<.10	<.100	.10		
Antimony ug/l									
Arsenic ug/l	4	4	9		2	4	3		
Barium ug/l	38		54	140	33	7.6	72	30	30
Beryllium ug/l	<1		<1	0.7	<3	<0.5	<0.5	9	12
Bismuth ug/l									
Boron ug/l									
Cadmium ug/l				<1		<1	<1	160	180
Calcium mg/l	12		11	10	10	15	12	130	120
Chloride mg/l	0.8	1.2	1.2		0.9	1.1	1.0		
Chromium ug/l	1		<10	<10	<10	<10	<10		
Cobalt ug/l	<3		<3	<3	<9	<3	<3	8100	9600
Copper ug/l	<10		<10	40	<30	<10	<10	1500	2700
Iron (Fe^{+2}) mg/l									
Iron ($Fe^{+2}+Fe^{+3}$) mg/l	.039		.90	3.7	.032	.11	.160		
Lead ug/l	<10		<10	<10	<30	<10	<10	<10	<10
Lithium ug/l	6		<4	8	12	<4	8	110	120
Magnesium mg/l	3.3		3.1	3.1	1.7	<4.7	4	43	50
Manganese ug/l	5		38	97	7	21	16	8600	9600
Mercury ug/l									
Molybdenum ug/l	<10		10	<10	<30	<10	<10	<10	<10
Nickel ug/l			100	<100	<100	<100	<100		
Potassium mg/l						<5	2.7	11	15
Selenium ug/l									
Silica mg/l	24		36	44	30	41	39	91	95
Sodium mg/l	5.6		6.9	5.5	4.1	8.4	7.4	26	26
Strontium ug/l	110		180	180	120	250	200	2400	2400
Sulfate mg/l	5.9	6.0	5		7.0	8.0	11	6300	7100
Tellurium ug/l									
Thallium ug/l			<1		<1	<1			
Titanium ug/l									
Vanadium ug/l	<6		<6	12	<10	6	<6	1100	1300
Zinc ug/l	4		4	120	49	8	4	1700	1800

TABLE 3.--Analyses of surface-water quality, 1981-83--**Continued**

Analyses	Site #2.										
	Date Collected										
	04-21-81	05-15-81	06-10-81	07-07-81	08-25-81	09-15-81	10-08-81	11-12-81	01-27-82	03-26-82	04-23-82
Acidity as H mg/l	189	169	244	81	99	94	96	87		200	220
pH (Lab) units									2.5	2.0	1.8
pH (Field) units	2.0	1.9	2.3	2.1	2.2	2.8	2.7	2.8	2.4	2.5	1.8
Specific Conductance (Field)				7000	6300	5900	5700	5700	9000	11000	16000
Specific Conductance (Lab)									7300	10600	15100
Discharge (Q)	.06	.06	.05	.04	.04	.03	.03	.02	.05	.08	.13
Water Temp. ^{o}C	13.0	10.0	12.0	14.5	13.0	13.0	13.0	12.0	12.5	12.5	12.5
Aluminum mg/l									400	440	810
Antimony ug/l											
Arsenic ug/l									5000	25000	30000
Barium ug/l				60	22	38	30	20	25	22	20
Beryllium ug/l				12	11	11	9	8	11	18	21
Bismuth ug/l											
Boron ug/l											
Cadmium ug/l				140	140	130	130	120	140	200	280
Calcium mg/l				120	100	96	95	94	120	160	160
Chloride mg/l									7.7	<0.1	13
Chromium ug/l									1900	2200	2100
Cobalt ug/l				6300	3200	3100	3000	680	3400	8900	13000
Copper ug/l				1300	800	740	660	640	1500	6800	22000
Iron (Fe^{+2}) mg/l											
Iron ($Fe^{+2}+Fe^{+3}$) mg/l				1300	1200	1200	1100	620	1400	1900	2700
Lead ug/l				<10	<10	<10	<10	<10	<10	<100	<100
Lithium ug/l				120	91	96	89	93	110	170	200
Magnesium mg/l				45	40	39	37	36	45	57	62
Manganese ug/l				9900	8900		8000	7700	9900	13000	14000
Mercury ug/l											
Molybdenum ug/l				<10	<10	<10	<10	<10	<10	<100	<100
Nickel ug/l									8100	11000	15000
Potassium mg/l	13	13	15	17	14	15	15				
Selenium ug/l											
Silica mg/l				100	94	95	94	96	86	100	110
Sodium mg/l				26	22	25	23	24	22	24	22
Strontium ug/l				2500	2200	2200	2200	2200	2200	3200	3800
Sulfate mg/l	7800	6600	6200	5800	6400	5400	5400	4500	7000	9400	12000
Tellurium ug/l											
Thallium ug/l									1000	2300	4400
Titanium ug/l											
Vanadium ug/l				1000	960	930	900	1100	1100	1500	2000
Zinc ug/l				1300	1200	1200	1100	1100	1400	2100	2700

TABLE 3.--Analyses of surface-water quality, 1981-83--**Continued**

Analyses	Site #2.		Site #3.						
	Date Collected								
	08-11-82	02-25-83	03-19-81	04-07-81	04-21-81	05-15-81	12-03-81	01-29-82	03-26-82
Acidity as H mg/l	288	123	39.8	80.4	218	228			188
pH (Lab) units	2.0	2.4						2.3	2.0
pH (Field) units	1.9	2.3	2.5	2.1	1.9	1.9	2.4	2.2	2.0
Specific Conductance (Field)	6500	8200						11000	13000
Specific Conductance (Lab)		7270						8800	12500
Discharge (Q)	.05	.05	.04	.06	.02	0.002	--	.01	.07
Water Temp. ^{o}C	13.0	12.0	0.0	15.0	13.0	11.0	0.5	2.0	13.0
Aluminum mg/l	450	570					180	200	440
Antimony ug/l							<1	4	
Arsenic ug/l	30000	27000					600	800	25000
Barium ug/l	17	15	10				7	17	25
Beryllium ug/l	12	20					32	16	25
Bismuth ug/l									
Boron ug/l									
Cadmium ug/l	180	190	33					100	270
Calcium mg/l	130	160	140				190	210	240
Chloride mg/l	0.1	3.5					1.2	7.2	0.1
Chromium ug/l	1600	1800					380	1700	1900
Cobalt ug/l	3800	4400	2200				890	300	10000
Copper ug/l	2000	1600	2900				1600	4700	22000
Iron (Fe^{+2}) mg/l									2400
Iron (Fe^{+2}+Fe^{+3}) mg/l	1400	1500	3700				540	1400	
Lead ug/l	<10	<50	<10				<30	10	2100
Lithium ug/l	120	180	60				78	120	250
Magnesium mg/l	43	57	40				55	70	82
Manganese ug/l	11000	4300	8500				27000	14000	12000
Mercury ug/l									
Molybdenum ug/l	<10	<50	<10				<30	10	2100
Nickel ug/l	12000	10000	10000				2200	5200	11000
Potassium mg/l		18							
Selenium ug/l							19	10	
Silica mg/l	100	110	47				42	78	90
Sodium mg/l	25	28	10				25	21	27
Strontium ug/l	2800	2800	630				630	1600	2600
Sulfate mg/l	6300	6300	2300	4500	7600	11000	2300	7200	11000
Tellurium ug/l									
Thallium ug/l	1300							460	1300
Titanium ug/l									
Vanadium ug/l	1000	1200	300				290	940	1700
Zinc ug/l	1200	1900	790				1400	1300	2400

TABLE 3.--Analyses of surface-water quality, 1981-83 **--Continued**

Analyses	Site #3.		Site #4.	Site#5.5	Site #6.		
	Date Collected						
	04-23-82	02-25-83	03-26-82	08-11-82	11-12-81	01-29-82	03-26-82
Acidity as H mg/l	172	76	0.1	37	35		48
pH (Lab) units	2.0	2.4	6.6	2.6		2.6	3.3
Ph (Field) units	1.8	2.0	5.7	2.9	3.6	3.5	3.3
Specific Conductance (Field)	12000	6600	110	2700		4880	4200
Specific Conductance (Lab)	12400	5600	134	3810	3610	4100	3650
Discharge (Q)	.12	.09	1.0	.02	.06	.05	.07
Water Temp. ^{o}C	15.5	3.0	6.0	9.5	7.5		9.0
Aluminum mg/l	540	290	4.5	130		130	200
Antimony ug/l						<1	
Arsenic ug/l	24000	8000	180	300		220	380
Barium ug/l	20	19	43	11	17	15	17
Beryllium ug/l	16	14	<1	11	12	13	16
Bismuth ug/l							
Boron ug/l							
Cadmium ug/l	240	97	<1	32	30	42	50
Calcium mg/l	180	220	11	300	330	340	350
Chloride mg/l	1.2	2.7	1.2	2.1		1.4	1.1
Chromium ug/l	1300	1300	10	190		290	300
Cobalt ug/l	9100	1800	35	1700	1100	2000	2500
Copper ug/l	24000	2300	50	<30	<10	860	3200
Iron (Fe^{+2}) mg/l							
Iron (Fe^{+2}+Fe^{+3}) mg/l	2100	85	14	630	1100	700	750
Lead ug/l	<100	<30	<10	<30	<10	<10	30
Lithium ug/l	180	120	<4	110	91	98	120
Magnesium mg/l	59	67	3.2	79	84	87	91
Manganese ug/l	9300	5200	150	22000	24000	25000	24000
Mercury ug/l							
Molybdenum ug/l	<100	<30	<10	<30	<10	<10	<30
Nickel ug/l	9000	3800	100	4800		8000	4700
Potassium mg/l		13					
Selenium ug/l						1	
Silica mg/l	72	69	35	57	53	59	63
Sodium mg/l	21	20	6.8	24	25	25	26
Strontium ug/l	2200	1500	170	1500	1500	1700	1800
Sulfate mg/l	9800	4100	6	2900	2900	3500	3700
Tellurium ug/l							
Thallium ug/l	1200		<1	450		120	130
Titanium ug/l							
Vanadium ug/l	1400	660	11	280	270	330	410
Zinc ug/l	1800	1100	20	720	590	730	820

TABLE 3.--Analyses of surface-water quality, 1981-83--**Continued**

Analyses	Site #6.			Site #6.5.	Site #7.				
	Date Collected								
	04-23-82	08-11-82	02-25-83	08-11-82	03-19-81	04-07-81	04-21-81	05-14-81	06-11-81
Acidity as H mg/l	48	31	48		.2	1.2	.2		
pH (Lab) units	3.1	2.8	3.4	2.7					
pH (Field) units	3.2	3.4	3.2	3.5	5.2	4.2	5.9	7.4	9.6
Specific Conductance (Field)	4200	2500	4300	2600					
Specific Conductance (Lab)	3860	2550	4090	2410					
Discharge (Q)	.08	.08	.07	.16	.02	.14	.55	.02	.02
Water Temp. ^{o}C	8.5	8.0	7.5	15.0	7.5	8.0	9.5		10.5
Aluminum mg/l	190	120	160	64					
Antimony ug/l									
Arsenic ug/l	1000	220	68	85					
Barium ug/l	8	14	9		130	80	50	90	120
Beryllium ug/l	17	14	15		<1	<1	<1	<1	<1
Bismuth ug/l									
Boron ug/l									
Cadmium ug/l	44	15	46		<1	<1	<1	2	<1
Calcium mg/l	330	300	360		135	74	13	97	100
Chloride mg/l	1.2	1.8	1.7	1.4					
Chromium ug/l	300	150	300	100					
Cobalt ug/l	3100	1400	2500		28	13	<3	11	11
Copper ug/l	2800	130	1100		<10	15	<10	<10	<10
Iron (Fe^{+2}) mg/l									
Iron (Fe^{+2}+Fe^{+3}) mg/l	730	590	690		4.6	1.6	.19	.97	2.3
Lead ug/l	30	30	30		12	11	44	60	<10
Lithium ug/l	120	110	130		13	19	<4	11	29
Magnesium mg/l	92	78	96		35	14	26	24	26
Manganese ug/l	24000	22000	22000		2800	1700	74	930	1700
Mercury ug/l									
Molybdenum ug/l	<30	<30	<30		<10	<10	<10	<10	<10
Nickel ug/l	5000	4500	4800	2500					
Potassium mg/l			20			52	3.8	2.0	2.7
Selenium ug/l									
Silica mg/l	62	54	63		19	23	29	18	19
Sodium mg/l	25	24	27		18	6.4	6.4	20	18
Strontium ug/l	1800	1400	1700		1200	190	130	1100	1000
Sulfate mg/l	3600	2700	3200	1400	380	300	24	180	240
Tellurium ug/l									
Thallium ug/l	220	120							
Titanium ug/l									
Vanadium ug/l	380	250	340		<6	<6	<6	<6	<6
Zinc ug/l	820	690	830		31	54	49	25	43

TABLE 3.--Analyses of surface-water quality, 1981-83--Continued

Analyses	Site #7.						Site#7.1	Site#7.2
	Date Collected							
	07-07-81	08-25-81	09-15-81	10-08-81	03-25-82	02-25-83	02-25-83	02-25-83
Acidity as H mg/l	.7				.2			
pH (Lab) units					7.5	7.2	7.8	7.8
pH (Field) units	6.9	7.0	7.0	7.4	5.8	6.8	7.3	7.6
Specific Conductance (Field)	820	770	740	660	420	480		
Specific Conductance (Lab)					425		425	542
Discharge (Q)	.01	.001	Low flow (leaking around weir)		.11	.06	.01	<.01
Water Temp. ^{o}C	17.5	14.0	17.0	10.5	8.5	6.5	7.0	7.0
Aluminum mg/l					.7	.20	.1	.1
Antimony ug/l								
Arsenic ug/l					3	2	2	3
Barium ug/l	130	36	36	36	66	71	110	72
Beryllium ug/l	<1	<1	<1	<1	1	<0.5	<.5	<.5
Bismuth ug/l								
Boron ug/l								
Cadmium ug/l	<1	<1	<1	<1	<1	<1	<1	<1
Calcium mg/l	120	100	97	91	56	64	54	75
Chloride mg/l					1	0.8	.8	1.0
Chromium ug/l					<10	<10	<10	<10
Cobalt ug/l	27	31	28	41	<3	<10	<3	<3
Copper ug/l	<10	<10	<10	<10	20	<10	<10	<10
Iron (Fe^{+2}) mg/l								
Iron (Fe^{+2}+Fe^{+3}) mg/l	4.2	3.5	3.7	5.2	.097	.73	.031	.055
Lead ug/l	<10	<10	<10	<10	<10	<10	20	<10
Lithium ug/l	17	14	13	10	7	13	14	15
Magnesium mg/l	30	30	26	25	13	16	12	16
Manganese ug/l	2400	3300	2900	2700	210	400	2	14
Mercury ug/l								
Molybdenum ug/l	<10	<10	<10	<10	<10	<10	<10	<10
Nickel ug/l					100	<100	<100	100
Potassium mg/l	3.9	3.7	4.4	3.9		1.6	1.0	1
Selenium ug/l								
Silica mg/l	19	16	15	15	21	19	21	17
Sodium mg/l	18	13	13	14	13	18	18	18
Strontium ug/l	980	790	730	690	620	760	780	1000
Sulfate mg/l	280	360	290	280	86	72		
Tellurium ug/l								
Thallium ug/l								
Titanium ug/l								
Vanadium ug/l	<6	<6	<6	<6	<6	<6	<6	<6
Zinc ug/l	31	31	53	14	6	8	21	<3

TABLE 3.--Analyses of surface-water quality, 1981-83--**Continued**

Analyses	Site #8.		Site #9.		Site #10.		
	Date Collected						
	03-25-82	08-11-82	03-25-82	08-12-82	12-03-81	02-01-82	03-25-82
Acidity as H mg/l	6.6		74				18
pH (Lab) units	3.4	2.6	2.1	4.0		2.6	2.9
pH (Field) units	3.4	3.2	2.8	4.1	2.7	2.8	3.0
Specific Conductance (Field)	1200	2200	9360	2000		2400	2100
Specific Conductance (Lab)	1190	2630	10000	2170	3360	2230	2150
Discharge (Q)	1.2	.26	.18	.02	.28	.29	1.4
Water Temp. °C	9.0	20.0		16.0	4.0	2.5	9.5
Aluminum mg/l	35	63	320	12	50	60	66
Antimony ug/l					<1	<1	
Arsenic ug/l	34	40	20000	50	340	1700	1700
Barium ug/l	57		44	19	18	40	67
Beryllium ug/l	3		21	5	9	5	4
Bismuth ug/l							
Boron ug/l							
Cadmium ug/l	6		170	5	19	22	25
Calcium mg/l	68		250	350	220	170	100
Chloride mg/l	1.3	15	<0.1	2.2	17	2.2	1.2
Chromium ug/l	50	90	1800	10	160	300	200
Cobalt ug/l	320		14000	420	600	740	660
Copper ug/l	510		9500	100	570	580	1400
Iron (Fe^{+2}) mg/l							
Iron (Fe^{+2}+Fe^{+3}) mg/l	83		3000	25	230	270	230
Lead ug/l	<10		<100	<30	<30	<10	<30
Lithium ug/l	19		170	83	57	50	36
Magnesium mg/l	18		84	100	45		29
Manganese ug/l	3400		17000	21000	9400	9900	5500
Mercury ug/l							
Molybdenum ug/l	<10		<100	<30	<30	<10	<30
Nickel ug/l	700	2400	8400	1100	1500		1400
Potassium mg/l							
Selenium ug/l					2	1	
Silica mg/l	38		84	34	35	53	45
Sodium mg/l	9.4		23	26	11	17	12
Strontium ug/l	430		2500	2400	1200	1100	1700
Sulfate mg/l	630	1600	7600	1400	1400	1800	1400
Tellurium ug/l							
Thallium ug/l	29	74	1300	8		110	120
Titanium ug/l							
Vanadium ug/l	15		1100	18	130	170	160
Zinc ug/l			1800	260	370	370	300

TABLE 3.--Analyses of surface-water quality, 1981-83--**Continued**

Analyses	Site #10.			Site #11.
	Date Collected			
	04-22-82	08-12-82	02-25-83	03-25-82
Acidity as H mg/l	4.9	15	18	<0.1
pH (Lab) units	3.6	2.6	3.2	7.0
pH (Field) units	3.2	3.3	2.9	
Specific Conductance (Field)	1220	2000	2000	212
Specific Conductance (Lab)		2540	1780	230
Discharge (Q)	11.0	.36	1.07	.29
Water Temp. °C	9.5	18.0	3.0	
Aluminum mg/l	16	52	62	0.7
Antimony ug/l				
Arsenic ug/l	230	38	1800	6
Barium ug/l	75		49	51
Beryllium ug/l	<3		5	<1
Bismuth ug/l				
Boron ug/l				
Cadmium ug/l	5		22	<1
Calcium mg/l	33		100	23
Chloride mg/l	0.9	1.6	1.0	1.2
Chromium ug/l	50	70	260	<10
Cobalt ug/l	270		710	<3
Copper ug/l	390		580	
Iron (Fe^{+2}) mg/l				
Iron (Fe^{+2}+Fe^{+3}) mg/l	48		220	.22
Lead ug/l	<30		10	<10
Lithium ug/l	13		41	5
Magnesium mg/l	8.3		30	5.9
Manganese ug/l	1200		4600	62
Mercury µg/l				
Molybdenum ug/l	30		10	<10
Nickel ug/l	400	2200	1400	100
Potassium mg/l			5.4	
Selenium ug/l				
Silica mg/l	33		46	32
Sodium mg/l	6.2		13	8.7
Strontium ug/l	290		730	300
Sulfate mg/l	320	1500	1000	69
Tellurium ug/l				
Thallium ug/l	37	65		
Titanium ug/l				
Vanadium ug/l	11		140	<6
Zinc ug/l	81		290	7

TABLE 3.--Analyses of surface-water quality, 1981-83--**Continued**

Analyses	Site #12.		Site12.5	Site#14.	Site #15.	Site #16.	
	Date Collected						
	03-24-82	08-12-82	08-12-82	03-24-82	02-25-83	03-24-82	08-11-82
Acidity as H mg/l	14	16		0.1	9.7	0.1	
pH (Lab) units	3.1	2.8	2.6	6.1	3.3	6.7	7.2
pH (Field) units	2.8	2.8	2.4	5.4	3.3	5.2	8.0
Specific Conductance (Field)	1900	2200	5200	160	1400	810	540
Specific Conductance (Lab)	2060	2540	5380	152	1350	800	562
Discharge (Q)	2.5	.32	.01	.08	1.77	.74	.28
Water Temp. ^{o}C	8.5	20.0	22.5	7.0	1.5	12.0	21.5
Aluminum mg/l	55	64	130	.7	39	0.3	.1
Antimony ug/l							
Arsenic ug/l	1400	1	2300	2	970	3	7
Barium ug/l	63		28	78	57	58	38
Beryllium ug/l	4		14	<1	3	1	<0.5
Bismuth ug/l							
Boron ug/l							
Cadmium ug/l	19		170	<1	13	<1	<1
Calcium mg/l	94		220	20	86	110	74
Chloride mg/l	1.6	1.6	2.1	1.3	1.1	1.6	1.3
Chromium ug/l	160	140	1400	<10	150	<10	<10
Cobalt ug/l	470		3600	<3	410	24	9
Copper ug/l	1200		1700	<10	360	20	<10
Iron (Fe^{+2}) mg/l							
Iron (Fe^{+2}+Fe^{+3}) mg/l	180		1100	.17	120	.055	
Lead ug/l	<10		<30	<10	<10	<10	<10
Lithium ug/l	32		130	<4	31	22	13
Magnesium mg/l	27		58	6.1	26	28	17
Manganese ug/l	4500		12000	6	3400	1900	800
Mercury ug/l							
Molybdenum ug/l	<10		<30	<10	<10	<10	<10
Nickel ug/l	1200	2300	11000	100	900	100	100
Potassium mg/l					4.1		
Selenium ug/l							
Silica mg/l	44		120	36	42	25	23
Sodium mg/l	12		27	6.2	12	15	12
Strontium ug/l	730		3200	260	690	790	510
Sulfate mg/l	1100	1600	6200	<5	770	420	240
Tellurium ug/l							
Thallium ug/l	120	100	1300			1	<1
Titanium ug/l							
Vanadium ug/l	120		930	<6	81	<6	<6
Zinc ug/l	260		1400	4	190	27	3

TABLE 3.--Analyses of surface-water quality, 1981-83—Continued

Analyses	Site #16.	Site #17.								
	Date Collected									
	02-25-83	03-19-81	04-08-81	04-22-81	05-14-81	06-11-81	07-08-81	08-26-81	09-17-81	10-09-81
Acidity as H mg/l	0.1	7.8	19	8.7	12	15	12	6	3.8	3.9
pH (Lab) units	7.1	3.2	3.6		3.9	3.4	3.3	3.6	3.4	3.3
pH (Field) units	6.8									
Specific Conductance (Field)	520									
Specific Conductance (Lab)	669						1757	1410	1440	1370
Discharge (Q)	.57	2.2	2.5		1.1	.91	.54	.48	.53	.51
Water Temp. °C	3.0	7.0	13.0	7.0	9.0	14.0	10.5	16.5	13.5	7.5
Aluminum mg/l	1.4									
Antimony ug/l										
Arsenic ug/l	20									
Barium ug/l	65	90	90	70	70	150	130	52	55	53
Beryllium ug/l	0.5	3	3	<1	2	3	4	3	3	3
Bismuth ug/l										
Boron ug/l										
Cadmium ug/l	<1	11	8	4	10	11	9	3	2	<1
Calcium mg/l	91	150	100	54	97	120	140	140	140	140
Chloride mg/l	1.4									
Chromium ug/l	<10									
Cobalt ug/l	20	660	540	220	560	330	600	290	260	240
Copper ug/l	60	410	490	270	220	94	86	40	40	70
Iron (Fe^{+2}) mg/l										
Iron (Fe^{+2}+Fe^{+3}) mg/l	1.7	>10	76	47	85	86	120	51	33	35
Lead ug/l	<10	<10	<10	61	100	<10	<10	<10	<10	<10
Lithium ug/l	21	28	23	13	24	38	45	29	28	26
Magnesium mg/l	23	39	27	15	26	34	38	39	39	40
Manganese ug/l	1100	5800	4100	220	4300	5600	7100	6700	6400	6300
Mercury ug/l										
Molybdenum ug/l	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Nickel ug/l	<100									
Potassium mg/l	2.9	5.4	8.5	4.7	4.1	4.5	6.4	6.1	6.6	4.6
Selenium ug/l										
Silica mg/l	28	36	37	35	38	39	42	37	37	37
Sodium mg/l	14	16	14	9.4	14	15	17	16	17	17
Strontium ug/l	770	1100	730	430	750	860	990	930	970	1000
Sulfate mg/l	250	910	720	430	670	400	960	790	750	740
Tellurium ug/l										
Thallium ug/l										
Titanium ug/l										
Vanadium ug/l	8	23	14	9.0	16	11	21	6	<6	<6
Zinc ug/l	18	220	310	120	160	200	220	150	120	120

TABLE 3.--Analyses of surface-water quality, 1981-83—**Continued**

Analyses	Site #17.									Site #19
	Date Collected									
	11-18-81	12-11-81	02-03-82	03-24-82	04-16-82	04-22-82	08-11-82	10-04-82	02-25-83	08-11-82
Acidity as H mg/l	18			13		4.5			6.7	
pH (Lab) units	3.2	3.4	2.7	3.1		3.5	2.9	3.3	3.7	7.8
pH (Field) units			3.4	2.9			3.2	3.6	3.6	8.0
Specific Conductance (Field)			1600	1600		1000	1400	1300	1100	2100
Specific Conductance (Lab)	2290	2020	1880	1360		780	1550		1130	2350
Discharge (Q)	1.1	.88	.98	2.6		--	.72	.84	2.95	.01
Water Temp. °C	3.0	1.0	3.5	11.0		10.0		8.0	1.5	
Aluminum mg/l			34	55	35	19	24	18	29	.1
Antimony ug/l		<1	<1							
Arsenic ug/l		130	300	600		310	64	<360	780	100
Barium ug/l	53		52	68	340	65		39	64	35
Beryllium ug/l	5		2	3	2	<3			3	.5
Bismuth ug/l										
Boron ug/l								35		
Cadmium ug/l	14		9	12	10	7		<10	10	<1
Calcium mg/l	180		120	98	56	49		150	92	440
Chloride mg/l			1.4	1.6		1.1	1.4		3.6	2.9
Chromium ug/l		42	90	120	110	70	50	280	120	10
Cobalt ug/l	300		400	380	330	330	50	310	340	<3
Copper ug/l	520		300	880	640	590		120	340	<10
Iron (Fe^{+2}) mg/l								46		
Iron ($Fe^{+2}+Fe^{+3}$) mg/l	200		98	110	92	58		57	91	.023
Lead ug/l	<10		<10	<10	<10	<30		110	<10	<10
Lithium ug/l	46		25	25	25	19			29	48
Magnesium mg/l	55		35	27	17	13		35	26	100
Manganese ug/l	8700		5200	3700	2100	1500		5500	3000	68
Mercury ug/l										
Molybdenum ug/l	<10		<10	<10	<10	<30		65	<10	<10
Nickel ug/l			920	900	900	400	900	590	600	<100
Potassium mg/l								5.2	3.8	
Selenium ug/l		2	1							
Silica mg/l	44		41	38	85	34		43	38	29
Sodium mg/l	19		15	12	9	7.9		14	12	27
Strontium ug/l	1200		930	770	560	410		960	730	2700
Sulfate mg/l	1500	900	910	860		430	770	710	630	1500
Tellurium ug/l										
Thallium ug/l			42	80		53	38	28		2
Titanium ug/l										
Vanadium ug/l	95	290	15	50	83	23		12	67	<6
Zinc ug/l			190	190	400	110		120	150	22

TABLE 3.--Analyses of surface-water quality, 1981-83--**Continued**

Analyses	Site #20. Date Collected 08-11-82
Acidity as H mg/l	
pH (Lab) units	8.1
pH (Field) units	8.0
Specific Conductance (Field)	370
Specific Conductance (Lab)	386
Discharge (Q)	.37
Water Temp. °C	19.5
Aluminum mg/l	<.10
Antimony ug/l	
Arsenic ug/l	10
Barium ug/l	35
Beryllium ug/l	<.5
Bismuth ug/l	
Boron ug/l	
Cadmium ug/l	<1
Calcium mg/l	44
Chloride mg/l	1.2
Chromium ug/l	<10
Cobalt ug/l	4
Copper ug/l	<10
Iron (Fe^{+2}) mg/l	
Iron (Fe^{+2}+Fe^{+3}) mg/l	89
Lead ug/l	<10
Lithium ug/l	13
Magnesium mg/l	10
Manganese ug/l	630
Mercury ug/l	
Molybdenum ug/l	<10
Nickel ug/l	100
Potassium mg/l	
Selenium ug/l	
Silica mg/l	22
Sodium mg/l	9.7
Strontium ug/l	290
Sulfate mg/l	130
Tellurium ug/l	
Thallium ug/l	<1
Titanium ug/l	
Vanadium ug/l	<6
Zinc ug/l	<3

TABLE 3.--Analyses of surface-water quality, 1981-83--**Continued**

Analyses	Site21.6	Site #22.		Site #25.	
	Date Collected				
	08-13-82	08-11-82	02-25-83 0(	11-18-81	12-11-81
Acidity as H mg/l	0.3			3.2	
pH (Lab) units		7.9	7.4	5.7	4.4
pH (Field) units		8.1	7.0		
Specific Conductance (Field)	1000	190	200		
Specific Conductance (Lab)	1120	195	211	828	987
Discharge (Q)	.01	.12	.20	4.0	2.5
Water Temp. °C	17.0	20.0	3.5	1.0	0.5
Aluminum mg/l	.6	.1	<.1		
Antimony ug/l					
Arsenic ug/l	56	3	1		9
Barium ug/l	45	21	29	49	7
Beryllium ug/l	<5	<.5	<.5	2	<1
Bismuth ug/l					
Boron ug/l					
Cadmium ug/l	<1	<1	<1	1	<1
Calcium mg/l	160	24	24	81	86
Chloride mg/l	1.5	1.2	.8		1.5
Chromium ug/l	<10	<10	<10		7
Cobalt ug/l	63	<3	<3	110	21
Copper ug/l	2500	<10	<10	150	30
Iron (Fe^{+2}) mg/l					
Iron (Fe^{+2}+Fe^{+3}) mg/l	1.1	.013	.063	24	2
Lead ug/l	<10	<10	<10	<10	<10
Lithium ug/l	47	10	10	18	5
Magnesium mg/l	39	5.2	6.1	24	27
Manganese ug/l	4700	8	6	3200	450
Mercury ug/l					
Molybdenum ug/l	<10	<10	<10	<10	<10
Nickel ug/l	200	<100	<100		
Potassium mg/l			.9	3.5	
Selenium ug/l					1
Silica mg/l	25	24	26	38	3.7
Sodium mg/l	12	9.6	9.8	11	13
Strontium ug/l	390	300	310	650	89
Sulfate mg/l	650	<5	3.1	470	
Tellurium ug/l					
Thallium ug/l	5	<1			
Titanium ug/l					
Vanadium ug/l	<6	<6	<6	<6	<6
Zinc ug/l	150	13	<3	90	14

TABLE 3.--Analyses of surface-water quality, 1981-83--Continued

Analyses	Site #25.					Site #26.			
	Date Collected								
	02-03-82	03-24-82	04-16-82	04-22-82	08-12-82	12-10-81	02-05-82	03-24-82	04-22-82
Acidity as H mg/l		3.9		2.9	0.8			2.6	1.7
pH (Lab) units	4.2	4.0		4.4	4.7		7.8	4.4	4.5
pH (Field) units		4.3		4.9	4.6		7.6	4.9	4.8
Specific Conductance (Field)	740	930		580	470		370	590	470
Specific Conductance (Lab)	742	905		610	503	483	428	710	465
Discharge (Q)	3.0	6.3		25	2.5		3.7	7.7	37
Water Temp. °C		9.0		9.0	18.0	7.5	4.0	8.0	11.5
Aluminum mg/l	.13	28	19	8.1	4.3	.03	.07	7	41
Antimony ug/l									
Arsenic ug/l	62	160		170	2	2	6	130	110
Barium ug/l		60	220	54	43	16		44	51
Beryllium ug/l		2	2	<3	0.5	<1		1	<3
Bismuth ug/l									
Boron ug/l									
Cadmium ug/l		5	7	4	<1	<1		3	<3
Calcium mg/l		58	38	36	5.2	50		49	31
Chloride mg/l	1.2	1.5		1.1	1.2	1.1	1.5	1.4	1.1
Chromium ug/l		20	70	10	<10	<1		<10	<10
Cobalt ug/l		200	210	190	110	24		120	140
Copper ug/l		470	380	340	47	10		240	240
Iron (Fe^{+2}) mg/l									
Iron (Fe^{+2}+Fe^{+3}) mg/l		34	46	33	4.4	1.3		26	23
Lead ug/l		<10	<10	<30	<10	20		<10	<30
Lithium ug/l		14	17	14	11	8		11	13
Magnesium mg/l		16	11	9.9	15	13		15	9.1
Manganese ug/l		19	1000	930	1700	440		1300	740
Mercury ug/l									
Molybdenum ug/l		<10	<10	<30	<10	<10		<10	<30
Nickel ug/l		400	500	300	100		100	300	200
Potassium mg/l									
Selenium ug/l	1						<1		
Silica mg/l		38	63	35	36	9.6		40	36
Sodium mg/l		9.8	7.6	7.1	9.2	8.2		9.6	6.9
Strontium ug/l		510	400	340	430	140		440	310
Sulfate mg/l	400	440		260	240	190	160	290	210
Tellurium ug/l									
Thallium ug/l	16	37		30	9		5	23	20
Titanium ug/l									
Vanadium ug/l		<6	46	<10	<6	<6		<6	<10
Zinc ug/l		120	380	69	51	14		57	51

TABLE 3.--Analyses of surface-water quality, 1981-83--**Continued**

Analyses	Site #26. Date Collected 08-20-82
Acidity as H mg/l	1.8
pH (Lab) units	4.2
pH (Field) units	4.5
Specific Conductance (Field) micromhos	560
Specific Conductance (Lab) micromhos	584
Discharge (Q) ft3/s	3.8
Water Temp. °C	14.5
Aluminum mg/l	13
Antimony ug/l	
Arsenic ug/l	3
Barium ug/l	52
Beryllium ug/l	2
Bismuth ug/l	
Boron ug/l	
Cadmium ug/l	<1
Calcium mg/l	51
Chloride mg/l	1.7
Chromium ug/l	70
Cobalt ug/l	170
Copper ug/l	300
Iron (Fe^{+2}) mg/l	
Iron (Fe^{+2}+Fe^{+3}) mg/l	110
Lead ug/l	<10
Lithium ug/l	14
Magnesium mg/l	16
Manganese ug/l	1800
Mercury ug/l	
Molybdenum ug/l	<10
Nickel ug/l	500
Potassium mg/l	
Selenium ug/l	
Silica mg/l	45
Sodium mg/l	10
Strontium ug/l	440
Sulfate mg/l	300
Tellurium ug/l	
Thallium ug/l	18
Titanium ug/l	
Vanadium ug/l	<6
Zinc ug/l	88

TABLE 4.--Analyses for selected constituents during spring runoff for site 1 (April 1982[a])

	Dissolved	Total Recoverable
Al mg/L	<.001	
As ug/L	2	
Ba ug/L	33	140
Be ug/L	< 3	< 3
Ca mg/L	10	10
Cd ug/L	< 3	< 3
Co ug/L	< 9	< 9
Cr ug/L	< 10	< 10
Cu ug/L	< 30	38
Fe mg/L	.032	3.7
K mg/L		
Li ug/L	< 12	< 12
Mg mg/L	1.7	3.1
Mn ug/L	7	97
Mo ug/L	< 10	< 30
Na mg/L	4.1	1.4
Ni ug/L	< 100	
Pb ug/L	< 30	< 30
SiO_2 mg/L	30	44
Sr ug/L	120	180
V ug/L	< 10	12
Zn ug/L	49	120

[a] Dissolved, April 22 or 28; total recoverable, April 16.

TABLE 5.--Analyses for selected constituents during spring runoff for site 10 (April 1982[a])

	Dissolved	Total Recoverable
Al mg/L	16	
As ug/L	230	
Ba ug/L	75	360
Be ug/L	< 3	3
Ca mg/L	33	45
Cd ug/L	5	14
Co ug/L	270	620
Cr ug/L	50	
Cu ug/L	390	780
Fe mg/L	48	150
K mg/L		
Li ug/L	13	23
Mg mg/L	8.3	13
Mn ug/L	1,200	2,100
Mo ug/L	< 30	< 30
Na mg/L	6.2	7.4
Ni ug/L	400	
Pb ug/L	< 30	< 30
SiO_2 mg/L	33	70
Sr ug/L	290	540
V ug/L	11	110
Zn ug/L	81	300

[a] Dissolved, April 22 or 28; total recoverable, April 16.

TABLE 6.--Analyses for selected constituents during spring runoff for site 17 (April 1982[a])

	Dissolved	Total Recoverable
Al mg/L	19.0	
As ug/L	310	
Ba ug/L	65	340
Be ug/L	< 3	< 3
Ca mg/L	49	56
Cd ug/L	7	10
Co ug/L	330	330
Cr ug/L	70	
Cu ug/L	590	640
Fe mg/L	58	92
K mg/L		
Li ug/L	19	25
Mg mg/L	13	17
Mn ug/L	1,500	2,100
Mo ug/L	< 30	< 30
Na mg/L	7.9	9.0
Ni ug/L	400	
Pb ug/L	< 30	< 30
SiO_2 mg/L	34	85
Si ug/L	410	560
V ug/L	23	83
Zn ug/L	110	400

[a] Dissolved, April 22 or 28; total recoverable, April 16.

TABLE 7.--Analyses for selected constituents during spring runoff for site 25 (April 1982[a])

	Dissolved	Total Recoverable
Al mg/L	8.1	
As ug/L	170	
Ba ug/L	54	220
Be ug/L	< 3	< 3
Ca mg/L	36	38
Cd ug/L	4	7
Co ug/L	190	210
Cr ug/L	10	
Cu ug/L	340	380
Fe mg/L	33	46
K mg/L		
Li ug/L	14	17
Mg mg/L	9.9	11
Mn ug/L	930	1,000
Mo ug/L	< 30	< 30
Na mg/L	7.1	7.6
Ni ug/L	300	
Pb ug/L	< 30	< 30
SiO_2 mg/L	35	63
Sr ug/L	340	400
V ug/L	< 10	46
Zn ug/L	69	380

[a] Dissolved, April 22 or 28; total recoverable, April 16.

TABLE 8.—Analyses for selected constituents during spring runoff for site 26 (April 1982[a])

	Dissolved	Total Recoverable
Al mg/L	41	
As ug/L	110	
Ba ug/L	51	140
Be ug/L	< 3	< 3
Ca mg/L	31	33
Cd ug/L	< 3	5
Co ug/L	140	120
Cr ug/L	< 10	
Cu ug/L	240	320
Fe mg/L	23	28
K mg/L		
Li ug/L	13	17
Mg mg/L	9.1	9.8
Mn ug/L	740	800
Mo ug/L	< 30	< 30
Na mg/L	6.9	7.6
Ni ug/L	200	
Pb ug/L	< 30	< 30
SiO_2 mg/L	36	53
Sr ug/L	310	340
V ug/L	< 10	28
Zn ug/L	51	180

[a] Dissolved, April 22 or 28; total recoverable, April 16.

TABLE 9.--Analyses for selected constituents during summer base flow for site 1 (Aug. 11-22, 1982)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	< .10	< .14	< .14
As ug/L	4		
Ba ug/L	7.6	7.6	0
Be ug/L	< 0.5	< 0.5	< 0.5
Ca mg/L	15	18	3
Cd ug/L	< 1	9	< 9
Co ug/L	< 3	< 3	< 3
Cr ug/L	< 10	< 10	< 10
Cu ug/L	< 10	26	< 26
Fe mg/L	.11	.30	.19
K mg/L	<5		
Li ug/L	< 4	10	<10
Mg mg/L	4.7	4.8	0.1
Mn ug/L	21	27	6
Mo ug/L	<10	<10	<10
Na mg/L	8.4	8.5	0.1
Ni ug/L	<100	<100	<100
Pb ug/L	<10	13	<13
SiO_2 mg/L	41	41	0
Sr ug/L	250	250	0
V ug/L	< 6	< 6	< 6
Zn ug/L	8	76	68

TABLE 10.--Analyses for selected constituents during summer base flow for site 6.5 (Aug. 11-22, 1982)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	64	63	
As ug/L	85		
Ba ug/L		37	
Be ug/L		6	
Ca mg/L		160	
Cd ug/L		15	
Co ug/L		960	
Cr ug/L	100		
Cu ug/L		99	
Fe mg/L		310	
K mg/L			
Li ug/L		58	
Mg mg/L		43	
Mn ug/L		12,000	
Mo ug/L		< 10	
Na mg/L		17	
Ni ug/L	2,500		
Pb ug/L		< 10	
SiO_2 mg/L		50	
Sr ug/L		840	
V ug/L		140	
Zn ug/L		390	

TABLE 11.--Analyses for selected constituents during summer base flow for site 8 (Aug. 11-22, 1982)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	60	63	3
As ug/L	40		
Ba ug/L		52	
Be ug/L		6	
Ca mg/L		220	
Cd ug/L		15	
Co ug/L		760	
Cr ug/L	90	90	0
Cu ug/L		50	
Fe mg/L		270	
K mg/L			
Li ug/L		60	
Mg mg/L		58	
Mn ug/L		13,000	
Mo ug/L		< 10	
Na mg/L		19	
Ni ug/L	2,400	2,400	0
Pb ug/L		< 10	
SiO_2 mg/L		58	
Sr ug/L		110	
V ug/L		110	
Zn ug/L		430	

TABLE 12.--Analyses for selected constituents during summer base flow for site 10 (Aug. 11-22, 1982)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	52	52	0
As ug/L	38		
Ba ug/L		41	
Be ug/L		6	
Ca mg/L		220	
Cd ug/L		14	
Co ug/L		740	
Cr ug/L	70	70	0
Cu ug/L		48	
Fe mg/L		220	
K mg/L			
Li ug/L		62	
Mg mg/L		60	
Mn ug/L		13,000	
Mo ug/L		< 10	
Na mg/L		19	
Ni ug/L	2,200	2,200	0
Pb ug/L		< 10	
SiO_2 mg/L		53	
Sr ug/L		1,200	
V ug/L		86	
Zn ug/L		360	

TABLE 13.--Analyses for selected constituents during summer base flow for site 12 (Aug. 11-22, 1982)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	64	62	
As ug/L			
Ba ug/L		63	
Be ug/L		5	
Ca mg/L		210	
Cd ug/L		17	
Co ug/L		820	
Cr ug/L	140	110	
Cu ug/L		130	
Fe mg/L		190	
K mg/L			
Li ug/L		60	
Mg mg/L		57	
Mn ug/L		12,000	
Mo ug/L		< 10	
Na mg/L		19	
Ni ug/L	2,300	2,300	0
Pb ug/L		< 10	
SiO_2 mg/L		60	
Sr ug/L		1,300	
V ug/L		85	
Zn ug/L		350	

TABLE 14.--Analyses for selected constituents during summer base flow for site 16 (Aug. 11-22, 1982)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	< .1	1.1	< 1.1
As ug/L	7		
Ba ug/L	38	44	6
Be ug/L	< 0.5	< 0.5	< 0.5
Ca mg/L	74	72	
Cd ug/L	< 1	3	< 3
Co ug/L	9	10	1
Cr ug/L	< 10	< 10	< 10
Cu ug/L	< 10	62	< 62
Fe mg/L		.75	
K mg/L			
Li ug/L	13	18	5
Mg mg/L	17	18	1
Mn ug/L	800	840	40
Mo ug/L	< 10	< 10	< 10
Na mg/L	12	12	0
Ni ug/L	100	100	0
Pb ug/L	< 10	< 10	< 10
SiO_2 mg/L	23	27	4
Sr ug/L	510	520	10
V ug/L	< 6	< 6	< 6
Zn ug/L	3	84	81

TABLE 15.--Analyses for selected constituents during summer base flow for site 17 (Aug. 11-22, 1982)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	24	26	2
As ug/L	64		
Ba ug/L		53	
Be ug/L		2	
Ca mg/L		140	
Cd ug/L		9	
Co ug/L	50	340	290
Cr ug/L	50	50	0
Cu ug/L		98	
Fe mg/L		76	
K mg/L			
Li ug/L		34	
Mg mg/L		38	
Mn ug/L		6,000	
Mo ug/L		< 10	
Na mg/L		16	
Ni ug/L	900	1,000	100
Pb ug/L		< 10	
SiO_2 mg/L		42	
Sr ug/L		960	
V ug/L		33	
Zn ug/L		180	

TABLE 16.--Analyses for selected constituents during summer base flow for site 25 (Aug. 11-22, 1982)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	4.3	9.0	4.7
As ug/L	2		
Ba ug/L	43	41	-2
Be ug/L	0.5	0.5	0.0
Ca mg/L	5.2	5.6	0.4
Cd ug/L	< 1	11	< 11
Co ug/L	110	120	10
Cr ug/L	< 10	20	< 20
Cu ug/L	47	48	1
Fe mg/L	4.4	22	18
K mg/L			
Li ug/L	11	17	6
Mg mg/L	15	16	1
Mn ug/L	1,700	1,900	200
Mo ug/L	< 10	< 10	< 10
Na mg/L	9.2	10	1
Ni ug/L	100	300	200
Pb ug/L	< 10	< 10	< 10
SiO_2 mg/L	36	39	3
Sr ug/L	430	460	30
V ug/L	< 6	13	< 13
Zn ug/L	51	140	90

TABLE 17.--Analyses for selected constituents during summer base flow for site 26 (Aug. 11-22, 1982)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	13	16	3
As ug/L	3		
Ba ug/L	52	130	80
Be ug/L	2	2	0
Ca mg/L	51	50	
Cd ug/L	< 1	37	<37
Co ug/L	170	170	0
Cr ug/L	10	70	60
Cu ug/L	300	460	160
Fe mg/L	110	460	350
K mg/L			
Li ug/L	14	25	11
Mg mg/L	16	17	1
Mn ug/L	1,800	1,900	100
Mo ug/L	< 10	< 10	< 10
Na mg/L	10	10	10
Ni ug/L	500	500	0
Pb ug/L	< 10	< 10	< 10
SiO_2 mg/L	45	60	15
Sr ug/L	440	470	30
V ug/L	< 6	30	< 30
Zn ug/L	88	140	50

TABLE 18.--Analyses for selected constituents during winter low flow for site 1 (Feb. 25, 1983)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	.10	1.3	1.2
As ug/L	3	3	0
Ba ug/L	72	78	6
Be ug/L	<0.5	1	<1
Ca mg/L	12	12	0
Cd ug/L	<1	<1	<1
Co ug/L	<3	<3	<3
Cr ug/L	<10	<10	<10
Cu ug/L	<10	54	<54
Fe mg/L	.16	1.2	1.0
K mg/L	2.7	2.6	
Li ug/L	8	8	0
Mg mg/L	4	4	0
Mn ug/L	16	25	9
Mo ug/L	<10	<10	<10
Na mg/L	7.4	7.3	
Ni ug/L	<100	<100	<100
Pb ug/L	<10	<10	<10
SiO_2 mg/L	39	43	4
Sr ug/L	200	200	0
V ug/L	<6	7	<7
Zn ug/L	4	45	41
SO_4^{-2} mg/L	11	17	6
Sulfur Species mg/L	11	12	1

TABLE 19.--Analyses for selected constituents during winter low flow for site 3 (Feb. 25, 1983)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	290	300	10
As ug/L	8,000	9,000	1,000
Ba ug/L	19	44	25
Be ug/L	14	14	0
Ca mg/L	97	94	
Cd ug/L	220	210	
Co ug/L	1,800	1,500	
Cr ug/L	1,300	1,000	
Cu ug/L	2,300	2,800	500
Fe mg/L	85	830	740
K mg/L	13	12	
Li ug/L	120	130	10
Mg mg/L	67	69	2
Mn ug/L	5,200	5,200	0
Mo ug/L	< 30	< 30	< 30
Na mg/L	20	20	0
Ni ug/L	3,800	3,800	0
Pb ug/L	< 30	< 30	< 30
SiO_2 mg/L	69	82	13
Sr ug/L	1,500	1,500	0
V ug/L	660	660	0
Zn ug/L	1,100	1,200	100
SO_4^{-2} mg/L	4,100	4,200	100
Sulfur Species mg/L	4,300	4,000	

TABLE 20.--Analyses for selected constituents during winter low flow for site 7 (Feb. 25, 1983)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	.20	.27	.07
As ug/L	2	2	0
Ba ug/L	71	76	5
Be ug/L	< .5	.8	< .8
Ca mg/L	64	62	
Cd ug/L	<1	<1	<1
Co ug/L	< 10	3	< 3
Cr ug/L	< 10	10	< 10
Cu ug/L	< 10	54	< 54
Fe mg/L	.73	.76	.03
K mg/L	1.6	1.5	
Li ug/L	13	17	4
Mg mg/L	16	15	
Mn ug/L	400	330	
Mo ug/L	< 10	< 10	< 10
Na mg/L	18	17	
Ni ug/L	< 100		
Pb ug/L	< 10	< 10	<10
SiO_2 mg/L	19	19	0
Sr ug/L	760	750	
V ug/L	< 6	< 6	< 6
Zn ug/L	8	29	21
SO_4^{-2} mg/L	72	75	3
Sulfur Species mg/L	75	71	

TABLE 21.--Analyses for selected constituents during winter low flow for site 10 (Feb. 25, 1983)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	62	71	9
As ug/L	1,800	2,000	200
Ba ug/L	49	120	70
Be ug/L	5	4	
Ca mg/L	100	98	
Cd ug/L	22	19	
Co ug/L	710	560	
Cr ug/L	260	220	
Cu ug/L	580	720	140
Fe mg/L	220	220	0
K mg/L	5.4	5.7	0.3
Li ug/L	41	39	
Mg mg/L	30	30	0
Mn ug/L	4,600	4,800	200
Mo ug/L	< 10	< 10	< 10
Na mg/L	13	12	
Ni ug/L	1,400	1,300	
Pb ug/L	10	40	30
SiO_2 mg/L	46	57	11
Sr ug/L	730	730	0
V ug/L	140	150	10
Zn ug/L	290	300	10
SO_4^{-2} mg/L	1,000	1,100	100
Sulfur Species mg/L	1,100	1,200	100

TABLE 22.--Analyses for selected constituents during winter low flow for site 15 (Feb. 25, 1983)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	39	44	5
As ug/L	970	1,000	<80
Ba ug/L	57	110	50
Be ug/L	3	4	1
Ca mg/L	86	79	
Cd ug/L	13	13	0
Co ug/L	410	380	
Cr ug/L	150	150	0
Cu ug/L	360	750	390
Fe mg/L	120	130	10
K mg/L	4.1	4.3	0.2
Li ug/L	31	32	1
Mg mg/L	26	25	
Mn ug/L	3,400	3,300	
Mo ug/L	< 10	< 10	< 10
Na mg/L	12	11	
Ni ug/L	900	800	
Pb ug/L	< 10	< 10	< 10
SiO_2 mg/L	42	60	18
Sr ug/L	690	670	
V ug/L	81	85	4
Zn ug/L	190	300	110
SO_4^{-2} mg/L	770	760	
Sulfur Species mg/L	800	810	10

TABLE 23.--Analyses for selected constituents during winter low flow for site 16 (Feb. 25, 1983)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	1.4	22	21
As ug/L	20	33	13
Ba ug/L	65	380	320
Be ug/L	0.5	3	2.5
Ca mg/L	91	96	5
Cd ug/L	< 1	< 1	< 1
Co ug/L	20	24	4
Cr ug/L	< 10	20	< 20
Cu ug/L	60	150	90
Fe mg/L	1.7	30	28
K mg/L	2.9	4.9	2.0
Li ug/L	21	27	6
Mg mg/L	23	29	6
Mn ug/L	1,100	1,600	500
Mo ug/L	< 10	< 10	< 10
Na mg/L	14	14	0
Ni ug/L	< 100	< 100	< 100
Pb ug/L	< 10	< 10	< 10
SiO_2 mg/L	28	120	90
Sr ug/L	770	880	110
V ug/L	8	47	39
Zn ug/L	18	99	81
SO_4^{-2} mg/L	250	270	20
Sulfur Species mg/L	250	280	30

TABLE 24.--Analyses for selected constituents during winter low flow for site 17 (Feb. 25, 1983)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	29	41	12
As ug/L	780	720	
Ba ug/L	64	260	200
Be ug/L	3.0	3.0	0
Ca mg/L	92	86	
Cd ug/L	10	8	
Co ug/L	340	260	
Cr ug/L	120	110	
Cu ug/L	340	480	140
Fe mg/L	91.0	100	10
K mg/L	3.8	4.6	0.8
Li ug/L	29	32	3
Mg mg/L	26	27	1
Mn ug/L	3,000	2,900	
Mo ug/L	<10	<10	<10
Na mg/L	12	12	0
Ni ug/L	600	600	0
Pb ug/L	<10	<10	<10
SiO_2 mg/L	38	88	50
Sr ug/L	730	740	10
V ug/L			
Zn ug/L			
SO_4^{-2} mg/L	630	660	30
Sulfur Species mg/L	690	690	0

TABLE 25.--Analyses for selected constituents during winter low flow for site 22 (Feb. 25, 1983)

	Dissolved	Total Recoverable	Suspended recoverable
Al mg/L	< .10	< .24	< .24
As ug/L	1	1	0
Ba ug/L	29	29	0
Be ug/L	< .5	< .5	0
Ca mg/L	24	24	0
Cd ug/L	< 1	< 1	< 1
Co ug/L	< 3	< 3	0
Cr ug/L	< 10	< 10	< 10
Cu ug/L	< 10	19	< 19
Fe mg/L	.0635	.340	.280
K mg/L	0.9	1.0	0.1
Li ug/L	10	6	
Mg mg/L	6.1	6.0	
Mn ug/L	6	12	6
Mo ug/L	< 10	< 10	< 10
Na mg/L	9.8	9.8	0
Ni ug/L	< 100	< 100	< 100
Pb ug/L	< 10	< 10	< 10
SiO_2 mg/L	26	27	1
Sr ug/L	310	310	0
V ug/L	<6		
Zn ug/L	<5		
SO_4^{-2} mg/L	3.1	3.9	.8
Sulfur Species mg/L	20	13	

TABLE 26.--Discharge, water-quality data, and calculated acidity and sulfate loads for selected surface-water sites, March 6, 1982

Site number	Discharge (ft^3/s)	Water temperature (°C)	pH	Specific conductance (micromhos/cm)	Acidity (H)		Sulfate	
					mg/liter	lbs/day	mg/liter	lbs/day
1	2.26	0.3	7.2	110	--	--	8	97
2	.10	13.0	1.9	12,000	170	90	9,800	5,200
3	.16	6.5	1.9	10,000	142	120	8,800	7,500
4	2.71	.5	7.3	100	--	--	25	360
5	2.07	.5	4.2	260	1.0	11	100	1,100
6	.06	8.5	2.9	4,400	52	17	3,900	1,300
7	.14	5.0	7.2	350	--	--	67	51
8	2.70	2.0	2.9	840	4.6	67	330	4,800
9	.27	6.0	2.0	8,700	116	170	6,700	9,800
10	2.42	3.0	2.7	1,900	19	250	1,100	14,000
11	.35	2.0	7.3	220	--	--	8	15
12	3.55	3.5	2.7	1,600	15	290	700	13,000
14	.25	3.0	7.1	100	--	--	72	97
15	4.11	2.5	3.2	1,600	9.1	200	700	15,000
16	1.11	6.0	7.0	800	--	--	440	2,600
17	4.98	2.5	2.9	1,600	9.5	260	750	20,000

TABLE 27.--Discharge, water-quality data, and calculated acidity and sulfate loads for selected surface-water sites, April 16, 1982

Site number	Discharge (ft^3/s)	Water temperature (°C)	pH	Specific conductance (micromhos/cm)	Acidity (H)		Sulfate	
					mg/liter	lbs/day	mg/liter	lbs/day
1	7.63	6.5	7.4	75	--	--	7	290
2	.10	12.0	1.9	14,000	200	110	12,000	6,400
3	.22	12.3	1.8	8,100	110	130	6,400	7,500
6	.07	8.0	3.0	3,900	48	18	4,100	1,600
7	.86	5.5	7.6	150	--	--	8	37
8	8.72	7.8	3.1	750	3.6	170	290	14,000
9	.51	12.0	2.0	6,800	94	260	5,700	16,000
10	10.6	8.5	2.8	1,300	11	620	740	42,000
11	1.82	5.5	7.7	130	--	--	19	190
12	11.6	--	2.9	1,100	7.1	440	490	30,000
12.5	.10	--	3.6	1,300	5.5	3	860	460
13	.08	--	5.2	1,600	.4	.2	970	420
14	.53	--	7.9	130	--	--	7	20
15	12.4	8.5	2.9	1,100	6.4	430	480	32,000
16	2.35	10.8	6.7	670	.2	3	390	4,900
17	13.6	8.0	2.9	1,000	5.3	390	470	34,000
19	.13	13.5	6.6	1,700	.2	.14	1,100	770
20	--	10.0	6.4	540	--	--		

TABLE 28.--Discharge, water-quality data, and calculated acidity and sulfate loads for selected surface-water sites, May 6, 1982

Site number	Discharge (ft^3/s)	Water temperature (°C)	pH	Specific conductance (micromhos/cm)	Acidity (H)		Sulfate	
					mg/liter	lbs/day	mg/liter	lbs/day
4	8.77	6.5	7.6	94				
6	.07	8.0	3.4	3,700				
7	1.95	9.4	7.7	180	------------ not measured ------------			
8	10.8	11.0	4.7	390				
17[a]	15.5	7.5	--	370				

[a] Temperature, conductance, and discharge taken from gage recorders.

TABLE 29.--Discharge, water-quality data, and calculated acidity and sulfate loads for selected surface-water sites, June 1-2, 1982

Site number	Discharge (ft^3/s)	Water temperature (°C)	pH	Specific conductance (micromhos/cm)	Acidity (H) mg/liter	Acidity (H) lbs/day	Sulfate mg/liter	Sulfate lbs/day
June 1, 1982								
1	1.96	7.4	7.6	100	--	--	--	--
4	1.64	10.0	7.4	100	--	--	10	88
4.5	.01	16.5	2.4	6,100	109	2	670	12
6	.08	8.0	3.4	3,200	39	17	3,000	1,300
7	.42	13.5	7.6	260	--	--	22	49
8	2.71	16.0	4.5	650	4.2	61	370	5,400
9	.11	17.0	1.9	8,100	111	65	6,600	3,900
10	1.91	16.0	3.4	1,100	7.7	79	580	6,000
June 2, 1982								
10	1.76	11.0	3.1	1,100	9.2	87	640	6,100
11	.44	9.5	6.6	200	.1	.24	38	90
12	2.70	13.0	3.4	930	6.6	96	500	7,300
12.5	.01	13.8	8.1	1,000	--	--	450	9
14	.06	15.5	8.4	180	--	--	5	2
15	2.28	15.0	3.4	920	6.2	76	510	6,200
16	.92	16.0	7.4	690	--	--	320	1,600
17	3.35	15.0	3.6	880	5.1	92	470	8,500

TABLE 30.--Discharge, water-quality data, and calculated acidity and sulfate loads for selected surface-water sites, July 21, 1982

Site number	Discharge (ft^3/s)	Water temperature (°C)	pH	Specific conductance (micromhos/cm)	Acidity (H) mg/liter	Acidity (H) lbs/day	Sulfate mg/liter	Sulfate lbs/day
1	0.26	12.0	7.9	140	--	--	10	14
2	.06	13.0	2.0	8,500	123	37	6,700	2,000
3	.00	22.0	1.9	12,000	173	1	9,500	72
4	1.9	20.0	7.8	140	--	--	13	13
5	.20	22.0	4.6	380	1.2	1	160	170
5.5	.02	10.0	2.9	3,900	45	5	3,100	360
6	.09	8.5	3.6	3,400	35	18	2,700	1,400
6.5	.31	18.0	3.8	1,800	15	25	1,100	1,800
6.6	.01	13.5	3.2	2,700	15	1	1,900	72
7	.05	14.5	6.8	980	.5	*F*1	370	100
8	.34	22.0	3.4	2,000	14	26	1,300	2,400
9	.02	14.5	4.0	1,800	5.5	1	1,500	170
9.1	.04	23.0	2.0	6,600	132	31	6,500	1,500
10	.40	15.5	3.4	1,700	13	28	1,100	2,400
11	.10	11.3	7.6	310	--	--	100	54
12	.39	16.5	3.2	1,500	9.8	21	950	2,000
12.5	.01	20.0	2.4	4,600	--	--		
15	.57	21.5	3.0	1,500	9.7	30	980	3,000
16	.38	20.5	7.5	540	--	--	260	500
17	.72	22.0	3.3	1,000	5.2	20	640	2,500
19	.03	23.0	7.8	1,900	--	--	1,300	200
19.11	.01	29.0	7.8	2,200	--	--	1,700	52
19.12	.03	24.0	8.0	1,600	--	--	970	180
19.2	.02	25.0	3.5	2,000	8.7	1	1,700	220

TABLE 30.--Discharge, water-quality data, and calculated acidity and sulfate loads for selected surface-water sites, July 21, 1982--Continued

Site number	Discharge (ft^3/s)	Water temperature (°C)	pH	Specific conductance (micromhos/cm)	Acidity (H)		Sulfate	
					mg/liter	lbs/day	mg/liter	lbs/day
20	0.38	21.0	7.8	380	--	--	140	290
20.5	.04	11.5	3.4	1,200	7.3	2	860	210
21.5	.20	11.5	7.4	150	--	--	<.5	--
21.6	.08	22.5	7.3	440	--	--	170	73
22	.16	22.0	8.4	170	--	--	<.5	--
24	2.13	19.5	7.7	160	--	--	<.5	--
25	2.87	21.0	5.0	440	.3	5	200	3,100
26	4.16	19.0	7.6	360	--	--	170	3,800
29	.10	27.0	5.6	--	.2	<1	280	150

TABLE 31.--Analysis of stream-bottom material, May 12, 1983

Analysis	Site 17	Site 25	Site 26
Aluminum ug/gm	560,000	590,000	52,000
Antimony ug/gm	< 1	< 1	< 1
Arsenic ug/gm	280	170	250
Barium ug/gm	20	20	30
Beryllium ug/gm	< 1	< 1	< 1
Boron ug/gm	< 10	< 10	< 10
Cadmium ug/gm	< 1	< 1	1
Carbon gm/kg	0.1	<0.1	0.1
Chromium ug/gm	8	8	7
Cobalt ug/gm	< 10	< 10	< 10
Copper ug/gm	21	18	17
Iron ug/gm	9,000	8,500	7,500
Lead ug/gm	< 10	< 10	< 10
Mercury ug/gm	0.7	0.7	0.9
Moisture Content wgt %	38.8	41.1	40.4
Molybdenum ug/gm	1.0	1.0	< 1
Nickel ug/gm	30	10	10
Selenium ug/gm	2	3	2
Zinc ug/gm	8	8	7
Streamflow ft³/s	8.6		26

TABLE 32.—Suspended-sediment data, February-August 1982

Site #	Date	Time	Concentration mg/liter	Discharge Ft³/s	Discharge liters/sec	Particle Size % sand	Particle Size % silt +clay	Load lbs/day
1	2/11/82	1255	8*	0.30	8.5			13
10	2/12/82	1300	434*	0.50	14.2			1,200
16	2/10/82	1310	184*	0.10	2.8			98
17	2/10/82	1240	314*	2.0	56.6			3,400
25	2/10/82	1445	123*	2.5	70.8			1,700
25	2/19/82	1500	1,690	30.7	869.4			280,000
26	2/18/82	1355	141	27.6	701.6			21,000
1	3/12/82	1110	451	1.54	43.6	52	48	3,700
10	3/12/82	1350	1,980	2.17	61.4	44	56	23,000
1	3/26/82	1335	49*	1.23	34.8			320
4	3/26/82	1150	325*	1.01	28.6	68	32	1,800
8	3/25/82	1345	595*	1.22	34.6	34	66	3,900
10	3/25/82	1245	1,460*	1.40	39.6	33	67	11,000
11	3/25/82	1210	61*	0.29	8.2			95
12	3/24/82	1455	553*	2.49	70.5			7,400
16	3/24/82	1345	330	.74	21.0			1,300
17	3/24/82	1335	562	2.59	73.3	32	68	7,800
25	3/24/82	1245	556*	6.25	177.0	31	69	18,000
26	3/24/82	1045	99*	7.71	218.3			4,100
1	4/28/82	1425	646	12.3	348.3	48	52	43,000
10	4/22/82		1,810	11.4	322.8	53	47	110,000
17	4/21/82	1555	1,110	15.0	424.8	55	45	90,000
25	4/16/82	1245	651	37.2	1,053.4	51	49	130,000
25	4/21/82	1045	409	24.5	693.8	59	43	54,000
1	8/11/82	1100	6	0.14	4.0			5
6.5	8/11/82	1305	517	0.16	4.5			440
8	8/11/82	1400	396	0.26	7.4			560
10	8/12/82	1215	300	0.36	10.2			580
10.5	8/12/82	1130	257	0.32	9.1			440
11	8/12/82	1140	3	0.04	1.1			1
11.5	8/12/82	1135	235	0.42	11.9			530
12	8/12/82	1200	214	0.32	9.1			380
15	8/11/82	1440	200	0.35	9.9			380
16	8/11/82	1455	28	0.28	7.9			42
17	8/11/82	1515	138	0.72	20.4			540
25	8/13/82	1410	9	2.50	70.8			120
26	8/13/82	1345	51	3.80	107.6			1,000

* Average of two samples

TABLE 33.—Taxa and numbers of benthic invertebrates from Leviathan and Mountaineer Creeks, May 1982

[Organisms per square meter]

TAXA	Functional Group*	Leviathan Creek: Control above Site 1, May 7	Leviathan Creek: Control above Site 1, May 25	Leviathan Creek: Site 17, May 7	Mountaineer Creek: Site 24, May 7
INSECTA					
Ephemeroptera (mayflies)					
Baetis tricaudatus	C-G	--	72	--	187
Baetis bicaudatus	C-G	--	68	--	115
Cinygmula sp.	S	7	36	--	--
Epeorus longimanus	S	--	4	--	--
Ironodes sp.	S	--	18	--	29
Drunella grandis	C-G	--	11	--	14
Drunella spinifera	C-G	--	--	--	4
Attenella delentala	C-G	--	--	--	57
Ephemerella infrequens	C-G	--	--	--	14
Plecoptera (stoneflies)					
Chloroperlidae	P	7	61	--	14
Prostoia besametsa	Sh	18	47	--	--
Kogotus sp.	P	--	7	--	--
Trichoptera (caddisflies)					
Hydropsyche sp.	C-F	--	25	--	43
Rhyacophila angelita	P	--	4	--	14
Rhyacophila acropedes	P	--	4	--	14
Rhyacophila verrula	P	--	4	--	--
Glossosoma sp.	S	--	--	--	14
Micrasema sp.	S	--	--	--	4
Diptera (two-winged flies)					
Atherix pachypus	P	4	--	--	--
Simulium vittatum	C-F	--	14	--	--
Antocha sp.	C-G	--	--	--	14
Hesperoconopa sp.	C-G	--	4	--	--
Dicranota sp.	P	7	--	--	14
Pericoma sp.	C-G	4	--	--	--
Palpomyia sp.	P	4	7	4	--
Chelifera sp.	P	--	7	--	--

TABLE 33.--Taxa and numbers of benthic invertebrates from Leviathan and Mountaineer Creeks, May 1982--Continued

[Organisms per square meter]

		Leviathan Creek			Mountaineer Creek
		Control above Site 1		Site 17	Site 24
TAXA	Functional Group	May 7	May 25	May 7	May 7
Forcipomyia sp.	P	4	--	--	--
Chironomidae Form 1	C-G	43	72	14	13,498
Chironomidae Form 2	C-G	4	11	--	919
Chironomidae Form 3	Sh	29	36	18	747
Chironomidae Form 5	P	4	4	--	--
Chironomidae Form 7	C-G	309	22	4	--
Chironomidae Form 13	C-G	--	--	--	14
Chironomidae Form 14	C-G	--	--	--	273
Chironomidae Form 17	C-G	--	18	--	--
Chironomidae pupa		--	7	--	388
Coleoptera (beetles)					
Optioservus quadrimaculatus	C-G	18	341	--	5
Narpus sp.	C-G	--	7	--	--
MOLLUSCA					
Gastropoda (snails)					
Lymnaea sp.	S	4	--	--	--
Pelecypoda (clams)					
Pisidium sp.	C-F	--	--	4	--
OLIGOCHAETA (worms)					
Limnodrilus sp.	C-G	57	11	--	--
Eiseniella tetraedra	C-G	--	--	--	14
TOTAL		523	922	44	16,648
NUMBER OF SPECIES		16	26	5	22

* Functional Groups are:

C-G = Collector-gatherer S = Scraper P = Predator
C-F = Collector-filterer Sh = Shredder

TABLE 34.--Taxa and numbers of benthic invertebrates from Bryant Creek, May 7, 1982

[Organisms per square meter]

TAXA	Functional Group*	Bryant Creek		
		Below Site 25 at bridge	Site 26	Site 29
INSECTA				
Diptera (two-winged flies)				
Simulium vittatum	C-F	--	4	--
Chironomidae Form 1	C-G	--	7	11
Chironomidae Form 2	C-G	--	11	--
Chironomidae Form 3	Sh	22	25	22
Coleoptera (beetles)				
Optioservus quadrimaculatus	C-G	5	--	--
Cercyon sp.	P	--	4	--
Curculionidae	P	--	4	--
MOLLUSCA				
Gastropoda (snails)				
Lymnaea sp.	S	--	4	4
Pelecypoda (clams)				
Pisidium sp.	C-F	5	--	--
TOTAL		32	59	37
NUMBER OF SPECIES		3	7	3

* Functional Groups are:

C-G = Collector-gatherer　S = Scraper　P = Predator
C-F = Collector-filterer　Sh = Shredder

TABLE 35.--Taxa and numbers of benthic invertebrates from Leviathan and Mountaineer Creeks, November 4, 1982

[Organisms per square meter]

TAXA	Functional Group*	Leviathan Creek Control above Site 1	Leviathan Creek Site 17	Mountaineer Creek Site 24
INSECTA				
Ephemeroptera (mayflies)		5471	8	1321
Attenella delentala	C-G	14	--	187
Baetis bicaudatus	C-G	57	--	316
Baetis tricaudatus	C-G	57	--	158
Cinygmula sp.	S	3576	4	345
Drunella spinifera	C-G	--	--	14
Ephemerella infrequens	C-G	1623	--	172
Ironodes sp.	S	--	--	57
Paraleptophlebia sp.	C-G	144	4	72
Plecoptera (stoneflies)		546	--	234
Perlinodes aurea	P	--	--	4
Prostoia besametsa	Sh	115	--	--
Skwala parallela	P	29	--	43
Zapada cinctipes	Sh	29	--	--
Capniidae	Sh	115	--	158
Chloroperlidae	P	258	--	29
Trichoptera (caddisflies)		985	8	776
Agapetus sp.	S	29	--	29
Apatania sp.	S	29	--	--
Glossosoma sp.	S	431	--	29
Hydropsyche sp.	C-F	431	--	560
Hydroptila sp.	Sh	14	--	--
Lepidostoma sp.	Sh	14	--	29
Limnephilus sp.	Sh	4	4	--
Micrasema sp.	Sh	--	--	86
Parapsyche almota	C-F	4	--	--
Rhyacophila acropedes	P	29	4	29
Rhyacophila angelita	P	--	--	14
Diptera (two-winged flies)		3205	22	587
Antocha sp.	C-G	--	--	43
Chrysops sp.	P	--	4	--
Dicranota sp.	P	57	--	14
Glutops sp.	P	4	--	--
Hesperoconopa sp.	C-G	14	--	--
Pericoma sp.	C-G	632	--	14

TABLE 35.--Taxa and numbers of benthic invertebrates from Leviathan and Mountaineer Creeks, November 4, 1982--Continued

[Organisms per square meter]

TAXA	Functional Group*	Leviathan Creek Control above Site 1	Leviathan Creek Site 17	Mountaineer Creek Site 24
Simulium vittatum	C-F	14	--	--
Chironomidae Form 1	P	617	4	43
Chironomidae Form 2	C-G	--	--	43
Chironomidae Form 3	Sh	14	7	244
Chironomidae Form 5	P	29	--	14
Chironomidae Form 7	C-G	1781	7	--
Chironomidae Form 14	C-G	--	--	29
Chironomidae Form 17	C-G	--	--	14
Chironomidae pupa	---	43	--	129
Coleoptera (beetles)		607	--	172
Deronectes sp.	P	4	--	--
Optioservus quadrimaculatus	C-G	603	--	172
OLIGOCHAETA (worms)				
Eiseniella tetraedra	C-G	--	--	43
TURBELLIARIA (flat worms)				
Polycelis coronata	P	.4	--	--
TOTAL		10828	38	3133
NUMBER OF SPECIES		32	8	30

* Functional Groups are:
S = Scraper
Sh = Shredder
P = Predator
C-G = Collector-gatherer
C-F = Collector-filterer

TABLE 36.--Taxa and numbers of benthic invertebrates from Bryant Creek, November 4, 1982

[Organisms per square meter]

TAXA	Functional Group	Bryant Creek Below Site 25 at bridge	Site 26	Site 29
INSECTA				
Ephemeroptera (mayflies)		50	--	--
Baetis bicaudatus	C-G	14	--	--
Baetis tricaudatus	C-G	14	--	--
Cinygmula sp.	S	11	--	--
Drunella spinifera	C-G	4	--	--
Ephemerella infrequens	C-G	7	--	--
Plecoptera (stoneflies)		44	--	--
Skwala parallela	P	4	--	--
Zapada cinctipes	Sh	18	--	--
Capniidae	Sh	22	--	--
Trichoptera (caddisflies)		69	194	--
Agapetus sp.	S	4	--	--
Hydropsyche sp.	C-F	54	190	--
Lepidostoma sp.	Sh	11	--	--
Parapsyche elsis	C-F	--	4	--
Diptera (two-winged flies)		16	11	4
Chironomidae Form 1	P	--	4	--
Chironomidae Form 2	C-G	4	--	4
Chironomidae Form 3	Sh	4	--	--
Chironomidae Form 14	C-G	4	--	--
Chironomidae pupa	---	4	7	--
Coleoptera (beetles)		--	227	11
Deronectes sp.	P	--	4	--
Optioservus quadrimaculatus	C-G	--	223	11
HYDRACARINA (water mites)				
Mideopsis sp.	P	--	7	--

TABLE 36.--Taxa and numbers of benthic invertebrates from Bryant Creek, November 4, 1982--Continued

[Organisms per square meter]

TAXA	Functional Group*	Bryant Creek		
		Below Site 25 at bridge	Site 26	Site 29
CRUSTACEA				
Amphipoda (scuds)				
Hyalella azteca	C-G	--	11	--
TOTAL		179	450	15
NUMBER OF SPECIES		14	7	2

* Functional Groups are:

S = Scrapers
Sh = Shredders
P = Predators
C-G = Collector-gatherers
C-F = Collector-filterers

TABLE 37.--Mean biomass of major invertebrate groups from Leviathan and Mountaineer Creeks, May 1982

[Grams per square meter, wet weight]

	Leviathan Creek			Mountaineer Creek
	Control above Site 1		Site 17	Site 24
TAXA	May 7	May 25	May 7	May 7
INSECTA				
Ephemeroptera (mayflies)	0.0047	0.7740	--	1.7864
Plecoptera (stoneflies)	0.0230	0.6221	--	0.0115
Trichoptera (caddisflies)	--	0.3647	--	0.9230
Diptera (two-winged flies)	0.0395	0.1637	0.0075	12.3281
Coleoptera (beetles)	0.0898	0.1203	--	0.0704
MOLLUSCA				
Gastropoda (snails)	0.0083	--	--	--
Pelecypoda (clams)	--	--	0.0022	--
OLIGOCHAETA (worms)	0.0025	0.0025	--	0.0258
TOTAL	0.1678	2.0473	0.0097	15.1452

TABLE 38.--Mean biomass of major invertebrate groups from Bryant Creek, May 7, 1982

[Grams per square meter, wet weight]

TAXA	Bryant Creek: Below site 25 at bridge	Bryant Creek: Site 26	Bryant Creek: Site 29
INSECTA			
Diptera (two-winged flies)	0.0064	0.0194	0.0075
Coleoptera (beetles)	0.0016	0.0104	--
MOLLUSCA			
Gastropoda (snails)	--	0.0036	0.0032
Pelecypoda (clams)	0.0027	--	--
TOTAL	0.0107	0.0334	0.0107

TABLE 39.--Mean biomass of major invertebrate groups from Leviathan and Mountaineer Creeks, November 4, 1982

[Grams per square meter, wet weight]

TAXA	Leviathan Creek		Mountaineer Creek
	Control above Site 1	Site 17	Site 24
INSECTA			
Ephemeroptera (mayflies)	1.2924	0.0007	0.6304
Plecoptera (stoneflies)	0.9679	--	1.1743
Trichoptera (caddisflies)	1.1054	0.0887	1.9773
Diptera (two-winged flies)	0.9359	0.0075	0.3949
Coleoptera (beetles)	0.2843	--	0.0689
OLIGOCHAETA (worms)	--	--	0.1048
TURBELLIARIA (flat worms)	0.0115	--	--
TOTAL	4.5974	0.0969	4.3506

TABLE 40.--Mean biomass of major invertebrate groups from Bryant Creek, November 4, 1982

[Grams per square meter, wet weight]

TAXA	Bryant Creek		
	Below Site 25 at bridge	Site 26	Site 29
INSECTA			
Ephemeroptera (mayflies)	0.0212	---	---
Plecoptera (stoneflies)	0.2132	---	---
Trichoptera (caddisflies)	1.9063	1.8521	---
Diptera (two-winged flies)	0.6025	0.0014	0.0011
Coleoptera (beetles)	0.0222	0.2219	0.0021
HYDRACARINA (water mites)	---	0.0011	---
CRUSTACEA			
Amphipoda (scuds)	---	0.0022	---
TOTAL	2.1654	2.0787	0.0032

TABLE 41.--Water-quality survey in landslide area, May 24, 1982

	Field measurements				Lab measurements	
Site number	Water temp. (°C)	pH	Flow (ft^3/s)	Specific conductance (micromhos/cm)	Acidity (H) (mg/L)	Sulfate (mg/L)
16	18.5	7.0	2.0	690	--	350
18	7.5	6.3	.05*	1,800	0.1	1,100
19	20.5	8.0	.07*	2,000	--	1,300
19.12	23.5	5.3	.05*	2,300	0.3	1,600
19.2	16.0	3.9	.03*	2,300	5.9	1,600
20	16.0	7.0	1.5	510	--	230
20.5	8.5	3.5	.05*	1,200	5.4	110
21	9.5	2.8	0.1**	3,100	13	2,200
21.5	11.0	7.8	0.2	170	--	< 5
22	18.5	8.1	1.0	190	--	< 5

* Discharge estimated

** Total discharge from seep was flowing into a fissure and disappearing approximately 20 meters from its source.

TABLE 42.--Water-quality survey in lower landslide area, July 12, 1982

Site number	Water Temp. (°C)	pH	Specific conductance (micromhos/cm)
18	8.5	4.41	1,300
18.1	21.0	8.18	2,000
19	22.0	8.05	2,000
19.05	23.5	7.33	2,000
19.11	26.5	7.45	2,200
19.12	21.5	8.35	1,700
19.13	21.5	7.39	2,200
19.14	9.0	7.20	1,800
19.15	12.0	7.18	1,500
19.16	24.0	7.48	2,200
19.17	22.0	7.24	2,200
19.18	21.0	3.95	2,100
19.2	21.0	3.80	2,200

TABLE 43.—Index to data on mean daily discharge, specific conductance, and water temperature at gaging stations, water years 1981-82 (tables 44-80)

Station name (with station number; and site number in table 1, fig. 3)	Table number					
	Discharge		Specific conductance		Temperature	
	1981	1982	1981	1982	1981	1982
Leviathan Creek above Leviathan Mine (10308783; 1)	44	47	45	48	46	49
Seep at Leviathan Mine tunnel 5 (10308784; 2)	50	53	51	54	52	55
Drainage from Leviathan Mine open pit (10308785; 3)	56	57	--	58	--	59
Stream along northwest side of Leviathan Mine tailings dump (10308786; 7)	60	--	61	--	62	--
Seep below crusher adjacent to Leviathan Creek above delta area (10308787; 6)	--	63	--	64	--	65
Leviathan Creek below inflow from pit and tunnel (10308788; 10)	--	66	--	67	--	68
Leviathan Creek below Aspen Creek (10308790; 17)	69	72	70	73	71	74
Bryant Creek below confluence of Leviathan and Mountaineer Creeks (10308794; 25)	--	75	--	76	--	77
Bryant Creek above Doud Creek (10308800; 26)	--	78	--	79	--	80

TABLE 44.--Discharge of Leviathan Creek above Leviathan Mine (station 10308783), water year 1981

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	.13	.06	1.2	.24	.05	.02	.03
2					---	.12	.06	1.2	.20	.03	.03	.03
3					---	.11	.12	1.1	.20	.03	.03	.03
4					---	.10	.11	.97	.16	.03	.03	.03
5					---	.09	.65	.90	.13	.03	.03	.03
6					---	.11	1.0	.85	.13	.03	.03	.03
7					---	.09	1.4	.79	.11	.03	.02	.03
8					---	.14	1.2	.72	.11	.02	.02	.04
9					---	.20	1.5	.66	.11	.02	.02	.03
10					---	.32	1.8	.61	.13	.02	.02	.04
11					---	.30	1.6	.57	.16	.02	.03	.03
12					---	.35	1.5	.53	.16	.02	.02	.03
13					---	.25	1.9	.50	.16	.02	.05	.03
14					---	.24	2.0	.49	.16	.01	.05	.03
15					---	.23	2.3	.49	.13	.01	.04	.04
16					---	.23	1.8	.51	.13	.01	.04	.04
17					.51	.23	1.8	.50	.11	.01	.07	.05
18					.44	.22	1.6	.55	.11	.01	.06	.05
19					.41	.20	1.5	.54	.11	.01	.05	.05
20					.35	.16	1.7	.45	.09	.01	.04	.05
21					.29	.14	1.9	.43	.09	.01	.04	.05
22					.27	.12	2.1	.41	.07	.01	.04	.05
23					.26	.11	2.3	.36	.07	.02	.04	.05
24					.25	.10	2.1	.35	.07	.01	.03	.05
25					.24	.09	1.8	.35	.07	.02	.03	.07
26					.22	.08	1.6	.56	.06	.02	.03	.06
27					.24	.07	1.4	.46	.06	.01	.04	.06
28					.16	.07	1.3	.30	.05	.01	.04	.07
29					---	.07	1.3	.57	.06	.01	.02	.06
30					---	.07	1.3	.34	.05	.02	.02	.07
31					---	.07	---	.27	---	.03	.03	---
TOTAL					---	4.81	43.30	18.53	3.49	.59	1.06	1.31
MEAN					---	.16	1.44	.60	.12	.019	.034	.044
MAX					---	.35	2.3	1.2	.24	.05	.07	.07
MIN					---	.07	.06	.27	.05	.01	.02	.03

TABLE 45.—Specific conductance of Leviathan Creek above Leviathan Mine (station 10308783), water year 1981

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						---	141	136	---	166	173	164
2						---	141	133	---	167	172	163
3						---	143	130	---	167	171	161
4						134	141	133	---	167	170	158
5						136	136	133	---	162	172	156
6						135	134	130	---	161	176	154
7						136	139	134	---	162	176	157
8						134	137	129	---	164	180	157
9						133	131	130	---	164	180	157
10						131	129	129	---	164	180	159
11						133	125	128	---	164	179	160
12						132	121	128	151	164	178	163
13						136	115	128	153	163	173	166
14						136	109	128	154	164	169	165
15						135	107	---	154	165	171	164
16						137	112	---	151	167	170	164
17						139	122	---	151	168	167	163
18						140	119	---	154	167	164	160
19						134	115	---	160	167	167	162
20						138	115	---	160	168	169	164
21						135	109	---	162	169	168	161
22						133	110	---	164	170	167	160
23						137	126	---	166	170	168	157
24						131	140	---	166	172	168	157
25						128	141	---	168	171	170	157
26						132	139	---	170	169	170	156
27						138	140	---	171	170	167	155
28						135	140	---	169	172	167	154
29						136	139	---	166	171	166	152
30						146	137	---	165	171	165	152
31						141	---	---	---	174	163	---
MEAN						135	128	131	161	167	171	159

WTR YR 1981 MEAN 152 MAX 180 MIN 107

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 46.--Temperature of Leviathan Creek above Leviathan Mine (station 10308783), water year 1981

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	.0	1.5	9.5	---	14.0	13.5	12.5
2					---	.0	.5	8.0	---	15.0	12.0	12.0
3					---	.5	1.0	7.0	---	15.5	12.0	12.0
4					---	.5	1.5	7.0	---	16.0	12.5	11.5
5					---	.5	2.0	7.0	---	15.5	12.5	11.0
6					---	1.0	2.0	6.0	---	15.5	14.0	10.5
7					---	1.0	3.5	6.5	---	14.5	14.5	10.5
8					---	1.0	2.5	8.0	---	14.0	15.0	11.0
9					---	1.0	2.5	---	---	14.0	15.0	12.5
10					---	1.0	2.5	---	---	13.5	15.0	11.5
11					---	1.0	2.5	---	---	13.0	14.5	12.0
12					---	1.5	3.0	---	---	13.5	14.5	12.5
13					---	1.0	3.0	---	---	12.5	13.5	12.5
14					---	1.0	4.0	---	---	14.0	14.0	12.5
15					---	1.0	4.5	---	---	15.5	13.5	12.0
16					---	1.5	5.0	---	---	15.5	13.5	12.0
17					---	1.0	5.0	---	---	15.0	13.0	11.0
18					---	1.0	3.0	---	12.5	13.5	13.5	11.0
19					---	1.0	2.5	---	14.0	13.5	13.5	12.0
20					---	1.0	4.5	---	14.0	14.5	12.0	10.5
21					---	1.0	5.0	---	14.5	14.0	11.5	9.5
22					---	1.5	6.0	---	15.0	14.0	12.5	8.5
23					---	1.0	7.0	---	14.0	15.0	12.5	8.0
24					---	1.5	6.5	---	14.0	13.5	12.0	7.5
25					---	1.0	5.5	---	15.5	14.0	13.5	8.5
26					.0	.5	5.0	---	15.0	14.5	14.0	8.0
27					.0	.5	6.5	---	15.0	15.0	13.5	8.5
28					.0	.5	7.5	---	15.0	15.5	13.5	7.5
29					---	1.5	9.5	---	14.0	14.0	13.0	8.0
30					---	1.0	10.0	---	13.5	12.5	13.0	6.5
31					---	1.5	---	---	---	13.5	12.0	---
MEAN					.0	1.0	4.0	7.5	14.5	14.5	13.5	10.5

WTR YR 1981 MEAN 9.0 MAX 16.0 MIN .0

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 47.--Discharge of Leviathan Creek above Leviathan Mine (station 10308783), water year 1982

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.07	.12	.52	.19	.23	1.5	21	18	1.9	.58	.13	.06
2	.08	.12	.49	.19	.23	1.4	12	18	1.8	.55	.13	.06
3	.08	.11	.49	.19	.23	1.4	.85	17	1.7	.55	.15	.06
4	.08	.09	.49	.19	.26	1.3	.78	15	1.6	.51	.14	.06
5	.09	.09	.47	.19	.26	1.6	.92	14	1.6	.48	.13	.06
6	.08	.10	.45	.19	.26	1.1	.96	12	1.5	.48	.13	.06
7	.11	.09	.43	.19	.26	.69	1.1	12	1.4	.44	.20	.06
8	.10	.08	.41	.17	.28	.86	.87	11	1.3	.42	.13	.07
9	.10	.08	.41	.17	.28	.86	1.1	10	1.3	.38	.11	.07
10	.15	.08	.41	.17	.28	.93	2.5	9.0	1.2	.38	---	.07
11	.12	.08	.41	.17	.28	1.1	18	7.7	1.2	.36	---	.07
12	.11	.14	.41	.17	.28	1.5	10	6.5	1.1	.34	---	.07
13	.11	.72	.41	.17	.31	1.5	9.0	5.9	1.0	.32	---	.07
14	.11	.33	.40	.17	3.7	1.6	3.1	5.7	.93	.33	---	.07
15	.10	.16	.36	.17	52	1.5	7.5	5.4	.83	.31	---	.10
16	.10	.14	.34	.17	52	1.9	6.7	5.1	.96	.28	---	.19
17	.10	.20	.34	.17	53	1.7	6.4	5.0	.98	.32	---	.11
18	.10	.19	.33	.17	53	1.5	6.7	4.7	1.4	.29	---	.10
19	.09	.19	.51	.17	24	1.2	6.8	4.4	1.2	.26	---	.11
20	.09	.15	1.4	.17	2.6	1.2	6.3	---	.87	.22	---	.10
21	.09	.17	.69	.17	3.3	1.0	6.2	---	.74	.20	---	.09
22	.09	.25	.93	.17	3.1	1.2	6.6	---	.71	.19	---	.09
23	.09	.23	.93	.17	2.6	1.3	7.8	---	.66	.19	---	.11
24	.09	.24	.91	.17	2.4	1.2	8.4	---	.65	.20	---	.28
25	.09	.46	.85	.18	2.1	1.3	3.3	2.7	.59	.17	---	.16
26	.08	.66	.77	.24	1.8	1.3	8.8	2.7	.58	.20	.05	.13
27	.08	.59	.30	.26	1.6	1.4	9.4	2.5	.53	.19	.05	.13
28	.21	.59	.21	.26	1.5	1.7	14	2.4	.58	.42	.07	.13
29	.11	.59	.20	.26	---	3.0	16	2.3	.91	.18	.07	.16
30	.11	.59	.19	.23	---	5.6	17	2.2	.78	.15	.06	.16
31	.13	---	.19	.23	---	6.3	---	2.0	---	.14	.07	---
TOTAL	3.14	7.63	15.65	5.88	262.14	51.64	230.08	---	32.50	10.12	---	3.06
MEAN	.10	.25	.50	.19	9.36	1.67	7.67	---	1.08	.33	---	.10
MAX	.21	.72	1.4	.26	53	6.3	21	---	1.9	.68	---	.28
MIN	.07	.08	.19	.17	.23	.69	.78	---	.53	.14	---	.06

TABLE 48.--Specific conductance of Leviathan Creek above Leviathan Mine (station 10308783), water year 1982

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	152	144	149	147	131	146	71	83	99	112	164	145
2	152	145	149	146	127	136	79	80	101	111	158	146
3	152	147	148	142	123	130	97	78	102	111	157	146
4	152	149	146	144	119	126	112	81	103	111	155	146
5	143	149	144	141	118	125	117	84	104	112	155	147
6	148	150	141	141	115	131	118	86	106	112	155	146
7	148	150	141	140	112	128	120	86	108	113	152	146
8	147	151	142	142	111	127	124	87	109	113	154	144
9	147	150	143	142	108	126	127	87	111	111	155	144
10	146	149	140	143	107	132	121	87	113	112	151	143
11	146	150	141	142	103	131	94	88	114	113	148	141
12	143	143	142	143	111	---	79	89	115	114	148	140
13	142	195	140	144	105	---	57	89	115	114	149	140
14	141	232	137	144	91	---	50	89	117	115	147	140
15	142	157	138	144	110	---	53	90	118	114	144	135
16	146	131	139	144	78	---	56	90	106	119	143	130
17	144	133	143	144	105	---	59	91	111	123	143	138
18	145	150	144	144	124	---	61	91	109	127	144	138
19	145	145	134	144	129	---	66	92	115	131	140	137
20	146	138	123	143	128	---	78	93	117	134	140	140
21	146	137	125	142	130	---	81	94	116	138	141	142
22	145	133	131	142	134	---	85	94	115	137	144	143
23	144	137	134	142	139	---	87	95	115	137	144	141
24	143	138	136	141	145	---	86	96	113	138	143	129
25	144	147	139	140	150	---	75	101	113	138	145	131
26	146	145	141	137	149	---	71	116	115	136	149	137
27	150	143	140	143	148	109	72	116	115	137	148	134
28	136	142	147	143	147	105	78	114	113	132	146	136
29	144	143	142	142	---	105	84	110	111	157	144	130
30	155	146	143	139	---	105	84	107	110	171	146	132
31	146	---	145	136	---	95	---	103	---	170	145	---
MEAN	146	149	140	142	122	119	85	93	111	126	148	140

WTR YR 1982 MEAN 127 MAX 232 MIN 50

TABLE 49.—Temperature of Leviathan Creek above Leviathan Mine (station 10308783), water year 1982

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.5	1.0	.5	.0	.5	2.5	.5	5.0	9.0	11.0	12.5	11.5
2	8.5	1.0	.5	.0	.5	.5	.5	5.5	9.5	11.0	12.0	12.5
3	8.0	1.5	.0	.0	.5	1.0	.5	6.0	5.5	10.5	12.0	12.5
4	5.0	2.0	.0	.0	.5	.5	1.0	6.0	8.5	11.5	13.0	11.5
5	5.0	2.5	.5	.0	.5	1.0	1.5	6.0	8.0	11.5	13.5	11.5
6	6.0	4.0	.5	.0	.5	1.0	1.0	6.5	8.5	11.5	14.0	11.5
7	6.0	3.0	.5	.0	.5	2.0	1.0	6.5	9.0	13.0	13.5	11.5
8	2.5	2.0	.0	.0	1.0	2.5	2.0	6.0	10.0	13.0	14.0	11.5
9	5.5	2.0	.5	.0	1.0	2.0	2.0	5.0	10.5	12.5	14.5	11.0
10	5.5	2.5	.5	.0	1.0	4.0	1.5	4.5	11.0	14.0	12.5	10.5
11	4.0	2.5	.0	.0	1.0	3.5	1.0	5.0	11.0	14.5	12.5	8.0
12	2.0	2.5	.0	.0	1.0	2.5	2.5	6.5	11.0	14.5	13.0	8.0
13	2.5	2.0	.5	.0	1.0	2.5	3.0	7.5	9.5	14.5	13.5	9.5
14	2.0	2.0	.5	.0	.5	2.5	3.0	6.5	10.5	14.5	13.0	8.0
15	2.0	3.0	.5	.0	.5	1.5	3.0	7.5	12.5	14.0	12.5	7.0
16	2.0	3.0	.0	.0	.5	.5	3.0	8.5	13.0	13.5	13.5	5.5
17	3.0	.5	.0	.0	1.5	.5	3.5	8.0	12.5	13.0	13.5	7.5
18	3.5	.0	.5	.5	2.5	.5	3.5	7.5	12.0	13.5	14.0	8.0
19	3.5	.5	.5	.0	3.5	.5	3.5	8.0	12.0	14.0	13.0	8.0
20	4.0	.5	1.0	.0	3.0	1.0	3.0	9.0	12.5	14.0	14.0	7.0
21	3.5	1.0	.0	.0	3.0	1.5	3.0	9.5	12.5	15.0	14.5	8.0
22	3.0	2.5	.0	.0	3.0	1.5	3.5	9.5	12.5	15.5	15.0	8.5
23	3.0	3.5	.0	.5	2.0	1.5	4.0	10.5	12.5	15.5	14.5	9.0
24	3.0	1.0	.0	.5	2.5	3.0	4.0	10.5	11.5	15.5	14.0	10.0
25	4.0	.0	.0	.0	2.0	3.5	4.0	11.5	12.0	15.5	14.0	11.0
26	5.0	.0	.5	.0	1.5	3.0	4.0	11.5	13.5	14.5	13.0	9.5
27	4.5	.0	.5	.0	3.0	3.0	4.0	10.5	13.5	14.5	13.5	5.0
28	1.5	.0	.0	.5	3.0	.5	4.5	9.0	11.5	14.0	13.0	5.0
29	1.0	.5	.0	.5	---	.5	4.0	9.0	9.5	14.5	13.0	5.0
30	.5	.5	.5	.0	---	.5	5.0	9.5	9.5	15.0	11.5	2.5
31	.5	---	.0	.5	---	.5	---	9.5	---	14.0	11.5	---
MEAN	4.0	1.5	.5	.5	1.5	1.5	2.5	8.0	11.0	13.5	13.5	9.0

WTR YR 1982 MEAN 5.5 MAX 15.5 MIN .0

TABLE 50.--Discharge of seep at Leviathan Mine tunnel 5 (station 10308784), water year 1981

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	.04	.05	.08	.06	.05	.05	.03
2					---	.04	.05	.08	.06	.05	.04	.03
3					---	.04	.05	.08	.06	.05	.03	.03
4					---	.04	.06	.08	.06	.05	.03	.03
5					---	.04	.06	.08	.06	.05	.03	.03
6					---	.03	.06	.07	.05	.05	.03	.03
7					---	.03	.06	.07	.05	.05	.03	.03
8					---	.03	.06	.07	.05	.05	.03	.03
9					---	.03	.06	.07	.05	.05	.03	.03
10					---	.03	.06	.06	.05	.04	.03	.03
11					---	.03	.07	.06	.05	.04	.03	.03
12					---	.03	.06	.06	.05	.04	.03	.03
13					---	.03	.06	.06	.05	.04	.03	.03
14					---	.03	.06	.06	.05	.04	.03	.03
15					---	.03	.06	.06	.05	.04	.03	.03
16					---	.03	.06	.06	.05	.04	.03	.03
17					.04	.03	.06	.06	.05	.04	.03	.03
18					.04	.03	.06	.06	.05	.04	.03	.03
19					.04	.03	.06	.06	.05	.04	.03	.03
20					.04	.03	.06	.06	.05	.04	.03	.03
21					.04	.03	.06	.06	.05	.04	.03	.03
22					.04	.03	.08	.06	.05	.04	.03	.03
23					.04	.03	.09	.06	.05	.04	.03	.03
24					.04	.03	.09	.06	.05	.04	.03	.03
25					.04	.03	.09	.06	.05	.04	.03	.03
26					.04	.04	.09	.06	.05	.04	.03	.03
27					.05	.04	.09	.06	.05	.04	.03	.03
28					.05	.05	.08	.06	.05	.04	.03	.03
29					---	.05	.08	.06	.05	.04	.03	.03
30					---	.05	.08	.06	.05	.04	.03	.03
31					---	---	---	.06	---	.05	.03	---
TOTAL					---	---	2.01	2.00	1.55	1.34	.96	.90
MEAN					---	---	.067	.065	.052	.043	.031	.030
MAX					---	---	.09	.08	.06	.05	.05	.03
MIN					---	---	.05	.06	.05	.04	.03	.03

TABLE 51.—Specific conductance of seep at Leviathan Mine tunnel 5 (station 10308784), water year 1981

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						---	---	---		7030	6600	---
2						---	---	---		7040	6590	---
3						---	---	---		7040	6560	---
4						---	---	---		7030	6530	---
5						---	---	---		7030	6520	---
6						---	---	---		7030	6480	---
7						---	7580	---		7020	6460	---
8						---	7930	---		6980	6450	5880
9						---	8050	---		6940	6460	5860
10						---	8220	---		6920	6450	5840
11						---	8420	---		6910	6430	5800
12						---	8600	---		6890	6430	5790
13						---	8740	---		6860	6440	---
14						---	8830	---		6830	6430	---
15						---	8860	---		6820	6430	5960
16						---	8890	8000		6830	6420	5970
17						---	8870	7950		6820	6430	5960
18						---	8860	7920		6810	6430	5930
19						6870	8850	7870		6790	6400	5910
20						6910	8810	7820		6780	6390	5900
21						6930	8800	7820		6770	6400	5900
22						6950	8790	7700		6750	6400	5890
23						6960	8760	7840		6740	6350	5880
24						6990	8760	---		6720	6310	5860
25						7010	8740	---		6700	6260	5850
26						7060	8700	---		6690	6250	5830
27						7100	8550	---		6670	6220	5820
28						---	---	---		6660	6190	5810
29						---	8500	---		6650	6160	5800
30						---	---	---		6630	6120	5780
31						---	---	---		6600	6090	---
MEAN						6980	8610	7870		6840	6390	5870

WTR YR 1981 MEAN 6950 MAX 8890 MIN 5780

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 52.--Temperature of seep at Leviathan Mine tunnel 5 (station 10308784), water year 1981

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						---	---	---	---	13.5	12.5	---
2						---	---	---	---	13.5	12.5	---
3						---	---	---	---	14.0	12.5	---
4						---	---	---	---	14.0	12.5	---
5						---	---	---	---	14.0	12.5	---
6						---	---	---	---	14.0	12.5	---
7						---	12.0	---	---	13.0	13.0	---
8						---	12.0	---	---	12.5	13.0	12.0
9						---	12.0	---	---	12.5	12.5	12.5
10						---	12.0	---	---	12.5	12.5	12.5
11						---	12.0	---	8.5	12.5	13.0	12.5
12						---	12.0	---	9.0	12.5	12.5	12.0
13						---	12.0	---	8.5	12.5	12.5	---
14						---	12.0	---	9.0	12.5	12.5	---
15						---	12.0	---	9.5	12.5	12.5	12.5
16						---	12.0	12.5	9.5	12.5	12.5	12.5
17						---	12.0	12.5	10.0	12.5	12.5	12.0
18						---	12.0	12.5	10.5	12.5	12.5	12.5
19						12.0	12.0	12.5	10.5	12.5	12.5	12.5
20						12.0	12.0	12.5	10.0	12.5	12.5	12.5
21						12.0	12.5	12.5	10.0	12.5	12.5	12.5
22						12.0	13.0	12.5	10.0	12.5	13.0	12.5
23						12.0	13.0	12.5	10.0	12.5	12.5	13.0
24						12.0	13.0	12.5	9.5	12.5	12.5	12.5
25						12.0	12.5	12.0	10.5	12.5	12.5	12.5
26						12.0	12.5	---	10.5	12.5	12.5	12.5
27						12.0	12.5	---	11.5	12.5	12.5	12.5
28						---	12.5	---	13.5	12.5	12.5	12.5
29						---	12.5	---	13.5	12.5	12.5	12.5
30						---	---	---	13.5	12.5	12.5	12.5
31						---	---	---	---	13.0	12.5	---
MEAN						12.0	12.5	12.5	10.5	13.0	12.5	12.5

WTR YR 1981 MEAN 12.0 MAX 14.0 MIN 8.5

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 53.--Discharge of seep at Leviathan Mine tunnel 5 (station 10308784), water year 1982

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.03	.03	.04	---	.05	.10	.08	.13	.07	.05	.05	.04
2	.03	.03	.04	---	.06	.10	.07	.13	.07	.05	.05	.04
3	.03	.03	---	---	.06	.10	.08	.13	.07	.05	.05	.04
4	.03	.03	---	---	.06	.10	.08	.12	.07	.05	.05	.04
5	.03	.03	---	---	.06	.10	.09	.12	.07	.05	.05	.04
6	.03	.03	---	---	.06	.10	.10	.12	.07	.05	.05	.04
7	.03	.03	---	---	.06	.09	.11	.12	.07	.05	.05	.04
8	.03	.03	---	---	.06	.09	.11	.12	.07	.05	.05	.04
9	.03	.03	---	---	.06	.09	.09	.12	.07	.05	.05	.04
10	.03	.03	---	---	.06	.08	.09	.13	.07	.05	.05	.04
11	.03	.03	---	---	.06	.08	.09	.12	.06	.05	.05	.04
12	.03	.03	---	---	.06	.08	.09	.12	.06	.05	.05	.04
13	.03	.03	---	---	.06	.08	.10	.12	.06	.05	.05	.04
14	.03	.03	---	---	.06	.08	.10	.11	.06	.05	.05	.04
15	.03	.03	---	---	.06	.08	.10	.10	.06	.05	.05	.04
16	.03	.03	---	---	.07	.08	.10	.10	.06	.05	.05	.04
17	.03	.03	---	---	.07	.08	.12	.10	.06	.05	.05	.04
18	.03	.03	---	---	.08	.08	.12	.10	.06	.05	.05	.04
19	.03	.03	---	---	.08	.08	.12	.09	.06	.05	.05	.04
20	.03	.03	---	---	.08	.09	.12	.09	.06	.05	.05	.04
21	.03	.04	---	---	.08	.09	.12	.09	.05	.05	.05	.04
22	.03	.04	---	---	.09	.09	.12	.09	.05	.05	.05	.04
23	.03	.04	---	---	.09	.09	.13	.09	.05	.05	.05	.04
24	.03	.04	---	---	.09	.09	.13	.08	.05	.04	.05	.04
25	.03	.04	---	---	.10	.09	.13	.08	.05	.04	.05	.04
26	.03	.04	---	---	.10	.08	.13	.08	.05	.04	.05	.04
27	.03	.04	---	---	.10	.08	.13	.08	.05	.04	.05	.04
28	.03	.04	---	---	.10	.08	.13	.07	.05	.04	.05	.04
29	.03	.04	---	.05	---	.08	.13	.07	.05	.05	.05	.04
30	.03	.04	---	.05	---	.08	.13	.07	.05	.05	.05	.04
31	.03	---	---	.05	---	.08	---	.07	---	.05	.05	.04
TOTAL	.93	1.00	---	---	2.02	2.69	3.24	3.16	1.80	1.50	1.55	1.20
MEAN	.030	.033	---	---	.072	.087	.11	.10	.060	.048	.050	.040
MAX	.03	.04	---	---	.10	.10	.13	.13	.07	.05	.05	.04
MIN	.03	.03	---	---	.05	.08	.07	.07	.05	.04	.05	.04

TABLE 54.—Specific conductance of Leviathan Mine tunnel 5 (station 10308784), water year 1982

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5770	---	6730	8870	---				---	8230	7120	6550
2	5750	---	---	8830	---				---	8200	7110	6530
3	5740	---	6530	8820	---				---	8150	7090	6520
4	5740	---	6930	8810	---				---	8100	7100	6500
5	5730	---	7010	8810	6540				---	8040	7080	6490
6	5710	---	7070	8800	---				---	8000	7080	6470
7	5700	---	7150	8760	---				---	7950	7090	6450
8	5980	---	7130	8720	---				---	7910	7070	6440
9	6210	---	7160	8710	---	(VALUES EXCEEDED			---	7860	7060	6420
10	6200	---	7180	8710	---	10,000 MICROMHOS			---	7810	7060	6410
11	6180	---	7210	---	---	FROM ABOUT			---	7760	7060	6390
12	6170	---	7230	---	7350	MARCH 5 TO			---	7720	7060	6370
13	6160	---	7260	---	---	MAY 25)			---	7690	7050	---
14	6150	---	7260	---	---				---	7640	7060	---
15	6140	---	7310	---	---				---	7510	7060	---
16	6130	---	7340	---	---				---	7340	7050	---
17	6120	5880	7370	---	---				---	7320	7040	---
18	6110	5890	7370	---	---				---	7300	7040	---
19	6100	5950	7350	---	---				---	7290	7010	---
20	6090	6000	7360	---	---				6830	7260	6890	---
21	6050	6050	7410	---	---				6770	7250	6830	---
22	6100	6150	7520	---	---				6720	7240	6690	---
23	---	6200	7640	---	---				6660	7210	6660	---
24	---	6250	7800	---	---				6620	7200	6630	---
25	---	6300	8050	---	---				6540	7190	---	---
26	---	6380	8240	---	---				6490	7190	6650	---
27	---	6450	8250	7100	---				6440	7170	6640	---
28	---	6540	8300	7110	---				6390	7170	6630	---
29	---	6620	8400	7100	---				6340	7150	6600	---
30	---	6630	8510	7020	---				6300	7140	6570	---
31	---	---	8900	6960	---				---	7140	6560	---
MEAN	6000	6240	7520	8210					6550	7550	6920	6460

WTR YR 1982 MEAN 7130 MAX 8900 MIN 5430

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 55.--Temperature of Leviathan Mine tunnel 5 (station 10308784), water year 1982

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12.5	---	11.5	12.0				---	12.0	12.0	12.0	12.0
2	12.5	---	11.5	12.5				---	12.0	12.0	12.0	12.0
3	12.5	---	12.0	12.5				---	12.0	12.0	12.0	12.0
4	12.5	---	12.0	12.0				---	12.0	12.0	12.0	12.0
5	12.5	---	12.0	12.0				---	12.0	12.0	12.0	12.0
6	12.5	---	12.0	12.0				---	12.0	12.0	12.0	12.0
7	12.5	---	12.0	12.0				---	12.0	12.0	12.0	12.0
8	12.5	---	12.0	12.0				---	12.0	12.0	12.0	12.0
9	12.5	---	11.5	12.0				---	12.0	12.0	12.0	12.0
10	12.0	---	11.5	12.0				---	12.0	12.0	12.0	12.0
11	12.0	---	11.5	---				---	12.0	12.0	12.0	12.0
12	12.0	---	12.0	---				---	12.0	12.0	12.0	12.0
13	12.0	---	12.0	---				---	12.0	12.0	12.0	---
14	12.0	---	12.0	---				---	12.0	12.0	12.0	---
15	12.0	---	12.0	---				---	12.0	12.0	12.0	---
16	12.0	---	12.0	---				---	12.0	12.0	12.0	---
17	12.0	11.5	12.0	---				---	12.0	12.0	12.0	---
18	12.0	11.5	12.0	---				---	12.0	12.0	12.0	---
19	12.0	11.5	12.0	---				---	12.0	12.0	12.0	---
20	12.0	12.0	12.0	---				---	12.0	12.0	12.0	---
21	12.0	11.5	12.0	---				---	12.0	12.5	12.0	---
22	12.0	12.0	12.0	---				---	12.0	12.5	12.0	---
23	---	11.5	12.0	---				---	12.0	12.0	12.0	---
24	---	11.5	12.0	---				---	12.0	12.0	12.0	---
25	---	11.5	12.0	---				12.5	12.0	12.0	---	---
26	---	11.5	12.0	---				12.5	12.0	12.0	12.0	---
27	---	11.5	12.0	12.0				12.5	12.0	12.0	12.0	---
28	---	11.5	12.0	12.0				12.0	12.0	12.0	12.0	---
29	---	11.5	12.0	12.0				12.0	12.0	12.0	12.0	---
30	---	11.5	12.0	12.0				12.5	12.0	12.0	12.0	---
31	---	---	12.0	11.5				12.0	---	12.0	12.0	---
MEAN	12.0	11.5	12.0	12.0				12.5	12.0	12.0	12.0	12.0

WTR YR 1982 MEAN 12.0 MAX 12.5 MIN 11.5

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 56.--Discharge of drainage from Leviathan Mine open pit (station 10308785), water year 1981

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						---	.02	.01	.00	.00	.00	.00
2						---	---	.01	.00	.00	.00	.00
3						---	.02	.01	.00	.00	.00	.00
4						---	.03	.00	.00	.00	.00	.00
5						---	.05	.00	.00	.00	.00	.00
6						---	---	.00	.00	.00	.00	.00
7						---	.05	.00	.00	.00	.00	.00
8						---	.05	.00	.00	.00	.00	.00
9						---	.04	.00	.00	.00	.00	.00
10						---	.04	.00	.00	.00	.00	.00
11						---	.04	.00	.00	.00	.00	.00
12						---	.03	.00	.00	.00	.00	.00
13						---	.03	.00	.00	.00	.00	.00
14						---	.03	.00	.00	.00	.00	.00
15						---	.02	.00	.00	.00	.00	.00
16						---	.02	.00	.00	.00	.00	.00
17						---	.02	.00	.00	.00	.00	.00
18						---	.03	.00	.00	.00	.00	.00
19						.00	---	.00	.00	.00	.00	.00
20						.00	.03	.00	.00	.00	.00	.00
21						.00	.02	.00	.00	.00	.00	.00
22						.00	.02	.00	.00	.00	.00	.00
23						.00	.02	.00	.00	.00	.00	.00
24						.00	.02	.00	.00	.00	.00	.00
25						.00	.02	.00	.00	.00	.00	.00
26						.00	.02	.00	.00	.00	.00	.00
27						.00	.01	.00	.00	.00	.00	.00
28						.00	.01	.00	.00	.00	.00	.00
29						---	.01	---	.00	.00	.00	.00
30						---	.01	.00	.00	.00	.00	.00
31						.03	---	.00	---	.00	.00	---
TOTAL						---	---	---	.00	.00	.00	.00
MEAN						---	---	---	.000	.000	.000	.000
MAX						---	---	---	.00	.00	.00	.00
MIN						---	---	---	.00	.00	.00	.00

TABLE 57.--Discharge of drainage from Leviathan Mine open pit (station 10308785), water year 1982

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00				---	.25		---	.03	.01	.00	
2	.00				---	.25		---	.03	.01	.00	
3	.00				---	.25		---	.03	.01	.00	
4	.00				---	.25		---	.03	.01	.00	
5	.00				---	.25		---	.03	.01	.00	
6	.00				---	.25		---	.03	.01	.00	
7	.00				---	.25		---	.02	.01	.00	
8	.00				---	.25		---	.02	.01	.00	
9	---				---	.25		---	.02	.01	.00	
10	---				---	.25		---	.02	.01	.00	
11	---				.00	.25		---	.02	.01	.00	
12	---				.00	.25		---	.02	.01	.00	
13	---				.00	.25		---	.02	.01	.00	
14	---				.00	.25		---	.02	.01	.00	
15	---				.00	.25		---	.02	.01	.00	
16	---				.00	.25		---	.02	.00	.00	
17	---				.00	.25		---	.02	.00	.00	
18	---				.00	.25		---	.02	.00	.00	
19	---				.00	.25		---	.02	.00	.00	
20	---				.05	.25		---	.02	.00	.00	
21	---				.25	.25		---	.02	.00	.00	
22	---				.25	.25		---	.01	.00	.00	
23	---				.25	.25		---	.01	.00	.00	
24	---				.25	.25		---	.01	.00	.00	
25	---				.25	.25		.03	.01	.00	.00	
26	---				.25	---		.03	.01	.00	.00	
27	---				.25	---		.03	.01	.00	---	
28	---				.25	---		.03	.01	.00	---	
29	---				---	---		.03	.02	.00	---	
30	---				---	---		.03	.02	.00	---	
31	---				---	---		.03	---	.00	---	
TOTAL	---				---	---		---	.59	.15	---	
MEAN	---				---	---		---	.020	.005	---	
MAX	---				---	---		---	.03	.01	---	
MIN	---				---	---		---	.01	.00	---	

TABLE 58.--Specific conductance of drainage from Leviathan Mine open pit (station 10308785), water year 1982

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	9480	---	13200	14200	11000		
2					---	9500	---	13200	14100	11000		
3					---	9690	---	13300	14200	11000		
4					---	10200	---	13300	14200	10900		
5					---	10600	---	13400	14300	11100		
6					---	---	---	13500	13800	11200		
7					---	---	---	13500	13700	11300		
8					---	---	---	13700	13500	11200		
9					---	---	---	13600	13400	11200		
10					---	---	---	13500	13400	11100		
11					---	---	---	13600	13400	10900		
12					---	---	---	13600	13300	10800		
13					---	---	---	13600	13400	10800		
14					---	---	---	13700	13200	10800		
15					---	---	10100	13700	13100	10800		
16					---	---	10400	13700	13400	---		
17					---	---	10500	13800	13300	---		
18					---	---	10700	13900	12100	---		
19					---	---	10900	13900	11700	---		
20					9060	---	11400	13900	11400	---		
21					8980	---	11700	14000	11200	---		
22					9390	---	11900	14000	11000	---		
23					9480	---	12200	14000	10900	---		
24					9410	---	12500	14100	11100	---		
25					9290	---	12800	14400	11400	---		
26					9350	---	12800	14700	11000	---		
27					9600	---	12800	14700	10800	---		
28					9500	---	13000	14600	11300	---		
29					---	---	13100	14500	11500	---		
30					---	---	13100	14300	11200	---		
31					---	---	---	14300	---	---		
MEAN					9340	9890	11900	13800	12600	11000		

WTR YR 1982 MEAN 12200 MAX 14700 MIN 8980

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 59.--Temperature of drainage from Leviathan Mine open pit (station 10308785), water year 1982

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	6.5	---	8.5	10.0	11.0		
2					---	5.5	---	9.0	10.5	10.0		
3					---	5.0	---	9.5	9.0	10.0		
4					---	5.5	---	9.0	8.5	11.0		
5					---	---	---	8.5	9.0	11.5		
6					---	---	---	9.0	10.0	12.0		
7					---	---	---	9.0	10.0	12.0		
8					---	---	---	7.5	11.0	11.5		
9					---	---	---	7.0	12.0	12.5		
10					---	---	---	7.0	11.5	14.0		
11					---	---	---	7.5	11.0	15.0		
12					---	---	---	9.0	11.0	14.5		
13					---	---	---	9.0	10.0	14.0		
14					---	---	---	8.0	12.0	14.5		
15					---	---	5.5	9.5	13.0	13.0		
16					---	---	6.5	10.0	13.5	---		
17					---	---	7.0	9.0	12.5	---		
18					---	---	7.0	9.0	12.5	---		
19					---	---	6.5	9.5	12.0	---		
20					3.5	---	6.0	10.0	12.5	---		
21					4.5	---	6.5	10.0	12.5	---		
22					3.5	---	7.0	10.5	13.0	---		
23					4.5	---	7.0	11.0	12.5	---		
24					4.5	---	7.0	11.0	10.5	---		
25					4.0	---	6.5	12.0	12.5	---		
26					5.0	---	6.5	11.5	13.5	---		
27					8.0	---	8.0	11.0	13.5	---		
28					7.0	---	7.5	10.5	10.5	---		
29					---	---	7.5	10.0	9.5	---		
30					---	---	8.5	11.0	10.0	---		
31					---	---	---	10.0	---	---		
MEAN					5.0	5.5	7.0	9.5	11.5	12.5		

WTR YR 1982 MEAN 9.5 MAX 15.0 MIN 3.5

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 60.--Discharge of stream along northwest side of Leviathan Mine tailings dump (station 10308786), water year 1981

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	.00	.01	.08	.00	.00	.00	.00
2					---	.00	.02	.06	.00	.00	.00	.00
3					---	.00	.01	.06	.00	.00	.00	.00
4					---	.00	.01	.04	.00	.00	.00	.00
5					---	.00	.08	.04	.00	.00	.00	.00
6					---	.00	---	.04	.00	.00	.00	.00
7					---	.00	.32	.04	.00	.00	.00	.00
8					---	.00	.33	.04	.00	.00	.00	.00
9					---	.00	.23	.03	.00	.00	.00	.00
10					.00	.00	.16	.03	.00	.00	.00	.00
11					.00	.01	.09	.03	.02	.00	.00	.00
12					.00	.01	.08	.03	.02	.00	.00	.00
13					.00	.01	.06	.02	.02	.00	.00	.00
14					.00	.01	.09	.02	.02	.00	.00	.00
15					.00	.01	.09	.02	.02	.00	.00	.00
16					.00	.01	.25	.02	.02	.00	.00	.00
17					.00	.02	.22	.02	.02	.00	.00	.00
18					.00	.02	.27	.02	.02	.00	.00	.00
19					.00	.02	.31	.02	.02	.00	.00	.00
20					.00	.02	---	.02	.01	.00	.00	.00
21					.00	.02	---	.02	.01	.00	.00	.00
22					.00	.02	.42	.02	.01	.00	.00	.00
23					.00	.02	.38	.02	.01	.00	.00	.00
24					.00	.01	.30	.02	.01	.00	.00	.00
25					.00	.02	.24	.02	.01	.00	.00	.00
26					.00	.02	.18	.02	.00	.00	.00	.00
27					.00	.02	.15	.02	.00	.00	.00	.00
28					.00	.02	.12	.02	.00	.00	.00	.00
29					---	.02	.09	---	.00	.00	.00	.00
30					---	.02	.09	.00	.00	.00	.00	.00
31					---	.02	---	.00	---	.00	.00	---
TOTAL					---	.35	---	---	.24	.00	.00	.00
MEAN					---	.011	---	---	.008	.000	.000	.000
MAX					---	.02	---	---	.02	.00	.00	.00
MIN					---	.00	---	---	.00	.00	.00	.00

TABLE 61.--Specific conductance of stream along northwest side of Leviathan Mine tailings dump (station 10308786), water year 1981

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						---	863	---	---			
2						---	945	---	---			
3						---	699	---	---			
4						---	---	---	---			
5						---	---	---	---			
6						---	---	---	---			
7						---	---	---	---			
8						---	---	---	---			
9						---	---	---	---			
10						---	---	---	---			
11						843	---	---	831			
12						840	---	---	956			
13						867	---	---	943			
14						866	---	---	762			
15						848	---	729	703			
16						812	---	725	667			
17						860	---	730	757			
18						862	---	753	731			
19						841	---	744	702			
20						969	---	773	692			
21						897	---	796	781			
22						653	---	791	870			
23						---	---	813	917			
24						---	---	817	939			
25						---	---	833	963			
26						961	---	854	---			
27						1120	---	859	---			
28						1150	---	866	---			
29						779	---	---	---			
30						1220	---	---	---			
31						969	---	---	---			
MEAN						909	836	792	814			

WTR YR 1981 MEAN 843 MAX 1220 MIN 653

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 62.--Temperature of stream along northwest side of Leviathan Mine tailings dump (station 10308786), water year 1981

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						---	6.5	---	---			
2						---	6.0	---	---			
3						---	6.5	---	---			
4						---	---	---	---			
5						---	---	---	---			
6						---	---	---	---			
7						---	---	---	---			
8						---	---	---	---			
9						---	---	---	---			
10						---	---	---	---			
11						6.5	---	---	9.5			
12						6.5	---	---	8.0			
13						6.0	---	---	8.0			
14						6.0	---	---	8.0			
15						6.5	---	8.5	9.0			
16						6.5	---	8.5	9.5			
17						6.5	---	8.5	10.0			
18						6.5	---	8.5	10.0			
19						6.5	---	9.0	10.5			
20						6.5	---	8.5	10.5			
21						6.5	---	9.0	10.5			
22						6.5	---	9.5	11.0			
23						6.5	---	9.0	10.5			
24						6.5	---	9.5	11.0			
25						6.0	---	9.5	11.5			
26						6.0	---	9.5	---			
27						6.0	---	9.5	---			
28						6.5	---	10.0	---			
29						6.0	---	---	---			
30						6.5	---	---	---			
31						6.5	---	---	---			
MEAN						6.5	6.5	9.0	10.0			

WTR YR 1981 MEAN 8.0 MAX 11.5 MIN 6.0

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 63.—Discharge of seep below crusher adjacent to Leviathan Creek above delta area (station 10308787), water year 1982

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.05	.06	.06	.05	.04	.05	.06	.07	.08	.09	.08	.07
2	.05	.06	.06	.05	.04	.05	.06	.07	.08	.09	.08	.07
3	.05	.06	.06	.05	.04	.05	.07	.07	.08	.09	.08	.07
4	.05	.06	.06	.05	.04	.05	.08	.07	.08	.09	.08	.07
5	.05	.06	.06	.05	.04	.06	.09	.07	.08	.09	.08	.07
6	.05	.06	.06	.05	.04	.06	.08	.07	.08	.09	.08	.07
7	.05	.06	.06	.05	.04	.06	.09	.07	.08	.09	.08	.07
8	.05	.06	.06	.05	.04	.06	.09	.07	.08	.09	.08	.07
9	.05	.06	.06	.05	.04	.06	.08	.07	.08	.09	.08	.07
10	.05	.06	.06	.05	.04	.06	.07	.07	.08	.09	.08	.07
11	.05	.06	.06	.05	.04	.07	.09	.07	.08	.09	.08	.07
12	.05	.06	.06	.05	.03	.07	.07	.07	.08	.09	.08	.07
13	.05	.06	.06	.04	.04	.07	.07	.07	.08	.09	.08	.07
14	.05	.06	.06	.04	.03	.07	.07	.07	.08	.09	.08	.07
15	.05	.06	.06	.04	.04	.07	.07	.07	.08	.09	.08	.07
16	.05	.06	.06	.04	.03	.07	.07	.07	.08	.09	.08	.07
17	.05	.06	.05	.04	.04	.07	.06	.07	.08	.09	.08	.07
18	.05	.06	.05	.04	.05	.07	.06	.08	.08	.09	.08	.07
19	.05	.06	.05	.04	.05	.07	.06	.09	.08	.09	.08	.06
20	.05	.06	.05	.04	.05	.07	.06	.09	.08	.09	.08	.06
21	.05	.06	.05	.04	.04	.07	.06	.09	.08	.09	.08	.06
22	.05	.06	.05	.04	.05	.07	.06	.09	.08	.09	.08	.06
23	.05	.06	.05	.04	.05	.07	.07	.09	.08	.09	.08	.06
24	.05	.06	.05	.04	.05	.07	.07	.09	.08	.09	.08	.07
25	.05	.06	.05	.04	.06	.07	.07	.09	.08	.09	.08	.08
26	.05	.06	.05	.04	.05	.07	.06	.09	.08	.09	.08	.08
27	.05	.06	.05	.04	.05	.07	.06	.09	.08	.09	.08	.08
28	.05	.06	.05	.04	.05	.07	.06	.09	.08	.09	.08	.08
29	.05	.06	.05	.04	---	.06	.06	.09	.09	.09	.08	.08
30	.06	.06	.05	.04	---	.06	.06	.08	.09	.08	.08	.07
31	.06	---	.05	.04	---	.06	---	.08	---	.08	.08	---
TOTAL	1.57	1.80	1.71	1.36	1.20	2.00	2.08	2.42	2.42	2.77	2.48	2.10
MEAN	.051	.060	.055	.044	.043	.065	.069	.078	.081	.089	.080	.070
MAX	.06	.06	.06	.05	.06	.07	.09	.09	.09	.09	.08	.08
MIN	.05	.06	.05	.04	.03	.05	.06	.07	.08	.08	.08	.06

WTR YR 1982 TOTAL 23.91 MEAN .066 MAX .09 MIN .03

TABLE 64.--Specific conductance of seep below crusher adjacent to Leviathan Creek above delta area (station 10308787), water year 1982

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	3540	4030	---	4860	4510	4630	4040	3260	3470	2840	
2	---	3500	4080	---	4850	4490	4640	4030	3260	3470	2810	
3	---	3490	4110	---	4840	4460	4620	4010	3270	3490	2770	
4	---	3490	4120	---	4820	4430	4650	4000	3280	3480	2720	
5	---	3510	4140	---	4800	4360	4690	3980	3280	3490	2680	
6	---	3530	4140	---	4780	4390	4720	3970	3290	3500	2640	
7	---	3550	4150	---	4760	4390	4790	---	3300	3510	2600	
8	---	3560	4170	---	4740	4390	4780	---	3300	3510	2560	
9	---	3570	4170	---	4730	4400	4790	---	3300	3530	2530	
10	---	3580	4190	---	4710	4400	4800	---	3300	3530	2500	
11	---	3600	4210	---	4710	4400	4840	---	3320	3540	2460	
12	---	3600	4230	---	4700	4410	5150	---	3320	3550	2460	
13	---	3610	4240	---	4630	4290	5200	---	3330	3560	2450	
14	---	3530	---	---	4380	4230	4790	3810	3330	3570	2440	
15	3540	3630	---	---	4380	4040	4300	3780	3340	3580	2440	
16	3540	3510	---	---	5010	3980	4220	3760	3340	3580	2430	
17	3530	3390	---	---	5520	3830	4080	3740	3340	3600	2420	
18	3530	3420	---	---	5220	3880	4100	3730	3350	3600	2420	
19	3540	3460	---	---	4980	3920	4110	3720	3370	3330	2410	
20	3550	3500	---	---	4870	3880	4120	3710	3370	2930	2400	
21	3540	3540	---	---	4870	3800	4120	3690	3380	2940	2380	
22	3540	3580	---	---	4880	3740	4140	3680	3390	2950	---	
23	3530	3630	---	---	4820	3850	4150	3660	3420	2950	---	
24	3540	3690	---	---	4750	3960	4150	3640	3430	2960	---	
25	3550	3760	---	---	4690	4090	4140	3630	3430	2980	---	
26	3560	3820	---	---	4630	4250	4130	3600	3440	2980	---	
27	3580	3860	---	---	4580	4360	4120	3530	3440	2970	---	
28	3570	3910	---	---	4540	4440	4080	3480	3450	2980	---	
29	3560	3950	---	4870	---	4500	4060	3420	3450	2950	---	
30	3560	4000	---	4880	---	4570	4050	3360	3460	2920	---	
31	3560	---	---	4860	---	4610	---	3320	---	2880	---	
MEAN	3550	3610	4150	4870	4790	4230	4440	3720	3350	3300	2540	

WTR YR 1982 MEAN 3800 MAX 5520 MIN 2380

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 65.--Temperature of seep below crusher adjacent to Leviathan Creek above delta area (station 10308787), water year 1982

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	7.5	7.5	---	7.5	9.0	8.5	8.0	7.5	7.5	7.5	
2	---	7.5	7.5	---	8.0	8.5	8.0	8.0	7.5	7.5	7.5	
3	---	7.5	8.0	---	8.0	8.5	7.0	8.0	7.5	7.5	7.5	
4	---	7.5	8.0	---	8.0	8.5	6.0	7.5	7.5	7.5	7.5	
5	---	7.5	8.0	---	8.0	8.5	6.0	7.5	7.5	7.5	7.5	
6	---	7.5	8.0	---	8.0	8.5	6.0	7.5	7.5	7.5	7.5	
7	---	7.5	8.0	---	8.0	8.5	5.0	---	7.5	7.5	7.5	
8	---	7.5	8.0	---	8.5	8.5	5.5	---	7.5	7.5	7.5	
9	---	7.5	8.0	---	8.5	8.5	6.0	---	7.5	8.0	7.5	
10	---	7.5	8.0	---	8.5	8.5	6.5	---	7.5	8.0	7.5	
11	---	7.5	7.5	---	8.5	8.5	6.5	---	7.5	8.0	7.5	
12	---	7.5	7.5	---	8.0	8.5	6.5	---	7.5	8.0	7.5	
13	---	7.5	---	---	8.0	8.5	6.5	---	7.5	8.0	7.5	
14	---	6.0	---	---	7.5	8.5	6.5	---	7.5	8.0	7.5	
15	7.5	6.5	---	---	7.0	8.5	7.5	7.5	7.5	8.0	7.5	
16	7.5	7.0	---	---	6.5	8.5	7.5	7.5	7.5	8.0	7.5	
17	7.5	7.5	---	---	7.5	8.5	7.5	7.5	7.5	8.0	7.5	
18	7.5	7.5	---	---	7.5	8.5	7.5	7.5	7.5	8.0	7.5	
19	7.5	7.5	---	---	6.0	8.5	7.5	7.5	7.5	8.0	7.5	
20	7.5	7.5	---	---	8.0	8.5	7.5	7.5	7.5	8.0	7.5	
21	7.5	7.5	---	---	8.5	8.5	7.5	7.5	7.5	8.0	7.5	
22	7.5	7.5	---	---	8.5	8.5	7.5	7.5	7.5	8.0	---	
23	7.5	7.5	---	---	8.5	8.5	8.0	7.5	7.5	8.0	---	
24	7.5	7.0	---	---	8.5	8.5	8.0	7.5	7.5	8.0	---	
25	7.5	7.0	---	---	8.5	8.5	7.5	7.5	7.5	8.0	---	
26	7.5	7.5	---	---	8.5	8.5	7.5	7.5	8.0	8.0	---	
27	7.5	7.5	---	---	8.5	8.5	8.0	7.5	7.5	8.0	---	
28	7.5	7.5	---	---	8.5	8.5	8.0	7.5	7.5	8.0	---	
29	7.5	7.5	---	7.5	---	8.0	7.5	7.5	7.5	8.0	---	
30	7.5	7.5	---	7.5	---	8.5	8.0	7.5	7.5	8.0	---	
31	7.5	---	---	7.5	---	8.0	---	7.5	---	8.0	---	
MEAN	7.5	7.5	8.0	7.5	8.0	8.5	7.0	7.5	7.5	8.0	7.5	

WTR YR 1982 MEAN 7.5 MAX 9.0 MIN 5.0

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 66.--Discharge of Leviathan Creek below inflow from pit and tunnel (station 10308788), water year 1982

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	2.2	5.1	19	2.0	.76	.35	.43
2					---	2.0	6.9	21	1.9	.76	.35	.48
3					---	2.0	6.5	23	1.7	.65	.35	.56
4					---	1.9	6.1	25	1.7	.65	.35	.48
5					---	1.9	6.1	22	1.7	.65	.35	.48
6					---	1.9	5.7	19	1.6	.56	.30	.48
7					---	1.9	5.4	18	1.4	.56	.35	.41
8					---	1.9	5.7	16	1.4	.56	.35	.48
9					---	1.6	6.9	14	1.3	.56	.35	.48
10					---	2.0	15	12	1.3	.48	.35	.48
11					---	2.2	82	9.6	1.3	.48	.35	.43
12					1.9	2.2	24	8.2	1.3	.56	.35	.48
13					2.6	2.2	15	7.3	1.3	.65	.35	---
14					4.5	2.4	12	6.9	1.2	.56	.35	---
15					7.7	2.0	11	6.1	1.1	.56	.30	---
16					14	1.7	10	5.7	1.2	.48	.30	---
17					5.4	1.8	10	5.7	1.2	.48	.30	---
18					2.6	1.5	9.6	5.4	1.3	.41	.35	---
19					2.7	1.4	9.1	5.1	1.3	.41	.41	---
20					3.7	1.5	8.6	4.5	1.1	.41	.35	---
21					5.7	1.5	8.2	4.5	1.0	.41	.41	---
22					4.8	1.4	12	4.2	.87	.35	.65	---
23					3.9	1.4	11	3.7	.87	.35	.65	---
24					3.2	1.4	11	3.4	.87	.41	.65	---
25					2.6	1.7	9.6	3.2	.76	.35	.65	---
26					2.2	2.4	11	3.0	.65	.35	.56	---
27					2.2	3.0	14	2.7	.65	.41	.56	---
28					2.0	3.4	20	2.6	.76	.48	.65	---
29					---	2.2	17	2.4	1.0	.41	.65	---
30					---	3.2	18	2.4	1.0	.35	.65	---
31					---	2.0	---	2.2	---	.35	.65	---
TOTAL					---	61.8	392.5	287.8	36.73	15.41	13.59	---
MEAN					---	1.99	13.1	9.28	1.22	.50	.44	---
MAX					---	3.4	82	25	2.0	.76	.65	---
MIN					---	1.4	5.1	2.2	.65	.35	.30	---

TABLE 67.--Specific conductance of Leviathan Creek below inflow from pit and tunnel (station 10308788), water year 1982

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1			---	2320	2350	1850	2060	890				
2			---	2330	2360	1900	2060	850				
3			---	2330	2360	1970	2060	820				
4			---	2330	2360	2050	2060	870				
5			---	2340	2360	2080	2060	720				
6			---	2330	2360	1940	2060	700				
7			---	2330	2370	2100	2050	710				
8			---	2340	2370	2090	2040	730				
9			---	2350	2370	2000	2030	740				
10			---	2360	2370	2210	1950	730				
11			---	2360	2350	2060	1340	740				
12			---	2360	2280	1980	1050	770				
13			---	2360	2330	1940	848	750				
14			---	2370	2160	1870	813	760				
15			---	2370	2150	1870	908	760				
16			---	2370	1770	1920	911	810				
17			---	2360	1680	1900	918	810				
18			---	2360	1740	2010	948	810				
19			---	2360	1770	1450	978	810				
20			---	2360	1700	1610	960	830				
21			---	2370	1670	1510	1080	840				
22			---	2360	1610	1570	1110	860				
23			---	2360	1630	1600	1000	890				
24			2260	2360	1710	1730	880	920				
25			2280	2370	1710	1970	820	960				
26			2290	2370	1760	1770	990	950				
27			2300	2370	1810	1770	1040	---				
28			2310	2370	1840	1850	1130	---				
29			2320	2370	---	1980	940	---				
30			2330	2360	---	1950	940	---				
31			2330	2360	---	2030	---	---				
MEAN			2300	2360	2050	1890	1330	809				

WTR YR 1982 MEAN 1740 MAX 2370 MIN 700

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 68.--Temperature of Leviathan Creek below inflow from pit and tunnel (station 10308788), water year 1982

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1			---	1.5	1.5	3.0	3.5	5.5	8.5			
2			---	1.5	2.0	1.0	3.5	6.0	8.5			
3			---	2.0	2.0	1.5	4.0	6.5	7.5			
4			---	2.0	2.0	1.0	4.0	6.5	7.0			
5			---	2.5	1.5	1.0	4.5	6.0	---			
6			---	2.5	1.5	1.5	4.5	7.0	---			
7			---	2.5	2.0	2.5	4.5	7.0	---			
8			---	2.5	2.5	3.0	5.0	6.5	---			
9			---	2.5	2.0	2.5	5.5	5.0	---			
10			---	2.5	2.0	4.5	5.0	5.0	---			
11			---	2.5	2.0	4.0	2.0	5.0	---			
12			---	2.5	2.0	2.5	4.0	7.0	---			
13			---	2.5	3.0	3.5	4.5	8.0	---			
14			---	2.5	3.0	3.0	4.5	6.5	---			
15			---	2.5	2.5	2.0	5.0	7.0	---			
16			---	2.5	1.0	1.0	5.5	9.0	---			
17			---	2.5	1.5	1.0	6.0	12.0	---			
18			---	2.0	2.5	1.0	6.0	12.0	---			
19			---	1.5	4.0	1.0	6.0	8.5	---			
20			---	2.0	3.5	1.5	6.0	9.5	---			
21			---	2.0	3.5	1.5	6.0	10.0	---			
22			---	2.0	3.5	2.5	3.5	10.5	---			
23			---	2.5	2.5	2.5	4.0	11.0	---			
24			2.0	2.5	2.5	3.5	4.0	11.0	---			
25			2.0	2.5	2.5	4.5	4.0	12.0	---			
26			2.5	2.0	2.5	4.5	4.0	12.0	---			
27			2.0	2.0	3.5	4.5	4.5	10.5	---			
28			2.0	2.0	3.5	2.5	4.5	9.0	---			
29			2.0	2.0	---	3.0	4.5	8.5	---			
30			2.5	2.0	---	2.0	5.0	9.0	---			
31			1.5	2.0	---	3.5	---	9.0	---			
MEAN			2.0	2.0	2.5	2.5	4.5	8.5	8.0			

WTR YR 1982 MEAN 4.0 MAX 12.0 MIN 1.0

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 69.--Discharge of Leviathan Creek below Aspen Creek (station 10308790), water year 1981

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	.62	1.7	---	1.4	.42	.48	.42
2					---	.62	1.7	---	1.3	.48	.48	.42
3					---	.71	1.7	---	1.3	.48	.48	.42
4					.71	.71	1.6	---	1.1	.48	.48	.48
5					.62	.71	2.1	---	1.1	.41	.48	.48
6					.48	.71	2.4	---	1.0	.48	.48	.48
7					1.6	.71	2.4	---	1.0	.55	.48	.48
8					.62	.71	2.6	---	1.0	.55	.48	.48
9					.48	.90	3.5	---	1.0	.55	.48	.53
10					.48	.90	3.3	---	1.0	.55	.48	.53
11					.55	.90	2.8	---	.90	.55	.48	.48
12					.62	.90	2.8	---	.90	.55	.48	.48
13					1.4	.90	3.0	---	.90	.55	.48	.48
14					3.5	.80	3.5	1.1	.90	.55	.48	.53
15					1.3	1.0	4.0	1.1	.90	.55	.55	.53
16					1.3	1.0	4.0	1.1	.80	.55	.55	.53
17					1.6	1.4	3.8	1.3	.71	.48	.55	.55
18					1.3	1.0	3.8	1.4	.71	.48	.48	.55
19					1.7	1.6	3.5	1.4	.80	.48	.48	.55
20					1.3	2.1	3.5	1.6	.71	.48	.48	.55
21					1.7	1.6	3.8	1.4	.62	.55	.48	.55
22					.90	1.6	4.3	1.4	.62	.55	.48	.62
23					.90	1.3	4.6	1.3	.71	.48	.48	.62
24					.55	1.4	4.0	1.3	.62	.55	.48	.62
25					.71	1.9	3.5	1.3	.48	.55	.48	.80
26					.71	2.1	---	1.9	.48	.55	.48	.62
27					.62	1.7	---	2.1	.42	.48	.48	.55
28					1.6	2.6	---	1.7	.48	.48	.48	.55
29					---	2.4	---	2.1	.48	.48	.48	.55
30					---	1.7	---	2.1	.48	.48	.48	.48
31					---	1.6	---	1.7	---	.48	.48	---
TOTAL					---	38.80	---	---	24.82	15.90	15.09	15.91
MEAN					---	1.25	---	---	.83	.51	.49	.53
MAX					---	2.6	---	---	1.4	.55	.55	.80
MIN					---	.62	---	---	.42	.41	.48	.42

TABLE 70.--Specific conductance of Leviathan Creek below Aspen Creek (station 10308790), water year 1981

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	1930	1430	830	1600	1830	1670	
2					---	1830	1430	864	1620	1830	1660	
3					---	1870	1350	909	1640	1810	1660	
4					---	1890	1290	958	1660	1790	1680	
5					---	1860	1240	999	1680	1770	1660	
6					---	1860	1180	1030	1690	1780	1640	
7					---	1890	1190	1070	1690	1770	1630	
8					---	1880	1230	1110	1700	1790	1610	
9					---	1860	1230	1150	1710	1730	1590	
10					---	1830	1230	1190	1720	1800	1580	
11					---	1610	1240	1220	1740	1830	1560	
12					---	1830	1300	1250	1710	1870	1530	
13					---	1840	1270	1290	1690	1860	1510	
14					---	1860	1160	1460	1730	1840	1490	
15					---	1840	1130	1540	1800	1830	1490	
16					---	1830	1050	1540	1780	1810	1490	
17					---	1820	1060	1580	1800	1780	1490	
18					2110	1840	943	1640	1780	1760	1480	
19					2090	1760	880	1640	1810	1740	1490	
20					2140	1760	892	1680	1870	1730	1470	
21					2170	1750	755	1690	1910	1710	1460	
22					2180	1700	486	1670	1900	1700	1460	
23					2110	1640	419	1640	1880	1690	1450	
24					2060	1600	459	1630	1870	1660	1440	
25					1990	1570	511	1630	1860	1650	1450	
26					1920	1600	558	1620	1870	1630	---	
27					1880	1550	625	1610	1920	1620	---	
28					1900	1530	692	1580	1900	1610	---	
29					---	1460	748	1580	1870	1550	---	
30					---	1520	797	1600	1840	1570	---	
31					---	1440	---	1590	---	1660	---	
MEAN					2050	1750	993	1380	1770	1740	1550	

WTR YR 1981 MEAN 1560 MAX 2180 MIN 419

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 71.--Temperature of Leviathan Creek below Aspen Creek (station 10308790), water year 1981

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					---	2.0	3.5	11.0	14.0	12.0	13.5	
2					---	2.5	2.0	9.0	14.0	12.5	12.5	
3					---	2.5	3.5	8.0	14.5	13.0	13.0	
4					---	3.5	4.5	8.0	15.5	13.0	13.5	
5					---	2.0	5.5	8.0	16.5	12.5	14.0	
6					---	4.5	5.5	7.0	16.0	12.0	15.5	
7					---	3.5	5.0	7.0	16.0	11.0	16.0	
8					---	4.5	5.5	8.5	16.0	9.0	16.5	
9					---	4.0	5.5	10.0	16.5	8.0	16.5	
10					---	4.5	4.5	10.0	16.0	8.0	17.0	
11					---	3.5	4.0	9.5	15.5	8.0	17.0	
12					---	4.0	4.5	10.0	11.0	8.0	17.0	
13					---	3.0	5.0	10.5	10.0	8.0	16.0	
14					---	4.0	6.0	9.5	10.5	9.5	17.0	
15					---	3.5	6.5	7.0	12.0	10.5	17.0	
16					---	4.0	6.5	7.0	14.0	11.5	17.0	
17					---	3.0	6.5	8.5	13.5	11.0	16.5	
18					4.0	3.0	5.5	8.0	12.5	10.5	17.5	
19					3.5	3.0	4.5	9.0	14.0	10.5	17.5	
20					2.0	2.0	6.0	7.5	13.5	11.5	16.5	
21					1.5	3.5	7.5	9.0	14.0	11.0	16.5	
22					2.5	4.0	8.5	11.0	14.0	11.5	17.5	
23					3.0	3.5	9.0	11.0	13.0	12.0	18.0	
24					1.0	4.5	8.5	12.5	13.0	12.0	18.0	
25					1.5	3.5	7.5	11.5	14.0	12.0	18.0	
26					1.0	2.0	7.0	11.0	13.5	13.0	---	
27					1.5	2.0	8.0	13.0	13.5	13.5	---	
28					2.0	3.5	9.0	13.0	13.0	13.5	---	
29					---	3.5	11.0	12.5	11.5	13.0	---	
30					---	2.5	12.0	13.5	11.5	12.5	---	
31					---	4.0	---	14.0	---	13.5	---	
MEAN					2.0	3.5	6.5	10.0	14.0	11.0	16.0	

WTR YR 1981 MEAN 9.5 MAX 18.0 MIN 1.0

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 72.--Discharge of Leviathan Creek below Aspen Creek (station 10308790), water year 1982

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.42	.48			---	3.2	9.9	22	4.3	1.7	.62	.90
2	.42	.48			---	3.1	3.8	22	4.3	1.6	.62	.80
3	.36	.55			---	3.0	3.8	22	4.0	1.4	.62	.62
4	.42	.55			---	2.8	3.8	20	3.8	1.4	.62	.55
5	.42	.55			---	2.7	3.8	17	4.0	1.3	.62	.55
6	.36	.62			---	3.3	3.8	16	3.8	1.3	.62	.55
7	.48	.62			---	3.0	5.6	16	3.5	1.1	.71	.55
8	.48	.62			---	3.0	3.8	15	3.3	1.1	.90	.55
9	.48	.62			---	3.0	4.3	14	3.3	1.0	.71	.55
10	.48	.62			.66	4.0	9.9	12	3.0	1.0	.80	.62
11	.48	.62			.66	4.3	---	10	2.8	.90	.90	.71
12	.48	1.6			1.2	4.0	---	8.9	2.8	.90	.55	.71
13	.71	4.3			1.2	4.3	---	7.9	2.8	.90	.62	.80
14	.80	1.6			3.7	4.0	---	7.1	2.6	.80	.71	.80
15	.80	1.0			13	4.0	---	7.1	2.4	.80	.80	.80
16	.80	.90			30	3.3	---	5.9	2.6	.80	.80	1.3
17	.80	1.7			14	3.8	21	5.9	2.6	.80	1.0	.90
18	.80	1.6			9.1	4.0	22	5.6	3.0	.80	.80	.90
19	.80	1.4			8.0	3.3	19	5.6	3.0	.80	1.3	1.0
20	.80	1.4			7.0	3.3	17	4.9	2.4	.80	.90	.71
21	.80	2.2			8.2	3.0	15	5.2	2.2	.80	.90	.71
22	.90	---			6.5	3.3	16	4.9	2.1	.80	.80	.80
23	.90	---			5.3	3.5	18	4.9	1.9	.80	.71	.90
24	.90	---			4.9	3.5	19	4.6	2.1	.90	.71	1.9
25	1.0	---			4.2	3.5	19	4.6	1.9	1.0	.71	1.3
26	1.0	---			3.6	3.8	19	4.3	1.7	1.1	.71	1.0
27	1.0	---			3.4	4.0	20	4.6	1.6	1.3	.71	1.1
28	1.9	---			3.3	4.0	21	4.3	1.7	1.4	.90	1.1
29	.90	---			---	3.8	18	4.3	2.2	.71	.90	1.3
30	1.0	---			---	6.7	19	4.0	2.1	.62	.90	1.3
31	.62	---			---	4.9	---	4.0	---	.62	.90	---
TOTAL	22.51	---			---	113.9	---	294.6	83.8	31.25	24.07	26.28
MEAN	.73	---			---	3.67	---	9.50	2.79	1.01	.78	.88
MAX	1.9	---			---	6.7	---	22	4.3	1.7	1.3	1.9
MIN	.36	---			---	2.7	---	4.0	1.6	.62	.55	.55

TABLE 73.--Specific conductance of Leviathan Creek below Aspen Creek (station 10308790), water year 1982

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	1900	1910	1830	1610	1380	1390	1020	566	908	1040	
2	---	1910	1920	1870	1610	1420	1390	1000	600	895	1060	
3	---	1920	1940	1870	1610	1480	1370	955	646	887	1050	
4	---	1920	1950	1800	1610	1570	1370	920	740	886	1060	
5	---	1920	1960	1610	1610	1560	1380	905	579	881	1060	
6	---	1910	1980	1600	1600	1540	1400	872	561	888	1070	
7	---	1900	2060	1600	1600	1560	1410	854	564	910	1070	
8	---	1890	2120	1600	1580	1570	1430	855	578	935	1080	
9	---	1900	2100	1610	1560	1580	1430	871	611	893	1190	
10	1510	1890	2090	1600	1510	1580	1330	858	658	850	1330	
11	1590	1890	1960	1610	1530	1530	1240	842	697	856	1360	
12	1540	1910	1850	1620	1510	1520	1110	852	723	856	1470	
13	1510	2030	1900	1620	1480	1520	1040	838	739	863	1490	
14	1490	2190	1970	1630	1400	1520	1060	836	744	882	1470	
15	1490	2300	1980	1620	1340	1520	1110	847	756	952	1450	
16	1510	2290	1920	1620	1270	1520	1110	848	775	1010	---	
17	1510	2270	1910	1630	1380	1530	1060	852	793	1030	---	
18	1500	2250	1900	1640	1430	1540	1020	853	788	1030	---	
19	1500	2210	1730	1600	1300	1560	1030	853	780	1040	---	
20	1480	2210	1660	1620	1020	1570	1050	858	784	1040	---	
21	1490	2170	1670	1630	999	1570	1000	863	795	1050	---	
22	1510	2010	1710	1630	1010	1580	1090	871	805	1040	---	
23	1530	1990	1770	1650	1060	1490	990	882	819	1050	---	
24	1550	1950	1810	1640	1120	1400	930	889	832	1050	---	
25	1560	2010	1790	1630	1170	1390	940	892	845	1060	---	
26	1570	2080	1800	1630	1240	1370	1030	891	867	1050	---	
27	1610	2120	1800	1630	1290	1350	1030	740	880	1050	---	
28	1900	1960	1840	1630	1340	1310	996	588	898	1030	---	
29	1910	1920	1830	1630	---	1360	1010	556	899	1040	---	
30	1870	1920	1820	1620	---	1360	986	534	909	1050	---	
31	1870	---	1820	1620	---	1360	---	544	---	1040	---	
MEAN	1590	2030	1890	1650	1390	1490	1160	834	741	968	1220	

WTR YR 1982 MEAN 1360 MAX 2300 MIN 534

TABLE 74.--Temperature of Leviathan Creek below Aspen Creek (station 10308790), water year 1982

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	3.0	1.5	1.0	2.0	3.5	.5	6.5	9.5	11.5	12.5	
2	---	3.0	1.5	1.0	2.5	1.0	1.0	7.0	9.5	11.0	11.5	
3	---	3.0	1.0	1.0	2.5	1.5	2.0	7.5	8.5	10.5	12.5	
4	---	3.5	1.5	1.0	2.0	1.5	1.5	7.0	8.0	11.5	12.5	
5	---	4.0	2.0	1.5	1.0	1.5	2.0	6.5	7.5	11.0	13.5	
6	---	5.5	2.0	2.0	1.0	2.0	1.5	7.5	8.5	12.0	14.0	
7	---	4.0	2.5	1.5	1.5	3.0	1.5	8.0	9.0	13.0	13.0	
8	---	3.5	2.0	2.0	2.5	4.0	3.0	7.0	9.5	12.5	14.0	
9	---	3.5	2.5	2.5	2.0	3.5	3.0	6.0	10.5	13.0	14.0	
10	4.0	3.5	2.0	2.5	2.0	5.5	3.0	5.5	11.0	14.0	12.5	
11	2.5	3.5	1.0	2.5	1.5	5.0	1.0	6.0	11.0	15.0	12.5	
12	2.0	4.0	.5	2.0	1.5	4.5	3.0	7.5	11.0	14.5	13.5	
13	1.5	3.5	2.0	2.0	2.5	5.0	3.5	8.5	9.5	14.5	14.0	
14	1.5	3.5	3.0	2.5	2.0	4.5	3.5	7.5	11.5	14.5	13.0	
15	1.5	4.5	3.0	2.0	2.0	4.0	3.5	9.0	12.5	14.0	13.0	
16	3.0	4.5	1.5	2.5	3.0	2.5	3.5	9.5	13.0	13.0	---	
17	4.0	2.5	1.5	2.5	4.5	2.0	4.0	9.0	12.5	13.0	---	
18	4.0	1.5	3.0	2.0	4.5	2.5	4.0	8.5	12.0	13.5	---	
19	4.0	2.5	4.5	1.5	4.5	3.0	4.0	9.0	12.0	14.0	---	
20	4.0	3.0	3.5	2.0	4.0	3.5	3.5	10.0	12.5	14.0	---	
21	4.0	3.5	2.0	2.0	4.0	4.0	3.5	10.5	12.0	15.0	---	
22	4.0	4.5	1.0	2.0	3.5	4.5	4.5	11.0	13.0	15.0	---	
23	4.0	5.0	1.5	3.0	2.5	4.0	5.0	11.5	12.5	14.5	---	
24	3.5	2.5	2.0	3.0	3.0	4.0	5.0	11.5	11.0	15.0	---	
25	4.5	1.0	2.5	3.0	3.0	4.5	5.0	12.5	12.5	15.5	---	
26	4.5	.5	2.5	3.0	3.0	4.5	5.0	12.5	13.5	13.5	---	
27	4.0	.5	2.0	2.0	4.0	4.0	5.5	13.5	13.0	14.0	---	
28	2.0	1.0	2.0	2.5	4.0	1.0	5.5	10.0	11.5	14.5	---	
29	1.5	1.0	2.0	2.5	---	.5	5.0	9.5	9.5	15.0	---	
30	1.0	1.0	2.0	2.0	---	.5	6.0	10.5	10.0	15.0	---	
31	2.0	---	1.5	2.5	---	.5	---	10.0	---	13.5	---	
MEAN	3.0	3.0	2.0	2.0	2.5	3.0	3.5	9.0	11.0	13.5	13.0	

WTR YR 1982 MEAN 5.5 MAX 15.5 MIN .5

TABLE 75.--Discharge of Bryant Creek below confluence of Leviathan and Mountaineer Creeks (station 10308794), water year 1982

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1			---	2.7	---		---	31	8.4	4.7	2.6	2.5
2			---	2.9	---		---	32	8.3	4.5	2.7	2.5
3			---	2.9	2.6		---	32	7.8	4.3	2.7	2.5
4			---	2.9	2.5		---	30	7.6	4.2	2.7	2.5
5			---	3.6	3.6		---	27	7.8	4.2	2.7	2.5
6			---	3.7	3.9		---	25	7.3	4.1	2.6	2.5
7			---	3.7	3.7		---	25	7.1	4.0	2.9	2.5
8			---	3.7	2.9		---	24	6.9	4.0	2.8	2.5
9			---	3.7	2.4		---	23	6.6	3.8	2.6	2.5
10			---	3.7	2.6		---	21	6.5	3.6	2.6	2.5
11			2.0	3.7	2.6		---	19	6.2	3.7	2.5	2.6
12			2.1	3.6	2.7		---	18	6.1	3.6	2.5	2.6
13			2.2	3.6	3.3		---	18	6.1	3.5	2.5	2.6
14			2.2	3.6	14		---	17	5.8	3.4	2.5	2.6
15			2.2	---	63		---	16	5.6	3.3	2.5	2.9
16			2.0	---	---		---	16	5.9	3.4	2.4	3.2
17			2.0	---	---		---	15	5.9	3.3	2.4	2.8
18			2.1	---	---		---	14	5.9	3.3	2.4	2.8
19			4.3	---	---		---	14	7.4	3.2	2.7	2.8
20			20	---	---		---	13	5.7	3.1	2.6	2.7
21			7.2	---	---		26	13	5.3	3.1	2.8	2.7
22			4.4	---	---		25	12	5.1	3.1	2.6	2.6
23			4.4	---	---		28	12	4.8	3.0	2.6	2.8
24			4.0	---	---		28	11	4.9	3.2	2.6	3.5
25			3.6	---	---		27	11	4.8	3.0	2.5	3.0
26			3.6	---	---		28	10	4.6	3.1	2.5	2.8
27			3.2	---	---		30	10	4.6	3.1	2.5	2.9
28			3.2	---	---		32	11	4.5	3.2	2.6	2.8
29			3.2	---	---		30	9.9	5.0	3.0	2.6	3.1
30			3.2	---	---		30	9.3	4.9	2.8	2.5	3.2
31			2.9	---	---		---	9.0	---	2.8	2.5	---
TOTAL			---	---	---		---	548.2	183.4	108.6	80.2	82.0
MEAN			---	---	---		---	17.7	6.11	3.50	2.59	2.73
MAX			---	---	---		---	32	8.4	4.7	2.9	3.5
MIN			---	---	---		---	9.0	4.5	2.8	2.4	2.5

TABLE 76.--Specific conductance of Bryant Creek below confluence of Leviathan and Mountaineer Creeks (station 10308794), water year 1982

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1		---	891	877	742	618		---	428	513	474	477
2		---	898	873	740	633		---	421	505	478	478
3		---	897	871	736	651		---	422	506	457	481
4		---	909	869	---	667		---	429	508	453	483
5		---	920	866	---	685		---	416	511	450	485
6		---	930	862	---	701		---	415	513	454	489
7		---	941	859	---	716		---	434	516	455	489
8		---	941	857	---	731		---	426	520	462	492
9		---	952	857	---	744		---	428	510	454	494
10		---	962	854	---	758		---	428	443	459	495
11		---	954	850	---	774		---	424	452	467	---
12		---	948	844	---	786		---	420	445	464	---
13		---	957	838	---	795		302	416	436	474	---
14		---	959	834	---	802		239	421	421	466	---
15		---	958	829	---	821		250	432	447	467	---
16		---	947	823	---	835		256	421	454	462	---
17		---	937	817	---	851		281	436	460	441	---
18		---	940	810	---	867		321	435	463	417	---
19		832	941	855	---	881		323	443	463	404	---
20		838	870	801	504	893		405	520	454	423	---
21		851	876	804	506	904		338	524	454	469	---
22		868	880	793	597	913		375	520	436	491	530
23		851	885	788	519	924		379	520	425	476	575
24		853	888	785	536	---		382	520	422	470	556
25		841	890	780	553	---		382	545	440	465	549
26		847	890	769	567	---		398	533	450	467	548
27		870	890	761	581	---		422	525	450	468	535
28		875	889	754	599	---		428	523	474	472	542
29		879	887	750	---	---		430	520	494	472	---
30		884	885	746	---	---		431	505	483	473	515
31		---	881	744	---	---		431	---	480	476	---
MEAN		857	916	820	598	780		356	462	469	461	512

WTR YR 1982 MEAN 621 MAX 962 MIN 239

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 77.--Temperature of Bryant Creek below confluence of Leviathan and Mountaineer Creeks (station 10308794), water year 1982

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1		---	.5	.0	.0	5.5		---	9.0	13.0	14.5	12.5
2		---	.5	.0	.0	3.5		---	9.0	13.5	13.0	13.5
3		---	.5	.0	.0	3.5		---	8.5	12.5	13.5	13.0
4		---	1.0	.0	---	3.5		---	8.5	13.5	14.0	12.5
5		---	1.5	.5	---	3.5		---	8.0	13.5	15.0	12.5
6		---	1.5	.5	---	3.5		---	9.0	14.0	15.0	12.5
7		---	1.5	.0	---	4.5		---	9.5	15.5	14.5	12.5
8		---	1.0	.0	---	5.5		---	10.5	15.0	14.5	12.5
9		---	2.0	.5	---	5.0		---	11.5	14.5	15.0	12.5
10		---	1.5	.5	---	7.0		---	12.0	15.5	13.0	11.5
11		---	.5	.5	---	7.0		---	12.0	16.5	13.0	---
12		---	.5	.5	---	6.0		---	12.5	16.0	13.5	---
13		---	1.5	.0	---	6.5		---	11.0	16.5	14.0	---
14		---	3.0	.5	---	6.5		7.0	12.5	16.0	13.5	---
15		---	3.0	.5	---	5.5		8.0	14.5	15.5	13.5	---
16		---	.5	.5	---	4.5		9.0	14.5	15.0	14.0	---
17		---	.5	1.0	---	4.0		9.0	14.0	14.5	14.5	---
18		---	2.5	.5	---	4.0		8.0	13.5	15.5	15.5	---
19		1.5	4.0	.0	---	4.0		8.0	13.0	15.5	14.0	---
20		3.0	3.5	.0	5.0	4.5		9.0	13.5	16.5	15.0	---
21		3.5	1.5	.0	5.5	5.0		9.5	13.5	17.0	15.0	---
22		4.5	.5	.0	4.5	5.5		10.5	14.0	17.5	16.0	10.0
23		5.0	.5	.0	4.0	6.0		10.5	14.0	17.0	15.0	10.0
24		2.5	1.0	1.0	4.0	---		10.5	13.0	17.0	14.5	13.0
25		.0	2.0	1.0	4.0	---		11.0	14.0	17.0	15.0	11.5
26		.0	2.5	1.0	4.5	---		12.0	15.5	16.0	14.0	6.0
27		.0	1.5	.0	5.0	---		10.5	15.5	15.5	14.5	6.5
28		.0	1.0	.5	5.5	---		8.5	13.0	16.0	13.5	3.0
29		.5	1.5	.0	---	---		8.0	11.5	16.5	13.5	---
30		.0	1.5	.0	---	---		9.0	11.5	16.5	11.5	6.0
31		---	.5	.0	---	---		9.5	---	15.5	12.5	---
MEAN		1.5	1.5	.5	3.5	5.0		9.5	12.0	15.5	14.0	10.5

WTR YR 1982 MEAN 8.0 MAX 17.5 MIN .0

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 78.--Discharge of Bryant Creek above Doud Creek (station 10308800), water year 1982

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1			---		---	12	9.3	51	11	7.9	---	2.8
2			---		---	12	8.4	51	11	7.1	---	2.8
3			---		---	11	8.7	50	10	7.1	---	2.8
4			3.6		---	10	9.0	49	9.6	6.8	---	2.8
5			3.6		---	10	9.3	43	10	6.8	---	2.7
6			3.6		---	10	9.0	38	10	6.6	---	2.7
7			3.4		---	9.6	9.0	37	10	6.3	---	2.5
8			3.4		---	9.6	9.0	35	9.6	6.3	---	2.5
9			3.6		---	9.3	12	35	10	6.3	3.9	2.5
10			3.6		---	10	35	33	10	6.3	3.6	2.7
11			3.4		---	11	227	31	10	6.1	3.6	3.0
12			3.6		---	10	71	27	10	6.1	3.4	3.0
13			3.6		---	10	46	25	9.6	6.1	3.3	2.8
14			3.6		---	10	43	24	9.6	6.1	3.3	2.8
15			3.6		---	9.3	40	23	9.3	6.1	3.1	3.4
16			3.4		---	9.3	38	21	9.0	5.6	3.0	4.2
17			3.4		---	9.3	38	21	9.6	5.4	3.0	3.6
18			3.4		22	9.3	38	20	9.3	5.4	2.8	4.2
19			5.4		26	9.0	38	19	11	5.4	3.6	4.0
20			31		27	8.7	39	18	9.3	5.0	3.6	4.0
21			---		29	8.7	38	18	9.0	5.0	3.8	3.8
22			---		27	8.4	40	16	8.7	---	4.0	3.6
23			---		22	8.4	43	15	8.4	---	3.6	3.9
24			---		19	8.2	43	14	8.4	---	3.4	6.1
25			---		16	8.2	44	14	8.2	---	3.3	4.8
26			---		14	8.4	45	13	7.9	---	2.7	4.5
27			---		12	8.2	46	13	7.3	---	2.7	4.5
28			---		12	8.7	51	13	7.6	---	3.3	4.4
29			---		---	8.2	53	13	8.2	---	3.1	5.2
30			---		---	8.2	50	12	8.2	---	3.1	5.2
31			---		---	9.0	---	11	---	---	3.0	---
TOTAL			---		---	292.0	1189.7	803	279.8	---	---	107.7
MEAN			---		---	9.42	39.7	25.9	9.33	---	---	3.59
MAX			---		---	12	227	51	11	---	---	6.1
MIN			---		---	8.2	8.4	11	7.3	---	---	2.5

TABLE 79.--Specific conductance of Bryant Creek above Doud Creek (station 10308800), water year 1982

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1			---	376	370	665	---	429	389	347	336	384
2			---	370	369	639	---	408	392	347	336	383
3			---	371	370	655	---	344	394	346	338	381
4			---	376	373	652	---	380	398	346	338	383
5			---	375	373	657	---	383	400	346	339	383
6			---	374	383	659	---	383	396	345	340	382
7			---	375	395	659	---	360	397	349	340	386
8			---	375	407	634	---	340	395	350	349	384
9			---	375	429	604	---	337	395	349	354	387
10			---	375	448	623	---	350	392	349	381	384
11			461	376	468	604	---	353	389	349	380	386
12			446	378	484	605	---	360	386	347	376	387
13			469	378	504	598	---	360	382	349	379	387
14			474	379	404	595	---	358	376	350	379	390
15			482	379	306	601	---	360	374	352	378	400
16			461	377	292	599	---	359	372	353	377	453
17			445	375	349	594	---	358	391	320	377	421
18			462	373	404	587	---	355	377	352	376	406
19			458	370	489	601	---	358	361	356	384	409
20			320	370	595	595	---	360	362	355	431	405
21			319	370	588	596	460	361	370	358	390	401
22			331	373	604	600	460	362	372	345	538	398
23			340	373	594	606	453	362	374	338	407	395
24			351	372	588	---	447	364	370	340	403	486
25			360	372	594	---	442	---	380	337	389	436
26			366	368	603	---	426	---	374	334	385	434
27			373	364	657	---	402	353	375	339	385	420
28			374	363	656	---	402	379	379	341	383	416
29			375	365	---	---	436	382	390	340	388	390
30			376	368	---	---	406	382	369	335	387	425
31			379	369	---	---	---	387	---	337	386	---
MEAN			401	373	468	619	433	366	382	345	379	403

WTR YR 1982 MEAN 410 MAX 665 MIN 292

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 80.--Temperature of Bryant Creek above Doud Creek (station 10308800), water year 1982

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1			---	2.5	2.0	5.0	---	9.0	14.5	14.5	16.5	15.5
2			---	1.5	3.0	3.0	---	9.5	14.0	16.0	15.5	16.5
3			---	1.5	3.5	4.0	---	10.5	13.0	14.5	16.0	16.0
4			---	1.5	2.0	4.5	---	9.0	12.5	16.0	16.5	15.5
5			---	2.0	1.0	5.0	---	8.5	12.5	16.0	17.5	16.0
6			---	1.5	1.5	5.5	---	9.5	13.5	16.0	18.5	15.5
7			---	.5	3.0	5.5	---	10.5	14.5	17.0	17.0	16.0
8			---	1.0	4.0	7.5	---	8.5	15.5	17.0	18.0	16.5
9			---	1.0	3.5	6.0	---	7.0	15.5	17.0	18.0	15.5
10			---	1.5	3.5	---	---	7.0	17.0	18.5	16.0	14.5
11			4.0	2.0	3.5	---	---	7.5	17.0	19.5	16.0	12.5
12			4.0	2.0	3.5	---	---	10.0	17.0	19.5	17.0	12.5
13			5.5	1.5	6.0	---	---	11.5	15.5	20.0	17.5	14.0
14			7.0	2.0	3.0	---	---	11.0	16.5	20.0	16.5	12.0
15			7.0	2.0	3.0	5.5	---	11.5	18.0	18.5	16.5	10.0
16			4.5	3.0	3.0	---	---	13.0	20.0	18.0	17.5	10.0
17			4.5	3.0	3.5	2.5	---	12.5	17.0	17.0	17.5	11.5
18			5.5	2.5	4.0	3.5	---	12.0	18.0	17.5	18.5	12.0
19			7.5	1.5	6.0	4.0	---	12.5	18.0	18.0	17.5	13.0
20			5.0	1.5	5.5	---	---	13.5	18.0	18.0	18.0	12.0
21			3.5	1.5	5.5	---	5.5	14.0	---	19.0	18.5	13.0
22			4.0	1.0	6.5	---	6.5	15.5	19.0	19.0	18.5	13.5
23			2.5	3.0	3.5	---	8.0	15.5	18.0	19.0	17.5	13.0
24			3.5	3.5	3.5	---	7.5	16.0	16.5	19.5	17.5	14.0
25			4.0	3.5	3.5	---	8.0	17.0	17.5	19.5	18.0	15.0
26			5.0	3.0	4.5	---	9.0	17.5	18.5	18.0	17.0	14.5
27			4.5	2.0	5.5	---	10.5	16.5	18.5	18.0	17.0	10.0
28			5.0	3.0	7.0	---	10.5	14.5	16.0	19.5	16.5	9.5
29			4.5	2.5	---	---	7.5	14.0	13.5	20.0	17.0	5.5
30			4.5	2.0	---	---	8.5	14.0	16.5	19.5	16.0	7.5
31			3.5	2.5	---	---	---	14.0	---	18.0	16.0	---
MEAN			4.5	2.0	4.0	4.5	8.0	12.0	16.5	18.0	17.0	13.0

WTR YR 1982 MEAN 10.5 MAX 20.0 MIN .5

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 81.--Location, altitude, depth, and perforated interval for test holes drilled with CME-750 rig

Test-hole number	Location coordinates[1] North	Location coordinates[1] East	Altitude of top of casing[1] (feet above sea level)	Depth (feet below top of casing) Total	Depth (feet below top of casing) Approximate perforated interval
			Upgradient from mine		
22	385726.000	2669197.070	7,151.20	91.5	77.5-87.5
23	--	--	[2]7,322	150	Dry hole; no casing
23A	387894.963	2670701.382	7,322.71	68.5	58.5-68.5
24	386875.208	2670928.497	7,434.68	65	55-65
25	387220.009	2671002.310	7,382.40	115.5	105-115
31	385609.787	2670196.177	7,314.43	157	Not cased below 127
32	385683.916	2670312.205	7,333.25	129	113.5-128.5
33	385931.611	2669994.926	7,298.65	122	80.5-120.5
			Waste-dump area		
1A	386114.081	2667387.667	7,106.98	200.5	116-156
1AN	386113.572	2667393.225	7,107.09	117	Blank casing to 100
1AL	--	--	--	100	No casing
1B	386366.660	2667433.713	7,054.95	136	96-136
1BN	386366.508	2667424.504	7,055.64	60	Blank casing to 60
1BL	--	--	--	60	No casing
1C	386285.048	2667722.547	7,055.69	131	111-131
1CN	386285.361	2667715.709	7,055.96	60	Blank casing to 60
1CL	--	--	--	62.5	No casing
			Open-pit area		
2A1	386997.285	2668883.175	7,057.61	21	15-21
2A2	387000.317	2668883.933	7,058.08	10	7-10
2B1	387202.853	2668758.878	7,067.37	22	17.5-22
2C1	386878.052	2669364.226	7,065.63	31	26-31
2C2	386880.610	2669364.891	7,065.08	15	10-15
17A	386491.650	2669326.669	7,100.00	65	55-65

TABLE 81.--Location, altitude, depth, and perforated interval for test holes drilled with CME-750 rig--Continued

Test-hole number	Location coordinates[1] North	Location coordinates[1] East	Altitude of top of casing[1] (feet above sea level)	Depth (feet below top of casing) Total	Depth (feet below top of casing) Approximate perforated interval
17B	386484.686	2669441.493	7,102.84	70	54.5-64.5
17C	386477.488	2669547.423	7,128.42	95	80-90
26	--	--	[2]7,107	60	50-60
27	--	--	[2]7,097	73	Dry hole; no casing
		Between open pit and waste dump			
14	386440.360	2668472.652	7,037.77	91	71-91
15	386598.262	2668007.534	6,992.00	31.5	19-31.5
16	386621.402	2667792.160	6,990.76	62	42-62
		Delta area			
9A	386796.279	2667454.105	6,901.33	52	47-52
9B	386796.457	2667459.366	6,900.35	25	20-25
9C	386796.789	2667464.368	6,900.55	15	10-15
10A	386989.599	2667351.441	6,893.33	50	45-50
10B	386985.898	2667351.819	6,894.51	25	20-25
10C	386981.791	2667352.803	6,893.66	15	10-15
11A	387112.655	2667248.603	6,889.51	55	50-55
11B	387117.887	2667248.052	6,889.07	30	25-30
11C	387117.205	2667212.045	6,889.48	15	10-15
18A	386878.160	2667321.350	6,895.00	47	42-47
18B	386874.842	2667319.501	6,894.11	25	20-25
18C	386871.910	2667317.647	6,895.03	15	10-15
		Upper landslide area			
3A	389303.166	2669345.127	7,062.55	118.5	108.5-118.5
3B1	388691.265	2669720.916	7,105.11	82	72-82
3B2	388686.649	2669719.280	7,105.43	25	15-25
3C	389131.196	2669636.062	7,121.86	90	80-90
3CN	389135.967	2669628.699	7,119.98	51	Blank casing to 51

TABLE 81.--Location, altitude, depth, and perforated interval for test holes drilled with CME-750 rig--Continued

Test-hole number	Location coordinates[1]		Altitude of top of casing[1] (feet above sea level)	Depth (feet below top of casing)	
	North	East		Total	Approximate perforated interval
3CL	--	--	--	50	No casing
19A	389140.055	266996.863	7,079.12	82	72-82
19B	389138.399	2669992.240	7,080.35	40	30-40
		Lower landslide area			
4	390339.338	2667990.891	6,794.03	100	80-100
5	390201.274	2668583.482	6,853.90	10.3	93-103
5A	390197.165	2668579.687	6,854.30	31	21-31
6	390105.792	2668753.565	6,897.10	32	12-32
7	389546.829	2668260.202	6,857.77	163	143-163
8	390676.355	2668797.613	6,799.05	135	125-135
8A	390670.910	2668800.116	6,799.20	49	39-49
20	390783.581	2667975.097	6,710.68	32	22-32
20A	390794.487	2667985.325	6,710.02	92	82-92
21	389704.135	2668814.630	6,941.97	45	35-45

[1] Data from Resource Concepts, Inc., Carson City, Nev. Location coordinates are based on those of DWR (California Department of Water Resources) survey points PP3C and PP4C, which in turn are tied to the California State Coordinate System. Altitudes are based on that of DWR survey point PP3C, except as indicated (footnote 2).

[2] Altitude estimated from topographic map prepared by California Regional Water Quality Control Board (scale, 1:100).

TABLE 82.--Depth, altitude, and water-level data for shallow piezometers at base of waste dump

Piezometer (row and number)	Land-surface altitude (feet above sea level)	Depth (feet below land surface)	Piezometric head (feet above bottom of hole)			
			5/13/82	5/18/83	6/24/83	8/6/83
1-2	6,908.98	7.69	3.24	2.94	2.40	1.66
1-2	6,908.98	3.53	0	0	0	0
1-3	6,908.91	16.62	13.55	12.94	12.43	12.90
1-4	6,908.79	7.69	3.37	3.50	2.56	1.76
1-5	6,908.81	12.75	9.15	8.36	7.84	7.50
1-6	6,908.75	3.60	0	0	0	0
1-7	6,908.75	6.24	1.68	1.01	.80	.16
1-8	6,908.80	7.77	3.60	3.01	2.52	1.65
1-9	6,908.91	5.72	.76	.42	0	0
2-1	6,905.58	9.21	7.91	--	7.10	6.18
2-2	6,905.60	6.33	4.19	4.32	3.48	3.00
2-3	6,905.65	12.70	4.21		10.47	3.50
2-4	6,905.61	7.69	5.78	5.47	5.06	4.22
2-5	6,905.46	14.13	12.34	12.07	11.69	11.30
2-6	6,905.51	3.72	1.43	1.18	.79	.30
3-1	6,902.84	7.90	8.10	--	7.55	6.34
3-2	6,902.67	4.00	4.00	--	3.62	.37
3-3	6,902.71	9.73	9.55	--	8.91	8.00
3-4	6,902.71	5.88	5.23	--	4.64	3.37
4-1	6,899.63	6.71	6.70	6.50	6.27	5.03
4-2	6,899.49	4.40	4.41	3.65	3.22	3.07
4-3	6,899.12	4.36	4.40	3.80	3.43	2.93
4-4	6,899.80	9.32	9.30	8.50	8.38	7.52
5-1	6,899.25	3.85	3.85	--	4.33	--
5-2	6,899.19	6.93	6.90	--	5.70	--
5-3	6,899.20	9.80	9.80	--	4.50	--

TABLE 83.--Water-level and field water-quality data for test holes drilled with CME-750 rig

Test-hole number	Measurement date	Depth to water from top of casing (feet)	pH (units)	Specific conductance (umhos per centimeter)	Temperature (°C)	Dissolved oxygen (mg/L)	Remarks
1A	11-09-82	126.53	5.4	740	--	--	
1B	11-09-82	85.20	4.5	1,600	6.0	--	
	04-06-83	63.70	3.9	1,400	7.0	0.10	
1C	11-09-82	73.20	4.4	1,400	7.0	--	
	04-06-83	66.60	4.1	1,300	8.0	0.10	
2A1	11-08-82	1.57	2.0	13,000	10.0	--	
	11-17-82	1.51	2.1	12,000	10.0	--	
	04-06-83	0.31	1.9	13,000	8.5	0.11	
2A2	11-08-82	1.90	2.2	6,800	10.0	--	
	11-17-82	1.68	2.4	5,900	9.0	--	
	04-06-83	0.45	1.9	12,000	8.5	0.13	
2B	11-08-82	10.80	6.3	2,200	8.0	--	
	11-16-82	10.91	5.9	2,200	9.0	--	
	04-06-83	8.95	5.9	1,000	7.0	0.10	
2C1	11-08-82	10.70	4.1	8,600	8.0	--	
	11-17-82	10.91	3.8	9,400	8.5	--	
	04-06-83	9.00	3.6	8,600	10.0	0.25	
2C2	11-08-82	6.70	4.5	4,500	7.0	--	
	11-17-82	6.80	4.2	5,400	7.5	--	
	04-06-83	4.20	4.1	4,200	8.2	0.28	
3A	11-09-82	100.50	7.1	600	8.5	--	
	12-15-82	102.13	7.2	590	8.0	--	
	04-08-83	102.50	--	--	--	--	Some blockage at 20 ft

TABLE 83.--Water-level and field water-quality data for test holes drilled with CME-750 rig--Continued

Test-hole number	Measurement date	Depth to water from top of casing (feet)	pH (units)	Specific conductance (umhos per centimeter)	Temperature (°C)	Dissolved oxygen (mg/L)	Remarks
3B1	11-09-82	24.02	4.1	1,300	8.0	--	
	11-17-82	25.00	4.0	1,300	7.5	--	
	04-08-83	24.50	4.0	1,500	8.5	--	
3B2	11-09-82	20.50	4.2	730	--	--	
	11-17-72	21.92	4.2	860	7.5	--	
	04-08-83	19.30	4.3	620	8.0	--	
3C	11-09-82	48.00	6.1	1,300	9.0	--	
	11-17-82	47.86	6.3	900	8.5	--	
	04-08-83	56.0	6.0	1,600	7.5	--	
4	11-12-82	50.50	6.9	520	--	--	
	11-16-82	51.23	6.3	540	7.0	--	Blockage at 59.4 ft
	12-15-82	51.50	7.5	470	7.0	--	
	04-08-83	45.1	6.8	460	8.5	--	
5	04-08-83	58.3	6.6	1,800	8.0	--	Blockage at 72.5 ft 10/83
5A	11-19-82	21.25	5.4	1,300	8.0	--	
	12-15-82	22.17	5.6	1,200	7.5	--	
6	11-19-82	6.77	4.1	2,200	7.5	--	
	12-15-82	6.83	4.2	2,200	8.0	1.5	
7	11-12-82	45.67	5.7	2,800	9.5	--	
	04-08-83	45.90	7.8	420	9.5	--	

TABLE 83.--Water-level and field water-quality data for test holes drilled with CME-750 rig--Continued

Test-hole number	Measurement date	Depth to water from top of casing (feet)	pH (units)	Specific conductance (umhos per centimeter)	Temperature (°C)	Dissolved oxygen (mg/L)	Remarks
8	11-19-82	68.50	6.6	510	7.5	--	
	11-23-82	68.32	7.3	520	8.0	--	
	04-08-83	62.8	6.4	540	9.0	--	
8A	11-19-82	21.40	6.9	--	7.5	--	
	11-23-82	21.74	7.6	600	8.0	--	
	04-08-83	21.8	6.3	580	8.5	--	
9A	11-12-82	3.64	5.1	3,800	--	--	
	11-16-82	4.35	5.3	3,100	8.5	--	
	11-29-82	5.90	5.8	3,000	--	--	
9B	11-12-82	1.15	4.6	4,500	--	--	
	11-16-82	1.15	4.3	4,100	8.0	--	
	11-29-82	2.0	4.7	4,400	--	--	
9C	11-12-82	1.17	3.8	4,900	--	--	
	11-16-82	1.51	3.4	5,000	8.0	--	
10A	11-12-82	0.50	6.0	2,200	--	--	
	11-16-82	flowing	5.7	2,000	9.5	--	
	11-29-82	flowing	6.2	1,400	8.5	--	
10B	11-12-82	flowing	5.1	2,400	--	--	
	11-16-82	flowing	4.9	2,300	9.5	--	
10C	11-12-82	0.45	5.5	2,800	--	--	
	11-16-82	flowing	5.4	3,000	9.5	--	
11A	11-12-82	0.57	5.9	2,100	--	--	
	11-16-82	3.55	5.6	2,100	8.0	--	

TABLE 83.--Water-level and field water-quality data for test holes drilled with CME-750 rig--Continued

Test-hole number	Measurement date	Depth to water from top of casing (feet)	pH (units)	Specific conductance (umhos per centimeter)	Temperature (°C)	Dissolved oxygen (mg/L)	Remarks
11B	11-12-82	0.23	4.9	5,500	--	--	
	11-16-82	2.29	4.7	6,100	7.0	--	
11C	11-12-82	1.84	4.9	4,800	--	--	
	11-16-82	1.13	4.8	4,800	8.0	--	
14	10-26-82	32.13	2.6	5,400	--	--	
	04-06-83	27.7	3.0	5,400	11.0	0.08	
15	11-17-82	17.54	4.0	3,900	8.0	--	
16	11-08-82	50.12	4.0	2,900	7.0	--	
	11-16-82	51.24	4.0	3,100	7.0	--	
	04-06-83	49.73	4.1	2,700	7.0	0.12	
17A	11-08-82	50.40	2.5	4,100	--	--	
	11-17-82	50.59	2.6	3,800	11.0	--	
17B	11-08-82	46.00	6.2	2,800	--	--	
	11-17-82	45.95	6.0	3,000	8.0	--	
17C	11-08-82	80.00	4.4	2,600	--	--	
	11-17-82	72.53	4.2	3,000	11.0	--	
18A	11-12-82	0.23	4.8	2,300	--	--	
	11-16-82	flowing	4.2	2,300	7.0	--	
	11-29-82	flowing	4.5	2,200	7.0	--	
18B	11-12-82	0.14	4.5	--	--	--	
	11-16-82	0.20	4.2	2,900	7.0	--	
	11-19-82	0.83	4.3	3,400	7.0	--	

TABLE 83.--Water-level and field water-quality data for test holes drilled with CME-750 rig--Continued

Test-hole number	Measurement date	Depth to water from top of casing (feet)	pH (units)	Specific conductance (umhos per centimeter)	Temperature (°C)	Dissolved oxygen (mg/L)	Remarks
18C	11-12-82	0.76	6.1	3,300	—	—	
	11-16-82	1.74	5.4	3,200	7.0	—	
	11-29-82	1.65	5.5	3,100	7.0	—	
19A	11-09-82	24.90	4.6	2,500	9.0	—	
	12-15-82	26.25	5.1	1,900	7.5	—	
19B	11-09-82	18.90	4.0	2,600	9.0	—	
	12-15-82	19.00	3.8	2,500	8.0	—	
20	11-12-82	2.91	6.6	1,700	—	—	
	12-10-82	2.80	6.6	1,400	5.0	0.9	
	04-08-83	2.40	6.7	1,400	7.5	—	
20A	11-12-82	45.31	6.7	660	—	—	
	12-10-82	45.00	6.9	480	7.5	0.9	
	04-08-83	40.6	6.5	680	8.5	—	
21	11-15-82	39.10	6.9	2,050	6.0	—	
	12-15-82	39.21	7.0	1,700	7.0	—	
	04-08-83	39.1	6.8	1,700	7.0	—	Blockage at 66.2 ft
22	11-08-82	67.57	7.3	610	6.0	—	
	04-06-83	66.5	6.7	890	—	0.05	
23A	11-15-82	50.49	6.2	1,600	5.0	—	
	12-17-82	50.92	6.3	1,000	5.5	—	
24	11-08-82	50.54	7.0	850	7.0	—	
	12-17-82	51.17	7.0	660	6.0	—	

TABLE 83.--Water-level and field water-quality data for test holes drilled with CME-750 rig--Continued

Test-hole number	Measurement date	Depth to water from top of casing (feet)	pH (units)	Specific conductance (umhos per centimeter)	Temperature (°C)	Dissolved oxygen (mg/L)	Remarks
25	11-09-82	98.03	4.6	1,400	7.0	--	
	12-17-82	97.90	4.3	1,500	5.0	--	
26	11-08-82	84.42	1.8	18,000	7.0	--	
	11-17-82		1.8	22,000	13.0	--	
31	10-25-82	122.05	6.4	300	--	--	
32	10-25-82	40.37	5.1	360	--	--	
	04-06-83	39.4	4.4	300	--	0.20	
33	10-20-82	27.31	5.4	460	--	--	

TABLE 84.--Field water-quality data for water from shallow piezometers at base of waste dump

[Sample dates: row 1, July 7, 1982; rows 2-5, July 1, 1982]

Piezometer (row and number)	Water temperature (°C)	pH (units)	Specific conductance (umhos/cm)
1-1	--	3.3	2,200
1-2	(*a*)	(*a*)	(*a*)
1-3	--	3.3	2,600
1-4	--	3.2	2,400
1-5	--	3.5	2,200
1-6	(*a*)	(*a*)	(*a*)
1-7	--	2.9	2,600
1-8	8.3	2.9	2,900
1-9	--	(*a*)	(*a*)
2-1	10.0	2.6	2,700
2-2	11.0	2.6	2,600
2-3	9.0	3.1	2,300
2-4	10.0	2.4	2,800
2-5	9.4	3.1	2,300
2-6	(*a*)	(*a*)	(*a*)
3-1	10.0	2.7	2,500
3-2	11.0	2.6	2,600
3-3	9.3	2.7	2,600
3-4	12.0	2.8	3,100
4-1	12.0	3.3	3,300
4-2	9.7	3.0	3,400
4-3	(*a*)	(*a*)	(*a*)
4-4	8.5	3.0	3,100
5-1	12.5	3.7	2,200
5-2	10.0	3.3	3,300
5-3	8.5	3.2	3,300

[a] Piezometer dry at time of measurements.

TABLE 85.--Analyses of water samples from piezometers drilled with CME-750 rig

Analyses	Piezometer I.D.										
	1A	1B	1C	2A1	2A2	2C1	2C2	3B1	3C	4	5A
	Date Sampled										
	11-09-82	11-09-82	11-09-82	11-17-82	11-17-82	11-17-82	11-17-82	11-09-82	11-09-82	11-16-82	11-19-82
Acidity as H mg/l	2.8	12	2.8	194	70	170	0.6	4.1			6.2
pH (Lab) units	5.4	3.2	4.2	2.1	2.8	3.3	4.4	4.1		7.3	5.8
pH (Field) units	5.4	4.5	4.4	2.1	2.4	3.8	4.2	4.1	6.1	6.3	5.4
Specific Conductance (Field) umhos/cm	740	1600	1400	12000	5900	9400	5400	1300	1300	540	1300
Specific Conductance (Lab) umhos/cm	941	1720	1400	10800	5050	10900	5720	1510		487	1180
Water Temp. °C		6.0	7.0	10.0	9.0	8.5	7.5	8.0	9.0	7.0	8.0
Aluminum mg/l	1.6	25	9	770	270	760	130	32	< 0.1	< 0.1	0.4
Arsenic ug/l	150	130	11	33000	8400	22000	110	31	23	11	2
Barium ug/l	26	14	18	36	33	30	25	32	38	35	18
Beryllium ug/l	3	5	5	29	20	68	55	< 0.5	0.9	< 0.5	< 0.5
Cadmium ug/l	5	6	3	310	68	240	30	< 1	1	< 1	< 1
Calcium mg/l	72	140	150	310	350	390	410	250	150	11	170
Chloride mg/l	2.1	1.4	3.4	< 0.1	2.9	34	2.0	2.1		3.5	4.9
Chromium ug/l	< 10	10	< 10	2500	930	870	40	10	< 10	< 10	< 10
Cobalt ug/l	88	140	170	6600	1400	7500	2400	5	35	14	3
Copper ug/l	10	10	< 10	180	110	420	130	< 10	< 10	< 10	40
Iron (Fe^{+2}+Fe^{+3}) mg/l	70	230	140	240	870	2600	960	.021	29	.11	.010
Lead ug/l	10	< 10	< 10	< 50	< 30	< 50	< 30	10	< 10	< 10	< 10
Lithium ug/l	30	32	36	270	160	700	650	30	44	34	35
Magnesium mg/l	14	25	29	120	95	360	400	80	53	2.9	39
Manganese ug/l	5000	7800	13000	12000	12000	28000	62000	4000	7200	190	820
Molybdenum ug/l	< 10	< 10	< 10	< 50	< 30	< 50	< 30	< 10	10	< 10	< 10
Nickel ug/l	200	500	200	18000	5200	16000	5800	500	< 100	< 100	< 100
Silica mg/l	32	38	23	120	120	110	59	16	24	18	39
Sodium mg/l	11	13	19	60	34	680	26	46	34	80	34
Strontium ug/l	460	350	100	4700	2800	6400	380	2500	740	110	1100
Sulfate mg/l	380	990	840	11000	4800	13000	5400	930		69	660
Thallium ug/l	4	5	10	45	60	140	11	13	< 1	< 1	6
Vanadium ug/l	16	86	23	2300	850	1400	210	< 6	< 6	< 6	< 6
Zinc ug/l	100	310	590	3000	1600	8900	3400	27	91	12	58

TABLE 85.--Analyses of water samples from piezometers drilled with CME-750 rig--Continued

Analyses	Piezometer I.D.										
	6	7	8	8A	9A	9B	9C	10A	10B	10C	14
	Date Sampled										
	11-19-82	11-12-82	11-23-82	11-23-82	11-16-82	11-16-82	11-16-82	11-16-82	11-16-82	11-16-82	10-26-82
Acidity as H mg/l	4.1	2.0			14	40	56		7.0	2.6	110
pH (Lab) units	4.3	5.6	7.1	8.2	4.8	3.6	3.5	4.4	4.7	5.5	3.4
pH (Field) units	4.1	5.7	7.3	7.6	5.3	4.3	3.4	5.7	4.9	5.4	2.6
Specific Conductance (Field) umhos/cm	2200	2800	520	600	3100	4100	5000	2000	2300	3000	5400
Specific Conductance (Lab) umhos/cm	2280	2770	512	570	3170	4520	4800	1900	2280	2840	6010
Water Temp. °C	7.5		8.0	8.0	8.5	8.0	8.0	9.5	9.5	9.5	
Aluminum mg/l	29	0.1	< 0.1	< 0.1	1.1	68	160	< 0.1	6.5	200	580
Arsenic ug/l	< 1	700	5	12	87	270	4900	5	600	59	8
Barium ug/l	21	26	110	120	16	9	12	21	13	8	29
Beryllium ug/l	4.8	2	< 0.5	< 0.5	0.6	18	26	< 0.5	3	< 1.5	27
Cadmium ug/l	3	5	< 1	< 1	10	24	47	3	< 3	< 3	300
Calcium mg/l	370	180	35	26	340	440	430	300	310	510	390
Chloride mg/l	1.8	11	3.9	2.5	4.5	2	1.8	2.9	3.7	3.4	3.9
Chromium ug/l	10	< 10	< 10	< 10	10	30	210	10	20	10	50
Cobalt ug/l	360	280	< 3	< 3	1000	1100	3200	290	230	69	10000
Copper ug/l	310	10	< 10	10	10	40	50	< 10	< 30	< 30	6800
Iron (Fe^{+2}+Fe^{+3}) mg/l	.410	80	.017	.004	380	910	980	52	150	120	1200
Lead ug/l	< 30	10	< 10	< 10	40	< 30	< 30	10	60	< 30	< 30
Lithium ug/l	95	50	26	30	65	170	190	45	66	180	190
Magnesium mg/l	98	14	12	17	92	190	160	74	99	110	100
Manganese ug/l	16000	4400	130	31	34000	35000	31000	13000	6500	29000	68000
Molybdenum ug/l	< 30	< 30	10	< 10	< 10	< 30	30	< 10	< 30	< 30	< 30
Nickel ug/l	600	1000	< 100	< 100	1300	4000	8300	400	600	400	22000
Silica mg/l	40	11	17	16	23	27	110	25	37	11	130
Sodium mg/l	24	370	55	70	130	40	40	28	34	38	37
Strontium ug/l	1400	2200	730	900	2800	1600	1500	3300	2200	410	4600
Sulfate mg/l	1600	1500	150	110	2200	4100	4500	1200	1600	2000	7000
Thallium ug/l	11	11	< 1	< 1	22	33	120	1	< 1	7	62
Vanadium ug/l	< 18	13	< 6	< 6	50	270	470	< 6	42	< 18	460
Zinc ug/l	540	560	26	12	400	740	1900	41	98	110	2200

TABLE 85.--Analyses of water samples from piezometers drilled with CME-750 rig--Continued

Analyses	Piezometer I.D.										
	15	16	17A	17B	17C	20	21	23A	24	25	26
	Date Sampled										
	11-17-82	11-16-82	11-17-82	11-17-82	11-17-82	11-12-82	11-15-82	11-15-82	11-08-82	11-09-82	11-17-82
Acidity as H mg/l	55	17	45		15					0.2	275
pH (Lab) units	3.9	3.8	2.7	6.4	3.9	7.7	7.7	6.9	7.2	4.9	1.6
pH (Field) units	4.0	4.0	2.6	6.0	4.2	6.6	7.0	6.2	7.0	4.6	1.8
Specific Conductance (Field) umhos/cm	3900	3100	[illegible]	[illegible]	3000	1700	[illegible]	1600	850	1400	22000
Specific Conductance (Lab) umhos/cm	4830	3100	2950	3180	3140	1740	1870	1490	910	1620	18000
Water Temp. °C	8.0	7.0	11.0	8.0	11.0		6.0	5.0	7.0	7.0	13.0
Aluminum mg/l	150	24	190	0.1	100	<0.1	<0.1	<0.1	<0.1	1	1100
Arsenic ug/l	1	56	16000	270	320	11	2	2	8	2	35000
Barium ug/l	23	15	13	29	16	70	33	23	35	14	44
Beryllium ug/l	18	11	7	<0.5	26	0.9	0.7	<0.5	<0.5	8	28
Cadmium ug/l	77	9	70	1	9	<1	<1	1	<1	4	230
Calcium mg/l	450	430	74	700	460	250	370	66	130	200	99
Chloride mg/l	2.8	1.6	1.8	7.2	1.5	7.7	4.3	74	20	5	<0.1
Chromium ug/l	80	10	590	10	50	<10	10	<10	<10	<10	3200
Cobalt ug/l	3700	790	2100	210	530	6	<3	32	42	220	8400
Copper ug/l	410	50	350	<10	1800	20	<10	<10	<10	1200	5500
Iron (Fe^{+2}+Fe^{+3}) mg/l	860	340	530	15	54	.13	.059	2.2	2	5.1	2200
Lead ug/l	<30	50	<30	<10	<30	<10	<10	<10	10	<10	100
Lithium ug/l	150	150	58	86	140	6	43	43	43	54	310
Magnesium mg/l	170	97	23	110	100	83	58	17	18	55	46
Manganese ug/l	19000	23000	4600	25000	40000	180	140	1200	3500	6100	5200
Mercury ug/l											
Molybdenum ug/l	<30	<30	<30	<10	<30	<10	<10	<10	<10	<10	<100
Nickel ug/l	8000	2400	5800	200	1500	<100	<100	<100	<100	100	24000
Silica mg/l	92	41	89	14	51	58	39	39	34	45	150
Sodium mg/l	58	23	23	28	54	47	21	220	25	10	22
Strontium ug/l	3800	970	1700	1500	1400	80	2900	890	390	670	4900
Sulfate mg/l	4600	2300	2500	1600	2600	840	890	520	200	40	14000
Thallium ug/l	53	30	220	3	18	<1	<1	2	<1	5	6000
Vanadium ug/l	160	58	470	<6	<18	<6	<6	<6	<6	<6	2900
Zing ug/l	11000	710	1100	250	1400	21	17	52	59	500	45000

TABLE 85.--Analyses of water samples from piezometers drilled with CME-750 rig--Continued

Analyses	Piezometer I.D.		
	31	32	33
	Date Sampled		
	10-[illegible]-82	10-[illegible]-82	10-[illegible]-82
Acidity as H mg/l		0.2	
pH (Lab) units	7.4	4.5	6.3
pH (Field) units	6.4	5.1	5.4
Specific Conductance (Field) umhos/cm	[illegible]	[illegible]	460
Specific Conductance (Lab) umhos/cm	253	300	387
Water Temp. °C			
Aluminum mg/l	<0.1	1	<0.1
Arsenic ug/l	8	3	4
Barium ug/l	91	46	76
Beryllium ug/l	<0.5	<0.5	3
Cadmium ug/l	<1	<1	2
Calcium mg/l	23	21	33
Chloride mg/l	2.1	1.9	1.5
Chromium ug/l	<10	<10	<10
Cobalt ug/l	9	24	9
Copper ug/l	<10	20	20
Iron (Fe^{+2}+Fe^{+3}) mg/l	.033	.85	.21
Lead ug/l	<10	40	<10
Lithium ug/l	27	32	26
Magnesium mg/l	7.9	3.2	9.2
Manganese ug/l	49	250	480
Molybdenum ug/l	<10	<10	<10
Nickel ug/l	<100	<100	<100
Silica mg/l	55	73	80
Sodium mg/l	12	15	23
Strontium ug/l	320	240	320
Sulfate mg/l	22	120	140
Thallium ug/l	<1	2	<1
Vanadium ug/l	<6	<6	<6
Zinc ug/l	12	130	73

TABLE 86.--Data from hydraulic-conductivity tests on piezometers drilled with CME-750 rig

[August 16-18, 1982, except as indicated]

Test-hole number	Length of perforated interval (feet)	Piezometric head before test (feet above bottom of hole)	Hydraulic conductivity (feet per day)
1A	40	73.50	[a]2.0
1C	20	47.33	1
2A1	6	19.50	19
2A2	3	8.33	26
2B1	4.5	11.00	.2
2C1	5	10.50	.02
2C2	5	8.00	.8
3A	10	[c]16.37	1.3
3B1	10	[c]57.00	1.9
3C	10	[c]42.12	.4
4	20	48.70	.5
5A	10	8.83	16
6	20	24.75	2.3
7	20	115.42	.4
8	10	65.92	.2
8A	10	25.00	.1
9A	5	47.83	.5
9B	5	24.00	1.4
9C	5	14.58	1.6
10A	5	50	[b]1.4
10B	5	25	[b]4.3
10C	5	15	[b]4.7
11A	5	54.12	.5
11B	5	29.75	.4
11C	5	13.12	.01
14	10	58.58	.8
15	12.5	14.00	.4
17A	10	14.67	.6
17B	10	25.54	.7
17C	10	21.92	1
18A	5	47	[b]5.2
18B	5	24.75	.4
18C	5	14.21	.05
19A	10	55.37	2.2
19B	10	21.00	2
20	10	[c]29.25	.4
20A	10	[c]47.12	1
21	10	5.83	6.2
22	10	23.67	.7
24	10	14.00	1.3
25	10	16.75	1.9
31	30	35.5	[a]5.3
32	15	88.25	1.6
33	40	94.42	1.4

[a] Alternative method used to calculate hydraulic conductivity (see text).

[b] Piezometer flowing before test.

[c] December 15, 1982.

TABLE 87.--Data from hydraulic-conductivity tests on shallow piezometers at base of waste dump

[Row 1, May 17, 1982; row 2, May 18, 1982; rows 3 and 4, June 25, 1982; row 5, June 28, 1982]

Piezometer (row and number)	Length of perforated interval (feet)	Piezometric head before test (feet above bottom of hole)	Hydraulic conductivity (feet per day)
1-1	0.5	2.92	0.11
1-2	.5	dry	--
1-3	3.3	12.86	.1
1-4	.5	3.20	.8
1-5	3.3	8.31	[a].5
1-6	.5	dry	--
1-7	.5	.80	[a]1.0
1-8	.5	3.20	[a]1.8
1-9	.5	.36	2.3
2-2	.5	4.32	.8
2-4	.5	5.47	.5
2-5	1.7	11.69	[a].2
2-6	.5	1.18	.1
3-1	.5	7.53	.1
3-2	.5	3.63	.6
3-3	.5	8.91	[a].06
3-4	.5	4.65	[a].05
4-1	.5	6.27	.6
4-2	.5	4.23	[a].05
4-3	.5	3.46	[a].04
4-4	.5	8.39	.5
5-1	1.7	4.05	.08
5-2	1.7	5.72	.2
5-3	1.7	4.52	.4

[a] Alternative method used to calculate hydraulic conductivity (see text).

TABLE 88.--Water content and bulk density of cores from test holes drilled with CME-750 rig

Test-hole number	Depth (feet below land surface)	Water Content (by weight)	Bulk Density (grams/cm^3)
IA	5	(a)	(a)
	10	(b)	(b)
	15	.43	1.0
	20	.35	1.31
	25	.32	1.5
	30	.26	1.43
	38	.30	1.33
	50	.26	(c)
	60	.23	1.39
	70	.34	1.37
	80	.25	1.45
	90	.28	1.2
	100	(b)	(b)
IAN	5	0.34	1.27
	10	(a)	(a)
	15	.34	1.33
	20	.44	(c)
	25	.29	1.81
	30	.20	1.2
	40	.33	1.5
	50	.22	2.13
	60	.28	1.58
	70	.40	1.53
	80	.23	1.57
	90	.44	(c)
	100	.34	1.61
IAL	20	0.36	1.48
	40	(b)	(b)
	60	.39	1.09
	80	.18	1.38
	100	.40	1.09
IB	5	0.31	1.62
	10	.23	(c)
	18	.38	1.30
	30	.41	1.32
	40	.28	(c)
	60	.34	1.1
	80	.38	1.3
	90	.35	1.78
	110	.29	1.67

TABLE 88.--Water content and bulk density of cores from test holes drilled with CME-750 rig--Continued

Test-hole number	Depth (feet below land surface)	Water Content (by weight)	Bulk Density (grams/cm^3)
IBN	5	0.13	1.7
	10	.39	1.18
	15	.37	1.1
	20	.40	1.15
	25	.21	1.4
	30	.33	1.3
	40	.35	1.2
	50	.32	1.7
	60	.29	1.42
IBL	20	0.22	1.26
	40	.26	1.19
	60	.29	1.02
IC	5	0.47	1.54
	10	.43	(c)
ICN	10	0.38	1.27
	15	.38	1.02
	20	.43	1.18
	25	.40	1.94
	30	.37	1.00
	40	.37	1.14
	50	.27	1.81
	60	.26	2.13
ICL	20	0.44	1.21
	40	.28	1.49
	60	.26	1.79
2C1	10	0.53	1.27
	20	.58	1.42
3B1	5	0.25	1.10
	10	.32	1.50
	20	.36	(c)
	25	.34	1.30
	30	.38	(c)
	40	.42	1.16
	50	.50	1.1
	60	.32	0.94
	70	.35	1.1
	80	.28	1.3

TABLE 88.--Water content and bulk density of cores from test holes drilled with CME-750 rig--Continued

Test-hole number	Depth (feet below land surface)	Water Content (by weight)	Bulk Density (grams/cm^3)
3C	5	0.36	0.8
	10	.55	.9
	15	.52	.9
	20	.46	1.16
	25	.41	1.20
	30	.45	1.29
	40	.43	(c)
	50	.42	1.36
3CN	10	0.70	1.64
	19	.29	(c)
	39	0.42	1.21
	49	.35	1.70
4	10	0.58	0.77
	15	.15	1.42
	20	.55	.93
	25	.42	.97
	30	.18	1.68
	40	.26	1.28
	60	.31	1.61
	70	.27	1.66
	80	.24	1.50
5	5	0.50	0.73
	10	.41	1.20
	15	.51	1.04
	20	.37	1.30
	25	.37	1.36
	30	.26	1.70
	40	.30	1.37
	50	.22	1.55
	80	(b)	(b)
5A	25	0.21	1.60
	30	.08	1.7
6	5	0.72	0.8
	10	.60	1.02
	15	.47	1.07
	20	.47	1.18
	25	.43	1.36
	30	.47	1.21

TABLE 88.--Water content and bulk density of cores from test holes drilled with CME-750 rig--Continued

Test-hole number	Depth (feet below land surface)	Water Content (by weight)	Bulk Density (grams/cm^3)
8	5	0.20	1.39
	15	.24	1.53
	20	.21	(c)
14	80	0.26	1.39
16	20	0.34	(c)
	40	.37	1.35
	60	.27	1.60
19A	10	0.45	1.3
	20	.43	1.2
	30	.38	1.27
	40	.46	1.2
	50	.37	1.1
20	5	0.49	(c)
	10	(b)	(b)
	15	.36	(c)
	20	.47	1.17
	25	.52	1.06
20A	30	0.35	1.48
	40	(b)	(b)
	50	.37	1.00
	60	.30	1.38
21	6	0.51	1.15
	8	.43	1.1
	10	.25	1.33
	12	.22	1.53
	14	.20	1.47
22A	60	0.21	1.4

[a] Sample was unconsolidated and had dried out.

[b] Six-inch unsegmented sample was saved for other hydraulic tests.

[c] Core contained irregularly shaped rocks protruding from core surface; this excess volume could not be estimated.

TABLE 89.--General mineralogy of selected cores from piezometers drilled with CME-750 rig

Test-hole number	Depth of core (feet below land surface)	Semiquantitative determinations			
		Major	Moderate	Minor	Trace
1B	5	Plagioclase Smectite	Alunite Goethite	--	Chlorite
	18	Quartz Smectite	Sanidine Goethite Alunite	Pyrite Chlorite [a]Halloysite	--
	40	Smectite Tridymite	Sanidine Goethite	Gypsum Pyrite	--
	60	Smectite	--	--	Chlorite
	80	Tridymite Kaolinite	Pyrite	--	[a]Quartz
1C	90	Tridymite	Kaolinite Stilpnomelane	Pyrite	--
10	120	Smectite	--	--	Plagioclase or Sanidine Goethite [a]Celestite
3A	[b]50-69	Plagioclase Calcite Smectite	--	Pyroxene	--
	[b]89-98	Plagioclase Calcite	Smectite	Pyroxene	--
3B1	15	Quartz	Pyroxene	Anatase Chlorite	--
	50	Opal-CT	Quartz Pyroxene	Anatase Kaolinite	-- --
	80	Quartz	--	Anhydrite Elemental sulfur Pyrite [a]Hermatite [a]Jarosite	--

TABLE 89.--General mineralogy of selected cores from piezometers drilled with CME-750 rig--Continued

Test-hole number	Depth of core (feet below land surface)	Semiquantitative determinations			
		Major	Moderate	Minor	Trace
3C	5	Tridymite Smectite	Kaolonite Chlorite Alunite	Natrojarosite Quartz	Pyrite
	10	Smectite	Goethite	Chlorite or Kaolinite Sanidine	--
	20	Smectite	--	Sanidine	--
	30	Smectite	--	Gypsum	Sanidine
	50	Smectite	--	Kaolinite Sanidine Geothite Pyrite	--
	70	Quartz	--	--	Pyrite Anhydrite Illite [a]Acmite-Augite [b]Amphibole
	73	Quartz	--	[a]Anatase	--
	80	Smectite	Plagioclase or Sanidine	Quartz Geothite	--
4	40	Plagioclase Calcite Smectite	--	Pyroxene	--
	90	Plagioclose Calcite	Smectite Quartz Pyroxene	--	--
5	103	Plagioclase Smectite Orthoclase	Calcite	Pyroxene Muscovite	--

TABLE 89.--General mineralogy of selected cores from piezometers drilled with CME-750 rig--Continued

Test-hole number	Depth of core (feet below land surface)	Semiquantitative determinations			
		Major	Moderate	Minor	Trace
20	20	Quartz Plagioclase	Smectite	Kaolmite [a]Pyrite	--
20A	40	Plagioclase Smectite	Pyroxene	[a]Pentlandite [a]Rhodochrosite	--
	90.5	Plagioclase	Smectite Quartz Pyroxene	Muscovite	--
21	10	Plagioclase Smectite	Pyroxene	Quartz Calcite	--
	23	Plagioclase Calcite	Smectite	--	--
	29	Plagioclase	Pyroxene Smectite	Calcite	--
	37	Cristobalite Plagioclase	Smectite	--	--
	43	Plagioclase Calcite	Smectite	Corellite	--

[a] Some uncertainty in mineral identification.

[b] Composite sample of return cuttings from auger flights.

TABLE 90.--Clay mineralogy of selected cores from piezometers drilled with CME-750 rig

Test-hole number	Depth of core (feet below land surface)	Percent of total clay content in size fraction smaller than 2 micrometers		
		Smectite	Kaolinite	Illite
3A	25	77	23	0
3A	30	[a]100	0	0
3B1	30	83	17	0
4	80	79	0	21
5	50	[b]100	0	0
5	100	[a]100	0	0
20	10	94	6	0
20	25	77	23	0
20A	60	100	0	0
20A	90.5	100	0	0
21	23	100	0	0
21	37	100	0	0
21	43	100	0	0

[a] Regularly stratified mixed-layer smectites.

[b] Sample was dominated by carbonate minerals.

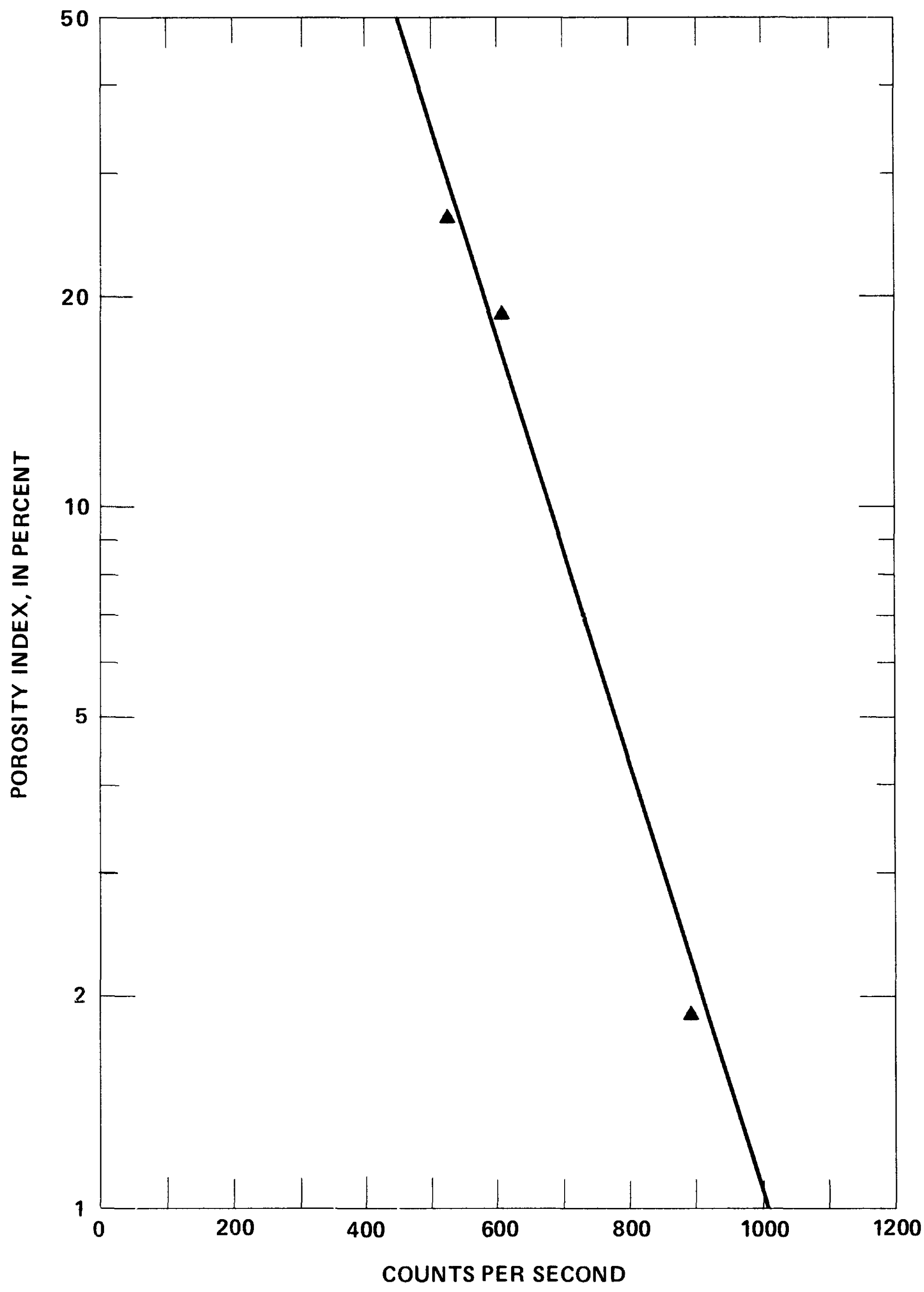


FIGURE 6.--Calibration curve for neutron-porosity logs.

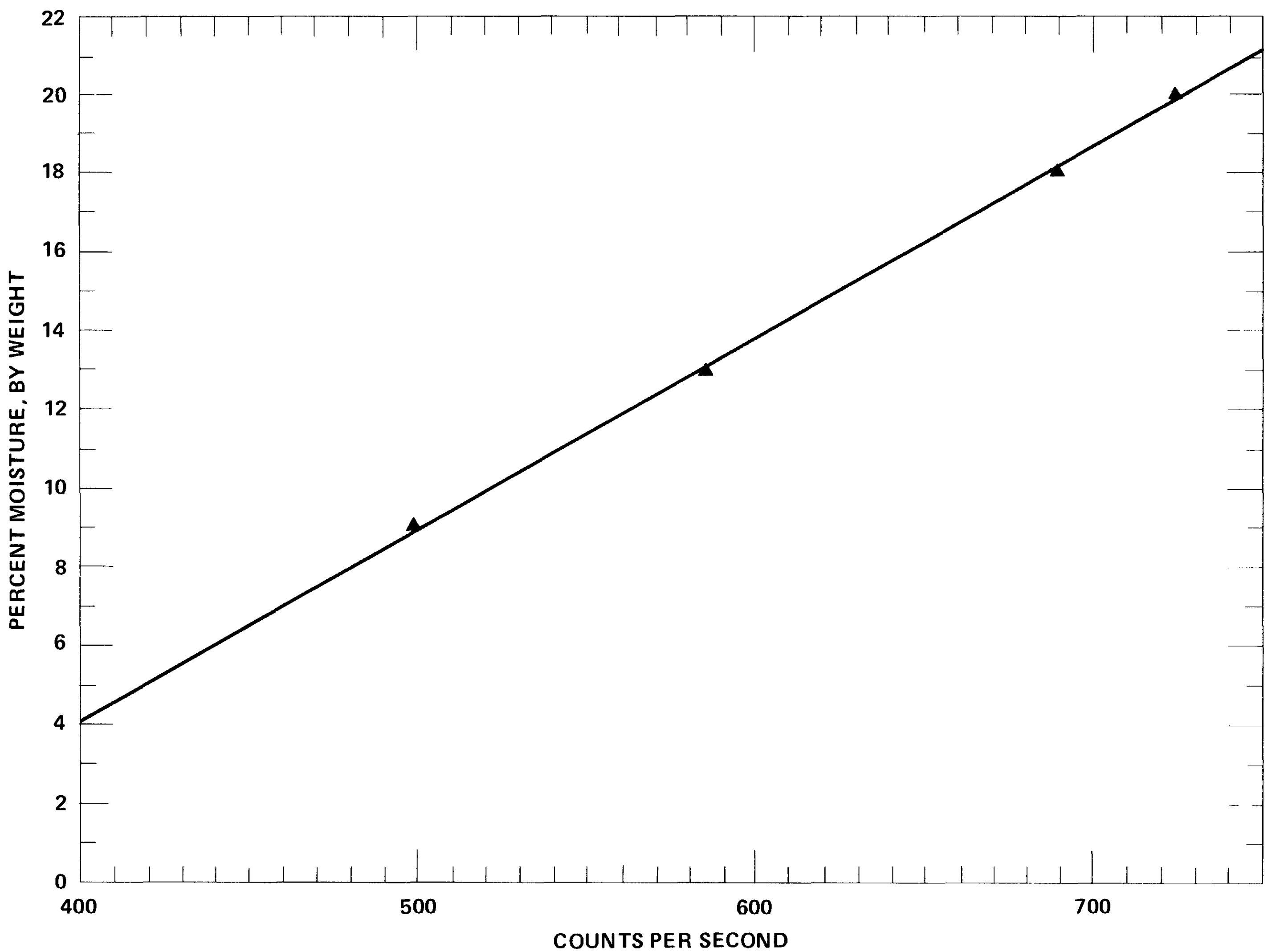


FIGURE 7.--Calibration curve for neutron-moisture logs.

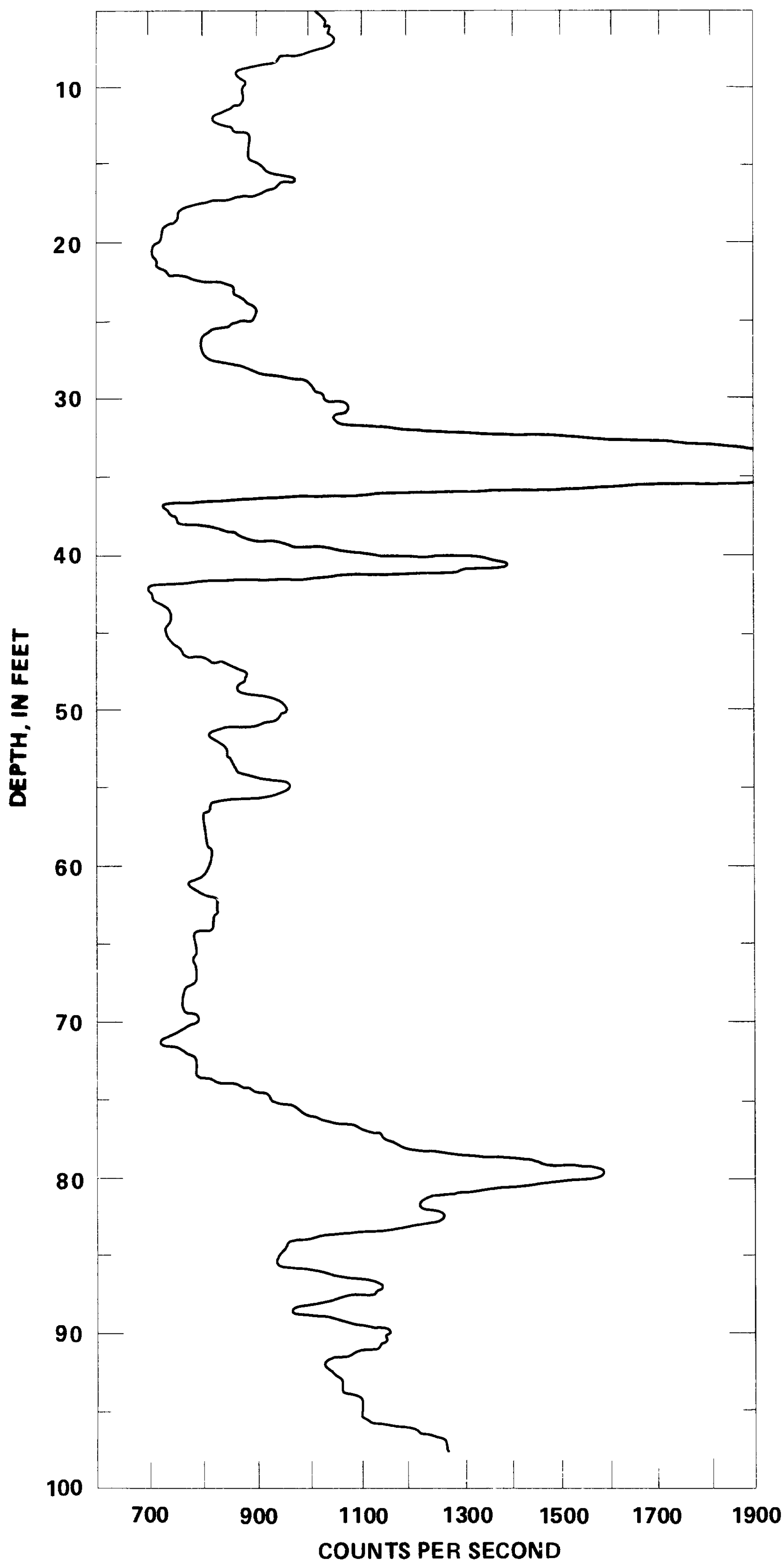


FIGURE 8.--Neutron-porosity log, test hole 1AN.

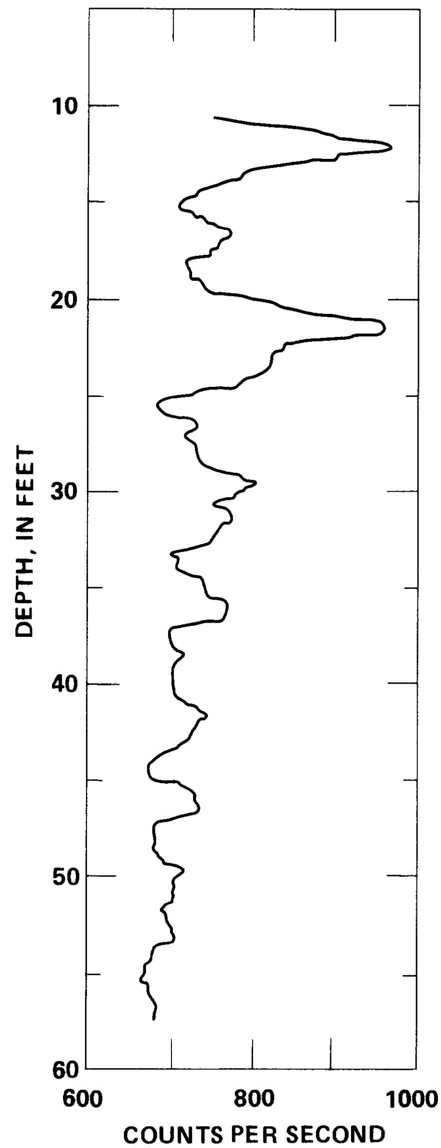


FIGURE 9.--Neutron-porosity log, test hole 1BN.

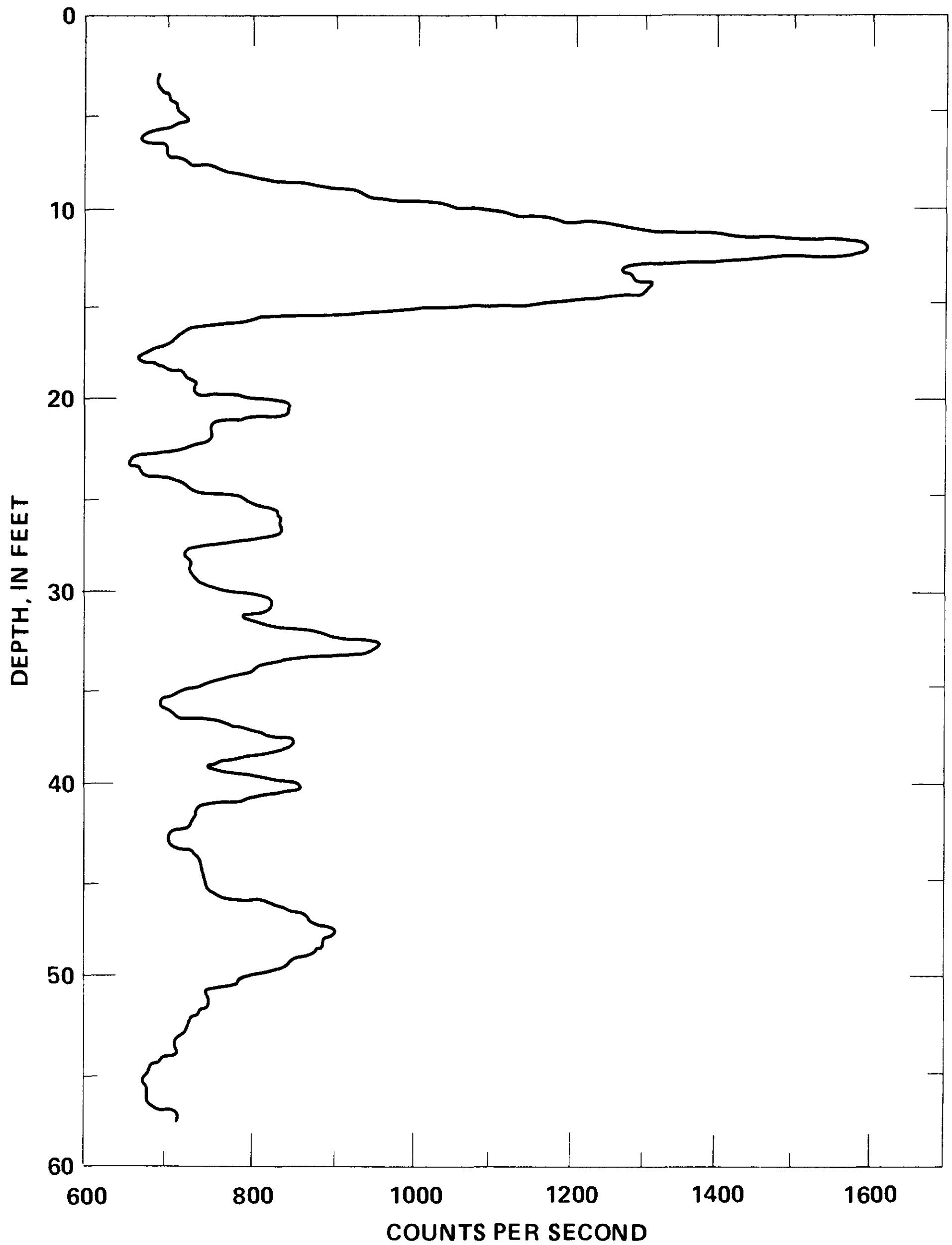


FIGURE 10.--Neutron-porosity log, test hole 1CN.

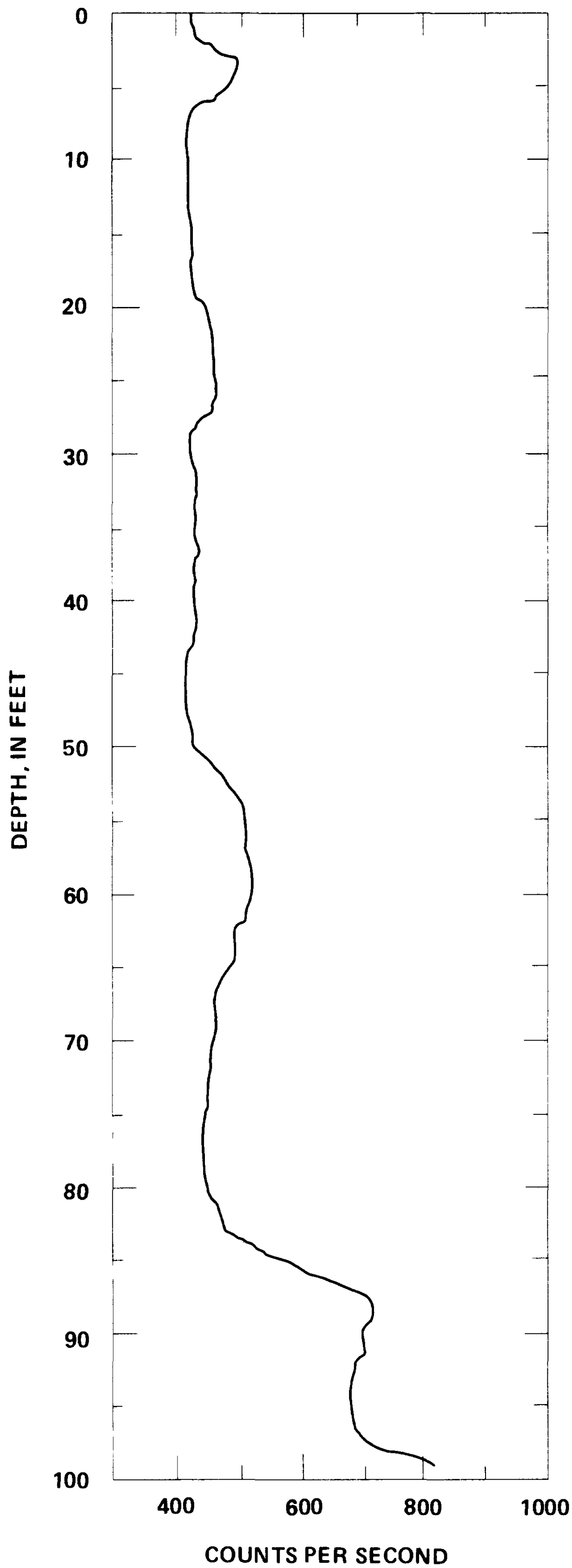


FIGURE 11.--Neutron-moisture log, test hole 1AN.

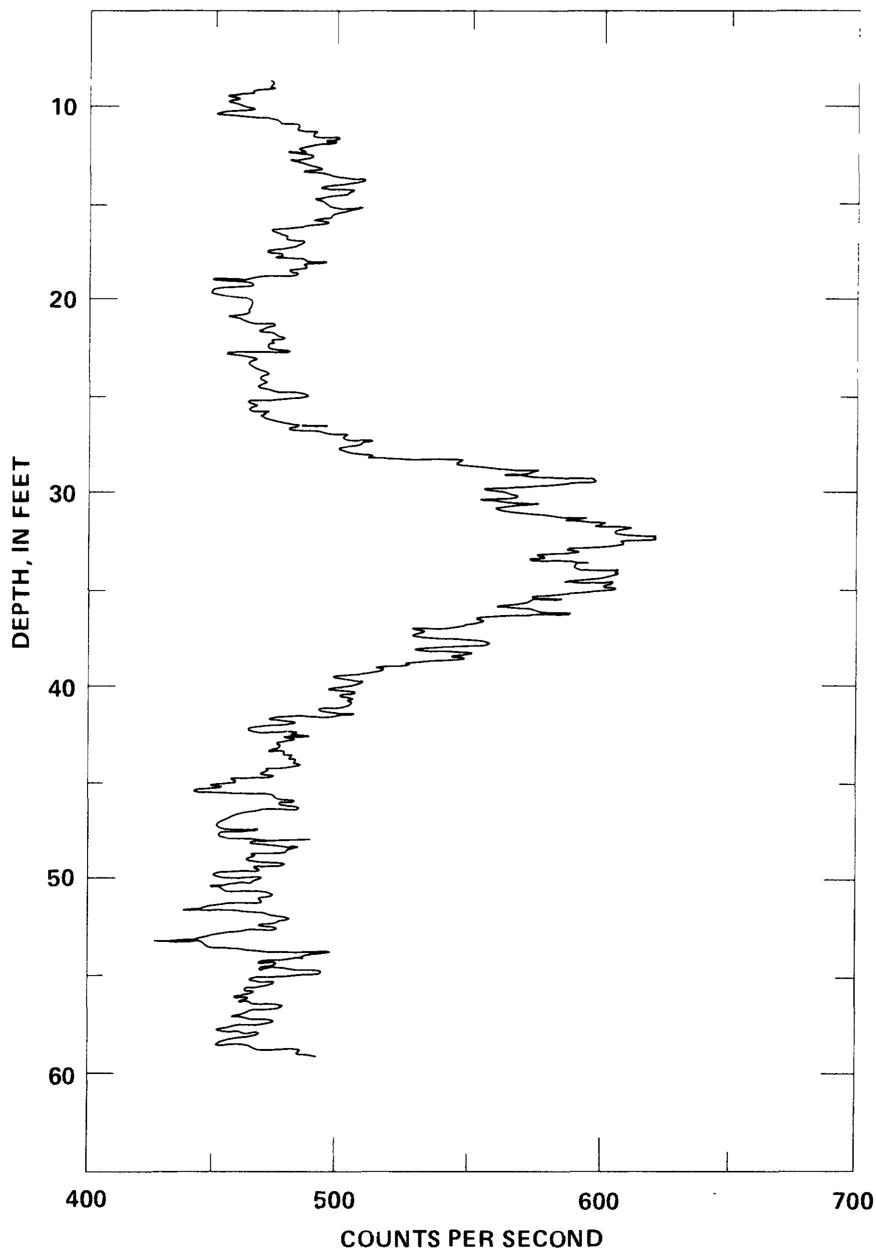


FIGURE 12.--Neutron-moisture log, test hole 1BN.

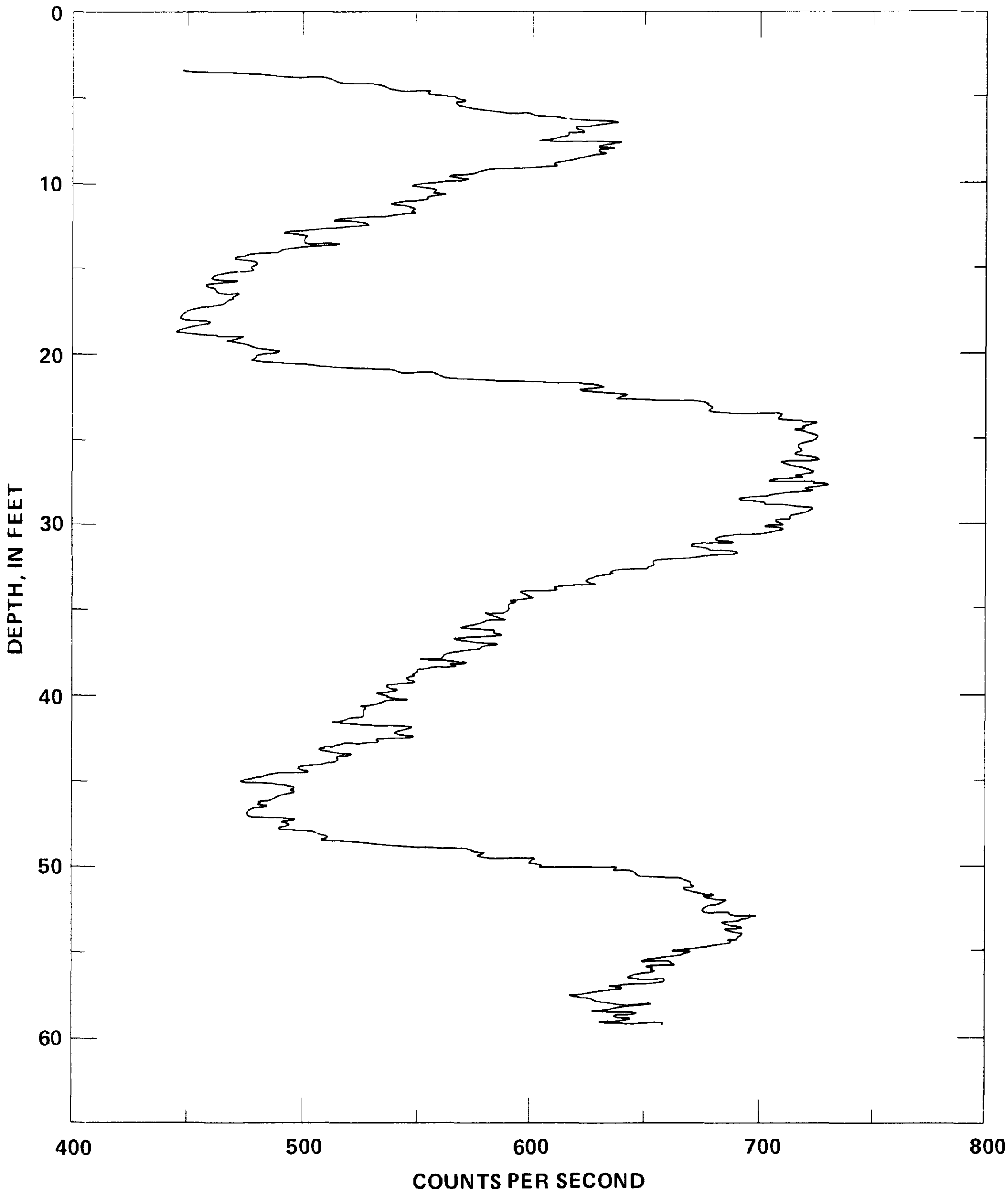


FIGURE 13.--Neutron-moisture log, test hole 1CN.

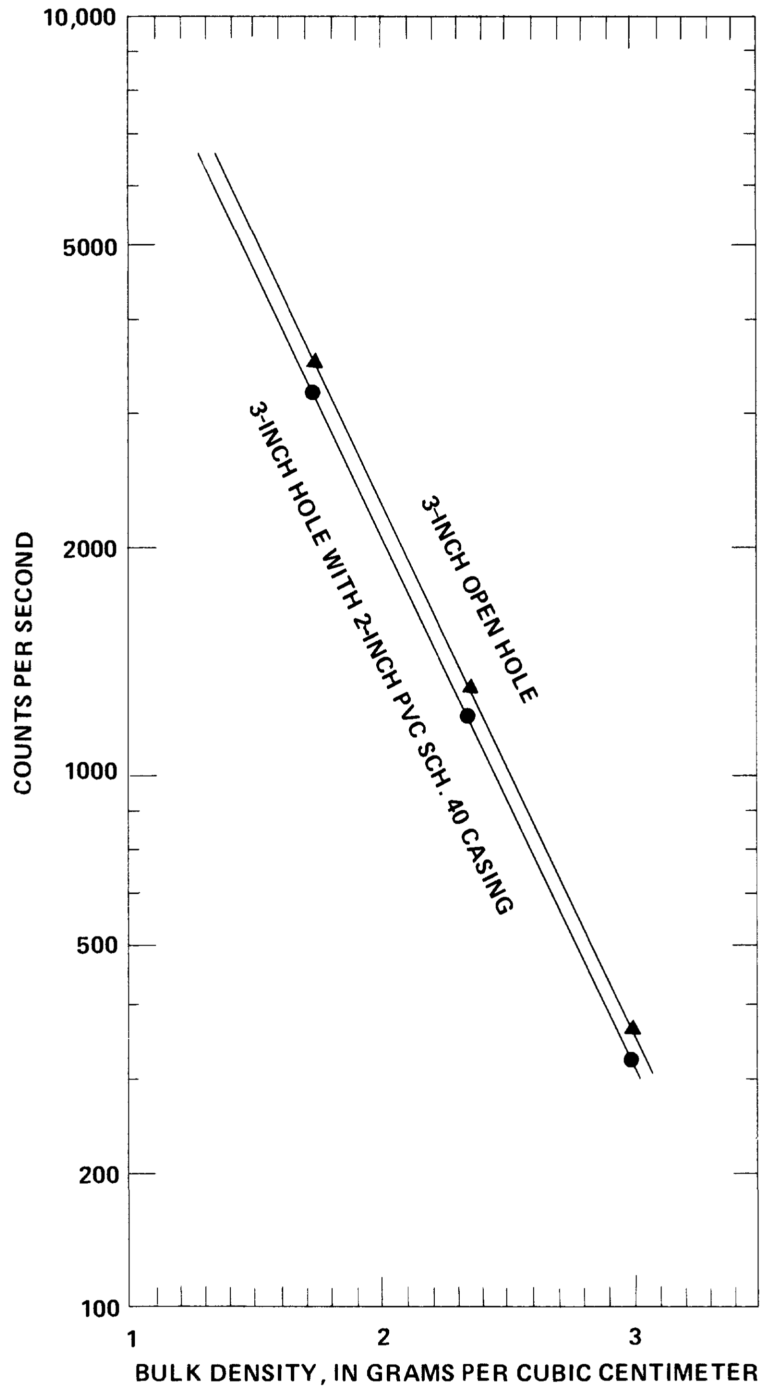


FIGURE 14.--Calibration curves for gamma-gamma log versus bulk density.

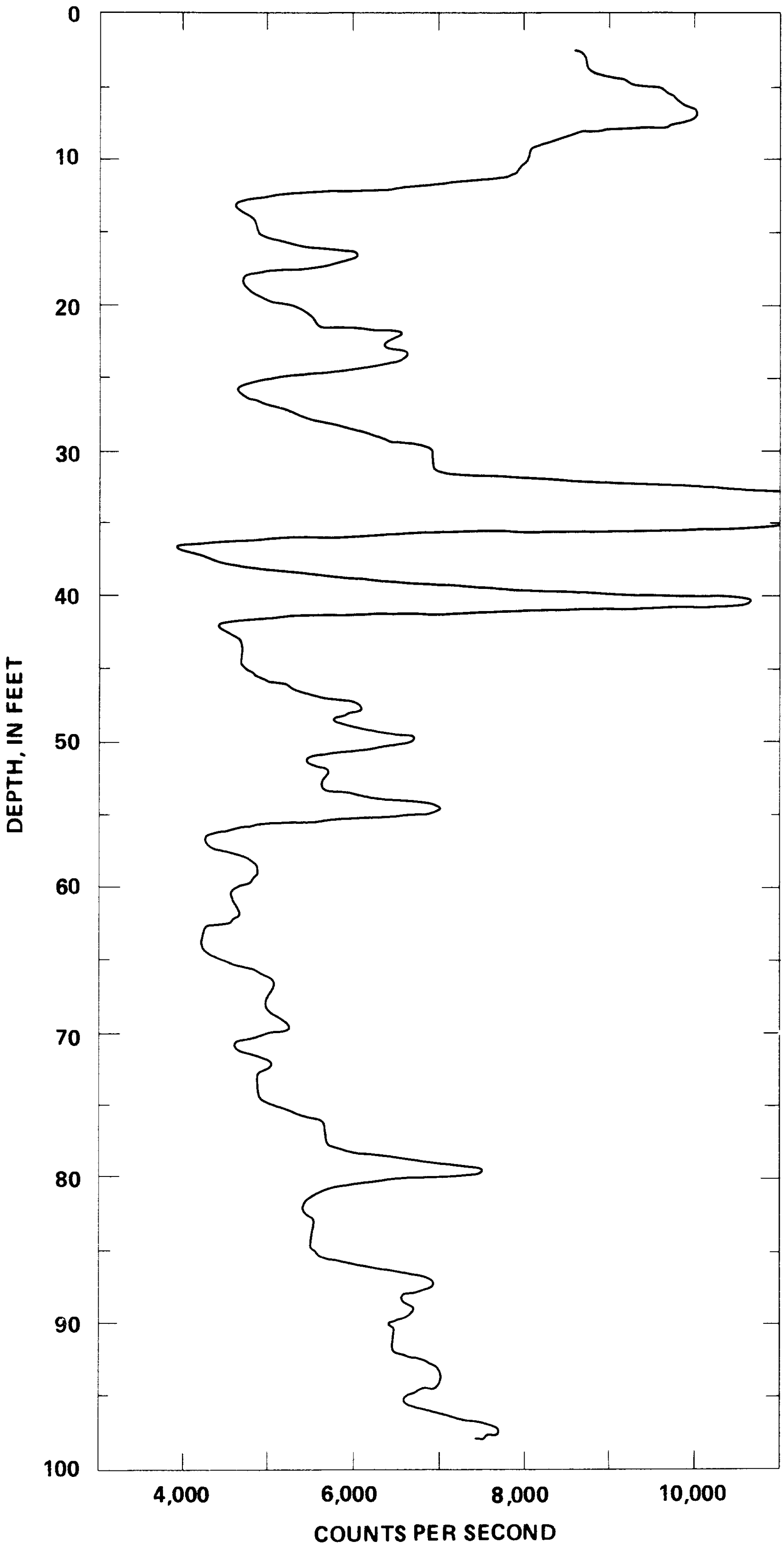


FIGURE 15.--Gamma-gamma density log, test hole 1AN.

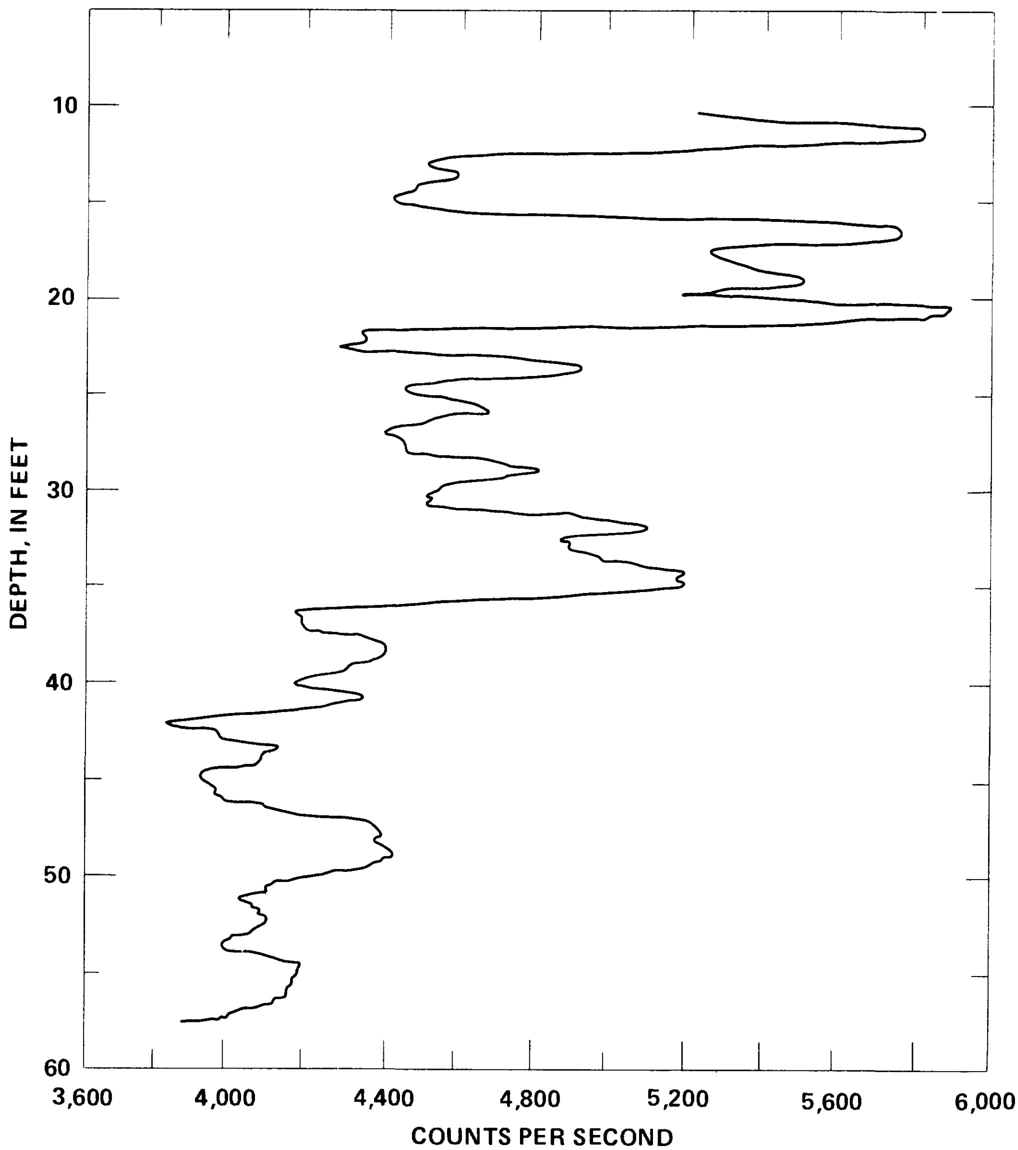


FIGURE 16.--Gamma-gamma density log, test hole 1BN.

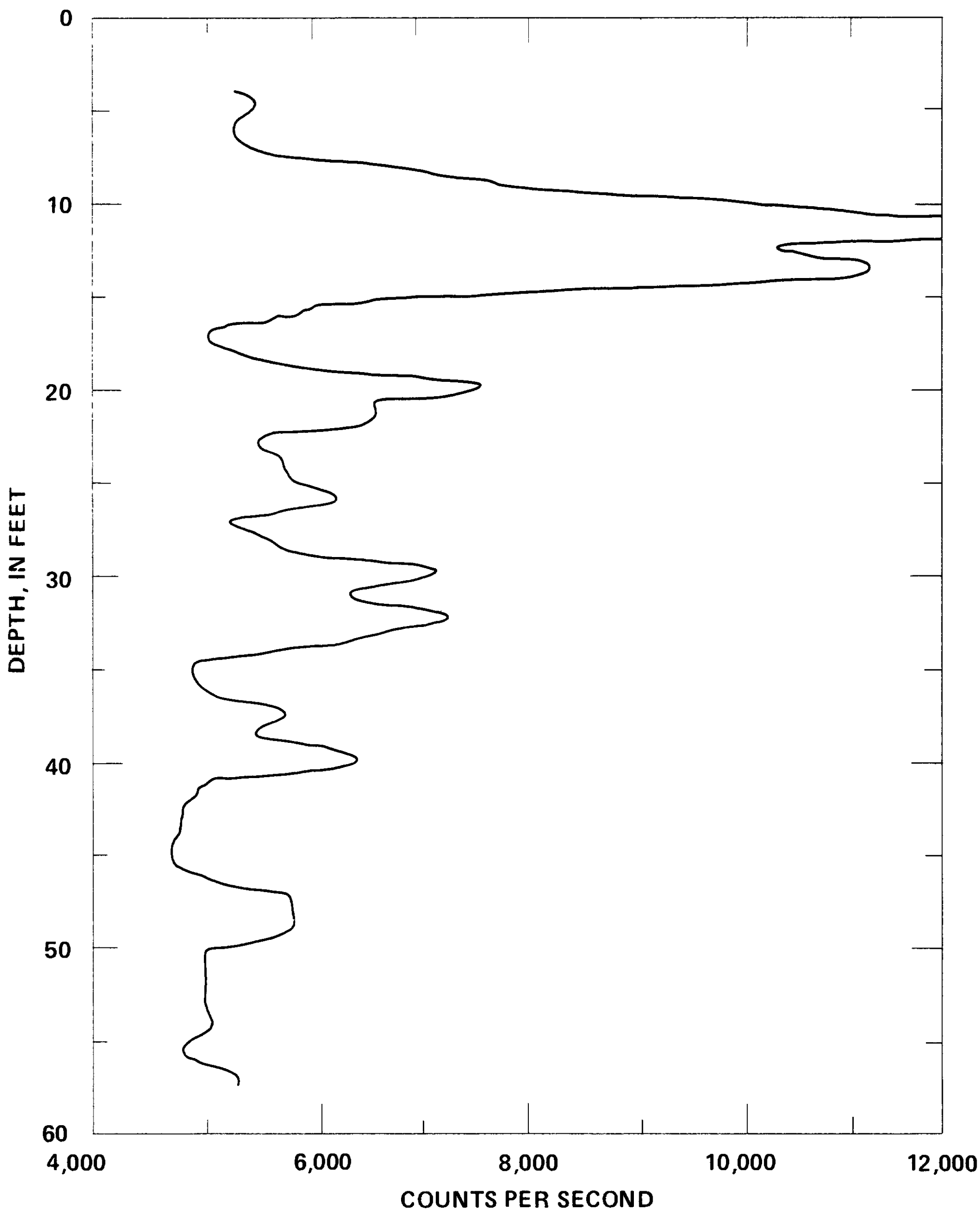


FIGURE 17.--Gamma-gamma density log, test hole 1CN.

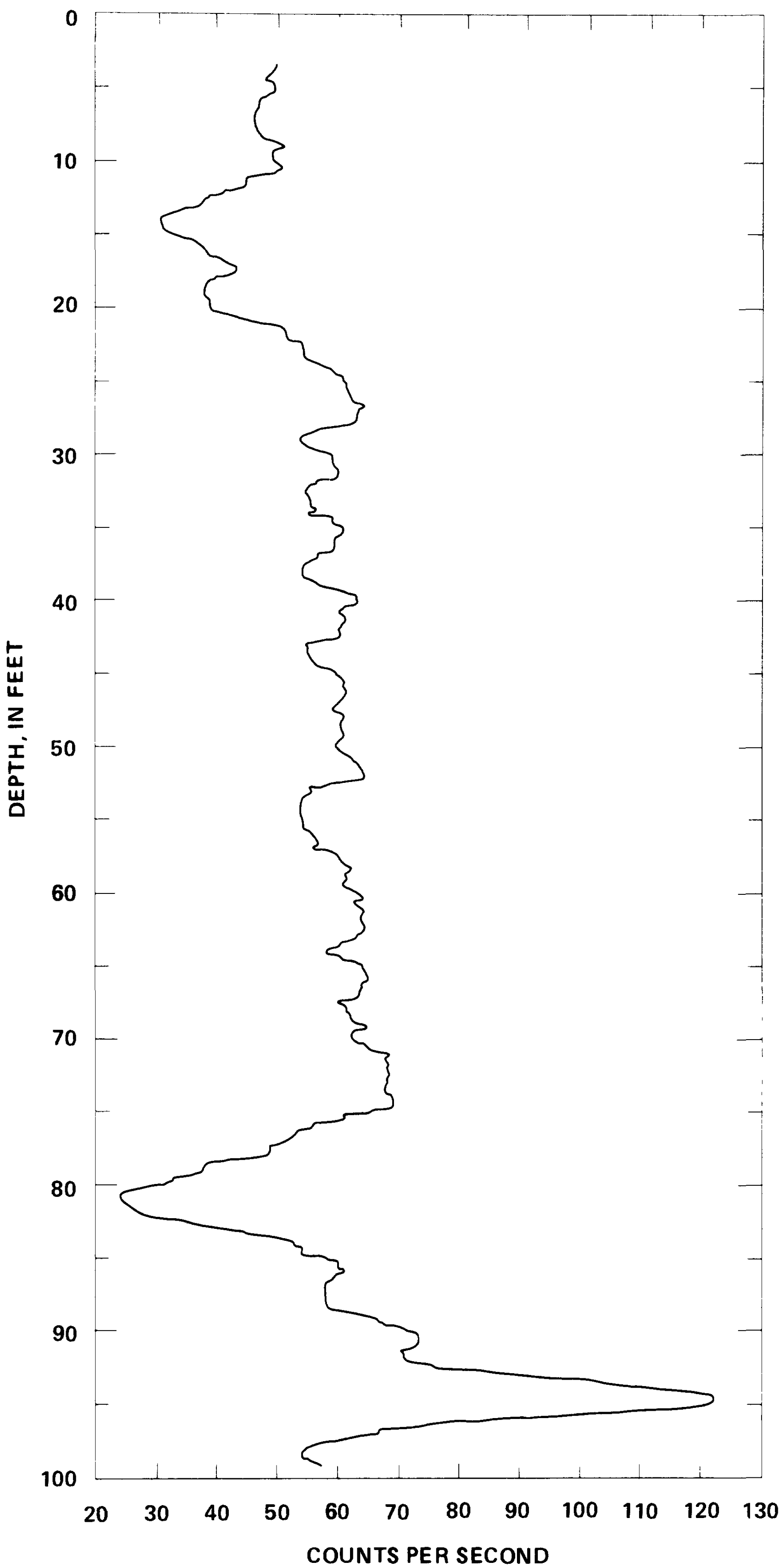
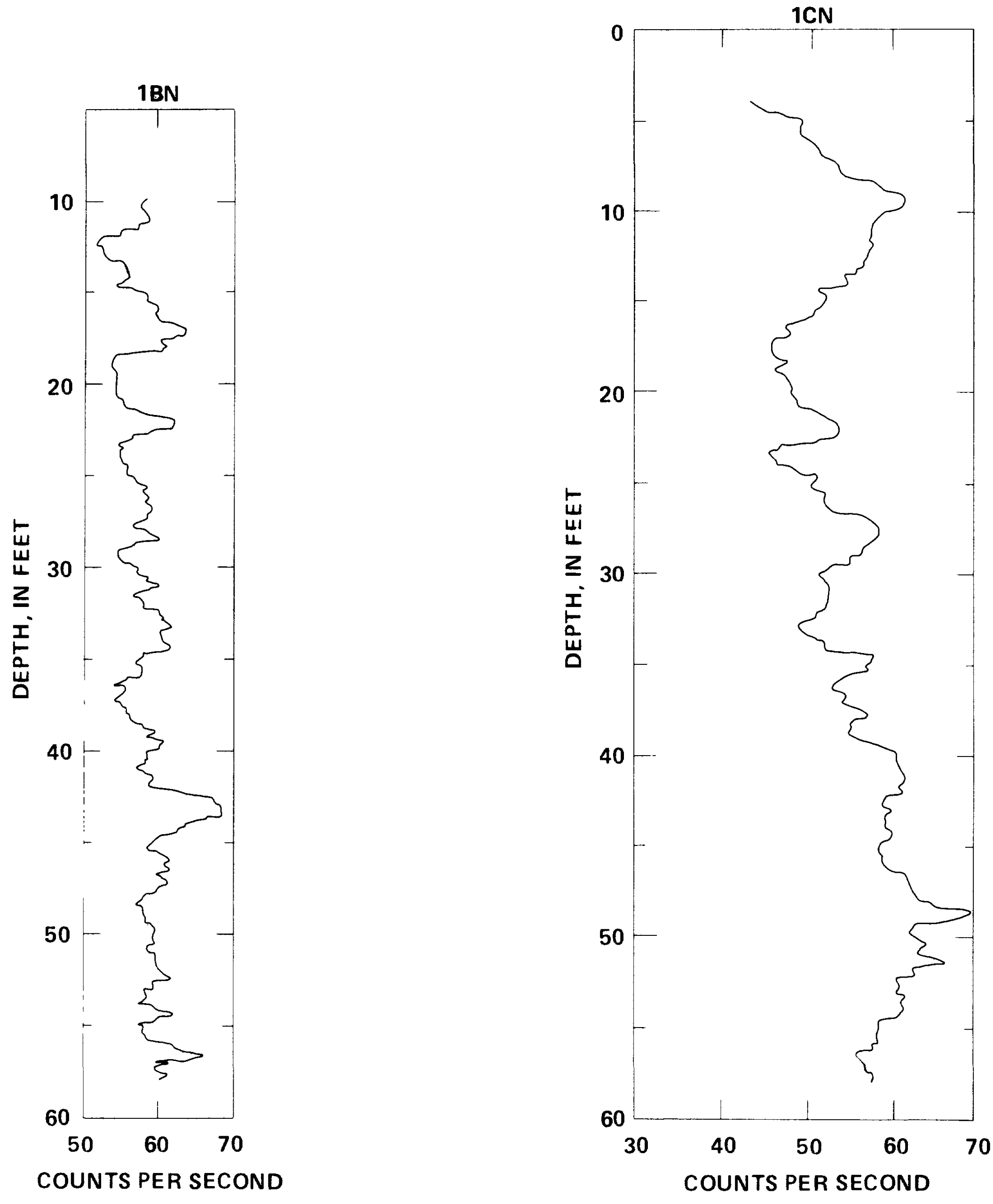


FIGURE 18.--Natural-gamma log, test hole 1AN.



FIGURES 19 and 20.--Natural-gamma logs for test holes 1BN and 1CN.

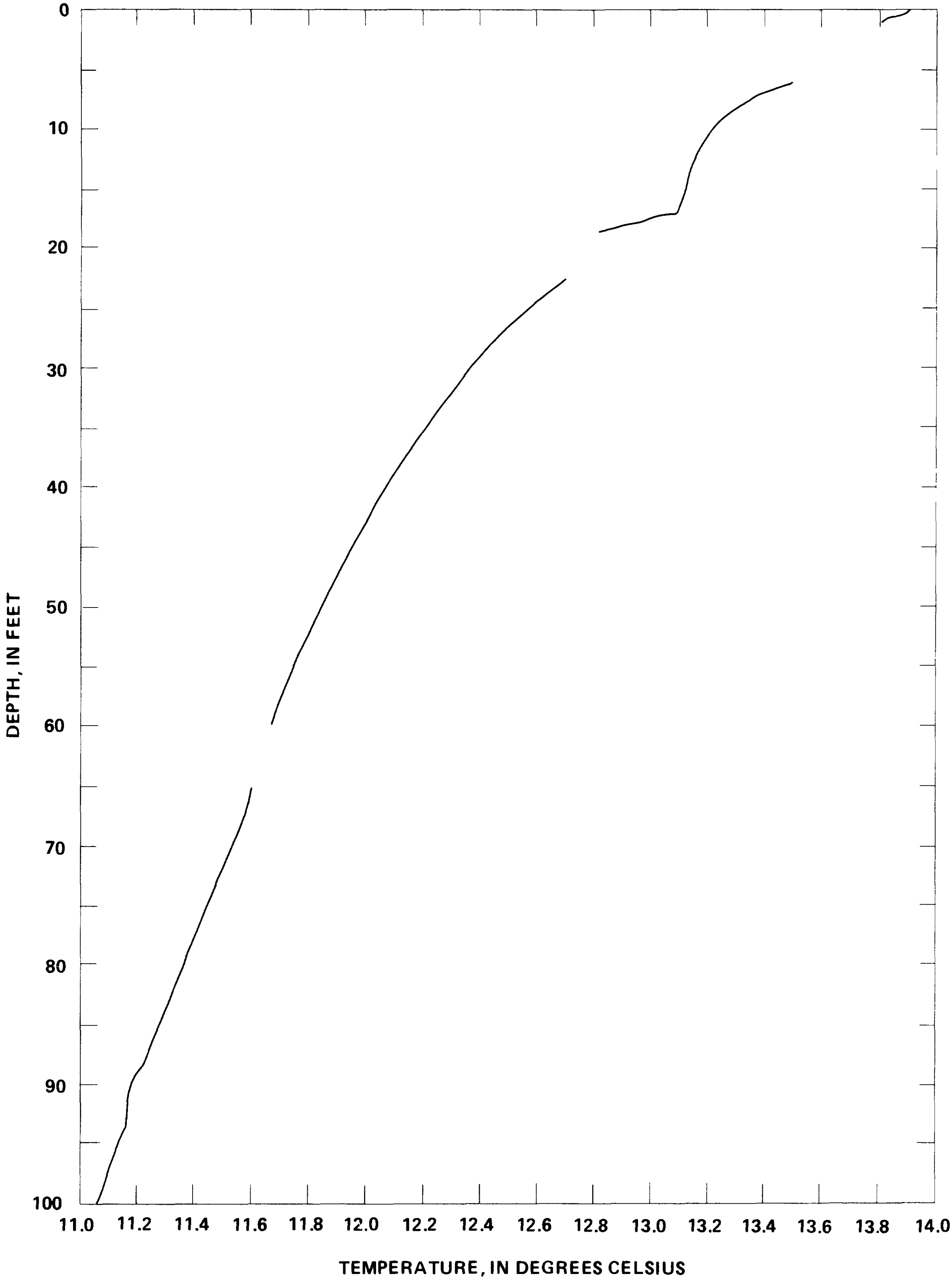
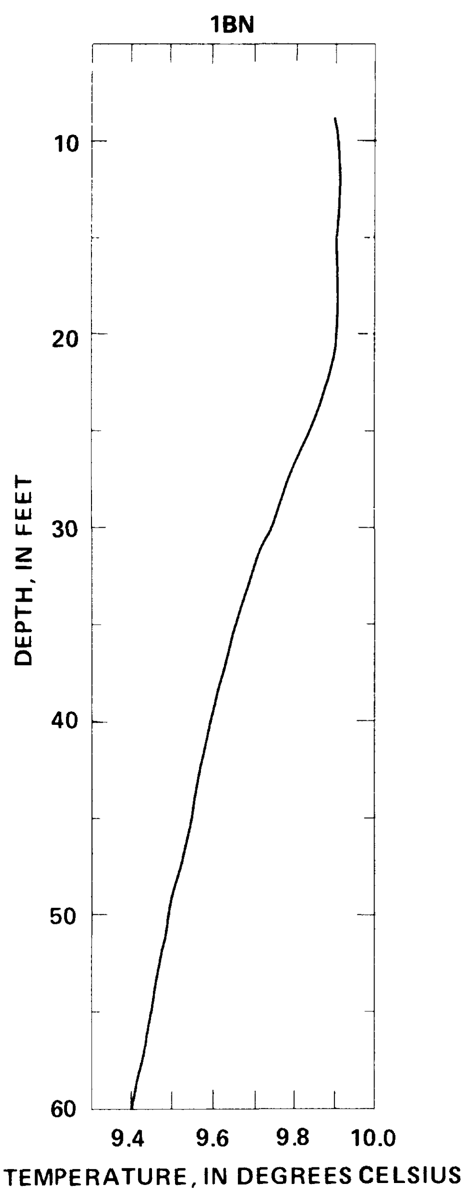
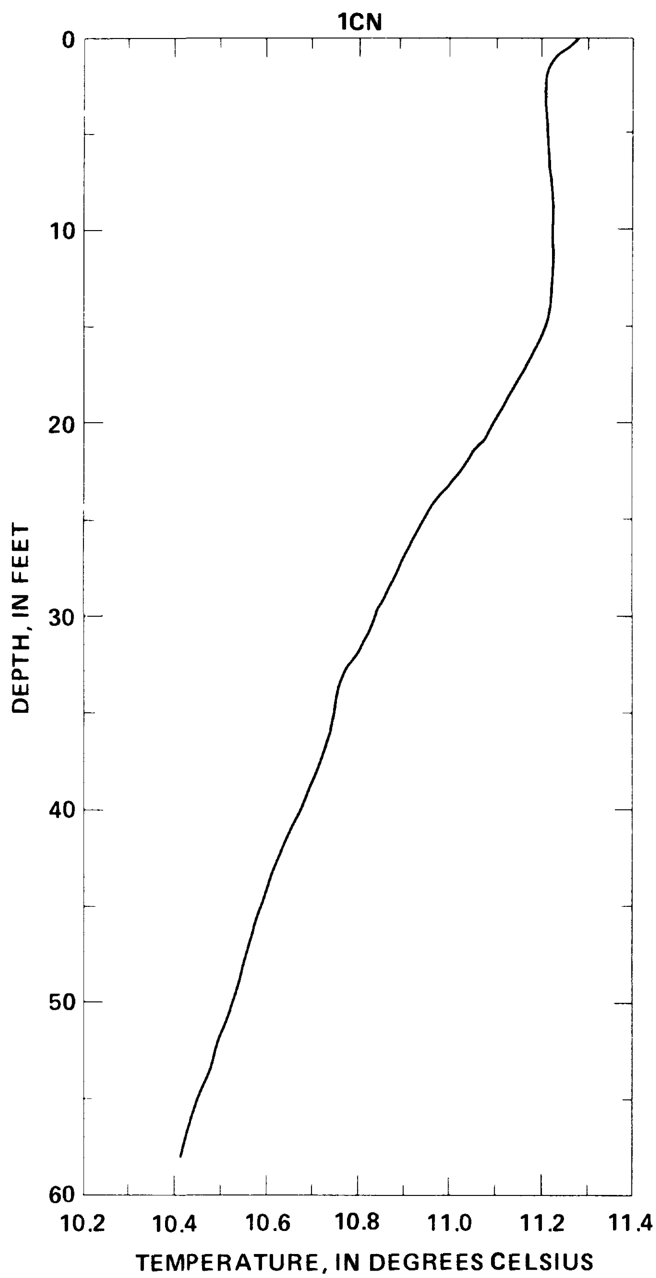


FIGURE 21.--Temperature log, test hole 1AN.





FIGURES 22 and 23.--Temperature logs for test holes 1BN and 1CN.

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