Colorado

WATER RESOURCES

CIRCULAR NO. 25









EFFECTS OF METAL-MINE DRAINAGE ON WATER QUALITY IN SELECTED AREAS OF COLORADO, 1972-73



STATE OF COLORADO John D. Vanderhoof, Governor

DEPARTMENT OF NATURAL RESOURCES T. W. Ten Eyck, Executive Director

COLORADO WATER CONSERVATION BOARD

DIVISION OF WATER RESOURCES Felix L. Sparks, Director Clarence J. Kuiper, State Engineer

> COLORADO GEOLOGICAL SURVEY John W. Rold, Director and State Geologist

> > COLORADO DEPARTMENT OF HEALTH Water Quality Control Division Frank Rozich, Director

U.S. GEOLOGICAL SURVEY James E. Biesecker, District Chief

In charge of cooperative water-resources investigations in Colorado.

COVER: These are examples of surface waters in Colorado which are adversely affected by metal-mine drainage. See the back cover for explanation.

EFFECTS OF METAL-MINE DRAINAGE ON WATER QUALITY IN SELECTED AREAS OF COLORADO, 1972-73

By Robert E. Moran and Dennis A. Wentz
U.S. Geological Survey

Prepared by the

U.S. GEOLOGICAL SURVEY

in cooperation with the

COLORADO WATER POLLUTION CONTROL COMMISSION

COLORADO WATER CONSERVATION BOARD 1845 Sherman Street Denver, Colorado 80203

1974

CONTENTS

Page
Abstract
Introduction
Purpose and scope
Background
Colorado mineral belt
Metal deposits
Acid formation and trace element liberation
Approach
Field measurements and observations
Sample collection
Biologic samplers
Laboratory procedures
Results and discussion
Kerber Creek
Summary
Overview
Downstream variations of chemical constituents 17
Metal transport
Precipitates
Relative adit and tailings contributions
Toxic effects of mine drainage
Effects of mine drainage on ground water
Leadville
Summary
Overview
Downstream and seasonal variations of pH and metals in
California Gulch and the Arkansas River 41
Boulder
Summary
Overview
Downstream variations
Crested Butte
Summary
Overview
Effect of metal mining on water quality in the Slate River. 48
Snake River
Summary
Overview
The bog-iron ore deposit 50
Downstream and seasonal variations 51
Creede
Summary
Overview
Downstream variations
Ouray
Summary
Overview
Downstream variations

	Page
Results and discussionContinued:	59
Alamosa Creek	59
Summary	60
Overview	61
Downstream variations	62
Lake Creek	62
Summary	63
Overview	63
Downstream variations	63
Lakes as metal sinks	64
North Clear Creek	66
Summary	
Overview	66
Lion Creek	66
Summary	66
Overview	67
Idaho Springs	67
Summary	67
Overview	67
Downstream and seasonal variations	68
French Gulch	69
Summary	69
Overview	69
Downstream and seasonal variations	, 70
Climax	, 70
Summary	, 71
Overview	71
Downstream and seasonal variations	, 73
Urad-Henderson	. 74
Summary	. 74
Overview	. 75
Downstream and seasonal variations	, 76
Fourmile Creek	. 77
Overview	. 77
Uravan	. 77
Overview	. 77
Oak Creek	. 80
Overview	. 80
References	. 81
Appendix	. 85
Inppendent v v v v v v v v v v v v v v v v v v v	
ILLUSTRATIONS	
Figure 1. Map showing areas chosen for intensive study of the	^
effects of metal mining on water quality in Colorado.	. 3
2. Map showing sampling sites in the Kerber Creek area, Colorado	. 16

		age
Figures 3-14		
	3. Hardness concentrations in the Kerber Creek drain-	10
	age, Colorado, October 1972 to June 1973 4. Dissolved zinc concentrations in the Kerber Creek	18
	4. Dissolved zinc concentrations in the Kerber Creek drainage, Colorado, October 1972 to June 1973	20
	5. Total cadmium concentrations in the Kerber Creek	20
	drainage, Colorado, October 1972 to June 1973	20
	6. Bicarbonate concentrations in the Kerber Creek	20
	drainage, Colorado, October 1972 to June 1973	21
•	7. The pH in the Kerber Creek drainage, Colorado,	•
	October 1972 to June 1973	21
	8. Relation between pH and dissolved nickel concen-	
	trations in the Kerber Creek drainage, Colorado,	
	October 1972 to June 1973	22
	9. Relation between pH and dissolved manganese	
	concentrations in the Kerber Creek drainage,	
	Colorado, October 1972 to June 1973	22
	10. Gradient of the Kerber Creek drainage, Colorado	24
	11. Percentage of dissolved metals in the Kerber	
	Creek drainage, Colorado, December 1972	25
	12. Percentage of dissolved metals in the Kerber	
	Creek drainage, Colorado, June 1973	25
	13. Iron loads in the Kerber Creek drainage, Colorado,	
	December 1972 and June 1973	28
	14. Copper loads in the Kerber Creek drainage,	
	Colorado, December 1972 and June 1973	28
15-2	•	
	15. Section of the Kerber Creek study area used for	
	determination of relative adit and tailings	20
	contributions	32
	16. Sampling sites in the Leadville area, Colorado	40 44
	17. Sampling sites in the Boulder area, Colorado 18. Sampling sites in the Crested Butte area, Colorado	47
	18. Sampling sites in the Crested Butte area, Colorado 19. Sampling sites in the Snake River and French Gulch	47
	areas, Colorado	49
• .	20. Sampling sites in the Creede area, Colorado	54
	21. Sampling sites in the Ouray area, Colorado	57
	22. Sampling sites in the Alamosa Creek area, Colorado	60
	23. Sampling sites in the Lake Creek area, Colorado	62
	24. Sampling sites in the North Clear Creek, Lion	
	Creek, and Idaho Springs areas, Colorado	65
	25. Sampling sites in the Climax area, Colorado	72
	26. Sampling sites in the Urad-Henderson area,	
	Colorado	75
2	7. Graph showing variation of chemical quality in the	
	Williams Fork, Colo., October 1972 to April 1974	76
28-3		
	28. Sampling sites in the Fourmile Creek area,	- ^
	Colorado	78
	29. Sampling sites in the Uravan area, Colorado	79
_	30. Sampling sites in the Oak Creek area, Colorado	81
3	1. Diagram of system of well locations used in Colorado	86

		Pa	ge
rab1	e 1.	Ore types found in intensive study areas of Colorado	5
	2.	Summary of analytical methods	10
١ .	3.	Estimates of precision for laboratory analyses	11
	4.	Comparison of emission spectroscopy and atomic absorption	
		analyses, Kerber Creek, May 1-2, 1973	13
	5.	Drinking water standards and suggested stream criteria for	
		fish and other aquatic life in regard to trace elements	
		and pH	14
	6.	Spectrographic analyses of chemical precipitates from the	
	•	stream bottoms of three complex-ore mining districts in	
		Colorado	29
	7.	X-ray diffraction analyses of sediment and chemical-	
	, •	precipitate samples from the Kerber Creek study area,	
		February 3, 1973	30
	8.	Concentration factors for metals in chemical precipitates	
	٠.	from three complex-ore mining districts in Colorado	31
	9.	Net change in metal loads due to passage through upper	
		tailings, Kerber Creek study area	34
	10.	Metal loads contributed by upper tailings, Kerber Creek	
-	100	study area	34
	11.	Chemical recovery of the Kerber Creek drainage, as indi-	
		cated by dissolved and total metals that exceed drinking	
		water standards at stations SL-7 and SL-2 in December	
		1972	36
	12.	Metals exceeding suggested biological criteria at station	
		SL-2, Kerber Creek study area, during the period October	
		1972 to June 1973	37
	13.	Recovery of California Gulch and the Arkansas River, as	
		indicated by water-quality parameters that exceed drink-	
		ing water standards and biological criteria	42
	14.	Pollution and recovery of Little James and James Creeks, as	
		indicated by metals that exceed biological criteria	45
	15.	Effect of metal mining on water quality in the Slate River.	48
	16.	Downstream change of water quality in Peru Creek and the	
		Snake River, October 1972, as indicated by parameters	c 1
		that exceed biological criteria	51
	17.		52
		Snake River	52
	18.		
		as indicated by water-quality parameters that exceed	59
		drinking water standards and biological criteria	23
î	19.	Recovery of Alamosa Creek, as indicated by water-quality	
		parameters that exceed drinking water standards and	61
		biological criteria	64
	20.	Effect of lakes on stream quality	UŦ
	21.	Impact of Argo Tunnel drainage, as indicated by concentra- tions in Clear Creek upstream and downstream from the	
		tunnel in January 1973	68
	20	Downstream variations of dissolved molybdenum concentra-	
	22.	tions along Tenmile Creek	73
		FIGUS STORE TERMITE CLEEK	

EFFECTS OF METAL-MINE DRAINAGE ON WATER QUALITY IN SELECTED AREAS OF COLORADO, 1972-73

By Robert E. Moran and Dennis A. Wentz

ABSTRACT

Intensive study of 18 different areas in Colorado—most of them complexore mining districts—has shown that significant amounts of acidity and metals are added to surface waters by drainage from mines and associated tailings.

In the vicinity of Kerber Creek, acid drainage from an abandoned adit flows through a tailings pile and then into the stream; metal contributions from the tailings are greater than those from the adit. Stream pH's increase below the drainage due to dilution and neutralization of the acid by bicarbonate. Dissolved metal concentrations decrease due to dilution, chemical precipitation, and probably adsorption onto ferric hydroxide particles. The relationships between pH and the various dissolved metals are inverse and, generally, well-defined.

Total metal concentrations (dissolved plus suspended) in streams of the Kerber Creek area decrease below the drainage due to dilution and to settling of the precipitates. The latter process coats the stream bottom for a considerable distance downstream during low flows. Manganese (Mn) and zinc (Zn) remain predominantly in the dissolved phase: when they do precipitate they settle out rapidly. Cadmium (Cd), copper (Cu), iron (Fe), lead (Pb), and nickel (Ni), on the other hand, gradually shift from the dissolved to the suspended fraction, indicating a different removal process. The mobility sequence for the metals studied generally follows the order (decreasing mobility):

 $Mn \approx Zn > Cu > Cd > Fe > Ni > Pb$.

This sequence is based on the percentage of each metal in solution and is predominantly independent of stream discharge.

Both total and dissolved metal loads in streams of the Kerber Creek area are greater during high flow than during low flow, owing to flushing of water from mines and tailings piles, erosion of tailings, and scouring of chemical precipitates from the stream bottom. Generally speaking, total and dissolved loads decrease downstream regardless of discharge, the primary exception being total Fe during high flow. In June 1973, for example, the total Fe

load increased throughout the entire length of the study reach below the acid drainage—a distance of greater than 20 miles (32 kilometres). This is apparently due to scouring of the light, flocculent precipitate from the stream bottom. Analysis of this precipitate shows it to be primarily an amorphous, hydrated ferric oxide.

Intensive study of 17 additional areas in Colorado has shown that comparable processes act in all areas affected by metal-mine drainage. Precipitates from several complex-ore study areas are similar in composition. And, given enough time and distance, the streams recover naturally by dilution, chemical precipitation, and settling.

One additional natural recovery mechanism was noted in the Alamosa Creek and Lake Creek study areas, where lakes downstream from metal-mine drainage acted as metal sinks. This effect was independent of stream discharge.

INTRODUCTION

Colorado is a child of mining. In the past, towns such as Cripple Creek, Leadville, Creede, and many others were the lifeblood of the economy. While metal mining is still economically important to Colorado, another legacy of this past activity is attracting increasing attention—the detrimental effects of drainage from abandoned and active mines and tailings piles (waste rock piles) on streams. Concern with metal—mine drainage is due to the acid resulting from oxidation of pyritic material. The acid itself can be harmful to aquatic organisms, and can make the water unusable for various recreational and industrial needs. Just as importantly, however, the acid dissolves metals from ores and tailings piles and releases them into the streams. Many of the metals are toxic to aquatic organisms, humans, and livestock; and, like excess acidity, the metals can make streams unusable for some types of recreation and industry.

In July 1971, a study of the effects of both metal— and coal—mine drainage on surface—water quality in Colorado was undertaken by the U.S. Geological Survey in cooperation with the Colorado Water Pollution Control Commission. Based on the reconnaissance phase of this project (Wentz, 1974), 17 areas judged to be adversely affected by metal—mine drainage were chosen for further study (see fig. 1). One additional area (area 18, fig. 1) was included because it is the only place found in Colorado that potentially could be affected by coal—mine drainage. The present report summarizes the intensive study of these areas; it is the second product of the mine—drainage study. The first report was published as Colorado Water Resources Circular 21.

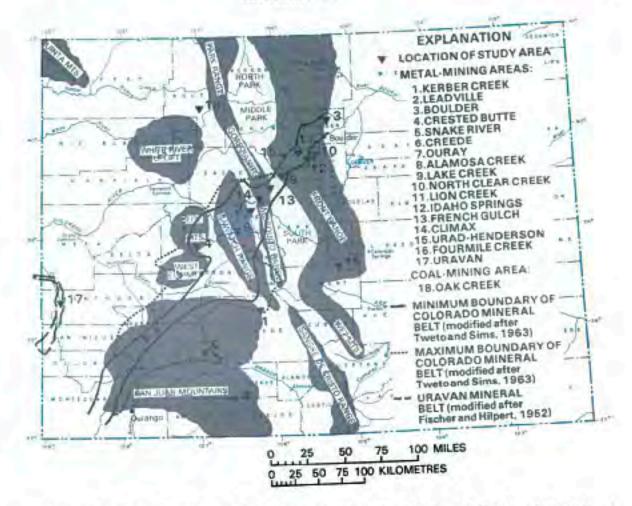


Figure 1.--Areas chosen for intensive study of the effects of metal mining on water quality in Colorado (areas are discussed in text in numerical order).

English units in this report may be expressed as metric units by use of the following conversion factors:

From.	Multiply by	To obtain
inches (in) feet (ft) miles (mi) pounds (1b) tons (short) cubic feet per second (ft ³ /s)	25.4 .3048 1.609 .4536 .9072 .02832	millimetres (mm) metres (m) kilometres (km) kilograms (kg) tonnes (metric ton) cubic metres per second (m ³ /s)

Purpose and Scope

The basic objective of this study was to determine the extent to which mining activities have affected the water quality in the 18 study areas and to gain a better understanding of the physical and chemical processes involved. More specifically, the intent was to determine what metals were entering the streams, how far they traveled downstream, how they varied seasonally, and what mechanisms were responsible for their transport and removal from the aqueous phase. In addition, the report discusses specific sources of pollution, observed and potential effects of mining activities on organisms, and effects on the ground-water resource.

A total of 268 water samples were collected at 134 sites in the 18 study areas between October 1, 1972, and June 28, 1973. One sample was collected on April 23, 1974. These areas together account for approximately 291 miles (468 km) of streams which, to varying degrees, have been adversely affected by mine drainage.

BACKGROUND

Colorado Mineral Belt

Metal mining in Colorado has generally been concentrated in a region known as the Colorado mineral belt, which extends from near Durango in the southwestern part of the State to Boulder in the Front Range. Figure 1 shows the 18 study areas in relation to the mineral belt.

The Colorado mineral belt coincides with a zone of weakness characterized by northeasterly trending Precambrian shear zones (Tweto and Sims, 1963). During and after the Laramide mountain-building episode, these shear zones were reactivated, resulting in extensive magmatic intrusion and volcanic activity. This igneous activity produced the ore deposits in most of the mining areas studied.

Metal Deposits

The non-sedimentary metal deposits of Colorado are generally considered to be of three distinct ages (Tweto, 1968): Precambrian, Late Cretaceous to early Tertiary (Laramide), and Oligocene (post-Laramide). Ores of the mining districts covered in this study can also be classified according to ore type.

The majority of the study areas contain a type of ore that may be from any one of the three ages previously mentioned; it is commonly termed "complex ore" (U.S. Congress, 1964, p. 29). This is a combination of base metals (usually copper, lead, and zinc) and precious metals (gold and silver). The base metals and silver are most commonly found as sulfides. Most of the gold and some silver occur in the elemental form, generally disseminated in the

gangue minerals, but occasionally they seem to be incorporated into the structure of metallic minerals (Sims and others, 1963). Some complex ores contain minor amounts of gold and silver tellurides.

A second ore type is one in which gold and silver tellurides are the predominant economic minerals. According to Tweto (1968), these deposits are post-Laramide. Molybdenum ores, which are also reported to be post-Laramide (Tweto, 1968) and which often contain economic quantities of tungsten and tin (Wallace and others, 1968), represent a third category of metal ores.

One additional type of metal deposit was dealt with very briefly: the uranium-vanadium ores found in certain Mesozoic sedimentary rocks of the Uravan mineral belt (fig. 1). Also, another area was studied even though it involved a non-metallic environment—a draining adit in a coal-mining area. Table 1 groups all study areas according to the above ore types.

Table 1.--Ore types found in intensive study areas of Colorado 1

Ore type	Study area (Number in parentheses refers to location in fig. 1)
Complex	Alamosa Creek (8) Boulder ² (3) Clear Creek Idaho Springs ² (12)
	Lion Creek (11) North Clear Creek (10) Creede (6) Crested Butte (4) French Gulch (13)
	Kerber Creek (1) Lake Creek (9) Leadville (2) Ouray (7) Snake River (5)
Gold-silver telluride	Boulder ² (3) Fourmile Creek (16) Idaho Springs ² (12)
Molybdenum	Climax (14) Urad-Henderson (15)
Uranium-vanadium	Uravan (17)
Coa 1	Oak Creek (18)

¹Summarized from: Tweto (1968), Vanderwilt (1947), Del Rio (1960), and Steven (1968).

²Sites listed twice have had production from more than one type of ore.

Acid Formation and Trace Element Liberation

Draining mines and tailings piles are sources of concern because of the acid and metals they release. The acid results from the breakdown of pyrite (FeS_2) when it is exposed to oxidizing conditions. In this process, ferrous (Fe^{+2}) ions are released and oxidized to the ferric state (Fe^{+3}) . The ferric ions hydrolyze, thus forming relatively insoluble ferric hydroxide $[\text{Fe}(0\text{H})_3]$, which precipitates on the stream bottom. Other metal ions may be adsorbed on (Jenne, 1968) or coprecipitated with (J. D. Hem, written commun., 1973) the $(\text{Fe}(0\text{H})_3)$, thereby forming a metal-rich orange coating (yellow boy) on rocks in affected streams. The overall process can be summarized as follows:

$$FeS_{2(s)} + \frac{15}{4}O_2 + \frac{7}{2}H_2O \stackrel{?}{\leftarrow} Fe(OH)_{3(s)} + 2SO_4^{-2} + 4H^{+1}.$$
 (1)

Metal sulfides other than pyrite [for example, sphalerite (ZnS) and galena (PbS)] will be broken down by the acid released in the above reaction. Their dissolution releases metals to the water but does not result in the production of additional net acid (Wentz, 1974).

More detailed discussions of pyrite oxidation and acid formation can be found in Coal Industry Advisory Committee (1965, 1968, 1970), Stumm and Morgan (1970), Ohio State University Research Foundation (1971), and Wentz (1974).

APPROACH

Study areas discussed in this report were chosen from a list of areas presented by Wentz (1974, p. 107). Areas were selected so that results might (with appropriate adjustments for differences in geology and hydrology) be extrapolated to other areas.

At the area of primary emphasis (Kerber Creek), samples were to be collected bimonthly. At secondary areas, it was intended that sampling be done twice—once during low flows and once during spring runoff. The last category (tertiary areas) contained sites that were to be sampled only during low flow conditions. The areas that received the most intensive study were chosen because (1) they had been studied little, or not at all, by other investigators, and (2) they represented areas that were typical of other metal-mining areas in Colorado, and thus would most readily allow extrapolation of results.

Information gained from the first round of sampling suggested the answers to some questions, but more often merely raised new questions. For this reason, several deviations from the original sampling schedule were adopted at varying stages of the project.

Field Measurements and Observations

Field measurements of water temperature were made with a mercury thermometer and are accurate to the nearest 0.5°C (Celsius). Measurements of pH were obtained using a portable pH meter. Two-point calibration procedures were used (pH 4 and 7, or pH 7 and 10), and sample measurements were made in a beaker. The values reported are accurate to within ± 0.05 pH unit. Specific conductance measurements were made directly in the stream using an instrument having a range of 50 to 8,000 μ mhos/cm (micromhos per centimetre) at 25°C. Values are accurate to within ± 2 percent of the number reported.

At each site, visual observations were made regarding the condition of the water and stream bottom. The presence of turbidity and chemical precipitates was recorded, as was the location of any obvious source of pollution, such as a tailings pile or draining adit.

Wherever Colorado Division of Natural Resources or U.S. Geological Survey stream gages were present, discharges were determined from the gage-height record. In other areas, discharges were computed from measurements made using a wading rod and pygmy meter, following procedures outlined in Buchanan and Somers (1969).

Sample Collection

At most sites, both filtered and unfiltered water samples were collected for analysis by atomic-absorption spectrophotometry. Samples were filtered at the time of collection by forcing the water through a 0.45-µm (micrometre) membrane filter from a polyvinyl chloride chamber, using a tire pump as the pressure source. At sites where much suspended sediment occurred, a glass-fiber prefilter was used in addition to the 0.45-µm filter. The samples were retained in acid-washed, l-litre polyethylene bottles. Immediately after filtration, samples were acidified with 1.5 ml (millilitre) double-distilled, analytical-grade nitric acid per litre of water (in order to prevent chemical precipitation and adsorption of the metals onto the walls of the containers).

Filtration through a 0.45-µm filter allows some colloidal material to pass through the filter (V. C. Kennedy, written commun., 1973). Acidification of the samples with nitric acid may leach some metals (especially iron, manganese, and aluminum) from silicate lattices of these colloids and remove adsorbed metals from particle surfaces. These processes can diminish the accuracy of data from filtered samples because the measureable concentrations of certain metals will increase with storage time (E. A. Jenne and others, written commun., 1971) Because some of the study samples were stored for as much as 2 months, the concentrations may reflect this acid leaching.

Unfiltered samples were collected using a depth-integrating suspended-sediment sampler (Model DH-48), following procedures outlined in Guy and Norman (1970). To prevent trace-element contamination, the butyl-rubber gasket of this sampler was replaced with one made from silicone rubber. Also, the brass nozzle was replaced by a Teflon nozzle (W. H. Durum, written

commun., 1971). Immediately after collection, unfiltered samples were acidified and retained in the same manner as filtered samples.

In addition to samples obtained for trace-element analysis, an unfiltered, unacidified sample was collected at each site for the for the determination of alkalinity. To facilitate this determination under field conditions where glass burets could easily be broken and where the weather was often severe, titration was performed in the evening for all of the samples collected during the day. It was recognized that the carbon dioxide concentration might change during storage, thereby altering the alkalinity values. However, for the waters in question, such changes were thought to be relatively insignificant, especially since the sample bottle was completely filled and was not opened until titration.

Biologic Samplers

Because one of the initial interests of the project was to determine the extent to which metal-mine drainage was affecting stream biota, various types of artificial substrate samplers were put out at many of the stream sites. Those tried included Hester-Dendy samplers¹, brick and glass slide periphyton samplers, and Mylar strips (Am. Public Health Assoc., 1971; Slack and others, 1973), and also glass microscope slides in glass staining trays (K. V. Slack, oral commun., 1972).

This part of the project was most notable for its lack of positive results. Only a very small percentage of the samplers placed in the streams were recovered; therefore, no discussion of results has been attempted. However, the following summary of the major problems encountered might prove useful to others attempting such an experiment.

Most of the difficulties can be directly attributed to the harsh climatic conditions of the Colorado Rockies—specifically to exceptional accumulations of snow during the winter of 1972-73. In general, samplers were tied to a metal stake with 50-pound test (23-kg) fishing line. This stake was then hammered into the stream bottom or bank. Pains were taken to choose sites that would be hidden from vandals but were near some large object (tree, boulder) that would be visible above the accumulations of snow and ice that were sure to come. Even though difficulties in relocating samplers had been anticipated, and sketch maps of the exact sites had been drawn, 4-5 feet (1.2-1.5 m) of snow on top of 2 feet (0.6 m) of ice invariably presented problems.

Colored flagging, such as that used by highway crews, could be tied to a tree limb, but experience has shown that under these weather conditions one needs to be within 1 foot (0.3 m) of the sampler or it will not be recovered.

¹The use of named products in this report is for identification only and does not imply endorsement by the U.S. Geological Survey.

Knowledge of the location need not be so precise if a power auger were used to cut the ice.

Some samplers were frozen in ice or were otherwise out of the water when recovered. In anticipation of these difficulties, they had been placed in water greater than 6 inches (150 mm) deep whenever possible. However, the magnitude of flow fluctuations was underestimated, and several samplers that had originally been set in 1.5-2 feet (0.4-0.6 m) of water were found exposed.

Many of the mountain streams have bedload material which is quite coarse (gravel to boulders), and therefore it was often difficult to drive the anchoring stakes into the stream bottom. Attempts were made to place all samplers in riffle areas, but some sites, because of the swift flow, necessitated placement in pools. In these cases, attachment to the bank was not practical, and siltation became a problem.

Those samplers composed wholly or partly of glass were prone to breakage by saltating rocks. Brick and glass slide periphyton samplers are not recommended in high velocity streams because the plastic adhesive used was not sufficiently strong to prevent the slides from being washed off the brick. This may have been partly due to the reduced "stickiness" that resulted when the adhesive was placed in cold water. In contrast, Mylar strips worked satisfactorily.

Due to recovery problems in the winter months, it was decided that most samplers would be left in place until spring when much of the snow and ice had thawed. The resulting high flow conditions often ripped the metal stakes from the streambed, leading to the suggestion that spring runoff conditions be avoided whenever large increases in flow are anticipated.

Subsequent studies, not reported here, have shown that at elevations above about 8,000 feet (2,400 m) one might expect reasonable success with artificial substrate samplers if they are set out and retrieved within the period from August to November. This means only one or two samples per year can be collected. In order to determine seasonal patterns, one of the natural substrate collection procedures might allow a certain degree of success. A detailed discussion of aquatic sampling may be found in Slack, Averett, Greeson, and Lipscomb (1973).

Laboratory Procedures

Preliminary sampling at each of the study areas during the reconnaissance phase provided information needed to decide which chemical parameters would be studied during the intensive study phase.

With few exceptions, cadmium (Cd), copper (Cu), iron (Fe), lead (Pb), manganese (Mn), nickel (Ni), and zinc (Zn) concentrations were determined on both filtered and unfiltered samples. In addition, one or more of the following clements were determined at areas where there was evidence to suspect that they might be present in "unusually" high concentrations: arsenic (As),

cobalt (Co), mercury (Hg), molybdenum (Mo), selenium (Se), silver (Ag), and vanadium (V). Silica (SiO₂) and aluminum (A1) were determined on filtered samples at selected sites in order to obtain a better understanding of the overall water chemistry. Analyses were performed by the U.S. Geological Survey's laboratory in Salt Lake City, Utah, following accepted procedures described in Brown, Skougstad, and Fishman (1970). These procedures are summarized in table 2.

Table 2.--Summary of analytical methods

[Method of analysis: S, spectrophotometric; (d)AA, atomic absorption-direct aspiration; (e)AA, atomic absorption-extraction¹; (f)AA, flameless atomic absorption]

ELEMENTS	METHOD
Filtered sa	mples
Al, Mo, Si, V,	S (d)AA (e)AA S (f)AA
Unfiltered s	amples
Mo, V	· (f)AA

¹The extraction procedure involves chelation of the element with ammonium pyrrolidine dithiocarbamate (APDC), followed by extraction with methyl isobutyl ketone (MIBK).

 $^2\mathrm{Same}$ procedure for filtered and unfiltered samples; no HCl digestion.

³Hydrochloric acid (HCl) digestion involves the addition of 25 ml of double-redistilled, reagent-grade, concentrated HCl to 500 ml of sample and heating to just below boiling for 0.5 hour.

Estimates of the analytical precision for filtered samples are presented in table 3. Precision data for unfiltered samples are not available. In some cases, reported concentrations in filtered samples exceeded those in unfiltered samples collected from the same site. This may be due to analytical interference from Fe and Mm in high concentrations in the unfiltered samples (Brown and others, 1970).

Table 3.--Estimates of precision for laboratory analyses (Frances ReMillard, written commun., 1973)

Element	Standard deviation for dissolved constituents (determined at mean concentration given in parentheses), in micrograms per litre
ArsenicCadmiumChromiumCobalt	4 (28) .6 (9.5) 4 (7) 2 (10)
Copper	(10 (242) (61 (639) (10 (121) (29 (829)
Lead Manganese Mercury	5.4 (22.9) (9 (65) (12 (117) .64 (6.57)
Molybdenum Nickel Selenium	$ \begin{pmatrix} 1 & (18) \\ (1.1) & (3.3) \\ (3.3) & (24.1) \\ 6 & (24) \end{pmatrix} $
SilverVanadiumZinc	1 (10) .25 (1.5) 27 (528)

Hereafter, data from filtered samples are referred to as "dissolved," whereas those from unfiltered samples are called "total." These terms are operationally defined by the field and laboratory procedures used in this study. The previous discussion regarding colloidal material and acid leaching should be kept in mind when reference is made to "dissolved" concentrations. Furthermore, the HCl digestion summarized in table 2 certainly is not drastic enough to break down most organic matter or silicates. Thus, the term "total," as used in this report, most likely represents some compromise between dissolved plus desorbable metals and true total metals.

Whereas the majority of trace-element determinations were obtained using atomic absorption and spectrophotometric techniques, a small number of water and precipitate samples were analyzed by means of emission spectroscopy. For the water samples, this was done both as a check against the values obtained by the other methods, and as a means of determining additional elements not readily detected by atomic absorption procedures.

Duplicate water samples from four sites were collected. One set was analyzed by means of atomic absorption, whereas the other was done by emission spectroscopy. Comparison of the results (table 4) shows reasonable agreement between the values for most parameters, and provides some measure of confidence in the accuracy of the overall data set. Emission spectroscopic analyses were performed by the U.S. Geological Survey's laboratory, Denver, Colo.

Finally, chemical precipitates and sediment samples from affected streams were analyzed by means of X-ray diffraction and petrographic techniques at the U.S. Geological Survey's laboratory, Denver, Colo.

RESULTS AND DISCUSSION

Each of the 18 study areas is discussed separately in the present section. The first area, Kerber Creek, contains complex ore. Streams from this area were sampled more intensively than those from any other area. It was reasoned that chemical and physical processes operating at Kerber Creek would be similar to those in other complex-ore areas, and therefore the former could be used as a model from which generalizations could be extrapolated to the latter. Hence, most of the process-oriented material is discussed in the Kerber Creek section. Any pertinent processes and (or) characteristics unique to other areas are treated in their respective sections.

Individual sections include a "summary" of the water quality problems in that area. That is, whenever metal concentrations exceed U.S. Public Health Service (1962, 1970) drinking water standards (see table 5) they are noted. Also, pH values are listed if they are outside the limits specified by the Colorado Department of Health (1971b) for water to be treated as a potable supply (see table 5). It should be noted that the standards for Mn [50 $\mu g/1$ (micrograms per litre)] and Fe (300 $\mu g/1$) have been established for esthetic (staining of clothes and porcelain) rather than health reasons. Even though Mn has often been listed as a "problem," its importance as a toxic substance is relatively minor. In fact, surface waters of the Colorado Rockies are sometimes anomalously high in manganese—even when unaffected by mining activities (Wentz, 1974).

Because many of the study-area streams have been classified for fish and wildlife uses by the Colorado Department of Health (1971b) these standards have also been considered. However, the present Colorado standards are too general to be of value for management, reclamation, or enforcement purposes. For example, the toxic-material standard for class B waters (those classified for fish and wildlife uses) states that the water shall be "Free from biocides, toxic, or other deleterious substances attributable to municipal, domestic, or industrial wastes, or other controllable sources in levels, concentrations, or combinations sufficient to be harmful to aquatic life." For this reason, the metal concentrations measured have been compared to a table of suggested stream criteria for fish and other aquatic life compiled and discussed by Wentz (1974). These criteria are also presented in table 5.

Table 4.--Comparison of emission spectroscopy and atomic absorption analyses, Kerber Creek, May 1-2, 1973

[Concentrations in micrograms per litre]

	Filter	-ed	Unfilte	red
Metal	Emission	Atomic	Emission	Atomic
	spectroscopy	absorption	spectroscopy	absorption
		Station SL-	3	
Cd	 15	30	40	
Cu	290	220	1,100	
Fe	2,800	1,900	18,000	
Pb	7	1	24	
Mn	5,000	5,200	5,000	
Ni	15	50	** 22	
Zn	7,000	5,600	10,000	
,		Station SL-	6	
Cd	130	100	130	110
Cu	1,400	1,400	1,500	1,600
Fe	180	250	3,600	1,300
Pb	40	33	150	100
Mn	12,000	15,000	14,000	14,000
Ni	40	50	65	<50
Zn	28,000	25,000	29,000	24,000
	•	Station SL-	7	
	150	80	130	90
Cu	6,000	6,500	6,200	6,300
Fe	21,000	18,000	36,000	35,000
Pb	90	53	111	200
Mn	20,000	21,000	19,000	20,000
Ni	46	50	50	50
Zn	26,000	21,000	25,000	21,000
	·	Station SL-S	7A	
Cd	130	110	140	110
Cu	380	420	370	420
Fe	4,500	4,300	5,500	4,800
Pb	17	18	19	<100
Mn	22,000	29,000	26,000	29,000
Ni	40	50	46	50
Zn	30,000	28,000	33,000	29,000

Table 5.--Drinking water standards and suggested stream criteria for fish and other aquatic life in regard to trace elements and pH

[All values except pH expressed as micrograms per litre. Minimum values shown for pH--maximum acidity]

Water-quality parameter	Drinking water standards [U.S. Public Health Service (1962, 1970); Colorado Dept. Health (1971a)]	Suggested criteria for fish and other aquatic life [Wentz (1974, table 3, p. 27)]
Arsenic Barium Cadmium Chromium Cobalt	¹ 50, (² 10) ¹ 1,000 ¹ 10 ¹ ,350	1,000 10 450 500
Copper Cyanide iron Lead Manganese	² 1,000 ¹ 200, (² 10) ² 300 ¹ 50 ² 50	10-20 300 5-10 1,000
Mercury Nickel Selenium Silver Zinc	15 ¹ 10 150 25,000	1 50 1,000 .1 30-70
pH (units) ⁵	6.0 <u><</u> pH <u><</u> 9.0	6.5 <u><</u> pH≤8.5

¹Maximum permissible concentration.

In many cases, the suggested biologic limits are lower than the accepted U.S. Public Health Service (1962, 1970) drinking water standards. Often the concentration of a metal much below that allowable for drinking purposes can be toxic to fish or other organisms. Like the drinking water standards, the suggested biologic standards have their shortcomings. For example, they do not deal with combinations of metals. It has been shown that certain combinations of metals may be even more toxic to aquatic organisms than the individual metals (McKee and Wolf, 1963). Many other complexities must be considered when evaluating trace-element toxicity (for example, water temperature, hardness, oxidation state of the elements, dissolved oxygen concentration, biologic species involved). These topics have been treated in detail by McKee and Wolf (1963) and Singer (1973).

²Recommended limit.

³Refers to Cr(VI).

⁴Refers to total dissolved Cr.

⁵From Colorado Department of Health (1971b).

Aside from metals listed in table 5, two other categories of potential pollutants were briefly studied. The first group includes some metals for which there are no U.S. Public Health standards or stream criteria for fish and other aquatic life. Specifically, these include molybdenum and vanadium. There are several mining areas where concentrations of these metals in the streams are much higher than in local, unmined areas. However, since there are no standards and since there has been relatively little research published on these metals in natural waters, evaluation of their environmental impact at these sites would seem premature. Nevertheless, instances in which these metals were present in concentrations considerably higher than at control sites have been noted.

Lastly, there is good reason to believe that a few of the areas studied warrant testing for cyanide. Although this is not a metal, it is used in the extraction processes for gold and silver associated with sulfides. Only one area with an active mill was sampled for cyanide, and the concentration (includes all cyanide forms) was 75 times the U.S. Public Health Service drinking water standard of 200 $\mu g/i$. Other sites with potential cyanide problems have been noted.

Kerber Creek

The Kerber Creek study area is located at the extreme northeast edge of the San Juan volcanic field (fig. 1) near the junction of the Sawatch Range and the Sangre de Cristo Mountains. Most of the local mining activity has been centered around the town of Bonanza—approximately 16 miles (26 km) west of Villa Grove and U.S. Highway 285 (fig. 2). Economic deposits of complex ore in Tertiary volcanic rocks have been mined in the district (Burbank, 1932). No active mining was conducted in 1973, but exploration work was carried on as recently as 1972.

Sites sampled in the Kerber Creek area are depicted in figure 2. Stations SL-8 and SL-10 represent control sites upstream from mining influences. Because SL-8 was inaccessible much of the year, a winter control (SL-7B) was sampled instead. Locations of the major tailings piles are also shown on figure 2.

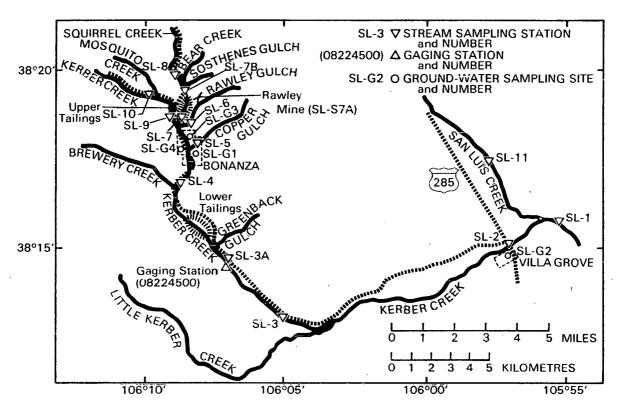


Figure 2.--Sampling sites in the Kerber Creek area, Colorado.

Summary

Sources of	Water-quality parameters that exceed indicated criteria 1					,										
metals and acid								n filt		-			`			
metals and acid	Drin	k i	no	7 1/7:				lards						rita	eri:	
								Zn		$\overline{}$						
Squirrel Creek																•
Rawley Mine	х	X	ζ.	X	X	X	x	X	Х	x	X	x	X	X		x
Tailings immediately downstream from Rawley Mine	Х	Х	ζ	x	X	х Х	X	x	x	х	x	X	x	x	X	x
Rawley Gulch (several draining adits	Х	Х	ζ.	x	x	X	x	x	x	x	x	X	X	x		x
Mine and mill tailings along Kerber Creek upstream and downstream from Bonanza ²					-?-							?				

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

Water from Kerber Creek is used to irrigate fields upon which cattle and sheep are grazed. In some cases, the livestock drink directly from the stream.

Degradation of the water quality in Kerber Creek is primarily due to acid water draining from the Rawley Mine (site SL-S7A) and from tailings piles (upper tailings) in Squirrel Creek, immediately downstream from this draining adit. Several mines are hydrologically interconnected by vertical shafts that collectively drain into the Rawley Mine. In addition, several draining mines and smaller tailings accumulations are present in Rawley Gulch. Downstream from Bonanza more tailings piles (lower tailings) are traversed by Kerber Creek.

Downstream Variations of Chemical Constituents

Figure 3 shows the downstream variation of hardness in the Kerber Creek drainage between stations SL-8 and SL-1. Side streams are not included in this or any of the similar graphs subsequently presented. Sample sites are plotted on the horizontal axis in downstream order. The most outstanding

²That these tailings are at least a potential source of metals and acid is inferred from what is known to be contributed by the tailings immediately downstream from the Rawley Mine.

feature of figure 3 is the great increase in hardness due to draining mines at site SL-S7A. (Values for site SL-S7A are not plotted as this is considered a side stream.) This is the cause of the rise in concentration between the controls (SL-7B and SL-8) and site SL-7.

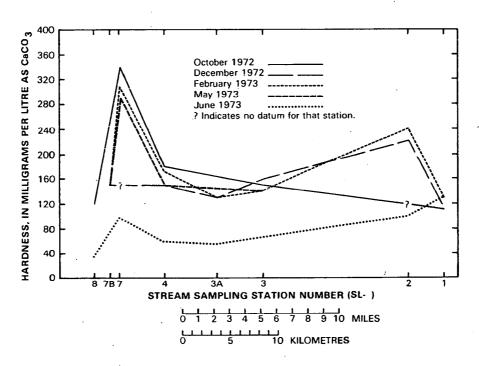


Figure 3.--Hardness concentrations in the Kerber Creek drainage, Colorado, October 1972 to June 1973.

Sites immediately downstream from the mines show a general decline in hardness concentrations until station SL-3A is reached. Downstream from this point the concentrations generally increase. Scattered outcrops of Mississippian limestone with visible alkaline springs are located near sites SL-3A and SL-3, suggesting that ground-water inflow is the most likely reason for the downstream rise in hardness below these stations. This speculation is supported by comparing hardness concentrations in water from wells at Bonanza (sites SL-Gl and SL-G3) with the hardness in a well at Villa Grove (SL-G2). The latter has a total hardness concentration of 230 mg/l compared to 130 mg/l for the Bonanza wells in February 1973. Such reasoning may appear inconsistent since Kerber Creek appears to recharge the alluvium in the reach downstream from station SL-3A. However, the aforementioned limestone springs

are often found 10 to 20 feet (3 to 6 m) in elevation above the stream, making simultaneous ground-water inflow to the stream and recharge from the stream possible. It seems unlikely that the addition of calcium phosphate fertilizers is raising the hardness since very little, if any, fertilizing is done on these meadows.

Specific conductance exhibits downstream patterns very similar to those of hardness. These patterns are also related to the contributions of ions from draining mines and ground-water inflow.

Figure 4 is a graph of downstream variation in dissolved zinc concentrations. Comparison of station SL-7 with the controls (SL-7B and SL-8) upstream shows a 18- to 1,600-fold increase in dissolved zinc concentrations in the stream below the adit and associated tailings.

Downstream from station SL-7 there is a general decline in the dissolved zinc concentration which, as will be discussed later, is due to dilution, chemical precipitation, and probably adsorption onto $Fe(OH)_3$ particles.

The graphical patterns of dissolved Zn and total Cd (fig. 5) are representative of concentrations of most of the other metals, both dissolved and total. Total concentrations would be affected by all factors affecting dissolved concentrations. In addition, total concentrations would reflect changes in the suspended fraction. Suspended metals might increase between sites SL-S7A and SL-7 due to erosion of the tailings. Downstream, suspended metals would decrease as a result of dilution and settling.

Total Pb, total Ni, and dissolved Ni are major exceptions to the above patterns. Graphs of these metals do not possess the same general downstream-declining pattern and seasonal regularity that graphs of the other metals do. The "uniqueness" of these distributions may be due to the fact that low concentrations are often reported as qualified values (for example, less than 50 $\mu g/1$). It may also be due to a relatively high degree of analytical error. There is, additionally, the possibility that these data are accurate and that the results reflect geochemical processes that we do not understand. When contrasted with the regular "behavior" of the other metals, such a possibility seems unlikely.

Bicarbonate concentrations and pH values (figs. 6 and 7, respectively), are low immediately below the mines and tailings, and increase downstream. Contributions from less acid side streams (1) dilute the H[†] concentration and (2) increase the bicarbonate concentration, which neutralizes the acid, thereby raising the pH at downstream sites.

As expected, the pH-metal relationships are inverse. Graphs of pH versus dissolved Ni (fig. 8) and Mn (fig. 9) exhibit this relationship and are typical of similar graphs of the other metals.

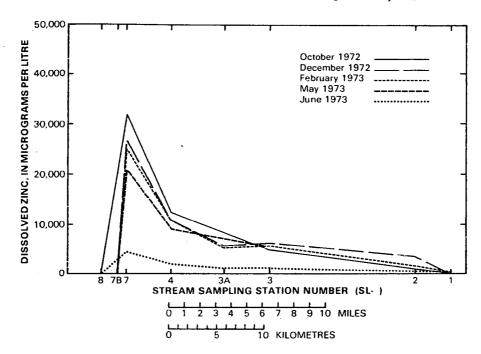


Figure 4.--Dissolved zinc concentrations in the Kerber Creek drainage, Colorado, October 1972 to June 1973.

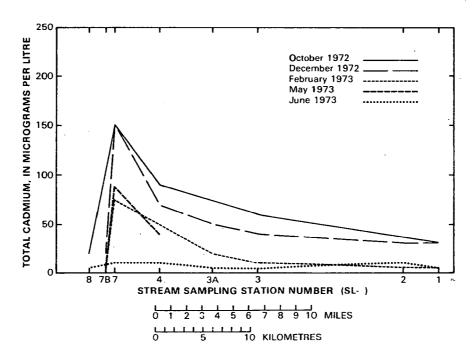


Figure 5.--Total cadmium concentrations in the Kerber Creek drainage, Colorado, October 1972 to June 1973.

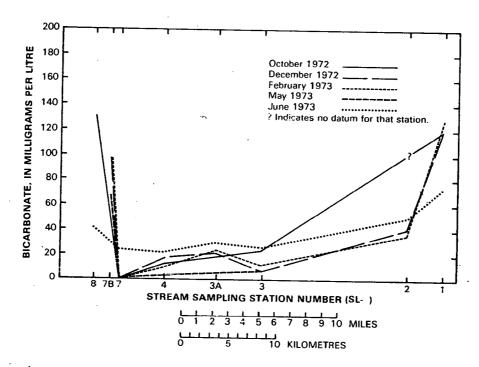


Figure 6.--Bicarbonate concentrations in the Kerber Creek drainage, Colorado, October 1972 to June 1973.

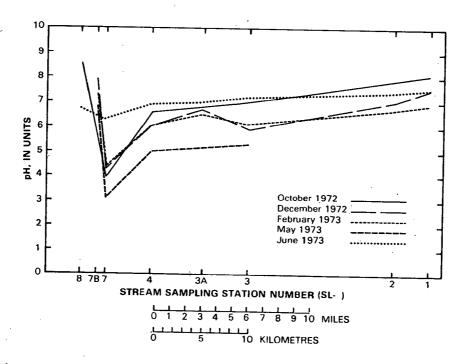


Figure 7.--The pH in the Kerber Creek drainage, Colorado, October 1972 to June 1973.

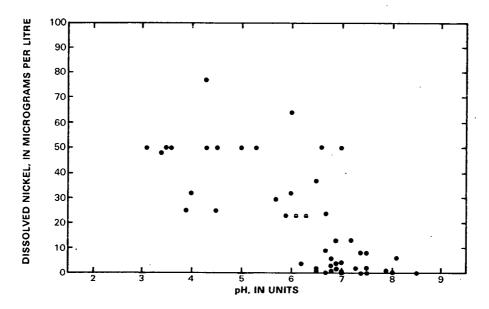


Figure 8.--Relation between pH and dissolved nickel concentrations in the Kerber Creek drainage, Colorado, October 1972 to June 1973.

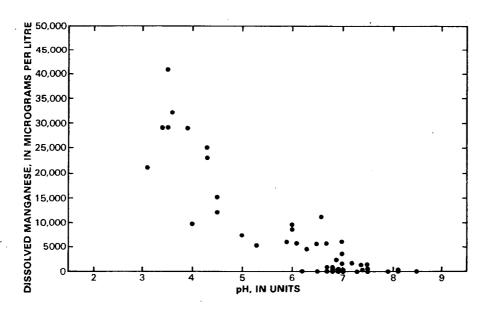


Figure 9.--Relation between pH and dissolved manganese concentrations in the Kerber Creek drainage, Colorado,
October 1972 to June 1973.

Metal Transport

Metals in true solution may be in the form of dissolved ionic species and inorganic associations, or they may be complexed with organic molecules. Due to the very limited extent of soil development, it has been assumed that metal-humate complexes are an insignificant part of the dissolved fraction in the Kerber Creek area. Likewise, the lack of active sources of industrial pollutants leads to the conclusion that other dissolved organometallic complexes are insignificant in this area.

Concentrations in unfiltered samples suggest that the suspended load carries significant quantities of metals. These metals may be: (1) adsorbed onto solids, including colloids; (2) contained in coatings on grains (precipitates and coprecipitates); (3) incorporated in solid biologic materials; and (4) incorporated in crystalline structures (Gibbs, 1973). Based on a literature review by Andelman (1973), it seems that an additional category should be added: (5) complexed with organic materials that are not in true solution. In the present study, it is impossible to state what percentage of the suspended metal load is transported in each of these forms. Moreover, whereas it is conceivable that reaction rates might account for some of the observations discussed below, this study was not designed to consider chemical kinetics, and this possibility, therefore, will not be considered further.

The dependence of dissolved metal concentrations on pH can drastically affect metal transport, because dissolved constituents generally are the most mobile fraction of the stream load (mass transported per unit time). Suspended materials may be relatively mobile while the water is flowing at a given velocity, but these materials settle out when the velocity decreases.

As mentioned previously, pH in the Kerber Creek drainage increases downstream. This lowers the solubilities of the metal hydroxides and carbonates, two of the more likely precipitation controls on dissolved-metal concentrations. The expected and generally observed result is a downstream decrease in the mass of metals transported, both in the dissolved and the total fractions. The dissolved load decreases due to precipitation, but this would not affect the total load if the precipitated material remained in suspension. The total load decreases as the stream gradient becomes flatter (see fig. 10), velocities decrease, and suspended materials settle out.

Increased pH's do not affect all metal solubilities to the same degree. By noting the percent of each metal in the dissolved phase [(dissolved concentration/total concentration) \times 100] at downstream stations, an indication of the relative effect of pH on solubility can be obtained. Figure 11 illustrates downstream changes in percentage of each metal in the dissolved phase during low flow in December 1972. Even though the dissolved loads of all metals decrease downstream, the percentage of Zn and Mn dissolved is affected very little by the rise in pH between stations SL-7 and SL-2. This indicates that most of the Mn and Zn lost from solution does not become part of the suspended load, but quickly settles to the stream bottom.

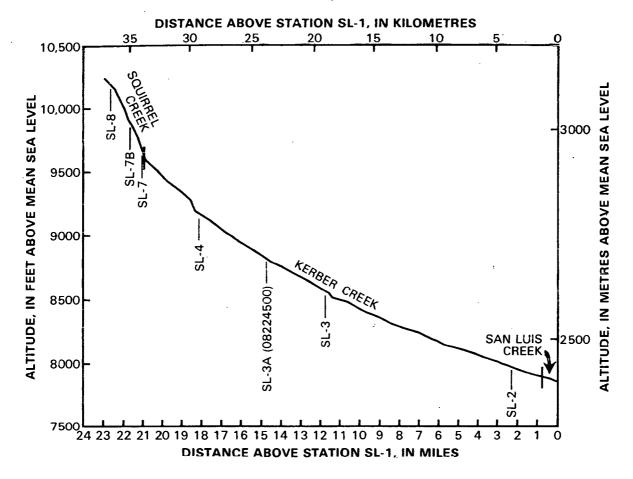


Figure 10.--Gradient of the Kerber Creek drainage, Colorado.

On the other hand, less than 10 percent of the Ni and Pb were still dissolved at station SL-2, with Cd, Cu, and Fe having intermediate percentages. This suggests that considerable amounts of these metals move from the dissolved to the suspended fraction.

A first approximation of the relative geochemical mobilities of the metals of concern in this study can be obtained by neglecting the suspended phase. This simplifies matters by removing a variable that is a function of stream velocity. With this in mind, the curves in figure 11 suggest the following geochemical mobility sequence based on the percent of each metal in the dissolved phase during December 1972 at Kerber Creek:

$$Mn \approx Zn > Cu > Cd > Fe > Ni > Pb.$$

Due to increased runoff and the resulting rise in pH's, it is not surprising to see that overall the percentage dissolved of most metals decreased in June 1973 (fig. 12). At station SL-2, Zn, Cu, and Fe percentages showed

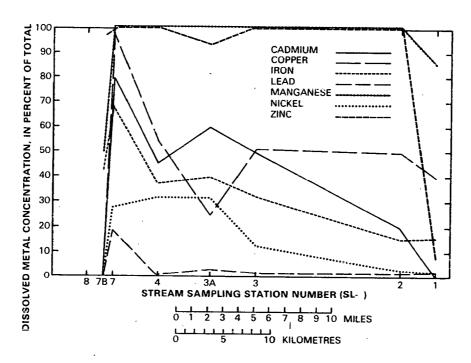


Figure 11.--Percentage of dissolved metals in the Kerber Creek drainage, Colorado, December 1972.

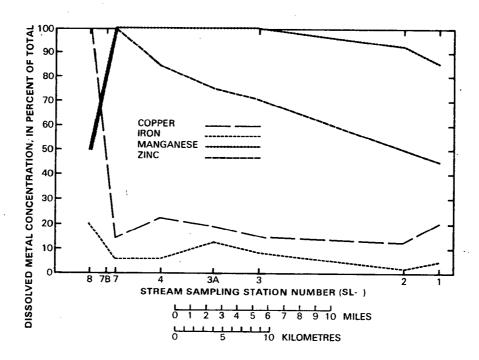


Figure 12.--Percentage of dissolved metals in the Kerber Creek drainage, Colorado, June 1973.

the most pronounced decreases but Mn was affected only slightly. Despite these changes, the geochemical mobility sequence remained approximately the same:

Mn > Zn > Cu > Fe.

The patterns of percentage dissolved Cd, Pb, and Ni in June could not be determined because total concentrations were often lower than the detection limit for unfiltered samples.

Although the pH dependence of dissolved metal concentrations may be partly due to individual precipitation reactions, it is also possible that adsorption onto suspended ferric hydroxide is contributing to the loss of metals from solution. Jenne (1968) has reviewed the literature on this subject and notes that the process seems to be more important at neutral than at acidic pH's. This fits the previously observed patterns of metal concentrations and pH in the Kerber Creek drainage (see, for example, figs. 4 and 7). Adsorption would be expected to be more important for Cd, Cu, Pb, and Ni (elements transported in the suspended fraction) than for Mn and Zn (elements not transported in the suspended fraction).

Coprecipitation of other metals with ferric hydroxide is a controversial subject. J. D. Hem (written commun., 1973) has presented good theoretical evidence for this possibility. However, experimental evidence for Cu (Boyles and others, 1973) and Ba and Sr (Kurbatov and others, 1945) tends to refute this as an important control.

The adsorption of metals onto manganese oxides or hydroxides is also not believed to be important at Kerber Creek, because pH values are seldom high enough to cause precipitation of these compounds. Thermodynamic calculations indicate that the drop in percent dissolved Mn between stations SL-2 and SL-1 (see figs. 11 and 12) may be due to precipitation of the metal as a carbonate: bicarbonate increased greatly in this reach (fig. 6), whereas pH changes very little (fig. 7).

The foregoing discussion of metal solubility has been predicated on the assumption that 0.45-µm filtered samples contain only truly dissolved metal constituents. As discussed earlier, such samples may actually contain materials in addition to those in true solution. For instance, those colloidal particles that are less than 0.45 µm in diameter should pass the filter and increase the measured concentrations of certain trace elements (V. C. Kennedy, written commun., 1973). This would severely restrict the use of thermodynamic calculations to estimate solubility controls. However, waters affected by mine drainage often contain considerable suspended material that will clog the filter, thereby reducing the effective pore size and, thus, the amount of particulate load that might be expected to pass through the filter. Moreover, as all filtrates were initially clear and colorless and remained so for extended periods, it seems that these filtered samples provide reasonable approximations of the metal concentrations in true solution.

Further insight into transport processes can be gained from an analysis of metal loads. In this way, the effects of dilution can be taken into account, because dilution affects concentration but not mass. Figures 13 and 14 show how both the dissolved and total loads of two metals (Fe and Cu, respectively) vary downstream in the Kerber Creek drainage during periods of low and high flows.

Peaks at station SL-7 in December 1972 are due to contributions of dissolved and suspended Fe and Cu from draining mines and tailings piles. Similar peaks at station SL-3A may be due to additions of dissolved and suspended Fe from the downstream tailings piles.

June 1973 loads for all metals studied were generally higher than those for December 1972. This is due partly to the greatly increased stream discharge available to erode metals from the tailings during spring runoff, and partly because the tailings piles are frozen during the winter low flows thereby making erosion difficult. In addition, it has been observed that increased flows in the spring and early summer cause scouring of the metalladen precipitates from the stream bottom.

With but one exception—total Fe—the total and dissolved loads of all metals decreased between stations SL-3A and SL-2 in June 1973. (This reach is considered because it is downstream from all metal sources.) Thus, it seems that some sort of removal mechanism was operating.

As discussed earlier, the removal mechanism might be expected to be a combination of individual precipitation reactions and adsorption onto ferric hydroxide particles. The latter alternative, however, does present a dilemma: if metals are adsorbed onto ferric hydroxide particles, and if these particles remain in suspension, then the total metal loads should not decrease. On the other hand, if metals precipitate independently and then settle out, both total and dissolved loads should decrease. The obvious conclusion is that adsorption onto ferric hydroxide is of minor importance in Kerber Creek—at least during high flows.

As mentioned, the total Fe load increases from stations SL-3A to SL-2 in June. No tailings piles exist in this reach of the stream, indicating that the increase is due to scouring of ferric hydroxide precipitate from the stream bottom. However, if the precipitate contains considerable amounts of other metals, why does such scouring not cause a similar increase in the total loads of metals other than Fe? The implication is that the precipitate in this reach of the stream is comprised mostly of Fe and contains relatively small amounts of the other metals. No precipitates from the stream bottom were collected from stations SL-3A or SL-2; but an analysis of the precipitate at station SL-7 (table 6) shows that Fe makes up the bulk of the material, and that significant amounts of some other metals (Zn, Cu) are also present. (Table 6 also presents precipitate analyses from two other study areas, which will be discussed later.) The precipitate analysis from station SL-7, together with the total load data, would indicate that the metal content (excluding Fe) of the stream precipitates decreases downstream. Such a pattern is consistent with variations in solubility and differences in grain sizes of

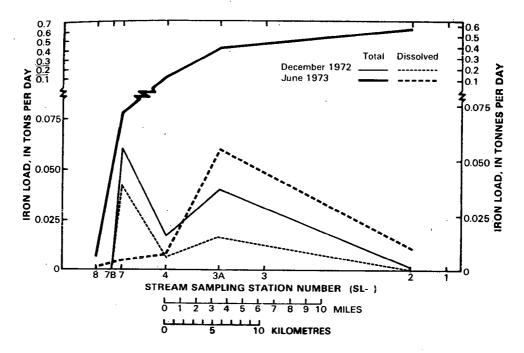


Figure 13.--Iron loads in the Kerber Creek drainage, Colorado, December 1972 and June 1973.

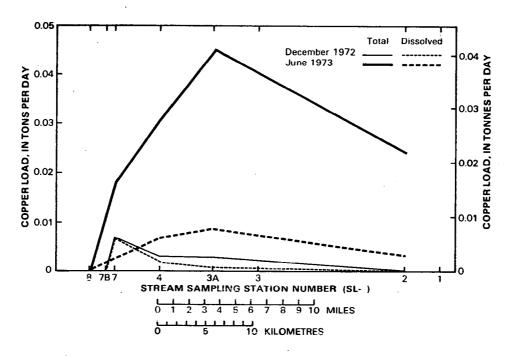


Figure 14.--Copper loads in the Kerber Creek drainage, Colorado, December 1972 and June 1973.

the source materials. For example, increases in the suspended Pb and Cu loads occur immediately downstream from the tailings, indicating that relatively large, suspended tailings particles are being collected and analyzed in the unfiltered samples. These particles would tend to settle out as the stream gradient decreases. The iron hydroxide precipitate, on the other hand, is probably composed of colloidal particles (Hem and Skougstad, 1960) that would travel farther downstream.

Table 6.--Spectrographic analyses of chemical precipitates from the stream bottoms of three complex-ore mining districts in Colorado

[Data expressed as milligrams per kilogram]

Station:	SL-7	EF-S6	UR-9
Collected:	2/7/73	11/6/72	12/15/72
pH of water:	4.3	3.9	3.3
Study area:	Kerber Creek	Leadville	
	Kerber Creek	Leadville	Ouray
Element			
A1	550	3,000	6,000
Ba	100	50	140
Be	<1	<1	<1
Bi	<5	<5	<5
B	<5	. 5	<5
		-	•
Cd	<20	<20	<20
Cr	<5	<5	<5
Co	<5	<5	<5
Cu	800	150	160
Ga	<2	<2	<2
	``	•	
Ge	<5	<5	<5
Fe	>10,000	>10,000	>10,000
Pb	140	>200	. 150
Mn	70	100	• 110
Mo-,	9	7	10
Ni	<3	<3	< 3
Ag	2	12	3
Sr	<10	10	33
Ti	<5	100	>200
V	<3	5	17
Zn	900	1,400	790
Zr	<5	9	21

The presence of other colloidal materials can greatly enhance the mobility of some metals. Clay minerals are known to adsorb metals onto their surface (Kennedy, 1965), thereby transporting them downstream until desorption or flocculation occurs. Bottom sediment samples collected during February 1973 showed 25 percent clay in the fine sand and smaller fraction at station SL-3, whereas clay minerals were only noted as being "present" at station SL-4. X-ray diffraction analysis indicated that the clay minerals were probably illite and either montmorillonite or mixed-layer illite-montmorillonite (table 7). Thus, adsorption onto the surfaces of clays should be considered as a possible transport mechanism for metals in Kerber Creek.

Table 7.--X-ray diffraction analyses of sediment and chemical-precipitate samples from the Kerber Creek study area, February 3, 1973

Station	Sample description	Constituents	Percent
3 Carlon 1	description	Constituents	composition
SL-3	Bottom sediment	Quartz	25
	(<0.125 mm = sand and	Plagioclase feldspar	15
	smaller fraction)	Potassium feldspar	10
		Clay minerals ¹ (²)	25
SL-4	Bottom sediment	Quartz	35
	$(\le 0.062 \text{ mm} \equiv \text{silt and smaller fraction})$	Plagioclase feldspar (³)	10
SL-7	Mixture of bottom sedi-	Quartz	15-20
	ment and chemical	Pyrite	10-20
	precipitate	Mixed-layer clay minerals (4)	<u><</u> 10

¹Probably illite and montmorillonite or mixed-layer illitemontmorillonite.

Precipitates

Petrographic and X-ray diffraction analyses of chemical precipitates collected at Kerber Creek and Leadville show the material to consist predominantly of amorphous, probably hydrated, iron oxides. As expected, spectrographic analysis of these two orange precipitates and one from the Ouray study area (table 6) show the most abundant metal to be Fe.

Based on the similarity of the analyses, the chemical precipitation processes operating at the many complex-ore districts in Colorado are thought to be very similar. As the flow of metal-laden water moves away from the acid environment of the adit, pH's rise and metals are removed from solution. Ferric iron is extremely insoluble and begins to precipitate immediately.

²Some augite and iron oxides may be present.

³Clay minerals and amorphous material also present.

⁴The remainder of the sample is amorphous material, probably mostly Fe(OH)₃.

Metals, such as Pb, also form very insoluble compounds and undoubtedly are precipitated within a very short distance of the adit opening. Other metals, for example Zn, form more soluble compounds under these conditions and continue to precipitate for a greater distance downstream. Thus, the percentage of the more mobile metals in the precipitates would increase with distance from the source (Boyles and others, 1973).

Comparison of precipitate analyses with analyses of filtered water samples collected from the same site at the same time gives an indication of the degree to which metals are concentrated in the chemical precipitates. Table 8 compares metal concentration factors (ratios of chemical-precipitate concentration in micrograms per kilogram/filtered-water concentration in micrograms per litre) for the three samples listed in table 6.

Table 8.--Concentration factors for metals in chemical precipitates from three complex-ore mining districts in Colorado

Site: Date:	Kerber Creek, SL-7 2/7/73	Leadville, EF-S6 11/6/72	Ouray, UR-9 12/15/72
Metal			······································
Cu	620	140	110
Pb	3,200	>18,000	1,100
Mn	3.0	3.6	41
Zn	36	26	220

No accurate estimate of the concentration factors for Fe, Ni, and Cd could be obtained because their precipitate concentrations were reported as qualified values. Even though all Fe concentrations were reported as >10,000 mg/l, the relative order of Fe concentrations in the three precipitates can be determined from the varying widths of the spectrograph lines. This order is: Ouray > Leadville > Kerber Creek (P. R. Barnett, oral commun., 1973). Larger amounts of precipitating Fe at the Ouray study area might account for the lower pH's at this site (UR-9). It is interesting to note that several metals that were detected at very low concentrations in the water are significantly concentrated in the precipitates—for example, Pb.

In addition to the variation in precipitate composition with distance from the drainage source, it is also likely that much of the variation present in both the precipitate compositions and the concentration factors can be accounted for by the differing mineral compositions of the local ores and tailings piles.

As previously mentioned, high flows cause scouring of the stream bottom. Under these conditions, precipitate accumulations are broken up and carried downstream. Although the initial result is a great increase in the total metal load, it seems encouraging to note that, following such a high-flow period, precipitates have essentially been flushed from the stream bottom. This suggests that if, by some means, the sources of metals were removed or bypassed, the stream would cleanse itself following one normal spring runoff period.

Relative Adit and Tailings Contributions

Precise knowledge concerning the sources of metal contaminants is necessary if any reclamation attempts at Kerber Creek are to be successful. For this reason, the section of the Kerber Creek drainage that encompasses a large tailings accumulation and the most flagrant source of adit drainage was studied in detail to determine the relative metal and acid contributions of these two sources (see fig. 15).

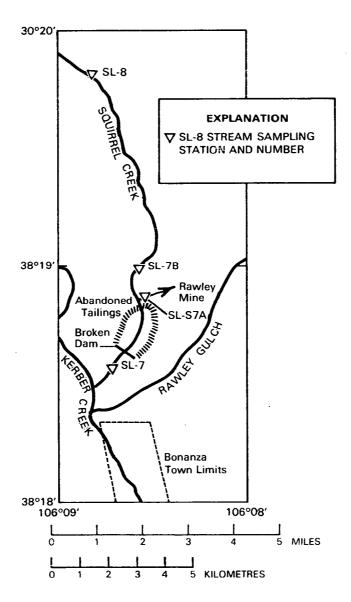


Figure 15.--Section of the Kerber Creek study area used for determination of relative adit and tailings contributions.

Metal concentrations at the adit in question (site SL-S7A) generally decline as the winter progresses, but begin to rise again in May as the flow increases due to snowmelt. Adit pH's varied little from December 1972 to June 1973 (3.4 to 3.6). Concentrations and loads of all metals generally were highest at the adit in June. Apparently this situation results from the build-up of acid and dissolved metals during the winter. With the onset of spring, ground-water recharge increases, flushing the accumulated acid and metals from rock fractures. Discharges at this adit average about 0.5 ft 3 /s (0.01 m 3 /s) and, as will be shown, represent a less significant source of metals than do the tailings.

Tailings piles are accumulations of waste rock separated during the mining and milling processes because they are too low in metal content to be processed economically. Due to relatively inefficient separation techniques, the older piles contained much greater concentrations of metals (when deposited) than those resulting from more modern operations. Tailings accumulations lying in the channel of the Kerber Creek drainage are from 5 to 90 years in age. Since milling activity has been quite limited at Bonanza in the last 25-30 years, the majority of the tailings are of the older, more metalliferous variety. Like the adit, these tailings also add acid and metals to the Immediately downstream from the upper tailings (station SL-7), lowflow pH values are highest in the winter, probably because of the frozen conditions and reduced flow of water around and through the piles. However, a sharp drop in the pH occurs at this site about the beginning of May, with the values rising sharply in June. As snowmelt begins to increase in May, pyrite degradation products are flushed into the stream, thus depressing the pH. The pH's rise in June as a result of dilution from surface runoff. As in the adit, it appears that pyrite oxidation and acid production continue throughout the winter, but that the reduced flow of water prevents transport of the acidity and metal ions from the tailings.

Metals leached by the acid from the tailings represent the largest single source of metals added to the Kerber Creek drainage. This conclusion was reached by comparing the metal loads at sites upstream and downstream from the tailings (fig. 15).

Table 9 lists the metal loads contributed by the upper tailings during December 1972 and during May and June 1973. Table 10 lists these contributions as percentages of the individual metal loads at SL-7. Most importantly, the data from tables 9 and 10 show that there is a net gain in most metal loads as the stream passes through the tailings, and that this contribution is often considerably larger than that from the draining adit.

Conclusions about the dissolved percentages of Cu, Fe, and Pb derived from the tailings in June are not so straightforward. Data for these metals indicate a loss of dissolved load as the stream passes through the tailings. It is possible that metals are being trapped by the tailings (adsorbed onto the particles), but there is no indication that such a process is occurring to a significant degree during any of the other months. Also, dissolved Cd, Zn, Mn, and Ni loads in June increase (after passing through the tailings), which also indicates that adsorption is probably not occurring to any great

Table 9.--Net change in metal loads due to passage through upper tailings, Kerber Creek study area

[Values expressed as tons per day]

Dissolved										
Metal	December 1972	May 1973	June 1973							
Cd	$+1.8 \times 10^{-4}$	$+1.7 \times 10^{-4}$	$+5.6 \times 10^{-5}$							
Cu	$+5.9 \times 10^{-3}$	$+2.6 \times 10^{-2}$	-1.9×10^{-3}							
Fe		$+6.7 \times 10^{-2}$	-3.6×10^{-3}							
Pb	$+1.6 \times 10^{-4}$	+1.9 x 10 ⁻⁴	-8.0×10^{-5}							
Mn	+5.1 x 10 ⁻²	$+4.4 \times 10^{-2}$	$+7.3 \times 10^{-2}$							
Ni	$+1.2 \times 10^{-4}$	$+1.3 \times 10^{-4}$	$+5.4 \times 10^{-4}$							
Zn	$+5.5 \times 10^{-2}$	$+4.4 \times 10^{-2}$	$+6.7 \times 10^{-2}$							
	To	tal								
Metal .	December 1972	May 1973	June 1973							
Cd		$+1.9 \times 10^{-4}$	$>-1.4 \times 10^{-4}$							
Cu		$+2.5 \times 10^{-2}$	$+1.3 \times 10^{-2}$							
Fe		$+1.3 \times 10^{-1}$	$+6.4 \times 10^{-2}$							
Pb		$>+4.0 \times 10^{-4}$	$>+1.1 \times 10^{-3}$							
Mn		$+4.0 \times 10^{-2}$	$+6.3 \times 10^{-2}$							
Ni		>0	$>+2.3 \times 10^{-4}$							
Zn		$+4.2 \times 10^{-2}$	$+6.7 \times 10^{-2}$							

Table 10.--Metal loads contributed by upper tailings, Kerber Creek study area

[Values expressed as percent of load at station SL-7]

Dissolved											
Meťal	December 1972	May 1973	June 1973.								
Cd	40	53	17								
Cu	87	98	-73								
Fe		92	-78								
Pb	76 ·	89	-103								
Mn	54	52	63								
Ni	63	63	91								
Zn	54	52	58								
	Tot	al	· · · · · · · · · · · · · · · · · · ·								
Metal	December 1972	May 1973	June 1973								
Cd		52	· >-56								
Cu		97	>74								
Fe		95	82								
Pb		>50	>43								
Mn		49	58								
Ni		>0	>35								
Zn		50	58								

degree. Instead it seems likely that the declines of dissolved Cu, Fe, and Pb loads are due to precipitation of these metals in the reach between stations SL-S7A and SL-7. The pH increases greatly between these two stations in June (pH 3.5 to 6.3), thereby lowering metal solubilities. Chemical precipitation in this reach during May would be greatly reduced because the pH actually decreases (pH 3.5 to 3.1 between stations SL-S7A and SL-7). Since Cu, Fe, and Pb solubilities are known to be more pH dependent than those of Zn, Cd, or Mn (Boyles and others, 1973), it is not surprising that only the Cu, Fe, and Pb loads should decrease below the tailings in June.

Toxic Effects of Mine Drainage

Based on field examination of rocks and artificial substrate samplers from the Kerber Creek area, it is inferred that no aquatic macroinvertebrates live in the reach between stations SL-S7A and SL-3. Benthic organisms first reappear at station SL-2--approximately 20 miles (32 km) downstream from SL-S7A. Such a condition also implies that no fish exist in this reach. A variety of benthic organisms—caddisfly, stonefly, and mayfly larvae, midges, and diatoms—were collected from control sites in the area. The absence of bottom-dwelling organisms for some distance downstream from the mines is undoubtedly due, either directly or indirectly, to the high concentrations of metals and acid. Reappearance of bottom organisms at station SL-2 reflects the degree to which Kerber Creek "recovers" chemically downstream.

In regard to indirect control of aquatic biota alluded to above, it is possible that high concentrations of ${\rm Fe}^{+2}$ in the adit drainage could cause a depletion of dissolved oxygen in the stream below the point of discharge:

$$Fe^{+2} + \frac{1}{4}O_2 + H^{+1} \stackrel{?}{\leftarrow} Fe^{+3} + \frac{1}{2}H_2O.$$
 (2)

This might then restrict the biotic community in the affected reach. It would not, on the other hand, be expected to completely eliminate all life, because there are certain organisms that can live under very low dissolved-oxygen concentrations. Dissolved-oxygen measurements were not made in conjunction with this study. However, because the reach of stream that is devoid of life is rather long and because the reaeration potential of the stream is relatively high, any effect due to the absence of dissolved oxygen is expected to be minimal in comparison to the toxicity effect of high metal concentrations and low pH.

The improvement of Kerber Creek water quality with respect to metals is summarized in table 11. For the month of December 1972, all dissolved metals exceeded U.S. Public Health Service drinking water standards (1962) at station SL-7 (with the exception of Ni, for which no standard exists). However, at SL-2 only dissolved Mn exceeded the standards. But aquatic invertebrates, fish, and livestock do not reside in or ingest filtered water. Data from unfiltered samples present a somewhat different situation. Under these conditions, total Pb and Cd exceed the standards at SL-2, in addition to total Mn.

Table II.--Chemical recovery of the Kerber Creek drainage, as indicated by dissolved and total metals that exceed drinking water standards at stations SL-7 and SL-2 in December 1972

[Concentrations	in	larger	type	exceed	the	standards]	j
-----------------	----	---------------	------	--------	-----	------------	---

Metal	Disso concent (µg,		Tot concent (µg/	ration	U.S. Public Health Service drinking water
	SL-7 (pH=4.3)	SL-2 (pH=7.0)	SL-7 (pH=4.3)	SL-2 (pH=7.0)	standards (1962) (μg/1)
Cd	120	6	150	3 0	¹ 10
Cu	1,800	10	1,850	20	² 1,000
Fe	11,000	40	16,000	260	² 300
Pb	56	3	3 00	200	¹ 50
Mn	25,000	3,53 0	25,000	3,360	² 50
Ni	50	4	180	150	
Zn	27,000	3,500	27,000	3,400	² 5,000

¹Maximum permissible concentration.

Reasonable interpretation of data, such as those presented in table 11, depends greatly on the existing or intended use of the water. As mentioned, fish, invertebrates, and livestock don't normally live in or drink filtered water. Therefore, data from unfiltered samples may give a more realistic idea of the metal load ingested. On the other hand, for water used for human consumption, reliance on such total concentrations may be unrealistic. Because surface water used as a municipal supply is generally flocculated, settled, and (or) filtered before distribution, most of the suspended material is removed. Also, ground water generally contains only slight amounts of material in suspension, even in shallow alluvial aquifers with local surfacewater recharge. Hence, use of data from filtered samples may be called for in such situations.

Obviously, it is important to rely on samples which best represent the environmental conditions in question. It is not presently known what fraction of the total metals consumed is biologically "available." When a steer drinks water containing greater than 10 µg/l of Cd, how much of this metal is absorbed from its digestive tract into the blood and concentrated in various organs? How much Cd is harmlessly eliminated? The answers to such questions are only partially known and are beyond the scope of this report. However, it would seem unrealistic to assume that only those metal species that are truly dissolved are biologically available. Given the highly acid environment

²Recommended limit.

of the mammalian stomach--pH 1-2 (White and others, 1964, p. 707)--it seems very likely that metals desorbed from colloidal surfaces and leached from silicate lattices and organic matrices are also, to some extent, biologically available.

The previous discussion emphasizes the importance of physiologic data in establishing water-quality standards. However, insufficient physiologic data on metal toxicity were available in the 1940's when the U.S. Public Health Service drinking water standards were being developed. As a result, many of the standards were based on limitations in analytical techniques and on esthetic considerations (Great Lakes Laboratory, 1971). Physiologic testing in the last 25 years has often shown that toxic effects can occur at metal concentrations much lower than those allowed by the U.S. Public Health Service standards (McKee and Wolf, 1963). Also, the United States presently (1973) has no limits for several elements that are known to be toxic to mammals, including nickel and vanadium (Lee, 1972). With these shortcomings in mind, Wentz (1974) compiled, from many literature sources, a list of suggested "stream criteria for fish and other aquatic life" (see table 5).

Table 12 lists those constituents that exceeded the suggested biological criteria at station SL-2 some time during the sampling period. Such a table probably conveys a more reasonable impression of the potential impact on aquatic life than do comparisons to U.S. Public Health Service drinking water standards. Moreover, keep in mind that evaluation of the potential toxic effects of metals is further complicated by antagonistic and synergistic effects, the chemical form of the metal(s) in question, and the biologic species involved.

Table 12.--Metals exceeding suggested biological criteria at station SL-2, Kerber Creek study area, during the period October 1972 to June 1973

Filtered samples	Unfiltered samples
	Cd
	Cu
·	РЬ
Mn	Mn
	Ni
Zn	Zn

¹Table 5, this report.

Effects of Mine Drainage on Ground Water

Due to the emphasis on surface water in this project, only four wells were sampled in the Kerber Creek area. All wells bottom in alluvium and are

less than 20 feet (6 m) deep. Even though the wells in Bonanza (SL-G1, SL-G3, SL-G4) are located less than 200 feet (60 m) laterally from Kerber Creek, none of the metals determined exceeded U.S. Public Health Service standards. However, draining mines and tailings on Kerber Creek are contributing metals to the ground water. The public well (SL-G1) contained higher concentrations of Fe than did the winter control site on Squirrel Creek (SL-7B) in February 1973. All other metals were either the same or lower in concentration than at SL-7B. Two private wells in the town contained higher Cu, Fe, and Zn concentrations than did SL-7B.

It would appear that ground-water inflow from Kerber Creek is being "filtered" by the alluvium. Adsorption and cation-exchange processes are probably responsible for the lowering of metal and hardness concentrations as water flows from the stream through the alluvium. Also, reduction in porosity owing to formation of metal precipitates may aid in this filtering process.

As mentioned previously, inflow of very hard ground water probably accounts for the rise in hardness at downstream surface-water stations on Kerber Creek. In addition to increased hardness, the well sampled at Villa Grove (SL-G2) had a higher Zn concentration than either the town well in Bonanza (SL-G1), or the winter control station (SL-7B). Between SL-3 and SL-2 Kerber Creek loses flow, indicating that it is recharging the aquifer. This recharge, coupled with the relatively great mobility of Zn could account for the high concentration of Zn in ground water approximately 20 miles (32 km) downstream from the mining area. It is also possible that the increased Zn concentrations at Villa Grove may be due to contamination from metal-casing and (or) pump parts. However, such contamination might be expected to occur in all the wells.

Leadville

The Leadville area (see fig. 1) contains the Leadville and Sugar Loaf-St. Kevin mining districts and is characterized by Tertiary replacement and vein-type ore deposits in a Paleozoic sequence of dolomite and quartzite. Such deposits have yielded economic amounts of many mineral products, including: silver, zinc, lead, gold, copper, manganese, iron, bismuth, and pyrite (Tweto, 1968).

Summary

Sources of metals and acid	Water-quality parameters that exceed indicated criteria ¹ (based on filtered samples)														
	Drin	kin,	g w					Biological criteri							
	pН	Cd	Cu	Fe	Pb	Mn	Zn	pН	Cd	Cu	Fe	РЪ	Mn	Ni	Zn
California Gulch (Yak Tunnel, other draining mines, and		- '								,					
tailings)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
St. Kevin Gulch	Х	X		X		X	X	X	X	X	X		X		X
Leadville Drain		X		x		X	X		x		x		X		x
Iowa Gulch Below Black Cloud Mine	x ²		х			x		х ³	N.	x	٠	x	х		x
Above Black Cloud Mine but below Sherman Tunnel												х			
Evans Gulch ⁴															x

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

Metals and acid entering surface waters in the Leadville area come from several sources. The most important of these is the Yak Tunnel (EF-S6), which collects water from many mines in the district, drains into California Gulch, and flows over extensive tailings piles to the Arkansas River (see fig. 16). All mines drained by this tunnel are currently inactive (Colorado Bureau of Mines, oral commun., 1973). California Gulch is normally dry above the Yak Tunnel; but, during periods of high flow, contaminated water flows down the channel and combines with the drainage from the tunnel.

The Leadville Drain (EF-15), which empties into the East Fork of the Arkansas River, also collects water from a number of mines in the Leadville area. However, this drain is a relatively minor source of pollution compared to the Yak Tunnel on California Gulch. Of the metals tested, Zn seems to be the most significant problem in the effluent from the Leadville Drain.

²Exceeds upper limit of 9.

³Exceeds upper limit of 8.5.

⁴Only flows part of the year.

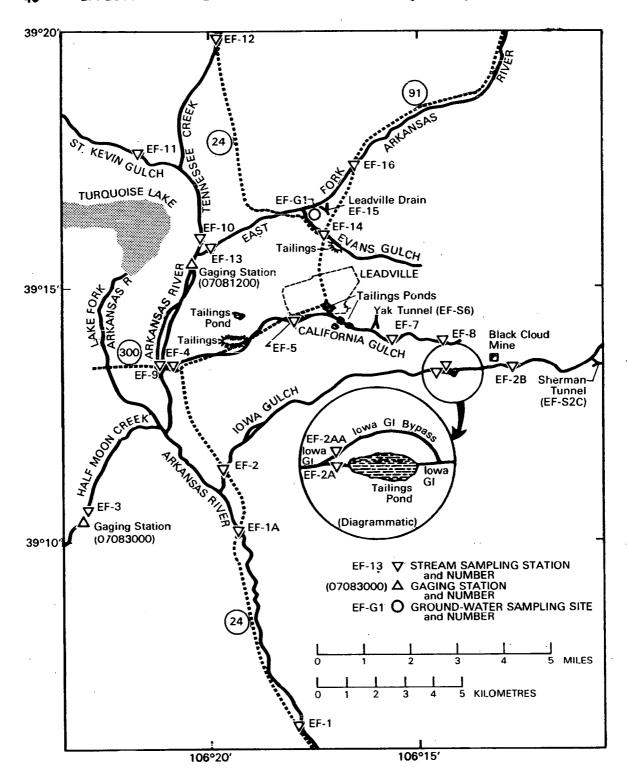


Figure 16.--Sampling sites in the Leadville area, Colorado.

Contributions from mines and tailings in St. Kevin Gulch enter Tennessee Creek, but do not seem to significantly degrade the water quality of Tennessee Creek.

Current mining and milling of complex ore is responsible for the pollution of surface water in Iowa Gulch. At station EF-2A, downstream from this operation, dissolved Cu and Mn concentrations exceed U.S. Public Health Service drinking water standards at certain times of the year. More importantly, a very high concentration (15 mg/1) of cyanide (includes all forms) was detected in November 1972 at this site. During the milling process, cyanide is added to facilitate the extraction of gold. These milling processes are also responsible for the high pH's (10.0 and 10.8 in November 1972 and May 1973, respectively) measured at station EF-2A. The streambed at this site is coated with a brownish-black scum of undetermined composition.

Examination of rocks from the streambed at station EF-2A revealed no living macroinvertebrates, although mayflies and caddisfly cases were found at station EF-2B upstream from the mining operation. Due to the high pH levels, little lead was detected in filtered samples from this station; this is consistent with the findings of Hem and Durum (1973). However, the unfiltered samples taken at station EF-2A in May 1973 contained 900 $\mu \mathrm{g}/1$ Pb.

The above contaminants (CN and Pb) probably have little, if any, effect on the water quality of the Arkansas River since Iowa Gulch has no surface flow at station EF-2, except during spring runoff. This lack of flow is probably because of recharge of the valley alluvium, and possibly some diversion for irrigation purposes.

Thus, it appears that the major contributor of metals and acid to the Arkansas River is California Gulch. As a result there is a significant deterioration of water quality at least down to the inflow of Lake Creek. Further degradation of water quality in the Arkansas River could result if planned diversions of water from Halfmoon Creek and the Lake Fork of the Arkansas are implemented by the U.S. Bureau of Reclamation. Such measures would greatly reduce the flow of these streams, which presently help to dilute the metals and acid from California Gulch.

Downstream and Seasonal Variations of pH and Metals in California Gulch and the Arkansas River

Patterns of downstream and seasonal metal variation at California Gulch are very similar to those at Kerber Creek. Metal loads contributed by the Yak Tunnel and tailings piles in California Gulch are generally greatest during periods of high flow (June). On the other hand, drainage from the Yak Tunnel fluctuates in pH more than similar adit drainage (station SL-S7A) at Kerber Creek, probably because of the larger number of sources drained.

Between stations EF-S6 and EF-4, the drainage of California Gulch flows through or around numerous tailings piles. These tailings would be expected to increase dissolved-metal loads in the drainage in a manner similar to that at Kerber Creek. This was the case in May 1973, just prior to spring runoff. But, in November 1972 (low flow) and June 1973 (high flow), the dissolvedmetal loads decreased or remained the same between EF-S6 and EF-4. At first glance, this seems to be a contradiction of the processes occurring at Kerber Creek. However, the distance between EF-S6 and EF-4 (about 5.5 miles or 8.8 km) is much greater than the distance under consideration at Kerber Creek (several hundred yards between stations SL-S7A and SL-7). Thus, the precipitation processes have more time to operate to remove metals from solution at These processes are probably enhanced by the addition of effluent from Leadville's sewage treatment plant just below station EF-5. This effluent constitutes one-third to one-half of the flow in the gulch below this point and raises the pH by dilution. Thus, in November and June the metals contributed by the tailings are more than counterbalanced by those removed via precipitation and other chemical processes in the channel.

Table 13 demonstrates the improvement in water quality which occurs in California Gulch and the Arkansas River between stations EF-S6 and EF-1, a

Table 13.--Recovery of California Gulch and the Arkansas River, as indicated by water-quality parameters that exceed drinking water standards and biological criteria 1

EF-S6	EF-4	EF-1A	EF-1	
E	xceeds drinking	water standard	s ²	
рН	рН			
Cd	Сd			
Cu		-		
Fe	Fe	Fe		
РЬ				
Mn	Mn	Mn	Mn	
Zn	Zn			
	Exceeds biol	ogical criteria	2	
pH	рН			
Cq.	Cd			
Cu	Cu	Cu	Cu _.	
Fe	Fe	Fe		
Pb	Pb			
Mn	Mn		 '	
Ni				
Zn	Zn	Zn	Zn	

¹Based on filtered samples.

²See table 5.

BOULDER 43

distance of about 15.5 stream miles (24.9 km). Although some self-purification occurs between EF-S6 and EF-4, the majority of the metals drop out between stations EF-4 and EF-1A. This is probably due primarily to dilution as California Gulch mixes with the Arkansas River. Because of this dilution, chemical and biological degradation of the Arkansas is much less significant than at Kerber Creek. In addition, the presence of extensive limestone and dolomite in the Leadville area may play a role in controlling the concentrations of dissolved metals by increasing background hardness, alkalinity, and pH values.

Boulder

The Boulder area is comprised of the Gold Hill and Jamestown mining districts. Only the latter will be discussed here, as mine-drainage effects are most severe in the streams draining this district.

The Jamestown District is located in the Front Range at the extreme northeastern end of the Colorado mineral belt (see fig. 1). In the central part of the district the Precambrian complex has been intruded by stocks and dikes of early Tertiary age (Vanderwilt, 1947). Most of the ore deposits occur in veins that are distributed irregularly around one of the smaller stocks. Lead-silver and fluorspar deposits occur nearer the stock, whereas pyritic gold and gold telluride occur farther away. Only fluorspar was actively mined in the area in 1972 (Colorado Div. Mines, 1973).

Summary

Sources of metals and acid		Water-quality parameters that exceed indicated criteria ^l (based on filtered samples)											
	Drinki	ng w	ater	stan	Biological criteria							<u>а</u>	
•					Zn								
Little James Creek (drainage in the area of the Argo-Burlington- Emmit complex)	X	:	x	x	x	х	x	x	x		x	X	х

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

At least some of the mine drainage entering Little James Creek appears to be coming from seeps in the area of the Argo-Burlington-Emmit complex near the headwaters (see fig. 17). The Argo Mine is an abandoned lead-silver mine, whereas the Burlington (active) and Emmit (inactive) are both fluorspar mines. Fluorspar mining normally is not thought to be a serious problem to surface-water quality; however, the oxidation of associated pyrite and other sulfides can contribute drainage high in acidity and metals.

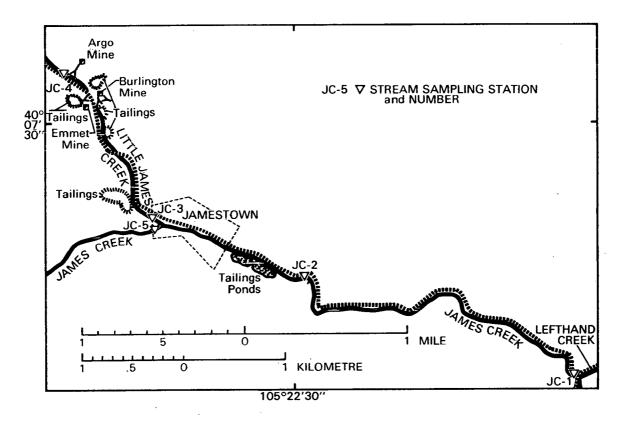


Figure 17.--Sampling sites in the Boulder area, Colorado.

Tailings piles exist near the mouth of Little James Creek and on James Creek just downstream from Jamestown. Although the effect of these tailings on the quality of the water flowing past them cannot be definitely stated from the results of this study, they would be expected to increase metal loads in a manner similar to that at Kerber Creek.

Downstream Variations

The downstream changes of dissolved-metal concentrations in Little James and James Creeks are reflected in table 14. This table shows that all metals except Cu are introduced into Little James Creek primarily between stations JC-4 and JC-3. Metals are diluted by James Creek so that all but Zn fall below the biological criteria by the time station JC-2 is reached. Because of its tendency to stay in solution, Zn is still above the suggested biological criterion at station JC-1. Cu and Zn are the only metals to exceed their biological criteria at a station other than JC-3. Apparently there is a signficant source of these metals, particularly Cu; above station JC-4.

Table 14.--Pollution and recovery of Little James and James Creeks, as indicated by metals that exceed biological criteria^{1,2}

[Numbers in parentheses are ratios of concentrations at that station to concentrations at station JC-3 for November 30 to December 1, 1972]

JC-4
(0.02) Cu (.83) (.31) (.01) (.02) Zn (.04)

¹Based on filtered samples.

Crested Butte

The Crested Butte district lies on the west edge of the Colorado mineral belt in the west-central part of the State (see fig. 1). The area is typified by Tertiary intrusives (generally laccoliths) in Cretaceous sedimentary rocks. Little has been published on the ore deposits of this district, though some are known to occur as replacement and vein deposits in the sedimentary rocks in a manner similar to those in Leadville (Tweto, 1968). Silver, lead, and zinc have been the principal products of the area, though historic production has been only about one-hundredth that of the Leadville district. The Colorado Division of Mines (1973) lists two active mines and one mill in the area during 1972. In addition, some exploratory work has been conducted near Gothic, just north of the town of Crested Butte.

 $^{^2\}mathrm{See}$ table 5 for biological standards.

Summary

			W				ity pa					t			
Sources of	exceed indicated criteria ^l														
metals and acid				(Ъ	ase	d or	n filt	ere	d sa	amp	les)			
	Drin	kin	g w	ate	r s	tan	dards		Bio.	log	ica	l cı	rite	eri	<u>а</u>
	pН	Cd	Cu	Fe	Pb	Mn	Zn	pН	Cd	Cu	Fe	РЪ	Mn	Ní	Zn
Coal Creek															
Below Keystone Mine															
(adit drainage and															
tailings)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Above Keystone Mine															
(specific sources															
unknown)						X									X
Oh-Be-Joyful Creek															
(specific sources															
unknown)						X						X			X

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

The most important source of metals and acidity in the Crested Butte area is adit drainage (SR-S4), and probably drainage from tailings, in the vicinity of the Keystone Mine on Coal Creek (see fig. 18). Every metal analyzed exceeded its drinking water standard and biological criterion. The Keystone Mine drainage severely affects Coal Creek down to its mouth at the town of Crested Butte.

Above the Keystone Mine, Coal Creek is affected only slightly. The exact source(s) of drainage contributing to this effect is not known; however, it is believed to be either (1) the Forest Queen Mine at Irwin or (2) Elk Creek, which enters Coal Creek just above the Keystone Mine and drains an area containing a number of abandoned mines.

Oh-Be-Joyful Creek, which enters the Slate River northwest of the town of Crested Butte, also contains several metals in relatively high concentrations. Again, the specific source(s) of the metals cannot be determined, but it is known that several abandoned mines exist in the watershed.

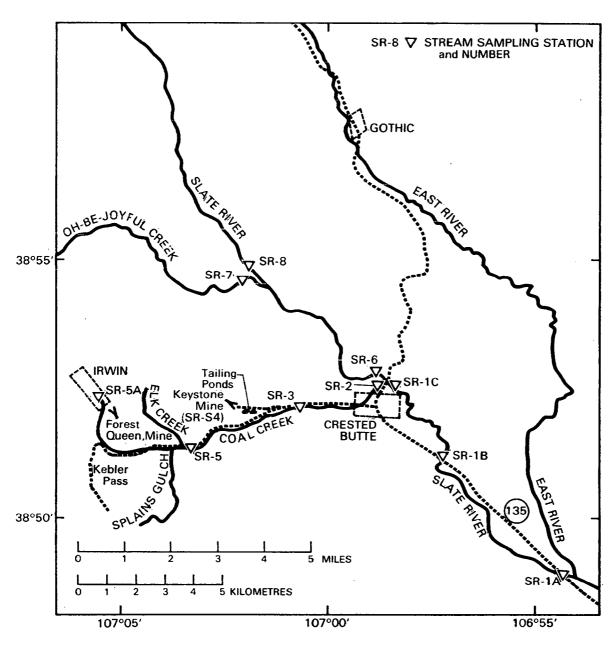


Figure 18.--Sampling sites in the Crested Butte area, Colorado.

Effect of Metal Mining on Water Quality in the Slate River

The Slate River above Oh-Be-Joyful Creek (SR-8) shows little or no effect due to metal-mining activity (see table 15). However, 5 miles (8 km) downstream from Oh-Be-Joyful Creek (SR-6, just above Coal Creek), Zn exceeds its biological criterion and Mn exceeds its drinking water standard. These effects are most likely the direct result of the addition of waters high in Zn and Mn from Oh-Be-Joyful Creek (SR-7), but may be partly due to seepage into the Slate River along its course. Just below Coal Creek at station SR-1C (0.15 mile or 0.24 km downstream from Coal Creek), Cd and Mn exceed the U.S. Public Health Service drinking water standards, whereas these two metals and Zn exceed the biological criteria. The downstream limit of this manifestation of Coal Creek is not known for sure, but it extends at least as far as the East River.

Table 15.--Effect of metal mining on water quality in the Slate River 1

SR-8	SR-6	SR-1C					
E	xceeds drinking water stan	dards ²					
		Cd					
	Mn	Mn					
	Exceeds biological crite	ria ²					
		Cd					
		Mn					
	Zn						

¹Based on filtered samples.

Snake River

The Snake River study area (see figs. 1 and 19) includes most of the region drained by the Snake River and its tributaries, particularly Peru Creek. The ore deposits of this area, also known as the Montezuma mining district, are chiefly mesothermal veins associated with Tertiary intrusives in Precambrian granite, gneiss, and schist. Lead, zinc, and silver sulfides are the predominant minerals that have been mined, though minor amounts of gold, copper, and bismuth have also been noted. There was no active mining in the area in 1972 (Colorado Div. Mines, 1973).

In addition to the primary sulfides mentioned above, a secondary bogiron ore deposit is known to exist above Deer Creek in the upper reaches of the Snake River valley. This deposit has been described by Deul (1947).

²See table 5.

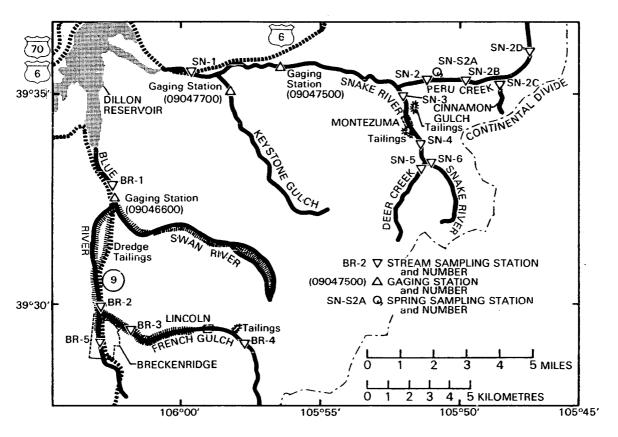


Figure 19.--Sampling sites in the Snake River and French Gulch areas, Colorado.

Some exploratory work has been done on the bog-iron deposit, but the question of whether or not the iron can or should be mined is still the subject of much controversy (see, for example, U.S. Forest Service, 1971; The Denver Post, Sept. 1, 1971; Sept. 3, 1971; Sept. 14, 1971; Sept. 15, 1971; Oct. 22, 1971; Nov. 21, 1971).

Summary

Sources of metals and acid	Water-quality parameters that exceed indicated criteria (based on filtered samples) Drinking water standards Biological criteria											
			Cu Fe P							 	Ni	
Peru Creek (draining mines and tailings, including Cinnamon Gulch)						X					-	х
Snake River above Peru Creek (draining mines and tailings, and natural drainage from bog-iron ore deposit)	x		X	X		Х			x	x		x

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

Specific sources of metals and acid in the Snake River area are difficult to pinpoint. Several abandoned, draining mines are known to exist on Peru Creek and on the Snake River above Peru Creek, but the names of these mines are not known. As indicated in the Summary, problems in the Peru Creek drainage are more severe than in the Snake River drainage above Peru Creek. Not only do more metals exceed their drinking water standards and biological criteria in Peru Creek and its tributaries, but the metal concentrations also are generally higher.

The Bog-Iron Ore Deposit

The bog-iron ore deposit in the headwaters of the Snake River is believed to be the major contributor of acid to the stream. Iron bogs commonly form in poorly drained, glaciated areas in the presence of an iron source. The iron source, in this case, is disseminated pyrite in the country rock (Theobald and others, 1963). Pyrite is first oxidized, and the ferrous iron (Fe $^{+2}$) is transported via the ground-water system to the bog:

$$FeS_{2(s)} + \frac{7}{2}O_2 + H_2O \stackrel{\Rightarrow}{\leftarrow} Fe^{+2} + 2SO_4^{-2} + 2H^{+1}.$$
 (3)

Reducing conditions and humic materials in the bulk of the bog keep the iron mobile in the dissolved ferrous form or as colloidal iron-humate complexes (Rankama and Sahama, 1950, p. 664-665). In the oxidizing zone near the surface of the bog, the iron precipitates as ferric hydroxide $[Fe(OH)_3]$:

$$Fe^{+2} + \frac{1}{4}O_2 + \frac{5}{2}H_2O + Fe(OH)_{3(s)} + 2H^{+1}.$$
 (4)

This can occur chemically or with the aid of micro-organisms such as Leptothrix and Gallionella (Brock, 1970).

Most of the acid generated by reaction 3 is probably consumed by solution of minerals in the country rock (weathering) as the water passes through the ground to the bog. The acid contributed by reaction 4, on the other hand, is released directly into the Snake River. This sequence of acid production from pyrite oxidation, subsequent untilization of the acid in normal chemical weathering, additional acid production from ferrous iron oxidation in downslope bogs, and eventual release of this acid to streams has also been postulated for an actively forming goethite deposit in southwestern Colorado (B. B. Hanshaw, written commun., 1974).

Values of pH at station SN-6 are on the order of 4. The pH's at this site probably do not go any lower, since Leptothrix and Gallionella are known to exist in the bog (Deul, 1947), and these micro-organisms can exist only at near neutral pH's (Brock, 1970). A possible explanation for the lack of pH's less than 4 might be a buffering effect due to the large amount of organic material in the bog.

Downstream and Seasonal Variations

Downstream variations of water quality in Peru Creek and the Snake River are represented in table 16 for low flow in October 1972. Although acidity

Table 16.--Downstream change of water quality in Peru Creek and the Snake River, October 1972, as indicated by parameters that exceed biological criteria^{1,2}

	Peru Creek			
SN-2C	SN-2B	SN-2		
рН	рH	рН		
	Cd			
Cu	Cu	Cu		
	Fe			
Pb	Pb			
Mn	Mn			
Zn	Zn	Zn		
	Snake River above Peru C	reek		
sn-6	SN-4	SN-3		
рН		***		
Fe		es. us		
Mn		·		
	Zn	Zn		
Zn	211	211		
	Snake River below Peru C			

¹Based on filtered samples.

²See table 5 for biological standards.

and several metals are contributed by Cinnamon Gulch (SN-2C), additional metals (notably Cd and Fe) are contributed to Peru Creek either above or below Cinnamon Gulch. Concentrations are diluted by the time SN-2 is reached so that only pH, Cu, and Zn exceed their respective biological standards. The major source of acidity and metals on the Snake River is upstream from station SN-6 (probably the bog-iron ore deposit). Additions downstream from this point, if any, are minor and only Zn exceeds its biological limit at station SN-3. The confluence of Peru Creek and the Snake River is just below stations SN-2 and SN-3. Dilution of Peru Creek water as a result of this junction and from side streams decrease metal concentrations further. Only Zn exceeds its biological criterion at SN-1, just upstream from Dillon Reservoir.

The effect of spring runoff in the Snake River area can be seen in table 17. This table shows the pH and metal concentrations in June 1973 relative to October 1972. Most concentrations decrease as a result of dilution from the relatively unmineralized snowmelt. This would be expected for dissolved metals based solely on pH changes: pH goes up in Peru Creek and stays about the same in Snake River above Peru Creek. In actuality, dissolved Fe and Ni increase at SN-2 in June, whereas dissolved Cd, Cu, and Fe increase at SN-3. None of these latter changes, however, is very significant.

Table 17Seasonal	variation	of water	quality	in	Peru	Creek
•		Snake Rive				

Water-quality parameter	Decem	June 1973 relative to ber 1972 ¹ o change, - = decrease ²) SN-3
pH	+	0
Cd	0/-	+/-
Cu	3_/_	+/+
Fe	+/ +	+/ +
Pb	-/	-/ -
Mn	-/-	-/-
Ni	+/-	/-
Ag	0/-	-/-
Zn	-/-	-/++ ⁴

¹Dissolved/total, except for pH.

²Values between 90 and 110 percent are considered as "no change." ³Heavy symbol indicates that the parameter exceeds its biological criterion (table 5).

 $^{^4}$ The double plus (++) indicates an increase by a factor greater than 10.

CREEDE 53

Total metal concentrations might be expected to increase in June because of suspended matter added when chemical precipitates are scoured from the stream bottom. This effect is much more noticeable at station SN-3 than at SN-2. Only total Fe increases at SN-2, and the increase is very slight. On the other hand, Fe, Cu, and Zn increase at SN-3. Total Zn increases by 1,600 percent and may be primarily from tailings washed into the stream near Montezuma.

Creede

The only established mining district in Mineral County is at Creede (figs. 1 and 20). Most of its production has been from veins along faults in Miocene volcanic rocks.

Economic value of the ore has been primarily due to silver, with lead, zinc, gold, and copper being of secondary importance (Del Rio, 1960).

Summary

Sources of	Water-quality pa exceed indicat		
metals and acid	(based on filt		
	Drinking water standards		<u> </u>
	pH Cd Cu Fe Pb Mn Zn		
Willow Creek			
Mill tailings south of			
Creede (inactive,			
June 1973)	X	X X	X
Effluent from mill on			
	(²)	(²)	
West Willow Creek			
(minor contribution			
from draining mines			
and tailings piles)	X	. X	X
East Willow Creek			
(minor contribution			
from draining mines			
and tailings piles)		X	X

 $^{^{1}\}mathrm{See}$ table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

²Only one unfiltered sample collected; see Overview for discussion.

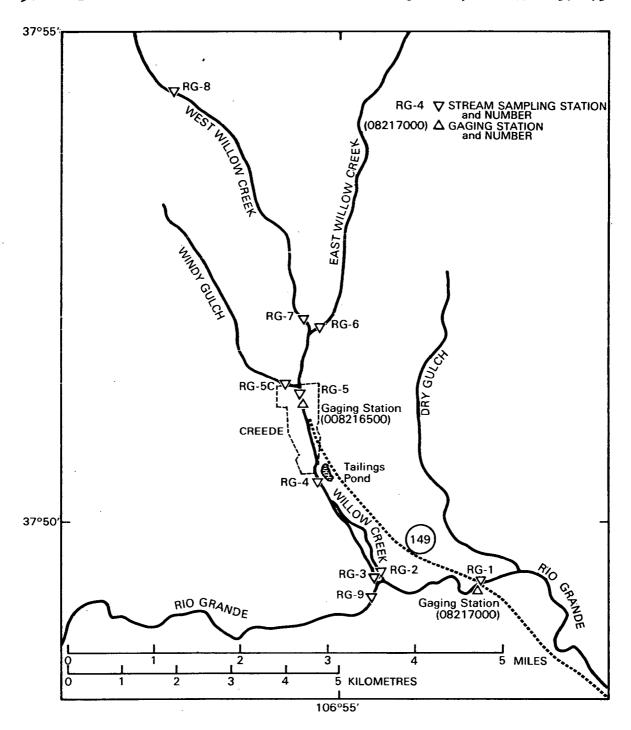


Figure 20.--Sampling sites in the Creede area, Colorado.

Overview

Instances of acute toxicity to trout have been noted in Willow Creek and the Rio Grande downstream from Willow Creek (The Denver Post, Sept. 15, 1971; Sept. 24, 1971; Oct. 21, 1971; Nov. 10, 1971; Jan. 13, 1972). According to Goettl, Sinley, and Davies (1972) the 1971 fish kill followed a period of hard rain in which large amounts of sediment were washed into Willow Creek. Subsequently, a break in a ditch carrying effluent from a mill just upstream from RG-4 was discovered.

At this date (1973), the mill is not active, thus mill effluent is not presently a hazard. However, tailings accumulations located between Creede and the Rio Grande River were probably responsible for some of the damage in the 1971 fish kill, and these tailings still represent a potential hazard during periods of high flow.

In addition, an unfiltered sample (at RG-5C) contaminated by effluent from another mill contained concentrations of Cd, Cu, Fe, Pb, Mn, Ni, and Zn that exceeded biological criteria and Cd, Fe, Pb, and Mn concentrations that exceed drinking water standards.

Although Ag was not determined during this study at Willow Creek, the Colorado Division of Wildlife reports finding up to 12 $\mu g/l$ in the mill effluent (John Goettl, Jr., oral commun., 1974). Since this mill processes gold and silver, it is possible that cyanide may also be present in the effluent. The presence of cyanide was not tested for during the present study.

Downstream Variations

Aquatic invertebrates at the control station on West Willow Creek (RG-8) were numerous, with considerable species diversity represented. Not surprisingly, all metal concentrations were well below drinking water standards and biological criteria at this station. Downstream, at the mouths of East and West Willow Creeks (RG-6, RG-7), the numbers and diversity of macroinvertebrates were greatly reduced. Here Pb, Mn, and Zn concentrations exceeded biological criteria. Farther downstream at RG-5, below the point at which effluent from the mill on Windy Gulch enters, the Mn concentration increases significantly. Concentrations of Zn increase even more between RG-5 and RG-2, apparently due to additions from tailings. Caddisfly larvae were the only macroinvertebrates observed at stations RG-2 and RG-3.

Metal concentrations in the Rio Grande River downstream from Willow Creek (RG-1) were not seriously affected by additions from Willow Creek. Only Mn and Zn showed significant increases between stations RG-9 and RG-1, and Zn was the only metal to exceed biologic criteria at RG-1. Despite this relatively minor increase in the dissolved metal concentration of the Rio Grande between RG-9 and RG-1, the diversity of macroinvertebrates observed at RG-1 was greatly reduced in October 1972.

Ouray

The Ouray study area (figs. 1 and 21) is composed of three mining districts: Red Mountain, Sneffels, and Uncompanier (Vanderwilt, 1947). Most of the metal production in these districts has been from Tertiary veins and from plugs and pipes in Tertiary volcanic rocks, but some veins have been followed into the underlying sedimentary beds (Fischer and others, 1968). Copper, lead, zinc, silver, gold, and minor amounts of bismuth, fluoride, tungsten, and bog iron have been commercially mined in the area.

Summary

Water-quality parameters that													
			ex	cee	d ir	ndicat	:ed	cri	ter	ia¹			
			(b.	ase	d or	1 filt	ere	d s	amp	les)		
Drin	kin	g w	ate	r s	tand	lards		Bio:	log	ica	1 c	riter	:ia
pН	Cd	Cu	Fe	Pb	Mn	Zn	pН	Cd	Cu	Fe	Pb	Mn N	li Zn
X	x	x	x	x	X		X	X	X	x	x	X	Х
	Н	pH Cd	pH Cd Cu	(b. Drinking wate pH Cd Cu Fe	(base) Drinking water s pH Cd Cu Fe Pb	(based or Drinking water stand	(based on filt Drinking water standards pH Cd Cu Fe Pb Mn Zn	(based on filtere Drinking water standards pH Cd Cu Fe Pb Mn Zn pH	(based on filtered some Drinking water standards Bio pH Cd Cu Fe Pb Mm Zn pH Cd	(based on filtered samp Drinking water standards Biolog pH Cd Cu Fe Pb Mm Zn pH Cd Cu	Drinking water standards Biologica pH Cd Cu Fe Pb Mn Zn pH Cd Cu Fe	(based on filtered samples) Drinking water standards Biological c pH Cd Cu Fe Pb Mn Zn pH Cd Cu Fe Pb	(based on filtered samples) Drinking water standards Biological criter pH Cd Cu Fe Pb Mn Zn pH Cd Cu Fe Pb Mn N

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Х

mill, and tailings---

X

Х

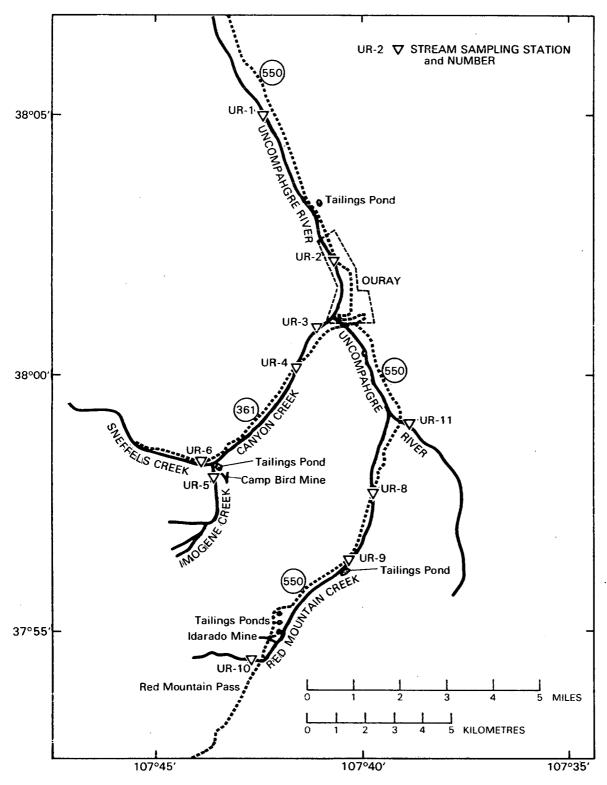


Figure 21.--Sampling sites in the Ouray area, Colorado.

のでは、大きないできょう。 またいまい 19 man 1

Overview

In the Red Mountain district, drainage from several abandoned mines and tunnels, together with drainage from the Idarado Mine (active) and tailings contribute to the degradation of Red Mountain Creek. Natural runoff from highly mineralized rocks in the district often contains metals in excess of U.S. Public Health Service drinking water standards (1962). However, this degradation is less significant than pollution resulting from mine drainage (Rouse, 1970). Fish and macroinvertebrates have been eliminated from Red Mountain Creek below the mines due to the very high metal concentrations, low pH, large amounts of suspended iron hydroxide and sediment, and, possibly, low dissolved oxygen.

Canyon Creek in the Sneffels district has concentrations of Pb and Zn that exceed biological criteria. Chemical analyses indicate that most of the Pb probably originates from the active Camp Bird operation—mines, mill, and tailings ponds. The relatively high Zn concentrations result from additions of Imogene and Sneffels Creek waters to Canyon Creek. Such concentrations may be due to mine drainage, natural runoff, or a combination of both. Unlike streams in the Red Mountain district, Canyon Creek does not suffer from highly acid or iron—stained conditions. Because gold and silver are extracted at the Camp Bird mill, there is a possibility that cyanide is present in Canyon Creek; however, water samples were not analyzed for this constituent.

No significant additional mine drainage was noted in the Ouray district. Although the quality of the Uncompander River is relatively poor for several miles downstream from the town of Ouray, this condition is primarily due to metals and acid from Red Mountain and Canyon Creeks. During high-flow periods, erosion of tailings from abandoned mills located along the Uncompander River may present a problem.

Downstream Variations

"The Uncompander River, which is a trout stream above Red Mountain Creek, contains no aquatic life from the mouth of Red Mountain Creek to the mouth of Canyon Creek at Ouray, and supports only a limited fishery for several miles downstream of this point" (Rouse, 1970). The reasons for such degradation become apparent when one examines the pH and metal concentrations reported from sites along the stream. Table 18 lists the parameters which exceed various criteria at stations UR-9 and UR-2, and gives an indication of chemical recovery within this reach (approximately 7 stream miles or 11 km). Indirectly, these data also help to explain the biologic recovery noted in this reach. However, much of the harm to fish and invertebrates is probably attributable to the relatively large amounts of suspended iron hydroxide particles, which are not represented in the dissolved iron concentrations.

Table 18.--Recovery of Red Mountain Creek and the Uncompander River, as indicated by water-quality parameters that exceed drinking water standards and biological criteria^{1,2}

UF	R-9	UR-2					
Exceed drinking water standards			Exceed biological criteria				
рН	pH · · c						
Cd	C d						
Cu	Cu		Cu				
Fe	Fe						
Pb	₽b						
Mn	Mn	Mn					
	Zn	-	Zn				

¹Based on filtered samples.

Alamosa Creek

Alamosa Creek, in the area of the Summitville mining district (figs. 1 and 22), drains volcanic and related shallow intrusive rocks of Tertiary age. The district has produced (as of 1960) approximately \$7.5 million worth of gold, silver, copper, and lead (Steven and Ratté, 1960).

Summary

		·	Water-	qua1	ity pa	rame	etei	rs 1	that	<u> </u>	•		
Sources of		•	exce	ed ir	ndicat	ed (crit	er:	ia ^l				
metals and acid			(bas	ed or	n filt	ere	l sa	amp.	les)			
•	Drin	king	water	stand	lards		Bio]	Log:	ica.	l cı	rite	eria	1
	pН	Cd	Cu Fe P	b Mn	Zn	pН	Cd	Cu	Fe	Pb	Mn	Ni	Zn
Wightman Fork (Summitville mines,												٠	
mill, and tailings)				X				X					X
Alum Creek (natural drainage)	х	x	х	x		х	X	x	X		X	X·	X
Bitter Creek (natural drainage)	x		x	x		X		x	x		x		x
Iron Creek (natural and mine drainage)	X		X	X		x	r		х				

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

 $^{^2}$ See table 5 for drinking water standards and biological criteria.

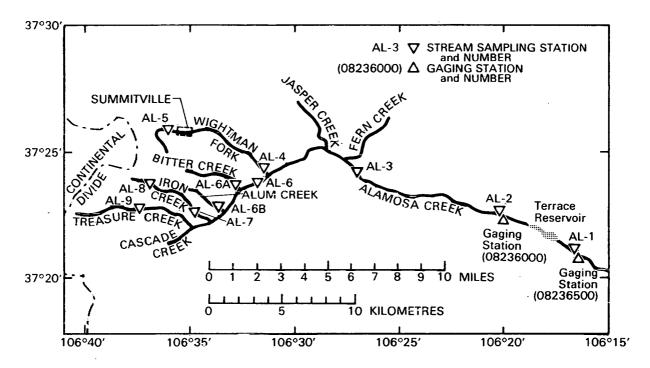


Figure 22.--Sampling sites in the Alamosa Creek area, Colorado.

Overview

Alum, Bitter, and Iron Creeks are tributaries to Alamosa Creek that flow through a zone of hydrothermally altered rock. This rock contributes significant quantities of acid, metals, and suspended sediment to the surface water. Iron Creek also receives minor amounts of drainage from abandoned mines. The Wightman Fork drains Summitville, a mining district with many abandoned mines, extensive tailings piles, and an active (as of 1971) mining and milling operation.

Water quality of Alamosa Creek is adversely affected from the mouth of Iron Creek to Terrace Reservoir. Although mining activities have aggravated the situation, it seems that most of this effect is due to natural erosion of highly mineralized and weathered rock.

Downstream Variations

Based on examinations of stream biota, chemical analyses, and information obtained from the U.S. Forest Service (U.S. Forest Service, Rio Grande National Forest, written commun., 1972), Alamosa Creek above the mouth of Iron Creek is known to be biologically healthy. Excellent fishing is reported in the area. Between Iron Creek and station AL-3, Alamosa Creek receives acid, metals, and suspended sediment that render the stream virtually devoid of macroinvertebrates and fish. Between stations AL-3 and AL-2 the stream "recovers" biologically and chemically because of additions from Jasper and Fern Creeks. Table 19 documents this recovery, but also shows that the stream at station AL-2 still contains concentrations of Cu and Zn that, because of potential synergistic effects, may be injurious to aquatic life.

Table 19.--Recovery of Alamosa Creek, as indicated by water-quality parameters that exceed drinking water standards and biological criteria 1,2

Al	L-3	AL	2
Exceed drinking water standards	Exceed biological criteria	Exceed drinking water standards	Exceed biological criteria
рН	рН		
	Cu		Cu ³
Fe	Fe		
Mn	·	Mn	***
	Zn		Zn ³

¹Based on filtered samples.

Terrace Reservoir seems to be acting as a "metal sink" as evidenced by the lower concentrations of most metals at station AL-1 than at AL-2 (see discussion under Lake Creek, p. 63). Downstream from the reservoir, no chemical parameters exceed either the drinking water standards or the biological criteria.

The great amounts of suspended sediment in Alamosa Creek above Terrace Reservoir are harmful to fish and invertebrates because of physical, as well as toxicological, considerations. This material can clog the gills of fish, and render the substrate unsuitable for invertebrates.

Erosion is one of the major processes responsible for the degradation of Alamosa Creek water quality. For this reason, it can be expected that chemical and sediment load conditions of the stream will change markedly with rainfall.

²See table 5 for drinking water standards and biological criteria.

³Although neither Cu nor Zn concentrations exceed the maximum value in table 5, both fall within the range listed in this table. They are cited because combinations of Cu and Zn are known to act synergistically.

Lake Creek

Once-active mining districts drained by Lake Creek (figs. 1 and 23) are known for high-grade gold samples but small overall production. Such production was from relatively small, Laramide gold veins (Tweto, 1968) in Precambrian igneous rocks. Some veins also contain lead, silver, and zinc (Vanderwilt, 1947).

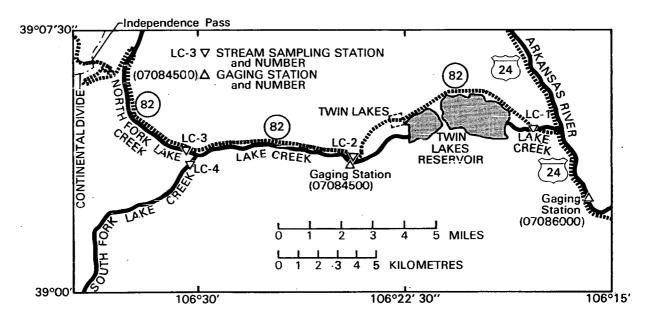


Figure 23. -- Sampling sites in the Lake Creek area, Colorado.

Summary

Sources of metals and acid	Water-quality parameters that exceed indicated criteria ^l (based on filtered samples)										
	Drink	ing water	stand	Biological criteria							
	pН	Cd Cu Fe	Pb Mn	Zn	рН С	l Cu	Fe	Pb	Mn	Ní	Zn
South Fork of Lake Creek (abandoned draining mines and tailings piles)	- x	X	Х		Х	X	Х				

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

In October 1972, the South Fork of Lake Creek had a pH of 5.1, and contained relatively large amounts of suspended iron hydroxide that gave the water and rocks a characteristic orange-red color. The South Fork also contained excessive amounts of Cu and Mn (see Summary table). No chemical parameters exceeded water-quality criteria at any stations on Lake Creek, either upstream or downstream from Twin Lakes Reservoir.

Downstream Variations

Merger of the North Fork with the South Fork of Lake Creek greatly dilutes the original high acid and metal concentrations in the South Fork. No stations downstream from the confluence of these two streams were chemically affected. Concentrations of several metals (Cu, Fe, Mn, Ni, Zn) were found to be lower downstream from Twin Lakes Reservoir (LC-1) than immediately upstream from the reservoir (LC-2).

Lakes as Metal Sinks

Data collected from both the Alamosa Creek and Lake Creek study areas provide good evidence that lakes act as sinks for trace metals. The lakes involved are Terrace Reservoir (Alamosa Creek study area) and Twin Lakes Reservoir (Lake Creek study area).

Table 20 shows, for several water-quality parameters, the ratios of chemical concentrations in the streams below lakes to those above the lakes. For the major cations and anions-represented by specific conductance and dissolved Ca, Mg, and HCO_3 —the ratios are ≤ 1 during low flows and >1 during high flows. This indicates that the lakes are acting as sinks for these parameters during low flows, whereas they contribute them during high flows. The reason for the latter is that during high flows the streams above the lakes are diluted by relatively unmineralized snowmelt runoff, whereas the water in the lake (and thus the water immediately downstream) reflects the previous year's low-flow contribution.

On the other hand, the lakes never act as contributors of trace metals: the ratios for total and dissolved Cd, Cu, Fe, Pb, Mn, Ni, and Zn are always <1. It seems to matter little whether (1) total and dissolved metals are considered separately (57 and 80 percent, respectively, of the ratios are <1 or (2) low and high flows are considered separately (68 and 64 percent, respectively, of the ratios are <1). The trend is most obvious in the cases of Cu and Fe, as seen from table 20.

The mechanisms by which metals are lost to the lakes can only be postulated at this time. It is not difficult to imagine the lake acting as a settling basin for suspended metals. In addition, dissolved metals are probably taken up biologically (by plankton) and physically (by adsorption onto detritus or by precipitation); they could then be readily deposited in the lake sediments.

Table 20.--Effect of lakes on stream quality
[t = Total; d = dissolved]

	Ratio of concentration in stream below lake to concentration in stream above lake									
Water-quality	Low		High flow							
parameter	AL-1/AL-2	LC-1/LC-2	LC-1/LC-2							
	(10-5-72)	(10-29-72)	(6-22-73)							
Specific conductance	1	0.67	>1.6							
HCO ₃	1	. 85	1.5							
Ca	.87	.71	1.3							
Mg	.90	.65	1.7							
t. Cd	.67	1	¹ ∿ 1							
q Cq	(2)	(2)	(2)							
t Cu	. 50	.50	.50							
d Cu	. 47	. 86	. 44							
t Fe	. 58	. 44	. 16							
d Fe	1	. 50	.38							
t Pb	1	1	1 ₀ 1							
d Pb	1	0	(2)							
t Mn	.38	1	.50							
d Mn	.26	0	(²)							
t Ni	- 75	1	¹∿l							
d Ni	. 46	.50	.50							
t Zn	•57	1	.28							
d Zn	.60	(3)	. 1							

 $^{^{1}}$ Qualified value divided by the same qualified value (example: <50/<50).

North Clear Creek

Tertiary veins and small stocks in Precambrian schist and gneiss are the sources of ores in the Blackhawk and Central City districts (Vanderwilt, 1947) drained by North Clear Creek (figs. 1 and 24). Sims, Drake, and Tooker (1963) have estimated mineral production between 1859 and 1963 at \$100 million, of which gold amounted to 85 percent, silver about 10 percent, with the remainder being due to copper, lead, zinc, and uranium. Several small mining operations and one mill were active in 1972 (Colorado Div. Mines, 1973).

 $^{^{2}0/0.}$

^{310/0.}

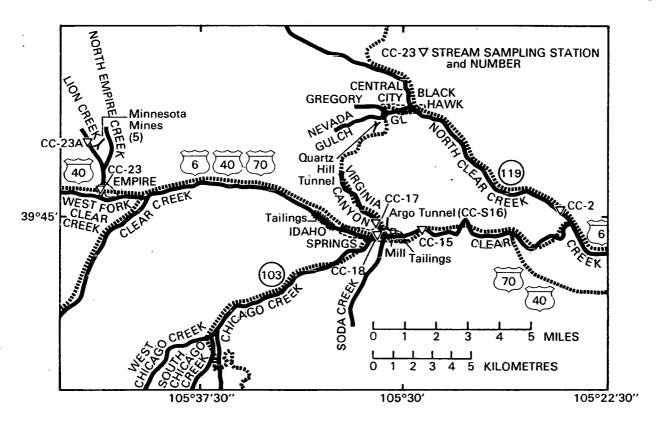


Figure 24.--Sampling sites in the North Clear Creek, Lion Creek, and Idaho Springs areas, Colorado.

Summary

Sources of metals and acid	Water-quality parameters that exceed indicated criteria ^l (based on filtered samples)									
	Drinking water standards Biological criteria									
	pH Cd Cu Fe Pb Mn Se Zn pH Cd Cu Fe Pb Mn Ni Zr									
Gregory Gulch and Nevada Gulch (draining mines and tailings piles; Quartz Hill Tunnel)	x x x x x x x x									

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

North Clear Creek receives drainage from several draining mines and tailings piles in Gregory and Nevada Gulches. The streambed is heavily coated with iron hydroxide, and the overall quantity and diversity of aquatic invertebrates at CC-2 (fig. 24) is greatly reduced compared to areas upstream from Blackhawk. The summary table shows that several metals and pH exceed water-quality criteria. In addition to metals that commonly are high in surface waters of Colorado mining districts, selenium was found to exceed the drinking water standard.

Lion Creek

Tertiary stocks, dikes, and veins in Precambrian granite are the source of the ore deposits at the Empire district drained by Lion Creek (figs. 1 and 24). Total output of the area has probably amounted to more than \$5 million worth of gold and silver (Vanderwilt, 1947).

Summary

Sources of metals and acid		Water-q excee (base	d in	dicat		iter	ia l				
	Drinkin	Drinking water standards Biological criteria									
	pH Cd	Cu Fe Pb	Mn	Zn	рН С	d Cu	Fe	Pb	Mn	Νi	Zn
Minnesota Mines and other abandoned mines and tailings	х	X	х		X	x	x		х	х	x

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

Several abandoned adits and tailings piles drain into Lion Creek, a tributary of Clear Creek. The Minnesota Mines are the predominant source of drainage. Station CC-23, almost 2 miles (3 km) downstream from the drainage sources, was one of the most acid sites noted during the entire mine drainage project (pH 3.2 in January 1973; 3.3 in June 1973). Lion Creek is judged to be adversely affected downstream to its confluence with the West Fork of Clear Creek.

Idaho Springs

Like ores of the Central City and Blackhawk districts, Idaho Springs (figs. 1 and 24) ores are mined predominantly from Tertiary veins in Precambrian gneiss and schist. Ore shipped from the district owed its value mainly to gold and silver (Vanderwilt, 1947). Less than a half dozen small mining operations were active in the district in 1972 (Colorado Div. Mines, oral commun., 1974).

Summary

Sources of metals and acid	Drin	le i n		ex (b	cee ase	d i	ity pa ndicat n filt dards	ed ere	cri	ter amp	ia¹ les)	rit	ori.	
							Zn		Cd						
Argo Tunnel (and associated tailings) Virginia Canyon (adits,	х	X	х	х	х	х	х	Х	Х	х	х	х	х	х	x
tunnels, and tailings piles)	Х	x	X	x		х	x	X	X	X	X	х	х	х	Х
Several draining adits and tailings piles upstream from Idaho Springs on Clear Creek				x		x				x	x				x

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

Clear Creek in the vicinity of Idaho Springs, receives polluted effluent from three major sources. The most important of these is the Argo Tunnel (CC-S16), which discharges approximately 1 ft 3 /s (0.03 m 3 /s) of highly acid (pH 2.7) and metalliferous water. In June 1973, dissolved metals in the tunnel discharge exceeded drinking water standards by the following factors: Cd, 32 X; Cu, 12 X; Fe, 730 X; Pb, 4.0 X; Mn, 2,800 X; Zn, 16 X.

Unlike effluent from the Argo Tunnel and most other acid mine-drainage sites, the relatively small flow (normally less than 0.1 ft³/s or 0.003 m³/s) from Virginia Canyon Creek (station CC-17), shows no signs of iron staining. It is, however, very acid (pH 2.8 in June 1972) and metal laden (see Appendix, p. 214). Virginia Canyon Creek represents a relatively minor metal source for Clear Creek due to its small flow.

Additional draining mines and tailings piles are located along Clear Creek, upstream from the Argo Tunnel. Data from station CC-18 show that these sources contribute amounts of Cu, Fe, Mn, and Zn that may be harmful to aquatic organisms, but which are relatively insignificant when compared to the impact of the Argo Tunnel drainage.

Downstream and Seasonal Variations

Water-quality data from stations on Clear Creek, both upstream (CC-18) and downstream (CC-15) from the Argo Tunnel (see table 21), show that drainage from the tunnel does increase concentrations of several parameters. Similar data from June 1973 show that fewer parameters increase in concentration between CC-18 and CC-15, suggesting that the Argo Tunnel has a greater relative impact on Clear Creek during periods of low flow. Such a conclusion is consistent with the findings of a detailed study done by Boyles, Alley, Cain, Gladfelter, and Rising (1973). Part of this increase is due to secondary drainage from the tailings immediately downstream from the tunnel. The

Table 21.--Impact of Argo Tunnel drainage, as indicated by concentrations in Clear Creek upstream and downstream from the tunnel in January 1973

[Concentrations in micrograms per litre unless otherwise specified; d = dissolved; t = total]

Wate	er-quality rameter ^l	CC-18 (upstream from tunnel)	CC-15 (downstream from tunnel)
pH d t	(units) Cd Cd Cu Fe	7.0 1 <10 60 440	6.8 2 10 170 6,900
t d	Mn Mn Ni Zn Zn	760 410 15 410 360	1,400 1,400 20 660 1,000

¹Concentrations of d Cu, d Fe, d Pb, t Pb, t Ni, d Ag, and t Ag all remain the same or decrease between stations CC-18 and CC-15.

report states, "The effect on Clear Creek of heavy metals from the tailings appears to be minor except during heavy rainstorms when rainwater runoff from the tailings is detrimental to the water quality of the creek."

Despite the impact of the Argo Tunnel, the only dissolved parameters to exceed either drinking water standards or biological criteria at CC-15 (approximately 1 mile or 1.6 km downstream from the tunnel) are Zn and Mn.

Detectable concentrations of Ag (both dissolved and total) were noted at all stations in the Idaho Springs area. While the biological criterion for Ag listed in table 5 is 0.1 $\mu g/l$, the Ag detection limit at the U.S. Geological Survey's laboratory in Salt Lake City, Utah, is 1 $\mu g/l$. For this reason, Ag was not listed in the Summary tables unless the concentration exceeded 1 $\mu g/l$.

French Gulch

Production in the Breckenridge district has generally been from placer deposits. Lode ores have been mined from veins in Precambrian schist, gneiss, and granite, and from Paleozoic and Mesozoic sedimentary rocks (Vanderwilt, 1947). The chief mineral products of the district have been gold, silver, lead, and zinc (Tweto, 1968). One mine was reported to be active on French Gulch (fig. 1) in 1972 (Colorado Div. Mines, 1973).

Summary

Sources of metals and acid	Water-quality parameters that exceed indicated criteria ^l (based on filtered samples)
metalo and dell	Drinking water standards Biological criteria
	pH Cd Cu Fe Pb Mn Zn
French Gulch (draining mines and tailings pilesnames unknown)	x x x x x x

 $^{^{\}rm l}{\rm See}$ table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

The Blue River near Breckenridge is affected by drainage from several mines in French Gulch (fig. 19). Extensive tailings are also located in this area, but most are the result of placer activity and probably do not significantly contribute to the degradation of the surface water. Fe, Mn, and Zn exceeded water-quality criteria during certain times of the year in French Gulch (station BR-3).

No chemical parameters were found to exceed acceptable criteria in the Blue River upstream from French Gulch (stations BR-4 and BR-5). Likewise, the Blue River 4 miles (6 km) downstream from French Gulch (station BR-1) had cleansed itself such that all chemical parameters tested were within acceptable limits.

Downstream and Seasonal Variations

Total Fe and dissolved Pb concentrations increased between stations BR-3 and BR-2 in November 1972, indicating that an unnoticed source of drainage may exist in this reach. The Blue River at station BR-2 had a dissolved Zn concentration that might be harmful to aquatic life (620 μ g/1). Despite these conditions at BR-2, no parameters tested exceeded water-quality criteria for approximately 4 miles (6 km) downstream.

Station BR-3 on French Gulch generally had the highest metal concentrations of any station in this study area. Nevertheless, mayfly and stonefly nymphs and midge larvae were observed at this station in November 1972, indicating that effects on aquatic organisms were only moderate. On the other hand, a similar search for organisms in January 1973 failed to reveal any macroinvertebrates. January was also the month in which acid and metal concentrations were the most severe at station BR-3. Reasons for these increased concentrations in January are unknown.

Climax

The largest known molybdenum deposit in the United States, and perhaps in the world, occurs at Climax (see fig. 1) (King, 1964). Here, Precambrian granite, schist, and gneiss are intruded by dikes and at least one large stock of Tertiary age (Vanderwilt, 1947; Del Rio, 1960). Mineralization is associated with and surrounds the porphyry stock. Molybdenite (MoS_2) occurs in veinlets and is associated with huebnerite ($MomVO_4$), cassiterite (SnO_2), pyrite, and monazite (a rare earth phosphate) (Wallace and others, 1968).

Summary

Motor-quality parameters

	l						.ty pa								
Sources of	ļ		ex	ce	ed	in	dicat	ed (eri	ter:	ia¹	, 2			
metals and acid	(based on filtered samples)														
	Drin	Drinking water standards Biological criteria										a			
	pН	Cd	Cu Fe	P	b M	n	Zn	pН	Cd	Cu	Fe	Pb	Mn	Ni	Zn
Tenmile Creek															
Tailings ponds and drainage at Climax			X		Х					x	х		х	х	x
Searle Gulch (abandoned, draining mines)					Х										X
East Fork Eagle River (tailings ponds and drainage)					X										
East Fork Arkansas River (specific sources unknown)					х										X

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

Overview

The molybdenum mining operation at Climax is located at the headwaters of three separate drainage systems—The Arkansas and Eagle Rivers, and Tenmile Creek (fig. 25). Under low-flow conditions most of the process water is recycled. However, the operation is unable to recycle much of this water during the spring and early summer due to the greatly increased amounts of runoff entering the tailings ponds. Consequently, much of this water eventually is discharged into Tenmile Creek.

Abandoned, draining mines in Searle Gulch, downstream from the molybdenum mining operation, also contribute minor amounts of metals to Tenmile Creek. Despite obvious iron staining of the rocks, pH values along Tenmile Creek were not low. Also, except for the station immediately downstream from the Tenmile tailings pond (TM-6), only Mn exceeded the drinking water standard, and only Zn consistently exceeded the biological criterion. Dissolved Mn concentrations were excessive as far downstream as station TM-2. Dissolved Zn concentrations exceeded the biological criterion throughout the entire reach of Tenmile Creek (from TM-6 below the Tenmile tailings pond to TM-1 at Frisco, a distance of approximately 13 stream miles or 21 km).

 $^{^2\}mathrm{Dissolved}$ Mo exceeds the proposed irrigation limit of 150 $\mu\mathrm{g}/1$ (see text) in 28 percent (5 of 18) of the surface-water samples. None of these occurred on the East Fork Arkansas River.

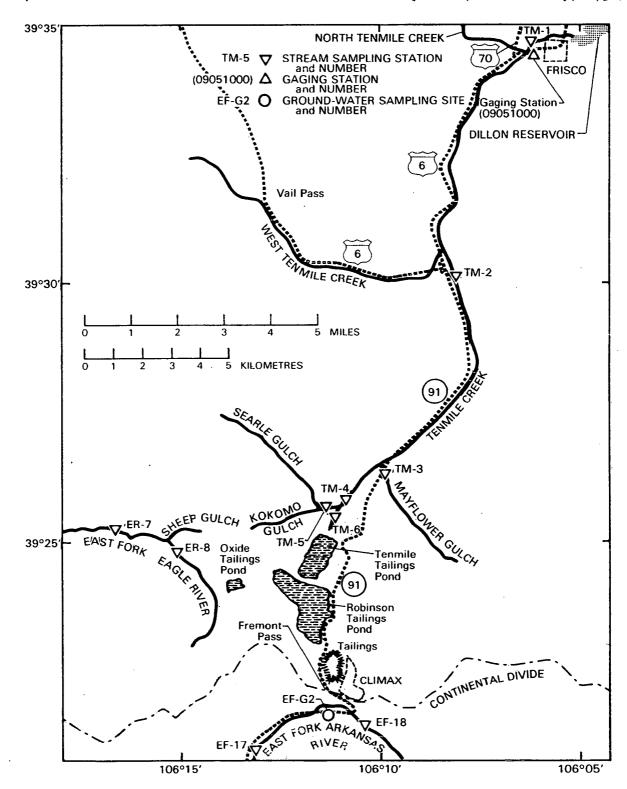


Figure 25.--Sampling sites in the Climax area, Colorado.

Since Mo is the major metal mined at Climax, it is not surprising to find very high dissolved Mo concentrations in Tenmile Creek--at TM-6, about 1,400 times the concentrations at the control station (TM-3). The significance of such Mo concentrations is uncertain since no drinking water standards or biological criteria are available. However, researchers working on the National Science Foundation's molybdenum project at the University of Colorado have recently recommended a limit of 150 $\mu \mathrm{g}/1$ Mo in irrigation water. This limit is based on effects on cattle and sheep (molybdenosis) grazing on irrigated forage (The Rocky Mountain News, March 4, 1974).

The East Fork of the Eagle River receives drainage from the Robinson tailings pond. Like Tenmile Creek, Mo concentrations at stations on the Eagle River are considerably higher than at control stations in the Climax area. However, the Mo concentrations decrease markedly between stations ER-8 and ER-7--from 400 to 45 $\mu g/1$, respectively, for the dissolved form. No metals tested exceeded biological criteria at ER-7 or ER-8 in November 1972. In June, only Mn exceeded the drinking water standard.

Mining activities at Climax also have minor effects on the quality of the East Fork of the Arkansas River, though the exact source of the contaminants is not known. Using station EF-18 as a control site, hardness and several metal concentrations showed increases downstream. These increases were generally slight, with only Mn exceeding the drinking water standard, and Zn exceeding the biological criterion.

Downstream and Seasonal Variations

Table 22 lists the dissolved Mo concentrations at sampling stations along Tenmile Creek in November 1972 and June 1973. The data illustrate two important phenomena. First, as previously mentioned, maximum Mo concentrations occur in June, and are the result of increased runoff that flows onto the tailings ponds, with the excess being purged into Tenmile Creek. Second, the table indicates that although Mo concentrations are very high immediately downstream from the Tenmile tailings pond (TM-6), they decline significantly in less than 1 mile (1.6 km) at TM-4. Between stations TM-4 and TM-1, Mo concentrations showed no further decline. In fact, there was actually a slight increase in this reach, which may be due to ground-water inflow.

Table 22 Downstream	variations	of dis	solved	molybdenum
concentrati	ions along	Termile	Creek	

	Dissolved molybo	lenum (μg/l)
Sampling station	November 1972	June 1973
TM-6	2,800	19,000
TM-4	150	
TM-2	150	4,000
TM-1	200	

Based on laboratory studies and analysis of samples collected along Clear Creek downstream from the Urad mine, Runnells, LeGendre, and Meglen (1973) have stated that Mo may be removed from solution by adsorbtion onto ferric hydroxide particles and by precipitation as ferrimolybdite $[Fe_2(MoO_4)_3 \cdot 8H_2O(?)]$. Precipitated iron is apparent along Tenmile Creek, suggesting that the drastic decrease in dissolved Mo between stations TM-6 and TM-4 may result from such processes.

The presence of organic compounds added to the water during milling processes may also be a factor in the transport of metals at Climax. Such compounds are known to form soluble complexes with many metals, including Mo (Dean and others, 1959), thereby increasing the potential mobility of the metals (Theis and Singer, 1973).

Urad-Henderson

The Urad district (fig. 1) has produced molybdenum from an ore body in a small porphyry stock of Oligocene age and in bordering Precambrian rocks. "As at Climax, molybdenite occurs in myriad veinlets in shattered silicified and sericitized rock." (Tweto, 1968.)

Summary

Sources of	Water-quality parameters that exceed indicated criteria 1,2									
metals and acid	(based or	ı filtered	samp	les)_						
	Drinking water stand	lards I	Biolog:	ical o	crite	riteria				
	pH Cd Cu Fe Pb Mn		Cd Cu	Fe Pl) Mn	Ni	Zn			
Urad Mine (tailings and mine drainage on Woods Creek)	х				x		х			
Henderson shaft West Fork Clear Creek	X				Х		Х			
Williams Fork	x x	Х	X	X			X			

¹See table 5; unless otherwise stated, X under pH means value is less than lower value in table 5.

 $^{^2} Dissolved$ Mo exceeds the proposed irrigation limit of 150 µg/l (see text under "Climax") in 22 percent (2 of 9) of the surface-water samples. All occurred on Woods Creek below the Urad Mine.

Overview

This study area actually encompasses drainages on both sides of the Continental Divide (see fig. 26). On the east, the West Fork of Clear Creek receives drainage from the active² Urad Mine and mill located on Woods Creek. In addition, water-quality data show that excavation activities at the Henderson shafts are beginning to affect this drainage. The Williams Fork, on the western side of the Divide, also seems to exhibit effects from excavation of a tunnel that is intended to connect the Henderson shafts near Berthoud falls on the eastern slope with the projected mill and tailings in the Williams Fork drainage above Keyser Creek.

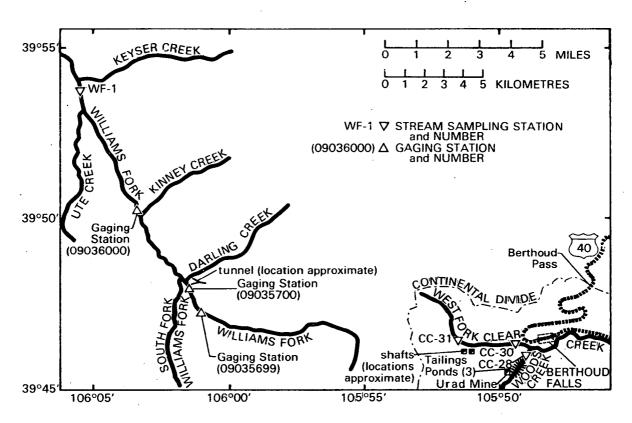


Figure 26.--Sampling sites in the Urad-Henderson area, Colorado.

 $^{^2}$ The Urad Mine was shut down on November 29, 1974 (Denver Post, Dec. 1, 1974).

Downstream and Seasonal Variations

Comparison of data above and below the Henderson shafts (stations CC-31 and CC-30, respectively) reveals that pH, specific conductance, hardness, Mn, Mo, and Zn increase markedly in this reach during low-flow periods. The significantly higher Fe at CC-31 is probably due to the presence of at least one abandoned draining mine above this station. Most of this Fe would be expected to precipitate readily at such high pH's (7.1-8.5), thereby explaining the decrease in Fe concentrations between CC-31 and CC-30.

Samples collected on the Williams Fork (station WF-1) show a distinct increase in the concentrations of most metals between October 1972 and February 1973 (see fig. 27), with Cu, Fe, and Zn exceeding their biological criteria in February. It is probable that this increase is the result of

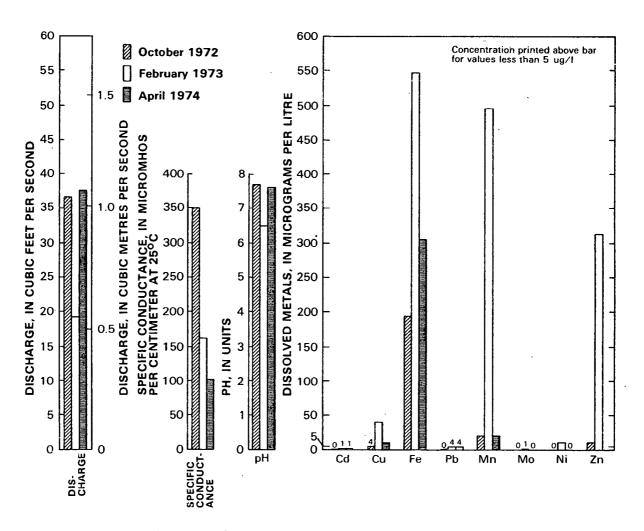


Figure 27.--Variation of chemical quality in the Williams Fork, Colo., October 1972 to April 1974.

activities associated with excavation of the tunnel, upstream from the sampling site, though a continuous monitoring program would be necessary to establish this in fact. Concentrations declined somewhat between February 1973 and April 1974. However, the 1974 sample was collected later into spring runoff than previous samples, and concentrations may reflect dilution from the higher discharge associated with this sample.

Compared to the West Fork of Clear Creek, concentrations of Mm, Mo, Ni, and V are considerably greater in Woods Creek below the Urad tailings. As a matter of fact, V occurs at higher levels here than at any other location sampled throughout the study.

Fourmile Creek

In the Fourmile Creek area (fig. 1), gold- and silver-rich veins are largely confined to a volcanic subsidence basin that is surrounded by Precambrian granite, gneiss, and schist. The basin is filled with fragmental volcanic and clastic non-volcanic rocks of Miocene age (Gott and others, 1969).

Overview

Fourmile Creek receives drainage from the Roosevelt and Carleton Tunnels of the Cripple Creek district (fig. 28). Despite such contributions, only Mn exceeded the drinking water standard during February and May 1973. A wide variety of aquatic invertebrates was observed at station FC-1, and no dissolved chemical constituents tested were found to exceed biological criteria.

Increased mineral exploration activity has occurred in the district due to recent rises in the price of gold. Local surface-water quality may be affected by this increased activity and, therefore, this area warrants future monitoring.

Uravan

Production of uranium and vanadium in the Uravan district (fig. 1) has largely been from Mesozoic sandstone (Del Rio, 1960). The Colorado Division of Mines (1973) lists uranium and vanadium production figures for Montrose County in 1972 at greater than \$4 million.

Overview

Based on preliminary observations, the mining operation at Uravan was recognized as a relatively minor source of metals for the San Miguel River. Nevertheless, this area was briefly investigated because it represented an entirely different type of geology and mining than the other study areas.

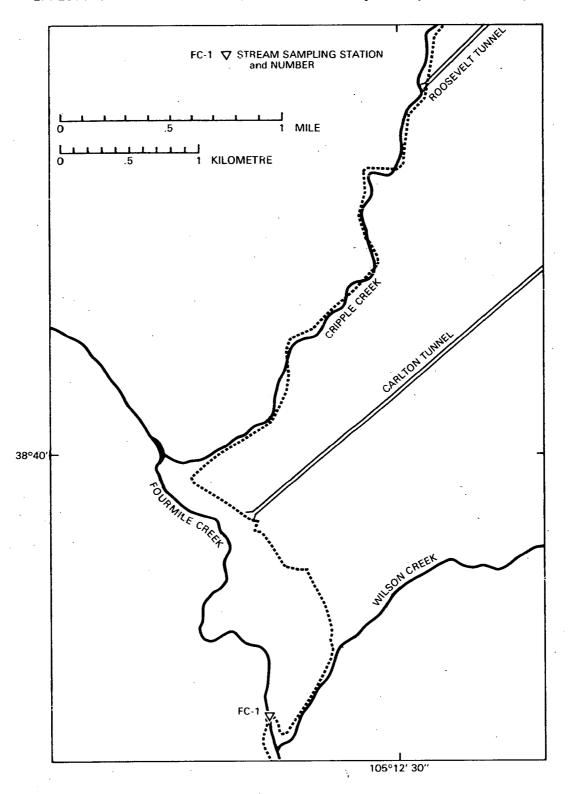


Figure 28.--Sampling sites in the Fourmile Creek area, Colorado.

Potential problem sources are settling ponds and tailings piles associated with the mining operation (see fig. 29). These sources did not contribute acid to the river; or if they did, it was in such small quantities that the pH was not affected. Whereas dissolved concentrations of Cu, Fe, Mn, Ni, V, and Zn increased downstream from the mining operation, only Mn exceeded the drinking water standard. No metal concentrations exceeded biological criteria, but the combined concentrations of Cu and Zn detected at station SM-1 may be harmful to aquatic organisms due to synergistic action of these two metals.

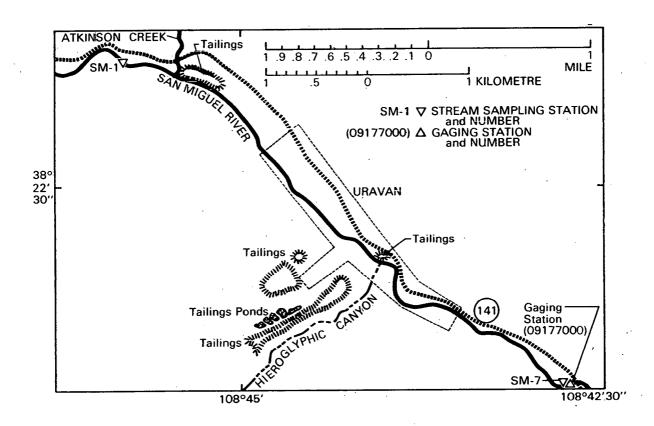


Figure 29.--Sampling sites in the Uravan area, Colorado.

During December 1972, high-alkalinity (pH 6.8 and 3,300 mg/l HCO $_3$) water was noticed seeping from the tailings into Atkinson Creek, a tributary to the San Miguel River. The source of the bicarbonate was probably from solution, by water containing dissolved CO $_2$, of host rock calcite and dolomite (Motica, 1968) concentrated in the tailings. At this time of year, the seepage was less than 0.1 ft 3 /s (0.003 m 3 /s) and had little effect on the quality of the San Miguel. However, tailings drainage may be a water-quality hazard during periods of high flow.

Oak Creek

Mining activity in the Oak Creek study area (fig. 1) has been connected primarily with the extraction of coal (Bass and others, 1955). The coal is bituminous and is associated with the Mesaverde Group, which is composed of sandstone and shale of Cretaceous age. Copper has been reported in the district, but the nature of its occurrence is not known (Vanderwilt, 1947).

Overview

Approximately 0.2 to 0.6 ft 3 /s (0.006 to 0.02 m 3 /s) of drainage, apparently from an abandoned coal mine, enters 0ak Creek near station OC-S3 (see fig. 30). Although this drainage has very little effect on the water quality of 0ak Creek, it was chosen as a study area because none of the other areas dealt with drainage from coal deposits. Comparison of concentrations above and below the drain (0C-4 and 0C-2, respectively) shows that hardness, Pb, and Mn increase slightly below the drain, but only Mn exceeds the drinking water standard at 0C-2. No parameters exceeded biological criteria in Oak Creek downstream from the drain. Drainage from the mine itself (0C-S3) produces considerable iron staining of the channel up to the point where it enters Oak Creek. Nevertheless, dissolved Fe concentrations at 0C-2 are not increased by the addition of this drainage. The dissolved Pb concentration of 50 µg/l in the June sample collected at the drain (0C-S3) indicates additional work in this area may be warranted.

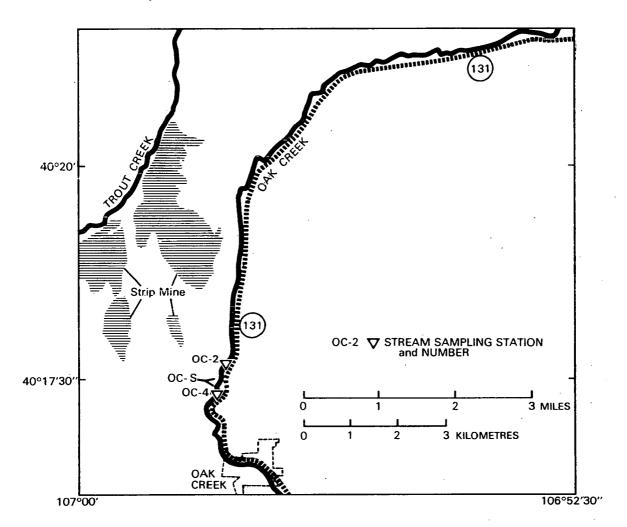


Figure 30.--Sampling sites in the Oak Creek area, Colorado.

REFERENCES

American Public Health Association, 1971, Standard methods for the examination of water and wastewater [13th ed.]: Washington, D.C., Am. Public Health Assoc., 874 p.

Andelman, J. B., 1973, Incidence, variability and controlling factors for trace elements in natural, fresh waters, *in* Singer, P. C., ed., Trace metals and metal-organic interactions in natural waters: Ann Arbor, Ann Arbor Sci. Publishers, p. 57-88.

- Bass, N. W., Eby, J. B., and Campbell, M. R., 1955, Geology and mineral fuels of parts of Routt and Moffat Counties, Colorado: U.S. Geol. Survey Bull. 1027-D, p. 143-250.
- Boyles, J. M., Alley, William, Cain, Douglas, Gladfelter, Wayne, and Rising, Celia, 1973, Impact of the Argo tunnel acid mine drainage and mine tailings on Clear Creek and possible abatement procedures: Golden, Colorado School Mines, 152 p.
- Brock, T. D., 1970, Biology of microorganisms: Englewood Cliffs, Prentice-Hall, 737 p.
- Brown, Eugene, Skougstad, M. W., and Fishman, M. J., 1970, Methods for collection and analysis of water samples for dissolved minerals and gases: U.S. Geol. Survey Techniques Water-Resources Inv., book 5, chap. Al, 160 p.
- Buchanan, T. J., and Somers, W. P., 1969, Discharge measurements at gaging stations: U.S. Geol. Survey Techniques Water-Resources Inv., book 3, chap. A8, 65 p.
- Burbank, W. S., 1932, Geology and ore deposits of the Bonanza mining district, Colorado: U.S. Geol. Survey Prof. Paper 169, 166 p.
- Coal Industry Advisory Committee, 1965, Acid mine drainage research—A symposium: Ohio River Valley Water Sanitation Comm., Pittsburgh, Pa., May 20-21, 232 p.
- _____1968, Coal mine drainage research--Second symposium: Ohio River Valley Water Sanitation Comm., Pittsburgh, Pa., May 14-15, 406 p.
- _____1970, Coal mine drainage research—Third symposium: Ohio River Valley Water Sanitation Comm., Pittsburgh, Pa., May 19-20, 406 p.
- Colorado Department of Health, 1971a, Colorado drinking water supplies: Denver, Colorado Dept. Health, Div. Eng. Sanitation, 42 p.
- 1971b, Water quality standards and stream classification: Denver, Colorado Dept. Health, Water Pollution Control Comm., 30 p.
- Colorado Division of Mines, 1973, A summary of mineral industry activities in Colorado, 1972: Denver, Colorado Div. Mines, Dept. Nat. Resources, 97 p.
- Dean, J. G., Kay, Herbert, and Larson, M. L., 1959, Molybdenum chelates, esters, and organometallics, *in* Gould, R. F., ed., Metal-organic compounds: Am. Chem. Soc., Advances Chem. Ser. 23, p. 357-367.
- Del Rio, S. M., 1960, Mineral resources of Colorado, first sequel: Denver, Colorado Mineral Resources Board, 764 p.
- Deul, Maurice, 1947, The origin of bog iron deposits near Montezuma, Summit County, Colorado: Boulder, Colorado Univ., unpub. M.S. thesis, 35 p.
- Fischer, R. P., and Hilpert, L. S., 1952, Geology of the Uravan mineral belt: U.S. Geol. Survey Bull. 988-A, 13 p.
- Fischer, R. P., Luedke, R. G., Sheridan, M. J., and Raabe, R. G., 1968, Mineral resources of the Uncompangre primitive area, Colorado: U.S. Geol. Survey Bull. 1261-C, 91 p.
- Gibbs, R. J., 1973, Mechanisms of trace metal transport in rivers: Science v. 180, p. 71-73.
- Goettl, J. P., Sinley, J. R., and Davies, P. H., 1972, Water pollution studies: Denver, Colorado Div. Wildlife, Proj. F-33-R-7, 47 p.
- Gott, G. B., McCarthy, J. H., Jr., Van Sickle, G. H., and McHugh, J. B., 1969, Distribution of gold and other metals in the Cripple Creek district, Colorado: U.S. Geol. Survey Prof. Paper 625-A, 17 p.

REFERENCES 83

- Great Lakes Laboratory, 1971, Chromium, cadmium, arsenic, selenium, mercury and aquatic life: A brief literature review: New York State Univ. College at Buffalo, Great Lakes Laboratory Spec. Rept. 9, 23 p.
- Guy, H. P., and Norman, V. W., 1970, Field methods for measurement of fluvial sediment: U.S. Geol. Survey Techniques Water-Resources Inv., book 3, chap. C2, 59 p.
- Hem, J. D., and Durum, W. H., 1973, Solubility and occurrence of lead in surface water: Am. Water Works Assoc. Jour., v. 65, p. 562-568.
- Hem, J. D., and Skougstad, M. W., 1960, Coprecipitation effects in solutions containing ferrous, ferric, and cupric ions: U.S. Geol. Survey Water-Supply Paper 1459-E, p. 95-110.
- Jenne, E. A., 1968, Controls on Mn, Fe, Co, Ni, Cu, and Zn concentrations in soils and water—the significant role of hydrous Mn and Fe oxides, *in* Gould, R. F., ed., Trace inorganics in water: Am. Chem. Soc., Advances Chem. Ser. 73, p. 337-387.
- Kennedy, V. C., 1965, Mineralogy and cation-exchange capacity of sediments from selected streams: U.S. Geol. Survey Prof. Paper 443-D, 28 p.
- King, R. U., 1964, Molybdenum, in Mineral and Water Resources of Colorado.
 [Report for use of U.S. Senate Committee on Interior and Insular Affairs, 88th Cong., 2d sess.]: Washington, U.S. Govt. Printing Office, p. 102-108.
- Kurbatov, J. D., Kulp, J. L., and Mack, Edward, Jr., 1945, Adsorption of strontium and barium ions and their exchange on hydrous ferric ions: Am. Chem. Soc. Jour., v. 67, p. 1923-1929.
- Lee, D. H. K., ed., 1972, Metallic contaminants and human health: New York, Academic Press, 241 p.
- McKee, J. E., and Wolf, H. W., 1963, Water quality criteria [2d ed.]: California State Water Quality Control Board Pub. 3-A, 548 p.
- Motica, J. E., 1968, Geology and uranium-vanadium deposits in the Uravan mineral belt, southwestern Colorado, in Ridge, J. E., ed., Ore deposits of the United States, 1933-1967: New York, Am. Inst. Mining, Metall., and Petroleum Engineers, v. 1, p. 805-813.
- Ohio State University Research Foundation, 1971, Acid mine drainage formation and abatement: Washington, [U.S.] Environmental Protection Agency Grant 14010 FPR, DAST-42, 82 p.
- Rankama, Kalervo, and Sahama, Th. G., 1950, Geochemistry: Chicago, Univ. Chicago Press, 912 p.
- Rouse, J. V., 1970, Mine drainage and other sources of heavy metal pollution in the San Juan Mountains and other portions of the Colorado River basin: Denver, Federal Water Quality Adm., Colorado River-Bonneville Basins Office, 22 p.
- Runnells, D. D., LeGendre, G. R., and Meglen, R. R., 1973, Scavenging of dissolved molybdenum by ferric oxyhydroxide, as a function of pH--Natural examples and possible economic application [abs.]: Geol. Soc. America Program, 1973 Ann. Mtg., Dallas, Tex., p. 788-789.
- Sims, P. K., Drake, A. A., Jr., and Tooker, E. W., 1963, Economic geology of the Central City district, Gilpin County, Colorado: U.S. Geol, Survey Prof. Paper 359, 231 p.
- Singer, P. C., 1973, Trace metals and metal-organic interactions in natural waters: Ann Arbor, Ann Arbor Sci. Publishers, 380 p.

- Slack, K. V., Averett, R. C., Greeson, P. E., and Lipscomb, R. G., 1973, Methods for collection and analysis of aquatic biological and microbiological samples: U.S. Geol. Survey Techniques Water-Resources Inv., book 5, chap. A4, 165 p.
- Steven, T. A., 1968, Ore deposits of the central San Juan Mountains Colorado, in Ridge, J. D., ed., Ore deposits of the United States, 1933-1967; New York, Am. Inst. Mining, Metall., and Petroleum Engineers, v. 1, p. 706-713.
- Steven, T. A., and Ratté, J. C., 1960, Geology and ore deposits of the Summitville district, San Juan Mountains, Colorado: U.S. Geol. Survey Prof. Paper 343, 70 p.
- Stumm, Werner, and Morgan, J. J., 1970, Aquatic chemistry—an introduction emphasizing chemical equilbria in natural waters: New York, Wiley—Interscience, 583 p.
- Theis, T. L., and Singer, P. C., 1973, The stabilization of ferrous iron by organic compounds in natural waters, *in* Singer, P. C., ed., Trace metals and metal-inorganic interactions in natural waters: Ann Arbor, Ann Arbor Sci. Publishers, p. 303-320.
- Theobald, P. K., Jr., Lakin, H. W., and Hawkins, D. B., 1963, The precipitation of aluminum, iron, and manganese at the junction of Deer Creek with the Snake River in Summit County, Colorado: Geochim. et Cosmochim. Acta, v. 27, p. 121-132.
- Tweto, Ogden, 1968, Geologic setting and interrelationships of mineral deposits in the Mountain Province of Colorado and south-central Wyoming, in Ridge, J. D., ed., Ore deposits of the United States, 1933-1967: New York, Am. Inst. Mining, Metall., and Petroleum Engineers, v. 1, p. 551-588.
- Tweto, Ogden, and Sims, P. K., 1963, Precambrian ancestry of the Colorado mineral belt: Geol. Soc. America Bull., v. 72, p. 991-1014.
- U.S. Congress, Senate Committee on Interior and Insular Affairs, 1964, Mineral and water resources of Colorado: U.S. 88th Cong., 2d sess., 302 p.
- U.S. Forest Service, 1971, A report on the Snake River mining claims of Montezuma Iron and Pigment Company: Golden, Colo., U.S. Forest Service, Arapaho Natl. Forest, 46 p.
- U.S. Public Health Service, 1962, Drinking water standards: U.S. Public Health Service Pub. 956, 61 p.
- _____1970, Mercury in water supplies: Am. Water Works Assoc. Jour., v. 62, p. 285.
- Vanderwilt, J. W., 1947, Mineral resources of Colorado: Denver, Colorado Mineral Resources Board, 547 p.
- Wallace, S. R., Muncaster, N. K., Jonson, D. C., Mackenzie, W. B., Bookstrom, A. A., and Surface, V. E., 1968, Multiple intrusion and mineralization at Climax, Colorado, in Ridge, J. D., ed., Ore deposits of the United States, 1933-1967: New York, Am. Inst. Mining, Metall., and Petroleum Engineers, v. 1, p. 605-640.
- Wentz, D. A., 1974, Effect of mine drainage on the quality of streams in Colorado, 1971-72: Colorado Water Conservation Board Water-Resources Circ. 21, 117 p.
- White, Abraham, Handler, Philip, and Smith, E. L., 1964, Principles of biochemistry [3d ed.]: New York, McGraw-Hill, 1106 p.

APPENDIX

Chemical Quality of Surface and Ground Water at Sites Sampled to Determine the Effects of Metal Mining in Colorado, 1972-73

[The station identification at the top of each page consists of three parts: the first is an 8- or 15-digit U.S. Geological Survey number; the second is a station description (surface-water stations) or well location (ground-water stations); the third is the letter-number designation (example, SL-1) given on the location maps in the text. Stations are listed in numerical order within each study area according to the letter-number designation. Study areas are listed in numerical order according to figure 1, p. 3.

STATION DESCRIPTION: AB, above; BL, below; CALIF, California; CO, Colorado; C, Creek; DI, distributary; E, East; F, Fork; FLS, Falls; GL, Gulch; HWY, Highway; LK, Lake; L, Little; MO, mouth; MTN, Mountain; NR, near; N, North; NO., Number; O-B-J, Oh-Be-Joyful; RE, Reservoir; R, River; ST., Saint; STP, sewage treatment plant; S, South; SPGS, Springs; TR, tributary; W, West.

WELL LOCATION: The well locations are based on the U.S. Bureau of Land Management system of land subdivision and locate the well within a 10-acre (0.04-km²) tract. The locations are described proceeding from the largest to the smallest land subdivision. This is in contrast to the legal description, which proceeds from the smallest to the largest land subdivision.

The largest subdivision is the *survey*. Colorado is governed by three surveys, the Sixth Principal Meridian Survey (S), the New Mexico Survey (N), and the Ute Survey (U) (fig. 31A). Costilla County was not included in any of the above official surveys. No wells in this report fall within the boundaries of the Ute Survey or within the boundaries of Costilla County. The first letter of the well location designates the survey.

A survey is subdivided into four *quadrants* formed by the intersection of the baseline and the principal meridian. The second letter of the well location designates the quadrant: A indicates the northeast quadrant, B the northwest, C the southwest, and D the southeast.

A quadrant is subdivided in the north-south direction every 6 miles by townships and is subdivided in the east-west direction every 6 miles by ranges (fig. 31B). The first three numbers of the well location designate the township and the fourth through sixth numbers designate the range.

The 36-square-mile (93-km 2) area described by the township and range designation is subdivided into 1-square-mile (2.59-km 2) areas called sections. The sections are numbered sequentially in the manner shown in figure 31B. The seventh and eighth numbers of the well location designate the section.

Figure 31. -- System of well locations used in Colorado.

APPENDIX

The section, which contains 640 acres (2.59 km^2) , is subdivided into quarter sections. The 160-acre (0.65-km^2) area is designated by the first letter following the section: A indicates the northeast quarter, B the northwest, C the southwest, and D the southeast. The quarter section is subdivided into quarter-quarter sections. The 40-acre (0.16-km^2) area is designated in the same manner by the second letter following the section. The quarter-quarter section is subdivided into quarter-quarter-quarter sections. The 10-acre (0.04-km^2) area is designated in the same manner by the third letter following the section.

Specific conductance, pH, alkalinity, and temperature are field measurements; bicarbonate, carbonate, and carbon dioxide are calculated from pH and alkalinity; noncarbonate hardness is calculated from hardness and alkalinity; all other parameters are laboratory determinations.

DISCHARGE: E, estimated instantaneous value; AD, computed average daily value; all others are measured instantaneous values.

CARBON DIOXIDE: Concentrations at pH's less than 4.5 are listed as zero because of the procedure used to calculate values for carbon dioxide. Actual concentrations may be greater than zero]

3

KERBER CREEK STUDY AREA

		DIS-	SPE- CIFIC CON- DUCT- ANCE	PH	BICAR- BONATE	CAR- BONATE	ALKA- LINITY AS	CARBON DIOXIDE	TEMPER-
DATE	TIME	CHARGE (CFS)	(MICRO- MHOS)	(UNITS)	(HCO3) (MG/L)	(CO3) (MG/L)	CACO3 (MG/L)	(CO2) (MG/L)	ATURE (DEG C)
OCT., 19	72 1540		275	8.1	120	0	.· 98	1.5	19.5
DEC. 09	1255		270	7.5	120	0	98	6.1	.0
FEB., 19			280	6.9	127	0	104	26	.5
JUNE 05	1205		320	7.5	74	0	61	3.7	9.5
03	,	DIS-	DIS- SOLVED		NON-	DIS-		210	TOTAL .
	DIS- SOLVED	SOLVED CAL -	MAG- NE-	HARD-	CAR- BONATE	SOLVED ALUM-	TOTAL	SOLVED	TOTAL CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
DATE	(SIO2)	(CA) (MG/L)	(MG) (MG/L)	(CA,MG) (MG/L)	NESS (MG/L)	(AL) (UG/L)	(AS) (UG/L)	(AS) (UG/L)	(CD) (UG/L)
DATE	(MG/L)	(MO/L)	(HG/L)	(1107 L)	(1107)	. (00/2)	(00, 2,	(00, 2)	(
OCT., 19 03 DEC.	20 20	29	8.4	110	12	·	3	0	30
09 FEB., 19	18 73	.32	8.4	110	12				36
10 JUNE	19	37	8.4	130	26				<10
05	19	- 38	8.6	130	69				<10
	015-		DIS-		DIS-		DIS-		015-
	SOLVED CAD-	TOTAL CHRO-	SOLVED CHRO-	TOTAL	SOF AED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(00)	(CU)	(CU)	(FE) (UG/L)	(FE) (UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(00/1)	., (00) EX	100/2/
OCT., 19	9 72 0					. 80	24	1900	40
DEC. 09	0					20	. 8	380	60
FEB 1'	973 0					60	10	430	50
JUNE 05	, 2					150	30	4000	180
	•	DIS-	TOTAL	DIS+ SOLVED		015-	TOTAL	DIS- SOLVED	TOTAL
	TOTAL LEAD	SOLVED LEAD	MAN- GANESE	MAN- GANESE	TOTAL MERCURY	SOL VED MERCURY	MOLYB- DENUM	MOLYB- Denum	NICKEL
	(P8)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
0CT., 1	972 200	2	690	220					100
DEC. 09	200	4	. 340	280					100
FEB., 1	<100	0	300	290					50
JUNE 05	<100	4	1400	1200			7.7		<25
		T07.1	DIS-		DIS-	TGTAL	DIS- SOLVED		D15-
	DIS- SOLVED	TOTAL SELE-	SOLVED SELE-	TOTAL	SOF AED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	Z 1NC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN) (UG/L)	(ZN) (UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(00/1)	100/61
007	972	3	0					26D	30
09	2							130	10
FEB., 1	.973					`		120	120
JUNE 05	8							930	420

CATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR~ BONATE {CO3} (MG/L)	ALKA LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
DEC., 19			4.00	7.0		_			_
09	1040	2 • 2	480	7.0	41	О	34	6.6	•0
FEB., 19	1300		480	6.7	36	0	30	11	1.0
JUNE	1300		400	0.1	36	U	30	11	1.0
05	1245	56	250	7.4	50	0	41	3.2	11.5
	DIS- SOLVED SILICA	DIS- 'SOLVED CAL- CIUM	DIS- SOLVED MAG- NE- SIUM	HARD- NESS	NON- CAR- BONATE HARO-	DIS- SOLVED ALUM- INUM	Total Arsenic	DIS- SOLVEO ARSENIC	TOTAL CAD- MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
									**
DEC., 19		67		220	100				
09 FEB., 19	18	61	12	220	190				30
11	18	75	13	240	210				<10
JUNE			• •	240	210				110
05	17	31	5.8	100	59				10
	DIS- SOLVEO	TOTAL	DIS- SOLVED	TOT. .	D15-		DIS-		DIS-
	CAD- Mlum	CHRO- Mlum	CHRO- Mium	TOTAL Cobalt	SOL VED COBALT	TOTAL COPPER	SOLVEO COPPER	TOTAL IRON	SOL VED IRON
	(CO)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC 10									
DEC., 19	6					20		240	
FEB., 19						20	10	260	40
11	1					70	20	120	80
JUNE									•
05	1					160	20	4100	70
	TOTAL LEAD (PB)	DIS- SOLVED LEAD (PB)	TOTAL MAN- Ganese (MN)	DIS- SOLVED MAN- GANESE (MN)	TOTAL Mercury (HG)	DIS- SOLVED MERCURY (HG)	TOTAL MOLYB- DENUM (MO)	D1S- SOLVED MOLYB- DENUM (MO)	TOTÄL NICKEL (NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC 10									•
DEC., 19 09 FEB., 19	200 173	3	3360	3530		`			150
11 JUNE	<100	-, O	700	780					<25
05	<100	4	1400	1300					<25
			D1S-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVEO		DIS-
	SOLVEO Nickel	SELE- Nium	SELE- NIUM	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	(NI)	(SE)	(SE)	\$1LVER {AG}	SILVER (AG)	DIUM (V)	DIUM (V)	ZINC (ZN)	ZINÇ (ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OEC., 19									
09	4							3400	3500
FEB., 19	9							1600	1600
JUNE	,				- -			1000	1000
05	8							1000	500

Lter

		•	SPE- CIFIC CON-		BICAR-	CAR-	ALKA- LINITY	CARBON	
DATE	TIME	DIS- CHARGE (CFS)	DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BONATE (HCO3)	BONATE (CO3) (MG/L)	AS CACO3 (MG/L)	DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
OCT., 19	72 1410		400	7.0	24	0	20	3.8	17.0
DEC. C7	1140		400	5.9	7	0 -	6	15	•0
FEB., 19	73 1030		340	6.1	12	. 0	10	15	. •0
MAY Cl	1130		360	5.3	7	0	6	56	6.0
JUNE 05	1310		200	7.2	26	0	21	2.6	15.5
DATE	DIS- SCLVED SILICA (SID2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SGLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SÜLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
OCT., 19	72 19	49	7.4	150	130		7	2	60
DEC. 07	18	50	7.9	160	150				40
FEB., 19	17	46	7.0	140	130				40
MAY 01		44	7.3	140	130				+-
JUNE 05	16	21	3.1	65	44				<10
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
OCT., 19	972			 -		270	170	3200	1900
DEC. 07	20					290	150	4000	1300
FEB., 1°						400	60	4200	610
MAY 01	.30						220		1900
JUNE 05	3					200	30	2500	220
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SCLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 1	972 100	18	5600	5900					100
03 DEC. 07	200	3	5900	590D					180
FEB., 1		1		5600					75
MAY 01		1		5200					
JUNE 05	<100	6	1500	1500					25
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL S1LVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SCLVED VANA- DIUM (V) (UG/L)	TOTAL Zinc (Zn)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT., 1	972	4	2		-,-			5300	5000
DEC. 07	23							6200	6300
FEB., 1						·		5700	5700
MAY 01	.50								5600
JUNE 05	13							1700	1200

			SPE-						
			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		D1S-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(27140)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DEC., 19									_
09	1445	2.5	330	6.7	22	0	18	7.0	•0
FEB., 19			200		22	0			
09	1140	2.1	300	6.5	22	U	18	11	.5
JUNE 05	1440	81	160	7.0	29	. 0	24	4.6	16.0
0,	1440	01	100	1.0		·		****	10.0
			DIS-		A: O.11	. 0.1.5	•		
		D15-	SOLVED		NEN-	DIS-		DIS-	TOTAL
	D15-	SOLVED	MAG- NE-	HARD-	CAR- BONATE	SOLVED ALUM-	TOTAL	SOLVED	CAD-
	SCLVED	CAL- MU13	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA.MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
04.2	******		*****						
DEC., 19	972								
09	16	41	6.3	130	110				50
FE8., 19	973				110				20
09	17	41	6.4	130	110				20
JUNE 05	15	18	2.7	56	32				<10
0,	1,	10		,,					
	DIS-		-210						
	SOLVED		SOLVED		-21G		D12-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	HIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON (FE)
	(CD)	(CR)	(CR) (UG/L)	(CO) (UG/L)	(CO) (UG/L)	(CU) (UG/L)	(CU) (UG/L)	(FE) (UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(06/1)	.10671	(00/1)	(00/1/	(00/1/	(00/2/	(00/2/
DEC., 1	972								24.00
09	30					440	110	6000	2400
FEB., 1	973 14					410	30	5700	2000
09 JUNE	17	,				710	30	3,00	2000
05	2					210	40	2200	280
								516	
				DIS-		DIS-	TOTAL	DIS- SOLVED	
	TOTAL	DIS- SOLVED	TOTAL Man-	SOLVED MAN-	TOTAL	SOL VED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L		(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 1	972			5100					75
09	100	3	5400	5600					• • • • • • • • • • • • • • • • • • • •
FEB., 1 09	<100	0 1	5400	5500					50
JUNE	1100		3400	,,,,,					
05	<100	6	1400	1400					25
			015-				D15-		
	-21g	TOTAL	SOLVED		-21d	TOTAL	SOLVED		DIS-
	SOLVE		SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKE		NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L) {UG/L}	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 1	972								
09	2	4						6200	5800
FEB., 1		-						5400	5400
09	3	7						5400	5400
JUNE								1600	1200

			SPE-						
			CIFIC CON-				ALKA-		
		•	DUCT		BICAR-	CAR-	LINITY	CARBON	
		D1S-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
5475	TIME	CHARGE	(MICRO- MHOS)	(UNITS)	(HCO3) (MG/L)	(CO3) (MG/L)	CACO3 (MG/L)	(CO2) (MG/L)	ATURE (DEG C)
DATE		(CFS)	MUO21	(OMI12)	(MO)L)	(1107)	(110/6/	(11072)	10000
OCT., 19	72								
01	1.000	1.8	500	6.6	13	0	11	5.2	5.0
DEC. 10	1145	1.6	400	6.0	17	0	14	27	.0
FFR., 19									
09	1400	1.6	380	6.0	10	0	8	16	.0
MAY 01	1625	10	420	5.0					3.0
JUNE	1027	10	120	,					
05	1540	32	300	6.9	22	0	18	4.4	13.5
			015-		NON-	D1 S-			
	D1 S-	SOLVED DIS-	SOL VED MAG-		CAR-	SOLVED		DIS-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	STUM	NESS	HARD- NESS	INUM (AL)	ARSENIC (AS)	ARSENIC (AS)	MIUM (CD)
DATE	(S102) (MG/L)	(CA) (MG/L)	(MG) (MG/L)	(CA,MG) (MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)

OCT., 19		E 0	8.6	180	170		2	1	90
01 DEC.	20	58	0.0	100	110		2	•	
10	18	49	7.2	150	140			,	70
FEB., 19		E /	7 7	170	140				50
09 May	18	56	7 .7	110	160		- -		
01		47	8.0	150					40
JUNE				59	41				10
05	17	19	2.9	29	71				
	D1S-		D15-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOL VED COBALT	TOTAL Copper	SOL VED COPPER	TOTAL IRON	SOL VED I RON
	M1UM (CD)	MIUM (CR)	MIUM (CR)	COBALT (CO)	(CO)	(CU)	(CO)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
007., 1	40					750	560	3400	2300
DEC.	••								
10	32					730	400	4000	1500
FEB., 1	30					970	410	7600	1500
MAY									
01	40					1 900	1700	11000	1600
JUNE 05	8					360	80	1500	90
			TOTAL	DIS+ SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	DIS- SOLVEO	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	. (PB)	(PB)	(MN) (UG/L)	(MN) (UG/L)	(HG) (UG/L)	(HG) (UG/L)	(MO) (UG/L)	(MO) (UG/L)	(NI) (UG/L)
DATE	(UG/L)	(UG/L)	100/2/	.00/ [/		, ,			
OCT., 1							_		100
01 DEC.	100	39	10000	11000					100
10	300	2	8200	8500					100
FEB., 1	973			0/00					100
09 May	100	2	9400	9400					100
01	100	16		7200					<50
JUNE	41.00	_	2200	2200					€25
05	<100	5	2200	2200					123
			DIS-				DIS-		
	-210	TOTAL	SDLVED		015-	TOTAL	SOLVED		D1S-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA- DI UM	TOTAL ZINC	SOLVED 21NC
	NICKEL (NI)	NIUM (SE)	NIUM (SE)	SILVER (AG)	SILVER (AG)	DIUM (V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ÚG/L)	(ÚG/L)	(UG/L)	(UG/L)
OCT., 1	.972 50	2	0					11900	12500
DEC.	70	-	·						
10	32							10000	11000
FEB., 1	.973 64							11000	11000
MAY									
01	50							9400	9100
JUNE 05	13							26D0	2200

	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO-	PH	BICAR- BONATE (HCO3)	CAR- BONATE (CO3)	ALKA- LINITY AS CACO3	CARBON DIOXIDE (CO2)	TEMPER-
CATE		(013)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OCT., 1	972 1505	E<1	300	6.5	18	0	15	9.1	9.0
DEC. 06	1500	E .5	300	7.0	17	0	14	2.7	•0
FEB., 1		E .6	280		7	0			
MAY				6.2			6	7.1	1.0
91 JUNE	1530	1.5	340	6.8	34	0	28	8.6	1.0
05	1655	2.6	180	6.9	31	0	25	6.2	9.5
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA, MG) (MG/L)	NGN- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
OCT., 1	972 16	39	- 5.0	120	100		2	3	40
DEC. 06	14	38	4.8	110					30
FEB., 1	973				96				
08	13	39	4.7	120	110				<10
01 JUNE		16	4.4	. 58	30				<10
05	12	22	2.4	65	40				<10
DATE	.DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
OCT., 1	972 1					20	5	180	4D
DEC. 06	1					10	2	80	20
FEB., 1						70	21	250	50
MAY	0								
01	_					40	2	470	20
05	3					70	20	390	30
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANE SE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO). (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 1	972 200	0	130	90					75
DEC. 06	200	3	70	70					150
FEB., 1'	973 <100	1	90	200					50
MAY 01	100	. 0	570	460					<50
JUNE 05	<100	4	730	710				**	<25
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SGLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT., 1	972 1	2	2		~~			750	800
DEC.	0							800	800
06 FEB., 1	973								
08 May	4							,30	910
01 JUNE	1							1200	930
05	2							1400	1200

	TIME	DIS- Charge	SPE- CIFIC CON- DUCT- ANCE (MICRO-	РН	BICAR- BONATE (HCO3)	CAR- BONATE (CO3)	ALKA- LINITY AS CACD3	CARBON DIOXIDE (CO2)	TEMPER-
DATE	1162	(CFS)	MHBS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OCT., 19									
02	0900	E .2	600	4.5	0	0	0	•0	4.0
MAY , 19	1400	.72	700	4.5	0	0	0	•0	2.0
JUNE	1,00	• • •	, , ,	***	ŭ	Ū	·	••	2.0
04	1730	4.7	560	4.0	0	0	0	•0	11.5
			015-						
		DIS-	SOLVED		NCN-	-210			
	CIS-	SOLVED	MAG-		CAR-	SOLVED		CIS-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
•	SILICA (S102)	CIUM (CA)	SIUM (MG)	NESS (CA,MG)	HARD- NESS	INUM (AL)	ARSENIC (AS)	ARSENIC (AS)	MIUM (CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
04.6	17 07 27	(*.G/ E)	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(,	(110727	100727	100,2,	100,2,	100, 2,
OCT., 19	972								
02	25	70	10	220	220		1	0	80
MAY , 19	,,,	85	13	270	270				110
JUNE		67	13	210	210				110
04	17	49	7.3	150	150				60
	D1S-		DIS-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CD)	(CO)	(CU)	(cu)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ne\f)	(UG/L)
OCT., 19	972								
02	90					1800	1900	120	70
MAY , 19	973								
01	100					1600	1400	1300	250
JUNE 04	60					1900	2100	1900	1000
				D. C.				0.15	
		DIS-	TOTAL	SOLVED DIS-		· DIS-	TCTAL	DIS-	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLY8-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MD)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
02	200	42	12000	12000					100
MAY , 19			•						• • •
01	100	33	14000	15000					<50
JUNE 04	100	100	9600	9600					50
V 1		100	7000	,,,,					,,,
			D15-				D15-		
	-210	TOTAL	SOLVED		D15-	TOTAL	SOLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
-	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(NI)	(SE) (UG/L)	(SE)	(AG)	(AG) (UG/L)	(V) (UG/L)	(V) {UG/L}	(ZN) (UG/L)	(ZN) (UG/L)
UAIE	(UG/L)	(06/1)	(UG/L)	(UG/L)	(06/1)	106/11	100/1	106/11	100/11
OCT., 19	972								
02	25	. 1	0					17000	18000
MAY + 19								24865	25.000
01 JUNE	50							24000	25000
04	32							12000	13000

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH {UNITS}	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
CCT., 1°	972 1450	.58	1000	3.9	0	0	0	•0	13 5
DEC. 06	1045	1.4	900	4.3	0	0	0	.0	12.5
FEB., 1'	973 1405	.57	700	4.3	0	0	0		.0
MAY 02	1400	1.5	950	3.1	0	0	0	.0	4.0
JUNE C6	0915	9.6	260	6.3	24	0		.0	9.5
				0.5	2.4	U	20	19	3.0
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM {AL} (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SCLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
02	20	110	16	340	340		10	4	150
DEC. 06	19		14						150
FEB., 19 07 MAY	18	100	14	310	310				100
02 JUNE		87	17	290	290				90
06	15	30	5.3	97	77				10
DATE	DIS- SOLVED CAD- MIUM (CO) (UG/L)	TOTAL CHRD- Mlum (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SULVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
OCT., 19	72 160					1700	1800	11000	11000
DEC. 06	120					1850	1800	11000	11000
FEB., 19						1400	1300	11000	7700
MAY 02	80					6300	6500	35000	18000
JUNE 06	13					700	100	3000	180
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 19	300	65	29000	29000					150
DEC. 06	300	56	25000	25000					180
FEB., 19	<100	43	23000	23000					75
MAY 02	200	53	20000	21000					50
JUNE 06	100	3	4200	4500				·	25
DATE	DIS- SDLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER. (AG) (UG/L)	TOTAL VANA~ DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL Z1NC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT., 19	72 25	0	0					31000	32000
DEC. 06	50							27000	27000
FEB., 19 07	73 77							24000	25000
MAY 02	50							21000	21000
JUNE 06	23			~-				4500	4500

CATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CD3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
DEC., 19	272								
06	1300	E+5		3.6	0	0	0	•0	·
FEB., 19	973 1100		900	3.4	0	•		0	
MAY	1100		700	3.4	v	0	0	•0	
02 JUNE	1610	E.5	1050	3.5	0	0	0	. •0	9.5
06	1330	.38	1250	3.5	0	0	0	.0	9.5
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE+ SIUM (MG) (MG/L)	HARD- NESS (CA;MG) (MG/L)	NON- CAR- BCNATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
DEC., 19	972 17	130	16	300	390			_	
FEB., 1		1 50	15	390	370			5	
12 May	. 16	130	15	390	390				100
02		120	15	360	360				110
06	19	150	19	450	450				260
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
DEC., 19	272								
06	200						670		
FEB., 19	973 13					500	570	12000	5400
MAY 02	110					420	420	4800	4300
JUNE D6	260					4400	4200	7400	6900
50000	200			DÎS-			.200	DIS-	0,00
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN GANESE (MN) (UG/L)	SOLVED MAN- GANE SE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS SOLVED MERCURY (HG) (UG/L)	TOTAL MDLYB- DENUM (MO) (UG/L)	SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
DEC., 19	LEAD (PB) (UG/L)	SOLVED LEAD (PB)	MAN- GANESE (MN)	SOLVED MAN- GANESE (MN)	MERCURY (HG)	SOLVED MERCURY (HG)	MDLYB- DENUM (MO)	SOLVED MOLYB- DENUM (MO)	NICKEL
DEC., 19	LEAD (PB) (UG/L)	SOLVED LEAD (PB)	MAN- GANESE (MN)	SOLVED MAN- GANESE (MN)	MERCURY (HG)	SOLVED MERCURY (HG)	MDLYB- DENUM (MO)	SOLVED MOLYB- DENUM (MO)	NICKEL
DEC., 19 06 FEB., 19 12	LEAD (PB) (UG/L)	SOLVED LEAD (PB) (UG/L)	MAN-: GANESE (MN) (UG/L)	SOLVED MAN- GANE SE (MN) (UG/L)	MERCURY (HG)	SOLVED MERCURY (HG)	MDLYB- DENUM (MO)	SOLVED MOLYB- DENUM (MO)	NICKEL
DEC., 19 06 FEB., 19	LEAD (PB) (UG/L) 972 	SOLVED LEAD (PB) (UG/L)	MAN GANE SE (MN) (UG/L)	SOLVED MAN- GANE SE (MN) (UG/L)	MERCURY (HG)	SOLVED MERCURY (HG)	MDLYB- DENUM (MO)	SOLVED MOLYB- DENUM (MO)	NICKEL (NI) (UG/L)
DEC., 19 06 FEB., 19 12 MAY 02 JUNE	LEAD (PB) (UG/L) 972 973 <100	SOLVED LEAD (PB) (UG/L) 32 26	MAN GANESE (MN) (UG/L) 29000	SOLVED MAN- GANE SE (MN) (UG/L) 32000 29000	MERCURY (HG)	SOLVED MERCURY (HG)	MDLYB- DENUM (MO)	SOLVED MOLYB- DENUM (MO)	NICKEL (NI) (UG/L) 50
DEC., 19 06 FEB., 19 12 MAY 02	LEAD (PB) (UG/L) 972 973 <100	SOLVED LEAD (PB) (UG/L)	GANESE (MN) (UG/L) 29000 29000 42000	SOL VED MAN- GANE SE (MN) (UG/L) 32000 29000	MERCURY (HG)	SOLVED MERCURY (HG)	MDLYB- DENUM (MD) (UG/L)	SOLVED MOLYB- DENUM (MO)	NICKEL (NI) (UG/L)
DEC., 19 06 FEB., 19 12 MAY 02 JUNE	LEAD (PB) (UG/L) 972 973 <100	SOLVED LEAD (PB) (UG/L) 32 26	MAN GANESE (MN) (UG/L) 29000	SOLVED MAN- GANE SE (MN) (UG/L) 32000 29000	MERCURY (HG)	SOLVED MERCURY (HG)	MDLYB- DENUM (MO)	SOLVED MOLYB- DENUM (MO)	NICKEL (NI) (UG/L) 50
DEC., 19 06 FEB., 19 12 MAY 02 JUNE 06	LEAD (PB) (UG/L) 972 973 <100 100 100 DIS- SOLVED NICKEL (NI) (UG/L) 972	SOLVED LEAD (PB) (UG/L) 32 26 18 100 TOTAL SELE- NIUM (SE)	MAN- GANESE (MN) (UG/L) 29000 29000 42000 DIS- SOLYED SELE- NIUM (SE) (UG/L)	SOLVED MAN- GANESE (MN) (UG/L) 32000 29000 41000 TOTAL SILVER (AG)	MERCURY (HG) (UG/L) DIS- SOLVED SILVER (AG)	SOLVED MERCURY (HG) (UG/L)	MDLYB- DENUM (MQ) (UG/L) DIS- SOLVED VANA- DIUM (V)	SOLVED MOLYB- DENUM (MQ) (UG/L) TOTAL ZINC (ZN) (UG/L)	NICKEL (NI) (UG/L) 50 50 75 DIS- SOLVED ZINC (ZN) (UG/L)
DEC., 19 06 FEB., 19 12 MAY 02 JUNE 06 DATE DEC., 1 06	LEAD (PB) (UG/L) 072	SOLVED LEAD (PB) (UG/L) 32 26 18 100 TOTAL SELE- NIUM (SE) (UG/L)	MAN- GANESE (MN) (UG/L) 29000 29000 42000 DIS- SOLVED SELE- NIUM (SE) (UG/L)	SOLVED MAN- GANE SE (MN) (UG/L) 32000 29000 29000 41000 TOTAL SILVER (AG) (UG/L)	MERCURY (HG) (UG/L) DIS- SOLVED SILVER (AG) (UG/L)	SOLVED MERCURY (HG) (UG/L)	MDLYB- DENUM (MD) (UG/L) DIS- SOLVED VANA- DIUM (V) (UG/L)	SOLVED MOLYB- DENUM (MO) (UG/L) TOTAL ZINC (ZN) (UG/L)	NICKEL (NI) (UG/L) 50 50 75 DIS- SOLVED ZINC (ZN) (UG/L) 34000
DEC., 19 06 FEB., 19 12 MAY 02 JUNE 06 DATE DEC., 1 06 FEB., 1	LEAD (PB) (UG/L) 772 773 <100 100 100 DIS- SOLVED NICKEL (NI) (UG/L) 972 50 973 48	SOLVED LEAD (PB) (UG/L) 32 26 18 100 TOTAL SELE- NIUM (SE) (UG/L)	MAN- GANESE (MN) (UG/L) 29000 29000 42000 DIS- SOLYED SELE- NIUM (SE) (UG/L)	SOLVED MAN- GANE SE (MN) (UG/L) 32000 29000 29000 41000 TOTAL SILVER (AG) (UG/L)	MERCURY (HG) (UG/L) DIS- SOLVED SILVER (AG) (UG/L)	SOLVED MERCURY (HG) (UG/L)	MDLYB- DENUM (MD) (UG/L) DIS- SOLVED VANA- DIUM (V) (UG/L)	SOLVED MOLYB- DENUM (MD) (UG/L) TOTAL ZINC (ZN) (UG/L)	NICKEL (NI) (UG/L) 50 50 75 DIS-SOLVED ZINC (ZNC) (UG/L) 34000 32000
DEC., 19 06 FEB., 19 12 MAY 02 JUNE 06 DATE DEC., 1 06 FEB., 1	LEAD (PB) (UG/L) 072	SOLVED LEAD (PB) (UG/L) 32 26 18 100 TOTAL SELE- NIUM (SE) (UG/L)	MAN- GANESE (MN) (UG/L) 29000 29000 42000 DIS- SOLVED SELE- NIUM (SE) (UG/L)	SOLVED MAN- GANE SE (MN) (UG/L) 32000 29000 29000 41000 TOTAL SILVER (AG) (UG/L)	MERCURY (HG) (UG/L) DIS- SOLVED SILVER (AG) (UG/L)	SOLVED MERCURY (HG) (UG/L)	MDLYB- DENUM (MD) (UG/L) DIS- SOLVED VANA- DIUM (V) (UG/L)	SOLVED MOLYB- DENUM (MO) (UG/L) TOTAL ZINC (ZN) (UG/L)	NICKEL (NI) (UG/L) 50 50 75 DIS- SOLVED ZINC (ZN) (UG/L) 34000

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3)	ALKA- LINITY AS CACO3	CARBON DIOXIDE (CO2)	TEMPER-
DATE		10737	PHO31	TONITION	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DEC., 19									
07 FEB., 19	1245	E .9	320	7.9	96	0	79	1.9	•0
12 MAY	1130		320	7.3	96	0	79	7.7	.0
02	1735	E1.0	320	6.8	67	0	55	17	1.0
	DIS-	DIS- SOLVED	DIS- SCLVED MAG-		NCN- CAR-	DIS- SOLVED		DIS-	TOTAL
	SCLVED SILICA	CAL- CIUM	NE- SIUM	HARD- NESS	BONATE HARD-	ALUM- Inum	TOTAL ARSENIC	SOLVED	CAD-
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	ARSENIC (AS)	MIUM (CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	172								
07 FEB., 19	14	47	8.8	150	71				20
12 MAY	14	51	9.0	160	81				<10
02		46	8.7	150	95				10
	DIS-	TOTAL	DIS- SOLVED		D1S-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
DATE	(CD) (UG/L)	(CR) {UG/L}	(CR) (UG/L)	(CO) (UG/L)	(CO) (UG/L)	(CU) (UG/L)	(CU) (UG/L)	(FE) (UG/L)	(FE) (UG/L)
		, , , , ,	100727	(00/2/	100727	100727	(06/1)	10671	10671
OEC., 19 07	l					20	2	70	30
FEB., 19 12 MAY	0					20	5	70	50
02	1					30	17	270	130
DATE	TOTAL LEAD (PB) (UG/L)	OIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANE SE (MN) (UG/L)	DIS- SOLVED MAN- GANE SE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
DEC., 19	72								
07 FEB., 19	200 73	3	40	20					75
12 May	<100	0	40	10					50
02	100	0	. 800	740					<50
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
DEC., 19	72 1							310	. 300
FEB., 19 12	73							300	270
MAY 02	3							1300	1200

			SPE-						
			CIFIC						
			CUN-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	РН	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE		rn					
0 A T C	1100		(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
	. 7.0								•
OCT., 19									
02	1330	E .25	280	8.5	1 30	0	107	.7	10.0
JUNE, 19									
06	1410	5.1	170	6.7	41	0	34	13	11.0
			C15-						
		-210	SOLVED		NON-	DIS-			
	0.15								
	DIS-	SOLVED	MAG-		CAR-	SOLVED		-213	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
02	16	34	9.3	120	13		2	1	20
JUNE: 19	773								
06	17	11	2.3	37.	3				<10
					=				123
	DIS-		D15-						
	SOLVED	TOTAL	SOLVED		D15-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRCN	IRON
•	(CD)	(CR)	(CR)	(CO)	(00)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L:
									10072
OCT., 19	972				·.		.•		
02	0					10	7	90	30
JUNE, 1						10	•	70	30
06	1					<10	12	460	90
00	1					(10	12	400	90
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)		(MO)	(MO)	(NI)
0.75						(HG)			
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
067									
OCT., 19		_							
02	100	3	30	40					130
JUNE, 19									
06	<100	4	200	100					<25
			D15-				-210		
	D15-	TOTAL	SOLVED		D1 S-	TOTAL	SOLVEO		D15+
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
04.5	.00,2,	.00, .,	100/2/	100, 2,	100,21	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	100,27		.00,2,
OCT., 19	272								
	0	0	0		w			40	20
02	-	U	U					40	20
JUNE, 19	913	_	_					20.	10
06	Ü							20	10

OATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	81CAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
					11.07.21	17.07.27	1110721	11107 27	1000
0CT., 19 02 DEC.	1630 1630	E .75	130	7.4	. 62	o	51	3.9	9.0
06	0915		200	7.0	55	0	45	8.8	•0
FEB., 19 07	1300		130	7.0	58	0	48	9.3	.0
JUNE 06	1010	12	140	6.7	26	o	21	8.3	5.5
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SULVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
OCT., 19	972 16	15	2.2	47	. 0		1	0	30
DEC. 06	17	14	2.2	44	0				20
FEB., 19	973 18	15	2 • 2	47	0				<10
JUNE 06	19	8.4	1.0	25	4				<10
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
OCT., 19					·				
02 DEC.	1					20	24	490	220
06 FEB., 19	73	·				10	9	390	190
07 JUNE	0					70	20	. 350	110
06	,2					10	. 20	490	170
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- Ganese (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 19	72 200	9	210	240					100
0EC. 06	100	3	170	170					100
FEB., 19	73 <100	1	170	180					50
JUNE 06	<100	8	ioo	110					<25
DATE	DIS- SOLVED NICKEL (NI)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TDTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- OIUM (V) (UG/L)	DIS- SCLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	UIS- SOLVED ZINC (ZN) (UG/L)
OCT., 19	72	1	0					210	190
DEC. 06	1							190	160
FEB., 19								180	160
JUNE 06	o							170	160

381915106093200 - KERBER C AB MOSQUITC C NR BUNANZA. CO - SL-10

			SPE- CIFIC						
		D15-	CON- DUCT- ANCE	РН	BICAR- BONATE	CAR- BONATE	AŁKA- Linity As	CARRON DIOXIDE	TEMPER-
DATE	3M1 T	CHARGE (CFS)	(MICRO- MHOS)	(UNITS)	(HCO3) (MG/L)	(CO3) (MG/L)	CACÓ3 (MG/L)	(CO2) (MG/L)	ATURE (DEG C)
OCT., 19	172								
03	1100	E1.0	120	7.5	62	0	51	3.1	6.5
FEB., 19	973 1330		120	6.5	58	0	48	29	.0
JUNE								_	
06	1125		120	6.8	29	0	24	7.4	7.0
			-210						
	-21D	DIS- SOLVEO	SOLVED MAG-		NON- Car-	DIS-		015-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SCLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19									
03 FFB., 19	16 273	14	2.1	. 44	0		1	0	. 40
12	16	15	1.7	44	0				<10
JUNE 06	20	7.6	.8	22	0				<10
	DIS- SULVED	TOTAL	DIS- SOLVED		015-		D15-		015-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOL VED
	MIUM	MIUM	MUIM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	72								
03 FEB., 19	0					10	3	320	130
12	0	·				60	10	890	210
JUNE 06	0					<10	16	620	· 190
			•	DIS-				D15-	
•		D1 S-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOFAED	MAN-	MAN-	TOTAL	SOLVED	MOLYB+	MOLY8-	TOTAL
	LEAD	LEAD	GANE SE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO) (UG/L)	(NI) (UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)		106/17	100/17
OCT., 19	100	2	40	0					130
FEB., 19									
12 JUNE	<100	0	200	120					50
06	<100	2	20	0					<25
			DIS-			TO-	DIS-		0.1.0
	D15-	TOTAL	SOLVED	TOTAL	-510	TOTAL Vana-	SOLVED VANA-	TOTAL	DIS- SOLVED
	NICKEL	SELE- NIUM	SELE- Nium	TOTAL Silver	SOL VED SILVER	VANA- DIUM	DIUM	ZINC	ZINC
•	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
03	0	. 0	0					40	20
FEB., 19	973 2							30	70
JUNE 06	7							30	0
00	,							30	v

		•	SPE- CIFIC						
			CON-		0.5.5.0	5.45	ALKA-		
		015-	OUCT- ANCE	РН	BICAR- BONATE	CAR- BONATE	LINITY	CARBON DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-	FD	(HC03)	(CO3)	CACO3	(02)	ATURE
CATE	• • • • • • • • • • • • • • • • • • • •	(CFS)	MHOSI	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
JUNE,							201		
05	1110	E • 4	1150	8.1	312	0	256	4.0	15.5
			DIS-						
		D15-	SOLVED		NON-	015-			
	D15-	SOLVED	MAG-		CAR-	SOLVED		D1S-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSEN1C	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE.	1973								
05		55	18	210	0				<10
	D15-		015-					*	
	SOLVED	TOTAL	SOLVED		DI S-		D1S-		-21D
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG /L)	(UG/L)	(UG/L)	(UG/L)
JUNE,	1973					. •			
05						<10	10	500	200
				DIS-				DIS-	
	TOT	D15-	TOTAL	SOLVED	70741	-21d	TOTAL	SOLVED	
	TOTAL LEAD	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	(PB)	LEAD (PB)	GANESE (MN)	GANESE (MN)	MERCURY (HG)	MERCURY	DENUM	DENUM	NICKEL
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(HG) (UG/L)	(MO) (UG/L)	(MO) (UG/L)	(NI) (UG/L)
UATE	10671	(06/1)	106717	(06/1/	(06/1)	(06/1/	106/17	106/17	(06/1)
JUNE,									
05	<100	3	40	30					- <25
			015-				DIS-		
	DIS-	TOTAL	SOLVED		. DIS-	TOTAL	SOLVED	•	DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	MUID	Z INC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE.	1973								
0.5	1713							. 20	20

CATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 IMG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG·C)
OCT., 19	72 1435		325	6.4					12.0
06	1440		310	6.6.	19	0	16	7.6	6.0
FEB., 19	73 1600		300	6.1	10	0	8	13	2.5
JUNE 05	1635		350	6.4	24	0	20	15	7.5
07	1033			0.4	. 24	U	20	17	1.5
DATE	DIS- SOLVED SILICA (S:102) (MG/L)	DIS- SULVED CAL- CIUM (CA) (MG/L)	DIS- SGLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) {MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
00119	16	41	4.9	120				6	
DEC. 06	14	41	4.9	120	100				
FEB., 19	14	44	5.1	130	120				<10
JUNE 05	15	49	5.9	150	130				
DATE	DIS- SOLVED CAD- MIUM (CO) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- Mlum (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
DC T., 19	072						2		
DEC. 06	0		-,-				4		
FEB., 19	73 -							250	
O8 JUNE	0					10	. 10	250	70
05	. 1						11		30
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MDLYE- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 19	72	3		10					
DEC. 06		2		10					
FEB., 19	73 <100	1	20	10					25
JUNE 05		. 4		10					
03				10					
DATE	DIS- SOLVED NICKEL (NI)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
001 01 DEC.	072		O						5 0
06	0								60
FEB., 19	2							50	50
JUNE 05	0								90

			SPE-						
			CIFIC CON-						
			DUCT-		BICAD	C 4.0	ALKA-		
		015-	ANCE	PH	BICAR- BONATE	CAR- BONATE	LINITY	CARBON	
	TIME	CHARGE	(MICRO-	FII	(HCO3)	(CO3)	AS CACO3	DIOXIDE	TEMPER-
DATE	, , , ,	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(CG2) (MG/L)	ATURE (DEG C)
FFB., 1	973								
11	1400		460	6.8	101	0	83	26	6.0
			01S-						
		015-	SOLVED		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOL VED.	CAL-	NE-	HARD-	BENATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(5102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
FE8., 1	973								
11	22	69	. 13	230	150	<u> </u>			<10
	012-		D15-						
	SOLVED	TOTAL	SOLVED		DIS-		-210		-210
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SCLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	1 RON
	(CD)	(CR)	. (CR)	(CD)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
FEB., 1	973								
11	0					70	30	120	50
				D15-				015-	•
		D15-	TOTAL	SOLVED		-21D	TOTAL	SOLVED	
	CTOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYR-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MC)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
FEB., 1									
11	<100	0	20	10					75
			015-				DIS-		
	D15-	TOTAL	SOLVED		D15-	TOTAL	SOLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SCLVED
	NICKEL (NI)	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(UG/L)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
		(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
FEB., 1									
11	0							500	500

381741106083000 - NA04700725DCA - SL-G3

			SPE-						
			CIFIC						
			CON-				ALKA-		
		D15-	DUCT-	611	BICAR-	CAR-	LINITY	CARBON	
	TIME	CHARGE	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
DATE	IIME		IMICRO-		(HC03)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(211NU)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEC C)
FEB., 1	973								
12	1545		300	6.5	24	0	20	12	7.5
			DIS-						
		015-	SOLVED		NGN-	DIS-			
	018-	SULVED	MAG-		CAR-	SOL VED		DIS-	TOT
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	TOTAL
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC		CAD~
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	ARSENIC (AS)	MIUM
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(CD) (UG/L)
								100727	100727
FEB., 1									
12	16	43	4.5	130	110				<10
	015-		DIS-						
	SOLVEO	TOTAL	SOLVED		D1 S-		DIS-		0.15
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TGTAL	SOLVED	TOTAL	-510
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER		SOLVED
	(CD)	(CR)	(CR)	(CO)	(CO)	(CA)	(CU)	IRON (FE)	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(FE) (UG/L)
					100727	100/2/	100, 2,	100727	100727
FEB., 19				•					
12	0					280	120	350	110
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SCLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MD)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
FEB., 19	973								
12	<100	2	20	20					75
	0.10	TOT4.	015-				-210		
	DIS-	TOTAL	SOLVED		015-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
OATE	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	. (UG/L)
FEB., 19									
12	Ω							770	710

381746106083000 - NA04700725DBD - SL-G4

DATE	TIME	DIS- CHARGE (CFS)	SPE+ CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS (CACD3) (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
FEB., 19	973 1600		380	6.7	70	0	57	22	1.5
DATE	DIS- SOLVED SILILA (SIO2) (MG/L)	OIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CO) (UG/L)
FEB., 19	973								
12									<10
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
FEB., 19	?73					60		610	
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL Man- Ganese (Mn) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
FEB., 19	973 <100		120						25
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TDTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
FEB., 19	973							1500	

LEADVILLE STUDY AREA

	*145	DIS-	SPE- CIFIC CON- DUCT- ANCE (MICRO-	PН	BICAR- BONATE (HCO3)	CAR- BONATE (CO3)	ALKA- LINITY AS CACO3	CARBON DIDXIDE (CO2)	TEMPER- ATURE
CATE	TIME	CHARGE (CFS)	MHOS)	(STINU)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 19	72								
01	1105		180	7.4	61	0	50	3.9	1.5
JUNE, 19	1620		125	7.1	50	0	41	6.4	12.0
27111	1020		103	. • •	,,,	٠.	•	•••	1277
			D15-						
		DIS-	SOLVED		NON-	D15-			
	DIS-	SOL VED.			CAR-	SOLVED		015-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
-	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(00)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/£)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
01	7.7	17	6.7	68	18			` 6	
JUNE, 1								_	
24		12	4.5	49	8			3	
	DIS-		-210						
	SOLVED	TOTAL	SOLVED		D15-		D15-		D1 S-
	CAD-	CHRD-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
01	2						10		160
JUNE, 1									
24	2						21		190
				D1S-				DIS-	
		DIS-	TOTAL	SOLVED		D1 S-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
01		2		280					
JUNE, 1	973	_							
24		6		180					
			DIS-				015-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1						_			440
01 JUNE, 1	2		0			-			440
24	2 2		4			•			540
2	٤.		•						

			SPE- C1FIC CON- DUCT-		BICAR-	CAR-	ALKA- LINITY	CARBON	
DATE	TIME	DIS- CHARGE (CFS)	ANCE (MICRO- MHOS)	PH (UNITS)	BONATE (HCC3) (MG/L)	BONATE (CG3) (MG/L)	AS CACO3 (MG/L)	010XIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
NOV., 1	972 1210		170	7.5	55	o	45	2.8	3.0
JAN., 1	973 1130		180	7.0	65	0	53	10	•0
MAR. 03	1130	60	320	7.3	67	О	55	5.4	2.0
MAY 08	1630		150	7.2	46	0	38	4.6	10.5
JUNE -	1535		.120	7.1	50	0	41	6.4	12.0
DATE	EIS- SOLVED SILICA (SIOZ) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SDLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NCN- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	FOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
NOV., 1	7.0	16	5.8	64	19		0	0	40
JAN., 1	973 8.5	20	7.3	8D	27		0	0	30
MAR. 03		22	8.2	89	34		0	. 0	0
MAY 08		16	5.6	63	25		3	6	10
JUNE 24		12	4.4	48	7		0	2	. 10
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SCLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL 1RON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
NOV., 19	1					20	5	2200	150
JAN., 19	973 1					20	10	420	130
MAR. 03	1					10	1	680	110
MAY 08	1					10	10	1200	590
JUNE 24	2					20	21	770	180
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVEO MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
NOV., 19	200	2	300	310					75
JAN., 19 06 MAR.	100	4	470	520					75
03 MAY	<100	0	530	500					<50
08 JUNE	300	1	430	430					<50
24	<50	8	200	180	+-				<25
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
NOV., 19	0	2	4					540	460
JAN., 19	973 2	4	, о					860	790
MAR. 03	1	5	5					850	610
MAY									
08 JUNE	2	0	2					1500	560

391120106194900 - IOWA GULCH AT MOUTH NR MALTA, CO - EF-2

			SPE-						
			CIFIC						
			CUN-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		-213	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HC03)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
•									
JUNE, 19	73								
21	1655	2.2	340	7.7	199	0	163	6.4	11.0
					•				
			015-						
		D1S-	SOLVED		NGN-	D15-			
	-213	SOLVED	MAG-		CAR-	SCLVED		C1S-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	Clum	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 19	973								
21		54	21	220	57		2	1	10
	DIS-		DIS-						
	SULVED	TOTAL	SOLVED		DIS-		D15-		-210
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MUIM	MIUM	COBALT	COBALT	COPPER	COPPER	1RON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	_								
JUNE, 19	973								
21	1					10	6	40	9
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		D1S-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANE SE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB).	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 19									
21	<50	3	10	10					<25
			DIS-			*	DIS-		
	DIS-	TOTAL	SOLVED		D15-	TOTAL	SOLVED		015-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NUIN	NIUM	SILVER	SILVER	MUID	MU 10	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 19	973								
21	0	10	0					100	90

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS (CACO3) (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
MAY, 197	'3 1705	E2	700	7.6	•••				
09	1705	E2	700	7.5	89	0	73	4.5	8.5
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NÚN- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CO) (UG/L)
MAY, 197	'3								
09							5		60 .
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
MAY, 197	3								
09						470		3200	
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (P8) (UG/L)	TOTAL MAN- Ganese (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- Denum (MO) (UG/L)	DIS- SOLVED MDLY8- DENUM (MO) (UG/L)	TDTAL Nickel (Ni) (UG/L)
MAY, 197	3		•						
09	600		2500						50
DATE	DIS- SDLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TDTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TDTAL Zinc (Zn) (UG/L)	DIS- . SOLVED ZINC (ZN) (UG/L)
MAY, 197	3								
09		14						13000	

CATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CC3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
NOV., 19	72 1520		1100	10.0	52	41	111	•0	3.0
06 MAY , 19			1100	10.0	72			••	3.0
09 JUNE	1630	E .5	1100	10.8	0	29	84	-0	8.0
21	1445	E25	220	7.5	89	0	73	4.5	9.0
DATE	DIS- SCLVED SILICA (SIO2) (MG/L)	OIS- SULVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SCLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
NOV., 19					270			0	
06 MAY , 19	1.6	170	14	480	370			U	
09 JUNE		210	9.8	560	480		7	2	10
21		22	7.9	87	14		0	i	10
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SCLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
NOV., 19	972 10						10000		30
MAY , 19	973 0					3600	3300	610	40
JUNE 21	1					. 90	90	330	30
DATE	TOTAL LEAD (PB) (UG/L)	DIS+ SOLVED LEAD (P8) (UG/L)	TDTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
NOV., 19	972	1		1200					
MAY , 19	973 • 900	18	340	10					<50
JUNE 21	50	5	120	90					<25
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUH (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
NOV., 19									
06 MAY , 19	12 9 73		0						1200
09	50	` 5	8					160	30
21	7	12	0					300	180

391332106130300 - IOWA GL AT UPPER STATION NR LEADVILLE. CO - EF-2B

			SPE-						
			CIFIC						
			CON- DUCT-		DICAD	C 4.D	ALKA-	C 40 0 0 0	
		D I S-	ANCE	PH	BICAR- BONATE	CAR- Bonate	LINITY As	CARBON	T = 110 = 0
	TIME	CHARGE	IMICRO-	F F F	(HCO3)	(CO3)	CACO3	010X10E (CO2)	TEMPER-
DATE	* * * * * * *	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	ATURE (DEG C)
2			111037	10.11137	11107 67	(11072)	(1107)	THG/L/	TOEG C)
NOV., 19	72								
07	1015		220	7.8	122	0	100	3.1	.0
JUNE, 19									
21	1405	E20	150	7.4	91	0	75	5.8	7.5
			-21G						
		D15-	2 OF AFD		NON-	D1 S-			
	- DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	C AL -	NE-	HARD-	BONATE	ALUM-	TOTAL	SCLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	1 NUM	AR SE NI-C	ARSEN1C	MI UM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
07	3.7	25	11	110	10			5	
JUNE, 19		2,7	1.1	110	10			,	
21		18	7.6	76	1			0	
				, -				•	
	DIS≟v		015-						
	SOLVED	TOTAL	SOLVED		D15-		D15-		D1 S-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	{UG/L}	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19									
07	0						20		9
JUNE, 1	973						_		
21	1						6		60
		011	TOTAL	015-			TOT 4.	015-	
	TOTAL	DIS- SOLVED	TOTAL Man-	SOLVED MAN-	TOTAL	DIS- SOLVED	TOTAL MOLYB-	SOLVED	TOT 44
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	MOLYB- DENUM	TOTAL NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UGZL)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	100/2/		100727	100727	1007.07	100727	1,007 67	100727
NOV., 19	972								
07		1		10					
JUNE, 19	973 '								
21		18		10		, -			
			D1S-				015-		
	D15-	TOTAL	SOLVED		015-	TOTAL	SOLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOL VED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
07	1		0						70
JUNE, 19			•						
21	6		2						50

		SPE- CIFIC						
TIME DATE	OIS- CHARGE (CFS)	CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
NOV., 1972								
07 1120 JUNE, 1973		340	7.7	110	0	90	3.5	•0
21 1340	E.05	170	7.5	94	0	77	4.8	4.0
DIS- SOLVED SILICA (SIO2) DATE (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARO~ NESS (CA;MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVEO ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
NOV., 1972 07 4.0	∙37	15	150	60			1	
JUNE, 1973 21						0		<10
DIS- SOLVED CAD- MIUM (CD) DATE (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL CDPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
NOV., 1972				•				
07 0 JUNE, 1973						7		
21		:			10		290	
TOTAL LEAD (PB) DATE (UG/L)	DIS- SDLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
NOV., 1972						•		
JUNE, 1973	12		30					
21 <50		10						<25
DIS- SOLVED NICKEL (NI) DATE (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TDTAL ZINC (ZN) (UG/L)	DIS- SDLVED ZINC (ZN) (UG/L)
NOV., 1972 07 0		o						70
JUNE, 1973	0						40	

DATE TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS (CACD3) (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
NOV., 1972								
01 1350 JUNE, 1973	13	100	7.4	47	0	39	3.0	•0
21 1740	88	70	7.5	34	0	28	1.7	10.0
DIS- SOLVED SILICA (S102) DATE (MG/L)	DIS- SGLVEO CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NDN- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED AŁUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CO) (UG/L)
NOV., 1972 01 5.3	9,4	3.7	39	0			0	
JUNE, 1973				0				
21	6.6	2.1	25	Ü			0	
DIS- SOLVED CAD- MIUM (CD) DATE (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS-, SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
NOV., 1972 01 0						3		50
JUNE, 1973 21 0						3		40
TOTAL LEAD (PB) DATE (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- OENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
NOV., 1972			_					
01 JUNE, 1973	3		0					
21	0		0			·		
DIS- SOLVED NICKEL (NI) DATE (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVEO ZINC (ZN) (UG/L)
NOV., 1972 01 1		0						0
JUNE, 1973 21 2		0						. 10

			SPE- CIFIC CON-				ALKA-		
	TIME	DIS- CHARGE	DUCT- ANCE (MICRO-	PH	BICAR- BCNATE (HCO3)	CAR- BONATE (CO3)	LINITY AS CACO3	CARBON DIOXIDE (CO2)	TEMPER-
DATE	TIPE	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	ATURE (DEG C)
NOV., 19									
06 MAR., 19	0845	2.6	1100	6.7	36	0	30	11	•0
03	1340	2.4	900	6.8	77	. 0	63	20	3.5
08 JUNE	1740	5.0	1050	5.9	5	0	4	10	11.5
25 • •	1150	4.9	1350	5.4					14.0
		-21D	DIS- SOLVED		NON-	-21D			
	-210	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARO-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	STUM	NESS	HARD-	ENUM	ARSENIC	ARSENIC	MTUM
DATE	(SIO2) (MG/L)	(CA) (MG/L)	(MG) (MG/L)	(CA,MG) (MG/L)	NESS (MG/L)	(AL) (UG/L)	(AS) (UG/L)	(AS) (UG/L)	(CD) (UG/L)
DATE	(110/11)	170717	(1107.6)	(10/6)	(1-0/1)	(00/6.	100/6/	100/ 27	
NOV., 19	13	110	49	480	450		6	1	120
MAR., 19	773	110	43	450	390		7	0	70
MAY 08		120	49	500	500		30	2	200
JUNE 25		120	57	530			14	0	480
22		120	,,	, , , ,			17	v	400
	-210		015-						
	SOLVED CAD-	TOTAL Chro-	SOLVED CHRO-	TOTAL	DIS- SOLVED	TOTAL	DIS- SOLVED	FOTAL	DIS-
	MIUM	MIUM	MTUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(00)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	72								
06	100					700	40	33000	3200
MAR., 19 03 MAY	30	·				220	10	22000	4600
08 JUNE	190			<u></u> -		620	80	35000	8200
25	460					1600	900	43000	15000
				D15-				015-	
	TOTAL	D1 S-	TOTAL	SOLVED	TOTAL	DIS-	TOTAL	SOLVED	TOTAL
	TOTAL LEAD	SOLVED	TOTAL Man-	SOLVED Man-	TOTAL MERCURY	DIS- SOLVED	MOLY8-	SOLVED MOLYB-	TOTAL Nickel
	TOTAL LEAD (PB)		TOTAL	SOLVED	TOTAL MERCURY (HG)	DIS-		SOLVED MOLY8- DENUM (MO)	NICKEL (NI)
DATE	LEAD	SOLVED LEAD	TOTAL Man+ Ganese	SOLVED MAN- Ganese	MERCURY	DIS- SOLVED MERCURY	MOLY8- DENUM	SOLVED MOLYB- DENUM	NICKEL
DATE	LEAD (PB) (UG/L)	SOLVED LEAD (PB)	TOTAL Man- Ganese (Mn)	SOLVED MAN- GANESE (MN)	MERCURY (HG)	DIS- SOLVED MERCURY (HG)	MOLYB- DENUM (MO)	SOLVED MOLY8- DENUM (MO)	NICKEL (NI)
NOV., 19	LEAD (PB) (UG/L) 972	SOLVED LEAD (PB)	TOTAL Man- Ganese (Mn)	SOLVED MAN- GANESE (MN)	MERCURY (HG)	DIS- SOLVED MERCURY (HG)	MOLYB- DENUM (MO)	SOLVED MOLY8- DENUM (MO)	NICKEL (NI)
NOV., 19 06 MAR., 19 03	LEAD (PB) (UG/L) 972	SOLVEO LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	SOLVED MAN- GANESE (MN) (UG/L)	MERCURY (HG)	DIS- SOLVED MERCURY (HG)	MOLYB- DENUM (MO)	SOLVED MOLY8- DENUM (MO)	NICKEL (NI) (UG/L)
NOV., 19 06 MAR., 19 03 MAY 08	LEAD (PB) (UG/L) 972 300	SOLVEO LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	SOLVED MAN- GANESE (MN) (UG/L)	MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG)	MOLYB- DENUM (MO)	SOLVED MOLY8- DENUM (MO)	NICKEL (NI) (UG/L)
NOV., 19 06 MAR., 19 03	LEAD (PB) (UG/L) 972 300 973	SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L) 17000	SOLVED MAN- GANESE (MN) (UG/L) 18000	MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG)	MOLYB- DENUM (MO)	SOLVED MOLY8- DENUM (MO)	NICKEL (NI) (UG/L) 130
NOV., 19 06 MAR., 19 03 MAY 08 JUNE	LEAD (PB) (UG/L) 9772 300 9773 100 800 400	SOLVEO LEAD (PB) (UG/L) 9 0 2	TOTAL MAN- GANESE (MN) (UG/L) 17000 15000 19000 23000 DIS-	SOLVED MAN- GANESE (MN) (UG/L) 18000 15000	MERCURY (HG) (UG/L)	DIS- SOL VED MERCURY (HG) (UG/L)	MOLYB- DENUM (MO) (UG/L)	SOLVED MOLY8- DENUM (MO)	NICKEL (NI) (UG/L) 130 <50 <50
NOV., 19 06 MAR., 19 03 MAY 08 JUNE	LEAD (PB) (UG/L) 2772 300 2773 100 800 400 DIS-	SOLVEO LEAD (PB) (UG/L) 9 0 2 20	TOTAL MAN- GANESE (MN) (UG/L) 17000 15000 19000 23000 DIS- SOLVED	SOLVED MAN- GANESE (MN) (UG/L) 18000 15000 1900 23000	MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L) TOTAL	MOLYB- DENUM (MO) (UG/L)	SOLVED MOLY 8- DENUM (MO) (UG/L)	NICKEL (NI) (UG/L) 130 <50 <50 75
NOV., 19 06 MAR., 19 03 MAY 08 JUNE	LEAD (PB) (UG/L) 272 300 273 100 800 400 DIS- SOLVED	SOLVEO LEAD (PB) (UG/L) 9 0 2	TOTAL MAN- GANESE (MN) (UG/L) 17000 15000 19000 23000 DIS-	SOLVED MAN- GANESE (MN) (UG/L) 18000 15000	MERCURY (HG) (UG/L)	DIS- SOL VED MERCURY (HG) (UG/L)	MOLYB- DENUM (MO) (UG/L)	SOLVED MOLY8- DENUM (MO)	NICKEL (NI) (UG/L) 130 <50 <50
NOV., 1 06 MAR., 1 03 MAY 08 JUNE 25	LEAD (PB) (UG/L) 2772 300 2773 100 800 400 DIS-	SOLVEO LEAD (PB) (UG/L) 9 0 2 20	TOTAL MAN- GANESE (MN) (UG/L) 17000 15000 19000 23000 DIS- SOLVED SELE- NIUM (SE)	SOLVED MAN- GANESE (MN) (UG/L) 18000 15000 1900 23000 TOTAL SILVER (AG)	MERCURY (HG) (UG/L) DIS- SOLVED SILVER (AG)	DIS- SOLVED MERCURY (HG) (UG/L) TOTAL VANA- DIUM (V)	MOLYB- DENUM (MO) (UG/L) DIS- SOLVED VANA- DIUM (V)	SOLVED MOLY 8- DENUM (MO) (UG/L)	NICKEL (NI) (UG/L) 130 <50 <50 75 DIS- SOLVED ZINC (ZN)
NOV., 19 06 MAR., 19 03 MAY 08 JUNE	LEAD (PB) (UG/L) 272 300 273 100 800 400 DIS- SOLVED NICKEL	SOLVEO LEAD (PB) (UG/L) 9 0 2 20 TOTAL SELE- NIUM	TOTAL MAN- GANESE (MN) (UG/L) 17000 15000 19000 23000 DIS- SOLVED SELE- NIUM	SOLVED MAN- GANESE (MN) (UG/L) 18000 15000 1900 23000 TOTAL SILVER	MERCURY (HG) (UG/L) DIS- SOLVED SILVER	DIS- SOL VED MERCURY (HG) (UG/L) TOTAL VANA- DIUM	MOLYB- DENUM (MO) (UG/L)	SOLVED MOLYB- DENUM (MO) (UG/L)	NICKEL (NI) (UG/L) 130 <50 <50 75 DIS- SOLVED ZINC
NOV., 1 06 MAR., 1 03 MAY 08 JUNE 25	LEAD (PB) (UG/L) 272 300 273 100 800 400 DIS- SOLVED NICKEL (N1) (UG/L)	SOLVEO LEAD (PB) (UG/L) 9 0 2 20 TOTAL SELE- NIUM (SE)	TOTAL MAN- GANESE (MN) (UG/L) 17000 15000 19000 23000 DIS- SOLVED SELE- NIUM (SE)	SOLVED MAN- GANESE (MN) (UG/L) 18000 15000 1900 23000 TOTAL SILVER (AG)	MERCURY (HG) (UG/L) DIS- SOLVED SILVER (AG)	DIS- SOLVED MERCURY (HG) (UG/L) TOTAL VANA- DIUM (V)	MOLYB- DENUM (MO) (UG/L) DIS- SOLVED VANA- DIUM (V)	SOLVED MOLY 8- DENUM (MO) (UG/L)	NICKEL (NI) (UG/L) 130 <50 <50 75 DIS- SOLVED ZINC (ZN)
NOV., 10 06 MAR., 13 03 MAY 08 JUNE 25 DATE NOV., 1	LEAD (PB) (UG/L) 272 300 273 100 800 400 DIS- SOLVED NICKEL (N1) (UG/L)	SOLVEO LEAD (PB) (UG/L) 9 0 2 20 TOTAL SELE- NIUM (SE)	TOTAL MAN- GANESE (MN) (UG/L) 17000 15000 19000 23000 DIS- SOLVED SELE- NIUM (SE)	SOLVED MAN- GANESE (MN) (UG/L) 18000 15000 1900 23000 TOTAL SILVER (AG)	MERCURY (HG) (UG/L) DIS- SOLVED SILVER (AG)	DIS- SOLVED MERCURY (HG) (UG/L) TOTAL VANA- DIUM (V)	MOLYB- DENUM (MO) (UG/L) DIS- SOLVED VANA- DIUM (V)	SOLVED MOLY 8- DENUM (MO) (UG/L)	NICKEL (NI) (UG/L) 130 <50 <50 75 DIS- SOLVED ZINC (ZN)
NOV., 10 06 MAR., 19 03 MAY 08 JUNE 25 DATE NOV., 1 C6 MAR., 1	LEAD (PB) (UG/L) 272 300 273 100 800 400 DIS- SOLVED NICKEL (N1) (UG/L)	SOLVEO LEAD (PB) (UG/L) 9 0 2 20 TOTAL SELE- NIUM (SE) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L) 17000 15000 19000 23000 DIS- SOLVED SELE- NIUM (SE) (UG/L)	SOLVED MAN- GANESE (MN) (UG/L) 18000 15000 1900 23000 TOTAL SILVER (AG) (UG/L)	MERCURY (HG) (UG/L) DIS- SOLVED SILVER (AG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L) TOTAL VANA- DIUM (V) (UG/L)	MOLYB- DENUM (MG) (UG/L) DIS- SOLVED VANA- DIUM (V) (UG/L)	SOLVED MOLY 8- DENUM (MO) (UG/L) TOTAL ZINC (2N) (UG/L)	NICKEL (NI) (UG/L) 130 <50 <50 75 DIS- SOLVED ZINC (ZN) (UG/L)
NOV., 10 06 MAR., 13 03 MAY 08 JUNE 25 DATE NOV., 1 C6 MAR., 1	LEAD (PB) (UG/L) 772 300 773 100 800 400 DIS- SOLVED NICKEL (NI) (UG/L) 972 50 973	SOLVEO LEAD (PB) (UG/L) 9 0 2 20 TOTAL SELE- NIUM (SE) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L) 17000 15000 19000 23000 DIS- SOLVED SELE- NIUM (SE) (UG/L)	SOLVED MAN- GANESE (MN) (UG/L) 18000 15000 1900 23000 TOTAL SILVER (AG) (UG/L)	MERCURY (HG) (UG/L) DIS- SOLVED SILVER (AG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L) TOTAL VANA- DIUM (V) (UG/L)	MOLYB- DENUM (MG) (UG/L) DIS- SOLVED VANA- DIUM (V) (UG/L)	SOLVED MOLYB- DENUM (MO) (UG/L) TOTAL ZINC (ZN) (UG/L) 33000	NICKEL (NI) (UG/L) 130 <50 <50 75 DIS- SOLVED 2INC (2N) (UG/L) 30000

			SPE-						
			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		D15-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HC03)	(CO3)	CACD3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NCV., 19	73		•						
06	1130		1700	2.0	•	_	_	_	
JUNE, 19			1700	3.8	0	0	0	.0	6.0
		F2 F	1500			_	_	_	
25	1015	E3.5	1500	4.0	0	0	0	.0	11.0
			-210						
		015-	SOLVED		NON-	DIS-			
	D1S-	SOLVED	MAG-		CAR-	SOLVED		-21D	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOT 41		
	SILICA	CIUM	SIUM				TOTAL	SCLVED	CAD-
				NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA, MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	72								
06	18	180	74	750	750		10	0	190
JUNE, 19	73								
25		150	66	65C	650		16	ÿ	620
			•						
	D.I.S		DIS-						
	SOLVED	TOTAL	SOLVED		D1S-		D1 S-		D1 S =
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	((0)	(CR)	(CR)	(CD)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	72								
06	170					1100	1100	47000	25000
JUNE, 19						1100	1100	41000	2,000
25	560		~~			2000	2000	50000	20000
				D15-				DIS-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLY8-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	72					•			
06	300	61	28000	280C0					180
JUNE, 19	773								_
25	450	250	28000	29000					50
									,
			DIS-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(A)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19									
06	50	0	0					56000	54000
JUNE, 19									
25	50	48	0					100000	110000

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
							11.07.21	11.07.27	1020 07
NCV., 19	1310	1.6	1600	3.9	0	0	0	.0	9.0
MAY , 19	73		1000	3.7	ŭ	ŭ	v	••	7.0
09 JUNE	0920	1.2	1300	5.5	7	0	6	35	10.0
25	0940	3.4	1500	3.8	0	0	0	.0	9.5
OATE	DIS- SGLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SCLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SGLVED ARSENIC (AS) (UG/L)	TOTAL CAD- Mium (CD) (UG/L)
	-	(11072)	1110727	1110767	(11071)	(00/1)	100767	(06/1)	106717
NOV., 19 D6 MAY , 19	17	160	68	680	680		20	1	160
ņ9 JUNE		160	65	670	660		4	0	110
25		140	59	590	590		20	1	720
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	OIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT. (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
NOV., 19	172 170					1000	1100	67000	39000
06 MAY , 19	773 100					630	160	66000	35000
JUNE .	690					2400	2500	72000	26000
DATE	TDTAL LEAD {PB} (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
NOV., 19	72 200	11	28000	28000					180
MAY , 19		0	23000	23000					50
JUNE 25	300	250	29000	30000					. 50
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
NOV., 19	72								
06 MAY , 19	75	0	0					51000	54000
JUNE	100	. 0	0					42000	40000
25	50	9	0					110000	120000

3914001061558CO - CALIF GULCH AB YAK TUNNEL NR LEADVILLE, CO - FF-7

			SPE- CIFIC CON- DUCT-		BICAR-	CAR-	ALKA- Linity	CARBON	
		D15-	ANCE	PH	BONATÉ	BONATE	.AS	DIOXIDE	TEMPER-
	TIME	CHARGE	IMICRO-		(HC 03)	(03)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
JUNE, 19	73								
25	0800	E.01	1350	3.1	0	0	0	•D	4.0
22000			.,,,,	3.1	Ū	ŭ	·	••	4.0
			015-						
		D1S-	SOLVED		NON-	-21D			
	-210	SOLVED	MAG-		CAR-	SOLVED		-21d	TOTAL
	SOLVED	CAL-	NE-	HARD-	BCNATE	ALUM~	TOTAL	SOLVED	CAD-
	SILICA	CTUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
0.475	(5102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE: 19	973								
25		100	45	440	440		10	0	960
•									
	D18-		DIS-						
	SOLVED	TOTAL	SOLVED		DIS-		015-		-210
	CAD- Mium	CHRO-	CHRO-	TOTAL	SOLVEO	TCTAL	SOLVED	TOTAL	SULVED
	(CD)	MIUM (CR)	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	1 RON
DATE	(UG/L)	(UG/L)	(CR) (UG/L)	(CO) (UG/L)	(CO) (UG/L)	(CU) (UG/L)	(CU)	(FE)	(FE)
DAIL	100767	ین ۱۵۵۶	100717	100717	106/17	10671	(UG/L)	(UG/L)	(UG/L)
JUNE, 19	973	A-C							
25	910					1200	1300	8900	7800
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		-2 I G	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	POLYB-	MOLY8-	TOTAL
•	LEAD (PB)	LEAD (PB)	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(UG/L)	(UG/L)	(MN) {UG/L}	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(03/1/	100/1	(06/1)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 19	73								
25	1900	1900	23000	23000					50
			D18-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		015-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
0.475	(NI)	(SE)	-(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 19	73		•						
25	25	0	0					120000	120000

391353106142600 - CALIFORNIA GULCH AB LEADVILLE CO - EF-8

			SPE-						
			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	TEMBER
		CIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
CATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
JUNE, 19						_		_	7.0
24	1720	E<1	925	2.9	0	0	0	•0	7.0
			D15-						•
		D15-	SOL VED		NON-	D1 S-			
	D1S-	SOL VED	MAG-		CAR-	SOLVED		CIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(5102)	(CA)	(MG)	(CA, MG1	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE . 1	973								
24		26	8.1	9B	98		5	6	100
	DIS-		D15-						
	SOLVED	TOTAL	SOL VED		DIS-		DIS-		D15-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 1	973								
24	100					1200	1200	21000	19000
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		D1 S-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 1									
24	100	57	11000	11000					50
			-D1S-				DIS-		
	D15-	TOTAL	SOLVED		D15-	TOTAL	SOLVED		DI S-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	2 INC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 1	973								
24	42	34	0					17000	18000

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE 1CO2) (MG/L)	TEMPER- ATURE (DEG C)
NCV., 19	72								
01	1510		290	7.7	98	0	80	3.1	.5
JUNE, 19	73 1430		95			_			
24	1430		95	7.1	41	0	34	5.2	9.5
DATE	DIS- SCLVED SILICA (SIO2) (MG/L)	DIS- SULVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD NESS (CA,MG) (MG/L)	NON- CAR- RONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
NOV., 19	72								
01	7.7	31	13	130	50		1	2	20
JUNE, 19	73							-	20
24		10	3.8	41	7		0	2	<10
	DIS- SOLVED CAD- MIUM (CD)	TOTAL CHRO- MIUM (CR)	DIS- SOLVED CHRO- MIUM (CR)	TOTAL COBALT (CO)	DIS- SOLVED COBALT (CO)	TOTAL Copper (CU)	DIS- SOLVED COPPER (CU)	TOTAL IRON (FE)	DIS- SOLVED IRON (FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19 01 JUNE. 19 24	1	 	 			50 10	6 10	360 480	210 70
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
NOV 19	72								
01 JUNE, 19	200 73	2	200	200					75 ·
24	<50	2	80	20					<25
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SDLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- Dium (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL Z INC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
NOV., 19	1	3	0					460	390
JUNE, 19	73	٠,	. •					700	270
24	0	60	0					150	90

a

391550106202500 - TENNESSEE C NR LEADVILLE, CO - EF-10

		DIS-	SPE- CIFIC CON- DUCT- ANCE	PH	BICAR- BONATE	CAR- BONATE	ALKA~ LINITY AS	CARBON DIOXIDE	TEMPER-
	TIME	CHARGE	MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NCV., 19	72								
07	1320		100	7.5	47	0	39	2.4	.0
JUNE, 19									
24	1320	E220	<50	7.4	26	0	21	1.7	10.5
		D1S-	DIS- SOLVED		NON-	D1 S-			•
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BGNATE	ALUM-	TOTAL	SOLVEO	CAD-
	SILICA	MUID	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	72								
07	9.4	8.7	3 - 2	35	0.			0	
JUNE, 19	73			_					
24		4.2	. 1.1	15	0			1	
	DIS-		-210						
	SOLVED	TOTAL			DIS-		015-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	WIUM.	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	272								
07	0						15		150
JUNE, 19							•		•••
24	1		^				20		130
				215					
		DIS-	TOTAL	DIS- SOLVED		015-	TOTAL	DIS- SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	772								
07		1		20					`
JUNE: 19	73	•							
24		4		50					
	D1 S-	TOTAL	D1S- SOLVED		DIS-	TOTAL	DIS- SOLVED		DIS-
	SOL VED	SELE-	SELE-	TOTAL	SOL VED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
07	50		0						30
JUNE, 19			Ū						,,,
24	. 1		1						110

			SPE-						
			CIFIC CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PН	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HC 03)	(CO3)	CACO3	(COZ)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 19	72								
07	1415	•52	320	3.7	0	0	0	.0	•0
JUNE, 19									
24	1240	E 2	120	5.2					11.5
			DIS-						
		DIS-	SOLVED		NON-	D1S-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BCNATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
07	17	14	5.2	56	56			4	
JUNE, 19	973	<i>.</i>						_	
24		4.9	1.7	19	 .			0	
	D15-		DIS-						
	SOLVED	TOTAL	SOLVED		D I S-		D15-		-210
	CAD-	CHRO-	CHRÚ-	TOTAL	SOLVED	TOTAL	SOF AED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	72								
07	70						90		180D
JUNE, 19	973								
24	18			·			50		1100
				C1S-				D15-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLY8-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(1A)
OATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	72								•
07		21		5500					
JUNE, 19	973								
24		3		1100					
			-210				D15-		
	-21G	TOTAL	SOL VED		015-	TOTAL	SCLVED		015-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	Z INC	ZINC
	(N1)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	72								
07	50		0						9400
JUNE, 19									
24	17		0						2900

391906106201300 - TENNESSEE C AB LONGS GL NR LEADVILLE, CO - EF-12

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATF (HCO3) (MG/L)	CAR- 80NATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
NOV., 19	172								
C8	0900		100	7.2	31	0	25	3.1	.0
JUNE, 19	1050	E 120	<50	7.3	24	0	20	1.9	6.0
24	1030	E 120	\30	1.3	24	U	,20	1.9	0.0
DATE	D1S- SCLVED S1L1CA (S1O2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	015- SGL VEO MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA.MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
NOV., 1	972								
08	8.1	6.8	2.4	27	2			0	
JUNE, 19									
24		3.4	.7	11	G			D	
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
NOV., 1	972								
08	0						2		190
JUNE, 1	973								
24	0						5		80
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MGLY8- DENUM (MD) (UG/L)	TOTAL NICKEL (NI) (UG/L)
NOV., 1	073	•							
08		3		20					
JUNE, 1	973	_							
24		1		20					
			DIS-				DIS-		
	D15-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NDV., 1	072								
08	1		0						10
JUNE, 1			ŭ						
24	1		2						20

DATE	TIME	DIS- Charge (CFS)	SPE- CIFIC CON- DUCI- ANCE (MICRO- MHOS)	PH {UNITS}	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
		10137	111037	1001137	(40/1/	(80/6)	150/17	(MG/L)	1000,07
NCV., 19 08	1030	E 30	460	7.6	34	0	28	1.4	.0
MAR., 19	773	2 30			,	·		•••	
03 May	1500	9.2	400	7.7	134	0	110	4.3	2.5
09	1220	12	340	7.7	125	0	103	4.0	9.0
JUNE 21	1050	E 250	170	7.4	60	0	49	3.8	5.5
DATE	DIS- SCLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- Clum (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR+ BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) IUG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS)	TOTAL CAD- MIUM - (CD)
		* / 11107 27	(1107.27	11.07.27		100767	100717	(UG/L)	(UG/L)
NOV., 19 08 MAR., 19	8.0	52	21	220	190		3	1	30
03 MAY		54	22	230	120		0	0	0
09 JUNE		44	19	190	90		2	0	0
21		15	6.0	62	13	••	2	0	<10
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SDLVED CHRO- MIUM (CR) (UG/L)	· TOTAL COBALT (CO) (UG/L)	OIS- SOLVED COBALT (CD) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
NOV., 19	72		•						
08	1					. 20	0	400	20
MAR., 19	1					10	3	290	40
MAY 09	1					10	3	440	170
JUNE 21	0					10	8	450	60
21						10	0		00
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANE SE (MN) (UG/L)	OIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
NOV., 19	100	2	520	530					75
MÁR., 19	973 <100	0	470	520					<50
MAY 09	<100	0	400	460					<50
JUNÈ									
21	<50	2	150	70					<25
DATE	(UG/L) SOLVED NICKEL (NI)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- Dlum (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL Zinc (Zn) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
NOV., 1	972 0	3	^	_	_	_		1100	1100
OB MAR., 1	973		0					1100	1100
03 May	2	0	0					1100	1100
09 JUNE	2	0	2					780	790
21	6	0	0					380	190

			SPE- CIFIC CON-				ALKA-		
		nis-	DUCT- ANCE	PН	BICAR- BONATE	CAR- BONATE	LINITY	CARBON DIOXIDE	TEMPER-
	TIME	CHARGE	IMICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE	-	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 19	72 1150		230	7.6		0.	107		•
08 JUNE, 19			230	7.6	131	0.	107	5.3	•0
21	0900	29	130	7.4	79	0	65	5.0	3.5
			DIS-						
		DIS-	SOLVED		NON-	DIS-			
	D1S-	SOLVED	MAG-		CAR-	SOLVED		D12-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	STUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS .	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19									
08	3.8	25	12	110	3			0	
JUNE . 19	973	16	7.8	72	7		2	4	<10
21		16	1.0	12	,		2	4	(10
	Dis-		D15-						
	SOLVED	TOTAL	SOLVED		-21D		012-		DIS-
	C AD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MUIM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(00)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
08	1						8		50
JUNE, 19									
21	1					10	8	180	40
				D15-				DIS-	
		DIS-	TOTAL	SOLVED		D1 S-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLY8-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
2176	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(HO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/E)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972					•			
08		4		0					
JUNE, 19	973								
21	₹50	2	20	30					<25
			DIS-				D15-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SCLVED		D1S-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19									
08	1		2		Ŧ-				90
JUNE, IS									
21	0	8	0					380	210

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBUN DIDXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
DATE									
NOV., 19	72								
08	1235	3.6	850	6.9	168	0	138	34	6.5
MAY . 19	73								
09	1350	3 • 2	775	6.7	166	0	136	53	7.0
JUNE	2015	53.4	000	, -	127	0	112	69	7.0
21	0815	E3.4	980	6.5	137	U	112	69	7.0
			DIS-						
		D15-	SOLVED		NCN-	-21G			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		015-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19		110		460	220		3	0	30
08 MAY , 19	11	110	46	400	320		,	·	30
09		110	. 46	460	320		10	0	20
JUNE			,,,		320		_		
21		110	47	470	360		9	0	80
	D15-		DIS-						016
	SOLVEO	TOTAL	SOLVED		DIS		D1 S-	70741	DIS- SOLVED
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL Copper	SOL VED COPPER	TOTAL Iron	IRON
	MIUM (CD)	MIUM (CR)	MIUM (CR)	COBALT (CD)	COBALT (CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ÚG/L)	(UG/L)
DATE	(00/2)	100,0,	100, 2,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
NOV., 19	72								
08	9					30	2	2500	100
MAY , 19	73							3200	270
09	20					10	10	3200	370
JUNE 2 1	8					30	10	2800	130
21	•		•						
				DIS-				DIS-	
		015-	TOTAL	SOLVEO		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLY8-	TOTAL
	LEAD	LEAD	GANE SE	GANE SE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	,(MO) (UG/L)	(NI) (UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	106/17	(06/1
NOV., 1	972								
08	100	1	2000	2300					130
MAY , 1									
09	<100	0	2500	2500					<50
JUNE									425
21	<50	1	5400	'5700					<25
			DIS-				D15-		
	D15-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVEO	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	OIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	{V}	(ZN)	{ZN}
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19		-	_					4500	4600
08	2	2	0					7,000	4000
MAY , 19	913 50	2	1					4800	4600
JUNE	50		•						_
21	26	0	0					13000	13000

391709106164600 - E F ARKANSAS R AT HWY 91 NR LEADVILLE, CO - EF-16

			SPE- CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	T
		DIS-	ANCE	PH	BONATE	BONATE (CO3)	AS CACO3	010X1DE (CO2)	TEMPER- ATURE
DATE	TIME	CHARGE (CFS)	(MICRO- MHOS)	(UNITS)	(HCO3) (MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 19	72								
08	1445		230	7.3	118	0	97	9.5	.0
JUNE, 19									
24	1005	E250	120	7.4	50	0	41	3.2	5.0
			DIS-						
		D15-	SOLVED		NDN-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM~	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
0.475	(Siū2) (MG/L)	(CA) {MG/L}	(MG) (MG/L)	(CA,MG) (MG/L)	NESS (MG/L)	(AL) (UG/L)	(AS) (UG/L)	(AS) (UG/L)	(CD) (UG/L)
DATE	(MG/L)	(MG/L)	(MG/L/	(MO)Ci	(MG/ L)	100717	100/11	100/17	100717
NOV., 19		26	9.9	100	3		0	0	30
08 JUNE, 19	5.6	25	9.9	100	3		U	U	30
24		12	4.0	46	5		1	2	<10
	DIS-		015-						
	SOLVED	TOTAL	SOLVED		D15-		D15-		DIS-
	CAD-	CHRO-	CHRD-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	I RON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19									
08	0					10	3	190	10 0
JUNE: 19 24	9/3					20	18	470	130
L	·								
		D15-	TOTAL	DIS-		015-	TOTAL	DIS- SOLVED	
	TOTAL	SOLVED	MAN-	SOL VED	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	772								
08	200	4	60	50					100
JUNE, 19									
24	< 50	0	50	40					<25
			DIS-				-21G		
	-S10	TOTAL	SOLVED	****	DIS-	TOTAL	SOLVED	TOTA:	DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER (AG)	SILVER (AG)	(V)	DIUM	Z I NC (ZN)	ZINC (ZN)
DATE	(N1) (UG/L)	(SE) (UG/L)	(SE) (UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
		,							
NOV., 19		-	1		_	_		30	30
08 JUNE, 19	0	3	1					30	30
24	10	12	2					. 70	30

391628106171400 - SC00908012CCD - EF-G1

			SPE- CIFIC						
			CON-				ALKA-		
		D15-	DUCT - ANCE	Pн	BICAR- BONATE	CAR- BONATE	LINITY AS	CARBON DIOXIDE	TEMPER-
		CHARGE	(MICRO-		(HCO3)	(CO3)	(CACO3)	(CO2)	ATURE
DATE	TIME	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 19									
08	1410		300	7.3	156	0	127	13	6.0
			015-						
		DIS-	SOLVED		NON-	DIS-			
	D12-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA (SIO2)	CIUM (CA)	SIUM (MG)	NESS (CA,MG)	HARD- NESS	INUM	ARSENIC	ARSENIC	MIUM
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(AL) (UG/L)	(AS) (UG/L)	(AS) (UG/L)	(CD) (UG/L)
NOV., 19	172			•			,	, , , , , ,	(55/2)
08	10	35	13	140	13			0	
								J	
	DIS-		DIS-						
	SOLVED	TOTAL	SOLVEO		DIS-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVEO	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM (CD)	MIUM (CR)	MIUM (CR)	COBALT (CO)	COBALT (CO)	COPPER	COPPER	IRON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(CU) (UG/L)	(CU) (UG/L)	(FE) (UG/L)	(FE) (UG/L)
NOV., 19	175								(00.27
08	0						8		
				-21G				D15-	
		D15-	TOTAL	SOLVED		015-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	. MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD (PB)	LEAD (PB)	GANESE (MN)	GANESE (MN)	MERCURY (HG)	MERCURY (HG)	DENUM (MD)	DENUM (MD)	NICKEL (NI)
DATE	(UG/L)	(ÚG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	172								
08		3		10					
			DIS-				DIS-		
	.DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	•	DIS-
	SOLVED NICKEL	SELE- NIUM	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	(N1)	(SE)	NIUM (SE)	SILVER (AG)	SILVER (AG)	(V)	DIUM (V)	ZINC (ZN)	ZINC (ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	172								
08	0		0						200

BOULDER STUDY AREA

			SPE- CIFIC						
			CON-				ALKA-		
			DUCT-	•	BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CG3)	CACO3	(CG2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
5416		10.31	1117037	10.11.57		,			
NOV., 19							,,	, ,	•0
30	1250		200	7.4	19	0	16	1.2	.0
			DIS-						
		D15-	SULVED		NDN-	D15-			
	-210	SULVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SCL VED	CAL-	NE- ·	HARU-	BONATE	ALUM-	TOTAL	SOLVED	CAO+
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	172								
30		13	3.0	45	29				20
30		13	J•0	, ,	2,7		•		
	DIS-		DIS-	•					
	SOLVED	TOTAL	SOLVED		D15-		DIS-		D15-
	CAD-	CHRD-	CHRO-	TOTAL	SULVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(00)	(CR)	(CR)	(00)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
30	1			70	2	20	1	70	50
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		D15-	TOTAL	SOLVED	****
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOL YB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANE SE	MERCURY	MERCURY	DENUM	DENUM	NICKEL (NI)
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972							-	
30	100	1	150	140					100
			015-				D1 S-		
	D15-	TOTAL	SOLVED		D1 S-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(117)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV 1	072								
NOV., 1	912							390	360
30	2							270	

400640105222600 - JAMES C AB JENKS GULCH NR JAMESTUWN. CO - 10-2

			SPE- CIFIC CON-				ALKA-		
	•		DUCT-		BICAR-	CAR-	LINITY	CARBON	
		D1S-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HC03)	(CO3)	CACO3	(C02)	ATURE
CATE		(CFS)	MHDS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 19	972								
30	1425		200	7.1	20	0	16	2.5	.0
	*					-			
			015-						
		DIS-	SOLVED		NON-	DIS-			
	015-	SOFAED	MAG-		CAR-	SOLVED		D15-	TOTAL
•	SCLVED	CVF-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOFAED	CAD-
	SILICA	CIUM	SIUM 1	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(2105)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MGAL)	(MG/L)	(MGZL)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV 19	972								
30		13	3.0	45	29				. 40
	D1S-		D1S-						
	SOLVED	TOTAL	SOLVED		D15-		D1S-		D15-
	CAD-	CHRO-	CHRO-	TOTAL	SUFAED	TOTAL	SOLVED	TOTAL	SOLVED
	MITTER	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CD)	(00)	(UD)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(nevr)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
30	2			120	2	50	0	460	260
		•			_		-		200
				015-				DIS-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL LEAD	SOLVED LEAD	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	(PB)	(PB)	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(UG/L)		(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	106/17	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
30	200	1	190	220					130
			D15-				DIS-		
	D15-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		015-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	MIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZING
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ÚG/L)	(ÚGŽL)	(UG/L)	(UG/L)
NOV., 19	972					_		670	550

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
DEC., 19	972 1100	E •5	1500	7.0	36	0	30	5.8	1.0
FEB., 19		E + 5	1500	7.0	30	.0	30	5.6	1.0
02	1030	E •6	1050	6 • B	82	0	67	21	2.0
28	1715	E .8	950	6-1	26	0	21	33	20.0
DATE	DIS- SOLVED SILICA (SIDZ) (MG/L)	DIS- SULVED CAL- CIUM (CA) IMG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NGN- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TÜTAL CAD- MIUM (CD) (UG/L)
DEC., 19					•				
01		85	. 23	310	280				100
FEB., 19 02 JUNE		58	17	210	140				50
28		υ2	18	230	210				30
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SULVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
DEC., 19	50			100	25	150	60	2700	480
FEB., 19	973 40			100	17	110	10	2100	190
JUNF 28	30			20	15	110	30	2800	160
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
DEC., 19	400	7	3400	3600					150
02	100	2	2300	2500					75
JUNE 28	100	1	2900	3000					50
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- N(UM (SE) (UG/L)	DIS- SDLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/E)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
DEC., 19	972							9300	9300
FEB., 19								5300	5000
JUNE 28	25							4500	4300
								.550	. 200

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
DEC., 19	72								
01	1245		160	6.9	17	0	14	3.4	. 5
JUNE: 19 28	1645	E .25	110	6.8	29	0	24	7.4	17.0
	DIS- SGLVED SILICA (SIO2)	DIS- SULVEO CAL- CIUM (CA)	DIS- SOLVED MAG- NE- SIUM (MG)	HARD- NESS (CA,MG)	NON- CAR- BONATE HARD- NESS	DIS- SOLVED ALUM- INUM (AL)	TOTAL ARSENIC (AS)	DIS- SOLVED ARSENIC (AS)	TOTAL CAD- Mium (CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., IS 01 JUNE, IS 28		15 9.7	3.2 2.6	51 35	37 11				30 <10
	D15-		D:15-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		DIS-
	CAU-	CHRO-	CHRO-	TOTAL	SOLVED	TCTAL	SCLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(C())	(CU)	(CU)	(FE)	(FE)
DATE	(UĠ/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)		(UG/L)	(UG/L)	(UG/L)
256									
DEC., 19	1			90	2	70	50	380	150
JUNE, 19					•		,,,	300	150
28	1			<20	0	30	10	320	110
20	•				-				
DATE	TOTAL LEAC (PB)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANE SE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYR- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
7474	.00,2,	100,2,							
DEC., 19 01 JUNE, 19	200	7	320	30					100
28	<100	3	40	50					<25
	DIS- NICKEL	TOTAL Sele- Nium	DIS- SOLVED SELE- NIUM	TOTAL SILVER	DIS- SOLVED SILVER	TOTAL Vana- Dium	OIS- SOLVED VANA- DIUM	TOTAL ZINC	DIS- SDLVED ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(OG/F)	(UG/L)
DEC., 19	372								
01	1							420	420
JUNE, 19									
28	3							90	70

400656105232800 - JAMES C AB L JAMES C AT JAMESTOWN, CO - JC-5

			SPE-						
			CIFIC						
			CON-		BICAR-	CAR-	ALKA-	CARRON	
		015-	DUCT-	PH	BONATE	BONATE	LINITY AS	CARBON DIOXIDE	TEMPER-
	TIME		ANCE	Pff		(CO3)	CACO3	(02)	ATURE
DATE	1175	CHARGE (CFS)	(MICRO- MHOS)	(UNITS)	(HCD3) (MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
UATE		(CFS)	WHO?	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(HG/L)	TOEG CI
DEC., 19	972								
01	1155		65	7.6	19	0	16	.8	.0
		DIS-	ə1S− SOLVED		NCN-	-210			
	-213	SULVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	STUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUH
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE		- (MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	972								
01		5.2	1.0	17	1				30
	015-		015-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		-210
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
*	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRGN	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	912			70	1	20	4	. 20	
01	·			70	ı	20	7	120	50
				D15-				DIS-	
		D1 S =	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TCTAL	SOLVED	MOLYH-	MOLY8-	TOTAL
	LEAC	LÉAD	GANESE	CANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	972								
01	100	0	20	10					100
	5.4.5		DIS-				-210		
	DIS- SOLVED	TOTAL	SOLVED	TOTAL	D18-	TOTAL	SOLVED	TOTAL	5110
		SELE-	SELE-	TUTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL (NI)	NIUM (SE)	NIUM (SE)	SILVER (AG)	SILVER (AG)	(A) M010	MUIG	ZINC	ZINC
DATE	(ACAF)	(ARVE)	(AC\F)	(UG/L)	(UG/L)	(UG/L)	(V) (UG/L)	(ZN) {UG/L}	(ZN) (UG/L)
DATE	100/11	100/6/	100767	10071	100/1	100/1	100/1	(00/1)	100/17
DEC., 19	972								
01	2							20	30

CRESTED BUTTE STUDY AREA

384853106541500 - SLATE R AT MOUTH NR CRESTED BUTTE. CO - SR-1A

			SPE- CIFIC CON-				ALKA-		
		0.4.6	DUCT-		BICAR-	CAR-	LINITY	CARBON	
	TIME	DIS- Charge	ANCE (MICRO-	PH	BONATE (HCO3)	BONATE	AS	DIOXIDE	TEMPER-
DATE		(CFS)	MHDS)	(UNITS)	(MG/L)	(CO3) (MG/L)	CACO3 (MG/L)	(CO2) (MG/L)	ATURE (DEG C)
								(11072)	1000 07
JUNE, 19 27	1045		85	7.0		_			
2,	1043		65	7.0	36	0	30	5.8	8.0
			-210						
		D15-	SOL VED		NCN-	DIS-			
	C15-	SOLVED	MAG-		CAR-	SOLVED		015-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	MUTS	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
04.75	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE. 19	973								
27		12	1.8	37	7				<10
					·				1.0
	-210		D15-						
	SOLVED	TOTAL	SOLVED		DIS-		015-		D15-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
•	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
DATE	(CD)	(CR)	(CR)	(CD)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 19	73								
27	1					10	6	1500	70
				DIS-				D15-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLY8-	MOLYB-	TOTAL
	LEAD (PB)	LEAD	GANESE	GANE SE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(UG/L)	(PB) (UG/L)	(MM)	(MN)	(HG)	(HG)	(MO)	(MO)	(1N)
DATE	100/2/	(OG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 19	73								
27	100	2	100	30				·	<25
			015-				DIS-		
	DIS-	TOTAL	SOLVED	TOTA:	-210	TOTAL	SOLVED		015-
	SOL VED NICKEL	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	(NI)	NIUM '('SE)	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(UG/L)	(UG/L)	(SE) (UG/L)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
	100/6/	100/1/	100/1/	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 19	73								
27	2							160	110
								• • •	

385107106571000 - SLATE R AB BAXTER GULCH NR CRESTED BUTTE, CO - SR-18

			SPE-						
			CIFIC						
			CDN-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS		*****
	TIME	CHARGE	(MICRO-	• • • • • • • • • • • • • • • • • • • •	(HCO3)	(CO3)	CACO3	DIOXIDE	TEMPER-
DATE	• • • • •	(CFS)	MHOS)	(UNITS)				(CO2)	ATURE
UNIT		10137	nnos,	(UN1137	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
JUNE, 1		-							
27	1005		75	6.9	29	0	24	5.8	6.5
									•••
			DIS-						
		D1S-	SOLVED		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		D15-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL		
	SILICA	CIUM	SIUM	NESS	HARD-	INUM		SOLVED	CAD-
	(2012)	(CA)	(MG)	(CA,MG)	NESS		ARSENIC	ARSENIC	MIUM
DATE	(MG/L)	(MG/L)				(AL)	(AS)	(AS)	(CD)
DATE	(HG/L)	(HG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 1	973								
27		10	1.6	. 32	. 8				<10
					•				110
	DIS-		D1S-						
	SDLVED	TOTAL	SOLVED		D15-				
	CAD-	CHRD-	CHRO-	TOTAL			DIS-		DIS-
	MIUM	MIUM	MIUM		SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	(CD)			COBALT	COBALT	COPPER	COPPER	IRON	1RON
CATE		(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 1	973				•				
27	1					10		2000	
_,,,,,	•					10	6	2000	80
				-210				DIS-	
		DIS-	TOTAL	SOLVED		D15-	TOTAL	SOLVEO	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVEO	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM		TOTAL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)		DENUM	NICKEL
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)		(MO)	(MO)	(NI)
DAIL	100767	100/6/	(00/1)	106/17	106/17	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 1	973								
27	<100	2	250	40					25
			DIS-				DI S-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		D1S-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	MUIN	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(٧)	(ZN)	
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ÚG/L)	(UG/L)	(UG/L)	(UG/L)	(ZN) (UG/L)
									.00/2/
JUNE, 19									
27	1							230	100

385231106583200 - SLATE R BL COAL C AT CRESTED BUTTE, CO - SR-1C

			SPE-						
			CIFIC				ALKA-		
			CON- DUCT-		BICAR-	CAR-	LINITY	CARBON	
•		D15-	ANCE	PH	BUNATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HC03)	(03)	CACO3	(CO2)	ATURE
CATE	• • • • •	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
MAR., 19			200		46	0	38	18	2.0
05	1210		200	6.6	40	U	30	10	2.0
		•	015-						
		D15-	SOLVED		NON-	DIS-			
	-21G	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SCLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MUIM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	73								
05		23	4.0	74	36				
									•
	D1 S-		DIS-						
	SOLVED	TOTAL	SOLVED		D15-		+21G		D15-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	HIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CD)	(00)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	973								
05	20						20		110
				DIS-				DIS-	
		D15-	TOTAL	SOLVED		DIS-	TOTAL	SCLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOL Y8-	MOLY8-	TOTAL
	LEAD	LEAD	GANE SE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(P8)	(PB)	(MN)	(MN)	(HG)	(HG)	(MD)	(MD)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	973								
05		0		4000					
			DIS-				D1S-		
	D1S-	TOTAL	SOLVED		D15-	TOTAL	SOLVED	_	DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
5475	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	973								
05	4								3000

		DIS-	SPE- CIFIC CON- DUCT- ANCE	PH	BICAR- BONATE	CAR- BONATE	ALKA- LINITY AS	CARBON DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HC03)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
MAR., 19									
05	1115		260	6.6	34	0	28	14	1.0
JUNE	1/20					_			
25	1630	E 150	65	6.6	19	О	16	7.6	12.0
			015-						
		DIS-	SCLVED		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		015-	TOTAL
	SOLVED	CAL- Cium	NE- Sium	HARD-	BCNATE	ALUM-	TOTAL	SCLVED	CAD-
	SILICA (S102)	(CA)	(MG)	NESS (CA,MG)	HARD- NESS	INUM (AL)	ARSENIC (AS)	ARSENIC (AS)	MIUM (CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	973								
05 JUNE		26	5.7	88	60				40
25		6.5	. 8	20	4				<10
	DIS-	TOTAL	DIS- SOLVED		DIS-		0.15		D12-
Cu,	SOLVED CAU~	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	OIS- SCLVED	TOTAL	20FAED
~	MIUM	MIUM	MIUM	COBALT	COBALT	CUPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(00)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 1									
05	30					130	10	3700	60
JUNE						420	.,		120
25	1					420	16	400	120
				-210				DIS-	
-		DIS-	TOTAL	SCLVED		015-	TOTAL	SOLVEO	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD (PB)	GANESE (MN)	GANE SE (MN)	MERCURY (HG)	MERCURY (HG)	DENUM (MO)	DENUM (MO)	NICKEL (NI)
DATE	(PB) (UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 1	100	0	9200	9000					<50
05 JUNE	100	U	7200						
25	<100	4	480	300					<25
			015-				D15-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DI 5-
	SOLVED	SELE-	SELE-	TOTAL	SOLVEO	VANA-	VANA-	TOTAL	SOL VED
	NICKEL	MUIN	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(N[) (UG/L)	(SE) (UG/L)	(SE) (UG/L)	(AG) (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V) (UG/L)	(ZN) (UG/L)	(ZN) (UG/L)
MAR., 1									
05	6							7100	6300
JUNE 25	0							9000	460

385208107004000 - COAL C AB WILDCAT C NR CRESTED BUTTE, CO - SR-3

			SPE- CIFIC CON- DUCT-		BICAR-	CAR-	ALKA- LINITY	C A D D D W	
		D1S-	ANCE	PH	BONATE	BONATE	AS	CARBON DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HC03)	(CD3)	CACO3	(02)	ATURE
CATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
MAR., 19	73								
05	1550	1.9	380	5.2	2	0	2	20	1.0
JUNE							-		
26	1035	E 1 30	70	6.3	22	0	18	18	6.5
			CIS-						
		DIS-	SOLVED		NCN-	D15-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		CIS-	TGTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	973								
05		34	7.6	120	120				70
JUNE			_						
26		7.1	.9	21	3				<10
	D15-		D15-						
	SOLVED	TOTAL	SOLVED		-210		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TCTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	WIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(OC/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	973								
05	60					240	210	5700	1200
JUNE	_								
26	2					30	30	320	140
				D15-				DIS-	
•		DIS-	TOTAL	SOLVED		015-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANE SE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19									
05	100	22	22000	22000					<50
JUNE 26	<100	4	390	860					<25
20***	. 100	7	370	500					123
			DIS-				D15-		
	015-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		-210
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	BIUM	ZINC	ZINC
DATE	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19									
05	50							1 4000	14000
JUNE 26	8							550	970
	_								

			SPE-						
			CIFIC CDN-				A1 V A		
			DUCT-		BICAR-	CAR-	ALKA- Linity	CARRON	
		D15-	ANCE	PH	BONATE	BONATE	AS	CARBON DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-	• • • •	(HC 03)	(003)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS 1	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L).	(DEG C)
					11.07.27	11.07.67	(11107 27.	1010 07
MAR., 19	973		•						
06	0945	. 38	925	3.3	0	0	0	.0	10.5
JUNE									
26	0950	E 1.5	1050	3.3	. 0	0	0	.0	13.5
			DIS-						
		DIS-	20F AED		NGN-	DIS-			
	015-	SOLVED	MAG-		CAR+	SOLAED 012-		DIC	70741
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	CIS- SOLVED	TOTAL CAD-
	SILICA	CIUM	STUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(PG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
J	0, 0,	1	***********	1110727	(1.0) (1	100767	(00/2)	100767	(00/6/
MAR., 19	973								
06		63	18	230	230				320
JUNE									
26		68	18	240	240				430
	015-		0.1.5						
	50f AED D18-	TOTAL	015-		015				
	CAD-	TOTAL CHRO-	SOL VEO CHRO-	TOTAL	DIS- SOLVED	TOTAL	015-	TOT 41	D1S-
	MIUM	MIUM	MIUM	COBALT	COBALT	TOTAL COPPER	SDLVED COPPER	TOTAL IRON	SCLVED
	(60)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE).	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(FE) (UG/L)
				100,2,	100727	(00, 2,	100727	100/ (7	100/2/
MAR., 19									
06	350					970	980	11000	11000
JUNE									
26	440					2000	2000	16000	14000
			•	D1S-				DIS-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	. (HG)	(MO)	(MC)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	800	640	61000	66000					150
JUNE	800	040	91000	66000					150
26	800	800	70000	69000					75
								•	
			DIS-				DIS-		
	015-	TOTAL	SOLVED		DI 5-	TOTAL	SOLVED		-21G
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	773				•				
06	150							65000	69000
JUNE									-,000
21	3.0								

385122107032900 - COAL C BL ELK C NR CRESTED BUTTE, CO - SR-5

			SPE- CIFIC						
			CON-				ALKA-		
		DIS-	DUCT-	PН	BICAR- Bonate	CAR-	LINITY	CARBON	T.C.W.D.C.O.
	TIME	CHARGE	ANCE (MECRO-	PH	(HCO3)	BONATE (CO3)	AS CACO3	DIOXIDE (CO2)	TEMPER- ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
MAR., 19									
07	1315		90	6.6	36	0	30	14	1.0
. JUNE	0005					_			
26	0835	EBC	. 60	6.6	j 9	0	16	7.6	4.5
			DIS-						
		015-	SOLVED		NON-	DIS-	•		
	DIS-	SOLVEO	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
DATE	(SIO2) (MG/L)	(CA) (MG/L)	(MG)	(CA,MG) (MG/L)	NESS (MG/L·)	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	73		. ,						-10
07 JUNE		14	1.6	42	12				<10
26		6.7	. 7	20	4				<10
	DIS-	TOTAL	D15-		0.15		0		
	SOLVED CAD-	FOTAL CHRO-	CHRO-	TOTAL	DIS- SOLVED	TOTAL	DIS-	TOTAL	DIS-
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	SOLVED 1ron
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	73								
07	10					<10	5	170	60
JUNE									
26	0					<10	9	260	70
				-210				DIS-	
		DIS-	TOTAL	SOLVED		DIS-	TCTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLY8-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	73								
07	<100	1	80	90					<50
JUNE 26	<100	2	70	50					<25
20	(100	2	70	50					125
			DIS-				D1 S-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(NI) (UG/L)	(SE) (UG/L)	(SE)	(AG) (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V) (UG/L)	(ZN) (UG/L)	(ZN) (UG/L)
			•						
MAR., 19								222	• 6 -
07 JUNE	1							230	180
26	0							290	190
20	U		_ _		- -			2 90	140

385219107054000 - COAL CREEK AT IRWIN, CO - SR-5A

				SPE-						
				CIFIC						
				CON-		0.000	6.0	ALKA-	C + D D D D 11	
				DUCT-		BICAR-	CAR-	LINITY	CARBON	T C H D C D
		~	-213	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	DATE	TIME	CHARGE	(MICRO-	/ UNITED	(HCO3)	(CO3)	CACO3	(ČU2)	ATURE
	DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
	JUNE, 19									
	26	1700	E 20	<50	6.9	17	0	14	3.4	7.5
				012-						
			-213	SCLVED		NCN-	-21G			
		DIS-	SOLVED	MAG-		CAR-	SULVED		DIS-	TOTAL
		SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
		SILICA	CIUM	Slum	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
		(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
	DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	JUNE, 19	973								
	26		5.0	.7	15	1				<10
		015-		DIS-						
		SOLVED	TOTAL	SOLVED		DIS-		DIS-		D1S-
		CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
		MIUM	MIUM	M I UM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
		(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
	DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
)	JUNE, 1	973								
	26	1					10	2	1400	50
					D18-				D15-	
			DIS-	TOTAL	SOLVED		nıs-	TOTAL	SOLVED	
		TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLY8-	MOLYB-	TOTAL
		LEAD	LEAD	GANESE	GANE SE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
		(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
	DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	JUNE, 1									
	26	<100	2	7 0	0					<25
				015-				DIS-		
		DIS-	TOTAL	SOLVED		D1 S-	TOTAL	SOLVED		015-
		SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
		NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
		(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
	DATE	(UG/L)	(ÚGŽĹ)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	JUNE, 1	973								
	26	3							30	20

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHDS)	PH (UNITS)	BICAR- BONATE (HCD3) (MG/L)	CAR- BONATE (CD3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CD2) (MG/L)	TEMPER- ATURE (DEG C)
MAR., 19									
05 JUNE	1240	12	160	6.7	46	0	38	15	1.5
27	0845		65	6.8	24	0	20	6.1	4.5
	DIS- SCL VED SIL ICA (SIO2)	DIS- SOLVED CAL- CIUM (CA)	DIS- SOLVED MAG- NE- SIUM (MG)	HARD- NESS (CA,MG)	NON- CAR- BONATE HARD- NESS	DIS- SOLVED ALUM- INUM (AL)	TOTAL ARSENIC (AS)	DIS- SOLVED ARSENIC (AS)	TOTAL CAD- Mium (CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(NC/F)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	973								
05		21	2.9	64	26				
JUNE		9.6	. 9	28					<10
27		9.0	. 4	20	8				110
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
DATE	100727	100727	(00,2,	103, 2.	,		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
MAR., 19 05 JUNE 27	973 0 1					 20	10 9	 3800	140 50
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
MAR., 19	973								
05		1		120					
JUNE 27	<100	2	120	0					<25
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SDLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
MAR. 1									
05 JUNE	2								120
27	. 0							210	50

			SPE- CIFIC						
			CON- DUCT-		BICAR-	CAR-	ALKA- Linity	CARBON	
		D15-	ANCE	PН	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
MAR., 19	173								
06	1600		150	6.8	48	0	39	12	•0
JUNE									
26	1445	E70	55	6.7	19	0	16	6.1	7.5
			015-						
		D15-	SOLVED		NON-	015-			
	-213	SOL VED	MAG-		CAR-	SOLVED		D15-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	973					•			
06		22	2.1	64	25				
JUNE				-					
26		6.0	.4	17	1				<10
	DIS-		015-						
	SOL VED	TOTAL	SOLVED		PIS-		DIS-		D1S-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOT AL	SOLVED
~1 ₀ .	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
-4.	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	973								
06	10						2		50
JUNE									
26	1					20	10	270	40
				DIS-				DIS-	
		015-	TOTAL	SOLVED		D1S-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANE SE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L _f)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19	973								
06		3		480					
JUNE									
26	<100	14	50	30					<25
			015-	•			DIS-		
	015-	TOTAL	SOLVED		D1 S-	TOTAL	SDLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA~	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	MUIG	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
MAR., 19									
06	2								620
JUNE									
26	1							250	210

385450107015700 - SLATE R AB U-B-J C NR CRESTED BUTTE, CO - SR-8

			SPE-						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CU2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
MAR., 19	773								
06	1545		480	8.0	230	0	189	3.7	.0
JUNE						-		, , ,	
26	1300	E 170	55	6.5	29	0	24	15	10.0
			DIS-						
		DIS-	SCLVED		NON-	DIS-			
	DÍS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
									.00,2,
MAR., 19	373								
06 JUNE		64	17	230	41				
26		12	.8	33	9				410 :
20		12	. • •	33	9				<10.
	-21G		DIS-						
	SOLVED	TOTAL	SOLVED		DIS-		D1S-		015-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVEO	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)								
MAR., 19	973								
06	0						10		50
JUNE									
26	0					<10	3	760	20
				015-				015-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLY8-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MD)	(MO)	(10)
DATE	(UG/L)								
								,	
MAR., 19	973								
06		3		20					
JUNE	4100		2.0						
26	<100	1	30	20					<25
			D1S-				DIS-		
	D1S-	TOTAL .	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE- `	SELE-	TOTAL	SOL VED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)								
MAR., 19	73								
06	4								50
JUNE									_
26	0							70	20

SNAKE RIVER STUDY AREA

393607105594500 - SNAKE R AT KEYSTONE. CO - SN-1

			SPE- CIFIC						
			CON-						
			DUCT-		BICAR-	CAR-	ALKA- Linity	C 4 0 0 0 0	
		01S-	ANCE	PH	BONATE	BONATE	AS	CARBON DIDXIDE	TEMBER
	TIME	CHARGE	(MICRO-	• • • •	(HCU3)	(CO3)	CACO3	(002)	TEMPER-
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	ATURE (DEG C)
									1020 07
OCT., 19		5 0.							
26	1235	E 26	140	7.0	29	0	24	4.6	2.0
			DIS-						
		C12-	SOLVED		NON-	D15-			
	-21G	SCLVED	MAG-		CAR-	SOLVED		D15-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAC-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	272								
26		14	2.8	47		2.0			
20		17	2.5	47	23	30			30
	DIS-		015-						
	SOLVED	TOTAL	SOLVED		D15-		-210		-210
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOL VED
	MÍÙM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(00)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	172								
26	0					20	-	200	
2000	ŭ					20	2	300	50
				DIS-				-210	
		DIS-	TOTAL	SOLVED		-210	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	72								
26	200	3	190	180					100
			D15-						
	015-	TOTAL	20FAED		015	TOT 41	D15-		
	SOLVED	SELE-	SELE-	TOTAL	015-	TOTAL	SOLVEO	70741	015-
	NICKEL	NIUM NIUM	NIUM SELE-	SILVER	SDL VED SIL VER	VANA-	VANA-	TOTAL	SOLVED
	(NI)	(SE)	(SE)	(AG)	(AG)	DIUM (V)	DIUM {V}	ZINC	ZINC
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ZN) (UG/L)	(ZN) (UG/L)
067 10	7.3						· · - •		
OCT., 19	12			20					

		015-	SPE- CIFIC CON- DUCT- ANCE	РН	BICAR- BONATE	CAR- BONATE	ALKA- LINITY AS	CARBON DIOXIDE	TEMPER-
DATE .	TIME	CHARGE (CFS)	(MICRO- MHOS)	(UNITS)	(HCO3) (MG/L)	(CO3) (MG/L)	CACO3 (MG/L)	(CO2) (MG/L)	ATURE (DEG C)
OCT., 19	72								
26	1600		140	5.9	5	0	4	10	3.0
MAR., 19 02	1215		190	5.5	5	0	4	25	3.0
JUNE 19	1330	E 105	120	7.0	24	0	20	3.8	6.0
	DIS- SOLVED S1L1CA (S102)	DIS- SOLVED CAL- CIUM (CA)	DIS- SOLVED MAG- NE- SIUM (MG)	HARD- NESS (CA+MG)	NON- CAR- BUNATE HARD- NESS	DIS- SGLVED ALUM- INUM (AL)	TOTAL ARSENIC (AS)	DIS- SOLVED ARSENIC (AS)	TOTAL CAD- Mlum (CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19		12	2.9	42	38	220			40
MAR., 19 02		17	3.8	58	54	420			<10
JUNE 19		8.8	1.7	29	9	30			<10
	DIS- SOLVED CAD- MIUM	TUTAL CHRO- MIUM	DIS- SOLVED CHRO- MIUM	TOTAL COBALT	DIS- SOLVED COBALT	TOTAL COPPER (CU)	DIS- SOLVED COPPER (CU)	TOTAL IRON (FE)	DIS- SOLVED IRON (FE)
DATE	(CD) (UG/L)	(CR) (UG/L)	(CR) (UG/L)	(UG/L)	(CO) (UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	72								
26 MAR., 19	1					60	60	310	130
02	1					70	70	270	50
JUNE 19	1					50	35	350	160
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	OIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (N1) (UG/L)
OCT., 19	972								
26 MAR., 19	200 973	7	570	600					100
02 JUNE	<100	2	670	700					<50
19	50	1	430	440					<25
			DIS-				D15-	,	
	DIS- SOLVED	TOTAL Sele-	SOLVED SELE-	TOTAL	DIS- SOLVED	TOTAL VANA-	SOLVED VANA	TOTAL	DIS- SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	2 INC	ZINC
DATE	(NI) (UG/L)	(SE) (UG/L)	(SE) (UG/L)	(AG) (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V) (UG/L)	(ZN) (UG/L1	(ZN) (UG/L)
26	7			30	0			1000	1100
MAR., 1 02	9 7 3			<10	o			1700	1700
JUNE	. 9			<10	0			840	630

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
OCT., 19	72								
26	1730			6.6					2.0
DATE	.DIS- SGLVED SILICA (SIU2) (MG/L)	CIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SCLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
OCT 19	972								
26		7.9	1.3	25		0			
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SDLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
OCT., 19	972								
26	c						1		20
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SDLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI)
OCT., 19	972								
26		1		0					
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TDTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM {V} (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT., 19					0				30
26	1				U				30

CATE	TIME	DIS- CHARGE (CFS)	SPÉ- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBUN DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
OCT., 19	972								
27	1255		180	4.9	2	0	2	40	. 5
			DIS-						
		D15-	SOLVED		NON-	DIS-			
	D1S-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SCLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	HIUH
	(2012)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1	972								
27		14	3.6	50	48	1900			
						.,,,			
	DIS-		DIS-						
	SOLVED	TOTAL	SOLVEO		DIS-		DIS-		D1S-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	((0)	(CR)	(CR)	(CO)	(CO)	(CU)	(50)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1	972								
27	4						110		530
2	•						110		530
				DIS-				DIS-	
		DIS-	TOTAL	SULVED		D1S-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MC)	(PO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
27		25		1100					
	0.5		-21D				D15-		
	015-	TOTAL	SOLVED		015-	TOTAL	SOLVED		-21G
	SOL VED NICKEL	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	(NI)	NIUM (SE)	NIUM	SILVER	SILVER	DIUM	MUIO	ZINC	ZINC
DATE	(UG/L)	(UG/L)	(SE) (UG/L)	(AG) (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V) (UG/L)	(ZN)	(ZN)
			. 53/ 2/	.03/ [/	103/1/	100/1	106/1	(UG/L)	(UG/L)
OCT., 19									
27	24				. 0				1500

			SP5-						
			CIFIC						
			CUN-			•	ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		015-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRU-		(HC03)	(CO3)	CACU3	(02)	ATURE
CATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DATE		10137		1011137	(110767	(1-10/11)	(140767	(MG/L)	TOEG CI
OCT., 19	172								
27	1410		210	, ,	•	•	^		•
JUNE, 19			210	4.3	0	0	0	•0	• 0
	0935	E2.5			•			_	
I 9 • • •	0937	62.5	140	4.1	0	0	0	.0	•0
			015-						
		DIS-	SOLVED		NON-	DIS-			
	D15-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BCNATE	ALUM-	TOTAL	SCLVED	CAD-
	SILICA	CIUM	STUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
					11.07.27	100/ 21	100, 6,	100/ 27	100767
OCT., 19	972								
27		13	3.9	49	49	3300			
JUNE, 19	973		3.,	• •	47	3300			
19		7.7	2.0	27	27				10
	<u></u>				21				. 10
	D15-		D15-						
	SOLVED	TOTAL	SOLVED		DIS-		D1S-		0.1.0
	CAD-	CHRO-	CHRO-	TOTAL		TOTAL			DIS-
	MIUM	MIUM		TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	(CD)	· (CR)	MIUM (CR)	COBALT	COBALT	COPPER	COPPER	IRON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(CO)	(00)	(CU)	(CU)	(FE)	(FE)
DATE .	(UG/L)	106717	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	177								
	4								
27 JUNE, 19							140		120
19	4								
19	4					120	120	670	500
				DIS-				-21D	
	TOTA:	DIS-	TOTAL	SOLVED		D1 S-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NIČKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(IN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
067 16	.7.2								
OCT., 19									
27		17		1900					
JUNE, 19		_							
19	<50	9	1000	1000	,				<25
	0.46		DIS-				DIS-		
	D15-	TOTAL	SOLVED		DIS-	TOTAL	SCLVED		-210
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	ZOFAEĎ
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE		(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	(UG/L)								
OCT., 19	72								•
OCT., 19	172 25				1				1400
OCT., 19 27 JUNE, 19	972 25								1400
OCT., 19	172 25			 <10	1			1100	1400

			SPE-						
			CIFIC				ALKA-		
			CON- DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	IMICRO-		(HCO3)	(CO3)	CAC 03	(CO2)	ATURE
DATE	1100	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(OEG C)
OCT., 19	72						_		.0
27	1150		120	ú•9	11	0	9	2.2	••
JUNE, 19	73				20	0	24	7.4	.5
19	0850	E1.5	115	8.8	29	U	24	,	
			015-			015			•
		DIS-	SOLVED		NON-	015-		DIS-	TOTAL
	DIS-	SOLVED	MAG-		CAR-	SOLVED ALUM-	TOTAL	SCLVED	CAD-
	SOLVED	CAL-	NE-	HARD-	BONATE	1 NUM	ARSENIC	ARSENIC	MIUM
	SILICA	CIUM	SIUM	NESS	HARD- NESS	(AL)	(AS)	(AS)	(CO)
	(\$102)	(CA)	(MG)	(CA,MG) (MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MO/L)	100727	(00/2/	,,,,,	
OCT., 19	72	12	2.9	42	33	30			40
27 JUNE, 19		12	,	.~					
19		13	2.5	43	19	10			<10
	DIS-	e sag	DIS-						
	SOLVED	TOTAL	SOLVED		D13-		DIS-		015-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE) (UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	100/1
OCT., 19	72					20	1	60	9
27	1					20		00	•
JUNE, 19						10	10	180	30
19	0					10			
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		· DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED		MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL (NI)
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO) (UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	{UG/L}	(UG/L)	(UG/L)	(06/1)	(00/11
OCT., 1	972								100
27	300	1	160	160					
JUNE, 1	973	_		10					<25
19	<50	0	50	10				•	
			D1S-			TOTAL	DIS-		DIS-
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED VANA-	TOTAL	SOLVED
	SOLVE		SELE-	TOTAL	SOLVED	VANA- Dium	DIUM	ZINC	ZINC
	NICKEL		NIUM	SILVER (AG)	SILVER (AG)	(V)	(V)	(ZN)	(ZN)
	(NI)	(SE)	(SE)		(UG/L)	(UG/L)	(UG/L)		(UG/L)
DATE	(UG/L	(UG/L)	(UG/L)	(UG/L)	(00/1)	100,01			
DCT., 1					0			190	. 190
27	10			30	U				
JUNE. 1	973	_		<10	. 0			200	20
19		2		110	•				

			SPE- CIFIC						
			CON-				41 7 4		
			DUCT-		BICAR-	CAR-	ALKA- Linity	CARBON	
	TIME	DIS-	ANCE	PH'	BONATE	BONATE	AS	DIOXIDE	TEMPER-
DATE	1100	CHARGE (CFS)	(MECRO- MHOS)	*********	(HC03)	(CO3)	CACO3	(CO2)	ATURE
		10.37	PHO3)	(STINU)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OCT., 1									
27 JAN., 1	1500		180	7.0	17	0	14	2.7	1.0
03	0940		170	4 5		_			
MAR.			. 110	6.5	40	0	33	20	•0
02	1100		200	6.2	17	0	14	17	.5
JUNE 19	1405	E120						• •	• • •
. ,	1409	2120	260	6.8	12	0	10	3.0	7.0
			DIS-						
		-21G	SOLVED		NON-	D15-			
	D1S- SOLVED	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SILICA	CAL- Clum	NE- SIUM	HARD-	BCNATE.	ALUM-	TOTAL	SOLVED	CAD-
	(\$102)	(CA)	(MG)	NESS (CA,MG)	HARD- NESS	INUM (AL)	ARSENIC	ARSENIC	MIUM
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(AS) (UG/L)	(AS) (UG/L)	(CD)
OCT., 1	972						,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	100727	(UG/L)
27		17	3.9	59	, =				
JAN., 1	973	- ,	3.7	59	45	30			20
03		19	5.2	69	. 36	30			40
MAR. 02		20		*	_				40
JUNE		20	4.5	68	54	50			<10
19		9.0	1.9	30	20	30			
						30			10
	-21D		D1S-						
	SOLVED	TOTAL	SOLVED		D15-		-210		-210
	CAD- Mium	CHRO- Mium	CHRO- MIUM	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	(CD)	(CR)	(CR)	COBALT (CO)	COBALT (CO)	COPPER (CU)	COPPER	IRON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(CU)	(FE) (UG/L)	(FE)
OCT., 19	972						100727	1007[7	(UG/L)
27	0						_		
JAN., 1						10	1	310	50
03 Mar.	0					20	6	240	50
02	0							2.70	,,,
JUNE	-					10	1	410	90
19	1					20	6	530	80
							_	230	00
		-210	TOTAL	DIS- SOLVED		D		DIS-	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED DIS-	TOTAL Molyb-	SOLVED	
	LEAD (PB)	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	MOLYB- Denum	TOTAL
DATE	(UG/L)	(PB) (UG/L)	(MN) (UG/L)	(MN)	(HG)	(HG)	(MO)	(MO)	(11)
			.00, [,	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19									
27 JAN., 19	100	2	360	400					50
03	200	2	370	380		_			
MAR.			3.0	.500					50
02 JUNE	<100	1	390	390					<50
19	<50	0	260	100					1,20
		·	200	180					<25
	D. C.		D15-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	NICKEL	SELE- Nium	SELE- NIUM	TOTAL Silver	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	(NI)	(SE)	(SE)	(AG)	SILVER (AG)	MUIG (V)	(V)	ZINC	ZINC
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ZN) (UG/L)	(ZN) (UG/L)
OCT., 19	72					**	· - ·	, -,	.00/ []
27	8			20	1				
JAN., 19	73			20	1			370	340
03	4			30	Û.			470	440
MAR. 02	7				_			.,0	770
JUNE	•			<10	0			520	460
19	6			<10	0			6500	220
					-			6500	230

			SPE- CIFIC CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
	TIME	DIS-	ANCE	PН	BONATE	BONATE	AS	DIOXIDE	TEMPER-
DATE	1100	CHARGE (CFS)	(MICRO- MHOS)	(UNITS)	(HCO3) (MG/L)	(CO3) (MG/L)	CACO3	(02)	ATURE
DATE		10137	mnu3)	(UNITS)	(80/1)	(MG/L/	(MG/L)	(MG/L)	(DEG C)
OCT., 19	972								
27	1620		140	6.4	4	0	3	2.5	.0
		0.16	D15-						
	C15-	018-	SOLVED		NON-	DIS-			
	SOL VED	SOLVED CAL-	MAG- NE-	HADO	CAR-	SOLVED	70741	015-	TOTAL
	SILICA	CIUM		HARD- NESS	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	(\$102)	(CA)	SIUM (MG)		HARD- NESS	I NUM	ARSENIC	ARSENIC	MIUM
DATE	(MG/L)	(MG/L)	(MG/L)	(CA,MG) (MG/L)		(AL)	(AS)	(AS)	(CD)
UATE	THUTET	180767	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
27		11	3.7	43	40	170			20
	D15-		D15-						
	SOLVED	TOTAL	SOLVED		D15-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL.	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR) [™]	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
007	073								
OCT., 1	1							300	
21						30	12	380	120
				DIS-				D15-	
•		D15-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
•	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1		_							
27	200	1	430	480					100
			DIS-				DIS-		
	D15-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIC-
	SOLVED	SELE-	SELE-	TOTAL	SOL VED	VANA-	VANA-	TOTAL	DIS- SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
27	1.7			20	1			220	190

		D1S-	SPE- CIFIC CON- DUCT-		BICAR-	CAR-	ALKA- Linity	CARBON	
	TIME	CHARGE	ANCE {MICRU-	PH	BONATE (HCO3)	BONATE (CO3)	AS CACO3	DIOXIDE	TEMPER-
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(CO2) (MG/L)	ATURE (DEG C)
OCT., 1									
28 JUNE, 1	0945 973	2.5	100	6.9	36	0	30	7.3	•0
19	1045	E12	65	7.2	26	0	21	2.6	2.5
			-21G						-
		DIS-	SOLVED		NON-	D15-			
	DIS-	SOLVED	MAG-	•	CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	\$1L1CA {\$102}	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
DATE	(MG/L)	(CA)	(MG)	(CA, MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MĢ/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1									
29 JUNE, 1	072	12	2.0	38	8	10			30
19		9.1	1.3	28					
			•••	20	. 7	30			<10
	-210		-21D						
	SOLVED	TOTAL	SOLVED		-21 0		D15-		DIS-
	CAD- Mium	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	(CD)	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
DATE	(UG/L)	(CR)	(CR)	(00)	(CO)	(CU)	(CU)	(FE)	(FE)
	100/[]	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1									
28 JUNE, 1	973					20	3	120	60
19	0					10	19	270	7.0
				D1S-			17		70
		-21G	TOTAL	SOLVED		D. C		DIS-	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	DIS- SOLVED	TOTAL	SOLVED	
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	MOLYB- Denum	MOLYB-	TOTAL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MD)	DENUM (MD)	NICKEL
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(NI) (UG/L)
OCT., 19	972								
28	100	3	40	30					
JUNE, 19	973 <50	8							100
.,	170	0	10	10					<25
	0.5		-21G				-210		
	-210	TOTAL	SOLVED		D15-	TOTAL	SOLVED		D1S-
	S OL VED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	(NI)	NIUM	NIUM	SILVER	SILVER	DIUM	MU10	ZINC	ZINC
DATE	(UG/L)	(SE) (UG/L)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
J		100/1	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L) ·	(UG/L)
OCT., 19	72								
28	1			20	0			20	20
JUNE, 19	73 6								20
47.00	0	**		· <10	0			20	10

393345105511300 - SNAKE R AB DEER C NR MONTEZUMA, CO - SN-6

		015-	SPE- CIFIC CON- DUCT- ANCE	Pн	BICAR- BONATE	CAR- BONATE	ALKA- LINITY AS	CARBON DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCD3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OCT., 19	72								
28	1200	3.1	240	4.0	0	0	0	.0	.5
JUNE: 19	73						_	_	
19	1135		115	4.3	0	0	0	•0	2.0
			015-						
		DIS-	SCLVED		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENTO	MUIM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	{UG/L}	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
28		9.5	5.0	44	44	4400			30
JUNE, 19	773								
19		5.0	2.0	21	21				20
		· sa-c	J						
	DIS-		DIS-						
	SOLVED	TOTAL .	SOLVED		-210		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
28	2					30	10	770	690
JUNE, 19	973								
19	1					20	20	830	520
								5.5	
				D1 S-		016	TOTAL	DIS- SOLVED	
		D15-	TOTAL	SOLVED	70741	DIS-	MOLYB-	MOLYE-	TOTAL
	TOTAL	SOLVED	PAN-	MAN- GANE SE	TOTAL MERCURY	MERCURY	DENUM	DENUM	NICKEL
	LEAD (P8)	LEAD (PB)	GANESE (MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(11)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)		(UG/L)	(UG/L)
DATE	(00/1/	100/2/	100727	100727	100/2/				
OCT., 19									150
28	100	8	980	1100					150
JUNE, 1									<25
19	<50	4	340	340					(2)
			D15-				DIS-		214
	DIS-	TOTAL	SULVED		DIS-	TOTAL	SOLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	MUIN	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN) (UG/L)
DATE	(UG/L)	(nevr)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(00/1)
OCT., 1	972								
28	25			20	0			410	440
JUNE, 1	973								
10	25			< 10	0			220	170

CREEDE STUDY AREA

			SPE+						
			CIFIC						
			CON- DUCT-		BICAR-	CAR-	ALKA- Linity	CARBON	
		DIS-	ANCE	PН	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE	722	(CFS)	MHOS)	(STINU)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OCT., 19	172								
11	1345		100	7.9	40		33	.8	10.5
DEC.				,			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	••	1007
13	1030		100	7.2	48	0	39	4.8	.0
			D1S-						
		DIS-	SOLVED		NON-	DIS-			
	015-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD+
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA+MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	772								
11		9.7	1.4	29	0				
DEC.									
13		12	2.3	39					
	CDIS-		DIS-						
	SOLVED	TOTAL	SOLVED		-210		-210		-210
	CAD-	CHRD-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MUIM	MUIM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CO)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
11	0						2		80
DEC.				•					
13	1						4		60
				DIS-				DIS-	
		D15-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL -	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
11		2		70		.0			
DEC.		-							
13		3		100		•0			
			DIS-				DIS-		
•	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	· TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
11	0								40
DEC.	<u>.</u> .								21.0
13	1								210

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)		BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS I CACO3 (MG/L)	(CO2)	EMPER- ATURE (DEG C)
DATE	_	, 0. 5.							
OCT., 197	1100	E 5	270	8.2	43	0	35	•4	12.0
DEC. 12	1440	11	240	7.3	40	0	33	3.2	3.5
FEB., 197	3 1150	8.2	230	6.7	46	0	38	15	3.0
JUNE 07	0650	16	140	6.6	24		20	9.6	3.5
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- Slum (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SDLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
OCT., 19		2.2	1-4	60	25				
11 DEC.		22		5 5	22				
12 FEB., 19	73	20	1 3						<10
13 JUNE		23	1.3	62	24				<10
07		7.7	.7	22	2				
DATE	DIS- SOL VED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- Mium (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
OCT., 19	972						1		30
11 DEC.	2						1		20
12 FEB., 1	973					50	9	310	70
13 JUNE	2						9	260	50
07	5					10	9	•	,,,
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	(MN)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MD) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT 1		• •		- 1700		.0			
11 DEC.						.0			
12 FEB., 1	973				.0	•0			75
13 JUNE	100	_				. 2			<25
07	<1,00) 7	170	0 170					
DATE	DIS- SOLVEI NICKEI (NI) (UG/L	SELE- NIUM (SE)	DIS- SBLVE SELE- NIUM (SE) (UG/L	D TOTAL SILVER (AG)	(AG)	DIUM (V)	OIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT.,	1972	•			. - -				- 310
11 DEC.		0				. <u>-</u>			1600
12 FEB.,	1973	0 -	=	- 				- 170	1500
13 JUNE		-						- 130	0 1200
07		8 -			-				

		•	SPE- CIFIC CON- DUCT-		BICAR-	- CAR-	ALKA-		
DATE	TIME	DIS- CHARGE (CFS)	ANCE (MICRO- MHOS)	· PH (UNITS)	BONATE (HCO3)	BONATE (CO3)	CACO3	DIOXIDE (CO2)	
OCT., 1	1972 D850	F 1.5	340	~ -				***************************************	1026 ()
DEC. 12	1600	•95	260 200	7.0		•	-	11	6.5
FE8., 1	1400	•90	210	7.2		•	59	7.3	4.5
JUNE 07	0805	E45	80	6.7	_	ŭ	59	23	5.0
			DIS-	6.6	26	0	21	10	4.5
DATE	01S- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CO)
OCT., 1	972	25						(00/2)	(UG/L)
DEC. 12			2.4	72	. 15				
FEB., 1		26 26	2.7	76	17				
JUNE 07		7.8	2.7	76	17				10
		**0	.7	22	1				10
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO)	DIS- SOLVED COBALT (CO)	TOTAL COPPER (CU)	DIS- SOLVED COPPER (CU)	TOTAL IRON (FE)	DIS- SOLVED IRON (FE)
OCT., 19		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(00/1)	(NG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
11 DEC.	4						0		20
12 FEB., 19	73	·		+-			2		20
13 JUNE	7					30	6		50
07	4					10	9	. 230	160
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) - (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 197		4		80		•0			
12		. 5		0 /		•0			
FEB., 197 13 JUNE	<100	1		20	•0	•1			
07	<100	14	180	170		.1			75
	(NI) SOLVED NICKEL OIS-	TOTAL SELE- NIUM	DIS- SOLVED SELE- NIUM	TOTAL SILVER	DIS- SOLVED SILVER	TOTAL VANA- Dium	DIS- SOLVED VANA- DIUM	TOTAL ZINC	DIS- SOLVED
•	(UG/L)	(SE)	(SE)	(AG) (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V) (UG/L)	(ZN) (UG/L)	ZINC (ZN) (UG/L)
OCT., 197 11	? 1								
DEC. 12	2								2600
FEB., 197: 13	3 0								2400
JUNE 07	8							2500	2400
	-		- -					1000	950

			SPE-						
			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		D1S-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS }	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OCT., 19	972								
11	1255	E4.5	240	8.5	57	0	47	.3	14.0
								. –	
			D15-						
		DIS-	SOLVED		NON-	D15-			
	DIS-	SULVED	MAG-		CAR-	SOLVED		D15-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BUNATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
								,,,,,	100/2/
OCT., 1	972		۵.						
11		22	1.3	60	13				
	D15-		D15-						
	SOLVED	TOTAL	SOLVED		D1S-		D1S-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(cū)	(CR)	(CR)	(CD)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(Ae\r)	(UG/L)						
OCT., 19	977								
11	3	<u></u>					4		30
*****	,						7		30
				015-				DIS-	
		DIS-	TOTAL	SOLVED		-21D	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANE SE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)								
067 1/				•					
OCT., 1	912	13				_			
11		13		1900		.0			
			DIS-				DIS-		
	015-	TOTAL	SOLVED		DIS-	TCTAL	SOLVED		DIS-
	SOLVED.	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(N1)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)								
OCT., 19	272		•						
11	1						_	_	210
									210

DATE	TIME	DIS- Charge (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3	CARBON DIOXIDE (CO2)	TEMPER-
007	070				***************************************	(46/1/	(MG/L)	(MG/L)	(DEG C)
OCT., 1									
DEC.	1100	9.8	280	8.0	41	0	34	.7	9.0
12	1200	5.0						• '	7.0
JUNE, 1		٥.0	260	7.3	50		41	4.0	3.5
07	1000	105	90						505
			90	6.6	24	0	20	9.6	5.0
	DIS- SOLVED	DIS- SOLVED CAL-	DIS- SOLVED MAG- NE-	HARD~	NON- CAR-	DIS- SOLVED		DIS-	TOTAL
	SILICA	CIUM	SIUM	NESS	BONATĘ HARD÷	ALUM-	TUTAL	SOLVED	CAD-
	(5102)	(CA)	(MG)	(CA,MG)	NESS	INUM (AL)	ARSENIC (AS)	ARSENIC	MIUM
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(AS)	(CD)
						100727	100727	(UG/L)	(UG/L)
OCT., 1 10 DEC.	972.	17	1.2	47	13				
12					5 -				
JUNE, 1	973					•			
07		8.6	• 8	25	` 5				<10
•	DIS- SOLVED	TOTAL	DIS-		DIS-		DIS-		
	CAD-	CHRD-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	D12-
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	SOLVED IRON
DATE	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	. (FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	72								
10	2								
DEC.	_						1		20
12	3						2		
JUNE, 19							2		90
07	3					30	10	530	60
	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 19		_							
10 DEC.		9		1300		•0			
12		5		3000		_			
JUNE, 19	73	,		2900		.0			,
07	<100	10	390	350		.2		+-	<25
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE)	DIS- SOLVED SELE- NIUM (SE)	TOTAL SILVER (AG)	DIS- SOLVED SILVER (AG)	TOTAL Vana- Dium (V)	DIS- SGLVED VANA- DIUM (V)	TOTAL Z INC (ZN)	DIS- SOLVED ZINC (ZN)
VALL	100/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 197	72								
10	2								
DEC.				-					330
12	1							~-	880
JUNE, 197									880
07	8 .	`						900	540

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS (CACO3) (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
DEC., 19 12	72 1255		390	7.6	65	0	53	2.6	11.0
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CO) (UG/L)
DEC., 19	72	<u>:-</u>							30
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	OIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
DEC., 19	72	· 				50		1200	
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
DEC., 19	1400		7100		0.6				100
OATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	OIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	· TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
DEC., 19	772			٠				2000	

375157106551900 - E WILLOW C AT MOUTH AT NORTH CREEDE, CO - RG-6

DIS-	DATE	TIME _.	DIS- Charge (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3)	CAR- BONATE (CO3)	ALKA- LINITY AS CACO3	CARBON DIOXIDE (CO2)	TEMPER- Ature
10 1235			10,3,	,,,,,,,,,,	10/41/37	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DEC. 12 1040 70 6.9 29 0 24 5.8 .0 DIS- SOLVED SO	OCT., 19	972								
		1235		120	8.0	34	0	28	- 5	0.0
DIS- SOLVED CAL- NE- NE- SOLVED CAP-							_		• • • • • • • • • • • • • • • • • • • •	7.0
DIS- SOLVED MAG- NGH- DIS- SOLVED	12	1040		.70	6.9	29	0	24	5.8	·
DIS- SOLVED NACH										
DIS- SOLVED NACH				DIS-						
DIS- SOLVED SOLVED SOLVED SOLVED SILICA CIUM SIUM NESS HARD- INUM ARSENIC ARSENIC CAD- MIUM SILICA CIUM SIUM NESS HARD- INUM ARSENIC ARSENIC CAD- MIUM ARSENIC CAD- MIUM ARSENIC CAD- MIUM ARSENIC CAD- CIUG/L CAD-			D15-	SOLVED		NON-	DIS-			
SOLVED STILICA CIUM STUM STUM MSSS HARD- INUM MSSSNIC ARSENIC ARSENIC MIUM			SOLVED	MAG-		CAR-			015-	TOTAL
SILICA CIUM SIUM NESS HARD INUM ARSENIC RASCHIC (GO) (GA)			CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL		
DATE			CIUM	SIUM	NESS	HARD-	INUM			
Date NG/L					(CA,MG)	NESS	{AL}			
10	DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	
10	007 10	777								
DEC. 12		,	7 0		22					
12			*.0	• 0	22	U				
DIS-			7.5	1.2	23	0				
SOLVED TOTAL SOLVED CAD- CHRO- CHR						•				
SOLVED TOTAL SOLVED CAD- CHRO- CHR		DIS-		DIS-						
CAD- CHRO- TOTAL SOLVED TOTAL			TOTAL			DIS-		015-		
MIUM		CAD-			TOTAL		TOTAL		TOTAL	
DATE (UG/L) (UG/		MEUM								
DATE (UG/L) (UG/										
OCT., 1972 10 1 2 6D DEC. 12 3 2 50 2 50 2 50 2 50 2 50 2 50 2 50	DATE									
10 1						100, 2,	100, 2,	100727	10071	106/11
DEC. 12 3										
12 3		1						2		60
TOTAL SOLVED MAN-		_								
TOTAL SOLVED MAN-	12	3						2		50
TOTAL SOLVED MAN-					016					
TOTAL SOLVED MAN- GANESE GANE			-210	TOTAL			216			
LEAD	•	TOTAL				TOTAL				
PB PB PB PB PB PB PB PB										
DATE (UG/L) (UG/										
OCT., 1972 10 16 100 DEC. 12 10 100 DIS- TOTAL SOLVED SOLVED SOLVED SOLVED SOLVED NICKEL NIUM NIUM SILVER SILVER DIUM DIUM ZINC ZINC (NI) (SE) (SE) (AG) (AG) (V) (V) (ZN) (ZN) DATE (UG/L) (UG/L) (UG/L) (UG/L) (UG/L) (UG/L) (UG/L) (UG/L) OCT., 1972 10 0 260 DEC.	DATE									
10 16 100 12 10 100 12 10 100 10 100							100/6/	100727	100/ [/	10671
DEC. 12 10 10 0 0 10 DIS- TOTAL SOLVED SOLV		972								
12			16		10		•0			
DIS- SOLVED SELE- NICKEL NIUM NIUM SILVER SILVER DIUM DIUM ZINC ZINC (NI) (SE) (SE) (AG) (AG) (V) (V) (ZN) (ZN) DATE (UG/L) (UG/L) (UG/L) (UG/L) (UG/L) (UG/L) (UG/L) OCT., 1972 10 0 260 DEC.										
OTS-	12		10		10		.0			
OTS-				DIC						
SOLVED SELE- SELE- TOTAL SOLVED VANA- VANA- TOTAL SOLVED		015-	TOTAL			0.7.0	TOTAL			
NICKEL NIUM NIUM SILVER SILVER DIUM DIUM ZINC ZINC (NI) (SE) (SE) (AG) (AG) (V) (V) (ZN) (ZN) (ZN) (UG/L) (TOTAL				***	
(N1) (SE) (SE) (AG) (AG) (V) (V) (ZN) (ZN) (ZN) (UG/L) (UG										
DATE (UG/L) OCT., 1972 10 0 260 DEC.	•									
OCT., 1972 10 0 260 DEC.	DATE									
10 0 260 DEC.					.00, .,	100, 2,	100/2/	100/1/	100/17	(UU/L)
DEC.	OCT., 19	72								
DEC.		0								260
12 2 640										
	12	2			·					640

			SPE-						
			CIFIC						
			CON-		_		ALKA-	C 4 0 0 0 N	
			DUCT-		BICAR-	CAR-	LINITY	CARBON	T. F. W. D. F. O.
		015-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE	11	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OCT., 19	72 1315		130	7.9	36	D	30	.7	8.0
	1312								
DEC.	1115		110	6.9	34	0	28	6.8	•0
12	1117								
		•	D15-						
		D15-	SOLVED		NON-	DIS-			TOTAL
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	
	SOLVED	CAL-	NE-	HARD-	BCNATE	ALUM-	TOTAL	SCLVED	CAO-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MEUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL) _	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(MO/L)	(HO/C)	(1.07.27						
OCT., 19				38	8				
10		13	1.4	30	•				
DEC.				33	5				
12		11	1.5	33	_				
	DIS-		D15-						DIS-
	SOLVED	TOTAL	SCLVED		-210		DIS-		SOLVED
	CAD-	CHR O-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVEO	TOTAL	
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON (FE)
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	070								
OCT., 1	912						2		.20
10	•								
DEC.	6						3		20
12	•								
				-21g				DIS-	
		DIS-	TOTAL	SOLVED		D18-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOL YB -	MOLY8-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM		NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
D									
OCT., 1	972	12		70		.0			
10		12		, ,					
DEC.		• •		50		.0			
12		13		,,,			_	-	
			DIS-			TOTAL	DIS-		DIS-
	DIS-	TOTAL	SOLVED		D1 S-	TOTAL	VANA-	TOTAL	SOLVED
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	DIUM	ZINC	ZINC
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM		(ZN)	(ZN)
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V) (UG/L)		
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(00/1)	(00/1/	100, 27
067	072								. 890
OCT., 1	1912								. 690
10 DEC.	v								1600
UEC.									1000

375424106571600 - W WILLOW C AB NORTH CREEDE, CO - RG-8

			SPE- CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(02)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OCT., 19	72						• •		
10	1530		140	7.8	43	• 0	35	1.1	9.0
JUNE + 19									
07	0920		70	7.0	26	0	21	4.2	2.5
			DIS-						
		DIS-	SOLVED		NON-	-210			
	D15-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NE SS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(2012)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
10		13	1.3	37	2				
JUNE, 19			_		2			•	
07		7.9	•9	23	2				<10
	D1 S-		DIS-						•
	SOLVED	TOTAL	SOLVED		DIS-		015-		DIS-
	CAD-	CHRO-	CHRU-	TGTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	72								
10	0						1		40
JUNE, 19									
07	0					<10	9	190	50
				DIS-				D15-	
		-210	TOTAL	SOLVEO		D15-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SCLVEO	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
•	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972					*			
10		0		0		.0			
JUNE, 19									
07	<100	2	10	0		.4			<25
			DIS-				DIS-		
	DIS-	TOTAL	SOLVED		-21G	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V) ,	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19									
10	1								20
JUNE, 19								2.5	20
07	7							20	20

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH'	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
OCT., 197	72 1705		100	7.9	46	0	38	.9	9.5
DEC. 12	1335		_~ 100	7.1	48	0	39	6.1	•0
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
OC T 19	72	8.9	1.4	28	0				
10 DEC.			2.0	38	0				
12		12	2.9	20	Ū				
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/E)	DIS- SOLVED CHRO- MIUM (CR) {UG/L}	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (fe) (ug/l)	DIS- SOLVEO IRON (FE) (UG/L)
OCT., 1°							1		70
10 DEC.	0						Ř.+		
12	0						3		70
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANE SE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 1	972					.1			
DEC.		2		10					
12		2		20		.1			
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	OIS- SOLVED SELE- (SE)	TOTAL SILVER (AG)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) {UG/L}	TOTAL ZINC (ZN)	DIS+ SOL VEO ZINC (ZN) (UG/L)
act., I									. 10
10	0			·					
DEC. 12	2		. '						30

\$

OURAY STUDY AREA

380448107420800 - UNCOMPAHGRE R AB CUTLER C NR OURAY, CO - UR-1

17000	23							630	250
DEC., 19	_								
DEC . 10	77			,	.007.27	106/1/	(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(V) (UG/L)	(V)	(ZN)	(ZN)
	(NI)	(SE)	(SE)	(AG)	SILVER (AG)	DIUM	DIUM	ZINC	ZINC
	NICKEL	NIUM	NIUM Sele-	TOTAL SILVER	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	SOLVED	SELE-	SOLVED SELE-	TOTAL	DIS-	TOTAL	SOLVED		DIS-
	DIS-	TOTAL	-210				DIS-		
		,		530					130
14	300	3	610	530					
DEC., 19	972						,	.00, 2,	.00/[/
UAIC	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(NI)
DATE	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	NICKEL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	TOTAL
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	SOLVED MOLYB÷	70744
		DIS-	TOTAL	DIS- SOLVED		DIS-	TOTAL	D15-	
17	2					160	7	3800	9
DEC., 1	-								
		-	· · - ·		100/1	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(Ca)	((CU)	(FE)	(FE)
	(CD)	(CR)	(CR)	(00)	(CO)	COPPER	COPPER	IRON	IRDN
	MIUM	MIUM	MIUM	COBALT	SOL VED COBALT	TOTAL	SOLVED	TOTAL	SOLVED
	CAD-	CHRO-	CHRO-	TOTAL	20175	76741	DIS-		D1S-
	SOLVED	TOTAL	SOLVED		015-				
	-21 0		DIS-						
14		120	4.9	320	280				40
	_			•					
DEC. 1	073					100/[/	(06/1)	(UG/L)	(UG/L)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(AS) (UG/L)	(AS)	(CD)
	(2105)	(CA)	(MG)	(CA.MG)	NESS	(AL)	ARSENIC	ARSENIC	MIUM
	SILICA	CIUM	SIUM	NESS	HARD-	ALUM- Inum	TOTAL	SOLVED	CAD-
	SOLVED	CAL-	NE-	HARD-	BONATE			DIS-	TOTAL
	-21G	SOLVED	MAG-		NGN- CAR-	DIS- SOLVED			
		015-	DIS- SOLVED		NCM				
				0.5	,,,	0	41	25	2.0
14	1130		700	6.5	50	•			
DEC., 1	1972			-			1176767	(MG/L)	(DEG C)
CATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	CACO3 (MG/L)	(02)	ATURE
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	AS CACOZ	DIOXIDE	TEMPER-
		DIS-	ANCE	PH	BONATE	BONATE	LINITY	CARBON	
			DUCT-		BICAR-	CAR-	ALKA-		
			CON-						
			CIFIC						•
			SPE-						

			SPE-						
			CIFIC						
			CON-		BICAR-	CAR-	ALKA- LINITY	CARRON	
		015-	DUCT- ANCE	PН	BONATE	BONATE	AS	CARBON Dioxide	TEMPER-
	T 1 MC	DIS- Charge	IMICRU-	РП	(HCD3)	.(CO3)	CACD3	(002)	ATURE
0475	TIME	(CFS)	PHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DATE		(CF3)	FH021	(00113)	(,40) [)	(1,0) (,)	(110) [(1407.67	1000 07
DEC., 19						_			
14	1245		. 800	7.0	55	0	45	8.8	7.0
			015-						
		DIS-	SOLVED		NON-	-21G			
	D1 S-	SOLVED	MAG-		CAR-	SOLVED		CIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BCNATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(5102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	972								
14		140	5.3	370	320				50
	D1 S-		DIS-				D. C.		010
	SOL VED	TOTAL	SOLVED		D15-	TOT 41	DIS-	TOTAL	DIS- SOLVED
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL Iron	IRON
	MIUM	MIUM	MUIM	COBALT	COBALT	COPPER	COPPER	(FE)	(FE)
	, (CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	106/17	106717
DEC., 19									
14	1					150	40	3700	60
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		D15-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(N1)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 1	972								
14	300	4	580	540					150
			DIS-		0.10	TOTAL	DIS-		-210
	DIS-	TOTAL	SOLVED	****	-210	TOTAL	SOLVED	TOTAL	
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL Z INC	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	_	(ZN)
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V) (UG/L)	(ZN) (UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(06/1)	106/L/	100/1/
DEC., 1	972						•	500	440

09145500 - CANYON C AT OURAY, CO - UR-3

			SPE-						
			CIFIC CON-						
			DUCT-		BICAR-	CAR-	ALKA-		
		D15-	ANCE	PH	BONATE	BONATE	LINITY	CARBON	
	TIME	CHARGE	(MICRO-	• • • •	(HCO3)	(CO3)	AS	DIOXIDE	TEMPER-
CATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	CACO3	(CO2)	ATURE
				10.1111	11107 27	(HO/L)	(MG/L)	(MG/L)	(DEG C)
DEC., 1									
14	* 1420		650	7.6	77	0	63	3.1	
						·	0,	3.1	1.0
			-210						
		DIS-	SULVED		NON-	DIS-			
	-21D	SOLVED	MAG-		CAR-	SOLVED			
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	DIS-	TGTAL
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	SOLVED	CAD-
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	ARSENIC (AS)	MTUM
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(CD)
						100, 2,	100, 6,	(00/17	(UG/L)
DEC., 1	972								
14		130	3.5	340	280				
	D15-		DIS-						
	SOLVED	TOTAL	SOLVED		-21D		DIS-		-210
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOFAED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UGŽL)
									,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
DEC., 19									
14	1						4		20
				-21G				015-	
		DIS-	TOTAL	SOLVED		-21d	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLY8-	MOLY8-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(PB) (UG/L)	(P8)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
UAIL	(00/6)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	72								
14		29		150					
				150					
			DIS-				DIS-		
	DIS-	TOTAL	SDLVED		DIS-	TOTAL	SDLVED		
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	015-
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	SOLVED
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
					-	· •			.00, .,
DEC., 19	-								
14	2					· 			190

380007107413600 - CANYON C BL SQUAW GULCH NR OURAY, CO - UR-4

DEC 3	.972								220
DATE	(NI) (UG/L)	(SE) (UG/L)	(SE) (UG/L)	(AG) (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V) (UG/L)	(UG/L)	(UG/L)
	SOL VED NICKEL	SELE- NIUM	SELE- Nium	TOTAL SILVER	SILVER	DIUM	DIUM	Z INC	ZINC (ZN)
	DIS-	TOTAL	SOLVED		DIS- SDLVED	TOTAL Vana-	SOLVED VANA-	TOTAL	DIS- SOLVED
			D1S-				DIS-		2.5
DEC., 1 15	972 - -	48		160					
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	106/11	(00/6/	1037 [7
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO) (UG/L)	(MO) (UG/L)	(N1) (UG/L)
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	TOTAL	DIS- SOLVED	TOTAL Man-	SOLVED MAN-	TOTAL	DIS- SOLVED	TOTAL MDLYB-	SOLVED MOLYB-	TOTAL
				DIS-				-210	
DEC., 1'	972 1						2		20
DATE	(CD)	(CR) (UG/L)	(CR) (UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	MIUM	MIUM	MIUM	COBALT (CO)	COBALT (CO)	COPPER (CU)	COPPER (CU)	(FE)	(FE)
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL Iron	SOLVED Iron
	DIS- SOLVED	TOTAL	DIS- SOL VED		015-		DIS-	TOT	DIS-
DEC., 19	972	130	3.0	340	280				'
DATE	(MG/L)	(MG/L)	(MG/L)	(10/6/	11.07 € 7	100/2/	,		
	(SID2)	(CA) (MG/L)	(MG) (MG/L)	(EA,MG) (MG/L)	NESS (MG/L)	(AL) (UG/L)	(AS) (UG/L)	(AS) (UG/L)	(CD) (UG/L)
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	DIS- SOLVED	SOL VED	MAG- NE-	HARD-	CAR- BGNATE	SOLVED ALUM-	TOTAL	SCLVED	CAD-
		015-	DIS- SOL VED		NON-	015-		015-	TOTAL
DEC., 19	72 1220	16	500	7.4	67	0	55	4.3	•0
CATE	TIME	CHARGE (CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
		015-	DUCT- ANCE (MICRO-	РН	BICAR- BONATE (HCO3)	CAR- BONATE (CO3)	LINITY AS CACO3	CARBON DIOXIDE (CO2)	TEMPER-
			CIFIC. CON-				ALKA-		
			SPE-						

375808107433600 - IMOGENE C AT MOUTH AT CAMP BIRD, CO - UR-5

DATE	TIME	DIS- Charge (CFS)	SPE- C1F1C CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
DEC., I	972							***************************************	.020 07
14	1600		170	7.3	43	0	35		
						Ū	,,,	3.4	
			D15-						
		-21G	SOLVED		NON-	D15-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	CAD-
	(\$102)	(CA)	(MG)	(CA, MG)	NESS	(AL)	(AS)	(AS)	MIUM
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(ÚGŽL)	(UG/L)	(UG/L)	(CD) (UG/L)
056	070							100727	100727
DEC., 1		25							
14		25	1.5	69	34			- -	
	015-								
	SOLVED	TOTAL	D12-						
	CAD-	CHRO-	SOLVED	TOTAL	DIS-		-21D		DIS-
	MIUM	MIUM	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	(60)		MIUM	COBALT	COBALT	COPPER	CDPPER	IRON	IRON
DATE	(UG/E)	(CR) (UG/L)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DA11	100.27	10671	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC 1	972								
14	1						8		50
							· ·		30
				DI 5-				DIS-	
		D1S-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLY8-	MOLY8-	TOTAL
	LEAD	LEAD	GANESE	GANE SE	MERCURY	MERC URY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	972								
14		6		0					
		Ū		U					
	DIS-	TOTAL	SOLVED DIS-		0.1.6		DIS-		
	SOLVED	SELE-	SELE-	TOTAL	DIS-	TOTAL	SOLVED		DIS-
	NICKEL	NIUM	NIUM	SILVER	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	(NI)	(SE)	(SE)		SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(UG/L)	(UG/L)	(UG/L)	(AG) (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V) (UG/L)	(ZN)	(ZN)
				. 507 27	100/1	100/6/	(UG/L)	(UG/L)	(UG/L)
DEC., 19									
14	,			_					

375818107434000 - SNEFFELS C AT MOUTH AT CAMP BIRD, CO - UR-6

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
DEC., 19	72 1130		200	7.3	48	0	39	3.8	•0
15	1130		200						
DATE	DIS- SCLVED STLICA (S102) (MG/L)	DIS- SOLVED CAL+ CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NCN- CAR- BONATE HARD- NESS (MG/L)	DIS- SULVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
DEC., 19	72								
15		37	2.8	100	61				
DATE DEC., 1° 15	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/I)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	(UG/L)	TOTAL NICKEL (NI) (UG/L)
DEC 1	972								
15		2		10					
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM- (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- Dium (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
DEC., 1	972								170
15	1								1.0

375732107394000 - RED MOUNTAIN C AB CRYSTAL LK NR IRONTON. CO - UR-8

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)		ALKA- LINITY AS (CACD3) (MG/L)	CARBON DIOXIDE (CO2)	TEMPER- ATURE
DEC., 19	72					(, [.]	(1107 [7	(MG/L)	(DEG C)
15	1540		950	3.4	•				
			,,,,	J.4	0	0	0	•0	•0
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)		OIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA+MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CO) (UG/L)
DEC., 19	72								
15									50
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
DEC., 197	2								100, 2,
15						800		24000	
DATE DEC., 197.	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
15	300		250D						
			-						180
DATE	DIS- SOLVED NICKEL (NI)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- Dium (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
DEC., 1972	2							(00, 2)	100/17
15								2500	

DATE	TIME	DIS- Charge (CFS)	SPE- CIFIC CDN- DUCT- ANCE (MICRD- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
							(1107)	1867[]	IDEC ()
DEC., 1	1445		950	2.2	_	_			
17	1445		950	3.3	0	0	0	•0	1.0
			DIS-						
		DIS-	SOLVEO		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		D15-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UĠ/L)	(UG/L)	(UG/L)
DEC., 1	972								
15		120	9.2	340	340				60
									_
	DIS-	TOT 41	DIS-						
	SOLVED CAD-	TOTAL CHRO-	SOLVEO		DIS-		DIS-		DIS-
	MIUM	MIUM	CHRO- Mium	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	(CD)	(CR)	(CR)	CORALT (CO)	COBALT	COPPER	COPPER	IRDN	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(CO) (UG/L)	(CU) (UG/L)	(CU)	(FE)	(FE)
			,,,,,	100727	100727	106717	(UG/L)	(UG/L)	(UG/L)
DEC., 1									
15	30					1300	1400	49000	32000
				DIS-				DIS-	
		DIS-	TOTAL .	SOLVED		D1 S-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MC)	(MD)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	972								
15	400	140	2600	270D					180
	•								100
			DIS-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(NI) (UG/L)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	' (ZN)	(ZN)
DHIE	100/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19								-	
15	50							35.00	3500

375422107422600 - RED MTN C NR SOURCE AT RED MOUNTAIN. CO - UR-10

			SPE- CIFIC CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		D15-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DEC., 19	72								
16	1020		110	7.2	31	0	25	3.1	•0
-								_	
			D15-						
		DIS-	SOLVED		NON-	D12-			
	-21G	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOL VED	CAL-	NE -	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA, MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	972								
16		16	. 8	43	18				50
	DIS-		D15-						
	SOLVED	TOTAL	SULVED		D1 S-		D15-		D15-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SDLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	{ CR }	(CR)	(CD)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	972								
16	0					20	19	60	190
10	Ū					20	• • •	00	170
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(1N)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	972				•				
16	200	3	20	10					100
20000	200	-		••					100
			DIS-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVEO	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 1						_	_	20	30

375916107385400 - UNCOMPAHGRE R AB RED MIN C NR CURAY, CO - UR-11

CATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
DEC., 197	72 0825		230	7.0	53		43	8.5	•0
16	0829		2,50						
DATE	DIS- SCLVED SILIGA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	GIS- SGLVED MAG- NE- SIUM (MG)	HARD- NESS (CA,MG) (MG/L)	NCN- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SÜLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
DEC., 19	72			120	77				30
16		44	2.9	120	" "				
DATE	DIS- SDLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRDN (FE) (UG/L)
DEC., 19	972					20	10	160	120
16	1					20	10	100	
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
DEC., 1	972								100
16	200	7	120	120					
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	NIUM (SE)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVEO VANA- DIUM (V)· (UG/L)	TOTAL ZINC (ZN)	DIS- SOLVED ZINC (ZN) (UG/L)
DEC., 1	972		- -	-				240	280

ALAMOSA CREEK STUDY AREA

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS (CACO3) (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
OCT., :	1972 1015		320	6.9	22	. 0	18	4.4	11.5
	DIS- SDLVED SILICA (SIO2)	DIS- SOLVED CAL- CIUM (CA)	DIS- SOLVED MAG- NE- SIUM (MG)	HARD- NESS	NON- CAR- BONATE HARD-	DIS- SOLVED ALUM- INUM	TOTAL Arsenic	DIS- SOLVED ARSENIC	TOTAL CAD- Mium
DATE	(MG/L)	(MG/L)	(MG/L)	(CA,MG) (MG/L)	NESS (MG/L)	(AL) (UG/L)	(AS) (UG/L)	(AS) (UG/L)	(CO) (UG/L)
OCT., 1	972								
05		33	5.3	100	82				20
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
OCT., 1									
05	0					20	8	140	20
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SDLVED MAN- GANESE (MN)· (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- OENUM (MO) (UG/L)	DIS- SOLVED MDLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 1									
05	200	2	80	50					75
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SDLVED SILVER (AG) (UG/L)	TOTAL VANA- Dium (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL Zinc (Zn) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT., 1 05	972 6							40	30

			SPE- CIFIC CON-		21612	CAR-	ALKA-	CARRON	
		0.5	DUCT-	PĤ	BICAR- BONATE	BONATE	LINITY	CARBON DIOXIDE	TEMPER-
	TIME	DIS- Charge	ANCE (MICRO-	PH	(HCO3)	(03)	CACO3	(CO2)	ATURE
DATE	IIME	(CFS)	MHGS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DATE		(0, 3)	,						
001., 1	972								
04	1320	12	320	7.2	22	0	18	2 • 2	12.0
			D15-						
		DIS-	SOL VED		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	C AD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
<i>U</i>	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		•						
OCT., 1	972								
04		38	5.9	120	100				30
	DIS-		DIS-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		DIS-
	CVD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	CO8ALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1						40	17	240	20
04	0					40		2.0	
				D15-				DIS-	
		DIS-	TOTAL	SOLVED	·	-21g	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(00/2/	100/2/	(00/2/	100727					
OCT.,	1972								
04	200	2	210	190					100
			DIS-				015-		
	DIS-	TOTAL	SOL VED		D15-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NECKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT.,	1972							70	50

372418106270600 - ALAMOSA C AB CASTLEMAN GL NR JASPER, CO - AL-3

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BDNATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS (CACO3) (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
OCT., 19 04 05	972 1620 1140		380 160	5.2 6.2	4 2	0	3 2	40 2.4	11.0 7.0
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
0CT., 19 04 05	772	44	6.8	140	140			 	
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CD) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/I.)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
0CT., 19 04 05	10 	 	==			180	200	1700	3200
DATE	TDTAL LEAD (P8) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SDLVED MDLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (N1) (UG/L)
OCT., 19 04 05	200	4	 490	460 				==	 150
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TDTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SDLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN). (UG/L)
OCT., 19 04 05	25 							100	140

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CD2) (MG/L)	TEMPER- ATURE (DEG C)
OCT., 19	72								
05	1220		260	5.3	4	0	3	32	8.0
. DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BCNATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- Mium (CD) (UG/L)
OCT., 19	972							-	
05		30	4.6	94	. 91				
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
OCT., 19	972								
05	3						1300		320
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVEO LEAD (PB) (UG/L)	TOTAL MAN- Ganese (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL Mercury (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 19	972								
05		2		470					
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT., 19				_:_					540

372553106355600 - WIGHTMAN F ALAMOSA C AT SUMMITVILLE. CO - AL-5

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON ©10×1DE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
007	272								
OCT., 19	1815		130			_			
0,	1017		130	6.7	11	0	9	3.5	9.5
	OIS- SGLVED SILICA (SIO2)	DIS- SOLVED CAL- CIUM (CA)	DIS- SOLVED MAG- NE- SIUM (MG)	HARD- NESS (CA+MG)	NON- CAR- BONATE HARD- NESS	DIS- SOLVED ALUM- INUM (AL)	TOTAL ARSENIC (AS)	DIS- SCLVED ARSENIC (AS)	TOTAL ·CAD- Mium (CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1	072								
05	712	8.0	2.0	28					
0,,,,,		0.0	2.0	20	19				
	DIS-		015-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	D15-
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER		SUL VED
	(CD)	(CR)	(CR)	(CO)	(00)	(CU)	(CU)	IRON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(FE) (UG/L)	(FE)
						100,2,	100/2/	(06/1)	(UG/L)
OCT., 19									
05	0						90		100
				0.00					
		DIS-	TOTAL	DIS- SOLVED				DIS-	
	TOTAL	SOLVED	MAN-	MAN-	TOT 4.1	DIS-	TOTAL	SOLVED	
	LEAD	LEAD	GANESE	GANE SE	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	(PB)	(PB)	(MN)	(MN)	MERCURY (HG)	MERCURY	DENUM	DENUM	NICKEL
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(HG) (UG/L)	(MO)	(MO)	(NI)
			100/2/	100/2/	100767	(06/11	(UG/L)	(UG/L)	(UG/L)
OCT., 19	772								
05		t		190					
									•
			D15-				D15-		
	DIS-	TOTAL	SOLVED		-21 0	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(N)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	72								
05	3								
	,								140

DATE	TIME	DIS- CHARGE (CFS) '	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE . (DEG C)
OCT., 19	72								
05	1310		140	6.6	10		8	4.0	8.5
··	DIS- SOLVED SILICA (SIO2)	DIS- SOLVED CAL- CIUM (CA)	DIS- SOLVED MAG- NE- SIUM (MG)	HARD- NESS (CA+MG)	NON~ CAR- BONATE HARD- NESS	DIS- SOLVED ALUM- INUM (AL)	TOTAL ARSENIC (AS)	DIS- SOLVED ARSENIC (AS)	TOTAL CAD~ MIUM (CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
05	772	12	2.2	39	31				
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRD- MIUM (CR) (UG/L)	DIS- SOLVED CHRŬ- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TGTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS+ SOLVED IRON (FE) (UG/L)
OCT., 19	972						• •		620
05	0						14		620
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANE SE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TCTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 1	972	1		170					
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT 1	972								

372341106330500 - BITTER C AT MOUTH NR JASPER. CO - AL-64

			SPE-						
			CIFIC						
			CON-				ALKA-		
		DIS-	DUCT-		BICAR-	CAR-	LINITY	CARBON	
	TIME		ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
DATE	LIME	CHARGE	IMICRO-		(HCO3)	(CD3)	CACO3	(CO2)	ATUR E
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OCT., 19	972								
05	1355		600	3.3	0	0	0	•0	9.0
					-	Ū	Ü	•0	7.0
			DIS-						
		D15-	SCLVED		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		015-	TOTAL
	SOLVED	C AL -	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA, HG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
05		32	9.7	120	120				
03		32	7. 1	120	120				
	DIS-		DIS-						
	SOLVED	TOTAL	SOLVED		D15-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	
	(CD)	(CR)	(CR)	(00)	(CO)	(CU)	(CU)	(FE)	IRON (FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19									
05	1						60		17000
				D12-				DIS-	
	TOTAL	D15-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	LEAD	SOLVEO LEAD	MAN-	MAN-	TOTAL	SCLVED	MOLYB-	MOLYB-	TOTAL
	(PB)	(PB)	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(UG/L)	(UG/L)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
UNIC	100727	100/27	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972				-				
05		8		1300					
	DIS-	TOTAL	DIS-				DIS-		
	SOLVED	TOTAL SELE-	SOLVED	TOTAL	DIS-	TOTAL	SOLVED		DIS-
	NICKEL	NIOW SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	(NI)	(SE)	NIUM (SE)	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(UG/L)	(UG/L)	(UG/L)	(AG)- (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V)	(ZN)	(ZN)
-		.00, 2,	100/2/	100717	106/6/	(06/1)	(he\r)	(UG/L)	(UG/L)
OCT., 19									
05	50								130

372306106335700 - ALUM C AT MOUTH NR JASPER, CO - AL-68

			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	****		IMICRO-	rn	(HC03)	(603)	CACO3	(CO2)	ATURE
	TIME	CHARGE (CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DATE		(CF3)	MNO31	(0/11/3)	(11072)	(11072)		(,	
OCT., 19	72						_	_	
05	1440		2000	2.7	0	0	0	.0	12.5
			D15-			0.1.6			
		DIS-	SOLVED		NON-	015-			TOTAL
	DIS-	SOLVED	MAG-		CAR-	SDLVED	TOT 41	015-	TOTAL CAD-
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	WIUM
	(\$102)	(CA)	(MG)	(CA, MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	972								
05		63	28	270	270				
0,,,,			- -	_					
	D15-		DIS-						
	SOLVED	TOTAL	SOLVED		D1S-		D1S-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUH	MIUM	COBALT	COBALT	COPPER	COPPER	I RON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	22								
05	20						270		170000
V 2									
				DIS-				D15-	
		DIS-	TOTAL	SOLVED		D15-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANE SE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(AN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
					•				
OCT., 1	972	. 1		5700					
05	,	•		3.00					
			DIS-				D15-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		D1 S-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SDLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1									940
05	100								, , , ,

372253106360800 - IRON C NR MOUTH NR JASPER. CO - AL-7

05	8			'					50
OCT 19	172							,	.00, 2,
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ÚG/L)	(UG/L)	(UG/L)	(UG/L)
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	ZINC (ZN)
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	MUIC	TOTAL Zinc	SOLVED
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	DIS-
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	DIS- SOLVED		016
			DIS-						
0,		6		360		 .			
05	,,,,	,		3					
OCT 19	177							-	
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	(P8)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MD)	(NI)
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	****	D15-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
				D15-				DIS-	
05	10						10		1200
OCT., 19									
	,	.00,21	.00,2,	100767	(00/1)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UGZE)	(UG/L)	(UG/L)	(CU)	(CU)	(FE)	(FE)
	(CD)	(CR)	(CR)	(004)	COBALT (CO)	COPPER	COPPER	IRON	IRON
	MIUM	MIUM	MIUM	COBALT	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	CAD-	CHRO-	CHRO-	TOTAL	DIS-	TOT41	DIS-		DIS-
	SOLVED	TOTAL	SOLVED		DIS-		DIC		
	DIS-		DIS-						
					-		-		
05		12	2.7	41	41				
OCT., 1	972								
		•		,	,,	100/6/	(00/1)	(06/1)	(UG/L)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(CD)
	(5102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	MIUM
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	CAD-
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	TOTAL
	D15-	SOLVED	MAG-		CAR-	SOLVED		DES-	TOTAL
		DIS-	SCLVED		NON-	D15-			
			-210						
03	1320		180	4.4	0	0	0	•0	10.0
OCT., 1 05	1520		• • •						
057									
CATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
	TIME	CHARGE	IMICRO-		(HCO3)	(003)	CACO3	(002)	ATURE
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
			CON-				ALKA-		
			CIFIC						
			SPE-						

	TIME	DIS- CHARGE	SPE- CIFIC CON- DUCT- ANCE (MICRO-	PH	BICAR- BONATE (HCO3)	CAR- BONATE (CO3)	ALKA- LINITY AS CACO3	CARBON DIOXIDE (CO2)	TEMPER-
CATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
007., 1				7.0	22	0	18	3.5	8.5
C5	1710		90	7.0	22	•	10	,,,	0.0
			-210						
		D15-	SOLVED		NON-	D1 S-		0.16	TOTAL
	D15-	SOLVED	MAG-		CAR-	SOLVED		015-	CAD-
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	MIUM
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	(CD)
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1	972								
05		5.7	•6	17	0				
			0.10						
	DIS-		DIS-		DIS-		DIS-		DIS-
	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	CAD-	CHRO-	C!!RO- MIUM	COBALT	COBALT	COPPER	COPPER	1 RDN	IRON
	MIUM	MIUM		(CO)	(00)	(CU)	(CU)	(FE)	(FE)
0.4.7.5	(CD) (UG/L)	(CR) (UG/L)	(CR) (UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(06/17	100727	,00	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
OCT., 1	1972								200
05	0						4		200
				CIS-				015-	
		D15-	TOTAL	SOLVED		DIS-	T OT AL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	{ HG }	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OC T	1972								
05		3		40					
			015-				D15-		
	015-	TOTAL	SOLVED		· D1S-	TOTAL	SOLVED		015-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	Z INC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)		(UG/L)	(UG/L)	(UG/L)	(UG/L)
	1072								
OCT • •	1417								. 0

372213106383300 - TREASURE C AB PROSPECT C NR JASPER, CO - AL-9

			SPE+ CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HC03)	(003)	CACO3	(002)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
54.5		10.37	1111037	(011113)	(11072)	(1107)	(107)	(11071)	1000 01
OCT 1	972								
05	1610		85	7.1	28	0	23	3.6	8.5
			0,5		20	Ū	2.3	J.0	0.7
			DIS-						
		DIS-	SOL VED		NON-	DIS-			
	· cis-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE+	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	HIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(ÚGŽL)	(UG/L)	(UG/L)	(UG/L)
				, . ,		100727		100,2,	100727
OCT., 1	972								
05		7.0	1.0	22	0				
	D12-		D15-						
	SOLVED	TOTAL	SOLVED		-21d		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	1 RON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1									•
05	0						6		80
				DIS-				DIS-	
		015-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLY6-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
								•	
OCT., 1	912	4							
05		4		10					
			DIS-				D15-		
	-210	TOTAL	SOLVED		DIS-	TOTAL	SOLVEO		D15-
	SOLVED	SELE-	SELE~	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	Z INC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1									
05	3								. 10

LAKE CREEK STUDY AREA

390444106174900 - LAKE C @ STATE HWY 82 BL TWIN LAKES RE. CO - LC-1

			SPE- CIFIC						
			CON-		BICAR-	CAR-	ALKA- Linity	CARBON	
		-210	DUCT- ANCE	PН	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(OEG C)
OCT., 19	72								
29	1110	10	80	7.0	29	0	24	4.6	6.0
JUNE, 19				7.0	24		21	2.4	11.0
22	0900		80	7.2	26	0	21	2.6	11.0
			D15-						
		DIS-	SOLVED		NON-	D18-			
	D1S-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD- Mium
	SILICA	CIUM	SIUM	NESS	HARD- NESS	INUM (AL)	ARSENIC (AS)	ARSENIC (AS)	(00)
DATE	(SIO2) (MG/L)	(CA) (MG/L)	(MG) (MG/L)	(CA,MG) (MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(MO/L)	(MG/L)	(MO/L)	THOTE	1110/11	(00, 2,	100717	100727	100727
OCT., 19				_					
29		10	1.3	30	6				30
JUNE, 19	773	11	1.4	33	12				<10
22		11	1.4	23	12				110
	DIS-		D15-						
	SOLVED	TOTAL	SOLVED		D15-		D1 S-		D1 S-
	CAD-	CHRO-	CHRD-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	{UG/L}	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19									
29	0					20	6	240	30
JUNE, 19	973			7.2		10	8	180	30
22	U					10		100	30
•				D15-				DIS-	
		D1 S-	TOTAL	SOLVED		D15-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLY8-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY (HG)	MERCURY (HG)	DENUM (MO)	DENUM (MO)	NICKEL
	(PB)	(PB)	(MN)	(MN) (UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(00/1)	(00/1)	100727	100/11	100/ [/	100,27
OCT., 19				_					100
29	∫ 200	0	20	0					100
JUNE, 19	97,3 . <50	0	10	0					<25
	-						0.1.0		
		70741	DIS-		DIS-	TOTAL	SOLVED		015-
	DIS-	TOTAL	SOLVED	TOTAL	SOF AED	VANA-	ANNA-	TOTAL	SOLVED
	SOLVED	SELE- NIUM	SELE- NIUM	TOTAL SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(٧)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ÙĠ/L)	(ÚG/L)	(UG/L)	(UG/L)
067	072								
29	972							30	10
JUNE, 19								50	
22	ı							40	20

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE {DEG C}
OCT., 19	72								
29	1345	31	120	7.1	34	0	28	4.3	1.5
JAN., 19	0930	13	80	7.0	31		25	5.0	•0
MAR.	1030	12	160			•			
JUNE JUNE	1030		100	6.8	31	0	25	7.9	•0
22	1000	7 77	<50	7.6	19	0	16	.8	4.5
DATE	DIS- SOLVED SILICA (S102) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA+MG) (MG/L)	NON- CAR- 80NATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
OCT., 19	772	14	2.0	43	15				30
JAN., 19	73								
06 Mar.		16	2.6	51	26				40
03 JUNE		19	2.7	59	34				<10
22		8.3	•9	24					<10
DATE	OIS+ SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CD) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
OCT., 19	0					40	7	550	60
JAN., 19	973 0					40	14	240	. 30
MAR. 03	0					20	10	280	70
JUNE 22	0	*-				20	18	1100	80
DATE	TOTAL LEAD (PB) (UG/L)	DIS+ ¬ SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANE SE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 19	200	1	20	20					100
JAN., 19	200	2	30	0					50
MAR. 03	<100	0	20	20					<50
JUNE 22	<50	0	20	o					(25)
DATE	DIS- SOLVED NICKEL (NI)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL S1LVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL Zinc (Zn) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT., 19									
29 JAN., 19	2 973				~-			30	0
06 MAR.	2							40	20
03 JUNE	7							30	30
22	2							140	20

CATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CU3) (MG/L)	ALKA- LINITY AS CACU3 (MG/L)	CARBON DIGXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
NOV., 19	72								
01	0940		120	7.4	34	0	28	2.2	.0
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	GIS- SOLVED CAL- CIUM (CA)-	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
NOV., 19	72								
01		9.7	1.6	31	3				20
DATE NOV., 19		TOTAL CHRD- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SDLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
01	0					20	J	110	
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
NOV., 19									150
01,	100	2	0	10					130
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- Nium (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
NOV., 1	972 1							30	0

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR+ BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
OCT., 19	72 1415	8.5	200	5.1	2	0	2	25	.0
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
OCT., 19	72 	17	3.4	56	54				10
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SGLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
OCT., 1						170	140	4400	1100
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB)	GANESE (MN)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS+ SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- Denum (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 1	972 200	a	90	90					130
31	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL	DIS- SOLVED SELE- NIUM (SE)	TOTAL SILVER (AG)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT., 3			- - -	. 				- 80	60

NORTH CLEAR CREEK STUDY AREA

		015-	SPE- CIFIC CON- DUCT- ANCE	РН	BICAR- Bonate	CAR÷ BONATE	ALKA- Linity As	CARBON DIOXIDE	TEMPER-
DATE	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(602)	ATURE
5416		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
JAN., 1									
24	1620	3.3	520	6.1					•0
JUNE 28	0750	56							•0
20	0750	26	130	6.5	17	0	14	8.6	9.0
			D15-						
		-210	SOLVED		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED			
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM~	TOTAL	DIS-	TOTAL
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	SOLVED	CAD-
	(8102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	ARSENIC (AS)	MIUM
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(CD)
JAN., 1	973							.00,2,	(00) 5 1
24		52	16	200					
JUNE		26	10	200			9	2	10
28		11	3.2	41	27		4	0	<10
	DIS-		DIS-					ŭ	110
	SOLVED	TOTAL	SOLVED		0.0				•
	CAD-	CHRO-	CHRO-	TOTAL	D13-		015-		D1 S
	MIUM	MUIM	MIUM	COBALT	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	(CD)	(CR)	(CR)	(CO)	COBALT	COPPER	COPPER	1 RON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(CO) (UG/L)	(CU)	(CU)	(FE)	(FE)
				100727	100767	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN., 1									
JUNE	8					300	150	9600	5000
28	1								
	-					130	90	1900	1000
				DIS-				DIS-	
	TOTAL	DI S-	TOTAL	SOLVED		-21D	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOL YB-	MOLYB-	TOTAL
	LEAC (PB)	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(UG/L)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	100767	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN., 19	73								
24	100	2	5000	4900					
JUNE									75
28	<100	6	750	710	·				<25
			DIS-				015-		
	D15-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		016
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	015-
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	SOLVED
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	ZINC (ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
IAN., 19	73								
24	50	6	3					2000	
UNE			-		_			2900	2800
28	13	67	27					580	490
									470

LION CREEK STUDY AREA

		015-	SPE- CIFIC CON- DUCT- ANCE	PH	BICAR- BONATE	CAR- BONATE	ALKA- LINITY AS	CARBON DIOXIDE	TEMPER-
DATE	TIME	CHARGE (CFS)	(MICRO- MHOS)	(UNITS)	(HCO3) (MG/L)	(CO3) (MG/L)	CACO3 (MG/L)	(CO2) (MG/L)	ATURE (DEG C)
JAN., I									
29	0945	.20	900	3.2	0	0	0	.0	.0
JUNE 28	1345	3.3			_				
20	1 343	3.3	420	3.3	0	0	0	•0	14.5
			D15-						
		D15-	SULVED		NON-	DIS-			
	D1 S-	SOL VED.	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	. NF-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA, MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN., I	973								
29 JUNE		75	25	290	290				10
28		19	7.1	77	77				<10
	DIS-		DIS-						
	SOLVED	TOTAL	SOLVED		DIS-		0.5		
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	-210		D1 S-
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	SOLVED COPPER	TOTAL	SOLVED
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	IRON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(FE) (UG/L)	(FE) (UG/L)
JAN., 1	973								
29	6					000			
JUNE	_					800	850	4400	4300
28	2					570	600	5800	4900
				0.1.5					1,00
		D1 S-	TOTAL	DIS- SOLVED		0.10		DIS-	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	-21d	TOTAL	SOLVED	
	LEAD	LEAD	GANESE	GANESE	MERCURY	SOL VED MERCURY	MOL YB-	MOLYB-	TOTAL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	DENUM (MO)	DENUM	NICKEL
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(MO) (UG/L)	(N1) (UG/L)
JAN., 1	973								
29	<100	8	11000	12000				_	100
JUNE									180
28	<100	7	2900	3000					25
			DIS-				DIS-		
	-210	TOTAL	SOLVED		-21d	TOTAL	SOLVED		
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	D13-
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	MUID	TOTAL ZINC	SOLVED
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	ZINC
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ZN) (UG/L)
JAN., 19	973								
29	150							860	980
JUNE								860	900
28	25							310	310

			SPE-				سم.		
			CIFIC				•		
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		-210	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
5475	TIME	CHARGE	IMICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	HHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
JAN., 19	773								
29	1215		140	6.7	12	0	10	3.8	3.0
JUNE			140	. 0.7	12	U	10	3.8	3.0
28	1245	E 1.5	<50	6.8	12	0	10	3.0	7.5
			, 120	•••	• -	J	10	3.0	7.5
			D15-						
	~	015-	SOLVED		NON-	012-			
	-210	SOLVED	MAG-		CAR-	SOLVED		015-	70741
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOFAED	TOTAL
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	CAD- MIUM
	(5102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(CD)
				11.07 2	(7107 L)	(00/11	100717	100/17	(OG/L)
JAN., 19	973				•				
29		8.9	1.5	28	18				10
JUNE									
28		2.3	. 4	7	. 0				<10
-									
	015-		D15-						
	SOLVED	TOTAL	SOLVED		015-		D15-		DIS-
•	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MUIM	MIUM	COBALT	COBALT	COPPER	COPPER	1 RON	IRON
DATE	(UG/L)	(CR) (UG/L)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(00/L)	(00/1/	(UG/L)	(nevr)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN., 19	73								
29	0					40	26	530	40
JUNE								,,,,	40
28	0					10	В	140	100
				D15-				D15-	
•	****	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAŁ LEAD	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	(PB)	LEAD (PB)	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(UG/L)	(UG/L)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	100717	(00/1)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN., 19	973								
29	<100	0	50	60					50
JUNE									,
28	<100	3	10	20					<25
					•				
			DIS-				D15-		
	015-	TOTAL	SOLVED		D1S-	TOTAL	SOLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	MUIN	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN 19	73								
29	4			^-				30	20
JUNE	-						_	,0	20
28	2							50	10
	_								10

IDAHO SPRINGS STUDY AREA

DATE	TIME	015- CHARGE (CF5)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH {UNETS}	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
JAN., 197	13		350	6.8	98	0	80	25	.0
24 JUNE	1340		370	•••					
28	1040	E 550	90	6.9	24	0	20	4.8	8.5
	DIS- SOLVED SILICA (SID2)	DIS- SOLVED CAL- CIUM (CA)	DIS- SOLVED MAG- NE- SIUM (MG)	HARD- NESS (CA,MG)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVEO ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(06/1/	100717	100/2/	(55/2)
JAN., 19 24 JUNE	73	32	7.2 1.7	110 26	30 6				10 <10
28		7.8	1.,	20	·				**
	DIS- SOLVED CAD- MIUM (CD)	TOTAL CHRO- Mium (CR)	DIS- SOLVED CHRO- MIUM (CR)	TOTAL COBALT (CO)	DIS- SOLVED COBALT (CO)	TOTAL COPPER (CU)	DIS- SOLVED COPPER (CU)	TOTAL IRON (FE)	DIS- SOLVED IRON (FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN., 19	2			60	3	170	10	6900	40
JUNE 28	1			<25	0	40	20	1600	150
DATE	TOTAL LEAD (PB)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MD) (UG/L)	DIS- SQLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
JAN., 19	973								50
JUNE	<100	0	1400	1400					<25
28	<100	2	400	300					
DATE	DIS- SOLVED NICKEL (NI)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SDLVED VANA- DIUM (V) (UG/L)	TOTAL Z INC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
JAN., 1	973							1000	440
24	20			<10	0			1000	660
JUNE 28	4			<10	1			280	190

			SPE-						
-			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	[MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
JAN., 19			3000	2.8	0	0	0	.0	14.0
24	1455		3000	2.0	U	v	•	••	1.00
JUNE			3400	2 (0	0	0	.0	15.5
28	1020	E1.0	3400	2.6	U	v	·	••	.,,,
			D1S-		NON	D I S-			
•		D1S-	SOLVED		NON-			-DIS-	TOTAL
	015-	SOLVED	MAG-		CAR-	SOLVED	TOTAL		CAD-
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(5102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN., 19	73	240	110	1300	1300				160
24		340	110	1300	1300				100
JUNE				1200	1300				320
28		320	130	1300	1300				320
	nis-		D15-						
	SOLVED	TOTAL	SOLVED		DIS-		D15-		-21G
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
		MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	1RON	IRON
	MIUP		(CR)	(60)	(CO)	(CU)	(CU)	(FE).	(FE)
	(CD)	(CR)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	106/11	106/67	(00/6)	100727	100727	100/2/	
JAN., 19	973								
24	140			220	75	4900	4800	140000	140000
JUNE	-								
28	300			330	330	11000	12000	380000	220000
20000							-		
•				D1S-				-21G	
		DIS-	TOTAL	SOLVED		D15-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANE SE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MD)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
_									
JAN., 19			25000	04000					300
24	100	30	95000	94000					300
JUNE				1.0000					430
28	200	200	150000	140000	,				.50
			016				DIS-		
		TOTAL	015-		DIS-	TCTAL	SOLVED		DIS-
	D1 S-	TOTAL	SOLVED	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	SOLVED	SELE-	SELE-	TOTAL		DIUM	DIUM	ZINC	ZINC
	NICKEL	NIUM	NTUM	SILVER	SILVER '(AG)	(V)	(V)	(ZN)	(ZN)
	(NI)	(SE)	(SE)	(AG)			(UG/L)	(UG/L)	(UG/L)
DATE	(UG/E.)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	100/11	100/ [/	100/27
JAN., 1	973								
24	300			<10	0			45000	45000
JUNE	500			0	-				
28	450			20	0			76000	81000

			SPE- CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
•		-210	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(02)	ATURE
DATE	,	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
JUNE, 1									
28	1050		2100	2.8	0	0	0	.0	14.5
			DIS-						
		DIS-	SCLVED		NON-	D18-			
	D15-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOL VED SILICA	CAL-	NE-	HARD-	BCNATE	ALUM-	TOTAL	SOLVED	CAD-
	(S102)	CIUM {CA}	SIUM (MG)	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
DATE	(MG/L)	(MG/L)	(MG/L)	(CA, MG)	NESS	(AL)	(AS)	(AS)	(CD)
SAIC	170727	140767	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 1	1973								
28		150	71	670	670				350
	DIS-	•	-210						
	SOLVED	TOTAL	SOL VED		-210		DIS-		
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TCTAL	SOLAED P12-	TOTAL	DIS-
	MIUM	MIUM	HIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(00)	(CU)	(00)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 1	1973								
28	350			225	230	8200	8400	89 00	9500
				D15-				DIS-	
		-210	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SCLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(PB) (UG/L)	(PB) (UG/L)	(MN) (UG/L)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(00/6)	100/1	100/11	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 1									
28	<100	22	52000	53000					580
			DIS-				D1S-		
	015-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	MUIG	ZINC	ZINC
	(N1)	(SE)	(SE)	(AG)	(AG)	(A) .	(V)	(ZN)	(ZN)
DATE	(UG/L)	(AC\F)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JUNE, 1	1973								
28	600			10	1			57000	63000

•			SPE-						
			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		D1S-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
•	TIME	CHARGE	IMICRO-		(HC03)	(CO3)	CACO3	(CO2)	ATURE
CATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
1.00	222								
JAN., 19	1545		240			_			
24 JUNE	1343		240	7.0	108	0	89	17	.0
28	1120	E550	90		2.4				
40	1120	2330	90	6.6	26	0	21	10	9.5
			DIS-						
		DIS-	SOLVED		NON-	DIS-	•		
	D1S-	SOLVED	MAG-		CAR-	SOLVED		D. C	
	SOLVED	CAL-	NE-	HARD-	BCNATE	ALUM-	TOTAL	DIS-	TOTAL
	SILICA	CIUM	STUM	NESS	HARD-	INUM	ARSENIC	SGLVED ARSENIC	CAD-
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	MIUM
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(CD)
								100/6/	(UG/L)
JAN. + 19	973								
24		30	6.7	100	11				<10
JUNE 28		8.1			_				
20		8.1	2.0	28	7				<10
	DIS-		015-						
	SOLVED	TOTAL	SOLVED		DIS-		0.16		
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	DIS- SOLVED	TOT	D15-
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	TOTAL	SOLVED
	(CD)	(CR)	(CR)	(CO)	(60)	(CU)	(CU)	IRON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(FE) (UG/L)	(FE)
								100/27	(UG/L)
JAN., 1									
24	1			60	2	60	30	440	400
JUNE									
28	2			· <25	0	20	40	1600	150
				D. C.					
		DIS-	TOTAL	DIS- SOLVED				DIS-	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	DIS- SOLVED	TOTAL Molyb-	SOLVED	TOT
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	MOLYB- DENUM	TOTAL Nickel
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MD)	(MD)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
								100, 2,	100,2,
JAN., 19							•		
24	<100	3	410	760					50
JUNE	4.00	_							
28	<100	2	340	. 300					<25
			D1S-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SCLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM'.	NTUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(2N)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ÚĞ/L)	(UG/L)
JAN., 19					_				
24 JUNE	15			<10	0			360	410
28	11			<10	1	<u></u>	_	210	200
20				<10	1			210	290

FRENCH GULCH STUDY AREA

			SPE-			•			
			CIFIC						
		•	CON-				ALKA-		
*		0.4.6	DUCT-	D14	BICAR-	CAR-	LINITY	CARBON	T.C.40.C.D
	****	D15-	ANCE	PH	BONATE (HCO3)	BONATE (CO3)	AS CACO3	010X1DE (CO2)	TEMPER- ATURE
DATE.	TIME	CHARGE (CFS)	(MICRO- MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DATE		(CF3)	mnus/	(UNITS)	(1071)	1110/11	110761	17071	1000 07
NOV., 19		25			30				
14	1610	25	170	7.3	. 70	0	57	5.6	4.0
			015-						
		DIS-	SOLVED		NCN-	D1 S-			
	D15-	SOLVED	MAG-		CAR-	SOLVED		D1 S-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	72								
14		21	4.6	71	14				<10
	DIS-		DIS-						
	SOLVED	TOTAL	SOLVED		DIS-		D15-		D1 S-
	CAD-	CHRO-	CHRO-	TOTAL	SCLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	HIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CD)	(CD)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV.; 19	972								
14	1	·				<10	2	90	10
				-21D				DIS-	
		D15-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANE SE	MERCURY	MERCURY	DENUM	DENU™	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MD)	(MD)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972		•						
14	<100	. 1	10	0					<25
			DIS-				DIS-		
	DIS-	TOTAL	SOLVED		D15-	TOTAL	SOLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(N1)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
14	. 4							50	60

392953106024700 - BLUE R BL CUCUMBER GL AT BRECKENRIDGE, CO - BR-2

•			SPE- CIFIC						
			CON-				ALKA-		
		_	DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NCV., 19									
14	0930		. 280	6.7	58	0	48	19	•0
			D1S-						
		uls-	SOLVED		NON-	-210			
	DI S-	SOL VED	MAG-		CAR-	SOLVED		015-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED.	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(S102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
14		31	5.8	100	52				<10
	015-		015-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SÕLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
14	2					10	3	1800	40
				DIS-				D15-	
		DIS-	TOTAL	SOLVED		D15-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
.NOV., 1	972								
14	<100	26	150	50					<25
			D15-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	MUID	MUID	ZINC	ZINC
	(N1)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972				,				
14	6				,			750	420

CATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CUN- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCG3)	BONATE (CO3)	ALKA- LINITY AS CACD3 (MG/L)	CARBON D10X1DE (CO2) (MG/L)	TEMPER- ATURE
NOV.,							***************************************	(MG/L)	(DEG C)
14 JAN.,	1973		230	7.0	64	0	52	10	•0
19 MAR.	1200		480	6.4	38	0	31	24	2.5
JUNE	1300	E 1.5	260	6.5	67	0	55	34	
19	1625	18	200	6.6	46	0	38	18	1.0
DATE	015- SCL VED S1L ICA (S102) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS-	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS)	TOTAL CAD- MIUM (CD) (UG/L)
NDV.,	1972	32	4.5	0.0					
JAN., 1	1973			98	46				30
MAR. 22	•	62	13	210	180				50
JUNE		38	5.7	120	65				20
19		27	4.0	84	46				<10
DATE	DIS- SOLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
NOV., 1 14	3								
JAN., 1	973 3					10	1	160	120
MAR. 22	10					10	9	530	570
JUNE 19	7					< 10	1	200	70
17	•					10	5	820	200
DATE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB~ DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
14 JAN., 19	200	3	780	900					75
19 MAR.	300	7	7100	7200					
22 JUNE	<100	О	1300	1200					75
19	<100	3	930	1100					<50
DATE	DIS- SOLVED NICKEL (NI)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS+ SOLVED VANA- DIUM (V)	TOTAL ZINC (ZN)	C25 DIS- SOLVED ZINC (ZN)
NOV., 197				•			. 55, 6,	(UG/L)	(UG/L)
14 JAN., 197								2400	2400
19 MAR.	39							15000	15000
22 JUNE	3							3800	3500
19	О							3700	
								2.00	4000

			SPE- CIFIC CON-				ALKA-		
٠.			DUCT-		BICAR-	CAR-	LINITY	CARBON	
	*****	015-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
DATE	TIME	CHARGE (CFS)	(MICRO-		(HC 03)	(CO3)	CACO3	(CD2)	ATURE
DATE		10757	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 1	972								
14	1345		140	7.1	50	0	41	6.4	.5
JUNE, 19						•	••	0.4.	•,
19	1700	E50	95	7.1	36	0	30	4.6	5.0
			015-						
	0.0	DIS-	SOLVED		NCN-	DIS-			
	-210	SULVED	MAG-		CAR-	SOLVED		015-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SULVED	CAD-
	SILICA (S102)	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
DATE		(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
14		19	1.4	53	12				30
JUNE, 1									,,
19		13	• 9	36	6				<10
	DIE					•			
	-210	707.11	-210	•					
	SOL VED CAD-	TOTAL	SOL VED		DIS-		D18-		D15-
	MIUM	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SCLVED	TOTAL	SOLVED
	(CD)	MIUM	MIUM	COBALT	CUBALT	COPPER	COPPER	IRON	IRON
DATE	(UG/L)	(CR) (UG/L)	(CR) (UG/L)	(CO)	(00)	(CU)	(CU)	(FE)	(FE)
DAIL	(00/1/	10071	(0671)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
14	0					10	3	60	40
JUNE, 19							,	00	40
19	0					10	3	270	30
,						,	-	2.0	30
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(1N)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	772								
14	100	3	30	10					100
JUNE, 19	973		-			•			100
19	<100	2	20	10					<25
	0.1.0	T0:	DIS-				DIS-		
	-210	TOTAL	SOLVED	TOT. .	DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	. SDL VED	VANA-	VANA-	TOTAL	SULVED
	NICKEL	NIUM	NTUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(NI) (UG/L)	(SE) (UG/L)	(SE) (UG/L)	(AG) (UG/L)	(AG) (UG/L)	(V)	(V)	(ZN)	(ZN)
		.00, 21	.00/ [/	100767	100/1/	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19									
14								40	40
JUNE, 19									• •
19	0							50	30

39284>106024600 - BLUE R AB SAWMILL GL NR BRECKENRIDGE, CO - BR-5

			SPE-						
			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMBER
	TIME	CHARGE	(MICRO-		(HC 03)	(603)	CACO3		TEMPER-
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(CO2)	ATURE
				10.11131	1110727	(HG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 19	972								
14	1510		180	7.1	101	0	83	13	•
						•	• •	13	• 0
			015-				•		
		DIS-	SCLVED		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BCNATE	ALUM-	TOTAL		
	SILICA	Clum	SLUM	NESS	HARD-	INUM	ARSENIC	SOLVED	CAD-
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)		ARSENIC	MUUM
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(AS)	(AS)	(CD)
				11107 27	THOTE	IÚGALI	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
14		23	5.9	82	0				410
					_				<10
	DIS-		nis-						
	SOLVED	TOTAL	SOLVED		DIS-		0.0		
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	-21D		D15-
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	SOLVED	TOTAL	SOLVED
	(CD)	(CR)	(CR)	((0)	(CO)		COPPER	I RON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(CU) (UG/L)	(CU)	(FE)	(FE)
				100727	10071	(06/1)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
14	1					<10	1	260	50
						110	-	260	50
				D18-				DIS-	
		DI \$-	TOTAL	SOLVED		D15-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLY8-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(IN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
								100,2,	(00/6)
NOV., 19		_							
14	<100	2	30	10					<25
	D1 S-	70744	015-				DIS-		
		TOTAL	SOLVED		D15-	TOTAL	SOLVED		DIS-
	SOL VED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(v)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	172								- ,
14	2								
	2							20	30

CLIMAX STUDY AREA

392056106131000 - E F ARKANSAS R AB CHALK C NR CLIMAY. CO - FE-17

	TIME	015-	SPE- CIFIC CON- DUCT- ANCE	РН	BICAR- BONATC	CAR- Bonate	ALKA- Linity AS	CARBON DIOXIDE	TEMPER-
DATE	TIME	CHARGE (CFS)	(MICRO- MHOS)	(UNITS)	(HCO3) (MG/L)	(CO3)	CACO3	(CO2)	ATURE
NOV 1	072			(0,1113)	1110767	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 1	0900								
JUNE, 1		2.3	180	7.7	50		41	1.6	•0
20	1530	34 .	85	7.4	36	0	20		
				•••	30	U	30	2.3	10.5
			DIS-						
	016	DIS-	SOLVED		NON-	DIS-			
	DI S-	SOLVED	MAG-		CAR-	SOLVED		015-	TOTAL
	SOLVED SILICA	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	(\$102)	Clum	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
DATE	(MG/L)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DAIL	(1.67 [)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
15		21	5.1	73	32				20
JUNE, 1	-								30
20		10	2.3	34	4				<10
	DIS-		DIS-						
	SOLVED	TOTAL	SDLVED		D15-		D15-		
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	70744	DI 5-
	MUIM	MIUM	MIUM	CCBALT	COBALT	COPPER	COPPER	TOTAL	SOLVED
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	IRON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(FE) (UG/L)	(FE) (UG/L)
NOV., 19	972								
15	2	- -							
JUNE, 19						30	14	120	20
20	0					20	15	1500	
							.,	1500	80
		-21D	TOTAL	D18-				D15+	
	TOTAL	SOLVED		SOLVED		012-	TOTAL	SOLVED	
	LEAD	LEAD	MAN- GANESE	MAN- GANESE	TOTAL	SOLVED	MDLYB-	MOLY8~	TOTAL
	(PB)	(PB)	(MN)	(MN)	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(HG) (UG/L)	(HG) (UG/L)	(MC) (UG/L)	(MO)	(NI)
NOV 30					,	(00/6/	100/27	(UG/L)	(UG/L)
NOV., 19		_							
15	100	3	410	440			19	20	130
JUNE, 19 20		_							
20	<100	2	170	70			27	16	<25
			D1S-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		D15-
	SOL VED	SELE-	SELE~	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
0.45-	(NE)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN) .
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	72								
15	2							220	
JUNE , 19								220	200
20	2				· 	·		160	40

392024106103200 - E F ARKANSAS R AT CLIMAX, CO - EF-18

			SPE- CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		-210	ANCE	PH	BONATE		AS		TENOCO
	* * ***			РМ		BONATE		DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NCV., 19									
15	1145		110	7.8	43		35	1.1	•0
					•				
			015-						
		DIS-	SOLVED		NCN-	D15-			
•	015-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	AL UM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	- INUM	ARSENIC	ARSENIC	MIUM
	(2105)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(2 A)	(AS)	(CD)
DATE	(PG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
15		12	3.0	42	7				<10
	DIS-		DIS-						
	SDLVED	TOTAL	SOLVED		DIS-		DIS-		D1 S
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	((0)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
15	0					<10	2	110	50
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(P8)	(PB)	(MN)	(MN)	(HG)	(HG)	(MD)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
15	<100	4	90	100			2	2	<25
							0.16		
			DIS-			****	DIS-		
	DIS-	TOTAL	SOLVED	****	DIS-	TOTAL	SOLVED	TOTAL	DIS-
	SOL VED	SELE-	SELE-	TOTAL	SCLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	MUID	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UC/L)
NOV., 1	972								
15	0							180	180

392143106114100 - SC00807910000 - EF-G2

			SPE- CIFIC						
			CON-		,		ALKA-		
		DIS-	DUCT- ANCE	PH	BICAR- BONATE	CAR- BONATE	LINITY AS	CARBON DIOXIDE	TEMPER-
DATE	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 1 15									
12	0830		240	6.7	22	0	18	7.2	4.5
						•			
		DIS-	DIS- SOLVED		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
DATE	(\$102) (MG/L)	(CA) (MG/L)	(MG) (MG/L)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
		(1107 L)	(MO/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
15		24	5.7	83	42				
	015-		DIS-						
	SOLVED CAD-	TOTAL CHRO-	SOLVED CHRO-	TOTAL	DIS-	TOT	DIS-		DIS-
	MIUM	MIUM	MIUM	TOTAL COBALT	SOLVED COBALT	TOTAL COPPER	SOLVED COPPER	TOTAL IRON	SOLVED
	(CD)	(CR)	(CR)	(CO)	(co)	(CU)	(CU)	(FE)	IRON (FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(ÚG/L)	(ÚGŽĹ)
NDV., 19	972					•			
15	5						10		
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL LEAD	SOLVED LEAO	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MŪLYB-	TOTAL
	(PB)	(PB)	GANESE (MN)	GANESE (MN)	MERCURY (HG)	MERCURY (HG)	DENUM	DENUM	NICKEL
DATE	(UG/L)	(ÙG/L)	(ÚG/L)	(UG/L)	(UG/L)	(UG/L)	(MD) (UG/L)	(MO) (UG/L)	(NI) (UG/L)
NOV 19	172						,	(,
15		6		140				54	
		•						74	
			DIS-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(NI) (UG/L)	(SE) (UG/L)	(SE) (UG/L)	(AG) (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V) (UG/L)	(ZN:) (UG/L)	(ZN) (UG/L)
			, , , , , ,	,007.27	(00/2/	(00/ 1/	(00/11	. (00/L)	(06/1
NOV., 19	72 13								
12000	13								200

392514106165800 - CATARACT C AT MOUTH NR CAMP HALE. CD - ER-7

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
NGV 1	972								
17	1500		340	8.2	166	0	1 36	1.7	4.0
DATE	CIS- SGLVED SILICA (SIO2) {MG/L}	DIS+ SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL Arsenic (AS) (UG/L)	CIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CO) (UG/L)
NOV.,	1972	37	16	160	- 24				<10
1,		٠,٠	10	100					110
	D15-		DIS-						
	SOLVED	TOTAL	SOLVED		D1 S-		D15-		D15-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRGN
	(CD)	(CR)	(CR)	(00)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UC/L)	(UG/L)	(UG/L)	(UG/L)
NOV.,	1972								
17	0					<10	2	70	40
*				D1S-				-210	
		Dis-	TOTAL	SOLVED	•	DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	-NA4	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	CANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV.,	1972								
17	<100	. 3	0	10			38	45	<25
			D I S-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		D1S-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL .	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC .	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(2N)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV	1972							,	
17	1,,,,							10	

			SPE- CIFIC CON-	,			ALKA-		
		`	DUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	РН	80NA TE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NCV., 19	72								
17	1300	1.2	300	8.1	96	0	79	1.2	•0
JUNE, 19	73						_		
20	1420	33	160	7.6	65	0	53	2.6	9.0
			015-						
		D15-	SOLVEO		NON-	DIS-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD+	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19 17		32	11	130	51				. 30
JUNE, 19		٥,	• •						
20		19	7.5	78	25				<10
	D15-		DIS-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SDL VED	TOTAL	SOLVED	TOTAL	SOLVED
	MUIM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRDN	I RON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
17	0					20	2	1 50	30
JUNE, 19						_	_		
20	0					10	5	920	8 0
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		-210	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
17	200	0	20	0			360	400	100
JUNE . 19	973				-				
20	<100	2	220	200			110	130	<25
			-21G		-		DIS-		
	DIS-	TOTAL	SOLVED		D15-	TOTAL	SOLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
17	2							20	20
JUNE, 1	973								
20	7					,		30	0

			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CADOON	
		D1S-	ANCE	PH	BONATE	BONATE		CARBON	TEMPER-
	TIME	CHARGE	(MICRO-	r n	(HCO3)	(CO3)	AS CACO3	DIOXIDE	
DATE	ITWE	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(CO2) (MG/L)	ATURE (DEG C)
DATE		1,0131	HHO37	(0/(1/3)	(10/6)	INGILI	(14671)	(MG/L)	TUEG C)
NGV., 19	972								
16	1355	18	170	8.2	67	0	55	.7	•5
			5.46						
			DIS-		NCN-	DIS-			
		D1S-	SOL VED					015-	TOTAL
	CIS-	SOLVED	MAG-		CAR- BONATE	SOLVED ALUM-	TOTAL	20FAED	CAD-
	SCLVED	CAL-	NE-	HARD-			ARSENIC		
	SILICA	CIUM	SIUM	NESS	HARD-	INUM		ARSENIC	MUIM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
16		20	3.7	65	10				<10
									-
	D15~		D1S-				D1.C		015-
	SOLVED	TOTAL	SOLVED		DIS-	TOTAL	D15-	TOTAL	SOLVED
	CAD-	CHRO-	CHRD-	TOTAL	SOLVED	TOTAL	SOLVED	IRON	IRON
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	(FE)	(FE)
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)		
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
16	1					<10	3	190	50
				0.1.0				DIS-	
ž-				DIS-		DIS-	TOTAL	SOLVED	
		DIS-	TOTAL	SOLVED	TOT 41	SOLVEO	MOLYB-	MOLYB-	TOTAL
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	MERCURY	DENUM	DENUM	NICKEL
	LEAD	LEAD	GANESE	GANESE	MERCURY	(HG)	(MD)	(MD)	(NI)
	(PB)	(PB)	(MN)	(MN)	(HG) (UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(06/1)	(06/1/	100/2/	(00, 2)	100,2,
NOV., 1	972 .								
16	<100	4	30	10			180	200	<25
			D1S-				DIS-		DIC.
	D1 S-	TOTAL	SOFAED		DIS-	TOTAL	SOLVED	TOTAL	DIS- SOLVED
	SDL VED	SELE-	SELE-	TOTAL	SOLVEO	VANA-	VANA-	TOTAL	ZINC
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
16								110	100

	~	2.5	SPE- CIFIC CON- DUCT-		BICAR-	CAR	ALKA- LINITY	CARRON	
DATE	TIME	DIS- CHARGE (CFS)	ANCE (MICRO- MHOS)	PH (UNITS)	BONATE (HCO3) (MG/L)	BONATE (CO3) (MG/L)	AS CACD3 (MG/L)	(CO2) (MG/L)	TEMPER- Aluke (DEG C)
NOV., 19			1.00			•	4.5	-	•
16 JAN., 19	1230 973		180	8.1	55	0	45	.7	•0
19 MAR.	1330		200	7.2	60	0	49	6.1	•0
22 JUNE	1035		180	7.1	60	0	49	7.6	1.5
20	0810	E180	540	7.0	38	0	31	6.1	3.0
DATE	DIS- SGLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SGLVED MAG- NE- SIUM (MG) IMG/L)	HARD- NESS (CA, MG) (MG/L)	NON- CAR- BONATE HARD- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
NDV., 14	972	22	3.7	70	25				30
JAN., 19	973								
19 MAR. 22		25 28	4.0	79 87	30				30
JUNE			4.1						
20		77	6.3	220	190				<10
DATE	DIS- SDLVED CAD- MIUM (CD) (UG/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
NOV., 19	972								
16 JAN., 19						10	2	220	20
19 MAR.	2					10	8	40	20
22 JUNE 20	1 2						10		60
20	2					30	30	840	190
		D15-	TOTAL	DIS- SOLVED	. :	015-	TOTAL	DIS- SOLVED	
	TOTAL Lead	SOLVED LEAD	MAN- GANESE	MAN- GANE SE	TOTAL MERCURY	SDL VED MERCURY	MOLY8- DENUM	MOLYB- DENUM	TOTAL N1CKEL
0475	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MD)	(NI)
OATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	100	2	80	70			170	150	100
JAN., 19	973 200	2	50	80			150	150	75
MAR. 22		1		40				150	
JUNE 20	<100	3	930	920			4000	4400	<25
	DIS-	TOTAL	DIS-		DI S-	TOTAL	SOLVED		015-
	NICKEL	SELE- NIUM	SELE- NIUM	TOTAL SILVER	SOL VED SIL VER	VANA- Dium	VANA- Dium	TOTAL' Zinc	SDLVED Z1NC
DATE	(NI) (UG/L)	(SE) (UG/L)	(SE) (UG/L)	(AG) (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V)	(ZN) (UG/L)	(ZN) (UG/L)
NOV., 19	972								
16 JAN., 19	o							310	320
19	3							350	430
MAR. 22	4								, 320
JUNE									

			SPE-						
			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		D1 S-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	-OADIMI		(HC03)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 19			• • •	7.9	72	0	59	1.5	•0
15	1300		160	7.9	12	U	29	1.5	• 0
JUNE, 19					34	0	28	3.4	1.0
20	0910	E7	80	7.2	34	U	26	3.4	1.0
			DIS-		NCN-	015-			
		DIS-	SOLVED					DIS-	TOTAL
	DIS-	SOLVED	MAG-		CAR-	SOLVED ALUM-	TOTAL	SOLVED	CAD-
	SOLVED	CAL-	NE-	HARD-	BCNATE	INUM	ARSENIC	ARSENIC	MIUM
	SILICA	CIUM	SIUM	NESS	HARD- NESS	(AL)	(AS)	(AS)	(CD)
	(\$102)	(CA)	(MG)	(CA,MG)					
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 19	972								
15		20	4.5	88	9				30
JUNE, 1									
20		9.7	1.7	31	3				<10
20000									
	-210		D1S-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		-210
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SCLVED
	MIUM	MILLE	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
5									
NOV., 1	972								
15	C					20	4	50	20
JUNE • 1	973								
20	C					10	7	120	30
				D I S -				015-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
15	300	1	10	0			1	2	75
JUNE, 1			10	•			-		
20	<100	3	10	10			5	. 13	<25
20111	1.00	-							
			-21G				DIS-		
	DIS-	TOTAL	SOLVED		D1 S-	TOTAL	SOLVED		D15-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(A)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	073								
NOV., 1	.912							60	50
15 JUNE, 1									
JUNE: 1								100	60

392540106110300 - TENMILE C BL SEARLE GULCH AT KOKOMO. CO - TM-4

			SPE- CIFIC CON-				ALKA-		•
	i		DUCT-		BICAR-	CAR-	LINITY	CARBON	
		015-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NOV., 19	972								
16	0835	0.93	300	7.9	91	0	75	1.8	•0
		-210	DIS- SOLVED		NON-	015-			
	015-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA.MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	~~~								
NOV., 1	972	41	8.1	140	, =				10
16		41	0.1	140	65				10
	DIS-	r	D15-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MEUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	((0)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV 3	072								
NOV., 1	10					10	9	370	30
10	10					10	,	310	30
				DIS-				D15-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MD)	( MO )	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NDV., 1	972								
16	100	4	340	350			120	150	<25
			D15-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		015-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(111)	(SE)	(SE)	(AG)	(AG)	(۷)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 1	972								
16	3							2400	2200

			SPE-						
-			CIFIC				ALKA-		
			CON-		BICAR-	CAR-	LINITY	CARBON	
			DUCT-	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	_	DIS-	ANCE	rn	(HC03)	(CO3)	CACO3	(CO2)	ATURE
	TIME	CHARGE	(MICRO-	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DATE		(CFS)	MHOS)	(041/3)	(1107-27	******			
NOV 107	13								
NOV., 197	1445		250	8.1	91	0	75	1.2	.0
JUNE, 197									
20	0945	E50	140	7.2	65	0	53	6.6	3.Ú
20	0,11,								
			015-						
		DIS-	SOLVED		NON-	D15-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		D15-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(45)	(AS)	(CD)
DATE	(PG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
0 m · C									
NOV., 19					35				10
15		32	7.1	110	33				
JUNE, 19		19	5.0	68	15				<10
20		19	5.0	00				•	
	D15-		DIS-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		D15-
	CAD-	CHR O-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MUUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CD)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	.7.2								
NOV., 19	6					10	4	250	60
15									
JUNE, 19	2					. 20	8	610	240
20	2								
				D15-				D15-	
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED MOLYB-	TOTAL
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MCLY8- DENUM	DENUM	NICKEL
	LEAD	LEAD	GANESE	GANE SE	MERCURY	MERCURY	(MO)	(MD)	- (NI)
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG) (UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	100/17	(00/2)	100727	
NOV., 19	77							_	
15	<100	5	340	300		~-	13	Đ	<25
JUNE, 19	773						_	_	<25
20	<100	4	180	16D			0	• 3	(2)
							0		
			D15-			****	DIS-		DIS-
	D1 S-	TOTAL	SOLVED		D15-	TOTAL	SOLVED VANA-	TOTAL	SOLVED
	SOL VED	SELE-	SELE-	TOTAL	SOLVED	VANA- DIUM	DIUM	ZINC	ZINC
	NICKEL	NIUM	NIUM	SILVER	SILVER	(A)	(V)	(ZN)	(ZN)
	(NI)	(SE)	(SE)	(AG)	(AG)	(UG/L)	(UG/L)		(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(06/1)	100/67	. 30/ [/	
NOV., 1	972								
15	3							2400	2100
JUNE, 1									
20	0							1300	1200

	TIME	DIS- Charge	SPE- CIFIC CON- DUCT- ANCE (MICRO-	Рн	BICAR- BONATE (HCO3)	CAR- BONATE (CO3)	ALKA- LINITY AS CACO3	CARBON DIOXIDE (CO2)	TEMPER-
DATE	í	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
NEV., 19	72								
15	1535		1050	7.9	160	0	131	3.2	.0
JUNE, 19 20	1020	E 75	1400	. n		_			
20	1020	E / 3	1600	6 · B	46	0	38	12	9.5
			DIS-						
		DIS-	SOLVED		NCN-	DIS-			
	D18-	SOLVED	MAG-		CAR-	SOLVED		015-	TOTAL
	SOLVED	CAL-	NE-	HARD~	BONATE	ALUM-	TOTAL	SOLVED	TOTAL
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	CAD- Mium
	(8102)	(CA)	(MG)	(CA, MG)	NESS	(AL)	(AS)	(AS)	
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(ÚGŽĹ)	(UG/L)	(CD) (UG/L)
NOV., 19	272						, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(00/2/	100717
15		170	20	510	200				
JUNE, 19	773		20	510	380				10
20		290	19	800	760				10
	016								••
	DIS- SOLVED	TOT	DIS-					. •	
	CAD-	TOTAL	SOLVED		D15-		DIS-		DIS-
	MIUM	CHRO-	CHRO-	TOTAL	SOLVED	TCTAL	SOLVED	TOTAL	SOLVED
	(CD)	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
DATE		(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)·	(UG/L)	(UG/L)
NOV., 19	72								
15	3					10	9		
JUNE, 19	73					10	7	840	150
20	4					100	90	3800	2100
									2100
		-210	TOTAL	D12-				D15-	
	TOTAL	SOLVED	MAN-	SOLVED MAN-	70744	D15-	TOTAL	SOLVED	
	LEAD	LEAD	GANESE	GANE SE	TCTAL MERCURY	SOLVED	MOLYB-	MOLYB-	TOTAL
	(PB)	(PB)	(MN)	(MN)	(HG)	MERCURY	DENUM	DENUM	NICKEL
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(HG) (UG/L)	(MO)	(MO)	(NI)
				100/2/	(00/1)	(00/1)	(UG/L)	(UG/L)	(UG/L)
NOV., 19									
15	<160	1	540	510			2300	2800	<25
JUNE, 19	/ 3 < 50	0	2700	-700					
20	130	U	3700	3700			86000	19000	130
			DIS-				DIS-		
	D1 S -	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
NOV., 197	12								
15	6							330	270
JUNE, 197	_							,,,,	2.0
20	100							700	640

URAD-HENDERSON STUDY AREA

			SPE-						
			CIFIC						
			CON-				ALKA-		
			OUCT-		BICAR-	CAR-	LINITY	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
				PN		(03)	CACO3	(CO2)	ATURE
	TIME	CHARGE	IMICRO-		(HC 03)			(MG/L)	(DEG C)
DATE	<u> </u>	(CFS)	(20HM	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
JAN., 19	173								
	1040	E.3	850	7.2	170		139	17	1.0
31	1040	E • 3	670	1 + 2	1.0		•	• •	
JUNE				~ -	20	0	24	1.5	5.5
22	1720		180	7.5	29	U	27	1.7	,.,
			-21G		NON	DIS-			
		D15-	SOLVED		NON-				TOTAL
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	STUM	NESS	HARD-	[ NUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA, MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	150767	(1907.07	(072)	(1.07.27	1710727	100.47			
JAN., 19	73								
31		120	8.5	330	190				< 10
JUNE									
22		20	1.4	56	32				< 10
22									
	D15-		D15-						
	SOLVED	TOTAL	SOLVED		DIS-		DIS-		D15-
	CAD-	CHRO-	CHRD-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
				(CD)	(CO)	(CU)	(CU)	(FE)	(FE)
	(CD)	(CR)	(CR)				(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	100727	100727	100727
JAN., 19	272								
31	1					80	10	460	50
JUNE	1					20	20	200	40
22	1								
				DIS-				DIS-	
		DIS-	TOTAL	SOLVED		D15-	TOTAL	SOLVED	
	TOTAL		MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	TOTAL	SOLVED				MERCURY	DENUM	DENUM	NICKEL
	LFAD	LEAD	GANESE	GANE SE	MERCURY				(NI)
	(PB)	(PB)	( MN )	(MN)	(HG)	(HG)	(MO)	(MO)	
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN., 19	973								
31	<100	1	16000	16000			4600	4500	50
JUNE	1100	-	20000	••					
22	<50	5	1100	920			2300	1900	<25
			DIS-				DIS-		0
	D15-	TOTAL	SDLVED		D1 S-	TOTAL	SOLVED		-210
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(00/ 6/	100/6/							
JAN., 1									
31	22					32	29	180	140
JUNE									
JUNE 22	12						25	230	170

			·SPE-						
			CIFIC						
٠,			CDN-				ALKA-		
•			DUCT-		BICAR-	CAR-	LINITY	CARBON	·
		D15-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HC03)	(CO3)	CACO3	(CO2)	ATURE
	1145	(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OATE		(0.5)	HIIO37	10.11.57	********				
JAN., 19	73					2.4			2 5
31	1130	5.9	950	8.5	427	24	388	2.1	3.5
JUNE						_			
22	1440	E90	140	7.7	53	0	43	1.7	6.5
		D1 S-	DIS~ SOLVED		NON-	015-			
			MAG-		CAR-	SOLVED		D15-	TOTAL
	DIS-	SOLVED		HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SOLVED	CAL-	NE-	NESS	HARD-	INUM	ARSENIC	ARSENIC	HIUM
	SILICA	CIUM	SIUM		NESS	(AL)	(AS)	(AS)	(CD)
	(\$102)	(CA)	(MG)	(CA,MG)		(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(06/27	100/2/	(00/2/	100/2/
JAN., 19	273								
31		100	9.4	288	0				<10
JUNE									
22		11	1.4	33	0				<10
			DIS-						
	DIS-	TOTAL	SOLVED		DIS-		D15-	100	DIS-
	SOLVED		CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	CAD-	CHRO-		COBALT	COBALT	COPPER	COPPER	IRON	IRON
	MUIM	MIUM	MIUM		(00)	(CU)	(CU)	(FE)	(FE)
	(CD)	(CR)	(CR)	(CO)	(UG/L)	(UG/L)	(UG/L)	(ÚGŽL)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	10671	(00/ 1/	100727	100,2,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
JAN., 19	973								
31	0					50	20	70	40
JUNE									
22	0					10	10	380	80
								D15-	
				DIS-		DIS-	TOTAL	SOLVED	
		DIS-	TOTAL	SOLVED	-0744		MOLYB-	MOLYB-	TOTAL
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOL VED MERCURY	DENUM	DENUM	NICKEL
	LEAD	LEAD	GANESE	GANESE	MERCURY		(MO)	(MD)	(NI)
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(06/1/	100727	100723
JAN., 19	973								
31	<100	0	6300	6500				52	25
JUNE									
22	<50	0	580	450			1	. 2	<25
			DIS-				D15-	•	
		TOTAL	SUF AED		D15-	TOTAL	SOLVED		D15~
	D1 S-	TOTAL		TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	SOLVED	SELE-	SELE-	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	NICKEL	NIUM	NIUM	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
	(NI)	(SE)	(SE)		(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	100/61	(00/1/	100/6/	,	
JAN., 1	973						_		100
31	5					15	0	240	190
JUNE							_		40
22	4					3.1	• 2	90	40

# 394622105513800 - W F CLEAR C AB BUTLER GL NR BERTHOUD FLS, CO - CC-31

			SPE-						
			CIFIC CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
		015-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME-	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(C02)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
JAN., 19	73								
31	1315		110	7.1	24	0	20	3.1	- 5
JUNE						_			
22	1600	€50	<50	7.8	. 17	0	14	.4	3.0
			-210						
		CIS-	SOLVED		NON-	D15-			
	DIS-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA (SID2)	CIUM	S I UM	NE SS	HARD- NESS	INUM	ARSENIC	ARSENIC	HIUM
DATE	(MG/L)	(CA) (MG/L)	(MG) (MG/L)	(CA,MG) (MG/L)	(MG/L)	(AL) (UG/L)	(AS) (UG/L)	(AS)	(CD)
UATE	(4071)	(FO/L)	( MO/L)	180767	110/61	(06/2)	106/1/	(UG/L)	(UG/L)
JAN., 19	973	9.5	1.3	29	9				410
JUNE		9.0	1.5	29	9				<10
22		2.8	₹5	. 9	0				<10
	DIS-		DIS-						
	SOLVED	TOTAL	SOLVED		D1S-		-21O·		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	MIUM	MIUM	MIUM	CDBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN., 19	773								
31	0					40	. 20	340	200
JUNE									
22	0					10	7	400	50
				DIS-				015-	
		D15-	TOTAL	SOLVED		D15-	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	· MOLY8-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
0475	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)		(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
JAN., 19									
31	<100	0		110				9	50
JUNE							_		_
22	<50	4	30	20			0	. 0	<25
			D1S-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SDLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL (NI)	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(UG/L)	(SE)	(SE)	(AG) (UG/L)	(AG) (UG/L)	(V) (UG/L)	(V) (UG/Ľ)	(ZN) (UG/L)	(ZN) (UG/L)
JAN., 19	73								
31	4					110	.0	110	60
JUNE							3.0		
22	3					3.1	•0	70	20

DATE	TIME	DIS- CHARGE (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH (UNITS)	BICAR- BONATE (HCO3) (MG/L)	CAR- BONATE (CO3) (MG/L)	ALKA- LINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
OCT., 197		AD 36	350	7.6	79	0	65	3.2	8.0
FEB., 197 27		AD 19	160	6.4	62	0	51	39	.0
JUNE 22	1400	AD469	60	7.8	29	0	24	•7	9.0
APR., 197		37	100	7.5			+-		1.5
23	1000	3,	100	,,,,					
	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BOMATE HARD- NESS (MG/L)	DIS- SULVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CD) (UG/L)
OCT., 197 18	2	17	3.6	57	D				
FEB., 197 27	3	16	3.7	55	4				<10
JUNE 22		6.3	1.1	20	0				10
APR., 197 23	4	12	2.7	41			·		<10.
DATE	DIS- SDLVED CAD- MIUM (CD) (UG/L)	TDTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CD) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRDN (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
DCT., 197	2 0						4		190
18 FEB., 197 27							40	410	540
JUNE 22	0					10	3	460	50
APR., 197						< 10	11	960	300
	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- Ganese (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	OIS- SOLVED MDLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
OCT., 197 18		0		20				0	
FEB., 197 27	'3 <100	4		490			1	0	<50
JUNE 22	<50	0	10	10			0	1	<25
APR., 197 23	<100	4	50	20			1	0	50
DATE	DIS- SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
OCT., 197	72	<u></u>							10
18 FEB., 197 27								310	310
JUNE 22	0							40	10
APR., 197 23									

FOURMILE CREEK STUDY AREA

			SPE- CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
	****	DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
DATE	TIME	CHARGE	(MICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
ĘEB., 1									
10 MAY	1600	7.0	. 990	8.2	180	0	148	1.8	8.5
25	1100							1.0	0.7
23	1100	E 4 30	250	7.4	96	0	79	6.1	11.0
			DIS-						
		DIS-	SOLVED		NGN-	D15-			
	CIS-	SOLVED	MAG-		CAR-	SDLVED		D15-	
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL		TOTAL
	SILICA	Clum	SIUM	NESS	HARD-	INUM	ARSENIC	SOLVED ARSENIC	CAD-
	(2012)	(EA)	(MG)	(CA, MG)	NESS	(AL)	(AS)		MIUM
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(AS) (UG/L)	(CD) (UG/L)
FEB., 1	.973						,	100/1/	100717
10		180	15	510	240				
MAY		100	15	510	360				<10
25	·	29	6.6	100	21				<10
	DIS-		DIS-						. (10
	SOLVED	TOTAL	SOLVED						
	CAD-	CHRO-	CHRD-	TOTAL	DIS-		DI S-		DIS-
	MIUM	MIUM	MIUM	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	(CD)	(CR)	(CR)	COBALT	COBALT	COPPER	COPPER	IRON.	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(CO)	(00)	(CU)	(CU)	(FE)	(FE)
		100/2/	(00/2)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
FEB., 1	973								
10	0					20	10	0.0	
MAY						20	, 10	940	20
25	0					20	12	7300	30
				D15-				DIS-	
		DIS-	TOTAL	SOLVED		+21G	TOTAL	SOLVED	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLY8-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUH	DENUM	NICKEL
DATE	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
FEB 19	973								
10	<100	1	380	130					
MAY				130					<50
25	<50	2	670	300					<25
			D15-				DIS-		
	DIS-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		015-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	-21G
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	SOLVED
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
FEB., 19	973								
10	50	7`	2	· <del></del>				170	10
MAY	-	_							10
25	9	0	2					100	20

URAVAN STUDY AREA

# 382310108454600 - SAN MIGUEL R BL ATKINSON C NR URAVAN, CO - SM-1

			SPE- CIFIC						
			CON-						
			DUCT~		07540		ALKA-		
		D15-	ANCE	PH	BICAR-	CAR-	LINITY	CARBON	
	TIME	CHARGE	(MICRO-	rn	BONATE	BONATE	AS	DIOXIDE	TEMPER-
DATE		(CFS)	MHOS)	4	(HC03)	(CO3)	CACO3	(CO2)	ATURE
		10/3/	unus)	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
DEC., 1	972								
17	0835		1150	8.1					•
`			1130	0.1	199	0	163	2.5	.0
			DIS-						
		D15-	SOLVED						
	015-	SOLVED	MAG-		NON-	D15-			
	SOLVED	CAL-	NE-		CAR-	SOLVED		DIS-	TOTAL
	SILICA	CIUM		HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	(\$102)-	(CA)	SIUM	NESS	HARD+	INUM	ARSENIC	ARSENIC	HIUM
DATE	(MG/L)		(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
	(110727	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC 1	972	•							100/2/
17		110	52	490	220				
			J.E	490	330				
	DIS-		D15-						
	SOLVED	TOTAL	SOLVED						
	CAD-	CHRO-	CHRO-	TOTAL	-21D		D15-		DIS-
	MIUM	MIUM	MIUM		SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	(CD)	(CR)	(CR)	COBALT	COBALT	COPPER	COPPER	IRON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
			100/1	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	972						-		
17	1								
	_						20		30
								•	
		0.1.6		DIS-				DIS-	
	TOTAL	-21d	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	LEAD	SOLVED	MAN-	MAN~	TOTAL	SOL VED	MDLYB-	MOLYB-	TOTAL
		LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
DATE	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MD)	
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(NI) (UG/L)
DEC. 19	72							100/2/	10671
17		4							
		7		240					
			-210						
	DIS-	TOTAL					DIS-		
	SOLVED	SELE-	SDLVED		DIS-	TOTAL	SOLVED		015-
	NICKEL	NIUM	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	(NI)	(SE)	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
DATE	(UG/L)	(UG/L)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
<b>-</b>	. 50, 2,	( UG/ L )	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DEC., 19	72								. 50, 2,
17	11		•						
			0				4.0		60

			SPE- CIFIC CON- DUCT-		BICAR-	CAR-	ALKA- LINITY	CARRON	
DATE	TIME	DIS- CHARGE (CFS)	ANCE (MICRO- MHOS)	PH- (UNITS)	BONATE (HCO3) (MG/L)	BONATE (CO3) (MG/L)	AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	TEMPER- ATURE (DEG C)
DEC., 1	072			••	,	(	(, 2.	(1.07 )	(520 0)
17	1100		850	8.1	187	5	162	2.5	.0
,									••
DATE	DIS- SOLVED SILICA (SIO2) (MG/L)	DIS- SOLVED CAL- CIUM (CA) (MG/L)	DIS- SOLVED MAG- NE- SIUM (MG) (MG/L)	HARD- NESS (CA,MG) (MG/L)	NON- CAR- BONATE HARO- NESS (MG/L)	DIS- SOLVED ALUM- INUM (AL) (UG/L)	TOTAL ARSENIC (AS) (UG/L)	DIS- SOLVED ARSENIC (AS) (UG/L)	TOTAL CAD- MIUM (CO) (UG/L)
DEC., 1	072								• • • • •
17		110	48	470	310				
DATE	DIS- SOLVED CAD- MIUM (CD) (UC/L)	TOTAL CHRO- MIUM (CR) (UG/L)	DIS- SOLVED CHRO- MIUM (CR) (UG/L)	TOTAL COBALT (CO) (UG/L)	DIS- SOLVED COBALT (CO) (UG/L)	TOTAL COPPER (CU) (UG/L)	DIS- SOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DIS- SOLVED IRON (FE) (UG/L)
DEC., 1	972								
17	0						8		9
DAȚE	TOTAL LEAD (PB) (UG/L)	DIS- SOLVED LEAD (PB) (UG/L)	TOTAL MAN- GANESE (MN) (UG/L)	DIS- SOLVED MAN- GANESE (MN) (UG/L)	TOTAL MERCURY (HG) (UG/L)	DIS- SOLVED MERCURY (HG) (UG/L)	TOTAL MOLYB- DENUM (MO) (UG/L)	DIS- SOLVED MOLYB- DENUM (MO) (UG/L)	TOTAL NICKEL (NI) (UG/L)
DEC., 1				100					
17		3		190					
DATE	DIS+ SOLVED NICKEL (NI) (UG/L)	TOTAL SELE- NIUM (SE) (UG/L)	DIS- SOLVED SELE- NIUM (SE) (UG/L)	TOTAL SILVER (AG) (UG/L)	DIS- SOLVED SILVER (AG) (UG/L)	TOTAL VANA- DIUM (V) (UG/L)	DIS- SOLVED VANA- DIUM (V) (UG/L)	TOTAL ZINC (ZN) (UG/L)	DIS- SOLVED ZINC (ZN) (UG/L)
DEC., 1	972						-		EO

OAK CREEK STUDY AREA

	TIME	DIS- CHARGE	SPE- CIFIC CON- DUCT- ANCE (HICRO-	РН	BICAR- BONATE (HCO3)	CAR- BONATE (CO3)	ALKA- LINITY AS CACO3	CARBON DIOXIDE (CO2)	TEMPER-
DATE		(CFS)	MHOS )	(UNITS)	(MG/L)	(MG/L)	(MG/L)	{MG/L}	(DEG C)
OCT., 19									
17 MAR., IS	1245		630	8.0	215	0	176	3.4	8.5
01	1200	2.4	560	T.5	233	0	191	12	3.0
JUNE					200	•			
18	1420	E55	680	7.8	228	0	187	5.8	10.0
			D1S-						
	0.15	D12-	SOLVED		NON-	D12-			
	SOLVED. D12-	SOLVED CAL-	MAG- NE-	HARD-	CAR- BONATE	SOLVED Alum-	TOTAL	DIS- SOLVED	TOTAL CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
067 10									
17		52	20	210	34				30
MAR., 19	973 [°]	26	20	210	34				30
01		67	29	290	99				<10
JUNE 18		65	26	270	0.0				410
10		0.7	20	210	83				<10
	D1S-		DI 5-						
	SOLVED	TOTAL	SOLVED		úis-		DIS-		DIS-
	CAD-	CHRO-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	TOTAL	SOLVED
	WIUM	MIUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	I RON
DATE	(CD) (UG/L)	(CR) (UG/L)	(CR) (UG/L)	(CO) (UG/L)	(CO) (UG/L)	(CU) (UG/L)	(CU) (UG/L)	(FE) (UG/L)	(FE) (UG/L)
DATE	100767	100727	100767	(00/2/	100727	100717	(00/2)	(00/6)	100767
OCT 19									
17 MAR., 19	0					10	3	700	60
01	0					10	10	630	50
JUNE						10	8		50
18	. 1		· <b></b>			10	0	11 Ó O	90
				D1 S -				D15-	
	70741	D1S-	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	
	TOTAL LEAD	SOLVED LEAD	MAN- GANESE	MAN~ GANESE	TOTAL Mercury	SOLVED MERCURY	MOLYB- DENUM	MOLYB- Denum	TOTAL Nickel
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
067 16	172								
0CT., 19	100	2	90	80					75
MAR., 19		-	,,	00					,,
01	<100	3	220	200					<50
JUNE 18	< 50	9	150	130					<25
	1,20	•							100
	D1 S-	TOTAL	SOFAED DI2-		DI S-	TOTAL	DIS- SOLVED		DIS-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	DIUM	ZINC	ZINC
	(NI)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	72								
17	2							40	20
MAR., 19									2.5
01	7							120	20
JUNE	10							50	10
18	10							50	10

			SPE-						
			CIFIC						
			CON-				ALKA-		
			DUCT-		BICAR-	CAR-	LINITY	CARBON	
•		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	(MICRO-		(HC03)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	MHOS)	(STINU)	(MG/L)	(MG/L)	(MG/L)	(.MG/L)	(DEG C)
OCT., 19	1430	.17	3500	7.6	372	0	305	15	12.0
17		• 1 /	3500	7.0	312	U	307	1.5	12.0
MAR., 19 01	1115	E.5	3200	7.6	372	0	305	15	11.0
JUNE	1112	Ç. 7	3200	7.0	312	J	303		11.00
18	1325	∠ E.5	2800	6.6	413	0	339	166	12.0
10	1 32 3		2000	0.0	,.,	_			
			D1S-						
		DI'S-	SOLVED		NON-	D15-			
	DIS-	SULVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SCLVED	CAL-	NE-	HARD-	BONATE	AL UM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
•	(\$012)	(CA)	(MG)	(CA,MG)	NESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(HG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(MO/L)	110767	1110727	11.07.27	107 = 7				
OCT., 19	72								
17		400	160	1700	1400				20
MAR., 19		,,,,		• • • • •	2.00				
01		- 380	150	1600	1300				10
JUNE			-;-	_					
18		340	140	1400	1100				10
10000		•		_					
	DIS-		DIS-					•	
	SOLVED	TOTAL	SOLVED		D1S-		D1 S-		015-
	CAD-	ÇHRD-	CHRO-	TOTAL	SOLVED	TOTAL	SOLVED	T OT AL	SOLVED
	MIUM	H LUM	MIUM	COBALT	COBALT	COPPER	COPPER	IRON	IRON
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	(CU)	(FE)	(FE)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DATE	(06/17	100/2/	(00/ 2)	100727	100727				
OCT., 19	972								
17	0	30	10			20	3	11000	5700
MAR., 19		-							
01	10	10	0			20	23	8200	2600
JUNE									
18	· 1	30	0			20	20	10000	9500
•									
				DIS-			TOT 44	015-	
		-21D	TOTAL	SOLVED		DIS-	TOTAL	SOLVED	TOTAL
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLY8-	
•	LEAC	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM (MO)	DENUM (MO)	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG)	(HG)	(UG/L)	(UG/L)	(UG/L)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(06/1)	106/11	(06/1/
007	07.2								
OCT., 19	300	4	1600	1800			1	1	75
17			1000	1000			•	-	
MAR., 1	100	. 0	1800	1800					50
01	100	U	1000	1600					
JDNE 18	50	50	1700	1700					50
10	,,,	70		2.00					
			015-				DIS-		
	-21G	TOTAL	SOLVED		DIS-	TOTAL	SOLVED		D1S-
	SOLVED	SELE-	SELE-	TOTAL	SOLVED	VANA-	VANA-	TOTAL	SOLVED
	NICKEL	NIUM	NIUM	SILVER	SILVER	DIUM	MU10	ZINC	ZINC
-:	(N1)	(SE)	(SE)	(AG)	(AG)	(V)	(V)	(ZN)	(ZN)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 1	972		•					_	٠ .
17	16	0	0			38	2.6	60	30
MAR., 1	973	•							
01	50	·				3.6	•3	40	20
JUNE								2.0	40
18	26					4.9	4.4	30	40

		•	SPE-						
			CIFIC CON-				** **		
			DUCT-		BICAR-	CAR-	ALKA- Linity	CARBON	
		DIS-	ANCE	PH	BONATE	BONATE	AS	DIOXIDE	TEMPER-
	TIME	CHARGE	IMICRO-		(HCO3)	(CO3)	CACO3	(CO2)	ATURE
DATE		(CFS)	( SOHM	(UNITS)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(DEG C)
OCT., 19	172								
17	1150		510	7.8	192	0	158	4.9	8.5
MAR., 19			,,,		1,2	v	170	7.7	0.5
01	0950		.500	7.8	235	0	193	6.0	.0
JUNE						•		•••	••
18	1340		480	8 - 1	214	0	176	2.7	10.0
			D1S-						
		015-	SOLVED		NON-	DIS-			
	D15-	SOLVED	MAG-		CAR-	SOLVED		DIS-	TOTAL
	SOLVED	CAL-	NE-	HARD-	BONATE	ALUM-	TOTAL	SOLVED	CAD-
	SILICA	CIUM	SIUM	NESS	HARD-	INUM	ARSENIC	ARSENIC	MIUM
	(\$102)	(CA)	(MG)	(CA,MG)	MESS	(AL)	(AS)	(AS)	(CD)
DATE	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(MG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19									
17		40	15	160	2				30
MAR., 19		6.3	2.2	220	27				
01 JUNE		52	23	220	27				<10
18		46	18	190	14				<10
	DIS- DIS-	TOT	D1S-						
	CAD-	TOTAL CHRO-	SOLVED CHRO-	TOTAL	DIS-		DIS-		DIS-
	MIUM	MIUM	MJUM	TOTAL COBALT	SOLVED . CDBALT	TGTAL COPPER	SOLVED	TOTAL	SOLVED
	(CD)	(CR)	(CR)	(CO)	(CO)	(CU)	COPPER (CU)	IRON	IRON
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(FE) (UG/L)	(FE) (UG/L)
					100727	100727	100727	100717	(00/1)
OCT., 19	72								
17	0					20	7	770	120
MAR., 19									
01 JUNE	0					10	10	1100	50
18	0					10	12	860	110
				D1 S-					
		DIS-	TOTAL	SOLVED		DIS-	TOTAL	DIS- Solved	
	TOTAL	SOLVED	MAN-	MAN-	TOTAL	SOLVED	MOLYB-	MOLYB-	TOTAL
	LEAD	LEAD	GANESE	GANESE	MERCURY	MERCURY	DENUM	DENUM	NICKEL
	(PB)	(PB)	(MN)	(MN)	(HG) '	( HG )	(MO)	(MO)	(NI)
DATE	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
OCT., 19	72	•				•			
17	200	4	50	20					75
MAR., 19	73								.,
01	<100	0	220	220					<50
JUNE 18	<50	0	60	50					<25
		-							123
	0.0		DIS-				-210		
	DIS- SOLVED:	TOTAL	SOLVED	TOT**	D1 S -	TOTAL	SOLVED	-07	-210
	NICKEL	SELE- Nium	SELE- NIUM	TOTAL SILVER	SOLVED	VANA- Dium	VANA-	TOTAL	SOLVED
	(NI)	(SE)	(SE)	(AG)	SILVER {AG}	(V)	DIUM (V)	ZINC (ZN)	ZINC (ZN)
DATE	(UG/L)	(ÚGŽĹ)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
DCT., 19	72								
17	3							40	
MAR., 19		,		_ <del>_</del>	<del>-</del>	- <b>-</b>		40	20
0.1	6							50	20
JUNE	_		•				•		
18	7	·						30	20

### COLORADO WATER RESOURCES CIRCULARS

- 1. Ground water in the Julesburg area, Colorado. 1948.
- 2. Ground water in the vicinity of Brush, Colorado. 1950.
- 3. Ground water in the vicinity of Trinidad, Colorado. 1952.
- 4. Ground water in Colorado and the status of investigations. 1953.
- Ground water in the Ogallala and several consolidated formations in Colorado. 1960.
- 6. Legal and management problems related to the development of an artesian ground-water reservoir. 1962.
- Ground water Prospects for irrigation in eastern Cheyenne and Kiowa Counties, Colorado. 1963.
- Potential ground-water development in the northern part of the Colorado High Plains. 1963.
- 9. Ground water in Colorado Its importance during an emergency. 1963.
- Effects of water management on a reach of the Arkansas Valley, La Junta to Las Animas, Colorado. 1963.
- 11. Pumping tests in Colorado. 1965.
- Geohydrologic data from the Piceance Creek basin between the White and Colorado Rivers, northwestern Colorado. 1968.
- Availability of water for artificial recharge, Plains Ground Water Management District, Colorado. 1970.
- 14. Electric analog model evaluation of a water-salvage plan, San Luis Valley, Colorado. 1970.
- 15. Ground-water occurrence in northern and central parts of western Colorado. 1972.
- Extent of development and hydrologic conditions of the alluvial aquifer, Fountain and Jimmy Camp Valleys, Colorado, 1972. 1973.
- Simulation of hydrologic and chemical-quality variations in an irrigated stream-aquifer system - A preliminary report. 1973.
- 18. Water in the San Luis Valley, south-central Colorado. 1973.
- Digital model of the hydrologic system, northern High Plains of Colorado - A preliminary report. 1973.
- Transit losses and travel times for reservoir releases, upper Arkansas River basin, Colorado. 1973 [1974].
- 21. Effect of mine drainage on the quality of streams in Colorado, 1971-72. 1974.
- 22. Appraisal of water resources of northwestern El Paso County, Colorado. [In press.]
- 23. Water-level declines and ground-water quality, upper Black Squirrel Creek basin, Colorado. 1973.
- 24. Digital model of the Ogallala aquifer of the northern part of the northern High Plains of Colorado. 1974.
- 25. Effects of metal-mine drainage on water quality in selected areas of Colorado, 1972-73. 1974.

# EXPLANATION OF PHOTOGRAPHS ON FRONT COVER

[Clockwise from upper left]

- ABANDONED MILL ALONG KERBER CREEK NEAR BONANZA (upstream from station SL-9).
- ABANDONED MINE AND "DEAD" BEAVER POND IN COPPER GULCH NEAR BONANZA (upstream from station SL-5).
- TENMILE CREEK NEAR CLIMAX SHOWING IRON STAIN DEPOSITED DURING HIGH FLOW (upstream from station TM-2).
- RED MOUNTAIN CREEK NEAR OURAY SHOWING TURBIDITY DUE TO SUSPENDED FERRIC HYDROXIDE (downstream from station UR-8).