3720 0002

Pyramid Lake Paiute Tribal Council

Post Office Box 256
Nixon, Nevada 89424
Telephone: (702) Nixon No. 3

November 15, 1984

Mr. John Schilling
Nevada Bureau of Mines & Geology
University of Nevada - Reno
Reno, NV 89557-0088

Dear Mr. Schilling,

As Mr. Tim McCauley, Planning Director, advised you over the phone we are enclosing the Tribe's Phase II report to be open filed to achieve some exposure. The Tribal Council chose this option at their November 9, 1984 Regular meeting.

Should someone want to follow up on the report with some field exploration they will be required to personally request this of the Tribal Council. Have them contact the Tribal Chairman for further information. My term as Tribal Chairman will be over as of January 7, 1985 and the new Chairman will be known following a December election.

My phone number is 476-0188 and that will also change in December because of Nevada Bell system improvements on the reservation.

Sincerely,

Roy Garcia

Roy Garcia
Tribal Chairman

cc: Robert Hunter, Superintendent, BIA
Jack Satkoski, U.S.B.M., Spokane

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item 2

FIELD INVENTORY OF MINERAL RESOURCES
PYRAMID LAKE INDIAN RESERVATION, NEVADA

Report BIA No. 38 - II

1982

Prepared by

U.S. Bureau of Mines

for

U.S. Bureau of Indian Affairs

FIELD INVENTORY OF MINERAL RESOURCES
PYRAMID LAKE INDIAN RESERVATION, NEVADA

Report BIA No. 38 - II

1982

by

Jack J. Satkoski

Andrew W. Berg

U.S. Bureau of Mines

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SUMMARY AND CONCLUSIONS

Three field seasons (1979-1981) were spent gathering geologic information on the mineral resource potential of the Pyramid Lake Indian Reservation. Stream sediment, soil, water, and rock samples were collected in conjunction with detailed geologic mapping of areas with known production or mineral potential. Considerable effort went into mapping and sampling a porphyry copper occurrence discovered by Bureau of Mines geologists during the stream sediment survey of the reservation.

Stream sediments were analyzed for gold, silver, copper, lead, zinc, molybdenum, tungsten, uranium and thorium. Most anomalies were field-checked and a few require more detailed evaluation.

Water samples taken from springs, creeks, and wells were analyzed for the same elements as the stream sediments, with the exception of tungsten and thorium. Only one water sample had anomalous values of uranium.

The Packard and Sano properties, and the Lakeview Mine, have produced small amounts of lead, silver, zinc, and gold. Surface and underground mapping of workings on the Packard and Sano properties indicate that the higher grade and most accessible ore has been mined. The veins in the area are narrow, discontinuous, and offset by faults. Samples from some of these veins show favorable lead, silver, zinc, and gold content. The area might attract the interest of a small mining company. Rock and soil sampling of the Lakeview Mine area indicates widespread occurrences of lead, silver, zinc, and gold. Mapping revealed the likelihood of several parallel veins that may contain ore at depth.

Little field time was allotted the Guanomi copper molybdenum deposit, which had received considerable attention by American Selco. A review of the available literature on the deposit indicates the presence of a large breccia zone that should be examined as a possible drilling target.

The Pyramid Lake copper deposit occurs in rocks with alkaline affinities, as do numerous diorite model copper-gold producers in British Columbia. The deposit differs from the diorite model because metamorphism has obscured its structural, lithologic, and alteration features associated with sulfides. Mapping, sampling, and an Induced Polarization (IP) survey indicate definite areas where drilling is warranted.

High-alumina clays are abundant on the reservation; high-iron clays are mined near the reservation for use in cement manufacture. Clay samples are moderately high in Al_2O_3 content but significant amounts of phosphorous and iron are a problem in beneficiation.

Marl and limestone occur on and near the reservation. There has been some production of marl, and the limestones of Marble Bluff have been tested for use in cement manufacture. It is not likely these commodities will greatly benefit the tribe because more favorable deposits exist closer to markets.

The reservation's oil, gas, and geothermal energy resources were not evaluated. Stream sediment, rock and water analyses, and scintillometer surveys indicate a low uranium potential. It does appear that a geysering geothermal well and hot springs in the Needles area could be utilized for agricultural purposes.

RECOMMENDATIONS

Color air photography, geologic mapping, and aeromagnetic surveys should be conducted on the reservation. Color air photography with overlapping coverage at a scale of 1 in. equals 1,000 ft would be useful in geologic mapping and general resource management. The aeromagnetic survey would aid in the exploration for para-magnetic mineral deposits. Specifically, the Pyramid Lake copper deposit and the pyrrhotite-pyrite massive sulfide exposed at the Boundary Prospect could be further delineated. These two surveys would comprise a data base which may attract exploration companies and increase leasing potential.

The Pyramid Lake copper deposit warrants core drilling. Four to six holes totaling 5,000 ft should adequately test the vertical extent of the best surface exposures and IP anomalies in Ore Gulch, Blizzard Creek, and south of Copper Point. Even if substantial copper sulfides are not encountered, the drilling may provide useful information leading to additional drilling.

At the Lakeview Mine, trenching is required in areas where surface samples contained high silver values. The Lakeview adit should be reopened, and mapped and sampled. Opening the adit would help determine the extent and grade of veins and alteration zones described in lease reports but never sampled.

Analysis of data at the Guanomi Mine indicates that additional evaluation is warranted, including an IP survey over a large breccia zone in the Guanomi stock. Abundant iron oxides should be studied for diagnostic copper or molybdenum boxworks.

Several areas with stream sediments showing anomalous metal contents require additional prospecting and sampling.

ACKNOWLEDGMENTS

Petrographic studies of the Pyramid Lake copper deposit by Jim Sjoberg (Reno Research Center) and Paul Klipfel (graduate student) were important contributions to the project. Michael Sweeney surveyed control points for the IP survey. Michael Dunn and Gary Galloway provided computer assistance for statistics on stream sediments. Ron Kistler and Carl Hedge of the U.S. Geological Survey provided Isotopic Age dates for the Pyramid Lake copper deposit. Special thanks is due Victor Hollister who provided valuable insight into the classification and exploration of the Pyramid Lake copper deposit. The authors take all responsibility for documentation, interpretation, and conclusions based on acknowledged contributions.

INTRODUCTION

Geographic Setting

The Pyramid Lake Reservation covers 475,086 acres, or about 742 sq mi (fig. 1), and was created for Paiute and other resident Indians by Executive order in 1874. Several lots and ranches in Wadsworth township within the reservation are owned in fee by non-Indians.

The reservation includes most of the Lake Range and Terraced Hills, and parts of the Fox Range, Virginia Mountains, Pah Rah Range, and Black Mountain. The southern part of the reservation extends for about 18 mi along the valley of the Truckee River, which empties into Pyramid Lake. Pyramid Lake covers about 180,000 acres (Harris, 1970) in the central portion of the reservation. The valley of Winnemucca Lake lies along part of the eastern boundary, and the valleys of Smoke Creek Desert and San Emidio Desert extend into the northern parts of the area.

The topography of the ranges is moderately rugged, with elevations ranging from about 4,000 ft at the bases of the ranges to more than 8,000 ft in the Lake Range. Low relief characterizes the valleys and the shoreline areas of Pyramid Lake, the lowest point in the area, which had a surface elevation of 3,792 ft in 1964. The elevation and surface area of the lake are decreasing, however, because annual inflow from the Truckee River and intermittent streams is less than annual loss by evaporation. From 1919 to 1969, the level of Pyramid Lake dropped about 66 ft. A branch of the Truckee River also supplied water to Winnemucca Lake until the early 1900's, but that lake is now dry.

The average annual precipitation at Nixon is 7.2 in., most of which comes from winter storms. The precipitation is significantly greater in the high parts of the ranges.

The reservation is within the area covered by the Reno and Lovelock topographic maps published at a scale of 1:250,000. More detailed topographic maps at scales of 1:62,500 or 1:24,000 also cover the reservation.

State Highways 33 and 34 are along the west and east sides of the reservation, respectively, and join Interstate 80, a major east-west highway. The Western Pacific Railroad crosses the northwest corner of the reservation. Commercial transportation is available in Reno, 40 mi to the southwest. The small towns of Nixon, Sutcliffe, and Wadsworth are within the reservation; tribal headquarters is at Nixon. The Indian population residing on, or adjacent to, the reservation is about 600.

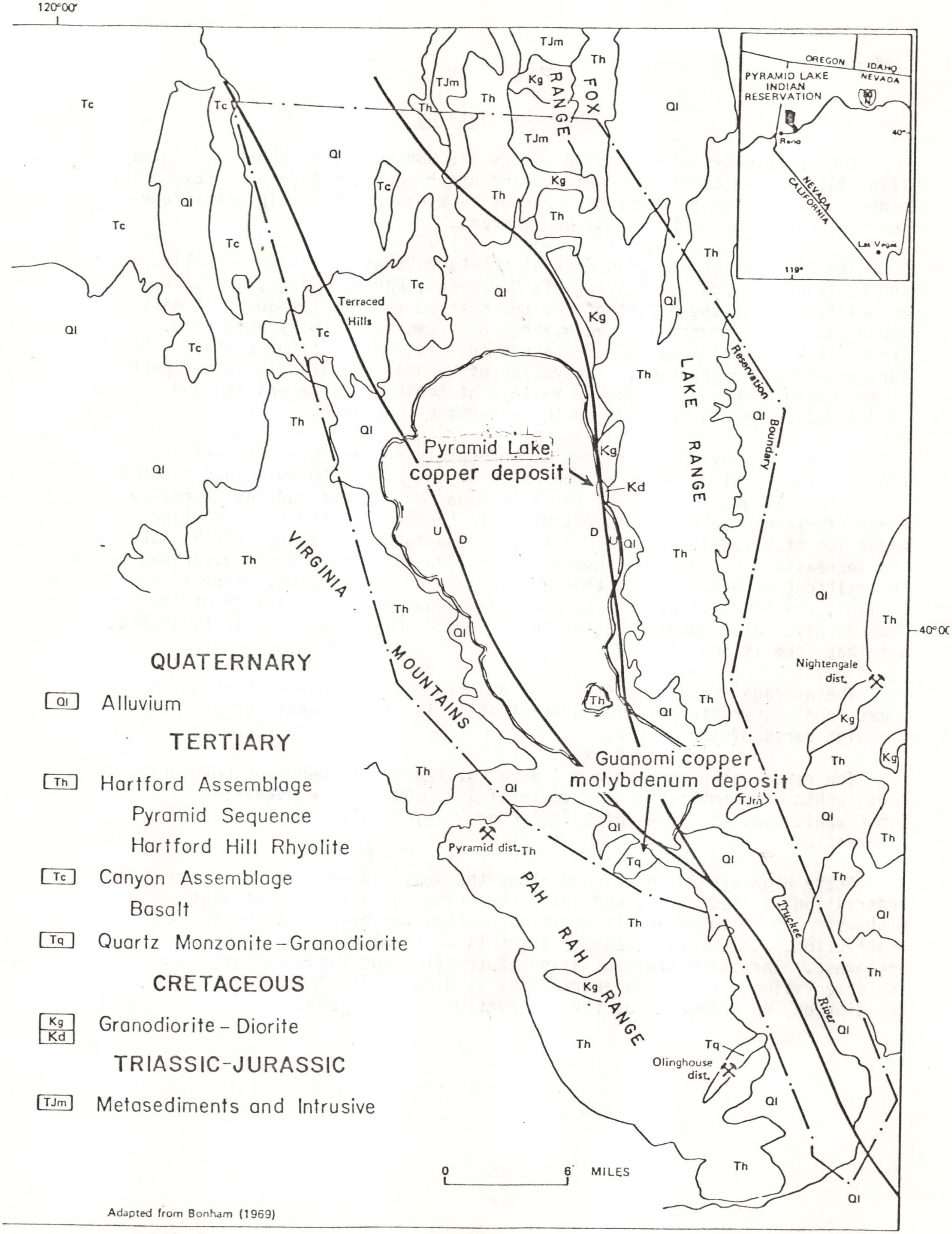


Figure 1.--Location and geology map, Pyramid Lake Indian Reservation.

Regional Geology

Regional geology has been described by Bonham (1969). The Pyramid Lake Indian Reservation is situated within the Basin and Range province, and Pyramid Lake is in a graben bounded by horsts of the Lake Range and Virginia Mountains. The reservation is located within the northeast edge of the Walker Lane; a 20-mi-wide structural feature dominated by right-lateral en echelon faults.

The oldest rocks in the area are Jurassic-Triassic metasediments, which are intruded by a Cretaceous granodiorite in the Fox Range (fig. 1). Similar intrusives have been exposed by erosion in the Lake and Pah Rah Ranges. The Hartford assemblage of Tertiary age comprises most of the regional geology. It consists of a variety of volcanic units that unconformably overlie Mesozoic intrusives and metasediments. Tertiary granitic rocks intrude the Hartford assemblage in several areas. Precious and base metal deposits mined in the Olinghouse District are related to these intrusives, and possibly underly the Pyramid mining district (Wallace, 1975).

Previous Investigations

Regional geology was first described in the reports on the exploration of the Fortieth Parallel (Hague and Emmons, 1877; King, 1878). Physiographic features related to Pyramid Lake and Winnemucca Lake were described by Russell (1885) during his studies of Lake Lahontan, and the lacustrine and subaerial units were studied in detail by Morrison and Frye (1965). Geology in the vicinity of Mullen Pass has been described by McJannet (1957) and Wallace (1975). The most comprehensive source of information on the geology of the Pyramid Lake Indian Reservation is the report by Bonham (1969) on the geology and mineral deposits of Washoe and Storey Counties. The water resources of the area have been studied by Van Denburgh, Lamke, and Hughes (1973). More recently the Department of Energy (DOE) has been evaluating the uranium potential of the Reno and Lovelock 2° Quadrangles which include the reservation.

Scope of Work

Mineral resource investigations of the Pyramid Lake Indian Reservation consisted of regional and specific programs. Stream sediments, surface water, and well water were sampled as a means of identifying extensions of known mineralized areas or discovering new target areas (Appendix A). During this geochemical survey, altered or sulfide-bearing outcrops and unreported prospects were sampled. Portable scintillometers (Geometrics Gr-101A) with threshold audio alarm were carried by crew members during the surveys. Time did not permit geologic mapping on a regional scale.

Detailed mapping and sampling was carried out on known mines, interesting prospects, or new discoveries with favorable potential. Where appropriate, geophysical surveys were conducted.

STREAM SEDIMENT GEOCHEMISTRY

Introduction

Stream sediments were collected throughout the reservation in areas of favorable geology and adequately developed drainage systems. Analysis of stream sediments for precious and base metals can indicate anomalous areas that may reflect mineral deposits at depth. Anomalous areas were, in most cases, further examined by more detailed stream sediment sampling and, if warranted, rock or soil sampling.

A total of 1,083 stream sediment samples were plotted on topographic maps or air photographs, digitized using the Universal Transmercator (UTM) system, and re-plotted at a scale of 1:100,000. Plate 1 shows the quadrangle coverage of the reservation and stream sediment sample locations. Quadrangles of the reservation are numbered from upper left to lower right. Each quadrangle's samples are numbered consecutively. Reference to a specific sample is by quadrangle number, followed by sample number (e.g. 4-21). Samples with the same UTM coordinate indicate a split of the original sample was submitted to the analytical laboratory as a check on analytical precision and accuracy.

Analyses of stream sediments were evaluated statistically as explained in Appendix B. Appendix C lists the metal contents of the stream sediments. Threshold values for the gold, molybdenum, and tungsten were adjusted upward because of variation in detection limit, or excessive number of determinations below the detection limit (table 1). Some geochemical anomalies were obviously a result of previous mining activities or contamination from ranching. Other anomalous areas received follow-up field work.

Evaluation of Anomalies

Five stream sediment samples contained 0.3 parts per million (ppm) or greater gold (quadrangles 3 and 10, pl. 2). Additional rock samples 15 through 19 (pl. 3), collected to check anomalous sediment samples 3-127 and 3-132, did not contain sufficient precious or base metals for the area to be of further interest. Additional stream sediment and rock sampling is warranted in the area of the three remaining gold anomalies.

Eight stream sediments contained 2.0 ppm or greater silver in quadrangles 3, 7, and 11. Samples 11-99 and 11-127 are from the Lakeview Mine area. The remaining anomalies should be investigated.

Table 1.--Statistically determined threshold and adjusted threshold of metals in stream sediments, Pyramid Lake Indian Reservation

[ppm = parts per million]

Statistical parameter	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
Mean (ppm)	0.022	0.170	35	17	88	3	13	2.1	23
Standard deviation (ppm)	.053	.947	27	32	69	0.7	5	1.1	14
Threshold (ppm)	.13	2.0	89	81	226	4	20	4.3	51
Adjusted threshold (ppm)	.30	2.0	89	81	226	8	40	4.3	51
Number of anomalies	5	8	53	6	18	10	3	52	25

Fifty-three copper anomalies occur in quadrangles 2, 3, 10, 11, and 13. Most of them occur in clusters. All but one area were field-checked by additional prospecting, and stream sediment and rock sampling. In quadrangle 3, the cluster of copper anomalies and one gold anomaly were further evaluated by prospecting and rock sampling. Rock samples 15 through 19 (pl. 3 and Appendix D) did not contain sufficient precious or base metals to be of further interest. Quadrangle 10 warrants additional prospecting near the reservation boundary. Four clusters of anomalies occur in quadrangle 11, including the area around the Lakeview Mine. The remaining clusters occur in Pyramid Sequence volcanics. No unusual alteration or geologic factors were observed there to explain the copper anomalies.

Six lead anomalies occur at scattered locations or are associated with copper. The only area of interest, south of Buckbrush Spring in quadrangle 3, was discussed earlier.

Quadrangle 2 contains the only cluster of zinc anomalies that was investigated. This area contains outcrops of shale and pyrite-bearing limestone that contain up to 0.29 percent zinc (rock samples 5-8, pl. 3, and Appendix D). Additional mapping and rock sampling is warranted in the area.

Two molybdenum anomalies occur with the zinc anomalies in the area of the pyrite-bearing limestone. One additional molybdenum anomaly is located in quadrangle 18 in the area of the Guanomi Mine and copper-molybdenum porphyry. This area is discussed further under the section Mines and Prospects.

Tungsten geochemistry does not appear favorable and no additional work is warranted. The ten tungsten anomalies are isolated occurrences or are not significantly above threshold.

Fifty-two stream sediments were anomalous in uranium, and 25 were anomalous in thorium. Scintillometer readings and analyses of rock samples for uranium and thorium indicate a low potential for these metals.

SURFACE- AND GROUND-WATER GEOCHEMISTRY

Surface and ground water were routinely sampled during the stream sediment survey. Sampling procedures are described in Appendix A, and metal contents are tabulated in Appendix E. Plate 3 shows sampling locations.

Analysis of water samples did not prove useful in outlining areas of significant mineral potential. Only sample no. 1, well water collected at the Sand Pass Railway Station, contained notable amounts of uranium (80 ppb).

ROCK GEOCHEMISTRY

Plate 3 shows the location of rock samples described in terms of petrography and metal content in Appendix D. Several areas contained anomalous values of precious and base metals, and were resampled in more detail. The following discussion concerns these anomalous areas.

Samples 9 through 12 were collected in sec. 36, T. 29 N., R. 21 E., an area of shallow excavations on a low hill 2,350 ft from the southern boundary, and 1,800 ft from the eastern boundary of section 36. Outcrops are scarce, and consist of granodiorite cut by a poorly exposed, altered, and brecciated dacite dike. A grab sample (no. 9) from a small excavation in altered granodiorite contained 1.2 ppm gold, 13 ppm silver, 0.1 percent copper, and 1.3 percent lead. Additional samples (nos. 10-12) from limonite boulders and the breccia zone were considerably lower in these elements, but tungsten and fluorine were unusually high in samples from the breccia.

Samples 26 through 29 were collected in sec. 28, T. 27 N., R. 22 E., near a small adit located 1,500 ft south of the northern boundary and 650 ft west of the eastern boundary of section 28. A 6-ft-long adit intersects a 3- to 8-ft-wide shear zone and silicified vein in Tertiary volcanics. The vein is bounded by a fault on the south, and appears to pinch out about 300 ft north of the adit. One selected sample (no. 26) contained 0.02 oz/ton gold, 22.5 oz/ton silver, 0.09 percent copper, 1.5 percent lead, and 0.65 percent zinc. A resample at the same location contained 9.6 oz/ton silver. Further sampling along the shear zone revealed sporadically high gold values (0.04 and 0.09 oz/ton). Additional prospecting in the area is warranted.

Samples 51 through 57 were collected in sec. 12, T. 23 N., R. 21 E. The area is located 1,700 ft from the southern boundary and 1,100 ft from the eastern boundary of section 12, and is on Indian land near the Quail Canyon Ranch. It borders the Pyramid mining district on the east. A parallel series of limonite-stained, highly silicified ribs and veins strike east-west across altered hornblende dacite. The silicified zone is 100-500 ft wide and traceable for 1,000 ft along strike. Two samples from silicified veins containing disseminated pyrite (nos. 52 and 55) contained 44 and 100 ppm molybdenum. Other samples lacked high molybdenum content.

Petrographic examination by Jim Sjoberg (Reno Research Center) indicates the silicified zone is made up of:

60-65 percent silicified groundmass
20-25 percent kaolinite, chlorite, sericite, and talc
5-7 percent quartz and K-feldspar phenocrysts
5-7 percent opaques and iron oxide staining

No additional evaluation is warranted in this area.

MINES AND PROSPECTS

Boundary Prospect

The Boundary Prospect is located in sec. 20, T. 29 N., R. 21 E., (pl. 3, fig. 2). Workings consist of one short adit that crosscuts a quartz and limonite vein. The geology of the area consists of Triassic-Jurassic Nightingale Sequence rocks (limestone and metasediments) intruded by gabbro (norite) and diorite, which has been altered and metamorphosed. The mafic rocks have been subsequently intruded by granitic dikes and a granodiorite body exposed about 1,000 ft west from the main sampled area. The older intrusive rocks were covered by Tertiary volcanics, but are now partly exposed by erosion. Volcanic cover prevents any detailed mapping of the older intrusives that contain the mineralized outcrops.

The gabbroic and diorite intrusives are exposed in a small creek gully. Iron-oxide staining is common and sulfide minerals occur in both disseminated and massive form. Seventeen rock samples were collected from host rock and sulfide-bearing outcrops (Appendix F). Whole rock analyses were carried out on two of these samples (Appendix G). The massive sulfide outcrop is exposed in the east bank of the creek and consists of a mixture of pyrrhotite and pyrite (fig. 3). Samples of the outcrop contained anomalous concentrations of copper (340 and 460 ppm) and 0.1 and 0.12 percent cobalt. No stratification was noted in the sulfides. Disseminated chalcopyrite with malachite staining occurs locally in altered and metamorphosed gabbro on both sides of the creek, upstream from the massive sulfide outcrop. Selected samples (5, 9, and 14) contained from 0.17 to 0.29 percent copper. Sample no. 8 contained disseminated pyrrhotite with a trace of chalcopyrite. The gabbro with its local disseminated sulfide occurrences disappears under Tertiary volcanics.

Pendants of gabbro in granodiorite containing traces of chalcopyrite have been described in the headwaters of Wild Horse Canyon, and at the Wild Horse Mine (Bonham, 1969), about 3 mi north of the reservation. Geologic mapping from Mullen Canyon to Wild Horse Canyon would be useful in understanding the Boundary Prospect and Wild Horse Canyon copper occurrences. Magnetometer and electromagnetic surveys should be conducted in the area of the Boundary Prospect to delineate possible underlying massive sulfide deposits. A low-grade "porphyry-type" deposit may exist in this area.

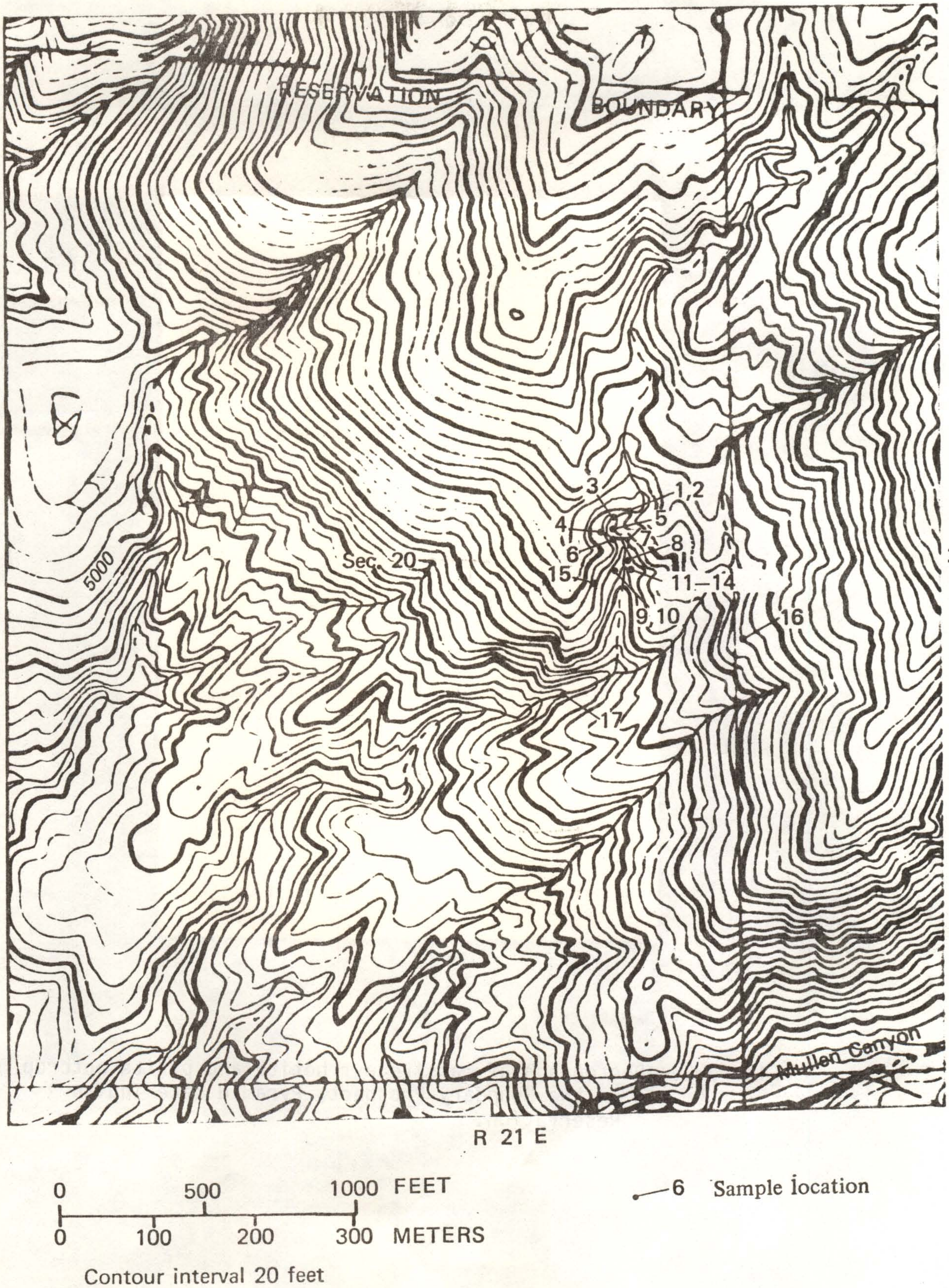


Figure 2.--Sample locations, Boundary Prospect, Pyramid Lake Indian Reservation (see pl. 3 for area location and Appendix F for assays).

Figure 3.--Photograph of massive pyrrhotite and pyrite outcrop on the Boundary Prospect, Pyramid Lake Indian Reservation.

Packard and Sano Properties

Geology

The adjoining Packard and Sano properties are located about 5 mi north of Pyramid Lake in secs. 4 and 9, T. 28 N., R. 21 E., (pl. 4, fig. 4).

The oldest rocks in the area comprise the Jurassic-Triassic Nightingale Sequence, and consist of slate, phyllite, hornfels, calc-silicate hornfels, and marble (Bonham, 1969). In the vicinity of the Packard and Sano properties, these rocks have been intruded by a coarse-grained granodiorite. A medium-grained quartz monzonite intrudes the granodiorite and Nightingale Sequence. The Miocene Pyramid Sequence volcanics overly the metamorphic and intrusive rocks, and consist of basalt, andesite, and light-colored tuff.

Structure and Mineralization

The properties are situated in a tilted fault block along the east side of a northwest-trending basin and range fault.

Mineralized structures of the Packard and Sano properties consist of easterly-striking and northerly-dipping veins and fault zones. They are generally oxidized, but do contain sulfide minerals as shown in portions intersected by adits, where galena, sphalerite, and chalcopyrite have been mined. The mineralized zones are near (1) the metasediment-granodiorite contact; (2) the metasediment-quartz monzonite contact; and, (3) the granodiorite-quartz monzonite contact. Veins containing anomalous concentrations of gold, silver, lead, zinc, and copper have been sampled and mapped from the Packard workings over a distance of 3,000 ft to the north (Appendix H). Most of the veins appear to have been offset by faulting. Vein width on the properties varies from a few inches to over 6 ft. Selected dump samples containing galena, sphalerite, and chalcopyrite contain as much as 0.95 oz gold/ton, 20.2 oz silver/ton, 16.9 percent lead, 11.9 percent zinc, and 0.23 percent copper.

The Packard and Sano properties were developed in the early 1920's. The Packard Mine consisted of approximately 1,000 ft of workings (now caved) on two levels (fig. 5). The main orebody was intersected in the lower workings between the first south-directed crosscut and the northwest crosscut. A 3-ton shipment of hand-sorted ore that assayed 0.135 oz gold/ton, 38.1 oz silver/ton, 22.3 percent lead, and 4.3 percent zinc was shipped from this 200-ft section. The crosscuts suggest the vein may have been faulted off on both ends.

The Sano workings adjoin the Packard property on the north. The middle and upper Sano adits (figs. 6 and 7) were driven along a vein and gouge zone, 2-8 ft wide, that is offset by a fault between the two adits. Samples from the vein contained up to 0.03 oz gold/ton, 9.1 oz silver/ton, and 3.0 percent lead. This vein may be the same structure mined on the Packard properties to the southeast.

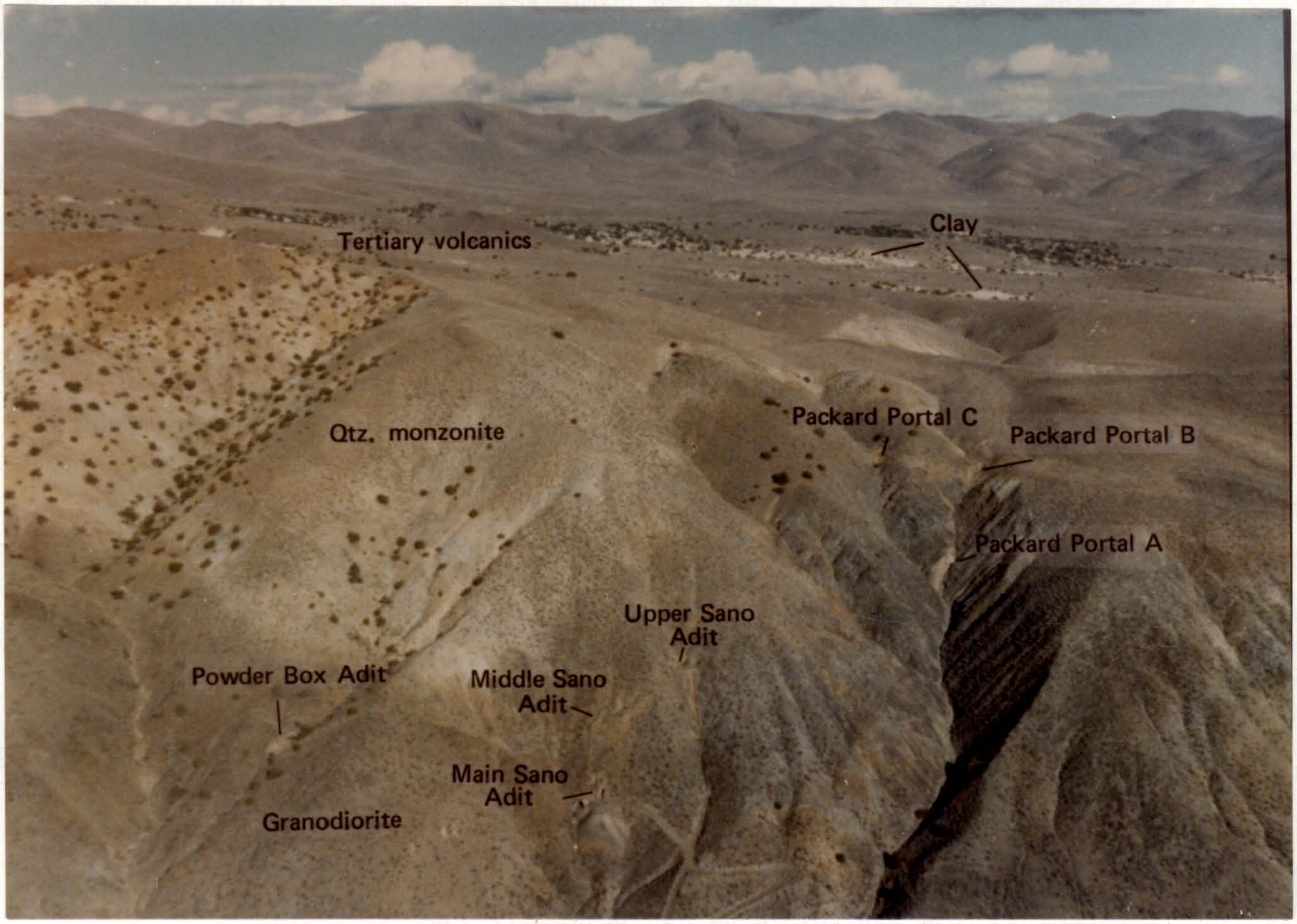


Figure 4.--Easterly-looking photograph of the Packard and Sano properties, Pyramid Lake Indian Reservation.

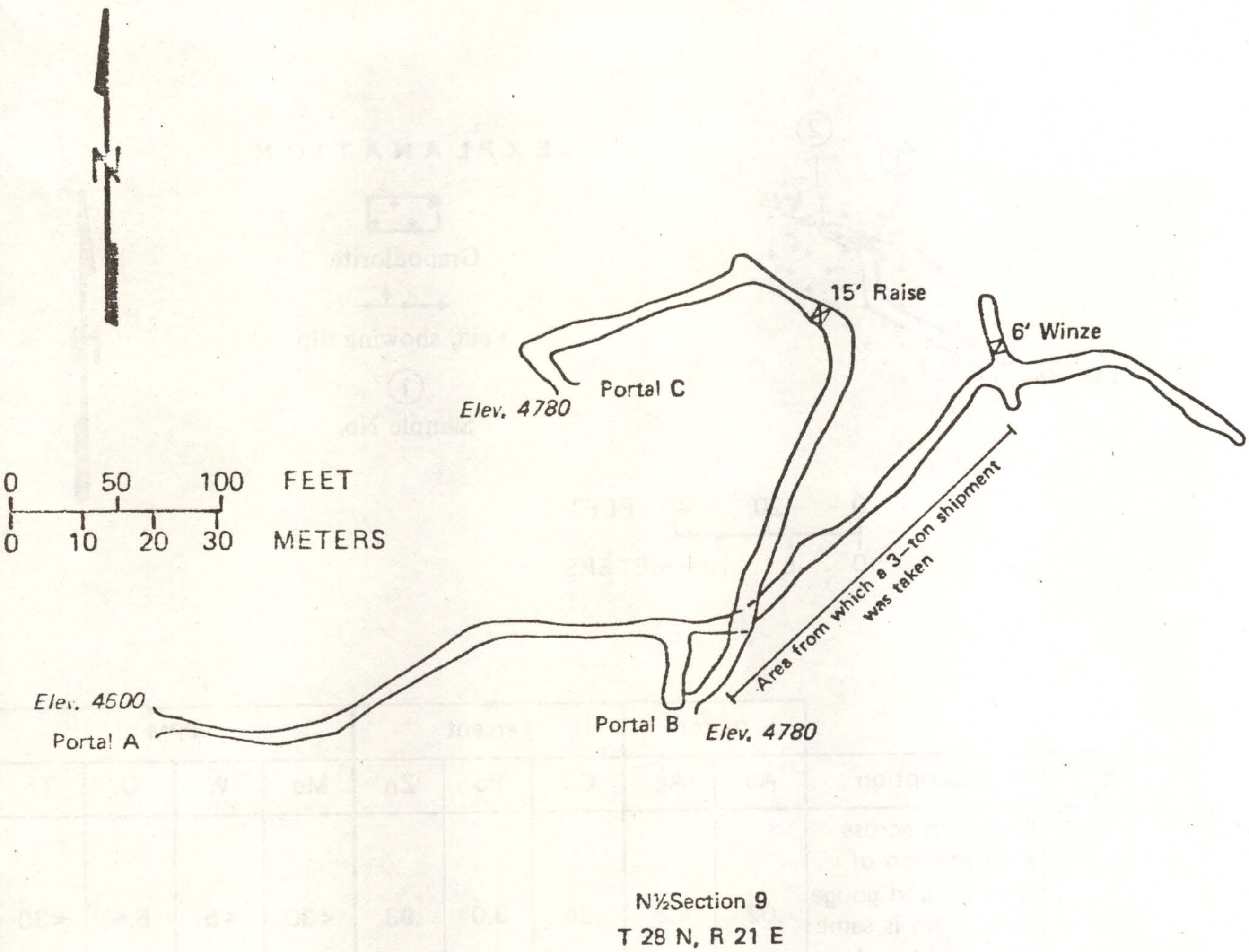
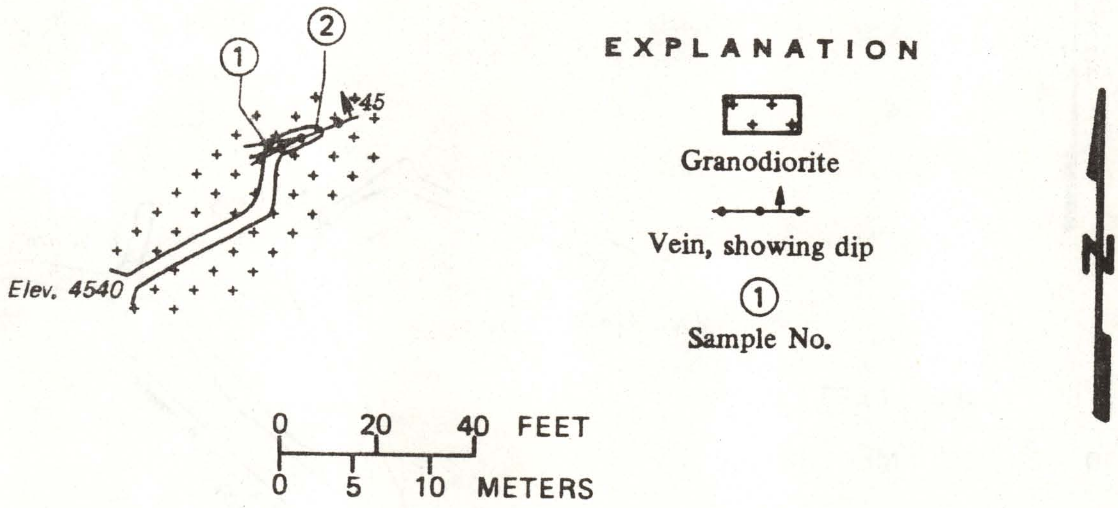
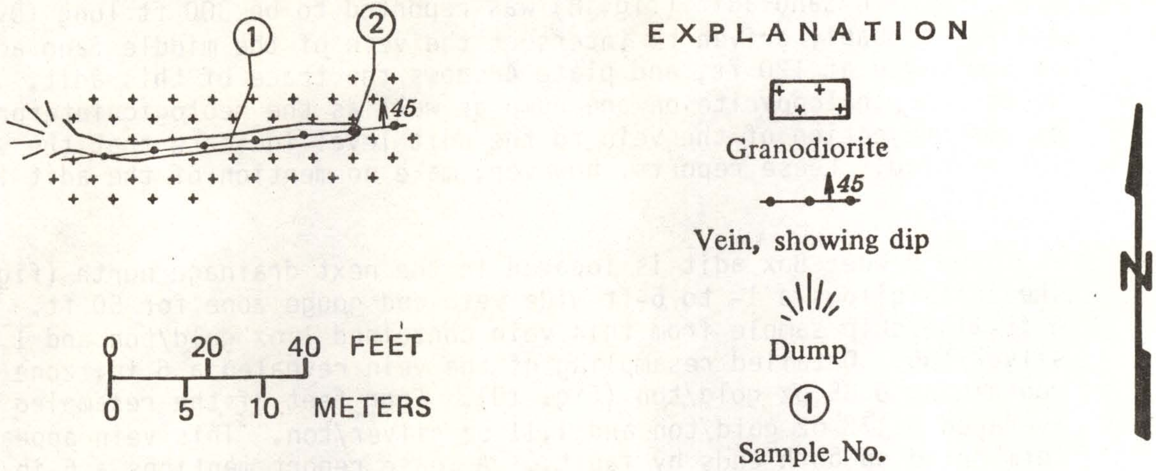


Figure 5.--Sketch map of the Packard Mine underground workings, Pyramid Lake Indian Reservation (see pl. 4 for adit location).



Sample No.	Description	oz/ton		Percent			PPM			
		Au	Ag	Cu	Pb	Zn	Mo	W	U	Th
1	8–ft chip across wide portion of limonite and gouge zone. Vein is same sampled at surface. (See Plate 4 No. 21)	.02	4.8	.04	3.0	.93	<30	<5	5.4	<30
2	2–ft chip across vein and limonite zone.	.03	3.5	.04	2.4	.75	<30	<5	4	30

Figure 6.--Geology and analytical results of the Middle Sano Adit, Pyramid Lake Indian Reservation (see pl. 4 for adit location).



Sample No.	Description	oz/ton Au	oz/ton Ag	Percent Cu	Percent Pb	Percent Zn	PPM Mo	PPM W	PPM U	PPM Th
1	3–ft chip across argillic zone containing limonite and qtz.	.03	9.1	.06	1.4	.35	.03	<5	6	30
2	2–ft chip across same vein as above at face.	.02	3.1	.03	.6	2.2	<30	<5	4.4	<30

Figure 7.--Geology and analytical results of the Upper Sano Adit, Pyramid Lake Indian Reservation (see pl. 4 for adit location).

The main Sano adit (fig. 8) was reported to be 300 ft long (Dyer, 1929), and was probably driven to intersect the vein of the middle Sano adit. It is now caved at 120 ft, and plate 4 shows the trace of this adit. Samples of galena and chalcopyrite on the dump as well as the geologic interpretation of the projection of the vein to the adit level indicate that the vein was intersected. Lease reports, however, make no mention of the adit intersecting the vein.

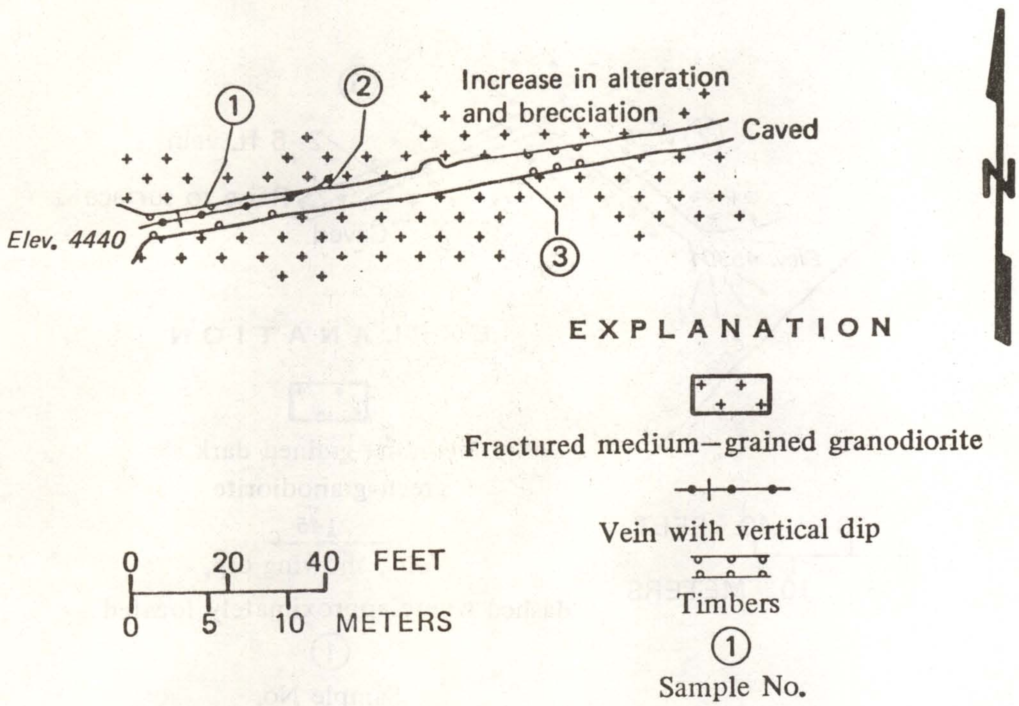
The Powder Box adit is located in the next drainage north (fig. 9). The adit follows a 1- to 6-ft-wide vein and gouge zone for 50 ft. An initial 6-ft-wide chip sample from this vein contained 1 oz gold/ton and 1.3 oz silver/ton. Detailed resampling of the vein revealed a 6 in. zone of limonite containing 0.85 oz gold/ton (fig. 10). Four feet of the resampled vein averaged 0.173 oz gold/ton and 1.11 oz silver/ton. This vein appears to be terminated on both ends by faults. A lease report mentions a 6-in.-wide vein containing galena and pyrite in the quartz monzonite. No veins were found in quartz monzonite during this study.

The north Sano adit was driven in argillic-altered and fractured granodiorite near its contact with metasediments (fig. 11). Several narrow siderite veins and gouge zones were intersected. The highest assay of samples from the adit was 0.03 oz gold/ton and 0.44 oz silver/ton.

Two narrow veins containing appreciable gold and silver crop out east of the north Sano adit (pl. 4). Two samples of these veins (nos. 12 and 13) contained 0.05 and 0.07 oz gold/ton and 0.44 and 4.2 oz silver/ton, respectively.

The northermost sample from the Sano property contained significant gold, silver and copper. Sample no. 8 was from the dump of a 30-ft adit in metasediments and contained 0.04 oz gold/ton, 5.2 oz silver/ton, and 5.6 percent copper. Only brecciated hornfels with calcite stringers was found in this adit.

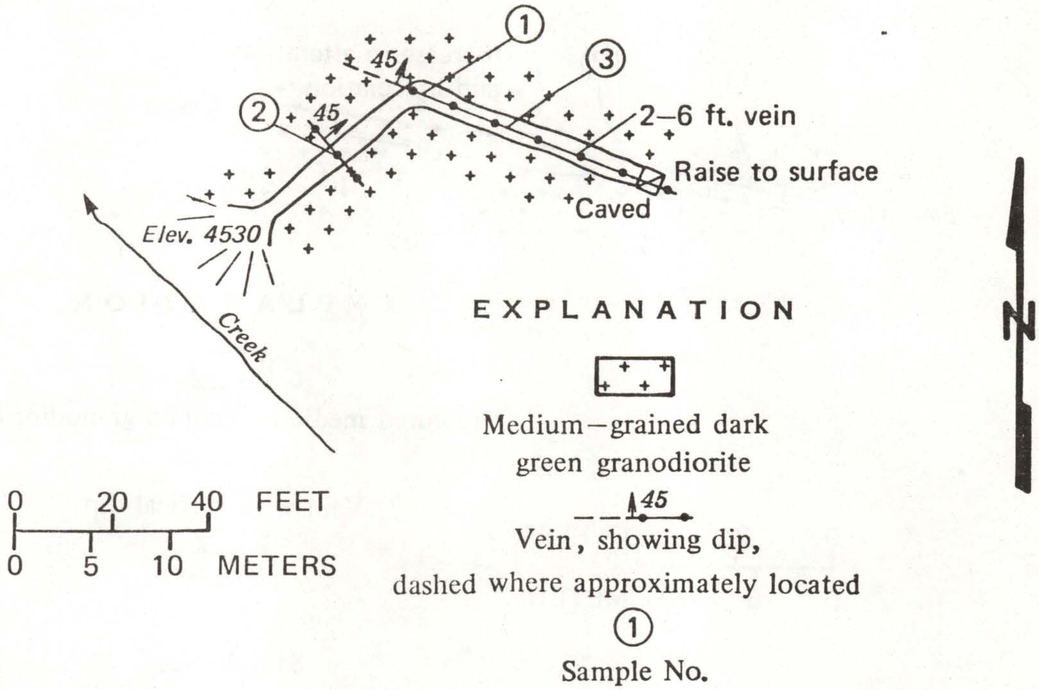
Sampling of veins in the middle and upper Sano adits indicate the vein carries marginally economic concentrations of gold and silver, with lesser amounts of lead and zinc. Geologic mapping shows, however, that these veins are offset or terminated by faulting. The caved portion of the main Sano adit should be opened to permit sampling of the lower portion of the vein. If results are encouraging, then core drilling should be carried out to intersect (1) the vein mined in portal A of the Packard Mine; (2) the vein of the middle Sano adit; and (3) the Powder Box adit vein.



Sample No.	Description	oz/ton Au	oz/ton Ag	Percent Cu	Percent Pb	Percent Zn	PPM Mo	PPM W	PPM U	PPM Th
1	2–ft chip across gray gouge zone. Contains limonite, calcite, and siliceous fragments.	.007	.05	.01	.03	.06	<30	<5	2.3	30
2	1 ft chip through gouge zone 1 ft above floor.	.02	.09	.02	.07	.09	<30	*	4.1	<30
3	2–ft chip across pale green argillic clay zone. Flat lying 8 ft above floor.	.004	.05	.005	<.003	.006	<30	<5	.8	<30

* Interference

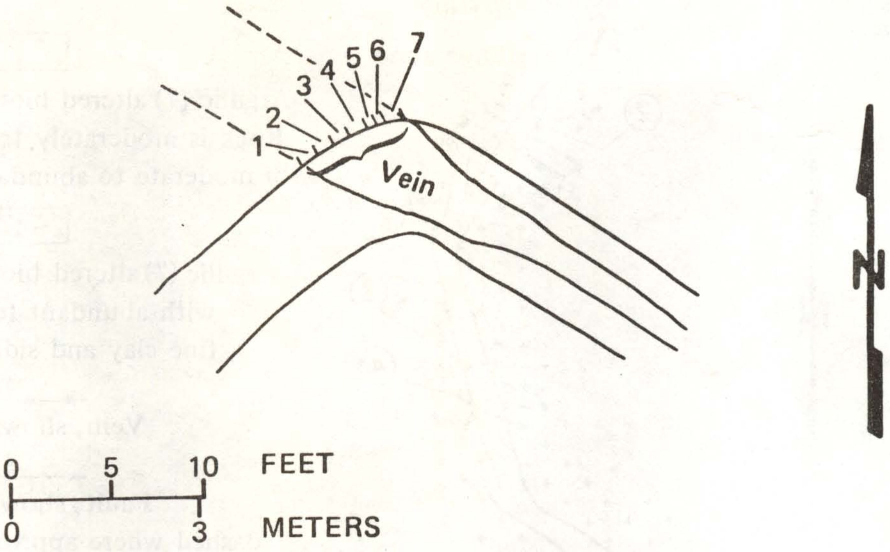
Figure 8.--Geology and analytical results of the Main Sano Adit, Pyramid Lake Indian Reservation (see pl. 4 for adit location).



		oz/ton		Percent			PPM			
Sample No.	Description	Au	Ag	Cu	Pb	Zn	Mo	W	U	Th
1	6–ft chip across vein and gouge zone containing some malachite.	1.0 .93	.1 1.3	.08 Rerun	.09	.05	<30	*	2.8	60
2	2–5–in limonite vein in gouge zone.	Nd	.03	.01	.02	.03	<30	<5	2.0	40
3	1 ft limonite vein including 1–2–in qtz vein.	.03	3.3	.11	.80	.12	<30	*	22	50

*Interference

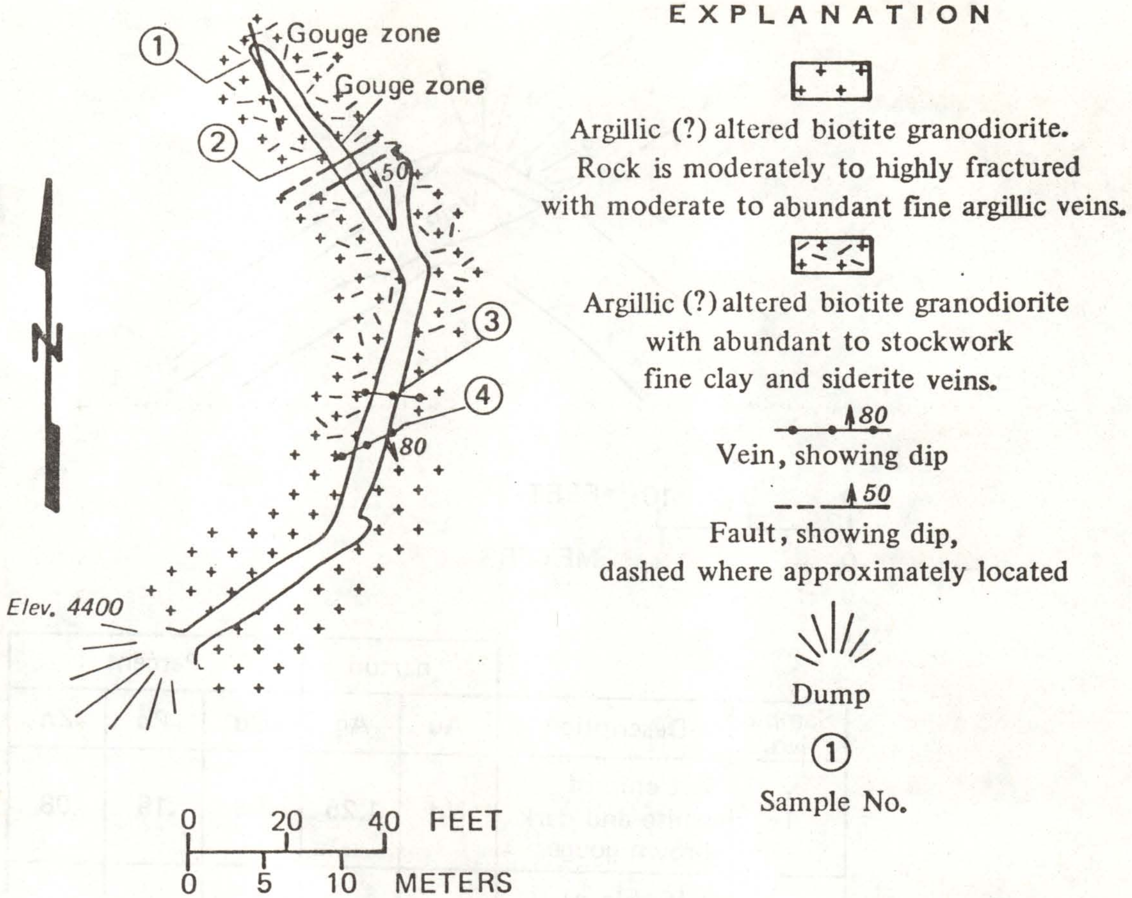
Figure 9.--Geology and analytical results of the Powder Box Adit, Sano property, Pyramid Lake Indian Reservation (see pl. 4 for adit location and figure 10 for detailed vein sampling).



Sample No.	Description	Au (oz/ton)	Ag (oz/ton)	Cu (Percent)	Pb (Percent)	Zn (Percent)
1	1 ft chip of white and dark brown gouge.	Nd	1.25	.08	.19	,08
2	1 ft chip of brown and white gouge.	Nd	.3	.03	.04	.06
3	do	.02	.3	.04	.04	.07
4	Same as no. 2 with minor malachite.	.13	2.8	.10	.13	.11
5	6-in chip of limonite gouge with granodiorite fragments.	.01	.2	.05	.01	.03
6	6-in chip of dark brown limonite gouge.	.85	1.3	.08	.05	.01
7	1 ft chip of limonite gouge with granodiorite fragments.	.04	.3	.03	.01	.02

Sample results are an average of two assays
Nd—not detected

Figure 10.--Detailed chip sample of the gold zone in the Powder Box Adit, Sano property, Pyramid Lake Indian Reservation (see fig. 9).



Sample No.	Description	Au (oz/ton)	Ag (oz/ton)	Cu (Percent)	Pb (Percent)	Zn (Percent)	Mo (PPM)	W (PPM)	U (PPM)	Th (PPM)
1	4–ft chip of limonitic fault gouge.	.01	.19	.07	.01	.03	<30	<5	1.9	40
2	7–ft chip of limonitic gouge zone with calcite, gypsum and minor qtz.	Nd	.01	.01	.003	.005	<30	8	1.0	40
3	1–6–in wide siderite vein.	.006	.44	.02	.58	.16	<30	12	1.7	<30
4	1–3–in wide siderite vein.	.03	.03	.21	.009	.008	<30	<5	1.6	<30

Nd–not detected

Figure 11.--Geology and analytical results of the North Sano Adit, Pyramid Lake Indian Reservation (see pl. 4 for adit location).

The Pyramid Lake Copper Deposit

Introduction

The Pyramid Lake copper deposit occurs in a metamorphic mafic complex of probable Mid-Cretaceous age. Metamorphism of the complex occurred during intrusion of a Mid-Cretaceous quartz monzonite. Low to moderately-high thermal metamorphism has obscured textural, lithologic, and alteration features associated with mineralization. The presence of scapolite and epidote as pervasive alteration minerals, coupled with the occurrence of disseminated sulfides in diorite suggest the Pyramid Lake copper deposit is similar to the diorite model porphyry copper deposits. However, the metamorphic overprint of this deposit precludes classification with any of the current porphyry copper models.

Geology and Petrology

Figure 12 shows local geology of the Pyramid Lake copper deposit. The dark rocks of the metamorphic mafic complex are the oldest and will be described in detail. Quartz monzonite intrudes the complex and is the source of the thermal metamorphism. Miocene volcanics cap the erosional surface of the quartz monzonite and complex. The two lighter bands in figure 12 represent older shorelines of Pyramid Lake, which follow the trace of a north-trending Basin and Range Fault.

Interpretation of the Pyramid Lake copper deposit is based on mapping, geochemical analysis, and 75 petrographic determinations.

The principal rock types of the metamorphic mafic complex are diorite porphyry and foliated diorite porphyry (pl. 5). The complex displays localized color and textural banding suggesting volcanic units; however, no primary volcanic textures including vesicles and amygdules have been found because of the loss of original rock texture during metamorphism. Overall lateral and vertical exposure of the complex is good except at lower elevations where outcrops are obscured by talus and tufa.

The diorite porphyry consists of 25-35 percent plagioclase (An_{20-40}) in the form of relict phenocrysts, 0.5-2 cm long, and in the groundmass. The phenocrysts are prominent on weathered surfaces. Pyroxene and hornblende are present in about equal amounts and comprise 30-36 percent of the rock. Much of the pyroxene is diopside or augite with some replacement by hornblende along rims and cleavages. The hornblende also occurs as poikilitic grains containing inclusions of pyroxene. K-feldspar (12-15 percent) occurs as crystalloblastic grains in seams and groundmass. Scapolite (5-7 percent) occurs as poikiloblastic grains replacing plagioclase. Epidote (2-4 percent) occurs as 0.25 mm or smaller grains replacing plagioclase or primary ferromagnesian silicates. Sphene (2 percent) occurs as small patches choked with opaque inclusions. Accessory minerals include calcite, actinolite, and magnetite. Diorite porphyry with its characteristic crystalloblastic texture indicates thermal metamorphism. The type locality for the rock is in the vicinity of Blizzard Creek west of the trail (Plate 5).

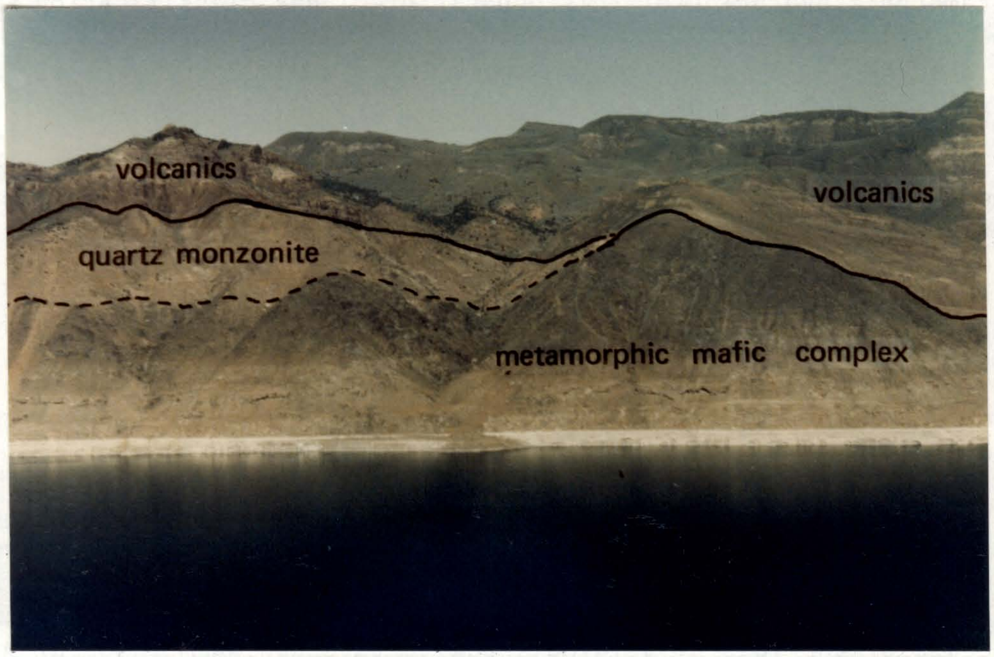


Figure 12.--Easterly-looking photograph showing regional geology of the Pyramid Lake copper deposit.

Foliated diorite porphyry with syenodiorite-to-monzonite affinities contains 30-35 percent plagioclase (An_{20-40}). The plagioclase occurs mainly as relict phenocrysts 0.1-1 cm long and in the groundmass. In some thin-sections, saussuritization of the plagioclase is apparent. K-feldspar content ranges from 15-25 percent and consists of crystalloblastic orthoclase, and microcline. K-feldspar also shows replacement of plagioclase phenocrysts. Dark brown lepidioblastic biotite comprises 15-25 percent of the rock, and defines the foliated texture. Hornblende (5-10 percent) occurs as relict and sometimes poikiloblastic grains. Scapolite and epidote vary considerably in abundance but generally comprise 3-5 percent of the rock. Accessory minerals include sericite, tourmaline, calcite, sphene, magnetite, hematite, pyrite, and chalcopyrite. Indications from small outcrops suggest the foliated diorite porphyry intrudes the diorite porphyry. The dashed contact on plate 5 represents a transition from non-foliated to foliated rock. The type localities for the rock are the sulfide zones of Ore Gulch and Blizzard Creek.

A brecciated diorite engulfed by quartz diorite and granodiorite is found only in Pyrite Creek. This rock differs from the diorite porphyries in that it contains up to 10 percent quartz, lacks foliation, and contains zoned and unzoned K-feldspar and plagioclase. It also lacks a pronounced metamorphic overprint.

Rocks of quartz diorite-to-quartz monzonite composition occur east and north of the metamorphic mafic complex. Quartz monzonite intrudes foliated diorite porphyry. Its contact strikes in a northerly direction, dips 45°-60° to the east, and is interdigitated over several hundred feet (pl. 5, cross section); it is best exposed in Blizzard Creek. The quartz monzonite contains 40-50 percent feldspar of which 65-75 percent is oligoclase and 25-35 percent microcline. Quartz comprises 25-35 percent and biotite 20-25 percent of the rock. Larger biotite grains contain abundant zircon. Tourmaline-bearing veins are found near the edge of the intrusive and in the mafic complex.

Age dating of these four rock types has been done by Ron Kistler and Carl Hedge (USGS). The data indicate a whole rock age of 100 $\pm$ 5 m.y. by the rubidium strontium method. Additional age determinations are being done by Ron Kistler (USGS).

Three sets of mafic and aplitic dikes are present in the metamorphic mafic complex. The oldest dikes are lamprophyric, and generally trend to the east. Some of these mafic dikes show strong epidote-scapolite veining and metasomatism. Aplite dikes associated with the quartz diorite-granodiorite intrusives range in width from several inches to several feet, and intrude the foliated diorite porphyry. The youngest dikes are basaltic in composition, and intrude along the foliation in the foliated diorite porphyry.

Calcium carbonate deposits of tufa cement lake sediments, coat older rocks along Pyramid Lake, and cover much of the metamorphic mafic complex. The deposits are shaped like domes, pipes, and cones; sometimes forming spectacular masses like Pyramid Island and the Needles. Many of the deposits contain irregular cavities lined with thinolite crystals several inches to over a foot long.

Petrochemistry

Chemical analyses and calculated norms of rocks from the metamorphic mafic complex, the diorite in Pyrite Creek, and the quartz diorite-granodiorite, are presented in Appendix G. Three rocks from the metamorphic alkalic complex are nepheline normative, and have compositions similar to those of intrusive and volcanic rocks of the upper Triassic Nicola Group central belt (Preto, 1979).

In figure 13, alkalinity of some British Columbia intrusives that contain diorite model porphyry copper deposits are compared with rocks of the Pyramid Lake copper deposit.

Structure

The copper deposit is situated within the Walker Lane fault zone of Jurassic age. One northwest-trending segment of the Walker Lane passes west of the Truckee River and along the west side of Pyramid Lake (Bonham, 1969). All major faults through the deposit are high angle, Basin and Range type that are unrelated to copper mineralization. Mafic dikes are spatially associated with some disseminated and shear-zone copper minerals, but were not a structural control for mineralized fluids, because most mineralization is not associated with dikes. The oldest structural features of the metamorphic mafic complex are epidote, scapolite, K-feldspar, garnet, and calcite shear zones that in most cases parallel foliation in the diorite porphyry. The shear zones are up to 5 feet thick, generally strike northerly, and dip 35°-60° to the east.

Hydrothermal Alteration

Field evidence indicates hydrothermal solutions deposited epidote, scapolite (meionite), K-feldspar, garnet (andradite), tourmaline, magnetite, and calcite in veins and shear zones. Sulfides in veins are associated with epidote, epidote-scapolite, or various combinations of the above mineral assemblage. Zonation in veins is common and consists of a core of sulfides, magnetite, K-feldspar, and garnet. Tourmaline surrounds the core followed by epidote; scapolite radiates into the host rock (fig. 14). Shear zones, up to 5 ft in thickness contain K-feldspar, sphene, epidote, zoisite, scapolite, garnet, muscovite, amphibole, and calcite with or without copper sulfides. Shear zone minerals represent total replacement of the diorite host and form sharp contacts with it. Incompletely developed shears contain large relict plagioclase phenocrysts or xenoliths of the diorite host.

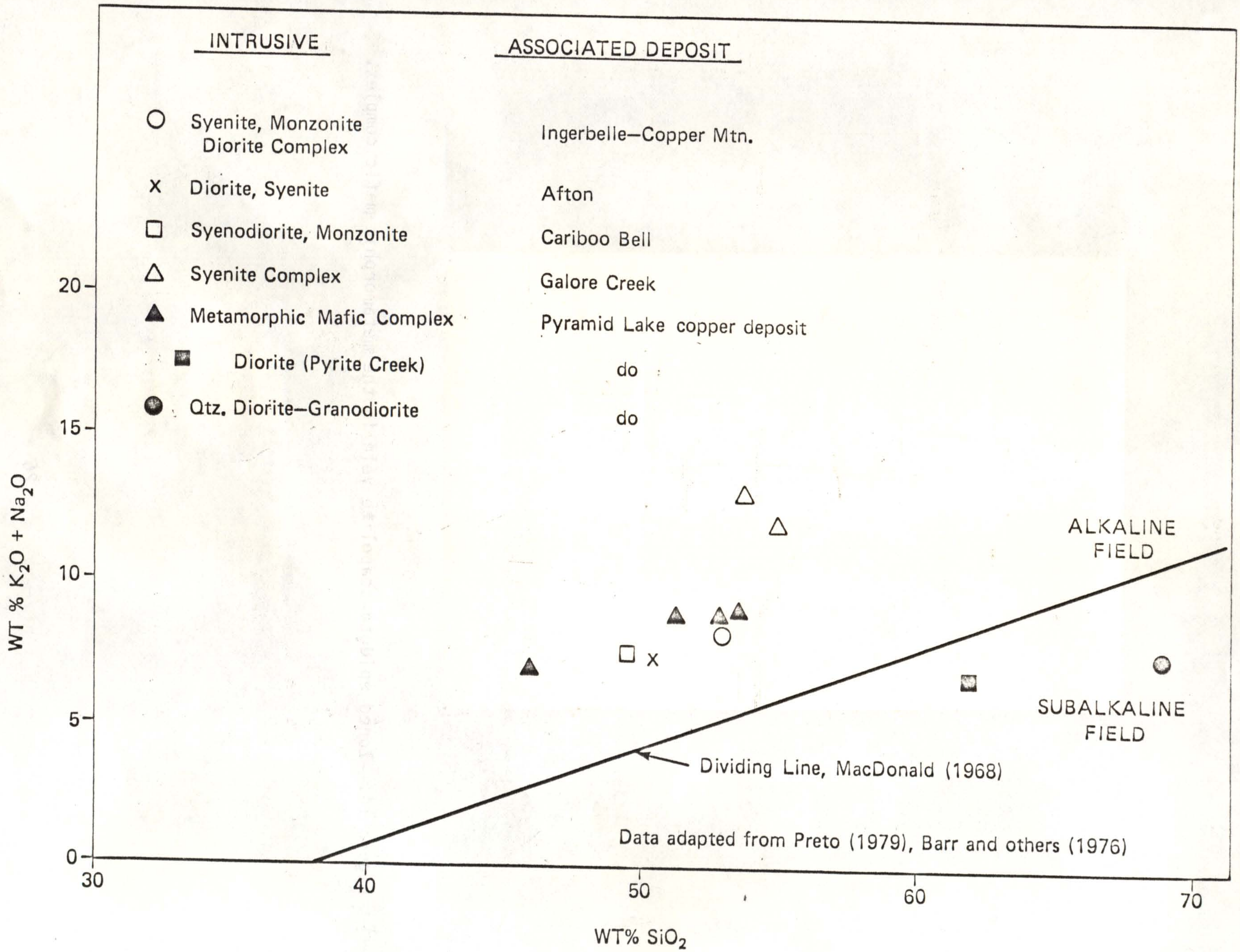


Figure 13. — Total alkali—silica plot of some British Columbia intrusives and their associated copper—gold deposits compared with the Pyramid Lake copper deposit.

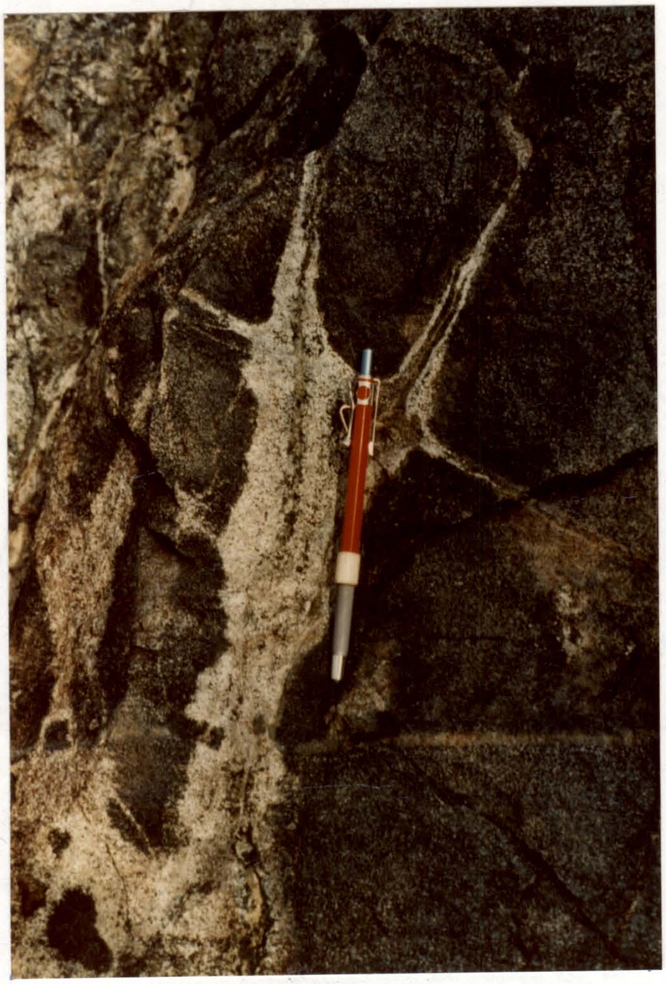


Figure 14.--Zoned epidote-scapolite vein in the metamorphic mafic complex.

Massive localized replacements in diorite are also considered of hydrothermal origin because the mineral assemblage and zonation is very similar to that in veins and shear zones. In outcrops, diorite has been replaced by 20 to 80 percent scapolite. In these outcrops concentric zoning consists of a core of tourmaline surrounded by scapolite, or a core of tourmaline, surrounded by epidote, with scapolite radiating into the host rock (fig. 15). Scapolite veining associated with K-feldspar, garnet, and epidote approaches massive replacement 1500 ft south of Blizzard Creek at 5000 ft elevation (pl. 5). Scapolite is also an abundant alteration mineral of the propylitic zone at the Ingerbelle Mine in southern British Columbia (Fahani and others, 1976; Hollister, 1978). Another type of massive replacement is represented by a tactite xenolith in weathered quartz monzonite. It contains garnet and magnetite. This zenolith is exposed only in the bottom of Blizzard Creek in the area of the interdigitated contact.

Disseminated chalcopyrite and pyrite in foliated diorite porphyry are spatially related to vein and shear zone copper, but direct evidence of their hydrothermal origin is lacking. The silicates, biotite, K-feldspar, and magnetite that may have accompanied deposition of sulfides now have a crystalloblastic texture. In the usual porphyry copper deposit definite silicate-sulfide associations are apparent for pyrite, copper sulfide, or altered but non-sulfide-bearing rock.

Metamorphism

Contact thermal metamorphism varies in grade from moderate (along Pyramid Lake) to moderately high (at the quartz monzonite contact). The mineralogy is diagnostic of hornblende-hornfels grade metamorphism. All veins and shear zones have been metamorphosed, and rocks having disseminated sulfides have relict porphyritic and granoblastic texture. Locally developed color and texture banding found in the metamorphic alkalic complex is not found near the quartz monzonite. Because the biotite content of foliated diorite increases towards the quartz monzonite and is fine grained, it is believed to be of metamorphic origin. Little clay or chlorite was seen in thin section. Crystalloblastic K-feldspar occurs in seams and patches in diorite porphyry but is more abundant and evenly distributed in foliated diorite porphyry.

Cataclasis occurred during metamorphism as evident from shear zones and foliation. In shear zones, crystalloblastic orthoclase, actinolite, tourmaline, sphene, epidote, and scapolite show cataclasis and synkinematic growth. Foliated diorite contains shredded and bent bands of biotite that appear to have formed under stress during metamorphism.

Figure 15.--Tourmaline, epidote, and scapolite concentric zoning in diorite porphyry.

Mineralization

Silicate mineralogy produced during hydrothermal alteration suggests that copper and iron sulfides originated from solutions rich in potassium, calcium, and boron. Sulfides occur in veins, shear zones, and disseminated in the host rock. In evaluating the extent and metal content of the deposit, 173 rock samples were collected and analyzed for gold, silver, copper, lead, zinc, molybdenum, and occasionally tungsten (Appendix I).

Chalcopyrite, pyrite, and malachite, with occasional bornite, and chalcocite occur in veins and shear zones in both nonfoliated and foliated diorite porphyry of the metamorphic mafic complex over approximately 1 mi^2 within a restricted elevation interval of 1,000 ft. Molybdenite was found in one vein associated with chalcopyrite. Microprobe analysis of chalcocite grains revealed minor hessite, a silver telluride mineral. Figure 16 shows close-spaced veins, some of which contain malachite, chalcopyrite, and bornite. Scapolite, epidote, garnet, magnetite, K-feldspar, tourmaline, and calcite with occasional quartz are associated with sulfides in the veins and shear zones. Calcite is also present as an accessory in the host rocks, suggesting that the presence of abundant carbonate ions in solution favored the formation of malachite, and prevented secondary enrichment of copper. Malachite has been the only useful guide to locating copper-sulfides in the metamorphic alkalic complex. Metallic abundances in veins and shear zones range from 1-3 percent copper, from a trace to 0.10 oz gold/ton; and up to 0.75 oz silver/ton. Quartz or quartz veins are rare in the metamorphic alkalic complex, and except for two locations, do not contain appreciable copper or gold.

In two areas, sulfides are disseminated, and are associated with biotite, K-feldspar, and magnetite in the foliated diorite porphyry. A disseminated chalcopyrite zone is exposed in Ore Gulch over a distance of 300 ft east-west, and 100-300 ft north-south. The rocks average about 1 percent sulfide, containing 0.01 to 0.5 percent copper and up to 0.01 oz gold/ton (fig. 17).

A series of continuous chip samples across 100 ft of the disseminated chalcopyrite zone averaged 0.2 percent copper. Gold content is appreciable only in samples where copper content is at least 0.5 percent. To test chalcopyrite as the source of gold, a nonmagnetic heavy-mineral concentrate containing chalcopyrite was made. It assayed 2.8 percent copper, 0.74 oz silver/ton, and 0.34 oz gold/ton. The corresponding magnetic fraction contained 0.26 percent copper, 0.23 oz silver/ton, and 0.0087 oz gold/ton. In Ore Gulch, there is a transition from the chalcopyrite zone to disseminated pyrite as the quartz diorite contact is approached. This can be seen in the A-A^1 cross section on plate 5. This sulfide transition is not accompanied by any change in silicate mineralogy. Such a change in silicate mineralogy would be expected in unmetamorphosed porphyry copper deposits. Local areas of malachite-staining and chalcopyrite are present in the pyrite zone.

Figure 16.--Chalcopyrite, bornite, and malachite-bearing veins in metamorphosed foliated diorite porphyry.

Figure 17.--Disseminated chalcopyrite in metamorphosed foliated diorite porphyry, Ore Gulch, Pyramid Lake copper deposit.

A second disseminated sulfide zone in foliated diorite porphyry, containing 1-2 percent pyrite, crops out along Blizzard Creek. It is approximately 100 ft wide and 700 ft long, and confined to the creek bottom. The exposure of the sulfide zone is believed to be similar to the pyrite zone in Ore Gulch. At Blizzard Creek, erosion may not be deep enough to expose disseminated chalcopyrite.

A third sulfide zone crops out in the bottom of Pyrite Creek in a diorite breccia engulfed by quartz diorite-granodiorite. It is about 50 ft wide by 500 ft long, and contains about 2 percent pyrite. Both rock types contain pyrite but no anomalous concentrations of copper were found.

Geophysics

Rocks of the metamorphic mafic complex are enclosed by a 2,600 gamma contour on an aeromagnetic map prepared by USGS (1972). The magnetic contour indicates a large part of the complex is under Pyramid Lake. The magnetic expression of the Pyramid Lake copper deposit is consistent with magnetic highs across diorite model copper-gold porphyry deposits in British Columbia (Barr and others, 1976).

Approximately 18 line-miles of frequency domain IP were conducted over the deposit by Phoenix Geophysics 1/ (Appendix J). The layout of the IP survey was designed to trend across known structures, rock contacts, and mineralized zones of the metamorphic alkalic complex. Eight lines were run approximately east-west and one line was run north-south. The north-south line was run because open-ended anomalies occurred near the lake on east-west lines, and the steep shore line and deep water prevented westward extension of lines. A 500-ft dipole spacing was used on all lines. Because lines through Ore Gulch and Blizzard Creek were over surface exposures of disseminated sulfide zones, 250 ft and 100 ft dipole spacings were run over these areas to better define their size and depth. Six rock samples representing the various rock types were collected for laboratory determinations of IP response. Test results indicate magnetite and specular hematite produce a portion of IP response.

Percent-frequency-effect anomalies over the surveyed area were weak to moderate, ranging from 2.3-6.3 percent. These values are comparable with those associated with diorite-model porphyry deposits in British Columbia. Percent-frequency-effect profiles over ore zones of Galore Creek, Gnat Lake, Caribou Bell, Lorraine, and Afton range from 2-8 percent (Barr and others, 1976).

1/ Mention of a company or product does not constitute endorsement by the U.S. Bureau of Mines.

Recommendations

The Pyramid Lake copper deposit warrants further exploration by core drilling. Four to six holes should be drilled for a total footage of 5,000 ft. The program will require helicopter support to minimize surface disturbance, and because access to some areas is difficult. It should be undertaken in early spring to ensure an adequate water supply in Blizzard Creek. Based on surface geology, sampling, and IP results the following holes should be drilled (pl. 5 and figure A in Appendix J).

Blizzard Creek:

1) IP Line 1 beneath 17 + 50 E. to a depth of 700 ft. Tests IP anomaly only.

2) IP Line 1 beneath 33 + 00 E. to a depth of 700 ft. Tests shallow IP anomaly and possible extensions of sulfide zone exposed to the west, and dipping 45° E.

3) IP Line 1 beneath 24 + 50 E. to a depth of 600 ft. Tests hypothesis that pyrite zone is exposed halo above chalcopyrite orebody.

Ore Gulch:

4) IP Line 2 beneath 7 + 50 E. to a depth of 700 ft. Tests same hypothesis as in No. 3. If chalcopyrite zone follows foliation, it would be intercepted by this hole at approximately 250 ft.

5) IP Line 2 beneath 12 + 50 E. to a depth of 1,000 ft. Optional hole drilled only if chalcopyrite zone appears to be following foliation.

6) IP Line 2 beneath 50 + 50 E. to a depth of 600 ft. Tests shallow IP anomaly over disseminated chalcopyrite.

Copper Point Area:

7) IP Line 9 beneath 12 + 50 N. to a depth of 700 ft. Tests deep IP anomaly in area of exposed copper minerals.

The Lakeview Mine

Development and Production

The area including secs. 13 and 14, T. 25 N., R. 22 E., on the east side of Pyramid Lake was the locus for exploration and mining in the early 1930's. These workings are referred to as the Lakeview Mine (or Big Basin Prospect by Bonham, 1969).

Development consisted of three adits and a shaft (fig. 18 and pl. 6). Shaft No. 1, is approximately 100 ft deep with about 100 ft of drifting from several levels.

Total production was two carloads, each with 45 tons of hand-sorted material. One of these carloads assayed 0.0625 oz gold/ton, 36.00 oz silver/ton, and 13.60 percent lead (Magill and Whitebread, 1977).

Adit No. 2 was driven about 1,000 ft north of Shaft No. 1, extending about 90 ft in a westerly direction with some crosscuts. An interesting feature of this adit is a 2 to 8-in.-thick layer of a mixture of zinc and other metallic oxides coating the adit walls and back, which formed after the adit was driven (pl. 6). A sample of this material assays 0.20 oz silver/ton, 0.11 percent copper, 0.11 percent lead, and 6.2 percent zinc (Appendix K).

Northwest of this site, and at a lower (4,400 ft) elevation, Adit No. 3 was started in a S. 45^{o} E. direction, with the intention of intersecting northeasterly-trending mineralized structures exposed at the surface. The adit was abandoned at 590 ft after intercepting several mineralized structures (pl. 6, cross section). An attempt was made to reopen this adit with a backhoe during the Bureau of Mines investigation, but was abandoned upon encountering two sets of completely rotted timbers. Reopening of the adit would require about 200 ft of retimbering through Pleistocene Lake Lahontan gravel.

Numerous dozer cuts and pits are scattered about the property; these will be discussed in a subsequent section.

Geology

The Lakeview Mine is situated in the Lake Range, which is mostly composed of dacitic-to-basaltic rocks of Miocene to Pliocene age. Lenses of tuff and thin welded ash-flows are intercalated with lava flows and breccias.

In the westernmost portion of the Lake Range, the predominant unit is the Pyramid Sequence which consists of 2,000 ft of basalt and andesite flows, breccias, and intrusives. This unit overlies the Hartford Hill Rhyolite, and is unconformably overlain by Pliocene basalts. These rocks range from coarse-grained, olivine-rich basalts to glass-rich andesites and dacites. Basalts and andesites in the lower part of the section are typically porphyritic (Bonham, 1969).

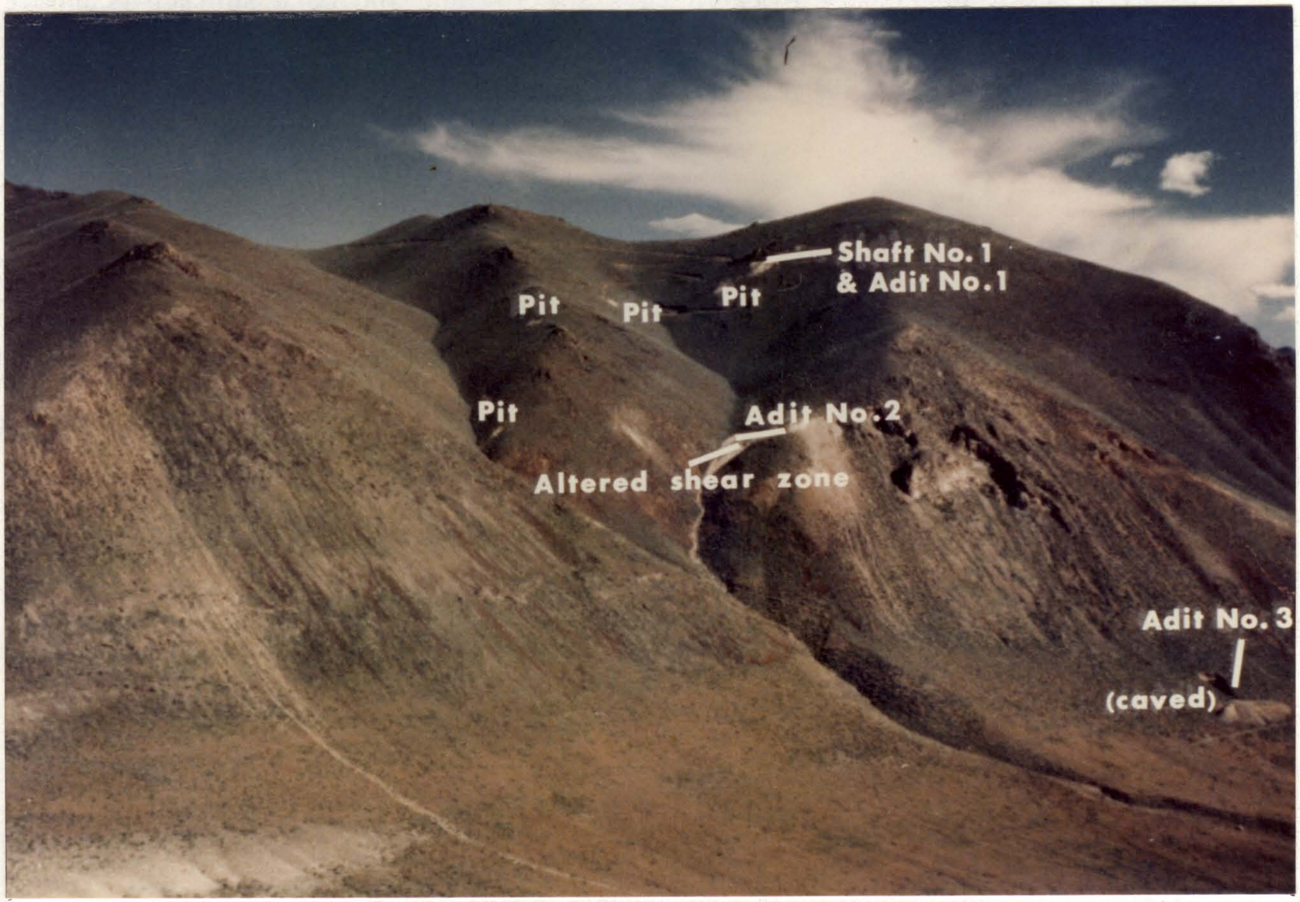


Figure 18.--Southerly-looking photograph of the Lakeview Mine area, Pyramid Lake Indian Reservation (see pl. 6).

In the area of the Lakeview Mine and prospects, basalts overlain by andesites and dacites exhibit a persistent system of shears and fractures that strike in a northeasterly direction and dip steeply to the southeast (pl. 6). Some of these shears and fractures exhibit hydrothermal alteration, and contain minerals of possible economic interest.

Mineralization

Appendix L presents analytical results of samples collected from mineralized zones. Sample locations are shown on plate 6. Significant results are discussed briefly in this section and indicate surface economic concentrations of silver that may persist at depth.

At sample site no. 5, a pit in altered andesite porphyry exposed a vertical structure trending N. 75 E. A 12-ft-wide sample of this structure assayed 0.01 oz gold/ton, 27.9 oz silver/ton, 0.03 percent copper, 2.52 percent lead, and 0.25 percent zinc. Sample no. 6, a select sample of a 1.5-ft width within the interval of sample no. 5, assayed 0.01 oz gold/ton, 36.4 oz silver/ton, 4.86 percent lead, and 0.045 percent zinc.

At sample site no. 15, a 7-ft-wide chip sample across a sheared and altered zone in dacite porphyry assayed 0.24 oz gold/ton, 15.1 oz silver/ton, 0.01 percent copper, 2.4 percent lead, and 0.03 percent zinc. Sample no. 24, a 3-ft chip sample across a gouge zone exposed in a pit contains 0.02 oz gold/ton, 8.9 oz silver/ton, 0.21 percent copper, 8.1 percent lead, and 0.13 percent zinc.

At sample site no. 38, a pit 12 ft in diameter exposed a structure with an attitude of N. 70 W., 75 N. A zone of highly altered white, yellow, and limonitic material was sampled over a 6-ft-wide interval, and assayed 0.02 oz gold/ton, 16.8 oz silver/ton, 0.39 percent lead, and 0.13 percent zinc.

Electromagnetic Survey

The Very Low Frequency (VLF) transmitting stations operating for communications with submarines have a vertical antenna that creates a concentric horizontal magnetic field. When this magnetic field interacts with conductive orebodies in the ground, secondary fields are created that radiate from the bodies. The EM-16 is a sensitive receiver covering the frequency band of the VLF transmitting stations, and is used in the field to measure the secondary field components of conducting bodies in the subsurface.

In the Lakeview area, an electromagnetic survey was run on line no. 4 concurrently with soil sampling. Plate 6 shows a plot of the values obtained from that survey using an EM-16 instrument. The results indicate a strong response from a subsurface conductor, and correlate well with surface indications and soil sampling.

Soil Sampling

A total of four soil lines were run over the Lakeview area. Samples were analyzed for gold, silver, copper, lead, and zinc (Appendix L). Analytical results were evaluated using the same statistical procedure as for the stream sediment survey. Anomalous values are plotted on plate 6. Table 2 shows the determination of threshold or anomalous metal content plotted on plate 6.

Table 2.--Statistically determined threshold of metals in soil samples from the Lakeview Mine, Pyrmaid Lake Indian Reservation

Statistical parameter	Au	Ag	Cu	Pb	Zn
Mean (ppm)	0.027	0.91	102	50	115
Standard deviation (SD)	.029	.78	43	59	63
Mean + 2 x SD threshold (ppm)	.085	2.5	188	168	241

Recommendations

The Lakeview area has some very interesting structural and mineralogical features which are worthy of further work. Preliminary indications suggest a more comprehensive EM survey might be worthwhile. Soil lines should be extended to cover areas of suspected anomalies.

Additionally, trenching over areas with anomalies may provide detail regarding thickness and attitudes of mineralized structures. If this work is encouraging, Adit No. 3 should be reopened, mapped, and sampled. The adit crosses several veins of interest but did not reach the main vein developed by Shaft No. 1.

The Guanomi Mine

Description

During 1971-1972, American Selco, Inc., conducted an exploration program on a property known as the Guanomi Mine in the southwest corner of the Pyramid Lake Indian Reservation (Prochnau, 1973). Target of this effort was porphyry molybdenum or porphyry copper-molybdenum deposits associated with a quartz monzonite stock of Miocene age. Geologic, geochemical, and geophysical surveys were followed by 5,230 feet of rotary and diamond drilling in nine holes.

Rhyolite flows and tuffaceous rocks of the Hartford Hill Formation underlie much of the leased area, and have been intruded by the quartz monzonite (fig. 19). Within the intrusive, mineralization is confined to silicified zones along fault traces and areas of weakly silicified and potassium-metasomatized quartz monzonite. Traces of libethenite, an emerald green phosphate of copper and malachite occur along the northwest margin of the stock, and account for the anomalous copper values in soil samples.

Drilling results confirm copper and molybdenum mineralization in altered and pyritized rocks peripheral to the Guanomi stock. Values of 0.05 percent copper and 0.003 percent molybdenum are remarkably persistent over a widespread area. However, the work of American Selco failed to demonstrate economic-grade material.

Drill hole cuttings were assayed by the U.S. Bureau of Mines for gold and silver. Forty-two samples were selected from various depths of all holes except no. 7. Only one gold assay value (0.08 ppm) exceeded the 0.03 ppm detection limit. The highest silver content reported was 0.48 ppm. Uranium values ranged from 1.5 ppm to 4.8 ppm.

Recommendations

A 1,000-ft by 300-ft breccia zone is exposed along the southern contact between the quartz monzonite and Hartford Hill Rhyolite (fig. 19). The zone contains abundant limonite, exhibits significant alteration, and perhaps deserves reexamination. Previous rock sampling, geochemical testing, and an induced polarization survey failed to delineate a target attractive enough to drill.

This breccia zone should be carefully examined with regard to possible diagnostic boxwork structures. If present, further geophysical work might be indicated; it is the one site peripheral to the stock in which ground preparation was most favorable for mineralization.

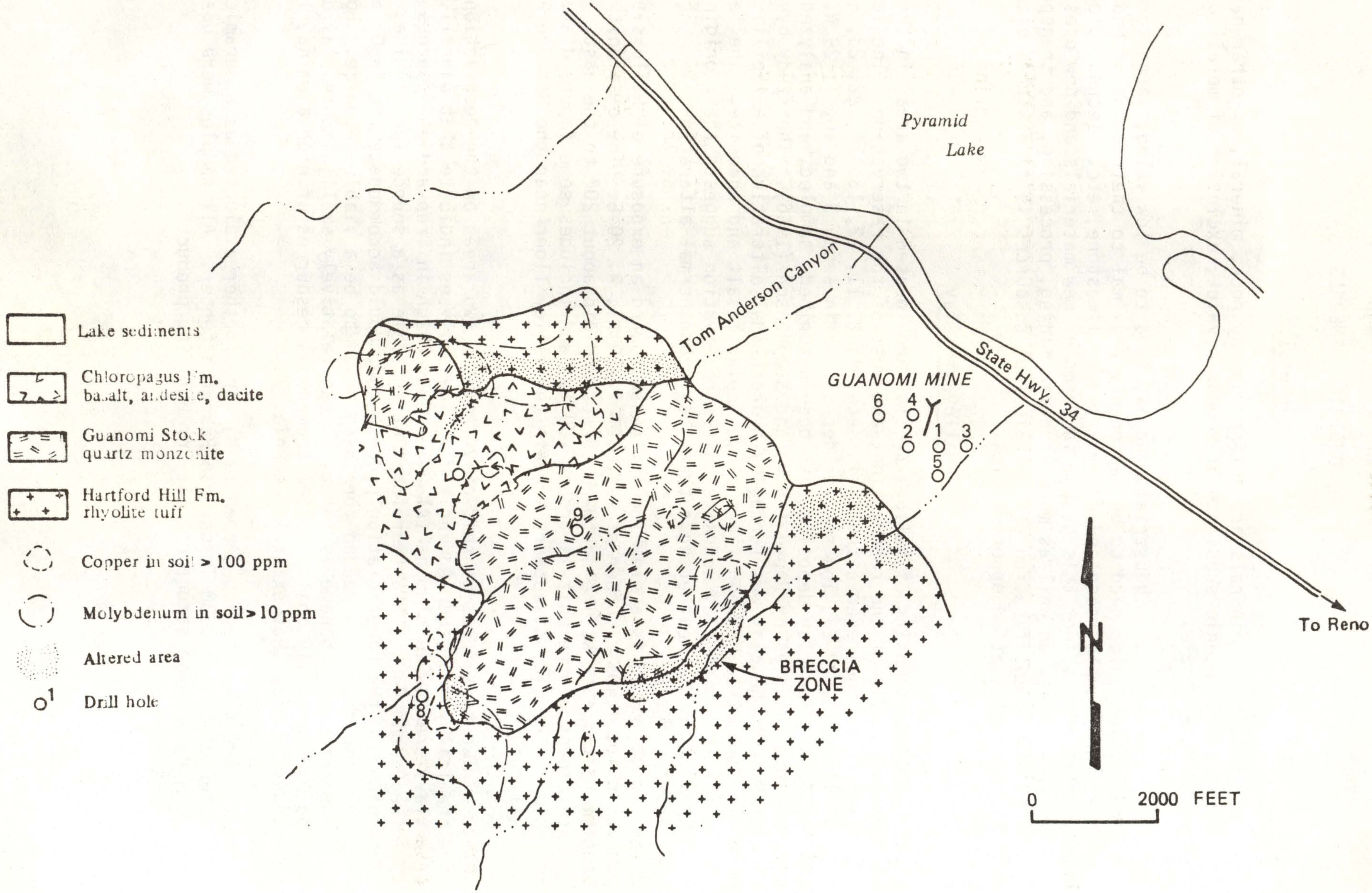


Figure 19.--Geology and drill locations, Guanomi Mine, Pyramid Lake Indian Reservation (see pl. 3 for area location).

INDUSTRIAL MINERALS

General

Industrial minerals are defined as any rock, mineral, or other naturally occurring inorganic substance of economic value, exclusive of metallic ores and mineral fuels.

As a group, industrial minerals tend to be low value, large tonnage commodities which need to be reasonably proximal to their point of end use; for example, sand and gravel, clays, limestone, etc. Technological developments affect this group, in terms of new materials and new uses for existing ones, as well as more economic mining, processing, and transportation methods. Identification and appraisal of resources is made with a view toward future exploitation opportunities.

Halloysite Clay

Large deposits of halloysite clay are located in two areas in the northern part of the reservation, and west of the reservation. The largest deposit on the reservation is in secs. 1, 2, 11, 12, 13, 14, 22, 23, and 24, T. 28 N., R. 20 E., The smaller deposit is in secs. 3 and 10, T. 29 N., 28 ? R. 21 E. The clay deposits have been described, sampled, and analyzed in previous studies by Papke (1969) and Stephenson (1966). The study by Papke indicates the clay was formed by hydrothermal alteration of a lapilli tuff unit deposited between flows of vesicular basalt and andesite. The large areal extent of clay deposits on the reservation suggests their origin was from lateritic weathering rather than hydrothermal alteration.

Figure 20 is a view looking south toward an exposure of halloysite clay in the northeast corner of sec. 12, T. 28 N., R. 20 E. The clay unit and enclosing rock strike north-northeast and dip about 20° to the east. Total thickness of the unit is around 200 ft, and includes some impure diatomite beds. The clay disappears beneath the valley floor near the Western Pacific Railroad line.

Twenty samples of this clay from the two areas on the reservation were chemically analyzed (Appendix M). The analyses indicate that overall, these clays are low in alumina (Al_2O_3) and too high in iron and phosphorous oxides (Fe_2O_3 and P_2O_5), and therefore not suitable as a source for alumina. A change in the beneficiation process that could accommodate the Fe_2O_3 and P_2O_5 impurities is needed for these areas to be a viable resource. However, the potential tonnage is large. These relatively small, impure clay deposits do not seriously challenge the tremendous resources of high alumina, low impurity clay that exist in Georgia.

The clay samples (Appendix M) were further evaluated as a ceramic material by the USBM Tuscaloosa Research Center. All samples were unsuitable to marginal for structural clay or building products.

Figure 20.--Southerly-looking photograph of clay beds, Pyramid Lake Indian Reservation.

Bentonite

In January 1960, drilling was conducted on a bentonite deposit in sec. 34, T. 24 N., R. 23 E., by Don S. York and W. E. Edgar. The area drilled is west of Highway 34 and about 6.5 mi north of Nixon (Magill and Whitebread, 1977).

Shifting sands have obscured the drill sites, which are located in an area about 400 x 1,800 ft. The bentonite unit averaged 15 ft, but most drill holes were terminated in bentonite due to intersection with the water table. The ensuing 21 years of dropping water level at Pyramid Lake may have eliminated the water problem, and might allow deeper drilling at some future date.

Tests on this material revealed inferior swell characteristics below that of Wyoming bentonite. Results of the drilling suggest at least 700,000 t of bentonite are present.

Marble Bluff Limestone

The Marble Bluff limestone deposit is located just within the east boundary of the Pyramid Lake Indian Reservation in secs. 2, 9, 10, 11, and 15, T. 23 N., R. 23 E., about 3 mi north of Nixon. The highway to Gerlach crosses the western edge of the deposit. The limestone is well-exposed, but covered with calcareous tufa at lower elevations.

A detailed description of the geology and drilling history of this deposit is contained in a report by E. L. Stephenson (1962), available from the Bureau of Indian Affairs. Drilling has demonstrated that most of the western part of the deposit is dolomite. A small block of commercial grade limestone is exposed in a quarry, and is underlain in part by dolomite or dolomitic limestone.

The eastern portion of the deposit is overlain by gravel and volcanic rocks of too great a thickness for economical operations.

The limestone, in general, occurs stratigraphically beneath the dolomite, and tends to grade into dolomitic limestone in an irregular pattern. These problems render it unsuitable for cement manufacture.

Pyramid Limestone

About 1 mi north of Pyramid Island, sec. 34, T. 25 N., R. 22 E., is an exposure of re-crystallized limestone (pl. 3, no. 35). The unit is of probable Paleozoic or Mesozoic age, and similar to the limestone at Marble Bluff. This limestone is highly jointed and fractured with calcite filling the fractures. Bedding is obscure but field evidence suggests a strike of approximately N. 60° E., and a vertical dip. A 2-3-ft zone in the limestone is dark gray to black and exhibits a distinctly fetid odor on breaking.

A sample of this limestone was submitted for analysis to Nevada Cement Company, Fernley, Nevada, with the following results:

$CaCO_3$	92.8 percent
MgO	3.58 percent
SiO_2	Not detected
Al_2O_3	1.28 percent
Fe_2O_3	0.72 percent
Na_2O	0.02 percent
K_2O	0.11 percent

Marl

Deposits of unconsolidated calcium carbonate (marl) are present on the west and northwest portions of the reservation in substantial quantity. This material is composed of stems and powdered debris of chara, a non-marine algae belonging to the charophycophtta group (Bonham, 1969). Present day varieties live in shallow, quiet, or very slowly moving bodies of fresh or brackish water. Fresh water gastropod shells are also present in the marl, and two samples taken at Astor Pass show radiocarbon ages of 16,800 ± 600 and 17,500 ± 600 years BP, respectively. Deposition appears to have taken place in shallow and extensive areas of Pleistocene Lake Lahontan.

Four samples of marl have the following average compositon:

CaO	36.8 percent	(65.68 percent $CaCO_3$)
MgO	1.02 percent	
SiO_2	21.52 percent	
Al_2O_3	4.15 percent	
SO_3	2.5 percent	
H_2O	2.29 percent	

The deposits are up to 12 ft in thickness, and are intercalated with thin beds of impure diatomite. The marl has been sold as poultry and livestock feed after being ground and mixed with other ingredients, and also as a soil conditioner. Relatively large tonnages are available, both on and off the reservation.

Sand and Gravel

Terraces along the Truckee River between Wadsworth and Pyramid Lake contain substantial tonnages of sand and gravel. One such deposit near Wadsworth is currently being mined.

Outwash sand and gravel deposits from the mountains surrounding the lake, in addition to similar deposits along the former shoreline of Pleistocene Lake Lahontan, are readily available for many years into the future.

ENERGY

Uranium

Rock samples collected during the stream sediment survey were consistently low in uranium. Samples 41-43 (Appendix D) contained the most uranium (up to 30 ppm), and their source area gave the highest scintillometer readings (500 cps). Economic uranium deposits are not likely to be found on the reservation.

Geothermal

The Bureau's resource inventory did not include evaluation of geothermal potential because this is the responsibility of the Department of Energy and U.S. Geological Survey. It appears, however, that the geothermal well drilled by Western Geothermal, and hot springs of the Needles area have agricultural potential. Such hot water sources can be developed as hothouses, where tomatoes or lettuce can be grown year-round.

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APPENDIX A.--SAMPLING PROCEDURES FOR STREAM SEDIMENT, SOIL, ROCK, AND WATER SAMPLES, PYRAMID LAKE INDIAN RESERVATION

The fine fraction of stream sediments were collected along flowing streams and from dry stream beds. Stream sediments were sieved in the field through stainless steel screens to insure adequate fine material for analyses. Check samples were taken by splitting a double volume of fine material. Notes were taken concerning the nature of the sediment, rock type in the area, and possible contaminants. Soil samples were collected from the upper B horizon. Samples were placed in brown Kraft paper envelopes, oven dried, and sieved through minus 80 mesh stainless steel screens.

Rock samples were collected from unmineralized rock, selected mineralized zones, and dump material, as chip, random, or selected samples. Sample size ranged from 4 to 8 pounds. Samples were crushed and pulverized to minus 80 mesh or finer. The pulverizer plates were cleaned with high purity quartz sand between each sample.

Water samples were collected in streams, springs, and near well-heads. Samples were placed in quart polyethylene bottles that had been rinsed three times with water from the source to be sampled. Lo-ion paper was used for pH measurements. Samples were filtered through Millipore 0.45 micron filter paper with a self-contained-hand vacuum pump and filter apparatus. The water samples were then acidified with six normal nitric acid to a pH of 1.

APPENDIX B.--APPLIED STATISTICS, PYRAMID LAKE INDIAN RESERVATION

The statistical methods for evaluation of stream sediment analyses described by Levinson (1974), Hawkes and Webb (1962), and Rose and others (1979) are used in this report. They are based on normal probability relations and use the standard deviation as an important statistical parameter in evaluating data. If the elemental content of a sample was below the analytical detection limit, it was arbitrarily given a value of one-half the detection limit. Analyses by procedures with abnormally high detection limits and those from obviously contaminated samples were not used in statistical evaluations.

The probability that a single sample is statistically not part of a normal population is given as follows (Texas Instruments, 1978):

Content of element in a sample	Probability that sample is not part of a normal population
mean plus 1 standard deviation	6.3 to 1
mean plus 1.5 standard deviations	15 to 1
mean plus 2 standard deviations	44 to 1
mean plus 3 standard deviations	768 to 1

A single sample was considered anomalous if the concentration of a element exceeded the mean of all the samples plus twice the standard deviation (Hawkes and Webb, 1962). Note the probability that the sample is not part of a normal population is 44 to 1. Clusters of samples can also form an anomaly with an average elemental content that is less than single anomalous samples. The minimum elemental contents of samples in a cluster in terms of deviation from the mean for the same 44 to 1 probability is given as follows (Texas Instruments, 1978):

Number of samples in cluster supporting an anomaly	Minimum number of standard deviations from mean for 44 to 1 probability that a cluster will be anomalous
1	2.
2	1.3
3	.57
4	.28

Most clusters will not conform exactly to the above table. However, the average of the individual deviations from the mean can be used as an approximation (Elkins, 1940). For example, if the standard deviations of the samples in a cluster of three are 0.25, 0.5, and 1.00, the average is 0.58. Since this is greater than 0.57 from the above table, the cluster is anomalous. This table shows that two or more samples may be below the mean plus twice the standard deviation, but because they are in a cluster they can be considered anomalous.

The statistical method of Hawkes and Webb (1962) for evaluating analytical data was used in this report because it correctly identified samples from known mineralized areas as anomalous. Therefore, anomalous samples from areas on the reservation where mineralization is unknown, strongly infer mineral existence. Nevertheless, other methods for analyzing similar data have been reported. One receiving much attention utilizes curves relating cumulative frequency to the log of sample analyses (Sinclair, 1976; Lepeltier, 1969).

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION
(see pl. 1 for sample locations)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
2	1	275000	4473317	<.03	.06	30	<30	90	<5	<30	1.6	<30
2	2	274947	4472921	<.03	<.03	15	<30	80	<5	<30	1.8	<30
2	3	274925	4472190	<.03	.06	20	<30	90	<5	<30	2.3	50
2	4	274975	4472100	<.03	.04	20	<30	80	<5	<30	2.3	<30
2	5	274925	4471990	<.03	.03	25	<30	90	<5	<30	2.3	<30
2	6	274950	4471875	<.03	<.03	60	<30	80	<5	<30	1.1	<30
2	7	274675	4471615	<.03	.05	30	<30	100	<5	<30	1.9	<30
2	8	274725	4471565	<.03	.04	20	<30	80	<5	<30	2.8	<30
2	9	274735	4471475	<.03	.04	20	<30	80	<5	<30	1.7	<30
2	10	275950	4472020	<.03	.12	30	<30	60	<5	<30	1.4	<30
2	11	276075	4471950	<.03	.30	50	<30	70	<5	<30	1.1	<30
2	12	275150	4471290	<.03	.04	40	<30	80	<5	<30	2.9	<30
2	13	276810	4471600	<.03	.10	34	<30	100	<5	<30	1.2	<30
2	14	277000	4471525	<.03	<.03	33	<30	68	<5	<30	0.82	<30
2	15	276610	4471535	<.03	.25	35	<30	85	<5	<30	1.4	<30
2	16	276610	4471475	<.03	<.03	28	<30	62	<5	<30	0.80	<30
2	17	276625	4471375	<.03	.07	39	<30	85	<5	<30	1.0	30
2	18	276465	4471475	<.03	.15	39	<30	110	<5	<30	1.2	<30
2	19	276350	4471325	<.03	.20	29	<30	100	<5	<30	0.85	<30
2	20	275900	4470950	<.03	.40	53	38	250	<5	54	2.8	40
2	21	275220	4470970	<.03	.07	40	<30	370	<5	<30	2.9	<30
2	22	276075	4470840	<.03	<.03	36	<30	120	<5	<30	1.4	<30
2	23	274920	4470690	<.03	<.03	40	<30	60	<5	<30	1.5	<30
2	24	275940	4470360	<.03	.35	25	<30	70	<5	<30	2.0	<30
2	25	276410	4470350	<.03	.25	20	<30	70	<5	<30	2.0	<30
2	26	276980	4470300	<.03	<.03	30	<30	140	<5	<30	1.3	<30
2	27	276760	4470190	<.03	.05	20	<30	90	<5	<30	1.4	<30
2	28	275375	4470000	<.03	.20	25	<30	90	<5	<30	1.8	30
2	29	276290	4469915	<.03	1.10	100	40	1400	<5	100	7.3	<30
2	30	276900	4469810	<.03	.05	15	<30	90	<5	<30	1.6	<30
2	31	276675	4469640	<.03	.65	40	<30	300	<5	<30	5.0	<30
2	32	276250	4469560	<.03	.30	40	<30	410	<5	<30	2.8	<30
2	33	275290	4469370	<.03	<.03	30	<30	80	<5	<30	2.2	<30
2	34	275765	4469145	<.03	.91	55	<30	290	<5	<30	2.4	<30
2	35	275740	4468750	<.03	.33	60	<30	290	<5	<30	3.0	<30
2	36	275560	4468485	<.03	.55	50	<30	810	<5	<30	2.7	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
2	37	275500	4468190	<.03	.22	30	<30	80	<5	<30	4.0	30
2	38	275275	4468150	<.03	.39	45	<30	140	<5	<30	2.5	<30
2	39	275575	4467900	<.03	.23	30	<30	60	8	<30	1.6	30
2	40	275515	4467715	<.03	.17	40	<30	70	<5	<30	2.0	<30
2	41	275700	4467575	<.03	.05	30	<30	60	<5	<30	1.7	<30
2	42	275540	4467475	<.03	.08	30	<30	60	<5	<30	1.5	<30
2	43	275415	4467275	<.03	<.03	30	<30	70	<5	<30	2.2	30
2	44	275660	4467190	<.03	.25	40	70	80	<5	<30	1.7	<30
2	45	275950	4466900	<.03	.06	25	<30	70	<5	<30	3.0	<30
2	46	275630	4466600	<.03	.09	40	<30	80	<5	<30	2.2	40
2	47	276175	4466680	<.03	.07	40	<30	70	<5	<30	1.8	<30
2	48	276860	4466740	<.03	.13	20	<30	60	<5	<30	1.5	<30
2	49	276900	4466700	.03	.10	25	<30	60	<5	<30	2.3	<30
2	50	276760	4466540	<.03	.08	30	<30	60	<5	<30	1.5	<30
2	51	276780	4466480	<.03	.20	20	<30	80	<5	<30	2.8	60
2	52	276600	4466350	.07	.10	20	<30	70	<5	<30	2.0	<30
2	53	276750	4466360	<.03	.03	40	<30	130	<5	<30	3.5	50
2	54	276685	4466300	<.03	.03	50	<30	110	<5	<30	2.7	50
2	55	276620	4466235	<.03	.05	10	<30	50	<5	<30	2.0	40
2	56	276320	4466750	<.03	.36	25	<30	70	<5	<30	1.4	<30
2	57	276320	4466250	<.03	.27	25	<30	70	<5	<30	1.6	<30
2	58	276065	4465950	<.03	.24	40	40	80	<5	<30	2.2	<30
2	59	276565	4465800	<.03	1.3	50	180	440	6	<30	1.5	<30
2	60	276500	4465590	<.03	<.03	44	<30	96	<5	<30	1.0	<30
2	61	276360	4465230	<.01	.08	83	<30	140	<5	<30	1.5	<30
2	62	276575	4465150	<.01	.03	29	<30	120	<5	<30	3.1	<30
2	63	276585	4464300	.04	.06	24	<30	73	<5	<30	1.9	<30
3	1	277890	4471700	<.03	<.03	37	<30	88	<5	<30	0.70	<30
3	2	277700	4471700	<.03	<.03	27	<30	59	<5	<30	0.77	<30
3	3	277560	4471540	<.03	<.03	31	<30	100	<5	<30	0.71	<30
3	4	277360	4471380	<.03	<.03	36	<30	83	<5	<30	0.67	<30
3	5	280280	4472980	<.03	<.03	23	<30	100	<5	<30	1.1	30
3	6	280430	4473000	<.03	.03	22	<30	130	<5	<30	1.8	<30
3	7	280390	4472850	<.03	.58	39	<30	150	<5	<30	1.5	<30
3	8	280500	4472550	<.03	.20	31	<30	160	<5	<30	1.7	<30
3	9	281110	4470980	<.03	.06	23	<30	100	<5	<30	1.4	40
3	10	281180	4470820	<.03	.06	21	<30	99	<5	<30	2.3	<30
3	11	281040	4470530	<.03	.42	50	<30	190	<5	<30	2.2	<30
3	12	280950	4470380	<.03	.06	32	<30	85	<5	<30	1.5	<30
3	13	279580	4470420	<.03	<.03	30	<30	100	<5	<30	1.3	30
3	14	279140	4470520	<.03	.08	16	<30	45	<5	<30	2.5	<30
3	15	279060	4470190	<.03	.09	7	<30	28	<5	<30	3.0	<30
3	16	279620	4469730	<.03	.19	29	<30	74	<5	<30	1.1	<30
3	17	281120	4470160	<.03	.18	28	<30	79	<5	<30	1.7	50
3	18	280860	4470080	<.03	.14	39	<30	120	<5	<30	1.7	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
				All values in ppm								
3	19	280920	4469970	1.0	.23	27	<30	120	<5	<30	1.5	<30
3	20	280960	4469870	<.03	.08	23	<30	70	<5	<30	1.2	30
3	21	280900	4469720	<.03	.06	22	<30	65	<5	<30	1.6	30
3	22	280830	4469600	<.03	<.03	33	<30	130	<5	<30	1.6	<30
3	23	280720	4469730	<.03	<.03	33	<30	100	<5	<30	1.3	<30
3	24	280200	4469760	<.03	1.90	41	<30	85	<5	<30	1.6	<30
3	25	280270	4469710	<.03	.10	25	<30	75	<5	<30	2.0	<30
3	26	280460	4469500	<.03	.16	33	<30	130	<5	<30	1.7	<30
3	27	280120	4469400	<.03	.16	46	<30	98	<5	<30	2.0	<30
3	28	280020	4469310	<.03	.20	30	<30	120	<5	<30	1.5	<30
3	29	280020	4469310	.06	.25	28	<30	110	<5	<30	1.3	<30
3	30	279300	4469030	.03	.06	21	<30	64	<5	<30	1.7	<30
3	31	279290	4468760	--	--	16	<30	93	<5	<30	1.7	<30
3	32	277990	4468780	<.03	.04	24	<30	48	<5	<30	1.0	<30
3	33	278280	4468160	<.03	2.0	34	<30	100	<5	<30	1.4	<30
3	34	278980	4468100	<.03	.09	30	<30	89	<5	<30	1.6	30
3	35	279060	4468140	<.03	<.03	29	<30	93	<5	<30	1.5	<30
3	36	279370	4468200	<.03	<.03	22	<30	95	<5	<30	1.8	30
3	37	280550	4468240	<.03	.09	19	<30	67	<5	<30	1.5	<30
3	38	280800	4468400	<.03	1.3	26	39	75	<5	<30	0.94	40
3	39	281170	4468400	<.03	.63	21	45	77	<5	<30	1.3	<30
3	40	281400	4468480	<.03	1.6	21	39	57	<5	<30	1.7	40
3	41	281660	4468490	<.03	.05	19	34	54	<5	<30	1.5	30
3	42	281630	4468580	<.03	.32	23	45	61	<5	<30	1.0	<30
3	43	281780	4468920	<.03	.25	21	39	49	<5	<30	0.74	<30
3	44	281690	4469070	<.03	.20	26	34	72	<5	<30	0.89	<30
3	45	281820	4469080	<.03	.18	28	<30	74	<5	<30	1.2	<30
3	46	281690	4469270	<.03	.08	30	<30	70	<5	<30	1.2	<30
3	47	281750	4469350	<.03	.27	28	39	80	<5	<30	1.3	40
3	48	282160	4469400	<.03	.04	26	<30	71	<5	<30	1.2	<30
3	49	282120	4469490	<.03	.16	28	34	74	<5	<30	1.2	<30
3	50	282900	4471020	<.03	<.05	34	<30	100	<5	<30	1.4	<30
3	51	282850	4470930	<.03	.12	35	<30	130	<5	<30	2.1	<30
3	52	283030	4470700	<.03	.06	36	<30	110	<5	<30	1.7	<30
3	53	282950	4470570	.26	<.03	32	<30	87	<5	<30	1.8	<30
3	54	283510	4470400	<.03	<.03	22	<30	100	<5	<30	2.3	<30
3	55	283600	4470500	<.03	<.03	17	<30	57	<5	<30	1.7	<30
3	56	283680	4470410	<.03	<.03	31	<30	120	<5	<30	1.5	<30
3	57	283740	4470270	<.03	<.03	21	<30	63	<5	<30	1.9	<30
3	58	284120	4470300	<.03	<.03	32	<30	89	<5	<30	1.4	<30
3	59	284240	4470160	<.03	<.06	28	<30	74	<5	<30	1.7	<30
3	60	284320	4470000	<.03	<.03	25	<30	70	<5	<30	1.4	<30
3	61	284440	4470180	<.03	<.03	36	<30	84	<5	<30	1.4	<30
3	62	284540	4470150	<.03	.04	31	<30	74	<5	<30	1.6	<30
3	63	284650	4469950	<.03	<.03	31	<30	80	<5	<30	1.5	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
3	64	284800	4469980	<.03	.06	26	<30	76	<5	<30	1.6	<30
3	65	285140	4469960	<.03	.06	30	<30	96	<5	<30	2.0	40
3	66	285280	4470050	<.03	.04	27	<30	100	<5	<30	2.0	<30
3	67	285680	4469920	<.03	<.03	27	<30	90	<5	<30	1.7	50
3	68	285600	4469180	<.03	<.03	29	<30	53	<5	<30	2.0	30
3	69	285560	4469120	<.03	<.03	26	<30	74	<5	<30	1.4	<30
3	70	285560	4469000	<.03	<.03	28	<30	97	<5	<30	1.5	<30
3	71	285700	4468800	<.03	<.03	40	<30	84	<5	<30	1.7	30
3	72	285700	4468720	<.03	<.03	38	<30	77	<5	<30	2.0	<30
3	73	285820	4468320	<.03	<.03	43	<30	86	<5	<30	1.9	40
3	74	285850	4468100	<.03	<.03	37	<30	79	<5	<30	1.7	<30
3	75	285950	4467870	<.03	.04	35	<30	74	<5	<30	1.3	<30
3	76	281780	4467780	<.03	.03	28	34	57	<5	<30	0.96	<30
3	77	281670	4467880	<.03	.63	26	<30	49	<5	<30	1.1	<30
3	78	281300	4467810	<.03	1.1	25	<30	54	<5	<30	1.3	<30
3	79	281260	4467900	<.03	.30	28	62	97	<5	<30	1.7	40
3	80	279390	4467630	<.03	<.03	27	<30	100	<5	<30	2.2	<30
3	81	278175	4467580	<.03	.47	25	<30	60	<5	<30	1.4	<30
3	82	277900	4467500	<.03	.12	26	<30	67	<5	<30	2.0	40
3	83	277840	4467200	<.03	.08	27	<30	71	<5	<30	1.2	<30
3	84	277640	4467140	<.03	.50	36	100	100	<5	<30	1.3	<30
3	85	277560	4466850	<.03	.46	33	39	69	<5	<30	1.4	30
3	86	277500	4466720	<.03	.12	23	<30	29	<5	<30	1.2	<30
3	87	277180	4466540	<.03	.18	25	<30	90	<5	<30	2.2	<30
3	88	277430	4466520	<.03	.21	30	<30	58	<5	<30	1.4	<30
3	89	277250	4466400	<.03	.36	30	<30	90	<5	<30	1.4	<30
3	90	277300	4466260	<.01	.03	28	<30	160	<5	<30	1.8	<30
3	91	277250	4466260	<.01	.02	28	<30	130	<5	<30	1.9	<30
3	92	277000	4465920	<.01	.08	16	<30	69	<5	<30	1.6	30
3	93	277330	4465870	.01	.03	26	<30	110	<5	<30	1.6	<30
3	94	277420	4465850	.01	.03	27	<30	83	<5	<30	2.5	<30
3	95	277470	4465200	<.01	.01	24	<30	80	<5	<30	2.1	<30
3	96	279720	4466700	<.03	<.03	28	55	81	<5	<30	2.1	<30
3	97	279800	4466860	<.03	<.03	24	<30	83	<5	<30	1.6	<30
3	98	279840	4466680	<.03	.06	32	<30	95	<5	<30	1.5	<30
3	99	279820	4466080	<.03	<.03	27	<30	67	<5	<30	1.3	<30
3	100	279750	4465450	<.03	.06	33	<30	120	<5	<30	2.6	<30
3	101	279720	4464100	<.03	<.03	25	<30	140	<5	<30	2.0	<30
3	102	281850	4467530	.05	.61	33	<30	120	<5	<30	0.96	<30
3	103	281810	4467000	<.03	4.3	44	45	59	<5	<30	1.0	30
3	104	281560	4466780	<.03	.46	23	39	61	<5	<30	1.8	30
3	105	281560	4466620	<.03	.15	26	62	87	<5	<30	1.5	<30
3	106	281550	4466290	<.03	.15	35	56	62	<5	<30	1.7	30
3	107	281580	4466220	<.03	<.03	31	67	69	<5	<30	1.9	<30
3	108	281610	4466010	<.03	.08	30	<30	40	<5	<30	2.0	30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
				All values in ppm								
3	109	281560	4465900	<.03	<.03	30	<30	35	<5	<30	1.3	<30
3	110	281500	4465780	<.03	.04	50	<30	46	<5	<30	1.7	<30
3	111	281420	4465680	<.03	.23	41	39	44	<5	<30	1.5	<30
3	112	281370	4465520	<.03	<.03	36	34	36	<5	<30	1.4	<30
3	113	281140	4465440	<.03	.10	46	<30	61	<5	<30	1.6	<30
3	114	281050	4465300	<.03	.05	57	45	51	<5	<30	1.4	<30
3	115	281020	4465180	<.03	.07	48	45	44	<5	<30	1.1	<30
3	116	280920	4465061	<.03	.08	73	56	57	<5	<30	1.0	<30
3	117	280840	4464950	<.03	.09	71	34	54	<5	<30	0.90	30
3	118	280820	4464790	<.03	.12	57	<30	53	<5	<30	1.2	<30
3	119	280770	4464540	<.03	.17	75	45	64	<5	<30	1.1	40
3	120	280720	4464340	<.03	.07	78	39	54	<5	<30	1.6	<30
3	121	280720	4464160	<.03	.05	78	34	59	<5	<30	1.4	<30
3	122	280750	4464030	<.03	.04	62	51	66	<5	<30	1.5	<30
3	123	280790	4463890	<.03	.10	71	51	49	<5	<30	1.6	30
3	124	280750	4463660	<.03	<.03	190	73	53	<5	<30	1.6	60
3	125	280780	4463520	<.03	.23	290	90	97	<5	<30	2.1	<30
3	126	280875	4463420	<.03	.07	140	56	54	<5	<30	1.6	40
3	127	280920	4463290	.30	.22	110	56	56	<5	<30	1.9	<30
3	128	280960	4463080	<.03	.13	140	67	59	<5	<30	1.9	<30
3	129	281350	4462790	<.03	.05	49	<30	89	<5	<30	2.0	50
3	130	281420	4463180	<.03	.21	66	79	100	<5	<30	2.2	<30
3	131	281520	4463090	<.03	.12	46	40	86	<5	<30	1.7	<30
3	132	281950	4463520	1.2	.81	49	75	130	<5	<30	1.9	30
3	133	282140	4463860	.08	.28	50	98	170	<5	<30	1.5	50
3	134	282200	4464080	<.03	.15	41	67	150	<5	<30	1.4	<30
3	135	282300	4464070	<.03	.12	43	52	100	<5	<30	1.5	<30
3	136	282520	4464200	<.03	.10	37	<30	67	<5	<30	1.6	<30
3	137	282700	4464180	<.03	.13	30	<30	93	<5	<30	1.4	<30
3	138	282980	4463840	<.03	.20	33	<30	89	<5	<30	1.4	<30
3	139	283370	4464020	<.03	.06	19	<30	70	<5	<30	2.0	<30
3	140	283450	4463970	<.03	.08	32	<30	110	<5	<30	2.2	<30
3	141	283420	4463470	<.03	.07	39	33	130	<5	<30	2.3	<30
3	142	283460	4463340	<.03	.10	26	<30	78	<5	<30	1.8	<30
3	143	282880	4462860	.09	.02	18	<30	78	<5	<30	1.9	<30
3	144	283050	4462280	.04	.01	18	<30	76	<5	<30	1.7	<30
3	145	285960	4467260	<.03	.03	31	<30	84	<5	<30	1.4	50
3	146	286080	4467200	<.03	.04	19	<30	76	<5	<30	1.9	<30
3	147	286580	4467420	<.03	<.03	23	<30	76	<5	<30	2.6	<30
3	148	287080	4466540	<.03	<.03	35	<30	83	<5	<30	1.6	30
3	149	286840	4466420	<.03	.06	22	<30	96	<5	<30	2.3	40
3	150	287450	4465820	<.03	.09	18	<30	61	<5	<30	2.0	<30
3	151	287130	4465680	—	—	32	<30	67	<5	<30	1.4	<30
3	152	287140	4465620	<.03	.15	28	<30	80	<5	<30	1.7	40
3	153	287300	4465140	<.03	.04	44	35	81	<5	<30	1.7	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
3	154	287340	4464690	<.03	<.03	23	36	120	<5	<30	2.2	<30
3	155	287450	4464680	<.01	.21	12	<30	95	--	<30	2.1	--
3	156	287440	4464620	<.01	.15	23	<30	91	<5	<30	2.1	<30
3	157	287200	4464300	--	--	21	<30	73	<5	<30	2.5	<30
3	158	286890	4464600	<.03	.03	22	<30	84	<5	<30	2.2	<30
3	159	286470	4464680	<.03	<.03	21	<30	97	<5	<30	2.1	<30
3	160	286470	4464590	<.03	.07	13	<30	89	<5	<30	1.7	<30
3	161	286470	4464590	<.01	.15	15	<30	100	<5	--	2.2	--
3	162	286280	4464650	<.03	.08	15	<30	95	<5	<30	1.9	40
3	163	286280	4464570	<.03	.14	23	<30	160	<5	<30	2.1	50
3	164	286420	4464480	<.03	.07	21	<30	100	<5	<30	1.9	<30
3	165	286420	4464480	<.03	.11	8	<30	60	--	<30	2.0	--
3	166	286420	4464480	<.03	.14	8	<30	62	--	<30	2.2	--
3	167	285440	4463760	<.01	<.01	30	<30	150	--	<30	2.0	<30
3	168	285560	4463780	<.01	<.01	28	<30	150	--	<30	1.5	<30
3	169	285690	4463650	<.01	.01	23	<30	150	--	<30	2.0	30
3	170	285640	4463600	<.01	.05	15	<30	73	--	<30	2.9	--
3	171	285580	4463600	.04	.11	28	<30	69	--	<30	1.6	--
3	172	285690	4463240	<.01	.04	20	<30	130	--	<30	1.7	<30
3	173	285580	4463250	.04	.09	24	<30	78	--	<30	2.1	--
3	174	285590	4462980	<.01	.05	22	<30	140	--	<30	2.4	<30
3	175	285590	4462900	<.01	.02	21	<30	130	--	<30	2.1	<30
3	176	285480	4462830	.08	.08	18	<30	73	--	<30	1.7	--
3	177	285240	4462660	<.01	.02	24	<30	120	--	<30	2.1	30
3	178	285280	4462600	.02	.05	21	<30	100	--	<30	1.8	--
3	179	285380	4462580	<.01	.02	25	<30	120	--	<30	1.9	--
3	180	285280	4462460	.01	.08	22	<30	94	--	<30	1.9	--
3	181	285400	4462180	<.01	.02	26	<30	130	--	<30	1.9	<30
3	182	284650	4462280	<.01	.01	28	<30	110	--	<30	1.7	--
3	183	284600	4462260	<.01	.06	23	<30	170	--	<30	2.6	<30
3	184	284070	4462040	<.01	<.01	14	<30	73	<5	<30	2.2	40
3	185	284150	4462020	<.01	.03	22	<30	60	<5	<30	1.4	30
3	186	284640	4461960	<.01	.07	11	<30	210	<5	<30	1.6	<30
3	187	284820	4461940	<.01	.08	29	<30	130	--	<30	1.8	<30
3	188	284580	4461660	.06	<.01	22	<30	88	<5	<30	2.0	<30
3	189	284370	4461500	.09	.02	21	<30	100	<5	<30	1.9	30
3	190	283660	4461540	<.01	.03	17	<30	66	<5	<30	2.0	30
3	191	283470	4461480	<.01	<.01	22	<30	75	<5	<30	2.0	<30
3	192	283160	4461500	<.01	<.01	10	<30	49	<5	<30	1.8	<30
3	193	282690	4461630	<.01	.03	14	<30	82	<5	<30	2.2	50
3	194	282770	4461490	.01	.01	16	<30	75	<5	<30	1.6	<30
3	195	282900	4461070	<.01	.06	24	<30	75	<5	<30	2.2	40
3	196	283980	4461020	<.01	.01	26	<30	130	--	<30	1.8	<30
3	197	284180	4461140	<.01	.04	26	<30	220	--	<30	1.4	<30
3	198	284720	4461300	<.01	.02	33	<30	130	--	<30	2.0	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
3	199	284770	4461150	<.01	.02	20	<30	69	--	--	1.4	--
3	200	285050	4461300	<.01	.02	23	<30	110	--	<30	2.2	<30
3	201	285150	4461380	<.01	.01	26	<30	120	--	<30	2.0	<30
3	202	285120	4461540	.03	.12	28	<30	110	--	--	1.9	--
3	203	285170	4461490	<.03	.08	27	<30	120	--	--	2.0	--
3	204	285260	4461450	<.01	.01	23	<30	110	--	<30	1.6	<30
3	205	285490	4461610	<.01	.02	25	<30	120	--	<30	1.9	<30
3	206	285530	4461830	<.01	.01	21	<30	130	--	<30	1.6	<30
3	207	282970	4460520	<.01	.01	15	<30	180	<5	<30	1.3	30
3	208	283300	4460220	<.01	.02	19	<30	64	<5	<30	1.8	40
3	209	283660	4459980	<.01	<.01	30	<30	74	<5	<30	1.9	<30
3	210	283760	4459580	<.01	<.01	24	<30	74	<5	<30	1.8	<30
3	211	283820	4459390	<.01	.02	20	<30	76	<5	<30	2.3	<30
3	212	283880	4459340	<.01	.03	21	<30	73	<5	<30	1.4	40
3	213	283950	4459250	.01	.02	24	<30	85	<5	<30	2.1	<30
3	214	283900	4458930	.07	.04	26	<30	82	<5	<30	2.1	<30
3	215	284180	4459080	<.01	.05	23	<30	76	<5	<30	1.8	30
3	216	284590	4459150	.08	.03	26	<30	86	<5	<30	2.2	50
3	217	284940	4459260	<.01	.06	27	<30	85	<5	<30	1.7	<30
3	218	285080	4459200	<.01	.03	21	<30	140	<5	<30	1.4	<30
3	219	285130	4459120	<.01	.05	24	<30	72	<5	<30	1.7	<30
3	220	284510	4458890	<.01	.09	18	<30	63	<5	<30	1.8	<30
3	221	284080	4458500	<.01	.01	17	<30	72	<5	<30	2.2	40
3	222	285720	4458720	.02	.03	24	<30	74	<5	<30	2.0	40
3	223	285780	4458600	.01	.08	29	<30	75	<5	<30	1.9	50
3	224	285680	4458500	.01	.02	21	<30	64	<5	<30	1.8	40
3	225	285400	4458400	.03	.03	24	<30	92	<5	<30	1.7	50
3	226	285860	4458380	<.01	.06	27	<30	57	<5	<30	1.5	<30
3	227	286100	4458580	<.01	.06	29	<30	54	<5	<30	2.0	<30
3	228	286280	4458490	<.01	.03	24	<30	52	<5	<30	1.6	<30
3	229	286280	4458430	.01	.02	24	<30	48	<5	<30	1.7	<30
3	230	286660	4458400	.01	.15	27	<30	63	<5	<30	1.7	<30
3	231	286680	4458580	<.01	.01	20	<30	49	<5	<30	1.6	40
3	232	286900	4458820	.12	.05	28	<30	63	<5	<30	1.8	<30
3	233	286920	4458700	.18	.05	25	<30	60	<5	<30	1.8	60
3	234	287140	4458460	<.01	.06	23	<30	70	<5	<30	1.4	<30
4	01	287855	4464521	--	--	25	<30	83	<5	<30	2.1	50
4	02	287708	4464295	<.03	.13	25	<30	83	6	<30	1.9	<30
4	03	287932	4463598	<.03	<.03	32	<30	88	<5	<30	1.3	30
4	04	288006	4463223	<.03	<.03	57	<30	94	<5	<30	1.8	--
4	05	288216	4463303	--	--	20	<30	46	<5	<30	1.6	<30
4	06	291066	4462144	<.03	<.03	19	<30	73	<5	<30	1.4	<30
4	07	290355	4461696	<.03	.05	11	<30	58	<5	<30	2.6	<30
4	08	290280	4461296	<.03	.03	15	<30	72	<5	<30	2.3	40
4	09	289338	4460854	<.03	.04	17	<30	59	<5	<30	2.1	30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad	Samp	UTM Grid (meters)		All values in ppm								
no.	no.	East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
4	10	288952	4460793	<.03	.03	16	<30	58	<5	<30	2.0	<30
4	11	289230	4460436	<.03	<.03	17	<30	80	<5	<30	2.1	<30
4	12	289504	4460172	<.06	<.06	15	<30	67	<5	<30	2.4	40
4	13	289551	4459847	<.03	<.03	12	<30	73	<5	<30	1.8	<30
4	14	289563	4459499	<.03	<.03	10	<30	43	<5	<30	1.2	<30
4	15	289199	4459146	<.03	<.03	12	<30	58	<5	<30	1.3	<30
4	16	289146	4458979	<.03	<.03	14	<30	59	<5	<30	1.3	<30
4	17	287380	4458604	.03	<.01	18	<30	73	<5	<30	2.1	30
4	18	287538	4458507	<.01	<.01	21	<30	72	<5	<30	2.1	<30
4	19	288977	4458435	<.03	<.03	14	<30	70	<5	<30	1.6	<30
4	20	292641	4461401	<.03	.05	34	<30	100	<5	<30	2.1	<30
4	21	292831	4460673	<.03	<.03	21	<30	87	<5	<30	1.3	<30
4	22	292725	4458958	<.03	<.03	15	<30	69	<5	<30	1.7	<30
4	23	292762	4458882	<.03	<.03	12	<30	64	<5	<30	1.5	40
4	24	292618	4458315	<.03	<.03	29	<30	96	<5	<30	1.9	<30
5	1	264429	4458079	<.03	<.03	35	<15	81	<5	<15	2.0	30
5	2	263924	4457170	<.03	<.03	37	<15	83	<5	<15	2.0	30
5	3	264300	4456769	<.03	.44	36	<15	77	<5	<15	1.1	<30
5	4	264200	4456641	<.03	<.03	33	<15	84	<5	<15	2.3	<30
5	5	263924	4456459	<.03	.03	30	<15	80	<5	<15	0.92	30
5	6	265080	4456349	<.03	<.03	35	<15	73	<5	<15	1.8	<30
5	7	265610	4454800	<.03	<.03	30	<15	76	<5	<15	1.2	<30
5	8	265850	4454249	<.03	<.03	29	<15	79	<5	<15	1.3	<30
5	9	265791	4454200	<.03	.05	39	<15	73	<5	<15	1.1	<30
6	1	266639	4447500	<.03	<.03	26	<15	51	<5	<15	2.0	<30
6	2	267564	4445329	<.03	<.03	27	<15	53	<5	<15	1.2	<30
7	1	284091	4457882	<.01	.02	19	<30	79	<5	<30	1.4	30
7	2	285039	4457948	.04	.05	23	<30	100	<5	<30	1.9	<30
7	3	285440	4458209	.06	.02	20	<30	89	<5	<30	2.0	30
7	4	285504	4458001	<.01	.01	23	<30	66	<5	<30	1.8	<30
7	5	285500	4457880	.02	.03	22	<30	62	<5	<30	1.0	30
7	6	285669	4457769	<.01	.05	29	<30	130	<5	<30	2.5	<30
7	7	285071	4457801	<.01	.09	21	<30	70	<5	<30	1.8	30
7	8	284828	4457630	.19	.03	21	<30	63	<5	<30	2.6	<30
7	9	286212	4457921	<.01	.03	22	<30	35	<5	<30	1.6	30
7	10	286891	4457965	.05	.09	34	<30	41	<5	<30	1.5	40
7	11	287141	4458018	.02	.03	28	<30	71	<5	<30	1.3	30
7	12	287219	4458062	<.01	.01	21	<30	44	<5	<30	1.5	40
7	13	287196	4457900	.03	.01	24	<30	60	<5	<30	1.4	40
7	14	286642	4457679	.06	.03	26	<30	56	<5	<30	2.2	<30
7	15	286184	4457655	<.01	<.01	20	<30	37	<5	<30	7.4	50
7	16	284918	4457352	.02	.23	41	<30	66	<5	<30	2.6	30
7	17	285084	4457000	<.01	.14	30	<30	69	<5	<30	2.7	<30
7	18	285079	4456847	.01	.03	34	<30	77	<5	<30	--	<30
7	19	285191	4456728	.10	<.01	26	<30	70	<5	<30	--	40

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad	Samp	UTM Grid (meters)		All values in ppm								
no.	no.	East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
7	20	285399	4456720	<.01	.01	26	<30	77	<5	<30	10.0	60
7	21	285779	4456613	<.03	<.03	25	<30	58	<5	<30	1.2	200
7	22	285820	4456739	<.01	.03	40	<30	110	<5	<30	1.8	<30
7	23	285932	4456781	<.03	.09	30	<30	69	<5	<30	2.8	<30
7	24	286094	4456754	<.03	.95	17	<30	48	<5	<30	4.1	<30
7	25	286644	4456872	<.03	<.03	20	<30	54	<5	<30	1.5	100
7	26	286922	4457060	<.03	<.03	21	<30	61	<5	<30	1.7	<30
7	27	287242	4457150	<.03	<.03	22	<30	64	<5	<30	3.1	<30
7	28	286605	4456659	<.03	<.03	26	<30	69	<5	<30	8.6	<30
7	29	286380	4456290	<.03	<.03	36	<30	69	<5	<30	1.7	50
7	30	286040	4456240	<.03	<.03	22	<30	58	<5	<30	2.3	70
7	31	285769	4456439	<.01	.02	21	<30	62	<5	<30	10.0	120
7	32	285750	4456050	<.01	<.01	26	<30	110	<5	<30	4.9	<30
7	33	285355	4456025	<.01	<.01	29	<30	80	<5	<30	--	50
7	34	285310	4455820	.03	.14	20	14	75	2	1	10.0	--
7	35	285188	4455730	<.01	.06	26	<30	89	<5	<30	--	<30
7	36	285818	4455305	.08	.06	26	<30	57	<5	<30	--	<30
7	37	286492	4455779	.24	.03	39	<30	110	<5	<30	--	<30
7	38	286509	4455679	<.01	.05	24	<30	69	<5	<30	--	<30
7	39	286325	4455280	.07	.02	27	<30	63	<5	<30	--	<30
7	40	285560	4455120	<.03	.18	20	28	63	2	1	7	--
7	41	287092	4455162	<.03	<.03	29	<30	67	<5	<30	1.6	40
7	42	287240	4455000	<.03	.03	33	<30	72	<5	<30	2.1	<30
7	43	287049	4454663	<.01	.01	36	<30	100	<5	<30	--	<30
7	44	286090	4454060	<.03	.15	20	50	73	2	1	5	--
7	45	286260	4453430	.03	.15	20	20	89	3	1	5	--
7	46	286290	4452860	<.03	.22	20	20	120	2	1	5	--
7	47	286380	4452220	<.03	.28	20	12	79	2	1	5	--
7	48	286590	4451900	<.03	.32	12	12	53	4	1	4	--
7	49	286400	4451690	.03	.24	18	20	75	1	1	5	--
7	50	286979	4451650	<.03	.06	20	<30	140	<5	<30	2.5	40
7	51	286970	4451594	<.03	.04	55	<30	90	<5	<30	1.9	30
7	52	286390	4448750	.04	.14	12	10	79	5	1	5	--
7	53	286570	4448440	<.03	.18	12	8	64	2	1	5	--
7	54	286480	4448100	<.03	6.2	12	10	65	4	1	4	--
7	55	287017	4448080	<.03	.10	10	<30	80	<5	<30	1.8	<30
7	56	286600	4447700	<.03	.15	10	16	77	2	1	5	--
7	57	286530	4446950	<.03	.13	14	12	66	1	1	4	--
7	58	286740	4446840	<.03	.53	18	10	60	5	1	5	--
7	59	286750	4446220	<.03	.14	18	10	60	4	1	7	--
7	60	286699	4445427	<.03	.74	15	<30	70	<5	<30	1.7	<30
7	61	286600	4444700	<.03	.16	30	<30	80	<5	<30	1.8	<30
7	62	286640	4444700	.04	.31	25	15	75	<1	3	2.0	<20
8	1	287582	4457971	<.03	<.03	17	<30	86	<5	<30	1.7	<30
8	2	287403	4457712	<.03	<.03	31	<30	77	<5	<30	2.1	60

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
				All values in ppm								
8	3	287570	4457458	<.03	<.03	22	<30	64	<5	<30	2.2	<30
8	4	287456	4457248	<.03	<.03	21	<30	67	<5	<30	2.4	<30
8	5	287961	4457464	<.03	<.03	17	<30	86	<5	<30	2.4	<30
8	6	288082	4457391	<.03	<.03	12	<30	80	<5	<30	2.2	30
8	7	288978	4457613	<.03	<.03	6	<30	100	<5	<30	2.3	30
8	8	292545	4457636	<.03	.03	20	<30	62	<5	<30	2.0	<30
8	9	292484	4457489	<.03	<.03	12	<30	100	<5	<30	1.8	50
8	10	294861	4457078	<.03	.08	12	<30	46	<5	<30	1.9	50
8	11	294852	4456973	<.01	.03	11	<30	64	<5	<30	1.7	30
8	12	296130	4456372	<.01	.06	25	<30	120	<5	<30	1.1	<30
8	13	296102	4456281	<.01	.06	20	<30	180	<5	<30	1.3	<30
8	14	297189	4456305	<.01	.06	15	<30	70	<5	<30	1.2	50
8	15	297282	4456145	<.02	<.03	15	<30	80	<5	<30	1.2	<30
8	16	296902	4456024	<.01	.06	30	<30	80	<5	<30	1.0	<30
8	17	294263	4456390	<.01	.03	14	<30	78	<5	<30	2.0	<30
8	18	294365	4456297	<.01	.03	12	<30	87	<5	<30	2.4	40
8	19	294295	4456160	<.01	.04	20	<30	75	<5	<30	2.4	40
8	20	294363	4456051	<.01	.04	13	<30	80	<5	<30	2.2	30
8	21	292760	4456600	<.01	.04	28	<30	94	<5	<30	1.8	<30
8	22	292760	4456600	<.01	.04	29	<30	110	<5	<30	1.8	<30
8	23	292600	4456360	<.01	<.03	32	<30	130	<5	<30	1.5	30
8	24	291520	4456740	<.01	.04	16	<30	69	<5	<30	1.7	30
8	25	291510	4456570	<.01	.03	16	<30	88	<5	<30	1.5	40
8	26	288770	4457360	<.03	<.03	12	<30	86	<5	<30	2.3	<30
8	27	288920	4457160	<.03	<.03	24	<30	81	<5	<30	1.8	30
8	28	288820	4456990	<.03	<.03	34	<30	61	<5	<30	1.5	<30
8	29	288570	4457040	<.03	<.03	25	<30	96	<5	<30	1.5	<30
8	30	288360	4457100	<.03	.08	9	<30	96	<5	<30	1.9	30
8	31	288360	4457200	<.03	<.03	21	<30	75	<5	<30	1.8	40
8	32	287850	4457110	<.03	<.03	11	<30	78	<5	<30	2.0	<30
8	33	287480	4456840	<.03	<.03	17	<30	69	<5	<30	2.0	30
8	34	288140	4456880	<.03	.05	14	<30	83	<5	<30	2.1	<30
8	35	288540	4456720	<.03	.05	60	<30	78	<5	<30	1.1	<30
8	36	288560	4456540	<.03	<.03	27	<30	78	<5	<30	2.1	<30
8	37	288440	4456440	<.03	<.03	29	<30	80	<5	<30	1.9	<30
8	38	288150	4456580	<.03	<.03	43	<30	76	<5	<30	2.8	<30
8	39	287580	4456180	.02	.05	32	<30	74	<5	<30	--	<30
8	40	288020	4456020	<.03	.08	30	<30	67	<5	<30	5.0	60
8	41	287440	4455910	<.01	.02	15	<30	61	6	<30	--	<30
8	42	287773	4455690	<.03	<.03	24	<30	91	<5	<30	9.8	100
8	43	287414	4455643	<.01	.04	24	<30	51	11	<30	--	<30
8	44	277980	4455420	<.03	<.03	23	<30	70	<5	<30	3.8	40
8	45	288260	4455530	<.03	<.03	24	<30	54	<5	<30	9.0	90
8	46	288500	4455620	<.03	<.03	25	<30	83	<5	<30	2.2	<30
8	47	288450	4455960	<.03	.06	35	<30	75	<5	<30	1.5	50

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
8	48	288760	4455870	<.03	<.03	18	<30	76	<5	<30	1.5	<30
8	49	289065	4455817	<.03	.08	22	<30	72	<5	<30	2.3	<30
8	50	289339	4455153	<.03	.04	24	<30	86	<5	<30	2.4	60
8	51	289287	4455059	<.03	<.03	10	<30	75	<5	<30	1.9	40
8	52	289101	4454924	<.03	<.03	19	<30	61	<5	<30	2.0	<30
8	53	288915	4454707	<.03	<.03	25	<30	86	<5	<30	2.3	40
8	54	288572	4454626	<.03	<.03	16	<30	94	<5	<30	2.6	<30
8	55	288145	4454834	<.03	<.03	27	<30	100	<5	<30	3.2	<30
8	56	287980	4454630	<.03	<.03	17	<30	91	<5	<30	3.1	<30
8	57	287858	4454588	<.03	<.03	26	<30	100	<5	<30	2.7	50
8	58	287740	4454910	<.03	<.03	22	<30	92	<5	<30	3.2	50
8	59	287400	4454825	<.03	.11	22	<30	64	<5	<30	0.56	--
8	60	287890	4453860	<.03	<.03	20	<30	100	<5	<30	3.2	40
8	61	287887	4453680	<.03	<.03	30	<30	170	<5	<30	2.4	40
8	62	287888	4453540	<.03	<.03	30	<30	730	<5	<30	2.4	<30
8	63	288045	4453832	<.03	<.03	25	<30	110	<5	<30	1.6	<30
8	64	288159	4453815	<.03	<.03	30	<30	130	<5	<30	1.5	<30
8	65	288593	4453732	<.03	.04	25	<30	110	<5	<30	1.8	<30
8	66	288480	4453995	<.03	<.03	30	<30	100	<5	<30	1.1	<30
8	67	288610	4453995	<.03	<.03	20	<30	110	<5	<30	1.5	30
8	68	288600	4453740	<.03	<.03	25	<30	90	<5	<30	1.4	<30
8	69	288220	4453525	<.03	<.03	30	<30	100	<5	<30	1.7	<30
8	70	288700	4453520	<.03	.03	15	<30	80	<5	<30	2.0	<30
8	71	289340	4453590	<.03	.03	20	<30	100	<5	<30	2.1	<30
8	72	291320	4453950	<.03	.05	24	<30	100	<5	<30	2.2	40
8	73	291145	4453580	<.03	.08	14	<30	100	<5	<30	1.8	30
8	74	288960	4453000	<.03	.03	10	<30	90	<5	<30	2.1	30
8	75	288450	4453130	<.03	.06	30	<30	80	<5	<30	1.8	40
8	76	288100	4453060	<.03	.03	20	<30	80	<5	<30	2.0	<30
8	77	287770	4453015	<.03	<.03	24	<30	76	<5	<30	1.8	<30
8	78	287730	4453095	<.03	.21	21	<30	88	<5	<30	1.8	<30
8	79	287570	4452980	<.03	.04	12	<30	86	<5	<30	3.2	40
8	80	287770	4452990	<.03	.09	19	<30	92	<5	<30	1.6	<30
8	81	288220	4452890	<.03	.04	20	<30	100	<5	<30	1.8	<30
8	82	288532	4452870	<.03	.03	30	<30	100	<5	<30	1.1	<30
8	83	288938	4452783	<.03	<.03	10	<30	80	<5	<30	2.2	60
8	84	289114	4452650	<.03	.04	20	<30	110	<5	<30	1.4	<30
8	85	289091	4452587	<.03	.05	20	<30	80	<5	<30	2.1	30
8	86	288518	4452709	<.03	<.03	10	<30	80	<5	<30	1.9	<30
8	87	288190	4452740	<.03	<.03	20	<30	120	<5	<30	2.5	30
8	88	287884	4452740	<.03	.18	16	<30	78	<5	<30	2.5	<30
8	89	287576	4452553	<.03	<.03	21	<30	75	<5	<30	2.4	40
8	90	287327	4452461	<.03	<.03	22	<30	83	<5	<30	3.1	50
8	91	287726	4452484	<.03	<.03	17	<30	100	<5	<30	2.1	50
8	92	288126	4452554	<.03	<.03	20	<30	91	<5	<30	2.3	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
				All values in ppm								
8	93	288020	4452380	<.03	<.03	19	<30	100	<5	<30	2.5	50
8	94	288231	4452460	<.03	<.03	18	<30	64	<5	<30	4.5	<30
8	95	288667	4452354	<.03	<.03	20	<30	140	<5	<30	1.7	<30
8	96	288766	4452418	<.03	.10	15	<30	100	<5	<30	2.1	40
8	97	290748	4452648	<.03	<.03	18	<30	62	<5	<30	1.9	<30
8	98	290675	4452205	<.03	.04	22	<30	80	<5	<30	1.6	<30
8	99	294775	4451855	<.03	<.03	16	<15	74	<5	<15	2.1	<30
8	100	294579	4451641	<.03	<.03	15	<15	84	<5	<15	2.1	<30
8	101	294192	4451069	<.03	<.03	17	<15	68	<5	<15	2.1	<30
8	102	293958	4450838	<.03	<.03	16	<15	82	<5	<15	2.2	<30
8	103	297067	4450398	<.01	.01	25	<30	100	<5	<30	1.8	40
8	104	297039	4450344	<.01	.06	30	<30	90	<5	<30	2.4	<30
8	105	288657	4451760	<.03	.06	10	<30	90	<5	<30	1.4	<30
8	106	288354	4451760	<.03	<.03	15	<30	80	<5	<30	1.9	<30
8	107	287425	4451665	<.03	.04	20	<30	160	<5	<30	1.8	<30
8	108	288391	4451630	<.03	.05	15	<30	80	<5	<30	2.9	50
8	109	288724	4451680	<.03	.04	20	<30	120	<5	<30	1.6	<30
8	110	288776	4451400	<.03	.04	20	<30	90	<5	<30	1.9	40
8	111	288333	4451450	<.03	.03	10	<30	80	<5	<30	1.8	60
8	112	288140	4451500	<.03	.10	10	<30	90	<5	<30	2.2	50
8	113	288000	4451240	<.03	<.03	20	<30	110	<5	<30	2.0	<30
8	114	287643	4451350	<.03	.09	15	<30	100	<5	<30	2.1	<30
8	115	288444	4451140	<.03	<.03	15	<30	90	<5	<30	1.6	<30
8	116	288054	4450800	<.03	.74	10	<30	70	<5	<30	2.2	<30
8	117	288074	4450680	<.03	<.03	10	<30	70	<5	<30	1.6	<30
8	118	287830	4450585	<.03	<.03	15	<30	100	<5	<30	1.9	<30
8	119	287685	4450995	<.03	.38	15	<30	100	<5	<30	2.0	<30
8	120	287591	4450585	<.03	.03	15	<30	110	<5	<30	2.3	40
8	121	287577	4450280	<.03	.03	20	<30	110	<5	<30	2.1	<30
8	122	287869	4450065	<.03	<.03	10	<30	70	<5	<30	1.7	<30
8	123	288412	4450420	<.03	<.03	10	<30	70	<5	<30	1.5	40
8	124	288461	4449990	<.03	<.03	10	<30	80	<5	<30	2.0	30
8	125	288776	4450392	<.03	<.03	10	<30	90	<5	<30	1.8	<30
8	126	288949	4450000	<.03	.10	10	<30	110	<5	<30	1.8	40
8	127	289960	4449980	<.03	<.03	15	<30	80	<5	<30	2.1	<30
8	128	290190	4449828	<.03	<.03	10	<30	90	<5	<30	2.0	<30
8	129	290334	4449918	<.03	<.03	10	<30	70	<5	<30	1.8	<30
8	130	290525	4449984	<.03	.09	10	<30	70	<5	<30	1.7	<30
8	131	289991	4449474	<.03	<.03	10	<30	70	<5	<30	1.6	<30
8	132	289692	4449450	<.03	<.03	15	<30	70	<5	<30	1.7	30
8	133	289081	4449317	<.03	<.03	10	<30	70	<5	<30	1.7	40
8	134	288845	4448990	<.03	<.03	10	<30	70	<5	<30	1.7	<30
8	135	288833	4448815	<.03	<.03	15	<30	70	<5	<30	2.0	<30
8	136	288504	4448977	<.03	<.03	15	<30	60	<5	<30	1.8	<30
8	137	288408	4449002	<.03	<.03	10	<30	80	<5	<30	1.6	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
				All values in ppm								
8	138	287990	4449444	<.03	<.03	10	<30	70	<5	<30	1.8	40
8	139	287958	4449600	<.03	<.03	10	<30	70	<5	<30	2.1	<30
8	140	288310	4449689	<.03	<.03	<5	<30	90	<5	<30	3.4	<30
8	141	287670	4449622	<.03	<.03	15	<30	90	<5	<30	1.7	<30
8	142	287310	4449260	<.03	<.03	20	<30	110	<5	<30	2.1	40
8	143	287729	4449307	<.03	<.03	20	<30	80	<5	<30	2.0	<30
8	144	287700	4449170	<.03	.72	15	<30	100	<5	<30	2.3	<30
8	145	287256	4448470	<.03	<.03	10	<30	80	<5	<30	1.9	<30
8	146	287291	4448242	<.03	<.03	10	<30	90	<5	<30	1.4	<30
8	147	287963	4448593	<.03	<.03	15	<30	70	<5	<30	1.3	<30
8	148	288172	4448200	<.03	<.06	15	<30	60	<5	<30	2.1	<30
8	149	288179	4448143	<.03	.07	30	60	110	<5	<30	1.6	<30
8	150	289280	4448519	<.03	<.06	10	<30	60	<5	<30	2.0	<30
8	151	289288	4448302	<.03	<.03	20	<30	90	<5	<30	2.0	<30
8	152	289832	4448316	<.03	<.03	20	<30	110	<5	<30	2.4	<30
8	153	291729	4449625	<.03	<.03	15	<30	70	<5	<30	4.0	<30
8	154	292239	4449646	<.03	<.03	30	<30	80	<5	<30	2.9	<30
8	155	292920	4449294	<.03	.27	35	<30	110	<5	<30	4.0	<30
8	156	293467	4448631	<.03	.04	30	<30	80	<5	<30	3.2	<30
8	157	294286	4448509	<.03	<.03	35	<30	80	<5	<30	2.8	<30
8	158	294680	4448152	<.03	<.03	30	<30	80	<5	<30	1.2	<30
8	159	287265	4447565	<.03	.04	20	<30	80	<5	<30	2.1	<30
8	160	287265	4447492	<.03	<.03	20	<30	80	<5	<30	1.9	<30
8	161	287150	4447140	<.03	1.50	20	<30	110	<5	<30	2.9	<30
8	162	288536	4446913	<.03	.16	20	<30	80	<5	<30	2.3	<30
8	163	288610	4446757	<.03	1.00	20	<30	80	<5	<30	1.6	<30
8	164	288547	4446723	<.03	.40	25	<30	250	<5	<30	4.5	<30
8	165	289361	4446570	<.03	<.03	20	<30	80	<5	<30	2.0	<30
8	166	289562	4446417	--	--	20	<30	80	<5	<30	1.6	<30
8	167	289516	4446333	<.03	<.03	20	<30	90	<5	<30	2.3	<30
8	168	287073	4446034	<.03	.25	18	<30	54	<5	<30	2.2	<30
8	169	287903	4444531	<.03	.09	30	<30	130	<5	<30	1.8	<30
8	170	288849	4445306	<.03	<.03	20	<30	100	<5	<30	2.1	40
8	171	289725	4444608	<.03	.06	50	<30	510	<5	<30	1.6	<30
8	172	289784	4444481	.05	.39	50	<30	90	<5	<30	1.5	<30
8	173	292992	4445806	<.01	<.03	20	<30	70	<5	<30	2.1	<30
8	174	293006	4445872	<.01	<.03	30	<30	70	<5	<30	2.0	<30
8	175	293674	4445483	<.01	<.03	25	<30	80	<5	<30	2.3	<30
8	176	293785	4445400	<.01	<.03	30	<30	100	<5	<30	1.9	<30
8	177	293752	4445569	<.01	<.03	35	<30	90	<5	<30	2.4	<30
8	178	296484	4447233	<.01	<.03	20	<30	110	<5	<30	1.8	<30
8	179	296525	4447334	<.01	<.03	25	<30	120	<5	<30	1.7	<30
8	180	296972	4446863	<.01	.03	25	<30	90	<5	<30	2.0	<30
8	181	297139	4446079	<.01	.99	20	<30	90	<5	<30	2.4	<30
8	182	297375	4445068	<.01	<.03	30	<30	90	<5	<30	1.2	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
8	183	297491	4444674	<.01	<.03	40	<30	170	<5	<30	1.9	<30
8	184	288280	4453680	<.03	<.03	20	<30	100	<5	<30	1.7	<30
8	185	294750	4452355	<.03	<.03	12	<15	86	<5	<15	2.8	<30
9	1	298111	4455507	<.01	.06	15	<30	70	<5	<30	1.2	50
9	2	298213	4453950	<.01	.06	15	<30	80	<5	<30	1.7	<30
9	3	297992	4452830	<.01	.10	20	<30	80	<5	<30	1.3	<30
9	4	298182	4452459	<.01	.06	15	<30	60	<5	<30	1.3	<30
9	5	297892	4450409	<.01	.10	30	<30	110	<5	<30	1.6	<30
9	6	297841	4450124	<.01	.06	25	<30	80	<5	<30	2.0	<30
9	7	298040	4449360	<.01	<.03	30	<30	70	<5	<30	2.4	<30
10	1	267239	4444496	<.01	.07	39	<30	32	<5	<30	1.4	<30
10	2	266928	4444122	<.01	.07	28	<30	23	<5	<30	1.5	--
10	3	266946	4443853	<.01	.03	26	<30	51	<5	<30	1.4	--
10	4	267072	4443309	<.01	.03	21	<30	56	<5	<30	1.4	30
10	5	267155	4443178	.03	.07	38	<30	18	<5	<30	2.0	<30
10	6	268050	4443176	<.01	.07	43	<30	11	<5	<30	1.9	30
10	7	268207	4443034	<.01	--	34	<30	20	<5	<30	1.9	<30
10	8	267520	4442536	<.07	.07	16	<30	<5	<5	<30	2.5	30
10	9	267552	4442423	<.03	.03	25	<30	34	<5	<30	2.1	40
10	10	267809	4442367	<.03	.07	33	<30	18	<5	<30	2.5	<30
10	11	267988	4442523	.07	.10	31	<30	<5	<5	<30	2.4	<30
10	12	268166	4441557	.01	.07	34	<30	37	<5	<30	2.0	<30
10	13	268283	4441658	<.01	.07	31	<30	<5	<5	<30	2.3	40
10	14	268554	4441353	.02	.07	37	<30	<5	<5	<30	2.8	70
10	15	269140	4441768	<.03	.14	43	<30	20	<5	<30	2.1	30
10	16	269530	4440764	<.01	.10	44	<30	25	<5	<30	2.0	<30
10	17	268740	4440802	.02	.10	54	<30	25	<5	<30	1.8	50
10	18	268058	4440677	.02	.10	60	33	41	<5	<30	1.9	<30
10	19	268370	4439561	<.01	.07	56	<30	25	<5	<30	2.4	<30
10	20	269038	4439662	<.03	<.03	37	<30	8	<5	<30	2.1	30
10	21	269000	4439195	<.01	.07	41	<30	23	<5	<30	3.6	30
10	22	268579	4438973	<.01	.10	34	<30	<5	<5	<30	4.1	30
10	23	268596	4438175	.17	.48	63	<15	68	<5	<15	3.4	<30
10	24	268676	4438054	.03	.03	82	<15	82	<5	<15	2.6	50
10	25	269504	4438482	.03	.07	30	<15	95	<5	<15	2.9	40
10	26	269583	4438125	.03	.02	33	<15	97	<5	<15	2.6	40
10	27	270302	4437758	<.01	.02	88	<15	100	<5	<15	3.9	<30
10	28	270469	4437253	<.01	.03	71	<15	74	<5	<15	2.1	50
10	29	269329	4437239	<.01	<.01	45	<30	78	<5	<30	2.1	30
10	30	269078	4436920	.03	<.01	76	<30	120	<5	<30	2.2	30
10	31	270167	4436685	<.01	<.01	83	<15	89	<5	<15	2.0	<30
10	32	268861	4436583	<.01	.14	100	<30	89	<5	<30	2.1	<30
10	33	268861	4436025	<.01	.01	110	<30	110	10	<30	2.7	<30
10	34	268899	4435787	<.01	<.01	63	<30	87	<5	<30	1.6	30
10	35	269298	4436093	<.01	.03	67	<30	84	<5	<30	1.9	30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
10	36	271171	4436130	.31	<.01	25	<30	57	<5	<30	2.3	<30
10	37	269061	4435402	<.01	.07	90	<30	73	<5	<30	2.0	<30
10	38	269146	4435159	<.01	.07	110	<30	67	<5	<30	2.4	<30
10	39	269425	4435135	.02	.24	64	<30	51	<5	<30	1.5	<30
10	40	269397	4434644	<.01	.10	82	<30	56	<5	<30	1.9	<30
10	41	269577	4434642	.01	.10	76	<30	51	<5	<30	1.9	<30
10	42	269550	4434220	.01	.10	82	<30	60	<5	<30	1.5	50
10	43	269265	4433996	.01	.38	50	<30	41	<5	<30	1.5	40
10	44	269404	4433644	<.01	.10	72	<30	49	<5	<30	1.5	<30
10	45	270492	4433949	<.01	.02	51	<30	100	<5	<30	1.9	<30
10	46	270473	4434250	<.01	.14	48	<30	110	<5	<30	4.4	50
10	47	271014	4434544	.01	<.01	46	39	77	<5	<30	--	40
10	48	270719	4434833	.01	<.01	49	<30	77	<5	<30	1.6	30
10	49	270839	4435000	<.01	<.01	56	<30	81	<5	<30	1.2	<30
10	50	270804	4435270	<.01	<.01	48	<30	87	<5	<30	1.7	<30
10	51	271314	4434781	.38	<.01	66	<30	77	<5	<30	2.0	<30
10	52	271778	4434783	<.01	<.01	57	<30	87	<5	<30	1.8	40
10	53	271912	4435345	<.03	.03	78	<30	90	<5	<30	2.6	30
10	54	273245	4434764	<.01	.03	33	<30	73	<5	<30	2.3	40
10	55	272151	4434180	<.01	<.01	60	<15	85	<5	<15	1.7	30
10	56	271666	4433783	<.01	.03	39	<15	81	<5	<15	3.1	30
10	57	271990	4433540	<.01	.07	49	<15	83	<5	<15	1.9	40
10	58	271268	4433318	<.01	.01	68	<15	78	<5	<15	1.7	50
10	59	270936	4433488	.03	.24	51	<30	81	<5	<30	0.75	<30
10	60	270985	4433297	<.01	.02	100	<15	140	<5	<15	3.1	50
10	61	270676	4433192	.01	<.01	120	<15	99	<5	<15	0.64	30
10	62	270175	4433366	.01	<.01	23	<30	87	<5	<30	1.2	<30
10	63	269995	4433180	.03	<.01	65	<30	75	<5	<30	0.83	<30
10	64	270135	4432745	.01	.03	49	<30	73	<5	<30	0.74	<30
10	65	270497	4432532	.02	.01	42	<30	100	<5	<30	0.89	<30
10	66	271022	4432492	.01	.03	31	<30	71	<5	<30	0.86	<30
10	67	270921	4432728	<.01	.03	93	<15	100	<5	<15	1.8	<30
10	68	271057	4432771	.02	.07	69	<30	78	<5	<30	1.7	<30
10	69	274259	4433545	<.01	.03	42	35	94	<5	<30	1.5	30
10	70	272880	4432566	<.01	<.01	35	<30	100	<5	<30	1.6	30
10	71	274390	4432388	<.01	<.01	42	<30	100	<5	<30	1.1	40
10	72	273907	4432100	<.01	<.01	39	<30	78	<5	<30	1.8	30
10	73	273674	4432024	<.01	<.01	57	<30	81	<5	<30	0.73	<30
10	74	272723	4432179	<.01	<.01	45	<30	83	<5	<30	1.9	60
10	75	272586	4431694	<.01	<.01	52	<30	78	<5	<30	1.2	<30
10	76	271916	4431338	--	--	89	<30	94	--	<30	--	--
10	77	271728	4431417	.02	.03	53	<30	73	<5	<30	0.89	<30
10	78	270552	4431243	.14	.03	49	<30	73	<5	<30	0.93	<30
10	79	271254	4431058	<.01	.03	54	<30	71	<5	<30	0.77	30
10	80	271397	4431024	--	--	38	<30	81	<5	<30	1.5	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
10	81	273423	4431561	.03	<.01	38	<30	86	<5	<30	1.6	40
10	82	273552	4431363	<.01	<.01	33	<30	58	<5	<30	1.9	40
10	83	274248	4431387	<.01	.03	42	35	68	<5	<30	2.0	40
10	84	274964	4431625	<.01	.03	59	<30	78	<5	<30	1.1	<30
11	1	286590	4444015	.05	.60	26	<15	80	<1	<2	4.0	<20
11	2	286570	4443998	<.03	.09	20	<30	60	<5	<30	2.8	40
11	3	288570	4444056	<.03	1.30	40	<30	90	<5	<30	2.2	<30
11	4	288570	4444000	<.03	2.70	20	<30	90	<5	<30	2.5	<30
11	5	286740	4443200	<.03	.04	110	<30	90	<5	<30	1.5	<30
11	6	286800	4443200	.05	.40	80	10	73	3	2	3.0	<20
11	7	286792	4442499	<.03	.05	50	<30	90	<5	<30	2.9	<30
11	8	286792	4442499	<.03	.03	50	<30	90	<5	<30	2.4	<30
11	9	286810	4442540	.05	.49	45	12	85	<1	4	3.0	<20
11	10	287120	4442520	<.03	.40	29	10	71	<5	3	6.0	<20
11	11	287310	4442480	<.03	.40	42	11	110	<5	4	5.0	<20
11	12	287540	4442550	.08	1.4	29	46	190	<5	2	10.0	<20
11	13	287750	4442568	<.03	<.03	40	<30	130	<5	<30	1.8	<30
11	14	288807	4442519	<.03	.03	55	<30	100	<5	<30	1.7	<30
11	15	289338	4443022	<.03	.09	85	<30	80	<5	<30	1.5	<30
11	16	289433	4442803	<.03	<.03	105	<30	90	<5	<30	1.5	<30
11	17	289556	4442517	<.03	.05	40	<30	70	<5	<30	1.5	<30
11	18	289470	4442366	<.03	<.03	75	<30	80	<5	<30	1.5	<30
11	19	297521	4443916	<.01	.20	40	<30	110	<5	<30	1.7	30
11	20	296560	4441750	<.03	.40	62	18	55	<5	2	4.0	<20
11	21	296716	4441678	<.01	<.03	75	<30	70	<5	<30	2.9	40
11	22	296686	4441647	<.01	.85	120	<30	90	<5	<30	1.9	<30
11	23	297390	4441616	<.01	.06	40	<30	60	<5	<30	2.8	<30
11	24	296717	4440818	<.01	.06	80	<30	100	<5	<30	2.6	<30
11	25	296680	4440757	<.01	.06	80	<30	90	<5	<30	1.7	30
11	26	296964	4440257	<.01	.06	80	<30	100	<5	<30	2.3	<30
11	27	296866	4439891	.01	.03	80	<30	60	<5	<30	2.3	<30
11	28	297011	4439696	.01	.03	50	<30	90	<5	<30	2.9	<30
11	29	296532	4439150	.01	<.03	50	<30	80	<5	<30	1.9	<30
11	30	295546	4438672	.01	.03	45	<30	90	<5	<30	2.0	40
11	31	295507	4438619	.01	.06	110	<30	100	<5	<30	1.6	<30
11	32	294932	4438769	<.01	.03	110	<30	110	<5	<30	1.4	<30
11	33	294928	4438836	.01	<.03	100	<30	90	<5	<30	1.8	<30
11	34	295100	4438840	<.03	.40	77	18	71	<5	1	10.0	<20
11	35	295000	4438800	<.03	.50	76	16	63	<5	2	4.0	<20
11	36	294700	4438840	<.03	.40	78	<15	76	<5	2	11.0	<20
11	37	294480	4438780	.04	.50	77	16	64	<5	1	4.0	<20
11	38	294700	4439080	<.03	.40	42	16	66	<3	4	3.0	<20
11	39	294520	4439820	<.03	.40	97	16	64	<5	3	9.0	<20
11	40	294709	4439805	<.01	.06	90	<30	100	<5	<30	1.0	<30
11	41	294543	4440205	<.01	.10	70	<30	110	<5	<30	1.6	30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
				All values in ppm								
11	42	293980	4440210	<.01	.10	35	<30	100	<5	<30	1.4	<30
11	43	293644	4440860	<.01	<.03	30	<30	100	<5	<30	1.2	<30
11	44	293548	4440822	<.01	.06	30	<30	110	<5	<30	1.1	<30
11	45	293456	4440758	<.01	.06	30	<30	110	<5	<30	1.4	30
11	46	293510	4440697	<.01	.06	30	<30	110	<5	<30	1.4	30
11	47	289185	4442057	<.03	<.03	60	<30	200	<5	<30	1.3	30
11	48	289122	4441349	<.03	<.03	230	<30	220	<5	<30	1.2	<30
11	49	289265	4441224	<.03	<.03	45	<30	130	<5	<30	0.92	<30
11	50	288970	4441150	.04	.33	12	11	93	2	<2	2.0	<20
11	51	288880	4441170	.03	.55	55	<15	105	<1	2	3.0	<20
11	52	288880	4441260	.04	.31	25	12	97	<1	3	2.0	<20
11	53	288780	4441185	<.03	.36	26	13	110	5	<2	2.0	<20
11	54	288557	4440962	<.03	.06	60	<30	110	<5	<30	1.0	<30
11	55	288355	4441000	<.03	<.03	60	<30	180	<5	<30	0.51	<30
11	56	287110	4441240	.04	5.0	50	13	65	<1	<2	3.0	<20
11	57	287030	4441140	<.03	.03	60	<30	70	<5	<30	2.1	<30
11	58	287296	4440811	<.03	.03	30	<30	70	<5	<30	1.5	<30
11	59	287270	4440800	.03	.36	25	<15	83	<1	<2	3.0	<20
11	60	287300	4440760	.04	.48	30	12	75	2	4	3.0	<20
11	61	287695	4440715	<.03	1.6	130	110	180	--	--	--	--
11	62	287520	4440470	<.03	.92	31	10	100	<1	<2	2.0	<20
11	63	287493	4440457	<.03	.07	60	<30	90	<5	<30	1.0	<30
11	64	287784	4440208	<.03	<.03	45	<30	80	<5	<30	1.3	<30
11	65	287881	4439950	<.03	.06	85	<30	80	<5	<30	1.6	<30
11	66	288063	4439511	<.03	.04	45	<30	110	<5	<30	1.7	<30
11	67	289166	4440603	<.03	<.06	90	<30	100	<5	<30	1.5	<30
11	68	289251	4440523	<.03	.05	90	<30	90	<5	<30	1.5	<30
11	69	289497	4440278	<.03	.12	100	<30	80	<5	<30	1.4	<30
11	70	289497	4440278	<.03	.08	100	<30	90	<5	<30	1.5	<30
11	71	289481	4439900	<.03	.09	110	<30	130	<5	<30	1.5	<30
11	72	288129	4438609	<.03	<.03	80	<30	90	<5	<30	1.9	<30
11	73	288239	4438162	<.03	.06	65	<30	70	<5	<30	1.1	<30
11	74	288347	4437681	<.03	.06	55	<30	70	<5	<30	1.9	<30
11	75	288360	4437367	<.03	<.06	60	<30	80	<5	<30	2.0	<30
11	76	295854	4438050	<.01	.06	60	<30	100	<5	<30	1.1	30
11	77	297057	4438200	.01	.10	40	<30	120	<5	<30	3.2	<30
11	78	296187	4437715	<.01	.06	60	<30	100	<5	<30	1.1	30
11	79	296083	4437647	<.01	.03	40	<30	120	<5	<30	1.6	<30
11	80	296908	4437042	.01	<.03	70	<30	100	<5	<30	1.6	<30
11	81	290680	4436130	.04	.64	55	11	90	<1	<2	4.0	<20
11	82	290500	4436160	.05	.21	60	<15	98	2	3	3.0	<20
11	83	290325	4436132	<.03	.05	100	<30	80	<5	<30	1.6	<30
11	84	290278	4436259	<.03	.03	85	<30	100	<5	<30	1.7	<30
11	85	290214	4436359	<.03	<.03	95	<30	80	<5	<30	1.9	<30
11	86	288724	4436789	<.03	.06	60	<30	100	8	<30	1.9	<30

APPENDIX 2.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
				All values in ppm								
11	87	288562	4436225	<.03	.09	80	<30	90	8	<30	2.8	<30
11	88	289012	4435864	<.03	.38	140	<30	100	8	<30	1.6	<30
11	89	289378	4435800	<.03	.26	135	<30	90	<5	<30	1.6	30
11	90	290163	4435808	<.03	.05	65	<30	90	<5	<30	1.4	<30
11	91	290106	4435751	<.03	.14	140	<30	90	<5	<30	1.4	<30
11	92	289928	4435762	<.03	.91	140	<30	100	<5	<30	1.6	<30
11	93	289928	4435762	<.03	1.00	145	<30	120	<5	<30	1.7	<30
11	94	290148	4435325	<.03	.22	150	<30	110	<5	<30	0.7	<30
11	95	290320	4435220	.05	.36	83	10	110	<1	6	2.0	<20
11	96	290280	4434950	.01	.92	120	18	100	<1	4	3.0	<20
11	97	289840	4434920	.07	.56	95	22	99	<1	3	3.0	<20
11	98	289820	4434925	.06	.45	105	20	96	9	<2	4.0	<20
11	99	288428	4435559	.06	4.70	130	1000	850	<5	<30	1.3	<30
11	100	288079	4435280	<.01	.44	90	<30	120	<5	<30	1.4	40
11	101	287930	4434456	<.03	.44	100	<30	100	<5	<30	1.3	40
11	102	288673	4434268	--	--	110	<30	100	<5	<30	1.4	<30
11	103	289343	4434623	<.03	.56	140	<30	130	<5	<30	0.90	40
11	104	290855	4434797	<.03	.05	85	<30	100	<5	<30	2.4	<30
11	105	291192	4434686	<.03	<.03	70	<30	100	<5	<30	1.8	<30
11	106	294979	4436169	<.03	.03	56	<30	77	<5	<30	--	<30
11	107	295198	4436407	<.01	.10	50	<30	340	<5	<30	1.6	<30
11	108	296174	4435813	.01	<.03	50	<30	270	<5	<30	1.8	<30
11	109	296162	4435411	<.01	.06	60	<30	290	<5	<30	1.8	<30
11	110	296243	4434484	.01	.06	25	<30	40	<5	<30	2.0	30
11	111	295585	4433791	<.01	.06	50	<30	80	<5	<30	1.7	<30
11	112	295551	4433741	<.01	.10	80	<30	80	<5	<30	1.3	<30
11	113	296053	4433669	<.01	.07	60	<30	98	<5	<30	--	<30
11	114	296184	4433622	<.01	.13	60	<30	70	<5	<30	1.4	<30
11	115	296199	4432965	<.01	.27	40	<30	80	<5	<30	1.7	<30
11	116	296269	4432548	<.01	.10	80	<30	110	<5	<30	1.6	<30
11	117	294983	4433420	<.03	.03	46	<30	79	<5	<30	1.6	<30
11	118	294076	4432786	<.01	.17	85	<30	90	<5	<30	1.8	40
11	119	293936	4432594	<.03	.05	92	<30	69	<5	<30	1.8	<30
11	120	293384	4432977	<.01	.13	120	<30	100	<5	<30	1.9	40
11	121	293384	4432977	.04	.60	74	<15	74	<5	5	5.0	<20
11	122	293330	4432980	--	--	74	14	53	<5	1	9.0	--
11	123	293000	4433000	<.03	1.2	80	14	62	7	1	2.0	<20
11	124	292910	4432810	<.03	.05	69	14	135	6	2	3.0	<20
11	125	293077	4432935	<.01	.10	115	<30	90	<5	<30	1.9	40
11	126	293075	4432847	<.01	.06	110	<30	100	<5	<30	1.8	30
11	127	290643	4433604	.15	28.1	35	<30	80	<5	<30	1.6	<30
11	128	290600	4433674	<.01	<.03	15	<30	70	<5	<30	1.7	<30
11	129	290061	4432794	<.01	<.03	70	<30	90	<5	<30	1.8	<30
11	130	289803	4432665	<.01	.03	55	<30	100	<5	<30	1.5	<30
11	131	289278	4433082	<.03	.10	40	<30	100	<5	<30	1.7	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad	Samp	UTM Grid (meters)		All values in ppm								
no.	no.	East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
11	132	289320	4433149	<.03	<.06	30	<30	90	<5	<30	1.3	<30
11	133	289169	4433259	<.03	<.03	30	<30	100	<5	<30	1.8	50
11	134	288915	4432999	<.03	<.03	25	<30	110	<5	<30	2.3	<30
11	135	288751	4433109	<.03	.25	55	<30	100	<5	<30	1.7	<30
11	136	288320	4433000	<.01	.06	50	<30	110	<5	<30	1.6	<30
11	137	287379	4433308	<.01	.03	30	<30	90	<5	<30	1.4	<30
11	138	287526	4432990	<.01	.10	35	<30	90	<5	<30	1.2	<30
11	139	287540	4432655	<.01	.06	50	<30	90	<5	<30	1.2	40
11	140	287647	4432352	<.01	.10	30	<30	80	<5	<30	1.6	<30
11	141	287470	4431819	<.01	<.03	50	<30	90	<5	<30	1.3	<30
11	142	287585	4430889	<.01	.06	50	<30	90	<5	<30	2.3	<30
11	143	288014	4430893	<.01	.10	40	<30	80	<5	<30	2.2	<30
11	144	288020	4430798	<.01	.13	30	<30	70	<5	<30	2.5	40
11	145	289571	4431444	<.03	.06	40	<30	100	<5	<30	1.4	<30
11	146	289560	4431363	<.03	.09	35	<30	90	<5	<30	1.8	50
11	147	289805	4431165	<.03	.11	20	<30	90	<5	<30	2.0	<30
11	148	289831	4431113	<.03	.18	45	<30	100	<5	<30	2.1	<30
11	149	293233	4432056	<.03	.08	100	<30	85	<5	<30	1.9	30
11	150	292880	4432000	.07	1.0	76	21	63	<5	1	6.0	<20
11	151	293461	4431869	<.03	.09	74	36	150	<5	<30	2.3	30
11	152	293217	4431415	<.03	.27	68	<30	62	<5	<30	1.8	40
11	153	293330	4431329	<.03	.20	57	<30	66	<5	<30	1.9	<30
11	154	294267	4430930	<.03	.04	75	<30	58	<5	<30	1.5	50
11	155	294372	4431096	--	--	100	<30	90	<5	<30	2.0	<30
11	156	294450	4431090	<.03	.50	64	17	70	<5	5	4.0	<20
11	157	294350	4431080	<.03	2.1	69	18	77	<5	2	18.0	<20
11	158	294558	4431123	<.03	.11	72	<30	52	<5	<30	1.5	<30
11	159	294835	4431691	<.01	.20	50	<30	110	<5	<30	2.1	30
12	1	297817	4442985	<.01	.45	40	<30	90	<5	<30	1.4	40
12	2	297839	4442696	<.01	.31	40	<30	90	<5	<30	1.6	<30
13	1	273422	4430783	<.03	<.03	47	<15	72	<5	<15	1.2	<30
13	2	273994	4430690	<.03	.16	46	<15	74	<5	<15	1.1	<30
13	3	274654	4430760	<.03	.10	57	<15	77	<5	<15	1.8	<30
13	4	273173	4430348	<.03	<.03	51	<15	75	<5	<15	1.5	<30
13	5	273173	4430281	<.03	.14	54	<15	82	<5	<15	1.4	30
13	6	273924	4430207	<.03	<.03	48	<15	66	<5	<15	2.0	<30
13	7	274970	4429908	<.01	.07	57	<15	92	<5	<15	1.2	40
13	8	272762	4429910	<.03	<.03	51	<15	75	<5	<15	1.8	30
13	9	272853	4429684	<.03	.03	57	<15	85	<5	<15	1.6	<30
13	10	272513	4429450	.03	.03	59	<15	100	<5	<15	1.6	30
13	11	272321	4429450	<.01	<.01	68	<15	100	<5	<15	1.1	<30
13	12	270889	4429903	.07	<.01	32	<15	120	<5	<15	.60	30
13	13	270796	4429854	<.01	<.01	34	<15	96	<5	<15	.74	<30
13	14	270378	4429479	.03	<.01	27	<15	100	<5	<15	.63	<30
13	15	270279	4429333	.03	.03	37	<15	100	<5	<15	.77	30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
				All values in ppm								
13	16	273668	4429051	<.03	.04	40	<15	99	<5	<15	1.6	<30
13	17	274580	4429108	<.01	<.01	63	<15	120	<5	<15	1.0	<30
13	18	274587	4429247	<.01	.03	54	<15	100	<5	<15	1.4	<30
13	19	274715	4429247	<.01	.41	74	<15	98	<5	<15	1.3	30
13	20	275086	4429118	<.01	.02	50	<15	95	<5	<15	2.0	30
13	21	275714	4429180	<.03	1.40	48	<15	75	<5	<15	1.3	<30
13	22	275534	4428778	.01	.03	47	<15	100	<5	<15	1.4	40
13	23	275301	4428706	<.01	.03	120	<15	100	<5	<15	1.8	30
13	24	275138	4428679	<.01	<.01	95	<15	110	<5	<15	1.7	<30
13	25	274522	4428627	<.01	.07	60	<15	100	<5	<15	1.6	30
13	26	274375	4428662	<.01	.03	51	<15	120	<5	<15	1.3	<30
13	27	273342	4428138	<.01	<.01	44	<15	130	<5	<15	.69	<30
13	28	273127	4428309	<.01	<.01	54	<15	110	<5	<15	<.50	<30
13	29	272926	4428308	<.01	.03	38	<15	110	<5	<15	.64	<30
13	30	272317	4428220	<.01	.01	34	<15	100	<5	<15	.97	40
13	31	271768	4428396	<.01	<.01	81	<15	110	<5	<15	2.0	50
13	32	271757	4428229	<.01	.02	72	<15	100	<5	<15	1.8	40
13	33	272152	4428092	<.01	.03	54	<15	95	<5	<15	1.3	40
13	34	273692	4427804	<.03	.03	48	<15	100	<5	<15	1.1	<30
13	35	273670	4427713	<.03	<.03	48	<15	71	<5	<15	1.3	<30
13	36	275474	4427844	<.01	.03	86	<15	120	<5	<15	1.0	<30
13	37	275660	4427587	<.03	.89	54	<15	95	<5	<15	1.3	<30
13	38	275501	4427389	<.01	<.01	47	<15	180	<5	<15	.94	<30
13	39	275526	4426798	<.03	<.03	27	<15	73	<5	<15	1.6	<30
13	40	274462	4426871	<.03	<.03	39	<15	64	<5	<15	2.2	<30
13	41	274044	4427128	<.03	<.03	30	<15	80	<5	<15	1.1	30
13	42	274055	4427041	<.03	<.03	21	<15	55	<5	<15	2.5	30
13	43	273216	4427000	<.03	<.03	55	<15	90	<5	<15	1.1	<30
13	44	275437	4425840	<.03	<.03	12	<15	36	<5	<15	3.4	<30
13	45	274803	4425669	<.03	<.03	10	<15	77	<5	<15	2.7	30
13	46	274780	4425600	--	--	28	<15	59	<5	<15	2.7	30
13	47	274909	4425406	<.03	<.03	25	<15	98	<5	<15	1.5	30
13	48	275339	4425352	<.03	<.03	19	<15	68	<5	<15	1.9	<30
13	49	273964	4424821	<.03	<.03	27	<15	71	<5	<15	1.0	<30
13	50	273918	4424762	<.03	<.03	21	<15	87	<5	<15	2.0	<30
13	51	273499	4424762	<.03	<.03	27	<15	75	<5	<15	2.1	<30
13	52	273363	4424681	<.03	<.03	28	<15	90	<5	<15	1.4	<30
13	53	273656	4424492	<.03	<.03	27	<15	98	<5	<15	1.8	<30
13	54	274268	4424071	<.03	<.06	16	<15	61	<5	<15	3.1	30
13	55	274751	4423834	<.03	<.03	15	<15	81	8	<15	5.5	70
13	56	274129	4423904	<.03	<.03	<3	<15	38	<5	<15	3.7	40
13	57	273840	4423728	<.03	.05	6	18	66	<5	<15	4.3	70
13	58	273775	4423741	<.03	.03	12	<15	63	<5	<15	2.8	30
13	59	274742	4421979	<.03	.14	5	<15	21	<5	<15	7.7	<30
13	60	274768	4421829	<.03	.14	6	<15	31	<5	<15	4.9	60

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
13	62	275237	4421757	<.03	.14	11	<15	36	<5	<15	2.1	<30
13	63	275404	4421827	<.03	.14	3	<15	57	<5	<15	3.6	<30
13	64	275635	4421706	<.03	.14	5	<15	37	<5	<15	2.4	50
14	1	276607	4424496	<.03	<.03	4	<15	34	<5	<15	3.8	50
14	2	276952	4424266	<.03	<.03	4	<15	43	<5	<15	3.1	30
14	3	277374	4423408	<.03	<.03	4	<15	22	6	<15	3.2	50
14	4	277313	4423190	<.03	.36	7	<15	45	<5	<15	3.5	60
14	5	277230	4423055	<.03	<.03	3	<15	10	<5	<15	2.6	40
14	6	277313	4422995	<.03	<.03	7	<15	34	<5	<15	3.4	40
14	7	276803	4423077	<.03	.14	8	<15	67	<5	<15	5.1	40
14	8	276777	4423020	<.03	.06	4	<15	43	<5	<15	4.1	<30
14	9	276285	4423029	<.03	1.70	<3	<15	73	<5	<15	3.8	60
14	10	276108	4423047	<.03	.06	3	20	100	<5	<15	5.3	60
14	11	276089	4422863	<.03	.08	4	<15	23	<5	<15	2.6	50
14	12	277019	4422625	<.03	<.03	5	<15	32	<5	<15	2.6	<30
14	13	277070	4422556	<.03	<.03	7	<15	31	<5	<15	2.1	30
14	14	277778	4422726	<.03	<.03	5	<15	42	<5	<15	4.0	40
14	15	278182	4422525	<.03	<.03	4	<15	64	<5	<15	3.4	<30
14	16	278819	4422237	<.03	<.03	14	<15	93	<5	<15	2.4	<30
14	17	279836	4421630	--	--	3	<15	35	<5	<15	5.3	<30
14	18	276878	4422342	<.03	<.03	10	<15	60	<5	<15	2.4	<30
14	19	276760	4422351	<.03	<.03	5	<15	34	<5	<15	2.9	<30
14	20	276452	4422298	<.03	.07	7	<15	29	<5	<15	3.0	<30
14	21	276362	4421956	<.03	<.03	9	26	350	<5	<15	6.4	50
14	22	276203	4421969	<.03	<.03	6	<15	29	<5	<15	2.5	30
14	23	276165	4421558	<.03	.19	4	18	120	<5	<15	4.3	30
14	24	276117	4421468	<.03	.14	4	<15	54	<5	<15	4.2	30
14	25	275824	4421597	<.03	<.03	5	<15	37	<5	<15	3.5	40
14	26	275830	4421503	<.03	<.03	7	<15	30	<5	<15	2.6	30
14	27	276203	4420312	<.03	<.03	10	<15	45	<5	<15	3.1	<30
14	28	276389	4420808	<.03	<.03	4	23	310	<5	<15	8.2	40
14	29	276863	4420790	<.03	.47	18	<15	89	<5	<15	2.6	<30
14	30	276954	4420831	<.03	<.03	20	<15	69	<5	<15	2.2	<30
14	31	277132	4420804	<.03	<.03	10	<15	93	<5	<15	3.1	40
14	32	277624	4420934	<.03	<.03	12	<15	55	<5	<15	3.1	30
14	33	277713	4421008	<.03	<.03	6	<15	35	<5	<15	11.0	<30
14	34	277793	4420928	.20	.03	34	<15	63	<5	<15	2.1	<30
14	35	277577	4420708	<.03	<.03	8	<15	73	<5	<15	3.4	<30
14	36	277468	4420505	<.03	<.03	17	<15	53	<5	<15	2.3	<30
14	37	277607	4420475	<.03	<.03	7	<15	29	<5	<15	3.6	40
14	38	277330	4419943	<.03	<.03	18	<15	93	<5	<15	1.5	<30
14	39	278121	4420459	<.03	.08	33	<15	52	<5	<15	1.7	<30
14	40	278427	4420401	<.03	<.03	30	<15	70	<5	<15	1.9	<30
14	41	278687	4420352	<.03	.14	25	<15	69	<5	<15	1.7	40
14	42	278727	4420740	<.03	.14	33	<15	60	<5	<15	4.4	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
14	43	278829	4420740	<.03	.14	27	<15	66	<5	<15	1.6	<30
14	44	279235	4420241	<.03	.14	17	<15	46	<5	<15	1.5	<30
14	45	279506	4420272	<.03	.14	8	<15	46	<5	<15	3.1	50
14	46	279789	4420345	<.03	.14	6	<15	32	<5	<15	4.4	<30
14	47	281000	4418626	<.03	<.03	9	<15	48	<5	<15	4.9	<30
14	48	280938	4418484	<.03	<.03	6	<15	42	<5	<15	3.9	30
14	49	280790	4418300	<.03	<.03	25	<15	46	<5	<15	2.6	30
14	50	278549	4417805	<.03	<.03	55	<15	70	<5	<15	3.3	30
14	51	278845	4417201	<.03	<.03	12	<15	48	<5	<15	2.1	30
14	52	279341	4417646	<.03	.20	54	<15	63	<5	<15	2.1	<30
14	53	279376	4417217	<.03	<.03	19	<15	46	<5	<15	2.0	<30
14	54	279771	4417442	<.03	<.03	31	<15	67	<5	<15	2.7	60
14	55	279934	4417375	<.03	<.03	26	<15	62	<5	<15	2.4	30
14	56	280653	4417526	<.03	.03	24	<15	77	<5	<15	1.9	<30
14	57	280560	4417076	<.03	.13	25	<15	74	<5	<15	3.3	<30
14	58	280680	4417140	<.03	.08	24	<15	70	<5	<15	1.9	<30
14	59	282196	4416856	.03	.14	15	19	61	<5	<15	2.7	30
14	60	282337	4416848	<.03	.14	43	18	79	<5	<15	1.5	<30
14	61	282843	4417656	<.01	.14	36	18	66	<5	<15	1.7	<30
14	62	282871	4417742	<.01	.17	35	19	68	<5	<15	1.9	<30
14	63	280920	4416970	.10	1.0	27	15	68	11	1	6	<20
14	64	280560	4416880	.09	1.3	23	18	57	3	4	3	<20
15	1	291921	4429659	--	--	40	<30	90	<5	<30	.90	50
15	2	291740	4429488	.01	<.03	35	<30	90	<5	<30	1.4	40
15	3	294597	4429716	<.01	.06	85	<30	80	<5	<30	2.0	<30
15	4	288224	4428685	<.01	1.03	55	<30	70	<5	<30	1.6	40
15	5	287845	4426776	<.01	.06	30	<30	40	<5	<30	1.8	<30
15	6	287996	4426692	.01	.06	30	<30	70	<5	<30	1.6	40
15	7	289441	4427356	<.01	1.37	30	<30	120	<5	<30	1.8	<30
15	8	291918	4427626	<.01	.10	50	<30	80	<5	<30	1.6	<30
15	9	291431	4426803	<.01	<.03	30	<30	110	<5	<30	1.3	<30
15	10	291643	4426755	<.03	<.03	45	<30	90	<5	<30	.90	<30
15	11	294738	4425640	.01	.06	30	<30	90	<5	<30	1.3	<30
15	12	296279	4425860	.01	<.03	40	<30	80	<5	<30	1.0	<30
15	13	296312	4425350	.01	<.03	20	<30	70	<5	<30	1.4	<30
15	14	293209	4424590	.01	.03	30	<30	60	<5	<30	1.3	<30
15	15	290360	4423979	.01	<.03	35	<30	100	<5	<30	1.1	<30
15	16	291465	4423537	.02	<.03	55	<30	80	<5	<30	2.2	<30
15	17	292268	4424055	<.03	<.03	50	<30	90	<5	<30	1.9	<30
15	18	293131	4423849	.02	<.03	40	<30	80	<5	<30	1.3	<30
15	19	293913	4423470	.01	<.03	30	<30	60	<5	<30	1.0	<30
15	20	295156	4423826	.02	.03	25	<30	60	<5	<30	.90	<30
15	21	296303	4423777	.01	<.03	25	<30	60	<5	<30	1.3	<30
15	22	292890	4422955	.01	<.03	40	<30	80	<5	<30	2.3	<30
15	23	293310	4422709	.01	.03	20	<30	60	<5	<30	1.6	50

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS,
PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
15	24	292694	4422369	.01	<.03	30	<30	60	<5	<30	2.0	<30
15	25	293938	4422101	.01	<.03	20	<30	60	<5	<30	1.8	<30
15	26	296484	4421606	--	--	18	<15	37	<5	<15	2.6	30
15	27	296271	4419874	--	--	7	<15	21	<5	<15	2.7	30
17	1	280454	4416277	<.03	<.03	27	<15	82	<5	<15	2.9	--
17	2	280948	4416156	<.03	<.03	33	<15	75	<5	<15	2.4	--
17	3	281570	4416041	<.03	<.03	52	<15	85	<5	<15	1.2	--
17	4	282126	4416586	.14	.17	41	21	130	<5	<15	2.7	<30
17	5	282173	4416505	.03	.17	50	18	74	<5	<15	1.9	<30
17	6	282291	4416491	.03	.14	36	<15	69	<5	<15	--	<30
17	7	282424	4416613	.03	.10	43	<15	50	<5	<15	1.7	<30
17	8	282620	4415977	<.01	.07	49	18	110	<5	<15	--	<30
17	9	282556	4415912	<.01	.14	52	18	79	<5	<15	1.5	<30
17	10	282000	4415654	<.03	<.03	53	<15	81	<5	<15	1.2	<30
17	11	282369	4415442	<.03	<.03	29	<15	57	<5	<15	1.5	<30
17	12	283072	4415846	<.01	<.01	28	18	89	<5	<15	2.1	<30
17	13	283141	4415925	<.01	<.01	51	<15	70	<5	<15	1.4	<30
17	14	283538	4415685	.01	<.01	32	<15	72	<5	<15	1.4	<30
17	15	285075	4415295	<.01	.03	10	<15	14	<5	<15	2.3	<30
17	16	284940	4414676	.07	<.03	37	16	85	<5	<15	1.4	40
17	17	284704	4414448	.03	.03	33	<15	73	<5	<15	2.1	30
17	18	284630	4414585	<.01	.03	24	<15	38	<5	<15	2.9	<30
17	19	283432	4414492	.02	<.01	23	<15	58	<5	<15	1.5	<30
17	20	283362	4414529	.01	.14	52	<15	71	<5	<15	1.2	<30
17	21	282975	4414203	.01	.01	55	<15	83	<5	<15	--	<30
17	22	284288	4413885	.02	.14	33	<15	110	<5	<15	3.3	<30
17	23	284270	4413542	.01	.03	16	<15	23	<5	<15	2.0	30
17	24	284340	4413215	.01	.03	33	<15	79	<5	<15	1.5	<30
17	25	284400	4413177	.01	.03	25	<15	92	<5	<15	2.0	30
17	26	284427	4412869	.01	.03	29	<15	110	<5	<15	2.4	<30
17	27	284339	4412802	.03	<.03	27	20	100	<5	20	2.3	<30
17	28	285756	4413527	<.03	<.03	37	<15	70	<5	<15	1.4	30
17	29	285815	4413476	<.03	<.03	32	<15	58	<5	<15	1.4	30
17	30	285370	4413010	<.03	<.03	33	<15	100	<5	<15	--	<30
17	31	285564	4412975	<.03	<.03	36	<15	85	<5	<15	1.6	<30
17	32	285471	4412947	<.03	.43	19	<15	46	<5	<15	1.3	<30
18	1	287231	4415074	<.01	.03	38	<15	100	<5	<15	1.6	<30
18	2	286236	4414303	<.03	<.03	43	<15	65	<5	<15	1.6	30
18	3	286614	4414194	<.03	<.03	34	<15	62	<5	<15	1.3	<30
18	4	286684	4414064	<.03	<.03	47	25	65	<5	<15	2.1	30
18	5	287197	4414359	<.03	<.03	40	<15	68	<5	<15	2.4	<30
18	6	287379	4414182	.03	.17	24	27	100	<5	<15	3.0	<30
18	7	288016	4414407	.03	.10	29	<15	64	<5	<15	1.6	<30
18	8	291367	4414452	--	--	11	<15	52	<5	<15	2.1	<30
18	9	291472	4414947	--	--	13	<15	100	<5	<15	2.2	<30

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
				All values in ppm								
18	10	292139	4415127	--	--	10	<15	49	<5	<15	1.8	40
18	11	286278	4412405	<.03	<.03	28	<15	67	<5	<15	1.6	<30
18	12	286221	4412220	<.03	<.03	20	<15	52	<5	<15	1.2	<30
18	13	287638	4412233	<.03	.14	45	47	89	8	41	1.9	30
18	14	288654	4413063	<.03	.18	37	40	90	--	<30	9.2	--
18	15	289844	4412567	--	--	29	25	100	<5	<15	2.5	30
18	16	289661	4412445	<.03	.18	27	<30	80	--	<30	3.2	--
18	17	288912	4411886	--	--	36	20	92	<5	<15	2.7	<30
18	18	288325	4412496	<.03	.15	36	28	130	<5	<15	1.4	<30
18	19	286845	4411601	<.03	<.03	22	<15	62	<5	<15	1.3	30
18	20	286749	4411412	<.03	<.03	49	<15	90	<5	<15	2.4	<30
18	21	288307	4411545	.07	<.03	40	<30	90	<5	<30	2.4	<30
18	22	287861	4411352	<.01	.03	33	45	83	<5	<30	2.2	40
18	23	289381	4411244	--	--	20	39	96	6	<15	2.8	<30
18	24	290011	4411540	--	--	38	23	91	<5	<15	2.3	40
18	25	288737	4410877	--	--	18	35	87	<5	<15	2.5	<30
18	26	287857	4411111	.03	<.01	87	<30	74	<5	<30	1.7	30
18	27	287696	4410754	.01	<.01	26	<30	20	<5	<30	3.9	30
18	28	287857	4410586	<.01	<.01	21	<30	39	<5	<30	4.5	60
18	29	287719	4410265	.01	.03	39	45	18	<5	<30	3.1	50
18	30	287262	4410374	<.01	<.01	42	<30	98	<5	<30	1.6	30
18	31	287361	4410137	--	--	33	<30	51	<5	<30	1.0	<30
18	32	287525	4410191	.03	<.01	20	<30	27	<5	<30	4.1	50
18	33	290815	4410525	--	--	10	21	88	<5	<15	3.9	40
18	34	291604	4411108	--	--	14	<15	68	<5	<15	2.9	40
18	35	293151	4410370	--	--	15	<15	77	<5	<15	3.6	<30
18	36	292838	4409193	--	--	16	<15	82	<5	<15	3.3	<30
18	37	292443	4408971	<.03	.11	16	<30	60	--	<30	6.2	--
18	38	292036	4408600	--	--	16	<15	81	<5	<15	3.2	50
18	39	294254	4407420	<.03	.20	13	<30	60	--	<30	4.0	--
18	40	294330	4404822	<.03	.07	17	<30	50	--	<30	2.3	--
19	1	297349	4407075	<.03	.08	12	<30	40	--	<30	2.5	--
19	2	296260	4405562	<.03	.08	32	<30	60	--	<30	2.0	--
19	3	297102	4405138	<.03	.08	8	<30	<30	--	<30	2.8	--
20	1	295563	4398911	<.03	.06	36	<30	90	--	<30	1.0	--
20	2	297444	4399163	<.03	.06	27	<30	60	--	<30	1.6	--
20	3	295958	4398453	<.03	.10	29	<30	60	--	<30	1.3	--
20	4	295855	4396936	<.03	.08	30	<30	110	--	<30	1.2	--
20	5	296113	4396769	<.03	.24	26	<30	60	--	<30	2.5	--
20	6	295884	4396736	<.03	.08	34	<30	70	--	<30	1.2	--
20	7	295379	4396167	<.03	<.06	38	<30	70	--	<30	1.6	--
20	8	295091	4396114	<.03	.05	33	<30	80	--	<30	1.6	--
20	9	295454	4396003	<.03	<.06	51	<30	70	--	<30	1.3	--
20	10	295212	4395779	<.03	.09	50	<30	80	--	<30	1.0	--
20	11	295679	4394832	<.03	.05	16	<30	40	--	<30	1.3	--

APPENDIX C.--METAL CONTENT OF STREAM SEDIMENTS, PYRAMID LAKE INDIAN RESERVATION (cont.)

Quad no.	Samp no.	UTM Grid (meters) East	North	All values in ppm Au	Ag	Cu	Pb	Zn	W	Mo	U	Th
20	12	295797	4394872	<.03	<.12	18	<30	60	--	<30	2.7	--
20	13	295852	4394652	<.03	.06	18	<30	50	--	<30	1.5	--
20	14	295781	4394561	<.03	.12	34	<30	80	--	<30	1.2	--
20	15	295990	4394442	<.03	.06	18	<30	50	--	<30	1.3	--
20	16	296729	4394357	<.03	.12	24	<30	50	--	<30	1.3	--
20	17	292684	4391585	.05	.40	37	<30	80	--	<30	1.0	--
20	18	294151	4391975	<.03	.08	34	<30	90	--	<30	.90	--
20	19	294928	4392026	<.03	.07	30	<30	70	--	<30	.80	--
20	20	294854	4392628	<.03	.90	38	<30	70	--	<30	1.6	--
20	21	295697	4392386	<.03	.36	35	<30	80	--	<30	1.5	--
20	22	296760	4391520	.05	.21	33	<30	70	--	<30	.70	--

APPENDIX D.--METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE INDIAN RESERVATION
(see pl. 3 for sample locations)

[--, not analyzed]

Sample no.	Description	Au	Ag	Cu	Metal content in ppm Pb	Zn	Mo	W	U	Th	Hg	F	Sn
1	Chip sample of altered quartz monzonite-------------------	<0.03	<0.03	10	<30	80	<30	5	1.4	<30	--	--	--
2	Chip sample along contact between welded tuff and rhyolite dike----------------	<.03	.05	20	<30	30	<30	<5	4.9	40	--	--	--
3	Select chip along contact of andesite or dacite with limestone-------------------	<.03	.11	35	<30	60	<30	<5	0.81	<30	--	--	--
4	Select chip of altered rhyolite tuff with limonite stain----------------------	<.03	.23	20	<30	<30	<30	<5	1.6	<30	--	--	--
5	1-ft chip of black, decomposed shaly limestone, rich in limonite, calcite, and manganese oxide----------	<.03	1.1	100	40	1,400	100	<5	7.3	<30	--	--	--
5A	Random chip from iron oxide stained and silicified shale in creek bottom--------------	<.03	2.4	32	16	205	--	--	--	--	--	--	--
6	3-ft chip across dark shale and weathered intrusive contact; abundant limonite and manganese oxide----------	<.03	1.4	130	<30	2,900	40	8	7.6	<30	--	--	--

APPENDIX D.--METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE INDIAN RESERVATION (cont.)
(see pl. 3 for sample locations)

Sample no.	Description	Au	Ag	Cu	Metal content in ppm Pb	Zn	Mo	W	U	Th	Hg	F	Sn
6A	Random chip of iron oxide stained, punky, siliceous, shaley, limestone. Calcite and gypsum along fractures----------------	0.06	1.1	42	22	525	--	--	--	--	--	--	--
7	Select calcite vein in black shale and limestone	.03	1.4	100	<30	1,000	40	<5	3.9	<30	--	--	--
7A	Random chip of fine grained blue-gray limestone on north side of creek. Limestone contains 2-3 percent disseminated pyrite------	<.03	2.7	61	35	95	--	--	--	--	--	--	--
8	Select chip from oxidized shear zone in basalt-----	<.03	2.3	170	<30	670	40	<5	6.5	<30	--	--	--
9*	Grab sample from small excavation in altered granodiorite-------------	1.2	13	1,000	13,000	90	<30	<5	.91	<30	--	--	--
10	Grab sample from limonite stained boulder with limonite veins-----------	.51	1.6	710	47	54	2	<5	6	--	--	140	<5
11	Grab sample from breccia dike exposed as float 150 ft southeast of hilltop. Breccia fragments are quartz-sericite-altered dacite with limonite and large biotite flakes-----	.03	.3	21	45	100	4	61	3	--	--	710	<5

* Samples 9-12 and geology described further in text.

APPENDIX D.--METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE INDIAN RESERVATION (cont.)
(see pl. 3 for sample locations)

Sampe no.	Description	Metal content in ppm											
		Au	Ag	Cu	Pb	Zn	Mo	W	U	Th	Hg	F	Sn
12	Same rock type as No. 11 located 150 ft south of hilltop------------------	0.10	6.0	445	33	100	5	67	3	--	--	460	<5
13	Float grab of biotite granite with pale green stain around biotite-----	<.03	.11	25	<30	50	<30	<5	<.5	<30	--	--	--
14	Grab sample of granodiorite, slight chloritic alteration-----	<.03	.03	47	<15	37	<15	<5	.83		--	--	--
15	Quartzite with limonite stained fractures, north side of wash-------------	.04	.42	150	4	21	--	--	--		<0.1	--	--
16	Altered intrusive (alaskite?) in gully bottom, N. 2° E., 69 W., abundant limonite stain--	.04	.22	50	<1	10	--	--	--		<.1	--	--
17	2-ft exposure (possibly float) of highly oxidized light intrusive----------	.17	1.20	82	330	165	--	--	--		<.1	--	--
18	2-ft-wide bleached and altered shear zone N. 60° W., 80° S., exposed in gully for 40 ft. Enclosing rock is altered light-colored intrusive, with shears S. 25° W., and vertical--	.10	2.4	290	325	300	--	--	--		<.1	--	--

APPENDIX D.--METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE INDIAN RESERVATION (cont.)
(see pl. 3 for sample locations)

Sample no.	Description	Au	Ag	Cu	Metal content in ppm Pb	Zn	Mo	W	U	Th	Hg	F	Sn
19	3-ft diameter outcrop north side of creek of dark porphyritic andesite(?) contains pyrite, limonite joints N. 5° W., 68° W.--	0.05	0.50	106	4	50	--	--	--	--	<0.1	--	--
20	Grab sample of float, altered basalt with *glauconite---------------	<.03	.05	10	<30	90	<30	<5	1.4	50	--	--	--
21	Select sample of dike in quartz monzonite. Iron oxide staining and pyrite at contact---------------	<.03	.19	15	<30	70	<30	<5	1.6	<30	--	--	--
22	Random sample of dark dike intruding quartz monzonite----------------	<.03	.07	15	<30	60	<30	<50	2.0	<30	--	--	--
23	20-ft channel through alteration zone north side of drainage. Zone trends S. 20° W., and vertical. 20-ft exposed on hillside, limonite stain and gypsum crystals. Joints N. 40° W., 80 N.----------------	<.03	.56	32	12	30	--	--	--	--	<.1	--	--
24	Adit in shear S. 10° E., 70 W., 4-ft wide. Pyrite abundant plus silicification----------	.04	.32	72	10	115	--	--	--	--	<.1	--	-

* Glauconite in various volcanics was confirmed by X-ray diffraction.

APPENDIX D.--METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE INDIAN RESERVATION (cont.)
(see pl. 3 for sample locations)

Sample no.	Description	Metal content in ppm Au	Ag	Cu	Pb	Zn	Mo	W	U	Th	Hg	F	Sn
25	Select chip of iron-stained quartz monzonite---------	0.03	0.05	20	<30	30	<30	<5	1.1	<30	--	--	--
26*	1-ft select from 3 to 8-ft shear and vein in volcanics. Attitude of zone is N.10 W, 72° W. Sample is from bleached and silicified zone with malachite at portal of 6-ft adit-----------------	.80	770	850	15,500	6,500	115	115	7	--	--	--	--
27	Re-sample of No. 26-------	.92	330	530	9,000	7,200	17	132	2	--	--	490	<5
28	Sample located on same vein as No. 26, 100 ft north of portal. 1-ft chip sample of oxidized, brecciated vein with drusy quartz cement-------------------	1.39	170	765	1,000	2,700	6	48	5	--	--	440	<5
		.34	789	(BM check assays; average of two assays)									
29	Sample located on same vein as No. 26, 300 ft north of portal. Select sample of iron-oxide-stained quartz-cemented breccia from stockpile near small pit--	3.08	.1	93	1,800	2,000	11	38	2	--	--	490	<5
		3.05	86.0	(BM check assays; average of two assays)									
30	Select chip of altered rhyolite----------------	<.03	<.03	15	<30	140	<30	<5	3.1	<30	--	--	--

* Sample Nos. 26-29 further described in text

APPENDIX D.--METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE INDIAN RESERVATION (cont.)
(see pl. 3 for sample locations)

Sample no.	Description	Metal content in ppm											
		Au	Ag	Cu	Pb	Zn	Mo	W	U	Th	Hg	F	Sn
31	Select sample of 14-in.-wide green rhyolite dike in brecciated volcanic rock----------------------	<0.03	0.05	10	<30	70	30	<5	1.8	<30	--	--	--
32	Volcanic rock contains quartz and calcite veining, with glauconite-----------	<.03	.05	110	<30	50	<30	<5	--	--	--	--	--
33	Brown agglomerate with glauconite filled vesicles-----------------	<.03	.08	40	<30	70	<30	<5	1.8	<30	--	--	--
34	Chip sample of dike-------	<.03	.16	150	<30	100	<30	<5	0.83	<30	--	--	--
34A	Random chip of vesicular dacite porphyry with brown biotite. Extensive outcrops in area------------	<.03	.05	81	18	70	--	--	--	--	--	--	--
35*	Recrystallized limestone, bedding indistinct, possibly vertical. Grain size 0.5 cm, jointed, fracture fillings of calcite. 3-ft zone in limestone with distinct fetid smell------	<.03	<.03	5	18	19	<15	<5	.95	<30	--	--	--
36	Equigrangular granodiorite from large intrusive------	.08	.1	5	10	45	--	--	2.7	40	--	--	--

* See industrial minerals section

APPENDIX D.--METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE INDIAN RESERVATION (cont.)
(see pl. 3 for sample locations)

Sample no.	Description	Au	Ag	Cu	Pb	Zn	Mo	W	U	Th	Hg	F	Sn
					Metal content in ppm								
37	No description-----------	<0.03	0.32	10	<30	90	<30	<5	4.1	<30	--	--	--
38	Grab sample of white welded tuff(?)----------	<.03	.15	35	<30	70	<30	<5	2.8	<30	--	--	--
39	Fresh well cuttings of green and brown volcanic rock, some quartz--------	<.03	.21	96	12	40	7	4	11	--	--	--	--
40	Red andesite (high scintillometer readings)-	<.03	.08	27	<15	53	<15	<5	3.6	30	--	--	--
41	Select chip of fracture zone in rhyolite (500 cps on scintillometer)-------	<.03	.47	43	49	39	19	<5	30	<30	--	--	--
42	Random grab from outcrops near dike----------------	<.03	.07	43	33	37	18	<5	18	<30	--	--	--
43	Select chip across fracture zone in rhyolite (300 cps on scintillometer--------	<.03	.22	6	<15	37	<15	<5	26	<30	--	--	--
44	Random sample of pink rhyolitic tuff with quartz and feldspar phenocrysts-	<.03	.04	41	15	62	18	<5	5.1	30	--	--	--
45	Iron-oxide-stained rhyolitic porphyry. Phenocrysts are quartz and sanidine. Exposure and iron oxide staining visible for several miles-------------------	<.03	.37	15	<30	60	<30	<5	6.2	50	--	--	--

APPENDIX D.--METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE INDIAN RESERVATION (cont.)
(see pl. 3 for sample locations)

Sample no.	Description	Au	Ag	Cu	Metal content in ppm Pb	Zn	Mo	W	U	Th	Hg	F	Sn
46	Same rock type as no. 45---	<0.03	0.54	30	<30	50	<30	<5	4.5	40	--	--	--
47	Basalt porphyry with 20-25 percent plagioclase laths--	<.03	.42	120	<30	430	<30	<5	1.6	<30	--	--	--
48	No description-------------	<.03	.18	15	<30	110	<30	<5	5.1	<30	--	--	--
49	No description-------------	<.03	.08	10	<30	70	<30	<5	2.4	40	--	--	--
50	Arkosic sandstone at base of andesite	<.03	<.03	65	<15	73	<15	<5	1.4	<30	--	--	--
51*	Select chip across siliceous vein in altered dacite-----	.06	4.2	52	530	100	16	<5	5.1	<30	--	--	--
52	1-ft chip across siliceous vein in altered dacite, with disseminated pyrite--------	<.03	4.2	190	28	33	44	<5	2.9	<30	--	--	--
53	1-ft chip across siliceous zone and quartz veins. Some pyrite and barite crystals-	.12	1.1	51	20	32	<15	<5	2.1	30	--	--	--
53A	Re-sample of No. 53--------	.09	3.9	54	45	64	14	5	14	--	--	310	<5
54	Select float of altered and silicified porphyritic dacite---------------------	.08	2.1	51	110	57	<15	<5	4.3	<30	--	--	--

* Sample Nos. 51-57 further described in text

APPENDIX D.--METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE INDIAN RESERVATION (cont.)
(see pl. 3 for sample locations)

Sample no.	Description	Au	Ag	Cu	Pb	Zn	Mo	W	U	Th	Hg	F	Sn
		Metal content in ppm											
55	2-ft chip across siliceous and altered dacite with disseminated pyrite-------	<0.03	5.5	120	330	78	100	<55	2.3	<30	--	--	--
56	1-ft chip across southern most east-west silicified rib of altered dacite with disseminated pyrite. Silicification consists of quartz veins and jasper. Sample is located about 100 ft east of No. 55----------	.37	5.4	80	1,110	49	9	5	4	--		240	<5
57	Hornblende dacite host for the more intense altered and silicified areas. Sample taken across drainage about 200 ft southeast of No. 55-------	<.03	.09	8	17	85	3	7	4	--	--	310	<5
58	Random chip of pink rhyolitic tuff------------	<.03	.06	39	<15	48	21	<5	4.4	40	--	--	--
59	3-ft chip through bed of ferrocrete on west bank of railroad cut--------------	<.03	1.5	40	<30	70	<30	<5	2.1	<30	--	--	--
60	Random chip of quartz-sericite-altered monzonite. Part of Guanomi Porphyry System--------------------	<.03	<.03	29	20	77	<15	<5	1.8	<30	--	--	--

APPENDIX D.--METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE INDIAN RESERVATION (cont.)
(see pl. 3 for sample locations)

Sample no.	Description	Metal content in ppm											
		Au	Ag	Cu	Pb	Zn	Mo	W	U	Th	Hg	F	Sn
61	Random chip of dacite with iron oxide staining-------	<0.03	30	65	95	73	89	6	2.3	<30	--	--	--
62	Marbleized limestone from large quarry--------------	<.03	0.58	10	110	30	<30	<5	3.9	--	--	--	--
63	Marbleized limestone from southernmost dozer cut----	<.03	.17	10	40	30	<30	<5	1.2	--	--	--	--
64	Marbleized limestone from small quarry--------------	<.03	.30	60	40	<30	<30	<5	3.5	<30	--	--	--

APPENDIX E.--METAL CONTENT OF WATER SAMPLES, PYRAMID LAKE INDIAN RESERVATION
(see pl. 3 for sample locations)

Sample no.	Description	Metal content in ppb Au	Ag	Cu	Pb	Zn	Mo	U	pH
1	Well - Sand Pass Railroad Station--------------------	<20	<20	<20	<60	13	<10	80.0	6.4
2	Soda Springs - standing water-	<20	<20	<20	<60	<10	<10	3.1	>11
3	Spring - sample taken from old rubber hose-----------------	<20	<20	<20	<60	21	<10	6.0	7.0
4	Spring - flows about 2 gpm----	<20	<20	<20	<60	<10	<10	1.3	8.0
5	Spring - sampled below stock water tank--------------------	<20	<20	<20	<60	<10	<10	2.7	8.0
6	Summit Spring - water from corroded galvanized pipe, flows 0.5 gpm-----------------	<20	<20	<20	<60	31	<10	2.9	8.0
7	Small stock pond, flows about 0.25 gpm---------------------	<40	<20	<20	<60	21	<10	5.9	8.0
8	Spring - sampled about 30 ft from source in Fox Canyon, flows 0.5 gpm-----------------	<20	<20	<20	<60	<10	<10	2.1	9.0
9	Creek - 3 gpm flow------------	<20	<20	<20	<60	<10	<10	1.5	9.0
10	Spring (clear) - flows about 3 gpm-------------------------	<40	<20	<20	<60	23	<10	2.0	6.4
11	Sheep Pass Spring - flows about 0.25 gpm----------------	<40	<20	<20	<60	<10	<10	8.0	8.0

APPENDIX E.--METAL CONTENT OF WATER SAMPLES, PYRAMID LAKE INDIAN RESERVATION
(see pl. 3 for sample locations)

Sample no.	Description	Metal content in ppb Au	Ag	Cu	Pb	Zn	Mo	U	pH
12	Stag Spring - sampled from pool of water, flows about 1 gpm	<20	<20	<20	<60	<10	<10	0.59	8.5
13	Small pond in main drainage, flows 0.5 gpm	<40	<20	<20	<60	<10	<10	.42	7.0
14	Spring - 2.5 gpm flow	<20	<20	<20	<60	<10	<10	<.40	7.3
15	Western Geothermal Needles Well no. 2(?) (flowing)	<20	<20	<20	<60	<10	<10	1.2	6.7
16	Western Geothermal Needles No. 1 Well, 5,888 ft deep (geysering)	<20	<20	<20	<60	<10	<10	1.9	6.7
17	Spring - sampled at source, 1 gpm flow	<20	<20	<20	<60	<10	<10	.73	8.5
18	Small seep	<20	<20	<20	<60	<10	<10	.59	6.0
19	Spring - sampled at source, flows about 0.5 gpm	<20	<20	<20	<60	<10	<10	3.0	9.0
20	Spring - sampled at source, flows about 5 gpm	<20	<20	<20	<60	<10	<10	.89	7.5
21	Spring - sampled at source, flows about 0.5 gpm	<20	<20	<20	<60	<10	<10	<.40	8.0
22	Spring - sampled at source, 1 gpm flow	<20	<20	<20	<60	<10	<10	1.0	9.0

APPENDIX E.--METAL CONTENT OF WATER SAMPLES, PYRAMID LAKE INDIAN RESERVATION
(see pl. 3 for sample locations)

Sample no.	Description	Metal content in ppb: Au	Ag	Cu	Pb	Zn	Mo	U	pH
23	Creek (clear) - flowing 3-4 gpm over brecciated volcanics------	<20	<20	<20	<60	<10	<10	<0.40	8.0
24	Sample downstream from spring flowing 2-3 gpm over rhyolite--	<20	<20	<20	<60	<10	<10	<.40	7.0
25	Spring - sample taken 5 ft from source, 3 gpm flow-------------	<20	<20	<20	<60	<10	<10	1.1	8.5
26	Spring - 3 gpm flow------------	<20	<20	<20	<60	<10	<10	1.0	8.0
27	Spring - 5 gpm flow------------	<20	<20	<20	<60	<10	<10	1.6	5.1
28	Spring - 1 gpm flow------------	<40	<20	<20	<60	<10	<10	2.7	7.9
29	Spring - 1/2 mile below Big Canyon Ranch, flows 8 gpm, contaminated by horses---------	<20	<20	<20	<60	<10	<10	<.40	6.4
30	Spring - contaminated by stock--------------------------	<20	<20	<20	<60	<10	<10	<.40	6.5
31	Spring - sampled at source, 3 gpm flow--------------------	<20	<20	<20	<60	<10	<10	.53	6.6
32	Well - Warrior Point Park Office, sampled at well head---	<20	<20	<20	<60	1,270	<10	<.40	6.6
33	Well at Warrior Point Campground--------------------	<20	<20	72	<60	24	<10	<.40	6.5

APPENDIX E.--METAL CONTENT OF WATER SAMPLES, PYRAMID LAKE INDIAN RESERVATION
(see pl. 3 for sample locations)

Sample no.	Description	Metal content in ppb Au	Ag	Cu	Pb	Zn	Mo	U	pH
34	Spring - flows about 2 gpm---	<20	<20	<20	<60	<10	<10	2.9	7.4
35	Spring - trickle flow with algae------------------------	<20	<20	<20	<60	<10	<10	2.6	6.6
36	Spring - 2 gpm flow----------	<40	<20	<20	<60	<10	<10	1.1	7.4
37	Well at fish hatchery, 300 ft deep, owned by Tribal Enterprises------------------	<20	<20	<20	<60	95	<10	0.44	6.5
38	No. 3 well, Tribal Enterprises, 130 gpm, 350 ft deep------------------------	<20	<20	<20	<60	19	<10	.64	6.6
39	Dave Iveson Well------------	<20	<20	<20	<60	66	<10	4.0	7.4
40	Well at Crosby Lodge Motel, Sutcliff, 110 ft deep--------	<20	<20	61	<60	23	<10	5.3	7.8
41	Well at Sutcliff Inn--------	<20	<20	<20	<60	<10	<10	3.6	7.4
42	Well at Paiute Enterprises office----------------------	<20	<20	<20	<60	<10	<10	4.8	7.9
43	No. 2 well, Tribal Enterprises, 40 gpm, next to hatchery-------------------	<20	<20	<20	<60	140	<10	2.1	6.9
44	Sutcliff community water	<20	<20	70	<60	26	<10	.75	6.6

APPENDIX E.--METAL CONTENT OF WATER SAMPLES, PYRAMID LAKE INDIAN RESERVATION
(see pl. 3 for sample locations)

Sample no.	Description	Au	Ag	Cu	Pb	Zn	Mo	U	pH
		Metal content in ppb							
45	Al Renslo Well; 12 ft deep, produces 1,200 gal/day--------	<20	<20	<20	<60	<10	<10	2.6	6.4
46	Spring at Quail Canyon Ranch, sampled at house--------------	<20	<20	<20	<60	190	<10	1.1	6.5
47	Spring (clear) - 0.5 gpm flow-	<20	<20	<20	<60	<10	<10	4.3	7.3
48	Spring - 2 gpm flow----------	<40	<20	<20	<60	<10	<10	2.7	7.4
49	Spring at Monte Cristo Ranch--	<20	<20	<20	<60	<10	<10	0.63	6.3
50	No data----------------------	<20	<20	<20	<60	150	<10	3.5	6.1
51	Well - Sample from very rusty old hand pump----------------	<20	<20	79	<60	300	<10	1.4	6.7
52	Well - Sampled from old hand pump, flows 15 gpm-----------	<20	<20	<20	<60	1,675	<10	<.40	6.3
53	Itakovich Well----------------	<20	<20	88	<60	<10	<10	1.6	7.4
54	No data----------------------	<20	<20	<20	<60	21	<10	1.8	6.9
55	Nixon community water system at Nixon laundry-------------	<20	<20	<20	<60	<10	<10	2.3	7.4
56	Well at Assembly of God Church, 167 ft deep-----------	<20	<20	<20	<60	31	<10	1.8	9.0

APPENDIX E.--METAL CONTENT OF WATER SAMPLES, PYRAMID LAKE INDIAN RESERVATION

(see pl. 3 for sample locations)

Sample no.	Description	Metal content in ppb							
		Au	Ag	Cu	Pb	Zn	Mo	U	pH
57	No data------------------------	<20	<20	<20	<60	<10	<10	1.6	7.4
58	Little Nixon community water system, sampled from kitchen sink---------------------------	<20	<20	30	<60	50	<10	3.3	6.4
59	No data------------------------	<20	<20	<20	<60	<10	<10	3.3	7.4
60	No data------------------------	<20	<20	<20	<60	<10	<10	0.50	7.4
61	Well at Physical plant, University of Reno, sampled at S-S field station---------------	<20	<20	<20	<60	31	<10	.88	7.4
62	No data------------------------	<20	<20	<20	<60	<10	<10	<0.40	6.5
63	Well - sampled from faucet-----	<20	<20	<20	<60	<10	<10	2.1	6.3
64	Well at Paiute Pit aggregates--	<20	<20	<20	<60	28	<10	3.8	6.5
65	Well at Wadsworth School-------	<20	<20	300	<60	230	<10	7.6	6.9
66	Well at Wadsworth Post Office--	<20	<20	<20	<60	660	<10	4.9	6.8
67	Well at Wadsworth Inn, depth about 100 ft------------------	<20	<20	72	<60	1,220	<10	5.2	6.5

APPENDIX F.--METAL CONTENT OF ROCK SAMPLES, BOUNDARY PROSPECT PYRAMID LAKE INDIAN RESERVATION (see fig. 2 for sample locations)

[--, not analyzed]

(Petrography by J. Sjoberg, Reno Research Center, Reno, Nevada)

Sample no.	Description	Au	Ag	Cu	Pb	Zn	Ni	Cr	Pt	Co
		ppm (unless otherwise stated)								
1	Iron-oxide-stained volcanics----------	0.70	0.73	30	<30	80	--	--	--	--
2	One-ft chip in brown gouge zone in volcanics. Gouge 10 to 15 ft wide, N. 10° E. vertical--------------------	<.30	.28	10	50	250	--	--	--	--
3	Two-ft chip in brown gouge zone in volcanics. Zone has same trend as no. 2----------------------------------	<.01	2.1	77	12	86	95	38	<0.03	56
4	Decomposed diorite. Iron-oxide stained, exposed on west side of drainage--------------------------------	<.03	1.1	125	7	68	13	100	<.03	21
5	Altered gabbro (norite) with coarse grained subhedral texture and containing 40-50% orthopyroxene, 20-25% labradorite, 10-15% olivine, 7-10% biotite, 3-5% hematite, magnetite, and chalcopyrite, minor chlorite, talc, sericite, and traces of hornblende, and apatite. The labradorite displays irregular zoning possibly from metamorphism. Labradorite also occurs in a poikiloblastic relationship with hypersthene and biotite. Sample is random chip from small outcrop--------	<.03	2.3	0.29%	14	80	21	86	<.03	41

APPENDIX F.--METAL CONTENT OF ROCK SAMPLES, BOUNDARY PROSPECT
PYRAMID LAKE INDIAN RESERVATION (see fig. 2 for sample locations) (cont.)

Sample no.	Description	Au	Ag	Cu	Pb	Zn	Ni	Cr	Pt	Co
		ppm (unless otherwise stated)								
6	Random chip from small outcrop of gabbro exposed in creek bottom and east bank. Essentially same rock as no. 5--------------------------------	<0.03	1.5	860	14	90	27	175	<0.03	26
7	18-in. chip of limonite and quartz vein with diorite or gabbro fragments. Vein N. 65° W. vertical and cut by adit N. 30° E. (caved)-----------------	<.03	1.6	210	9	31	19	205	<.03	14
8	Altered gabbro (diorite ?) with finely disseminated pyrrhotite and magnetite. The rock contains 60-65% andesine to labradorite, 15-20% hornblende altering to pyroxene, 10-15% orthopyroxene and clinopyroxene, 3-5% biotite, and 3% magnetite, pyrite, with trace of chalcopyrite. Some hornblende is an alteration product of pyroxene. Some orthopyroxene has altered to clino-pyroxene, then to hornblende-----------	<.03	2.4	52	5	47	7	100	<.03	22
9	Select sample of medium-to-fine-grained, altered, and metamorphosed gabbro (norite) with malachite staining and disseminated chalcopyrite. The pyroxene occurs as small, optically continuous scattered grains separated by patches of plagioclase. The plagioclase occurs as a few coarse laths and fine-grained anhedral patches. Secondary oxy-biotite has hornblende cleavage. Malachite and chalcopyrite only occur locally in outcrop--------------------------------	<.03	1.5	0.26%	10	61	20	230	<.03	22

APPENDIX F.--ROCK SAMPLE AND ASSAYS, BOUNDARY PROSPECT
PYRAMID LAKE INDIAN RESERVATION (see fig. 2 for sample locations) (cont.)

Sample no.	Description	Au	Ag	Cu	Pb	Zn	Ni	Cr	Pt	Co
		ppm (unless otherwise stated)								
10	Ten-ft random chip in same rock as no. 9, 5 ft below copper zone----------	<0.03	2.9	90	6	44	6	105	<0.03	15
11	Select sample from 15 x 5-ft outcrop of massive pyrrhotite and pyrite exposed on east side of drainage---------------	<.03	1.5	340	8	20				0.10%
12	Re-sample of no. 11--------------------	.03	2.0	460	21	27	25	48	<.03	.12%
13	Gossan above massive sulfide-----------	.03	4.7	270	13	25	6	61	<.03	39
14*	Two-ft-chip sample from outcrop of altered gabbro (norite) with malachite and disseminated chalcopyrite. Patches of talc, chlorite, sericite, and biotite have replaced coarse grained pyroxene minerals. Rock is similar to sample no. 5-------------------------	<.03	2.2	0.17%	8	73	35	385	<.03	49
15	Random chip of small outcrop of gabbro with occassional malachite------	<.03	0.08	110	4	53	24	175	<.03	15
16	Black and rusty gossan material exposed in talus. Quartz monzonite outcrop exposed 75 ft northeast--------	<.03	3.6	350	17	77	34	76	<.03	38

* See Appendix G for whole rock analysis

APPENDIX F.--ROCK SAMPLE AND ASSAYS, BOUNDARY PROSPECT
PYRAMID LAKE INDIAN RESERVATION (see fig. 2 for sample locations) (cont.)

Sample no.	Description	Au	Ag	Cu	Pb	Zn	Ni	Cr	Pt	Co
		ppm (unless otherwise stated)								
17*	Grab sample of very coarse grained porphyritic meta-diorite. Large phenocrysts of hornblende up to 4 mm in length engulf zoned plagioclase laths. The plagioclase displays zoning and albitization. Minor biotite occurs as "wavy" and "curly" forms suggesting metamorphism. Fine-grained saussuritization occurs throughout the sample------------------	<0.03	1.7	27	8	91	14	120	<0.03	25

* See Appendix G for whole rock analysis

APPENDIX G.--WHOLE ROCK ANALYSES AND NORMS OF INTRUSIVE ROCKS, PYRAMID LAKE INDIAN RESERVATION

Figure/ plate and sample no.	Description	SiO_2	Al_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	MnO	Fe_2O_3	FeO	BaO	P_2O_5	LOI	Total
F 2, No. 14	Altered gabbro (Norite) with disseminated chalcopyrite, Boundary Prospect	52.76	17.62	3.66	5.04	4.78	4.43	1.15	0.14	2.65	5.08	0.14	0.63	2.07	100.15
F 2 , No. 17	Dirote porphyry, Boundary Prospect	57.15	17.57	3.10	5.85	4.33	2.22	1.15	0.14	2.65	4.53	1.07	0.22	1.08	101.06
Pl. 4, No.20	Granodiorite, Packard and Sano properties	52.79	17.46	3.42	7.13	1.78	5.71	1.18	0.22	2.68	4.52	0.16	0.62	2.49	100.16
Pl. 5, No. 10	Diorite, Pyrite Creek	61.85	16.96	2.23	5.11	4.52	2.13	0.61	0.11	2.11	2.96	0.10	0.15	1.27	100.04
Pl. 5, No. 52	Foliated diorite Porphyry, Ore Gulch, Pyramid Lake Porphyry (PLP)	53.28	17.46	3.73	5.31	4.78	3.87	1.14	0.16	2.64	5.36	0.09	0.62	1.66	99.74
Pl. 5,No. 78A	Quartz diorite-granodiorite (PLP)	69.11	14.49	1.18	2.74	3.45	4.12	0.39	0.05	1.89	2.30	0.10	0.08	0.20	100.10
Pl. 5,No. 108A	Diorite porphyry, Blizzard Creek (PLP)	53.44	17.48	3.72	5.12	4.85	3.92	1.13	0.14	2.63	5.08	0.08	0.69	1.81	99.98
Pl. 5, No. 113	Foliated diorite porphyry, Blizzard Creek pyrite zone (PLP)	46.28	14.87	7.85	6.35	2.58	4.64	0.90	0.28	2.40	10.61	0.14	1.02	2.21	100.13

	Description: Rock type based on normative mineralogy (Irvine and Baragar, 1971)	Quartz	Corundum	Orthoclase	Albite	Anorthite	Nepheline	Hedenbergite	Diopside	Enstatite	Forsterite	Fayalite	Ferrosilite	Magnetite	Ilmenite	Apatite
F 2, No. 14	Trachybasalt, potassic alkalic series	-	-	26.22	31.26	13.54	4.95	2.05	3.89	-	5.12	3.41	-	3.84	2.18	1.47
F 2, No. 17	Calc-alkaline (high alumina) andesite	6.11	-	13.13	36.62	21.97	-	1.54	3.02	6.31	-	-	3.68	3.84	2.18	0.51
Pl. 4, No. 20	Calc-alkaline (high alumina) basalt	1.70	-	33.80	15.05	22.76	-	2.21	4.73	6.32	-	-	3.39	3.88	2.24	1.44
Pl. 5, No. 10	Calc-alkaline (high alumina andesite) potassium average series	13.23	-	12.63	38.23	19.68	-	1.18	2.61	4.35	-	-	2.26	3.06	1.16	0.35
Pl. 5,No. 52A	Trachybasalt, potassic alkalic series	-	-	22.87	35.43	14.76	2.70	2.23	3.90	-	5.23	3.78	-	3.83	2.17	1.44
Pl. 5,No. 78A	Calc-alkaline dacite potassium-rich series	25.18	-	24.35	29.15	11.91	-	0.37	0.59	2.67	-	-	1.91	2.74	0.74	0.17
Pl. 5, No.108A	Trachybasalt, potassic alkalic series	-	-	23.18	36.37	14.36	2.51	1.83	3.50	-	5.35	3.54	-	3.31	2.14	1.59
Pl. 5, No.113A	Alkalic basalt, potassic series	-	-	27.47	9.08	15.25	6.93	3.35	4.54	-	12.23	11.40	-	3.48	1.71	2.36

APPENDIX H.--METAL CONTENT OF ROCK SAMPLES FROM THE PACKARD AND SANO PROPERTIES, PYRAMID LAKE INDIAN RESERVATION (see pl. 4)

[Nd, not detected; *, interference; --, not analyzed]

Sample No.	Description	Oz/ton		Percent			ppm			
		Au	Ag	Cu	Pb	Zn	Mo	W	U	Th
1	6-ft chip across gouge zone with gypsum and limonite	Nd	0.03	0.03	0.002	Nd	--	--	--	--
2	6-ft chip across fault zone of limonite and gypsum	0.006	.08	.19	.004	0.01	<30	<5	2.2	<30
3	20 ft southeast of sample No. 2; 4-ft chip across similar zone	Nd	.13	.07	.01	.004	<30	<5	0.8	<30
4	7-ft chip across limonitic gouge zone	.003	.16	.04	.01	.01	<30	<5	.6	<30
5	3-ft chip across fault zone with limonite and gypsum at portal of adit	Nd	.02	.07	<.003	.02	<30	<5	3.9	<30
6	Select gossan material of limonite and gypsum from sample No. 5	Nd	.04	.03	<.003	.005	<30	<5	2.1	<30
7	4-in. barren quartz vein	Nd	.003	.003	<.003	<.003	<30	<5	.5	<30
8	Select malachite and limonite from base of dump	.04	5.2	5.6	<.003	.12	100	100	15	<30
9	2.5-ft chip across fault gouge with limonite	.006	.19	.08	.02	.01	<30	8	2.1	<30
10	3-ft chip across argillic alteration zone with minor malachite in granodiorite	.007	.07	.10	.003	.006	<30	<5	1.7	<30
11	1 to 3-in. chip across quartz-calcite-siderite vein	Nd	.12	.007	<.003	.005	<30	<5	1.9	<30
12	5-in. chip across limonite vein with calcite and minor pyrite	.05	.44	.06	.38	.08	<30	<5	2	<30

APPENDIX H.--METAL CONTENT OF ROCK SAMPLES FROM THE PACKARD AND SANO PROPERTIES, PYRAMID LAKE INDIAN RESERVATION (see pl. 4) (cont.)

Sample No.	Description	Oz/ton		Percent			ppm			
		Au	Ag	Cu	Pb	Zn	Mo	W	U	Th
13	1-ft chip across limonite vein similar and parallel to sample no. 12----------------------	0.07	4.2	0.06	0.28	0.003	<30	<5	7.6	<30
14	3-in. chip of limonite from 7-in-wide limonite-calcite vein--	Nd	0.04	.02	.003	.009	<30	<5	2.1	<30
15	4 to 6-in. chip of calcite vein with pyrite------	.006	.06	.005	.04	.06	<30	*	1.1	<30
16	6-in. chip across manganese-stained calcite veins-	Nd	.01	.002	.007	.006	<30	<5	0.7	<30
17	4-in. chip across limonite-stained calcite stringers--	Nd	.01	.005	<.003	.008	<30	8	.9	<30
18	10-ft chip sample across zone in granodiorite containing 2 ft of narrow quartz, calcite and limonite veins------------------------------------	.008	.24	.02	.10	.09	<30	<5	2.6	50
19	Select sample from garbage dump containing galena, pyrite, and chalcopyrite-------------------------	.95*	10.3*	.23	5.31	11.9	<15	<5	<.5	--
20	Medium-to-coarse-grained granodiorite. Minor alteration of hornblende to biotite---------------	Nd	.004	.003	<.003	.006	<30	<5	.84	<30
21	5-ft chip across limonite vein with gypsum and minor galena-------------------------------------	.02	3.3	.04	1.3	.3	<30	<5	3.7	<30
22	Quartz monzonite---------------------------------	Nd	.004	.003	<.003	<.003	<30	<5	1.4	<30
23	Medium-to-fine-grained diorite-------------------	Nd	.002	.004	<.003	<.003	<30	<5	1.4	40
24	4-ft channel sample across of limonitic zone in soil--	.01	.35	.02	.53	.28	<30	<5	2.8	40
25	6-ft chip, continuation of sample no. 24----------	.006	.29	.01	.25	.48	<30	<5	3.5	<30

* Average of two independent assays

APPENDIX H.--METAL CONTENT OF ROCK SAMPLES FROM THE PACKARD AND SANO PROPERTIES, PYRAMID LAKE INDIAN RESERVATION (see pl. 4) (cont.)

Sample No.	Description	Oz/ton		Percent			ppm			
		Au	Ag	Cu	Pb	Zn	Mo	W	U	Th
26	Quartz monzonite with argillic alteration--------	Nd	0.003	0.002	<0.003	<0.003	<30	<5	1.0	<30
27	1-ft chip across limonite veins in argillic-altered andesite----------------------------------	0.02	.06	.002	.07	.01	<30	<5	2.2	30
28	1-ft chip across 2-ft-wide vein in altered andesite. Sampled section contains hematite stringers---	.06	.1	.003	<.003	.005	<30	<5	2.9	<30
29	Select limonitic dump material, very altered and weathered, with disseminated pyrite---------------	.05	2.1	.07	.80	3.8	<30	<5	<0.5	<30
30	Select dump material containing galena, chalcopyrite, and pyrite--------------------------	.13	20.2	.18	16.9	10.0	<30	<5	1.1	<30
31	6-ft channel sample across limonitic-argillic zone in andesite-----------------------------------	.002	.01	.002	<.003	.006	<30	<5	1.0	<30
32	6-ft continuation of sample no. 31-----------	.002	.01	.001	<.003	.003	<30	12	.5	<30

APPENDIX I. - METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5)

[Analyses with 0.01 oz gold/ton, 0.1 oz silver/ton or 0.05 percent copper, and higher content of these elements are listed along with the ppm value]

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
1	Medium-grained cream-colored alaskite with calcite veins----------------------	<0.03		0.03		7		<30	<30		<30
2	1.5 to 3-ft-wide quartz vein N. 45 E., 37° SE with fine-grained dark material. Small pit on vein------------------------------------	<.03		<.03		50		<30	<30		<30
3	Sample of meta-diorite(?) host rock near vein of sample No. 2----------------------	<.03		.19		70		<30	50		<30
4	Random chip in faulted, brecciated, and altered (?) quartz diorite with K-feldspar veins-------------------------------------	<.03		<.03		26		<30	40		<30
5	Random sample of 6-in. aplite vein in darker intrusive. Contact with volcanics nearby--	<.03		.09		23		<30	50		<30
6	Grab sample from iron-oxide-stained zone near contact of altered mafic and quartz diorite intrusions------------------------	<.03		.19		22		8	27		12
7	Pyrite zone along diorite and quartz diorite contact---------------------------------------	<.03		1.6		30		4	41		3
8	Altered diorite porphyry with 1-2 percent disseminated pyrite from contact zone with quartz diorite breccia----------------------	.1		<1		285		<5	95		1
9	Same pulp from No. 8 rerun for copper-------					80					
10	Same area as No. 8 re-sampled---------------	.05		.28		86		4	48		

APPENDIX I. - METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
11	5-ft chip across pyrite veins in a contact zone between diorite and granodiorite------	<0.03		0.10		20		4	63		2
12	Brecciated quartz diorite with propylitic alteration and minor slickensides----------	<.03		<.03		20		<30	60		<30
13	Random chip of dark-colored diorite inter-digitated with quartz diorite--------------	<.03		<.03		37		<30	40		<30
14	Propylitic-altered quartz diorite with chlorite(?) and iron-oxide-staining--------	<.03		.03		28		<30	60		<30
15	Select chip of highly oxidized zone with strong sulfur smell and propylitic alteration(?)-------------------------------	<.03		.05		25		<30	<30		<30
16	Propylitic(?) altered quartz diorite with hematite staining--------------------------	<.03		<.03		18		<30	40		<30
17	Random sample for 20 ft along altered dark intrusive (diorite)(?) contains aplite veining-----------------------------------	<.03		<.03		41		<30	<30		<30
18	Select chip of iron oxide zone in propylitic-altered diorite------------------	<.03		.23		28		<30	<30		<30
19	Random chip of quartz diorite---------------	<.03		<.03		14		<30	50		<30
20	Random chip of quartz diorite with sulfides(?)-------------------------------	<.03		<.03		30		<30	45		<30
21	Random chip of granodiorite(?) with pyrite cubes--------------------------------------	<.03		.10		12		<30	45		50

APPENDIX I. - METAL CONTENT OF ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
22	Random chip of fractured, brown volcanic rock---	<0.03		<0.03		34		<30	100		60
23	Random chip from iron-stained contact between quartz diorite and diorite---------	<.03		<.03		17		<30	50		<30
24	Random sample of intrusive with possible alteration--------------------------------	<.03		<.03		40		<30	50		<30
25	Random chip of quartz diorite-------------	<.03		.03		21		<30	55		<30
26	2 to 3-ft-wide aplite dike----------------	<.03		.07		30		<30	140	<5	<30
27	Chip across interfingered contact zone between diorite and quartz diorite--------	<.03		<.03		21		<30	70		<30
28	Chip across 7-in.-wide fracture in dark intrusive----------------------------------	.06		.10		1,000	0.10	<30	40		<30
29	Outcrop sample of sample No. 28-----------	<.03		<.03		20		<30	<30		<30
30	Interfingered contact zone between quartz diorite and diorite porphyry--------------	<.03		<.03		28		<30	40		<30
31	Random chip of fine-grained mafic rock----	<.03		<.03		180		<30	40		<30
32	8-ft chip across foliated diorite porphyry with minor disseminated chalcopyrite and malachite stain------------------------------	<.03		.08		760	.076	<30	50		<30
33	Random chip of diorite with possible sulfides-------------------------------------	<.03		<.03		170		<30	45		<30
34	Random chip of diorite, with minor chalcopyrite and malachite-----------------	<.03		<.03		800	.08	<30	35		<30

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
35	Random chip of altered diorite-------------	<0.03		<0.03		90		<30	<30		<30
36	Random chip of quartz diorite near contact with diorite----------------------------------	<.03		<.03		70		<30	40		<30
37	do---	<.03		<.03		20		<30	60		<30
38	Grab sample of quartz vein float-----------	<.03		2.4		115		<30	30		<30
39	75-ft random chip along meta-diorite with abundant biotite----------------------------	<.03		.04		290		<30	40		<30
40*	Random chip from a 20 ft x 40 ft outcrop of foliated diorite with disseminated chalcopyrite and pyrite-------------------	<.03		.38		4,500	0.45	<30	40		<30
41	10-ft chip across foliated diorite porphyry with disseminated chalcopyrite and malachite stain------------------------	.34	0.01	.24		5,000	.50	<30	70		<30
42	Random chip of 6 to 8-in.-wide quartz vein with dark stringers------------------------	<.03		<.03		61		<30	9		<30
43	Random chip across 200 sq ft of foliated diorite porphyry. Same rock as samples 48-60 but no copper minerals noted---------	<.03		<.03		350		<30	50		<30
44	Random chip from 200 ft of altered rock, quartz veining, calcite veining, and minor malachite---------------------------------	<.03		.11		220		<30	35		<30

* Samples 40-78 taken in Ore Gulch area

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
45	Random chip from a 20 ft x 20 ft outcrop. Some pyrite and chalcopyrite; rock is porphyritic----------------------------------	<0.03		0.16		930	0.09	<30	50		<30
46	6-in. to 1-ft-wide magnetite and calcite vein--	.03		.8		36		35	39		2
47	6-in. to 1-ft-wide epidote-scapolite-magnetite-chalcopyrite-malachite vein------	.65	0.02	.6		1015	.10	37	51		<2
48	Select sample of disseminated chalcopyrite zone in foliated diorite. Same rock as No. 49--------------------------------------	.12		.32		5650	.56	8	38		<30
49	25 ft chip across foliated diorite porphyry containing disseminated chalcopyrite and pyrite. Sample starts at top of 75-ft cliff in creek bottom. Malachite stain common at top of cliff---------------------	.03		.08		2200	.22	<30	40		<30
50	25-ft easterly continuation of No. 49------	.03		.12		1300	.13	<30	40		<30
51	25-ft chip, continuation of No. 50---------	<.03		.07		1300	.13	<30	60		<30
52*	Selected portions of No. 51. Disseminated chalcopyrite in foliated diorite porphyry--	.05		.20		4500	.45	6	63		
53	25-ft chip, continuation of no. 51. Same rock with disseminated chalcopyrite and pyrite---	.04		.16		2800	.28	<30	70		<30

* See Appendix G, Whole rock analyses

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
54	Samples taken at 25-ft intervals going east from No. 53, chalcopyrite decreasing, pyrite increasing----------------------------	<0.03		<0.03		130		<30	115		<30
55	do--	<.03		<.03		100		<30	70		<30
56	do--	<.03		<.03		140		<30	70		<30
57	do--	<.03		<.03		500	0.05	<30	60		<30
58	do--	<.03		<.03		110		<30	100		<30
59	do--	<.03		<.03		120		<30	130		<30
60	do--	<.03		<.03		150		<30	60		<30
61	1-ft-wide quartz vein with limonite box works and pyrite----------------------------	<.03		.25		1100	.11	<30	<30		<30
62	75-ft random chip in diorite porphyry-------	<.03		.04		23		<30	130		<30
63	10-ft chip across malachite-stained chalcopyrite zone in foliated diorite porphyry------------------------------------	<.03		.29		5000	.50	<30	90		<30
64	Porphyritic diorite-------------------------	<.03		<.03		57		<30	100		<30
65	Random chip from 100 ft of outcrop and float composed of quartz diorite------------------	<.03		<.03		54		<30	<30		<30
66	Baked contact zone in volcanics. Rock is oxidized and contains calcite and glauconite-------------------------------	<.03		.10		35		<30	130	<5	<30

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
67	10-ft chip across same zone as No. 63 about 20 ft south----------------------------	<0.03		0.32		3800	0.38	<30	80		50
68	12-ft chip in malachite and chalcopyrite zone from basalt dike in foliated diorite porphyry------------------------------------	.14	0.003	.20		5400	.54	<30	70		<30
69	Random chip of diorite porphyry-------------	<.03		<.03		130		<30	80		<30
70*	40-ft random chip from cliff of altered diorite porphyry. Sample is westerly continuation from No. 49--------------------	<.03		<.03		34		<30	40		<3
71	60-ft random chip continuing west from No. 63--------------------------------------	<.03		<.03		16		<30	40		<30
72	5-ft chip across foliated diorite porphyry, minor chalcopyrite and malachite-- ---------	.14	.003	.20		2500	.25	<30	90		<30
73	10-ft random chip of foliated diorite porphyry, minor pyrite and chalcopyrite----	<.03		<.03		330		<30	60		<30
74	15-ft chip across foliated diorite porphyry, with disseminated chalcopyrite, pyrite, and malachite stain---------------------------	<.03		.04		1700	.17	<30	70		<30
75	Quartz vein float with goethite(?)--------	.03		1.0		460		<30	<30		60
76	20-ft chip across foliated diorite porphyry with disseminated chalcopyrite------------	.08		.22		3000	.30	<30	90		<30
77	Porphyritic diorite with magnetite--------	<.03		<.03		13		<30	40		<30

* Climbing gear used to obtain sample Nos. 70 and 71

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
78	8-ft chip across quartz vein with limonite and rutile-------------------------	0.20	0.006	4.0	0.12	185		<30	<30		90
78A*	Select chip of fresh biotite-quartz diorite------------------------------------	<.03		<0.03		35		<30	<30		<30
79	Chip across quartz diorite with aplite dikes---------------------------------------	<.03		<.03		22		<30	30		<30
80	Malachite impregnated zone in contact area between diorite porphyry and quartz diorite------------------------------------	4.8	.14	3.08	.09	30,000	3.0	<30	90	<5	<30
81	2-ft chip across same zone as above--------	.90	.03	3.6	.10	9640	0.96	6	57		6
82	Select sample from stockpile dug on above zone---	.14		.45		9660	.96	2	55		5
83	Random chip across 300 ft of altered hornblende diorite and mafic dike----------	<.03		<.03		42		<30	<30		5
84	1-ft-thick zone of limonite box works with malachite-----------------------------------	3.08	.09	4.8	.14	9800	.98	<30	120	8	<30
85	Propylitic-altered diorite, mainly epidote as veins and circular patches------	<.03		<.03		15		<30	50		<30
86	Local malachite-stained propylitic altered zone in diorite(?)------------------------	<.03		<.03		90		<30	<30		<30
87	Random 50-ft chip in propylitic-altered diorite cut by mafic dike with pyrite, chalcopyrite, and abundant epidote---------	<.03		<.03		650	.065	<30	<30		<30

* See Appendix G for whole rock analysis

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
88	Random 150-ft chip in propylitic-altered diorite. Most of sample from non-mineralized rock-------------------------	<0.03		<0.03		45		<30	<30		<30
89	Random 75-ft chip of altered diorite(?) in contact with quartz diorite, some epidote present-----------------------------------	<.03		.06		31		<30	40		<30
90	Random chip (200 ft x 75 ft) of outcrop from quartz diorite-------------------------	<.03		<.03		41		<30	40		<30
91	Random chip of propylitic-altered diorite---	<.03		<.03		27		<30	<30		<30
92	Select chip of tufa-------------------------	<.03		<.03		60		<30	<30		<30
93	Random chip every 5-10 ft for 250 ft. Sheared intrusives and fine-grained lamprophyre(?) with garnets-----------------	<.03		.03		40		<30	<30		<30
94	Random chip of deep red, fine-grained aplite intruded into quartz diorite----------------	<.03		.04		115		<30	<30		<30
95	Random chip of propylitic-altered diorite---	<.03		<.03		190		<30	<30		<30
96	Random chip for 60 ft. in diorite with minor malachite and chalcopyrite-----------------	<.03		<.03		78		<30	35		<30
97	Random chip of propylitic-altered diorite---	<.03		<.03		36		<30	<30		<30
98	do--	<.03		<.03		45		<30	<30		<30
99	Select vein and gouge from fault N. 10 E., 80° W. Malachite noted and probable small adit in zone--------------------------------	2.02	0.06	.18		3780	0.38	32	220	32	3

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
100	Propylitic-altered diorite locally porphyritic. Concentric alteration of epidote and scapolite------------------------	<0.03		<0.03		32		<30	<30		<30
101	6-ft chip of malachite and limonite zone in foliated diorite near quartz diorite contact---------------------------------------	0.2		7.8	0.22	9400	0.94	6	59		
102	15-ft chip from No. 101. Less malachite with aplite dikes in foliated diorite--------	<.03		0.38		390		<1	45		
103	3-ft chip across limonite zone---------------	<.03		.16		206		<1	41		
104	Tactite zone in weathered quartz diorite. Massive magnetite and garnet with minor quartz--	<.03		.07		440		<1	50		40
105	20-ft chip across tactite zone---------------	<.03		.15		330		8	30		
106	Mafic dike in quartz diorite-----------------	<.03		.15		36		2	65		
107	Select chip of 5-ft area containing chalcopyrite, pyrite, and malachite in sheared area of propylitic-altered diorite porphyry--	<.03		.13		35		<30	70	<5	<30
108	10-in.-wide shear zone in diorite porphyry with epidote, garnet, calcite, and magnetite-	.05		.70		9		25	24		
*108A	Select fresh diorite porphyry---------------	<.03		<.03		25		<30	<30		<30
109	10-ft chip across foliated diorite porphyry with 2 percent disseminated pyrite----------	<.03		.20		200		<30	130	<5	<30

* See Appendix G for whole rock analysis

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
110	Random chip in scapolite-altered diorite and diorite porphyry	<0.03		<0.03		20		<30	<30		<30
111	Select sample of shear zone and quartz veining in diorite containing sulfides(?)	<.03		.22		20		<30	40		<30
112	Random chip over 270 sq ft of diorite porphyry with 2-3 percent disseminated pyrite	<.03		<.03		63		<30	<30		<30
113*	Same as No. 112 only with 3 percent disseminated pyrite	<.03		<.03		70		<30	40		<30
114	Same as No. 112, intrusive with fine magnetite and 2-3 percent disseminated pyrite, chalcopyrite noted in polished section	<.03		<.03		115		<30	40		<30
115	Random chip of contact zone with quartz diorite intrusive, aplite, and darker diorite. Malachite stain nearby	<.03		<.03		18		<30	50		<30
116	Select copper minerals from 6-ft scapolite-garnet-calcite-epidote shear zone with minor quartz	.64	0.02	1.9	0.05	9660	0.96	6	90		
117	Random chip over 1,000 sq ft in granular metadiorite(?), quartz veining and open space filling was included	<.03		<.03		140		6	<30		<30
118	Random chip of contact containing metadiorite, quartz diorite, and red aplite	<.03		<.03		36		<30	40		<30
119	Random chip every 5 ft for 100 ft of propylitic-altered diorite	<.03		<.03		105		<30	<30		<30

* See Appendix G for whole rock analysis

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
120	0.5 to 1-ft-wide quartz vein containing limonite, goethite, and chlorite------------	<0.03		<0.03		1200	0.12	6	<30		<30
121	Select sample from zone of scapolite, garnet and secondary feldspar. Scapolite crystals over 3 in. long------------------------------	.30		1.5		2050	.2	20	25		4
122	15-ft chip across vein system bearing chalcopyrite and bornite. Veins range from 1/4-4 in. wide-------------------------------	<.03		.47		690	.07	6	90		<30
123*	Select of 4-in.-wide vein containing malachite, chalcopyrite, and bornite in association with K-feldspar, garnet, calcite, epidote, tourmaline, and quartz-------------	.54	0.02	2.6	0.76	80,800	8.8	<30	80		<30
124	1-ft chip across copper-bearing shear zone and vein. Scapolite, K-feldspar, stilbite, epidote, and tourmaline in vein-------------	1.50	.04	2.2		9640	.96	8	39	4	8
125	Random chip of aplitic intrusive------------	<.03		<.03		36		<30	30		<30
126	Random chip over 300 sq ft of diorite porphyry with minor pyrite-----------------	<.03		<.03		19		<30	50		<30
127	Random chip of 150-ft propylitic-altered diorite with small copper-bearing shear zone-	<0.03		<0.03		530	0.05	<30	<30		<3
128	Select chip of mineralized zone described in No. 127-----------------------------------	<.03		<.03		340		<30	<30		<30
129	3-ft chip across copper-bearing shear zone of No. 127-----------------------------------	.06		.35		9660	.97				
130	Random chip across 300-ft outcrop, sampled every 5-10 ft, includes propylitic-altered and shear zone diorite----------------------	<.03		.03		380		<30	70		<30

* Bornite rimmed by covellite in polished section

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
131	5-ft chip across 10-ft brecciated zone in diorite. Rocks stained red and brown with minor malachite-------------------------------	<0.03		2.0		210		4	29		2
132	Select malachite and azurite from shear zone---	1.4	0.04	2.9	0.08	11,900	1.2	<30	100		<30
133	Approximately 15-ft chip of area in No. 132--	1.0	.03	1.5	.04	8000	0.8	<30	40		<30
134	Grab sample of quartz vein float with limonite-staining-----------------------------	<.03		<.03		380		<30	<30		<30
135	Random chip over 200-ft traverse of rocks similar to No. 130--------------------------	<.03		<.03		30		<30	70		<30
136	Random chip of 6-ft quartz vein with garnet and epidote--------------------------	<.03		<.03		230		<30	<30		<30
137	Outcrop sample from diorite porphyry north of pit area and above shear zone-----------	<.03		.04		69		<30	<30		<30
138	8-ft chip across foliated diorite porphyry with malachite and chalcopyrite------------	.03		<.03		9500	0.95	<30	60		<30
139	Grab of malachite-stained rocks from dump of lower pit------------------------------	.39	.01	6.0	.18	81,000	8.1	<30	120		<30
140*	Grab of brown oxide material from same dump-	4.6	.13	2.5	.73	53,000	5.3	<30	160		450
141	Weighted chip sample along a 3-ft x 40-ft shear zone containing malachite, chalcopyrite, and bornite(?). Associated minerals include epidote, scapolite, K-feldspar, calcite, sphene, and quartz------------------------	.39	.01	1.2		3800	.38	<30			<30

* Molybdenite found in association with chalcopyrite, K-feldspar, augite, and scapolite in vein about 100 ft south of lower pit.

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
142	Select dump from upper pit, abundant malachite and azurite------------------------	1.6	0.05	6.3	0.18	30,000	3.0	<30	<30		<30
143	Random chip across 75 ft of non-mineralized area near upper pit-------------------------	<.03		.10		320		<30	<30		<30
144	Random chip (approximately 75 ft) of altered diorite----------------------------	<.03		<.03		23		<30	<30		<30
145	Random chip of altered diorite--------------	<.03		<.03		30		<30	<30		<30
146	1-ft chip across scapolite vein with malachite and chalcopyrite------------------	1.3	.04	7.1	.21	9670	.97	10	35		39
147	1-ft mineralized zone of 2 to 3-ft-wide quartz vein containing chalcocite(?) and malachite-	.6	.02	8.9	.26	9630	.96	15	20		3
148	4.5-ft chip across scapolite shear zone with malachite, chalcopyrite, minor chalcocite, and bornite. Polished surface shows chalcocite, digenite, and bornite rimmed by covellite--	.2		.82		2800	.28	15	5		12
149	Select sample of chalcocite and bornite in scapolite shear zone of No. 148. Hessite (Ag_2Te) and covellite (CuS) associated with chalcocite found by SEM-microprobe---------	.84	.02	5.8	.17	8220	.82	32	30		4
150	Porphyritic diorite near Tertiary volcanic contact-------------------------------------	<.03		.06		20		1500?	60		<30
151	Miocene volcanic float with glauconite------	<.03		<.03		51		<30	80		<30
152	Random sample of 200-ft x 300-ft area of diorite with minor alteration---------------	<.03		<.03		100		<30	50		<30

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
153	Random chip from a 30-ft x 30-ft area in altered metadiorite-------------------------	<0.03		<0.03		35		<30	<30		<30
154	Random chip 75-ft long in metadiorite(?), quartz, and calcite present-----------------	<.03		<.03		43		<30	<30		<30
155	50-ft random chip across diorite outcrop containing minor malachite and chalcopyrite-	.08		.18		100		<30	<30	<5	<30
156	Select chip across 1-ft zone of sample No. 155 containing malachite and chalcopyrite--	.06		.40		2000	0.20	<30	<30		<30
157	5-ft chip across narrow veins containing malachite and chalcopyrite-----------------	<.03		.40		2200	.22	<30	<30		<30
158	Random sample from 100-sq-ft outcrop in area of sample No. 157. Obvious malachite stain avoided---------------------------------	<.03		<.03		120		<30	<30		<30
159	10-ft random chip across altered diorite(?) containing malachite and chalcopyrite------	<.03		<.03		190		<30	<30		<30
160	3-ft chip across copper-bearing zone of sample No. 159------------------------------	.24		.26		1500	.15	<30	<30		<30
161	Random chip for 200 ft of outcrop. Approximately 100 ft contains minor malachite and chalcopyrite-----------------	<.03		<.03		250		<30	<30		<30
162	Random chip of large outcrop of porphyritic diorite---------------------------------------	<.03		<.03		17		<30	50		<30
163	Diorite porphyry with propylitic alteration and calcite veining-----------------------	<.03		<.03		32		<30	<30		<30

APPENDIX I. - METAL CONTENT AND ROCK SAMPLES, PYRAMID LAKE COPPER DEPOSIT (see pl. 5) (cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu percent	Pb ppm	Zn ppm	W ppm	Mo ppm
164	Random chip of soft zones in diorite-------	<0.03		<0.03		16		30	80		<30
165	Weathered vesicular, gray volcanic with possible zeolites-------------------------	<.03		.17		25		<30	70	<5	<30
166	2-ft-thick quartz vein in propylitic-altered diorite, iron-stained, and contains specular hematite and chlorite--------------	<.03		.12		78		<30	<30		<30
167	Random chip in propylitic altered volcanics with close-spaced epidote veins------------	<.03		<.03		25		<30	<30		<30
168	Select chip across highly altered intrusive(?) containing 1-ft-wide quartz vein with limonite and malachite----------	<.03		1.7		16,000	1.6	<30	<30		<30
169	Vertical vein with black secondary mineral-	.04		.15		52		6	15		7
170	Same vertical mineralized structure as sample No. 169 with quartz, malachite, and limonite-----------------------------------	.05		3.2	0.09	9630	0.96	10	16		14
171	Select chip of Miocene volcanics with abundant glauconite-----------------------	.05		<.03		92		<30	50		<30
172	Weathered volcanic with limonite and calcite------------------------------------	<.03		.31		10		<30	110	<5	<30
173	Weathered basalt(?) with glauconite--------	<.03		.08		10		<30	100	<5	<30

APPENDIX J

REPORT ON THE INDUCED POLARIZATION AND RESISTIVITY SURVEY OF THE PYRAMID LAKE COPPER DEPOSIT

FOR

U. S. BUREAU OF MINES

by

PHOENIX GEOPHYSICS, INC.
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PHOENIX GEOPHYSICS

Notes on the Theory, Method of Field Operation, and Presentation of Data for the Induced Polarization Method

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Induced Polarization as a geophysical measurement refers to the blocking action or polarization of metallic or electronic conductors in a medium of ionic solution conduction.

This electro-chemical phenomenon occurs wherever electrical current is passed through an area which contains metallic minerals such as base metal sulphides. Normally, when current is passed through the ground, as in resistivity measurements, all of the conduction takes place through ions present in the water content of the rock, or soil, i.e. by ionic conduction. This is because almost all minerals have a much higher specific resistivity than ground water. The group of minerals commonly described as "metallic" however, have specific resistivities much lower than ground waters. The induced polarization effect takes place at those interfaces where the mode of conduction changes from ionic in the solutions filling the interstices of the rock to electronic in the metallic minerals present in the rock.

The blocking action or induced polarization mentioned above, which depends upon the chemical energies necessary to allow the ions to give up or receive electrons from the metallic surface, increases with the time that a d.c. current is allowed to flow through the rock; i.e. as ions pile up against the metallic interface the resistance to current flow increases. Eventually, there is enough polarization in the form of excess ions at the interfaces, to appreciably reduce the amount of current flow through the metallic particle. This polarization takes place at each of the infinite number of solution-metal interfaces in a mineralized rock.

When the d.c. voltage used to create this d.c. current flow is cut off, the Coulomb forces between the charged ions forming the polarization cause them to return to their normal position. This movement of charge creates a small current flow which can be measured on the surface of the ground as a decaying potential difference.

From an alternate viewpoint it can be seen that if the direction of the current through the system is reversed repeatedly before the polarization occurs, the effective resistivity of the system as a whole will change as the frequency of the switching is changed. This is a consequence of the fact that the amount of current flowing through each metallic interface depends upon the length of time that current has been passing through it in one direction.

The values of the percent frequency effect or PFE are a measurement of the polarization in the rock mass. However, since the measurement of the degree of polarization is related to the apparent resistivity of the rock mass it is found that the metal factor values or MF are the most useful values in determining the amount of polarization present in the rock mass. The MF values are obtained by normalizing the PFE values for varying resistivities.

The induced polarization measurement is perhaps the most powerful geophysical method for the direct detection of metallic sulphide mineralization, even when this mineralization is of very low concentration. The lower limit of volume percent sulphide necessary to produce a recognizable IP anomaly will vary with the geometry and geologic environment of the source, and the method of executing the survey. However, sulphide mineralization of less than one percent by volume has been detected by the IP method under proper geological conditions.

The greatest application of the IP method has been in the search for disseminated metallic sulphides of less than 20 percent by volume. However, it has also been used successfully in the search for massive sulphides in situations where, due to source geometry, depth of source, or low resistivity of surface layer, the EM method can not be successfully applied. The ability to differentiate ionic conductors, such as water-filled shear zones, makes the IP method a useful tool in checking EM anomalies which are suspected of being due to these causes.

In normal field applications the IP method does not differentiate between the economically important metallic minerals such as chalcopyrite, chalcocite, molybdenite, galena, etc., and the other metallic minerals such as pyrite. The induced polarization effect is due to the total of all electronic conducting minerals in the rock mass. Other electronic conducting materials which can produce an IP response are magnetite, pyrolusite, graphite, and some forms of hematite.

In the field procedure, measurements on the surface are made in a way that allows the effects of lateral changes in the properties of the ground to be separated from the effects of vertical changes in the properties. Current is applied to the ground at two points in distance (X) apart. The potentials are measured at two other points (X) feet apart, in line with the current electrodes is an integer number (n) times the basic distance (X).

The measurements are made along a surveyed line, with a constant distance (nX) between the nearest current and potential electrodes. In most surveys, several traverses are made with various values of (n); i.e. (n) = 1,2,3,4, etc. The kind of survey required (detailed or reconnaissance) decides the number of values of (n) used.

In plotting the results, the values of the apparent resistivity, apparent percent frequency effect, and the apparent metal factor measured for each set of electrode positions are plotted at the intersection of grid lines, one from the center point of the current electrodes and the other from the center point of the potential electrodes (see fig. A). The resistivity values are plotted above the line as a mirror image of the metal factor values below. On a second line, below the metal factor values, are plotted the values of the percent frequency effect. In some cases the values of percent frequency effect are plotted as superscripts of the metal factor value. In this second case the frequency effect values are not contoured. The laterial displacement of a given value is determined by the location along the survey line of the center point between the current and potential electrodes. The distance of the value from the line is determined by the distance (nX) between the current and potential electrodes when the measurement was made.

The separation between sender and receiver electrodes is only one factor which determines the depth to which the ground is being sampled in any particular measurement. The plots then, when contoured, are not section maps of the electrical properties of the ground under the survey line. The interpretation of the results from any given survey must be carried out using the combined experience gained from field results, model study results and theoretical investigations. The position of the electrodes when anomalous values are measured is important in the interpretation.

In the field procedure, the interval over which the potential differences are measured is the same as the interval over which the electrodes are moved after a series of potential readings has been made. One of the advantages of the induced polarization method is that the same equipment can be used for both detailed and reconnaissance surveys merely by changing the distance (X) over which the electrodes are moved each time. In the past, intervals have been used ranging from 25 feet to 2,000 feet for (X). In each case, the decision as to the distance (X) and the values of (n) to be used is largely determined by the expected size of the mineral deposit being sought, the size of the expected anomaly and the speed with which it is desired to progress.

The diagram in figure A demonstrates the method used in plotting the results. Each value of the apparent resistivity, apparent metal factor, and apparent percent frequency effect is plotted and identified by the position of the four electrodes when the measurement was made. It can be seen that the values measured for the larger values of (n) are plotted farther from the line indicating that the thickness of the layer of the earth that is being tested is greater than for the smaller values of (n); i.e. the depth of the measurement is increased. When the PFE values are plotted as superscripts to the MF values, the third section of data values is not presented and the PFE values are not contoured.

METHOD USED IN PLOTTING DIPOLE-DIPOLE INDUCED POLARIZATION AND RESISTIVITY RESULTS

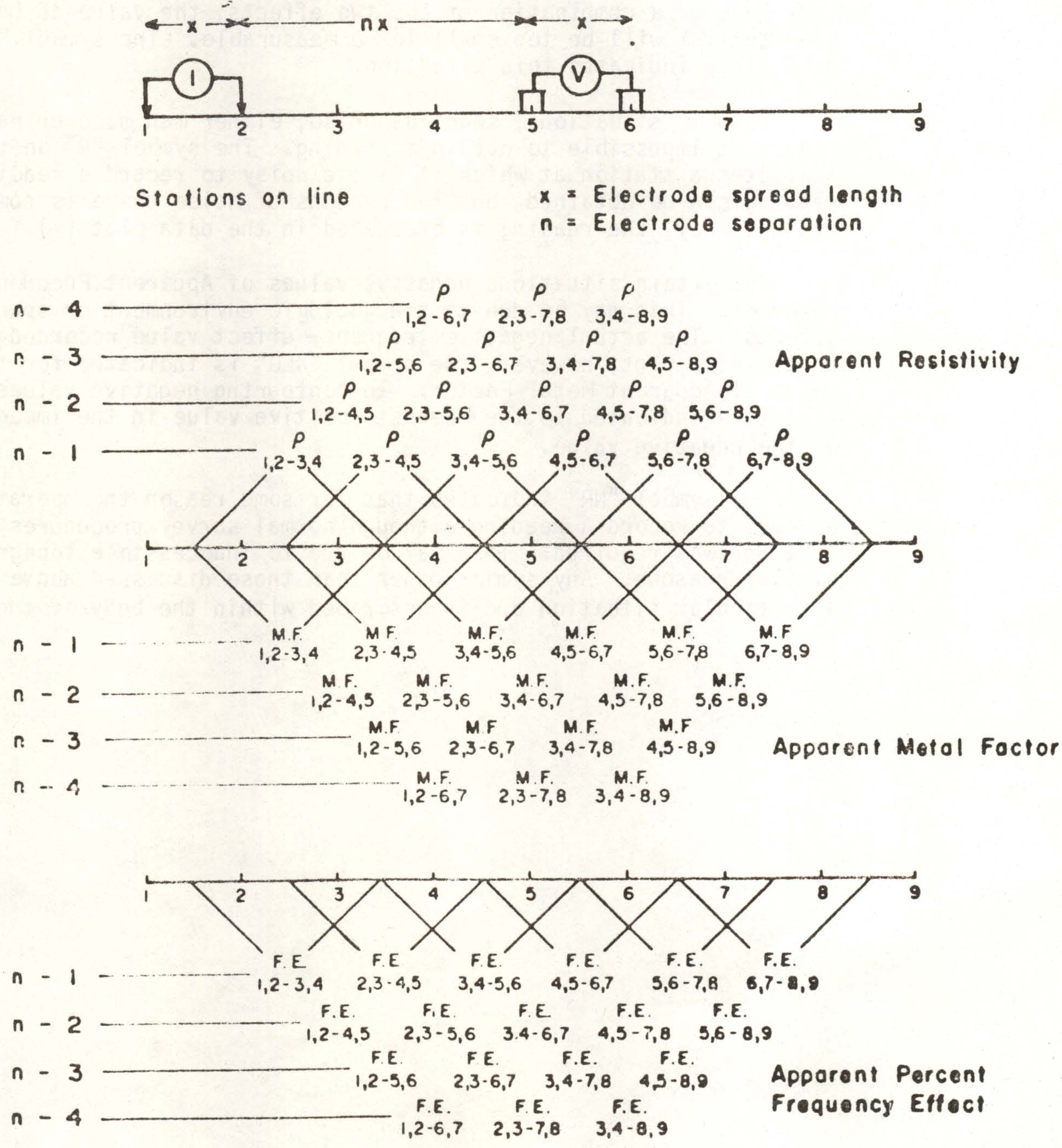

Fig. A

The IP measurement is basically obtained by measuring the difference in potential or voltage (Δv) obtained at two operating frequencies. The voltage is the product of the current through the ground and the apparent resistivity of the ground. Therefore, in field situations where the current is very low due to poor electrode contact, or the apparent resistivity is very low, or a combination of the two effects; the value of (Δv) the change in potential will be too small to be measurable. The symbol "TL" on the data plots indicates this situation.

In some situations, spurious noise, either man made or natural, will render it impossible to obtain a reading. The symbol "N" on the data plots indicates a station at which it is too noisy to record a reading. If a reading can be obtained, but for reasons of noise there is some doubt as to its accuracy, the reading is bracketed in the data plot ( ).

In certain situations negative values of Apparent Frequency Effect are recorded. This may be due to the geologic environment or spurious electrical effects. The actual negative frequency effect value recorded is indicated on the data plot; however, the symbol "NEG" is indicated for the corresponding value of Apparent Metal Factor. In contouring negative values the contour lines are indicated to the nearest positive value in the immediate vicinity of the negative value.

The symbol "NR" indicates that for some reason the operator did not attempt to record a reading although normal survey procedures would suggest that one was required. This may be due to inaccessible topography or other similar reasons. Any symbol other than those discussed above is unique to a particular situation and is described within the body of the report.

PHOENIX GEOPHYSICS, INC.

REPORT ON THE INDUCED POLARIZATION AND RESISTIVITY SURVEY

ON THE PYRAMID LAKE INDIAN RESERVATION

FOR

U.S. BUREAU OF MINES

CONTRACT NO. S0201047

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1. INTRODUCTION

Phoenix Geophysics has completed an Induced Polarization and Resistivity Survey on the Pyramid Lake Indian Reservation in Nevada under contract number S0201047 for the U.S. Bureau of Mines. The area surveyed is within T. 24 and 25 N., R. 22 E. of Washoe County.

The geological information provided indicates that a Late Cretaceous metamorphic mafic complex consisting of diorite porphyry and foliated diorite porphyry, is intruded by Tertiary granodiorite, and is overlain by undifferentiated Tertiary volcanics. Several areas of alteration have been located that contain disseminated sulphide mineralization.

An initial test survey was conducted along Lines 1 and 2 using 500 foot and 250 foot electrode spacing to determine which dipole length would be most appropriate for the entire survey; these lines crossed the known mineralization. The survey was completed with 500 foot spreads and several lines detailed with shorter intervals when a shallow response was identified.

Mr. John Reynolds, geologist for Phoenix Geophysics supervised and conducted the survey using Phoenix I.P. equipment operating at 2.5 Hz at 3 Hz. Descriptive literature on the Phoenix I.P. equipment can be obtained by writing the company.

2. PRESENTATION OF RESULTS

The Induced Polarization and Resistivity Survey results are shown on the following data plots in the manner described in the notes accompanying this report.

Line	Electrode Intervals	Drawing No.
1	500 feet	IP-U-5092-1
1	250 feet	IP-U-5092-2
1	100 feet	IP-U-5092-3
2	500 feet	IP-U-5092-4
2	250 feet	IP-U-5092-5
2	100 feet	IP-U-5092-6
3	500 feet	IP-U-5092-7
3	250 feet	IP-U-5092-8
4	500 feet	IP-U-5092-9
4	250 feet	IP-U-5092-10
5	500 feet	IP-U-5092-11
6	500 feet	IP-U-5092-12
7	500 feet	IP-U-5092-13
8	500 feet	IP-U-5092-14
9	500 feet	IP-U-5092-15

Also enclosed with this report is Dwg. I.P.P.-U-5092, a plan map of the Blizzard Camp property grid at a scale of 1" = 500 feet. The definite probable and possible Induced Polarization anomalies are indicated by bars, in the manner shown on the legend, on this plan map as well as on the data plots. These bars represent the surface projection of the anomalous zones as interpreted from the location of the transmitter and receiver electrodes when the anomalous values were measured.

Since the Induced Polarization measurement is essentially an averaging process, as are all potential methods, it is frequently difficult to exactly pinpoint the source of an anomaly. Certainly, no anomaly can be located with more accuracy than the electrode interval length; i.e. when using 500 foot electrode intervals the position of a narrow sulphide body can only be determined to lie between two stations 500 feet apart. In order to definitely locate, and fully evaluate, a narrow, shallow source it is necessary to use shorter electrode intervals. In order to locate sources at some depth, larger electrode intervals must be used, with a corresponding increase in the uncertainties of location. Therefore, while the center of the indicated anomaly probably corresponds fairly well with source, the length of the indicated anomaly along the line should not be taken to represent the exact edges of the anomalous material.

Metal Factor (MF) anomalies and percent frequency effect (PFE) are shown on the data plots. The percent frequency effect results indicate polarizable areas without taking into account the resistivity of the areas. The metal factor is obtained by combining the percent frequency effect and the resistivity. A good conductor (low resistivity) that is strongly polarizable (high PFE) will give a well-defined or "definite" metal factor anomaly. Less well-defined metal factor anomalies are designated as probable or possible.

The percent frequency effect and metal factor parameters are complementary. The relative importance of each type of information depends upon the particular geophysical environment encountered and the type of target expected. For example, a mineralized silicified zone will give a "strong" percent frequency effect anomaly, but may not give a "definite" metal factor anomaly. Alternatively, an oxidized ore zone may only give a "weak" percent frequency effect anomaly, but will give a "definite" metal factor anomaly. Since the apparent resisitivity is used in calculating the metal factor parameter, topographic effects affecting the resistivity will also affect the metal factor parameter. Thus, since hills increase the apparent resistivity they will in turn decrease the metal factor, and conversely, where valleys give rise to lower apparent resistivities the metal factor parameter will be enlarged. Judicious consideration of both the percent frequency effect and the metal factor results permits a comprehensive evaluation of the geophysical environment.

The anomalies as shown on the data plots represent the surface projection of the polarizable zones. Contacts of faults inferred from the resistivity patterns are also shown. Anomaly boundaries and fault locations should be considered accurate to the electrode interval used.

The anomalies shown on the plan map are designated apparent depths of shallow, moderate, or deep. At larger dipole separations a greater volume of rock is averaged, in lateral extent as well as depth. Thus, the source of a deep-appearing anomaly detected along a single line may be at shallow depth to one side of the line. The data plots, therefore, cannot represent true depth. Depths can be calculated from the apparent resistivity data in the case of ideal horizontal layers, but even this calculation depends on an assumed resistivity contrast between the zone at depth and the overlying rock. Although ambiguous, the following simple depth designations are useful for correlating or comparing anomalous zones obtained on adjacent survey lines.

Anomaly depth	Apparent Depth (dipole separation)	Drill Hole Depth (in dipole lenghts)
Shallow	1 - 2	1/2 - 1
Moderate	2 - 3	1 - 1 1/2
Deep	3 - 5	1 1/2 - 2+

Thus, a shallow zone is one detected at a one to two separation and should be tested by a drill hole from half-to-one dipole length deep.

3. DISCUSSION OF RESULTS

The apparent resistivity on the Blizzard Camp property exhibits quite a wide variation, from less than 50 ohm meters to greater than 2,000 ohm meters. Since the metal factor parameter is derived, in part, from resistivity, areas of low resistivity and background PFE response can produce an apparent MF anomaly in an area of non-polarizability that is equal to or greater in magnitude than an area that is polarizable. This result is easily seen on Line 1, 500 foot dipoles. The MF response on N=4 and N=5 beneath 20E to 25E is probably anomalous due to the high PFE response (3% +) but is lower in magnitude than the MF calculated on N=4 and N=5 beneath 50E to 55E where the PFE is approximately one. Thus in this report, only the areas that show an increased polarizability (increased PFE), are interpreted as anomalous.

Line 1 and Line 2 were surveyed as an initial test to determine which dipole length would be best suited for the entire area. The 500 foot data on Line 1 identifies a higher PFE response at depth than is seen on the 250 foot data. Line 2 exhibits the converse. It was, however, decided to complete the area with 500 foot dipoles, then consider detail work over areas where shallow anomalous zones were located.

Generally, an area of increased polarizability has been located on the west end of each line, at varying depths. The strongest areas of polarizability occur on Line 9, south of the initial area of interest, at depth, between 15S and 32 + 50S and from 2 + 50S to 17 + 50N. The apparent resistivity of these areas are comparatively low and may represent a rock unit similar to sample No. 5 which was laboratory tested for resistivity and PFE response (table 1).

Table 1.--Induced polarization and resistivity laboratory measurements on rock samples from Pyramid Lake copper deposit, Nevada

Sample no.	Rock description	Resistivity	Metal factor	PFE
1	Foliated diorite porphyry, no sulfides (Line 2)--------	185 ohm m.	7.0	1.3
2	Same as above with 1-2 percent pyrite and chalco-pyrite----------------------	133 ohm m.	32	4.3
3	Diorite porphyry; magnetic (Line 1)-------------------	747 ohm m.	3.8	2.8
4	Foliated diorite porphyry disseminated pyrite zone (Line 1)-------------------	616 ohm m.	6.5	4.0
5	Quartz diorite, no sulfide---------------------	90 ohm m.	22	2.0
6	Diorite with 1-2 percent disseminated pyrite (Pyrite Creek)---------------------	249 ohm m.	10	2.5

Other areas of moderately strong PFE response, located on the 500 foot dipole data, occur on:

Line 1 at depth between 12 + 50E to 22 + 50E
Line 4 at depth from 10E to 15E

Line 5 through 8 show a slightly weaker PFE response which appears to increase in magnitude with depth. These interpreted anomalies are remarkably similar in magnitude and the source may be identified by additional geological investigation and/or shallow drilling on Line 7 between 2 + 50E and 10E where this anomaly is the shallowest. It is possible that the source of these anomalies may be magnetite which is probably evident in sample number 3.

Lines 1 through 4 were detailed with 250 foot dipoles and a portion of Line 1 and Line 2 resurveyed with 100 foot intervals. The anomalous source on Lines 3 and 4 are sufficiently deep that no real change has been unidentified with the shorter electrodes. However, Line 1 and Line 2 have located definite PFE responses at shallow depth which correspond with the areas of known disseminated mineralization. The strongest shallowest anomaly occurs on Line 2 from 5E to 6E within a moderately high PFE response extending from 4 E to 8E. The known mineralized zone on Line 1 also appears as a definite anomaly on the 100 foot data between 30E and 34E. The former anomaly occurs across a more complex resistivity pattern than the latter anomaly.

Six rock samples which represent the geological environment of the Pyramid Lake Reservation have been submitted for laboratory IP measurements. The results are tabulated on table 1. Sample Nos. 2, 4, and 6 are from known sulphide zones but only the first two samples exhibit a high or anomalous PFE response; they were taken along Line 2 and Line 1, respectively. None of the survey lines crossed the third area of disseminated sulphides. The sample with the lowest measured resistivity (no. 5) and second lowest PFE is the most acidic rock (quartz diorite) submitted.

Sample No. 3 is slightly magnetic and exhibits a slightly anomalous PFE response.

4. CONCLUSIONS AND RECOMMENDATIONS

Several areas of increased polarizability have been located on the Pyramid Lake Indian Reservation which may represent zones of sulphide mineralization. The shallowest responses occur on Line 1 and Line 2 across the areas of known disseminated mineralization. Three deep zones have also been identified which may not have any surface evidence. These occur as follows:

Zone I	Line 1 from 12 + 50E to 22 + 50E and
	Line 4 from 10E to 15E
Zone II	Line 9 from 15S to 32 + 50S
Zone III	Line 9 from 2 + 50S to 17 + 50N

If geological evidence and concepts cannot determine the source of these four anomalous areas and the extent of the source, drilling is warranted and recommended to intersect the anomalous sources as follows:

Line 1 beneath 33E at depth of 100 feet
Line 2 beneath 5 + 50E at a depth of 100 feet
Line 1 beneath 17 + 50E at a depth of 600 feet to 750 feet
Line 9 beneath 25S at a depth of 600 to 750 feet
Line 9 beneath 12 + 50N at a depth of 600 to 750 feet

A reevaluation of the geophysical data may be warranted upon completion of the recommended drilling or as additional geological and geochemical data is obtained.

PHOENIX GEOPHYSICS, INC.

(signed)

Bruce S. Bell
Geologist

Dated: August 5, 1980

APPENDIX K.--METAL CONTENT OF ROCK SAMPLES FROM THE LAKEVIEW MINE AND VICINITY, PYRAMID LAKE INDIAN RESERVATION (see pl. 6 for sample locations)

[Tr, trace; Nd, none detected]

Sample no.	Description	Au		Ag		Cu		Pb		Zn		Mo	Hg	W	U	Th
		ppm	oz/ton	ppm	oz/ton	ppm	%	ppm	%	ppm	%	ppm	ppm	ppm	ppm	ppm
1	15-ft zone in sporadically altered porphyritic andesite similar to No. 2------	<0.03		0.20		40		4		45			<0.1			
2	Alteration zone (limonite) similar to other Lakeview area alteration zones. Attitude indistinct but appears to strike northeast--------------------------------	<.03		.34		58		4		130			<.1 <.1			
3	Dark gray-to-red, weathered porphyritic andesite, joint N. 25° W., 71° W.----------	.06		2.4		220		100		90			<.1			
4	Porphyritic dacite - iron-oxide stained----	<.03		.71		140		34		48			14			
5	Altered andesite porphyry in caved pit (ladder in west wall protruding above caving). Altered zone is 12 ft wide, N. 15° E., near vertical, with abundant gypsum crystals. Sample is 12-ft channel--	.38	0.01	955	27.9	300	0.03	25200	2.52	2500	0.25		10			
6	Select sample over 1.5 ft in east wall of pit at sample No. 5------------------------	.36	.01	1250	36.4	415	.04	48600	4.86	450	.045				3.3	30
7	Sericitic alteration in rhyolite porphyry with <3% disseminated sulfides. Sample from dump---------------------------------------		Tr	2.06	0.06	20		125		275					3.7	<30
8	Same as No. 7 with manganese-oxide staining-		Nd	1.71	.05	40		595		2100						
9	Select limonitic rock from dump with relict sulfides------------------------------------	.27	.008	58	1.7	240		4200	.42	9300	.93					
10	Same as No. 9, but without relict sulfides--	.20	.006	10.3	.3	90		1000	.1	2600	.2	<15			0.6	<30
11	Random chip of dark gray andesite porphyry with 5% disseminated pyrite-----------------	<.03		.44		72		16		100			<1			
12	do--	<.03		.20		94		6		108		34		<5	3.7	<30
13	Random chip of argillic alteration porphyritic andesite. Rock highly fractured-	<.03		19	.55	210			.66		.57	36		<5	3.1	<30
14	Random chip through transition zone between altered porphyritic rhyolite and altered porphyritic dacite(?)----------------------	<.03		3.2		79		930	.09		.57	<15		<5	2	50
15	7-ft chip across altered shear zone in dacite porphyry---------------------------	8.22	.24	518	15.1	100	.01		2.4	320	.03					

APPENDIX K.--METAL CONTENT OF ROCK SAMPLES FROM THE LAKEVIEW MINE AND VICINITY, PYRAMID LAKE INDIAN RESERVATION (see pl. 6 for sample locations) (cont.)

Sample no.	Description	Au		Ag		Cu		Pb		Zn		Mo	Hg	W	U	Th
		ppm	oz/ton	ppm	oz/ton	ppm	%	ppm	%	ppm	%	ppm	ppm	ppm	ppm	ppm
16	Select gray-to-white efflorescent coating 2 to 8-in.-thick on inside walls adit-----	<0.03		7.0	0.20	1100	0.11	1100	0.11		6.2	<30		<5	2.8	<30
17	do--	<.03		30.0	.87	700	.07	470	.05		3.9	<15		<5	1.9	<30
18	Chip sample of dark gray to gray-green andesite near shear zone------------------	<.03		2.2		100		350		950		23		<5	1.7	<30
19	1-ft chip across shear zone in altered dacite with vugs of quartz crystals-------	<.03		0.77		76		140		260		<15		<5	1.2	<30
20	12-ft chip of limonite zone in altered porphyritic andesite----------------------	.05		4.8	.14	190		30		470			<0.1			
21	6-ft chip across same zone as No. 20, malachite(?) stain-----------------------	<.03		1.7		790		240		460		<15		<5	0.7	<30
22	Chip sample through shear zone in altered andesite porphyry------------------------	<.03		1.6		78		53		160		28		<5	.9	<30
23	Select sample with minor galena from stockpile of dump near shear zone---------	.34	0.01	247	7.2	470			.21		0.45	<15		<5	1.1	<30
24	3-ft chip across gouge zone in pit--------	.68	.02	305	8.9	2100	.21	81000	8.1	1300	.13	18			2.4	<30
25	Select sample of altered dacite from pit--	.12		42	1.2	355		15000	1.5	480		<30			2.0	<30
26	15-ft chip across shear zone in light brown dacite-----------------------------	<.03		6.0		200		150		370		<15		<5	2.8	<30
27	9-ft chip across argillic zone at portal of adit----------------------------------	.08		34	1.0	120		60		730		<15		8	1.9	<30
28	6-ft chip across face of adit in altered andesite porphyry with limonite stringers-	.05		5.3	.15	630		570			.26	<15		<5	1.5	<30
29	Select grab of limonitic material from dump-------------------------------------	1.02	.03	329	9.6	285		21000	2.1	210		<30		<5	1.1	<30
30	Altered blue-gray andesite porphyry-------	<.03		.45		190		12		103			<.1			
31	6-ft chip across silicified zone in fine-grained tuff(?) with very finely disseminated pyrite----------------------	.05		7.6	.22	240		15		10		23	.1			
32	Decomposed rock from alteration zone in pit. Material is tan-to-purple and contains gypsum------------------------	.05		.52		94		20		20		8	.3			

APPENDIX K.--METAL CONTENT OF ROCK SAMPLES FROM THE LAKEVIEW MINE AND VICINITY, PYRAMID LAKE INDIAN RESERVATION (see pl. 6 for sample locations)(cont.)

Sample no.	Description	Au ppm	Au oz/ton	Ag ppm	Ag oz/ton	Cu ppm	Cu %	Pb ppm	Pb %	Zn ppm	Zn %	Mo ppm	Hg ppm	W ppm	U ppm	Th ppm
33	Altered porphyritic andesite dike (N. 65° E. and vertical) with limonite stain and calcite------------------------------	<0.03		2.1	0.06	110		32		63			<0.1			
34	Porphyritic andesite---------------------	<.03		0.70		72		24		85			<.1			
35	White quartz-bearing unit sampled in contact with porphyritic andesite, contact N. 70° E. and vertical-----------	<.03		.35		86		16		20		10	<.1			
36	Sample from limonite zone in west side of pit---------------------------------------	<.03		.30		98		16		59		5	<.1			
37	Unaltered dark gray porphyritic andesite. Plagioclase phenocrysts average 1.5 x 0.25 cm----------------------------------	<.03		.68	.02	180		18		50		17	<.1			
38	Highly altered zone of white, yellow, and limonitic material exposed by 12-ft diameter pit. Sample is over 6 ft wide. Structure trends N. 70° W., 75° N. and beneath overburden to the south----------	.68	0.02	575	16.8	150		3880	0.39	1300	0.13	42	.5			
39	Select of black limonitic material from area of sample No. 38. Surrounding rock is porphyritic andesite float of quartz latite porphyry-------------------------	.05		3.7	.1	245		9000	.90	3900	.39	66	1.0			
40	Select limonitic material from stockpile-	.68	.02	89	2.6	430		36000	3.6	1400	.14	<30		<5	1.3	<30
41	6-ft channel across stockpile------------	.68	.02	110	3.2	175		14000	1.4	280		<30		8	2.0	<30
42	Select grab of limonite material from stockpile--------------------------------	1.03	.03	453	13.2	520			7.0	590		<30		<5	3.9	
43	Chip across limonite zone in altered rhyolite--------------------------------	.06		.68	.02	34		60		190		8		<0.1		
44	Random grab of orange and white welded tuff---------------------------------------	<.03		<.03		10		<30		<30				<5	0.91	<30
45	Random grab of weathered, orange and white tuff------------------------------	<.03		.10		10		<30		80		<30		<5	1.5	<30
46	Iron-oxide-stained rhyolite outcrop, attitude N. 45° E, 40° NW-----------------	<.03		.16		22		2		23			<.1			
47	Random grab of tuff-----------------------	.03		.21		10		<30		70		<30		<5	1.7	30

APPENDIX L.--METAL CONTENT OF SOIL SAMPLES FROM THE LAKEVIEW MINE AND VICINITY, PYRAMID LAKE INDIAN RESERVATION (see pl. 6 for location)

Line no.	Sample no.	All values in ppm				
		Au	Ag	Cu	Pb	Zn
1	1	<0.03	12.0	71	27	88
1	2	<.03	1.5	62	26	82
1	3	<.03	0.76	73	23	88
1	4	<.03	1.0	76	25	88
1	5	<.03	.93	84	<15	69
1	6	<.03	1.48	68	<15	72
1	7	<.03	.90	78	23	72
1	8	<.03	.45	91	<15	67
1	9	<.03	.87	110	27	84
1	10	<.03	1.1	94	51	120
1	11	<.03	1.1	78	100	170
1	12	<.03	2.8	98	350	280
1	13	<.03	9.6	100	850	270
1	14	<.03	.62	85	130	110
1	15	<.03	.54	73	38	89
1	16	<.03	1.3	64	32	82
1	17	<.03	.57	65	52	89
1	18	<.03	.61	70	55	90
1	19	<.03	.67	77	57	91
1	20	<.03	.64	89	54	93
1	21	<.03	.53	79	36	88
1	22	<.03	.55	77	51	85
1	23	<.03	.51	88	42	85
1	24	<.03	.31	88	23	76
1	25	<.03	.31	85	32	83
1	26	<.03	.28	84	23	75
1	27	<.03	.34	82	20	75
1	28	<.03	.28	86	19	79
1	29	<.03	.38	81	42	84
1	30	<.03	.28	89	20	74
2	1	<.01	.21	240	18	100
2	2	<.01	.14	200	18	100
2	3	<.01	.14	160	21	94
2	4	<.01	.62	180	53	100
2	5	<.01	2.67	190	130	250
2	6	<.01	.65	320	37	130
2	7	<.01	.24	300	26	110
2	8	.03	.21	190	31	100
2	9	<.01	.27	170	31	100
2	10	<.01	.31	130	31	110
2	11	<.01	.41	100	26	96
2	12	<.01	.82	120	32	100
2	13	<.01	15.46	120	110	210
2	14	.03	1.58	120	54	100

APPENDIX L.--METAL CONTENT OF SOIL SAMPLES FROM THE LAKEVIEW MINE AND VICINITY, PYRAMID LAKE INDIAN RESERVATION (see pl. 6 for location)(cont.)

Line no.	Sample no.	All values in ppm				
		Au	Ag	Cu	Pb	Zn
2	15	<0.01	2.13	110	66	130
2	16	<.01	3.81	110	93	170
2	17	<.01	3.63	120	95	210
2	18	<.01	1.99	100	88	170
2	19	<.01	1.54	100	97	180
2	20	<.01	1.71	100	100	180
2	21	<.01	1.06	100	64	120
2	22	<.01	1.17	110	72	140
2	23	<.01	.79	100	54	97
2	24	.02	.65	86	33	58
2	25	<.01	.41	100	28	63
2	26	<.01	.41	95	30	69
2	27	<.01	.48	89	28	60
2	28	<.01	.48	100	28	99
2	29	<.01	.58	95	33	88
2	30	.01	.31	100	28	98
2	31	<.01	.69	110	28	95
2	32	.03	.59	100	30	100
2	33	<.03	.49	100	18	110
2	34	<.03	.78	100	<15	130
2	35	<.03	4.5	100	30	160
2	36	<.03	.94	100	<15	120
2	37	<.03	.44	100	15	110
2	38	<.03	.54	110	<15	110
2	39	<.03	.51	110	<15	110
2	40	<.03	.52	110	<15	100
2	41	<.03	.38	110	15	100
2	42	<.03	.48	100	<15	110
3	1	<.03	1.4	150	96	195
3	2	<.03	2.7	150	170	214
3	3	.05	1.9	180	205	290
3	4	<.03	3.2	200	240	250
3	5	<.03	2.1	100	325	300
3	6	<.03	2.7	135	265	300
3	7	.09	11.2	140	3380	1200
3	8	.05	10.0	185	4185	3000
3	9	<.03	2.7	345	265	650
3	10	<.03	3.9	200	300	520
3	11	.03	4.5	140	230	400
3	12	.03	22.0	130	850	550
3	13	.08	3.8	130	800	700
3	14	.12	7.0	98	1150	850
3	15	.03	4.6	98	720	800

APPENDIX L.--METAL CONTENT OF SOIL SAMPLES FROM THE LAKEVIEW MINE AND VICINITY, PYRAMID LAKE INDIAN RESERVATION (see pl. 6 for location)(cont.)

Line no.	Sample no.	All values in ppm				
		Au	Ag	Cu	Pb	Zn
3	16	0.03	2.0	90	260	320
3	17	.03	0.15	46	14	115
3	18	.03	1.4	46	84	105
3	19	.12	.61	80	54	115
3	20	.03	.89	90	80	135
3	21	.03	1.4	88	105	270
3	22	.10	.69	60	40	150
3	23	.12	2.8	100	70	115
3	24	.07	.71	82	88	165
3	25	.11	2.7	86	98	155
3	26	<.03	3.4	78	82	115
3	27	.03	1.9	78	120	215
3	28	--	--	--	--	--
3	29	.03	2.4	92	64	179
3	30	.06	2.1	92	36	93
3	31	<.03	.70	74	24	80
3	32	<.03	.55	78	32	79
3	33	.30	3.2	94	30	95
3	34	<.06	7.2	98	32	125
3	35	<.03	1.8	90	145	410
3	36	<.06	1.4	110	40	85
3	37	<.06	.72	170	20	56
3	38	.06	.60	130	26	70
3	39	<.06	1.3	160	16	70
3	40	<.06	.76	150	20	73
3	41	.10	.54	145	20	75
3	42	<.03	.48	90	24	73
3	43	<.03	.39	80	14	60
3	44	<.03	.26	62	12	58
3	45	<.03	.33	72	16	65
3	46	<.06	.36	66	10	50
3	47	<.03	.38	86	20	75
3	48	<.03	.31	72	16	65
3	49	<.10	.61	100	12	70
3	50	<.09	3.0	70	14	60
3	51	<.06	.32	80	20	55
3	52	<.12	.88	98	26	85
3	53	<.06	.60	90	44	105
3	54	<.12	.56	110	20	70
3	55	<.03	.16	105	20	75
3	56	<.03	.44	130	60	150
3	57	<.03	.45	120	36	103
3	58	<.03	.34	125	28	105
3	59	<.12	.60	115	26	90
3	60	<.06	.42	110	24	90
3	61	<.03	.76	105	30	81
3	62	<.03	.38	105	20	85

APPENDIX L.--METAL CONTENT OF SOIL SAMPLES FROM THE LAKEVIEW MINE AND VICINITY, PYRAMID LAKE INDIAN RESERVATION (see pl. 6 for location)(cont.)

Line no.	Sample no.	All values in ppm				
		Au	Ag	Cu	Pb	Zn
3	63	<0.03	0.40	90	32	55
3	64	<.03	1.0	50	16	50
3	65	.03	.25	78	18	43
3	66	<.03	.50	68	22	41
3	67	<.03	.55	14	20	75
3	68	<.03	.50	190	18	77
3	69	<.03	.42	175	14	76
3	70	<.03	.40	160	20	75
3	71	<.03	.36	150	18	62
3	72	<.03	.45	160	24	80
3	73	<.03	.45	150	20	80
3	74	<.03	.48	155	20	77
3	75	<.03	1.60	130	32	85
4	1	.14	.56	70	44	100
4	2	<.03	.60	68	50	100
4	3	<.03	.58	66	56	110
4	4	<.03	.62	70	56	110
4	5	<.03	.63	76	120	220
4	6	.03	.71	70	165	280
4	7	<.06	1.00	84	190	290
4	8	<.03	1.10	88	230	290
4	9	.03	.45	88	32	105
4	10	.03	.40	70	36	90
4	11	<.03	12.0	104	110	300
4	12	<.03	.90	90	34	110
4	13	<.03	.62	72	50	133
4	14	<.03	.59	66	40	125
4	15	<.03	.85	76	50	160
4	16	<.03	1.3	90	40	145
4	17	.03	.85	66	38	95
4	18	<.03	1.2	70	46	155
4	19	<.03	.60	80	36	120
4	20	<.03	.49	74	30	93
4	21	<.03	.26	42	14	50
4	22	<.03	.60	76	22	80
4	23	<.03	.48	66	14	65
4	24	<.03	.50	68	16	85
4	25	<.03	.65	60	16	79
4	26	<.03	.68	70	20	110
4	27	<.03	.74	66	24	80
4	28	<.03	.65	70	16	75
4	29	<.03	.65	70	24	84
4	30	<.03	.64	66	18	77
4	31	<.03	.60	70	18	70
4	32	<.03	.65	76	20	92
4	33	<.03	.85	86	134	130

APPENDIX L.--METAL CONTENT OF SOIL SAMPLES FROM THE LAKEVIEW MINE AND VICINITY, PYRAMID LAKE INDIAN RESERVATION (see pl. 6 for location)(cont.)

Line no.	Sample no.	All values in ppm				
		Au	Ag	Cu	Pb	Zn
4	34	<0.03	0.70	80	20	97
4	35	<.03	.75	76	24	155
4	36	<.03	.66	70	22	81
4	37	<.06	.50	66	20	67
4	38	<.09	1.20	90	30	95
4	39	<.06	4.80	66	20	66
4	40	<.06	2.20	70	28	79
4	41	<.06	.80	82	14	85
4	42	<.08	1.7	105	16	94
4	43	<.06	.68	110	22	110
4	44	<.03	.69	108	20	75
4	45	<.03	.46	98	18	73
4	46	<.03	.65	96	26	88
4	47	<.06	.60	100	22	120
4	48	<.06	.68	100	26	120
4	49	<.03	.76	110	40	163
4	50	.03	.80	110	102	250
4	51	<.03	.74	100	66	125
4	52	<.06	.90	88	44	115
4	53	<.03	.32	98	42	105
4	54	.04	.34	125	32	182
4	55	<.03	.15	100	28	110
4	56	<.03	.25	90	30	91
4	57	<.03	4.50	90	28	97
4	58	.05	1.00	86	30	90
4	59	<.03	.50	90	24	80
4	60	.05	.45	90	22	74
4	61	<.06	.96	92	20	94
4	62	<.06	1.80	90	24	89
4	63	<.03	.40	76	20	83
4	64	<.06	.90	100	26	100
4	65	<.06	1.00	94	30	80
4	66	<.12	1.4	90	18	78
4	67	.09	.53	90	20	85
4	68	<.12	.16	90	20	85
4	69	<.12	.22	90	20	95
4	70	<.12	.96	170	24	100

APPENDIX M.--ANALYTICAL RESULTS OF HIGH ALUMINA CLAYS, PYRAMID LAKE INDIAN RESERVATION
(see pl. 3 for sample locations)

Sample no.	Description	Oxide percent Al_2O_3	SiO_2	Fe_2O_3	MgO	P_2O_5
1	Iron-oxide-stained clay as talus, no thickness measured----------------	18.3	56.0	6.19	0.55	0.05
2	35-ft exposure of very competent white, firm clay, not too fractured. White zone sampled is 19 ft thick, below and above are iron-rich clays, N. 30° W., 15° E.(?)-----------------	16.4	64.0	3.04	.50	.01
3	Gray-to-white clay in thick exposure-	11.7	70.5	2.04	.50	.10
4	Gray clay, good exposure but no measured thickness--------------------	14.1	70.5	2.72	.36	.11
5	Dark red-brown ferruginous clay, in part hard and brittle, some places poorly consolidated. Hard pieces have trace of ash or tuff-like qualities. Incompletely altered to clay. 25 ft exposed-----------------	19.8	53.5	6.33	.68	.06
6	Medium tan, competent and brittle clay. Weathers to darker tan, 25 to 30 ft exposed------------------------	18.9	58.0	5.05	.48	.07
7	Light brown to tan, firm clay, about 30 ft exposed------------------------	15.5	64.0	3.62	.46	.41
8	White, grey, tan, heavy limonite-stained clay in three zones 0.1-1 in. thick. N. 5° E. 23° E. at least 35 ft of thickness exposed-----	34.0	47.0	2.04	.30	.11

APPENDIX M.--ANALYTICAL RESULTS OF HIGH ALUMINA CLAYS, PYRAMID LAKE INDIAN RESERVATION (see pl. 3 for sample locations)(cont.)

Sample no.	Description	Oxide percent				
		Al_2O_3	SiO_2	Fe_2O_3	MgO	P_2O_5
9	Approximately 150-ft exposed thickness of light cream through orange halloysite(?). Strike N. 5° W., 20° E.--------------------	30.2	46.0	4.76	0.50	0.32
10	White, orange, mixed clays; at least 100 ft of thickness exposed. N. 5° W. 20° E. diatomite bed near the top of section------------------	29.3	46.0	5.62	.60	.69
11	White, gray, tan clay with heavy limonite staining in three zones 0.1-1 in. thick. N 5° E., 23 ° E. at least 35 ft of thickness exposed-----	22.7	45.0	10.5	.63	.14
12	Similar clay, but less friable than No. 11, topographically higher than adjacent sample, faulting(?)----	38.7	43.0	2.61	.58	.08
13	Light gray, hard, brittle, non-calcerous, well fractured halloysite(?) in blocky pieces, N. 10° E., 20° E.. Thickness exposed is about 25 ft. Diatomite bed above clay-------------------------------	34.0	47.0	6.62	.50	.55
14	Same stratigraphic zone as No. 11 and 200 yds away, but differs greatly. Very hard, dark gray tuff(?), with some color banding------------------	17.4	70.5	0.83	.20	.01
15	Same zone as No. 14 with diatomite and clay zones----------------------	17.4	50.0	2.90	1.14	.01

APPENDIX M.--ANALYTICAL RESULTS OF HIGH ALUMINA CLAYS, PYRAMID LAKE INDIAN RESERVATION
(see pl. 3 for sample locations)

Sample no.	Description	Oxide percent				
		Al_2O_3	SiO_2	Fe_2O_3	MgO	P_2O_5
16	Same as No. 11, 50-ft pink to light gray to red-brown, well-fractured, hard blocky clay bed exposed in cliff. No diatomite seen, N. 10° W., 15° E. Clays extend from top of hill to railroad tracks------------------------	33.1	44.0	4.62	0.78	0.33
17	Good quality clay, weathers tan, very poor exposures, friable, slightly calcareous. 20 ft exposed on hillside-	35.9	40.5	8.48	.31	.03
18	Altered tuffs, white-to-tan-to-dark red brown. Head of drainage-----------	34.9	36.5	11.8	.52	.65
19	Green-to-tan, very soft, small exposure of clay derived from altered or weathered tuff; retains visual properties of tuff---------------------	33.6	37.5	13.1	.35	.61
20	White-to-medium-gray clays, hard and brittle, soft and chalky when weathered. Three small patches exposed in this drainage, each 30 x 30 ft----------------------------------	15.7	63.0	2.90	1.04	.02

Plate 1 - Stream Sediment Sample Location Map, Pyramid Lake Indian Reservation
(See Appendix C for Sample Results).

3720 0082

Plate 2 - Stream Sediment Anomaly Map, Pyramid Lake Indian Reservation.

Plate 3 - Rock, Clay, and Water Sample Locations, and Detailed Figure Index, Pyramid Lake Indian Reservation (See Appendicies C,D and M).

3720 0082

319-A Item 2

(Plate 3 of 6)

Plate 4 - Geology, Mine Workings, Sample Locations and Detailed Figure Locations of the Packard and Sano Properties, Pyramid Lake Indian Reservation (See Appendix H for Sample Results).

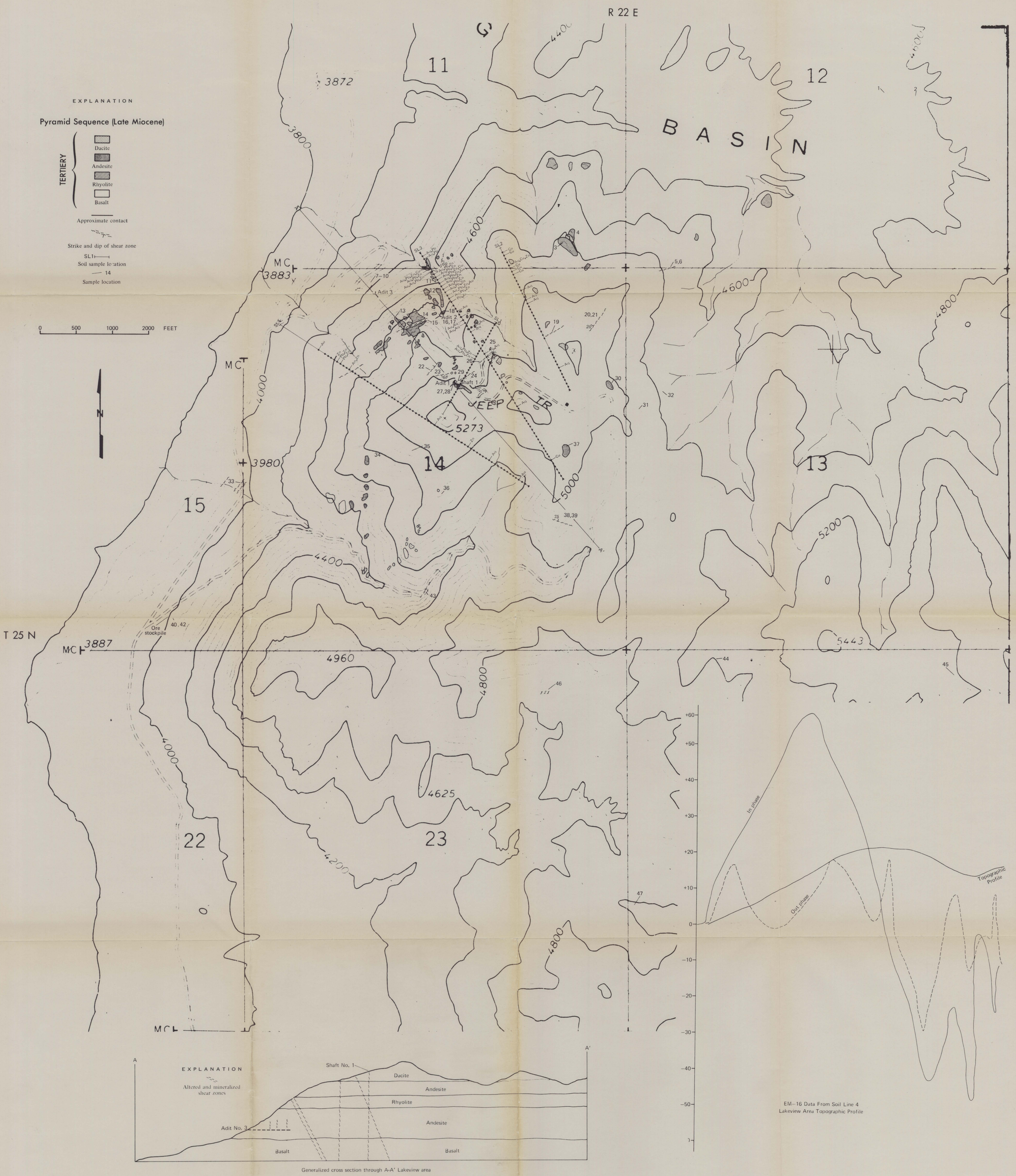
3720 0082

319-A Item 2 (Plate 4 of 6)

319 A

Plate 5-Geology and Sample Location Map, Pyramid Lake Copper Deposit, Pyramid Lake Indian Reservation
(See Appendix G for Whole Rock Analyses, and Appendix I for Sample Results).

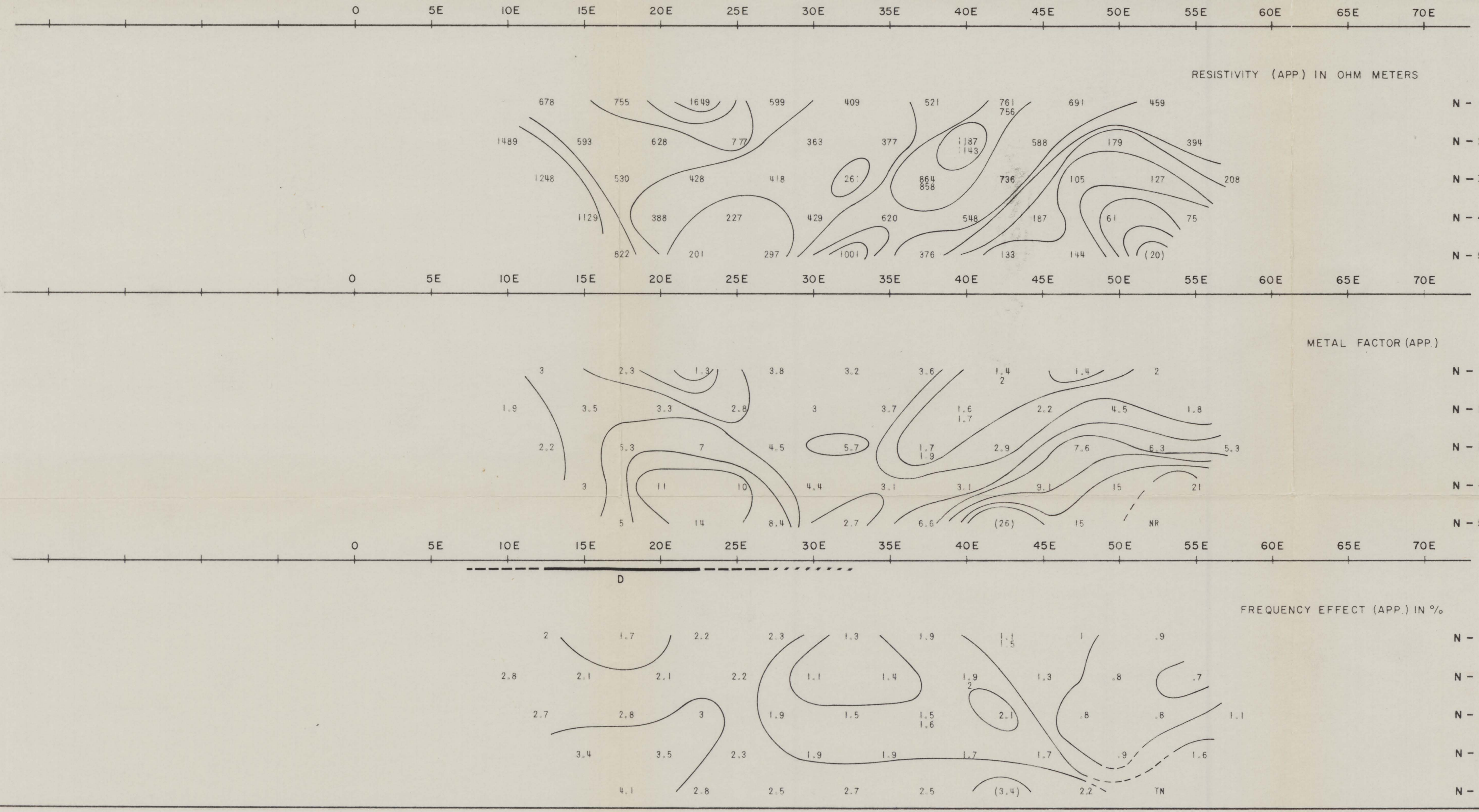
3720 0082



3720 0082

Plate 6 - Geology, Mine Workings, Soil and EM-16 Lines, and Sample Locations, Lakeview Mine, Pyramid Lake Indian Reservation (See Appendicies K and L).

319-A Item 2
(Plate 6 of 6)



3720 0082 (314A) Item 2

DWG. NO. - I. P. - U - 5092 - I (1 of 15)

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - I

ELECTRODE CONFIGURATION

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED: JUNE 1980

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1, -1.5-2, -3 -5 -7.5 -10

APPROVED

DATE: 7/24/85

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

3720 0082 DWG. NO. - I.P. - U-5092-2

319-A Item 2 (2 of 15)

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 1

ELECTRODE CONFIGURATION

X — NX — X

PLOTTING POINT → X = 250 FT

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED: JUNE 1980

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1 - 1.5 - 2 - 3 - 5 - 7.5 - 10

APPROVED

DATE 7/24/80

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

319-A Item 2 (3 of 15)

3720 0082 DWG. NO. - I. P. - U - 5092 - 3

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 1

ELECTRODE CONFIGURATION

X — NX — X

PLOTTING POINT X = 100 FT

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED JUNE 1980

APPROVED

NOTE CONTOURS AT LOGARITHMIC INTERVALS 1, -1.5-2.-3.-5-7.5-10

DATE 7/24/80

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

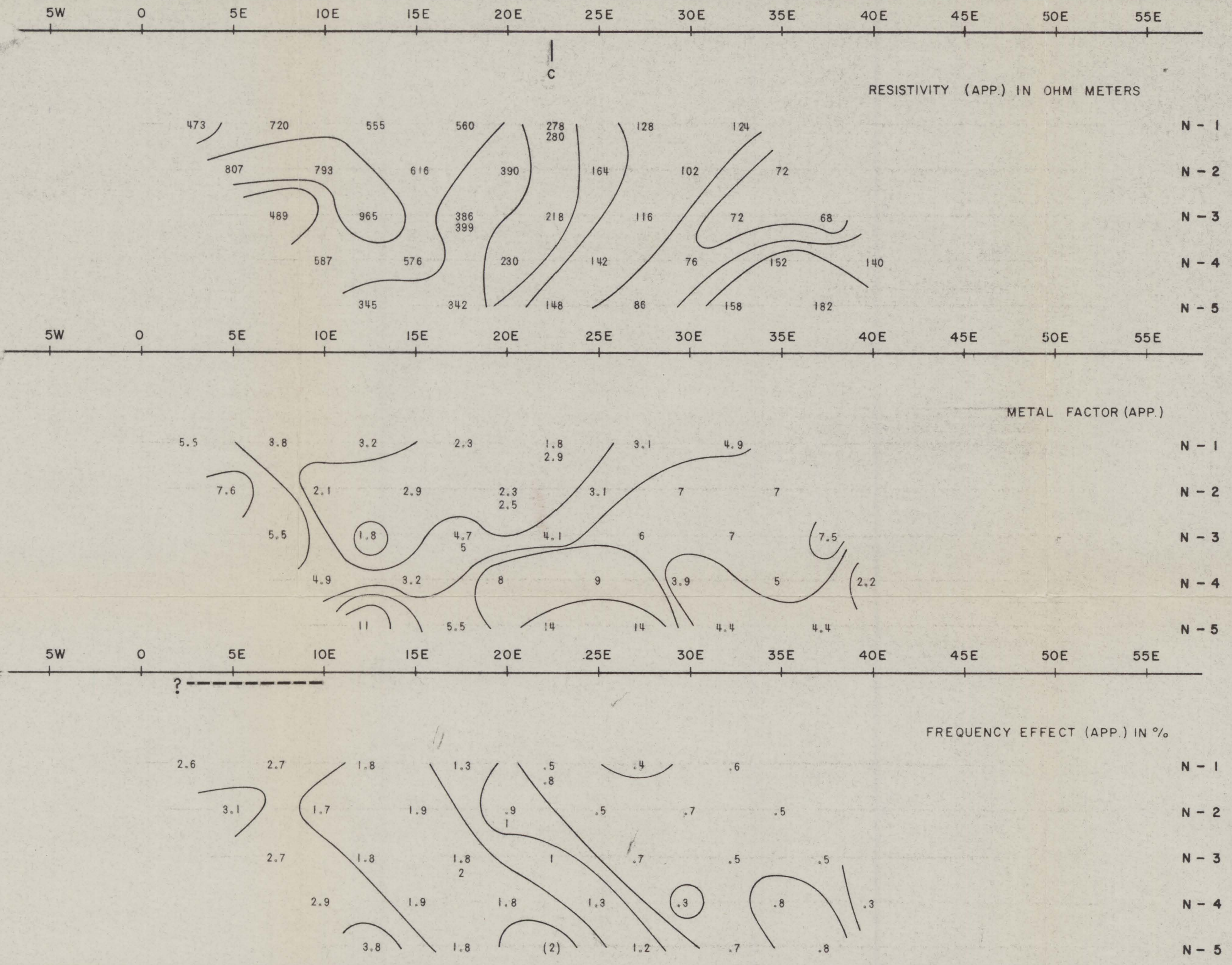
3720 0082

DWG. NO. - I. P. - U-5092-4 (4 of 15)

319-A Item 2

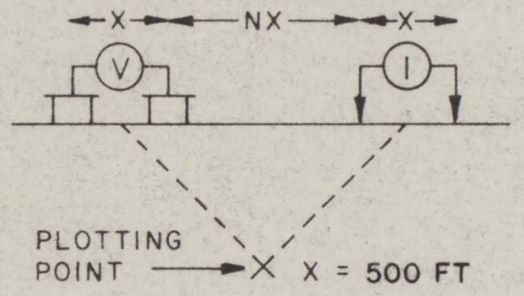
UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA



LINE NO. - 2

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3-5-7.5-10

DATE SURVEYED: JUNE 1980

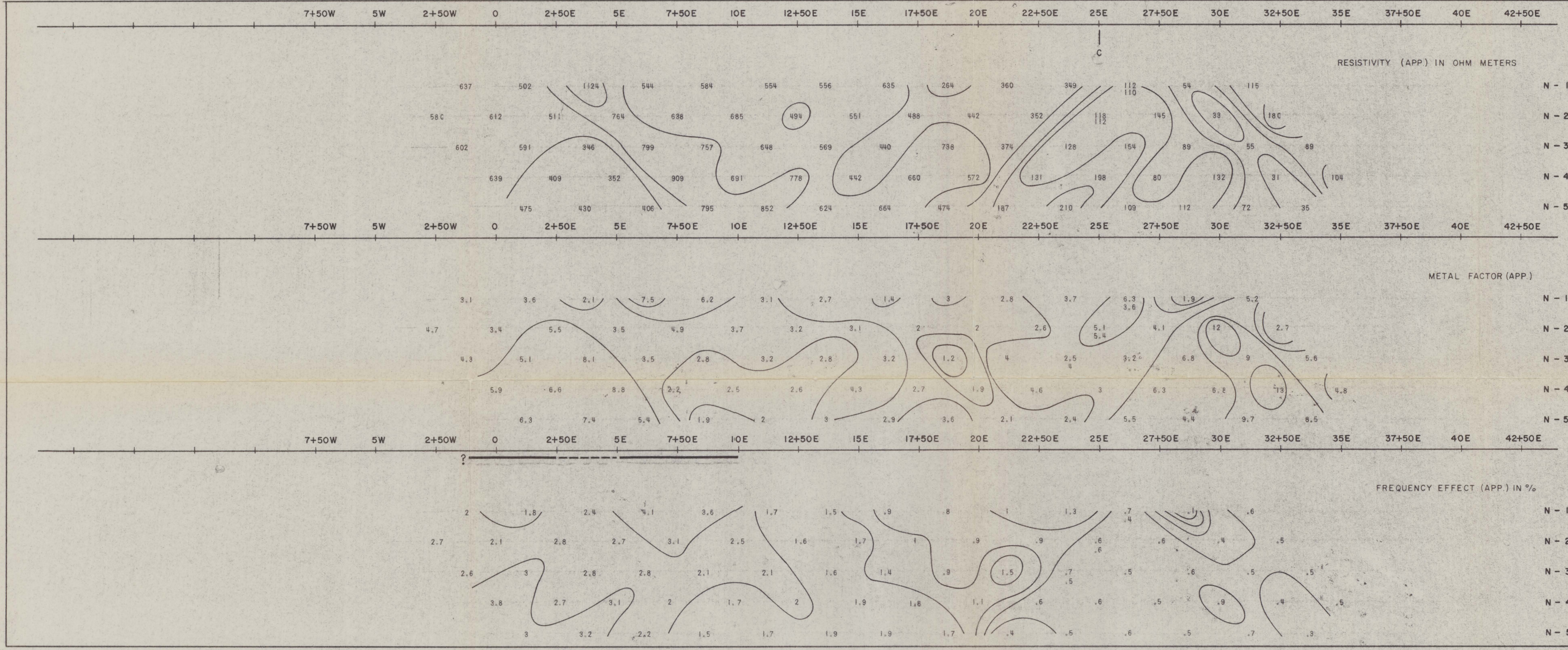
APPROVED: [signature]

DATE: 7/24/80

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

319-A Item 2
(5 of 15)



3720 0082

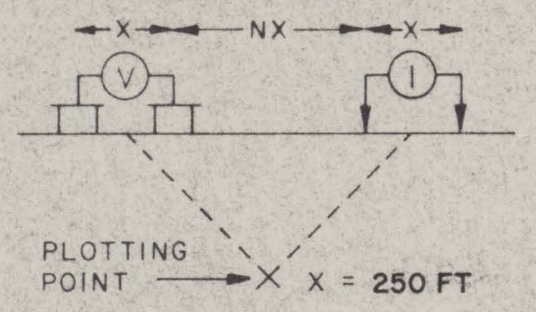
DWG. NO. - I. P. - U - 5092 - 5

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 2

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED: JUNE 1980

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1, -1.5 -2, -3 -5 -7.5 -10

APPROVED

DATE: 7/25/80

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

(319-A) Item 2
(6 of 15)

DWG. NO. - I. P. - U - 5092 - 6

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 2

ELECTRODE CONFIGURATION

X — NX — X

PLOTTING POINT → X = 100 FT

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED: JUNE 1980

APPROVED

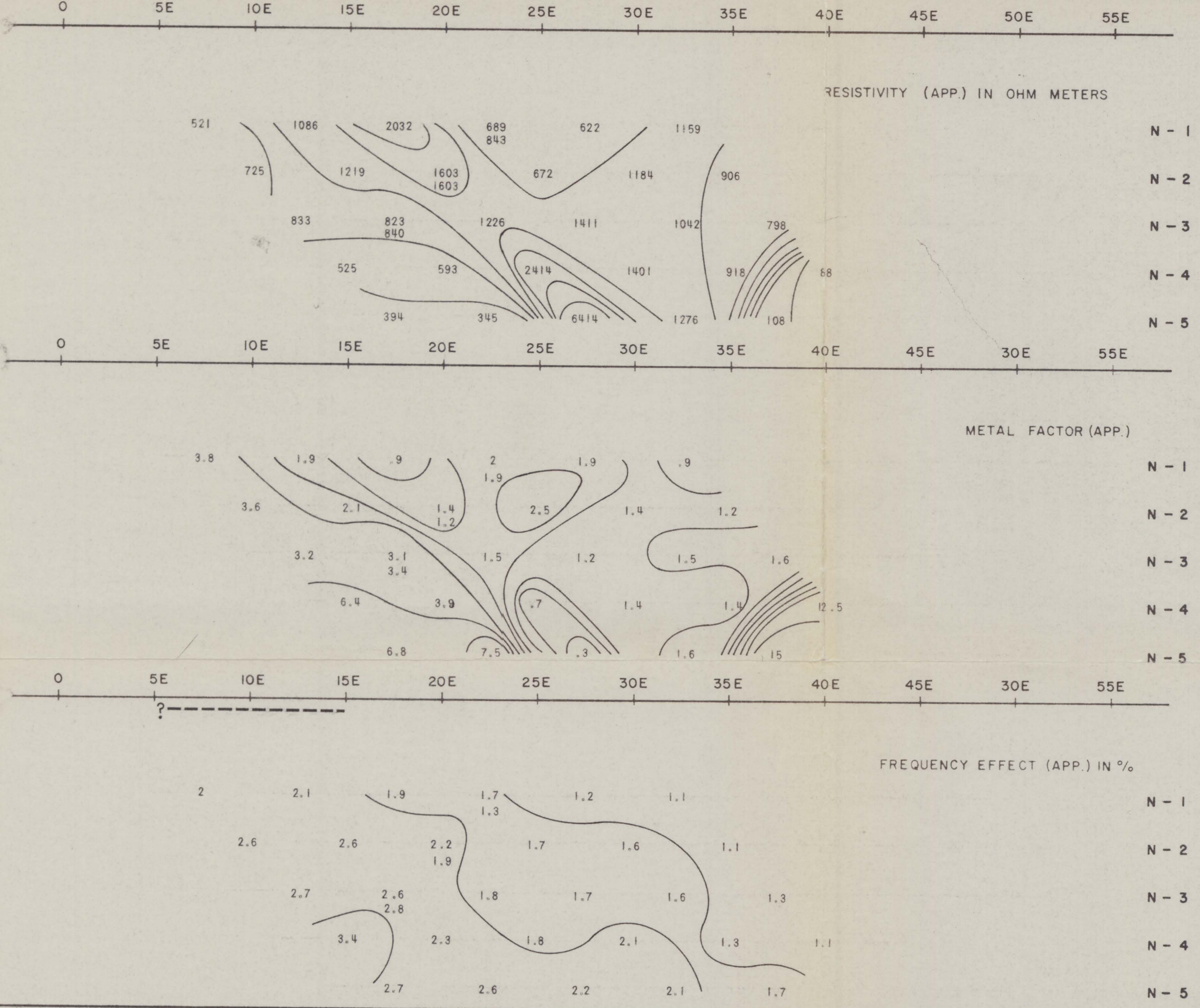
DATE: 7/24/80

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1, -1.5-2,-3,-5,-7.5,-10

3720 0082

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY



3720 0082

(319-A) Item 2

DWG. NO. - I. P. - U - 5092 - 7

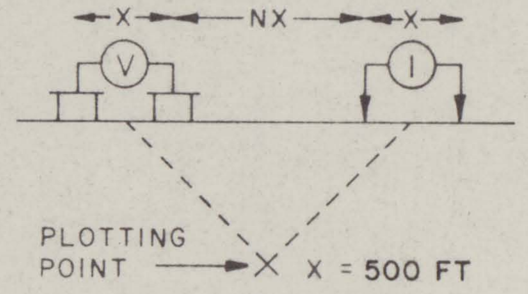
(7 of 15)

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 3

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED JUNE 1980

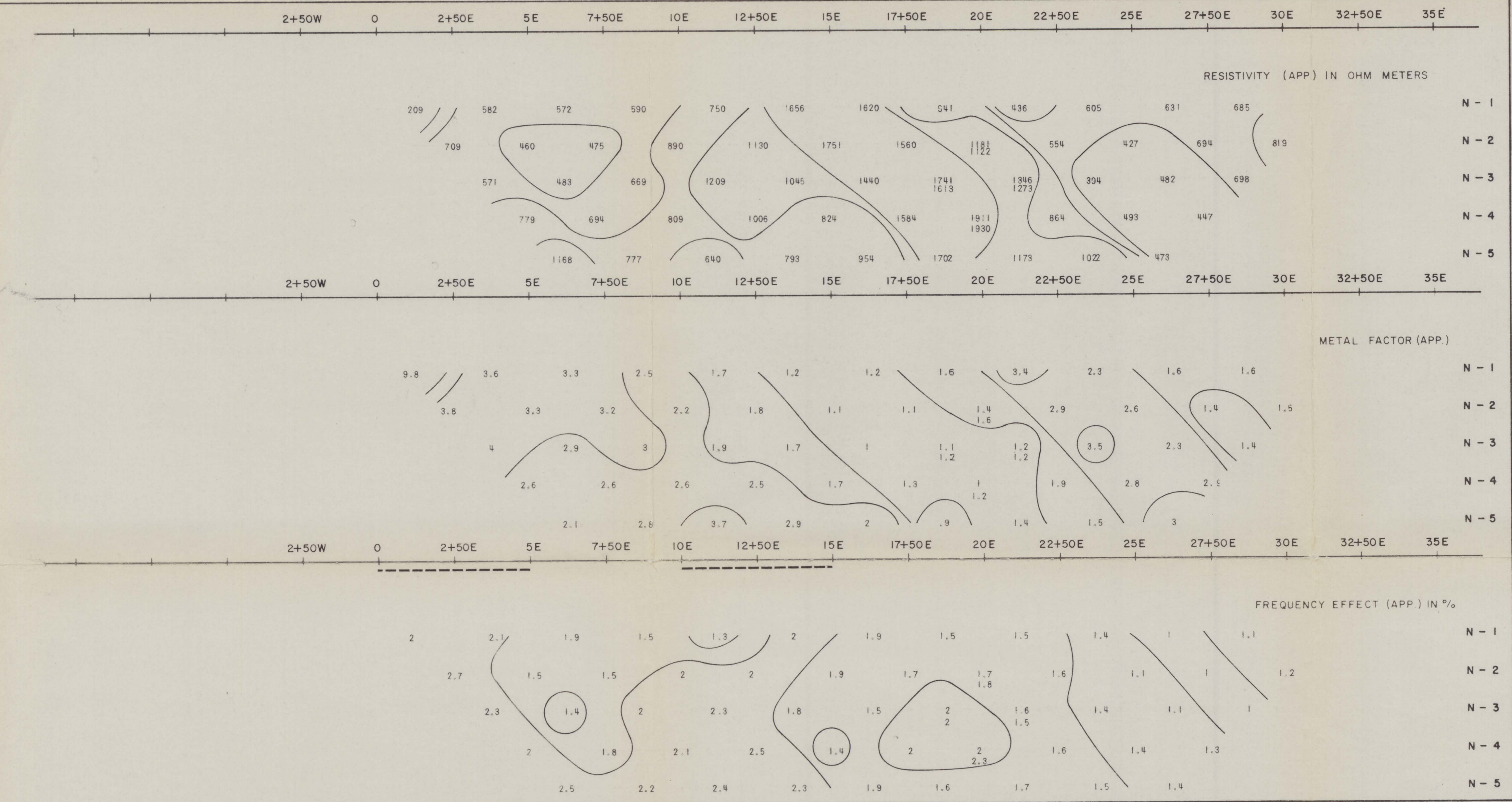
APPROVED

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1. - 1.5 - 2. - 3 - 5 - 7.5 - 10

DATE: 7/24/80

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY



3720 0082

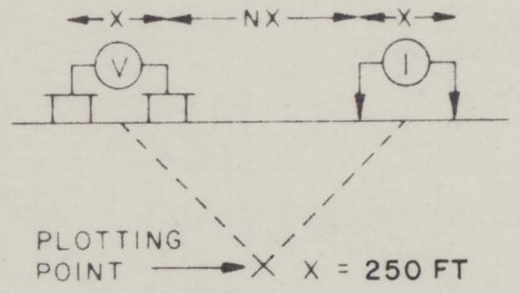
DWG. NO. - I. P. - U - 5092 - 8 (319-A) Item 2 (8 of 15)

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 3

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED JUNE 1980

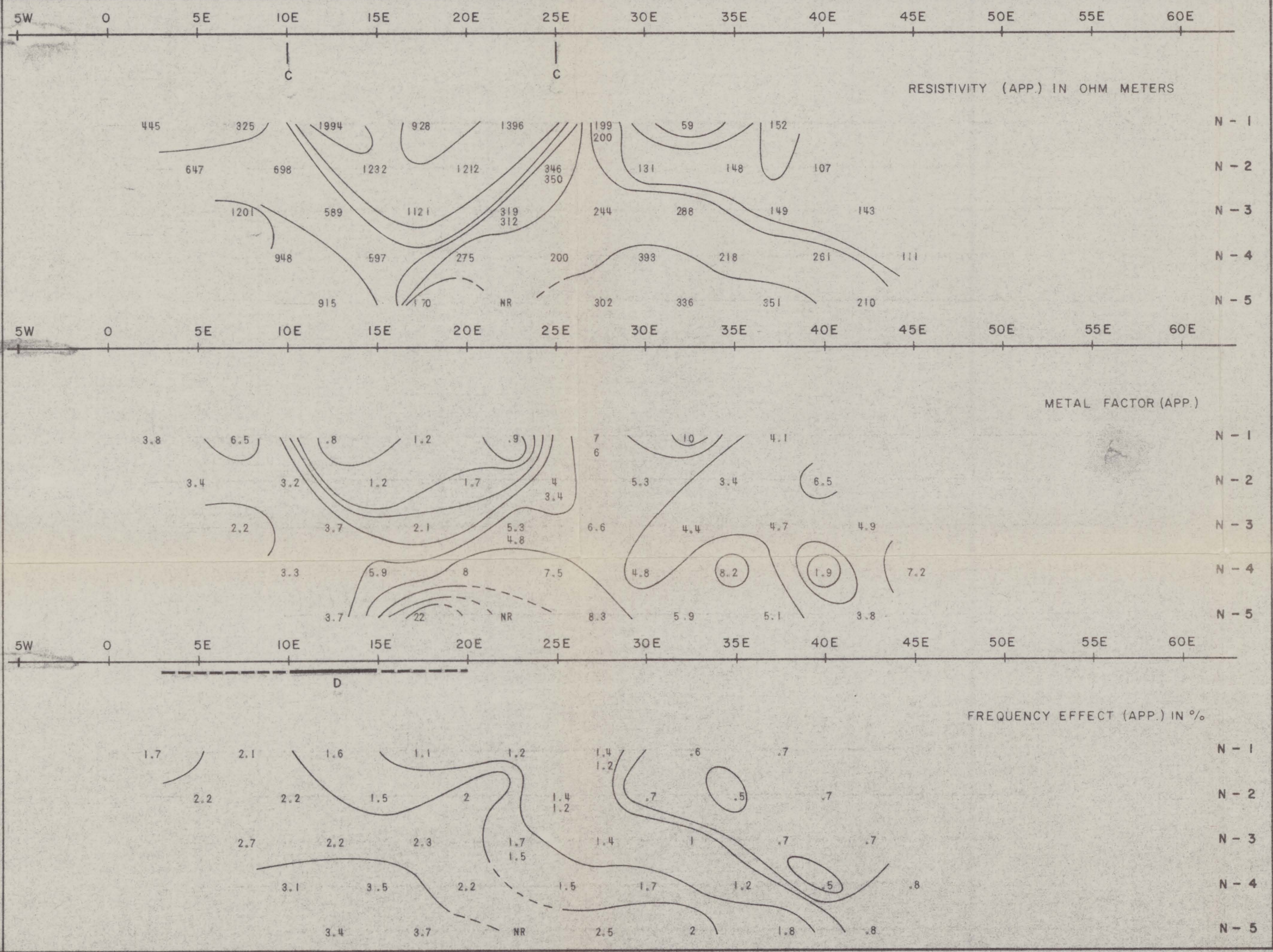
APPROVED

DATE 7/24/80

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1 - 1.5 - 2. - 3 - 5 - 7.5 - 10

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY



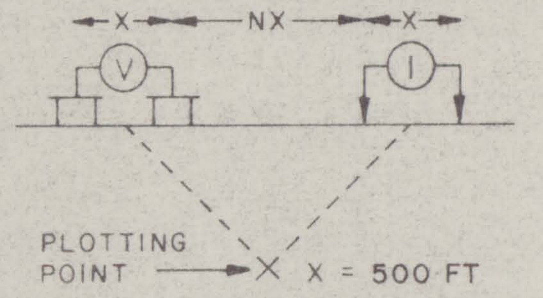
3720 0082 DWG. NO. - I. P. - U-5092-9

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 4

ELECTRODE CONFIGURATION



PLOTTING POINT → X X = 500 FT

SURFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED JUNE 1980

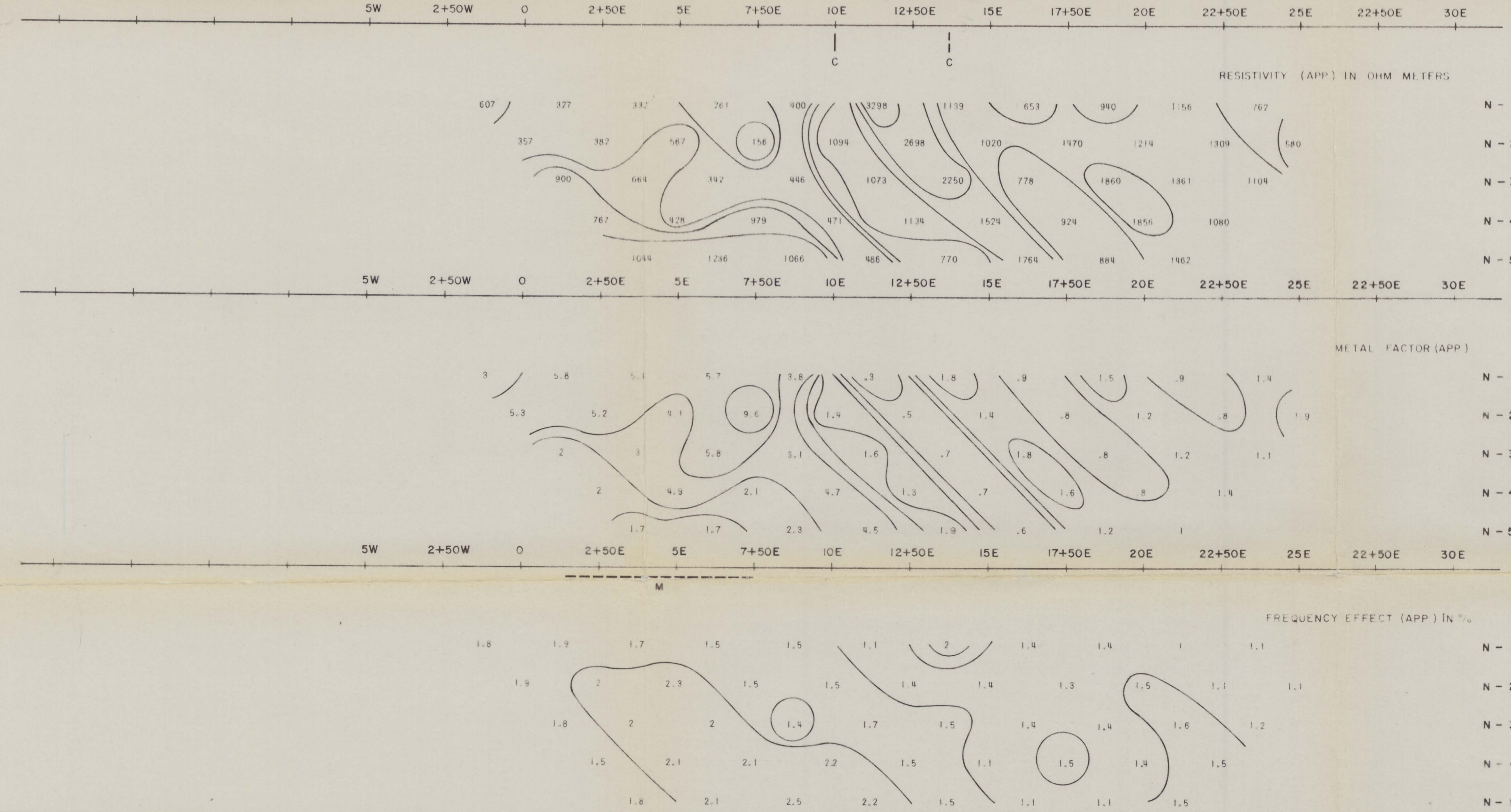
APPROVED

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3-5-7.5-10

DATE: 7/25/80

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY



3720 0082

(319-A) Item 2

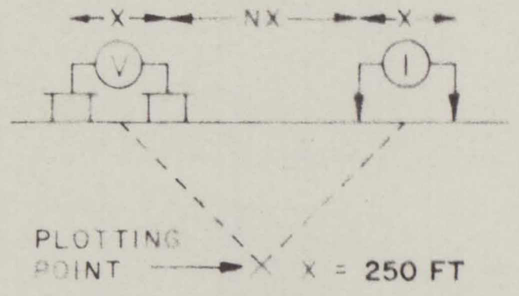
DWG. NO. - I. P. - U - 5092 - 10
(10 of 15)

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 4

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED JUNE 1980

APPROVED

NOTE: CONTOURS AT LOGARITHMIC INTERVALS
1 - 1.5 - 2 - 3 - 5 - 7.5 - 10

DATE 11/20/80

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

3720 0082

319-A Item 2

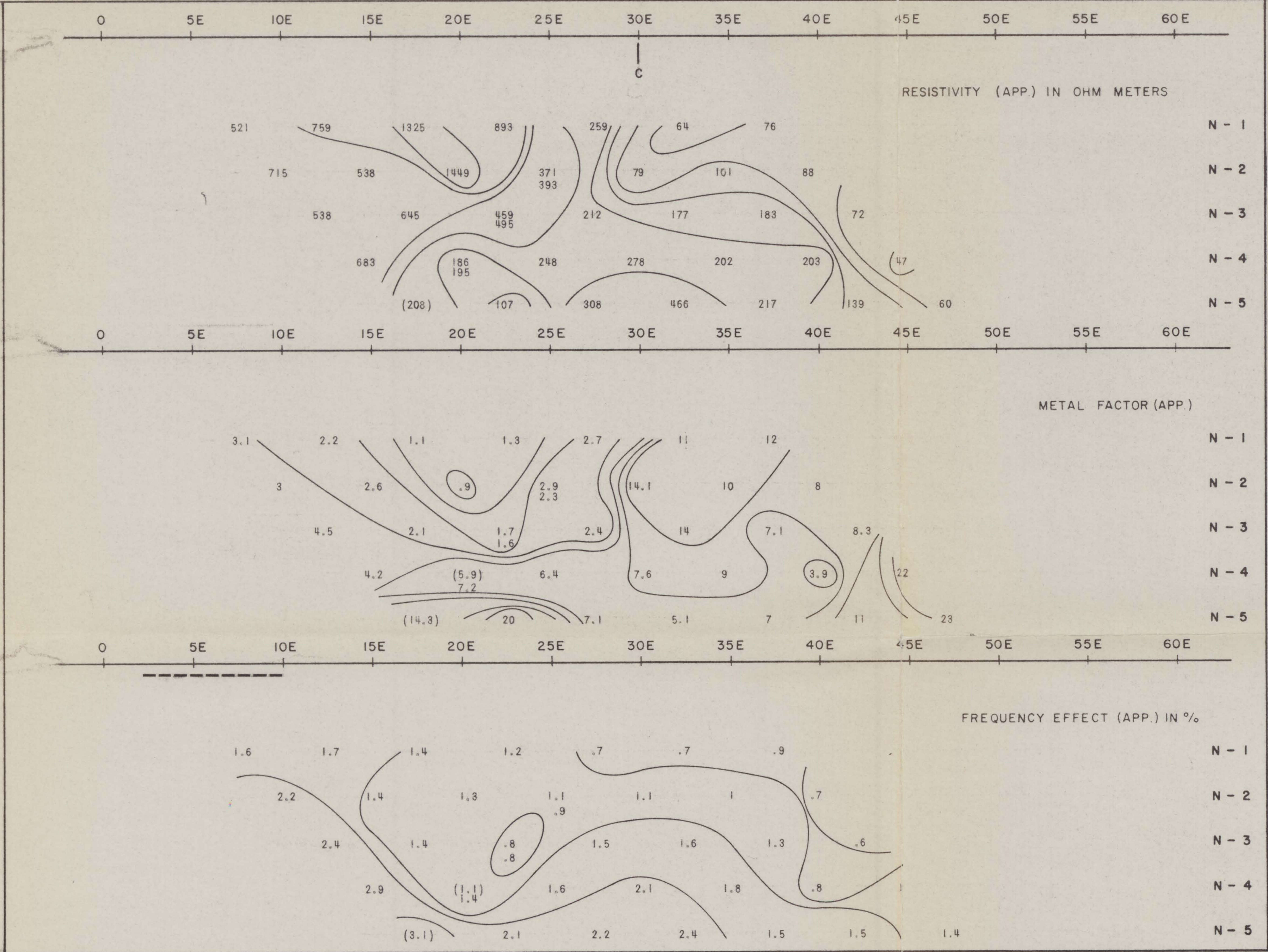
DWG. NO. - I. P. - U - 5092 - II

(11 of 15)

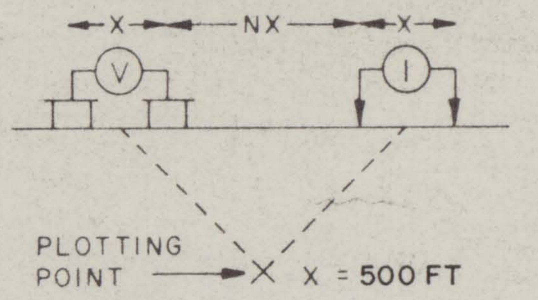
UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 5



ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED: JUNE 1980

APPROVED

DATE: 7/27/80

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1. - 1.5 - 2. - 3 - 5 - 7.5 - 10

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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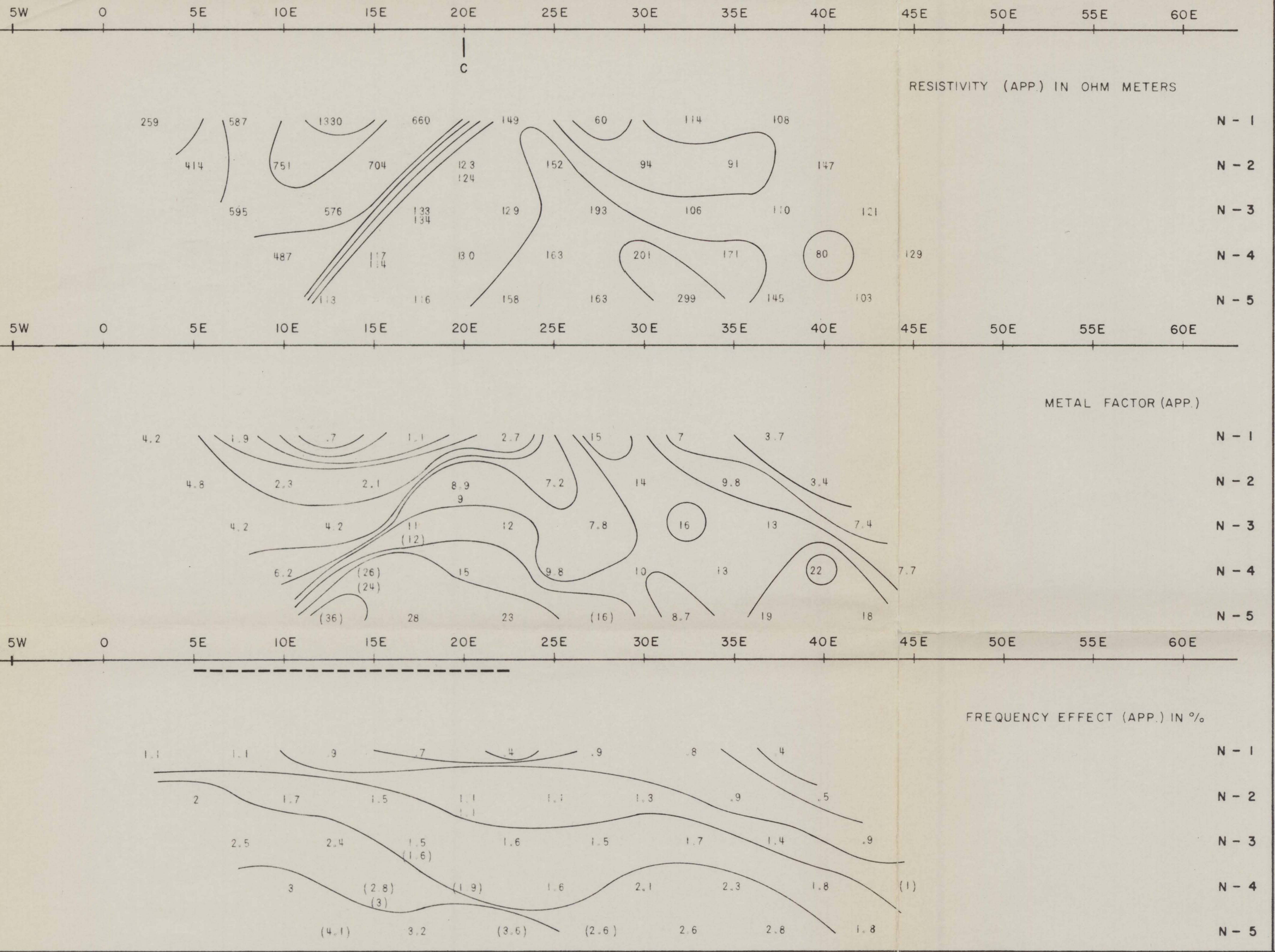
DWG. NO. - I. P. - U - 5092-12

(12 of 15)



UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 6

ELECTRODE CONFIGURATION

X — NX — X

PLOTTING POINT → X   X = 500 FT

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED: JUNE 1980

APPROVED

DATE 7/24/80

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1, -1.5 -2, -3 -5 -7.5 -10

3720 0082

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

3720 0082

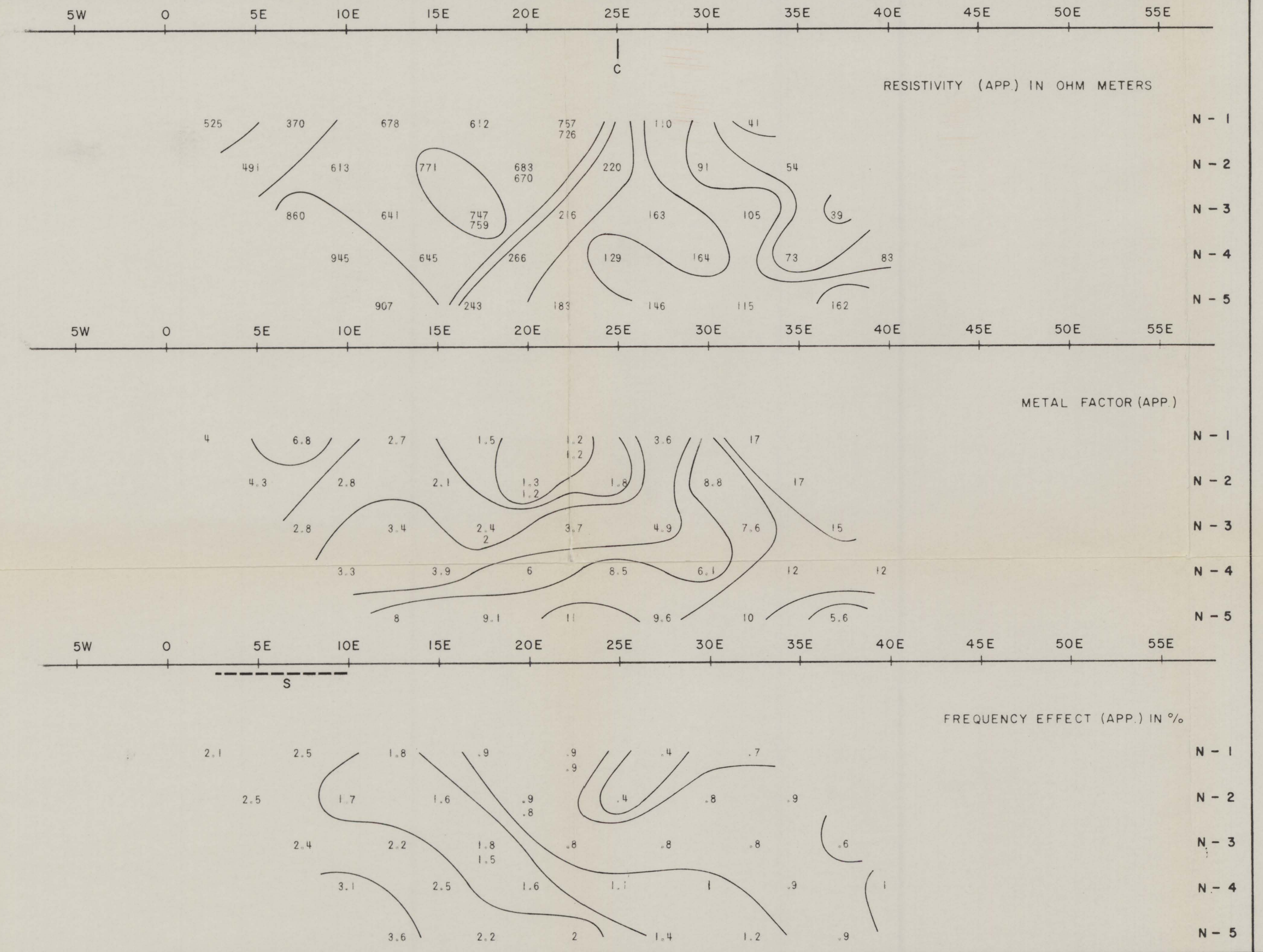
DWG. NO. – I. P. – U – 5092 – 13
(13 of 15)

(319-A) Item 2

UNITED STATES BUREAU OF MINES
& PYRAMID LAKE PAIUTE TRIBE

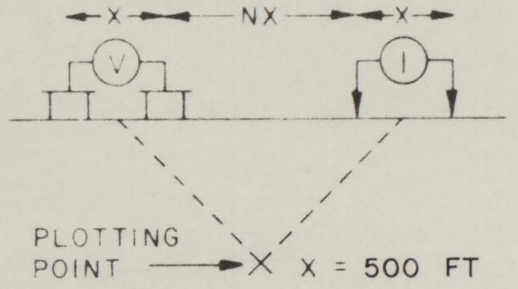
BLIZZARD CAMP PROJECT WASHOE COUNTY,

NEVADA



LINE NO. – 7

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED: JUNE 1980

APPROVED [signature]

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1. - 1.5 - 2. - 3 - 5 - 7.5 - 10

DATE: 7/24/80

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

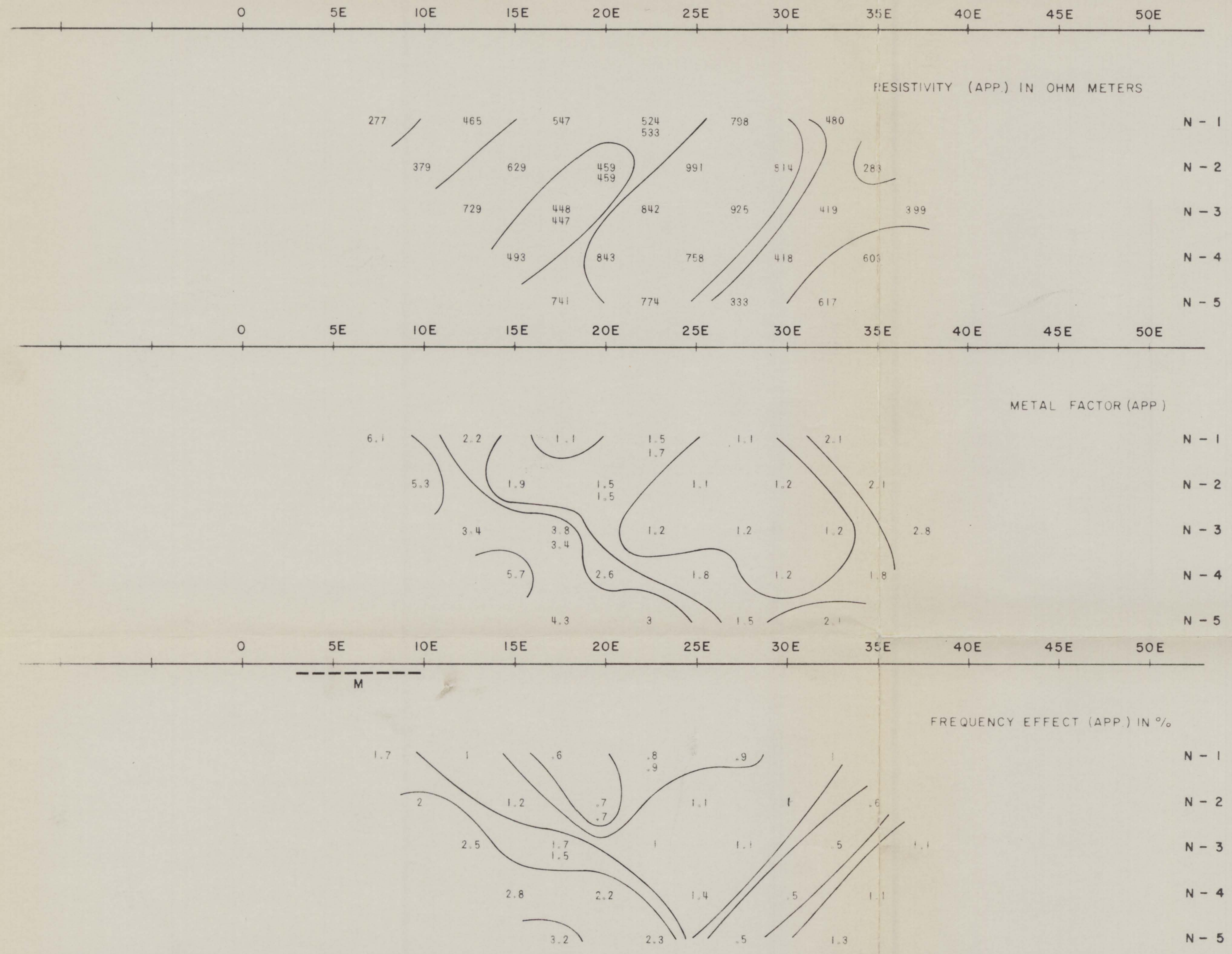
3720 0082 (319-A Item 2)

DWG. NO. - I. P. - U-5092-14 (14 of 15)

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - 8



ELECTRODE CONFIGURATION

X — NX — X

PLOTTING POINT X = 500 FT

SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED JUNE 1980

APPROVED

NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1, -1.5 -2 -3 -5 -7.5 -10

DATE 11/24/80

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

3720 0082

319-A Item 2

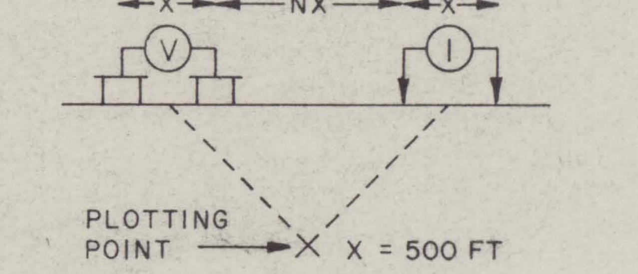
DWG. NO. - I. P. - U-5092-15
(15 of 15)

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY, NEVADA

LINE NO. - BL9

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE
PROBABLE
POSSIBLE

FREQUENCIES 0.3 & 2.5 HZ

DATE SURVEYED: JUNE 1980

APPROVED:

DATE: 7/24/80

NOTE: CONTOURS AT LOGARITHMIC INTERVALS
1. - 1.5 - 2. - 3. - 5. - 7.5 - 10

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

DWG. I.P.P.-U-5092

4000-V

PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PLAN MAP

SURFACE PROJECTION OF ANOMALOUS ZONES

METAL FACTOR		PERCENT FREQUENCY EFFECT	
DEFINITE		VERY STRONG	
PROBABLE		STRONG	
POSSIBLE		MODERATE	
		WEAK	
		VERY WEAK	

APPARENT DEPTH

S = shallow

M = moderate, D = deep

C = contact, F = fault

Number at the end of anomaly indicates spread used.

UNITED STATES BUREAU OF MINES & PYRAMID LAKE PAIUTE TRIBE

BLIZZARD CAMP PROJECT WASHOE COUNTY,

NEVADA

SCALE

FEET 500 0 500 1000 1500 2000 2500 FEET

1 INCH EQUALS 500 FEET

DRAWN MLM

DATE JULY 1980

APPROVED

DATE

GEOPHYSICAL SURVEY PLAN MAP

1X 579-A Item 2

DWG. I.P.P.-U-5092

4000-V