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BASELINE GEOCHEMICAL STUDIES FOR RESOURCE EVALUATION OF D-2 LANDS-GEOPHYSICAL AND GEOCHEMICAL INVESTIGATIONS OF THE RED DOG AND DRENCHWATER CREEK MINERAL OCCURRENCES

by

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Baseline Geochemical Studies for Resource Evaluation of D-2 Lands - Geophysical and Geochemical Investigations of the Red Dog and Drenchwater Creek Mineral Occurrences

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INTRODUCTION

Major zinc, lead and barite mineralization has been discovered at Red Dog and Drenchwater Creeks in the DeLong Mountains of northwestern Alaska. The host rocks for the mineral occurrences are carbonates, cherts, shales, and dacitic volcanic rocks of the Mississippian Lisburne Group. The host rocks are deformed in a narrow belt of imbricate thrust sheets that extend from the Canadian border to the Chikchi Sea. The rocks strike generally east-west and dip to the south.

The sulfide minerals occur as stratiform mineralization parallel to bedding planes, as breccia fillings and vein replacements, and as disseminations in the various host rocks. The primary ore minerals are sphalerite, pyrite, pyrrhotite, and galena. Barite occurs as massive beds up to 90 meters (300 feet) thick at Red Dog Creek and as nodules, veinlets, and disseminations at Drenchwater Creek.

Close spaced soil sampling, mercury vapor sampling, and magnetic and radiometric surveys were conducted over the areas of exposed sulfide mineralization to test the response of these techniques to these types of deposits in northern Alaska. There is potenital for additional deposits of this type in the Lisburne Group of the entire northern Brooks Range. These techniques provide a rapid low cost method for the discovery and preliminary evaluation of these types of mineral occurrences in northern Alaska.

OBJECTIVES

The objectives of the geophysical and geochemical investigations of the Red Dog and Drenchwater Creek mineral occurrences can be summarized as follows:

1. To determine the existence and extent of soil geochemical halos around the known massive sulfide mineral occurrences.

2. To determine the existence and extent of mercury vapor geochemical halos around the known sulfide mineral occurrences via a field portable mercury spectrograph.

3. To determine the radiometric signature of known and possible volcanic rocks associated with the known massive sulfides.

4. To determine the magnetic signature of the known massive sulfide bodies.

GENERAL GEOLOGY OF THE RED DOG CREEK AND DRENCHWATER CREEK MINERAL OCCURRENCES

RED DOG CREEK MINERAL OCCURRENCE

Location and Previous Investigations

The Red Dog Creek mineral occurrence is located in Sections 20 and 29, T31N, R18W, Kateel River Meridian. The area is in the DeLong Mountains quadrangle (Fig. 1). The area is within the DeLong Mountains which form the western end of the Brooks Range and is included in the proposed Noatak National Arctic Range as described by the Bureau of Land Management map entitled, "Alaska", dated 1974.

The mineral occurrence was first described by Tailluer (1970). The general geology of an area of approximately 30 square kilometers (12 square miles) surrounding the occurrence was mapped by Plahuta (1978) on a scale of 1:12,000. The rock units in the mapped area can be correlated with other sections in northwestern Alaska described by Sable and Dutro (1961), Cambell (1967), Snelson (1968), and Armstrong (1970).

Regional Geology and Petrology

The DeLong Mountains are located in the western end of the Brooks Range physiographic province. The western Brooks Range is composed primarily of Devonian through Mississippian age clastic and carbonate rocks. The stable shelf sediments have been compressed into generally east-west striking imbricate thrust sheets that dip to the south. In the DeLong Mountains, the sediments are deformed into an arc convex to the north and the geologic column from the oldest to the youngest rocks includes: dolomite and limestone of the Devonian Baird Group; quartzite, conglomerate, sandstone, and siltstone of the Devonian and Mississippian Endicott Group; limestone, dolomite, chert, and shale of the Mississippian Lisburne Group; shale, chert, and limestone of the Permian and Triassic Siksikpuk Formation and the Triassic Shublik Formation; shale, mudstone, wacke, and conglomerate of the Cretaceous Okpikruak Formation; and sandstone and conglomerate of the Fortress Mountain Formation. The sediments are juxtaposed in imbricate thrust plates tht include thrust sheets of layered mafic and ultramafic rocks dated at 150 to 160 m.y.

In the study area, the oldest rocks are quartzite, sandstone, conglomerate, siltstone and shale of the Endicott Group. The

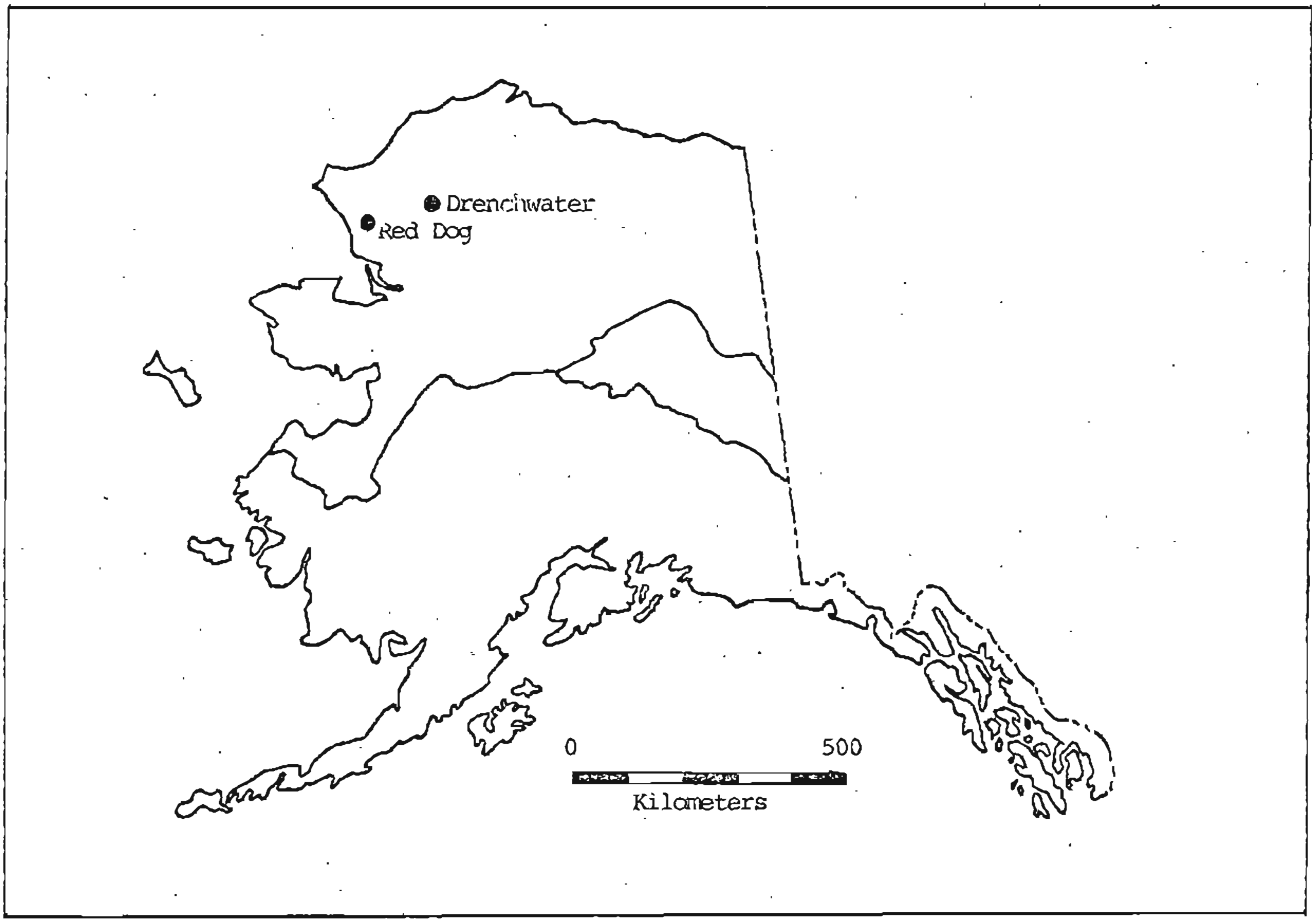

Figure 1. Location map of the Red Dog Creek and Drenchwater Creek Mineral occurrences

quartzites and sandstones are medium grained, cross bedded, tan weathering rocks that contain minor plant fossils.

Stratigraphically above the Endicott Group is the carbonate, chert, and shale of the Lisburne Group. Only the Kogruk and Tupik Formations of the Lisburne Group were mapped in the vicinity of the Red Dog prospect (Plahuta, 1978). Since the contact between the underlying Utukok Formation and the younger Kogruk is gradational and since exposure is poor, the Utukok Formation of the Lisburne Group may be present in the mapped area. The Kogruk Formation is represented by approximately 90 meters (300 feet) of interbedded limestone and chert. The limestone is a dark to medium gray bioclastic rock that weathers light gray to orange. It forms beds ranging from 10 centimeters to 2.7 meters (4 inches to 9 feet) thick. Bioclastic debris includes crinoid stems, horn corals, and spiriferoid and productid brachiopods. The unit has been correlated with the Wachsmuth and Alapah Limestones of the Lisburne Group in the central and eastern Brooks Range (Sable and Dutro, 1961).

The Kogruk Formation is conformably overlain by at least 185 meters (600 feet) of limestone and chert of the Tupik Formation. Plahuta (1978) has divided the formation into two informal members in the study area. The lower limestone member includes medium dark gray to blackish gray aphanitic limestone and interbedded dark gray shale. The limestone weathers olive gray and forms individual beds approximately 0.5 meters (1.5 feet) thick. The overlaying chert member includes grayish black chert, siliceous mudstone, and black shale. The chert member includes grayish black chert, siliceous mudstone, and black shale. The chert member is host to breccia fillings, veins, conformable pods and disseminations of sulfide minerals.

Disconformably overlying the Lisburne Group is the Siksikpuk Formation of Permian and Triassic age. The formation has been divided into three informal members in the study area by Plahuta (1978). The silicic member, the basal member, is a massive granular white to light gray quartz-rich rock. The unit has a maximum thickness of 76 meters (250 feet) and contains minor disseminated sulfides. Conformably overlying the silicic member is the barite member which includes up to 90 meters (300 feet) of massive barite interbedded with minor limestone and shale. The barite member is coarsely crystalline with individual grains up to 5 centimeters (2 inches in diameter). Minor disseminated sulfides occur at the base of the unit. The felsic volcanic member, the upper member of the formation, is composed of felsic tuff that contains quartz and barite. The member is restricted to one outcrop in section 29 and its composition and stratagraphic position are questionable.

The undivided Siksikpuk Formation contains major red and green argillite and red and greenish gray chert. Although the formation is probably less than 185 meters (600 feet) thick, structural thickening, lack of marker beds, and poor exposure make accurate measurement of the stratigraphic section impossible.

Conformably overlaying the Siksikpuk Formation is a section of black chert, black shale, and carbonate that has been assigned to the Triassic Shublik Formation. The chert forms relatively thin beds up to 15 centimeters (6 inches) thick while the shale occurs in beds up to 0.5 centimeters (1/4 inch) thick. Carbonate beds are less than a meter (3.28 feet) thick. The carbonate includes limestone and dolomite that is medium gray and weathers grayish orange. Neither Monotis nor Halobia which are common in other sections of the Shublik Formation were identified within the carbonates in the study area. The total thickness of the Shublik Formation in the area is less than 55 meters (180 feet).

Unconformably overlying the Shublik is a section of sandstone, siltstone, argillite, and shale that may range in age from the Jurassic to the Cretaceous. The sandstones are medium to fine grained medium to dark gray muddy rhythmically bedded rocks. Locally the sandstones display well developed cross bedding. The interbedded siltstones are also medium to dark gray. The argillites and shale are calcareous and contain gastropod and pelecypod fragments. Individual beds of the argillite and calcareous shales are less than 1 centimeter (0.5 inches) thick. The total thickness of the Jurassic and or Cretaceous section is less than 90 meters (300 feet). These rocks form the youngest consolidated deposits in the vicinity of Red Dog Creek.

Geochronology and Structural Geology

Age determinations within the Red Dog area have been based entirely on correlations with similar rocks in the region. The age determinations of the Devonian rocks and of the Mississippian Lisburne Group rocks in the region are the result of detailed stratigraphic and paleontological examinations by Sable and Dutro (1961) and by Armstrong (1970). The younger rocks have been correlated with similar rocks mapped by Cambell (1967). No radiometric age dating has been done in either the study area or in the immediate vicinity. The age of mineralization at Red Dog should be dated by lead-lead methods for a better understanding of the relationships of the mineralization to the enclosing host rocks.

In the study area, the Endicott Group rocks strike generally northeast-southwest. The rocks form large open folds and are in thrust contact with the Juro-Cretaceous, Permo-Triassic, and Mississippian age rocks. The Mississippian age and younger rocks form large open folds that generally strike northwest-southeast. Locally the Permo-Triassic, and younger rocks form overturned folds and are highly deformed. These areas of high deformation may represent yielding along unmapped thrust plates.

The rocks are offset by numerous high angle faults on a regional as well as a local scale. Figs. 2 and 3 are general interpretations of linear features observed on landstat and low altitude aerial photographs respectively. The landstat photo interpretation (Fig. 2) shows extensive low angle faulting in northwestern Alaska that strikes

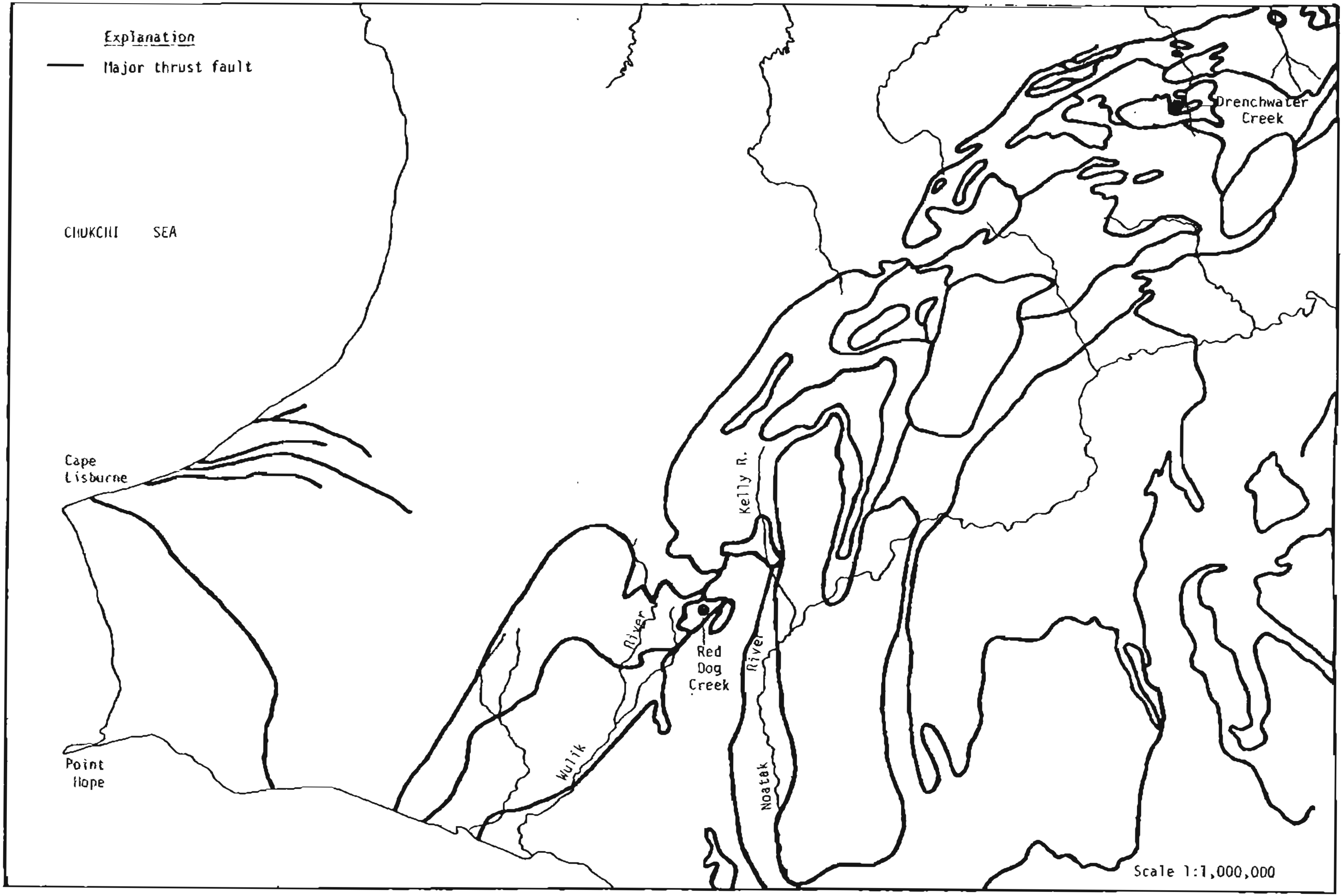

Figure 2 Major thrust faults of northwestern Alaska (from Landstat imagery and after Beikman, 1975)

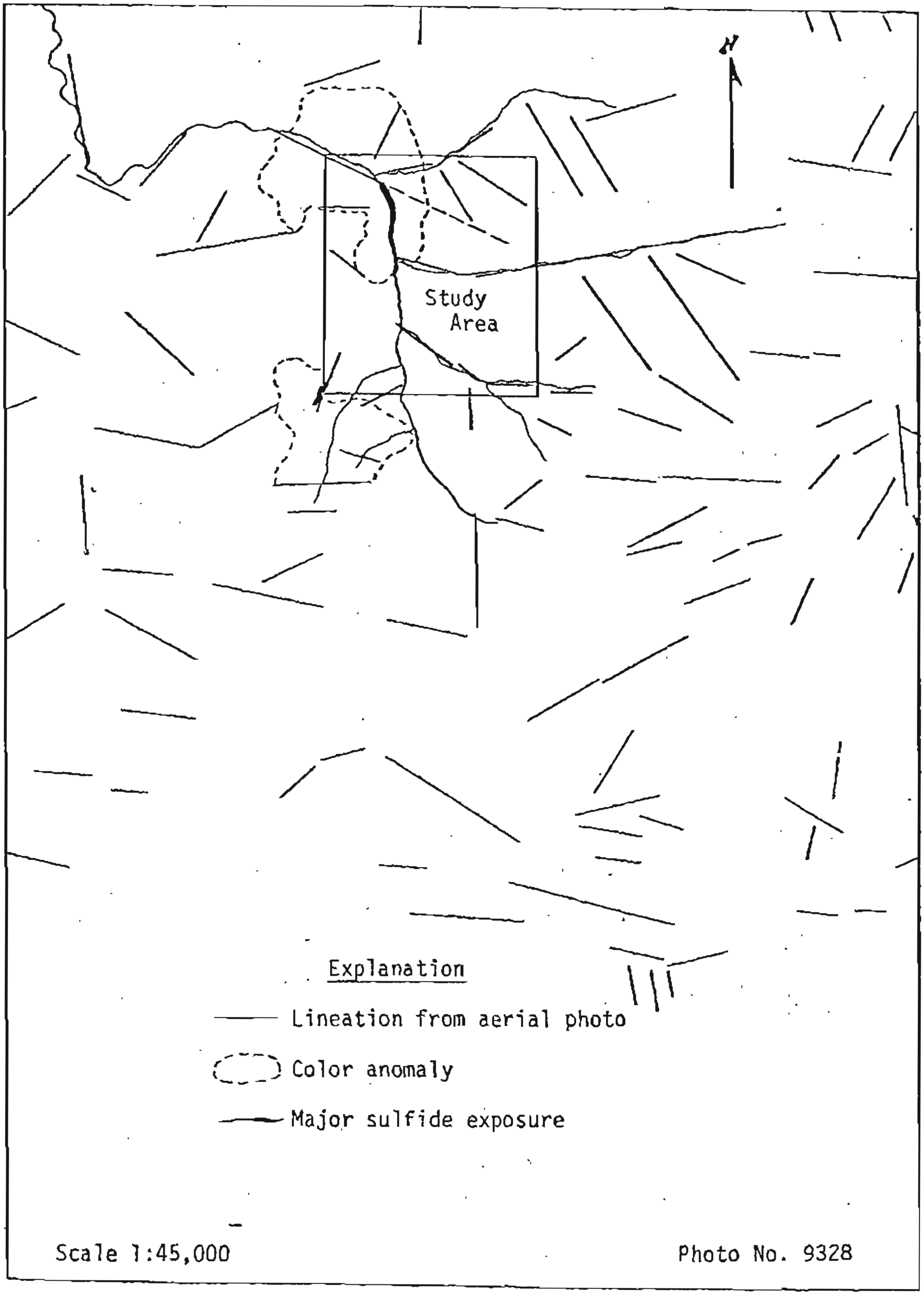

Figure 3 Lineations in the Red Dog Creek area and location of the study area

generally northeast-southwest. Fig. 3, an interpretation of a low altitude aerial photo of the Red Dog area, shows major east-west and north-south structural features. Detailed interpretations of these features are beyond the scope of this examination.

Economic geology

Exposures of sulfide mineralization are found at two major localities. The more extensive exposure is along the entire length of Red Dog Creek in section 20. The smaller exposure is located on the hill centered in section 29. If the exposures represent the same mineralized body, the mineralization has a strike length of at least 2439 meters (8000 feet).

Sphalerite, pyrite, pyrrhotite, and galena occur in the Lisburne Group as stratiform mineralization parallel to bedding planes and as breccia fillings and vein replacements crosscutting bedding surfaces. The sulfides are hosted in black cherts and black siliceous mudstones. The host rocks generally strike northwest-southeast and dip up to 30° to the southwest. The mineralization has not been traced down dip nor has the base of the mineralized horizon been mapped. The mineralization is within iron-stained zones that are devoid of vegetation. These zones extend for 328 meters (1000 feet) at right angles to the strike of the mineralization.

The sulfide mineralization is overlain by at least 90 meters (300 feet) of massive barite that has been mapped as a member of the Siksikpuk Formation. Disseminated sulfides occur in the lower few meters of the member. The unit also contains minor carbonate.

The sulfide minerals in the Lisburne Group occur as disseminated fine anhedra and as medium to coarse grained subhedra in replacement veins and stockworks. The disseminated ore is primarily pyrrhotite, pyrite, and sphalerite that form spherical aggregates. The ores are concentrically zoned with sphalerite, pyrrhotite, and pyrite crystallizing along the vein walls with the major crystal axis at right angles to the vein walls. The early sulfides are replaced by quartz, galena, and late iron sulfides. The veins vary from simple structures with parallel walls to complex stockworks that include breccia fragments up to a meter (3.28 feet) in diameter. The vein systems strike approximately S40W and N40W. The individual veins range from 2.5 centimeters to 3 meters (1 inch to 10 feet) wide and are nearly vertical. The vein outcrops are all within the creek bottom and individual veins can not be traced for more than 10-15 meters (30-50 feet).

In section 29 Plahuta (1978) mapped a sequence of siliceous rocks as felsic volcanics. The classification of these rocks as volcanics was based on handspecimen identification and comparison with felsic tuffs associated with dacitic flow rocks at Drenchwater Creek. If the correlation is correct the massive sulfide mineralization at Red Dog Creek could possibly be classified as a Kuroko type volcanigenic ore deposit. More detailed examination of the siliceous rocks has not warranted classifying them as felsic volcanics thus the mode of origin of the mineralization is still in question. The mineralogy, structural form and ore textures are similar to the distal exhalative volcanic deposits currently forming in the Mediterranean region as described by Honnorez et al., (1973).

DRENCHWATER CREEK MINERAL OCCURRENCE

Location and Previous Investigations

The Drenchwater Creek mineral occurrence is located T10S, R1E, Umiat Meridian which is in the Howard Pass quadrangle. The area is on the north flank of the western Brooks Range and is within the National Petroleum Reserve Alaska (Fig. 1).

The mineral occurrence was described in detail by Nokleberg and Winkler (1978) however Tailleur (1970) noted the mineral potential of the area based on work at the Red Dog mineral occurrence 160 kilometers (100 miles) to the west. The only other pertinent published data in adjacent areas includes regional mapping by Tailleur and others (1966) and general discussions on the geology of northern Alaska (Tailleur, 1969).

Regional Geology and Petrology

The regional geology west of Drenchwater Creek has been described in the previous section on the Red Dog Creek mineral occurrence. East of Drenchwater Creek the Paleozoic stratigraphic column of the northern Brooks Range has been described by Bowsher and Dutro (1957). Their work included detailed mapping and the measurement of 11 sections in the Shanin Lake area 400 kilometers (250 miles) east of Drenchwater Creek.

The oldest exposed rocks in the Shanin Lake area are unnamed shales and sandstones of Upper Devonian age. The sandstones and shales (488 meters, 1600 feet) are overlain by the Kanayut conglomerate (1006 meters, 3300 feet). The Kanayut conglomerate is divided into three members. The lower member is poorly defined and includes at least 427 meters (1400 feet) of conglomerate, sandstone, shale, and limestone. The middle conglomerate member contains 313 meters (1026 feet) of massive chert-pebble conglomerate. The Stuver Member at the top of the formation includes 262 meters (860 feet) of orthoquartzite, conglomerate, and shale.

The Kanayut conglomerate is disconformably overlain by the Mississippian age Kayak Shale. The Kayak Shale has a total thickness of 293 meters (960 feet) and is divided into five informal members. From oldest to youngest these include; the basal sandstone member (40 meters, 131 feet), lower black shale member (181 meters, 595 feet), argillaceous limestone member (24 meters, 80 feet), upper black shale member (43 meters, 140 feet), and the red limestone member (3-5 meters, 10-15 feet).

The Kayak Shale is disconformably overlain by the Lisburne Group. In the Shanin Lake area, only the Wachsmuth and Alapah Limestone Formations are present, both of which are Mississippian in age. The Wachsmuth Limestone has a total thickness of 375 meters

(1230 feet) and is divided into four informal members. From oldest to youngest these include: the shaly limestone member (5 meters, 18 feet); the crinoidal limestone member (67 meters, 219 feet); the dolomite member (172 meters, 564 feet); and the banded chert and limestone member (131 meters, 429 feet). The Wachsmuth Limestone is disconformably overlain by the Alapah Limestone which has a total thickness of 296 meters (970 feet). The Alapah Limestone is divided into nine informal members which include from oldest to youngest: the shaly limestone member (26 meters, 85 feet); the dark limestone member (53 meters, 175 feet); the platy limestone member (57 meters, 187 feet); the banded limestone member (64 meters, 210 feet); the black chert-shale member (12 meters, 38 feet); the light-gray limestone member (14 meters, 46 feet); the fine-grained limestone member (24 meters, 80 feet); chert nodule member (24 meters, 80 feet); and upper limestone member (21 meters, 70 feet).

The Alapah Limestone is disconformably overlain by the Permian and Triassic Siksikpuk Formation. At the type locality on Tiglukpuk and Skimo Creeks, tributaries of the Siksikpuk River, the formation includes 108 meters (354 feet) of shale, siltstone, and calcareous siltstone. Pyrite nodules occur in the lower 18 meters (60 feet) of the section and minor bedded and nodular barite occurs in the upper 37 meters (120 feet) of the unit.

The Siksikpuk Formation is disconformably overlain by the Triassic Shublik Formation. The unit is represented at its type locality on Shublik Island by 91 to 137 meters (300-450 feet) of section. The unit is divided into three members which include from oldest to youngest; shale member, chert member and limestone member. The shale member locally contains significant concentrations of phosphate and the limestone member contains abundant pyrite concretions.

Shublik Formation is disconformably overlain by an unnamed sequence of Jurassic and Cretaceous siltstones and shales. In the Atigun area east of Shanin Lake the sequence may exceed 90 meters (300 feet).

The unnamed unit is unconformably overlain by the lower Cretaceous Okpikruak Formation. The Okpikruak Formation includes 451 meters (1480 feet) of graywacke, shale, and siltstone.

The Okpikruak Formation is disconformably overlain by the upper lower Cretaceous Fortress Mountain Formation. The unit includes 3000 meters (10,000 feet) of conglomerate, sandstone, shale, and minor carbonaceous material. The Fortress Mountain is disconformably overlain by at least 1370 meters (4500 feet) of marine and nonmarine sandstone, shale and conglomerate of the Albian and Cenomanian Nanuskuk Group. The Nanuskuk Group is in turn disconformably overlain by the upper Cretaceous Colville Group. The Colville Group includes at least 915 meters (3000 feet) of marine and nonmarine shale, sandstone, conglomerate, and coal.

Within the Drenchwater Creek area mapped by Nokleberg and Winkler (1978) only the Lisburne Group and the Siksikpuk, Shublik, and Okpikruak Formations are present. The Lisburne Group in the Drenchwater Creek area is more characteristic of the DeLong Mountains than of the Shanin Lake section. In addition to the abundant chert in the Lisburne Group in the Drenchwater Creek area, the section includes felsic volcanic and volcaniclastic rocks.

The volcanic rocks include flows and sills of dacite and dacite porphyry. The rocks as described by Nokleberg and Winkler (1978) consist of coarse-grained potash feldspar and medium-grained biotite phenocrysts in a light gray to reddish brown aphanitic matrix. The biotite from the dacite has yielded a 319 m.y. K-Ar age date.

The volcaniclastics include tuffs, agglomerates and tuffaceous sandstones. The tuffs are composed of quartz, feldspar, biotite, fragments of chert and minor pyrite sphalerite, and barite. The sulfide minerals also occur in chert and shale associated with the volcaniclastics.

The Siksikpuk, Shublik, and Okpikruak Formations are similar to sections to the east. Barite has been identified at several localities in the Siksikpuk in the Drenchwater Creek area along with minor pyrite. The presence of bedded barite facilitates the discrimination of the black and green shales of the Siksikpuk Formation from those of the Shublik Formation. The presence of the pelecypod Monotis in the Shublik Formation is also used to distinguish the unit from both the underlying Siksikpuk Formation and the overlying Okpikruak Formation. The Okpikruak Formation contains the pelecypod Buchia in great abundance.

Geochronology and Structural Geology

Age determinations within the Drenchwater Creek area have been based on correlations with similar rocks in the region, on fossil identification, and on K-Ar age dating. Although the mineralization at Drenchwater Creek is within the Mississippian age volcanic and sedimentary rocks, the age of mineralization should also be dated by lead-lead methods for a better understanding of the relationships of the mineralization to the enclosing host rocks.

The major structural form in the area is a coarse-grained tectonic breccia bounding numerous east-west striking thrust plates. The majority of the contacts are faults and stratigraphic continuity is limited to a few hundred meters. The individual units form asymmetrically overturned folds that have been breached into imbricate thrust plates that dip generally to the south (See Fig. 4).

The microstructures exhibit the same trends as the major structures. All units have a well developed cleavage that strikes east-west and dips to the south. Small scale isoclinal folds mimic the larger scale folds.

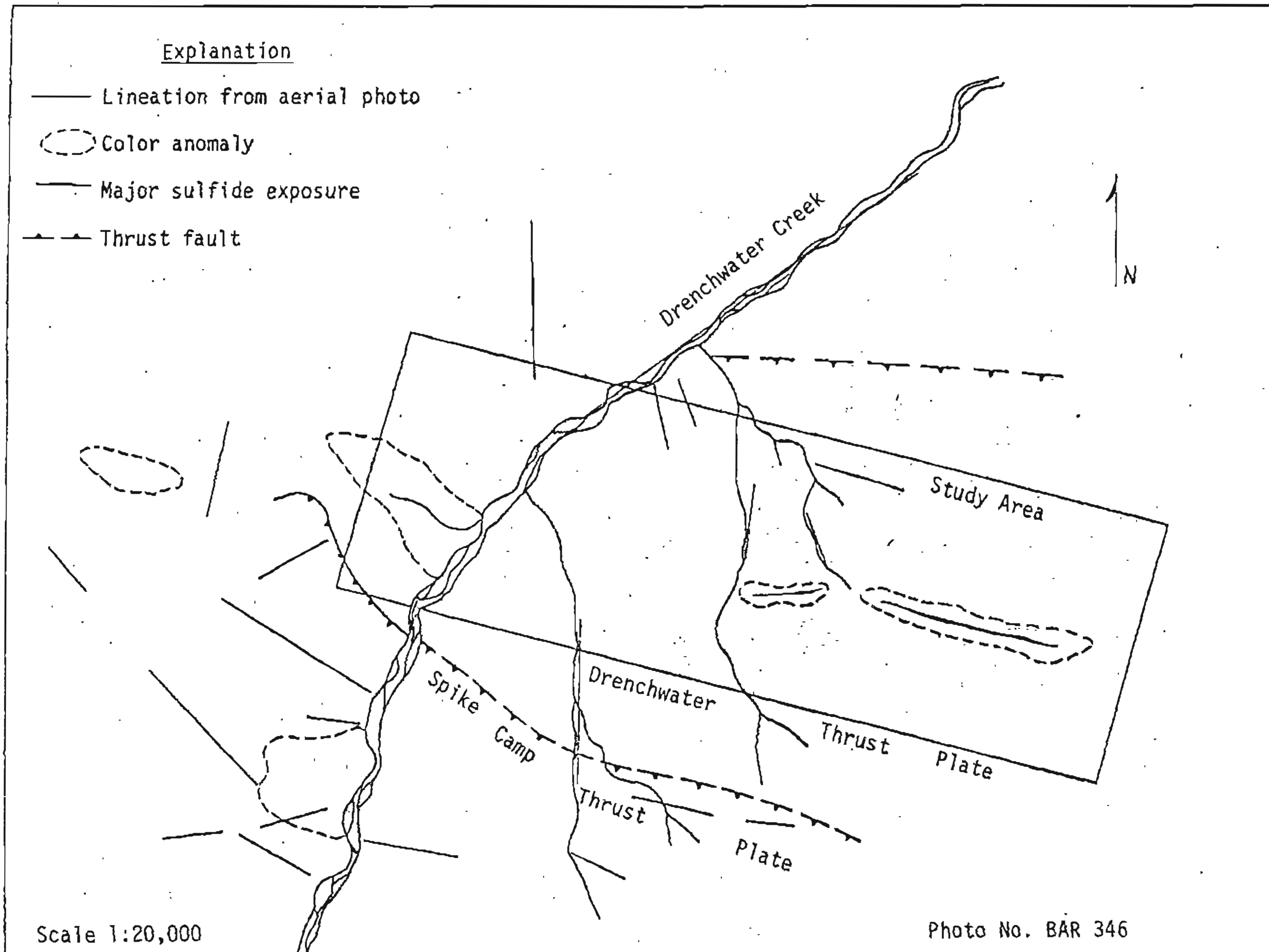

Figure 4 Lineations in the Drenchwater Creek area and location of the study area

The structural form indicates a major north-south directed compressional event with blocks from the north being thrust under blocks to the south (Nokleberg and Winkler, 1978).

Economic Geology

The sulfide mineralization at Drenchwater Creek as well as at Red Dog Creek and the Wulik River to the west and at Elusive Lake and Porcupine Lake to the east is within a topographic and sedimentary basin environment. The mineral occurrences are all located in physiographic lows. The mineralization is hosted by black cherts and siliceous mudstones and by volcanic rocks within the basinal sediments.

Nokleberg and Winkler (1978) have described the mineralization and have suggested geologic controls for the ore minerals at Drenchwater Creek. The following is taken directly from their work.

> "The galena, sphalerite, and the barite mineralization observed in this and earlier work occurs in a relatively narrow zone that extends eastward along strike from Drenchwater Creek for about 1,830 m. with a width of about 6-30 m. The zone of sulfide mineralization is restricted to the Drenchwater thrust plate. The galena and sphalerite occur principally in dark cherts and dark shales, with lesser occurrences in the tuffs. Analyses of 24 rock, soil, and stream sediment samples from the zone of mineralization show zinc values of 0 to greater than 10,000 ppm with an average of about 200 ppm, and show lead values of 20-15,000 ppm with an average of about 200 ppm. Barite is rarer and occurs only in black chert along Drenchwater Creek and in undifferentiated yellow-green cherts of the Shublik or Siksikpuk Formations in the southwest part of the mapped area. Strongly developed iron staining also occurs in the zone of sulfide mineralization as a weathering product of pyrite which is disseminated in sparse amounts in the felsic tuffs. Stream sediments are also iron-stained downstream from the tuffs. Iron staining should <u>not</u> be used as the sole prospecting tool in this region as many areas of iron-stained bedrock contain no visible galena or sphalerite, and because galena and sphalerite, without accessory pyrite, weather to shades of dark gray to black.
>
> Sphalerite and galena occur primarily as disseminated grains in underformed fragments of rock. This texture strongly suggests that sulfide crystallization occurred coincidentally with, or just after sedimentation. Less commonly, sphalerite and galena occur in 1-2 cm. thick veins of massive sulfides in brecciated chert and shales. Locally the veins crosscut cleavage, suggesting a period of mobilization and redeposition of sulfides after deformation. Sphalerite and galena occur sparsely in the

zone of sulfide mineralization; in rare hand samples, the volume of galena and sphalerite varies from 1/2-2 mm. Barite occurs mainly as beds, lenses, or nodules a few centimeters wide within black chert or shale. The barite is mostly massive, light to medium gray colored, and medium to coarse grained. In contrast to the Red Dog area (Tailleur, 1970), barite does not appear to be associated with galena and sphalerite. Galena is the only sulfide observed towards the east end of the zone of mineralization in this intensely weathered and low relief area, galena occurs as sparse relic grains in a chert boxwork.

There are two major geologic controls for the galena and sphalerite deposits in the Drenchwater Creek area. First, the unique association of galena and sphalerite with tuff or with dark chert and dark shale adjacent to tuff strongly suggests that: (1) sulfide mineralization is syngenetic or stratiform, i.e., that mineralization occurred simultaneously or just after sedimentation and volcanism; and (2) volcanic exhalations were the source of the mineralization fluids. This origin is similar to that proposed by Tailleur (1970) for the Red Dog area."

The current investigation resulted in the location of several additional sulfide occurrences and thus extended the strike length of the mineralization to at least 3000 meters (10,000 feet).

Geochemical and geophysical data collection, analysis and reduction - Red Dog Creek

A sample grid 1753 x 1448 meters (5750 x 4750 feet) with sample points located on 76 meters (250 feet) centers was established at Red Dog Creek. The sample grid was layed out by transit and tape methods with a north-south and east-west orientation and included 480 points. The major sulfide mineralization at Red Dog Creek is located near the center of the grid (Figs. 3 and 5).

Soil samples were collected at each of the grid points with a hand held 1 meter (3.28 feet) soil auger. Samples were collected to 1 meter (3.28 feet), or to the bottom of the active layer or to bedrock whichever was less. The samples were analyzed by atomic absorption spectrometry for Cu, Pb, Mo, Ag and Zn.

Mercury vapor readings were taken with a Scintrex HGG-3 mercury spectrometer in accordance with the field procedures established by the manufacturer. Samples of soil and rock were also analyzed with the spectrometer by established laboratory procedures.

Radiometric readings were taken with a Scintrex GAD-6 four channel Gamma-Ray spectrometer with a GSP-2 crystal sensor. Readings were taken for U, Th, K, and the total count.

Magnetic readings were taken with a Geometrics proton precession magnetometer. Three readings were taken at each station.

Sample means, ranges, standard deviations and means plus 1.645, 2.00, and 2.33 times the standard deviations were calculated for each of the elemental analyses. The geochemical and geophysical data was also reduced by means of a trend surface program developed by the University of Kansas. The trend surface plots are included in Appendix I and the geochemical data is included in Appendix II. There are two trend surface plots for each elemental analysis or geophysical parameter. The first plot is a contour of the raw data and the second plot is a contour of the calculated residuals on a three, or four degree surface.

Geochemical and geophysical data collection, analysis, and reduction - Drenchwater Creek

A sample grid 2744 x 1220 meters (9000 x 4000 feet) with sample points located on 305 meters (1000 foot) centers was established at Drenchwater Creek. The sample grid was layed out by compass and tape methods with a N60W and N30E orientation and included 50 points. The major sulfide mineralization and color anomalies at Drenchwater Creek are located along the center of the grid (Figs. 4 and 6). Data collection, analysis, and reduction was conducted by the same procedures as described for Red Dog Creek. The trend surface plots are included in Appendix III and the geochemical data is included in Appendix IV.

SUMMARY AND CONCLUSIONS

In review of the trend surface plots for Red Dog Creek and Fig. 5, the following summaries can be made about the geochemical and geophysical data:

A. A major copper anomaly (surface of residuals) occurs over the main sulfide mineralization in section 20, however additional anomalies occur at sample localities 448-449, 597, 619-620, 714-716, 741-742, 779, and 834-835.

B. Major lead anomalies occur over the sulfide exposures.

C. Molybdenum anomalies occur over sample localities 625-626, 685-707, 736-737, and 758-759 and over a large area in section 28.

D. A major silver anomaly occurs over the main sulfide occurrence and smaller anomalies are found at sample localities 540, 625-626, and 672. The silver anomalies generally correlate well with the lead anomalies.

E. A large zinc anomaly occurs over the main sulfide occurrence and smaller anomalies are found at sample localities 377-379, 399-401, 597, 619-620. The anomalies at 377-379, and 399-401 are down slope from the sulfide occurrence in section 29. The zinc anomalies generally correlate with the copper anomalies.

F. A positive magnet anomaly of 40 gammas exists over the main sulfide occurrence. The positive anomaly is flanked by two 20 gamma negative anomalies. A similar dipole of the same magnitude is located in section 28. This anomaly is congruous with the molybdenum anomaly in section 28.

G. Small potassium anomalies are located over the main sulfide occurrence and over the sulfide occurrence in section 29. A very small anomaly is correlated with the molybdenum and magnetic anomalies in section 28.

H. The thorium and uranium data is analogous with the potassium data.

I. The total count plots are similar to the potassium, thorium, and uranium with the exception of three sample localities. At sample localities 501 and 440 zero total count values were entered in the computer. The result is large negative anomalies at these localities. At sample locality 745 a large number was entered for the total count and the result was a large positive anomaly. These three sample points must be disregarded in the synthesis of the total count data.

Mercury vapor was not detected and this may be a function of the absence of mercury in the geologic environment but more probably the negative results are a function of inadequate instrumentation for the detection of mercury under existing physical conditions. Mercury has been used as an effective indicator of sulfide mineralization in the region by the private sector however, the analysis are conducted by laboratory rather than by field methods (personal communication, staff, Cominco American).

In review of the trend surface plots for Drenchwater Creek and Fig. 6, the following summaries can be made about the geochemical and geophysical data:

A. A 50 ppm copper anomaly is found over the volcanic rocks in the northeast of the study area and another 50 ppm anomaly is found at the southern edge of the Drenchwater Thrust.

B. There is a major lead anomaly over the volcanic rocks in the north, however it is offset to the west of the major copper anomaly. A small anomaly occurs in the east end of the area and another in the Spike Camp Thrust near sample localities 1 and 11.

C. Several molybdenum anomalies correlate with both the copper and lead anomalies.

D. The silver anomalies correlate with the copper anomalies.

E. The zinc anomalies correlate with the lead anomalies however they are offset to the south of the lead peak values.

F. A large magnetic anomaly in the northwest corner of the study area is attributed to numerous diabase dikes. Other magnetic highs are congruous with the zinc anomalies.

G. A very large potassium anomaly occurs over the volcanic rocks in the northeast end of the area.

H. The thorium anomaly correlates with the potassium anomaly.

I. A major uranium anomaly occurs over the potassium and thorium anomalies and another occurs over the volcanics west of Drenchwater Creek. The offset in the uranium anomalies is strong evidence for major faulting in Drenchwater Creek. There is also evidence for the existence of volcanic rocks in the vicinity of sample locality 21.

J. The total count trend surface is very similar to the uranium surface.

The following general conclusions are drawn from this investigation:

1) Very large geochemical anomalies occur over areas of visible sulfide mineralization and over areas of no visible sulfides at Red Dog and Drenchwater Creeks.

2) Mercury vapor was not detected at either occurrence and this may be a function of

   a. Absence of mercury in the geologic environment.

   b. Inadequate instrumentation for the detection of mercury under the existing physical conditions.

3) Very large gamma-ray anomalies are associated with the volcanic rocks and with the mineralization at Drenchwater Creek however very minor anomalies were detected over "hypothesized" volcanic rocks at Red Dog Creek.

4) Magnetic anomalies were detected at both localities.

5) From the molybdenum, magnetic, and radiometric data, additional sulfide mineralization may be present at the Red Dog occurrence in section 28.

6) Close spaced soil, magnetic and radiometric investigations can provide drilling targets for sulfide mineralization in the northern Brooks Range base metal province.

7) Radiometrics may provide a rapid method of detecting base metal sulfides associated with volcanic flow rocks in the province.

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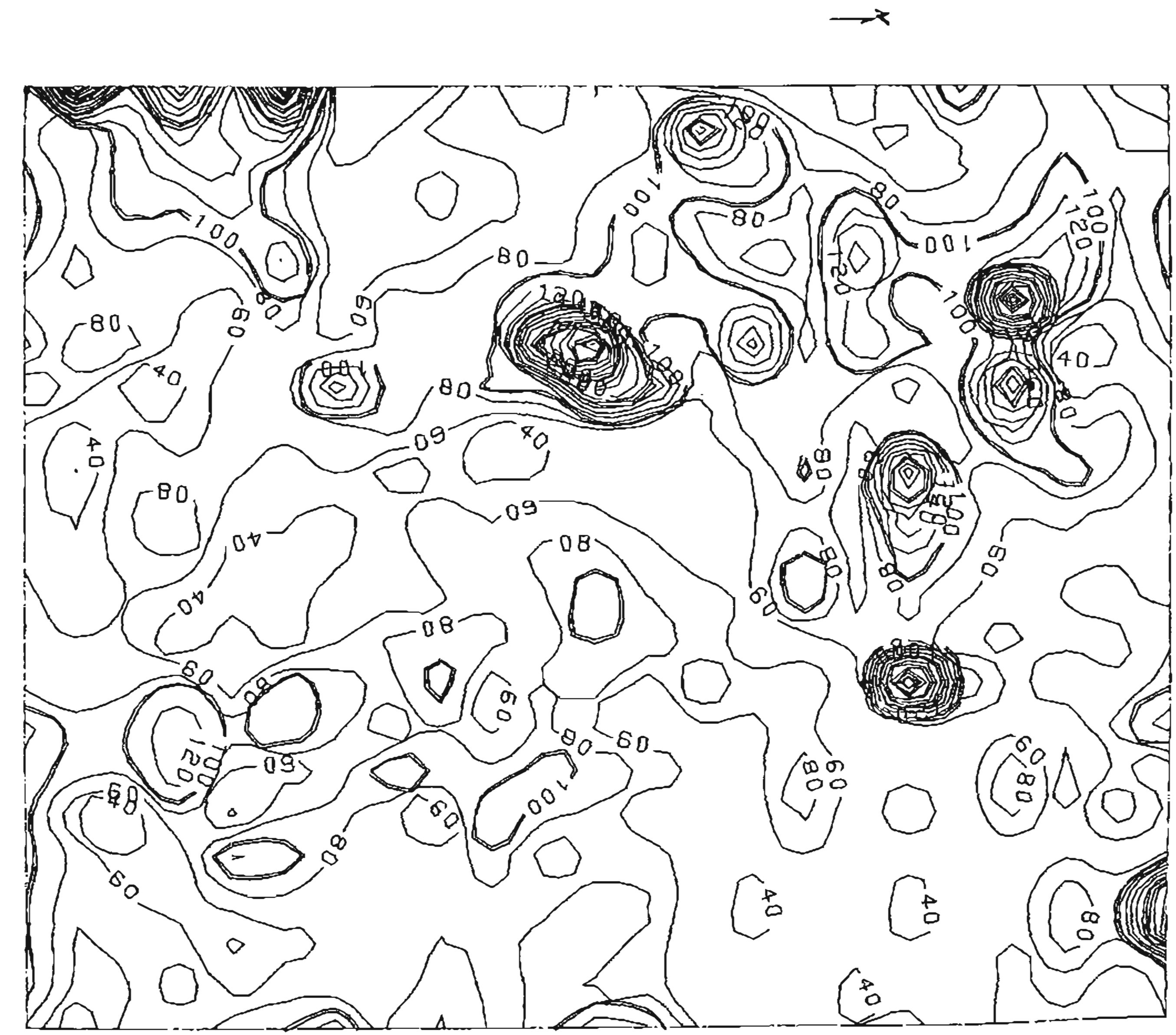
APPENDIX I

Trend surface plots of the geochemical and geophysical data -

Red Dog Creek

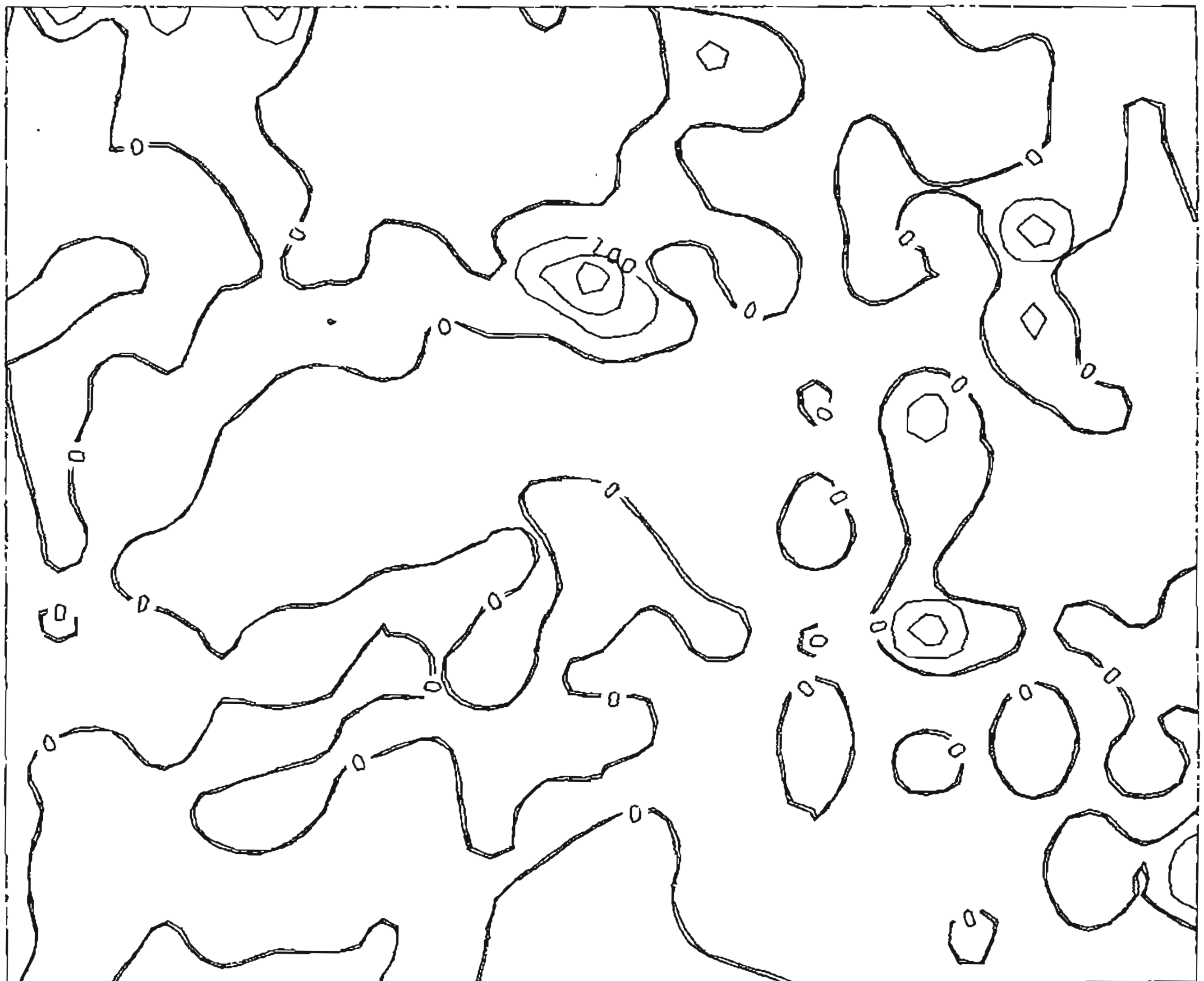
RED DOG - CONTOUR..CU

PLOT NO. 2 DATE 01/11/79 TIME 16



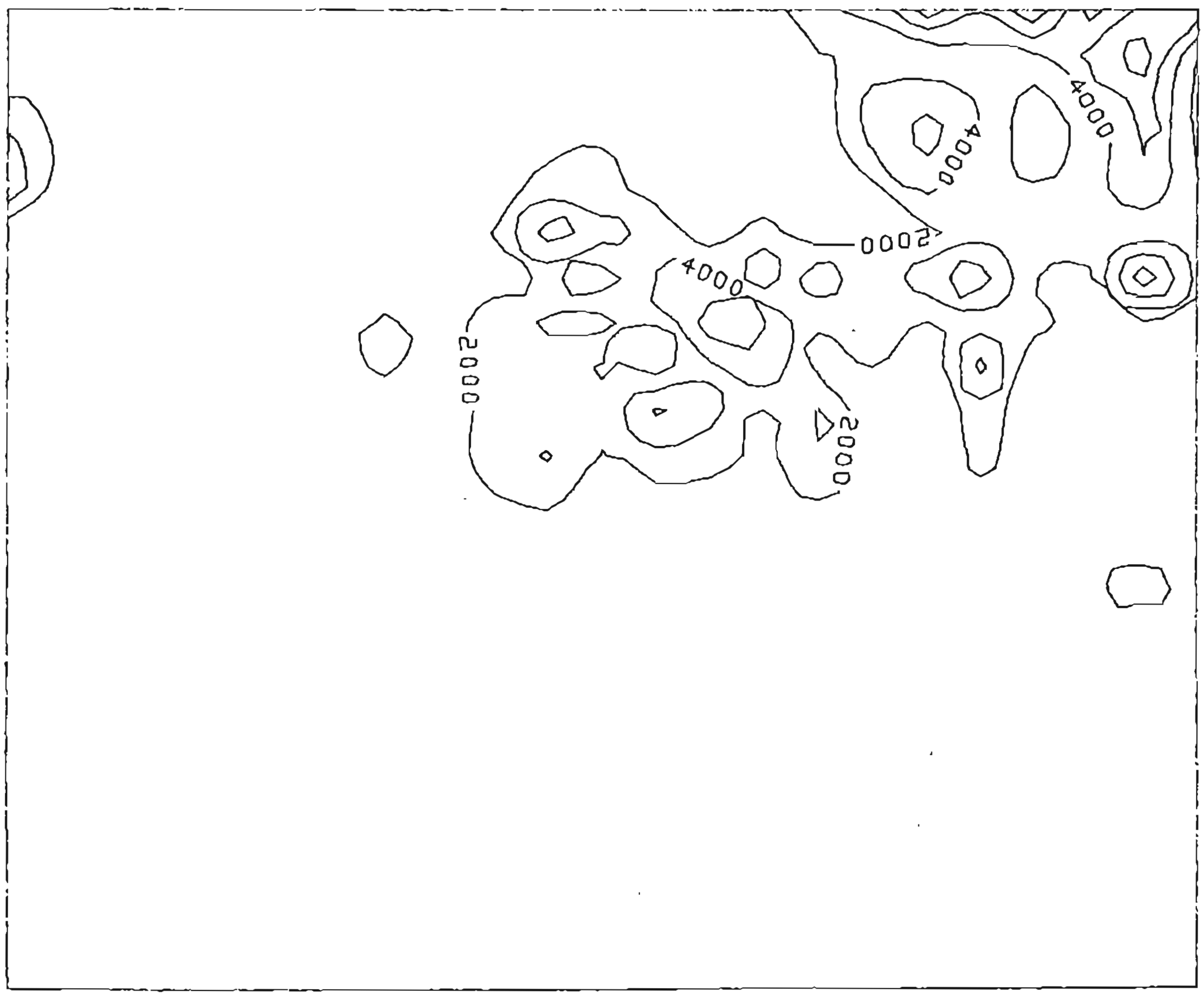
RED DOG - TREND #4.RESIDUALS..CU

PLOT NO. 2 DATE 01/11/79 TIME 16



RED DOG CONTOUR - - PB

PLOT NO. 2 DATE 01/11/79 TIME 16



RED DOG - TREND #4.RESIDUALS..PB

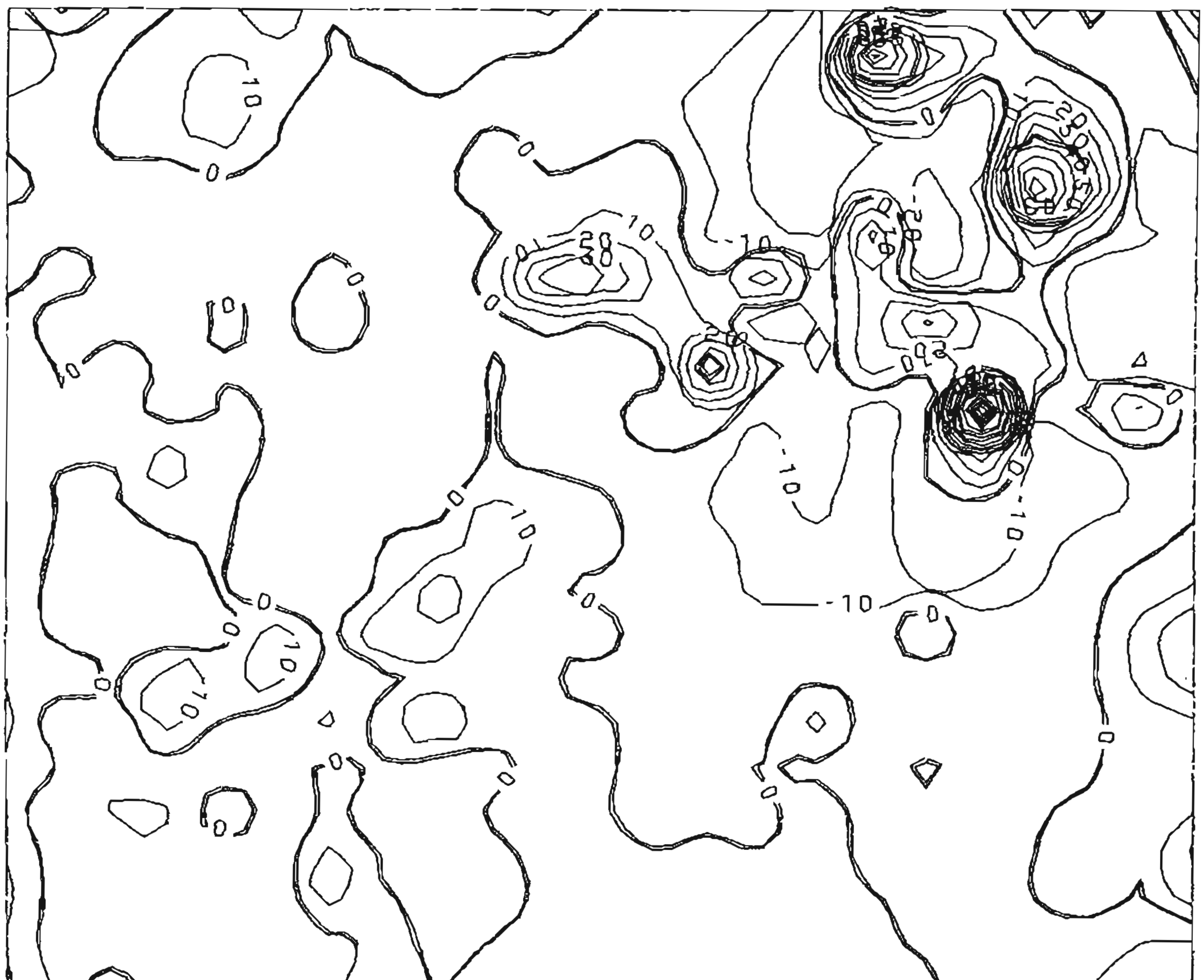
PLOT NO. 2 DATE 01/11/79 TIME 16

RED DOG - CONTOUR..MOLYBDENUM

PLOT NO. 2 DATE 01/11/79 TIME 17

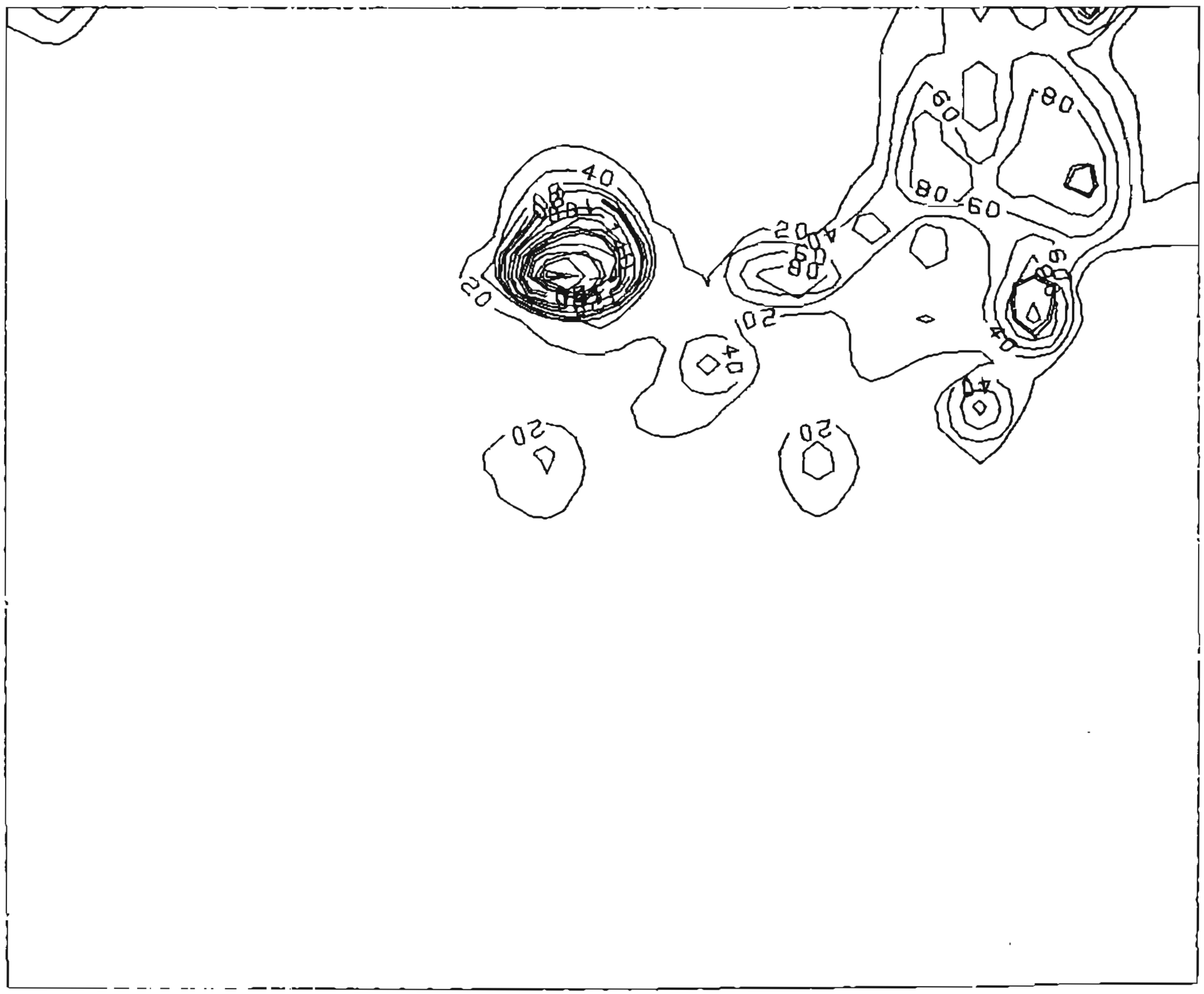
RED DOG - TREND #4,RESIDUALS..MO

PLOT NO. 2 DATE 01/11/79 TIME 17



RED DOG - - CONTOUR..AG

PLOT NO. 2 DATE 01/11/79 TIME 15

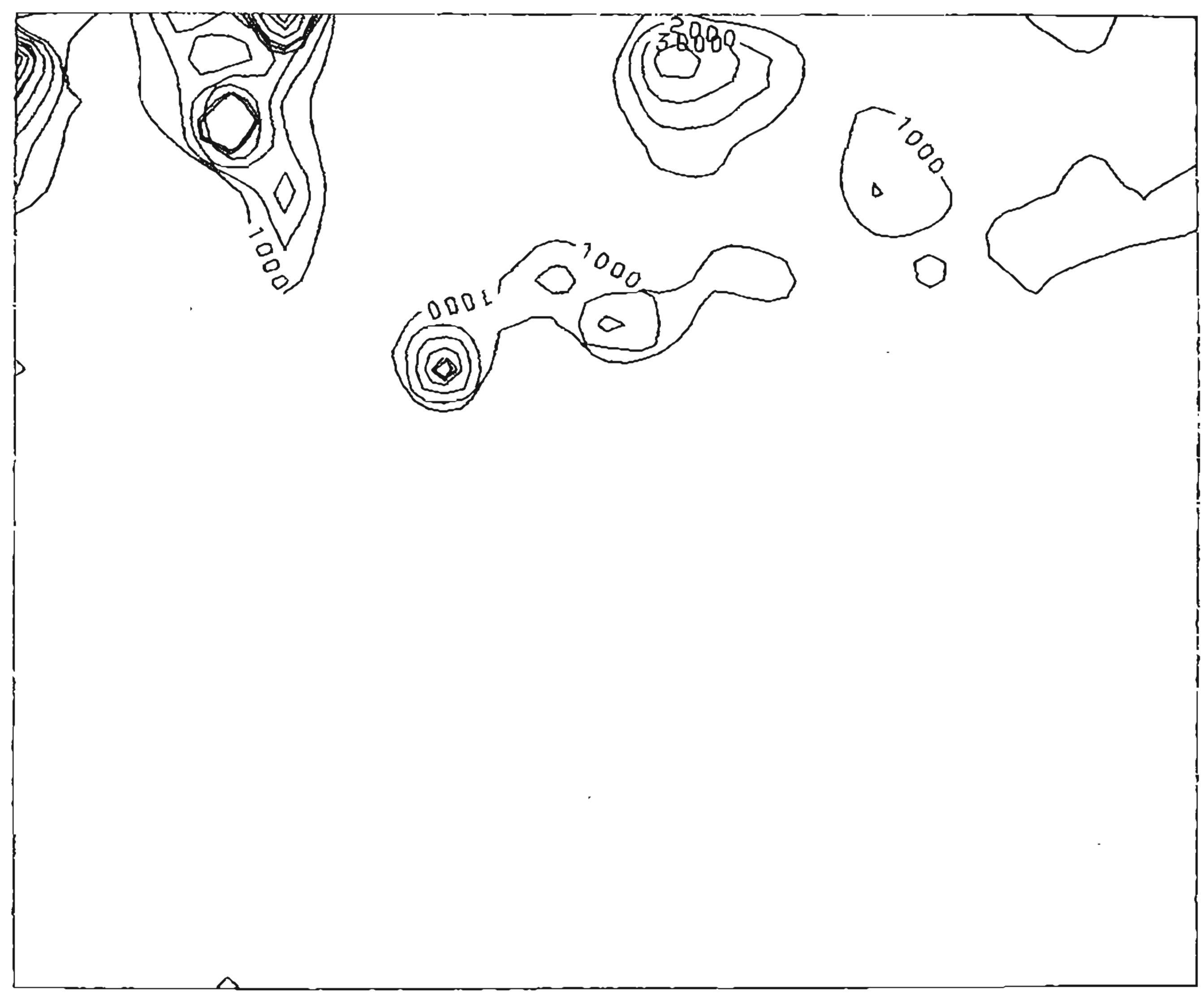


RED DOG - TREND #4.RESIDUALS..AG

PLOT NO. 2 DATE 01/11/79 TIME 10

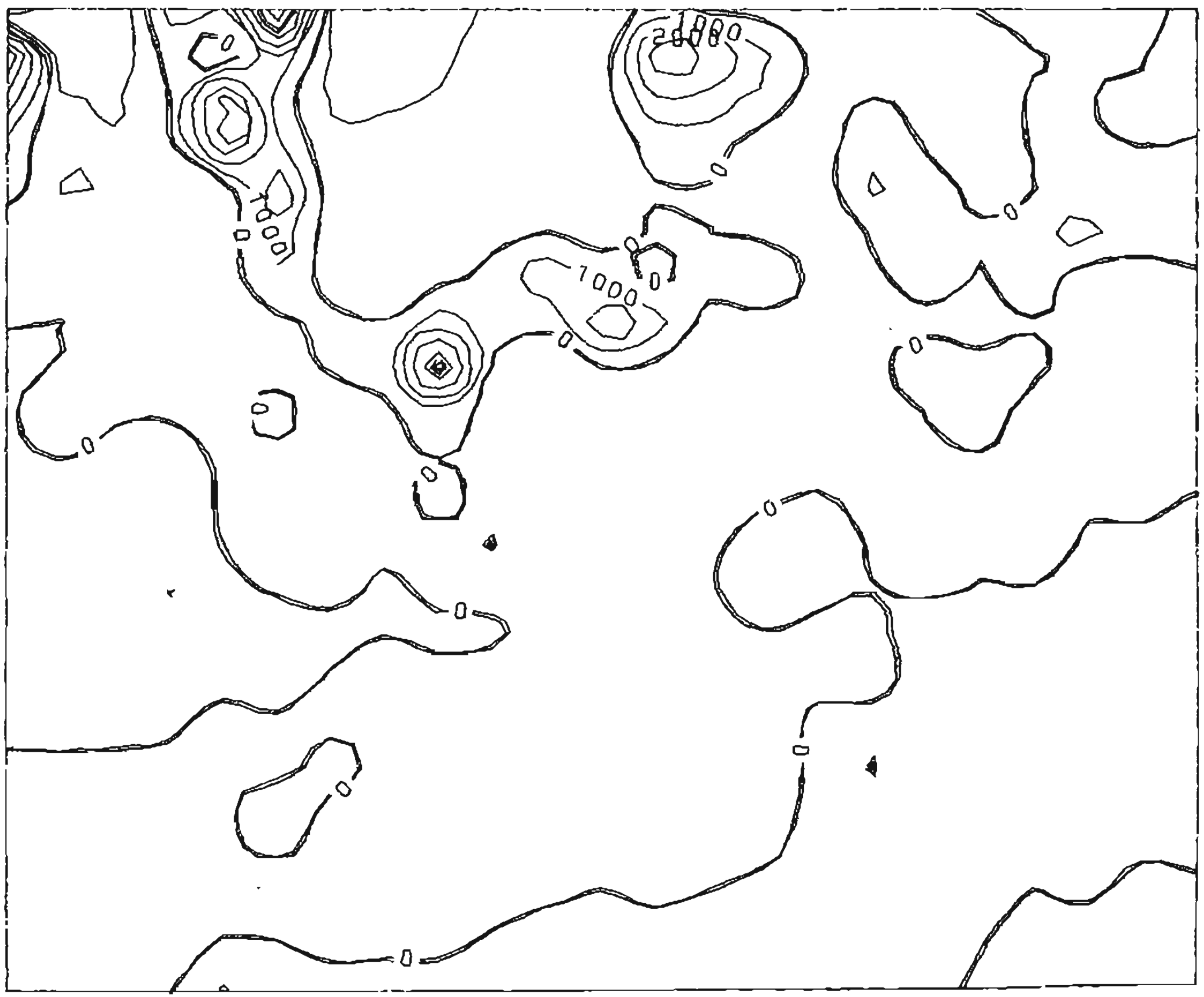
RED DOG - CONTOUR..ZN

PLOT NO. 2 DATE 01/11/79 TIME 17



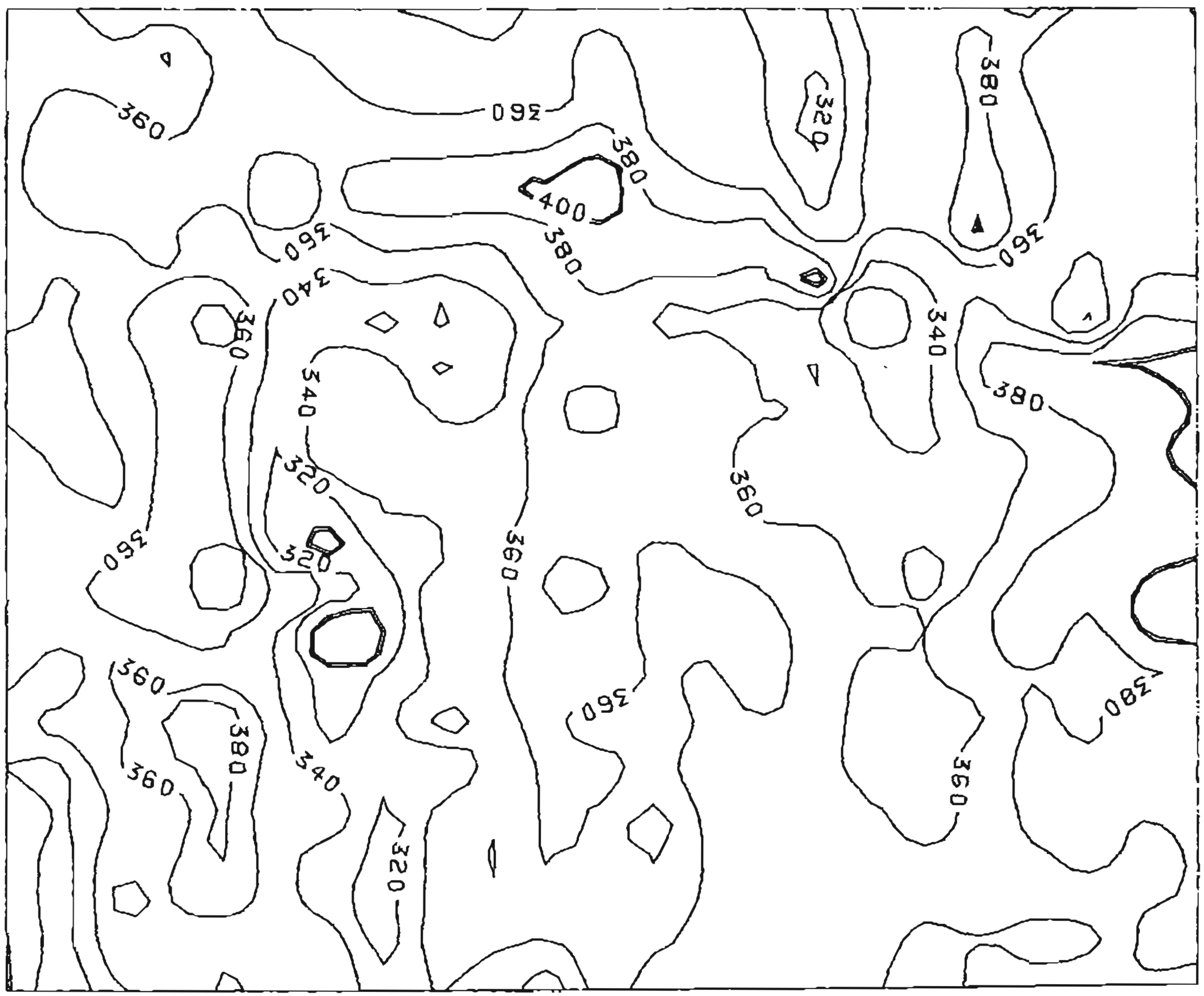
RED DOG - TREND #4,RESIDUALS..ZN

PLOT NO. 2 DATE 01/11/79 TIME 17



RED DOG - CONTOUR ..MAGNETIC

PLOT NO. 2 DATE 01/10/79 TIME 19

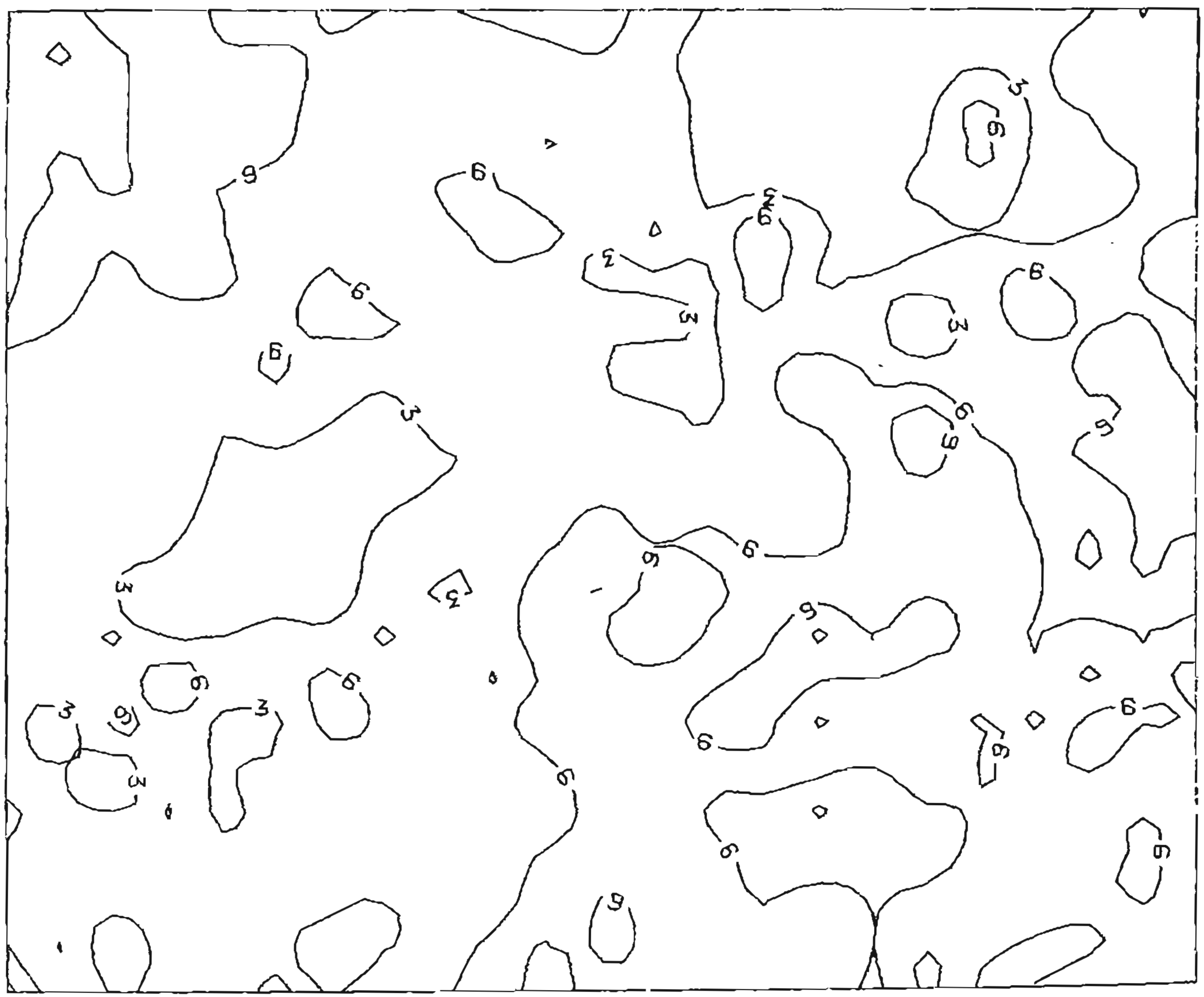


RED DOG · TREND #4, RESIDUALS..MAGNETIC

PLOT NO. 2 DATE 01/10/79 TIME 19

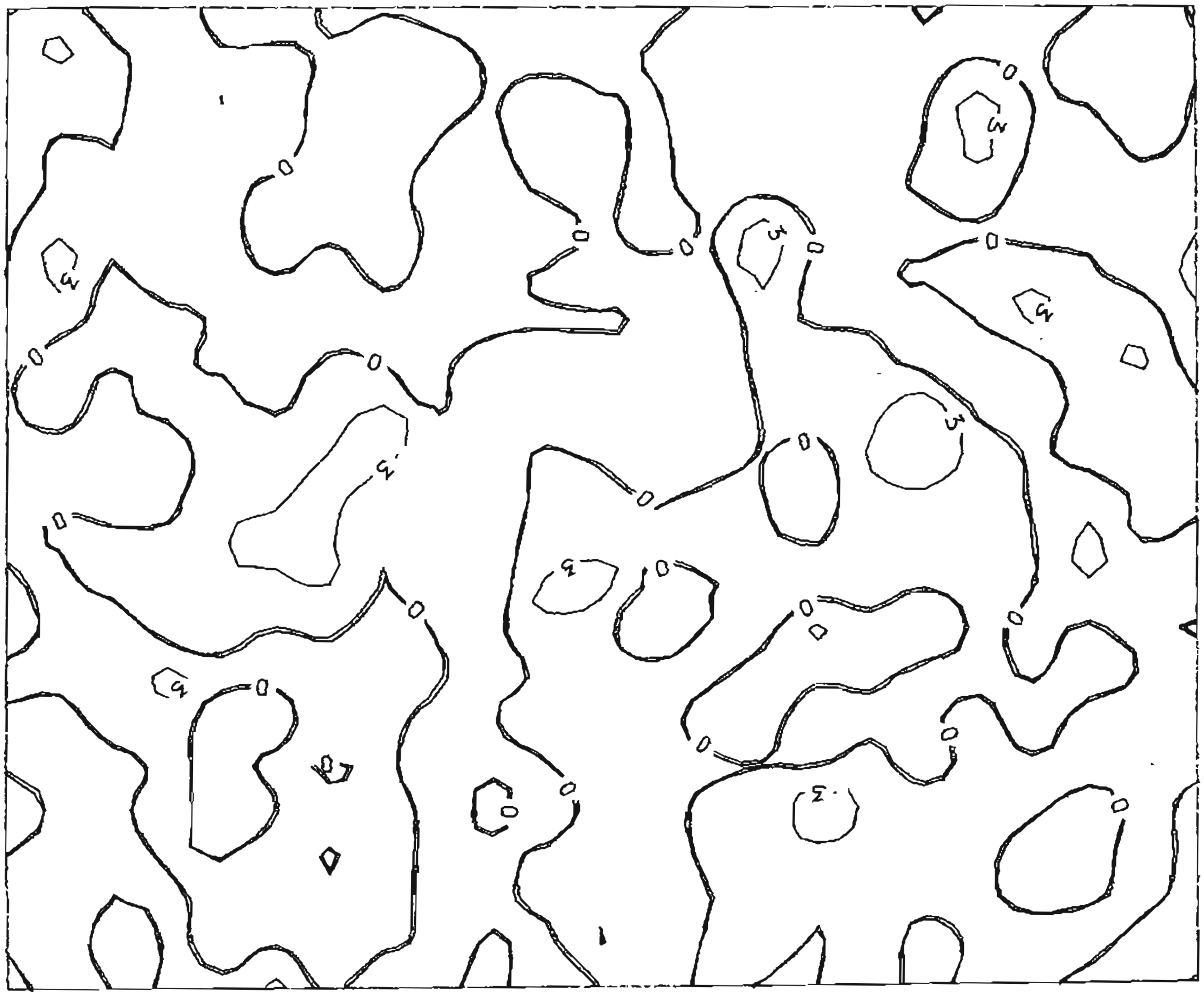
RED DOG - CONTOUR..POTASSIUM

PLOT NO. 2 DATE 01/10/79 TIME 17



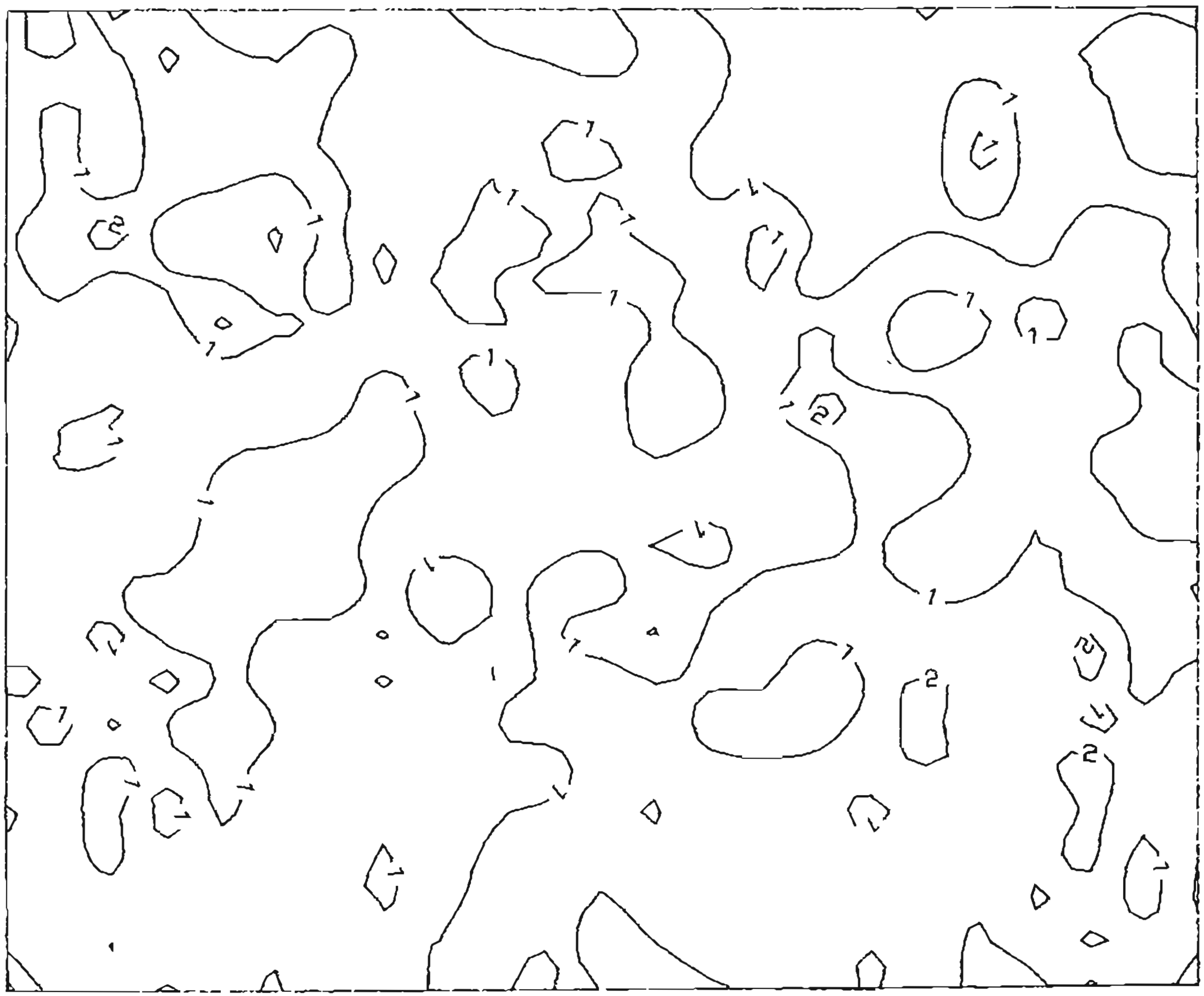
RED DOG - TREND #4,RESIDUALS..POTASSIUM

PLOT NO. 2 DATE 01/10/79 TIME 17



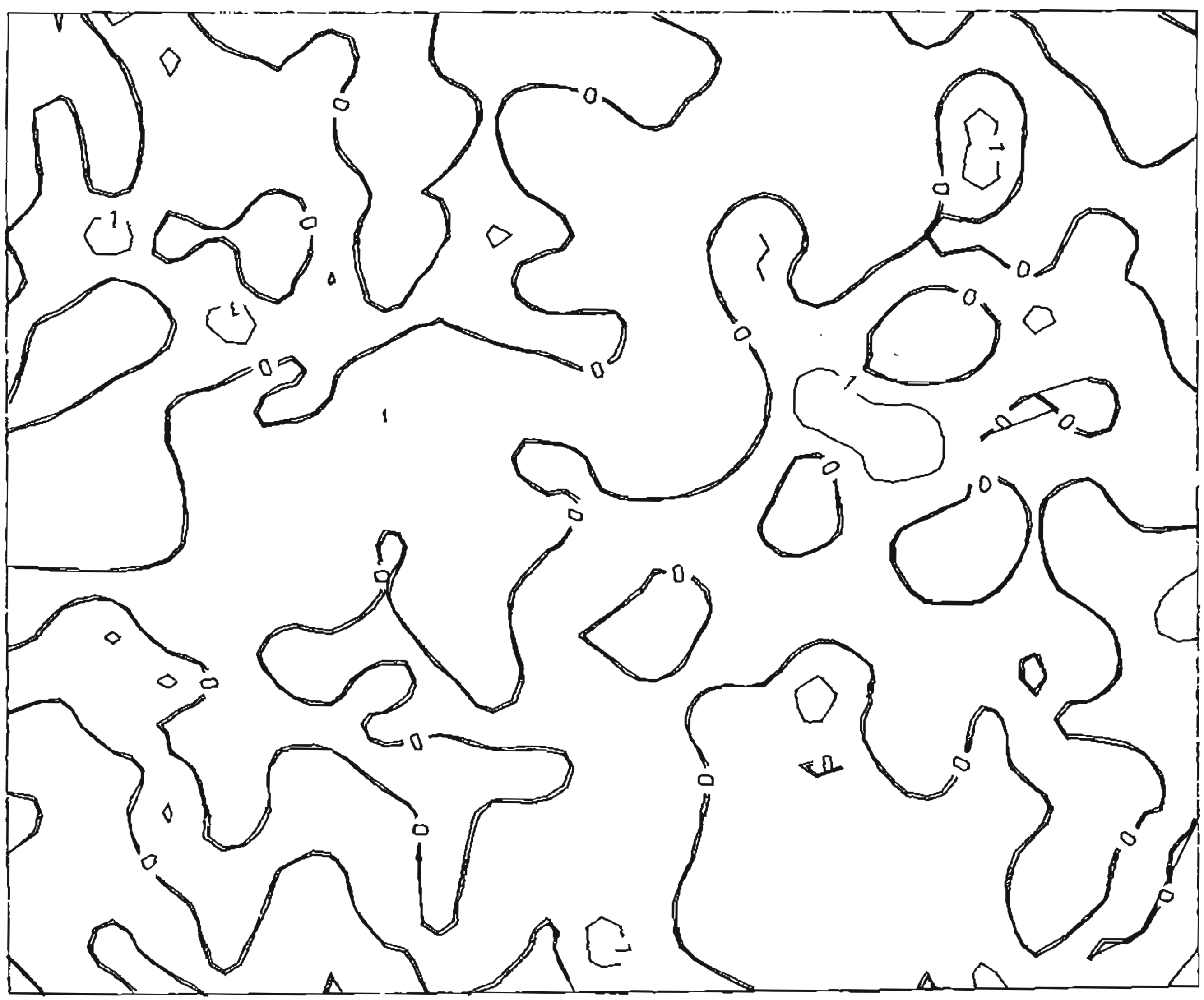
RED DOG - CONTOUR..THORIUM

PLOT NO. 2 DATE 01/10/79 TIME 17



RED DOG - TREND #4,RESIDUALS..THORIUM

PLOT NO. 2 DATE 01/10/79 TIME 17

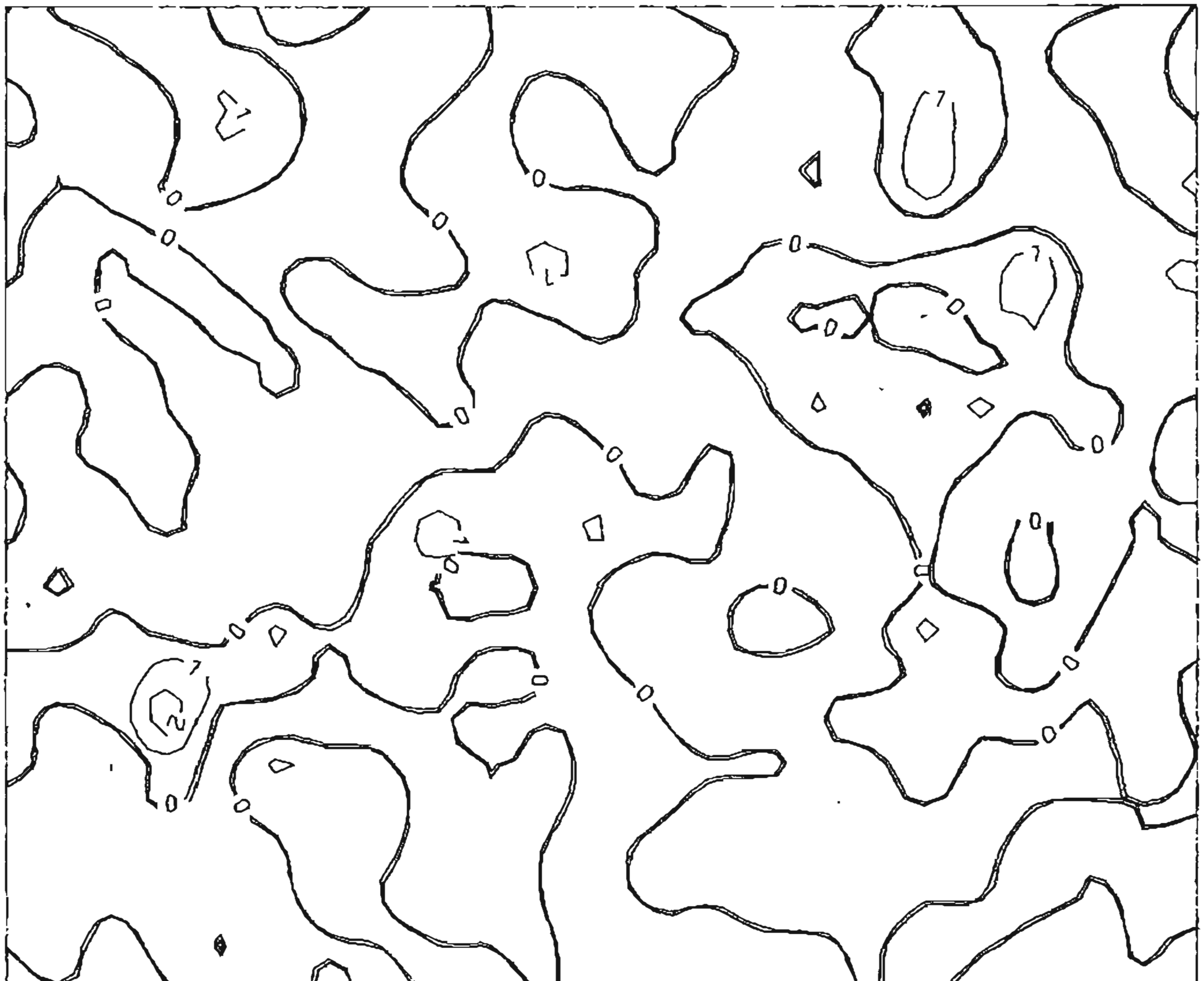


RED DOG - CONTOUR..URANIUM

PLOT NO. 2 DATE 01/10/79 TIME 18

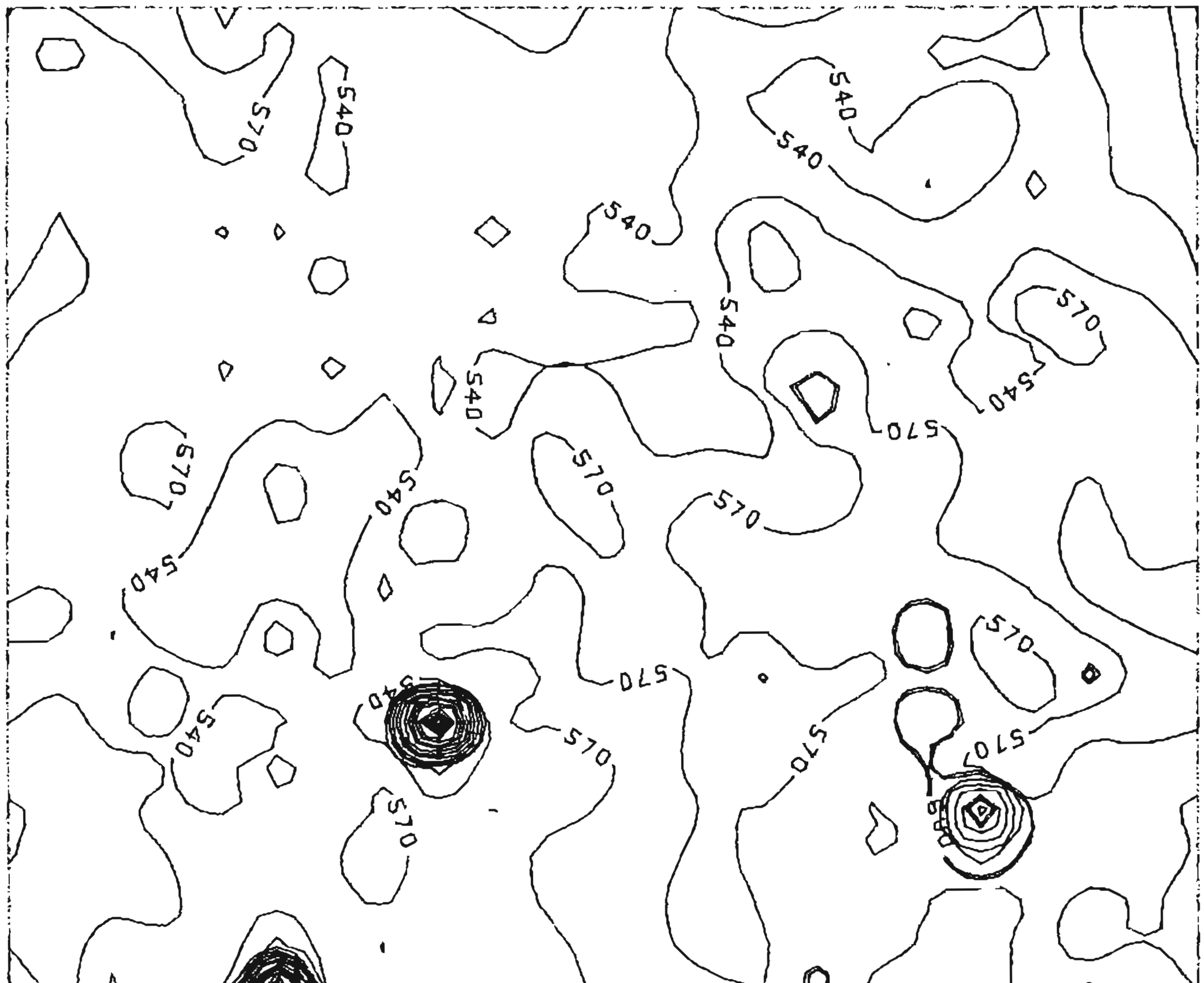
RED DOG - TREND #4,RESIDUALS..URANIUM

PLOT NO. 2 DATE 01/10/79 TIME 18



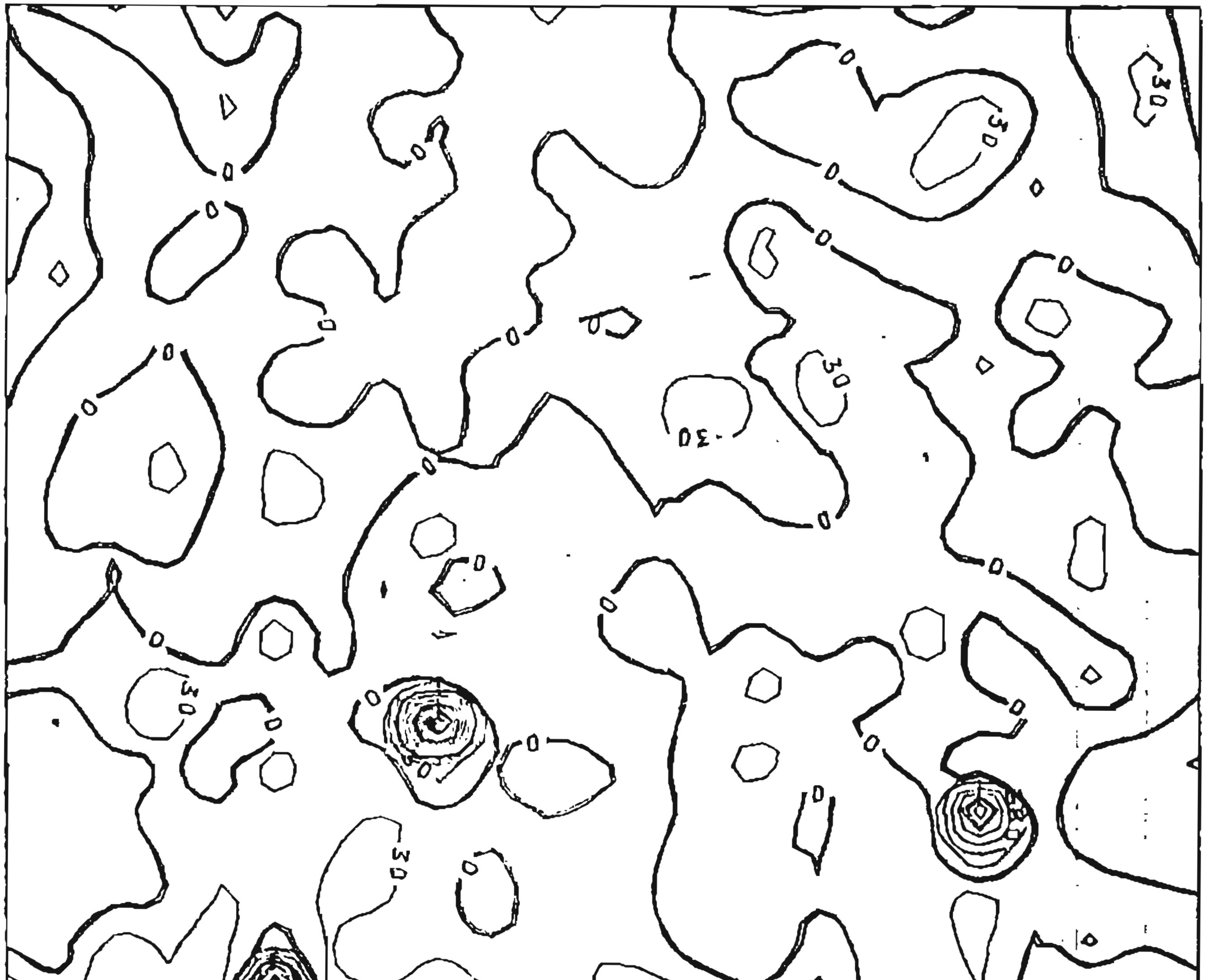
RED DOG - CONTOUR..TOTAL COUNT

PLOT NO. 2 DATE 01/10/79 TIME 16



RED DOG - TREND #5, RESIDUALS..TOTAL COUNT

PLOT NO. 2 DATE 01/10/79 TIME 15



APPENDIX II

Geochemical analyses, sample means, ranges, standard deviations, and anomalous samples -

Red Dog Creek

MINERAL INDUSTRY RESEARCH LABORATORY

ANALYTICAL METHOD ATOMIC ABSORPTION SPECTROPHOTOMETRY

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STR SD	311	26.000	52.000	12000.000	84.000	26.000
	312	7.200	87.000	10000.000	9900.000	7.000
	313	7.100	120.000	3100.000	2600.000	11.000
	314	20.000	110.000	7600.000	2600.000	20.000
	315	0.700	66.000	62.000	170.000	1.000
	316	0.700	29.000	120.000	300.000	1.000
	317	6.800	100.000	830.000	410.000	8.000
	318	3.000	53.000	25.000	1300.000	6.000
	319	1.400	54.000	58.000	110.000	3.000
	320	1.400	54.000	33.000	120.000	3.000
	321	0.700	62.000	39.000	150.000	6.000
	322	2.000	80.000	100.000	110.000	4.000
	323	4.400	72.000	76.000	270.000	8.000
	324	3.900	130.000	99.000	240.000	11.000
	325	7.000	110.000	130.000	100.000	17.000
	326	3.600	110.000	74.000	78.000	12.000
	327	1.100	110.000	71.000	170.000	7.000
	328	2.300	100.000	58.000	65.000	19.000
	329	1.800	120.000	36.000	150.000	12.000
	330	1.500	78.000	57.000	130.000	12.000
	333	57.000	400.000	11000.000	1600.000	37.000
	334	5.600	21.000	2100.000	120.000	6.000
	336	0.	49.000	97.000	130.000	4.000
	337	0.500	61.000	49.000	170.000	5.000
	338	1.200	96.000	45.000	200.000	10.000
	339	2.400	72.000	1500.000	560.000	0.
	340	2.000	31.000	43.000	78.000	3.000
	341	0.300	15.000	34.000	26.000	4.000
	342	0.500	42.000	41.000	86.000	3.000
	343	0.500	41.000	30.000	110.000	3.000

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	344	0.700	61.000	27.000	150.000	3.000
	345	1.200	59.000	22.000	130.000	3.700
	346	1.400	92.000	130.000	200.000	14.000
	347	2.400	92.000	84.000	150.000	0.
	348	1.200	36.000	60.000	100.000	8.000
	349	1.000	76.000	4.800	130.000	2.000
	350	0.900	51.000	53.000	200.000	3.000
	351	0.	52.000	50.000	100.000	0.
	352	0.600	16.000	11.000	25.000	2.400
	355	3.000	150.000	140.000	480.000	14.000
	356	8.700	110.000	1700.000	330.000	12.000
	357	3.000	120.000	52.000	750.000	16.000
	358	1.400	78.000	58.000	200.000	4.000
	359	0.700	70.000	39.000	150.000	5.000
	360	1.400	88.000	50.000	180.000	3.000
	361	0.700	32.000	91.000	110.000	0.
	362	1.000	61.000	47.000	160.000	11.000
	363	1.600	76.000	48.000	180.000	10.000
	364	0.100	83.000	44.000	130.000	4.000
	365	0.	62.000	64.000	130.000	6.000
	366	0.	61.000	23.000	140.000	4.000
	367	3.100	74.000	99.000	230.000	1.000
	368	2.300	100.000	91.000	130.000	8.000
	369	2.800	87.000	66.000	290.000	1.200
	370	0.900	22.000	24.000	25.000	2.100
	371	1.400	42.000	42.000	98.000	0.
	372	1.800	72.000	36.000	120.000	10.000
	373	0.300	58.000	120.000	160.000	5.000
	374	1.600	72.000	94.000	120.000	10.000
	377	3.800	310.000	180.000	3600.000	10.000

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	378	4.000	170.000	270.000	2200.000	20.000
	379	1.000	110.000	71.000	1200.000	13.000
	380	0.300	63.000	71.000	150.000	2.000
	381	0.900	63.000	36.000	130.000	2.000
	382	0.600	54.000	68.000	110.000	0.
	383	0.700	36.000	75.000	110.000	2.000
	384	0.500	52.000	43.000	120.000	3.000
	385	0.600	66.000	40.000	160.000	2.000
	386	8.600	110.000	230.000	410.000	26.000
	387	4.300	51.000	810.000	260.000	8.000
	388	0.700	15.000	56.000	28.000	0.
	389	4.400	100.000	80.000	110.000	4.000
	390	4.800	140.000	160.000	350.000	24.000
	391	11.000	140.000	31.000	170.000	25.000
	392	2.000	82.000	33.000	130.000	8.000
	393	0.200	40.000	29.000	130.000	0.
	394	0.700	55.000	29.000	160.000	5.000
	395	2.500	100.000	28.000	90.000	10.000
	396	0.	63.000	17.000	90.000	5.000
	399	2.300	130.000	180.000	2800.000	14.000
	400	3.600	120.000	800.000	690.000	16.000
	401	4.800	155.000	73.000	9000.000	29.000
	402	0.	80.000	80.000	180.000	1.000
	403	0.	50.000	110.000	120.000	1.000
	404	1.200	60.000	74.000	140.000	5.000
	405	1.400	76.000	150.000	160.000	7.000
	406	1.400	67.000	50.000	160.000	6.000
	407	4.000	64.000	56.000	160.000	8.000
	408	3.000	38.000	140.000	46.000	10.000
	409	4.800	26.000	180.000	68.000	12.000

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	410	15.000	56.000	140.000	120.000	12.000
	411	6.400	44.000	68.000	92.000	8.000
	412	6.600	92.000	110.000	180.000	20.000
	413	2.500	59.000	43.000	99.000	12.000
	414	0.800	34.000	34.000	93.000	7.000
	415	6.800	140.000	140.000	130.000	20.000
	416	0.100	28.000	31.000	130.000	2.000
	417	0.100	45.000	32.000	110.000	2.000
	418	3.600	92.000	850.000	1300.000	4.000
	421	3.700	380.000	130.000	9300.000	20.000
	422	1.700	150.000	160.000	3000.000	9.000
	423	0.900	43.000	170.000	1200.000	3.000
	424	2.800	160.000	200.000	4200.000	4.000
	425	2.000	99.000	75.000	2400.000	3.000
	426	2.200	72.000	480.000	1400.000	0.
	427	1.000	66.000	140.000	240.000	5.000
	428	0.800	66.000	49.000	260.000	3.000
	429	3.000	46.000	210.000	350.000	8.000
	430	2.800	42.000	110.000	78.000	8.000
	431	2.800	30.000	80.000	52.000	0.
	432	1.600	21.000	21.000	92.000	0.
	433	5.900	110.000	71.000	260.000	27.000
	434	5.000	120.000	110.000	350.000	24.000
	435	1.000	53.000	44.000	120.000	6.000
	436	4.100	78.000	57.000	69.000	8.000
	437	3.900	120.000	220.000	550.000	8.000
	438	0.500	49.000	22.000	69.000	0.
	439	1.600	64.000	32.000	200.000	0.
	440	0.800	100.000	40.000	130.000	4.000
	443	0.400	22.000	150.000	380.000	0.

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	444	0.800	34.000	180.000	180.000	1.000
	445	0.800	40.000	96.000	140.000	0.
	446	0.400	47.000	59.000	140.000	1.000
	447	1.600	39.000	140.000	140.000	0.
	448	2.800	60.000	56.000	180.000	12.000
	449	2.800	180.000	72.000	760.000	12.000
	450	11.000	59.000	1300.000	400.000	6.000
	451	5.800	62.000	650.000	98.000	4.000
	452	2.800	22.000	16.000	80.000	4.000
	453	3.200	49.000	130.000	80.000	0.
	454	7.200	56.000	52.000	52.000	0.
	455	5.200	92.000	52.000	260.000	8.000
	456	0.800	85.000	13.000	150.000	5.000
	457	3.200	64.000	32.000	120.000	0.
	458	5.200	90.000	130.000	360.000	14.000
	459	1.200	76.000	32.000	110.000	12.000
	460	6.400	70.000	52.000	82.000	32.000
	461	0.	48.000	20.000	96.000	4.000
	462	1.600	140.000	56.000	170.000	2.000
	465	1.600	37.000	160.000	120.000	0.
	466	0.300	35.000	140.000	99.000	2.000
	467	0.600	72.000	98.000	150.000	0.
	468	0.600	36.000	38.000	64.000	0.
	469	1.200	96.000	120.000	150.000	0.
	470	2.800	88.000	390.000	152.000	0.
	471	3.700	87.000	2500.000	460.000	6.000
	472	7.200	90.000	2500.000	310.000	6.000
	473	0.600	24.000	230.000	56.000	0.
	474	3.300	58.000	64.000	240.000	6.000
	475	1.100	41.000	83.000	110.000	11.000

TABLE 18

LIVENGOOD QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AMR154	Lithic tuff with calcite stringers			
155	Lithic tuff with calcite stringers and manganese staining	Ca		
156	Lithic conglomerate			
157	Lithic conglomerate with carbonate cement			
158	Lithic sandstone with coal fragments			
159	Lithic conglomerate			
160	Lithic conglomerate			
161	Tuff with manganese staining	Mg		
162	Well-indurated siltstone with calcite stringers			P
163	Tuff with calcite stringers	Ca		
164	Porphyritic andesite			
165	Phyllite	Y		Ti
166	Tuff			
167	Conglomerate			
168	Lithic tuff			Zr
169	Amygdaloidal basalt	Ca,Mg,Ti		
170	Chloritized andesite	Ca,Mg,Ti		
171	Volcanic rock	Ca		
172	Lithic conglomerate			

TABLE 18

LIVENGOOD QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AMR173	Graphitic material			
174	Lithic tuff with quartz stringers			
175	Amygdaloidal volcanic	Mg,Ti	Y	
176	Volcanic rock with minor pyrite			
177	Chloritized volcanic rock with pyrite and chalcopyrite			
178	Chloritized amygdaloidal basalt	Ca		Ga
179	Chloritized andesite	Ca,V		Ga
180	Argillite			
181	Siltstone			
182	Siltstone			
183	Diorite with minor pyrite	Ca,Mo,V	Y	Ga,Ti
184	Lithic tuff with calcite stringers	Ca		Ga
185	Argillite	Ca,Ti		Ga
186	Lithic tuff			
187	Lithic tuff			
188	Phyllite with minor pyrite			
189	Lithic tuff			K
190	Lithic tuff			K
191	Lithic tuff			
192	Lithic tuff			Mg
193	Chloritized diorite with pyrite	Ca		
194	Chloritized, silicified, quartz diorite with pyrite			Ga

TABLE 18

LIVENGOOD QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AMR195	Chloritized volcanic rock	Ca,Ti,V		
196	Siltstone with graphitic partings			
197	Lithic tuff	Ca,Ti		
198	Vein material with pyrite, sphalerite, calcite	Ca		Cr,Mg,Ni,Zn
199	Chloritized and silicified tuff with quartz stringers	Ca,Mg	Ti,Y	
200	Silicified tuff with pyrite			
201	Altered tuff with quartz stringers	Ca		
202	Chert with quartz stringers	P		
203	Silicified Lithic tuff with quartz stringers	Ca,Mg		
204	Chloritized andesite with pyrite	Ca,P	Bi	
205	Silicified dike rock		Bi	
206	Chloritized diorite	Ca,Ni,Ti,Y	Mg	Cr
207	Argillite			
208	Silicified argillite			
209	Lithic tuff	Ca,V	Mg	Ga
210	Sheared siltstone with iron-staining	Mo		Ga,K
211	Chloritized, sheared, tuff	Ca	Mg,Ni	Cr,Y
212	Altered olivine gabbro	Ca,Mg,Mo,Ti,Y	V	Ti
213	Chloritized olivine gabbro	Ca,Mo		Cr,Mg,Sc,Ti,V
214	Quartzite			
215	Quartzose sandstone			Bi,P
216	Siliceous siltstone with plant fragments		Bi	

TABLE 18

LIVENGOOD QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AMR217	Siltstone with limonite staining			
218	Chloritized diorite	Ca,Mg		
219	Phyllite			Zn
76AJB302	?			
305	?			
309	?			
401	Schist and quartzite			
402	Quartzite with quartz veining			
403	Quartzite			
404	Quartz vein material			
405	Vein material			
504	Shale			
505	Graywacke			
506	Graywacke			
507	Graywacke			
508	Granite porphyry			Pb
514	Shale and granite			
515	Shale			
516	Granite			
517	Shale			
518	Granite dike material			
519	Chert			
520	Granite			
521	?			Zn
522	?			
523	Granite			
524	Chert			
525	Granite			

TABLE 18

LIVENGOOD QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AJB526	Granite			
527	Granite			
528	Granite			
529	Granite			
530	Shale and slate			
721	Schist and quartzite	B		Ga
722	Schist	Mi		
723	Quartzite	K		B
724	Quartzite			
725	?			
731	Quartzite and schist			
732	?		Mo	Sc
733	?			
734	?			
735	?			As
741	Granite and quartzite	Bi		Ag,Ga,K
742	Granite and quartzite		Mo,Pb	Ag,Ga,K,Na,Sc
743	Granite			B,Ga,K,Na
744	Alaskite			
745	Alaskite	Bi	Pb	
746	Alaskite			
747	Alaskite	K,Zn		
748	Alaskite	K		Na
749	Alaskite			
750	Alaskite			
751	Banded granite	Bi		

TABLE 18

LIVENGOOD QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AJB752	Granite			
753	Quartzite			
755	Quartzite and schist			Sc
761	Quartzite and biotite schist			
762	Quartzite and biotite schist			
763	Quartzite	Ni	Mo	Co,K,Sc,Y
764	Quartzite			
765	Vein material		Mo	Sc
766	Quartzite			
767	Schist			
768	?			
769	?			
770	Biotite schist and quartzite			
771	Schist and quartzite			
772	Quartzite			
781	Micaceous quartzite			
782	Schist with quartz veining			
783	Quartzite and schist			
784	Quartzite			
785	?			
786	Quartzite			
787	Biotite schist			Na
788	Quartzite			
789	Biotite schist and quartzite			K
790	Biotite schist		Mo	Ag,Au,B,Sc,Se

TABLE 18

LIVENGOOD QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
791	Quartzite	Se		
792	Quartzite and biotite schist			P,Se
793	Quartzite		Mo	P,Se
794	Schist	Mn		K
795	Quartzite and biotite schist			
796	Biotite schist and quartzite			
797	Biotite schist and quartzite			
798	Muscovite schist and micaceous quartzite			
799	Phyllite and quartzite	K,Mg		
800	Phyllite			
801	Phyllite			
802	Phyllite and schist			
821	Dike rock			
822	Phyllite and Slate			
823	Vein material			
824	Mafic intrusive			
825	Mafic intrusive	Ca,Mo	Y	Sr
826	Slate			
827	Intrusive	Ca,Mo		Sr
828	Mafic intrusive and slate			
829	Mafic intrusive			
831	Quartzite	Mo,P		Au,B,Ga,La,Sn,Ta,W, Y,Zr
832	?			
833	Slate			
841	Mafic intrusive			

TABLE 18

LIVENGOOD QUADRANGLE

Rock Sample Descriptions and Trace-Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AJB842	Mafic intrusive			
843	Mafic intrusive			
844	Schist and mafic intrusive			
845	Mafic intrusive			
846	Mafic intrusive			
847	Mafic dike rock			
848	Slate			
849	Slate			
850	Mafic intrusive(?)			
851	Mafic intrusive(?)			
852	Quartz diorite			
853	Mafic intrusive and quartz diorite			
854	?		K	
855	?			
856	?			Be,K
857	Slate			Bi
911	Granite			B
912	Granite			
913	Granite			
914	Granite and schist			B
915	Granite and schist			
916	Contact Rock (?)			Pb,Zn
921	Slate	Zn		
922	Slate	K		Pb
923	Dike rock			
924	Granite dike	Pb	K	Mn,Zn

TABLE 18

LIVENGOOD QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AJB925	Slate		Mn	Zn
926	Altered intrusive			
927	Slate and granite			
928	Granite dike	Bi,K		
929	Granite dike			K
930	Slate			
931	Slate			
932	Granite			
933	Slate			
934	Slate			Ga,K,Zn
935	Slate			
936	Slate			
951	Conglomerate	Ni		
952	Shale	Mo,Y		
953	Graywacke and slate	Y		
954	Shale and slate		Y	
955	Slate		Y	
959	Slate			
960	?			
961	Slate with minor pyrite			Ga,K
962	Conglomerate and black slate			
963	Conglomerate	La		Ga,K,Y
965	Slate			Zn
966	Slate			Ag,Pb
967	Granite dike			
968	Shale and slate			

TABLE 18

LIVENGOOD QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AJB969	Granite with quartz veining	Mo		Ga,K,Sc,Y,Zn
970	Slate			
971	Granite			
972	Slate		Y	K
973	Granite dike			Pb
981	Slate			Pb
982	Slate and shale			
983	Slate and shale			
984	Graywacke			
985	Shale			
986	Conglomerate			
987	Shale and Graywacke			

TABLE 19

MIRL Rock Samples, Birch Creek Terrane, 1976
(based on 155 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level		
		Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	26	27	28
Al		11.58%	12.67%	13.69%
As	800	855	867	877
Au	20	21	22	22
B	100	108	110	112
Ba	700	881	918	953
Be	10	10	10	10
Bi	200	385	412	436
Ca	40	4.20%	4.95%	5.64%
Cd	400	400	401	401
Co	40	47	49	50
Cr	20	141	159	176
Cu	40	238	278	314
Fe		7.14%	7.94%	8.69%
Ga	20	24	25	25
K	1.1%	7.44%	8.31%	9.11%
La	200	200	200	200
Li	1.0%	1.0%	1.0%	1.0%
Mg		2.48%	2.81%	3.13%
Mn	60	1572	1776	1966
Mo	10	18	19	20
Na	1.0%	1.97%	2.24%	2.49%
Nb	800	801	801	801
Ni	20	82	92	101
P	800	956	986	1013
Pb	80	122	130	137
Pd	20	20	20	20
Pt	20	20	20	20
Sb	500	512	515	517
Sc	10	25	27	29
Se	300	523	566	607
Si		11.23%	11.50%	11.76%
Sn	60	66	67	69
Sr	10	105	121	135
Ta	300	406	433	459
Te	200	300	328	354
Ti	500	2877	3240	3577
V	40	90	99	107
W	200	228	234	239
Y	20	93	98	101
Zn	10	81	90	98
Zr	20	163	184	204

TABLE 20

MIRL Rock Samples, Rampart Terrane, 1976
(based on 297 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level: Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	66	75	84
Al		13.44%	14.64%	15.75%
As	800	6400	7543	8605
Au	20	23	24	25
B	100	390	448	502
Ba	700	5461	6427	7325
Be	10	12	13	13
Bi	200	483	526	565
Ca	40	8.76%	10.12%	11.39%
Cd	400	451	463	474
Co	40	487	579	665
Cr	20	332	383	430
Cu	40	503	589	669
Fe		10.79%	11.94%	13.01%
Ga	20	27	29	30
K	1.1%	4.21%	4.65%	5.06%
La	200	228	234	239
Li	1.0%	1.0%	1.0%	1.0%
Mg		6.05%	6.83%	7.56%
Mn	60	9778	1.15%	1.31%
Mo	10	28	30	33
Na	1%	3.23%	3.64%	4.02%
Nb	800	801	801	801
Ni	20	240	279	314
P	800	1056	1103	1146
Pb	80	318	364	406
Pd	20	22	22	23
Pt	20	25	27	28
Sb	500	502	503	503
Sc	10	40	45	49
Se	300	993	1128	1253
Si		11.40%	11.72%	12.02%
Sn	60	74	76	79
Sr	10	168	194	219
Ta	300	404	430	455
Te	200	295	325	352
Ti	500	3345	3713	4055
V	40	168	186	202
W	200	248	257	266
Y	20	128	138	146
Zn	10	291	337	379
Zr	20	127	145	162

TABLE 21

TANANA QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AMR220	Silicified diorite with pyrite			Bi,Se
221	Phyllite			
222	Phyllite	Fe	Mo	B,Zn
223	Phyllite			Zn
224	Phyllite			
225	Phyllite			Cu
226	Phyllite	Zn		
227	Phyllite			Bi
228	Phyllite	Bi		Zn
229	Phyllite			Bi,Ga
230	Phyllite			
231	Volcanic pebble conglomerate			

TABLE 22

TANANA QUADRANGLE

Stream Sediment Sample Trace Concentrations

Sample Number	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AMR403	Fe		

TABLE 23

MIRL Rock Samples, Kanuti Terrane, 1976
(based on 107 samples)
Values in PPM or Percent (as noted)

		Minimum or Threshold Values to give indicated confidence level		
Element	Level of Detection	Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	34	37	39
Al		13.57%	14.96%	16.26%
As	800	800	800	800
Au	20	20	20	20
B	100	102	102	102
Ba	700	805	826	845
Be	10	10	10	10
Bi	200	460	503	543
Ca	40	7.73%	8.97%	10.13%
Cd	400	400	400	400
Co	40	83	91	99
Cr	20	8596	1.03%	1.19%
Cu	40	64	69	73
Fe		9.7%	10.87%	11.95%
Ga	20	26	27	28
K	1.1%	4.6%	5.15%	5.66%
La	200	243	251	258
Li	1.0%	1.0%	1.0%	1.0%
Mg		5.97%	6.85%	7.67%
Mn	60	1719	1941	2147
Mo	10	27	29	32
Na	1%	1.62%	1.81%	1.99%
Nb	800	966	1043	1087
Ni	20	1157	1367	1562
P	800	940	967	992
Pb	80	130	139	148
Pd	20	23	24	24
Pt	20	27	29	30
Sb	500	500	501	501
Sc	10	44	48	53
Se	300	557	607	653
Si		10.0%	10.0%	10.0%
Sn	60	110	119	128
Sr	10	149	169	188
Ta	300	403	429	454
Te	200	282	304	325
Ti	500	4164	4703	5205
V	40	131	144	156
W	200	319	342	364
Y	20	134	143	152
Zn	10	99	113	125
Zr	20	131	147	162

TABLE 24

MIRL Stream Sediment Samples, Kanuti Terrane, 1976
(based on 23 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level: Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	31	32	34
Al		12.49%	13.27%	13.99%
As	800	800	800	800
Au	20	20	20	20
B	100	127	132	137
Ba	700	859	888	916
Be	10	10	10	10
Bi	200	200	200	200
Ca	40	1.90%	2.18%	2.45%
Cd	400	400	400	400
Co	40	40	40	40
Cr	20	358	417	472
Cu	40	40	40	40
Fe		4.73%	5.13%	5.49%
Ga	20	28	29	31
K	1.1%	5.0%	5.48%	5.93%
La	200	200	200	200
Li	1.0%	1.0%	1.0%	1.0%
Mg		1.48%	1.60%	1.72%
Mn	60	1345	1495	1635
Mo	10	20	22	23
Na	1%	1.12%	1.22%	1.30%
Nb	800	800	800	800
Ni	20	88	98	108
P	800	839	847	853
Pb	80	92	95	97
Pd	20	20	20	20
Pt	20	20	20	20
Sb	500	500	500	500
Sc	10	37	41	44
Se	300	300	300	300
Si		10.0%	10.0%	10.0%
Sn	60	64	65	65
Sr	10	202	231	259
Ta	300	390	412	433
Te	200	200	200	200
Ti	500	2278	2461	2632
V	40	95	102	109
W	200	223	228	232
Y	20	115	122	129
Zn	10	72	81	90
Zr	20	146	163	178

TABLE 25

BETTLES QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AMR232	Quartz mica schist and micaceous quartzite with pyrite		Mo	La,Se,W
233	Quartz mica schist and micaceous quartzite			
234	Quartz muscovite schist			
235	Quartz muscovite schist			
236	Porphyritic biotite granite			Ga,Na
237	Porphyritic biotite granite		Ca	Na,Sr
238	Hornblendite and dunite	Fe	Bi,Ca,Pb,Sc	Mg,Ni,V
239	Serpentinized harzbergite with chromite	Fe	Mo	Co,Mg,Ni
240	Serpentinized lherzolite	Fe,La,Y	Mo	Co,Mg,Ni,Pb,Sn,W
241	Serpentinized lherzolite	Fe	Ca,Mo	Co,Cu,Mg,Pb
242	Serpentinized dunite with chromite			Co,Cr,Ga,Mg,Ni,Pb,Sn, Zn
243	Clinopyroxenite		Bi,Ca	Mg,P,Pb,Sc,Ti
244	Chloritized diorite	Ti	Ca	Bi,Sc,Sr
245	Serpentinized peridotite	Fe	Ca,Mo	Co,Cu,Mg,Pb
246	Porphyritic biotite granite			
247	Porphyritic quartz monzonite		Na	Sr
248	Porphyritic, biotite quartz monzonite			Na,Sr
249	Porphyritic, biotite quartz monzonite			Na
250	Quartz mica schist and micaceous quartzite			
251	Quartz mica schist			Cu

TABLE 25

BETTLES QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76Z033	Granite and quartz monzonite	K		K,Zr
035	Chert	Mn,Y	Mn	Ag,Ba
038	Basalt			Zr
039	Phyllite			
040	Phyllite and slate with quartz veining			
041	Phyllite with quartz veining			
042	Quartz monzonite		K	Ag,Ga,Mn,Y,Zr
044	Quartz monzonite			
045	Phyllite	Bi,Zn		Ag,K
046	Chlorite schist	V	Mo	Ag,Ga,La,P,Pb
048	Chlorite schist			Ag
051	Graphitic schist			
052	Chlorite schist		Sc	Ag,Ga,K,La,Se,Y

TABLE 26

BETTLES QUADRANGLE

Stream Sediment Sample Trace Element Concentrations

Sample Number	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AMR404			
405	Mo,Sc		Zr
406			Zn
407	Y		
408	Mo	Ti	B,Mn
409	Mo		
410	Ti		P
411			
412			
413			
414			
415	Mo,Sc		
416			Cr,Ni,Pb
76Z029			
030			
034			K,Sr
036	Mg		Y
037			
043	Zr		Ba,Ca,Sr
047	Mo		K
049			Ga,Sn
050		Mo	

TABLE 27

MIRL Rock Samples, Kanuti Terrane, 1976
(based on 107 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level		
		Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	34	37	39
Al		13.57%	14.96%	16.26%
As	800	800	800	800
Au	20	20	20	20
B	100	102	102	102
Ba	700	805	826	845
Be	10	10	10	10
Bi	200	460	503	543
Ca	40	7.73%	8.97%	10.13%
Cd	400	400	400	400
Co	40	83	91	99
Cr	20	8596	1.03%	1.19%
Cu	40	64	69	73
Fe		9.7%	10.87%	11.95%
Ga	20	26	27	28
K	1.1%	4.6%	5.15%	5.66%
La	200	243	251	258
Li	1.0%	1.0%	1.0%	1.0%
Mg		5.97%	6.85%	7.67%
Mn	60	1719	1941	2147
Mo	10	27	29	32
Na	1.0%	1.62%	1.81%	1.99%
Nb	800	966	1043	1087
Ni	20	1157	1367	1562
P	800	940	967	992
Pb	80	130	139	148
Pd	20	23	24	24
Pt	20	27	29	30
Sb	500	500	501	501
Sc	10	44	48	53
Se	300	557	607	653
Si		10.0%	10.0%	10.0%
Sn	60	110	119	128
Sr	10	149	169	188
Ta	300	403	429	454
Te	200	282	304	325
Ti	500	4164	4703	5205
V	40	131	144	156
W	200	319	342	364
Y	20	134	143	152
Zn	10	99	113	125
Zr	20	131	147	162

TABLE 28

MIRL Stream Sediment Samples, Kanuti Terrane, 1976
(based on 23 samples)
Values in PPM or Percent (as noted)

		Minimum or Threshold Values to give indicated confidence level		
Element	Level of Detection	Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	31	32	34
Al		12.49%	13.27%	13.99%
As	800	800	800	800
Au	20	20	20	20
B	100	127	132	137
Ba	700	859	888	916
Be	10	10	10	10
Bi	200	200	200	200
Ca	40	1.90%	2.18%	2.45%
Cd	400	400	400	400
Co	40	40	40	40
Cr	20	358	417	472
Cu	40	40	40	40
Fe		4.73%	5.13%	5.49%
Ga	20	28	29	31
K	1.1%	5.0%	5.48%	5.93%
La	200	200	200	200
Li	1.0%	1.0%	1.0%	1.0%
Mg		1.48%	1.60%	1.72%
Mn	60	1345	1495	1635
Mo	10	20	22	23
Na	1.0%	1.12%	1.22%	1.30%
Nb	800	800	800	800
Ni	20	88	98	108
P	800	839	847	853
Pb	80	92	95	97
Pd	20	20	20	20
Pt	20	20	20	20
Sb	500	500	500	500
Sc	10	37	41	44
Se	300	300	300	300
Si		10.0%	10.0%	10.0%
Sn	60	64	65	65
Sr	10	202	231	259
Ta	300	390	412	433
Te	200	200	200	200
Ti	500	2278	2461	2632
V	40	95	102	109
W	200	223	228	232
Y	20	115	122	129
Zn	10	72	81	90
Zr	20	146	163	178

TABLE 29

WISEMAN QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76Z028	Gabbro	Bi,Fe,Mn,Sr,Ti,V, Y,Zr	Ca,Mo,Sc,Ti	Ag,P,Sc,Ti,Y,Zr
031	Conglomerate and shale	Fe	Mn	
032	Conglomerate and sandstone			La,Se,W
77AMR040	Quartz-chlorite schist			
041	Chlorite schist with limonite staining			
042	Quartz vein material with pyrite	Na		
043	Quartz muscovite Schist and micaceous quartzite			
044	Quartz mica schist and micaceous quartzite			
045	Quartz mica schist			
047	Quartz muscovite schist			Mn
049	Quartz muscovite schist with limonite and pyrite			
053	Quartz muscovite and biotite schist			
054	Quartz muscovite schist			
055	Graphitic schist	B		Mn
057	Graphitic schist with pyrite			
061	Quartz vein material			
062	Quartz muscovite schist	Na	Ti	
063	Quartz muscovite schist	K		Li
064	Quartz muscovite schist			Li
066	Silicified graywacke	Cu,Ni		Mg,Cr
067	Chert with quartz veining			
068	Highly fractured siliceous vein(?) material			Pt(?),Sb
069	Greenstone with pyrite	Cu	Fe,Ti	

TABLE 29

WISEMAN QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
77AMR074	Greenstone with pyrite	Cu		
075	Greenstone with limonite staining	Fe		
076	Greenstone with limonite staining and pyrite	Cu,Mg	Fe,Ti	Cr
077	Greenstone with limonite staining and pyrite	Cu		
078	Greenstone	Fe		Cr,Mg
079	Greenstone with limonite staining		Cr	Cu,Mg,Nb
080	Greenstone	Cu,Mg		
081	Chert			Pt(?)
77Z040	Calc-mica schist			Cu,Ni
041	Quartz muscovite schist and calc-schist	Cu		
042	Calc-schist and quartz muscovite schist			
043	Calc-schist with pyrite			Sr
044	Marble			
045	Marble and argillaceous marble with pyrite and galena			Sr
046	Marble			
051	Marble			
052	Marble with pyrite			Mg,Nb
053	Calc-schist with pyrite	Sr		

TABLE 30

WISEMAN QUADRANGLE

Stream Sediment Sample Trace Element Concentrations

Sample Number	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76Z023		Mo,Y	Sc
024			Ag,Y
025	Ni		P
026	Sc		
027	Sc	Mo	La,Zr
029			
030			
77AMR046	Mn		
048			
050			Mn
051			
052			
056			
058			Na,Te
059			
060			
065			
070		Al	Cr,Cu,Fe,Mn,Ni, Pt(?),Ta,Ti,V
071			
072			Fe
073			
082		Pt(?)	Ag,Au,As,Bi,Cd,K, La, Mo, Na, Pb, Sb, Se,Sn,Ta,Te,W,Y
77Z039			Ni
047	LI,Nb		
048	Nb		
049			Bi
050			
054			

TABLE 31

MIRL Rock Samples, Brooks Range Terrane, 1976
(based on 15 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level		
		Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	38	41	44
Al		13.66%	15.21%	16.65%
As	800	800	800	800
Au	20	20	20	20
B	100	100	100	100
Ba	700	946	992	1034
Be	10	10	10	10
Bi	200	200	200	200
Ca	40	10.20%	11.77%	13.22%
Cd	400	400	400	400
Co	40	40	40	40
Cr	20	116	127	136
Cu	40	55	57	60
Fe		8.75%	9.75%	10.68%
Ga	20	20	20	20
K	1.1%	2.85%	3.07%	3.28%
La	200	210	212	213
Li	1.0%	1.0%	1.0%	1.0%
Mg		4.14%	4.60%	5.04%
Mn	60	5810	6769	7660
Mo	10	28	30	33
Na	1%	1.28%	1.43%	1.57%
Nb	800	800	800	800
Ni	20	65	72	77
P	800	800	800	800
Pb	80	92	95	96
Pd	20	20	20	20
Pt	20	20	20	20
Sb	500	500	500	500
Sc	10	35	38	42
Se	300	300	300	300
Si		13.19%	14.0%	14.76%
Sn	60	60	60	60
Sr	10	101	111	121
Ta	300	407	435	460
Te	200	200	200	200
Ti	500	3189	3525	3836
V	40	96	103	109
W	200	200	200	200
Y	20	131	140	148
Zn	10	564	662	753
Zr	20	182	205	226

TABLE 32

MIRL Stream Sediment Samples, Brooks Range Terrane, 1976
(based on 52 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level: Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	24	24	25
Al		10.9%	12.89%	13.81%
As	800	800	800	801
Au	20	20	20	20
B	100	100	100	100
Ba	700	700	700	700
Be	10	10	10	10
Bi	200	254	265	275
Ca	40	8.75%	10.1%	11.36%
Cd	400	400	400	400
Co	40	40	40	40
Cr	20	98	106	113
Cu	40	68	73	78
Fe		7.23%	7.72%	8.18%
Ga	20	20	20	20
K	1.1%	2.88%	3.13%	3.36%
La	200	202	203	203
Li	1.0%	1.0%	1.0%	1.0%
Mg		2.46%	2.70%	2.91%
Mn	60	1917	2112	2294
Mo	10	18	20	21
Na	1%	1.39%	1.55%	1.69%
Nb	800	800	800	800
Ni	20	69	75	80
P	800	945	972	997
Pb	80	128	137	146
Pd	20	20	20	20
Pt	20	20	20	20
Sb	500	500	500	500
Sc	10	29	32	35
Se	300	406	428	447
Si		10.0%	10.0%	10.0%
Sn	60	60	60	60
Sr	10	128	145	161
Ta	300	300	300	300
Te	200	283	306	327
Ti	500	2766	2990	3199
V	40	113	124	133
W	200	200	200	200
Y	20	102	108	112
Zn	10	291	339	384
Zr	20	98	109	119

TABLE 33

MIRL Rock Samples, Brooks Range Terrane, 1977
(based on 116 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level: Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	84	96	108
Al		8.78%	9.79%	10.73%
As	60	164	181	196
Au	10	27	30	32
B	100	185	200	215
Ba	20	1.75%	2.09%	2.41%
Be	10	10	10	10
Bi	600	2252	2259	2845
Ca	10	10.35%	11.81%	13.16%
Cd	10	22	24	26
Co	10	42	48	54
Cr	10	172	199	224
Cu	10	87	101	113
Fe	60	8.84%	9.86%	10.8%
Ga	10	25	29	31
K	2%	3.94%	4.29%	4.61%
La	100	741	870	990
Li	10	257	299	337
Mg		7.88%	8.83%	9.71%
Mn	10	2.55%	3.03%	3.48%
Mo	20	55	62	68
Na	1%	2.69%	3.00%	3.29%
Nb	20	324	381	434
Ni	10	77	88	99
P	2000	5352	6000	6604
Pb	300	531	574	615
Pd	10	10	10	10
Pt	30	67	73	79
Sb	300	8416	1.01%	1.16%
Sc	10	15	16	17
Se	9000	1.70%	1.85%	1.99%
Si		13.65%	14.67%	15.62%
Sn	40	116	130	143
Sr	10	742	867	984
Ta	300	699	774	844
Te	700	1606	1731	1847
Ti	2000	1.68%	1.89%	2.09%
V	10	361	428	490
W	400	659	732	800
Y	50	70	74	77
Zn	10	206	237	266
Zr	20	170	199	227

TABLE 34

MIRL Stream Sediment Samples, Brooks Range Terrane, 1977
(based on 58 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level		
		Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	22	23	23
Al		8.94%	9.78%	10.56%
As	60	104	109	113
Au	10	12	13	13
B	100	142	150	157
Ba	20	1238	1425	1598
Be	10	10	10	10
Bi	600	703	723	741
Ca	10	4.01%	4.57%	5.10%
Cd	10	12	13	13
Co	10	10	10	10
Cr	10	132	152	170
Cu	10	118	137	156
Fe	60	6.66%	7.22%	7.74%
Ga	10	10	10	10
K	2%	2.42%	2.50%	2.57%
La	100	123	128	132
Li	10	291	341	387
Mg		7.08%	7.78%	8.44%
Mn	10	3638	4123	4574
Mo	20	25	26	26
Na	1%	1.55%	1.65%	1.75%
Nb	20	50	54	59
Ni	10	44	49	54
P	2000	2001	2001	2001
Pb	300	323	328	332
Pd	10	10	10	10
Pt	30	37	39	40
Sb	300	347	356	365
Sc	10	10	10	10
Se	9000	9233	9280	9323
Si		10.0%	10.0%	10.0%
Sn	40	47	48	50
Sr	10	120	135	148
Ta	300	353	363	373
Te	700	1237	1292	1342
Ti	2000	1.25%	1.36%	1.46%
V	10	104	123	140
W	400	447	456	465
Y	50	55	56	56
Zn	10	566	663	754
Zr	20	44	49	53

TABLE 35

CHANDALAR QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76Z009	Slate with quartz veining		Sc	La
010	Slate and phyllite			
011	Phyllite and limestone			
012	Phyllite with calcite veining		Zn	
013	Phyllite and limestone		Y	
014	Limestone and phyllite		Mg,Sr	
017	Limestone	Mo		
77AMR024	Phyllite			
026	Phyllite with quartz stringers			
027	Phyllite			
029	Phyllite with pyrite	Cu		Zn
030	Phyllite with pyrite			
031	Porphyroblastic schist		Li	
032	Calc-schist with pyrite			
033	Greenstone with pyrite	Fe	Al	Ti
034	Schistose greenstone with pyrite	Al	Fe	Ti
035	Phyllite with quartz stringers			Pt(?)
036	Quartz muscovite schist with pyrite			
037	Porphyroblastic schist with pyrite			Pt(?)
77AMR038	Metasiltstone with pyrite	Cu		
039	Quartz mica schist			Li
77Z031	Phyllite with calcite and quartz boudins			
032	Phyllite		Cr	
033	Phyllite and graphitic schist		Al	Pt(?)
034	Phyllite with quartz veining			Li
065	Phyllite with quartz veining			
071	Phyllite with quartz veining			Sr
074	Phyllite			
075	Calc-schist and phyllite	K		Cr,Mg,Ni,Sn

TABLE 36

CHANDALAR QUADRANGLE

Stream Sediment Sample Trace Element Concentrations

Sample Number	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AMR290	Ca		
291	Ca		Mg
292	Sr		
293			
294			Sr
295	K	Y	Mn
296	Ca		
297			
298	Ca		
299			Mn
76Z015	Ca,Sc	Na	Ag,Mg
016	Ca	Sr	
018			
019			
020	Sc	Na	
021			
022			Zn
77AMR023			Ni
025	Nb		
028			
77Z035			
036			Na
037			
038			
055	Al		Zn
056		Al	
057	Al		Li,Nb
058			Na,Ti
059			Ca
060			Mn,Na
061			
062			
063			
064			
066			
067			Bi
068			Nb
069	Mn		K
070			K
072			Sr
073			Sr
076	Nb		

TABLE 37

MIRL Rock Samples, Brooks Range Terrane, 1976
(based on 15 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level		
		Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	38	41	44
Al		13.66%	15.21%	16.65%
As	800	800	800	800
Au	20	20	20	20
B	100	100	100	100
Ba	700	946	992	1034
Be	10	10	10	10
Bi	200	200	200	200
Ca	40	10.22%	10.77%	13.22%
Cd	400	400	400	400
Co	40	40	40	40
Cr	20	116	127	136
Cu	40	55	57	60
Fe		8.75%	9.75%	10.68%
Ga	20	20	20	20
K	1.1%	2.85%	3.07%	3.28%
La	200	210	212	213
Li	1.0%	1.0%	1.0%	1.0%
Mg		4.14%	4.60%	5.04%
Mn	60	5810	6769	7660
Mo	10	28	30	33
Na	1%	1.28%	1.43%	1.57%
Nb	800	800	800	800
Ni	20	65	72	77
P	800	800	800	800
Pb	80	92	95	96
Pd	20	20	20	20
Pt	20	20	20	20
Sb	500	500	500	500
Sc	10	35	38	42
Se	300	300	300	300
Si		13.19%	14.0%	14.76%
Sn	60	60	60	60
Sr	10	101	111	121
Ta	300	407	435	460
Te	200	200	200	200
Ti	500	3189	3525	3836
V	40	96	103	109
W	200	200	200	200
Y	20	131	140	148
Zn	10	564	662	753
Zr	20	182	205	226

TABLE 38

MIRL Stream Sediment Samples, Brooks Range Terrane, 1976
(based on 52 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level		
		Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	24	24	25
Al		10.9%	12.89%	13.81%
As	800	800	800	800
Au	20	20	20	20
B	100	100	100	100
Ba	700	700	700	700
Be	10	10	10	10
Bi	200	254	265	275
Ca	40	8.75%	10.1%	11.36%
Cd	400	400	400	400
Co	40	40	40	40
Cr	20	98	106	113
Cu	40	68	73	78
Fe		7.23%	7.72%	8.18%
Ga	20	20	20	20
K	1.1%	2.88%	3.13%	3.36%
La	200	202	203	203
Li	1.0%	1.0%	1.0%	1.0%
Mg		2.46%	2.70%	2.91%
Mn	60	1917	2112	2294
Mo	10	18	20	21
Na	1%	1.39%	1.55%	1.69%
Nb	800	800	800	801
Ni	20	69	75	80
P	800	945	972	997
Pb	80	128	137	146
Pd	20	20	20	20
Pt	20	20	20	20
Sb	500	500	500	500
Sc	10	29	32	35
Se	300	406	428	447
Si		10.0%	10.0%	10.0%
Sn	60	60	60	60
Sr	10	128	145	161
Ta	300	300	300	300
Te	200	283	306	327
Ti	500	2766	2990	3199
V	40	113	124	133
W	200	200	200	200
Y	20	102	108	112
Zn	10	291	339	384
Zr	20	98	109	119

TABLE 39

MIRL Rock Samples, Brooks Range Terrane, 1977
(based on 116 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level: Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	84	96	108
Al		8.78%	9.79%	10.73%
As	60	164	181	196
Au	10	27	30	32
B	100	185	200	215
Ba	20	1.75%	2.09%	2.41%
Be	10	10	10	10
Bi	600	2252	2559	2845
Ca	10	10.35%	11.81%	13.16%
Cd	10	22	24	26
Co	10	42	48	54
Cr	10	172	199	224
Cu	10	87	101	113
Fe	60	8.84%	9.86%	10.8%
Ga	10	25	29	31
K	2%	3.94%	4.29%	4.61%
La	100	741	870	990
Li	10	257	299	337
Mg		7.88%	8.83%	9.71%
Mn	10	2.55%	3.03%	3.48%
Mo	20	55	62	68
Na	1%	2.69%	3.00%	3.29%
Nb	20	324	381	434
Ni	10	77	88	99
P	2000	5352	6000	6604
Pb	300	531	574	615
Pd	10	10	10	10
Pt	30	67	73	79
Sb	300	8416	1.01%	1.16%
Sc	10	15	16	17
Se	9000	1.70%	1.85%	1.99%
Si		13.65%	14.67%	15.62%
Sn	40	116	130	143
Sr	10	742	867	984
Ta	300	699	774	844
Te	700	1606	1731	1847
Ti	2000	1.68%	1.89%	2.09%
V	10	361	428	490
W	400	659	732	800
Y	50	70	74	77
Zn	10	206	237	266
Zr	20	170	199	227

TABLE 40

MIRL Stream Sediment Samples, Brooks Range Terrane, 1977
(based on 58 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level		
		Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	22	23	23
Al		8.94%	9.78%	10.56%
As	60	104	109	113
Au	10	12	13	13
B	100	142	150	157
Ba	20	1238	1425	1598
Be	10	10	10	10
Bi	600	703	723	741
Ca	10	4.01%	4.57%	5.10%
Cd	10	12	13	13
Co	10	10	10	10
Cr	10	132	152	170
Cu	10	118	137	156
Fe	60	6.66%	7.22%	7.74%
Ga	10	10	10	10
K	2%	2.42%	2.50%	2.57%
La	100	173	128	132
Li	10	291	341	387
Mg		7.08%	7.78%	8.44%
Mn	10	3638	4123	4574
Mo	20	25	26	26
Na	1%	1.55%	1.65%	1.75%
Nb	20	50	54	59
Ni	10	44	49	54
P	2000	2001	2001	2001
Pb	300	323	328	332
Pd	10	10	10	10
Pt	30	37	39	40
Sb	300	347	356	365
Sc	10	10	10	10
Se	9000	9233	9280	9323
Si		10.0%	10.0%	10.0%
Sn	40	47	48	50
Sr	10	120	135	148
Ta	300	353	363	373
Te	700	1237	1292	1342
Ti	2000	1.25%	1.36%	1.46%
V	10	104	123	140
W	400	447	456	465
Y	50	55	56	56
Zn	10	566	663	754
Zr	20	44	49	53

TABLE 41

PHILIP SMITH MOUNTAINS QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76Z001	Calcareous shale	Cr,Fe,W		Ba
002	Chert pebble conglomerate and shale			
003	Sandstone and conglomerate			
004	Limestone and conglomerate		Sc	Zr
005	Slate and mudstone	Ti		Cu,Ni
006	Slate	K		Ag,Pb
007	Slate			Mn
008	Slate			
77AMR001	Sandstone and chert breccia with pyrite and sphalerite		Fe	Ba,P,Sr
002	Shale			
004	Shale	Al		
006	Dolomitic limestone			
007	Siliceous dolomite			
008	Limestone			Mg,Nb
009	Dolomitic limestone and nodular chert			Mg,Nb
012	Silicified limestone with pyrite			
013	Recrystallized limestone			Ba,Mg
014	Recrystallized limestone			
016	Recrystallized limestone			
017	Recrystallized limestone			
020	Recrystallized limestone			
021	Chert			Pt(?)
77Z006	Sandstone, shale and conglomerate		V	
007	Limestone	B		Te
008	Limestone			As,Au,B,Bi,Ca,K,Mo, Pb,Pt(?),Sc,Se,Ta,Te,Y

TABLE 41

PHILIP SMITH MOUNTAINS QUADRANGLE

Rock Sample Descriptions and Trace Element Concentrations (continued)

Sample Number	Sample Description	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
77Z009	Limestone			
010	Limestone and muddy limestone			
011	Shale and mudstone with pyrite	Mg	Fe	Ag,As,B,Bi,Cd,Co,Ga,K La,Mo,Ni,Pb,Pt(?),Sc, Se,Sn,Ta,Te,Ti,V,W,Y, Zn
012	Shale with pyrite		Fe	
013	Shale with pyrite			P,Sr
014	Shale with pyrite			
015	Shale with pyrite and chalcopyrite		Al,Fe,Ga	As,Au,B,Bi,Cd,K,Mo,Ni, Pb,Pt(?),Sc,Se,Sn,Ta, Te,W,Y
016	Chert			
017	Shale and dolomite with barite(?)			
018	Shale with barite			
021	Shale with barite concretions	B		Li,Te
022	Shale with barite and pyrite			Pt(?)
023	Limestone and chert			
024	Limestone and mudstone			
025	Sandstone and shale			
028	Limestone and shale	Fe		As,Au,B,Bi,Cd,K,Mn,Mo, Pb,Pt(?),Sc,Se,Ta,Te,Y

TABLE 42

PHILIP SMITH MOUNTAINS QUADRANGLE

Stream Sediment Sample Trace Element Concentrations

Sample Number	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
76AMR260	Sc	Mo	
261	Ni	Mo	Cu,Fe,V
262		Mo,V	Cu,Na,Sc
263		Cr	
264	Ca,Cr	Mo,Ni,Ti	Pb
265			
266	Ca,Ni,Ti		Sr
267			
268			
269	Mn,Ni	Cr	P,Ti
270			
271	Cr,Zr		Fe
272			
273			
274			
275			
276	Ni		Bi,P,Pb,Ti
277	Ni		Se
278			
279		Mo	Zr
280			
281			
282			
283		Mo	
284			
285			
286			K,Zr
287		K	
288			K
289		K	
77AMR003		Mg	Nb
005			Ca,Nb
010			
011			
015			
018			
019			Ca,Mg
022			Fe
77Z019		Al	
020			Ba
026			B,Zr
027			Zr
029	Fe		Ba
030		Al	B,Ba

TABLE 43

PHILIP SMITH MOUNTAINS QUADRANGLE

USGS Stream Sediment Sample Trace Element Concentrations

Sample Number	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
PS001			
002			Ca,Sr
003			Ca,Sr
004			Co
005			
019			Y,Zn
021	Sr		Ca
022			Be,Y,Zr
023	Sr		Ca,Y
024			Sr
025			Ca
026			La,Zn
027			Ca,Mg,Sr
028			Ba,Ca,Sr
029			
030	Fe		Cr
031			
032			
033	Fe		
034			
035			Mn
036		Mn	
037	Fe		Mn
038			
039	Fe		
040	Sr		
041			Ca,Mg
042	Fe		
043			Y
044			
045			
046			
047			
048			Mn
076	B,Sr		Ca
078	B		
080			
083		Zr	
085			
086	Fe	Mn	Co
087			
088			
089			Cr

TABLE 43

PHILIP SMITH MOUNTAINS QUADRANGLE

USGS Stream Sediment Sample Trace Element Concentrations (continued)

Sample Number	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
PS090			
091			Ba,Ca,Cu,Mg,Sr
092			
093	Fe		
094			Ca,Cr
095			Ca
096		Mn	Ca,Mg
097	Fe		Be,Cr,Zn
098			Ca,Mg
099	Fe		Co,Zn
101	Sr		Ca,Mg
103	Fe		
104			
105			Y
107			
109	Fe		
111			
118			
120	Fe	Zr	Ti
122	B		
124	Fe		Zn
129	Fe		Be,Y
131	Fe		
PS330	B		
332	B,Fe		Cu,Zn
333	B,Fe		
334	B		Zr
342	Fe		
344	B,Fe		
345	B,Fe		Pb
346	B,Fe		Pb
347	B,Fe		Ti
348	B		Zr
349	B		
350	B		
351	B		
352	B,Fe		
354	B,Fe		
357	B		
359	B,Fe	Zr	Cr
361	B		
364	B,Fe		
366			Y

TABLE 43

PHILIP SMITH MOUNTAINS QUADRANGLE

USGS Stream Sediment Sample Trace Element Concentrations (continued)

Sample Number	Weakly Anomalous Elements 90%C.L.	Anomalous Elements 95%C.L.	Strongly Anomalous Elements 98%C.L.
PS367			
371			
376			
378			
379			
380			
381			Zn
382			
383			
385			Cu
387			
PS430			
431	Sr		Ca
447			Ca,Mg,Sr
448			Ca,Sr
468	B,Fe	Ba	
469	B,Fe	Ba	Mn,Mo,Zn
470	Fe		
472	B,Fe		Cr
473	B,Fe		
PS726			Ni
727			
728			

TABLE 44

USGS Stream Sediment Samples, Brooks Range Terrane
(based on 179 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level: Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	.5	0	0	0
Al	---			
As	20	39	45	50
Au	10	0	0	0
B	10	192	210	226
Ba	20	1315	1468	1611
Be	1	2	3	3
Bi	10	3	3	4
Ca	500	6.86%	7.95%	8.96%
Cd	---			
Co	5	37	41	44
Cr	10	158	173	186
Cu	5	74	83	91
Fe	500	9.98%	11.0%	11.94%
Ga	---			
K	---			
La	20	77	84	90
Li	---			
Mg	200	2.43%	2.71%	2.96%
Mn	10	1760	1948	2123
Mo	5	2	3	3
Na	---			
Nb	20	0	0	0
Ni	5	141	161	178
P	---			
Pb	10	52	59	65
Pd	---			
Pt	---			
Sb	100	499	596	686
Sc	5	25	27	28
Se	---			
Si	---			
Sn	10	0	0	0
Sr	100	448	505	557
Ta	---			
Te	---			
Ti	20	5614	6103	6557
V	10	201	215	228
W	50	0	0	0
Y	10	39	42	44
Zn	200	386	442	495
Zr	10	256	284	310

TABLE 45

MIRL Stream Sediment Samples, Brooks Range Terrane, 1977
(based on 58 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level: Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	22	23	23
Al		8.94%	9.78%	10.56%
As	60	104	109	113
Au	10	12	13	13
B	100	142	150	157
Ba	20	1238	1425	1598
Be	10	10	10	10
Bi	600	703	723	741
Ca	10	4.01%	4.57%	5.10%
Cd	10	12	13	13
Co	10	10	10	10
Cr	10	132	152	170
Cu	10	118	137	156
Fe	60	6.66%	7.22%	7.74%
Ga	10	10	10	10
K	2%	2.42%	2.50%	2.57%
La	100	123	128	132
Li	10	291	341	387
Mg		7.08%	7.78%	8.44%
Mn	10	3638	4123	4574
Mo	20	25	26	26
Na	1%	1.55%	1.65%	1.75
Nb	20	50	54	59
Ni	10	44	49	54
P	2000	2001	2001	2001
Pb	300	323	328	332
Pd	10	10	10	10
Pt	30	37	39	40
Sb	300	347	356	365
Sc	10	10	10	10
Se	9000	9233	9280	9323
Si		10.0%	10.0%	10.0%
Sn	40	47	48	50
Sr	10	120	135	148
Ta	300	353	363	373
Te	700	1237	1292	1342
Ti	2000	1.25%	1.36%	1.46%
V	10	104	123	140
W	400	447	456	465
Y	50	55	56	56
Zn	10	566	663	754
Zr	20	44	49	53

TABLE 46

MIRL Rock Samples, Brooks Range Terrane, 1977
(based on 116 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level		
		Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	84	96	108
Al		8.78%	9.79%	10.73%
As	60	164	181	196
Au	10	27	30	32
B	100	185	200	215
Ba	20	1.75%	2.09%	2.41%
Be	10	10	10	10
Bi	600	2252	2559	2845
Ca	10	10.35%	11.81%	13.16%
Cd	10	22	24	26
Co	10	42	48	54
Cr	10	172	199	224
Cu	10	87	101	113
Fe	60	8.84%	9.86%	10.8%
Ga	10	25	29	31
K	2%	3.94%	4.29%	4.61%
La	100	741	870	990
Li	10	257	299	337
Mg		7.88%	8.83%	9.71%
Mn	10	2.55%	3.03%	3.48%
Mo	20	55	62	68
Na	1%	2.69%	3.00%	3.29%
Nb	20	324	381	434
Ni	10	77	88	99
P	2000	5352	6000	6604
Pb	300	531	574	615
Pd	10	10	10	10
Pt	30	67	73	79
Sb	300	8416	1.01%	1.16%
Sc	10	15	16	17
Se	9000	1.70%	1.85%	1.99%
Si		13.65%	14.67%	15.62%
Sn	40	116	130	143
Sr	10	742	867	984
Ta	300	699	774	844
Te	700	1606	1731	1847
Ti	2000	1.68%	1.89%	2.09%
V	10	361	428	490
W	400	659	732	800
Y	50	70	74	77
Zn	10	206	237	266
Zr	20	170	199	227

TABLE 47

MIRL Stream Sediment Samples, Brooks Range Terrane, 1976
(based on 52 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level		
		Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	24	24	25
Al		10.9%	12.89%	13.81%
As	800	800	800	800
Au	20	20	20	20
B	100	100	100	100
Ba	700	700	700	700
Be	10	10	10	10
Bi	200	254	265	275
Ca	40	8.75%	10.1%	11.36%
Cd	400	400	400	400
Co	40	40	40	40
Cr	20	98	106	113
Cu	40	68	73	78
Fe		7.23%	7.72%	8.18%
Ga	20	20	20	20
K	1.1%	2.88%	3.13%	3.36%
La	200	202	203	203
Li	1.0%	1.0%	1.0%	1.0%
Mg		2.46%	2.70%	2.91%
Mn	60	1917	2112	2294
Mo	10	18	20	21
Na	1%	1.39%	1.55%	1.69%
Nb	800	800	800	800
Ni	20	69	75	80
P	800	945	972	997
Pb	80	128	137	146
Pd	20	20	20	20
Pt	20	20	20	20
Sb	500	500	500	500
Sc	10	29	32	35
Se	300	406	428	447
Si		10.0%	10.0%	10.0%
Sn	60	60	60	60
Sr	10	128	145	161
Ta	300	300	300	300
Te	200	283	306	327
Ti	500	2766	2990	3199
V	40	113	124	133
W	200	200	200	200
Y	20	102	108	122
Zn	10	291	339	384
Zr	20	98	109	119

TABLE 48

MIRL Rock Samples, Brooks Range Terrane, 1976
(based on 15 samples)
Values in PPM or Percent (as noted)

Element	Level of Detection	Minimum or Threshold Values to give indicated confidence level: Weakly Anomalous at 90%confidence level	Anomalous at 95%confidence level	Strongly Anomalous at 98%confidence level
Ag	20	38	41	44
Al		13.66%	15.21%	16.65%
As	800	800	800	800
Au	20	20	20	20
B	100	100	100	100
Ba	700	946	992	1034
Be	10	10	10	10
Bi	200	200	200	200
Ca	40	10.20%	11.77%	13.22%
Cd	400	400	400	400
Co	40	40	40	40
Cr	20	116	127	136
Cu	40	55	57	60
Fe		8.75%	9.75%	10.68%
Ga	20	20	20	20
K	1.1%	2.85%	3.07%	3.28%
La	200	210	212	213
Li	1.0%	1.0%	1.0%	1.0%
Mg		4.14%	4.60%	5.04%
Mn	60	5810	6769	7660
Mo	10	28	30	33
Na	1%	1.28%	1.43%	1.57%
Nb	800	800	800	800
Ni	20	65	72	77
P	800	800	800	800
Pb	80	92	95	96
Pd	20	20	20	20
Pt	20	20	20	20
Sb	500	500	500	500
Sc	10	35	38	42
Se	300	300	300	300
Si		13.19%	14.0%	14.76%
Sn	60	60	60	60
Sr	10	101	111	121
Ta	300	407	435	460
Te	200	200	200	200
Ti	500	3189	3525	3836
V	40	96	103	109
W	200	200	200	200
Y	20	131	140	148
Zn	10	564	662	753
Zr	20	182	205	226

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	476	4.500	83.000	62.000	240.000	11.000
	477	6.400	70.000	250.000	190.000	32.000
	478	0.500	41.000	29.000	81.000	8.000
	479	1.200	120.000	30.000	180.000	16.000
	480	1.600	60.000	71.000	110.000	9.000
	481	0.	66.000	26.000	110.000	8.000
	482	0.	64.000	30.000	100.000	8.000
	483	0.	88.000	26.000	130.000	8.000
	484	0.	56.000	130.000	92.000	12.000
	487	0.	33.000	83.000	140.000	4.000
	488	0.200	78.000	200.000	154.000	7.000
	489	0.100	16.000	120.000	47.000	3.000
	490	0.	56.000	140.000	160.000	0.
	491	0.	86.000	54.000	210.000	6.000
	492	0.	88.000	120.000	220.000	0.
	493	5.400	76.000	580.000	2100.000	7.000
	494	1.200	68.000	180.000	6900.000	0.
	495	5.600	40.000	730.000	152.000	0.
	496	3.700	93.000	260.000	380.000	7.000
	497	1.000	37.000	56.000	170.000	1.000
	498	7.200	90.000	50.000	150.000	44.000
	499	11.000	120.000	82.000	250.000	31.000
	500	2.600	92.000	48.000	150.000	16.000
	501	2.400	96.000	60.000	96.000	32.000
	502	0.700	37.000	50.000	78.000	2.000
	503	1.200	54.000	40.000	94.000	4.000
	505	0.100	42.000	30.000	95.000	2.000
	506	0.800	34.000	36.000	76.000	0.
	509	0.800	64.000	180.000	180.000	4.000
	511	0.800	34.000	350.000	320.000	0.

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	512	4.800	76.000	60.000	140.000	22.000
	513	0.800	76.000	200.000	360.000	6.000
	514	2.000	84.000	430.000	460.000	8.000
	515	4.800	110.000	3200.000	1300.000	8.000
	516	7.900	25.000	3400.000	74.000	15.000
	517	8.200	40.000	2400.000	200.000	16.000
	518	4.700	57.000	1800.000	240.000	13.000
	519	5.000	84.000	200.000	350.000	36.000
	520	2.000	100.000	48.000	140.000	24.000
	521	2.000	44.000	540.000	340.000	12.000
	522	2.000	47.000	55.000	78.000	14.000
	523	1.600	84.000	44.000	130.000	13.000
	524	1.800	140.000	40.000	130.000	6.000
	525	1.000	110.000	32.000	130.000	8.000
	526	1.400	58.000	40.000	120.000	2.000
	527	1.200	58.000	40.000	130.000	2.000
	528	1.200	60.000	40.000	110.000	1.000
	531	3.600	130.000	200.000	350.000	19.000
	532	1.700	90.000	140.000	210.000	1.000
	533	2.900	59.000	1200.000	530.000	10.000
	534	27.000	86.000	11000.000	1400.000	15.000
	535	18.000	140.000	9900.000	800.000	15.000
	536	280.000	85.000	13000.000	3000.000	56.000
	537	8.800	100.000	2800.000	620.000	14.000
	538	12.000	36.000	3900.000	99.000	11.000
	539	6.100	32.000	2800.000	130.000	6.000
	540	100.000	92.000	7500.000	170.000	16.000
	541	3.300	44.000	180.000	210.000	19.000
	542	4.800	61.000	46.000	110.000	15.000
	543	1.000	56.000	39.000	95.000	10.000

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	544	0.400	92.000	230.000	140.000	12.000
	545	1.200	92.000	34.000	160.000	6.000
	546	3.100	74.000	53.000	120.000	6.000
	547	1.000	20.000	22.000	110.000	8.000
	548	0.300	100.000	64.000	110.000	1.000
	549	0.600	100.000	50.000	140.000	1.000
	550	0.	72.000	40.000	110.000	0.
	553	2.100	46.000	1000.000	170.000	5.000
	554	2.400	54.000	1300.000	160.000	5.000
	555	3.600	80.000	1200.000	520.000	0.
	556	26.000	20.000	2400.000	61.000	11.000
	557	320.000	47.000	14000.000	7.300	8.000
	559	480.000	890.000	130000.000	2100.000	91.000
	559	27.000	78.000	68000.000	540.000	14.000
	560	4.500	43.000	1500.000	360.000	7.000
	561	7.200	52.000	2000.000	420.000	2.000
	562	4.000	73.000	660.000	220.000	11.000
	563	6.500	150.000	38.000	140.000	31.000
	564	3.700	71.000	45.000	86.000	9.000
	565	4.500	130.000	49.000	96.000	29.000
	566	1.000	64.000	56.000	170.000	8.000
	567	8.400	150.000	34.000	140.000	19.000
	568	6.800	100.000	54.000	120.000	15.000
	569	3.400	75.000	53.000	150.000	7.000
	570	5.800	79.000	70.000	150.000	7.000
	571	0.100	61.000	39.000	200.000	5.000
	572	5.100	130.000	4.300	100.000	3.000
	575	1.700	71.000	81.000	230.000	1.000
	576	3.800	70.000	210.000	140.000	6.000
	577	6.900	89.000	3300.000	770.000	17.000

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	578	6.400	170.000	730.000	1000.000	24.000
	579	33.000	82.000	7300.000	620.000	49.000
	580	26.000	64.000	11000.000	170.000	34.000
	581	46.000	450.000	12000.000	6900.000	15.000
	582	17.000	38.000	1400.000	36.000	12.000
	583	7.800	65.000	3500.000	75.000	19.000
	584	12.000	51.000	2400.000	100.000	11.000
	585	2.900	96.000	57.000	520.000	13.000
	586	2.700	130.000	130.000	210.000	7.000
	587	1.200	56.000	35.000	300.000	5.000
	588	0.500	45.000	35.000	120.000	3.000
	589	0.600	46.000	28.000	100.000	1.000
	590	0.600	46.000	22.000	110.000	2.000
	591	1.000	45.000	22.000	110.000	2.000
	592	3.100	150.000	53.000	110.000	9.000
	593	0.500	61.000	22.000	110.000	0.500
	594	4.500	140.000	59.000	120.000	2.000
	597	6.600	97.000	160.000	1800.000	7.000
	598	3.000	64.000	110.000	8700.000	4.000
	599	10.000	110.000	190.000	1700.000	10.000
	600	3.300	120.000	770.000	700.000	27.000
	601	13.000	140.000	880.000	1200.000	16.000
	602	17.000	66.000	5900.000	420.000	40.000
	603	13.000	110.000	12000.000	110.000	43.000
	604	7.900	13.000	760.000	31.000	3.400
	605	47.000	45.000	9600.000	33.000	38.000
	606	4.000	62.000	1500.000	180.000	8.400
	607	1.600	54.000	84.000	96.000	7.000
	608	5.300	95.000	92.000	120.000	8.000
	609	1.000	42.000	50.000	120.000	3.400

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	610	1.000	40.000	34.000	78.000	2.100
	611	4.700	92.000	43.000	87.000	4.000
	612	0.300	33.000	27.000	90.000	0.
	613	1.900	100.000	34.000	110.000	1.000
	614	1.100	45.000	19.000	97.000	0.
	615	1.600	42.000	30.000	97.000	0.
	616	3.300	120.000	31.000	120.000	5.000
	619	4.800	39.000	570.000	120.000	2.500
	620	16.000	340.000	420.000	3300.000	14.000
	621	6.000	44.000	410.000	1300.000	0.
	622	10.000	80.000	490.000	920.000	14.000
	623	12.000	110.000	420.000	710.000	8.000
	624	18.000	87.000	3900.000	1600.000	20.000
	625	26.000	51.000	8800.000	120.000	29.000
	626	94.000	63.000	14000.000	130.000	110.000
	627	11.000	46.000	3700.000	84.000	18.000
	628	7.700	42.000	1900.000	120.000	7.000
	629	2.800	67.000	370.000	240.000	7.000
	630	0.700	54.000	34.000	150.000	6.000
	631	6.600	120.000	70.000	140.000	4.000
	632	5.900	57.000	3.000	150.000	8.000
	633	0.600	44.000	53.000	94.000	0.
	634	0.500	43.000	32.000	100.000	2.000
	635	0.600	31.000	57.000	78.000	4.000
	636	0.300	35.000	43.000	100.000	2.000
	637	1.300	46.000	0.	110.000	2.100
	638	1.300	40.000	44.000	99.000	4.200
	641	6.400	>48.000	820.000	380.000	10.000
	642	10.000	110.000	820.000	2400.000	0.
	643	12.000	140.000	500.000	530.000	4.000

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	644	1.200	24.000	180.000	380.000	0.
	645	16.000	110.000	3300.000	460.000	6.800
	646	100.000	210.000	20000.000	1800.000	62.000
	647	12.000	95.000	6000.000	210.000	2.700
	648	9.600	91.000	5800.000	150.000	21.000
	649	4.000	59.000	1200.000	130.000	8.900
	550	4.300	64.000	1100.000	160.000	5.100
	651	1.500	58.000	52.000	540.000	5.100
	652	0.800	49.000	43.000	1200.000	1.700
	653	1.200	58.000	47.000	182.000	5.000
	654	1.700	58.000	36.000	110.000	6.200
	655	1.600	51.000	76.000	92.000	3.400
	656	1.500	51.000	29.000	99.000	6.900
	657	1.000	41.000	45.000	110.000	0.
	658	1.200	38.000	33.000	92.000	2.500
	659	1.100	44.000	41.000	110.000	0.400
	660	1.100	49.000	61.000	120.000	3.400
	663	10.000	52.000	4000.000	320.000	0.
	664	6.000	58.000	1700.000	310.000	1.600
	665	6.800	82.000	190.000	480.000	5.600
	666	8.200	60.000	300.000	220.000	4.200
	667	8.800	76.000	300.000	190.000	8.400
	668	96.000	56.000	26000.000	320.000	21.000
	669	5.800	100.000	1900.000	280.000	19.000
	670	5.300	91.000	1400.000	170.000	15.000
	671	8.600	110.000	4600.000	190.000	26.000
	672	76.000	60.000	4400.000	140.000	21.000
	673	3.000	160.000	76.000	850.000	6.100
	674	0.700	44.000	91.000	240.000	2.700
	675	1.700	75.000	36.000	140.000	5.600

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	676	1.600	72.000	57.000	120.000	17.000
	677	2.300	93.000	44.000	160.000	22.000
	678	2.500	87.000	51.000	130.000	2.600
	686	18.000	41.000	12000.000	240.000	151.000
	687	7.700	97.000	6800.000	1400.000	9.200
	688	17.000	200.000	1400.000	2500.000	19.000
	689	89.000	130.000	12000.000	970.000	71.000
	690	11.000	140.000	12000.000	660.000	50.000
	691	33.000	83.000	13000.000	660.000	48.000
	692	29.000	55.000	12000.000	410.000	45.000
	693	4.600	44.000	270.000	120.000	7.200
	694	1.800	42.000	170.000	150.000	5.300
	695	1.800	41.000	100.000	170.000	0.800
	696	3.600	72.000	90.000	240.000	2.400
	697	0.900	43.000	22.000	91.000	4.500
	698	0.700	40.000	8.500	110.000	1.200
	699	0.900	44.000	46.000	120.000	1.300
	700	0.600	41.000	22.000	82.000	2.500
	701	2.200	46.000	28.000	92.000	0.
	702	1.000	47.000	29.000	130.000	0.800
	703	0.600	37.000	100.000	97.000	2.300
	704	1.200	40.000	37.000	98.000	5.300
	707	29.000	60.000	9200.000	310.000	25.000
	708	40.000	35.000	11000.000	260.000	77.000
	709	96.000	48.000	48000.000	400.000	31.000
	710	120.000	110.000	25000.000	1300.000	11.000
	711	6.800	80.000	1400.000	920.000	4.800
	712	22.000	110.000	5400.000	1100.000	12.000
	713	42.000	49.000	12000.000	480.000	75.000
	714	16.000	75.000	10000.000	1000.000	30.000

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	715	5.600	280.000	300.000	520.000	21.000
	716	2.800	150.000	140.000	280.000	24.000
	717	4.200	96.000	120.000	180.000	20.000
	718	1.500	57.000	82.000	130.000	3.400
	719	3.900	390.000	59.000	310.000	21.000
	720	1.400	44.000	56.000	120.000	2.500
	721	1.400	50.000	30.000	210.000	2.400
	722	1.200	80.000	110.000	180.000	6.000
	723	0.600	37.000	45.000	80.000	1.900
	724	0.200	35.000	50.000	76.000	1.300
	725	3.600	48.000	68.000	110.000	0.
	726	1.100	36.000	56.000	100.000	4.900
	729	68.000	130.000	26000.000	690.000	42.000
	730	41.000	71.000	13000.000	490.000	49.000
	731	13.000	50.000	4100.000	530.000	6.100
	732	82.000	110.000	22000.000	550.000	32.000
	733	40.000	100.000	13000.000	970.000	23.000
	734	27.000	83.000	7000.000	700.000	26.000
	735	30.000	98.000	13000.000	540.000	52.000
	736	16.000	77.000	6700.000	670.000	48.000
	737	100.000	77.000	13000.000	830.000	220.000
	738	8.800	89.000	2800.000	220.000	23.000
	739	0.800	70.000	65.000	160.000	15.000
	740	1.900	36.000	49.000	170.000	2.500
	741	0.800	100.000	52.000	110.000	2.300
	742	1.000	48.000	43.000	220.000	6.500
	743	0.900	41.000	12.000	96.000	2.000
	744	0.600	42.000	49.000	94.000	2.300
	745	1.400	44.000	36.000	110.000	2.500
	746	0.900	47.000	39.000	110.000	0.

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	747	1.800	62.000	44.000	110.000	2.000
	748	0.600	48.000	44.000	100.000	0.
	751	17.000	67.000	9600.000	1100.000	17.000
	752	66.000	62.000	13000.000	630.000	41.000
	753	97.000	87.000	110000.000	1100.000	68.000
	754	93.000	81.000	12000.000	700.000	160.000
	755	54.000	420.000	13000.000	1700.000	68.000
	756	97.000	140.000	12000.000	1200.000	38.000
	757	133.000	240.000	23000.000	600.000	38.000
	758	30.000	150.000	120000.000	690.000	49.000
	759	2.100	73.000	660.000	140.000	12.000
	760	3.100	56.000	640.000	170.000	5.000
	761	1.100	46.000	67.000	110.000	2.800
	762	2.700	36.000	110.000	110.000	2.000
	763	0.	51.000	57.000	210.000	4.000
	764	1.200	48.000	61.000	97.000	5.000
	765	5.000	95.000	62.000	74.000	5.000
	766	2.700	87.000	49.000	86.000	2.000
	767	1.400	39.000	130.000	90.000	2.000
	768	0.500	42.000	170.000	96.000	3.000
	769	2.600	30.000	420.000	83.000	5.000
	770	0.	35.000	56.000	88.000	2.000
	773	120.000	97.000	13000.000	1300.000	39.000
	774	15.000	88.000	6900.000	900.000	29.000
	775	82.000	120.000	12000.000	800.000	52.000
	776	120.000	160.000	13000.000	1200.000	92.000
	777	72.000	130.000	13000.000	2100.000	41.000
	778	5.900	26.000	1700.000	170.000	14.000
	779	3.700	51.000	340.000	150.000	11.000
	780	2.500	79.000	46.000	140.000	11.000

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	781	2.400	120.000	43.000	180.000	25.000
	782	0.800	47.000	50.000	230.000	0.
	783	0.100	66.000	52.000	170.000	5.000
	784	3.300	50.000	1500.000	100.000	7.000
	785	0.800	81.000	83.000	160.000	3.000
	786	1.000	43.000	36.000	100.000	2.000
	787	1.100	37.000	44.000	93.000	0.
	788	1.100	38.000	36.000	99.000	0.
	789	0.500	54.000	50.000	110.000	5.000
	790	0.800	120.000	52.000	190.000	17.000
	791	0.800	60.000	52.000	92.000	0.
	792	0.	33.000	31.000	100.000	2.000
	795	5.900	54.000	6700.000	710.000	20.000
	796	10.000	84.000	9700.000	730.000	28.000
	797	11.000	77.000	6800.000	710.000	28.000
	798	15.000	68.000	6600.000	890.000	13.000
	799	23.000	58.000	12000.000	1200.000	25.000
	800	16.000	40.000	9700.000	250.000	12.000
	801	6.700	60.000	1800.000	230.000	8.000
	802	1.500	94.000	46.000	220.000	1.000
	803	0.700	80.000	110.000	150.000	46.000
	804	0.	50.000	58.000	120.000	0.
	805	0.800	69.000	41.000	120.000	5.000
	806	0.700	56.000	3500.000	90.000	8.000
	807	0.100	60.000	170.000	72.000	17.000
	808	1.700	88.000	32.000	170.000	14.000
	809	1.000	63.000	39.000	160.000	6.000
	810	1.400	99.000	48.000	290.000	7.000
	811	1.300	42.000	50.000	99.000	3.200
	812	0.500	50.000	36.000	120.000	3.000

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	813	0.600	31.000	21.000	90.000	0.
	814	0.700	30.000	40.000	93.000	0.
	817	12.000	35.000	7400.000	180.000	54.000
	818	1.300	66.000	510.000	230.000	27.000
	819	2.900	110.000	1200.000	430.000	30.000
	820	20.000	110.000	12000.000	1400.000	7.000
	821	27.000	100.000	12000.000	990.000	10.000
	822	11.000	84.000	3600.000	530.000	8.000
	823	4.600	49.000	330.000	190.000	5.000
	824	1.000	35.000	69.000	110.000	3.000
	825	0.	51.000	83.000	110.000	3.000
	826	1.300	47.000	52.000	120.000	2.000
	827	0.500	45.000	62.000	100.000	2.000
	828	1.700	76.000	1100.000	93.000	8.000
	829	2.100	89.000	38.000	110.000	27.000
	830	2.300	140.000	46.000	120.000	24.000
	831	0.	48.000	31.000	200.000	5.000
	832	0.	54.000	41.000	170.000	2.000
	833	0.400	37.000	22.000	64.000	7.000
	834	2.300	410.000	70.000	270.000	35.000
	835	0.	37.000	51.000	100.000	0.500
	836	0.	40.000	54.000	100.000	0.500
CONTINENTAL CRUSTAL AVE						

ATOMIC ABSORPTION SPECTROPHOTOMETRY

STREAM SEDIMENTS

ELEMENT = CU

NUMBER OF SAMPLES	=	472
SUM OF SAMPLES	=	37385.000
SUM OF SQUARES OF SAMPLES	=	4999961.000
MEAN OF SAMPLES	=	79.206
VARIANCE OF SAMPLES	=	4328.796
MINIMUM VALUE	=	13.000
MAXIMUM VALUE	=	890.000
THE RANGE	=	877.000
STANDARD DEVIATION	=	65.794
TWICE STANDARD DEVIATION PLUS MEAN	=	210.793

NINETY % = 187.44 NINETY-FIVE % = 210.79 NINETY-EIGHT % = 232.50

FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM
				333	400.00
				377	310.00
				421	380.00
				558	890.00
				581	450.00
				620	340.00
646	210.00				
688	200.00				
				715	280.00
				719	380.00

646	210.00	6[illegible]	340[illegible]
688	200.00		
		715	280.00
		719	380.00
		755	420.00
		757	240.00
		834	410.00

834 410.00

ATOMIC ABSORPTION SPECTROPHOTOMETRY

STREAM SEDIMENTS

ELEMENT = PB

NUMBER OF SAMPLES =	472
SUM OF SAMPLES =	1345939.609
SUM OF SQUARES OF SAMPLES =	0.603E 11
MEAN OF SAMPLES =	2851.567
VARIANCE OF SAMPLES =	119911479.000
MINIMUM VALUE =	0.
MAXIMUM VALUE =	130000.000
THE RANGE =	130000.000
STANDARD DEVIATION =	10950.410
TWICE STANDARD DEVIATION PLUS MEAN =	24752.387

NINETY % = 20864.99 NINETY-FIVE % = 24752.39 NINETY-EIGHT % = 28366.02

FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM
				558	130000.00
				559	68000.00
		668	26000.00		
				709	48000.00
		710	25000.00		
		729	26000.00		
732	22000.00				
				753	110000.00
757	23000.00				

ATOMIC ABSORPTION SPECTROPHOTOMETRY

STREAM SEDIMENTS

ELEMENT = MO

NUMBER OF SAMPLES	=	472
SUM OF SAMPLES	=	5900.100
SUM OF SQUARES OF SAMPLES	=	261880.568
MEAN OF SAMPLES	=	12.500
VARIANCE OF SAMPLES	=	399.423
MINIMUM VALUE	=	0.
MAXIMUM VALUE	=	220.000
THE RANGE	=	220.000
STANDARD DEVIATION	=	19.986
TWICE STANDARD DEVIATION PLUS MEAN	=	52.471

NINETY % = 45.38 NINETY-FIVE % = 52.47 NINETY-EIGHT % = 59.07

FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM
		536	56.00		
				558	91.00
579	49.00				
				626	110.00
				646	62.00
				686	151.00
				689	71.00
690	50.00				
691	48.00				
				708	77.00

691	48.00				
				708	77.00
				713	75.00
730	49.00				
735	52.00				
736	48.00				
				737	220.00
				753	68.00
				754	160.00
				755	68.00
758	49.00				
775	52.00				
				776	92.00
803	46.00				
		817	54.00		

ATOMIC ABSORPTION SPECTROPHOTOMETRY

STREAM SEDIMENTS

ELEMENT = AG

NUMBER OF SAMPLES =	472
SUM OF SAMPLES =	5316.400
SUM OF SQUARES OF SAMPLES =	646124.516
MEAN OF SAMPLES =	11.264
VARIANCE OF SAMPLES =	1244.677
MINIMUM VALUE =	0.
MAXIMUM VALUE =	480.000
THE RANGE =	480.000
STANDARD DEVIATION =	35.280
TWICE STANDARD DEVIATION PLUS MEAN =	81.824

NINETY % = 69.30 NINETY-FIVE % = 81.82 NINETY-EIGHT % = 93.47

FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM
				536	280.00
				540	100.00
				557	320.00
				558	480.00
		580	86.00		
				626	94.00
				646	100.00
				668	96.00
672	76.00				
		689	89.00		
				709	96.00

672	76.00				
		689	89.00		
				709	96.00
				710	120.00
		732	82.00		
				737	100.00
				753	97.00
		754	93.00		
				756	97.00
				757	133.00
				773	120.00
		775	82.00		
				776	120.00
777	72.00				

ATOMIC ABSORPTION SPECTROPHOTOMETRY

STREAM SEDIMENTS

ELEMENT = ZN

NUMBER OF SAMPLES =	472
SUM OF SAMPLES =	219826.301
SUM OF SQUARES OF SAMPLES =	638999584.000
MEAN OF SAMPLES =	465.734
VARIANCE OF SAMPLES =	1139318.625
MINIMUM VALUE =	7.300
MAXIMUM VALUE =	9900.000
THE RANGE =	9892.700
STANDARD DEVIATION =	1067.389
TWICE STANDARD DEVIATION PLUS MEAN =	2600.511

NINETY % = 2221.59 NINETY-FIVE % = 2600.51 NINETY-EIGHT % = 2952.75

FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM
				312	9900.00
313	2600.00				
314	2600.00				
				377	3600.00
		399	2800.00		
				401	9000.00
				421	9300.00
				422	3000.00
				424	4200.00

ALL ANOMALOUS VALUES PER SAMPLE

	ZN		
312	9900.00		
	CU		
333	400.00		
	CU	ZN	
377	310.00	3600.00	
	ZN		
399	2800.00		
	ZN		
401	9000.00		
	CU	ZN	
421	330.00	9300.00	
	ZN		
422	3000.00		
	ZN		
424	4200.00		
	ZN		
494	6900.00		
	AG	ZN	MO
536	280.00	3000.00	56.00
	AG		

CUMULATIVE FREQUENCY DISTRIBUTION FOR MO , AS ANALYZED BY ATOMIC ABSORPTION IN STREAM SEDIMENTS

CLASS LIMITS UPPER - LOWER (PPM)	FREQ	FREQ (PCT)	CUM FREQ (PCT)
1200000 - 830000	0.	0.	0.
830000 - 560000	0.	0.	0.
560000 - 380000	0.	0.	0.
380000 - 260000	0.	0.	0.
260000 - 180000	0.	0.	0.
180000 - 120000	0.	0.	0.
120000 - 83000	0.	0.	0.
83000 - 56000	0.	0.	0.
56000 - 38000	0.	0.	0.
38000 - 26000	0.	0.	0.
26000 - 18000	0.	0.	0.
18000 - 12000	0.	0.	0.
12000 - 8300	0.	0.	0.
8300 - 5600	0.	0.	0.
5600 - 3800	0.	0.	0.
3800 - 2600	0.	0.	0.
2600 - 1800	0.	0.	0.
1800 - 1200	0.	0.	0.
1200 - 830	0.	0.	0.
830 - 560	0.	0.	0.
560 - 380	0.	0.	0.
380 - 260	0.	0.	0.
260 - 180	1.	0.24	0.24
180 - 120	2.	0.48	0.72
120 - 83	3.	0.72	1.43
83 - 56	7.	1.67	3.10
56 - 38	21.	5.01	8.11
38 - 26	27.	6.44	14.56
26 - 18	35.	8.35	22.91
18 - 12	54.	12.89	35.80
12 - 8.3	32.	7.64	43.44
8.3 - 5.6	78.	18.62	62.05
5.6 - 3.8	54.	12.89	74.94
3.8 - 2.6	31.	7.40	82.34
2.6 - 1.8	46.	10.98	93.32
1.8 - 1.2	6.	1.43	94.75
1.2 - 0.83	16.	3.82	98.57
0.83 - 0.56	2.	0.48	99.05
0.56 - 0.38	4.	0.95	100.00
0.38 - 0.26	0.	0.	100.00
0.26 - 0.18	0.	0.	100.00
0.18 - 0.12	0.	0.	100.00
0.12 - 0.083	0.	0.	100.00
0.083 - 0.056	0.	0.	100.00
0.056 - 0.038	0.	0.	100.00
0.038 - 0.026	0.	0.	100.00
0.026 - 0.018	0.	0.	100.00
0.018 - 0.012	0.	0.	100.00
0.012 - 0.0083	0.	0.	100.00

CUMULATIVE FREQUENCY DISTRIBUTION FOR AG , AS ANALYZED BY ATOMIC ABSORPTION IN STREAM SEDIMENTS

CLASS LIMITS UPPER	-	LOWER (PPM)	FREQ	FREQ (PCT)	CUM FREQ (PCT)
1200000	-	830000	0.	0.	0.
830000	-	560000	0.	0.	0.
560000	-	380000	0.	0.	0.
380000	-	260000	0.	0.	0.
260000	-	180000	0.	0.	0.
180000	-	120000	0.	0.	0.
120000	-	83000	0.	0.	0.
83000	-	56000	0.	0.	0.
56000	-	38000	0.	0.	0.
38000	-	26000	0.	0.	0.
26000	-	18000	0.	0.	0.
18000	-	12000	0.	0.	0.
12000	-	8300	0.	0.	0.
8300	-	5600	0.	0.	0.
5600	-	3800	0.	0.	0.
3900	-	2600	0.	0.	0.
2600	-	1800	0.	0.	0.
1800	-	1200	0.	0.	0.
1200	-	830	0.	0.	0.
830	-	560	0.	0.	0.
560	-	380	1.	0.22	0.22
380	-	260	2.	0.45	0.67
260	-	180	0.	0.	0.67
180	-	120	4.	0.90	1.57
120	-	83	11.	2.47	4.04
83	-	56	7.	1.57	5.61
56	-	38	7.	1.57	7.17
38	-	26	13.	2.91	10.09
26	-	19	7.	1.57	11.66
18	-	12	21.	4.71	16.37
12	-	8.3	20.	4.48	20.85
8.3	-	5.6	43.	9.64	30.49
5.6	-	3.8	40.	8.97	39.46
3.8	-	2.6	49.	10.99	50.45
2.6	-	1.8	36.	8.07	58.52
1.8	-	1.2	63.	14.13	72.65
1.2	-	0.83	36.	8.07	80.72
0.83	-	0.56	51.	11.43	92.15
0.56	-	0.38	17.	3.81	95.96
0.38	-	0.26	7.	1.57	97.53
0.26	-	0.18	3.	0.67	98.21
0.18	-	0.12	0.	0.	98.21
0.12	-	0.083	8.	1.79	100.00
0.083	-	0.056	0.	0.	100.00
0.056	-	0.033	0.	0.	100.00
0.038	-	0.026	0.	0.	100.00
0.026	-	0.018	0.	0.	100.00
0.018	-	0.012	0.	0.	100.00
0.012	-	0.0083	0.	0.	100.00

CUMULATIVE FREQUENCY DISTRIBUTION FOR ZN , AS ANALYZED BY ATOMIC ABSORPTION
IN STREAM SEDIMENTS

CLASS LIMITS UPPER - LOWER (PPM)	FREQ	FREQ (PCT)	CUM FREQ (PCT)
1200000 - 830000	0.	0.	0.
830000 - 560000	0.	0.	0.
560000 - 380000	0.	0.	0.
380000 - 260000	0.	0.	0.
260000 - 180000	0.	0.	0.
180000 - 120000	0.	0.	0.
120000 - 83000	0.	0.	0.
83000 - 56000	0.	0.	0.
56000 - 38000	0.	0.	0.
38000 - 26000	0.	0.	0.
26000 - 18000	0.	0.	0.
18000 - 12000	0.	0.	0.
12000 - 8300	4.	0.85	0.85
8300 - 5600	2.	0.42	1.27
5600 - 3800	1.	0.21	1.48
3800 - 2600	7.	1.48	2.97
2600 - 1800	9.	1.91	4.87
1800 - 1200	21.	4.45	9.32
1200 - 830	14.	2.97	12.29
830 - 560	23.	4.87	17.16
560 - 380	31.	6.57	23.73
380 - 260	30.	6.36	30.08
260 - 180	56.	11.86	41.95
180 - 120	128.	27.12	69.07
120 - 83	107.	22.67	91.74
83 - 56	27.	5.72	97.46
56 - 38	4.	0.85	98.31
38 - 26	5.	1.06	99.36
26 - 18	2.	0.42	99.79
18 - 12	0.	0.	99.79
12 - 8.3	0.	0.	99.79
8.3 - 5.6	1.	0.21	100.00
5.6 - 3.8	0.	0.	100.00
3.8 - 2.6	0.	0.	100.00
2.6 - 1.8	0.	0.	100.00
1.8 - 1.2	0.	0.	100.00
1.2 - 0.83	0.	0.	100.00
0.83 - 0.56	0.	0.	100.00
0.56 - 0.38	0.	0.	100.00
0.38 - 0.26	0.	0.	100.00
0.26 - 0.18	0.	0.	100.00
0.18 - 0.12	0.	0.	100.00
0.12 - 0.083	0.	0.	100.00
0.083 - 0.056	0.	0.	100.00
0.056 - 0.038	0.	0.	100.00
0.038 - 0.026	0.	0.	100.00
0.026 - 0.018	0.	0.	100.00
0.018 - 0.012	0.	0.	100.00
0.012 - 0.0083	0.	0.	100.00

APPENDIX III

Trend surface plots of the geochemical and geophysical data - Drenchwater Creek

	AG	ZN	MO	
536	280.00	3000.00	56.00	
	AG			
540	100.00			
	AG			
557	320.00			
	AG	CU	PB	MO
558	480.00	890.00	130000.00	91.00
	PB			
559	68000.00			
	AG			
580	86.00			
	CU	ZN		
581	450.00	6900.00		
	ZN			
598	8700.00			
	CU	ZN		
620	340.00	3300.00		
	AG	MO		
626	94.00	110.00		
	AG	MO		
646	100.00	62.00		
	AG	PB		
668	96.00	26000.00		
	MO			
[illegible]	[illegible]			

PB
668 96.00 26000.00

MO
686 151.00

AG MO
689 89.00 71.00

MO
708 77.00

AG PB
709 96.00 48000.00

AG PB
710 120.00 25000.00

MO
713 75.00

CU
715 280.00

CU
719 380.00

PB
729 26000.00

AG
732 82.00

AG MO
737 100.00 220.00

AG PB MO
753 97.00 110000.00 68.00

	[illegible]	[illegible]	
737	100.00	220.00	
	AG	PB	MO
753	97.00	110000.00	68.00
	AG	MO	
754	93.00	160.00	
	CU	MO	
755	420.00	68.00	
	AG		
756	97.00		
	AG	CU	
757	133.00	240.00	
	PB		
758	120000.00		
	AG		
773	120.00		
	AG		
775	82.00		
	AG	MO	
776	120.00	92.00	
	MO		
817	54.00		
	CU		
834	410.00		

CUMULATIVE FREQUENCY DISTRIBUTION FOR CU , AS ANALYZED BY ATOMIC ABSORPTION IN STREAM SEDIMENTS

CLASS LIMITS UPPER - LOWER (PPM)	FREQ	FREQ (PCT)	CUM FREQ (PCT)
1200000 - 830000	0.	0.	0.
830000 - 560000	0.	0.	0.
560000 - 380000	0.	0.	0.
380000 - 260000	0.	0.	0.
260000 - 180000	0.	0.	0.
180000 - 120000	0.	0.	0.
120000 - 83000	0.	0.	0.
83000 - 56000	0.	0.	0.
56000 - 38000	0.	0.	0.
38000 - 26000	0.	0.	0.
26000 - 18000	0.	0.	0.
18000 - 12000	0.	0.	0.
12000 - 8300	0.	0.	0.
8300 - 5600	0.	0.	0.
5600 - 3800	0.	0.	0.
3800 - 2600	0.	0.	0.
2600 - 1800	0.	0.	0.
1800 - 1200	0.	0.	0.
1200 - 830	1.	0.21	0.21
830 - 560	0.	0.	0.21
560 - 380	6.	1.27	1.48
380 - 260	3.	0.64	2.12
260 - 180	4.	0.85	2.97
180 - 120	48.	10.17	13.14
120 - 83	98.	20.76	33.90
83 - 56	134.	28.39	62.29
56 - 38	122.	25.85	88.14
38 - 26	41.	8.69	96.82
26 - 18	10.	2.12	98.94
18 - 12	5.	1.06	100.00
12 - 8.3	0.	0.	100.00
8.3 - 5.6	0.	0.	100.00
5.6 - 3.8	0.	0.	100.00
3.8 - 2.6	0.	0.	100.00
2.6 - 1.8	0.	0.	100.00
1.8 - 1.2	0.	0.	100.00
1.2 - 0.83	0.	0.	100.00
0.83 - 0.56	0.	0.	100.00
0.56 - 0.38	0.	0.	100.00
0.38 - 0.26	0.	0.	100.00
0.26 - 0.18	0.	0.	100.00
0.18 - 0.12	0.	0.	100.00
0.12 - 0.083	0.	0.	100.00
0.083 - 0.056	0.	0.	100.00
0.056 - 0.038	0.	0.	100.00
0.038 - 0.026	0.	0.	100.00
0.026 - 0.018	0.	0.	100.00
0.018 - 0.012	0.	0.	100.00
0.012 - 0.0083	0.	0.	100.00

CUMULATIVE FREQUENCY DISTRIBUTION FOR PB , AS ANALYZED BY ATOMIC ABSORPTION IN STREAM SEDIMENTS

CLASS LIMITS UPPER - LOWER (PPM)	FREQ	FREQ (PCT)	CUM FREQ (PCT)
1200000 - 830000	0.	0.	0.
830000 - 560000	0.	0.	0.
560000 - 380000	0.	0.	0.
380000 - 260000	0.	0.	0.
260000 - 180000	0.	0.	0.
180000 - 120000	2.	0.42	0.42
120000 - 83000	1.	0.21	0.64
83000 - 56000	1.	0.21	0.85
56000 - 38000	1.	0.21	1.06
38000 - 26000	2.	0.42	1.49
26000 - 18000	4.	0.85	2.34
18000 - 12000	27.	5.73	8.07
12000 - 8300	13.	2.76	10.83
8300 - 5600	14.	2.97	13.80
5600 - 3800	7.	1.49	15.29
3800 - 2600	12.	2.55	17.83
2600 - 1800	11.	2.34	20.17
1800 - 1200	17.	3.61	23.78
1200 - 830	6.	1.27	25.05
830 - 560	14.	2.97	28.03
560 - 380	11.	2.34	30.36
380 - 260	10.	2.12	32.48
260 - 180	22.	4.67	37.15
180 - 120	34.	7.22	44.37
120 - 83	28.	5.94	50.32
83 - 56	64.	13.59	63.91
56 - 38	92.	19.53	83.44
38 - 26	53.	11.25	94.69
26 - 18	16.	3.40	98.09
18 - 12	4.	0.85	98.94
12 - 8.3	2.	0.42	99.36
8.3 - 5.6	0.	0.	99.36
5.6 - 3.8	2.	0.42	99.79
3.8 - 2.6	1.	0.21	100.00
2.6 - 1.8	0.	0.	100.00
1.8 - 1.2	0.	0.	100.00
1.2 - 0.83	0.	0.	100.00
0.83 - 0.56	0.	0.	100.00
0.56 - 0.38	0.	0.	100.00
0.38 - 0.26	0.	0.	100.00
0.26 - 0.18	0.	0.	100.00
0.18 - 0.12	0.	0.	100.00
0.12 - 0.083	0.	0.	100.00
0.083 - 0.056	0.	0.	100.00
0.056 - 0.038	0.	0.	100.00
0.038 - 0.026	0.	0.	100.00
0.026 - 0.018	0.	0.	100.00
0.018 - 0.012	0.	0.	100.00
0.012 - 0.0083	0.	0.	100.00

CUMULATIVE FREQUENCY DISTRIBUTION FOR AG , AS ANALYZED BY ATOMIC ABSORPTION IN STREAM SEDIMENTS

CLASS LIMITS UPPER	-	LOWER (PPM)	FREQ	FREQ (PCT)	CUM FREQ (PCT)
1200000	-	830000	0.	0.	0.
830000	-	560000	0.	0.	0.
560000	-	380000	0.	0.	0.
390000	-	260000	0.	0.	0.
260000	-	180000	0.	0.	0.
180000	-	120000	0.	0.	0.
120000	-	83000	0.	0.	0.
83000	-	56000	0.	0.	0.
56000	-	38000	0.	0.	0.
38000	-	26000	0.	0.	0.
26000	-	18000	0.	0.	0.
18000	-	12000	0.	0.	0.
12000	-	8300	0.	0.	0.
8300	-	5600	0.	0.	0.
5600	-	3800	0.	0.	0.
3800	-	2600	0.	0.	0.
2600	-	1800	0.	0.	0.
1800	-	1200	0.	0.	0.
1200	-	830	0.	0.	0.
830	-	560	0.	0.	0.
560	-	380	0.	0.	0.
380	-	260	0.	0.	0.
260	-	180	3.	7.50	7.50
180	-	120	3.	7.50	15.00
120	-	83	2.	5.00	20.00
83	-	56	0.	0.	20.00
56	-	38	0.	0.	20.00
39	-	26	0.	0.	20.00
26	-	18	0.	0.	20.00
18	-	12	0.	0.	20.00
12	-	8.3	2.	5.00	25.00
8.3	-	5.6	4.	10.00	35.00
5.6	-	3.8	9.	22.50	57.50
3.8	-	2.6	2.	5.00	62.50
2.6	-	1.8	2.	5.00	67.50
1.8	-	1.2	3.	7.50	75.00
1.2	-	0.83	3.	7.50	82.50
0.83	-	0.56	4.	10.00	92.50
0.56	-	0.38	0.	0.	92.50
0.38	-	0.26	2.	5.00	97.50
0.26	-	0.18	1.	2.50	100.00
0.18	-	0.12	0.	0.	100.00
0.12	-	0.083	0.	0.	100.00
0.083	-	0.056	0.	0.	100.00
0.056	-	0.038	0.	0.	100.00
0.038	-	0.026	0.	0.	100.00
0.026	-	0.018	0.	0.	100.00
0.018	-	0.012	0.	0.	100.00

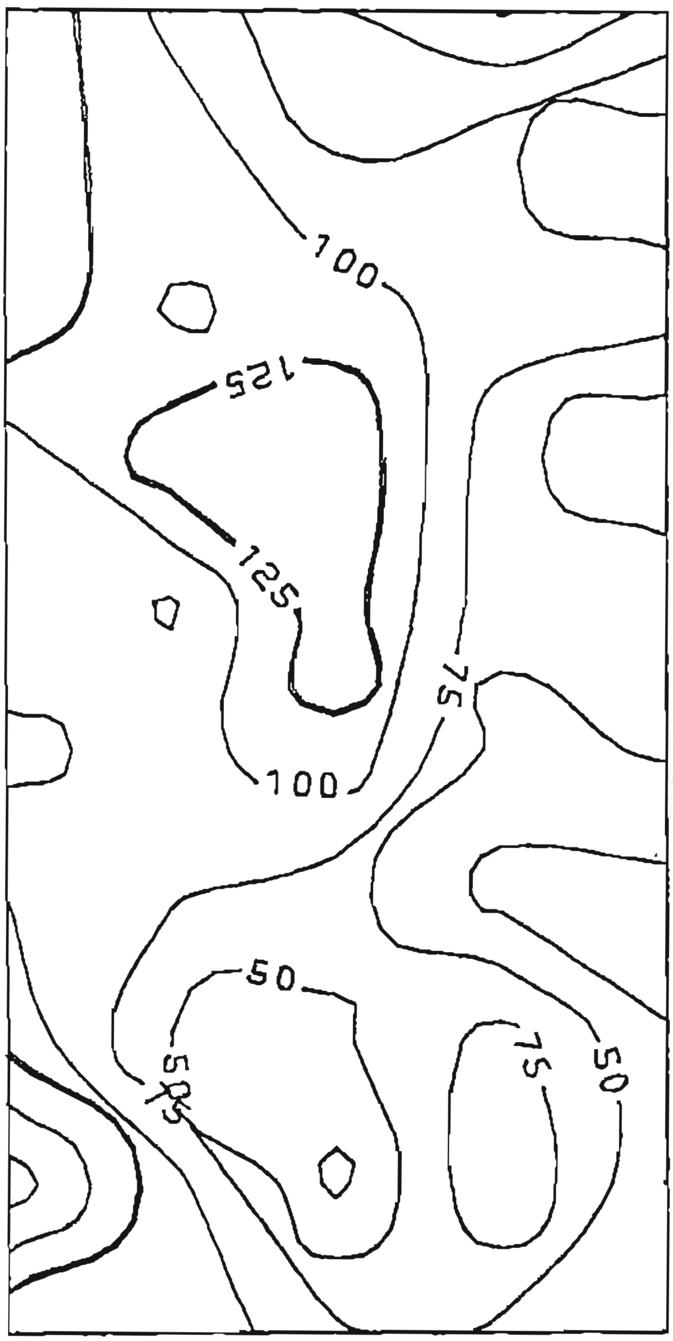
CUMULATIVE FREQUENCY DISTRIBUTION FOR ZN , AS ANALYZED BY ATOMIC ABSORPTION IN STREAM SEDIMENTS

CLASS LIMITS UPPER - LOWER (PPM)	FREQ	FREQ (PCT)	CUM FREQ (PCT)
1200000 - 830000	0.	0.	0.
830000 - 560000	0.	0.	0.
560000 - 380000	0.	0.	0.
380000 - 260000	0.	0.	0.
260000 - 180000	0.	0.	0.
180000 - 120000	0.	0.	0.
120000 - 83000	0.	0.	0.
83000 - 56000	0.	0.	0.
56000 - 38000	0.	0.	0.
38000 - 26000	0.	0.	0.
26000 - 18000	0.	0.	0.
18000 - 12000	0.	0.	0.
12000 - 8300	0.	0.	0.
8300 - 5600	0.	0.	0.
5600 - 3800	0.	0.	0.
3800 - 2600	0.	0.	0.
2600 - 1800	1.	2.00	2.00
1800 - 1200	0.	0.	2.00
1200 - 830	1.	2.00	4.00
830 - 560	1.	2.00	6.00
560 - 380	5.	10.00	16.00
380 - 260	4.	8.00	24.00
260 - 180	12.	24.00	48.00
180 - 120	13.	26.00	74.00
120 - 83	7.	14.00	88.00
83 - 56	3.	6.00	94.00
56 - 38	2.	4.00	98.00
38 - 26	1.	2.00	100.00
26 - 18	0.	0.	100.00
18 - 12	0.	0.	100.00
12 - 8.3	0.	0.	100.00
8.3 - 5.6	0.	0.	100.00
5.6 - 3.8	0.	0.	100.00
3.8 - 2.6	0.	0.	100.00
2.6 - 1.8	0.	0.	100.00
1.8 - 1.2	0.	0.	100.00
1.2 - 0.83	0.	0.	100.00
0.83 - 0.56	0.	0.	100.00
0.56 - 0.38	0.	0.	100.00
0.38 - 0.26	0.	0.	100.00
0.26 - 0.18	0.	0.	100.00
0.18 - 0.12	0.	0.	100.00
0.12 - 0.083	0.	0.	100.00
0.083 - 0.056	0.	0.	100.00
0.056 - 0.038	0.	0.	100.00
0.038 - 0.026	0.	0.	100.00
0.026 - 0.018	0.	0.	100.00
0.018 - 0.012	0.	0.	100.00
0.012 - 0.0083	0.	0.	100.00

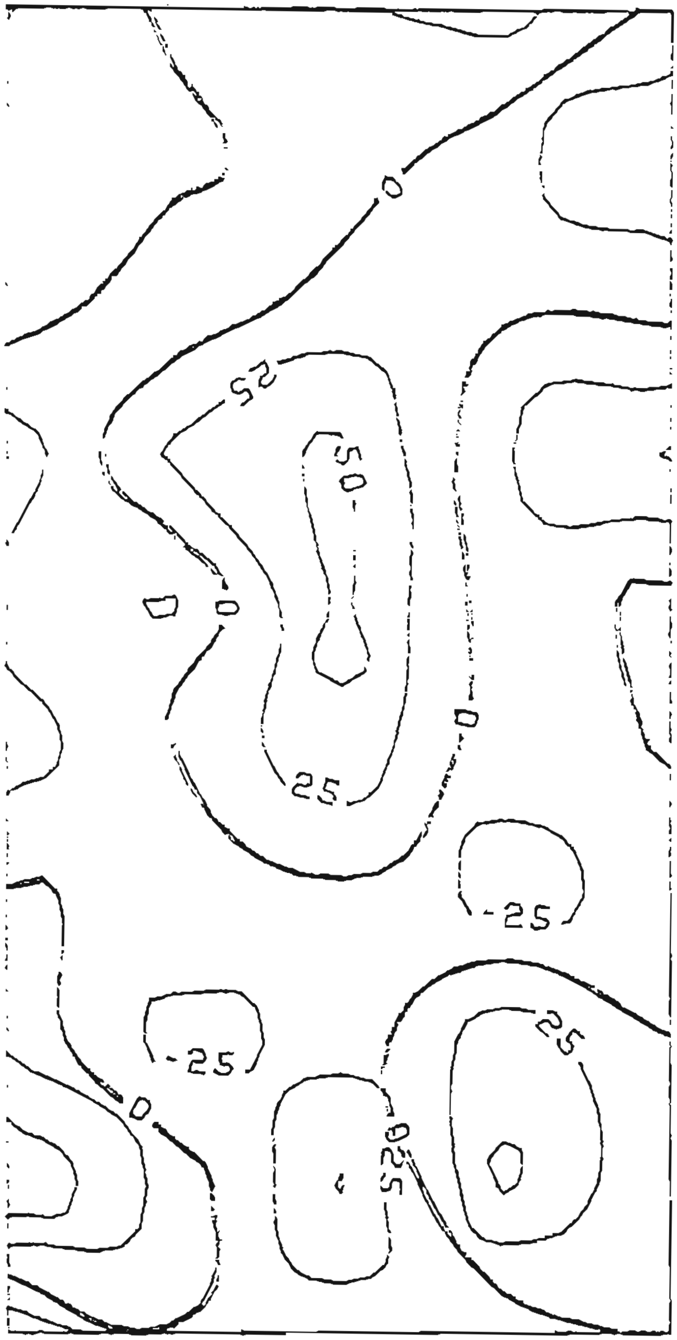
TOTAL DATA VALUES 50.

DRENCHWATER DATA - - CU CONTOUR

PLOT NO. 2 DATE 01/05/79 TIME 11

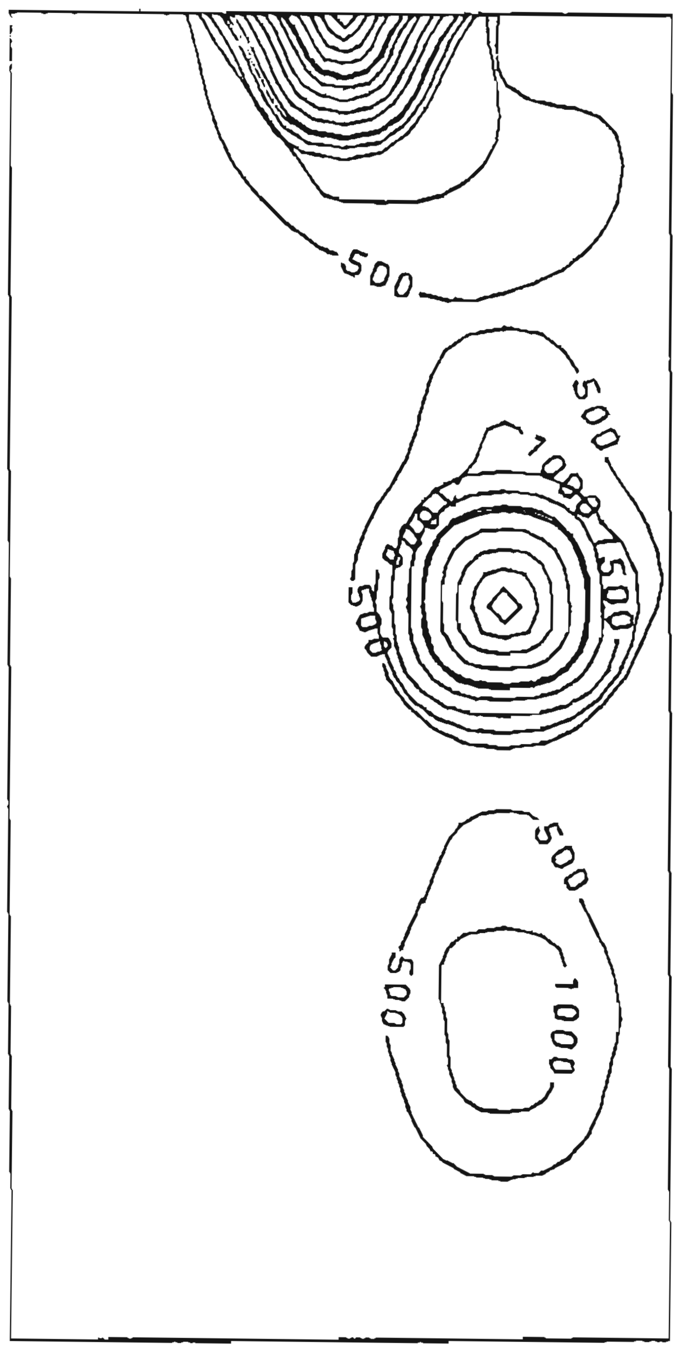


DRENCHWATER DATA - - TREND #3,RESIDUALS..CU
PLOT NO. 2 DATE 01/05/79 TIME 11



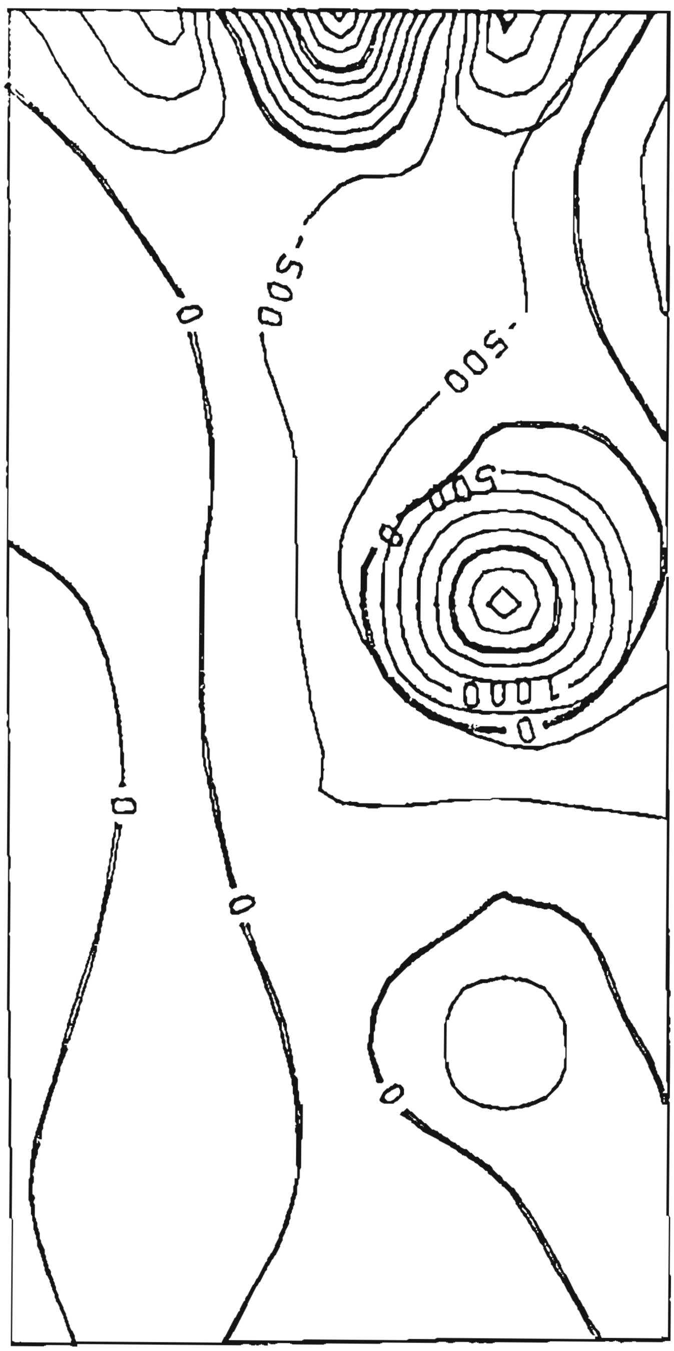
DRENCHWATER DATA - - CONTOUR..P8

PLOT NO. 2 DATE 01/05/79 TIME 13



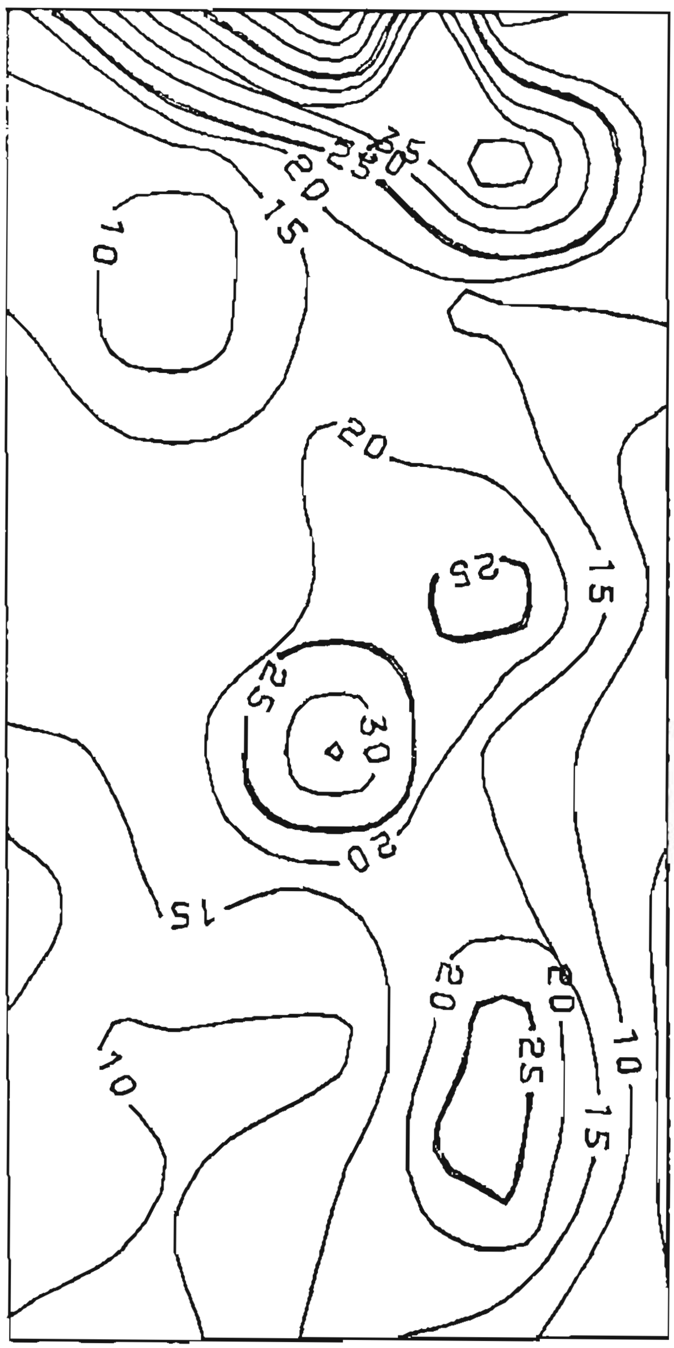
DRENCHWATER DATA - - TREND #4,RESIDUALS..PB

PLOT NO. 2 DATE 01/05/79 TIME 13



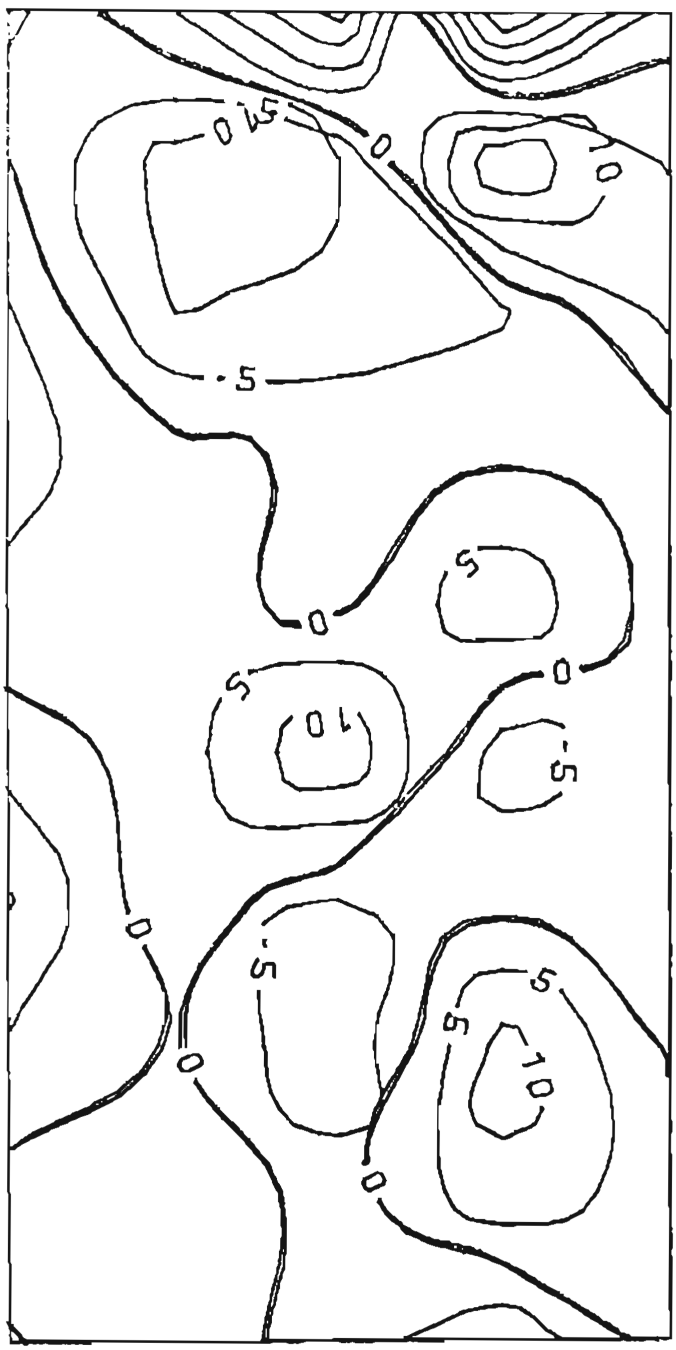
DRENCHWATER DATA - - CONTOUR..MO

PLOT NO. 2 DATE 01/05/79 TIME 15



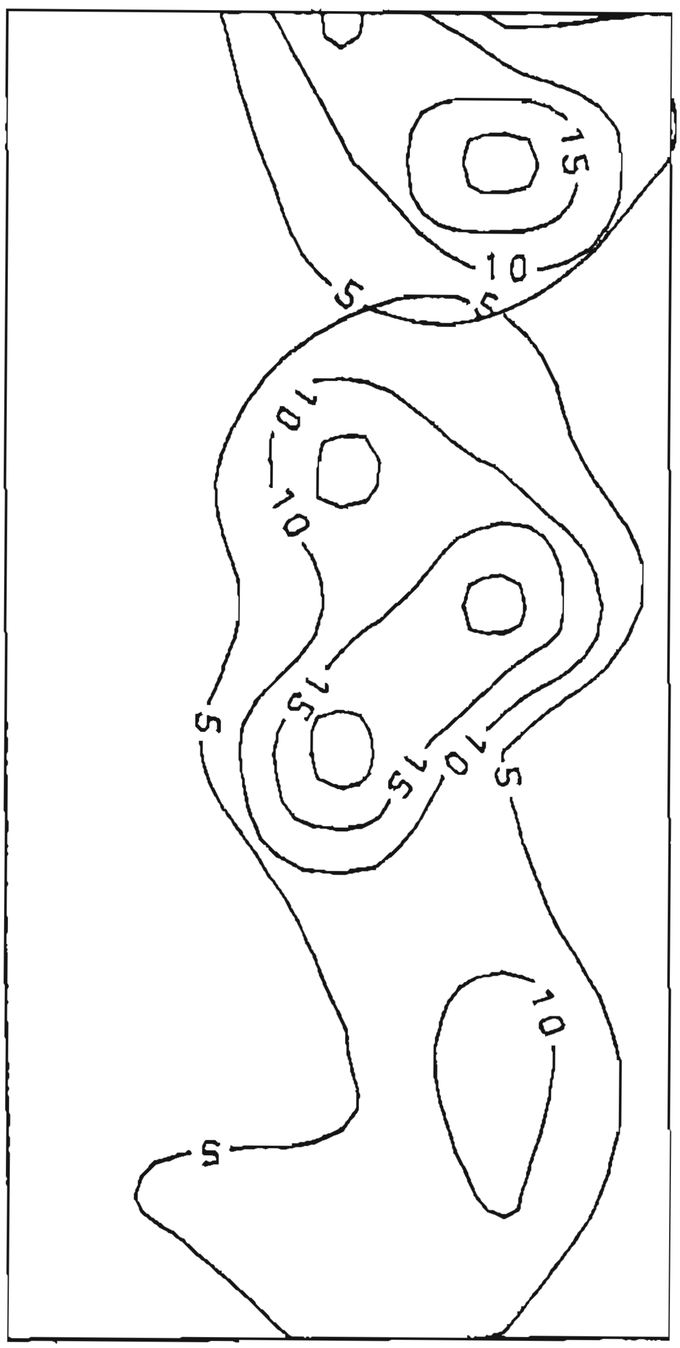
DRENCHWATER DATA - - TREND #4,RESIDUALS..MO

PLOT NO. 2 DATE 01/05/79 TIME 14



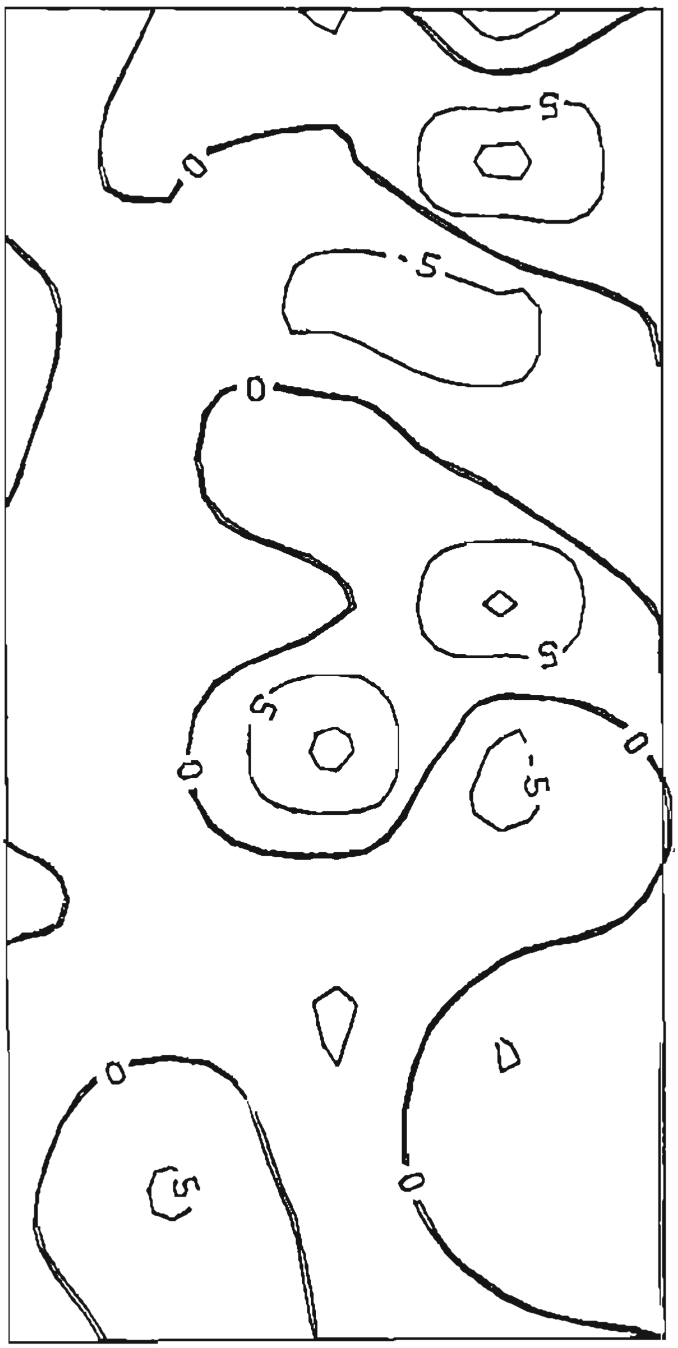
DRENCHWATER DATA - - CONTOUR..AG

PLOT NO. 2 DATE 01/05/79 TIME 12



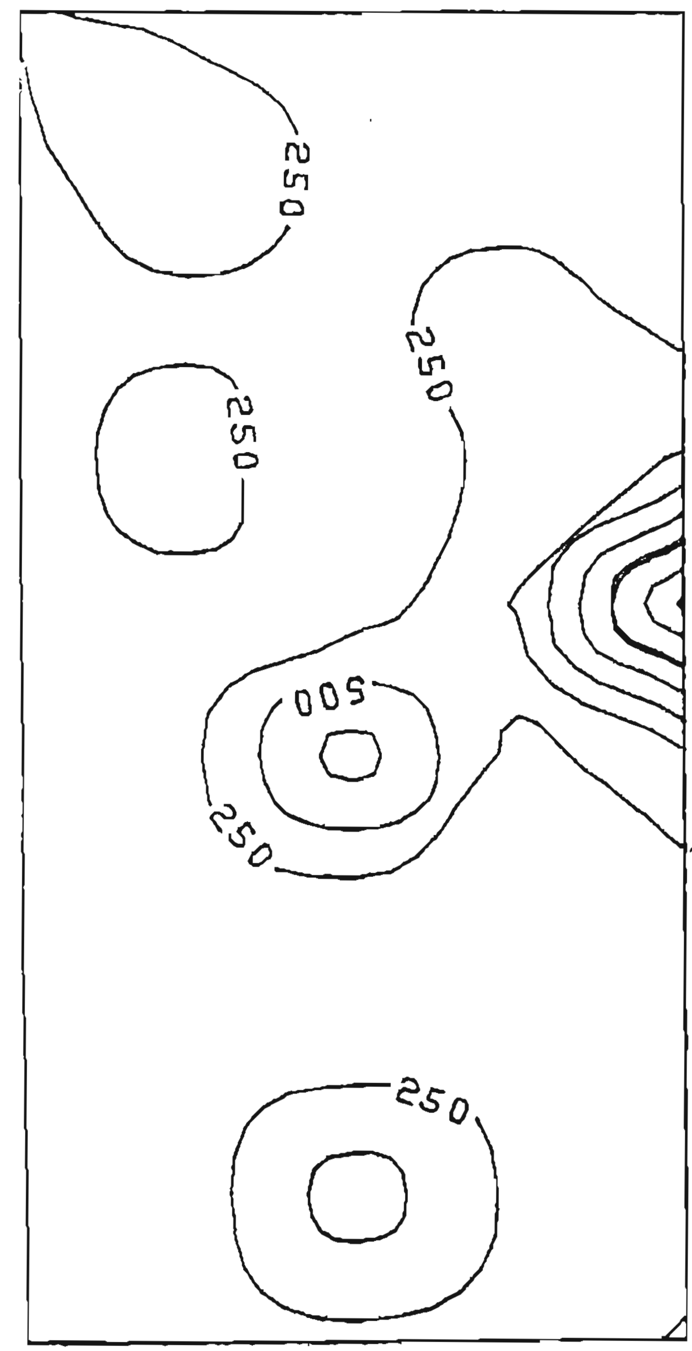
DRENCHWATER DATA - - TREND #4,RESIDUALS..AG

PLOT NO. 2 DATE 01/05/79 TIME 12



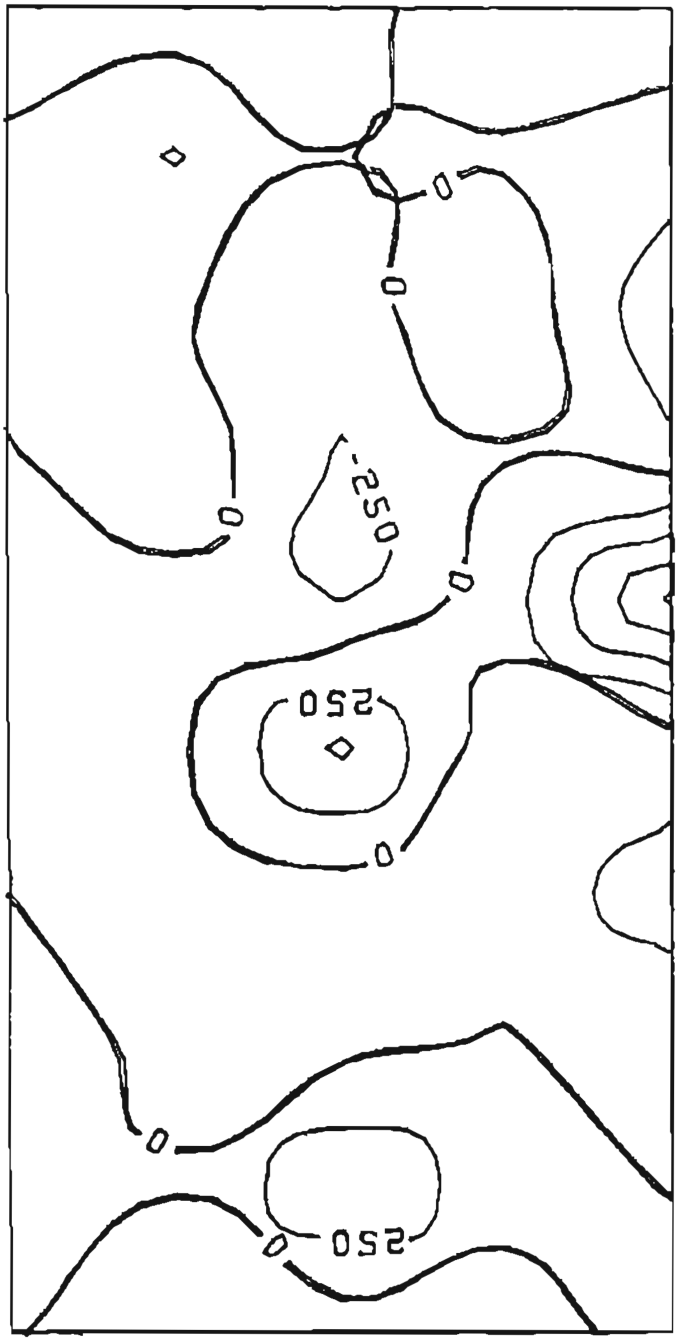
DRENCHWATER DATA - - CONTOUR..ZN

PLOT NO. 2 DATE 01/05/79 TIME 14

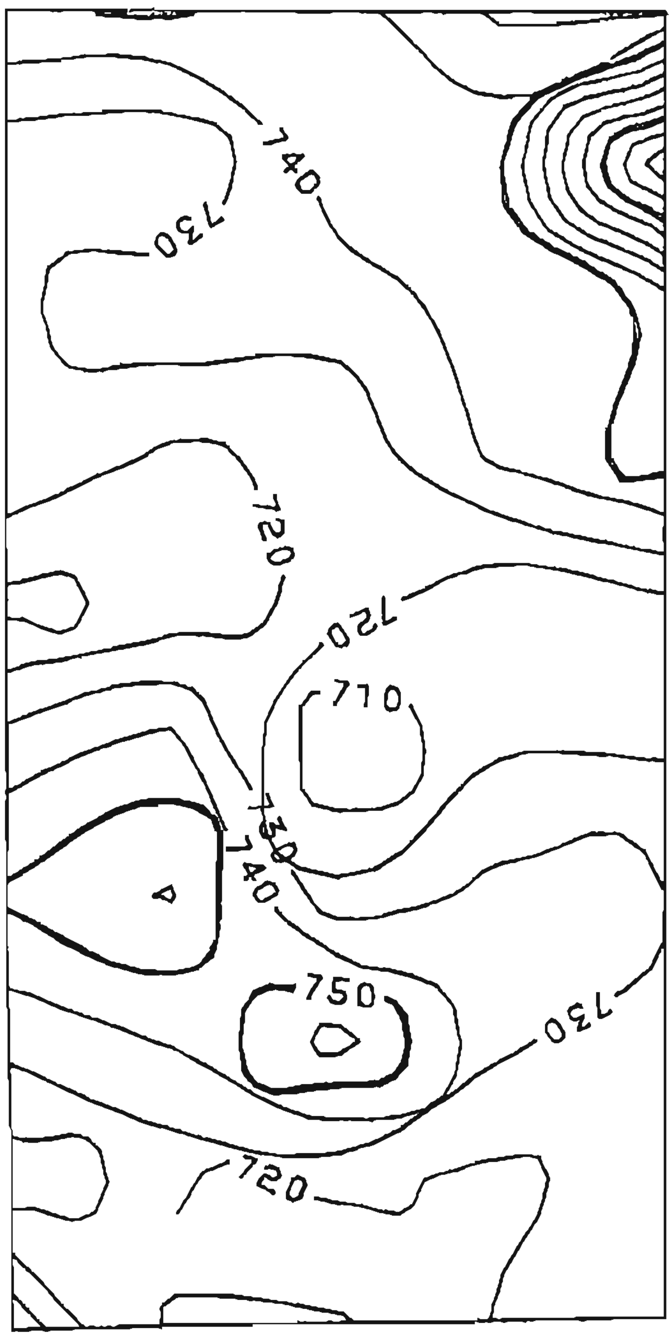


DRENCHWATER DATA - - TREND #4,RESIDUALS..ZN

PLOT NO. 2 DATE 01/05/79 TIME 14

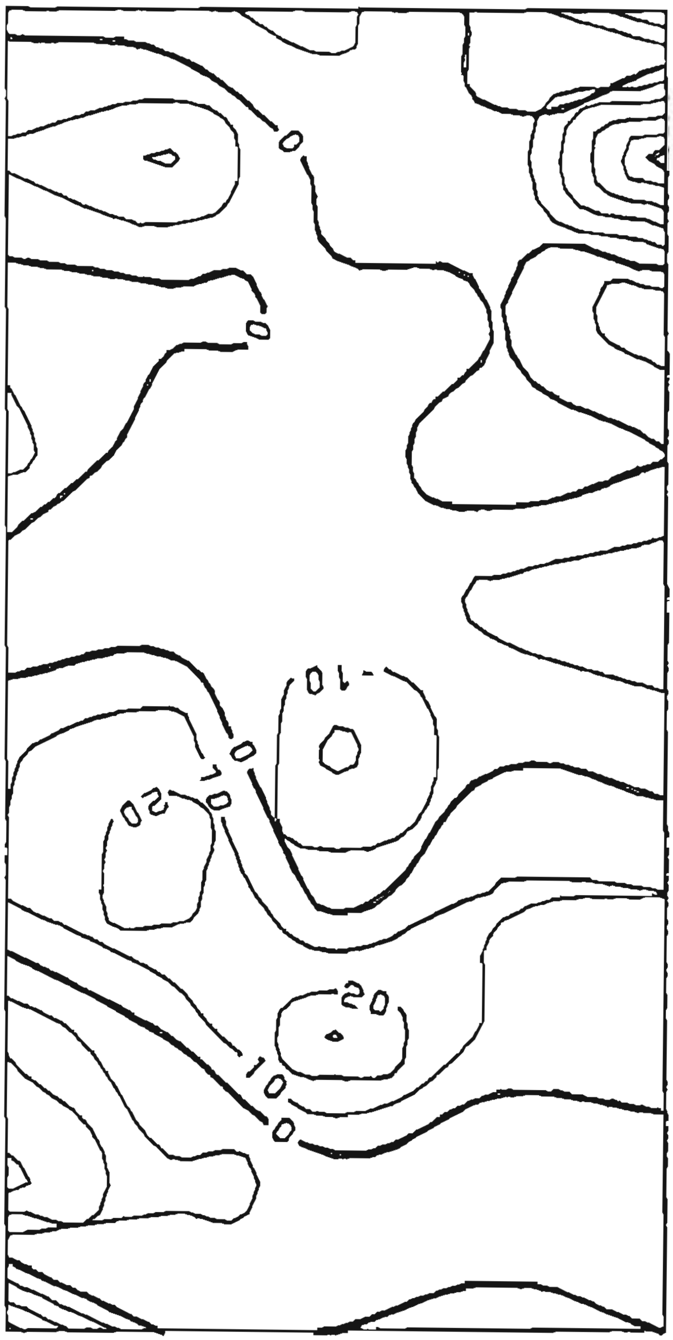


DRENCHWATER - - CONTOUR..MAGNETIC
PLOT NO. 2 DATE 01/08/79 TIME 16



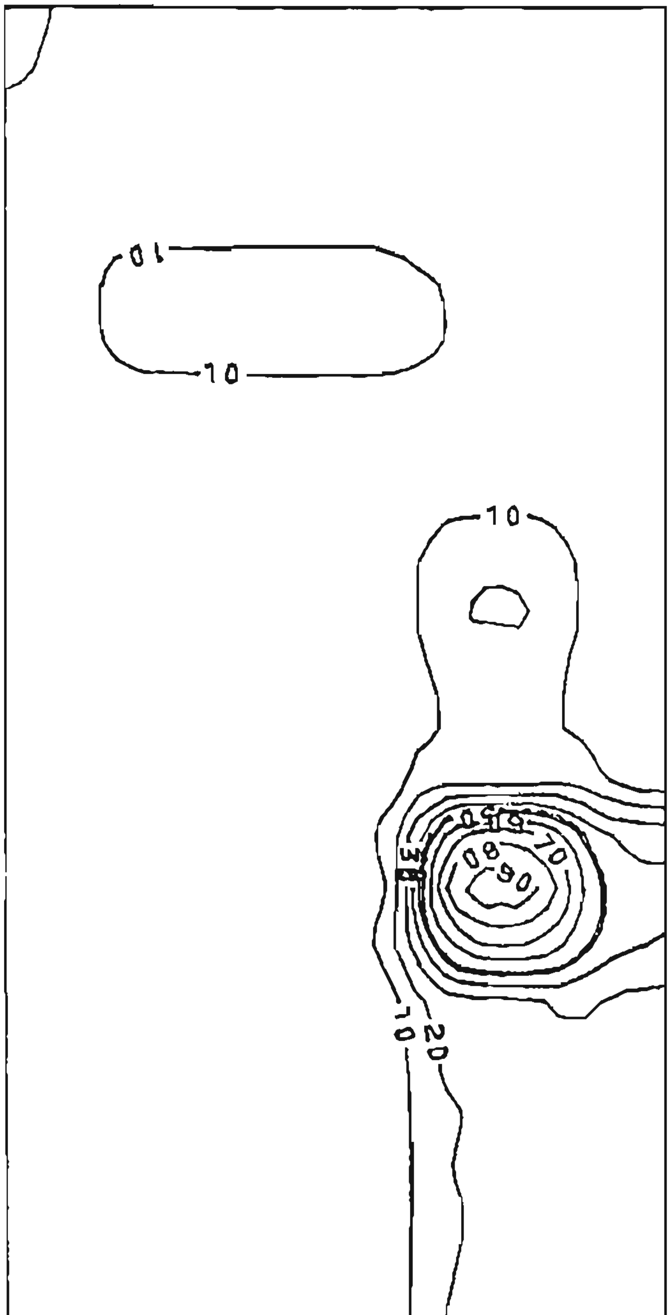
DRENCHWATER - - TREND #4.RESIDUALS..MAGNETIC

PLOT NO. 2 DATE 01/08/79 TIME 16



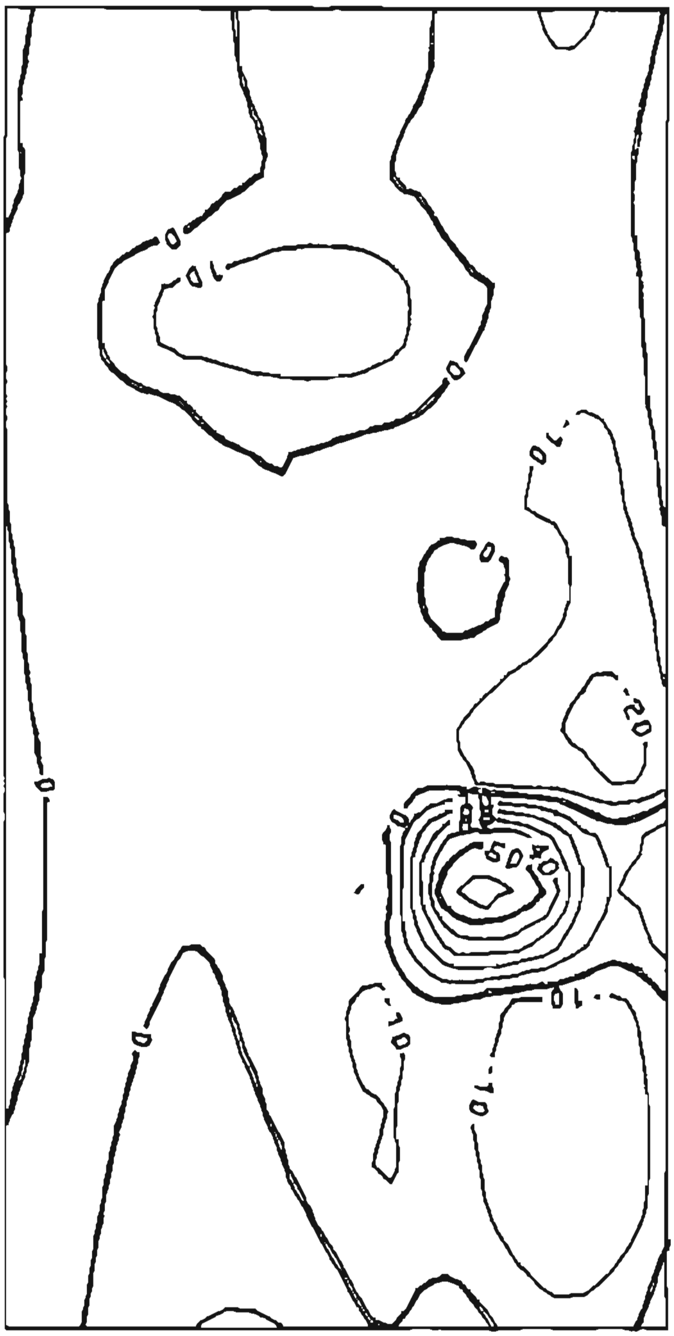
DRENCHWATER - - CONTOUR..POTASSIUM

PLOT NO. 2 DATE 01/08/79 TIME 17

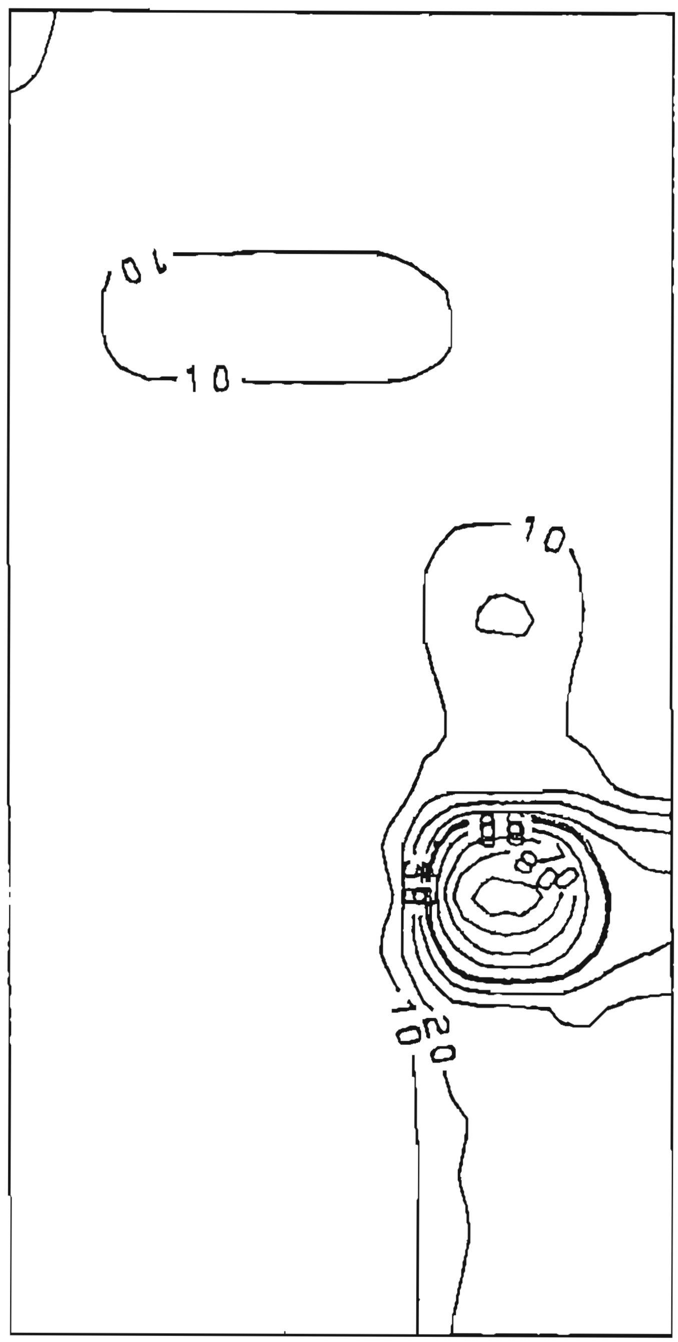


DRENCHWATER - - TREND #4,RESIDUALS..POTASSIUM

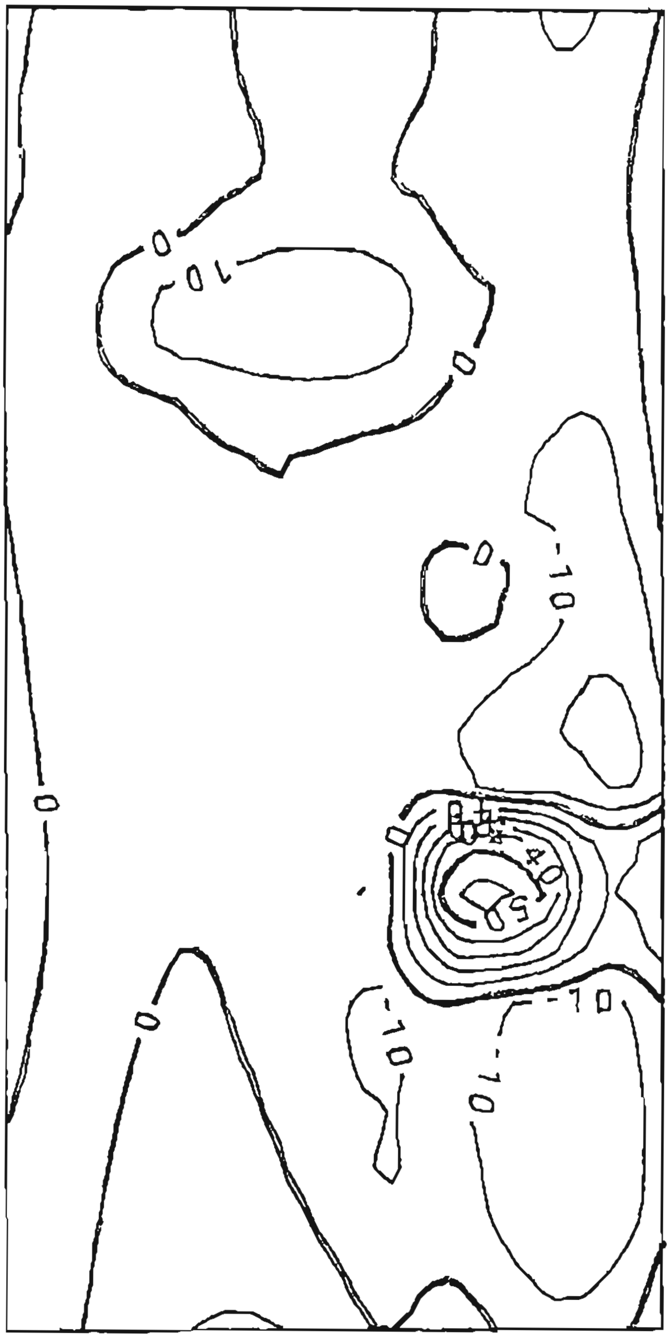
PLOT NO. 2 DATE 01/08/79 TIME 17



DRENCHWATER - - CONTOUR..THORIUM
PLOT NO. 2 DATE 01/08/79 TIME 17

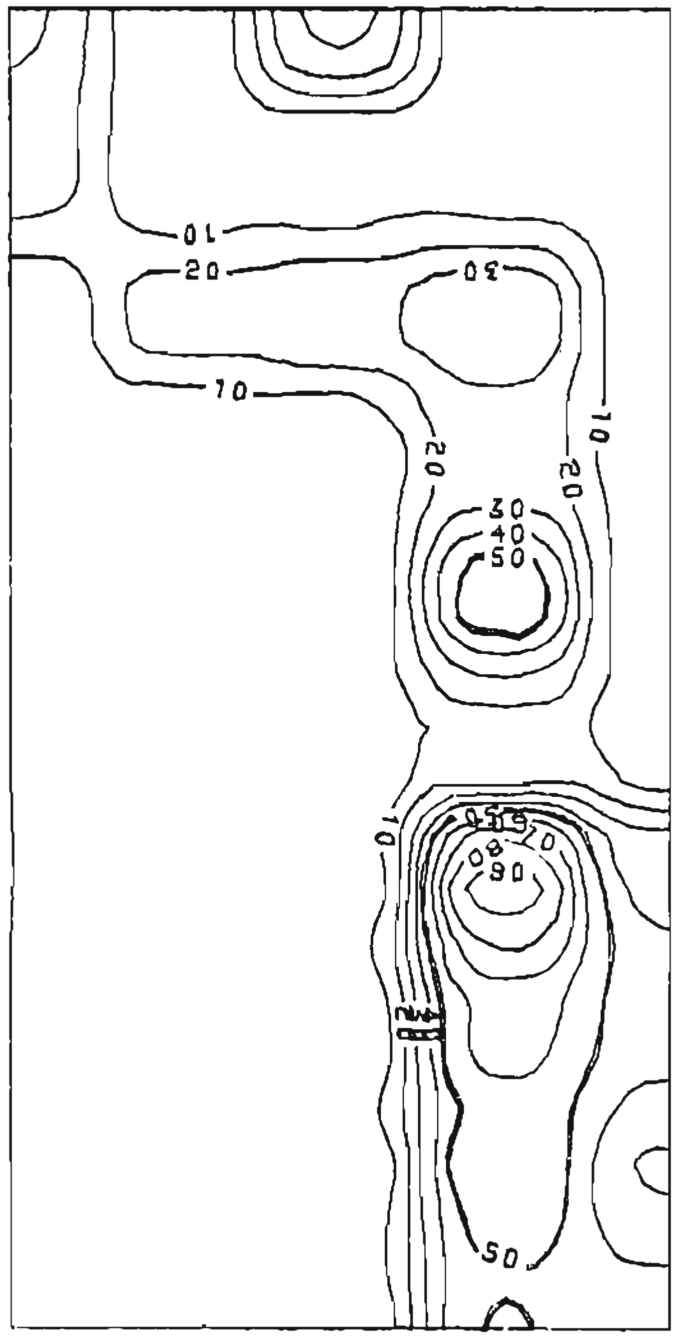


DRENCHWATER - - TREND #4, RESIDUALS..THORIUM
PLOT NO. 2 DATE 01/08/79 TIME 17



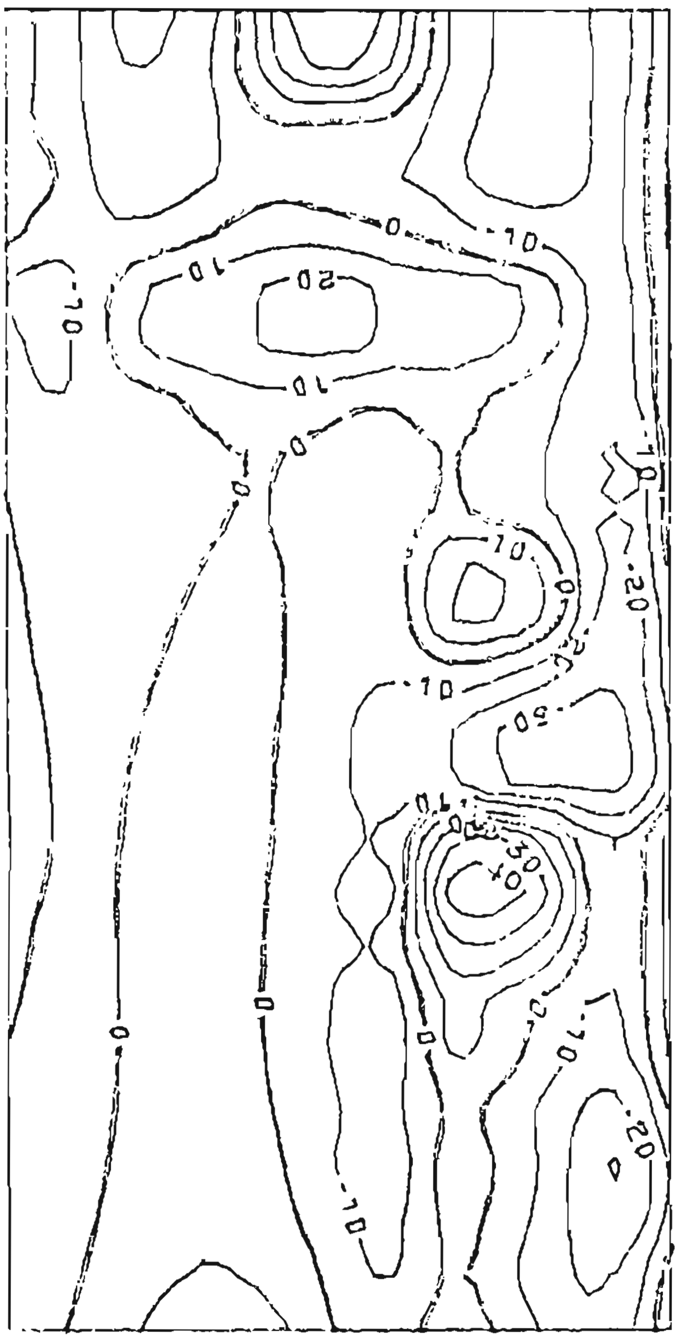
DRENCHWATER - - CONTOUR..URANIUM

PLOT NO. 2 DATE 01/08/79 TIME 18



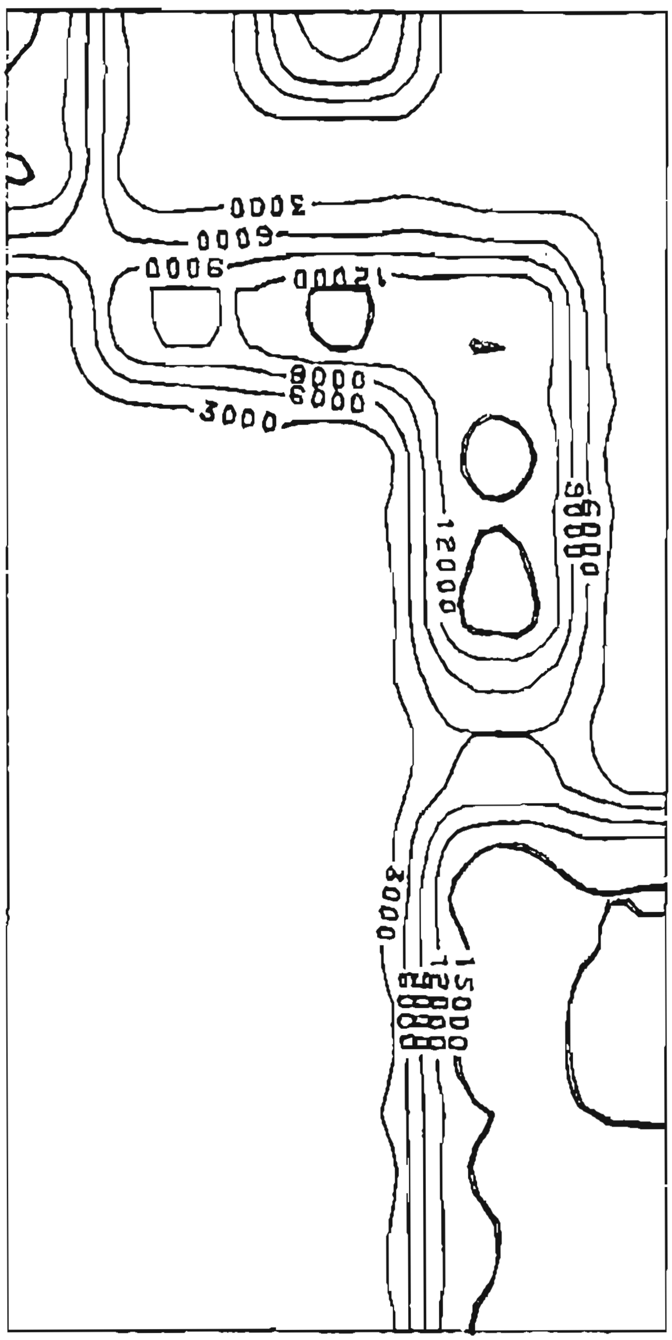
DRENCHWATER - - TREND #4,RESIDUALS..URANIUM

PLOT NO. 2 DATE 01/08/79 TIME 18



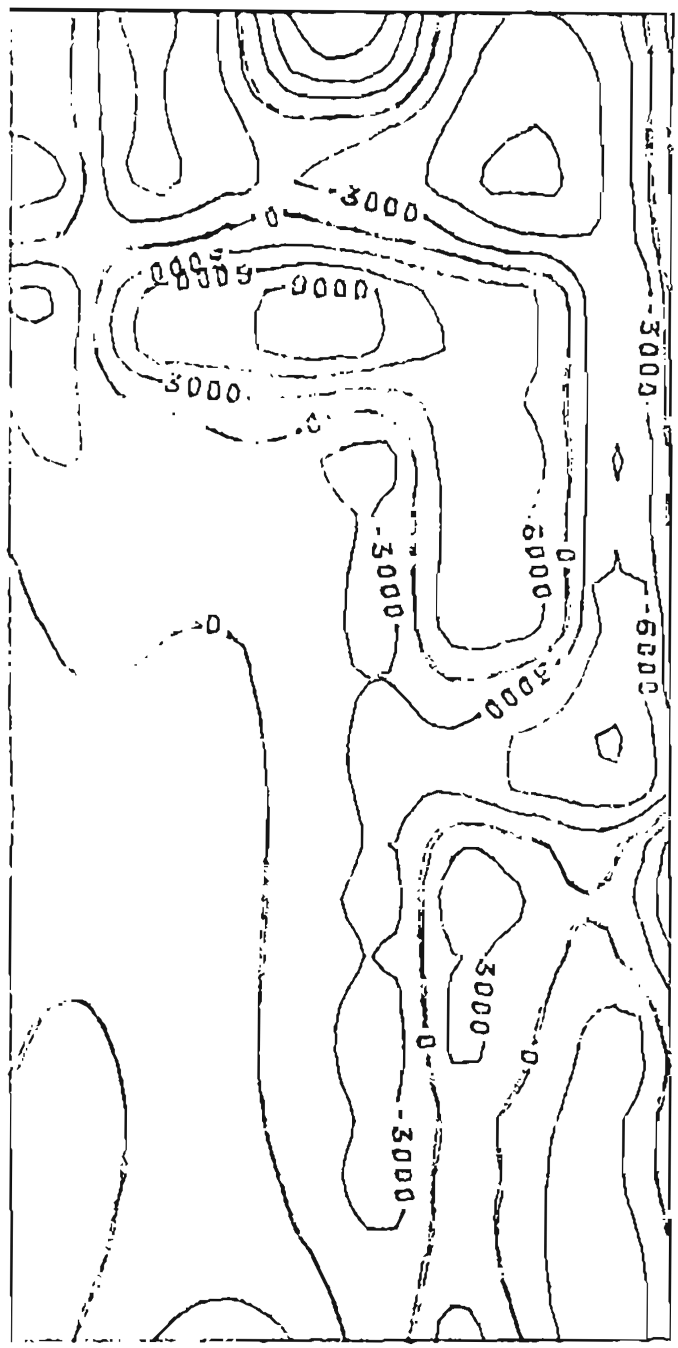
DRENCHWATER CONTOUR...TOTAL COUNT

PLOT NO. 2 DATE 01/08/79 TIME 18



DRENCHWATER - - TREND #4,RESIDUALS..TOTAL COUN

PLOT NO. 2 DATE 01/08/79 TIME 18



i

APPENDIX IV

Geochemical analyses, sample means, ranges, standard deviations, and anomalous samples -

Drenchwater Creek

MINERAL INDUSTRY RESEARCH LABORATORY

ANALYTICAL METHOD ATOMIC ABSORPTION SPECTROPHOTOMETRY

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	DW78001	0.	1500.000	58.000	270.000	17.000
	DW78002	0.	1300.000	35.000	190.000	12.000
	DW78003	0.	1500.000	39.000	190.000	15.000
	DW78004	0.	830.000	34.000	160.000	18.000
	DW78005	0.	1000.000	29.000	180.000	19.000
	DW78006	0.	650.000	29.000	140.000	14.000
	DW78007	1.500	1000.000	32.000	220.000	6.900
	DW78008	0.	1200.000	31.000	200.000	11.000
	DW78009	0.	1900.000	31.000	130.000	14.000
	DW78010	0.	1000.000	38.000	140.000	9.200
	DW78011	0.300	920.000	49.000	190.000	45.000
	DW78012	0.200	1200.000	52.000	450.000	11.000
	DW78013	0.	960.000	40.000	190.000	5.800
	DW78014	0.300	1400.000	86.000	360.000	16.000
	DW78015	0.900	720.000	28.000	190.000	15.000
	DW78016	0.800	890.000	22.000	190.000	16.000
	DW78017	1.200	780.000	23.000	170.000	16.000
	DW78018	0.900	480.000	70.000	110.000	9.200
	DW78019	6.500	1100.000	31.000	120.000	9.700
	DW78020	0.700	1200.000	28.000	68.000	8.300
	DW78021	170.000	520.000	7600.000	98.000	71.000
	DW78022	8.900	760.000	1300.000	170.000	22.000
	DW78023	4.400	1100.000	41.000	150.000	17.000
	DW73024	170.000	1500.000	49.000	44.000	21.000
	DW78025	110.000	1400.000	20.000	91.000	21.000
	DW78026	240.000	1200.000	89.000	880.000	36.000
	DW78027	6.700	590.000	120.000	140.000	15.000
	DW78028	4.500	460.000	96.000	110.000	8.700
	DW78029	5.400	180.000	40.000	650.000	15.000
	DW78030	6.700	810.000	64.000	180.000	17.000

SAMPLE TYPE	FIELD NUMBER	AG (PPM)	CU (PPM)	PB (PPM)	ZN (PPM)	MO (PPM)
STRM SD	DW78031	3.000	230.000	96.000	41.000	12.000
	DW78032	240.000	980.000	950.000	33.000	45.000
	DW78033	4.900	890.000	430.000	410.000	14.000
	DW78034	8.700	590.000	1200.000	340.000	18.000
	DW78035	230.000	570.000	5000.000	520.000	28.000
	DW78036	4.800	420.000	270.000	160.000	12.000
	DW78037	6.100	170.000	880.000	74.000	17.000
	DW78038	140.000	840.000	1500.000	150.000	29.000
	DW78039	110.000	1000.000	400.000	190.000	26.000
	DW78040	4.700	420.000	78.000	82.000	11.000
	DW78041	5.400	570.000	390.000	94.000	19.000
	DW78042	4.400	1200.000	320.000	180.000	16.000
	DW78043	3.800	860.000	300.000	140.000	16.000
	DW78044	0.800	240.000	83.000	520.000	6.500
	DW78045	1.400	720.000	64.000	1800.000	7.500
	DW78046	2.600	530.000	94.000	470.000	7.500
	DW78047	1.800	180.000	95.000	140.000	3.500
	DW78048	0.900	260.000	25.000	93.000	3.500
	DW78049	0.800	240.000	51.000	100.000	3.500
	DW78050	1.800	420.000	68.000	280.000	6.000

CONTINENTAL CRUSTAL AVE

ATOMIC ABSORPTION SPECTROPHOTOMETRY

STREAM SEDIMENTS

ELEMENT = CU

NUMBER OF SAMPLES	=	50
SUM OF SAMPLES	=	41390.000
SUM OF SQUARES OF SAMPLES	=	42549100.000
MEAN OF SAMPLES	=	827.800
VARIANCE OF SAMPLES	=	169111.391
MINIMUM VALUE	=	170.000
MAXIMUM VALUE	=	1900.000
THE RANGE	=	1730.000
STANDARD DEVIATION	=	411.232
TWICE STANDARD DEVIATION PLUS MEAN	=	1650.263

NINETY % = 1504.28 NINETY-FIVE % = 1650.26 NINETY-EIGHT % = 1785.97

FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM
				DW78009	1900.00

ATOMIC ABSORPTION SPECTROPHOTOMETRY

STREAM SEDIMENTS

ELEMENT = PB.

NUMBER OF SAMPLES	=	50
SUM OF SAMPLES	=	22488.000
SUM OF SQUARES OF SAMPLES	=	90706992.000
MEAN OF SAMPLES	=	449.760
VARIANCE OF SAMPLES	=	1644750.813
MINIMUM VALUE	=	20.000
MAXIMUM VALUE	=	7600.000
THE RANGE	=	7580.000
STANDARD DEVIATION	=	1282.478
TWICE STANDARD DEVIATION PLUS MEAN	=	3014.717

NINETY % = 2559.44 NINETY-FIVE % = 3014.72 NINETY-EIGHT % = 3437.93

FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM
				DW78021	7600.00
				DW78035	5000.00

ATOMIC ABSORPTION SPECTROPHOTOMETRY

STREAM SEDIMENTS

ELEMENT = MO

NUMBER OF SAMPLES	=	50
SUM OF SAMPLES	=	832.800
SUM OF SQUARES OF SAMPLES	=	20859.700
MEAN OF SAMPLES	=	16.656
VARIANCE OF SAMPLES	=	142.624
MINIMUM VALUE	=	3.500
MAXIMUM VALUE	=	71.000
THE RANGE	=	67.500
STANDARD DEVIATION	=	11.943
TWICE STANDARD DEVIATION PLUS MEAN	=	40.541

NINETY % = 36.30 NINETY-FIVE % = 40.54 NINETY-EIGHT % = 44.48

FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM
				DW78011	45.00
				DW78021	71.00
				DW78032	45.00

ATOMIC ABSORPTION SPECTROPHOTOMETRY

STREAM SEDIMENTS

ELEMENT = AG

NUMBER OF SAMPLES	=	50
SUM OF SAMPLES	=	1515.800
SUM OF SQUARES OF SAMPLES	=	270257.961
MEAN OF SAMPLES	=	30.316
VARIANCE OF SAMPLES	=	4577.652
MINIMUM VALUE	=	0.
MAXIMUM VALUE	=	240.000
THE RANGE	=	240.000
STANDARD DEVIATION	=	67.658
TWICE STANDARD DEVIATION PLUS MEAN	=	165.633

NINETY % = 141.61 NINETY-FIVE % = 165.63 NINETY-EIGHT % = 187.96

FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM
		DW78021	170.00		
		DW78024	170.00		
				DW78026	240.00
				DW78032	240.00
				DW78035	230.00

ATOMIC ABSORPTION SPECTROPHOTOMETRY

STREAM SEDIMENTS

ELEMENT = ZN

NUMBER OF SAMPLES	=	50
SUM OF SAMPLES	=	12188.000
SUM OF SQUARES OF SAMPLES	=	6778400.000
MEAN OF SAMPLES	=	243.760
VARIANCE OF SAMPLES	=	77703.125
MINIMUM VALUE	=	33.000
MAXIMUM VALUE	=	1800.000
THE RANGE	=	1767.000
STANDARD DEVIATION	=	278.753
TWICE STANDARD DEVIATION PLUS MEAN	=	801.266

NINETY % = 702.31 NINETY-FIVE % = 801.27 NINETY-EIGHT % = 893.25

FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM	FIELD NO.	VALUE PPM
		DW78026	880.00		
				DW78045	1800.00

ALL ANOMALOUS VALUES PER SAMPLE

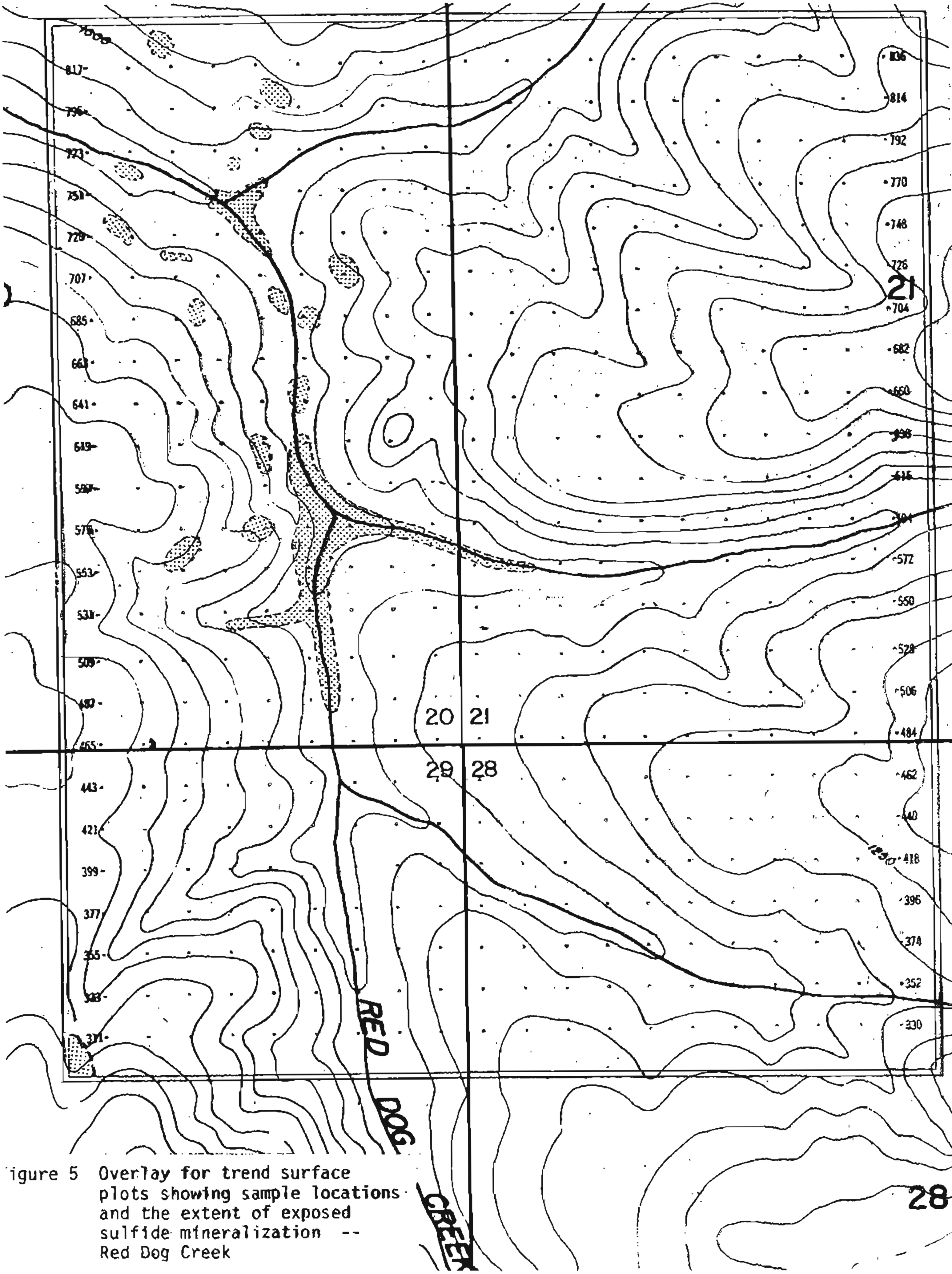
	CU		
DW78 009	1900.00		
	MO		
DW78 011	45.00		
	AG	PB	MO
DW78 021	170.00	7600.00	71.00
	AG		
DW78 024	170.00		
	AG	ZN	
DW78 026	240.00	880.00	
	AG	MO	
DW78 032	240.00	45.00	
	AG	PB	
DW78 035	230.00	5000.00	
	ZN		
DW78 045	1800.00		

CUMULATIVE FREQUENCY DISTRIBUTION FOR CU , AS ANALYZED BY ATOMIC ABSORPTION IN STREAM SEDIMENTS

CLASS LIMITS UPPER	-	LOWER (PPM)	FREQ	FREQ (PCT)	CUM FREQ (PCT)
1200000	-	830000	0.	0.	0.
830000	-	560000	0.	0.	0.
560000	-	380000	0.	0.	0.
380000	-	260000	0.	0.	0.
260000	-	180000	0.	0.	0.
180000	-	120000	0.	0.	0.
120000	-	83000	0.	0.	0.
83000	-	56000	0.	0.	0.
56000	-	38000	0.	0.	0.
38000	-	26000	0.	0.	0.
26000	-	18000	0.	0.	0.
18000	-	12000	0.	0.	0.
12000	-	8300	0.	0.	0.
8300	-	5600	0.	0.	0.
5600	-	3800	0.	0.	0.
3800	-	2600	0.	0.	0.
2600	-	1800	1.	2.00	2.00
1800	-	1200	11.	22.00	24.00
1200	-	830	14.	28.00	52.00
830	-	560	10.	20.00	72.00
560	-	380	7.	14.00	86.00
380	-	260	1.	2.00	88.00
260	-	180	5.	10.00	98.00
180	-	120	1.	2.00	100.00
120	-	83	0.	0.	100.00
83	-	56	0.	0.	100.00
56	-	38	0.	0.	100.00
38	-	26	0.	0.	100.00
26	-	18	0.	0.	100.00
18	-	12	0.	0.	100.00
12	-	8.3	0.	0.	100.00
8.3	-	5.6	0.	0.	100.00
5.6	-	3.8	0.	0.	100.00
3.8	-	2.6	0.	0.	100.00
2.6	-	1.8	0.	0.	100.00
1.8	-	1.2	0.	0.	100.00
1.2	-	0.83	0.	0.	100.00
0.83	-	0.56	0.	0.	100.00
0.56	-	0.38	0.	0.	100.00
0.38	-	0.26	0.	0.	100.00
0.26	-	0.18	0.	0.	100.00
0.18	-	0.12	0.	0.	100.00
0.12	-	0.083	0.	0.	100.00
0.083	-	0.056	0.	0.	100.00
0.056	-	0.038	0.	0.	100.00
0.038	-	0.026	0.	0.	100.00
0.026	-	0.019	0.	0.	100.00
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]

CUMULATIVE FREQUENCY DISTRIBUTION FOR PB , AS ANALYZED BY ATOMIC ABSORPTION IN STREAM SEDIMENTS

CLASS LIMITS UPPER - LOWER (PPM)	FREQ	FREQ (PCT)	CUM FREQ (PCT)
1200000 - 830000	0.	0.	0.
830000 - 560000	0.	0.	0.
560000 - 380000	0.	0.	0.
380000 - 260000	0.	0.	0.
260000 - 180000	0.	0.	0.
180000 - 120000	0.	0.	0.
120000 - 83000	0.	0.	0.
83000 - 56000	0.	0.	0.
56000 - 38000	0.	0.	0.
38000 - 26000	0.	0.	0.
26000 - 18000	0.	0.	0.
18000 - 12000	0.	0.	0.
12000 - 8300	0.	0.	0.
8300 - 5600	1.	2.00	2.00
5600 - 3800	1.	2.00	4.00
3800 - 2600	0.	0.	4.00
2600 - 1800	0.	0.	4.00
1800 - 1200	3.	6.00	10.00
1200 - 830	2.	4.00	14.00
830 - 560	0.	0.	14.00
560 - 380	3.	6.00	20.00
380 - 260	3.	6.00	26.00
260 - 180	0.	0.	26.00
180 - 120	1.	2.00	28.00
120 - 83	7.	14.00	42.00
83 - 56	6.	12.00	54.00
56 - 38	9.	18.00	72.00
38 - 26	10.	20.00	92.00
26 - 18	4.	8.00	100.00
18 - 12	0.	0.	100.00
12 - 8.3	0.	0.	100.00
8.3 - 5.6	0.	0.	100.00
5.6 - 3.8	0.	0.	100.00
3.8 - 2.6	0.	0.	100.00
2.6 - 1.8	0.	0.	100.00
1.8 - 1.2	0.	0.	100.00
1.2 - 0.83	0.	0.	100.00
0.83 - 0.56	0.	0.	100.00
0.56 - 0.38	0.	0.	100.00
0.38 - 0.26	0.	0.	100.00
0.26 - 0.18	0.	0.	100.00
0.18 - 0.12	0.	0.	100.00
0.12 - 0.083	0.	0.	100.00
0.083 - 0.056	0.	0.	100.00
0.056 - 0.038	0.	0.	100.00
0.038 - 0.026	0.	0.	100.00
0.026 - 0.018	0.	0.	100.00
0.018 - 0.012	0.	0.	100.00
0.012 - 0.0083	0.	0.	100.00



'igure 5 Overlay for trend surface plots showing sample locations and the extent of exposed sulfide mineralization -- Red Dog Creek

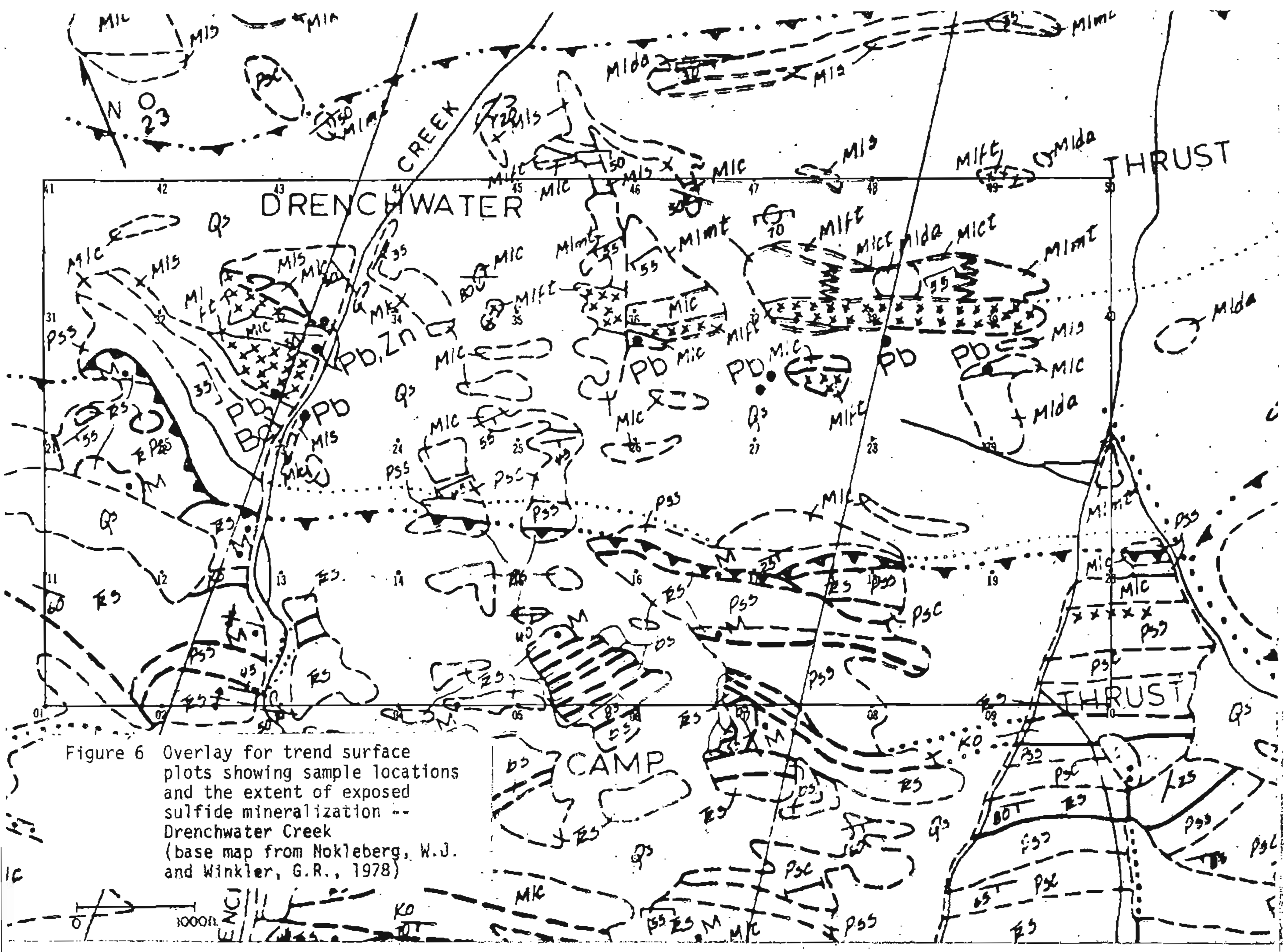


Figure 6 Overlay for trend surface plots showing sample locations and the extent of exposed sulfide mineralization -- Drenchwater Creek (base map from Nokleberg, W.J. and Winkler, G.R., 1978)