GEOLOGIC MAP AND CROSS SECTIONS OF THE RED DOG PROSPECT, DELONG MOUNTAINS, NORTHWESTERN, ALASKA

By Joseph T. Plahuta

* *Open-File Report No. 65-78

UNITED STATES DEPARTMENT OF THE INTERIOR

Cecil D. Andrus, Secretary

BUREAU OF MINES

FOREWORD

This is one of a series of summary reports that present the findings of reconnaissance-type mineral assessments of certain lands in Alaska. It is important to remember that Alaska has not been seriously prospected for minerals other than gold--except in a few relatively limited areas. These summary reports include data developed by both contract and Bureau studies; frequently a combination of both. As digests of more detailed reports that are still in preparation, these summaries omit the detailed findings that will be presented in the main reports, but the basic data and conclusions remain the same.

Assessing an area for its potential for buried mineral deposits is by far the most difficult of all natural resource assessments. This becomes more apparent when considering that no two deposits even of the same genesis and host rock conditions are identical. Moreover, judgments prior to drilling, the ultimate test, frequently vary among evaluators and continue to change as more detailed studies add to the understanding.

Included in these reports are estimates of the relative favorability for discovering metallic and related nonmetallic mineral deposits similar to those mined elsewhere. Favorability is estimated by evaluation of visible outcrops, and analyses of sampling data, including mineralogic characteristics and associated elements, in combination with an evaluation of the processes that have formed the rocks in which they occur. Essentially, it is a comparison of a related series of prospects and the environment in which they occur with the mineral deposits and environments in well-known mining districts. Recognition of a characteristic environment allows not only the delineation of a trend but also a rough estimate of the favorability of conditions in the trend for the formation of minable concentrations of mineral materials. This is a technique long used in the mineral industry to select areas for mineral exploration. Qualifying a trend or area as "highly favorable" for the discovery of mineral deposits indicates that the combination of outcrop samples, mineralogic data and geologic conditions that have been observed essentially duplicate the conditions in a recognized mining district elsewhere.

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GEOLOGIC MAP AND CROSS SECTIONS OF THE RED DOG PROSPECT, DELONG MOUNTAINS, NORTHWESTERN ALASKA

by

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ABSTRACT

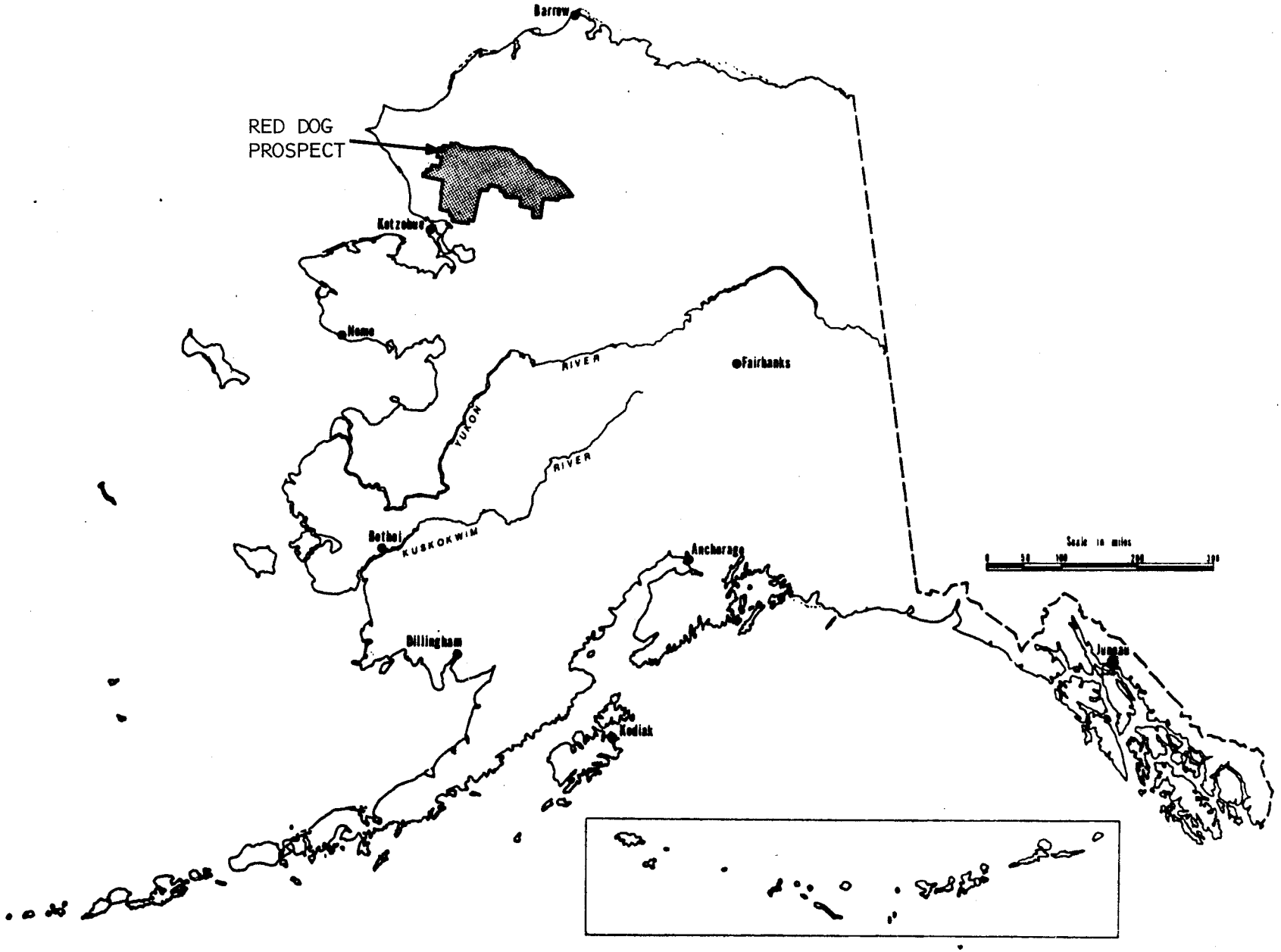
The Red Dog Prospect (unclaimed) is in the DeLong Mountains near the western end of the Brooks Range in an area presently closed to mineral entry. The Geological Survey reported mineralization in the area in 1970. Follow-up field work by the Bureau of Mines in 1976 and 1977 revealed impressive amounts of zinc, lead, silver, and barite in outcroppings exposed over approximately 0.6km^2 (about 1/4 square mile). This summary report includes a geologic map and cross sections of the deposit and a description of mineral samples.

INTRODUCTION

The Red Dog Prospect (unclaimed) is located in the DeLong Mountains near the western end of the Brooks Range. The prospect is within but near the western edge of the proposed Noatak National Arctic Range as outlined in the Bureau of Land Management Map (dated 1974) used during the investigation (figure 1). The prospect is outside the boundary of the Noatak Preserve as drawn on the Administration Map dated 1977 and described in H.R. 39 as passed by the House of Representatives in 1978. The area in which the prospect occurs remains closed to mineral entry. Mineralization in the area was first reported by the Geological Survey in 1970 (1) 2/. In 1975 a field party sponsored by the Bureau of Mines confirmed the report by locating and roughly outlining the bedrock source. The investigation described in this report was a follow-up field study made in 1977 to map the outcropping and provide a detailed description of the minerals and the geologic setting in which they occur.

1/ Department of Geology, University of Montana, Missoula Montana

2/ Underlined numbers in parentheses refer to items in the references listed at the end of this report.



Index map of project area

Figure 1 - Index Map of Proposed Noatak National Arctic Range

The mapping and sampling was sponsored by the Bureau of Mines and was done by the Geology Department at the University of Montana, Missoula, Montana. The field work and geologic interpretation were by J. T. Plahuta, graduate student at the University of Montana. The samples were analysed at a commercial laboratory in Anchorage. Access to and from the deposit was by helicopter.

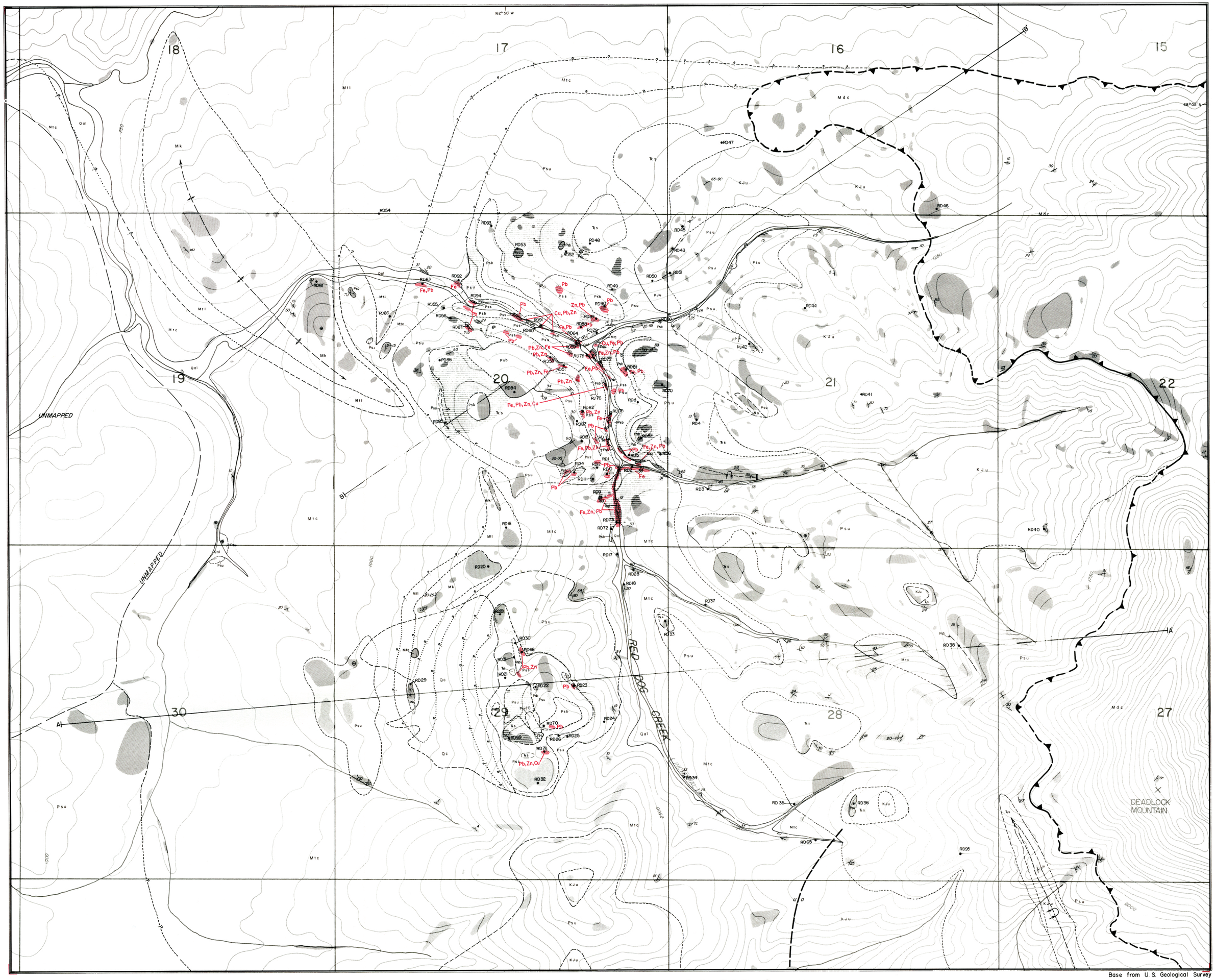
DESCRIPTION OF THE WORK

Field work was conducted during June and July of 1977. Fifty man-days were required to complete geologic mapping of 24 km^2 (9 square miles) at a scale of 1:6000 (1" = 500 ft.). Representative samples were collected during mapping. A number of traverses, extending several kilometers outward from the map area, helped to ascertain the larger scale geologic setting.

This summary report presents a geologic mineral map (figure 2) and cross sections (figure 3) of the Red Dog prospect and the sampling results. A more detailed report is being written for the Geology Department, University of Montana, as a thesis.

SUMMARY OF FINDINGS

The Red Dog prospect, in the western DeLong Mountains of Alaska, contains abundant showings of sphalerite, galena, pyrite, and barite mineralization. Mapping has revealed two distinct forms of mineral occurrence. A stratigraphically lower zone of sulfide vein and breccia filling is confined to a locally silicified upper Paleozoic black chert and shale unit. Immediately overlying, is a "stack" of interfingered lenses of sulfide-bearing barite and granular siliceous rock, interlayered with a predominantly greenish-gray upper Paleozoic and/or lower Mesozoic chert and argillite unit. These lenses normally contain less than 5% disseminated sulfide, but at least two sphalerite-rich sulfide layers occur in the



Base from U. S. Geological Survey

FIGURE 2 - Outcrop geology map of the Red Dog Prospect

RED DOG PROSPECT

DE LONG MOUNTAINS, ALASKA

1977

Geology by J. Plahuta

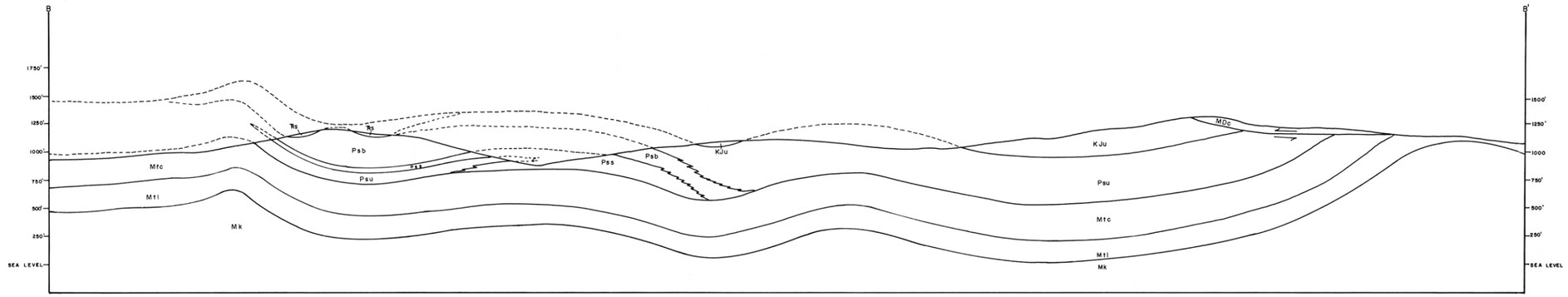
LEGEND

Qc	QUATERNARY COLLUVIUM.
Qal	QUATERNARY ALLUVIUM.
KJu	CRETACEOUS AND/OR JURASSIC UNDIVIDED, INTERBEDDED MICACEOUS SANDSTONE AND SHALE.
	UNCONFORMITY (?)
Trs(?)	TRIASSIC SHUBLIK FM., BLACK CHERT WITH SHALE PARTINGS. LOCALLY CONTAINS LIMESTONE AND SANDY DOLOMITE.
Psu	PERMIAN SIKSIKPUK FM. UNDIVIDED, GREEN AND RED ARGILLITE INTERBEDDED WITH GREENISH-GRAY CHERT.
Psv(?)	FELSIC VOLCANIC MEMBER, VERY FINE GRAIN FELSIC TUFF (?) CONTAINING 0.5mm QUARTZ, BARITE, AND SANIDINE (?) CRYSTALS. PENDING PETROGRAPHIC STUDY THE POSSIBILITY EXISTS THAT THIS ROCK IS ACTUALLY AN ALTERED ARGILLITE.
Psb	BARITE MEMBER, COARSELY CRYSTALLINE, MASSIVE BARITE BEDS. MAY CONTAIN DISSEMINATED SULFIDES.
Pss	SILICIC MEMBER, MASSIVE, GRANULAR QUARTZ ROCK. LOCALLY CONTAINS DISSEMINATED TO MASSIVE SULFIDES
	DISCONFORMITY (?)
LISBURNE GROUP: Mtc	MISS. TUPIK FM.-CHERT MEMBER, INTERBEDDED BLACK SHALE, CHERT, AND LITHIC GRAYWACKE. LOCALLY CONTAINS CONFORMABLE PODS AND DISSEMINATIONS OF SULFIDES. HOST FOR SULFIDE VEIN AND BRECCIA-FILLINGS.
LISBURNE GROUP: Mtl	MISS. TUKIK FM. LIMESTONE MEMBER, INTERBEDDED DARK GRAY SHALE AND LIMESTONE.
LISBURNE GROUP: Mk(?)	MISS. KOGRUK FM.(?), CHERT-BEARING DOLOMITE LIMESTONE.
ENDICOTT GROUP: Mdc	MISS-DEVONIAN ENDICOTT GROUP, QUARTZITE, SANDSTONE, CONGLOMERATE, SILTSTONE AND SHALE.
	FAULT, DEFINITE LOCATION
	FAULT, APPROXIMATE LOCATION
	FAULT, INFERRED LOCATION
	THRUST FAULT
	CONTACT, DEFINITE
	CONTACT, APPROXIMATE
	CONTACT, INFERRED
	CONTACT, CONCEALED
	GRADATIONAL CONTACT
	AXES, APPROXIMATE
	SYNCLINE, OVERTURNED
	STRIKE OF VERTICAL BEDS
30	STRIKE AND DIP OF BEDS
20	STRIKE AND DIP OF BEDS, APPROXIMATE
10	GENERALIZED STRIKE AND DIP OF CRUMPLED, PLICATED, CRENULATED OR UNDULATING BEDS
	STRIKE AND DIP OF OVERTURNED BEDS
	HORIZONTAL BED
RD 21	SAMPLE LOCATION AND NUMBER
	OUTCROP
	SILICIFICATION
	GOSSAN
	AREAS OF MACROSCOPICALLY VISIBLE SULFIDES AS DETERMINED BY FIELD STUDY OF HAND SPECIMEN

500 0 500 1000 1500 2000 FEET

500 0 500 1000 METERS

CONTOUR INTERVAL = 50 FEET



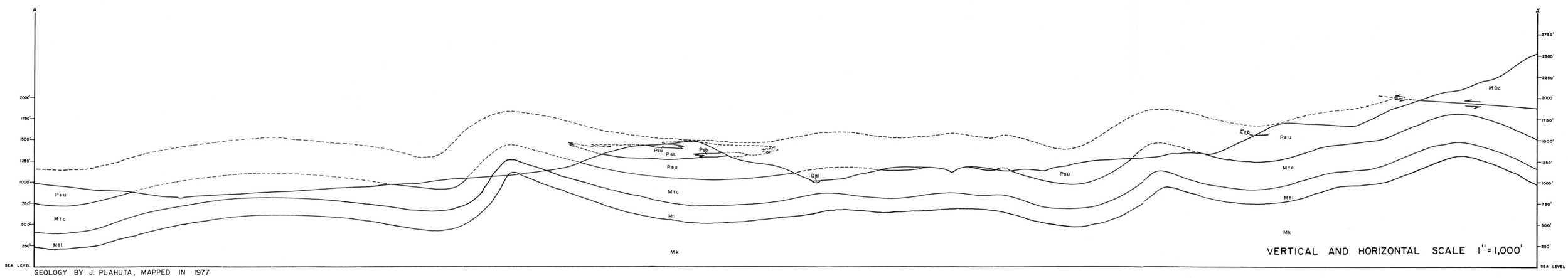


FIGURE 3 - Geologic cross sections of the Red Dog Prospect

siliceous rock. The layers appear 2 to 4 meters thick and greater than 300 meters long.

REFERENCE

1. Tailleur, I.L., 1970, Lead, zinc and barite-bearing samples from the western Brooks Range, Alaska, U. S. G. S. open-file report 445, 16 p.

APPENDIX - SAMPLE DESCRIPTIONS AND ANALYTICAL RESULTS

The following list gives field descriptions of character samples whose locations are shown on figure 2. Analytical results are given when available.

RD-1a — Sample of silicified shales and cherts of unit G. This is the host rock for the vein and breccia mineralization.

RD-1b — Character sample from rubble-crop of granular quartz rock (unit F). This rock differd from most granular quartz, in that it appears highly "crossveined", expressed as areas of lighter colored or finer grained quartz. Pending further study, I feel that some of this crossveining may actually be soft sediment deformation structures

RD-3a — Character sample of cherts of Unit C.

RD-3a — Character sample of green argillite of Unit C.

RD-9a — Galena-bearing gossan formed in host rock of black shales and cherts (Unit G).

RD-11 — Small outcrop of Unit F, granular quartz rock. Highly altered to limonite stained, friable rock. However, local fresh areas display banding of undermined origin, sample of both fresh banded and altered rock.

RD-12 — Very localized occurrence of silicified shale or chert in matrix of granular quartz rock.

RD-13 — Gossan developed in Unit F granular quartz rock, probably representing massive sulphide pods. Galena is rarely present.

RD-16 — "Siltstone" of Unit G. Suspected to be meta-chert, but no petrographic work has been done to confirm this.

RD-19a — Gossan material exposed 200' west of RD-19.

RD-20a — Possible crinoid stems in Unit I.

RD-22 — Samples of barite from rubble crop; one piece shows conspicous banding which is not common at this location.
10 ppm Ag, .0005% Pb, .020% Zn, 33% Ba

RD-22a — Granular quartz of Unit F, 100' north of RD-22

RD-23 — Typical galena-bearing barite from this locality.

RD-23a — Quartz-veined silicified shale of localized extent.

RD-23b — Bedded barite float, bedding not usually this evident.

RD-25
RD-25a — These are non-typical silicified shales which appear to extend approximately along contour to exposure at RD-23a.

RD-29 Local development of breccia possibly cemented by limonite in Unit I. Similar rocks are exposed in SW1/4 NW1/4 sec 20.

RD-30 Barite rubble-crop. Often weathers red and appears to be a gossan. No sulphide seen.

RD-31 Suspected volcanic tuff. Occasional 0.5-1.0 mm quartz crystals in fine matrix. Some similar looking grains have cleavages and may be sanidine.

RD-32 Typical of barite in this vicinity.

RD-33 Subcrop exposure of quartz-veined black chert of Unit B. Float of fine-grain sandstone with disseminated limonite.

RD-36 Possibly crinoid fossils in silicified chert. This is a rubbly subcrop over 300' by 100' area.

RD-38 Coarse barite typical of type that appears to be weathering out from a thin bed in Unit C.

RD-40 Character sample of Unit A.

RD-42 Character sample of Unit A.

RD-43 Chert-grain bearing sandstone of Unit A.

RD-45 Character sample of thin bedded lower thrust plate sandstones. Unit J.

RD-47 Resistant knob of greenish, sandy dolomite which forms very restricted facies of Unit B.

RD-51 Rubble-crop of barite. No sulphide noted.

RD-51a Barite concreations weathering out of green argillites of Unit C.

RD-52 Light gray bleached shale containing barite crystals. In hand specimen this looks like suspected volcanic tuff but this is clearly an interbed in the Unit C, green argillite and chert sequence.

RD-53 Isolated outcrop of barite in Unit C.

RD-56 Rubble-crop of highly silicified rock possibly containing many "worm tubes".

RD-57 Typical sample of Zn and Pb bearing Unit F rock in this vicinity. 80 ppm Ag, .013% Cu, 7.6% Pb, 15% Zn, .15% Ba.

RD-58 Random sample of Pb-Zn gossan in Unit F at this vicinity.

RD-59 Representative sample of highly mineralized area of Unit F. 105 ppm Ag, .035% Cu, 10% Pb, 25% Zn, .090% Ba.

RD-60 Possibly layered granular quartz rock of Unit F. This expression of layering is not often seen.

RD-61 Character sample of Unit I.

RD-62 Representative sample of highly mineralized Unit F.

RD-63 Bedded pyrite and galena in black chert of Unit G. This type of rock is not abundantly exposed but does appear widespread over 10 miles radius, at least.

RD-63a As above about 20' upstream

RD-63b Massive sulphide and siliceous rock in about 1 1/2" thick layer between rocks as in RD-63a.
16 ppm Ag, .001% Cu, 1.5% Pb, 16% Zn, .055% Ba.

RD-64 Veined Unit G. Veins are at random orientations and vary from sparse to so abundant that a breccia is formed. Pyrite occurs as elongate blebs, and only rarely gives impression of veining.
50 ppm Ag, .016% Cu, .15% Pb, .090 Zn, .070% Ba.

RD-65 Numerous possibly flattened ovoid concreations or boudins of fine grain granular quartz and minor euhedral barite. Found in shale layers of Unit G.

RD-68 Gossan; believed to be derived from massive Pb-Zn sulfide.
200 ppm Ag, .029% Cu, 14% Pb, 20% Zn, .23% Ba.

RD-70 Abundant float of massive barite. Samples represent two modal crystal sizes.
50 ppm Ag, .0025% Cu, 3.0% Pb, .052% Zn, 35% Ba.

RD-71 Unit F granular quartz rock. In area, most is light colored non-sulphide bearing barite.
40 ppm Ag, .0005% Cu, 4.0% Pb, 6.9% Zn, .97% Ba.

RD-72 Rusty weathering, pyrite-bearing barite within Unit G.

RD-72a Silicified, unmineralized Unit G immediately underlying above barite.

RD-74 Typical sample of Fe, Pb, Zn bearing massive barite.
48 ppm Ag, .005% Cu, 2.8% Pb, 4.9% Zn, 26% Ba.

RD-75 Siliceous Fe, Pb-bearing barite.

RD-76 Massive sulfide rock Pb, Zn, Fe, Cu.

RD-77 Rusty weathering medium grain siliceous rock with disseminated pyrite. Locally develops black sooty material on fractures.

RD-77a Massive sulfide.

RD-78 Silicified Unit G, veined and breccia filling of Fe and Zn with lesser Pb.
20 ppm Ag, .004% Cu, .70% Pb, 10% Zn, .090% Ba.

RD-79 From barite outcrop in shales of Unit G. May be tectonically emplaced but little definite evidence.

RD-80 Bleached shale of Unit C.

RD-81 Rubble-crop of Fe & Pb-bearing barite.
38 ppm Ag, .006% Cu, .70% Pb, 2.7% Zn, 35% Ba.

RD-82a Granular siliceous rock veined by barite. This outcrop is surrounded by barite.

RD-84 Character sample of massive barite at this locality.
.8 ppm Ag, .0005% Cu, .0005% Pb, .013% Zn, 35% Ba.

RD-85 Gossan at upper limit of gossan float.

RD-86 Silicified black chert and shale.

RD-87 Pb-bearing barite abundant 5-8mm euhedral crystals in 2-3mm metrix.

RD-88 Granular siliceous float and associated gossan float.

RD-88a 100' upslope from Rd-88. Massive sulfide Zn, Pb, Fe.

RD-91 Representative massive sulfide. Some chalcopyrite and bornite seen at this location.
150 ppm Ag, .018% Cu, 12% Pb, 30% Zn, .20% Ba.

RD-93 Character sample of barite in area.

RD-94 Character of sulfide rich siliceous rock at this area.

RD-95 Fossils (possibly pelycopods) abundant in 5-6" bed of limestone in gray geen cherts of Unit C.