United States Department of the Interior

BUREAU OF MINES
Fairbanks, Alaska 99701

July 30, 1981

To: Cobalt Files

From: Karen Clautice

Subject: Investigation of reported cobalt occurrences, Manley Hot Springs Dome, Alaska.

Personnel: Karen H. Clautice, Geologist, AFOC, Fairbanks
Dennis D. Southworth, Physical Science Aide, AFOC, Fairbanks

Dates: May 28, 29, 1981

Sample Numbers: 16677-16695, 16705-16722, 17383

Maps: Tanana A-2, Kantishna River D-2

Introduction:

Approximately two hours were spent at the summit of Manley Hot Springs Dome investigating and sampling the prospect trenches and drill hole sites within a prominant gossan where there is a reported occurrence of cobalt bloom. One day was also spent collecting stream sediment samples from streams which drain the dome. In addition the Juneau lab has been asked to pull all core samples available from the 1953 Bureau of Mines (BOM) drilling project on the dome for re-analysis for cobalt.

Location:

The deposit is near the summit of Manley Hot Springs Dome, about five miles northwest of Manley Hot Springs, Alaska at 65° 01' 51" N. latatude and 150° 44' 30" W. longitude.

Histroy and Ownership:

The following is taken from Maloney, 1971(6) and updated where necessary.

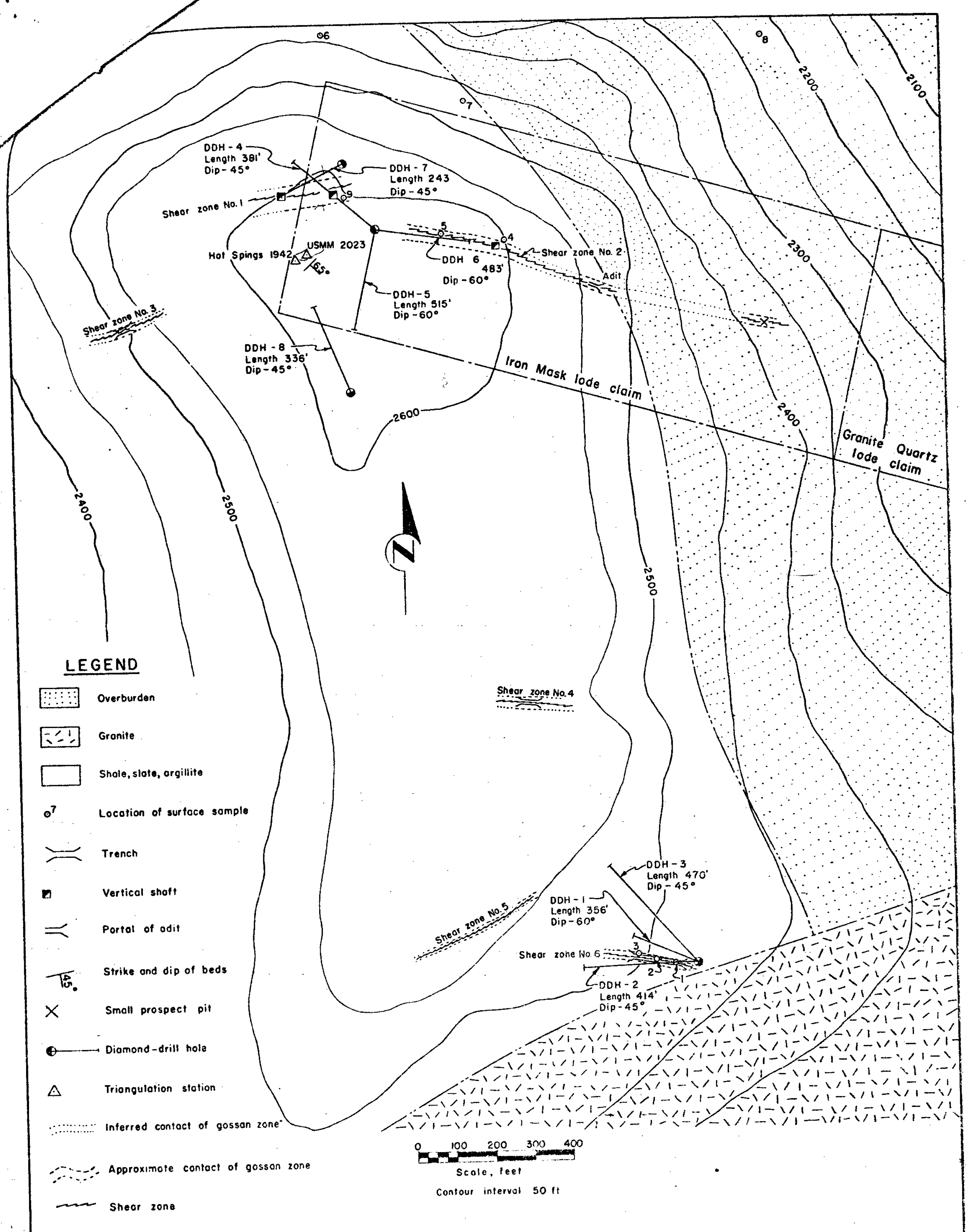

FIGURE [illegible].- Geologic and Topographic Map of Hot Springs Dome, Alaska. *from Maloney 1971*

(Hot Springs Dome)

Cobalt, Copper, Gold, Lead, Manganese, Monazite, Nickel(?), Silver

Hot Springs district
MF-371, loc. 6

Tanana (16.7, 0.8)
65°02'N, 150°45'W

Summary: At least 6 mineralized shear zones in metamorphosed sedimentary rocks close to and roughly parallel to the contact with a biotite granite intrusive body. Most of the material oxidized to a depth of at least 446 ft. (deepest diamond drill hole). Sulfides identified are galena, chalcopyrite, pyrrhotite, and pyrite. Other minerals include siderite, cerussite, limonite, goethite, hematite, quartz, calcite, malachite, azurite, and erythrite (cobalt bloom). Assays of oxidized material indicated $1-$2 in gold (at $20.67 an ounce) and 5-8 oz. silver per ton. Sample from a dike that cuts granite contained monazite; dikes also contain as much as 15% tourmaline. Unverified report of nickel in a pyrrhotized basalt dike. Only exploration was at Barrett prospect, where 3 shallow shafts were sunk, a short adit driven, and several trenches and pits excavated. No production.

Mertie, 1934 (B 844-D), p. 215-216 -- Metamorphosed sediments that strike N 45° E and dip about 60° S are just N of a large body of biotite granite that forms the south slopes of Hot Springs Dome and extends NW and SE for about 10 mi. Metamorphosed sediments on NW side of granite body are sheared in 6 or more east-trending zones with gold and silver mineralization. At the Barrett prospect a short tunnel, a shaft 40 ft. deep, and several open cuts had been made, but were caved in 1931. Surface ore is essentially veins of galena and pockets of limonite. Siderite and possibly manganese minerals with limonite. Sulfides with galena include chalcopyrite, pyrrhotite, and pyrite. Malachite or azurite present; chalcocite reported. Erythrite (pink cobalt bloom) in quartz stringers and in crevices in schistose rock. Unverified report of nickel in pyrrhotized basalt dike. Native sulfur in small balls at surface of lode. Assays of oxidized material indicate $1-$2 in Au and 5-8 oz. Ag per ton. Very little exploration of any other shear zones, but they appear to be similar to lode at Barrett prospect.

Waters, 1934 (B 844-D), p. 229 -- Dikes 3 in. to 4 ft. thick that cut granite of Hot Springs Dome contain as much as 15% tourmaline similar to that in tin placers of the district. Monazite identified in one specimen.

*Joesting, 1942 (TDM 1), p. 18-19 -- Reference to B 844-D, p. 215.

Wedow and others, 1952 (OF 51), p. 99-100 -- Barrett prospect originally developed for gold, but the important metals present are silver and lead. Veins in shear zone in schist; metallic minerals are argentiferous galena, chalcopyrite, pyrrhotite, pyrite, limonite, hematite, and siderite. Erythrite in quartz stringers and in crevices in schist country rock.

Moxham, 1954 (C 317), p. 3-4 -- At Barrett prospect shear zone in hornfels and schist contains metallic minerals in zone 20-35 ft. wide that has been traced 2,000 ft. horizontally. Minerals in zone include limonite, cerussite, siderite, copper carbonate, galena, chalcopyrite, pyrrhotite, pyrite, and erythrite.

Wayland, 1961 (B 1058-I), p. 369-370 -- At NW border of intrusive mass quartz-siderite-galena veins (one traced for 1,500 ft. and another for 500 ft.) also contain calcite, pyrite, chalcopyrite, pyrrhotite and alteration products (including erythrite) in a gossan.

Bilbrey, 1962 (IC 8103), p. 27 -- Erythrite reported in narrow quartz vein.

Berg and Cobb, 1967 (B 1246), p. 223 -- Low-grade mineralized belt in sheared metasedimentary rocks near a biotite granite intrusive. At least 6 gold-silver lodes. Barrett prospect contains argentiferous galena, limonite, and minor amounts of gold, hematite, chalcopyrite, chalcocite, pyrrhotite, pyrite, quartz, secondary copper minerals, and erythrite. Nickel reported in pyrrhotite-bearing basalt dike south of Barrett prospect.

Maloney, 1971 (USBM OF 8-71) -- USBM drilled 8 diamond-drill holes with a total length of 3,197.9 ft.; deepest penetration was 515 ft., which bottomed 446 ft. below the surface. Except for a few pockets containing small amounts of galena, pyrrhotite, chalcopyrite, and pyrite, all metallic minerals were oxidized; limonite, goethite, pyrolusite, hematite, magnetite, and rutile, some anglesite and erythrite. Most geologic data from C 317. Deposits in "shear" zones up to 50 ft. wide roughly parallel to contact between granite and metamorphosed sedimentary rocks. Claims (Barrett prospect) staked in 1914 and 1924; patented, 1937. Exploration was by 3 shafts about 20 ft. deep, an adit 20 ft. long, and several trenches and prospect pits. Analyses of USBM samples indicated maximum values of 0.02% Co, 3.7% Pb, 0.32% Zn, 1.20% Cu, 3.90% Mn, 0.17 oz. Au per ton, and 0.53 oz. Ag per ton; most values were traces only. [No Zn mineral identified.]

* Joesting, 1942. Pamphlet no. 1. "Nickeliferous pyrrhotite and cobalt bloom have been found in a basalt dike south of Hot Springs Dome. The highest analysis showed 0.8 percent cobalt, no quantitative nickel analyses are available. This prospect and others on Hot Springs Dome have been described by Mertie."

Logistics:

Access to the prospect was attempted on motor bikes over the trail built to the summit by the BOM in 1953 to haul in drilling equipment. The bikes were taken up 2 1/2 miles of deeply rutted and overgrown trail and abandoned where the trail disappeared into a boulder field. Any future trips to the site could more easily be made entirely on foot. Due to the distance from town it is suggested that any future work in the area be done either from a spike camp on the site, accessed by foot or with a helicopter. It is possible that a small plane could land on the ridge although this possibility was not explored with the local pilots.

Lodging and meals are available at the Manley Roadhouse although special arrangements must be made to allow for a full field day between breakfast and dinner.

Observations:

The gossans occur in a dark gray phyllite within 500 yards of a granitic contact. The phyllite is commonly crenulated and in places small (<6") isoclinal folds occur in a "cascade and run" pattern. Quartz veining follows and also cuts this folding. Adjacent to the contact the phyllite has been thermally altered to a classic spotted hornfels (#16683). Close to the granitic contact in the vicinity of "shear zone #6", figure 1, a dark gray, chalcopyrite, pyrrhotite (?) bearing quartzite was sampled (#16680). This rock may be the "nickel bearing pyrrhotized basalt" referred to by Mertie, 1934 (8).

The granitic rocks are a porphyritic medium-to-coarse grained biotite quartz monzonite with feldspar megacrysts up to two inches in length (#16686). This unit shows weathering with moderate clay alteration of the feldspars. Quartz veining is common within the granitic rocks. In one, one foot wide quartz vein (#16679) terminated quartz crystals, limonite, siderite (?) and tourmaline were noted. Float rock of a fine-grained garnet bearing tourmaline muscovite granite (#16684), occurs within the phyllite in the vicinity of prospect trenches on the south side of the summit in the vicinity of the burned cabin ("shear zone #6", fig. 1) and probably represents a late stage dike.

The gossans which occur in the phyllite are well developed and comprised mainly of iron (hematite, limonite, geothite, siderite) and manganese (pyrolusite, psilomelane) minerals (#16681). In addition anglesite (?) (a gray, heavy, botryoidal mineral)(#16685) and trace chalcopyrite and a secondary copper mineral (malachite?) were noted (#16687).

From the brief time spent at the prospect, it appears that Maloney's map (6) used as figure 1, is a good representation of the location of the prospect trenches and geologic contacts. In addition to these plotted trenches, Southworth located several other trenches several hundred feet down slope on the north and northeast sides of the summit. In this area he found abundant hematite(?) stained quartz vein material that was not seen on the summit.

Although some slicken sides were noted in mineralized areas, the distinct shear zones as mapped by Maloney (fig. 1) were not observed, but this could be due to the short time spent at the prospect. No cobalt bloom was found.

Recommendations:

Since cobalt is normally recovered as a by-product, this deposit would have to contain significant grade and tonnage in other ores, ie: lead, copper or silver as well as cobalt to be considered a cobalt resource. At this time, surficial studies and the 1953 drilling program by the BOM do not indicate this to be the case. The hydrothermal, vein-type nature of this deposit would also argue against this possibility, as these are often low tonnage deposits.

Recommendations for further work on this deposit as a resource for cobalt should be made after a review of the analyses of rock samples and drill core. If significant cobalt and other metal values are found in the analyses, a soil grid over the dome and Bean Ridge could help delineate the areal extent of mineralization.

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