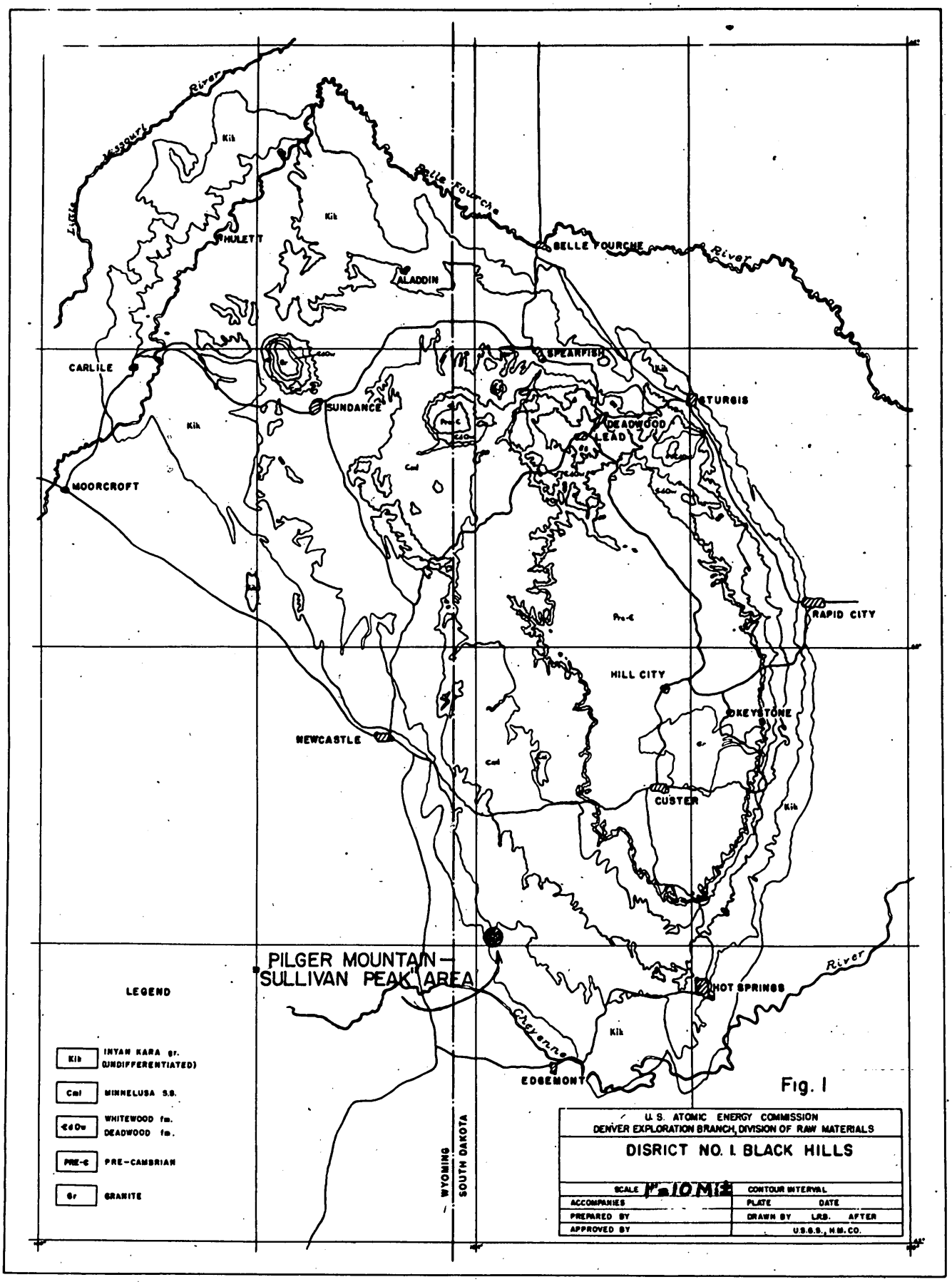

Missouri River
Little
Belle Fourche
Belle Fourche River
HULETT
ALADDIN
CARLILE
SUNDANCE
SPEARFISH
STURGIS
DEADWOOD
LEAD
MOORCROFT
RAPID CITY
HILL CITY
KEYSTONE
NEWCASTLE
CUSTER
HOT SPRINGS
Cheyenne River
EDGEMONT
WYOMING
SOUTH DAKOTA
Kik
Cml
Pre-C
Gr
PILGER MOUNTAIN—
"SULLIVAN PEAK" AREA
LEGEND
Kik INYAN KARA fm. (UNDIFFERENTIATED)
Cml MINNELUSA S.S.
Ꞓ dDw WHITEWOOD fm. DEADWOOD fm.
PRE-Ꞓ PRE-CAMBRIAN
Gr GRANITE
Fig. 1
U. S. ATOMIC ENERGY COMMISSION
DENVER EXPLORATION BRANCH, DIVISION OF RAW MATERIALS
DISRICT NO. I. BLACK HILLS
SCALE 1" = 10 MI.
CONTOUR INTERVAL
ACCOMPANIES
PLATE
DATE
PREPARED BY
DRAWN BY L.R.B.
AFTER
APPROVED BY
U.S.G.S., N.M. CO.

RECONNAISSANCE REPORT

on the "Sullivan Peak" - Pilger Mountain Area

South Dakota

by

G. Wendell Smith

Consulting Geologist

Bismarck, North Dakota

INTRODUCTION

Location of Area: The area under discussion is located in extreme Southwestern Custer County, South Dakota, and lies on the Southwest Flank of the Black Hills. (See Figure 1). The specific mineral claims cover parts of Section 12, 13, 14, 24, 25 and 36 of T. 6 S., R. 1 E., and parts of Sections 18, 19, 20, 29 and 30 of T. 6 S., R. 2 E. (See Figure 2).

Purpose of Report: The purpose of this report shall be to present the data gained from a two-day field study of the area under discussion. This is not intended to be an exhaustive study of the area, and is not tendered as such.

Acknowledgements: The writer is greatly indebted to the Messrs. King, O'Neal and Freelund of the South Dakota sub-office of the Atomic Energy Commission for providing maps and general guidance on the area.

GENERAL GEOLOGY

Stratigraphy: The Pilger Mountain - "Sullivan Peak" * Area is underlain by the geologic section typical of the Black Hills Area. The generalized section is shown on Figure 3, which was obtained from the Atomic Energy Commission Office in Hot Springs, South Dakota. No formations younger than the Fall River Sandstone outcrop in the immediate area of the mineral claims to be discussed here, and the oldest formation observed in the immediate area was the Spearfish. No purpose will be served by repeating here the lithologic descriptions shown on Figure 3. The Inyan Kara Group of formations contains all known commercial uranium ore deposits of the Black Hills, with both the Fall River and Lakota Sandstones yielding ore. Figure 1 indicates the Pilger Mountain - "Sullivan Peak" Area is located on the outcrop band of the Inyan Kara Group.

---

*The term "Sullivan Peak" as used by the natives and in this report applies to that peak lying in the Southwest Quarter of Section 12, T. 6 S., R. 1 E., and is so used in this report. The U. S. Geological Survey applies the term to that peak lying near the North Quarter corner of Section 28, T. 5 S., R. 1 E.

Structure: The mineral claims herein discussed lie on the Southwest dipping Southwest Flank of the Black Hills Uplift. (See Figure 4). No structural mapping was done during this short reconnaissance, but minor folding was observed and faulting and folding are definitely present in the area immediately adjoining the "Sullivan Peak" Area on the North.

G. WENDELL SMITH
GEORGE E. SUMMERS, JR.
CONSULTING GEOLOGISTS
BISMARCK, N. D.

THE OCCURRENCE OF URANIUM AND VANADIUM IN THE SOUTHERN BLACK HILLS*

Carnotite, the chief mineral in the Black Hills uranium ore, was discovered about three years ago near Edgemont, South Dakota. Since that time, over 1500 claims have been staked in the Southern Black Hills. Uranium ore has been shipped from over fifty locations in the Hills, but tonnages are restricted information and the writer could elicit only that small amount of production data presented later in this report under the discussion of specific mines.

The ore buying station of the Atomic Energy Commission is located at Edgemont (See Figure 1) at the extreme South end of the Hills.

Several radioactive anomalies have been noted in the areas of outcrop of the Inyan Kara Group of formations not only on the South end of the Hills, but also along the Southwest, West and North Flanks.

---

*Much of the discussion under this topic is covered by information taken from a published address, "Exploration Phases of the Uranium Program in South Dakota" by John W. King, Chief, Hot Springs, South Dakota Sub-Office, D. E. B., Atomic Energy Commission, delivered before the Colorado Section, A. I. M. E., in Denver, Colorado, May 20, 1954.

According to King*"minor structure appears to be an important feature related to the ore deposits of the Black Hills. It is suggested that the complicated structural pattern, like the complication of sedimentation, may be a significant factor in the localization of uranium ore bodies. ..... It was noted by the U. S. Geological Survey men in the Southern Black Hills last summer that the principal ore deposits follow structural terraces. ..... Although structural control of ore deposition appears to be important, it is to be emphasized that lithology is of prime importance. The deposits are typical sandstone ore bodies in which the uraniferous material (usually carnotite) is deposited as grain coatings and interstitial fillings. Without adequate permeability, access of ore bearing solutions is prohibited and without a chemical environment favorable to precipitation, ore deposits will not occur."

The writer's observations were that carnotite occurs also as coatings along fracture faces and as grain coatings in permeable zones immediately overlain by tight, impermeable, often limonitic sandstone layers. Other occurrences of carnotite are intimately associated with lignite and plant remains.

Exploration procedures for uranium follow the same techniques as in the better established Colorado Plateau producing area. Airborne radiometric surveys, ground scintillometer surveys, wagon drilling, and bulldozer excavating are all employed, and usually in that order. Aerial radiometric anomalies are checked by ground scintillation equipment, and the development is guided by bulldozer excavating and wagon drilling. Most development to date

---

*Op. Cit., P. 3.

has been in horizons less than 100 feet below the surface although AEC drilling has shown that good ore may be present as much as 470 feet below the surface.

In summary, Mr. King states*: ".... that over a period of less than three years, the Black Hills Area has progressed from a locality where uranium was not suspected, to a producing area with a bright future. Five separate districts have already produced ore and the near surface deposits have been only scratched. We feel that ore controls are being recognized which will aid greatly in the localization of favorable areas. We have confidence that refinement of the current theories will result in finding more uranium in the Black Hills than we suspect today. Finding it is a job for geologists who have ideas and imagination."

*King, Op, Cit., PP. 6 and 7.

G. WENDELL SMITH
GEORGE E. SUMMERS, JR.
CONSULTING GEOLOGISTS
BISMARCK, N. D.

DISCUSSION OF INDIVIDUAL MINES

LUCKY STRIKE

This claim, shown as No. 1 on Figure 2, is an active mine in which bulldozing has produced an unknown quantity of ore. It is located near the center of the N/2 SE/4 of Section 36, T. 6 S., R. 1 E. The ore occurs in the form of carnotite as grain and fracture coatings in the Fall River Sandstone. No tonnage or data as to quality was available. The Lucky Strike claim lies less than half a mile South of the Del Muerto Claim, one of those belonging to the group under consideration.

FREEZEOUT NO. 4

This mine, lying Southwest of the Del Muerto Claim is operated by John McCloud. Its location is in the NE/4 of the SE/4 of Section 36, T. 6 S., R. 1 E. (No. 2 on Figure 2). Operations were begun this spring and 493 tons of ore averaging .13% U_3O_8 were marketed during May. An unestimated tonnage of apparently good ore is stockpiled on the lease.

COAL CANYON NO. 1

This mine, (No. 3 on Figure 2), located near the center of the E/2 NE/4 of Section 27, T. 7 S., R. 2 E., has two drifts driven into the outcrop of the Lakota Sandstone. The ore is in the form of carnotite coatings around the grains of porous sandstone overlain by an apparently impervious claystone layer which was undoubtedly a controlling factor in the mineralization process. No production data is available in this claim. An extensive detailed wagon drill program is currently in progress, and the general impression gained by visiting the mine is that it is a profitable enterprise and that the wagon drilling is being done to outline precisely the extent of the ore body before a permanent mining plan is effected.

VIRGINIA C

This Claim, No. 4 on Figure 2, is located in the SW/4 SW/4 of Section 26, T. 7 S., R. 2 E., and is here mentioned, although it was not inspected, because production data was obtained. This mine was on production for two months in 1952, and for seven months in 1953. A total of 2600 tons was marketed in those nine months, with the ore averaging 0.29% U_3O_8. The highest percentage was the first ore marketed in 1952, which had .41% U_3O_8.

GOULD

This was the best developed of the mines visited. The ore is carnotite in coatings and seams in very coarse sand to quartz conglomerate within the Lakota Sandstone. A very obvious intraformational unconformity is exposed in the face of the workings and the ore appears richest in the small channel fillings immediately above the unconformity. A considerable amount of carbonized plant remains occur in and near the mineralized zones. Two drifts have been driven into the hillside and extensive wagon drilling has outlined an ore body which Mr. Matt Brown of the Pictograph Mining Company is quoted as estimating at 20,000 tons, running 0.26% U_3O_8.

PILGER MOUNTAIN GROUP

This group of claims is shown on Figure 5. The nearest producing mine is the Lucky Strike, about a quarter of a mile south of the Del Muerto Claim in the NE/4 of Section 36, T. 6 S., R. 1 E.

Del Muerto Claim: This is the one mineral claim which will be discussed individually because it has had some exploration work done on it. The claim is atop a wooded sloping mesa underlain by Fall River Sandstone. Bulldozing has exposed considerable bedrock, and along the east side of the claim Geiger Counter readings of .03 MR/Hr. were obtained along several mineralized fractures, the walls of which exhibited carnotite staining.

An apparently aimless wagon drill program has resulted in several drill holes which were investigated with the counter to only about six feet below the surface which is as deep as the probe of the counter would reach. Readings of 0.15 MR/Hr. were obtained from two core holes. This claim should be investigated by a detailed systematic ground scintillometer survey, followed by extensive drilling. Ore is definitely present here, but the quality and extent should be determined before extensive mining operations are instituted.

The next most interesting claims are Dead Cedar 2 through 8 and Pine 1 through 6. While no Geiger readings were obtained, an extensive limonite coated fracture system with possible faulting was noted on Dead Cedar 4 and on Dead Cedar 8. An estimated 30 feet of Fall River Sandstone outcrops throughout most of these claims and many zones of friable porous sandstone were noted. Since the group of claims listed above is underlain by the Fall River Sandstone and since a fracture system and porosity were noted, these claims should be thoroughly investigated by a ground scintillation program.

The remaining claims shown on Figure 5 are underlain by Fall River Sandstone, and most of them have a thin soil cover so that a ground-scintillometer-wagon drill combination program of exploration is indicated.

"SULLIVAN PEAK" GROUP OF CLAIMS

The "Sullivan Peak" Group of claims shown in Figure 6 will be more difficult of exploration than the Pilger Mountain Group because of the rough topography. Some bulldozing has been done, but no Geiger readings indicative of uranium mineralization were found on the few exposures examined. A strong joint system in the Fall River Sandstone was observed on "Sullivan Peak" and folding and probably faulting is indicated by outcrops North of "Sullivan Peak". Since minor structural deformation has been proved a factor in ore deposition, this fact coupled with the presence of Inyan Kara Group sediments in outcrops within this group of claims indicates a good potential area for mineralization. A scintillation survey in detail, followed by wagon drilling of anomalous areas is recommended.

SUMMARY STATEMENT

The Pilger Mountain - "Sullivan Peak" Group of claims are located on the outcrop or are underlain at shallow depths by the Inyan Kara Group of formations which have produced all known commercial uranium ore in the Southern Black Hills. Definite carnotite ore exists on the Del Muerto Claim, its quantity and quality unestimated because of lack of data.

The age and lithology of the rocks present in the area, coupled with observed jointing, fracturing and possible faulting in the area of commercial uranium ore accumulations make these claims very desirable as areas for detailed exploration.

The writer made no detailed examination of the properties, and the maps presented as Figures 6 and 7 were not thoroughly checked in the field, although the few claim corners checked were found to be essentially correct. Figures 6 and 7 are prepared from maps made by a Claim Checker who checked the claims in the field.

Respectfully submitted,

SMITH & SUMMERS

G. Wendell Smith
Consulting Geologist

July 29, 1954

G. WENDELL SMITH
GEORGE E. SUMMERS, JR.
CONSULTING GEOLOGISTS
BISMARCK, N. D.

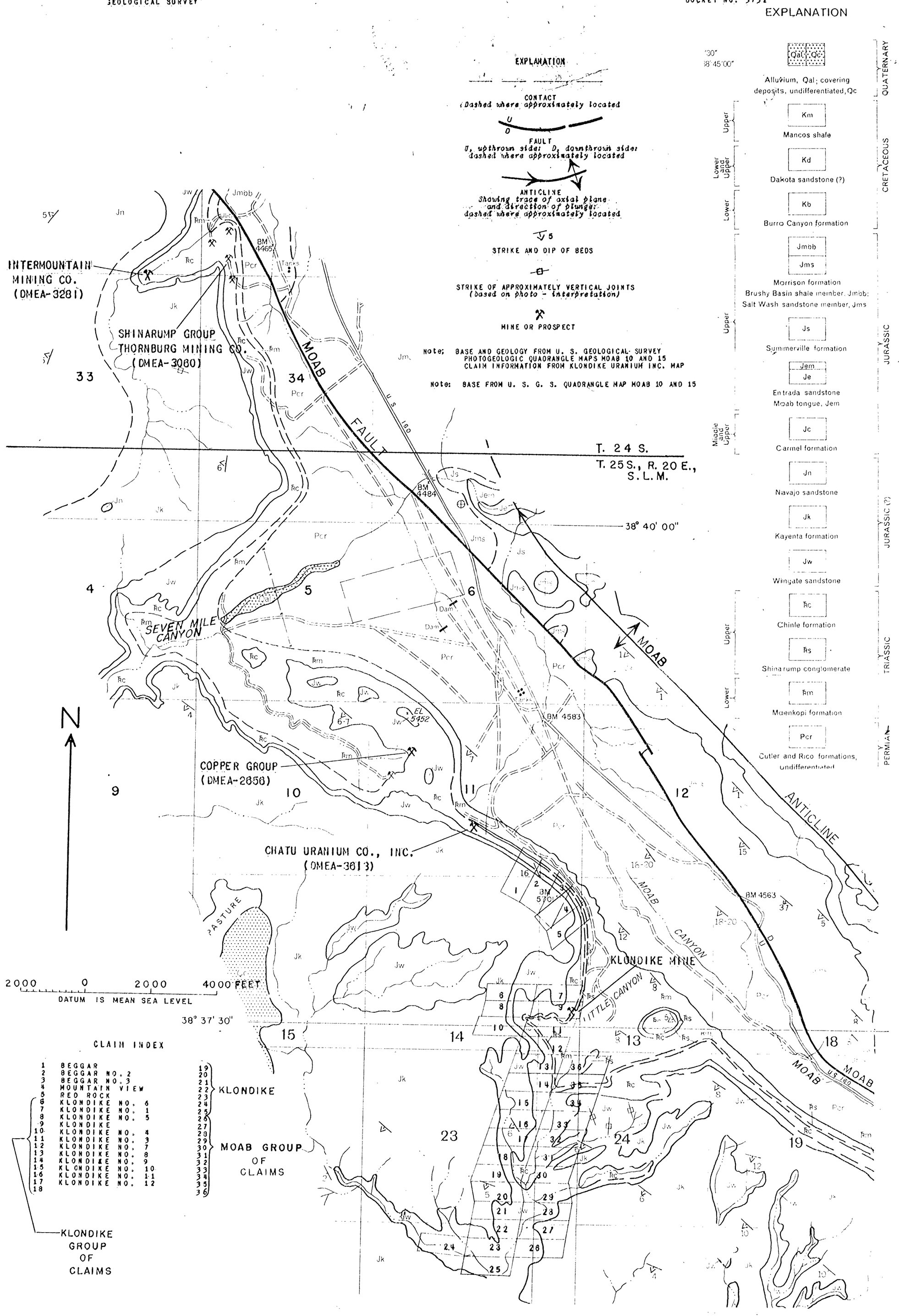
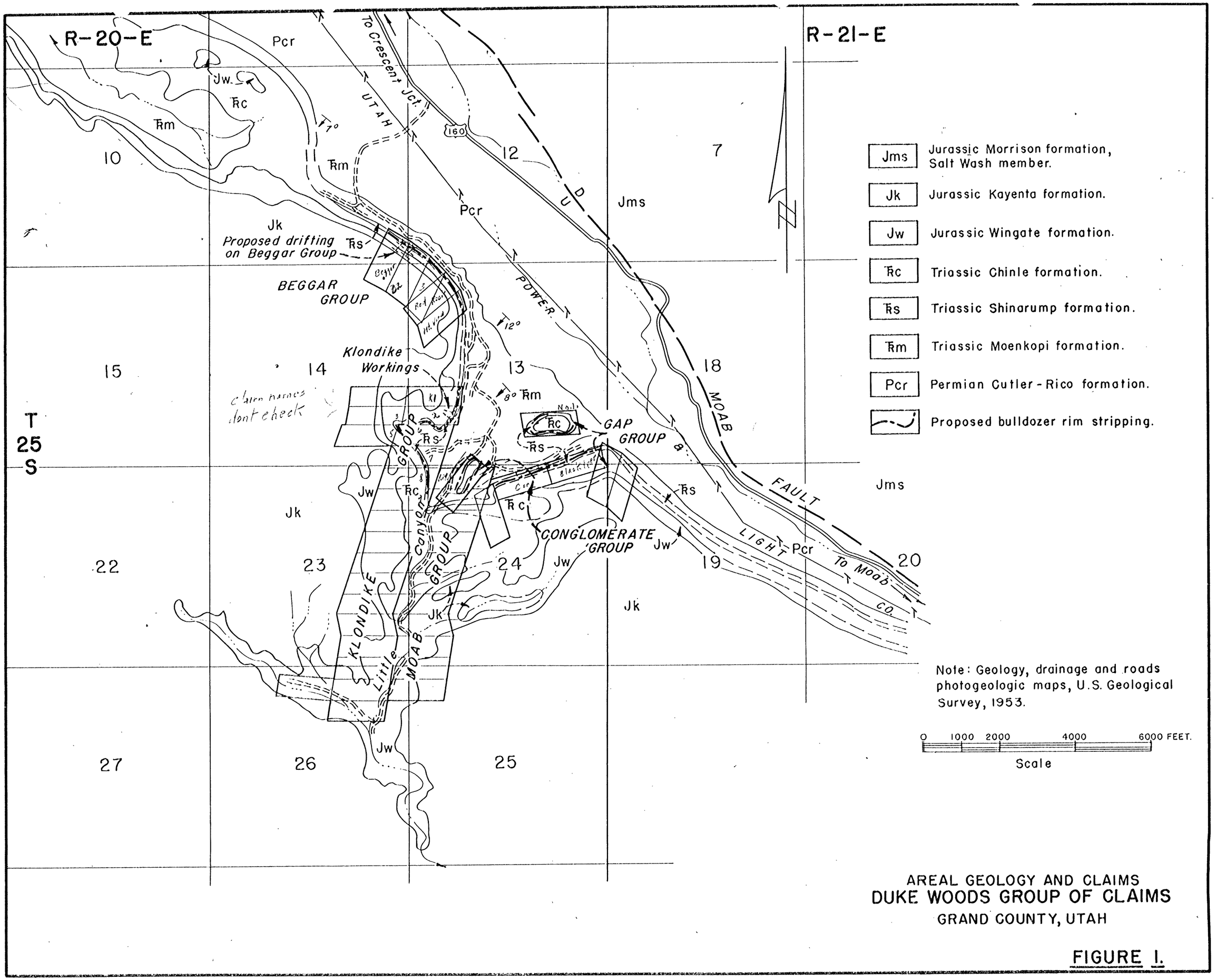


Figure 2. GEOLOGIC MAP OF SEVEN MILE AREA SHOWING KLONDIKE, ET AL. CLAIMS, KLONDIKE URANIUM, INC., GRAND COUNTY, UTAH



AREAL GEOLOGY AND CLAIMS
DUKE WOODS GROUP OF CLAIMS
GRAND COUNTY, UTAH

FIGURE I.

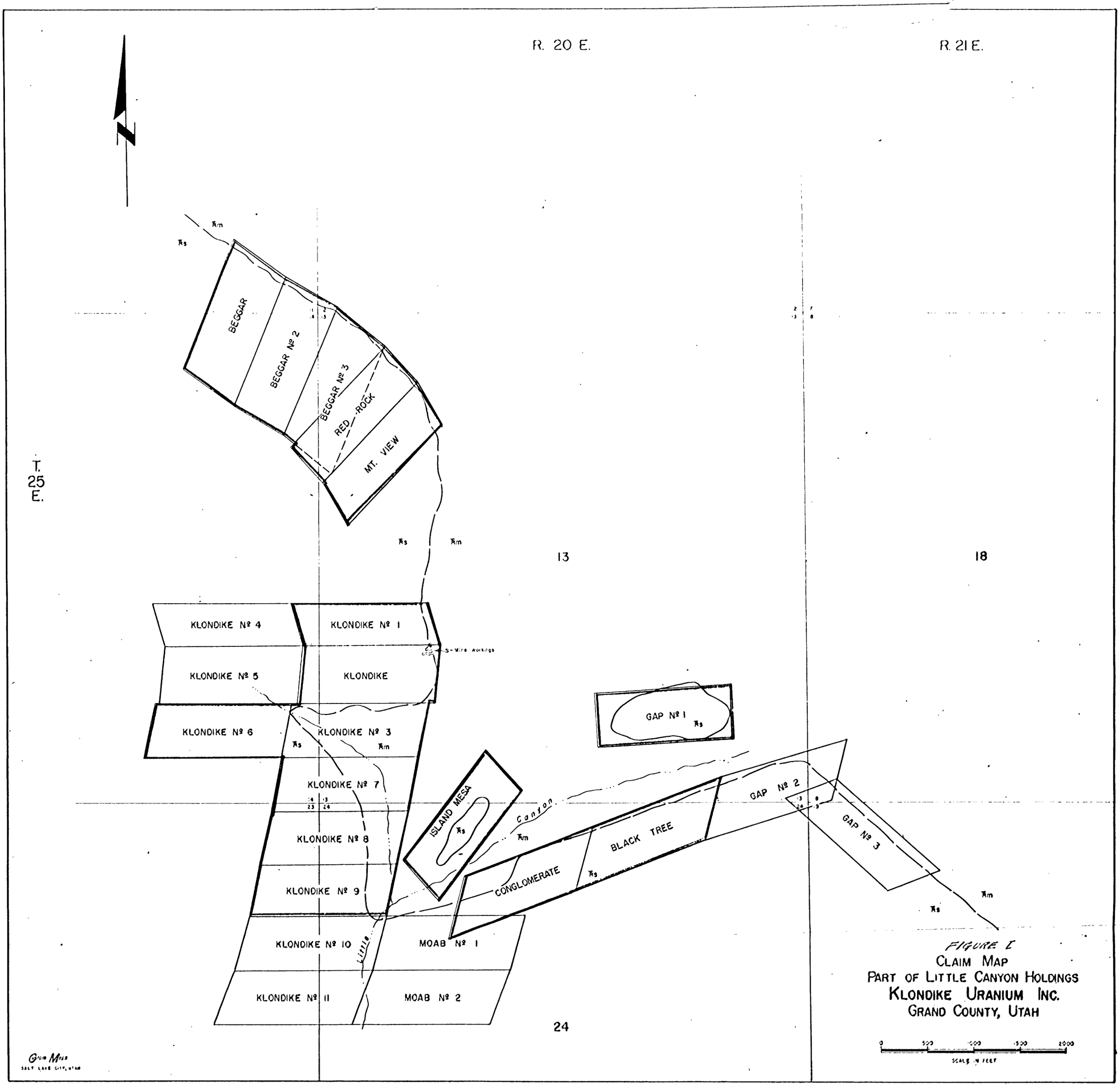


FIGURE I
CLAIM MAP
PART OF LITTLE CANYON HOLDINGS
KLONDIKE URANIUM INC.
GRAND COUNTY, UTAH