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DRILLING AT THE SUN FLOWER AND SNOW
FLAKE CLAIMS, LUCKY STRIKE AND
PETERINO CLAIMS, AND YELLOW CIRCLE
CLAIM GROUP, SAN JUAN COUNTY, UTAH

By
Chester E. Farrow, Jr.
Richard A. Teichman, Jr.
Robert C. Dickinson
James K. Hilleary

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UNITED STATES ATOMIC ENERGY COMMISSION
GRAND JUNCTION OPERATIONS OFFICE
EXPLORATION DIVISION

DRILLING AT THE SUN FLOWER AND SNOW FLAKE CLAIMS,
LUCKY STRIKE AND PETERINO CLAIMS,
AND YELLOW CIRCLE CLAIM GROUP,
SAN JUAN COUNTY, UTAH
Contracts AT(30-1)-1261, AT(05-1)-225 and AT(30-1)-1185

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January 5, 1955
(Grand Junction, Colorado)

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AND YELLOW CIRCLE CLAIM GROUP,

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ABSTRACT

The Sun Flower and Snow Flake claims, the Lucky Strike and Peterino claims, and the Yellow Circle group, all situated in San Juan County, Utah, were drilled at intervals from May 6, 1952, to June 18, 1953. The deposits occur in the Salt Wash member of the Morrison formation, and are of the carnotite-vanoxite type. In the Yellow Circle area, preliminary subsurface maps were helpful in carrying out the drilling program.

INTRODUCTION

The contract AT(30-1)-1261 was let to Minerals Engineering Company for development drilling with the objective of stimulating mining interest in areas where uranium production had lagged. The work was carried out from May 6, 1952, to December 18, 1952. Drilling under this contract was on the following properties:

<u>Name</u>	<u>Holes</u>	<u>Feet Drilled</u>
Sun Flower and Snow Flake claims	46	3,551
Lucky Strike area	34	4,706
Yellow Circle group (Yellow Circle No. 1)	117	14,277
Seven Mile Canyon (in a separate report)	1/	

The Yellow Circle area was also drilled from October 8 to November 9, 1952, as a part of contract AT(30-1)-1185, wherein 2,581 feet were wagon drilled in 44 holes. This work was called Yellow Circle No. 2. The area was again drilled, as a part of

contract AT(05-1)-225, during the period from April 13, 1953, to June 18, 1953; this work was called Yellow Circle No. 3. Drilling under this contract at the Yellow Circle totaled 16,113 feet in 109 holes.

The original plan in the first contract called for a small highly mobile field crew. The field unit and the accompanying contract core drills and drilling crew were to move into an area recommended for drilling and to drill holes behind known mines with the possibility, thereby, of increasing the ore reserves and stimulating miners to further operations. As soon as adequate drilling had been completed, another project would be undertaken.

Little emphasis was placed upon geology in the original drilling layouts inasmuch as the areas were small and drilling was confined to blocking out ore behind the various mines. After drilling one property, however, emphasis was again placed on geologic information in laying out the drilling.

It became necessary to enlarge the scope of the drilling as most drilling behind the stoped-out mines failed to locate appreciable ore.

LOCATION AND ACCESS

The Sun Flower and the Snow Flake claims are 16 miles southeast of Moab, Utah. They are 2.4 miles east over an unimproved but good dirt and gravel road from U. S. Highway 160. The Lucky Strike No. 1 and No. 2 claims and the Peterino claims are 15.5 miles southeast of Moab, Utah, and 1.5 miles easterly over a graded dirt and gravel road from U. S. Highway 160. The Yellow Circle claim group is 22 miles southeast of Moab, Utah, and is 8 miles over a graded dirt and gravel road from U. S. Highway 160. Figure 1 shows the location of the drilling areas and figure 2 illustrates the access to them.

The Atomic Energy Commission uranium mill at Monticello, Utah, is 56 miles south of Moab, Utah. The Union Carbide and Carbon Company's sampling plant and railroad loading station for uranium ores, located at Thompsons, Utah, is 37 miles north of Moab, Utah. Both mills process uranium ores from the Moab district.

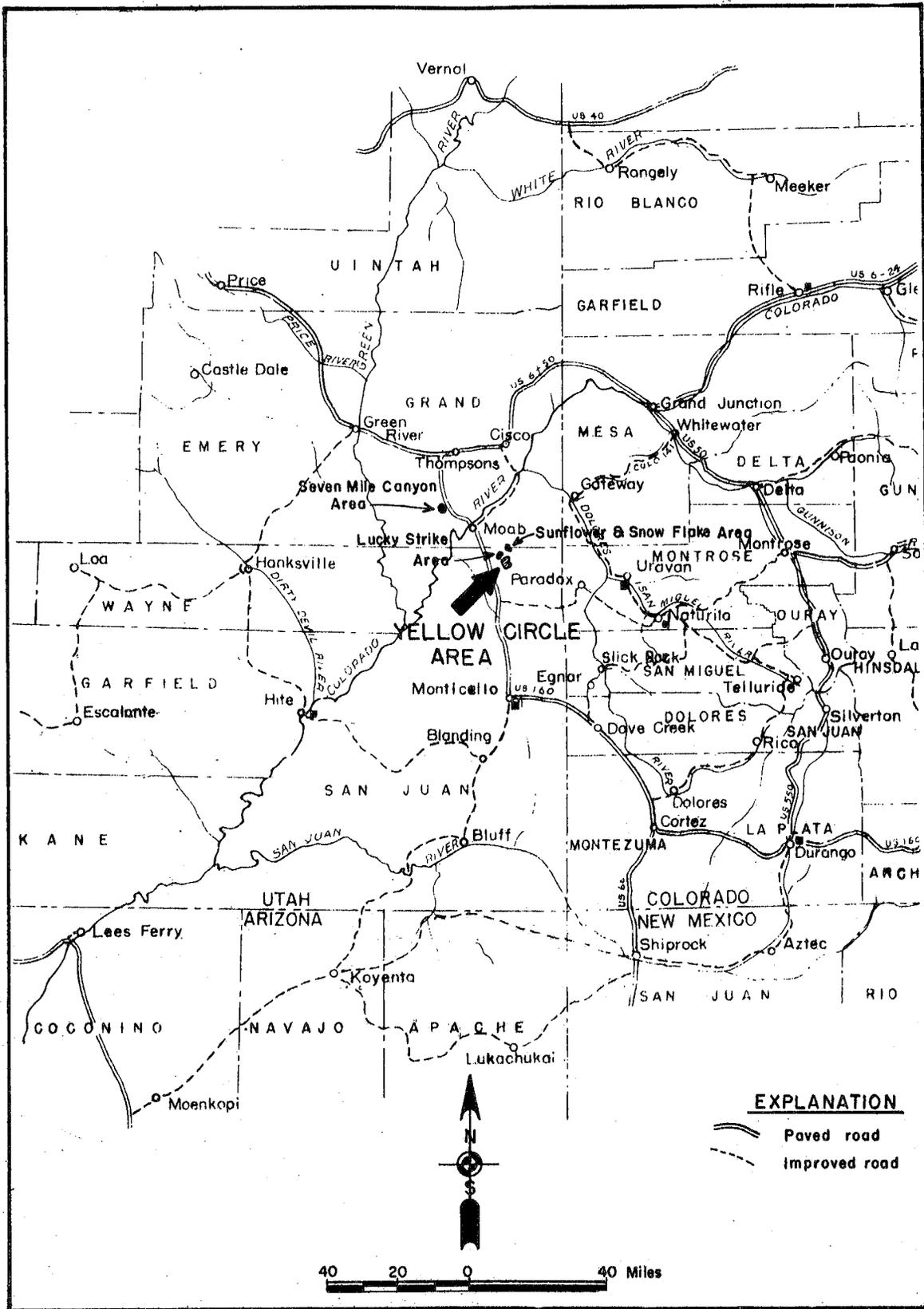


Figure 1. Location map of drilling areas, San Juan County, Utah

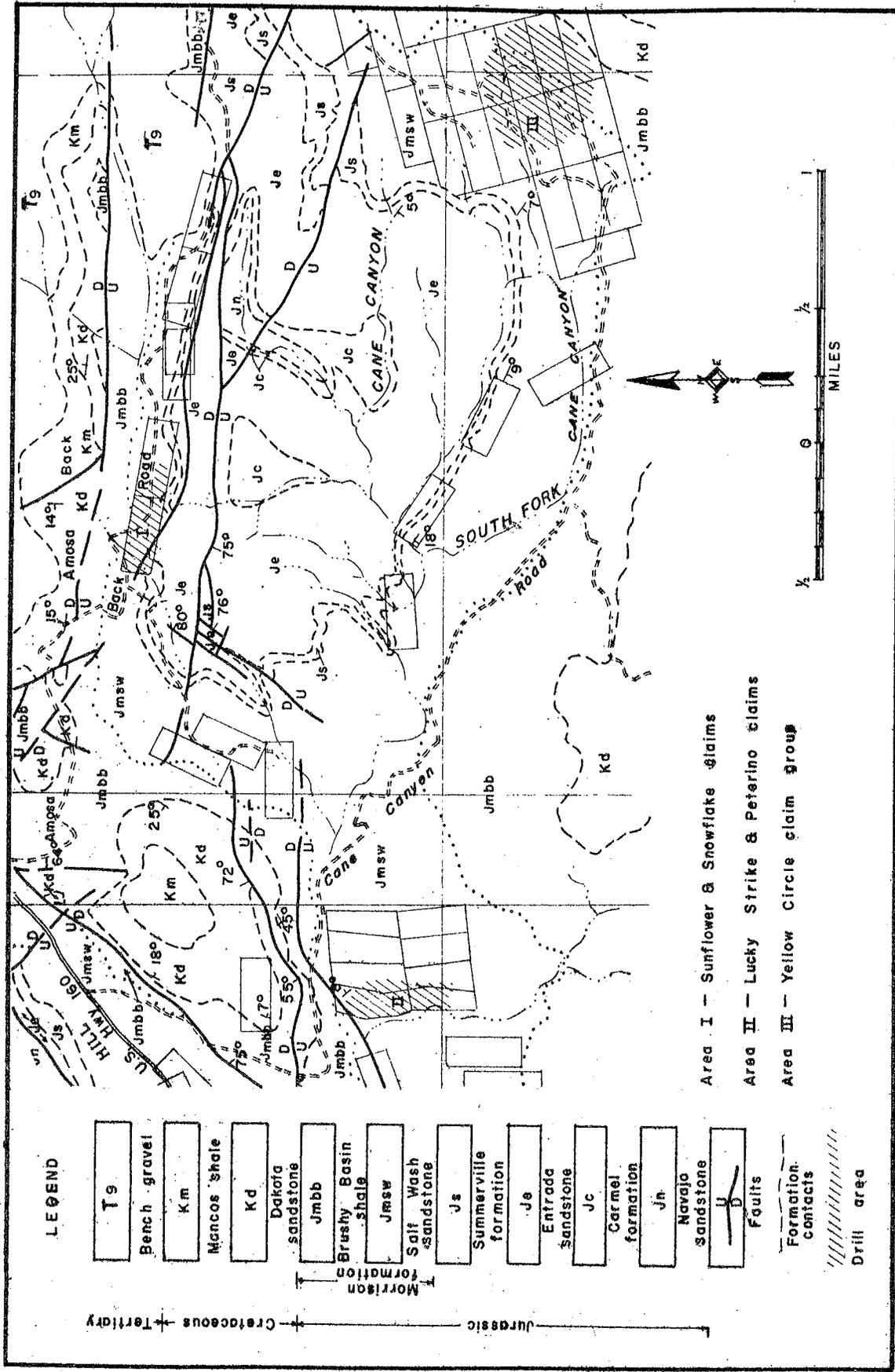


Fig. 2 Geologic map of drift areas, San Juan County, Utah

OWNERSHIP

All land drilled during this contract was owned by individuals or by private companies.

The Sun Flower and Snow Flake claims are owned by Howard Balsley of Moab, Utah. Recently a Defense Minerals Exploration Administration loan was awarded Balsley for the exploration of orebodies discovered by the Commission program.

The Lucky Strike claims Nos. 1 and 2 are owned by David Taylor of New York City, New York. They are leased to Pete Shumway of Moab, Utah. Some mining is being done on these claims from time to time by Shumway and sons.

The Peterino claims Nos. 1 through 6, owned by Pete Shumway and Howard Balsley, Moab, Utah, are located adjacent and to the east of the Lucky Strike claims. No development is being done on these claims at present.

The Yellow Circle claim group, owned by the Plateau Mining Company, Grand Junction, Colorado, consists of the following claims: Yellow Circle Nos. 1 through 6, Chapparal, Primero, Carol B, Fraction, Maybe, Forked Canyon, Exchequer, U. S. Treasury, Protection, Jessie Balsley, Inspiration, and White Fawn Nos. 1 and 2. These are the claims originally considered for drilling under the development drilling program. Other claims have been located in the area by the Plateau Mining Company since drilling by the Commission began, none of which were drilled by the Commission. Active development and exploration of the ore discovered by the Commission was begun by the owners as soon as information regarding the location of the orebodies and the grade of ore discovered was made available to them.

GENERAL GEOLOGY

The geologic column (fig. 6) gives a general description of the formations in the areas drilled.

The regional structure and stratigraphy of the Moab district are discussed in A. A. Baker's report. 2/

The uranium deposits in the Salt Wash sandstone of the area are relatively small and sparsely distributed except in the Yellow Circle area, where there is a greater concentration of small deposits.

Mineralization of the deposits is typical of the Salt Wash in other areas. The principal minerals are carnotite and vanoxite. Minor amounts of tyuyamunite and other of the rarer uranium and vanadium minerals are present in some of the deposits.

SUN FLOWER AND SNOW FLAKE CLAIMS

Geology of the Drilling Areas

This drilling area was small and the Salt Wash outcrops are seldom more than 20 feet thick. About 1,000 feet of the Salt Wash rim is exposed on the two claims with adits, stopes, and cuts scattered along its length. Local block faulting has caused the formations to dip as much as 35° to the north. The ore-bearing formation is greatly fractured as a result of the faulting.

According to Henry R. Wardwell ^{3/} the ore at this location is believed to lie about 180 feet above the base of the Salt Wash sandstone. The mineralization is primarily carnotite and vanoxite. These minerals are exposed at several places along the sandstone outcrop. They generally appear as thin seams, expanding where organic debris occurs and, at these points, increasing in concentration. Mine examinations and drilling results indicate most of the orebodies are small and lenticular with the length greatly exceeding the width. Although the tonnage of ore developed during drilling was small, the grade was relatively high.

Leaching of the deposits has occurred and many of the fractures in the sandstone contain thin veneers of tyuyamunite and some of the rarer uranium minerals. Mudstone galls and carbonaceous material are generally associated with the ore deposits. Caledonite, a complex iron mineral, is often found near the ore.

The drilling pattern was essentially that suggested in the drilling recommendations. A few modifications were made as the drilling advanced. The mine workings were backed up with holes spaced on 25- and 50-foot intervals. Where mineralization was disclosed, offset holes were drilled on 25-foot spacings. Figure 3 shows the drill pattern used.

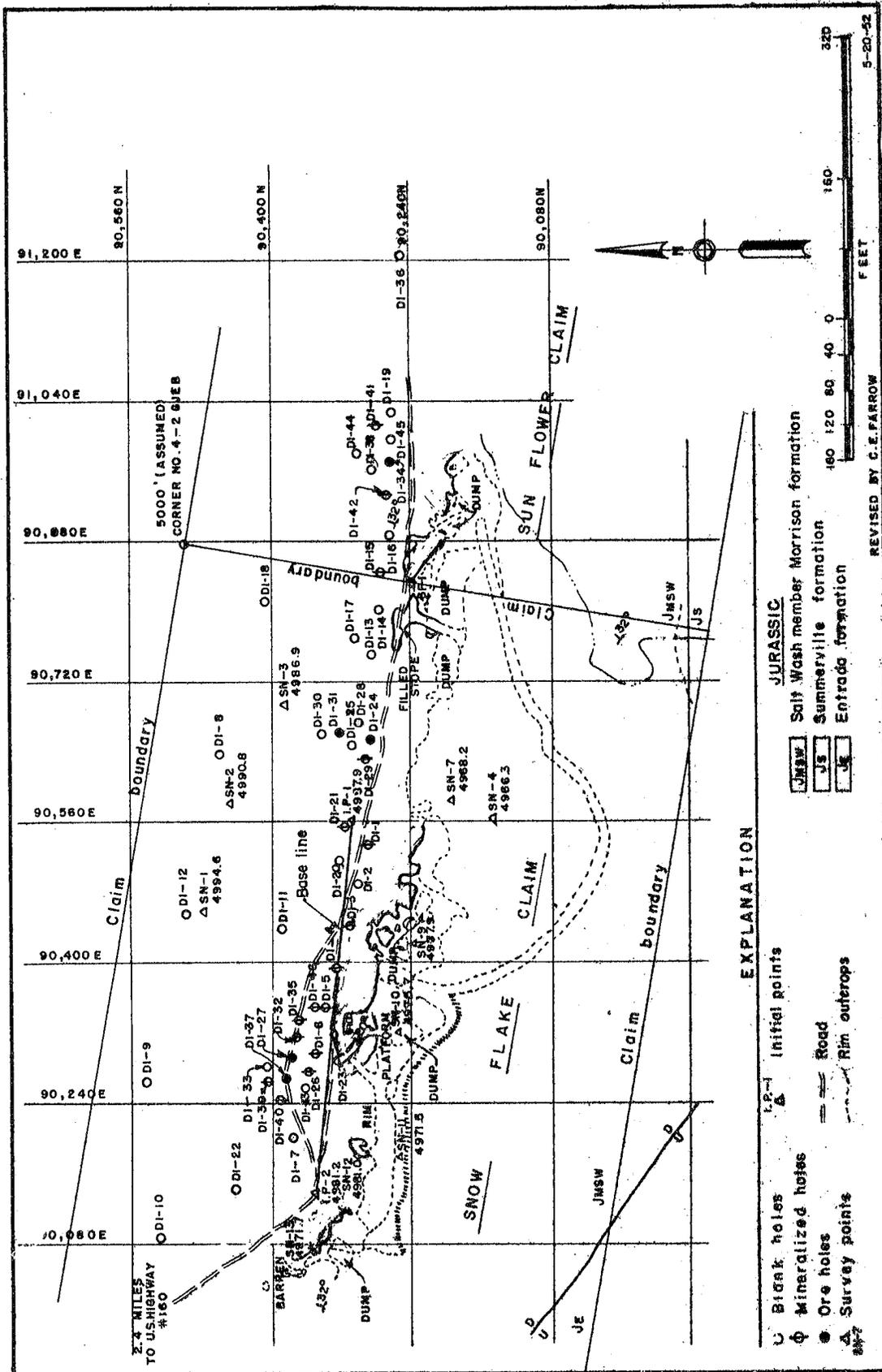


Figure 3. Drill hole map of Sun Flower and Snow Flake Claims
San Juan County, Utah

LUCKY STRIKE NOS. 1 AND 2 CLAIMS

AND PETERINO CLAIMS

Geology of the Drilling Area

Time and personnel were not available for extensive geologic investigation beyond the limited drilling areas. However, it is possible that further geologic reconnaissance would have proved useful in planning the drilling program.

Outcrops were walked and checked for mineralization and sedimentary controls. A thickened sandstone lens was projected into the drilling area and a few holes penetrated, but did not delimit the lens.

The Lucky Strike mine was examined and showed little promise of extending beyond its present workings. The orebody appeared to be mined out with only a few thin streaks of mineralization left along the walls of the mine. Closely spaced drill holes behind the mine failed to disclose mineralization of any importance. The ore is carnotite and vanoxite. The principal ore zone is about 180 feet below the top of the Salt Wash sandstone.

A comprehensive geological study of this general area might disclose sedimentary trends and controls that would indicate zones favorable for further drilling.

YELLOW CIRCLE CLAIM GROUP

Geology of the Drilling Areas

Stratigraphy

The rocks exposed in the Yellow Circle area range in age from the Jurassic Carmel formation to the Cretaceous Dakota sandstone.

The Dakota sandstone beds outcrop as a nearly vertical ledge in the eastern and southern parts of the area and form an extensive protective platform above the Morrison formation.

The Brushy Basin member of the Morrison formation forms a steep slope down to the Salt Wash member of the Morrison, which forms three prominent benches between the slopes of the Brushy Basin and the Summerville at the base of the Morrison (fig. 6).

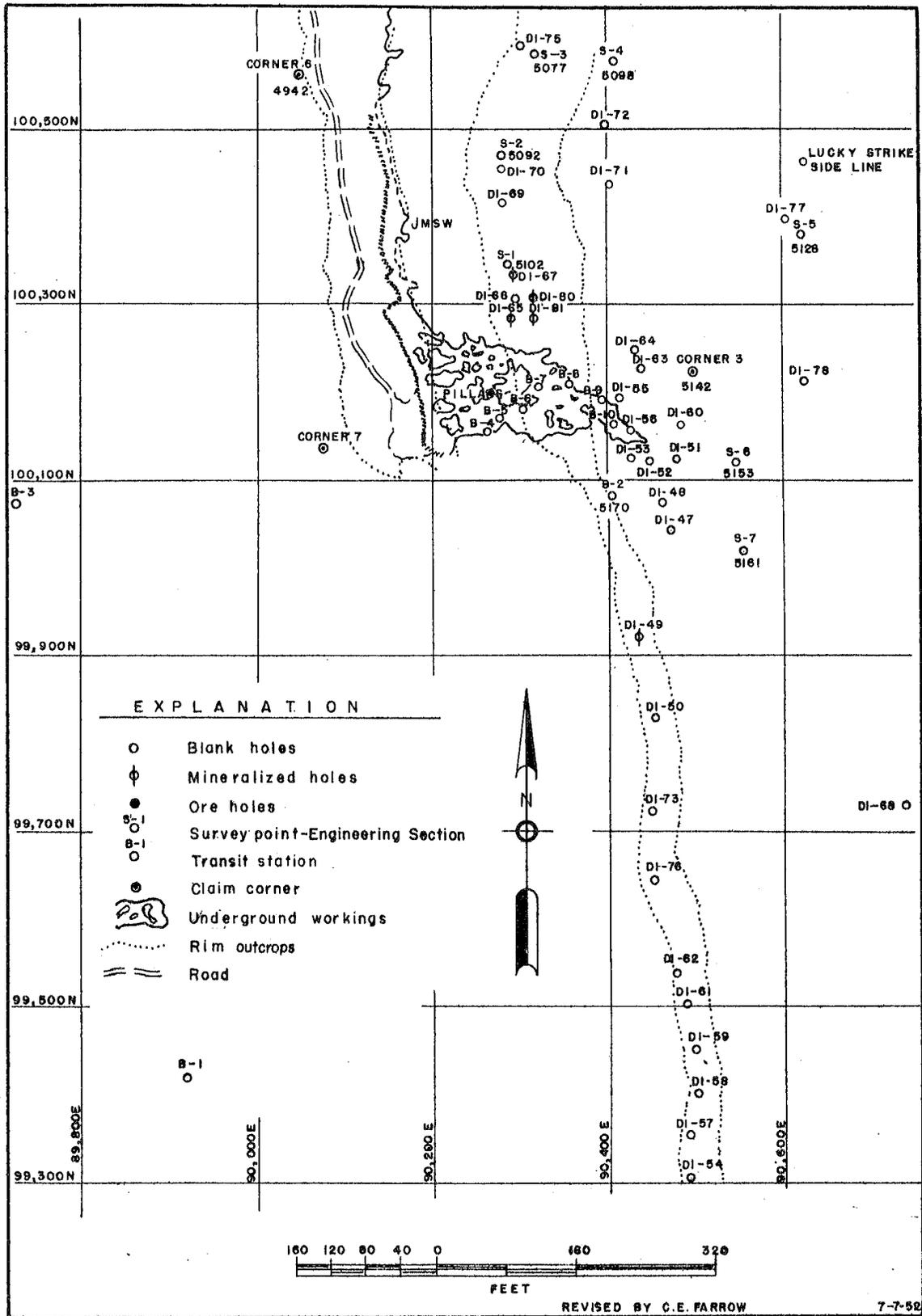


Figure 4. Drill hole map of Lucky Strike and Peterino Claims
San Juan County, Utah

Structure

The Yellow Circle area is located on the southwest flanks of the La Sal Mountains. These laccolithic intrusions have raised the sedimentary rocks in the vicinity, imparting a dip to the strata of approximately 6° southwest. Erosion has cut through the sedimentary strata in several areas exposing the Jurassic Carmel formation.

No faulting has been observed in the immediate area, although several steeply-dipping faults (fig. 5) trending N. 80° W. occur to the north.

Uranium Deposits

Most of the uranium and vanadium production from the Yellow Circle area has come from two stratigraphic levels within the Salt Wash member; one lying 100 feet and the other 125 feet above the base of the Salt Wash. In area "A" (fig. 5) production has been from both levels. In area "B" there has been no production, but drilling by the Commission indicates mineralization is confined to the lower sandstone unit. In area "C" production has been from both levels. The upper level is continuous, but the lower level pinches out in the central portion of area "C."

Mineralization in the upper sandstone unit consists primarily of yellow carnotite and black vanoxite. The carnotite generally occurs as a replacement of tree trunks and tree fragments, which produce extremely rich ore averaging 3 percent U_3O_8 and 10 percent V_2O_5 . In some places, a halo of carnotite surrounds fragments of trees which have been silicified or calcified to such an extent that little organic material is retained.

In the lower sandstone unit the ore deposits are mostly lenticular, scattered, and range in size from lengths of several feet and thicknesses of less than one inch to lengths of 200 feet and thicknesses up to five feet. Carnotite and vanoxite type minerals are common, but the ore usually occurs in rolls or lenses rather than as replacement of trees.

Project Geology

Subsurface Geology

Rim studies were made to obtain data on festoon bedding, ripple marks, and lineation in order to determine the probable direction of

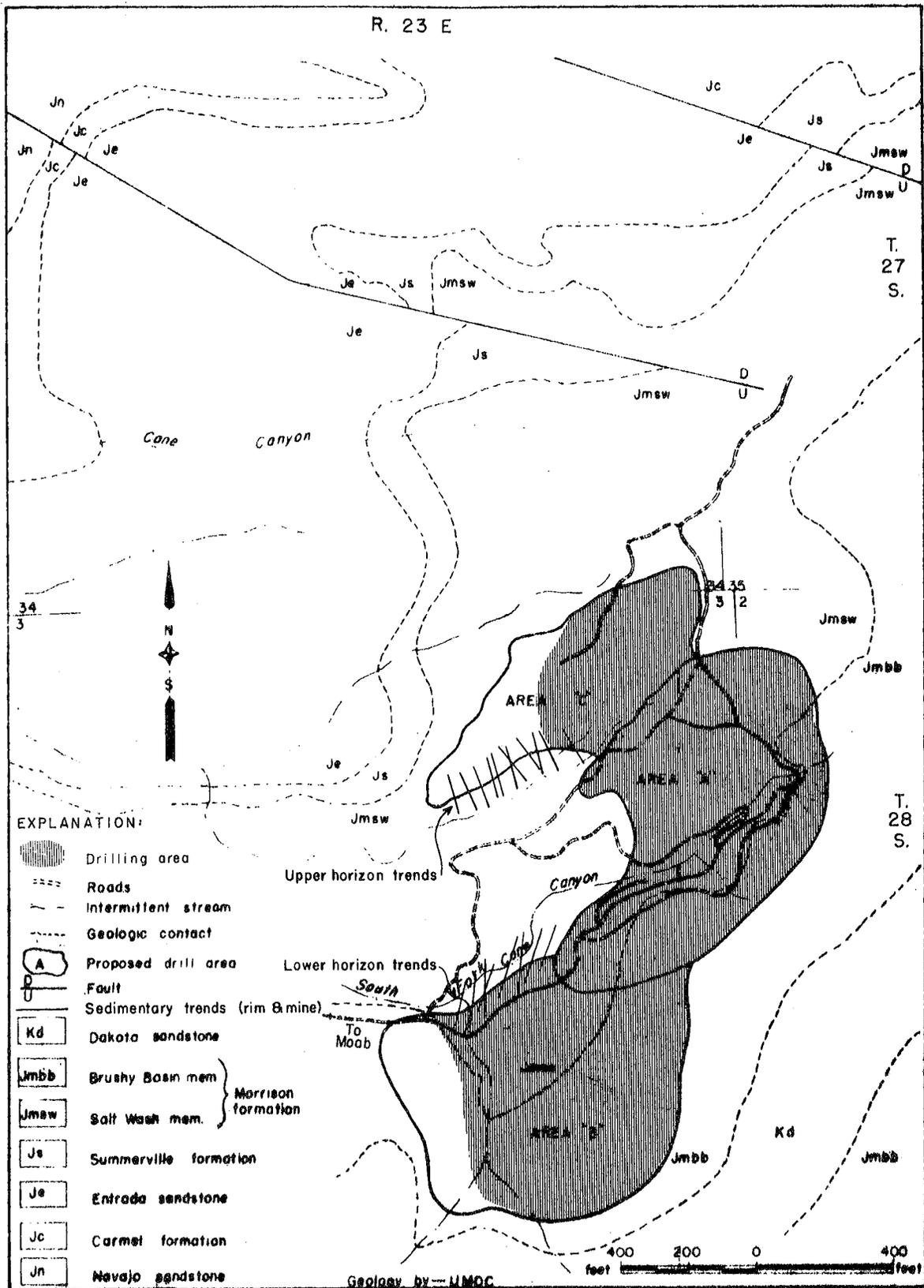


Figure 5. Geologic map of Yellow Circle claim group, San Juan County, Utah

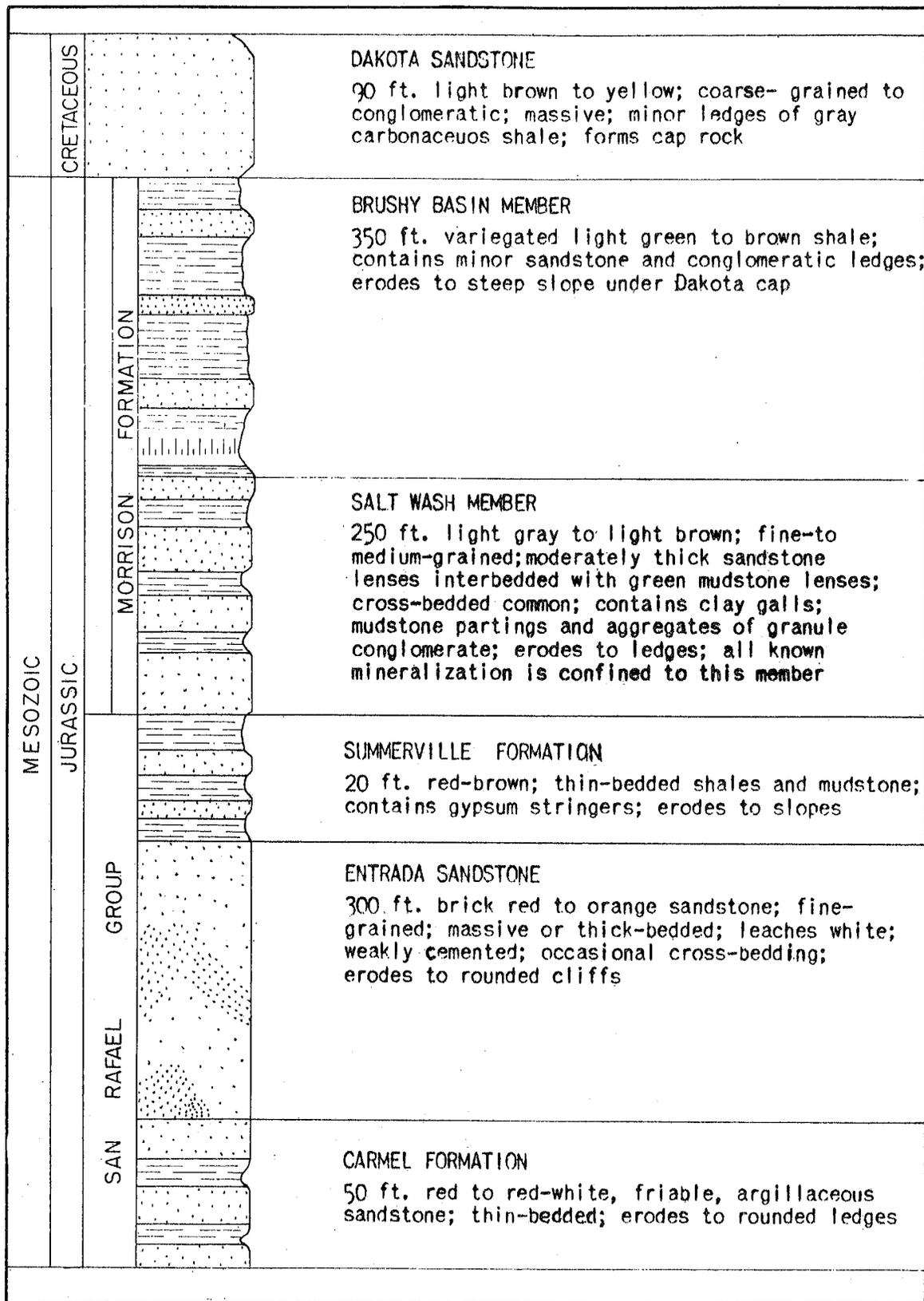


Figure 6. Geologic column of Yellow Circle area. San Juan County, Utah.

sedimentary trends. Further data on sedimentary trends were obtained by mapping all mines in the area which have produced over 100 tons.

Information obtained from holes drilled in area "A" under contract AT(30-1)-1261 supplemented and confirmed data obtained from rim studies and mine mapping.

In the upper ore-bearing unit a sedimentary trend was projected northwestward into area "C." In the lower ore-bearing unit the favorable trend was projected southwestward into area "B." A drill hole pattern was laid out on 250-foot centers in both areas "B" and "C" along the strike of the projected sedimentary trends. Preliminary subsurface maps were constructed using data obtained from the initial holes drilled, which were spaced 500 feet apart. Wherever favorable criteria for ore deposition were indicated on the subsurface maps, spacings were reduced to 250 feet to obtain more information. In the eastern portion of area "B," for example, the initial drill hole information indicated unfavorable conditions for ore, hence no attempt was made to reduce the drill hole spacings. In the western portion of area "B," however, favorable criteria were encountered (sandstone color, percent carbon, and gamma-ray anomalies), and the spacings were reduced, resulting in the discovery of two orebodies.

In area "C," the drill hole pattern was developed in a manner similar to that used in area "B." However, inasmuch as the "C" area involves the upper ore-bearing unit and a different type of mineralization, subsurface maps were of little value. An isorad map, based on the maximum deflection of the gamma-ray log, was used to determine the extent of the favorable area.

The diamond core drilling in area "A" under contract AT(05-1)-225 was directed primarily at development. Four grid holes and 36 offset holes were drilled. Of three orebodies remaining to be blocked out from the 1952 drilling project, two were completed and one was partially blocked out. In addition, one large new orebody was discovered and partially blocked out.

Three separate areas were drilled out under contract AT(05-1)-225. In area "A," 14,207 feet of core and non-core diamond drilling had been expended in 1952 under contract AT(30-1)-1261. In areas "B" and "C," no previous drilling had been done.

In areas "B" and "C" an exploration type drilling program was carried out and approximately 70 grid and offset holes were required to complete the program.

In areas "A," "B," and "C," subsurface maps were revised daily in order that drilling operations could be conducted in the most efficient and economical manner. The following subsurface maps were most valuable.

Favorability Maps

Isorad Maps: Construction of isorad maps based on the maximum deflection of the gamma-ray log 4/ indicated the presence of two favorable trends, one to the northwest in the upper ore-bearing unit and one to the southwest in the lower ore-bearing unit (figs. 7 and 8). In areas "B" and "C" drill hole patterns were laid out at right angles to these trends.

In area "C," in particular, isorad maps were extremely useful in delineating favorable ground because the lack of other apparent physical characteristics useful in determining favorable drilling areas prevented the construction of any other maps of value.

Green Mudstone Map: This map (fig. 9) was constructed with reference only to the presence or absence of the green mudstone and no consideration was given to the thickness of the mudstone. The areas where the green mudstone unit was found to underlie the lower ore-bearing sandstone unit were outlined. Use of this map in areas "A" and "B," in conjunction with the isorad map, served to radically reduce the total area considered worthwhile for drilling.

Isopach Map: An isopach map was constructed on the lower sandstone unit (fig. 10). The map indicated the majority of the ore would be concentrated in those areas where the lower ore-bearing sandstone was approximately 40 to 50 feet thick. This map served as a guide in locating drill sites as drilling progressed.

Composite Map: A composite favorability map was constructed by superimposing on one map (fig. 11) the favorable areas shown by the isorad, green mudstone, and isopach maps of areas "A" and "B." No composite map could be made for area "C" as only the maximum amplitude isorad map could be used with any success.

CONCLUSIONS

The subsurface studies made during exploration and development drilling in the Yellow Circle district under contract No. AT(O5-1)-225 have proven useful in delineating favorable areas.

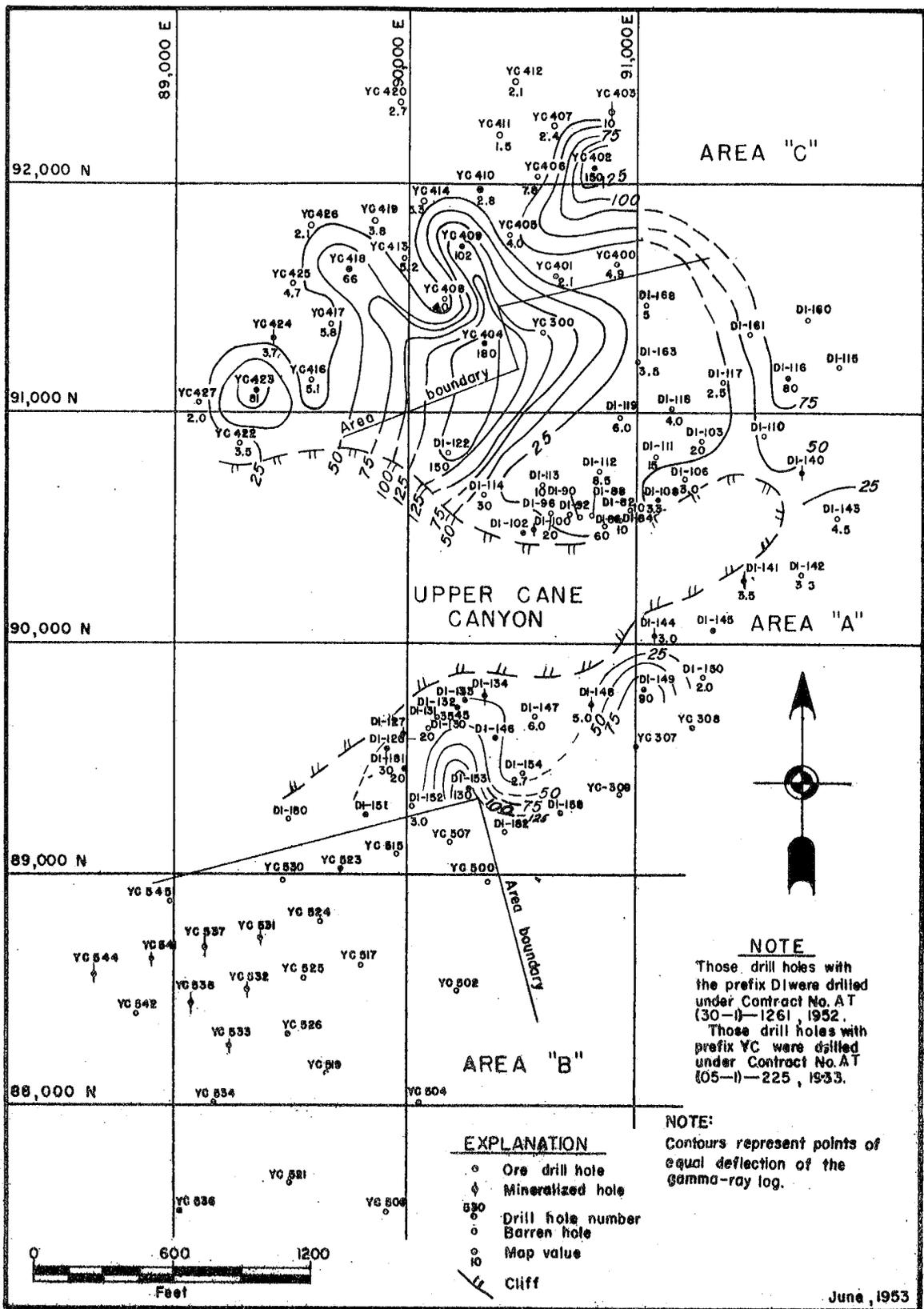


Figure 7. Maximum deflection isorad map—upper sandstone unit, Yellow Circle group, San Juan County, Utah

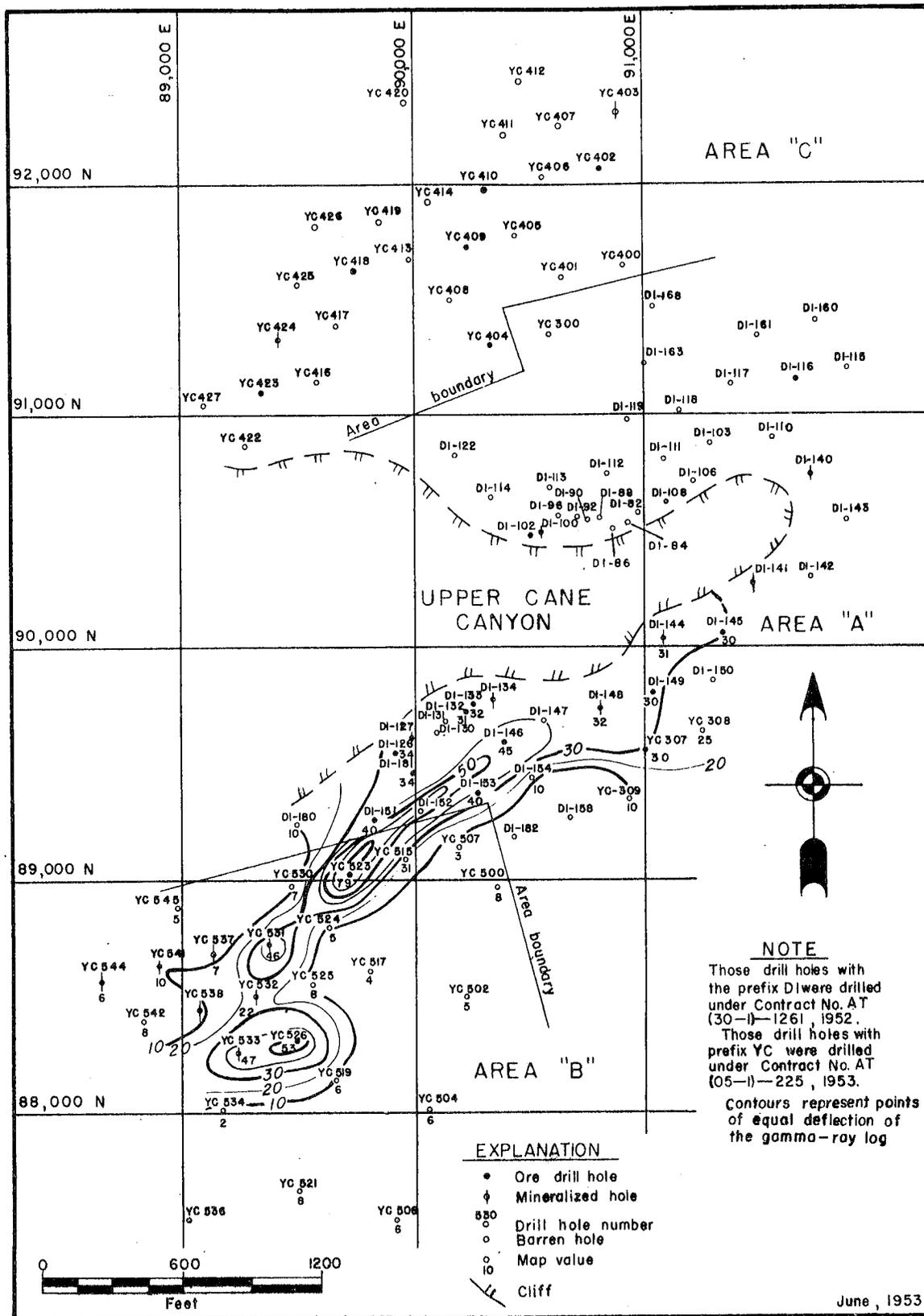


Figure 8. Maximum deflection isorad map—lower sandstone unit, Yellow Circle group, San Juan County, Utah

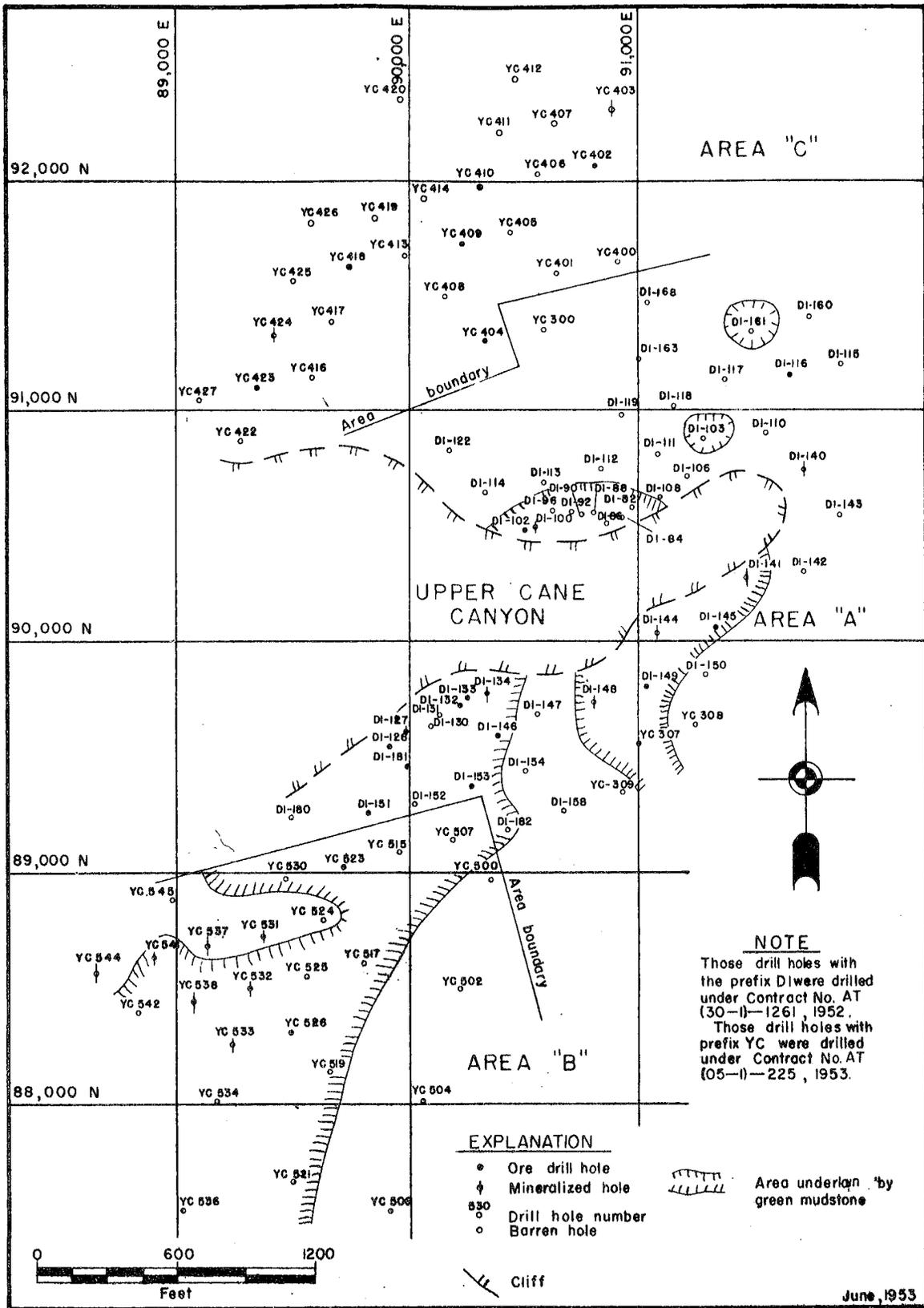


Figure 9. Green mudstone map—lower sandstone unit, Yellow Circle group, San Juan County, Utah

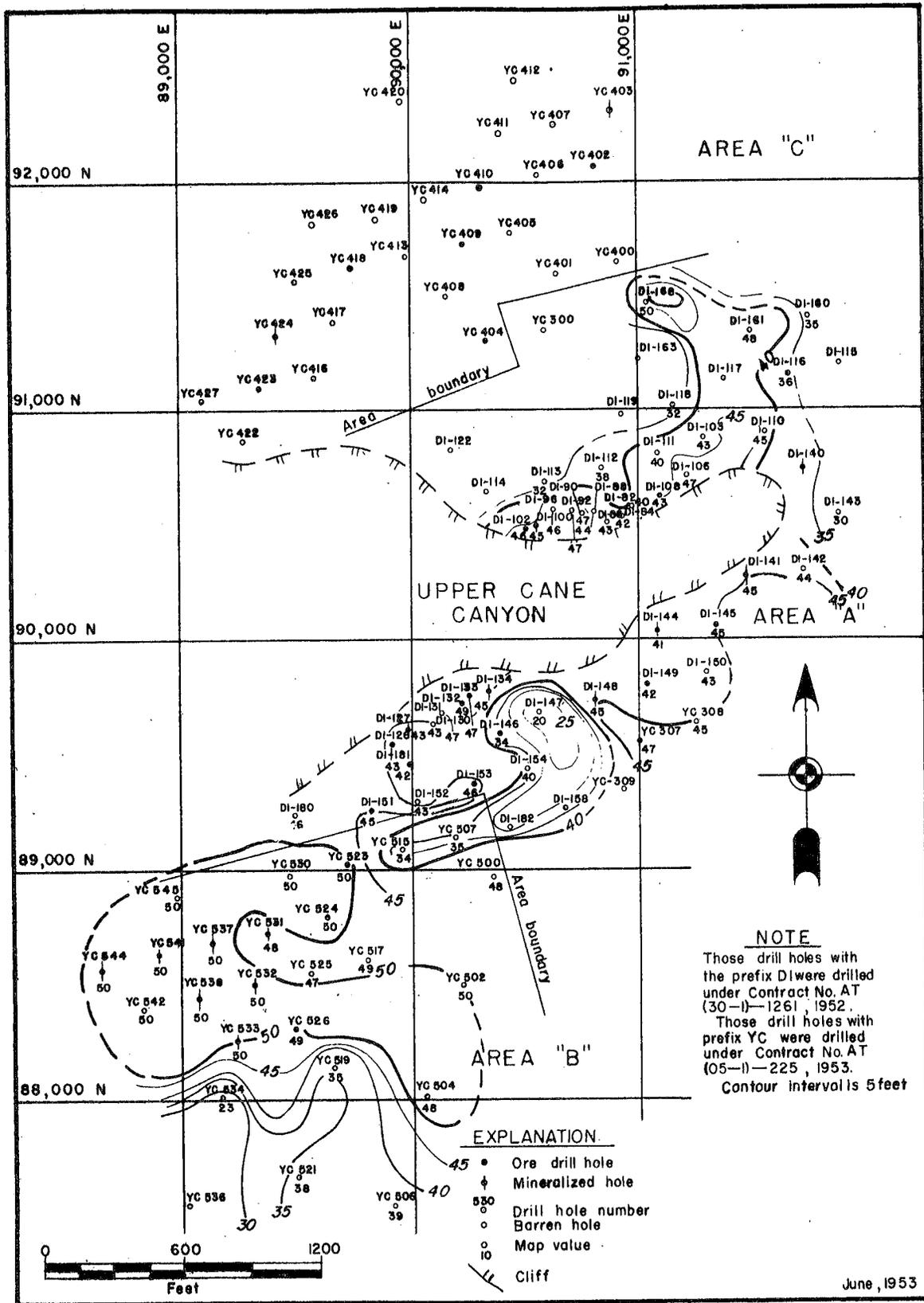


Figure 10. Isopach map—lower sandstone unit, Yellow Circle group, San Juan County, Utah

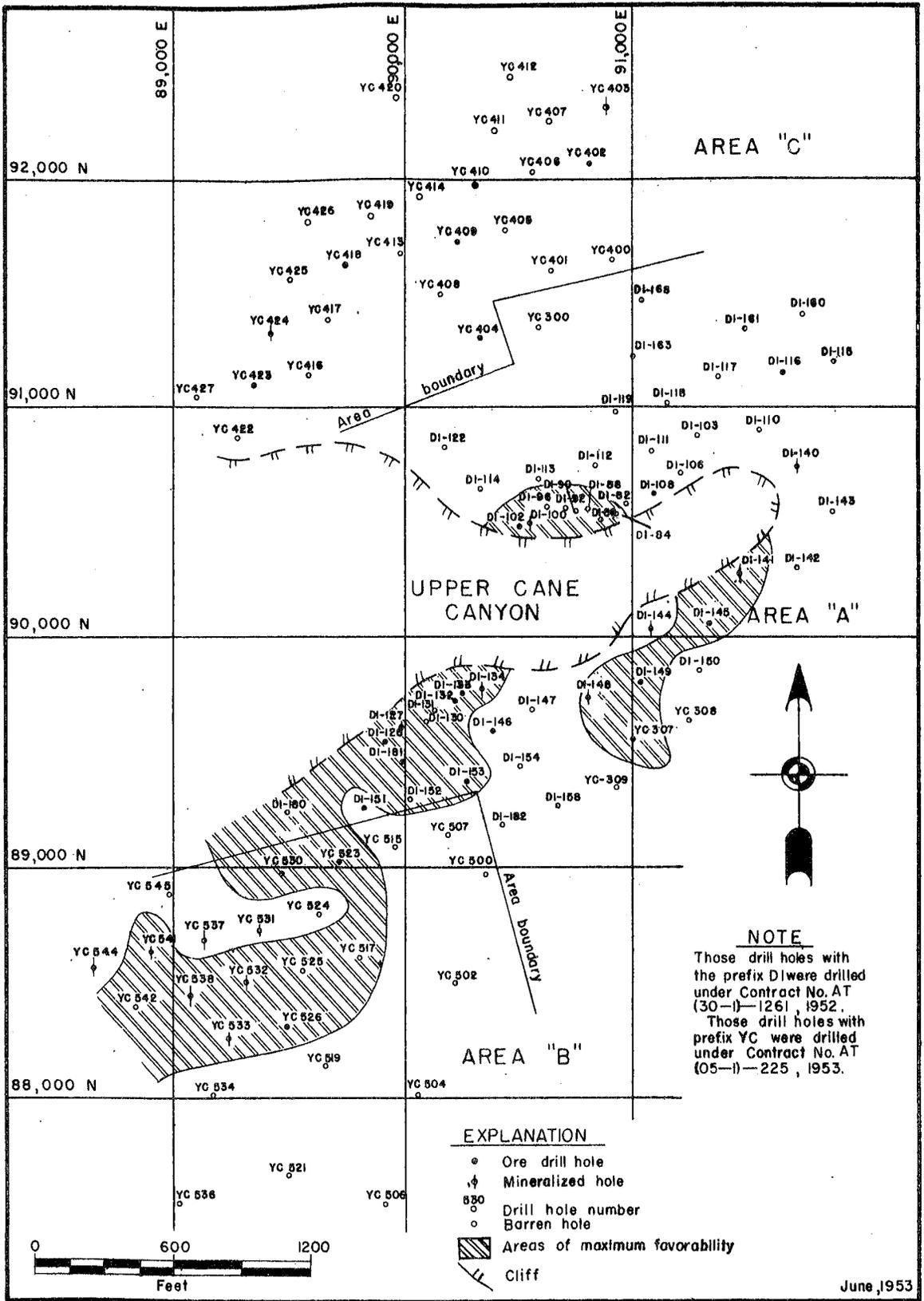


Figure II. Composite favorability map, Yellow Circle group, San Juan County, Utah

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