Report on

MID-CONTINENT URANIUM CORP. PROPERTIES

in the

THOMPSON DISTRICT, GRAND COUNTY, UTAH

RECEIVED
FEB - 9 1956

Comprising 1,180 Acres

in the

Yellow Cat Area

MID-CONTINENT URANIUM CORP.

ENGINEERING STAFF

February 1956

February 1, 1956

RECEIVED

FEB - 9 1956

To the Directors and Officers
Mid-Continent Uranium Corp.
201 Uranium Center Building
Grand Junction, Colorado

RE: Status of Yellow Cat Properties

Gentlemen:

Pursuant to your request, I am herewith submitting for your consideration a report on the present status of Mid-Continent's properties in the Yellow Cat area, Thompson District, Grand County, Utah. Please refer to the original report dated March 15, 1954. Specifically the ground includes the following properties: (All in S.L.M., Grand County, Utah)

1. Sec. 2, T. 23 S., R. 21 E., 397.76 acres. This school section was originally approved and drilled under a Defense Minerals Exploration Administration loan. Several ore bodies of commercial value have recently been drilled. Evaluations of these ore bodies in terms of tonnage, grade, and gross value are included in this report. Refer to page 21.

2. John Group. Sec. 1, T. 23 S., R. 21 E., 183.78 acres. An application has been recently filed with the DMEA for financial assistance to drill the John group of nine claims. The proposed exploration program and cost estimates are included in this report. Evaluations of ore reserves in the John Incline mine are included. Refer to page 28.

3. Silver Top Group. Sec. 34, T. 22 S., R. 22 E., 103.30 acres. Refer to page 38.

4. Juanita Group. Secs. 14 and 23, T. 23 S., R. 21 E., 162.43 acres. Refer to page 38.

5. N 1/2 of Sec. 2, T. 23 S., R. 22 E., 332.52 acres. Refer to page 41.

The report covers the geology of the area, production records, and an estimate of the value of the various properties. The Yellow Cat properties controlled by Mid-Continent indicate the advisability of an extensive mining program as well as a continued exploration program.

Mid-Continent staff, who collaborated on the preparation of this data, include C. M. Mobley, geologist, Roy Hall, mining engineer, and Norman Ebbley, mining geologist.

Yours very truly,

Norman E. Ebbley

Norman E. Ebbley
General Manager

TABLE OF CONTENTS

	Page
Abstract	1
Introduction	2
Location and Accessibility	4
Physical Features and Climate	5
Labor and Living Conditions	6
History	7
General - Colorado Plateau Area	7
Thompson Area	9
Property and Ownership	11
Ore Deposits	13
General Geology	13
Occurrence of Deposits	17
Production	20
Utah State School Section (West)	21
Ore Hole Data	24
Recap of Proven Reserves	27
John Group	28
Production	32
Proven Reserves	33
Recommended Exploration Program	34
Estimated Exploration Costs under DMEA	35
Silver Top Group	38
Juanita Group	38
Utah State School Section (East)	41
Conclusion	42

ILLUSTRATIONS

Figures		Page
1.	Index Map, Location Thompson Area	4
2.	West Half Thompson, Utah Area	5
2A.	East Half Thompson, Utah Area	5
3.	Sec. 2, T. 23 S., R. 21 E., Yellow Cat Area .	23
4.	Relative Position of Ore Bodies and Fourth Sandstone Channel	23
5.	West Ore Body Area, Sec. 2 (West)	23
6.	East Ore Body Area, Sec. 2 (West)	23
7.	John Group, Showing Proposed Exploration . .	29
8.	John Incline Underground Workings	31
9.	Silver Top Claims, Sec. 34, T. 22 S., R. 22 E.	38
10.	Juanita Group, Yellow Cat Area	39
11.	North Half Sec. 2, T. 23 S., R. 22 E. . . .	41

RECEIVED
FEB - 9 1956

APPENDICES

1. Utah State Land Board Fissionable Minerals Royalty Schedule for State Lands, Revised November 1955.

2. Excerpts from Utah State School Section Lease

3. Excerpts from Atomic Energy Commission Regulations for Purchasing Uranium-Vanadium Ores, March 1, 1951.

4. Excerpts from Atomic Energy Commission Circular on the Uranium Bonus, February 28, 1951.

5. Excerpts from Atomic Energy Commission Press Release, September 23, 1953, Extending Uranium Ore Price and Initial Production Bonus.

6. Reproductions of Assay Laboratory Returns of Holes Drilled on School Section, Section 2, T. 23 S., R. 21 E., S.L.M., Grand County, Utah.

ABSTRACT

This report describes the uranium-vanadium ore reserves and potential of twenty-two mining claims and two Utah State School Sections, totalling 1,180 acres, located in the Thompson district, Grand County, Utah. Included in the report is a description of the geologic features of the area with accompanying geologic maps. In addition ore reserves calculations are given for recently drilled ore deposits on the westerly school section, and on the John Group of claims. An exploratory drilling program has been planned for the John Group with cost estimates covering the proposed program. A Defense Minerals Exploration Administration application for financial aid has been filed to help finance this program.

Drilling to date on the westerly school section has established the presence of a major fourth sandstone channel containing the uranium-vanadium ore deposits. Isopach mapping of the sandstone thicknesses shows that the favorable fourth sandstone channel has been traced for 2,500 feet east and west, and it is apparent that further drilling endeavoring to extend the channel is warranted. Recent discoveries of ore deposits in other fourth sandstone channels in the Yellow Cat vicinity foreshadows an economic revival of the district. Recently drilled ore bodies, now being mined, indicate proven reserves several times greater than the total past production from the Thompson district.

A summary of ore reserves in the properties owned by Mid-Continent in the Yellow Cat area are as follows: Drilled-out ore bodies, $530,000; inferred reserves, $1,250,000; estimated value of the remainder of the claims, $95,000.

INTRODUCTION

General - Colorado Plateau Area

Vanadium and uranium ores have been found to occur widely distributed throughout Western Colorado and Eastern Utah and recently commercial deposits have been found and mined in South Dakota, New Mexico, Arizona and Wyoming.

The majority of the ore occurrences are replacement deposits and impregnations of rare minerals in the Salt Wash member of the Morrison formation of upper Jurassic age and in the Shinarump Conglomerate of Triassic age.

The economic history of uranium prior to 1942 is well covered by several publications, a few of which are listed. 1/ From the start of the last World War the production figures of radioactive materials have been highly restricted information. The Atomic Energy Act of 1946 "for the

. . . . . .

1/De Ment, J., and Dake, H.C., "Uranium and Atomic Power", New York, Chemical Pub. Co., 1941; rev. edition, 1945; "Rarer Metals", New York, Chemical Pub. Co.

De Ment, J., and Dake, H.C. "Uranium Minerals Handbook", Mineralogist Pub. Co., 1945.

Thom, E. M., "Bibliography of North American Geology", 1929-1949, U. S. Geol. Survey Bull. 937(1944); 1940 and 1941, Ibid., Bull. 938(1942); 1942 and 1943, Ibid., Bull. 949(1945)

Tyler, P.M., "Radium", U. S. Bureau Mines Inf. Circ. 6312(1930)

U. S. Atomic Energy Commission, "Selected Bibliography on Atomic Energy", Washington, 1948

Fisher, R. P., "Vanadium Deposits of Colorado and Utah", U. S. Geol. Survey Bull., 1942

development and control of atomic energy" provided for a Domestic Uranium Program which established a graduated price schedule for domestic ores.

The Atomic Energy Commission's first policy was outlined in Circular No. 3, dated April 9, 1948. The initial price schedule proved to be too low, as the majority of the ore producers were suffering a loss in their operations. Accordingly, the Commission issued Circular No. 5, effective February 1949, alleviating to some extent the small producer's plight.

Increased material and labor costs again forced the Commission to revise its policy price-wise, and on March 1, 1951, the price schedule was raised and extended through March 31, 1958.[2/] On September 23, 1953, the same price schedule was extended to cover the period through March 31, 1962.[3/] An initial production bonus, under Domestic Uranium Program Circular No. 6, established March 1, 1951,[4/] was, on September 23, 1953, extended through February 28, 1957.[5/] It has been recently announced by the Atomic Energy Commission that the payments under the production bonus are now amounting to approximately $5,000,000 a year.

At the present time production of uranium-vanadium type ores has far out-distanced the milling phase of the program. The number of mills in the area having an estimated combined capacity of about 2,500 tons per

. . . . . .

2/ See Appendix No. 3

3/ See Appendix No. 5

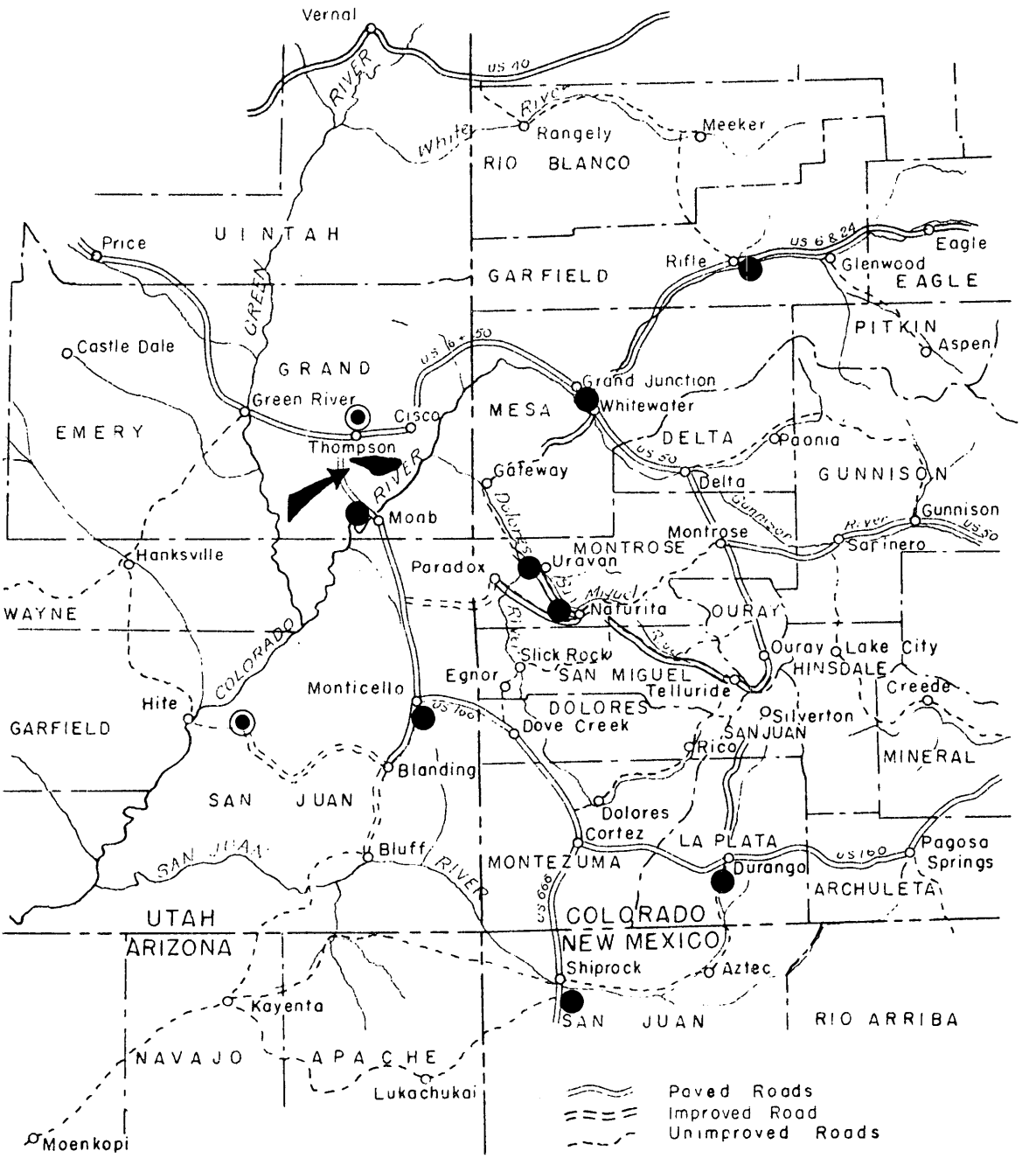
4/ See Appendix No. 4

5/ See Appendix No. 5

day are at present being increased to prevent the further accumulation of excessive stockpiles that present a possible economic hazard for the processing companies. For the past year and a half the production of uranium ores has been actively curtailed by the Atomic Energy Commission. The milling companies are naturally limited in their ability to carry large inventories of purchased ores in their stockpiles as they are not reimbursed for the payment to the miner for these ores until they have produced a refined product which they in turn can sell to the Atomic Energy Commission. However, even under the best of conditions, it will be from eight to eighteen months before mills now under construction at Moab, LaSal and Green River can be put into operation.

LOCATION AND ACCESSIBILITY

The Thompsons area has its long axis east and west and lies approximately six miles south of the road running between Cisco and Thompsons, Utah. Refer to Index map, Figure No. 1. The area embraces about 200 square miles of territory in the Canyon Lands Subdivision of the Colorado Plateau. At the present time there are two partially graveled roads and one new all-weather graveled road running from the main east-west highway south into the Yellow Cat area, which is in the center of the area under consideration.



INDEX MAP OF COLORADO PLATEAU

FIG. 1 LOCATION OF THOMPSON AREA

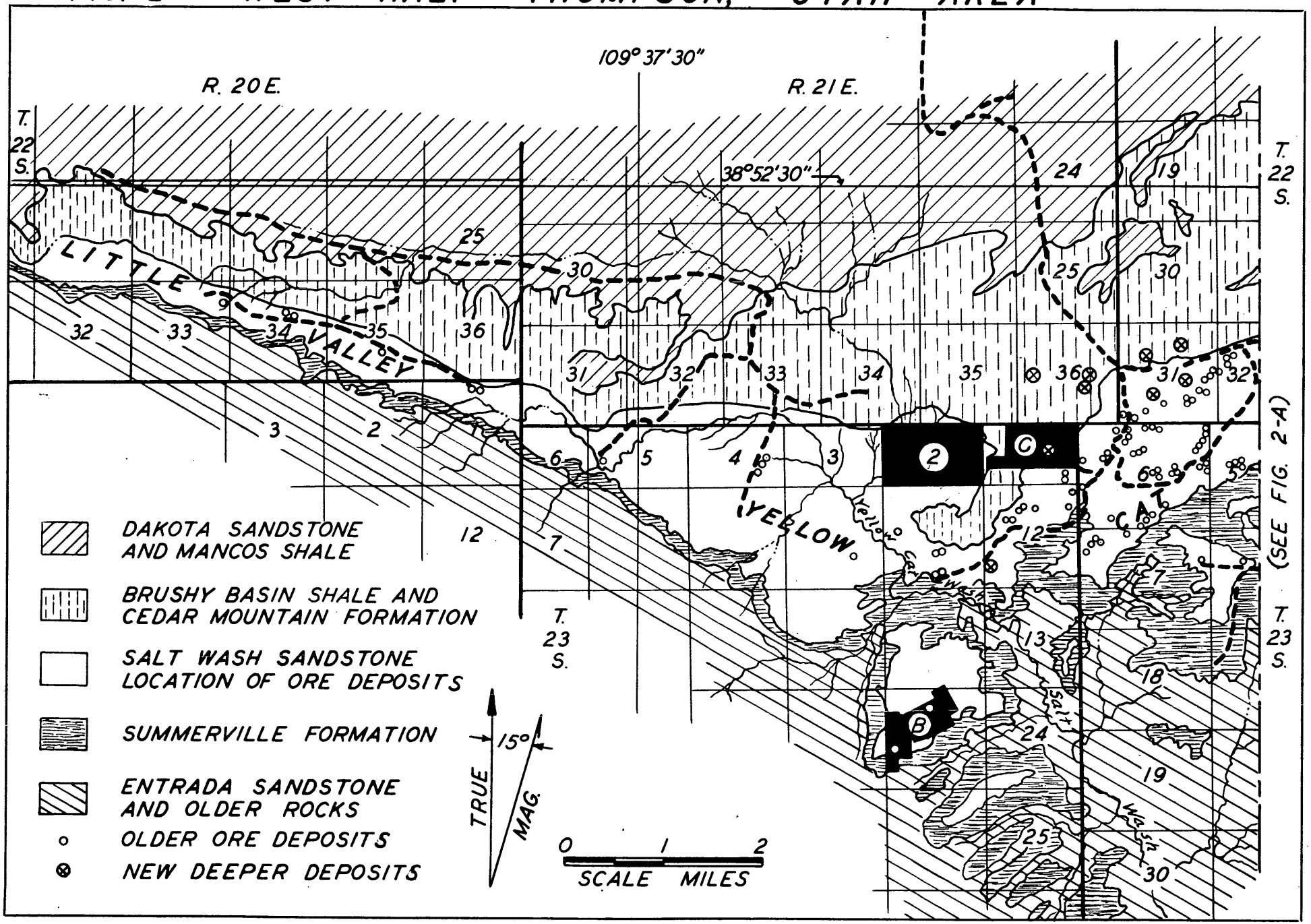
Figures 2 and 2A are vicinity maps showing the location of the property under consideration. Although the area is criss-crossed with arroyos and gulches, there are no perennial, through-flowing, streams with the exception of the Colorado River which flows southwesterly a few miles south of the general area. Road construction within the area itself is no problem as the surface overlying the Salt Wash formation is comparatively flat, it being possible to drive a jeep almost anywhere in the area even without the benefit of roads. Mining machinery and supplies are available in Grand Junction, Colorado, 80 miles east of Thompsons, and in Moab, Utah, approximately 40 miles south of Thompsons.

PHYSICAL FEATURES AND CLIMATE

Topographically, the area under consideration is of moderate relief. The roads into the area from the main highway traverse relatively flat, rolling country and then drop only slightly into the vicinity of the Yellow Cat mines. The exposed Salt Wash formation extends east and west about twenty-five miles and varies in width from one-half mile to two and a half miles north and south.

There is very little vegetation of any sort in the area with almost no trees. The Thompsons and surrounding area is primarily used as a winter grazing range for sheep. The climate is typical of east-central Utah and of west-central Colorado characterized by hot dry summers and cold winters. Rainfall is light. The U. S. Weather Bureau records, taken at Thompsons, show an annual average percipitation of 8.5 inches

FIG. 2 WEST HALF THOMPSON, UTAH AREA



RECEIVED
FEB - 9 1956

Trim lines — Leave at least 3/4" from heavy lines on other two sides.

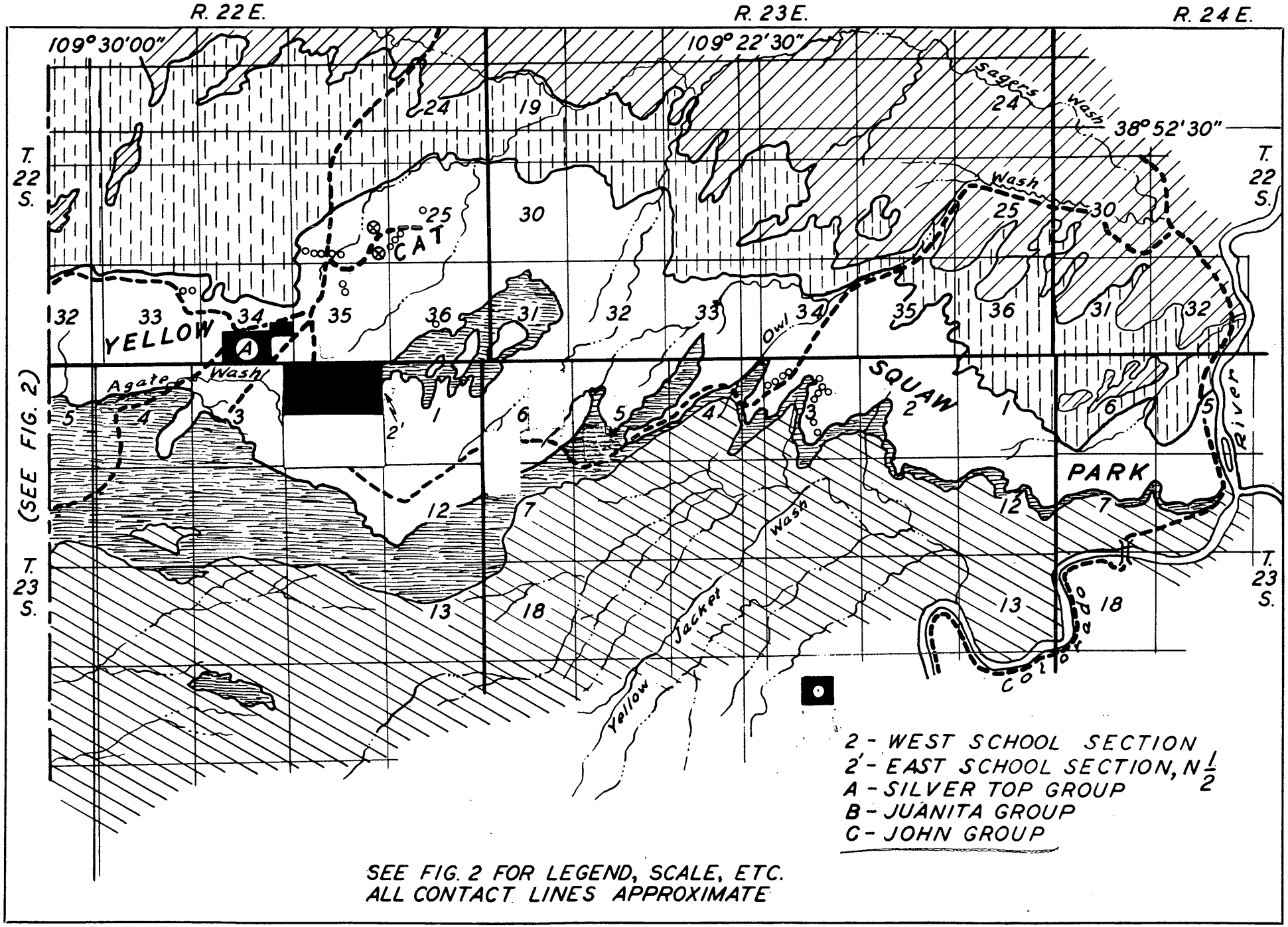


FIG. 2A EAST HALF THOMPSON, UTAH AREA

RECEIVED
FEB - 9 1956

over a period of thirty-three years. The coldest month is January, having an average mean temperature of 22 degrees above zero, compared with the hottest month, July, which has an average mean temperature of 83.4 degrees.

LABOR AND LIVING CONDITIONS

Grand Junction, which is the center of uranium mining activities, has a population of about 25,000 people. The increasing interest in uranium and the decline of Colorado's once thriving lead-zinc-silver mining industry and the closing of a large percentage of Colorado's coal mines have resulted in an influx of experienced hardrock miners - more than the uranium industry can absorb. Consequently, labor at the present time is no problem.

Base wages for common labor vary from $1.50 to $1.75 per hour. Experienced miners obtain from $1.75 to $2.50 per hour; diamond drill operators, $2.50 per hour; and carpenters and bulldozer operators, from $2.50 to $3.00 per hour.

The cost of food and supplies is normal to the whole of Colorado and Utah. Most camp boarding houses in the uranium field operate at a cost of from $2.50 to $3.00 per man per day. There are no housing facilities in the Yellow Cat area and the present operating companies are transporting their personnel back and forth from Thompson and Cisco where there is limited living quarters.

HISTORY[6/]

General - Colorado Plateau Area

Radioactive minerals were known to exist in the sandstones of Western Colorado as early as 1880. Deposits of vanadium and uranium ores, now known as Carnotite, were first produced on a small scale in 1898, and from 1911 to 1923 these deposits were worked extensively for radioactive uranium ores principally for the radium content. As early as 1910 several large companies acquired properties in the region and shipments of carnotite ore to radium extraction plants in France were made. Similar plants were built in the United States which produced 10.5 grams of radium in 1913, and 22.4 grams in 1914.

An almost complete cessation of mining activity occurred in 1915 due to the discovery of the rich uranium deposits of the Belgium Congo. A mill and roasting plant at Uravan, having a capacity of 125 tons per day, was completed in 1936 by the United States Vanadium Corporation. About the same time smaller plants were built at Cedar and Gateway, Colorado. By 1938, after the period of comparative inactivity, production primarily for vanadium had achieved respectable proportions and new impetus was given to the production of this metal by the United States entry into World War II in December 1941. During the war years several

. . . . . .

6/Fischer, R. P., "Vanadium Deposits of Colorado and Utah"; U.S.Geol. Survey Bull. 936-P, 1943, P. 368-394

Stokes, Wm. Lee, "Uranium-Vanadium Deposits of the Thompsons Area, Grand County, Utah", Utah Geol. and Mineralogical Sur. Bull. 46, 1952

new treatment plants for vanadium ores were completed in the area. At that time it was not publicly known that uranium was of major interest at these plants. New plants to beneficiate these ores were built at Monticello, Utah; and Durango, Colorado, and older plants were rehabilitated at Naturita and Uravan, Colorado.

Due to the small, irregular-shaped, ore bodies the extra production necessary to keep the mills at full capacity had to come from the small operators whose funds generally did not permit them to maintain the necessary development and exploratory programs ahead of actual mining operations. A survey by government agencies indicated that an extensive exploratory program would be necessary to maintain production and accordingly the U. S. Bureau of Mines in 1941 began a drilling program on a cooperative basis with the Geological Survey. The Survey's phase of the program was to furnish maps, suggest drill sites, and log drill cores. The principle objective of this program was to enlarge the known ore-bodies by development drilling rather than to discover new ore-bodies by exploratory drilling, although consideration was also given to this phase of the program. As a result of the Bureau's drilling program approximately 16,000 tons of ore valued at $270,000 was mined by the small operators throughout the area while the project was in operation. When the Bureau's program was finished in December 1943, a total of 895 diamond core drill holes were completed having a total length of 38,510 feet.

RECEIVED
FEB - 9 1956

The smaller producers in the region were forced to cease operations in December 1943 due to increased imports of foreign uranium and vanadium ores which caused the demand for domestic ores to decline markedly.

The Geological Survey had begun a systematic investigation of the Colorado Plateau Area as early as 1939, and in 1947 both the Geological Survey and the Atomic Energy Commission launched a full-scale geologic and exploratory drilling program to determine the actual uranium potential of the Plateau. While centering attention on the direct problem of finding uranium reserves, the investigation, in addition, has assembled general as well as specific information in the belief that all of it sooner or later will be found to be pertinent to the "classification, examination and preparation of plans for complete development" of the uranium country. The Atomic Energy Commission through their Grand Junction Operations Office have been the center of all activity being carried out in the uranium-vanadium region.

Thompsons Area

As seen in Index Map, Fig. 1, the Thompsons area is located in central Eastern Utah near the Colorado-Utah border. The specific area in question is situated on the northeast flank of the Salt Valley anticline in Grand County, Utah. The ore occurrences are found in the Salt Wash member of the Morrison Formation and occur through a vertical range of 200 feet, from the upper conglomerate member of the Salt Wash to within 50 or 60 feet of the underlying Summerville Formation.

In 1942 the Geological Survey initiated a program of geologic studies in the Thompson area as an integral part of the general survey of domestic uranium-vanadium reserves. Investigations of the area by the Geological Survey were under the direction of R. P. Fischer. Geologic features of the area were mapped on aerial photographs by Wm. Lee Stokes in 1943, and 1944. Topographic and geologic maps were completed of the central part of the Thompson area which is known as the "Yellow Cat" in 1943, as most of the important deposits of ore were first developed in this area. From 1951 through 1954 the Survey carried out an extensive diamond drilling program mainly in the Yellow Cat vicinity but extending easterly to the Squaw Park area, a distance of approximately twelve miles. The drilling was confined mainly to the Salt Wash member - - - the preliminary drilling being done on a widely-spaced grid pattern for geologic and sub-surface structural information. Some of this drilling later proved to be too shallow as it explored only the upper Salt Wash sandstones below the Brushy Basin member. Approximately two years ago considerable deeper drilling was done in the central Yellow Cat area, which previously had produced most of the ore. This deeper drilling proved additional large and valuable ore bodies in what is probably the fourth ore-bearing sandstone below the base of the Brushy Basin member. This ore would lie from 160 to 200 feet stratigraphically below the horizon that had produced the early ore in the district as exemplified by the Cactus Rat ore occurrence in the upper sandstone conglomerate. At the present time five

of these lower ore bodies are being developed by inclines and shafts. The recent deeper drilling by the Survey indicated that although some 1500 exploratory holes had been previously drilled in the Yellow Cat area a certain percentage of these must be discounted as being too shallow to explore the horizon containing the newly discovered ore bodies.

PROPERTY AND OWNERSHIP

The property discussed in this report includes 22 unpatented mining claims and two Utah State School Sections:

	Approx. Acres
1. Sec. 2, T. 23 S., R. 21 E., S.L.M., Grand County, Utah Refer to Fig. No. 3 for detail of Section.	
Utah State School Section all embraced in Uranium Mineral Lease No. 5821	397.76
2. Sec. 1, T. 23 S., R. 21 E., S.L.M., Grand County, Utah Refer to Fig. No.7 for detail of John Group.	
John Claim	20.66
Minnie Claim	20.66
Lee Claim	20.66
Maxine Claim	20.66
Rose Claim	20.66
Chance Claim	20.66
Bandy Claim	20.66
McGill Claim	20.66
Mark Claim	18.50
3. Sec. 34, T. 22 S., R. 22 E., S.L.M., Grand County, Utah Refer to Fig. No. 9 for detail of claims.	
Silver Top No. 1 Claim	20.66
Silver Top No. 2 Claim	20.66
Silver Top No. 3 Claim	20.66
Silver Top No. 4 Claim	20.66
Silver Top No. 5 Claim	20.66

4. Secs. 14 and 23, T. 23 S., R. 21 E., S.L.M., Grand County, Utah
Refer to Fig. No.10 for detail of Claims

	Approx. Acres
Juanita Claim	20.66
Juanita No. 1 Claim	20.66
Juanita No. 2 Claim	20.66
Juanita No. 3 Claim	20.66
Juanita No. 4 Claim	20.66
Juanita No. 5 Claim	18.02
Juanita No. 6 Claim	20.45
Juanita No. 7 Claim	20.66

5. Sec. 2, T. 23 S., R. 22 E., S.L.M., Grand County, Utah
Refer to Fig. No. 11for detail of Section.

N 1/2, Utah State School Section embraced in Uranium Mineral Lease No. 5825.	332.52
Total Acres	1,179.81

Equivalent in area to 59 mining claims.

Refer to Figs. 2 and 2A for locations of described property.

Under the regulations of the Utah State Land Board, the State receives a royalty based upon a sliding scale on the gross value on all ores produced and sold from school sections. Refer to Appendices No. 1 and 2 for excerpts from the Utah State Land Board Lease Agreements on school sections.

The two school sections (1 and 5 above) are held under lease by Mid-Continent Uranium Corp. The mining claims (3 and 4 above) are owned 100 percent by Mid-Continent; the mining claims (2 above) are owned 80 percent by Mid-Continent and 20 percent by Charles Steen, of Moab, Utah.

ORE DEPOSITS

General Geology[7/]

The rocks exposed in the Thompsons area consist entirely of sediments of Jurassic and Cretaceous age. The broad valley traversed by the highway between Cisco and Thompsons is composed of Mancos shale, a soft, gray, homogeneous formation that usually erodes into low rolling topography. Many of the lower beds in the Mancos shale contain organic content and certain beds are highly bituminous. Directly underlying the Mancos shale is the Dakota sandstone, a relatively hard formation that caps irregular mesas and forms cliffs and dip slopes above the more easily eroded Cedar Mountain formation. The Dakota is a wide spread continental formation made up of inter-stratified shales, sandstones and conglomerates with minor carbonaceous beds. The formation varies in thickness in this particular area from 40 to 110 feet, and a predominance of chert and quartzite pebbles are found in the lower part of the formation. A resistant bed at the base forms a wide dip slope.

. . . . . .

7/ Coffin, R. C., 1921, "Radium, Uranium, and Vanadium Deposits of Southwestern Colorado", Colorado Geol. Survey Bull. 16

Fischer, R. P., 1950, "Uranium-Bearing Sandstone Deposits of the Colorado Plateau", Econ. Geol., vol. 45, pp. 1-11

Ebbley, N. E., "Report on Certain Mining Claims and School Sections in the Thompsons District, Grand County, Utah, March 1954.

Dane, C. H., "Geology of the Salt Valley Anticline and Adjacent Areas, Grand County, Utah", U. S. Geol. Survey Bull. 863, 184 pp., 1935.

Work cited in footnote No. 6

Directly beneath the Dakota sandstone is found the Cedar Mountain formation, formerly mapped as upper Morrison, and for this reason has not been differentiated from the Brushy Basin on the geologic maps, Figs. 2 and 2A. The rock composition of the Cedar Mountain formation and the underlying Brushy Basin shale is very similar, both containing a predominence of mudstone, having varied colored tints with many calcareous nodules and lenses of siltstone, and conglomerate. The total thickness of the Cedar Mountain formation is approximately 110 feet. The bottom marker bed is a quartzitic conglomerate about 15 feet in thickness and forms a more persistent cliff and horizon marker than the Dakota sandstone. Underlying the Cedar Mountain is found the Morrison formation which is broken down into two members - - the upper member, the Brushy Basin shale, and the lower member, the Salt Wash sandstone. The Brushy Basin shale in the Yellow Cat area reaches a thickness of over 300 feet and consists mainly of banded mudstones and shales varying in colors from pink-red to yellow and brown. The formation contains a few thin lenses of grey coarse sandstone which are very lenticular in shape, and that form vertical cliffs where eroded.

The lower part of the Morrison formation, the Salt Wash sandstone member, has a thickness of over 230 feet in the Yellow Cat area. The contact between the Salt Wash sandstone and the Brushy Basin shale is not a definite stratigraphic plane but is usually determined by the local position of the uppermost sandstone conglomerate beds of the Salt Wash member. The Salt Wash sandstone usually forms benches, dip slopes, or shallow ravines, and is amenable to surface and sub-surface prospecting

at moderate depths. The Brushy Basin shale, on the other hand, generally always forms a steep slope that presents a difficult drilling problem. The Salt Wash sandstone member contains the carnotite deposits in the Yellow Cat area and in some places, five separate sandstone beds or rims have been determined. The uppermost or first rim is a conglomeratic sandstone that contains much limonite stain, plant impressions, silicified bones and wood, and is ore-bearing in many places. The next, or second rim, is also conglomeratic in texture, is from 10 to 15 feet in thickness, and is also ore-bearing in several places. A light red mudstone, approximately 20 feet in thickness, separates the first and second sandstone rims. Below the second ore-bearing sandstone lies a red mudstone usually from 5 to 8 feet in thickness. Directly under this mudstone is a third sandstone rim, a white to grey, medium-grained, soft sugary formation, that forms slopes and cliffs up to 60 feet in thickness. This particular rim contained the ore deposits mined in the Little Pittsburg No. 5 mine.

Directly underlying this massive sandstone occur a series of alternating mudstones and siltstones, having a cumulative thickness of approcimately 35 feet. Underlying this series of relatively thin beds is found another massive, light grey, sandstone containing an abundance of small grey clay pellets in layers one-half to one inch thick. This fourth sandstone rim is cliff forming and has, about nine feet from its base, a persistent layer of green-grey clay that is traceable over a wide area, and which has the same stratigraphic position as several thin ore bodies. From all indications, the recently discovered deeper ore

bodies occur in this sandstone horizon. Directly underneath lie an alternating series of about ten mudstones and siltstones which have an accumulative thickness of between 50 and 60 feet. These members lie directly over the Summerville formation.

The Summerville formation in the Thompsons area averages about 50 feet in thickness and consists of argillaceous and arenaceous components to an extent that true sandstones or mudstones are seldom observed. Several thin lenses of limestone appear and there exists a predominence of concretionary oval masses of chert from five to ten feet in diameter in the middle part of the formation. Locally the Summerville appears as broad flat surfaces, reddish in color. Although the contact between the Summerville and the underlying Entrada sandstone is easily determined and can be accurately mapped, this does not hold true with the overlying Salt Wash sandstone contact. This contact has been roughly established at the horizon where the thin red shales and chert constituents disappear and the lighter colored, sandy, lenticular beds appear. However, this contact is not sharp and in places Morrison sands are found in upper Summerville and red thin-bedded shales are found in the lower Morrison.

The pre-Summerville rocks have not been differentiated on the geologic maps, Figs. 2 and 2A, with only the contact between the Summerville and the Entrada shown. The Entrada formation in this area is a grey to orange, clean, massive fine grained sandstone, forming either smooth cliffs or wide bedrock benches over many square miles south of the outcrop of the Summerville formation. In places it shows

thicknesses of 350 feet and can be traced for hundreds of miles as a smooth cliff-forming sandstone. The predominent structural feature of the region is a northwest trending anticline, the crest of which has been dropped by a complicated fault system into a structural trough. The area under consideration is on the northeast flank of the fold outside of the area of major movement.

Occurrence of Deposits

In general the ore deposits of the Colorado Plateau area have been found in three main formations, the Morrison, Entrada and Shinarump. Many theories have been advanced endeavoring to explain why commercial concentrations of uranium and vanadium, which are widely disseminated in the earth's crust, have been formed in these formations. Some of these theories as proposed are: (1) They are the result of hydrothermal action, and therefore are related to deep-seated fractures, the deposition coming from nearby primary ore occurrences. (2) They are syngenetic accumulations laid down in close association with organic materials. (3) They are syngenetic accumulations of detrital mineral particles laid down with other inorganic constitutents of the enclosing rock. (4) They originated later than the enclosing rock by concentrations of ground water in the proximity of organic accumulations or under the influence of obscure physical or chemical factors not now easily detected. Although the origin of the uranium-vanadium mineralization in the ore has not been agreed upon, accumulated observations seem to point that its occurrence was probably a result of post-precipitation from ground

water solutions, after the sedimentation of the sands.

The major portion of the commercial ore bodies of the Colorado Plateau have been found in the Salt Wash sandstone member of the Morrison formation, overlying the Entrada sandstone. Generally the ore bodies are very irregular, tabular, layers that form "rolls" of considerable thickness, sometimes in excess of 20 feet. Usually they lie parallel to the bedding, but do not necessarily conform to the beds in detail. Frequently the rolls or longitudinal direction of the ore bodies are roughly parallel. The deposits have been observed to vary in size from only a few tons of ore to those exceptions containing from 60 to 100 thousand tons. Probably the average mine throughout the Plateau might be less than two thousand tons of ore, averaging 0.28 per cent U_3O_8 and 2.00 per cent V_2O_5. The deposits of the Morrison formation have usually been referred to as "Carnotite" deposits to distinguish them from similar deposits in the Entrada sandstone which have been termed the "Roscolite" deposits. Recent major discoveries of large ore deposits in the Shinarump formation foreshadows the probability that in the future production from this formation may out distance that from the Morrison and other formations.

In the Yellow Cat area the ore was evidently formed by selective mineralization of the sandstone, concentration of minerals around fossil organic remains, and absorbtion by certain types of clay material Recent deeper drilling has indicated that the more continuous massive sandstones are more likely to contain uranium-vanadium deposits than are the discontinuous ones. The sandstone lenses with thicknesses in excess of thirty feet appear to be more favorable for the occurrence of ore deposits.

In general the mudstones and siltstones are barren of mineralization.

Early mining in the area produced mainly carnotite-type ores, which are a potassium uranium vanadate, with the following chemical composition; $K_2O.2UO_2.V_2O_5nH_2O$. Recent ore bodies found in the lower, or fourth sandstone have produced green micaceous vanadium types of mineralization, and vanoxite, a black hydrous vanadium oxide, as well as sub-carnotite type ores. The older ore bodies, characterized by curving zones of mineralization or "rolls", varied in size from thin irregular layers a few feet in extent to masses several hundred feet in length, containing several hundred tons of ore. Curving planes of weakness on one side of the ore body usually separated heavily mineralized rock or ore from barren sandstone. Frequently, the side opposite from the curved surface graded from ore into waste gradually and in many instances consisted of an "assay" wall. In some ore bodies mineralized halos or aureoles of lower grade material were observed to grade out from the commercial ore. Rolls generally lie with the long axis parallel to the stratification planes of the sandstone, but do not seem to be controlled in any manner by the bedding planes. In thin-bedded sandstones and shales, the deposits are usually tabular and confined along the bedding planes with the greater dimensions corresponding to the stratification of the replaced rock.

The recently explored deeper ore deposits found to occur in the fourth sandstone rim have not been developed or mined to a sufficient extent to determine their shape or characteristics. However, estimates from drill logs and assays indicate that several of these deposits will contain commercial ore in excess of 25,000 tons, of grades averaging from 0.30 to 0.40 percent U_3O_8 and 2.00 to 2.50 percent V_2O_5.

The Geological Survey's drilling program in the Thompsons area to date includes over 1,725 diamond core and wagon drill holes spread over a total of 30 square miles or roughly 30 Sections. Of this number, over 1,000 holes were concentrated in one area containing about four square miles: Parts of Sec. 36, T. 22 S., R. 21 E.; Sec. 31, T. 22 S., R. 22 E.; Sec. 1, T. 23 S., R. 21 E.; and Sec. 6, T. 23 S., R. 22 E. Drilling to date has proven one channel runs east and west for at least two and one-half miles and has an average width of about 300 feet north and south. The majority of the new ore bodies recently discovered have been found to occur in this thick sandstone channel.

Production

There appear to be no production records prior to 1935, but from that time through 1954 a total of 40,000 tons of uranium-vanadium ore was produced from the Thompsons area, mainly from the Yellow Cat vicinity. Indicating the relative small size of the ore bodies mined during that period is the fact that only about six properties, are credited with production in excess of 1,000 tons. The average grade of ore produced has been estimated at 0.25 per cent U_3O_8 and 1.50 per cent V_2O_5, or a value of about $30 per ton. Thus, the total production from the area during this period would amount to slightly over one million dollars.

In striking contrast to the above production figures are the following estimates of some of the recently discovered ore deposits in the fourth rim sandstone channel previously described. These ore bodies are now being developed with shafts and inclines.

Blackstone (Sec. 31, T. 22 S., R. 22E.)

Two ore bodies with an estimated 25,000 tons.
Estimated average grade 0.30 per cent U_3O_8; 2.25 per cent V_2O_5.
Estimated value $1,000,000, plus two $35,000 production bonuses.

Utah Alloys (Sec. 31, T. 22 S., R. 22E.)
(Sec. 1 , T. 23 S., R. 21E.)

Two ore bodies. No estimated tonnage and grade.
One deposit reported worth in excess of $1,000,000.
Other deposit reported about 5,000 tons of ore.

Ringtail Shaft (Sec. 36, T. 21 E., R. 22 S.)

Incomplete data on last drilling.
Present estimate indicates 20 - 25 thousand tons of ore.
Estimated average grade 0.40 percent U_3O_8; 2.25 per cent V_2O_5.
Estimated value of $1,250,000, plus production bonus of $35,000.

John Incline (Sec. 1, T. 23 S., R. 21 E.)

Estimated tonnage 2,388
Estimated average grade 0.41 percent U_3O_8; 0.91 per cent V_2O_5.
Estimated value $99,787 , plus production bonus of $35,000.

UTAH STATE SCHOOL SECTION (WEST)
Sec. 2, T. 23 S., R. 21 E.

This section covers 397.76 acres in Grand County, Utah. The lease on this School Section is wholly owned by Mid-Continent, and originally carried a royalty of 12-1/2 percent of the gross production to the State of Utah. New regulations recently adopted by the Utah State Land Board (late 1955) governing royalty rates on State lands has changed the former straight 12-1/2 percent of the gross to a sliding scale on the gross value per ton on fissionable materials.[8/] The rate begins at 3.9 percent on ores with a gross value up to $4.00 per dry ton, and increases at the

8/ See Appendix No. 1

rate of 0.3 percent additionally for each one dollar value increase up to a maximum royalty of 17.4 percent on ores having a gross value per ton of $48.00 and over. In addition there is a royalty of 8.0 percent of any bonus received from the sale of fissionable materials. The ore bodies blocked out on the above School Section have an average gross value of $23.31 per ton; thus the royalty rate to the State of Utah would be based upon $23.31, less premium and development allowance payments, or $20.92 base price; thus royalty would be 9.0 percent.

Drilling began on December 6, 1954, under DMEA Docket 3360, Contract Idm-E723, and continued until April 20, 1955, at which time the contract was terminated by the DMEA. During this period 72 holes were completed of which one was ore and four were mineralized. Mid-Continent, however, continued drilling until May 10, 1955, and completed holes Nos. 73 through 94 (21 holes) of which three were ore and two were mineralized. After this drilling was done, an isopach map of the fourth ore-bearing sandstone was completed and indicated a consistently favorable channel approximately 300 feet wide and extending for a distance of 2,500 feet, with the east end open. Three areas within this channel indicated to Mid-Continent personnel the probable presence of commercial uranium deposits in the fourth ore-bearing sandstone.

This information was subsequently presented to the DMEA in Denver on June 8, 1955, at which time Mid-Continent suggested that the DMEA contract be reinstated. On August 11, 1955, Mid-Continent received a communication from the DMEA stating that they did not believe it advisable for them to reinstate the contract. On September 2, 1955, Mid-Continent started to drill offset holes around the ore and mineralized holes to block out the

ore deposits. As of December 31, 1955, Holes Nos. 95 through 142 have been completed, and two ore bodies have been discovered and blocked out on 50-foot centers. Both of these ore bodies are open on two ends and at present their extent has not yet been determined. The two ore bodies are 600 feet apart. Drilling to date has indicated at least 11,328 tons in the westerly deposit at a depth of 170 feet, averaging 0.202 percent U_3O_8, and 1.055 percent V_2O_5, having an average thickness of 4.24 feet. If the area is increased by including marginal holes around the perimeter this ore body would indicate 13,206 tons, averaging 0.18 percent U_3O_8, and 0.959 percent V_2O_5. Drilling on the easterly deposit so far indicates 2,293 tons of 0.246 percent U_3O_8, and 1.032 percent V_2O_5, at a depth of 190 feet, and averaging 1.56 feet thick. If the marginal holes around the perimeter of the easterly ore body are included the deposit shows 4,523 tons of ore averaging 0.166 per cent U_3O_8, and 0.743 percent V_2O_5.

In the area between the two ore bodies, two holes 100 feet apart encountered ore at a depth of 180 feet and indicate 2,732 tons of ore averaging 0.246 percent U_3O_8, and 0.396 percent V_2O_5, having an average thickness of 3.7 feet. This ore body, as well as the strongly mineralized area 200 feet east of the easterly ore body, has not been blocked out on 50-foot centers. In addition to the above estimates, calculations indicate 54,000 tons of potential ore having a value of $1,250,000.

Refer to Fig. 3, map of Sec. 2, T. 23 S., R. 21 E., showing relationship of Brushy Basin contact and the position of the original three north-south fences of holes drilled under the DMEA contact. Fig. 4 illustrates the relative position of the two ore bodies, the inferred ore reserve areas, and the trend of the fourth sandstone channel. Figs. 5 and 6 show ore holes and the outlines of the ore bodies.

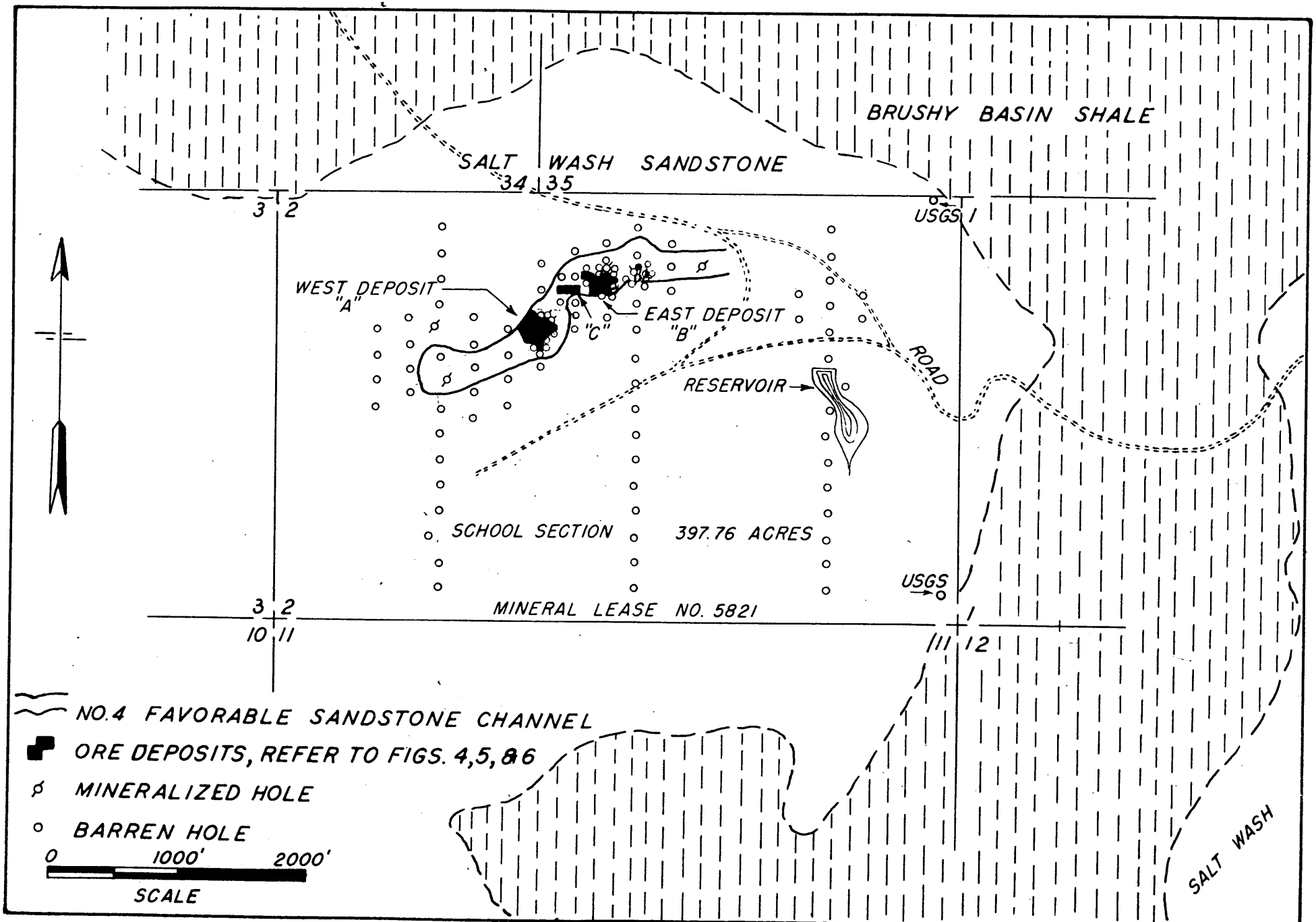


FIG. 3 SEC. 2 . T. 23 S., R. 21 E., YELLOW CAT AREA

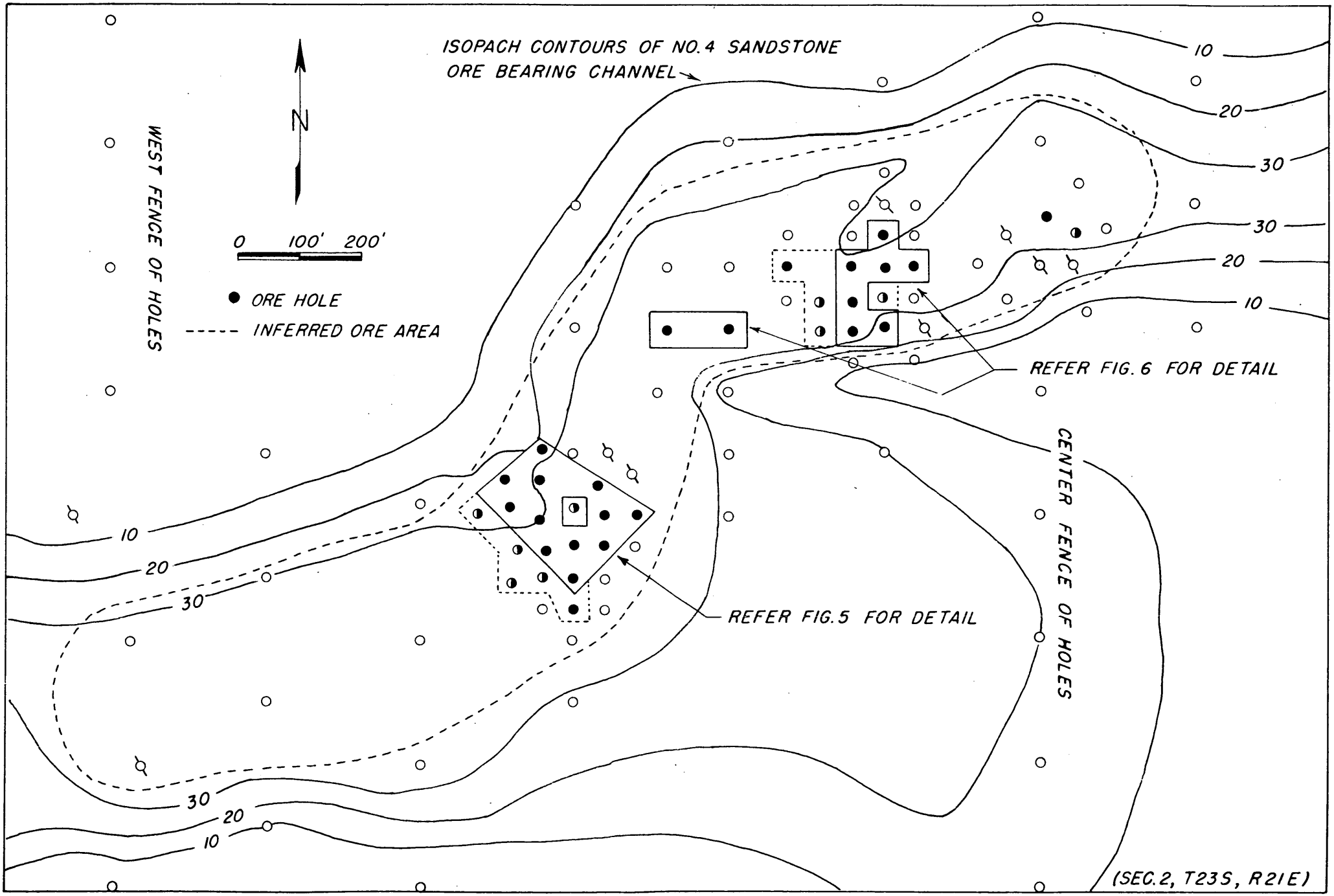


FIG. 4 RELATIVE POSITION OF ORE BODIES AND FOURTH SANDSTONE CHANNEL

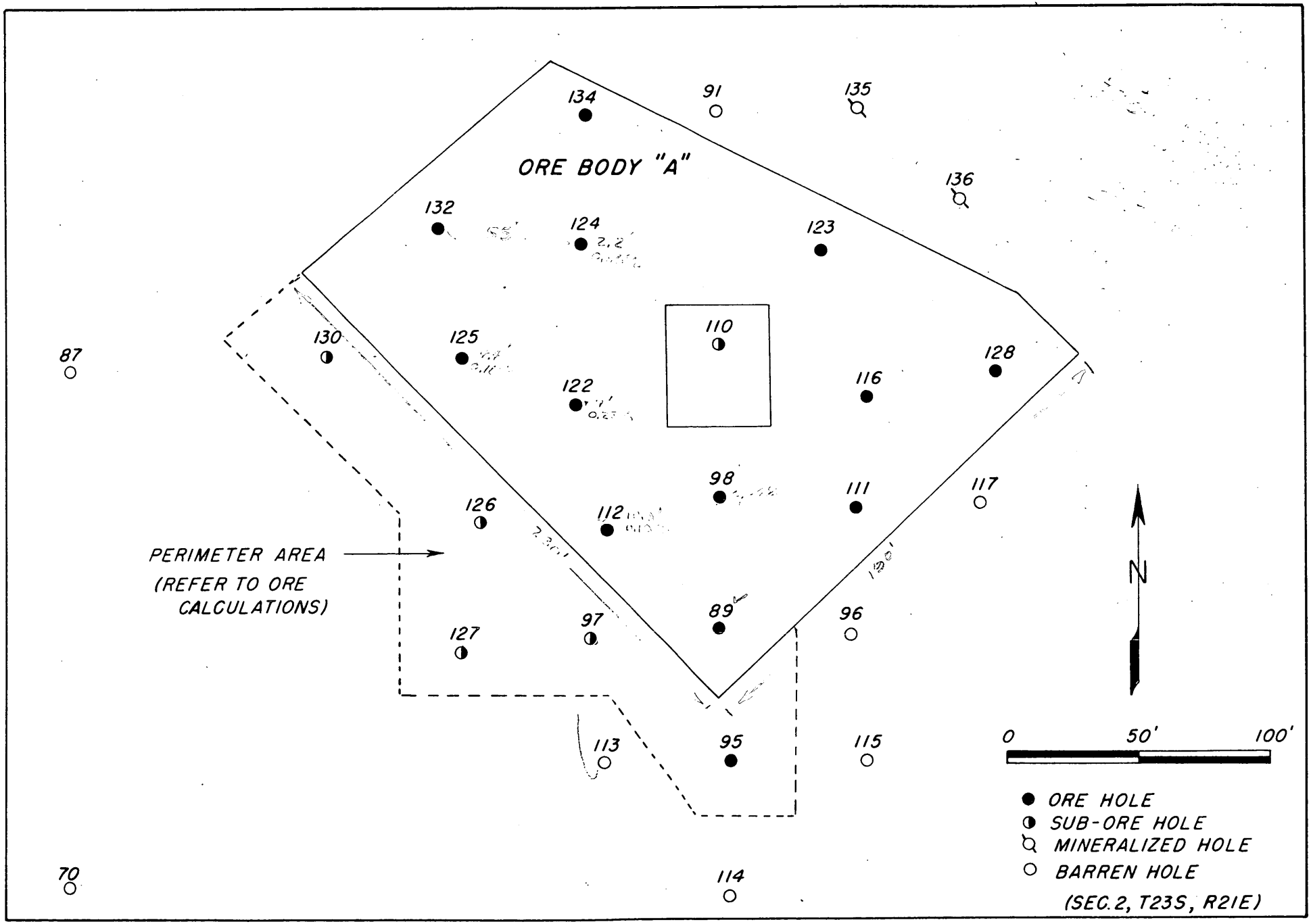


FIG. 5 WEST ORE BODY AREA, SEC. 2 (WEST)

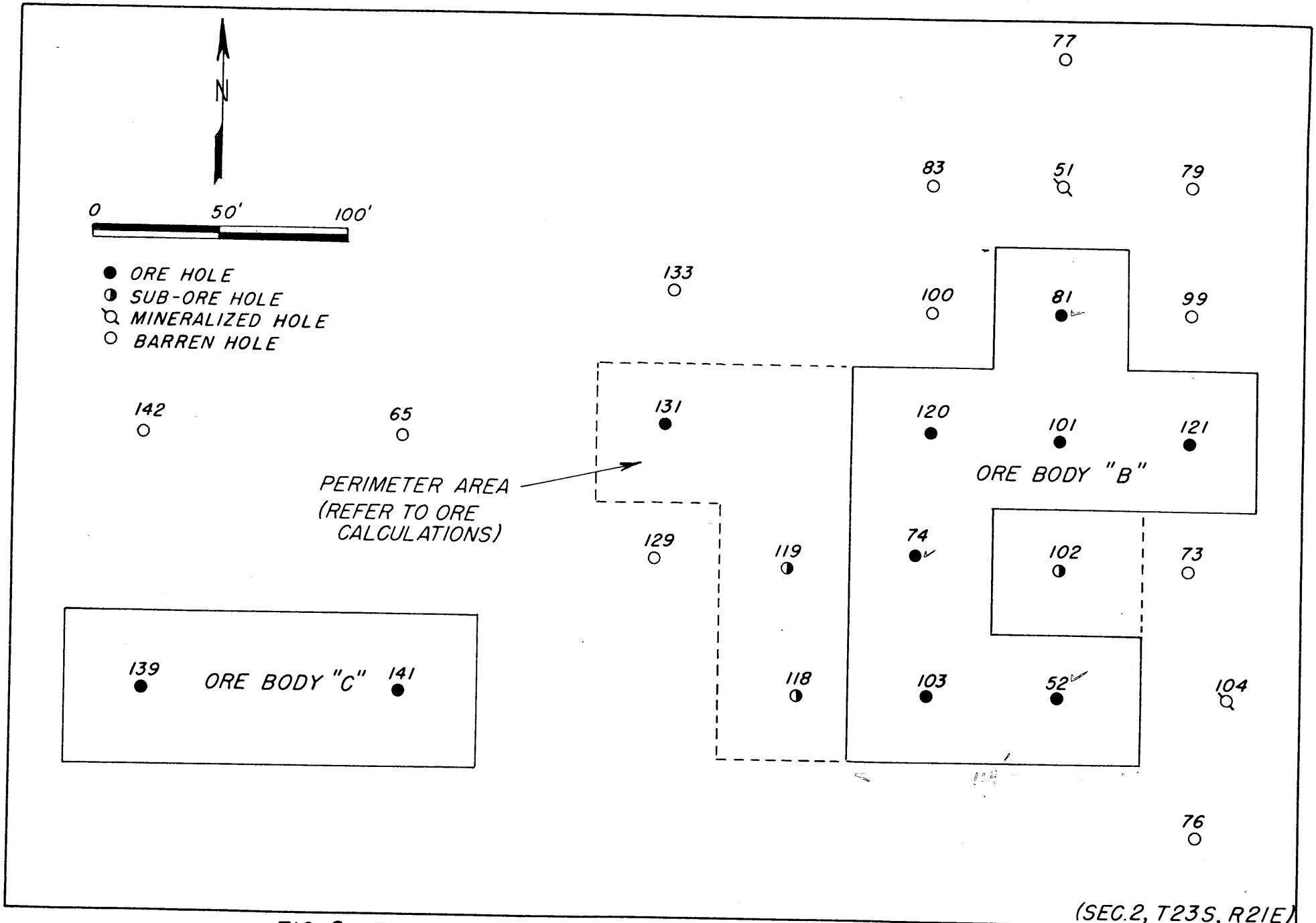


FIG. 6 EAST ORE BODY AREA, SEC. 2 (WEST)

Hole Nos., collar elevation, depth of base of ore, ore thickness, average grade, and sandstone thickness are given in the following tabulation:

ORE HOLE DATA

Hole No.	Collar Elev.	Base of Ore	Thickness of Ore	Aver. U_3O_8	Aver. V_2O_5	Sandstone Thickness Ft.
52	4,750.6	176.0	1.0	0.28	0.17	32
74	4,750.9	188.2	1.0	0.01 ?	1.91	38
81	4,751.1	194.5	1.0	0.42	1.15	28
89	4,762.0	168.1	1.6	0.20	1.13	57
95	4,764.9	171.6	1.5	0.14	0.79	47
97	4,760.4	157.8	2.0	0.05	0.45	48
98	4,754.4	170.4	3.6	0.04	2.19	49
101	4,750.9	187.6	1.3	0.01 ?	1.60	39
102	4,750.9	180.8	3.2	0.06	0.42	39
103	4,750.7	173.7	1.8	0.07	1.52	44
110	4,752.5	156.1	1.0	0.06	0.04	42
111	4,755.0	162.0	5.1	0.33	0.42	50
112	4,756.0	170.1	10.3	0.19	1.20	51
116	4,752.4	170.5	1.0	0.05	3.36	49
118	4,750.0	181.6	1.0	0.02 ?	0.60	46
119	4,750.9	181.6	1.6	0.07	0.50	40
120	4,751.0	178.4	2.0	0.40	0.47	31
121	4,750.2	185.5	2.8	0.37	0.81	33
122	4,751.7	163.5	7.0	0.23	0.90	30
123	4,752.0	176.5	9.8	0.23	0.28	54
124	4,752.5	173.2	2.2	0.36	2.62	31
125	4,752.2	164.9	4.4	0.16	0.82	23
126	4,754.3	163.7	1.9	0.08	0.73	43
127	4,762.8	158.0	2.4	0.06	0.38	44
128	4,753.7	159.4	1.4	0.11	3.78	50
130	4,753.1	162.4	1.8	0.08	0.50	26
131	4,751.5	183.3	3.5	0.10	0.29	45
132	4,752.8	162.1	2.4	0.11	0.79	25
134	4,753.2	168.0	2.1	0.17	0.25	21
139	4,753.8	185.0	4.3	0.30	0.45	46
141	4,752.7	178.4	3.1	0.17	0.32	44

The following three pages, 25, 26, and 27 list the ore holes and the calculations used in computing tonnage, grade and the gross value of the separate ore deposits. Page 27 gives a recap of the ore bodies showing total tonnage and gross value of the deposits. Reproductions of Assay Laboratory returns are shown in Appendix No. 6.

Class I, Proven Reserves

ORE BODY - A

Refer to Fig. 5

Hole No.	Thick. Ft.	U_3O_8 %	Ft x %	V_2O_5 %	Ft x %
89	1.6	0.20	0.320	1.13	1.808
98	3.6	0.04	0.144	2.19	7.884
111	5.1	0.33	1.683	0.42	2.142
112	10.3	0.19	1.957	1.20	12.360
116	1.0	0.05	0.050	3.36	3.360
122	7.0	0.23	1.610	0.90	6.300
123	9.8	0.23	2.254	0.28	2.744
124	2.2	0.36	0.792	2.62	5.764
125	4.4	0.16	0.704	0.82	3.608
128	1.4	0.11	0.154	3.78	5.292
132	2.4	0.11	0.264	0.79	1.896
134	2.1	0.17	0.357	0.25	0.525
	50.9		10.289		53.683

$\frac{50.9}{12}$ = 4.24 Av. Thickness Area = 34,735 sq. ft.

$\frac{10.289}{50.9}$ = 0.202% U_3O_8 $\frac{53.683}{50.9}$ = 1.055% V_2O_5

34,735 x 4.24' = $\frac{147,276.4}{13}$ cu.ft. = 11,328.95 Tons

Value per ton @ 0.202% U_3O_8 = $16.19

Value per ton @ 1.055% V_2O_5 = 6.54

$22.73 per ton

Gross Value = 11,328.95 x 22.73 = $257,507

Class I, Proven Reserves

Refer to Fig. 6

ORE BODY - B

Hole No.	Thick. Ft.	U_3O_8 %	Ft x %	V_2O_5 %	Ft x %
52	1.0	0.28	0.280	0.17	0.170
74	1.0	0.01	0.010	1.91	1.910
81	1.0	0.42	0.420	1.15	1.150
101	1.3	0.01	0.013	1.60	2.080
103	1.8	0.07	0.126	1.52	2.736
120	2.0	0.40	0.800	0.47	0.940
121	2.8	0.37	1.036	0.81	2.268
	10.9		2.685		11.254

$\frac{10.9}{7}$ = 1.56 Av. Thickness

Area = 19,112 sq. ft.

$\frac{2.685}{10.9}$ = 0.246% U_3O_8

$\frac{11.254}{10.9}$ = 1.032% V_2O_5

19,112 sq. ft. x 1.56 = $\frac{29,814.72}{13}$ = 2,293.44 tons

Value per ton @ 0.246% U_3O_8 = $20.37

Value per ton @ 1.032% V_2O_5 = 6.40

$26.77 per ton

Gross Value = 2,293.44 x 26.77 = $61,395

Class I, Indicated Ore

Refer to Fig. 6

ORE BODY - C

Hole No.	Thick. ft.	U_3O_8 %	Ft x %	V_2O_5 %	Ft x %
139	4.3	0.30	1.290	0.45	1.935
141	3.1	0.17	0.527	0.32	0.992
	7.4		1.817		2.927

$\frac{7.4}{2}$ = 3.70 Av. Thickness Area = 9,600 sq. ft.

$\frac{1.817}{7.4}$ = 0.246% U_3O_8 $\frac{2.927}{7.4}$ = 0.396% V_2O_5

9,600 x 3.7 = $\frac{35,520}{13}$ = 2,732.31 tons

Value per ton @ 0.246% U_3O_8 = $20.37

Value per ton @ 0.396% V_2O_5 = 2.46

$22.83 per ton

Gross Value = 2,732.31 x 22.83 = $62,379

RECAP OF ORE BODIES

Ore-body	Tons	$\%U_3O_8$	$\%V_2O_5$	Value per ton	Gross Value
"A" (West)	11,328.95	0.202	1.055	$ 22.73	$ 257,507
"B" (East)	2,293.44	0.246	1.032	26.77	61,395
"C" (Middle)	2,732.31	0.246	0.396	22.83	62,379
	16,355			Total	$ 381,281
				Plus Bonus	35,000
					$ 416,281

JOHN GROUP
(Sec. 1, T. 23 S., R. 21 E.)

The John Group of nine claims, comprising 183.78 acres, are located in Sec. 1, T. 23 S., R. 21 E., SLM, in the Yellow Cat area in Grand County, Utah. Refer to Fig. 2. The claims are recorded as follows:

Claim Name	Original Location	Book	Page	Amended Location	Book	Page
John		9K	5		15	330
Mark		9K	4		15	331
Minnie		9K	4		15	332
Lee		9K	4		15	333
Maxine		9K	4		15	334
Rose		9K	4		15	335
Chance		9K	3		15	336
McGill		9K	3		15	337
Bandy		9K	3		15	338

The assessment work for the year ending June 30, 1955 was completed and recorded. The expenditures made since July 1, 1955 for mining operations are more than sufficient to cover the required amount of assessment work for the year ending June 30, 1956.

The claims were originally staked by Charles Steen who conveyed eight-tenths interest to Strategic Minerals Exploration Co. Great Western Uranium Corp. later purchased the 80 percent interest from Strategic Minerals Exploration Co., who retained a 10 percent overriding royalty in the eight-tenths undivided interest. Ebbley and associates purchased the eight-tenths interest from Great Western and later bought out Strategic Minerals overriding royalty. Subsequently, Ebbley and associates conveyed their interest to Mid-Continent Uranium Corp. who now has an undivided eight-tenths interest in the nine claims, and Charles Steen has an undivided two-tenths interest. There is no overriding royalty on the claims.

The rocks exposed on the John Group consist of sediments of the Salt

Wash sandstone member and Brushy Basin shale member of the Jurassic Morrison formation. The Brushy Basin shale member is exposed on the northern one-third of the John Group and the eastern portion of the Chance claim. The Salt Wash sandstone member is exposed over the remainder of the claims. Refer to Fig. 7.

Drilling has indicated the fourth ore-bearing sandstone to be present everywhere under the John Group, and the John Incline mine is in the fourth sandstone. Here the fourth ore-bearing sandstone is interbedded with mudstone and contains thin lenses of mudstone and mudstone-pebble conglomerate. This mudstone is normally red-brown, but near ore deposits the mudstone within and immediately beneath the sandstone is gray. In plan view the areas of gray mudstone are several times larger than the associated mineralized rock and offer larger "targets" in delineating favorable ground. The ore minerals occur mostly in sandstone, coating the grains and partly or entirely filling the pore spaces. The best uranium ore occurs with carbonaceous material.

Drilling depths to penetrate the fourth ore-bearing sandstone on the John Group of claims vary from 60 to 250 feet. A limited drilling program was carried out by the U. S. Geological Survey on these claims during 1952 and 1953. A total of 58 holes were drilled, of which four were with a wagon-drill and 54 were diamond drilled. The four wagon-drill holes encountered water and did not penetrate through the fourth ore-bearing sandstone. Of the 58 holes, 28 holes were drilled on wide-spaced centers, nine holes were drilled on close-spaced centers in the southeast corner of the McGill claim on sites of selenium indicator plants, and 21 holes were drilled on close-spaced centers in blocking out ore on the John claim. Refer to Fig. 7. Of the total holes drilled

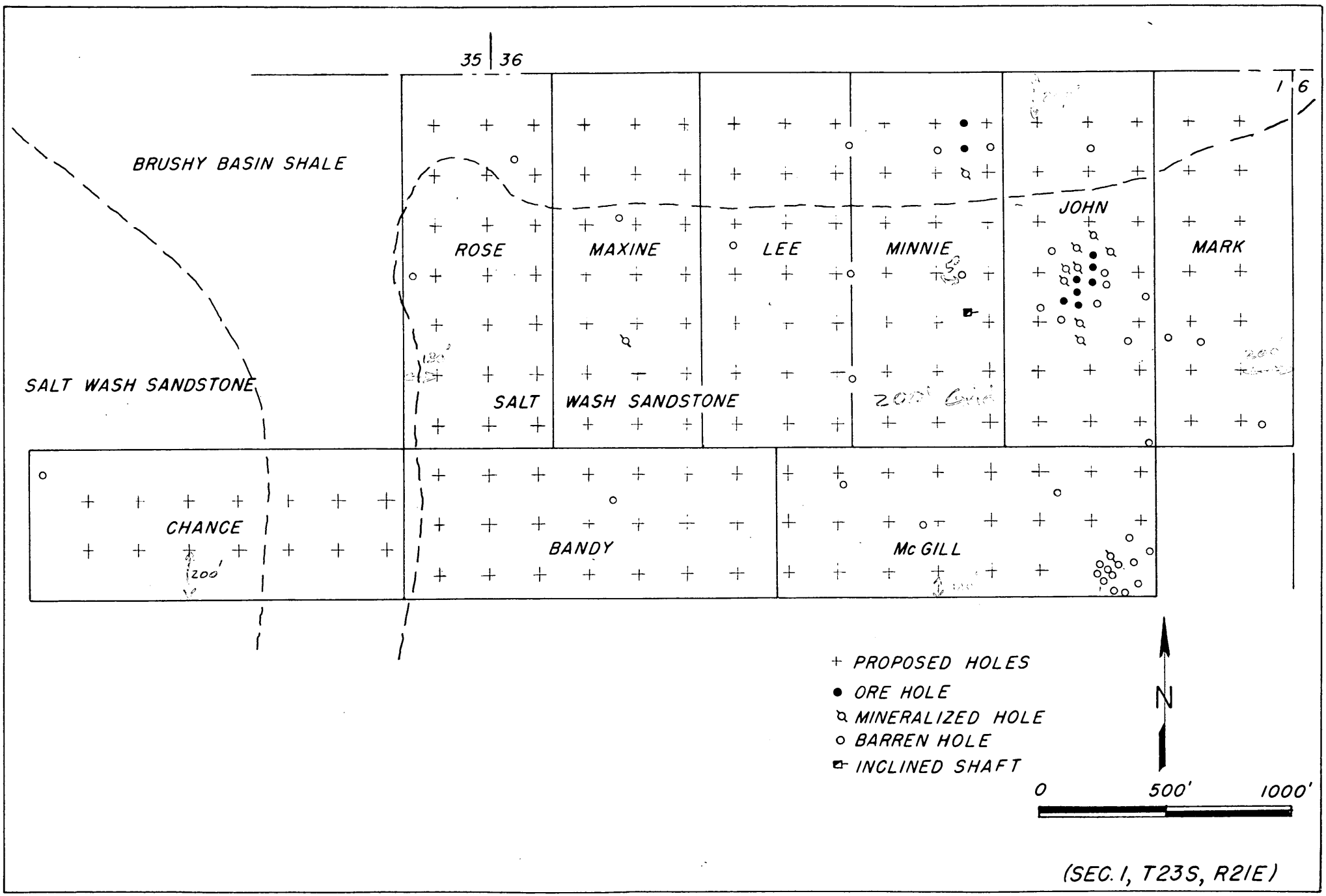


FIG. 7 JOHN GROUP, SHOWING PROPOSED EXPLORATION

that penetrated the fourth ore-bearing sandstone, 47 holes were considered favorable, four holes semifavorable, and three holes unfavorable. Of the holes considered favorable, nine holes cut mineralized material of ore grade and thickness and eleven holes cut mineralized material below the cutoff grade for ore. In addition to the ore blocked out on the John claim by the Geological Survey, two ore holes and one mineralized hole were drilled on 100-foot centers on the Minnie claim about 700 feet northwest of the John ore-body.

Before acquiring the property from Great Western, Ebbley and associates spent from September 8th to the 23rd, 1955, pumping out the incline and underground workings so that an inspection could be made to determine the extent of past mining. After the inspection had been made, the incline was allowed to refill.

Great Western had sunk the inclined shaft on a 25 degree slope, a distance of 335 feet to intercept the ore-horizon. Level development consisted of about 200 feet of drifting. Two of the ore holes had been reached and some mining had been done in those areas. It was noted from the drill logs that these two holes contained thin low-grade ore. Mining around these holes indicated the logs to be reliable. Approximately 100 tons of low-grade ore had been mined by Great Western, but this was not done in the areas indicated by the drilling to be the most favorable. Track and air lines had been installed and a timber ore bin of 40-50 ton capacity had been built and was in good condition. Surface buildings on the property consisted of a hoist shed, compressor house, tool shed, bunk-house, and powder magazine. Ground conditions were generally good, requiring little or no timber. Mining was done on a modified room and pillar method.

In February, 1955, after the property had been acquired by Mid-Continent, work was started on surface building rehabilitation. Mining equipment, consisting of a compressor, pump, hoist, fan, vent pipe, cars, drill and steel, etc., were purchased. The incline and workings were again pumped out and a program started to clean out the underground working and excavate for a large size sump. The first shipments of ore, mainly from development headings, were made in early May using a crew of three men. During the month of May, 68.1 tons were shipped to Climax Uranium Company mill at Grand Junction, Colorado. These shipments, averaging 0.613 percent U_3O_8 and 0.56 percent V_2O_5, realized $4,345.10 from the mill and $2,921.25 from the initial production bonus, or an average of $63.80 per ton without the bonus, and $106.70 per ton with the bonus.

Throughout the remainder of 1955 Mid-Continent operated the John Incline mine with a small crew, mainly on development work. By the end of the year a total of 375 feet of development drifting was completed, of which 230 feet was in barren rock. A new body of ore had just been opened up that appears to be of considerable size. By the end of the year, when Mid-Continent temporarily recessed all work in the Yellow Cat area, shipments of ore from the property for 1955 had been as follows:

Refer to Fig. 8 for map of underground workings.

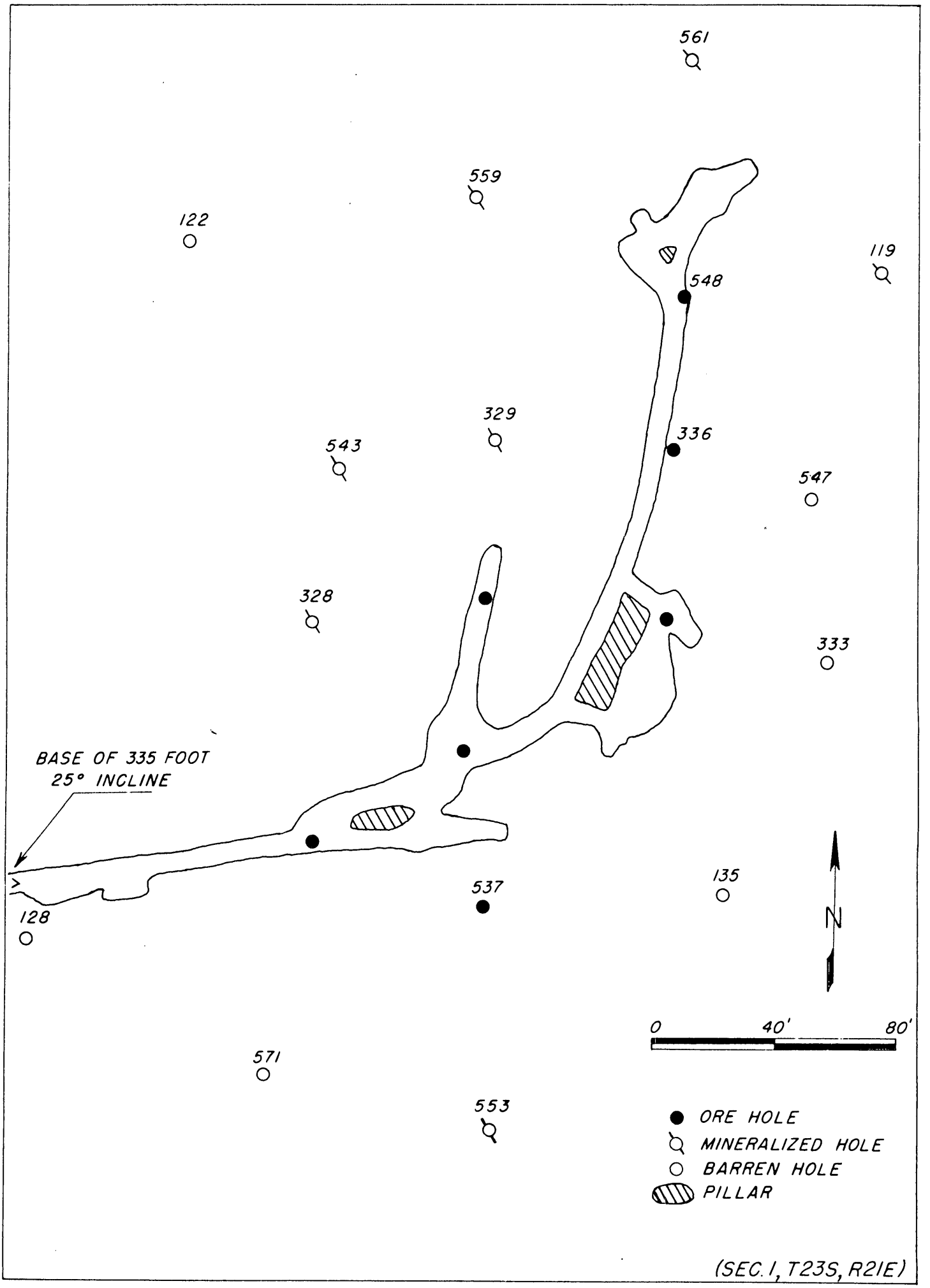


FIG. 8 JOHN INCLINE UNDERGROUND WORKINGS

Tons	% U_3O_8	Tons x %	% V_2O_5	Tons x %
57.93	0.5888	34.109184	0.5359	31.044687
10.17	0.75	7.627500	0.72	7.322400
10.00	0.36	3.600000	0.47	4.700000
45.04	0.165	7.431600	0.2583	11.633832
11.94	0.28	3.343200	0.89	10.626600
39.56	0.5497	21.746132	0.7798	30.848888
33.97	0.31	10.530700	0.66	22.420200
85.58	0.46	39.366800	0.66	56.482800
294.19 tons		127.755116		175.079407

Weighted Averages:

$\frac{127.755116}{294.19}$ = 0.434 % U_3O_8 $\frac{175.079407}{294.19}$ = 0.595% V_2O_5

Gross Ore Sales to end 1955 = $14,012.82, less Haulage Allowance = $12,166.53
Initial Production Bonus paid = 8,853.39
Total Net $21,019.92

Total Initial Production Bonus used to date . . . . . 2,550 pounds

Initial Production Bonus remaining on property . 7,450 pounds

Calculations of tonnages and grade from the data obtained from the U. S. Geological Survey drilling on the John claim are as follows:

Upper Layer:

Hole No.	Ft. Thick	% U_3O_8	Ft x %	% V_2O_5	Ft x %
111	3.25	0.10	0.325	0.08	0.2600
336	1.3	0.11	0.143	0.39	0.507
554	1.0	0.11	0.110	0.21	0.210
	5.55		0.578		0.977

$\frac{5.55}{3}$ = 1.85 Av. Thickness $\frac{0.578}{5.55}$ = 0.104% U_3O_8 $\frac{0.977}{5.55}$ = 0.176% V_2O_5

Area = 230' x 50' = 11,500 sq. ft; 11,500 x 1.85 = $\frac{21,275}{13}$ = 1,636.54 Ton

Value per ton @ 0.104% U_3O_8 = $4.34
Value per ton @ 0.176% V_2O_5 = 1.09

Total $5.43 per ton
(Not Commercial)

Lower Layer:

Hole No.	Ft. Thick	% U_3O_8	Ft x %	% V_2O_5	Ft x %
324	6.0	0.53	3.180	1.03	6.180
325	2.1	0.22	0.462	0.07	.147
537	1.2	0.17	0.204	0.25	.300
	9.3		3.846		6.627

$\frac{9.3}{3} = 3.1$ Av. Thickness $\frac{3.846}{9.3} = 0.414\%$ U_3O_8 $\frac{6.627}{9.3} = 0.713\%$ V_2O_5

Area = 180 x 50 = 9,000 sq. ft; 9,000 x 3.1 = $\frac{27,900}{13}$ = 2,146.15 tons

Addition to Lower Layer:

Hole No. 548 1.6' Thick 0.392% U_3O_8 2.67% V_2O_5

Using 25' radius = 1963.5 sq. ft. x 1.6 = $\frac{3,141.6}{13}$ = 241.66 tons

Weighted Average Lower Layer:

2,146.15	0.414	888.5061	0.713	1530.205
241.66	0.392	94.7307	2.67	645.232
2,387.81 tons		983.2368		2175.437

$\frac{983.2368}{2387.81} = 0.412\%$ U_3O_8 $\frac{2175.437}{2387.81} = 0.911\%$ V_2O_5

Value per ton @ 0.412 % U_3O_8 = $36.14

Value per ton @ 0.911 % V_2O_5 = 5.65

Total $ 41.79 per ton

Gross Value = 2,387.81 x 41.79 = $99,787

Less ore mined 1955, 294.19 tons 12,167

Ore remaining, 2094 tons = $ 87,620

Bonus remaining 7450 lbs = 26,065

$113,685

The value on the undrilled claims of the John Group is placed at $7,500 per claim.

A large area of favorable ground on the property has not been fully explored. There appears to be a good chance of locating more ore bodies with additional drilling. The location of the John Group, surrounded on all sides by operating properties; the Parco 23 on the South, the Ringtail shaft on the north, the old Yellow Cat workings and the Blackstone and Allor 12 mines to the east and Section 2 ore bodies to the west, would indicate that the property is worthy of the time and expense necessary to fully explore and develop it. The limited amount of drilling on the claims to date has not only shown the presence of appreciable thicknesses of the fourth ore-bearing sandstone but has actually indicated the presence of commercial ore deposits. It is evident that a comprehensive drilling program covering all of the area encompassed by the nine claims is warranted.

Recommended Exploration Program:

The following estimates of drilling costs on the John Group of nine claims are based upon what is considered sufficient concentration of holes to determine the presence of favorable ore-bearing thicknesses or channels in the fourth sandstone and to determine the trend of these channels. When the trends have been determined by the initial pattern of grid-spaced holes, a second phase of drilling would concentrate along the channels. In the event ore holes were drilled during the initial phase these deposits would be delimited with additional closely spaced holes during the second phase of drilling.

The suggested exploration program is setup in two Stages. Stage I consists of 170 holes on a 200-foot grid pattern. The holes skip areas previously drilled but explore all untested ground. Average depth

(shallower to the south and deeper towards the contact with the Brushy Basin to the north) is estimated at 200 feet to penetrate the fourth ore-bearing sandstone. Previous drilling in this area indicates that approximately 50 percent of the total footage should be cored for satisfactory results. Stage II drilling would be progressive drilling, consisting of 100-foot spaced holes along trends of channels determined by Stage I drilling, and 50-foot spaced holes, under the classification of "reasonable delineation" offsetting ore and mineralized holes found by Stage I and Stage II drilling. It is estimated that 100 holes would be required under Stage II. For location of the proposed holes under Stage I, refer to Fig. 7.

(a) Independent Contracts:

It is contemplated to do all phases of the drilling under contract, including equipment, labor, water, power, fuel, etc. on a per foot basis:

	Cost	Unit Cost Per Foot
STAGE I: The grid pattern of holes on 200-foot centers as shown on the map, Fig. 7, total 170 holes, average depth 200 feet, at an average price of $2.40 per foot. It is estimated that 50 percent of the total footage will be cored at $3.00 per foot and 50 percent plugged at $1.80 per foot.	$ 81,600.00	$ 2.400
Standby time: Probing of the holes with either Company owned equipment or government Barnaby requires: (a) the leaving of casing in the hole to protect upper portion from caving for latter probing by Barnaby, necessitating returning to pull casing, or (b) standby time at completion of hole for probing before pulling casing. From past experience this has amounted to an average of one hour per hole: 170 holes @ $12.00 per hole	2,040.00	0.060

RECEIVED
FEB - 9 1956

		Cost	Unit Cost Per Foot
It is contemplated to do the bulldozing work for drill roads and drill sites under contract, including equipment, labor, fuel, etc. on a per hour basis. It is estimated that a total of 200 hours will be required for this work at $12.00 per hour		$ 2,400.00	0.070
(b) Labor, supervision, consultants:			
It is estimated 4 drilling units can accomplish an average of 400 feet per working day. The total footage then could be drilled in 85 working days or about 3-1/2 months time, figuring 25 working days per month. Additional full time labor (not including (a) above) would consist of one sampler and one geologist. In addition an engineer-geologist consultant would work part time in an advisory capacity and aid in the final analysis and report on the program. One month is considered as 25 working days.			
One sampler (4 months)	$1,600.00		
One geologist (4 mo. incl.report)	2,000.00		
Expense (total 240 man days @ $5/d)	1,200.00		
Consultant (30 days, intermittent)	1,500.00	6,300.00	0.185
(c) Operating material and supplies:			
Fuel for 1/2-ton truck	300.00		
Core boxes (300 @ $3.50 ea.)	1,050.00		
Misc.drafting, office and report supplies	100.00	1,450.00	0.043
(d) Operating equipment:			
1/2-ton pickup truck ($150/mo.)	600.00		
Counter and probe unit ($62.50/mo.)	250.00	850.00	0.025
(g) Miscellaneous:			
Analytical work: 500 assays	2,500.00		
Accounting	400.00		
State & Fed. Unemploy. Ins., S.S.Tax, State Comp. Ins. (Total 8% of $3,600.00)	288.00	3,188.00	0.094

		Cost	Unit Cost Per Foot
(h)	Contingencies:		
	Approx. 5% of Total	4,892.00	0.144
	TOTALS	$ 102,720.00	3.02

STAGE II: As discussed under Estimate of Costs above, it is believed that an additional 100 holes will be required to offset favorable holes and to explore fourth sandstone channels that have been found during Stage I drilling. These holes, only as "reasonable delineation and sampling of the ore", can be drilled at a cost equal to the average overall cost as estimated above for Stage I. Such items as labor, bulldozing, operating materials, operating equipment, miscellaneous, and contingencies will be in proportion:

(a)	Independent Contract:		
	Diamond drilling, Total feet 20,000	48,000.00	2,400
	Standby time, 100 x $12.00	1,200.00	0.060
	Bulldozing, roads and drill sites, 100 hrs.	1,200.00	0.060
(b)	Labor, supervision, consultants:		
	For 20,000 feet	3,700.00	0.185
(c)	Operating materials:	860.00	0.043
(d)	Operating equipment:	500.00	0.025
(g)	Miscellaneous:	1,880.00	0.094
(h)	Contingencies: (Approx. 5 percent of total)	2,860.00	0.144
	Totals	$60,207.00	3.02

STAGE I	$102,720.00
STAGE II	60,207.00
Total (Both Stages)	$162,927.00

Total unit price per foot $3.02

Total time required to complete preliminary road work and both drilling stages: 6 months.

SILVER TOP GROUP

(Refer to Fig. 2A)

The Silver Top Group is comprised of five full claims located in Sec. 34, T. 22 S., R. 22 E., SLM, Grand County, Utah. Fig. 9 is a claim map of the Silver Top Group.

These claims, totalling 103.3 acres, are staked on the dip slope of the third ore-bearing sandstone of the Salt Wash member, the upper two sandstone lenses of the Salt Wash are missing. Drilling to date has consisted of assessment work only and has not explored to any extent the potential of the fourth ore-bearing sandstone. The claims are in an excellent area and a preliminary drilling program, costing approximately $15,000, should determine if commercial ore bodies are present.

During the initial phase of the U. S. Geological Survey drilling program in the Yellow Cat area these claims were drilled on 1,000-foot centers. This drilling, as well as the assessment work drilling done during 1955 by Mid-Continent, established the presence of appreciable thicknesses of the fourth ore-bearing sandstone. Contiguous claims to the north, west and south are owned by Pick Uranium Co. The estimated evaluation of these undrilled claims would be approximately $1,000 per claim.

JUANITA GROUP

(Refer to Fig. 2)

The Juanita Group of eight claims, comprising 162.43 acres, is located in the Yellow Cat area in Secs. 14 and 23, T. 23 S., R. 21 E., SLM, Grand

TRIM LINES Leave at least 3/4" from heavy line on other two sides.

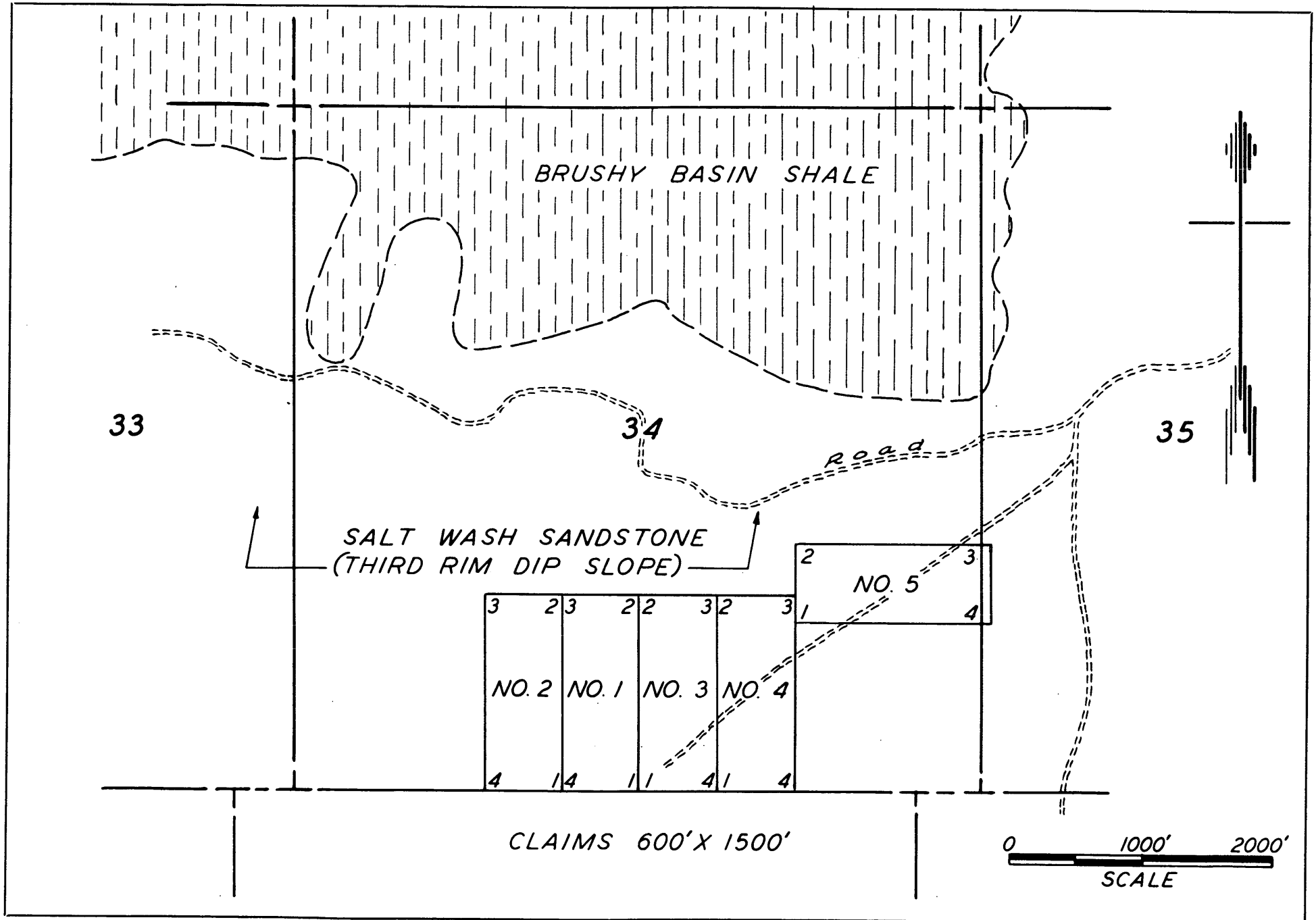


FIG. 9 SILVER TOP CLAIMS, SEC. 34, T. 22 S., R. 22 E.

County, Utah. The claims lie about three miles southwest of the center of the Yellow Cat area and are 20 miles by gravel road from Thompson, Utah, the nearest ore purchasing station. The claims cover the Salt Wash member of the Morrison formation. Fig. 10 is a claim map of the Juanita Group.

Drilling depths to penetrate the fourth ore-bearing sandstone are from 130 to 160 feet. This group of claims was acquired by Mid-Continent from Strategic Minerals Exploration Co., and are at the present time under a lease to the Western Silver Lead Corp. and the Square Deal Mining and Milling Co., of Wallace, Idaho.

The claims cover most of a mesa of low relief with an elevation of about 5,200 feet. Road building and maintenance is comparatively easy considering the more difficult terrain on the Colorado Plateau in general. The upper benches of the mesa are covered with a plentiful supply of juniper and pinon, which can be used for mine timber. There are no buildings or equipment on the claims at the present time. Strategic Minerals constructed about a mile of road to the mine, terminating it on the east side of the mesa, from which point Mid-Continent extended it an additional mile to the southwest corner of the claims.

On the Juanita Group, the ore thus far mined is estimated to be higher in uranium and lower in vanadium content than the average for the Colorado Plateau area. The ore mined on these claims occurred in the upper elongated sandstone lens of the Salt Wash member of the Morrison formation within an altered zone showing uranium "bloom". The original deposit was a high grade roll outcropping about 50 feet along the rim on

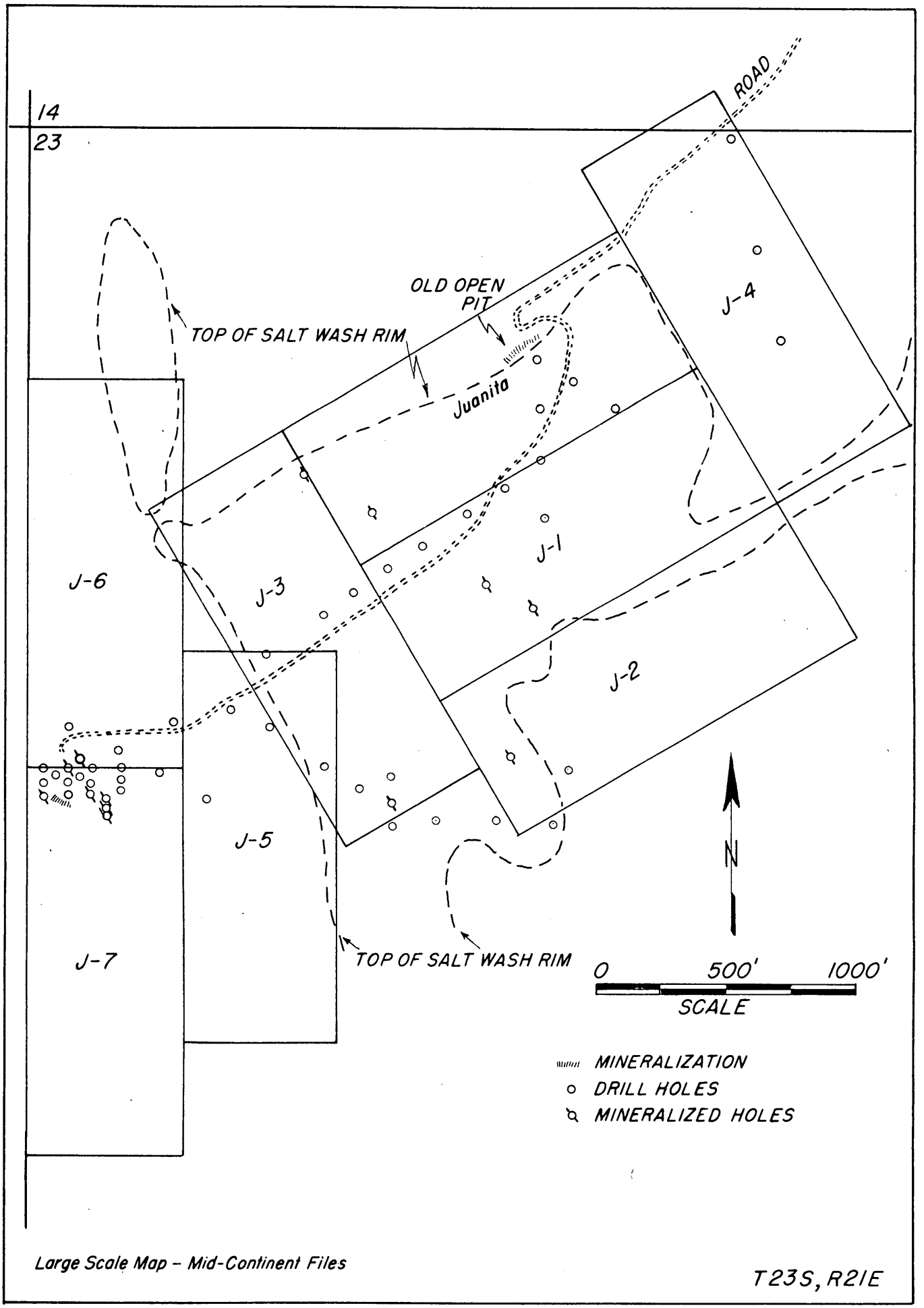


FIG.10 JUANITA GROUP — YELLOW CAT AREA

the northeast side of the mesa. The roll had a maximum outside diameter of about four feet, a portion of which had been removed by erosion. The uranium penetrated the wall rock in places to a depth of four inches. Low-grade vanadium, which is often an indicator of nearby ore, has been found along the next paralleling joint plane, suggesting the possible presence of another roll. This group of claims, although favorably situated geologically, has had comparatively little development work.

The Juanita and the Juanita No. 1 claims were discovered in June, 1951, by Strategic Minerals Exploration Co., and since that time a geologic study was made of the area in general and approximately five tons of ore was mined to check the continuity of the roll. After encouraging geological evidence was found and the ore continued over a length of more than 50 feet, the Juanita Nos. 2, 3, and 4 were located on December 10, 1951. Two samples were cut along an exposed roll. Sample No. 1, on the extreme east end, assayed 3.84 percent V_2O_5 and 0.25 percent U_3O_8. Sample No. 2, in the middle of the roll, assayed 1.64 percent V_2O_5 and 1.23 percent U_3O_8. Juanita Nos. 5, 6, and 7 were located in late 1953 and came under Circular 7 of the Atomic Energy Commission.

During the month of September 1954, the lessees, the Western Silver Lead Corp., and the Square Deal Mining and Milling Co., carried out a program of wagon drilling on the Juanita Group. A total of 7,182 feet was drilled at a cost of $5,769. Although this program did not discover the presence of ore bodies, several of the holes were mineralized, indicating up to 0.10 percent U_3O_8. It now appears that additional drilling is warranted. The estimated evaluation of these unproven claims would be approximately $1,000 per claim.

UTAH STATE SCHOOL SECTION (EAST)

Sec. 2, T. 23 S., R. 22 E.
(Refer to Fig. 11)

The north one-half of this school section, under lease to Mid-Continent, with a total of 332.52 acres, is perhaps less favorably located than the school section containing the previously described ore bodies, as it is located four miles east of the area containing the heaviest concentration of producing mines.

The major portion of the area covered by this lease is similar to the Silver Top claims, in that it appears to cover the dip slope of the third Salt Wash sandstone. Previous drilling by the U. S. Geological Survey consisted of 16 holes on 500-foot centers, 14 of which were by wagon-drill. During the spring of 1955 Mid-Continent drilled six core holes along the north end of the section. None of these holes encountered mineralization, but several of the holes penetrated appreciable thicknesses of favorable sandstone. This drilling indicated that the average drilling depth should be at least 100 feet to be sure of drilling through the fourth ore-bearing sandstone.

It appears advisable to drill from 30 to 40 core holes spaced on 200-foot centers endeavoring to determine if there exists any definite channeling in the fourth ore-bearing sandstone. The value of the lease on this has been placed at $30.00 per acre.

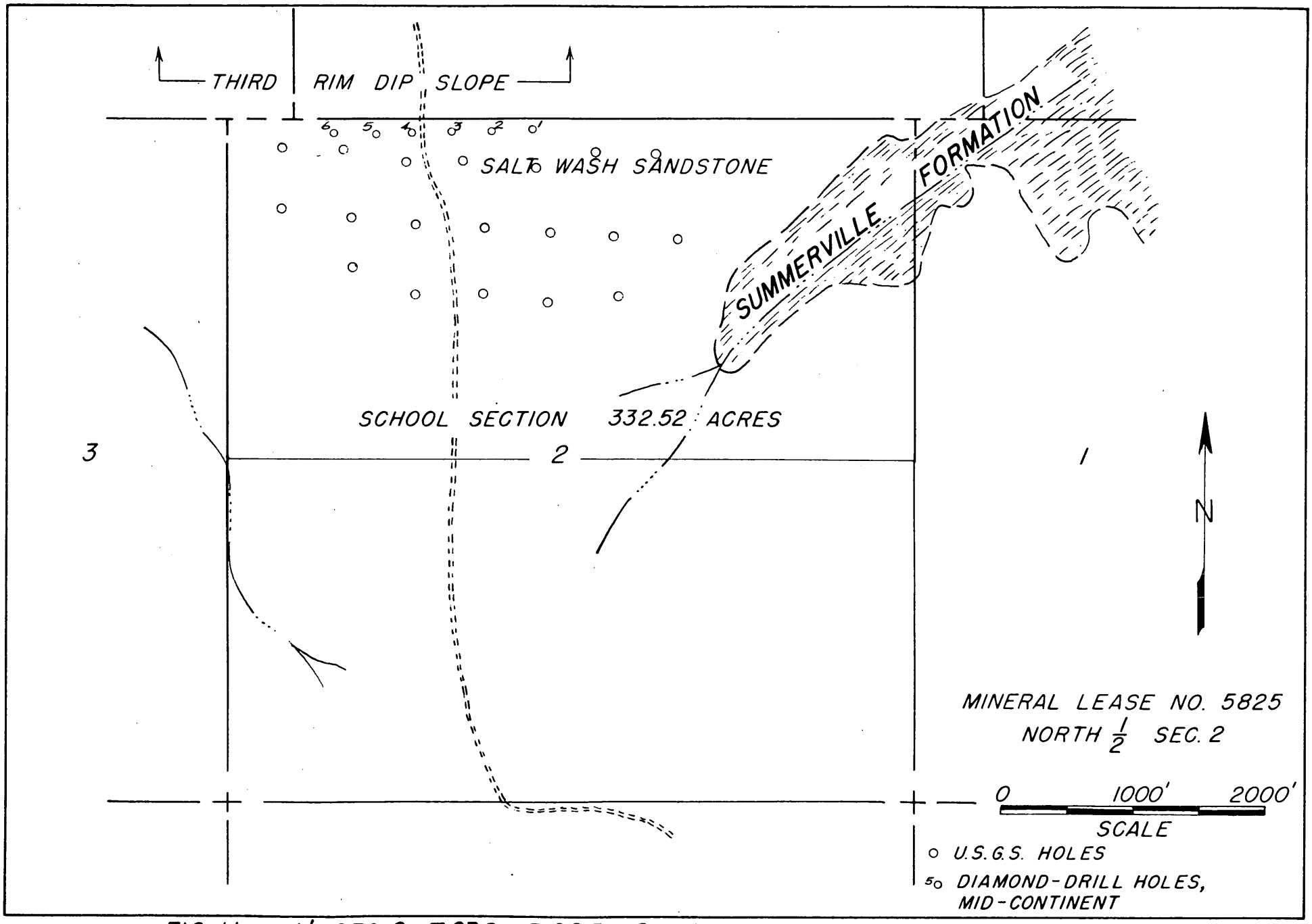


FIG. 11 N½ SEC. 2, T. 23S., R. 22E., S.L.M.

CONCLUSION

Estimated production from the Yellow Cat area from 1935 through 1954 would indicate that a total of 40,000 tons of uranium-vanadium ore was mined having a value slightly in excess of one million dollars. Recent drilling by the U. S. Geological Survey has established locations and trends of deeper ore-bearing sandstone channels containing ore deposits of major significance. Six or seven ore bodies are now being mined that contain proven ore reserves many times greater than all past production from the area. Favorable sandstone channels containing many commercial ore deposits have now been established in areas of concentrated drilling and these should be traced by further exploratory drilling.

Recent drilling by Mid-Continent Uranium Corp. has discovered a fourth ore-bearing sandstone channel on Utah State school section, Sec. 2, T. 23 S., R. 21 E., and traced the channel for over 2,500 feet. Two deposits of commercial grade uranium-vanadium ore, 600 feet apart, have been blocked out on 50-foot centers. Calculations, based on proven tonnages and grades established by chemical assays of BX-cores, indicate 16,355 tons of ore having a gross value of $416,281, including the initial production bonus.

Mid-Continent completed a development program during 1955 in the John Incline mine, on the John Group of nine claims, producing over $21,000 worth of ore. Estimates of ore reserves from Geological Survey drilling data indicate 2,094 tons of ore remaining in the mine having a gross value of $113,685, including the remaining production bonus. An

application for Defense Minerals Exploration Administration financial assistance has recently been filed to drill the John Group of claims. The estimated cost of the initial phase, Stage I, is $102,000, while the second phase, Stage II, of offset holes is estimated at $60,000.

In addition to the above two properties containing ore reserves Mid-Continent has three other properties in the Yellow Cat area: the Silver Top Group of five claims; the Juanita Group of eight claims; and the north half of Utah State School Section, Sec. 2, T. 23 S., R. 22 E. Although the presence of ore deposits has not be established on these three properties, each is worthy of an exploratory drilling program. It is proposed to locate the ore-bearing fourth sandstone channels by preliminary drilling, and then trace these favorable thicknesses by a progressive-type pattern of hole locations. The properties are all eligible for the initial production bonus, and each has the geologic features necessary for the presence of commercial ore deposits.

APPENDIX 1

UTAH LAND BOARD ROYALTY SCHEDULE

Fissionable Minerals Royalty
(Adopted November, 1955)

(1) To pay a royalty of 3.9% of the gross amount received for all fissionable materials, less any bonus, mine development and transportation allowance, and lime penalty deduction but including the gross amount received for any mineral included with the fissionable material on ore which has a gross value of from $0.00 to $3.99 per dry ton and on ore having a gross value per dry ton of $4.00 or more, to pay an additional 0.3% royalty for each $1.00 in gross value per dry ton to a maximum royalty of 17.4% on ore having a gross value of $48.00 or more per dry ton.

(2) And in addition to (1), to pay a royalty of 8.0% of any bonus received from the sale of fissionable materials.

EXAMPLES

URANIUM BASE PRICE					URANIUM	INITIAL PRODUCTION BONUS	
$0.00 to $3.99	Gross value per dry ton			3.9%	.01 U_3O_8	$3.00 per ton	8%
4.00 to 4.99	"	"	"	4.2%			
5.00 to 5.99	"	"	"	4.5%			
6.00 to 6.99	"	"	"	4.8%			
7.00 to 7.99	"	"	"	5.1%			
8.00 to 8.99	"	"	"	5.4%			
9.00 to 9.99	"	"	"	5.7%			
10.00 to 10.99	"	"	"	6.0%			
11.00 to 11.99	"	"	"	6.3%			
12.00 to 12.99	"	"	"	6.6%			
13.00 to 13.99	"	"	"	6.9%			
14.00 to 14.99	"	"	"	7.2%	.21 U_3O_8	$14.70 per ton	8%
15.00 to 15.99	"	"	"	7.5%			
16.00 to 16.99	"	"	"	7.8%	.24 U_3O_8	$16.80 per ton	8%
17.00 to 17.99	"	"	"	8.1%			
18.00 to 18.99	"	"	"	8.4%			
19.00 to 19.99	"	"	"	8.7%			
20.00 to 20.99	"	"	"	9.0%			
21.00 to 21.99	"	"	"	9.3%	.30 U_3O_8	$21.00 per ton	8%
22.00 to 22.99	"	"	"	9.6%			
23.00 to 23.99	"	"	"	9.9%			
24.00 to 24.99	"	"	"	10.2%	.35 U_3O_8	$24.50 per ton	8%
25.00 to 25.99	"	"	"	10.5%			
26.00 to 26.99	"	"	"	10.8%			
27.00 to 27.99	"	"	"	11.1%			
28.00 to 28.99	"	"	"	11.4%			
29.00 to 29.99	"	"	"	11.7%			
30.00 to 30.99	"	"	"	12.0%			
31.00 to 31.99	"	"	"	12.3%			
32.00 to 32.99	"	"	"	12.6%			

URANIUM BASE PRICE					URANIUM INITIAL PRODUCTION BONUS		
$33.00 to 33.99	Gross value per dry ton			12.9%			
34.00 to 34.99	"	"	"	13.2%			
35.00 to 35.99	"	"	"	13.5%	.50 U_3O_8	$35.00 per ton	8%
36.00 to 36.99	"	"	"	13.8%			
37.00 to 37.99	"	"	"	14.1%			
38.00 to 38.99	"	"	"	14.4%			
39.00 to 39.99	"	"	"	14.7%			
40.00 to 40.99	"	"	"	15.0%			
41.00 to 41.99	"	"	"	15.3%			
42.00 to 42.99	"	"	"	15.6%	.60 U_3O_8	$42.00 per ton	8%
43.00 to 43.99	"	"	"	15.9%			
44.00 to 44.99	"	"	"	16.2%			
45.00 to 45.99	"	"	"	16.5%			
46.00 to 46.99	"	"	"	16.8%			
47.00 to 47.99	"	"	"	17.1%			
48.00 and over	"	"	"	17.4%	.70 U_3O_8	$49.00 per ton	8%

Appendix 2

(Sample)

EXCERPTS FROM

UTAH STATE URANIUM AND VANADIUM MINERAL LEASE

Mineral Lease Application No. _____

Mineral Lease No. M.L.A. 4248
Grant: School

THIS INDENTURE OF LEASE AND AGREEMENT, entered into, in duplicate, this _____, by and between the State Land Board, acting in behalf of the State of Utah, hereinafter called the Lessor, and Norman Ebbley and associates, a copartnership of Grand Junction, Colorado, hereinafter called the Lessee, under the pursuant to Title 86, Chapter 1, Utah Code Annotated 1943, and Amendments thereto.

WITNESSETH: That the Lessor, in consideration of the rents and royalties to be paid and the covenants to be observed by the Lessee, as hereinafter set forth, does hereby grant and lease to the Lessee the exclusive right and privilege to mine and dispose of all of the uranium and vanadium minerals in the following described tract of land situated in Grand County, State of Utah, to-wit:

All of Section 2, T. 23 S., R. 21 E., of the S.L.M.,

containing a total of 397.96 acres, more or less, together with the right to use and occupy so much of the surface of said land as may be required for all purposes reasonably incident to the mining and removal of the uranium and vanadium minerals produced in commercial quantities from the said lands, upon condition that at the end of each Twenty-year period succeeding the first day of the year in which this lease is issued, such readjustment of terms and conditions may be made as the Lessor may determine to be necessary in the interest of the State.

ARTICLE 1

It is expressly understood and agreed that this lease is granted subject in all respects to and under the conditions of the laws of the State of Utah, and the Federal Statutes regarding the operation of Metallic mineral mines, Employer's Workman's Compensation, Workman's Insurance, Social Security and Unemployment Insurance and such existing Rules and Regulations or Rules and Regulations, hereafter adopted and approved by the State Land Board.

It is further expressly understood and agreed that this lease covers only the mining and marketing of uranium and vanadium minerals, but that should other minerals be discovered such fact shall be immediately reported to the Lessor.

ARTICLE III

The Lessee in consideration of the granting of the rights and privileges aforesaid, hereby covenant and agree as follows:

FIRST: To pay to the Lessor as annual rental for each acre covered by this lease the sum of 50¢ per acre per annum. All such annual payments of rental to be made in advance on the 2nd day of January of each year, except the 1954 rental, which is payable on the execution of this lease, such rental to be credited on the royalties to become due hereunder during the year for which said rental is paid.

SECOND: To pay to the Lessor a royalty of 12-1/2 per cent of the proceeds for ores sold less assay charges and transportation to point of sale. All payments to be made monthly on or before the 15th day of the month next succeeding the month in which the ores are sold. Monthly statements as to the amount of production sold from the leased ground in the preceding month must be in affidavit form and shall accompany the royalty remittance. Failure to pay the rents and royalties or any of them in the manner herein provided shall constitute a default and entitle the Lessor to declare a forfeiture on this lease and to enter upon and take possession of the premises with or without process of law.

THIRD: That at the option of the Lessor it may require the payment at the mine of royalties in kind; the amount being 12-1/2 per cent of the material produced. (See New Schedule Appendix 1)

FOURTH: That upon the shipment of any ore under this lease, the Lessor shall be immediately notified in writing that such shipment is being made, giving the means of transportation and the point of destination.

FIFTH: That at the option of the Lessor it may require, before the commencement of mining operations, that the Lessee shall submit a detailed plan with maps, showing the proposed method of opening the ground and that such work shall not be undertaken until the Lessor has approved such plan and that failure on the part of the Lessee to do so, if required, or to prosecute development on the lines directed, shall constitute a cause for cancellation of this lease.

SIXTH: To commence actual mining operations upon the land included herein on or before _____, and thereafter to diligently operate the property according to the plans accepted or under modifications thereof as may be acceptable to the Lessor.

SEVENTH: To at all times during the life of this lease perpetuate and protect the main line tunnels in ingress and egress to and from said lands and the air courses necessary for proper ventilation, by means of proper pillars and timbering as may be directed by the Lessor or State Mine Inspector, whether upon this leased land or extending through adjacent lands owned or operated by the Lessee, and upon abandonment or termination of this lease from any cause, to substantially fence, fill in, cover or close all surface openings or workings, if directed to do so by said Lessor.

EIGHTH: To keep at the mine office clear, accurate and detailed maps on tracing cloth, on a scale not more than 50 feet to the inch, of the workings in each separate mine on the leased lands and on the lands adjacent, and to be so arranged with reference to a public land corner that the maps can be readily and correctly superimposed, and to furnish to the Lessor annually, or upon demand, certified copies of such maps and such written statement of operations as may be called for. All mine surveys shall be made by a licensed engineer and all maps certified to by him.

NINTH: To not assign this lease or any interest therein, nor sublet any portion of the leased premises, or any of the rights and privileges herein granted, without the written consent of the Lessor being first had and obtained.

ARTICLE VI

Upon cancellation of this lease for any cause hereunder the Lessee shall be entitled to remove from the lease holdings only their personal and movable property and that improvements attached to the land such as buildings, timbering or other construction or constructions material in place, shall remain undisturbed upon the ground and the property surrendered in good usable condition.

ARTICLE VII

It is mutually understood and agreed that the suspension of mining operations by the Lessee for a longer period than six months without the written consent of the Lessor being first had and obtained shall be a cause for forfeiture, and that upon the violation of this provision or any of the other terms of this lease the Lessor may at its option after thirty days notice by registered mail cancel this lease. After the expiration of the said thirty days and the cancellation of the lease no notice of such cancellation need be given the Lessee.

ARTICLE VIII

It is mutually understood and agreed that the Lessee may terminate this lease at any time upon giving three months notice in writing to the Lessor, and upon payment of all rents and royalties and other sums due and payable to the Lessor, and upon complying with the terms of this lease with respect to the preservation of the workings in such order and condition as to permit of the continued operation of the premises and the preservation of the mine.

ARTICLE IX

It is understood and agreed by and between the parties hereto that the Lessor, its officers and agents, shall have the right at all times to go in and upon the leased lands and premises, during the term of said lease to inspect the work done and the progress thereof on said land and the products obtained therefrom, and to post any notices on the said land that it

may deem fit and proper; and also shall permit any authorized representatives of the Lessor to examine all books and records pertaining to operations and under this lease, and to make copies of and extracts from the same, if desired.

ARTICLE X

It is mutually understood and agreed by the parties hereto that all of the terms, covenants, conditions and obligations in this lease contained, shall be binding upon the heirs, executors, administrators and assigns of the Lessee.

ARTICLE XI

It is understood and agreed that this lease is issued only under such title as the State of Utah may now hold, and that in the event the State is hereafter divested of such title, the Lessor shall not be liable for any damages sustained by the Lessee, nor shall the Lessee be entitled to or claim any refund of rentals or royalties, or other monies theretofore paid to the Lessor.

IN WITNESS WHEREOF, the parties have hereunto subscribed their names the day and year first above written.

STATE OF UTAH, STATE LAND BOARD

APPROVED AS TO FORM

BY_____
Lessor

_____
Attorney General

_____
Lessee

Appendix 3

EXCERPTS FROM ATOMIC ENERGY COMMISSION REGULATIONS

FOR PURCHASING URANIUM-VANADIUM ORES

Effective March 1, 1951

"(Domestic Uranium Program Circular 5, Revised)

"PART 60 - DOMESTIC URANIUM PROGRAM

"GUARANTEED MINIMUM PRICE FOR URANIUM-BEARING CARNOTITE-TYPE OR ROSCOELITE-TYPE ORES OF COLORADO PLATEAU AREA

. . .

"Section 60.5 (c) Definitions. As used in this section and in 60.5a, the term 'buyer' refers to the U. S. Atomic Energy Commission, or its authorized purchasing agent. The term 'ore' does not include mill tailings or other mill products. The term 'seller' refers to any person offering uranium ores for delivery to the Commission. Weights are avoirdupois dry weights, unless otherwise specifically provided.

"(d) Deliveries of not to exceed 1,000 tons per year. To aid small producers, any one seller may deliver without a written contract but otherwise in accordance with this circular up to, but not exceeding, 1,000 short tons (2,000 pounds per ton) of ores during any calendar year.

"(e) Deliveries in excess of 1,000 tons per year. Sellers desiring to deliver in excess of 1,000 short tons (2,000 pounds per ton) of ores during any calendar year will be required to enter into a contract with the Commission providing for, among other things, a rate of delivery and the total quantity of ore to be delivered.

"(f) Delivery. Seller, at his own expense, shall deliver and unload all ores at the buyer's depot at Monticello, Utah. Deliveries shall be in lots of not less than 10 short tons (2,000 pounds per ton) unless special arrangements have been agreed upon by buyer, but such lots may be delivered in more than one load. Days and hours during which ore may be delivered will be posted at the depot.

"(g) Weighing, sampling and assaying. Buyer will bear the cost of weighing, sampling, and assaying. The net weight of each load will be determined by the buyer's weighmaster on scales which will be provided by the buyer at or in the vicinity of the purchase depot and such weight will be accepted as final. A weight ticket will be furnished seller or his representative for each load. Each lot of ores will be sampled promptly by the buyer according to standard practice and such sampling will be accepted as final . . . .

"(h) Payment. Buyer will make payment promptly but payment will not be made until an entire minimum lot of ten short tons (2,000 pounds per ton) has been delivered and accepted, unless special arrangements have been agreed upon by buyer, in which case there may be an extra charge for assaying and sampling. Moisture determinations, analyses and settlement sheets, together with the check in payment, will be mailed to seller . . . . .

"60.5a. Schedule I; minimum prices, specifications, and conditions - - (a) Prices.
Payment for delivery of the ores will be computed on the following basis:

"(1) Uranium. (i) Ores assaying less than 0.10 percent: no payment. Any such ores which are delivered to the purchase depot shall, unless otherwise specifically agreed to by buyer, become the property of the buyer as liquidated damages for buyer's expense of weighing, sampling, and assaying, and after sampling may be placed in process, comingled, or otherwise disposed of by buyer. If seller has any question as to the quality of his ore, it is suggested that before shipment and delivery to the purchase depot a representative sample be submitted to the buyer or to one of the umpires for assay at seller's expense. The buyer at its discretion may assay a limited number of samples without charge.

"(ii) Ores assaying 0.10 percent U_3O_8 and more, as follows:

U_3O_8 Assay:	Payment per pound U_3O_8
0.10 percent	$ 1.50
0.11 percent	1.70
0.12 percent	1.90
0.13 percent	2.10
0.14 percent	2.30
0.15 percent	2.50
0.16 percent	2.70
0.17 percent	2.90
0.18 percent	3.10
0.19 percent	3.30
0.20 percent and more	3.50

"(iii) Premiums on uranium: $0.75 per pound for each pound of U_3O_8 in excess of 4 pounds U_3O_8 per short ton (2,000 pounds per ton) of ore and an additional premium of $0.25 per pound for each pound in excess of ten pounds U_3O_8 per short ton. Fractional parts of a pound will be paid for on a pro rata basis to the nearest cent.

"(2) Vanadium. V_2O_5 at $0.31 per pound up to, but not exceeding, ten pounds of V_2O_5 for each pound of U_3O_8 contained in ores. No factor will be included for V_2O_5 in excess of ten pounds for each pound of U_3O_8, although buyer may, from time to time, publicly announce that, for limited periods

by written agreements with individual producer, V_2O_5 in excess of ten-to-one will be paid for. Any such announcement will be made by posting a notice to this effect at the Monticello depot and through such other channels as are deemed suitable to achieve maximum dissemination among producers. Excess V_2O_5 shall be deemed to be buyer's property.

"(3) Allowances. (i) A development allowance of $0.50 per pound U_3O_8 contained in ores assaying 0.10 percent U_3O_8 or more in recognition of the expenditures necessary for maintaining and increasing developed reserves of uranium ores. Fractional parts of a pound will be paid for on a pro rata basis to the nearest cent. Sellers accepting this allowance are deemed to agree to spend such funds for the development or exploration of their properties. Sellers delivering less than 1,000 short tons per calendar year will not be required to submit an accounting record of expenditures for development or exploration pursuant to this agreement but sellers delivering in excess of 1,000 short tons per calendar year will be required, under the terms of their contracts, to submit proof satisfactory to the Commission that funds equivalent to the amount received as development allowance have been spent for development or exploration either during the contract period or within six months thereafter, unless otherwise provided in the contract.

"(ii) A haulage allowance of 6¢ per ton mile for transportation of ore paid for under §§60.5 and 60.5a from the mine where produced to the purchase depot specified by the Commission, up to a maximum of 100 miles. The haulage distance from the mine to the purchase depot will be determined by the Commission and its decision will be final. Tonnages for purposes of this allowance shall be calculated on the basis of natural weights rather than dry weights.

"(4) Adjustment of assays. Assays shall be adjusted to the nearest 0.01 percent for purposes of payment.

"(b) Quality and size. Ores will not be accepted by buyer under §§60.5 60.5a which, in buyer's judgment:

"(1) Contain less than 0.10 percent U_3O_8;
"(2) Contain more than three parts of lime ($CaCO_3$) to one part of V_2O_5, or a total of more than 6 percent lime in the ore;
"(3) Contain impurities deleterious to buyer's extraction process or for any other reason are not amenable to it;
"(4) Contain lumps in excess of twelve inches in size.

"NOTE: The Commission will be interested in discussing arrangements for delivery to it of types of uranium-bearing materials other than those for which guaranteed prices have been established, such as tailings, mill products, and ores of types not acceptable under §§60.5 and 60.5a.

"(60 Stat. 755-775; 42 U. S. C. 1801-1819. Interpret or apply sec. 5, 60 Stat. 761, 42 U. S. C. 1805)

"Effective March 1, 1951 through March 31, 1958.

"Dated at Washington, D. C., this 26th day of February 1951.

"By order of the Commission.

M. W. Boyer, General Manager "

Appendix 4

EXCERPTS FROM AEC CIRCULAR ON THE URANIUM BONUS

February 28, 1951

"1. Effective March 1, 1951, to March 1, 1954, the Commission will pay a new graduated bonus of up to $35,000, depending upon the quantity and grade of ore, for initial production and delivery of acceptable uranium ore from new and certain existing mining properties.

"The new bonus, which is described in AEC Domestic Uranium Program Circular No. 6, 'Bonus for Initial Production of Uranium Ore from Domestic Mining Properties,' to be issued shortly, provides for the following:

"1. For new mining properties, bonus payments will be made on each pound of uranium oxide in acceptable ore delivered to qualified mills or Commission ore-buying stations up to and including the first 10,000 pounds.

"2. For mining properties which have produced less than 10,000 pounds of uranium oxide during the period April 9, 1948, to March 1, 1951, bonus payments will be made on the difference between what the mining property has delivered between April 9, 1948, and March 1, 1951, and 10,000 pounds. For example, the owner of a mine that has produced 4,000 pounds of uranium oxide between April 9, 1948, and March 1, 1951, may be eligible to receive a bonus on each new pound produced up to and including the next 6,000 pounds.

"3. Bonus payments per pound of uranium oxide in acceptable ores produced from qualified mining properties will range from $1.50 for those ores assaying 0.10% uranium oxide to $3.50 for ores assaying 0.20% or more. Thus the maximum bonus which may be obtained for production from new mines will range from $15,000 to $35,000, depending upon the grade of ore delivered.

"Payments under the new bonus plan will be made for all eligible ores purchased after March 1, 1951. Payments will be made directly by the Commission and not by the receiving station or mill, and will be in addition to purchase payments made pursuant to ore buying schedules. Before bonus payments will be made, the producer must make application to the Commission and the Commission must certify that the mine is eligible for the bonus."

Appendix 5

EXCERPTS FROM AEC PRESS RELEASE, SEPTEMBER 23, 1953,

EXTENDING URANIUM ORE PRICE AND INITIAL PRODUCTION BONUS

"The Commission's Domestic Uranium Program Circular 5, Revised, has been extended to cover the period through March 31, 1962, from its previous expiration date of March 31, 1958. This circular, which went into effect on March 1, 1951, provides guaranteed minimum base prices for the uranium oxide content of carnotite-type and roscoelite-type ores of the Colorado Plateau area. The price schedule ranges from $1.50 to $3.50 per pound of uranium oxide content, depending upon the grade of the ore, together with certain allowances and premiums.

"Domestic Uranium Program Circular 6, which established a bonus for initial and certain other production of uranium ores from domestic mines delivered under its terms between March 1, 1951 and February 28, 1954, now has been extended through February 28, 1957."

THE BROWN LABORATORY
2263 Broadway
GRAND JUNCTION, COLORADO

ANALYTICAL DEPARTMENT

PHONE 1543-W

CERTIFICATE OF ANALYSIS

TO

Mid-Continent Uranium Co.
201 Uranium Center Bldg.
Grand Junction, Colorado

Date 5-12-55
Order No. 3080-S

Material: Ore Samples
Received: 5-10-55
For: Analysis

Lab. No.	Your No.	Description		%U_3O_8	%V_2O_5	%$CaCO_3$
3080-1	MC-80 ✓	180.7 - 180.9	0.2'	Trace	0.05	
3080-2	MC-80 ✓	186.0 - 186.4	0.4'	0.01	0.29	
3080-3	MC-81 ✓	184.1 - 184.6	0.5'	0.08	0.60	
3080-4	MC-89 ✓	165.0 - 166.5	1.5'	0.03	0.06	
3080-5	MC-89 ✓	166.5 - 168.1	1.6'	0.20	1.13	

Analyst.

HE BROWN LABORATO. Y
2263 Broadway
GRAND JUNCTION, COLORADO

ANALYTICAL DEPARTMENT

PHONE 1543-W

CERTIFICATE OF ANALYSIS

TO

Mid-Continent Uranium Corp.
201 Uranium Center Bldg.
Grand Junction, olorado

Date 5-3-55
Order No. 2999-S

Material: Ore Sample
Received: 5-2-55
For: Analysis

Lab. No.	Your No.	Description	%U_3O_8	%V_2O_5	%$CaCO_3$
2999-1	HC-31	193.5-194.5 1.0'	0.42	1.15	

Analyst.

JE BROWN LABORATO

2263 Broadway
GRAND JUNCTION, COLORADO

ANALYTICAL DEPARTMENT

PHONE 1543-W

CERTIFICATE OF ANALYSIS

TO

Mid-Continent Uranium Corp.
201 Uranium Center Bldg
Grand Junction, Colorado

Date 3-29-55
Order No. 2633-S

Material: Ore Samples
Received: 3-26-55
For: Analysis

Lab. No.	Your No.	Description	%U_3O_8	%V_2O_5	%$CaCO_3$
2633-1	MC-~~52~~ 51	~~169.0~~ 168.5-169.6 1.1'	0.01	0.19	
2633-2	MC-52	175.0-175.5 0.5'	0.11	0.15	
2633-3	MC-52	175.5-176.0 0.5'	0.46	0.19	

Analyst.

Date 9/9/55

Minerals Assay Laboratory

Phone 1441

L#2399

549 ...land Avenue -:- Grand Junction, C...orado

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center City

NO.	SAMPLE RECEIVED 9/7/55	PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
4868	M-C-95 ~~170.5 to 172.0~~ 170.1 171.6 (1.5')	0.14	0.79			

TOTAL CHARGES $5.00

Date 9/16/55

Minerals Assay Laboratory

Phone 1441

L#2455

549 ...land Avenue -:- Grand Junction, C...rado

NAME Mid-Continent Uranium Corp. ADDRESS 201-202 Uranium Center Bldg. City

LAB. NO.	SAMPLE RECEIVED ~~5079~~ 9/15/55	PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
n 5079	MC-97 156.8 to 157.8 1.0'	0.07	0.84			

RECEIVED SEP 17 1955 MID-CONTINENT URANIUM CORP.

TOTAL CHARGES $5.00

THE BROWN LABORATORY
2263 Broadway
GRAND JUNCTION, COLORADO

ANALYTICAL DEPARTMENT

PHONE 1543-W

CERTIFICATE OF ANALYSIS

TO

Mid-Continent Uranium Corp.
201 Uranium Center
Grand Junction, Colorado

Date 9-22-55
Order No. 4685-S

Material: Ore samples
Received: 9-20-55
For: Analysis

Lab. No.	Your No.	Description	%U_3O_8	%V_2O_5	%$CaCO_3$
4685-1	1 MC98	~~153.0-154.0~~ 152.4 153.4 1.0'	0.03	1.01	
4685-2	2 MC98	161.0-163.0 2.0'	0.14	0.39	
4685-3	3 MC98	~~169.0-170~~ 169.1-170.1 1.0'	0.05	3.05	

Analyst.

Phone 1441

Date 9/23/55

Minerals Assay Laboratory

549 and Avenue -:- Grand Junction, C ado

L#4903

NAME Mid- Continent Uranium Corp. ADDRESS ~~201-202 Uranium Center Bldg. City~~

No.	SAMPLE RECEIVED 9/23/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
5300	MC-98	163.0-164.6	1.6'	0.02	1.10			
5301	MC-98	~~###~~ 166.8-169.1	2.3'	0.03	1.99			
5302	MC-98	170.1-170.4	0.3'	0.03	0.84			
5303	MC-98	171.3-172.2	0.9'	0.00	0.19			
5304	MC-99	183.1-183.7	0.6'	0.01	0.04			

TOTAL CHARGES $ 25.00

Phone 1441

Date 10/3/55

Minerals Assay Laboratory

549 and Avenue -:- Grand Junction, C rado

L#4962

NAME Mid-Continent Uranium Corp. ADDRESS 201-202 Uranium Center Bldg. City

LAB. No.	SAMPLE RECEIVED 10/1/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
5472	MC-101	186.3 to 187.6	1.3'	0.01	1.60			
5473	MC-102	177.6 to 178.0	0.4'	0.16	1.79			
5474	MC-103	171.9 to 173.7	1.8'	0.07	1.52			

Clim.

TOTAL CHARGES $ $15.00

Phone 1441

Minerals Assay Laboratory

L#2230

Date 10/14/55

541 land Avenue -:- Grand Junction, rado

NAME Mid-ontinent Uranium orp. ADDRESS 201-202 Uranium Center City

LAB. No.	SAMPLE RECEIVED 10/13/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
5696	MC-74	187.2 to 188.2	1.0'	0.01	1.91			
5697	MC-80	182.6 to 184.3	1.7'	0.05	0.41			
5698	MC-82	180.7 to 181.3	0.6'	0.04	0.61			
5699	MC-97	155.8 - 156.8 ~~156.8 to 157.8~~	Comm. 1.0'	0.03	0.06			
5700	MC-102	178.0 to 180.8	2.8'	0.05	0.22			
5701	MC-104	163.9 to 164.9	1.0'	0.02	0.23			
5702	MC-106	181.4 to 182.4	1.0'	0.13	0.21			
5703	MC-106	188.5 to 188.8	0.3'	0.03	0.45			

TOTAL CHARGES $ $40.00

Phone 1441

Minerals Assay Laboratory

L#2535

Date 10/21/55

541 land Avenue -:- Grand Junction, rado

NAME Mid-ontinent Uranium orp. ADDRESS ~~201-202~~ 201-202 Uranium enter. City

LAB. No.	SAMPLE RECEIVED 10/20/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
5867	MC-109	182.2 to 182.6	0.4'	0.07	0.99			
5868	MC-110	155.1 to 156.1	1.0'	0.06	0.04			
5869	MC-110	167.3 to 167.6	0.3'	0.01	0.49			
5870	MC-111	156.1 to 156.9	0.8'	0.00	0.20			
5871	MC-111	156.9 to 159.9	3.0'	0.52	0.68			
5872	MC-111	159.9 to 162.0	2.1'	0.05	0.04			

TOTAL CHARGES $ $30.00

RECEIVED OCT 22 1955 MID-CONTINENT URANIUM CORP.

Date 12/5/55

Minerals Assay Laboratory

Phone 1441

549 and Avenue -:- Grand Junction, Colorado

L#2757

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center Bldg. City

Lab. No.	SAMPLE RECEIVED 12/3/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
6955	MC-98	164.6 to 166.8	2.2'	0.01	0.06			
6956	MC-98	170.4 to 171.3	0.9'	0.02	0.38			
6957	MC-112	157.1 to 164.3	7.2'	0.00	0.03			
6958	MC-112	170.1 to 171.1	1.0'	0.01	0.06			
6959	MC-116	158.7 to 159.7	1.0'	Trace	0.04			
6960	MC-116	160.1 to 165.0	4.9'	0.01	0.02			
6961	MC-116	165.9 to 168.3	2.4'	0.03	0.12			

TOTAL CHARGES $35.00

Date 11/12/55

Minerals Assay Laboratory

Phone 1441

549 nd Avenue -:- Grand Junction, Colorado

L#2657

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center. City

LAB. NO.	SAMPLE RECEIVED 11/11/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
6314	MC-116	157.3 to 158.7	1.4'	0.03	0.67			
6315	MC-116	159.7 to 160.1	0.4'	0.03	0.05			
6316	MC-116	165.0 to 165.9	0.9'	0.12	0.37			
6317	MC-116	169.5 to 170.5	1.0'	0.05	3.36			
6318	MC-112	152.6 to 157.1	4.5'	0.13	0.61			
6319	MC-112	164.3 to 170.1	5.8'	0.23	1.65			

TOTAL CHARGES $30.00

11/22/55

Minerals Assay Laboratory

Phone 1441

549 and Avenue -:- Grand Junction, Colorado

L#2705

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center City

LAB. No.	SAMPLE RECEIVED 11/21/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
6593	MC-116	168.3 to 169.5	1.2'	0.03	0.34			
6594	MC-118	180.6 to 181.6	1.0'	0.02	0.60			
6595	MC-119	180.0 to 181.6	1.6'	0.07	0.50			
6596	MC-120	176.4 to 178.4	2.0'	0.40	0.47			

TOTAL CHARGES $20.00

RECEIVED NOV 23 1955 MID-CONTINENT URANIUM CORP.

Date 12/3/55

Minerals Assay Laboratory

Phone 1441

549 and Avenue -:- Grand Junction, Colorado

L#2746

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center, City

LAB. No.	SAMPLE RECEIVED 12/2/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
6865	MC-81	184.6-187.4	2.8'	0.05	0.09			
6866	MC-121	177.4-178.4	1.0'	0.03	0.66			
6867	MC-121	178.4-182.7	4.3'	0.01	0.08			
6868	MC-121	182.7-185.5	2.8'	0.37	0.81			
6869	MC-122	154.5-156.5	2.0'	0.04	0.31			
6870	MC-122	156.5-163.5	7.0'	0.23	0.90			
6871	MC-122	163.5-171.6	8.1'	0.05	0.04			
6872	MC-123	157.2-162.7	5.5'	0.21	0.09			
6873	MC-123	162.7-172.2	9.5'	0.04	0.06			
6874	MC-123	172.2-176.5	4.3'	0.25	0.53			
6875	MC-124	162.4-164.5	2.1'	0.12	1.14			
6876	MC-124	164.5-171.0	6.5'	0.03	0.10			
6877	MC-124	171.0-173.2	2.2'	0.36	2.62			
6878	MC-125	155.9-160.5	4.6'	0.09	0.28			
6879	MC-125	160.5-164.9	4.4'	0.16	0.82			

TOTAL CHARGES $74.00

Date 12/12/55

Minerals Assay Laboratory

549 and Avenue -:- Grand Junction, Colorado

Phone 1441

L#2785

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center, City

LAB. NO.	SAMPLE RECEIVED 12/10/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7234	MC-127	155.6-158.0	2.4	0.06	0.38			
7235	MC-126	161.8-163.7	1.9'	0.08	0.73			

TOTAL CHARGES $ $10.00

Date 12/17/55

Minerals Assay Laboratory

549 and Avenue -:- Grand Junction, Colorado

Phone 1441

L#2804

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center City

LAB. NO.	SAMPLE RECEIVED 12/16/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7360	MC-128	158.0-159.4	1.4'	0.11	3.78			
7361	MC-130	160.6-162.4	1.8'	0.08	0.50			
7362	MC-131	179.8-183.3	3.5'	0.10	0.29			
7363	MC-131	183.3-185.5	2.2'	0.04	0.07			

TOTAL CHARGES $ $20.00

Date 12/19/55

Minerals Assay Laboratory

Phone 1441

549 and Avenue -:- Grand Junction, C ado

L#2812

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center, City

No.	SAMPLE RECEIVED 12/17/55	PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7414	MC-132 159.7-162.1 2.4'	0.11	0.79			
7415	MC-132 162.1-163.0 0.9'	0.01	0.06			
7416	MC-132 163.0-166.3 3.3'	0.04	0.60			

TOTAL CHARGES $ $15.00

Date 12/22/55

Minerals Assay Laboratory

Phone 1441

549 1 nd Avenue -:- Grand Junction, Co do

L#2821

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center City

LAB. No.	Correction Report SAMPLE RECEIVED 12/19/55	PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7479	MC-134 165.9-168.0 2.1'	0.17	0.25			
7480	MC-135 169.9-170.7 0.8'	0.04	0.05			

TOTAL CHARGES $ $10.00

Phone 1441

Minerals Assay Laboratory

Date 12/31/55 — 549 and Avenue -:- Grand Junction, C ado — L#2866 & 2868

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center, City

No.	SAMPLE RECEIVED 12/30/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7907	MC-139	180.7-185.0	4.3'	0.30	0.45			
7908	MC-139	185.0-187.0	2.0'	0.05	0.50			
7910	MC-136	160.7-162.2	1.5'	0.04	0.24			
7911	MC-137	~~176.7-178.5~~ 166.7-168.5	1.8'	0.01	Trace			

Comm.

TOTAL CHARGES $ $20.00

Phone 1441

Minerals Assay Laboratory

Date 1/3/56 — 549 and Avenue -:- Grand Junction, C ado — L#2872

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center City

LAB. No.	SAMPLE RECEIVED 12/32/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7926	MC-141	175.3-178.4	'	0.17	0.32			
7927	MC-141	178.4-185.0	6.6'	0.02	0.01			
7928	MC-141	185.0-189.3	4.3'	0.01	0.02			

TOTAL CHARGES $ $15.00

Report on

MID-CONTINENT URANIUM CORP. PROPERTIES

in the

THOMPSON DISTRICT, GRAND COUNTY, UTAH

Comprising 1,180 Acres

in the

Yellow Cat Area

MID-CONTINENT URANIUM CORP.

ENGINEERING STAFF

February 1956

February 1, 1956

RECEIVED
FEB - 9 1956

To the Directors and Officers
Mid-Continent Uranium Corp.
201 Uranium Center Building
Grand Junction, Colorado

RE: Status of Yellow Cat Properties

Gentlemen:

Pursuant to your request, I am herewith submitting for your consideration a report on the present status of Mid-Continent's properties in the Yellow Cat area, Thompson District, Grand County, Utah. Please refer to the original report dated March 15, 1954. Specifically the ground includes the following properties: (All in S.L.M., Grand County, Utah)

1. Sec. 2, T. 23 S., R. 21 E., 397.76 acres. This school section was originally approved and drilled under a Defense Minerals Exploration Administration loan. Several ore bodies of commercial value have recently been drilled. Evaluations of these ore bodies in terms of tonnage, grade, and gross value are included in this report. Refer to page 21.

2. John Group. Sec. 1, T. 23 S., R. 21 E., 183.78 acres. An application has been recently filed with the DMEA for financial assistance to drill the John group of nine claims. The proposed exploration program and cost estimates are included in this report. Evaluations of ore reserves in the John Incline mine are included. Refer to page 28.

3. Silver Top Group. Sec. 34, T. 22 S., R. 22 E., 103.30 acres. Refer to page 38.

4. Juanita Group. Secs. 14 and 23, T. 23 S., R. 21 E., 162.43 acres. Refer to page 38.

5. N 1/2 of Sec. 2, T. 23 S., R. 22 E., 332.52 acres. Refer to page 41.

The report covers the geology of the area, production records, and an estimate of the value of the various properties. The Yellow Cat properties controlled by Mid-Continent indicate the advisability of an extensive mining program as well as a continued exploration program.

Mid-Continent staff, who collaborated on the preparation of this data, include C. M. Mobley, geologist, Roy Hall, mining engineer, and Norman Ebbley, mining geologist.

Yours very truly,

Norman E. Ebbley

Norman E. Ebbley
General Manager

TABLE OF CONTENTS

	Page
Abstract	1
Introduction	2
Location and Accessibility	4
Physical Features and Climate	5
Labor and Living Conditions	6
History	7
General - Colorado Plateau Area	7
Thompson Area	9
Property and Ownership	11
Ore Deposits	13
General Geology	13
Occurrence of Deposits	17
Production	20
Utah State School Section (West)	21
Ore Hole Data	24
Recap of Proven Reserves	27
John Group	28
Production	32
Proven Reserves	33
Recommended Exploration Program	34
Estimated Exploration Costs under DMEA	35
Silver Top Group	38
Juanita Group	38
Utah State School Section (East)	41
Conclusion	42

ILLUSTRATIONS

Figures		Page
1.	Index Map, Location Thompson Area	4
2.	West Half Thompson, Utah Area	5
2A.	East Half Thompson, Utah Area	5
3.	Sec. 2, T. 23 S., R. 21 E., Yellow Cat Area .	23
4.	Relative Position of Ore Bodies and Fourth Sandstone Channel	23
5.	West Ore Body Area, Sec. 2 (West)	23
6.	East Ore Body Area, Sec. 2 (West)	23
7.	John Group, Showing Proposed Exploration . .	29
8.	John Incline Underground Workings	31
9.	Silver Top Claims, Sec. 34, T. 22 S., R. 22 E.	38
10.	Juanita Group, Yellow Cat Area	39
11.	North Half Sec. 2, T. 23 S., R. 22 E. . . .	41

APPENDICES

1. Utah State Land Board Fissionable Minerals Royalty Schedule for State Lands, Revised November 1955.

2. Excerpts from Utah State School Section Lease

3. Excerpts from Atomic Energy Commission Regulations for Purchasing Uranium-Vanadium Ores, March 1, 1951.

4. Excerpts from Atomic Energy Commission Circular on the Uranium Bonus, February 28, 1951.

5. Excerpts from Atomic Energy Commission Press Release, September 23, 1953, Extending Uranium Ore Price and Initial Production Bonus.

6. Reproductions of Assay Laboratory Returns of Holes Drilled on School Section, Section 2, T. 23 S., R. 21 E., S.L.M., Grand County, Utah.

RECEIVED
FEB - 9 1956

ABSTRACT

This report describes the uranium-vanadium ore reserves and potential of twenty-two mining claims and two Utah State School Sections, totalling 1,180 acres, located in the Thompson district, Grand County, Utah. Included in the report is a description of the geologic features of the area with accompanying geologic maps. In addition ore reserves calculations are given for recently drilled ore deposits on the westerly school section, and on the John Group of claims. An exploratory drilling program has been planned for the John Group with cost estimates covering the proposed program. A Defense Minerals Exploration Administration application for financial aid has been filed to help finance this program.

Drilling to date on the westerly school section has established the presence of a major fourth sandstone channel containing the uranium-vanadium ore deposits. Isopach mapping of the sandstone thicknesses shows that the favorable fourth sandstone channel has been traced for 2,500 feet east and west, and it is apparent that further drilling endeavoring to extend the channel is warranted. Recent discoveries of ore deposits in other fourth sandstone channels in the Yellow Cat vicinity foreshadows an economic revival of the district. Recently drilled ore bodies, now being mined, indicate proven reserves several times greater than the total past production from the Thompson district.

A summary of ore reserves in the properties owned by Mid-Continent in the Yellow Cat area are as follows: Drilled-out ore bodies, $530,000; inferred reserves, $1,250,000; estimated value of the remainder of the claims, $95,000.

INTRODUCTION

General - Colorado Plateau Area

Vanadium and uranium ores have been found to occur widely distributed throughout Western Colorado and Eastern Utah and recently commercial deposits have been found and mined in South Dakota, New Mexico, Arizona and Wyoming.

The majority of the ore occurrences are replacement deposits and impregnations of rare minerals in the Salt Wash member of the Morrison formation of upper Jurassic age and in the Shinarump Conglomerate of Triassic age.

The economic history of uranium prior to 1942 is well covered by several publications, a few of which are listed. 1/ From the start of the last World War the production figures of radioactive materials have been highly restricted information. The Atomic Energy Act of 1946 "for the

. . . . . .

1/De Ment, J., and Dake, H.C., "Uranium and Atomic Power", New York, Chemical Pub. Co., 1941; rev. edition, 1945; "Rarer Metals", New York, Chemical Pub. Co.

De Ment, J., and Dake, H.C. "Uranium Minerals Handbook", Mineralogist Pub. Co., 1945.

Thom, E. M., "Bibliography of North American Geology", 1929-1949, U. S. Geol. Survey Bull. 937(1944); 1940 and 1941, Ibid., Bull. 938(1942); 1942 and 1943, Ibid., Bull. 949(1945)

Tyler, P.M., "Radium", U. S. Bureau Mines Inf. Circ. 6312(1930)

U. S. Atomic Energy Commission, "Selected Bibliography on Atomic Energy", Washington, 1948

Fisher, R. P., "Vanadium Deposits of Colorado and Utah", U. S. Geol. Survey Bull., 1942

development and control of atomic energy" provided for a Domestic Uranium Program which established a graduated price schedule for domestic ores.

The Atomic Energy Commission's first policy was outlined in Circular No. 3, dated April 9, 1948. The initial price schedule proved to be too low, as the majority of the ore producers were suffering a loss in their operations. Accordingly, the Commission issued Circular No. 5, effective February 1949, alleviating to some extent the small producer's plight.

Increased material and labor costs again forced the Commission to revise its policy price-wise, and on March 1, 1951, the price schedule was raised and extended through March 31, 1958.[2/] On September 23, 1953, the same price schedule was extended to cover the period through March 31, 1962.[3/] An initial production bonus, under Domestic Uranium Program Circular No. 6, established March 1, 1951,[4/] was, on September 23, 1953, extended through February 28, 1957.[5/] It has been recently announced by the Atomic Energy Commission that the payments under the production bonus are now amounting to approximately $5,000,000 a year.

At the present time production of uranium-vanadium type ores has far out-distanced the milling phase of the program. The number of mills in the area having an estimated combined capacity of about 2,500 tons per

. . . . . .

2/ See Appendix No. 3

3/ See Appendix No. 5

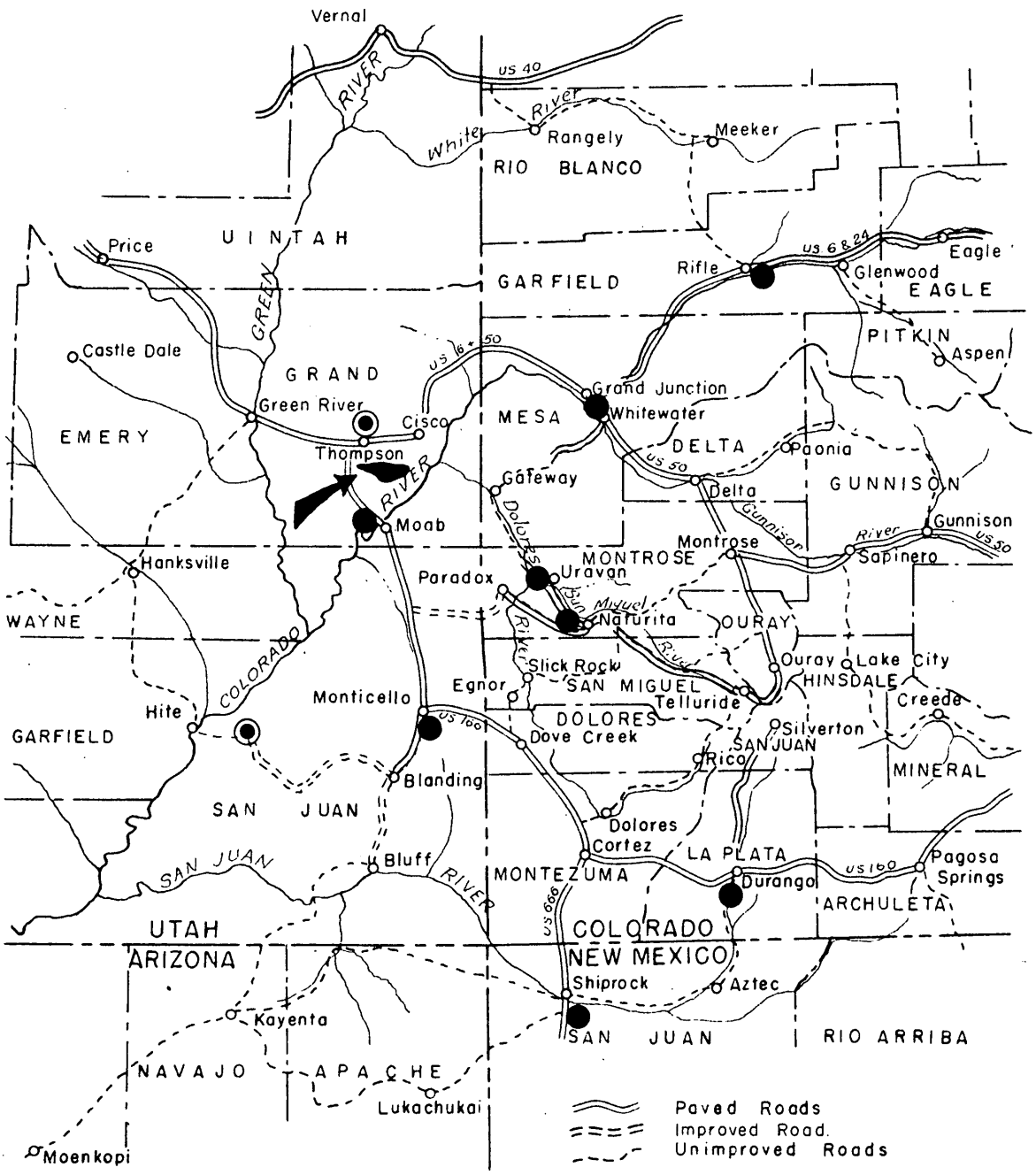
4/ See Appendix No. 4

5/ See Appendix No. 5

day are at present being increased to prevent the further accumulation of excessive stockpiles that present a possible economic hazard for the processing companies. For the past year and a half the production of uranium ores has been actively curtailed by the Atomic Energy Commission. The milling companies are naturally limited in their ability to carry large inventories of purchased ores in their stockpiles as they are not reimbursed for the payment to the miner for these ores until they have produced a refined product which they in turn can sell to the Atomic Energy Commission. However, even under the best of conditions, it will be from eight to eighteen months before mills now under construction at Moab, LaSal and Green River can be put into operation.

LOCATION AND ACCESSIBILITY

The Thompsons area has its long axis east and west and lies approximately six miles south of the road running between Cisco and Thompsons, Utah. Refer to Index map, Figure No. 1. The area embraces about 200 square miles of territory in the Canyon Lands Subdivision of the Colorado Plateau. At the present time there are two partially graveled roads and one new all-weather graveled road running from the main east-west highway south into the Yellow Cat area, which is in the center of the area under consideration.



INDEX MAP OF COLORADO PLATEAU

FIG. 1 LOCATION OF THOMPSON AREA

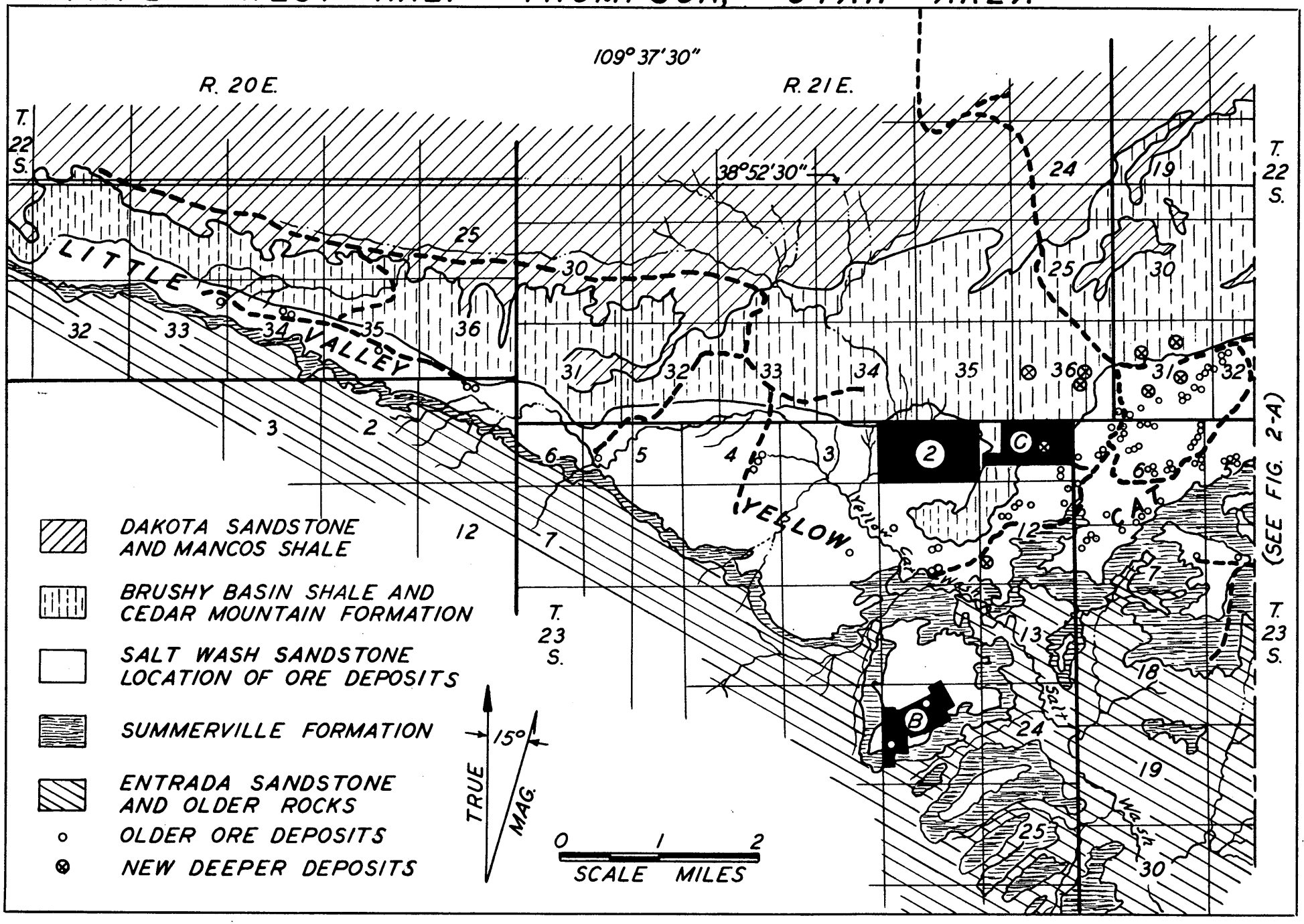
Figures 2 and 2A are vicinity maps showing the location of the property under consideration. Although the area is criss-crossed with arroyos and gulches, there are no perennial, through-flowing, streams with the exception of the Colorado River which flows southwesterly a few miles south of the general area. Road construction within the area itself is no problem as the surface overlying the Salt Wash formation is comparatively flat, it being possible to drive a jeep almost anywhere in the area even without the benefit of roads. Mining machinery and supplies are available in Grand Junction, Colorado, 80 miles east of Thompsons, and in Moab, Utah, approximately 40 miles south of Thompsons.

PHYSICAL FEATURES AND CLIMATE

Topographically, the area under consideration is of moderate relief. The roads into the area from the main highway traverse relatively flat, rolling country and then drop only slightly into the vicinity of the Yellow Cat mines. The exposed Salt Wash formation extends east and west about twenty-five miles and varies in width from one-half mile to two and a half miles north and south.

There is very little vegetation of any sort in the area with almost no trees. The Thompsons and surrounding area is primarily used as a winter grazing range for sheep. The climate is typical of east-central Utah and of west-central Colorado characterized by hot dry summers and cold winters. Rainfall is light. The U. S. Weather Bureau records, taken at Thompsons, show an annual average percipitation of 8.5 inches

FIG. 2 WEST HALF THOMPSON, UTAH AREA



Trim lines — Leave at least 3/4" from heavy lines on other two sides.

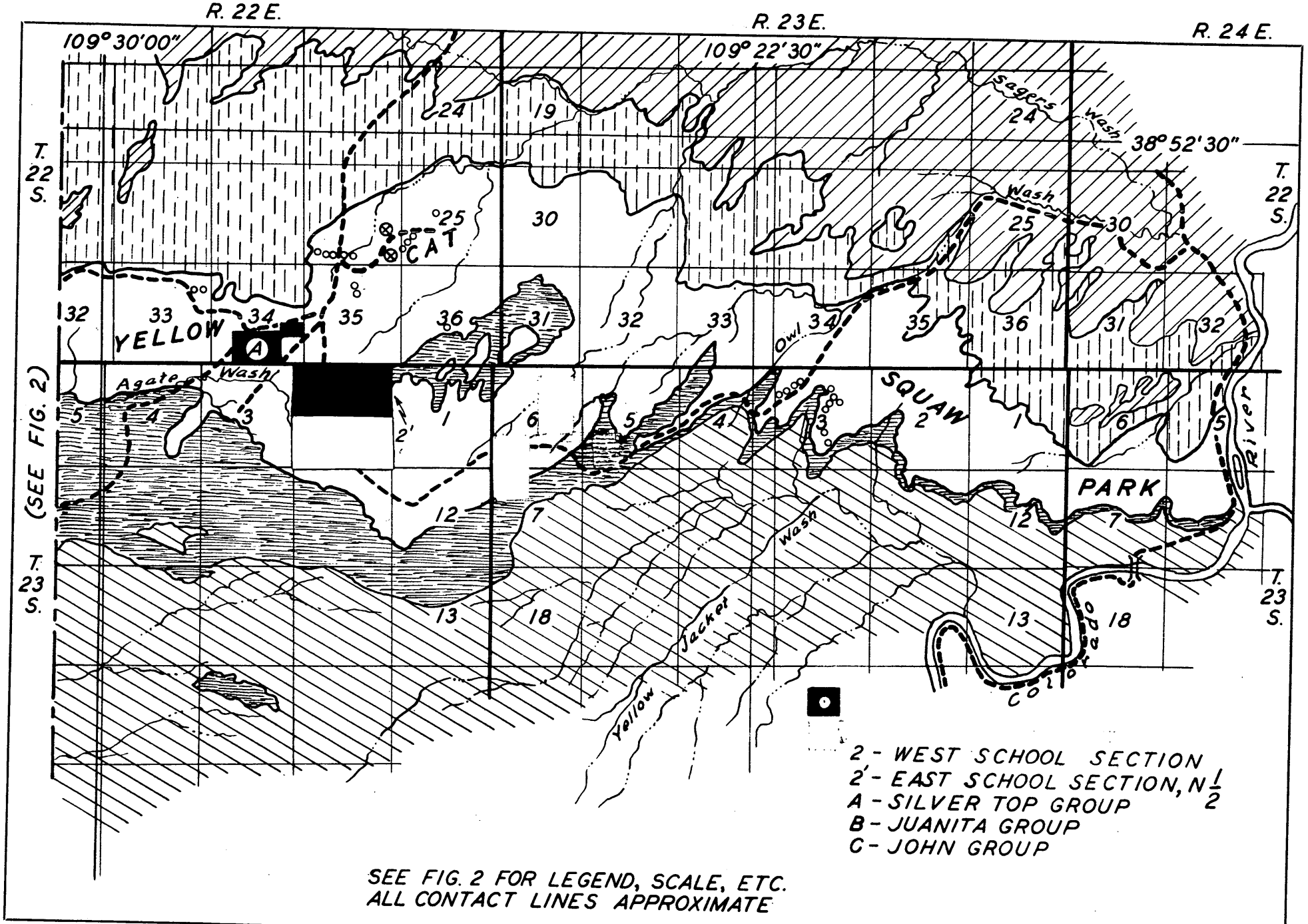


FIG. 2A EAST HALF THOMPSON, UTAH AREA

over a period of thirty-three years. The coldest month is January, having an average mean temperature of 22 degrees above zero, compared with the hottest month, July, which has an average mean temperature of 83.4 degrees.

LABOR AND LIVING CONDITIONS

Grand Junction, which is the center of uranium mining activities, has a population of about 25,000 people. The increasing interest in uranium and the decline of Colorado's once thriving lead-zinc-silver mining industry and the closing of a large percentage of Colorado's coal mines have resulted in an influx of experienced hardrock miners - more than the uranium industry can absorb. Consequently, labor at the present time is no problem.

Base wages for common labor vary from $1.50 to $1.75 per hour. Experienced miners obtain from $1.75 to $2.50 per hour; diamond drill operators, $2.50 per hour; and carpenters and bulldozer operators, from $2.50 to $3.00 per hour.

The cost of food and supplies is normal to the whole of Colorado and Utah. Most camp boarding houses in the uranium field operate at a cost of from $2.50 to $3.00 per man per day. There are no housing facilities in the Yellow Cat area and the present operating companies are transporting their personnel back and forth from Thompson and Cisco where there is limited living quarters.

HISTORY[6]

RECEIVED
FEB - 9 1956

General - Colorado Plateau Area

Radioactive minerals were known to exist in the sandstones of Western Colorado as early as 1880. Deposits of vanadium and uranium ores, now known as Carnotite, were first produced on a small scale in 1898, and from 1911 to 1923 these deposits were worked extensively for radioactive uranium ores principally for the radium content. As early as 1910 several large companies acquired properties in the region and shipments of carnotite ore to radium extraction plants in France were made. Similar plants were built in the United States which produced 10.5 grams of radium in 1913, and 22.4 grams in 1914.

An almost complete cessation of mining activity occurred in 1915 due to the discovery of the rich uranium deposits of the Belgium Congo. A mill and roasting plant at Uravan, having a capacity of 125 tons per day, was completed in 1936 by the United States Vanadium Corporation. About the same time smaller plants were built at Cedar and Gateway, Colorado. By 1938, after the period of comparative inactivity, production primarily for vanadium had achieved respectable proportions and new impetus was given to the production of this metal by the United States entry into World War II in December 1941. During the war years several

. . . . . .

6/Fischer, R. P., "Vanadium Deposits of Colorado and Utah"; U.S.Geol. Survey Bull. 936-P, 1943, P. 363-394

Stokes, Wm. Lee, "Uranium-Vanadium Deposits of the Thompsons Area, Grand County, Utah", Utah Geol. and Mineralogical Sur. Bull. 46, 1952

RECEIVED
FEB - 9 1956

new treatment plants for vanadium ores were completed in the area. At that time it was not publicly known that uranium was of major interest at these plants. New plants to beneficiate these ores were built at Monticello, Utah; and Durango, Colorado, and older plants were rehabilitated at Naturita and Uravan, Colorado.

Due to the small, irregular-shaped, ore bodies the extra production necessary to keep the mills at full capacity had to come from the small operators whose funds generally did not permit them to maintain the necessary development and exploratory programs ahead of actual mining operations. A survey by government agencies indicated that an extensive exploratory program would be necessary to maintain production and accordingly the U. S. Bureau of Mines in 1941 began a drilling program on a cooperative basis with the Geological Survey. The Survey's phase of the program was to furnish maps, suggest drill sites, and log drill cores. The principle objective of this program was to enlarge the known ore-bodies by development drilling rather than to discover new ore-bodies by exploratory drilling, although consideration was also given to this phase of the program. As a result of the Bureau's drilling program approximately 16,000 tons of ore valued at $270,000 was mined by the small operators throughout the area while the project was in operation. When the Bureau's program was finished in December 1943, a total of 895 diamond core drill holes were completed having a total length of 38,510 feet.

The smaller producers in the region were forced to cease operations in December 1943 due to increased imports of foreign uranium and vanadium ores which caused the demand for domestic ores to decline markedly.

The Geological Survey had begun a systematic investigation of the Colorado Plateau Area as early as 1939, and in 1947 both the Geological Survey and the Atomic Energy Commission launched a full-scale geologic and exploratory drilling program to determine the actual uranium potential of the Plateau. While centering attention on the direct problem of finding uranium reserves, the investigation, in addition, has assembled general as well as specific information in the belief that all of it sooner or later will be found to be pertinent to the "classification, examination and preparation of plans for complete development" of the uranium country. The Atomic Energy Commission through their Grand Junction Operations Office have been the center of all activity being carried out in the uranium-vanadium region.

Thompsons Area

As seen in Index Map, Fig. 1, the Thompsons area is located in central Eastern Utah near the Colorado-Utah border. The specific area in question is situated on the northeast flank of the Salt Valley anticline in Grand County, Utah. The ore occurrences are found in the Salt Wash member of the Morrison Formation and occur through a vertical range of 200 feet, from the upper conglomerate member of the Salt Wash to within 50 or 60 feet of the underlying Summerville Formation.

In 1942 the Geological Survey initiated a program of geologic studies in the Thompson area as an integral part of the general survey of domestic uranium-vanadium reserves. Investigations of the area by the Geological Survey were under the direction of R. P. Fischer. Geologic features of the area were mapped on aerial photographs by Wm. Lee Stokes in 1943, and 1944. Topographic and geologic maps were completed of the central part of the Thompson area which is known as the "Yellow Cat" in 1943, as most of the important deposits of ore were first developed in this area. From 1951 through 1954 the Survey carried out an extensive diamond drilling program mainly in the Yellow Cat vicinity but extending easterly to the Squaw Park area, a distance of approximately twelve miles. The drilling was confined mainly to the Salt Wash member - - - the preliminary drilling being done on a widely-spaced grid pattern for geologic and sub-surface structural information. Some of this drilling later proved to be too shallow as it explored only the upper Salt Wash sandstones below the Brushy Basin member. Approximately two years ago considerable deeper drilling was done in the central Yellow Cat area, which previously had produced most of the ore. This deeper drilling proved additional large and valuable ore bodies in what is probably the fourth ore-bearing sandstone below the base of the Brushy Basin member. This ore would lie from 160 to 200 feet stratigraphically below the horizon that had produced the early ore in the district as exemplified by the Cactus Rat ore occurrence in the upper sandstone conglomerate. At the present time five

of these lower ore bodies are being developed by inclines and shafts. The recent deeper drilling by the Survey indicated that although some 1500 exploratory holes had been previously drilled in the Yellow Cat area a certain percentage of these must be discounted as being too shallow to explore the horizon containing the newly discovered ore bodies.

PROPERTY AND OWNERSHIP

The property discussed in this report includes 22 unpatented mining claims and two Utah State School Sections:

	Approx. Acres
1. Sec. 2, T. 23 S., R. 21 E., S.L.M., Grand County, Utah Refer to Fig. No. 3 for detail of Section.	
Utah State School Section all embraced in Uranium Mineral Lease No. 5821	397.76
2. Sec. 1, T. 23 S., R. 21 E., S.L.M., Grand County, Utah Refer to Fig. No.7 for detail of John Group.	
John Claim	20.66
Minnie Claim	20.66
Lee Claim	20.66
Maxine Claim	20.66
Rose Claim	20.66
Chance Claim	20.66
Bandy Claim	20.66
McGill Claim	20.66
Mark Claim	18.50
3. Sec. 34, T. 22 S., R. 22 E., S.L.M., Grand County, Utah Refer to Fig. No. 9 for detail of claims.	
Silver Top No. 1 Claim	20.66
Silver Top No. 2 Claim	20.66
Silver Top No. 3 Claim	20.66
Silver Top No. 4 Claim	20.66
Silver Top No. 5 Claim	20.66

RECEIVED
FEB - 9 1956

4. Secs. 14 and 23, T. 23 S., R. 21 E., S.L.M., Grand County, Utah
Refer to Fig. No.10 for detail of Claims

	Approx. Acres
Juanita Claim	20.66
Juanita No. 1 Claim	20.66
Juanita No. 2 Claim	20.66
Juanita No. 3 Claim	20.66
Juanita No. 4 Claim	20.66
Juanita No. 5 Claim	18.02
Juanita No. 6 Claim	20.45
Juanita No. 7 Claim	20.66

5. Sec. 2, T. 23 S., R. 22 E., S.L.M., Grand County, Utah
Refer to Fig. No. 11for detail of Section.

N 1/2, Utah State School Section embraced in Uranium Mineral Lease No. 5825.	332.52
Total Acres	1,179.81

Equivalent in area to 59 mining claims.

Refer to Figs. 2 and 2A for locations of described property.

Under the regulations of the Utah State Land Board, the State receives a royalty based upon a sliding scale on the gross value on all ores produced and sold from school sections. Refer to Appendices No. 1 and 2 for excerpts from the Utah State Land Board Lease Agreements on school sections.

The two school sections (1 and 5 above) are held under lease by Mid-Continent Uranium Corp. The mining claims (3 and 4 above) are owned 100 percent by Mid-Continent; the mining claims (2 above) are owned 80 percent by Mid-Continent and 20 percent by Charles Steen, of Moab, Utah.

ORE DEPOSITS

General Geology[7/]

The rocks exposed in the Thompsons area consist entirely of sediments of Jurassic and Cretaceous age. The broad valley traversed by the highway between Cisco and Thompsons is composed of Mancos shale, a soft, gray, homogeneous formation that usually erodes into low rolling topography. Many of the lower beds in the Mancos shale contain organic content and certain beds are highly bituminous. Directly underlying the Mancos shale is the Dakota sandstone, a relatively hard formation that caps irregular mesas and forms cliffs and dip slopes above the more easily eroded Cedar Mountain formation. The Dakota is a wide spread continental formation made up of inter-stratified shales, sandstones and conglomerates with minor carbonaceous beds. The formation varies in thickness in this particular area from 40 to 110 feet, and a predominance of chert and quartzite pebbles are found in the lower part of the formation. A resistant bed at the base forms a wide dip slope.

. . . . . .

7/ Coffin, R. C., 1921, "Radium, Uranium, and Vanadium Deposits of Southwestern Colorado", Colorado Geol. Survey Bull. 16

Fischer, R. P., 1950, "Uranium-Bearing Sandstone Deposits of the Colorado Plateau", Econ. Geol., vol. 45, pp. 1-11

Ebbley, N. E., "Report on Certain Mining Claims and School Sections in the Thompsons District, Grand County, Utah, March 1954.

Dane, C. H., "Geology of the Salt Valley Anticline and Adjacent Areas, Grand County, Utah", U. S. Geol. Survey Bull. 863, 184 pp., 1935.

Work cited in footnote No. 6

RECEIVED
FEB - 9 1956

Directly beneath the Dakota sandstone is found the Cedar Mountain formation, formerly mapped as upper Morrison, and for this reason has not been differentiated from the Brushy Basin on the geologic maps, Figs. 2 and 2A. The rock composition of the Cedar Mountain formation and the underlying Brushy Basin shale is very similar, both containing a predominence of mudstone, having varied colored tints with many calcareous nodules and lenses of siltstone, and conglomerate. The total thickness of the Cedar Mountain formation is approximately 110 feet. The bottom marker bed is a quartzitic conglomerate about 15 feet in thickness and forms a more persistent cliff and horizon marker than the Dakota sandstone. Underlying the Cedar Mountain is found the Morrison formation which is broken down into two members - - the upper member, the Brushy Basin shale, and the lower member, the Salt Wash sandstone. The Brushy Basin shale in the Yellow Cat area reaches a thickness of over 300 feet and consists mainly of banded mudstones and shales varying in colors from pink-red to yellow and brown. The formation contains a few thin lenses of grey coarse sandstone which are very lenticular in shape, and that form vertical cliffs where eroded.

The lower part of the Morrison formation, the Salt Wash sandstone member, has a thickness of over 230 feet in the Yellow Cat area. The contact between the Salt Wash sandstone and the Brushy Basin shale is not a definite stratigraphic plane but is usually determined by the local position of the uppermost sandstone conglomerate beds of the Salt Wash member. The Salt Wash sandstone usually forms benches, dip slopes, or shallow ravines, and is amenable to surface and sub-surface prospecting

at moderate depths. The Brushy Basin shale, on the other hand, generally always forms a steep slope that presents a difficult drilling problem. The Salt Wash sandstone member contains the carnotite deposits in the Yellow Cat area and in some places, five separate sandstone beds or rims have been determined. The uppermost or first rim is a conglomeratic sandstone that contains much limonite stain, plant impressions, silicified bones and wood, and is ore-bearing in many places. The next, or second rim, is also conglomeratic in texture, is from 10 to 15 feet in thickness, and is also ore-bearing in several places. A light red mudstone, approximately 20 feet in thickness, separates the first and second sandstone rims. Below the second ore-bearing sandstone lies a red mudstone usually from 5 to 8 feet in thickness. Directly under this mudstone is a third sandstone rim, a white to grey, medium-grained, soft sugary formation, that forms slopes and cliffs up to 60 feet in thickness. This particular rim contained the ore deposits mined in the Little Pittsburg No. 5 mine.

Directly underlying this massive sandstone occur a series of alternating mudstones and siltstones, having a cumulative thickness of approcimately 35 feet. Underlying this series of relatively thin beds is found another massive, light grey, sandstone containing an abundance of small grey clay pellets in layers one-half to one inch thick. This fourth sandstone rim is cliff forming and has, about nine feet from its base, a persistent layer of green-grey clay that is traceable over a wide area, and which has the same stratigraphic position as several thin ore bodies. From all indications, the recently discovered deeper ore

bodies occur in this sandstone horizon. Directly underneath lie an alternating series of about ten mudstones and siltstones which have an accumulative thickness of between 50 and 60 feet. These members lie directly over the Summerville formation.

The Summerville formation in the Thompsons area averages about 50 feet in thickness and consists of argillaceous and arenaceous components to an extent that true sandstones or mudstones are seldom observed. Several thin lenses of limestone appear and there exists a predominence of concretionary oval masses of chert from five to ten feet in diameter in the middle part of the formation. Locally the Summerville appears as broad flat surfaces, reddish in color. Although the contact between the Summerville and the underlying Entrada sandstone is easily determined and can be accurately mapped, this does not hold true with the overlying Salt Wash sandstone contact. This contact has been roughly established at the horizon where the thin red shales and chert constituents disappear and the lighter colored, sandy, lenticular beds appear. However, this contact is not sharp and in places Morrison sands are found in upper Summerville and red thin-bedded shales are found in the lower Morrison.

The pre-Summerville rocks have not been differentiated on the geologic maps, Figs. 2 and 2A, with only the contact between the Summerville and the Entrada shown. The Entrada formation in this area is a grey to orange, clean, massive fine grained sandstone, forming either smooth cliffs or wide bedrock benches over many square miles south of the outcrop of the Summerville formation. In places it shows

thicknesses of 350 feet and can be traced for hundreds of miles as a smooth cliff-forming sandstone. The predominent structural feature of the region is a northwest trending anticline, the crest of which has been dropped by a complicated fault system into a structural trough. The area under consideration is on the northeast flank of the fold outside of the area of major movement.

Occurrence of Deposits

In general the ore deposits of the Colorado Plateau area have been found in three main formations, the Morrison, Entrada and Shinarump. Many theories have been advanced endeavoring to explain why commercial concentrations of uranium and vanadium, which are widely disseminated in the earth's crust, have been formed in these formations. Some of these theories as proposed are: (1) They are the result of hydrothermal action, and therefore are related to deep-seated fractures, the deposition coming from nearby primary ore occurrences. (2) They are syngenetic accumulations laid down in close association with organic materials. (3) They are syngenetic accumulations of detrital mineral particles laid down with other inorganic constitutents of the enclosing rock. (4) They originated later than the enclosing rock by concentrations of ground water in the proximity of organic accumulations or under the influence of obscure physical or chemical factors not now easily detected. Although the origin of the uranium-vanadium mineralization in the ore has not been agreed upon, accumulated observations seem to point that its occurrence was probably a result of post-precipitation from ground

water solutions, after the sedimentation of the sands.

The major portion of the commercial ore bodies of the Colorado Plateau have been found in the Salt Wash sandstone member of the Morrison formation, overlying the Entrada sandstone. Generally the ore bodies are very irregular, tabular, layers that form "rolls" of considerable thickness, sometimes in excess of 20 feet. Usually they lie parallel to the bedding, but do not necessarily conform to the beds in detail. Frequently the rolls or longitudinal direction of the ore bodies are roughly parallel. The deposits have been observed to vary in size from only a few tons of ore to those exceptions containing from 60 to 100 thousand tons. Probably the average mine throughout the Plateau might be less than two thousand tons of ore, averaging 0.28 per cent U_3O_8 and 2.00 per cent V_2O_5. The deposits of the Morrison formation have usually been referred to as "Carnotite" deposits to distinguish them from similar deposits in the Entrada sandstone which have been termed the "Roscolite" deposits. Recent major discoveries of large ore deposits in the Shinarump formation foreshadows the probability that in the future production from this formation may out distance that from the Morrison and other formations.

In the Yellow Cat area the ore was evidently formed by selective mineralization of the sandstone, concentration of minerals around fossil organic remains, and absorbtion by certain types of clay material Recent deeper drilling has indicated that the more continuous massive sandstones are more likely to contain uranium-vanadium deposits than are the discontinuous ones. The sandstone lenses with thicknesses in excess of thirty feet appear to be more favorable for the occurrence of ore deposits.

In general the mudstones and siltstones are barren of mineralization.

Early mining in the area produced mainly carnotite-type ores, which are a potassium uranium vanadate, with the following chemical composition; $K_2O.2UO_2.V_2O_5nH_2O$. Recent ore bodies found in the lower, or fourth sandstone have produced green micaceous vanadium types of mineralization, and vanoxite, a black hydrous vanadium oxide, as well as sub-carnotite type ores. The older ore bodies, characterized by curving zones of mineralization or "rolls", varied in size from thin irregular layers a few feet in extent to masses several hundred feet in length, containing several hundred tons of ore. Curving planes of weakness on one side of the ore body usually separated heavily mineralized rock or ore from barren sandstone. Frequently, the side opposite from the curved surface graded from ore into waste gradually and in many instances consisted of an "assay" wall. In some ore bodies mineralized halos or aureoles of lower grade material were observed to grade out from the commercial ore. Rolls generally lie with the long axis parallel to the stratification planes of the sandstone, but do not seem to be controlled in any manner by the bedding planes. In thin-bedded sandstones and shales, the deposits are usually tabular and confined along the bedding planes with the greater dimensions corresponding to the stratification of the replaced rock.

The recently explored deeper ore deposits found to occur in the fourth sandstone rim have not been developed or mined to a sufficient extent to determine their shape or characteristics. However, estimates from drill logs and assays indicate that several of these deposits will contain commercial ore in excess of 25,000 tons, of grades averaging from 0.30 to 0.40 percent U_3O_8 and 2.00 to 2.50 percent V_2O_5.

where

The Geological Survey's drilling program in the Thompsons area to date includes over 1,725 diamond core and wagon drill holes spread over a total of 30 square miles or roughly 30 Sections. Of this number, over 1,000 holes were concentrated in one area containing about four square miles: Parts of Sec. 36, T. 22 S., R. 21 E.; Sec. 31, T. 22 S., R. 22 E.; Sec. 1, T. 23 S., R. 21 E.; and Sec. 6, T. 23 S., R. 22 E. Drilling to date has proven one channel runs east and west for at least two and one-half miles and has an average width of about 300 feet north and south. The majority of the new ore bodies recently discovered have been found to occur in this thick sandstone channel.

Production

There appear to be no production records prior to 1935, but from that time through 1954 a total of 40,000 tons of uranium-vanadium ore was produced from the Thompsons area, mainly from the Yellow Cat vicinity. Indicating the relative small size of the ore bodies mined during that period is the fact that only about six properties, are credited with production in excess of 1,000 tons. The average grade of ore produced has been estimated at 0.25 per cent U_3O_8 and 1.50 per cent V_2O_5, or a value of about $30 per ton. Thus, the total production from the area during this period would amount to slightly over one million dollars.

In striking contrast to the above production figures are the following estimates of some of the recently discovered ore deposits in the fourth rim sandstone channel previously described. These ore bodies are now being developed with shafts and inclines.

Blackstone (Sec. 31, T. 22 S., R. 22E.)

Two ore bodies with an estimated 25,000 tons.
Estimated average grade 0.30 per cent U_3O_8; 2.25 per cent V_2O_5.
Estimated value $1,000,000, plus two $35,000 production bonuses.

Utah Alloys (Sec. 31, T. 22 S., R. 22E.)
(Sec. 1 , T. 23 S., R. 21E.)

Two ore bodies. No estimated tonnage and grade.
One deposit reported worth in excess of $1,000,000.
Other deposit reported about 5,000 tons of ore.

Ringtail Shaft (Sec. 36, T. 21 E., R. 22 S.)

Incomplete data on last drilling.
Present estimate indicates 20 - 25 thousand tons of ore.
Estimated average grade 0.40 percent U_3O_8; 2.25 per cent V_2O_5.
Estimated value of $1,250,000, plus production bonus of $35,000.

John Incline (Sec. 1, T. 23 S., R. 21 E.)

Estimated tonnage 2,388
Estimated average grade 0.41 percent U_3O_8; 0.91 per cent V_2O_5.
Estimated value $99,787 , plus production bonus of $35,000.

UTAH STATE SCHOOL SECTION (WEST)
Sec. 2, T. 23 S., R. 21 E.

This section covers 397.76 acres in Grand County, Utah. The lease on this School Section is wholly owned by Mid-Continent, and originally carried a royalty of 12-1/2 percent of the gross production to the State of Utah. New regulations recently adopted by the Utah State Land Board (late 1955) governing royalty rates on State lands has changed the former straight 12-1/2 percent of the gross to a sliding scale on the gross value per ton on fissionable materials.[8/] The rate begins at 3.9 percent on ores with a gross value up to $4.00 per dry ton, and increases at the

8/ See Appendix No. 1

rate of 0.3 percent additionally for each one dollar value increase up to a maximum royalty of 17.4 percent on ores having a gross value per ton of $48.00 and over. In addition there is a royalty of 8.0 percent of any bonus received from the sale of fissionable materials. The ore bodies blocked out on the above School Section have an average gross value of $23.31 per ton; thus the royalty rate to the State of Utah would be based upon $23.31, less premium and development allowance payments, or $20.92 base price; thus royalty would be 9.0 percent.

Drilling began on December 6, 1954, under DMEA Docket 3360, Contract Idm-E723, and continued until April 20, 1955, at which time the contract was terminated by the DMEA. During this period 72 holes were completed of which one was ore and four were mineralized. Mid-Continent, however, continued drilling until May 10, 1955, and completed holes Nos. 73 through 94 of which three were ore and two were mineralized. After this drilling was done, an isopach map of the fourth ore-bearing sandstone was completed and indicated a consistently favorable channel approximately 300 feet wide and extending for a distance of 2,500 feet, with the east end open. Three areas within this channel indicated to Mid-Continent personnel the probable presence of commercial uranium deposits in the fourth ore-bearing sandstone.

This information was subsequently presented to the DMEA in Denver on June 8, 1955, at which time Mid-Continent suggested that the DMEA contract be reinstated. On August 11, 1955, Mid-Continent received a communication from the DMEA stating that they did not believe it advisable for them to reinstate the contract. On September 2, 1955, Mid-Continent started to drill offset holes around the ore and mineralized holes to block out the

RECEIVED
FEB - 9 1956

ore deposits. As of December 31, 1955, Holes Nos. 95 through 142 have been completed, and two ore bodies have been discovered and blocked out on 50-foot centers. Both of these ore bodies are open on two ends and at present their extent has not yet been determined. The two ore bodies are 600 feet apart. Drilling to date has indicated at least 11,328 tons in the westerly deposit at a depth of 170 feet, averaging 0.202 percent U_3O_8, and 1.055 percent V_2O_5, having an average thickness of 4.24 feet. If the area is increased by including marginal holes around the perimeter this ore body would indicate 13,206 tons, averaging 0.18 percent U_3O_8, and 0.959 percent V_2O_5. Drilling on the easterly deposit so far indicates 2,293 tons of 0.246 percent U_3O_8, and 1.032 percent V_2O_5, at a depth of 190 feet, and averaging 1.56 feet thick. If the marginal holes around the perimeter of the easterly ore body are included the deposit shows 4,523 tons of ore averaging 0.166 per cent U_3O_8, and 0.743 percent V_2O_5.

In the area between the two ore bodies, two holes 100 feet apart encountered ore at a depth of 180 feet and indicate 2,732 tons of ore averaging 0.246 percent U_3O_8, and 0.396 percent V_2O_5, having an average thickness of 3.7 feet. This ore body, as well as the strongly mineralized area 200 feet east of the easterly ore body, has not been blocked out on 50-foot centers. In addition to the above estimates, calculations indicate 54,000 tons of potential ore having a value of $1,250,000.

Refer to Fig. 3, map of Sec. 2, T. 23 S., R. 21 E., showing relationship of Brushy Basin contact and the position of the original three north-south fences of holes drilled under the DMEA contact. Fig. 4 illustrates the relative position of the two ore bodies, the inferred ore reserve areas, and the trend of the fourth sandstone channel. Figs. 5 and 6 show ore holes and the outlines of the ore bodies.

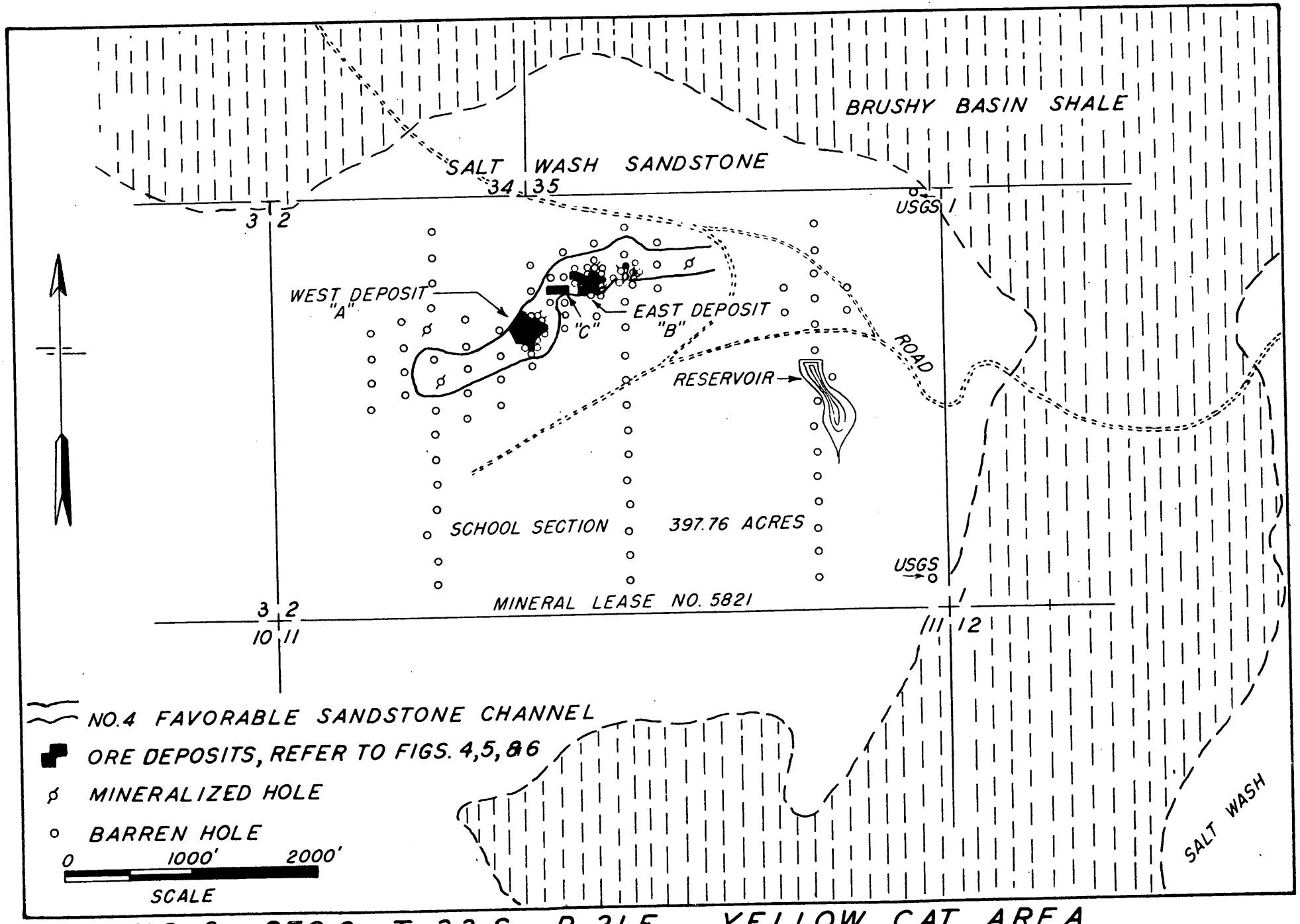


FIG. 3 SEC.2 . T. 23 S., R. 21 E., YELLOW CAT AREA

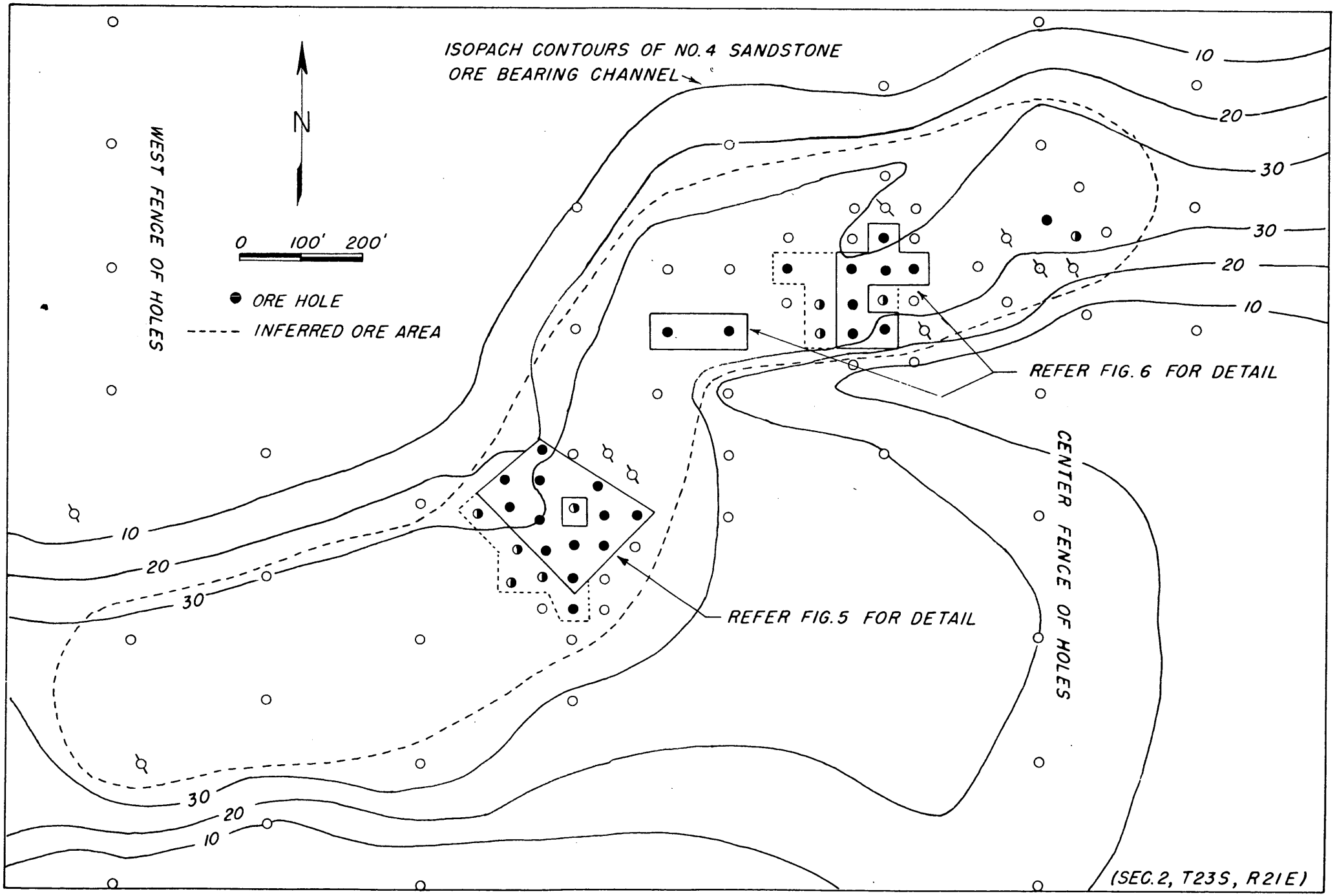


FIG. 4 RELATIVE POSITION OF ORE BODIES AND FOURTH SANDSTONE CHANNEL

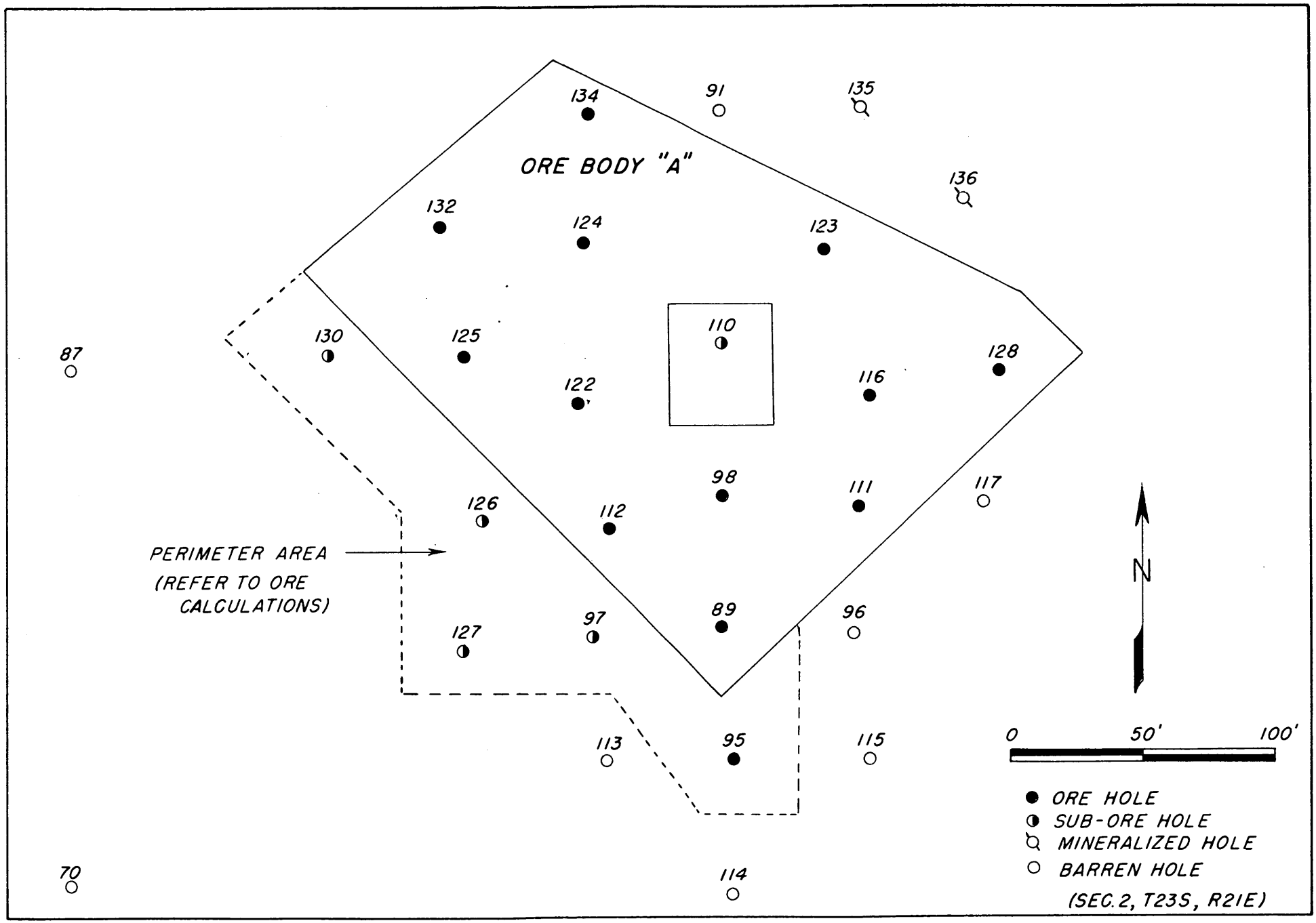


FIG. 5 WEST ORE BODY AREA, SEC. 2 (WEST)

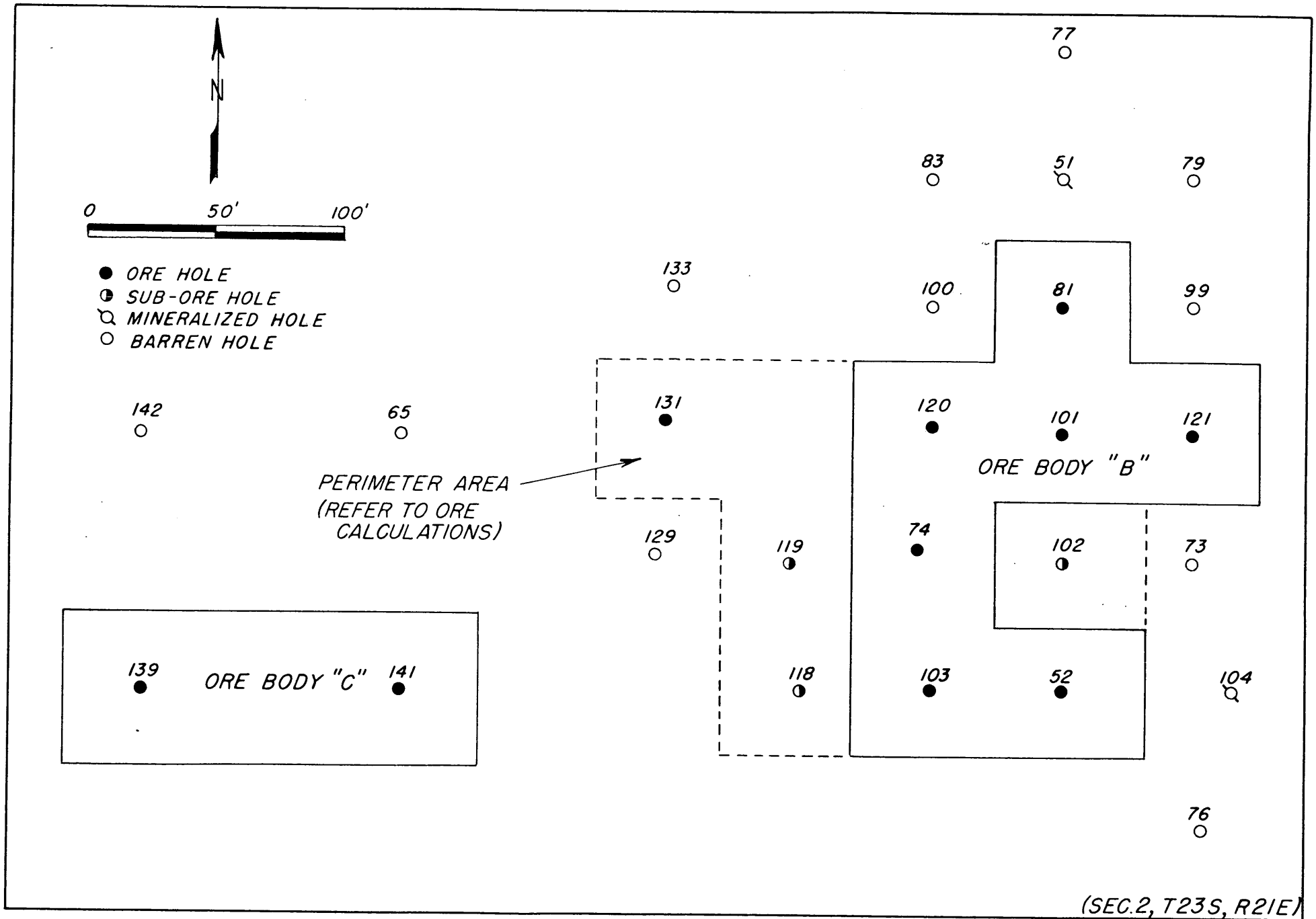


FIG. 6 EAST ORE BODY AREA, SEC. 2 (WEST)

Hole Nos., collar elevation, depth of base of ore, ore thickness, average grade, and sandstone thickness are given in the following tabulation:

ORE HOLE DATA

Hole No.	Collar Elev.	Base of Ore	Thickness of Ore	Aver. U_3O_8	Aver. V_2O_5	Sandstone Thickness Ft.
52	4,750.6	176.0	1.0	0.28	0.17	32
74	4,750.9	188.2	1.0	0.01	1.91	38
81	4,751.1	194.5	1.0	0.42	1.15	28
89	4,762.0	168.1	1.6	0.20	1.13	57
95	4,764.9	171.6	1.5	0.14	0.79	47
97	4,760.4	157.8	2.0	0.05	0.45	48
98	4,754.4	170.4	3.6	0.04	2.19	49
101	4,750.9	187.6	1.3	0.01	1.60	39
102	4,750.9	180.8	3.2	0.06	0.42	39
103	4,750.7	173.7	1.8	0.07	1.52	44
110	4,752.5	156.1	1.0	0.06	0.04	42
111	4,755.0	162.0	5.1	0.33	0.42	50
112	4,756.0	170.1	10.3	0.19	1.20	51
116	4,752.4	170.5	1.0	0.05	3.36	49
118	4,750.0	181.6	1.0	0.02	0.60	46
119	4,750.9	181.6	1.6	0.07	0.50	40
120	4,751.0	178.4	2.0	0.40	0.47	31
121	4,750.2	185.5	2.8	0.37	0.81	33
122	4,751.7	163.5	7.0	0.23	0.90	30
123	4,752.0	176.5	9.8	0.23	0.28	54
124	4,752.5	173.2	2.2	0.36	2.62	31
125	4,752.2	164.9	4.4	0.16	0.82	23
126	4,754.3	163.7	1.9	0.08	0.73	43
127	4,762.8	158.0	2.4	0.06	0.38	44
128	4,753.7	159.4	1.4	0.11	3.78	50
130	4,753.1	162.4	1.8	0.08	0.50	26
131	4,751.5	183.3	3.5	0.10	0.29	45
132	4,752.8	162.1	2.4	0.11	0.79	25
134	4,753.2	168.0	2.1	0.17	0.25	21
139	4,753.8	185.0	4.3	0.30	0.45	46
141	4,752.7	178.4	3.1	0.17	0.32	44

The following three pages, 25, 26, and 27 list the ore holes and the calculations used in computing tonnage, grade and the gross value of the separate ore deposits. Page 27 gives a recap of the ore bodies showing total tonnage and gross value of the deposits. Reproductions of Assay Laboratory returns are shown in Appendix No. 6.

Class I, Proven Reserves

ORE BODY - A

Refer to Fig. 5

Hole No.	Thick. Ft.	U_3O_8 %	Ft x %	V_2O_5 %	Ft x %
89	1.6	0.20	0.320	1.13	1.808
98	3.6	0.04	0.144	2.19	7.884
111	5.1	0.33	1.683	0.42	2.142
112	10.3	0.19	1.957	1.20	12.360
116	1.0	0.05	0.050	3.36	3.360
122	7.0	0.23	1.610	0.90	6.300
123	9.8	0.23	2.254	0.28	2.744
124	2.2	0.36	0.792	2.62	5.764
125	4.4	0.16	0.704	0.82	3.608
128	1.4	0.11	0.154	3.78	5.292
132	2.4	0.11	0.264	0.79	1.896
134	2.1	0.17	0.357	0.25	0.525
	50.9		10.289		53.683

$\frac{50.9}{12}$ = 4.24 Av. Thickness Area = 34,735 sq. ft.

$\frac{10.289}{50.9}$ = 0.202% U_3O_8 $\frac{53.683}{50.9}$ = 1.055% V_2O_5

34,735 x 4.24' = $\frac{147,276.4}{13}$ cu.ft. = 11,328.95 Tons

Value per ton @ 0.202% U_3O_8 = $16.19

Value per ton @ 1.055% V_2O_5 = 6.54

$22.73 per ton

Gross Value = 11,328.95 x 22.73 = $257,507

Class I, Proven Reserves

Refer to Fig. 6

ORE BODY - B

Hole No.	Thick. Ft.	U_3O_8 %	Ft x %	V_2O_5 %	Ft x %
52	1.0	0.28	0.280	0.17	0.170
74	1.0	0.01	0.010	1.91	1.910
81	1.0	0.42	0.420	1.15	1.150
101	1.3	0.01	0.013	1.60	2.080
103	1.8	0.07	0.126	1.52	2.736
120	2.0	0.40	0.800	0.47	0.940
121	2.8	0.37	1.036	0.81	2.268
	10.9		2.685		11.254

$\frac{10.9}{7}$ = 1.56 Av. Thickness

Area = 19,112 sq. ft.

$\frac{2.685}{10.9}$ = 0.246% U_3O_8

$\frac{11.254}{10.9}$ = 1.032% V_2O_5

19,112 sq. ft. x 1.56 = $\frac{29,814.72}{13}$ = 2,293.44 tons

Value per ton @ 0.246% U_3O_8 = $20.37

Value per ton @ 1.032% V_2O_5 = 6.40

$26.77 per ton

Gross Value = 2,293.44 x 26.77 = $61,395

Class I, Indicated Ore

Refer to Fig. 6

ORE BODY - C

Hole No.	Thick. ft.	U_3O_8 %	Ft x %	V_2O_5 %	Ft x %
139	4.3	0.30	1.290	0.45	1.935
141	3.1	0.17	0.527	0.32	0.992
	7.4		1.817		2.927

$\frac{7.4}{2}$ = 3.70 Av. Thickness Area = 9,600 sq. ft.

$\frac{1.817}{7.4}$ = 0.246% U_3O_8 $\frac{2.927}{7.4}$ = 0.396% V_2O_5

9,600 x 3.7 = $\frac{35,520}{13}$ = 2,732.31 tons

Value per ton @ 0.246% U_3O_8 = $20.37

Value per ton @ 0.396% V_2O_5 = 2.46

$22.83 per ton

Gross Value = 2,732.31 x 22.83 = $62,379

RECAP OF ORE BODIES

Ore-body	Tons	$\%U_3O_8$	$\%V_2O_5$	Value per ton	Gross Value
"A" (West)	11,328.95	0.202	1.055	$ 22.73	$ 257,507
"B" (East)	2,293.44	0.246	1.032	26.77	61,395
"C" (Middle)	2,732.31	0.246	0.396	22.83	62,379
	16,355			Total	$ 381,281
				Plus Bonus	35,000
					$ 416,281

JOHN GROUP
(Sec. 1, T. 23 S., R. 21 E.)

The John Group of nine claims, comprising 183.78 acres, are located in Sec. 1, T. 23 S., R. 21 E., SLM, in the Yellow Cat area in Grand County, Utah. Refer to Fig. 2. The claims are recorded as follows:

Claim Name	Original Location	Book	Page	Amended Location	Book	Page
John		9K	5		15	330
Mark		9K	4		15	331
Minnie		9K	4		15	332
Lee		9K	4		15	333
Maxine		9K	4		15	334
Rose		9K	4		15	335
Chance		9K	3		15	336
McGill		9K	3		15	337
Bandy		9K	3		15	338

The assessment work for the year ending June 30, 1955 was completed and recorded. The expenditures made since July 1, 1955 for mining operations are more than sufficient to cover the required amount of assessment work for the year ending June 30, 1956.

The claims were originally staked by Charles Steen who conveyed eight-tenths interest to Strategic Minerals Exploration Co. Great Western Uranium Corp. later purchased the 80 percent interest from Strategic Minerals Exploration Co., who retained a 10 percent overriding royalty in the eight-tenths undivided interest. Ebbley and associates purchased the eight-tenths interest from Great Western and later bought out Strategic Minerals overriding royalty. Subsequently, Ebbley and associates conveyed their interest to Mid-Continent Uranium Corp. who now has an undivided eight-tenths interest in the nine claims, and Charles Steen has an undivided two-tenths interest. There is no overriding royalty on the claims.

The rocks exposed on the John Group consist of sediments of the Salt

Wash sandstone member and Brushy Basin shale member of the Jurassic Morrison formation. The Brushy Basin shale member is exposed on the northern one-third of the John Group and the eastern portion of the Chance claim. The Salt Wash sandstone member is exposed over the remainder of the claims. Refer to Fig. 7.

Drilling has indicated the fourth ore-bearing sandstone to be present everywhere under the John Group, and the John Incline mine is in the fourth sandstone. Here the fourth ore-bearing sandstone is interbedded with mudstone and contains thin lenses of mudstone and mudstone-pebble conglomerate. This mudstone is normally red-brown, but near ore deposits the mudstone within and immediately beneath the sandstone is gray. In plan view the areas of gray mudstone are several times larger than the associated mineralized rock and offer larger "targets" in delineating favorable ground. The ore minerals occur mostly in sandstone, coating the grains and partly or entirely filling the pore spaces. The best uranium ore occurs with carbonaceous material.

Drilling depths to penetrate the fourth ore-bearing sandstone on the John Group of claims vary from 60 to 250 feet. A limited drilling program was carried out by the U. S. Geological Survey on these claims during 1952 and 1953. A total of 58 holes were drilled, of which four were with a wagon-drill and 54 were diamond drilled. The four wagon-drill holes encountered water and did not penetrate through the fourth ore-bearing sandstone. Of the 58 holes, 28 holes were drilled on wide-spaced centers, nine holes were drilled on close-spaced centers in the southeast corner of the McGill claim on sites of selenium indicator plants, and 21 holes were drilled on close-spaced centers in blocking out ore on the John claim. Refer to Fig. 7. Of the total holes drilled

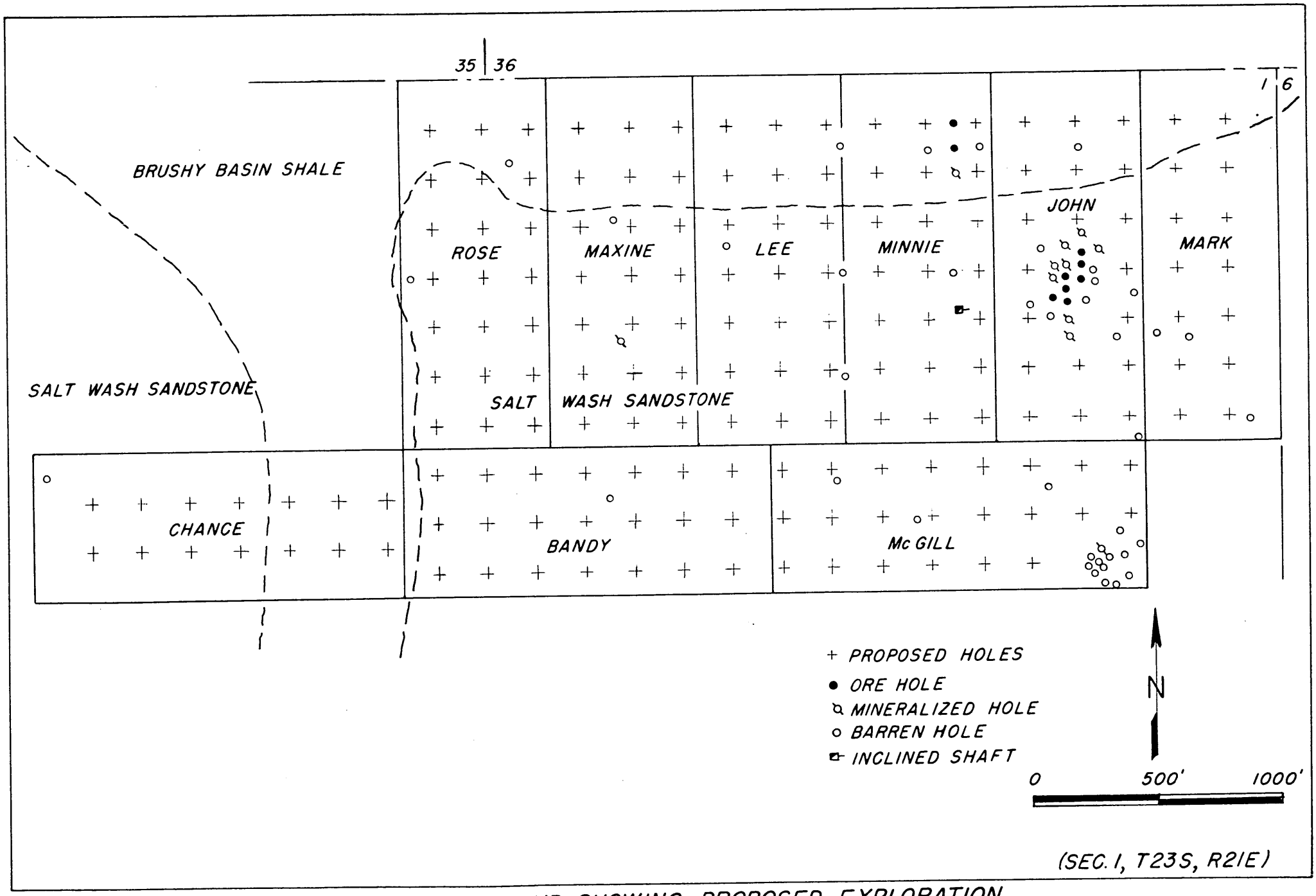


FIG. 7 JOHN GROUP, SHOWING PROPOSED EXPLORATION

that penetrated the fourth ore-bearing sandstone, 47 holes were considered favorable, four holes semifavorable, and three holes unfavorable. Of the holes considered favorable, nine holes cut mineralized material of ore grade and thickness and eleven holes cut mineralized material below the cutoff grade for ore. In addition to the ore blocked out on the John claim by the Geological Survey, two ore holes and one mineralized hole were drilled on 100-foot centers on the Minnie claim about 700 feet northwest of the John ore-body.

Before acquiring the property from Great Western, Ebbley and associates spent from September 8th to the 23rd, 1955, pumping out the incline and underground workings so that an inspection could be made to determine the extent of past mining. After the inspection had been made, the incline was allowed to refill.

Great Western had sunk the inclined shaft on a 25 degree slope, a distance of 335 feet to intercept the ore-horizon. Level development consisted of about 200 feet of drifting. Two of the ore holes had been reached and some mining had been done in those areas. It was noted from the drill logs that these two holes contained thin low-grade ore. Mining around these holes indicated the logs to be reliable. Approximately 100 tons of low-grade ore had been mined by Great Western, but this was not done in the areas indicated by the drilling to be the most favorable. Track and air lines had been installed and a timber ore bin of 40-50 ton capacity had been built and was in good condition. Surface buildings on the property consisted of a hoist shed, compressor house, tool shed, bunk-house, and powder magazine. Ground conditions were generally good, requiring little or no timber. Mining was done on a modified room and pillar method.

In February, 1955, after the property had been acquired by Mid-Continent, work was started on surface building rehabilitation. Mining equipment, consisting of a compressor, pump, hoist, fan, vent pipe, cars, drill and steel, etc., were purchased. The incline and workings were again pumped out and a program started to clean out the underground working and excavate for a large size sump. The first shipments of ore, mainly from development headings, were made in early May using a crew of three men. During the month of May, 68.1 tons were shipped to Climax Uranium Company mill at Grand Junction, Colorado. These shipments, averaging 0.613 percent U_3O_8 and 0.56 percent V_2O_5, realized $4,345.10 from the mill and $2,921.25 from the initial production bonus, or an average of $63.80 per ton without the bonus, and $106.70 per ton with the bonus.

Throughout the remainder of 1955 Mid-Continent operated the John Incline mine with a small crew, mainly on development work. By the end of the year a total of 375 feet of development drifting was completed, of which 230 feet was in barren rock. A new body of ore had just been opened up that appears to be of considerable size. By the end of the year, when Mid-Continent temporarily recessed all work in the Yellow Cat area, shipments of ore from the property for 1955 had been as follows:

Refer to Fig. 8 for map of underground workings.

Tons	% U_3O_8	Tons x %	% V_2O_5	Tons x %
57.93	0.5888	34.109184	0.5359	31.044687
10.17	0.75	7.627500	0.72	7.322400
10.00	0.36	3.600000	0.47	4.700000
45.04	0.165	7.431600	0.2583	11.633832
11.94	0.28	3.343200	0.89	10.626600
39.56	0.5497	21.746132	0.7798	30.848888
33.97	0.31	10.530700	0.66	22.420200
85.58	0.46	39.366800	0.66	56.482800
294.19 tons		127.755116		175.079407

Weighted Averages:

$\frac{127.755116}{294.19}$ = 0.434 % U_3O_8 $\frac{175.079407}{294.19}$ = 0.595% V_2O_5

Gross Ore Sales to end 1955 = $14,012.82, less Haulage Allowance = $12,166.53
Initial Production Bonus paid = 8,853.39
Total Net $21,019.92

Total Initial Production Bonus used to date . . . . . 2,550 pounds

Initial Production Bonus remaining on property . 7,450 pounds

Calculations of tonnages and grade from the data obtained from the U. S. Geological Survey drilling on the John claim are as follows:

Upper Layer:

Hole No.	Ft. Thick	% U_3O_8	Ft x %	% V_2O_5	Ft x %
111	3.25	0.10	0.325	0.08	0.2600
336	1.3	0.11	0.143	0.39	0.507
554	1.0	0.11	0.110	0.21	0.210
	5.55		0.578		0.977

$\frac{5.55}{3}$ = 1.85 Av. Thickness $\frac{0.578}{5.55}$ = 0.104% U_3O_8 $\frac{0.977}{5.55}$ = 0.176% V_2O_5

Area = 230' x 50' = 11,500 sq. ft; 11,500 x 1.85 = $\frac{21,275}{13}$ = 1,636.54 Ton

Value per ton @ 0.104% U_3O_8 = $4.34
Value per ton @ 0.176% V_2O_5 = 1.09
Total $5.43 per ton
(Not Commercial)

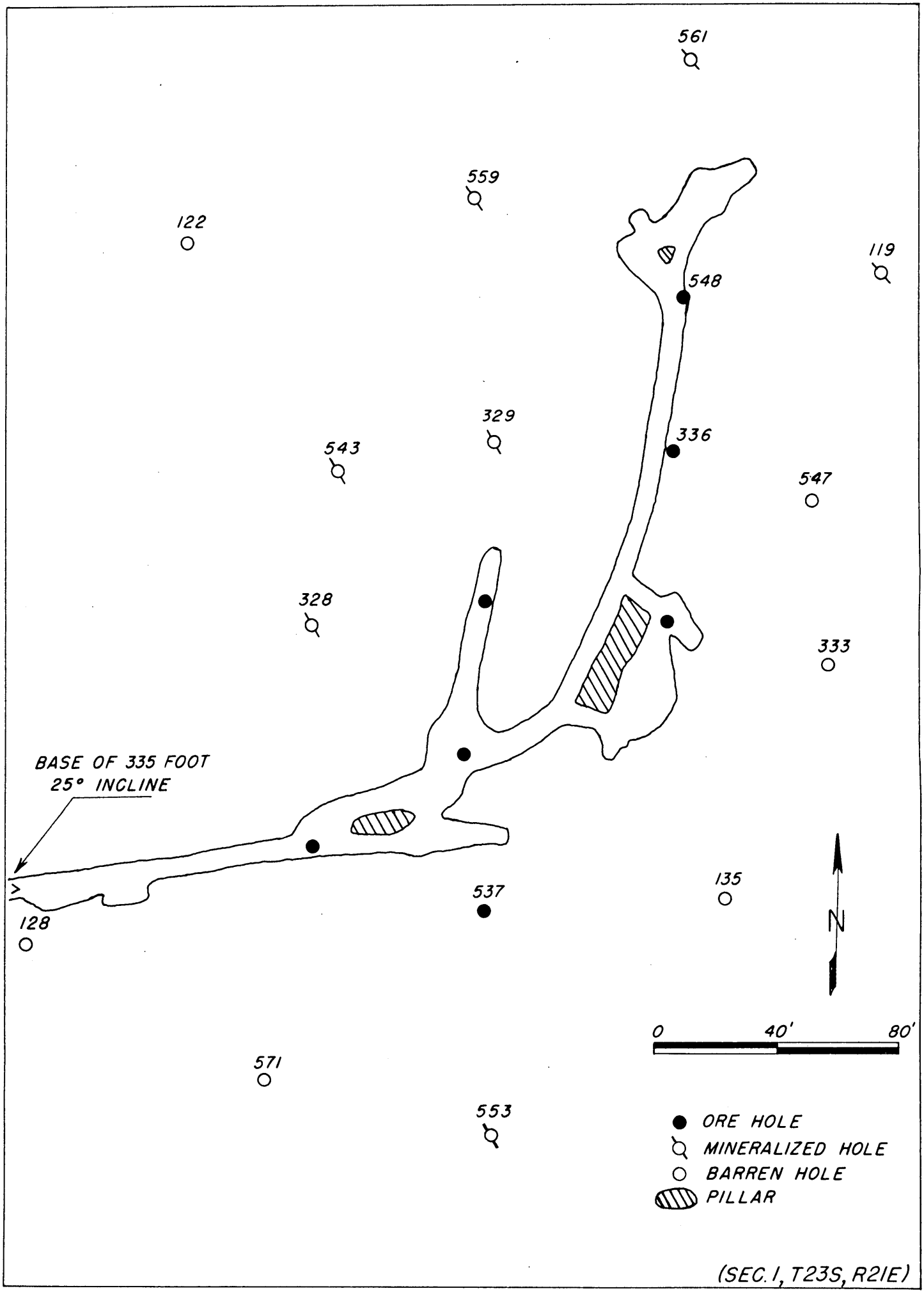


FIG. 8 JOHN INCLINE UNDERGROUND WORKINGS

Lower Layer:

Hole No.	Ft. Thick	% U_3O_8	Ft x %	% V_2O_5	Ft x %
324	6.0	0.53	3.180	1.03	6.180
325	2.1	0.22	0.462	0.07	.147
537	1.2	0.17	0.204	0.25	.300
	9.3		3.846		6.627

$\frac{9.3}{3}$ = 3.1 Av. Thickness $\frac{3.846}{9.3}$ = 0.414% U_3O_8 $\frac{6.627}{9.3}$ = 0.713% V_2O_5

Area = 180 x 50 = 9,000 sq. ft; 9,000 x 3.1 = $\frac{27,900}{13}$ = 2,146.15 tons

Addition to Lower Layer:

Hole No. 548 1.6' Thick 0.392% U_3O_8 2.67% V_2O_5

Using 25' radius = 1963.5 sq. ft. x 1.6 = $\frac{3,141.6}{13}$ = 241.66 tons

Weighted Average Lower Layer:

2,146.15	0.414	888.5061	0.713	1530.205
241.66	0.392	94.7307	2.67	645.232
2,387.81 tons		983.2368		2175.437

$\frac{983.2368}{2387.81}$ = 0.412% U_3O_8 $\frac{2175.487}{2387.81}$ = 0.911% V_2O_5

Value per ton @ 0.412 % U_3O_8 = $36.14

Value per ton @ 0.911 % V_2O_5 = 5.65

Total $ 41.79 per ton

Gross Value = 2,387.81 x 41.79 = $99,787

Less ore mined 1955, 294.19 tons 12,167

Ore remaining, 2094 tons = $ 87,620

Bonus remaining 7450 lbs = 26,065

$113,685

The value on the undrilled claims of the John Group is placed at $7,500 per claim.

A large area of favorable ground on the property has not been fully explored. There appears to be a good chance of locating more ore bodies with additional drilling. The location of the John Group, surrounded on all sides by operating properties; the Parco 23 on the South, the Ringtail shaft on the north, the old Yellow Cat workings and the Blackstone and Allor 12 mines to the east and Section 2 ore bodies to the west, would indicate that the property is worthy of the time and expense necessary to fully explore and develop it. The limited amount of drilling on the claims to date has not only shown the presence of appreciable thicknesses of the fourth ore-bearing sandstone but has actually indicated the presence of commercial ore deposits. It is evident that a comprehensive drilling program covering all of the area encompassed by the nine claims is warranted.

Recommended Exploration Program:

The following estimates of drilling costs on the John Group of nine claims are based upon what is considered sufficient concentration of holes to determine the presence of favorable ore-bearing thicknesses or channels in the fourth sandstone and to determine the trend of these channels. When the trends have been determined by the initial pattern of grid-spaced holes, a second phase of drilling would concentrate along the channels. In the event ore holes were drilled during the initial phase these deposits would be delimited with additional closely spaced holes during the second phase of drilling.

The suggested exploration program is setup in two Stages. Stage I consists of 170 holes on a 200-foot grid pattern. The holes skip areas previously drilled but explore all untested ground. Average depth

(shallower to the south and deeper towards the contact with the Brushy Basin to the north) is estimated at 200 feet to penetrate the fourth ore-bearing sandstone. Previous drilling in this area indicates that approximately 50 percent of the total footage should be cored for satisfactory results. Stage II drilling would be progressive drilling, consisting of 100-foot spaced holes along trends of channels determined by Stage I drilling, and 50-foot spaced holes, under the classification of "reasonable delineation" offsetting ore and mineralized holes found by Stage I and Stage II drilling. It is estimated that 100 holes would be required under Stage II. For location of the proposed holes under Stage I, refer to Fig. 7.

(a) Independent Contracts:

It is contemplated to do all phases of the drilling under contract, including equipment, labor, water, power, fuel, etc. on a per foot basis:

	Cost	Unit Cost Per Foot
STAGE I: The grid pattern of holes on 200-foot centers as shown on the map, Fig. 7, total 170 holes, average depth 200 feet, at an average price of $2.40 per foot. It is estimated that 50 percent of the total footage will be cored at $3.00 per foot and 50 percent plugged at $1.80 per foot.	$ 81,600.00	$ 2.400
Standby time: Probing of the holes with either Company owned equipment or government Barnaby requires: (a) the leaving of casing in the hole to protect upper portion from caving for latter probing by Barnaby, necessitating returning to pull casing, or (b) standby time at completion of hole for probing before pulling casing. From past experience this has amounted to an average of one hour per hole: 170 holes @ $12.00 per hole	2,040.00	0.060

		Cost	Unit Cost Per Foot
	It is contemplated to do the bulldozing work for drill roads and drill sites under contract, including equipment, labor, fuel, etc. on a per hour basis. It is estimated that a total of 200 hours will be required for this work at $12.00 per hour	$ 2,400.00	0.070
(b)	Labor, supervision, consultants:		
	It is estimated 4 drilling units can accomplish an average of 400 feet per working day. The total footage then could be drilled in 85 working days or about 3-1/2 months time, figuring 25 working days per month. Additional full time labor (not including (a) above) would consist of one sampler and one geologist. In addition an engineer-geologist consultant would work part time in an advisory capacity and aid in the final analysis and report on the program. One month is considered as 25 working days.		
	One sampler (4 months) $1,600.00		
	One geologist (4 mo. incl.report) 2,000.00		
	Expense (total 240 man days @ $5/d) 1,200.00		
	Consultant (30 days, intermittent) 1,500.00	6,300.00	0.185
(c)	Operating material and supplies:		
	Fuel for 1/2-ton truck 300.00		
	Core boxes (300 @ $3.50 ea.) 1,050.00		
	Misc.drafting, office and report supplies 100.00	1,450.00	0.043
(d)	Operating equipment:		
	1/2-ton pickup truck ($150/mo.) 600.00		
	Counter and probe unit ($62.50/mo.) 250.00	850.00	0.025
(g)	Miscellaneous:		
	Analytical work: 500 assays 2,500.00		
	Accounting 400.00		
	State & Fed. Unemploy. Ins., S.S.Tax, State Comp. Ins. (Total 8% of $3,600.00) 288.00	3,188.00	0.094

		Cost	Unit Cost Per Foot
(h)	Contingencies:		
	Approx. 5% of Total	4,892.00	0.144
	TOTALS	$ 102,720.00	3.02

STAGE II: As discussed under Estimate of Costs above, it is believed that an additional 100 holes will be required to offset favorable holes and to explore fourth sandstone channels that have been found during Stage I drilling. These holes, only as "reasonable delineation and sampling of the ore", can be drilled at a cost equal to the average overall cost as estimated above for Stage I. Such items as labor, bulldozing, operating materials, operating equipment, miscellaneous, and contingencies will be in proportion:

(a)	Independent Contract:		
	Diamond drilling, Total feet 20,000	48,000.00	2,400
	Standby time, 100 x $12.00	1,200.00	0.060
	Bulldozing, roads and drill sites, 100 hrs.	1,200.00	0.060
(b)	Labor, supervision, consultants:		
	For 20,000 feet	3,700.00	0.185
(c)	Operating materials:	860.00	0.043
(d)	Operating equipment:	500.00	0.025
(g)	Miscellaneous:	1,880.00	0.094
(h)	Contingencies: (Approx. 5 percent of total)	2,860.00	0.144
	Totals	$60,207.00	3.02

STAGE I	$102,720.00
STAGE II	60,207.00
Total (Both Stages)	$162,927.00

Total unit price per foot $3.02

Total time required to complete preliminary road work and both drilling stages: 6 months.

SILVER TOP GROUP

(Refer to Fig. 2A)

The Silver Top Group is comprised of five full claims located in Sec. 34, T. 22 S., R. 22 E., SLM, Grand County, Utah. Fig. 9 is a claim map of the Silver Top Group.

These claims, totalling 103.3 acres, are staked on the dip slope of the third ore-bearing sandstone of the Salt Wash member, the upper two sandstone lenses of the Salt Wash are missing. Drilling to date has consisted of assessment work only and has not explored to any extent the potential of the fourth ore-bearing sandstone. The claims are in an excellent area and a preliminary drilling program, costing approximately $15,000, should determine if commercial ore bodies are present.

During the initial phase of the U. S. Geological Survey drilling program in the Yellow Cat area these claims were drilled on 1,000-foot centers. This drilling, as well as the assessment work drilling done during 1955 by Mid-Continent, established the presence of appreciable thicknesses of the fourth ore-bearing sandstone. Contiguous claims to the north, west and south are owned by Pick Uranium Co. The estimated evaluation of these undrilled claims would be approximately $1,000 per claim.

JUANITA GROUP

(Refer to Fig. 2)

The Juanita Group of eight claims, comprising 162.43 acres, is located in the Yellow Cat area in Secs. 14 and 23, T. 23 S., R. 21 E., SLM, Grand

TRIM LINES Leave at least 3/4" from heavy line on other two sides.

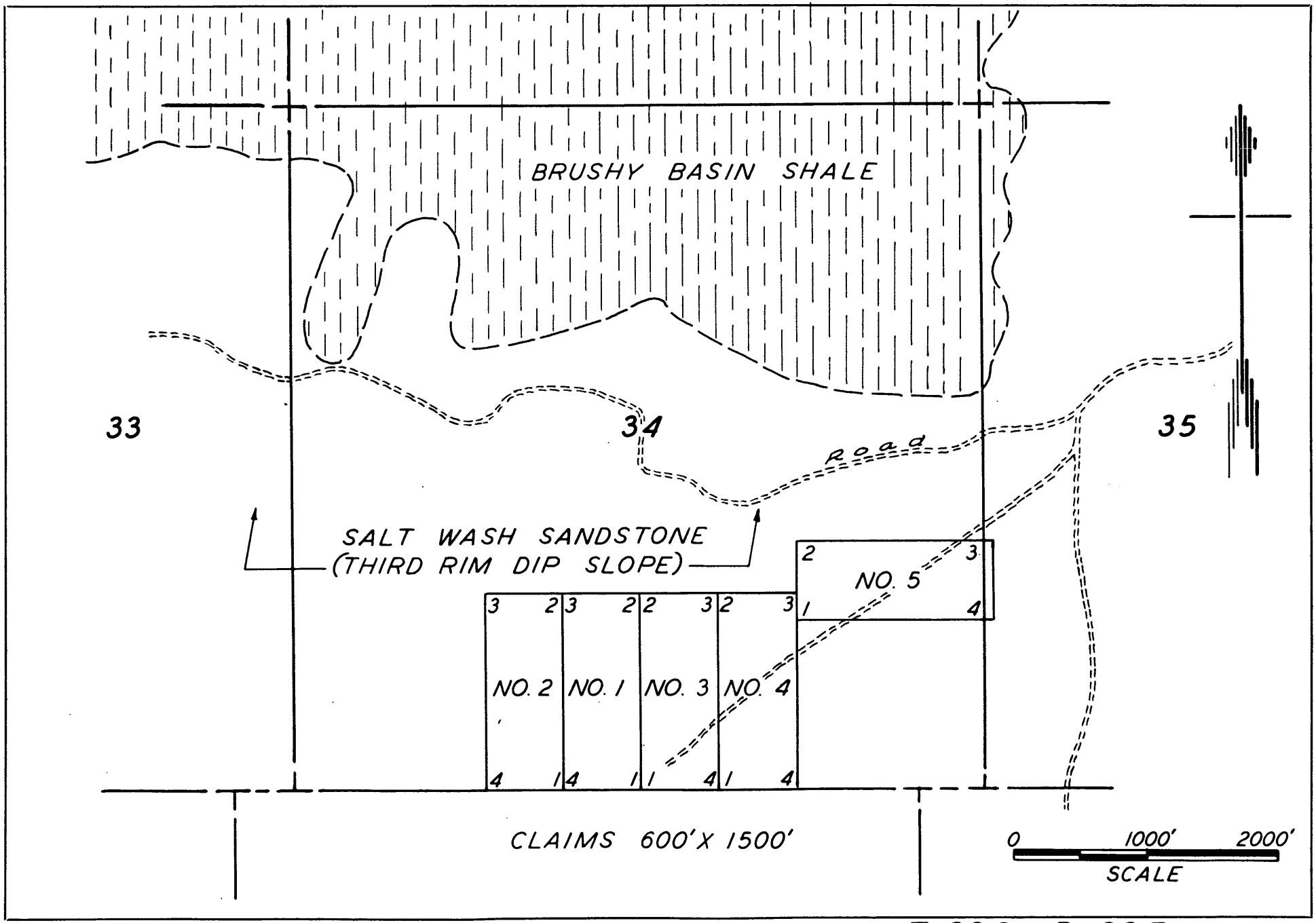


FIG. 9 SILVER TOP CLAIMS, SEC. 34, T. 22 S., R. 22 E.

County, Utah. The claims lie about three miles southwest of the center of the Yellow Cat area and are 20 miles by gravel road from Thompson, Utah, the nearest ore purchasing station. The claims cover the Salt Wash member of the Morrison formation. Fig. 10 is a claim map of the Juanita Group.

Drilling depths to penetrate the fourth ore-bearing sandstone are from 130 to 160 feet. This group of claims was acquired by Mid-Continent from Strategic Minerals Exploration Co., and are at the present time under a lease to the Western Silver Lead Corp. and the Square Deal Mining and Milling Co., of Wallace, Idaho.

The claims cover most of a mesa of low relief with an elevation of about 5,200 feet. Road building and maintenance is comparatively easy considering the more difficult terrain on the Colorado Plateau in general. The upper benches of the mesa are covered with a plentiful supply of juniper and pinon, which can be used for mine timber. There are no buildings or equipment on the claims at the present time. Strategic Minerals constructed about a mile of road to the mine, terminating it on the east side of the mesa, from which point Mid-Continent extended it an additional mile to the southwest corner of the claims.

On the Juanita Group, the ore thus far mined is estimated to be higher in uranium and lower in vanadium content than the average for the Colorado Plateau area. The ore mined on these claims occurred in the upper elongated sandstone lens of the Salt Wash member of the Morrison formation within an altered zone showing uranium "bloom". The original deposit was a high grade roll outcropping about 50 feet along the rim on

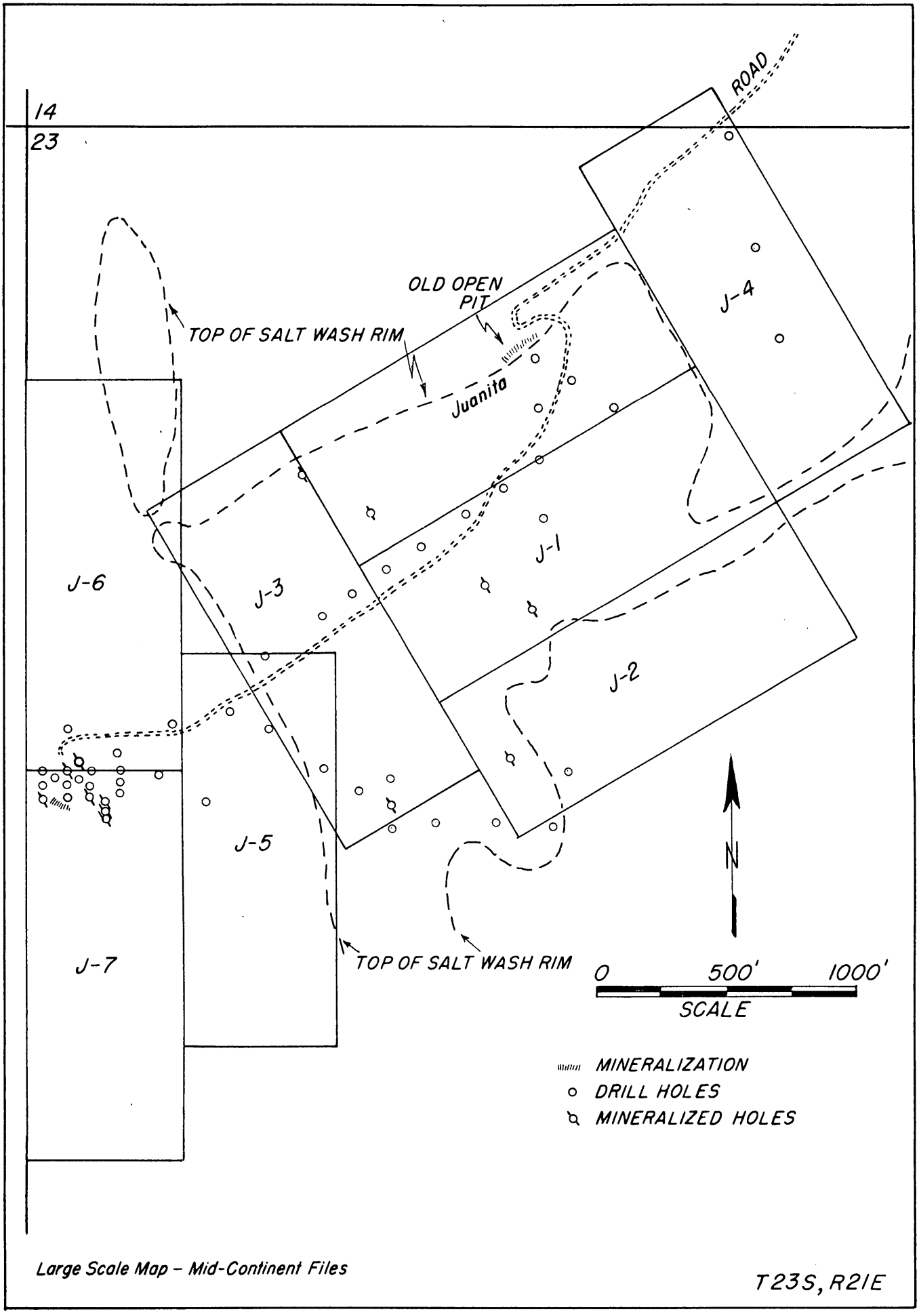


FIG.10 JUANITA GROUP – YELLOW CAT AREA

the northeast side of the mesa. The roll had a maximum outside diameter of about four feet, a portion of which had been removed by erosion. The uranium penetrated the wall rock in places to a depth of four inches. Low-grade vanadium, which is often an indicator of nearby ore, has been found along the next paralleling joint plane, suggesting the possible presence of another roll. This group of claims, although favorably situated geologically, has had comparatively little development work.

The Juanita and the Juanita No. 1 claims were discovered in June, 1951, by Strategic Minerals Exploration Co., and since that time a geologic study was made of the area in general and approximately five tons of ore was mined to check the continuity of the roll. After encouraging geological evidence was found and the ore continued over a length of more than 50 feet, the Juanita Nos. 2, 3, and 4 were located on December 10, 1951. Two samples were cut along an exposed roll. Sample No. 1, on the extreme east end, assayed 3.84 percent V_2O_5 and 0.25 percent U_3O_8. Sample No. 2, in the middle of the roll, assayed 1.64 percent V_2O_5 and 1.23 percent U_3O_8. Juanita Nos. 5, 6, and 7 were located in late 1953 and came under Circular 7 of the Atomic Energy Commission.

During the month of September 1954, the lessees, the Western Silver Lead Corp., and the Square Deal Mining and Milling Co., carried out a program of wagon drilling on the Juanita Group. A total of 7,182 feet was drilled at a cost of $5,769. Although this program did not discover the presence of ore bodies, several of the holes were mineralized, indicating up to 0.10 percent U_3O_8. It now appears that additional drilling is warranted. The estimated evaluation of these unproven claims would be approximately $1,000 per claim.

UTAH STATE SCHOOL SECTION (EAST)

Sec. 2, T. 23 S., R. 22 E.
(Refer to Fig. 11)

The north one-half of this school section, under lease to Mid-Continent, with a total of 332.52 acres, is perhaps less favorably located than the school section containing the previously described ore bodies, as it is located four miles east of the area containing the heaviest concentration of producing mines.

The major portion of the area covered by this lease is similar to the Silver Top claims, in that it appears to cover the dip slope of the third Salt Wash sandstone. Previous drilling by the U. S. Geological Survey consisted of 16 holes on 500-foot centers, 14 of which were by wagon-drill. During the spring of 1955 Mid-Continent drilled six core holes along the north end of the section. None of these holes encountered mineralization, but several of the holes penetrated appreciable thicknesses of favorable sandstone. This drilling indicated that the average drilling depth should be at least 100 feet to be sure of drilling through the fourth ore-bearing sandstone.

It appears advisable to drill from 30 to 40 core holes spaced on 200-foot centers endeavoring to determine if there exists any definite channeling in the fourth ore-bearing sandstone. The value of the lease on this has been placed at $30.00 per acre.

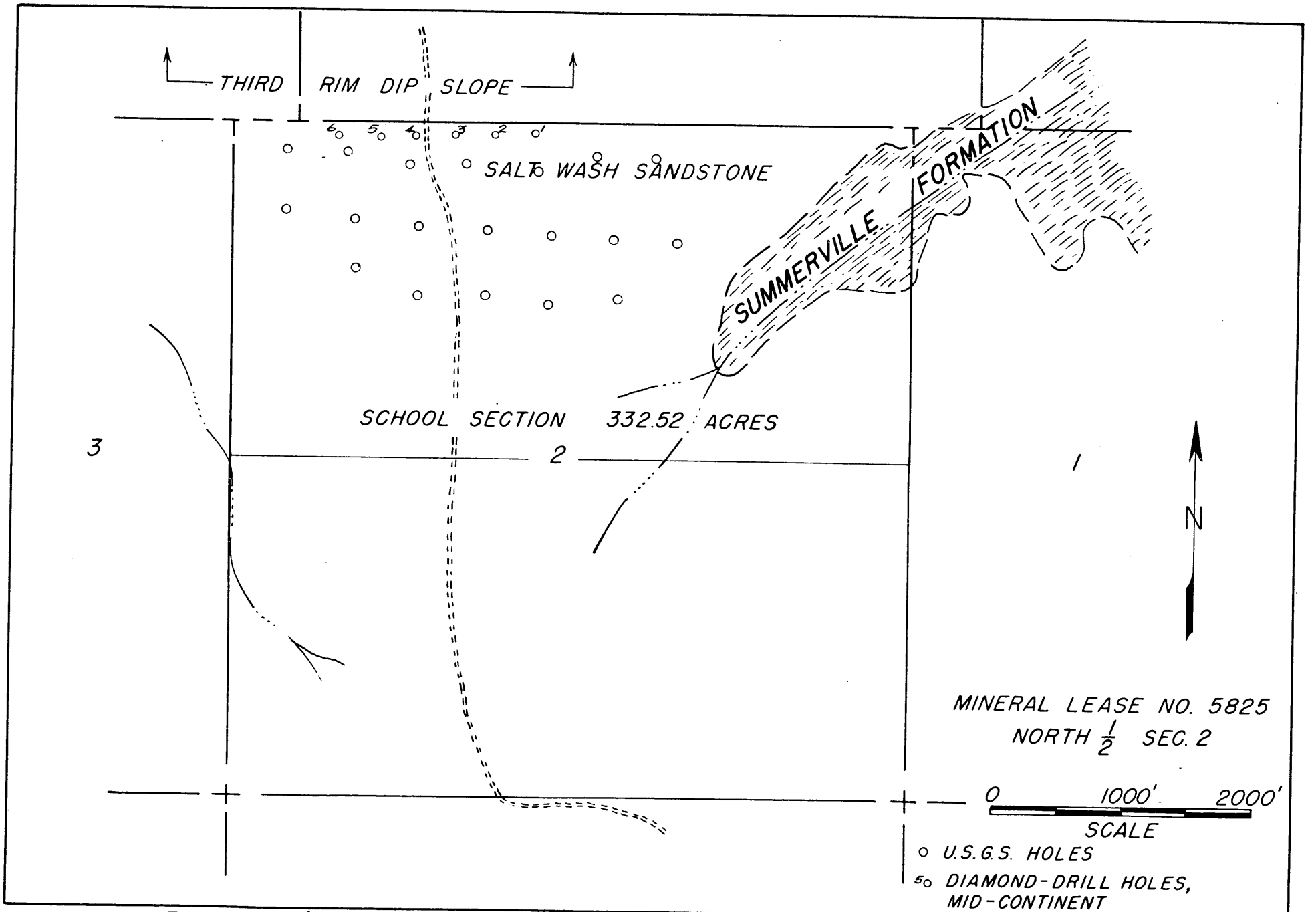


FIG. 11 N½ SEC. 2, T. 23S., R. 22E., S.L.M.

CONCLUSION

Estimated production from the Yellow Cat area from 1935 through 1954 would indicate that a total of 40,000 tons of uranium-vanadium ore was mined having a value slightly in excess of one million dollars. Recent drilling by the U. S. Geological Survey has established locations and trends of deeper ore-bearing sandstone channels containing ore deposits of major significance. Six or seven ore bodies are now being mined that contain proven ore reserves many times greater than all past production from the area. Favorable sandstone channels containing many commercial ore deposits have now been established in areas of concentrated drilling and these should be traced by further exploratory drilling.

Recent drilling by Mid-Continent Uranium Corp. has discovered a fourth ore-bearing sandstone channel on Utah State school section, Sec. 2, T. 23 S., R. 21 E., and traced the channel for over 2,500 feet. Two deposits of commercial grade uranium-vanadium ore, 600 feet apart, have been blocked out on 50-foot centers. Calculations, based on proven tonnages and grades established by chemical assays of BX-cores, indicate 16,355 tons of ore having a gross value of $416,281, including the initial production bonus.

Mid-Continent completed a development program during 1955 in the John Incline mine, on the John Group of nine claims, producing over $21,000 worth of ore. Estimates of ore reserves from Geological Survey drilling data indicate 2,094 tons of ore remaining in the mine having a gross value of $113,685, including the remaining production bonus. An

application for Defense Minerals Exploration Administration financial assistance has recently been filed to drill the John Group of claims. The estimated cost of the initial phase, Stage I, is $102,000, while the second phase, Stage II, of offset holes is estimated at $60,000.

In addition to the above two properties containing ore reserves Mid-Continent has three other properties in the Yellow Cat area: the Silver Top Group of five claims; the Juanita Group of eight claims; and the north half of Utah State School Section, Sec. 2, T. 23 S., R. 22 E. Although the presence of ore deposits has not be established on these three properties, each is worthy of an exploratory drilling program. It is proposed to locate the ore-bearing fourth sandstone channels by preliminary drilling, and then trace these favorable thicknesses by a progressive-type pattern of hole locations. The properties are all eligible for the initial production bonus, and each has the geologic features necessary for the presence of commercial ore deposits.

APPENDIX 1

UTAH LAND BOARD ROYALTY SCHEDULE

RECEIVED
FEB - 9 1956

Fissionable Minerals Royalty
(Adopted November, 1955)

(1) To pay a royalty of 3.9% of the gross amount received for all fissionable materials, less any bonus, mine development and transportation allowance, and lime penalty deduction but including the gross amount received for any mineral included with the fissionable material on ore which has a gross value of from $0.00 to $3.99 per dry ton and on ore having a gross value per dry ton of $4.00 or more, to pay an additional 0.3% royalty for each $1.00 in gross value per dry ton to a maximum royalty of 17.4% on ore having a gross value of $48.00 or more per dry ton.

(2) And in addition to (1), to pay a royalty of 8.0% of any bonus received from the sale of fissionable materials.

EXAMPLES

URANIUM BASE PRICE					URANIUM	INITIAL PRODUCTION BONUS	
$0.00 to $3.99	Gross value per dry ton			3.9%	.01 U_3O_8	$3.00 per ton	8%
4.00 to 4.99	"	"	"	4.2%			
5.00 to 5.99	"	"	"	4.5%			
6.00 to 6.99	"	"	"	4.8%			
7.00 to 7.99	"	"	"	5.1%			
8.00 to 8.99	"	"	"	5.4%			
9.00 to 9.99	"	"	"	5.7%			
10.00 to 10.99	"	"	"	6.0%			
11.00 to 11.99	"	"	"	6.3%			
12.00 to 12.99	"	"	"	6.6%			
13.00 to 13.99	"	"	"	6.9%			
14.00 to 14.99	"	"	"	7.2%	.21 U_3O_8	$14.70 per ton	8%
15.00 to 15.99	"	"	"	7.5%			
16.00 to 16.99	"	"	"	7.8%	.24 U_3O_8	$16.80 per ton	8%
17.00 to 17.99	"	"	"	8.1%			
18.00 to 18.99	"	"	"	8.4%			
19.00 to 19.99	"	"	"	8.7%			
20.00 to 20.99	"	"	"	9.0%			
21.00 to 21.99	"	"	"	9.3%	.30 U_3O_8	$21.00 per ton	8%
22.00 to 22.99	"	"	"	9.6%			
23.00 to 23.99	"	"	"	9.9%			
24.00 to 24.99	"	"	"	10.2%	.35 U_3O_8	$24.50 per ton	8%
25.00 to 25.99	"	"	"	10.5%			
26.00 to 26.99	"	"	"	10.8%			
27.00 to 27.99	"	"	"	11.1%			
28.00 to 28.99	"	"	"	11.4%			
29.00 to 29.99	"	"	"	11.7%			
30.00 to 30.99	"	"	"	12.0%			
31.00 to 31.99	"	"	"	12.3%			
32.00 to 32.99	"	"	"	12.6%			

URANIUM BASE PRICE					URANIUM INITIAL PRODUCTION BONUS		
$33.00 to 33.99	Gross value	per dry	ton	12.9%			
34.00 to 34.99	"	"	"	13.2%			
35.00 to 35.99	"	"	"	13.5%	.50 U_3O_8	$35.00 per ton	8%
36.00 to 36.99	"	"	"	13.8%			
37.00 to 37.99	"	"	"	14.1%			
38.00 to 38.99	"	"	"	14.4%			
39.00 to 39.99	"	"	"	14.7%			
40.00 to 40.99	"	"	"	15.0%			
41.00 to 41.99	"	"	"	15.3%			
42.00 to 42.99	"	"	"	15.6%	.60 U_3O_8	$42.00 per ton	8%
43.00 to 43.99	"	"	"	15.9%			
44.00 to 44.99	"	"	"	16.2%			
45.00 to 45.99	"	"	"	16.5%			
46.00 to 46.99	"	"	"	16.8%			
47.00 to 47.99	"	"	"	17.1%			
48.00 and over	"	"	"	17.4%	.70 U_3O_8	$49.00 per ton	8%

Appendix 2

(Sample)

EXCERPTS FROM

UTAH STATE URANIUM AND VANADIUM MINERAL LEASE

Mineral Lease Application No. _____

Mineral Lease No. M.L.A. 4248
Grant: School

THIS INDENTURE OF LEASE AND AGREEMENT, entered into, in duplicate, this _____, by and between the State Land Board, acting in behalf of the State of Utah, hereinafter called the Lessor, and Norman Ebbley and associates, a copartnership of Grand Junction, Colorado, hereinafter called the Lessee, under the pursuant to Title 86, Chapter 1, Utah Code Annotated 1943, and Amendments thereto.

WITNESSETH: That the Lessor, in consideration of the rents and royalties to be paid and the covenants to be observed by the Lessee, as hereinafter set forth, does hereby grant and lease to the Lessee the exclusive right and privilege to mine and dispose of all of the uranium and vanadium minerals in the following described tract of land situated in Grand County, State of Utah, to-wit:

All of Section 2, T. 23 S., R. 21 E., of the S.L.M.,

containing a total of 397.96 acres, more or less, together with the right to use and occupy so much of the surface of said land as may be required for all purposes reasonably incident to the mining and removal of the uranium and vanadium minerals produced in commercial quantities from the said lands, upon condition that at the end of each Twenty-year period succeeding the first day of the year in which this lease is issued, such readjustment of terms and conditions may be made as the Lessor may determine to be necessary in the interest of the State.

ARTICLE 1

It is expressly understood and agreed that this lease is granted subject in all respects to and under the conditions of the laws of the State of Utah, and the Federal Statutes regarding the operation of Metallic mineral mines, Employer's Workman's Compensation, Workman's Insurance, Social Security and Unemployment Insurance and such existing Rules and Regulations or Rules and Regulations, hereafter adopted and approved by the State Land Board.

It is further expressly understood and agreed that this lease covers only the mining and marketing of uranium and vanadium minerals, but that should other minerals be discovered such fact shall be immediately reported to the Lessor.

ARTICLE III

The Lessee in consideration of the granting of the rights and privileges aforesaid, hereby covenant and agree as follows:

FIRST: To pay to the Lessor as annual rental for each acre covered by this lease the sum of 50¢ per acre per annum. All such annual payments of rental to be made in advance on the 2nd day of January of each year, except the 1954 rental, which is payable on the execution of this lease, such rental to be credited on the royalties to become due hereunder during the year for which said rental is paid.

SECOND: To pay to the Lessor a royalty of 12-1/2 per cent of the proceeds for ores sold less assay charges and transportation to point of sale. All payments to be made monthly on or before the 15th day of the month next succeeding the month in which the ores are sold. Monthly statements as to the amount of production sold from the leased ground in the preceding month must be in affidavit form and shall accompany the royalty remittance. Failure to pay the rents and royalties or any of them in the manner herein provided shall constitute a default and entitle the Lessor to declare a forfeiture on this lease and to enter upon and take possession of the premises with or without process of law.

THIRD: That at the option of the Lessor it may require the payment at the mine of royalties in kind; the amount being 12-1/2 per cent of the material produced. (See New Schedule Appendix 1)

FOURTH: That upon the shipment of any ore under this lease, the Lessor shall be immediately notified in writing that such shipment is being made, giving the means of transportation and the point of destination.

FIFTH: That at the option of the Lessor it may require, before the commencement of mining operations, that the Lessee shall submit a detailed plan with maps, showing the proposed method of opening the ground and that such work shall not be undertaken until the Lessor has approved such plan and that failure on the part of the Lessee to do so, if required, or to prosecute development on the lines directed, shall constitute a cause for cancellation of this lease.

SIXTH: To commence actual mining operations upon the land included herein on or before _____, and thereafter to diligently operate the property according to the plans accepted or under modifications thereof as may be acceptable to the Lessor.

SEVENTH: To at all times during the life of this lease perpetuate and protect the main line tunnels in ingress and egress to and from said lands and the air courses necessary for proper ventilation, by means of proper pillars and timbering as may be directed by the Lessor or State Mine Inspector, whether upon this leased land or extending through adjacent lands owned or operated by the Lessee, and upon abandonment or termination of this lease from any cause, to substantially fence, fill in, cover or close all surface openings or workings, if directed to do so by said Lessor.

EIGHTH: To keep at the mine office clear, accurate and detailed maps on tracing cloth, on a scale not more than 50 feet to the inch, of the workings in each separate mine on the leased lands and on the lands adjacent, and to be so arranged with reference to a public land corner that the maps can be readily and correctly superimposed, and to furnish to the Lessor annually, or upon demand, certified copies of such maps and such written statement of operations as may be called for. All mine surveys shall be made by a licensed engineer and all maps certified to by him.

NINTH: To not assign this lease or any interest therein, nor sublet any portion of the leased premises, or any of the rights and privileges herein granted, without the written consent of the Lessor being first had and obtained.

ARTICLE VI

Upon cancellation of this lease for any cause hereunder the Lessee shall be entitled to remove from the lease holdings only their personal and movable property and that improvements attached to the land such as buildings, timbering or other construction or constructions material in place, shall remain undisturbed upon the ground and the property surrendered in good usable condition.

ARTICLE VII

It is mutually understood and agreed that the suspension of mining operations by the Lessee for a longer period than six months without the written consent of the Lessor being first had and obtained shall be a cause for forfeiture, and that upon the violation of this provision or any of the other terms of this lease the Lessor may at its option after thirty days notice by registered mail cancel this lease. After the expiration of the said thirty days and the cancellation of the lease no notice of such cancellation need be given the Lessee.

ARTICLE VIII

It is mutually understood and agreed that the Lessee may terminate this lease at any time upon giving three months notice in writing to the Lessor, and upon payment of all rents and royalties and other sums due and payable to the Lessor, and upon complying with the terms of this lease with respect to the preservation of the workings in such order and condition as to permit of the continued operation of the premises and the preservation of the mine.

ARTICLE IX

It is understood and agreed by and between the parties hereto that the Lessor, its officers and agents, shall have the right at all times to go in and upon the leased lands and premises, during the term of said lease to inspect the work done and the progress thereof on said land and the products obtained therefrom, and to post any notices on the said land that it

may deem fit and proper; and also shall permit any authorized representatives of the Lessor to examine all books and records pertaining to operations and under this lease, and to make copies of and extracts from the same, if desired.

ARTICLE X

It is mutually understood and agreed by the parties hereto that all of the terms, covenants, conditions and obligations in this lease contained, shall be binding upon the heirs, executors, administrators and assigns of the Lessee.

ARTICLE XI

It is understood and agreed that this lease is issued only under such title as the State of Utah may now hold, and that in the event the State is hereafter divested of such title, the Lessor shall not be liable for any damages sustained by the Lessee, nor shall the Lessee be entitled to or claim any refund of rentals or royalties, or other monies theretofore paid to the Lessor.

IN WITNESS WHEREOF, the parties have hereunto subscribed their names the day and year first above written.

STATE OF UTAH, STATE LAND BOARD

APPROVED AS TO FORM

BY _____
Lessor

_____
Attorney General

_____
Lessee

Appendix 3

EXCERPTS FROM ATOMIC ENERGY COMMISSION REGULATIONS

FOR PURCHASING URANIUM-VANADIUM ORES

Effective March 1, 1951

"(Domestic Uranium Program Circular 5, Revised)

"PART 60 - DOMESTIC URANIUM PROGRAM

"GUARANTEED MINIMUM PRICE FOR URANIUM-BEARING CARNOTITE-TYPE OR ROSCOELITE-TYPE ORES OF COLORADO PLATEAU AREA

. . .

"Section 60.5 (c) Definitions. As used in this section and in 60.5a, the term 'buyer' refers to the U. S. Atomic Energy Commission, or its authorized purchasing agent. The term 'ore' does not include mill tailings or other mill products. The term 'seller' refers to any person offering uranium ores for delivery to the Commission. Weights are avoirdupois dry weights, unless otherwise specifically provided.

"(d) Deliveries of not to exceed 1,000 tons per year. To aid small producers, any one seller may deliver without a written contract but otherwise in accordance with this circular up to, but not exceeding, 1,000 short tons (2,000 pounds per ton) of ores during any calendar year.

"(e) Deliveries in excess of 1,000 tons per year. Sellers desiring to deliver in excess of 1,000 short tons (2,000 pounds per ton) of ores during any calendar year will be required to enter into a contract with the Commission providing for, among other things, a rate of delivery and the total quantity of ore to be delivered.

"(f) Delivery. Seller, at his own expense, shall deliver and unload all ores at the buyer's depot at Monticello, Utah. Deliveries shall be in lots of not less than 10 short tons (2,000 pounds per ton) unless special arrangements have been agreed upon by buyer, but such lots may be delivered in more than one load. Days and hours during which ore may be delivered will be posted at the depot.

"(g) Weighing, sampling and assaying. Buyer will bear the cost of weighing, sampling, and assaying. The net weight of each load will be determined by the buyer's weighmaster on scales which will be provided by the buyer at or in the vicinity of the purchase depot and such weight will be accepted as final. A weight ticket will be furnished seller or his representative for each load. Each lot of ores will be sampled promptly by the buyer according to standard practice and such sampling will be accepted as final . . . .

"(h) Payment. Buyer will make payment promptly but payment will not be made until an entire minimum lot of ten short tons (2,000 pounds per ton) has been delivered and accepted, unless special arrangements have been agreed upon by buyer, in which case there may be an extra charge for assaying and sampling. Moisture determinations, analyses and settlement sheets, together with the check in payment, will be mailed to seller . . . . .

"60.5a. Schedule I; minimum prices, specifications, and conditions - - (a) Prices.
Payment for delivery of the ores will be computed on the following basis:

"(1) Uranium. (i) Ores assaying less than 0.10 percent: no payment. Any such ores which are delivered to the purchase depot shall, unless otherwise specifically agreed to by buyer, become the property of the buyer as liquidated damages for buyer's expense of weighing, sampling, and assaying, and after sampling may be placed in process, comingled, or otherwise disposed of by buyer. If seller has any question as to the quality of his ore, it is suggested that before shipment and delivery to the purchase depot a representative sample be submitted to the buyer or to one of the umpires for assay at seller's expense. The buyer at its discretion may assay a limited number of samples without charge.

"(ii) Ores assaying 0.10 percent U_3O_8 and more, as follows:

U_3O_8 Assay:	Payment per pound U_3O_8
0.10 percent	$ 1.50
0.11 percent	1.70
0.12 percent	1.90
0.13 percent	2.10
0.14 percent	2.30
0.15 percent	2.50
0.16 percent	2.70
0.17 percent	2.90
0.18 percent	3.10
0.19 percent	3.30
0.20 percent and more	3.50

"(iii) Premiums on uranium: $0.75 per pound for each pound of U_3O_8 in excess of 4 pounds U_3O_8 per short ton (2,000 pounds per ton) of ore and an additional premium of $0.25 per pound for each pound in excess of ten pounds U_3O_8 per short ton. Fractional parts of a pound will be paid for on a pro rata basis to the nearest cent.

"(2) Vanadium. V_2O_5 at $0.31 per pound up to, but not exceeding, ten pounds of V_2O_5 for each pound of U_3O_8 contained in ores. No factor will be included for V_2O_5 in excess of ten pounds for each pound of U_3O_8, although buyer may, from time to time, publicly announce that, for limited periods

by written agreements with individual producer, V_2O_5 in excess of ten-to-one will be paid for. Any such announcement will be made by posting a notice to this effect at the Monticello depot and through such other channels as are deemed suitable to achieve maximum dissemination among producers. Excess V_2O_5 shall be deemed to be buyer's property.

"(3) Allowances. (i) A development allowance of $0.50 per pound U_3O_8 contained in ores assaying 0.10 percent U_3O_8 or more in recognition of the expenditures necessary for maintaining and increasing developed reserves of uranium ores. Fractional parts of a pound will be paid for on a pro rata basis to the nearest cent. Sellers accepting this allowance are deemed to agree to spend such funds for the development or exploration of their properties. Sellers delivering less than 1,000 short tons per calendar year will not be required to submit an accounting record of expenditures for development or exploration pursuant to this agreement but sellers delivering in excess of 1,000 short tons per calendar year will be required, under the terms of their contracts, to submit proof satisfactory to the Commission that funds equivalent to the amount received as development allowance have been spent for development or exploration either during the contract period or within six months thereafter, unless otherwise provided in the contract.

"(ii) A haulage allowance of 6¢ per ton mile for transportation of ore paid for under §§60.5 and 60.5a from the mine where produced to the purchase depot specified by the Commission, up to a maximum of 100 miles. The haulage distance from the mine to the purchase depot will be determined by the Commission and its decision will be final. Tonnages for purposes of this allowance shall be calculated on the basis of natural weights rather than dry weights.

"(4) Adjustment of assays. Assays shall be adjusted to the nearest 0.01 percent for purposes of payment.

"(b) Quality and size. Ores will not be accepted by buyer under §§60.5 60.5a which, in buyer's judgment:

"(1) Contain less than 0.10 percent U_3O_8;
"(2) Contain more than three parts of lime ($CaCO_3$) to one part of V_2O_5, or a total of more than 6 percent lime in the ore;
"(3) Contain impurities deleterious to buyer's extraction process or for any other reason are not amenable to it;
"(4) Contain lumps in excess of twelve inches in size.

"NOTE: The Commission will be interested in discussing arrangements for delivery to it of types of uranium-bearing materials other than those for which guaranteed prices have been established, such as tailings, mill products, and ores of types not acceptable under §§60.5 and 60.5a.

"(60 Stat. 755-775; 42 U. S. C. 1801-1819. Interpret or apply sec. 5, 60 Stat. 761, 42 U. S. C. 1805)

"Effective March 1, 1951 through March 31, 1958.

"Dated at Washington, D. C., this 26th day of February 1951.

"By order of the Commission.

M. W. Boyer, General Manager "

Appendix 4

EXCERPTS FROM AEC CIRCULAR ON THE URANIUM BONUS

February 28, 1951

"1. Effective March 1, 1951, to March 1, 1954, the Commission will pay a new graduated bonus of up to $35,000, depending upon the quantity and grade of ore, for initial production and delivery of acceptable uranium ore from new and certain existing mining properties.

"The new bonus, which is described in AEC Domestic Uranium Program Circular No. 6, 'Bonus for Initial Production of Uranium Ore from Domestic Mining Properties,' to be issued shortly, provides for the following:

"1. For new mining properties, bonus payments will be made on each pound of uranium oxide in acceptable ore delivered to qualified mills or Commission ore-buying stations up to and including the first 10,000 pounds.

"2. For mining properties which have produced less than 10,000 pounds of uranium oxide during the period April 9, 1948, to March 1, 1951, bonus payments will be made on the difference between what the mining property has delivered between April 9, 1948, and March 1, 1951, and 10,000 pounds. For example, the owner of a mine that has produced 4,000 pounds of uranium oxide between April 9, 1948, and March 1, 1951, may be eligible to receive a bonus on each new pound produced up to and including the next 6,000 pounds.

"3. Bonus payments per pound of uranium oxide in acceptable ores produced from qualified mining properties will range from $1.50 for those ores assaying 0.10% uranium oxide to $3.50 for ores assaying 0.20% or more. Thus the maximum bonus which may be obtained for production from new mines will range from $15,000 to $35,000, depending upon the grade of ore delivered.

"Payments under the new bonus plan will be made for all eligible ores purchased after March 1, 1951. Payments will be made directly by the Commission and not by the receiving station or mill, and will be in addition to purchase payments made pursuant to ore buying schedules. Before bonus payments will be made, the producer must make application to the Commission and the Commission must certify that the mine is eligible for the bonus."

Appendix 5

EXCERPTS FROM AEC PRESS RELEASE, SEPTEMBER 23, 1953, EXTENDING URANIUM ORE PRICE AND INITIAL PRODUCTION BONUS

"The Commission's Domestic Uranium Program Circular 5, Revised, has been extended to cover the period through March 31, 1962, from its previous expiration date of March 31, 1958. This circular, which went into effect on March 1, 1951, provides guaranteed minimum base prices for the uranium oxide content of carnotite-type and roscoelite-type ores of the Colorado Plateau area. The price schedule ranges from $1.50 to $3.50 per pound of uranium oxide content, depending upon the grade of the ore, together with certain allowances and premiums.

"Domestic Uranium Program Circular 6, which established a bonus for initial and certain other production of uranium ores from domestic mines delivered under its terms between March 1, 1951 and February 28, 1954, now has been extended through February 28, 1957."

THE BROWN LABORATORY
2263 Broadway
GRAND JUNCTION, COLORADO

ANALYTICAL DEPARTMENT

PHONE 1543-W

CERTIFICATE OF ANALYSIS

TO

Mid-Continent Uranium Co.
201 Uranium Center Bldg.
Grand Junction, Colorado

Date 5-12-55
Order No. 3080-S

Material: Ore Samples
Received: 5-10-55
For: Analysis

Lab. No.	Your No.	Description	%U_3O_8	%V_2O_5	%$CaCO_3$
3080-1	MC-80	180.7 - 180.9 0.2'	Trace	0.05	
3080-2	MC-80	186.0 - 186.4 0.4'	0.01	0.29	
3080-3	MC-81	184.1 - 184.6 0.5'	0.08	0.60	
3080-4	MC-89	165.0 - 166.5 1.5'	0.03	0.06	
3080-5	MC-89	166.5 - 168.1 1.6'	0.20	1.13	

Analyst.

HE BROWN LABORATO. Y
2263 Broadway
GRAND JUNCTION, COLORADO

ANALYTICAL DEPARTMENT

PHONE 1543-W

CERTIFICATE OF ANALYSIS

TO

Mid-Continent Uranium Corp.
201 Uranium Center Bldg.
Grand Junction, Colorado

Date 5-3-55
Order No. 2998-S

Material: Ore Sample
Received: 5-2-55
For: Analysis

Lab. No.	Your No.	Description	%U_3O_8	%V_2O_5	%$CaCO_3$
2998-1	HC-31	193.5-194.5 1.0'	0.42	1.15	

Analyst.

JE BROWN LABORATOI

2263 Broadway
GRAND JUNCTION, COLORADO

ANALYTICAL DEPARTMENT

PHONE 1543-W

CERTIFICATE OF ANALYSIS

TO

Mid-Continent Uranium Corp.
201 Uranium Center Bldg
Grand Junction, Colorado

Date 3-29-55
Order No. 2633-S

Material: Ore Samples
Received: 3-26-55
For: Analysis

Lab. No.	Your No.	Description	%U_3O_8	%V_2O_5	%$CaCO_3$
2633-1	MC-~~52~~ 51	~~169.0~~ 168.5-169.6 1.1'	0.01	0.19	
2633-2	MC-52	175.0-175.5 0.5'	0.11	0.15	
2633-3	MC-52	175.5-176.0 0.5'	0.46	0.19	

Analyst.

Date 9/9/55

Minerals Assay Laboratory

Phone 1441

L#2399

549 Gland Avenue -:- Grand Junction, Colorado

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center City

LAB. NO.	SAMPLE RECEIVED 9/7/55	PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
4868	~~M-C-95 190.5 to 172.0~~	0.14	0.79			

TOTAL CHARGES $5.00

Date 9/16/55

Minerals Assay Laboratory

Phone 1441

L#2455

549 Gland Avenue -:- Grand Junction, Colorado

NAME Mid-Continent Uranium Corp. ADDRESS 201-202 Uranium Center Bldg. City

LAB. NO.	SAMPLE RECEIVED ~~5072~~ 9/15/55	PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
5079	MC-97 156.8 to 157.8 1.0'	0.07	0.84			

TOTAL CHARGES $5.00

THE BROWN LABORATORY

2263 Broadway
GRAND JUNCTION, COLORADO

ANALYTICAL DEPARTMENT

PHONE 1543-W

CERTIFICATE OF ANALYSIS

TO

Mid-Continent Uranium Corp.
201 Uranium Center
Grand Junction, Colorado

Date: 9-22-55.
Order No. 4685-S

Material: Ore samples
Received: 9-20-55
For: Analysis

Lab. No.	Your No.	Description	%U_3O_8	%V_2O_5	%$CaCO_3$
		Comm			
4685-1	1 MC98	152.4 153.4 1.0' ~~153.0-154.0~~	0.03	1.01	
4685-2	2 MC98	161.0-163.0 2.0'	0.14	0.39	
4685-3	3 MC98	~~169.0-170~~ 169.1-170.1 1.0'	0.05	3.05	

Analyst.

Phone 1441

Minerals Assay Laboratory

Date 9/23/55

549 and Avenue -:- Grand Junction, Colorado

L#4903

NAME Mid- Continent Uranium Corp. ADDRESS ~~201-202 Uranium Center Bldg. City~~

LAB. No.	SAMPLE RECEIVED 9/23/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
5300	MC-98	163.0-164.6	1.6'	0.02	1.10			
5301	MC-98	~~###~~ 166.8-169.1	2.3'	0.03	1.99			
5302	MC-98	170.1-170.4	0.3'	0.03	0.84			
5303	MC-98	171.3-172.2	0.9'	0.00	0.19			
5304	MC-99	183.1-183.7	0.6'	0.01	0.04			

TOTAL CHARGES $ 25.00

RECEIVED SEP 26 1955

Phone 1441

Minerals Assay Laboratory

Date 10/3/55

549 and Avenue -:- Grand Junction, Colorado

L#4962

NAME Mid-Continent Uranium Corp. ADDRESS 201-202 Uranium Center Bldg. City

LAB. No.	SAMPLE RECEIVED 10/1/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
5472	MC-101	186.3 to 187.6	1.3'	0.01	1.60			
5473	MC-102	177.6 to 178.0	0.4'	0.16	1.79			
5474	MC-103	171.9 to 173.7	1.8'	0.07	1.52			

Clm.

TOTAL CHARGES $ $15.00

RECEIVED OCT 4 1955 MID-CONTINENT URANIUM CORP.

Date 10/14/55

Minerals Assay Laboratory

L#9230

Phone 1441

541 land Avenue -:- Grand Junction, rado

NAME Mid-Continent Uranium Corp. ADDRESS 201-202 Uranium Center City

LAB. NO.	SAMPLE RECEIVED 10/13/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
5696	MC-74	187.2 to 188.2	1.0'	0.01	1.91			
5697	MC-80	182.6 to 184.3	1.7'	0.05	0.41			
5698	MC-82	180.7 to 181.3	0.6'	0.04	0.61			
5699	MC-97	~~156.8 to 157.8~~ 155.8 - 156.8	Cnun. 1.0'	0.03	0.06			
5700	MC-102	178.0 to 180.8	2.8'	0.05	0.22			
5701	MC-104	163.9 to 164.9	1.0'	0.02	0.23			
5702	MC-106	181.4 to 182.4	1.0'	0.13	0.21			
5703	MC-106	188.5 to 188.8	0.3'	0.03	0.45			

TOTAL CHARGES $ $40.00

Date 10/21/55

Minerals Assay Laboratory

L#2535

Phone 1441

541 land Avenue -:- Grand Junction, rado

NAME Mid-Continent Uranium Corp. ADDRESS ~~251-280~~ 201-202 Uranium Center, City

LAB. NO.	SAMPLE RECEIVED 10/20/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
5867	MC-109	182.2 to 182.6	0.4'	0.07	0.99			
5868	MC-110	155.1 to 156.1	1.0'	0.06	0.04			
5869	MC-110	167.3 to 167.6	0.3'	0.01	0.49			
5870	MC-111	156.1 to 156.9	0.8'	0.00	0.20			
5871	MC-111	156.9 to 159.9	3.0'	0.52	0.68			
5872	MC-111	159.9 to 162.0	2.1'	0.05	0.04			

TOTAL CHARGES $ $30.00

RECEIVED OCT 22 1955

Date 12/5/55

Minerals Assay Laboratory

Phone 1441

549 and Avenue -:- Grand Junction, Colorado

L#2757

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center Bldg. City

LAB. No.	SAMPLE RECEIVED 12/3/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
6955	MC-98	164.6 to 166.8	2.2'	0.01	0.06			
6956	MC-98	170.4 to 171.3	0.9'	0.02	0.38			
6957	MC-112	157.1 to 164.3	7.2'	0.00	0.03			
6958	MC-112	170.1 to 171.1	1.0'	0.01	0.06			
6959	MC-116	158.7 to 159.7	1.0'	Trace	0.04			
6960	MC-116	160.1 to 165.0	4.9'	0.01	0.02			
6961	MC-116	165.9 to 168.3	2.4'	0.03	0.12			

TOTAL CHARGES $35.00

Date 11/12/55

Minerals Assay Laboratory

Phone 1441

549 nd Avenue -:- Grand Junction, Colorado

L#2657

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center. City

LAB. No.	SAMPLE RECEIVED 11/11/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
6314	MC-116	157.3 to 158.7	1.4'	0.03	0.67			
6315	MC-116	159.7 to 160.1	0.4'	0.03	0.05			
6316	MC-116	165.0 to 165.9	0.9'	0.12	0.37			
6317	MC-116	169.5 to 170.5	1.0'	0.05	3.36			
6318	MC-112	152.6 to 157.1	4.5'	0.13	0.61			
6319	MC-112	164.3 to 170.1	5.8'	0.23	1.65			

TOTAL CHARGES $30.00

11/22/55

Minerals Assay Laboratory

Phone 1441

549 and Avenue -:- Grand Junction, Colorado

L#2705

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center City

LAB. NO.	SAMPLE RECEIVED 11/21/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
6593	MC-116	168.3 to 169.5	1.2'	0.03	0.34			
6594	MC-118	180.6 to 181.6	1.0'	0.02	0.60			
6595	MC-119	180.0 to 181.6	1.6'	0.07	0.50			
6596	MC-120	176.4 to 178.4	2.0'	0.40	0.47			

TOTAL CHARGES $ $20.00

Date 12/3/55

Minerals Assay Laboratory

Phone 1441

549 and Avenue -:- Grand Junction, Colorado

L#2746

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center, City

LAB. NO.	SAMPLE RECEIVED 12/2/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
6865	MC-81	184.6-187.4	2.8'	0.05	0.09			
6866	MC-121	177.4-178.4	1.0'	0.03	0.66			
6867	MC-121	178.4-182.7	4.3'	0.01	0.08			
6868	MC-121	182.7-185.5	2.8'	0.37	0.81			
6869	MC-122	154.5-156.5	2.0'	0.04	0.31			
6870	MC-122	156.5-163.5	7.0'	0.23	0.90			
6871	MC-122	163.5-171.6	8.1'	0.05	0.04			
6872	MC-123	157.2-162.7	5.5'	0.21	0.09			
6873	MC-123	162.7-172.2	9.5'	0.04	0.06			
6874	MC-123	172.2-176.5	4.3'	0.25	0.53			
6875	MC-124	162.4-164.5	2.1'	0.12	1.14			
6876	MC-124	164.5-171.0	6.5'	0.03	0.10			
6877	MC-124	171.0-173.2	2.2'	0.36	2.62			
6878	MC-125	155.9-160.5	4.6'	0.09	0.28			
6879	MC-125	160.5-164.9	4.4'	0.16	0.32			

TOTAL CHARGES $ 74.00

Phone 1441

Date 12/12/55

Minerals Assay Laboratory

549 and Avenue -:- Grand Junction, Colorado

L#2785

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center, City

LAB. No.	SAMPLE RECEIVED 12/10/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7234	MC-127	155.6-158.0	2.4	0.06	0.38			
7235	MC-126	161.8-163.7	1.9'	0.08	0.73			

TOTAL CHARGES $ $10.00

Phone 1441

Date 12/17/55

Minerals Assay Laboratory

549 and Avenue -:- Grand Junction, Colorado

L#2804

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center City

LAB. No.	SAMPLE RECEIVED 12/16/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7360	MC-128	158.0-159.4	1.4	0.11	3.78			
7361	MC-130	160.6-162.4	1.8'	0.08	0.50			
7362	MC-131	179.8-183.3	3.5'	0.10	0.29			
7363	MC-131	183.3-185.5	2.2'	0.04	0.07			

TOTAL CHARGES $ $20.00

Phone 1441

Minerals Assay Laboratory

Date 12/19/55 L#2812

549 and Avenue -:- Grand Junction, C ado

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center, City

LAB. NO.	SAMPLE RECEIVED 12/17/55	PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7414	MC-132 159.7-162.1	0.11	0.79			
7415	MC-132 162.1-163.0	0.01	0.06			
7416	MC-132 163.0-166.3	0.04	0.60			

TOTAL CHARGES $ $15.00

Phone 1441

Minerals Assay Laboratory

Date 12/22/55 L#2821

549 and Avenue -:- Grand Junction, C do

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center City

LAB. NO.	Correction Report SAMPLE RECEIVED 12/19/55	PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7479	MC-134 165.9-168.0	0.17	0.25			
7480	MC-135 169.9-170.7	0.04	0.05			

TOTAL CHARGES $ $10.00

Phone 1441

Minerals Assay Laboratory

L#2866 & 2868

Date 12/31/55

549 and Avenue -:- Grand Junction, Colorado

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center, City

LAB. NO.	SAMPLE RECEIVED 12/30/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7907	MC-139	180.7-185.0	4.3'	0.30	0.45			
7908	MC-139	185.0-187.0	2.0'	0.05	0.50			
7910	MC-136	160.7-162.2	1.5'	0.04	0.24			
7911	MC-137	~~176.7-178.5~~ 166.7-168.5	1.8'	0.01	Trace			

TOTAL CHARGES $20.00

Phone 1441

Minerals Assay Laboratory

L#2872

Date 1/3/56

549 and Avenue -:- Grand Junction, Colorado

NAME Mid-Continent Uranium Corp. ADDRESS 201 Uranium Center City

LAB. NO.	SAMPLE RECEIVED 12/32/55			PERCENT URANIUM	PERCENT VANADIUM	PERCENT LIME AS. CACO3	PERCENT TUNGSTEN OXIDE	PERCENT MOLY AS. MO
7926	MC-141	175.3-178.4		0.17	0.32			
7927	MC-141	178.4-185.0	6.6'	0.02	0.01			
7928	MC-141	185.0-189.3	4.3'	0.01	0.02			

TOTAL CHARGES $15.00