IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Defense Minerals Exploration Administration
Denver Federal Center
Denver, Colorado

July 11, 1956

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: John F. Shaw
E. N. Hawkinson

Subject: DMEA Docket 4085 (Uranium), Valcan Silver-Lead Corporation (Indian Creek group), Gunnison and Saguache Counties, Colorado

Enclosed are the original and 9 copies of an examination report on the subject property prepared by R. U. King and F. B. Moore, U. S. Geological Survey, and F. W. Rupp, U. S. Bureau of Mines.

The property is in an area only recently prospected for uranium deposits of both bedded and vein type. The area appears to be one of considerable promise.

The applicant proposes a rather extensive program of drilling and drifting at an estimated cost of $300,056.25. The examiners recommend a modified program of drilling and drifting to explore both bedded and vein type deposits at an estimated total cost of $109,875.25, Government participation $82,406.44.

We concur with the conclusions and recommendations of the examining team.

Nine extra copies of figure 3 are enclosed for use in the proposed contract.

for W. S. King
John F. Shaw
Supervising Mining Engineer

E. N. Hawkinson
E. N. Hawkinson
Member, Field Team

Enclosures (19)

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UNITED STATES
DEPARTMENT OF THE INTERIOR
FRED A. SEATON, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

DMEA 4225

Vulcan Silver-Lead Corporation

Indian Creek Group

Gunnison and Saguache Counties, Colorado

Uranium

Joint Engineering and Geologic Report

by

E. W. Buel, Mining Engineer
Bureau of Mines

R. U. King) Geologists
F. B. Moore)
Geological Survey

July 10, 1956

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DMEA 4225

VULCAN SILVER-LEAD CORPORATION
INDIAN CREEK GROUP
GUNNISON AND SAGUACHE COUNTIES, COLORADO

SUMMARY

Vulcan Silver-Lead Corporation, 100 Park Avenue, New York, applied for Defense Minerals Exploration Administration assistance to explore for uranium on their leased Indian Creek group of claims in Gunnison and Saguache Counties, Colorado. The estimated cost of the project was $300,056.28 to be used in a two-stage exploration program of core drilling, trenching, and geologic mapping.

Uranium mineralization of commercial grade has been found on the Indian Creek property in sandstone and vein type deposits. Uranium occurs in bedded deposits in the Harding sandstone of Ordovician age, and vein deposits occur along a major reverse fault between Precambrian granite and Paleozoic sedimentary rocks.

The examining team approves the applicant's proposal but recommends a modified two-stage exploration program to consist of 300 feet of drifting, 30,700 feet of drilling, and 900 feet of trenching that will reach the objectives more effectively and at about one-third of the applicant's estimated cost.

The estimated cost of the recommended exploration is $109,875.25, Government participation would be $82,406.44.

It is concluded that there is a good probability of finding significant uranium deposits on the Indian Creek group of claims, and a modified two-stage exploration program is recommended.

INTRODUCTION

Vulcan Silver-Lead Corporation requested DMEA assistance for $300,056.28 to explore for uranium on the Indian Creek group near Sargents, Colorado. An examination was made of the property on May 9, 1956, and it was reexamined on May 23, 1956, upon the completion of additional work by the applicant. The reexamination is explained in a DMEA Field Team memorandum of May 16, 1956.

The DMEA examining team, during the initial examination, consisted of Frank Moore, Geological Survey, and Edward W. Buel, Bureau of Mines, accompanied by Messrs. James E. Dunn and Arthur Baker III, respectively, manager and chief geologist of Vulcan Silver-Lead Corporation's Gunnison field office. The later examination was made by Robert U. King, Geological Survey, and Edward W. Buel, Bureau of Mines. The company personnel were also present during the second examination.

Except for some sloughing, most of the exploratory cuts and roadways were sufficiently exposed to permit a detailed examination of the salient geological features.

A. E. C. personnel were consulted in the Denver office and in the field. They agreed that the Indian Creek area has a good potential for uranium and that the deposits warranted further exploration.

LOCATION AND ACCESSIBILITY

The Indian Creek group, composed of several groups of claims, is in the Gunnison National Forest at an estimated average altitude of 10,500 feet and is on the west slope of the Continental Divide. The property is in secs. 12, 13, 24, and 25, T. 48 N., R. 5 E., and secs. 5, 7, 8, 9, 15, 16, 17, 18, 19, 20, 21, 22, 28, 29, 30, and 31, T. 48 N., R. 6 E., New Mexico principal meridian, Gunnison and Saguache Counties, Colorado (fig. 1).

The property is reached from Sargents, a small town 33 miles east of Gunnison along U. S. Highway 50, by a county road and a railroad bed (accessible to all type of vehicles) following along Marshall Creek to Indian Creek gulch, a distance of 5 miles, and by a road following Indian Creek for 3 or 4 miles to the claims. A number of roadways lead to various exploratory sites throughout the property.

GEOGRAPHY

The relief in the Indian Creek area is moderate. Altitudes range from approximately 9,000 to 11,000 feet. Conspicuous physiographic features are V-shaped valleys, narrow canyons, and small mesas.

Indian Creek, as well as a number of its small tributaries, and some springs, flow throughout the year; consequently, the exploratory drill sites are favorably located with respect to water. Adequate timber for mining operations exists on the property.

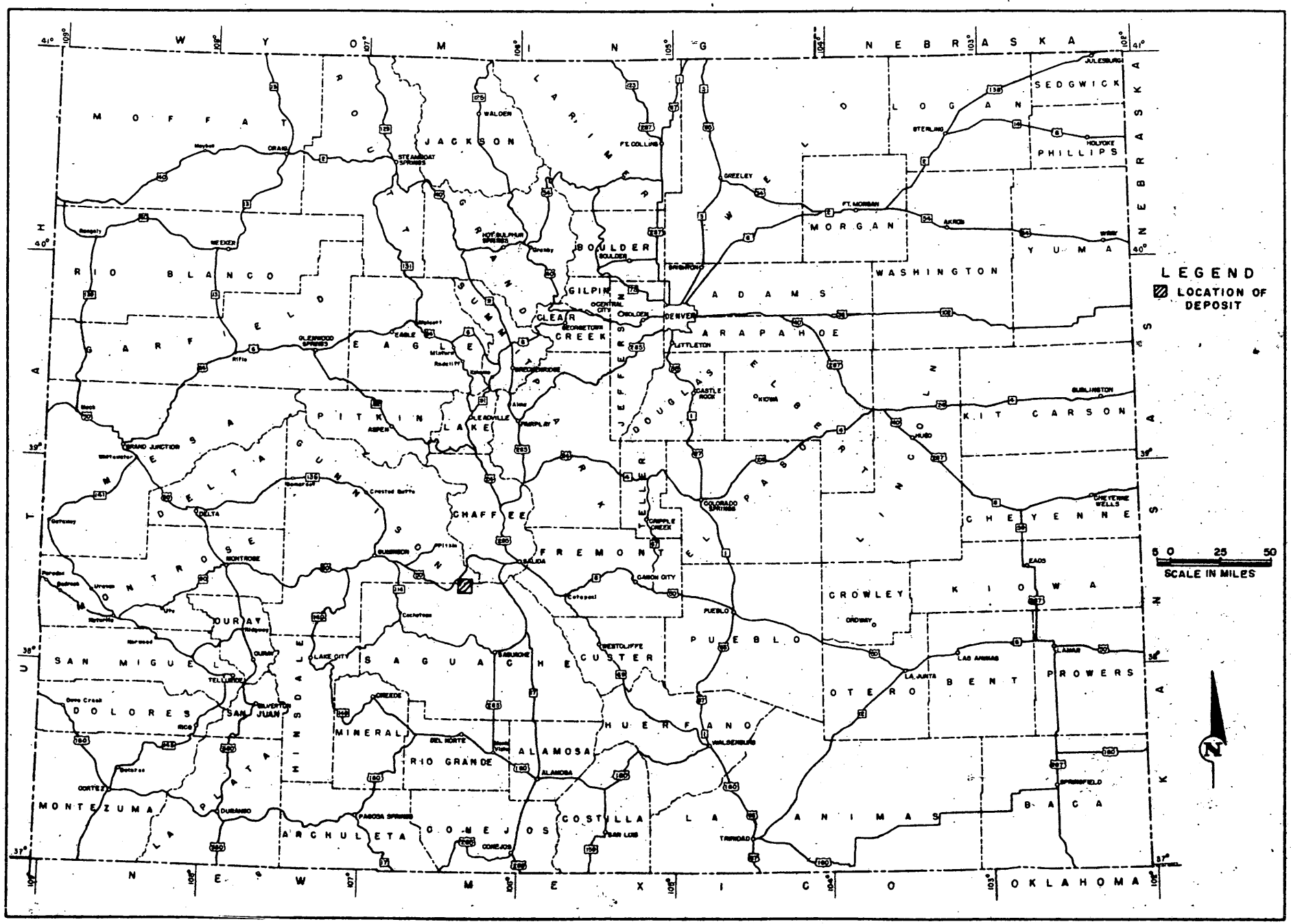

FIGURE 1 - LOCATION MAP, INDIAN CREEK GROUP, GUNNISON AND SAGUACHE COUNTIES, COLO. DMEA 4225

The climate is typical of the high altitudes of Colorado - short cool and dry summers, with long and severe winters. Because of cold winters and heavy snowfall, exploratory operations have been confined principally to the period of May to October, but it would be possible to keep the roads open for year around operations.

Supplies and equipment can be obtained at Gunnison and Salida, both less than 50 miles from the Indian Creek area; the nearest railhead is at Salida. Skilled mining labor can be found in nearby communities.

PROPERTY

The Indian Creek group is a consolidation of the Blue Fawn, Little Indian, Assay, Erie, Fulton, and Lorelei claim groups. A total of 295 unpatented claims are included in the consolidation. Distribution of the claims is as follows: 98 Blue Fawn, 43 Little Indian, 38 Assay, 40 Erie, 48 Fulton (two claims not included in consolidation), and 30 Lorelei claims. The property encompasses approximately 6,118 acres.

Ownership of the Indian Creek group of claims is as follows:

(1) Blue Fawn group - 98 claims owned by Leo Klinker, William F. Hostetler, and Dale Garrett.

(2) Little Indian group - 43 claims owned by Warren Goff, Clyde Hackney, Bernard Irby, Charles R. Irby, and Charles Nachtrieb.

(3) Assay group - 38 claims owned by Warren Goff, Clyde Hackney, Bernard Irby, Charles R. Irby, and Charles Nachtrieb.

(4) Erie group - 40 claims owned by Warren Goff, Clyde Hackney, Bernard Irby, Charles R. Irby, and Charles Wachtrieb.

(5) Fulton group - 48 claims owned by Warren Goff, Clyde Hackney, Bernard Irby, Charles R. Irby, and Charles Wachtrieb.

(6) Lorelei group - 30 claims owned by Gunnison Uranium Corp.

Notes: Addresses of owners are not known.

Amount of ownership per individual is not known.

All of the above groups have been leased to the Vulcan Silver-Lead Corporation of 100 Park Avenue, New York 17, N. Y., under the terms of 99-year leases.

Recorded claim data are tabulated as follows:

Saguache County

Claim	Book	Pages
Fulton 1A to 4A	272	183 to 189
Fulton 1 to 32	272	191 to 253
Fulton 34 to 35	272	255 to 257
Fulton 37 to 38	272	259 to 261
Fulton 40 to 45	272	263 to 273
Erie 1 to 34	272	275 to 341
Erie 35 to 40	273	349 to 359
Assay 3 to 40	270	152 to 226
Little Indian 1 to 30	269	366 to 424
Little Indian 32	269	426
Little Indian 34	269	428
Little Indian 36	269	430
Little Indian 39 to 43	273	361 to 369
Blue Fawn 1 to 22	270	326 to 368
Blue Fawn 24	270	370
Blue Fawn 26	270	372
Blue Fawn 28	270	374
Blue Fawn 39 to 70	273	235 to 297
Blue Fawn 72	273	299
Blue Fawn 74	273	301

Claim	Book	Pages
Blue Fawn 76	273	303
Blue Fawn 78	273	305
Blue Fawn 91	273	307
Blue Fawn 93	273	309
Lorelei 1 to 30	263	410 to 468

Gunnison County

Claim	Book	Pages
Little Indian 25	314	151
Little Indian 27	314	153
Little Indian 29	314	155
Little Indian 31 to 38	314	157 to 171
Blue Fawn 19	314	477
Blue Fawn 21	314	479
Blue Fawn 23	314	481
Blue Fawn 25 to 38	314	483 to 509
Blue Fawn 65	316	305
Blue Fawn 67	316	307
Blue Fawn 69	316	309
Blue Fawn 71	316	311
Blue Fawn 73 to 90	316	313 to 347
Blue Fawn 92	316	349
Blue Fawn 94 to 98	316	351 to 359

HISTORY AND PRODUCTION

Mr. Dunn reported that during the 1920's an attempt was made to obtain patents on placer ground located along Indian Creek. The placers were located for iron, but it is not known whether the claims were ever worked for their metallic content. It is known that the claim locators were representatives of a lumber company who removed considerable timber before abandoning the claims.

The area, especially on adjoining Marshall Creek, shows evidence of minor amounts of prospecting and exploration work, but there is no information relating to any significant iron discoveries.

After the discovery of radioactive anomalies in the area in the spring of 1955, the claim owners staked the claims. Since, several mining companies have become interested in the area, namely Vulcan Silver-Lead Corporation, Monarch Exploration Company, Gunnison Mines Corporation, Donald Reed Company, and Uncompaghre Exploration Company. Some exploration work was performed by Vulcan and Monarch before operations were halted during the past winter. The work performed was principally mapping, surveying, bulldozer trenching, diamond drilling, short exploratory adits, and access roadways. Following the clearing of snow, the Vulcan company has been building roads, excavating cuts, and rehabilitating trench sites. Uncompaghre Exploration Company also is currently doing exploratory bulldozer work on a favorable pitchblende showing in the area.

PRESENT STATUS

Development on the Indian Creek group of claims consists chiefly of shallow hand-dug trenches and pits and relatively deep bulldozer cuts and trenches. A number of access roadways have been constructed. Locations where anomalous radioactivity has been detected are shown in figure 3.

The applicant is doing extensive bulldozer stripping and road building at the uranium showing on the Erie claim No. 28 (area A, fig. 3), which is at the contact of Precambrian granite and Paleozoic sedimentary rocks.

SAMPLING AND ORE ESTIMATES

The applicant took a number of grab, channel, and specimen samples from widely scattered outcrops of the Harding sandstone, and assays ranged from 0.018 to 0.078 percent U_3O_8. Drill hole core samples of mineralized Harding sandstone taken by the Monarch Exploration Company from holes drilled behind radioactive rim exposures at sample locations 12 and 13 southwest of area F (fig. 3) assayed from 0.05 to 0.32 percent U_3O_8.

Twenty-nine channel and grab samples taken by the Vulcan Silver-Lead Company north and in the vicinity of sample location 39 (area A, fig. 3) contained from a trace to 3.1 percent U_3O_8.

A 4-inch piece of rock float found at sample locality 39 assayed 14.9 percent U_3O_8.

Radiometric analyses submitted by the applicant of the material sampled indicate that the uranium is generally in equilibrium.

Check samples taken by the examining team are given as follows:

	Sample	U_3O_8, percent	Description
Site E-33			
	EB-7	0.056	Grab
	EB-8	0.014	Grab
Site E-28			
	EB-9	0.005	Grab
	EB-10	2.02	1-foot chip
	EB-11	0.006	1-foot chip

Sample EB-10 taken by the examining team confirms the applicant's statements of the high grade nature of the vein in the Chester Fault near sample location 39 (fig. 3).

At the present time there are not sufficient exposures in the Indian Creek area to permit calculation of ore reserves. However, from the limited geologic and assay data available, it appears that the Harding sandstone may contain uranium deposits throughout the entire Indian Creek area. Assuming that Monarch Exploration Company's drill-hole assays are representative of the mineralized portions of the Harding sandstone, then that formation may have a large ore potential measuring in the millions of tons of uranium ore.

The applicant's work to date has been done efficiently, and their sampling data appears reliable.

Data are insufficient for estimation of reserves either for the bedded deposits in the Harding sandstone or the vein deposits along the Chester Fault.

GEOLOGY

The Indian Creek group of claims is underlain largely by Ordovician and Devonian sedimentary rocks which dip about 15° to the south or south-southeast. Near the eastern edge of the claim area, these rocks are in fault contact with Precambrian schist and granite; to the west and south Tertiary volcanic rocks cover all older rocks to within a short distance of the claims. Much of the area is covered by overburden.

The stratigraphic sequence, with estimated thickness of formations, is given below:

	Thickness (in feet)
Tertiary	
Volcanic rocks (undifferentiated)	Not known
Devonian	
Chaffee formation	
Sandstones and dolomites; also includes Mississippian Leadville limestone, Pennsylvanian Kerber formation, and Permian Maroon formation	1,700
Ordovician	
Fremont formation	
Massive gray dolomite; forms vertical cliffs in places	150
Harding formation	
Sandstone with shale partings; contains organic material and is locally strongly iron-stained; uranium-bearing bed. Forms slope with poor outcrops	25
Manitou formation	
Massive gray dolomite with chert nodules; forms cliffs in upper 50 feet.	250
Precambrian	
Schist and granite with much pegmatite; poorly exposed.	---

The Paleozoic rocks are essentially undisturbed by folding. Geologic mapping in the area by the applicant is in an early stage and only suggestions of mild warping can be observed. Faulting in the area is indicated by the unusual position or offset of rock units.

Because much of the area is covered, the locations of the faults are imperfectly known, and the presence of some is inferred. The strongest fault, the Chester, is exposed in only one place on the claims by two trenches. The Chester fault, along the east edge of the claim area (area A, fig. 3), trends north, dips east 45°, and brings the Precambrian granite against the Paleozoic sediments. Vertical displacement is estimated at more than 2,000 feet.

MINERALIZATION

The uranium mineralization at Indian Creek is of two types - a blanket-type in the Harding sandstone and a vein type in the Chester fault.

Where the Harding sandstone is exposed along the canyons in the western part of the area, anomalous radioactivity has been found in numerous places, at one exposure radioactivity amounted to 0.18 MR/hr. Autunite has been identified by company geologists, and one diamond drill hole, drilled on adjoining ground by the Monarch Exploration Company, cut a 4.5-foot bed in the Harding sandstone which contained 0.32 percent U_3O_8. 1/ The mineralization in the

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1/A check sample assayed by the Bureau of Mines showed 0.238 percent U_3O_8.

Harding sandstone is not known to be related to any structural features.

Uranium minerals along the Chester fault were seen at only one place. A trench across the fault near sample location 39 (fig. 3) exposed pods of uranophane in sheared pegmatite adjacent to the fault. The mineralization extends from the fault for a distance of 1 foot into pegmatite. The fault, which is one-half foot wide, is mineralized also, but the uranium minerals were not identified. Both the uranophane-bearing area in the pegmatite and the fault gave a radiometric measurement of over 5 MR/hr. Exposures are limited but mineralization is continuous for over 50 feet. Two channel samples, cut by the company geologist 2 to 3 feet apart, assayed 1.543 and 1.825 percent U_3O_8 over a width of 1.5 and 1.7 feet, respectively.

About 2,000 feet north and roughly along the trend of the Chester fault, a series of small shears are exposed in several pits. Radioactivity in the shears is weak, but several heavily iron-stained boulders in the overburden give readings of 0.15 MR/hr. The source of these boulders is not known, nor can any uranium minerals be seen. Company assays on selected samples of iron-stained material run as high as 0.14 percent U_3O_8.

In the gully between the two sites just discussed, the applicant found a 4-inch boulder which contained pitchblende and fine-grained silica. Two samples split from this boulder assayed 14.879 and 16.62 percent U_3O_8. The source of the boulder is not known, but presumably came from the Precambrian area in the hanging wall of the Chester fault.

APPLICANT'S PROPOSED EXPLORATION

The applicant proposes a two-stage program of exploration. Stage I includes 14,275 feet of diamond drilling at several locations on the property and two months of bulldozer work, applied where necessary. Contingent upon the results of Stage I, the applicant proposes 20,000 feet of diamond drilling, three months of bulldozer trenching, and geologic mapping to precede and accompany the work under Stage II.

The applicant intends to drill six holes ranging in depths from 150 to 300 feet to explore the Harding sandstone at site HF-12 (area "E" fig. 3). The sandstone in this area lies at relatively shallow depths and is exposed by erosion on three sides which makes it favorably located for drilling and bulldozer stripping. The applicant believes this to be a favorable site because of radioactive anomalies and because of the proximity of an inferred fault, thought to be the conduit for hypogene uraniferous solutions.

The applicant further proposes drilling 12 holes in area "F" and in an area south of area "F" (fig. 3). The proposed holes range in depth from 175 to 800 feet. This drilling is to explore the "Apache mineralized zone" in the Harding sandstone and to determine its lateral extent. The "Apache mineralized zone" is thought to trend northeast and to pass through the applicant's claims from the adjoining Monarch Exploration Company's claims where 4 feet of ore-grade material containing 0.32 percent U_3O_8 was found in DDH No. 3, one of Monarch's four drill holes.

Sites E-28 (area "A", fig. 3) and E-35 are proposed for drilling to explore the Chester fault and the Harding sandstone. The Chester fault is exposed at site E-28 near sample locality 39 (fig. 3) and contains uranium of ore grade. Three holes ranging in depth from 200 to 400 feet with 2,150 feet alloted for additional drilling, are proposed by the applicant for site E-28. Two long holes, each 1,500 feet deep, are included in the drilling for site E-35.

It is proposed to explore radioactive anomalies in silicified limestone at site E-33 by three drill holes ranging from 150 to 225 feet deep. Another 1,450 feet of drilling is alloted for this site, if warranted.

An additional 20,000 feet of drilling is requested by the applicant for second phase exploration which is dependent upon the results of information obtained during Stage I exploration.

In general, the applicant's program has been well prepared, and the DMEA examining team essentially concurs with the proposed exploratory program. Many of the applicant's drill hole locations, however, are placed in relation to inferred faults which are not known to be favorable structures for ore concentration. The applicant postulates that faults in the Harding sandstone are favorable for the occurrence of uranium, but prospecting has not provided any evidence to support this hypothesis.

RECOMMENDED EXPLORATION

The examining team believes that the most effective method to explore for bedded uranium deposits in the Harding sandstone is by drilling in two stages. In those areas (areas "B," "C," "D," and "E", fig. 3) back of radioactive rim outcrops where the Harding sandstone is buried to only shallow depths, the first stage drilling should be on a grid pattern with holes at 400-foot centers. This should be followed by a second stage of offset drilling around mineralized holes, and additional holes drilled on 400-foot centers to extend areas found to be favorable as a result of Stage I drilling.

The vein deposits of uranium along the Chester fault (area "A", fig. 3) can best be explored by drifting on the ore and by trenching across the fault ahead of the drift in Stage I. A second stage to explore the vein at depth and to determine its lateral extent should consist of deep drill holes and additional trenches.

Other areas selected by the applicant for exploration (area "F", fig. 3 this report and site K-33, applicant's report) will require further prospecting to determine geologic controls and attitudes of structures before exploration can be planned satisfactorily.

It is recommended that the exploration be conducted in two stages as follows: Stage I is to consist of 300 feet of drifting, 500 feet of trenching, and 5,700 feet of drilling; Stage II is to consist of 400 feet of trenching and 25,000 feet of drilling.

It is suggested that the exploration be performed in the following order: (1) areas "A" and "B", and (2) areas "C," "D," and "E." Upon prior approval of the Government, Stage II exploration in any area may be undertaken after Stage I exploration has been completed in that area, provided that no Stage I exploration be unduly delayed by Stage II exploration.

It is estimated that 40 feet of core drilling per hole will be adequate to penetrate the Harding sandstone. Coring of AX, or larger size, shall begin at the top of the Harding sandstone and continue through the sandstone and into the Manitou dolomite for a distance of not less than 2 and not more than 10 feet.

Table I lists the estimated depth of non-core drilling and estimated total depth of the drill holes recommended for Stage I exploration.

Table 1.--Recommended drill holes

Hole No.	Est. Non-core (feet)	Est. Total depth (feet)	Hole No.	Est. Non-core (feet)	Est. Total depth (feet)
Area "B"			Area "D"		
1	120	160	19	60	100
2	180	220	20	60	100
3	180	220	21	60	100
4	130	170	22	60	100
5	150	190	23	110	150
6	220	260	24	60	100
7	130	170	25	110	150
8	190	230	26	60	100
9	220	260	27	60	100
10	180	220	28	110	150
Totals 10	1,700	2,100	10	750	1,150
Area "C"			Area "E"		
11	160	200	29	60	100
12	160	200	30	60	100
13	160	200	31	60	100
14	210	250	32	60	100
15	210	250	33	60	100
16	210	250	34	60	100
17	210	250			
18	210	250			
Totals 8	1,530	1,850	6	360	600

COST ESTIMATES

Stage I

A. Adit drift 300'

Drift data is as follows: 3 men/shift, 1 shift/day, 6 days/week, advance 4'/shift, 5' by 7' drift in the clear, timbered and lagged, and a total of 75 shifts for completion.

1. Labor and supervision

	Estimated cost
2 miners at $32/shift x 63 shifts	$ 2,016.00
1 trammer at $14/shift x 63 shifts	882.00
Overtime 1-1/2 x @ $69/shift x 12 shifts	828.00
1 supervisor-engineer @ $3.50/1/8 shift x 75 shifts	262.50
Total payroll	$ 3,988.50
Payroll deductions 5%	199.43
	$4,187.93
Cost per foot	$ 13.96

2. Rental and depreciation

1 - 250 C.F.M. compressor (diesel) @ $345/mo. x 3 mo.	1,035.00
1 - 12B mucking machine @ $275/mo. x 3 mos.	825.00
1 - 500 to 1,000 c.f.m. blower @ $70/mo. x 2 mos.	140.00
1 - car 18 cu. ft. @ $40/mo. x 3 mos.	120.00
1 - drifter, hoses, receiver, etc., @ $100/mo. x 3 mos.	300.00
1 - jeep pick-up @ $1,800 x 1/60 = $30/mo. x 3 mos.	90.00
Total cost	$2,510.00
Cost per foot	$ 8.37

3. Operating materials and supplies	Estimated cost
Pipe - air, 2", @ $0.40/ft. x 250 ft.	$ 100.00
water, 1/2", @ $0.20/ft. x 250 ft.	50.00
ventilation, 8", @ $1.00/ft. x 275 ft.	275.00
fittings	35.00
explosives - dynamite @ $14/50# box x 75 boxes	1,050.00
caps @ $4.00/100-box x 15 boxes	60.00
fuse @ $2.00/100-ft. reel, 75 reels	150.00
track - 17# @ $65/ton x 2 tons	130.00
splice bars, bolts, spikes, etc.	50.00
ties @ $0.40/each x 200	80.00
fuel - diesel, @ $0.17/gal. x 1,500 gals.	255.00
lubrication, oil, etc. @ $0.30/shift x 75 shifts	22.50
steel - Swede steel @ $21/each x 10 pieces	210.00
timber - 1 set, 8" x 8" x 6' & 7' @ 75/1000 bd ft. x 6,420 bd. ft.	481.50
lagging, top & sides @ $75/1,000 bd. ft. x 12,960 bd. ft.	972.00
Miscellaneous - small tools, freight, contingencies, etc.	750.00
Total cost	$ 4,671.00
Cost per foot	15.57

4. Consulting	
1 - company geologist @ $29.07/day x 3 days	87.21
Cost per foot	0.29

5. Sampling and assays

30 samples @ $3.50/each	$ 105.00
Total costs of Stage I drifting	$11,561.14
Unit cost per foot	38.537
or say	38.55
Total costs	$11,565.00

B. Core drilling 1,360 feet

Holes shall be AX (or larger), approximately 40 feet of coring per hole, 34 holes; estimated completion time 1/4 month.

Drilling costs are computed as follows:

1. Independent contracts	Estimated cost
a. Core drilling 1,360 feet @ $4/ft. (Subject to revision on competitive bids)	$ 5,440.00
b. Road building and drill site preparation 3 days at $112/day * for bulldozer rental (D-8 **)	336.00
c. Standby time to radiometrically prove drill holes - 34 holes at 1/2 hr. each @ $10/hr.	170.00
	$ 5,946.00

* Includes all costs.

** D-8 bulldozer currently in use on the property.

2. Labor and supervision	
1 Engineer-supervisor, 1/4 mo. @ $600/mo.	150.00
1 Geologist-sampler, 1/4 mo. @ $450/mo.	112.50
1 Survey crew, 1 day at $45.60/day	45.60
	308.10
Payroll deductions at 5%	15.41
	$ 323.51

3. Operating equipment (rental)	Estimated cost
1 Jeep pick-up, 1/4 mo. @ $30/mo.	$ 7.50
1 Jeep station wagon, 1/4 mo. @ $30/mo.	7.50
Scintillation equipment, 1/4 mo. @ $8.34/mo.	2.09
Probing equipment, 1/4 month at $16.67/mo.	4.17
Miscellaneous items	25.00
	46.26
4. Operating materials and supplies	
68 core boxes at $3.50/each	238.00
Gasoline, oil, tools, etc.,	100.00
	338.00
5. Assays	
34 assays at $3.50/each	119.00
Total costs for Stage I core drilling	$6,772.77
Unit cost per core foot	4.979
or say	5.00
Total cost	$6,800.00

C. Non-core drilling 4,340 feet

Holes shall be AX (or larger), depths estimated to range from 60 to 220 feet, 34 holes, estimated completion time 3/4 month.

Drilling costs are computed as follows:

	Estimated cost
1. Independent contracts	
a. Non-core drilling 4,340 feet at $2/ft. (Subject to revision on competitive bids)	$ 8,680.00
b. Road building and drill site preparation	
9 days at $112/day * for bulldozer rental (D-8 **)	1,008.00
	$9,688.00

* Includes all costs.

** D-8 bulldozer currently in use at the property.

2. Labor and supervision	
1 Engineer-supervisor, 3/4 mo. @ $600/mo.	450.00
1 Geologist-sampler, 3/4 mo. @ $450/mo.	337.50
1 Survey crew, 3 days at $45.60/day	136.80
	924.30
3. Operating equipment (rental)	
1 Jeep pick-up, 3/4 mo. @ $30/mo.	22.50
1 Jeep station wagon, 3/4 mo. @ $30/mo.	22.50
Scintillation equipment, 3/4 mo. @ $8.34/mo.	6.27
Probing equipment, 3/4 mo. at $16.67/mo.	12.51
Miscellaneous items	75.00
	$ 138.78
4. Operating materials and supplies	
Gasoline, oil, tools, etc.	300.00
Total costs for Stage I non-core drilling	$ 11,051.08
Unit cost per non-core foot	2.546
or say	2.55
Total costs	$ 11,067.00

	Estimated cost
D. Bulldozer trenching	
1. Independent contracts	
Bulldozer D-8 rental for 10 days @ $112/day *	$ 1,120.00

* Includes all costs.

2. Assays	
10 assays at $3.50/each	35.00
Total costs for Stage I trenching	$1,155.00
Total costs of Stage I drifting, drilling, and trenching	$30,587.00
Government's participation at 75%	$22,940.25

Stage II

A. Bulldozer trenching	
1. Bulldozer D-8 rental for 8 days @ $112/day *	$ 896.00

* Includes all costs.

2. Assays	
8 assays at $3.50 ea.	28.00
Total costs for Stage II trenching	$ 924.00

B. Drilling 25,000 feet

Drilling estimated as follows: non-core rotary drilling 19,035 feet, core drilling (AX or larger) 5,965 feet, completion time 1 year, ** and all other items figured at 4.38 x those given under Stage I, in -- order to conform with drilling unit costs figured in Stage I.

Total costs for Stage II drilling	$78,364.25
Unit cost per non-core foot	2.55
per core foot	5.00

** To allow for suspension of operations during winter, if conditions -- prove too difficult for surface work.

Total costs of Stage II trenching and drilling	$79,288.25
Government participation 75%	59,466.19

SUMMARY OF RECOMMENDED EXPLORATION AND COSTS

Stage I

Area "A"

300-foot adit to be driven in a southerly direction along the uranium-bearing vein (Chester fault).*

Completion time: 1-1/2 months

Total cost: $11,561.14

5 trenches to expose the Chester fault at intervals of 400 feet in a southerly direction from the adit site of Stage I. (a) Estimated length of each trench is 100 feet. *

Completion time: 2 weeks

Total cost: $1,155.00

* The approximate locations of the adit and the trenches are shown on figure 3.

Area "B"

10 drill holes of AX (or larger) totaling an estimated 2,100 feet to explore the mineralized Harding sandstone behind radioactive outcrops. Approximate locations of holes are shown on figure 3.

Area "C"

8 drill holes of AX (or larger) totaling an estimated 1,850 feet to explore the mineralized Harding sandstone behind radioactive outcroppings. Approximate locations of holes are shown on figure 3.

Area "D"

10 drill holes of AX (or larger) totaling an estimated 1,150 feet to explore the mineralized Harding sandstone behind radioactive outcroppings. Approximate locations of holes are shown on figure 3.

Area "E"

6 drill holes of AX (or larger) totaling an estimated 600 feet to explore the mineralized Harding sandstone behind radioactive outcroppings. Approximate locations of holes are shown on figure 3.

Notes: 1) Locations of holes may be moved a maximum of 50 feet in any direction from locations as shown in figure 3 if field conditions require, without prior approval of the Government.

2) All holes drilled under the terms of the DMEA contract, excepting area "A", shall be cored from the top of the Harding sandstone and continued through the sandstone and into the Manitou dolomite for a distance of not less than 2 and not more than 10 feet.

Completion time:	1 month
Total cost:	$17,867.00
Unit cost non-core:	$2.55
Core:	$5.00

Stage II

Area "A"

(a) 4 trenches to explore mineralized areas discovered during Stage I trenching and to extend favorable ground to the north and south. Trenches shall not be closer than 50 feet nor more than 400 feet away from any pre-existing trenches. Estimated length of each trench is 100 feet.

Completion time: 1 week

Total cost: $924.00

(b) 5,000 feet of drill holes of AX (or larger) to explore the mineralized structure at depth. Location, inclination, and depth of holes to be determined from results of Stage I drifting and trenching and Stage II trenching.

(Costs and completion time shown below.)

Areas "B", "C", "D", "E", and "F"

(a) 20,000 feet of drilling for off-setting mineralized holes drilled under Stage I, or to extend the favorable mineralized areas. Off-set holes shall not be closer than 50 feet to any pre-existing mineralized holes. Extended area drilling shall be drilled on 400-feet centers.

Drilling in areas "B", "C", "D", "E", and "F" not to be undertaken without prior approval of the Government. Drilling in area "F" to be dependent upon the results of Stage I drilling, and upon the results of drilling in adjacent properties (Monarch Exploration Company, DMEA 4251).

Stage II Area "A" (b) and Areas "B", "C", "D", "E", and "F"(a):

Completion time:	1 year
Total cost:	$78,364.25
Unit cost non-core:	$2.55
Unit cost core:	$5.00
Total costs of Stage II drilling and trenching:	$79,288.25
Government's participation at 75%:	$59,466.19

Total costs Stage I:	$30,582.00
Stage II:	79,288.25
Total:	$109,875.25
Government's share 75%:	
Stage I:	$22,940.25
Stage II:	59,466.19
Total Government's share:	$82,406.44

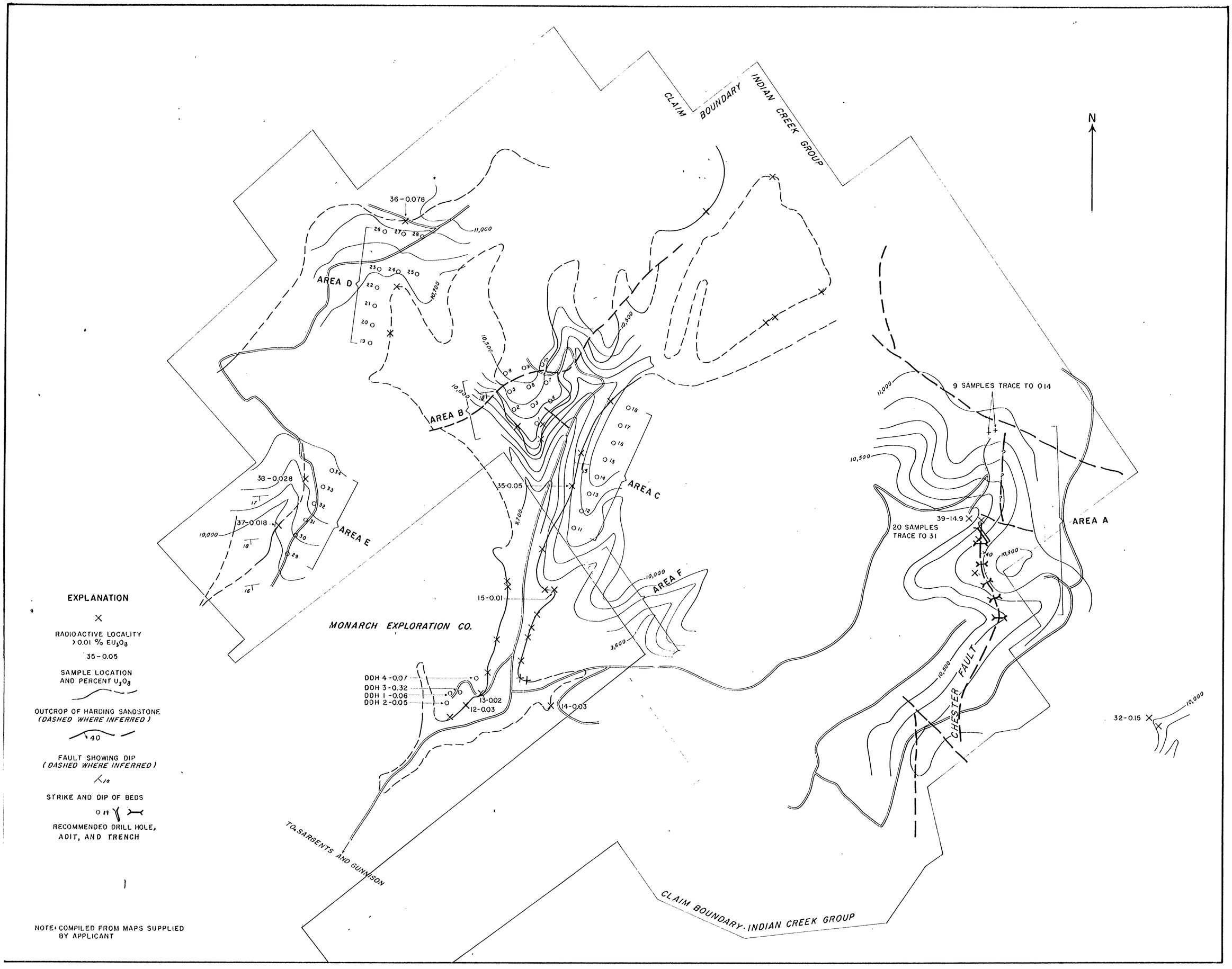
Non-coring of approximately 76 percent of the total drilling footage accounts for the greater part of the difference between the applicant's estimated costs and the costs of the recommended drilling.

No provision is made for geologic mapping, as it is anticipated that the engineering and geologic personnel provided for in the cost estimates can do this work during the course of the exploration.

CONCLUSIONS AND RECOMMENDATIONS

The uranium potential of the bedded and vein deposits on the Indian Creek group is believ ed to be large, and it is concluded that there is a good probability of discovering significant deposits of uranium ore on the subject claims.

It is recommended that a modified exploration program of two stages be approved, to consist of 300 feet of drifting, 500 feet of trenching, and 5,700 feet of non-core and core drilling in Stage I, and 400 feet of trenching and 25,000 feet of drilling in Stage II.



R. U. KING, JUNE, 1956

FIGURE 3. - GEOLOGIC MAP SHOWING RECOMMENDED EXPLORATION, VULCAN SILVER-LEAD CORPORATION, INDIAN CREEK GROUP, T.48N., R.6E., SAGUACHE AND GUNNISON COUNTIES, COLORADO

1000 0 1000 2000 3000 4000 5000 FEET

CONTOUR INTERVAL 100 FEET
DATUM IS SEA LEVEL

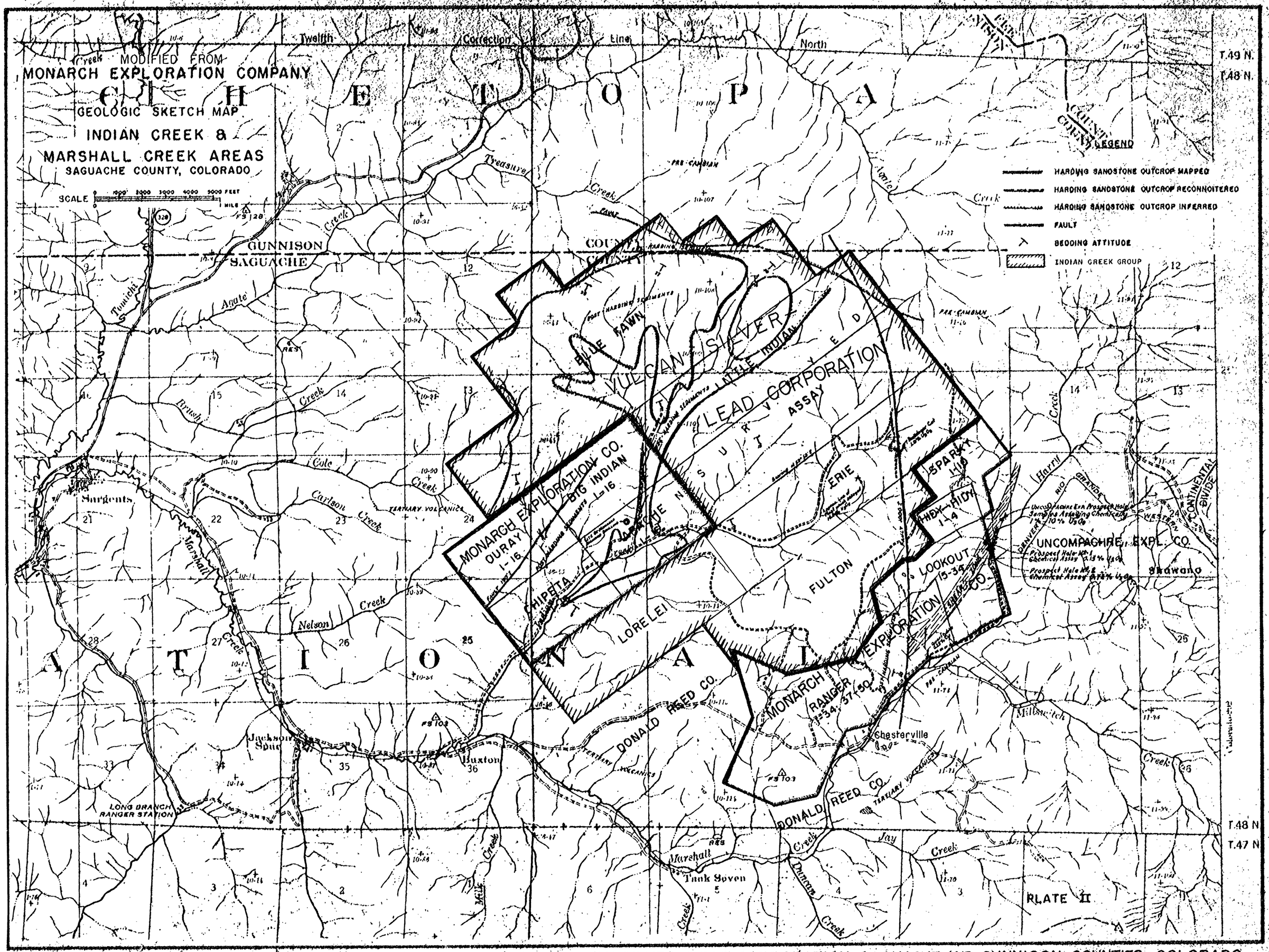


FIGURE 2 - PROPERTY OWNERSHIP MAP, INDIAN CREEK GROUP, VULCAN SILVER-LEAD CORPORATION, SAGUACHE AND GUNNISON COUNTIES, COLORADO.

DMEA 4225