IN REPLY REFER TO:

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

October 16, 1956

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: A. H. Marshuna
J. F. Shaw

Subject: DMEA Docket 4236 (Uranium), Black Hills Exploration Company (Black Vein claims, Crook County, Wyoming, and White Cloud, etc., claims, Pennington County, South Dakota

Enclosed are the original and nine copies of a joint engineering and geologic report covering an examination of the subject property by J. A. Redman, U. S. Bureau of Mines, and B. A. Rinehart, U. S. Geological Survey.

The applicant proposes to explore for uranium on two properties - (1) the Black Vein claims, Crook County, Wyoming, and (2) the White Cloud, etc., claims, Pennington County, South Dakota, by a program of tunneling, drilling, and bulldozer trenching to cost an estimated $202,150.

On the Black Vein claims uranium in very minor quantities occurs in the Cretaceous sedimentary rocks of the Fall River formation. No production has been made to date from this property and only insignificant mineralization has been encountered in auger holes drilled by the applicant. On the White Cloud, etc., claims weak radioactivity anomalies have been prospected in the Cambrian Deadwood formation.

The examiners conclude that there is little probability of finding significant uranium deposits on either of the two groups of claims and recommend that the application for exploration assistance, AMEA Docket 4236, be denied.

We concur with the examining team's conclusions and recommendations.

The completion of this report was delayed two to three weeks pending analyses of samples.

J. F. Shaw
Supervising Mining Engineer

E. E. Hartshorn
Member, Field Team

Enclosures

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

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

DMEA 4236

Black Hills Exploration Company

Black Vein claims, Crook County, Wyoming

White Cloud, Marion, and Lackey claims

Pennington County, South Dakota

Uranium

Joint Engineering and Geologic Report

by

D. H. Richter, Geologist
Geological Survey

D. E. Redmon, Mining Engineer
Bureau of Mines

October 15, 1956

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DMEA 4236

BLACK HILLS EXPLORATION COMPANY
BLACK VEIN CLAIMS, CROOK COUNTY, WYOMING
WHITE CLOUD, MARION, AND LUCKEY CLAIMS
PENNINGTON COUNTY, SOUTH DAKOTA

INTRODUCTION

Black Hills Exploration Company, 510 Main, Miles City, Montana, a South Dakota corporation, requested DMEA assistance to explore for uranium on its Black Vein claims in Crook County, Wyoming, and its White Cloud, Marion, and Luckey claims in Pennington County, South Dakota. The application was received March 23, 1956, by DMEA, Denver, Colorado. Processing was deferred pending receipt of additional information from applicant, and the application was released for examination on August 10, 1956.

The applicant proposed to explore for uranium by drilling, tunneling, and bulldozer cuts on two properties that are about 30 miles apart. The total estimated cost was $202,150.

A Region III DMEA examining team composed of D. H. Richter, U. S. Geological Survey, and D. E. Redmon, U. S. Bureau of Mines, investigated the properties on September 11 and 12, 1956, accompanied by Willis Aye, president of the company.

SUMMARY

The property consists of 31 unpatented mining claims from which there has been no production to date.

The Black Vein claims in Wyoming are underlain by Cretaceous rocks of the Skull Creek and Fall River formations. They have been partly explored by drilling 4-inch auger holes 10 to 50 feet deep on outcrops and radioactivity anomalies. No records were kept of the radiometric probe results, but apparently no significant mineralization was encountered. AEC hole no. 100 was drilled on the property, and AEC personnel indicated slight interest in further exploration. A sample of radioactive carbonaceous shale (lignite?), which averages 15 inches thick, contained 0.095 percent U_3O_8.

The White Cloud, Marion, and Lumbay claim groups in South Dakota are underlain by a series of Precambrian metasediments and lower Paleozoic sediments. The Gunbarrel Sandstone Formation, which is approximately 65 feet thick consists of sandstone and conglomerate, and contains a few weak radioactivity anomalies. Radioactivity checks in several bulldozer excavations showed a maximum of 0.085 Mr/hr with a background of 0.007 Mr/hr.

It is considered that there is little probability of finding significant quantities of uranium ore on either of the two properties.

It is recommended that the application for DMEA assistance be denied.

ACKNOWLEDGEMENTS

Personnel of the AEC office, Denver, Colorado, were consulted, and information on the general mineralization of the subject area was obtained. The AEC office at Spearfish, South Dakota, made available to the examining team, the radiometric log of AEC hole no. 100, drilled on the Black Vein claim. Mr. Robert Davis, U. S. Geological Survey, who is mapping in the area, accompanied the examining team to the Wyoming property.

LOCATION, TOPOGRAPHY, PHYSICAL FEATURES

The property consists of two widely separated groups of claims.

Black Vein claims

The Black Vein claims are in secs. 10 and 15, T. 56 N., R. 66 W., 6th P. M., Crook County, Wyoming _/. This group is reached by first travelling west on Highway 24 from Hulett, Wyoming, then turning right immediately after crossing the Belle Fourche River bridge (fig. 1). Proceed 1 mile and turn right on a well-travelled dirt road. Stay on this road for 16.0 miles, then turn left at the high-pressure gasoline valve and proceed one-half mile south on an ill-defined trail. One then will be about at the center of the west side line of Black Vein claim No. 6.

_/ Applicant's map is in error as to section numbers.

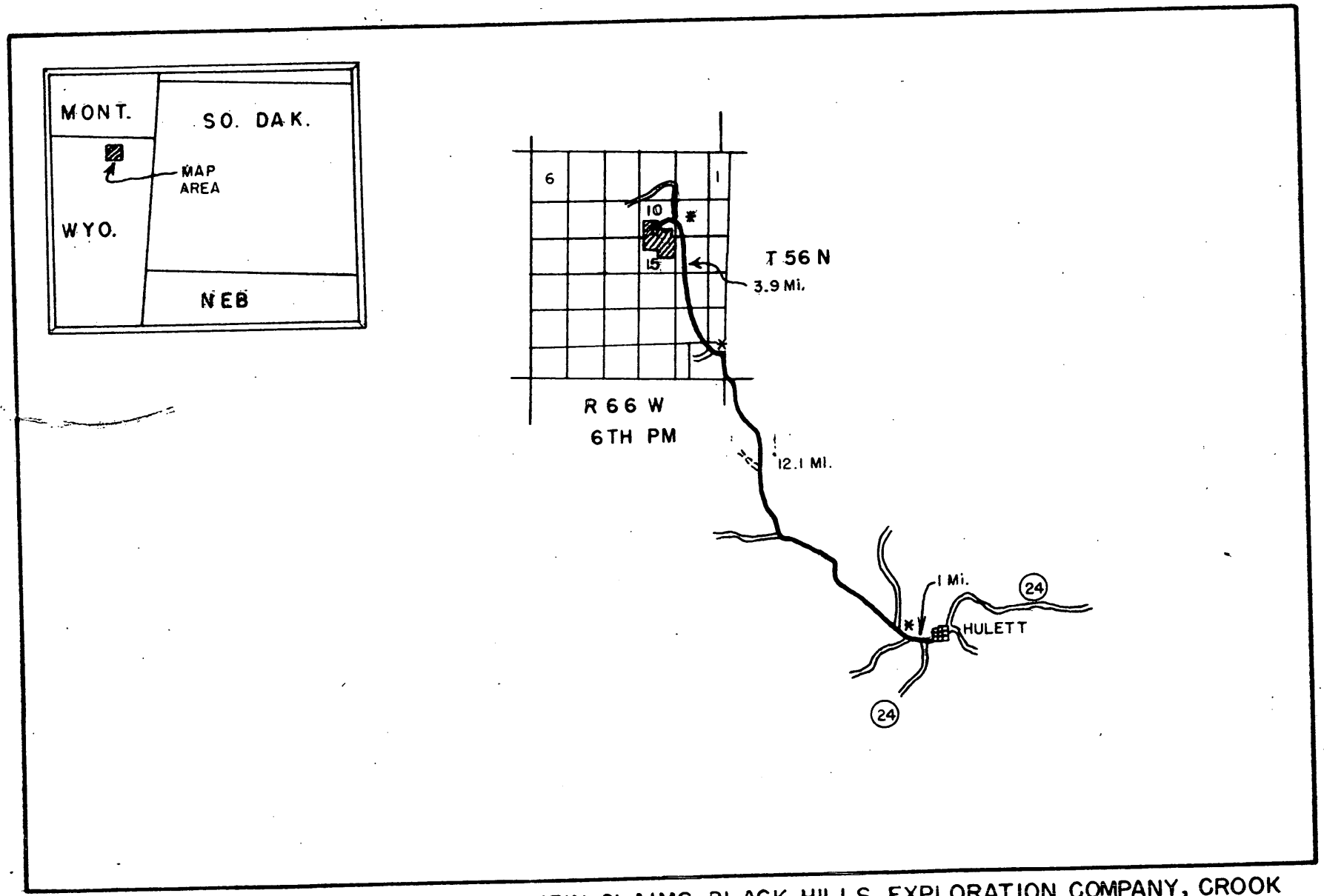

FIGURE 1-GENERAL AREA MAP, BLACK VEIN CLAIMS, BLACK HILLS EXPLORATION COMPANY, CROOK COUNTY, WYOMING. DMEA 4236

The surface of the claims dips gently to the northwest. Topographic relief does not exceed 75 feet.

There is moderate rainfall during the warm months, and heavy drifting snow during the winter. There are no permanent streams; water would have to be hauled about 2 miles. There is no usable timber, and only southwood sage and other low-growing brush cover on the property.

Labor and housing are available in Hulett and at local ranches. Operating supplies are available in Hulett, Wyoming, Sundance, Wyoming, and Rapid Springs, South Dakota.

White Chief, Marion, and Lumber claims

This group is in secs. 25 and 26, T. 2 N., R. 2 E., Black Hills P. M., Pennington County, South Dakota (Fig. 2). The claims are reached from Rockford, South Dakota, by traveling west 6 miles, then turning left on the Deerfield road for 3.5 miles, and then turning right on a Forest Service road toward the Shanks ranch. Proceed 1.3 miles, turn left on Shanks ranch road for 1.6 miles, then turn left on the Taylor Springs road for 1 mile. The Marion claims will then be down slope to the left.

The claims lie at an average altitude of 6,600 feet, the greatest difference in altitude being about 600 feet.

The climate is moderate during much of the year, but heavy snowfalls occur during winter months. There are permanent springs on the

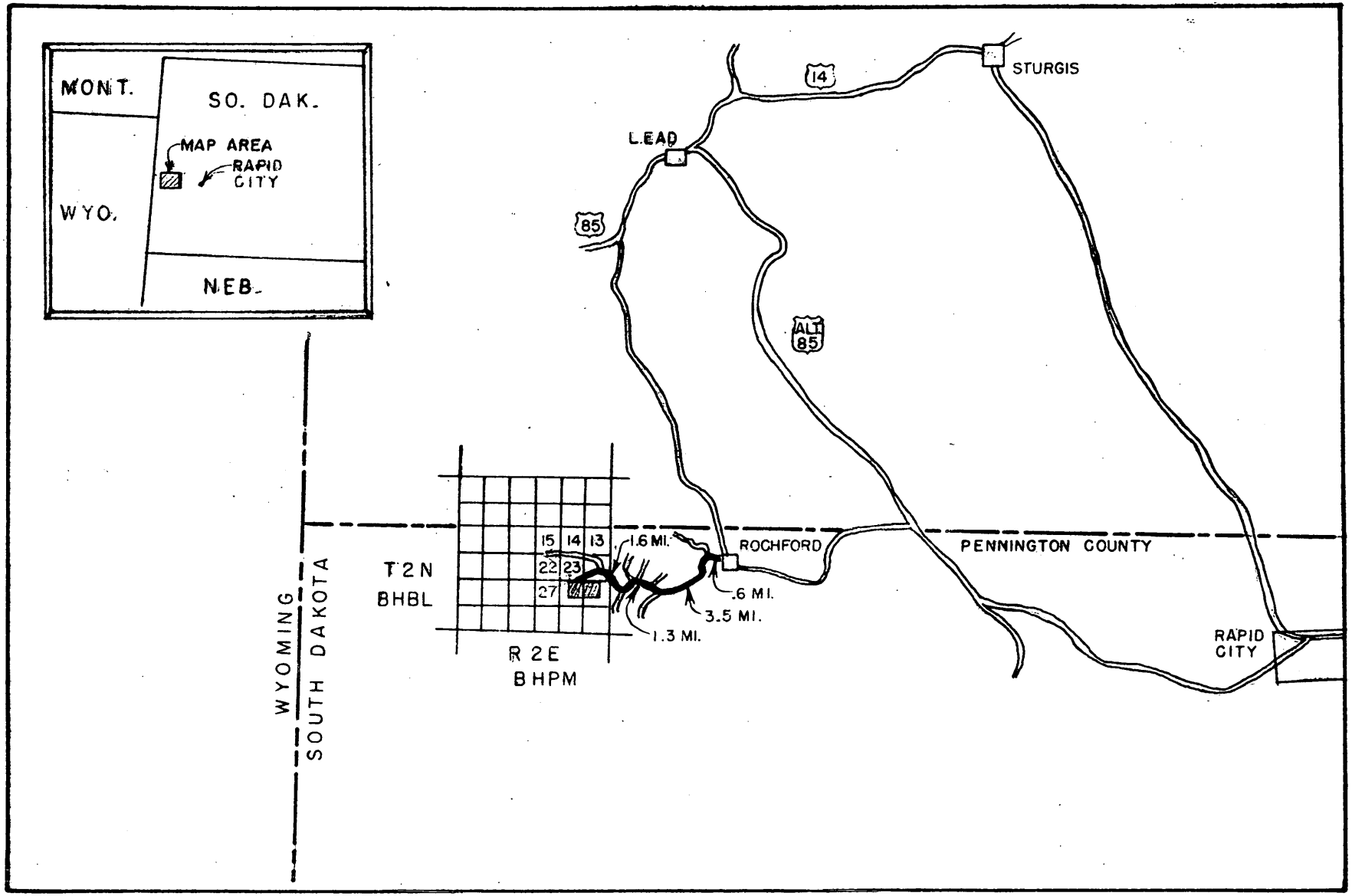

FIGURE 2 - CLAIM AREA MAP, WHITE CLOUD CLAIMS, BLACK HILLS EXPLORATION COMPANY, PENNINGTON COUNTY, SOUTH DAKOTA. DMEA 4236

property with adequate flow to supply a small mining operation. Considerable timber is available, consisting of ponderosa pine, spruce, and aspen.

Labor and housing are available in nearby communities and local ranches. Operating supplies can be purchased in Lead and Deadwood, South Dakota. There is no electrical power supply in the immediate vicinity.

HISTORY, PROSPECTING, AND OWNERSHIP

The Black Hills Exploration Company's ownership of the subject claims is based on quit-claim deeds. Photostats of the deeds accompanied the original application.

Filing records of the subject claims are reported to be as follows:

The Black Vein Lode mining claims, T. 56 N., R. 66 W., 6th P. M., filed in the office of the County Clerk and Recorder of Creek County, Wyoming:

Claim No.	Name	Date	Book	Page
158146	Lode Black Vein No. 1	Feb. 10, 1954	10	138
158147	" " " No. 2	" " "	10	139
158890	" " " No. 3	Feb. 26, 1954	10	309
158447	" " " No. 4	Mar. 18, 1954	10	313
158448	" " " No. 5	" " "	10	314
158449	" " " No. 6	" " "	10	315

Claim No.	Name	Date	Book	Page
158450	Lode Black Vein No. 7	Mar. 12, 1954	10	316
158451	" " " No. 8	" " "	10	317
158452	" " " No. 9	" " "	10	318
158453	" " " No. 10	" " "	10	319
158454	" " " No. 11	" " "	10	320
158455	" " " No. 12	" " "	10	321
158456	" " " No. 13	" " "	10	322
158457	" " " No. 14	" " "	10	323
158458	" " " No. 15	" " "	10	324
158459	" " " No. 16	" " "	10	325

Claims in T. 2 N., R. 2 E., Black Hills P. M., recorded in the office of the Register of Deeds, Pennington County, South Dakota:

White Cloud Lode mining claims Nos. 1 to 9, inclusive, Book 149, pages 263 to 271, inclusive.

The Marian Nos. 1, 2, and 3, Book 49, pages 483, 484, 485.

Luckey Lady No. 1, Luckey Girl No. 1, and Luckey Baby, Book 49, pages 272, 273, 274.

Interest was first shown on these properties in 1954 when radioactivity anomalies were noted.

The Black Lode claims are located 3 miles north of the Sodak Bearfield mine in Crook County, Wyoming. The applicant has drilled several 4-inch auger holes 10 to 50 feet deep, on the property; no

records were kept of the hole locations or radiometric probing results. AEC hole no. 100 disclosed no significant uranium mineralization.

There has been no ore production.

The White Cloud, Marion, and Luckey claims were located on the strength of a few low radioactivity anomalies and because of local interest in the area. The applicant drilled several holes on the property but no records were kept of the radiometric probing results.

There has been no ore production.

GEOLOGY

Black Vein claim group

The Black Vein claim group is in Crook County, Wyoming, in the northwestern part of the Black Hills. Gently-dipping consolidated rocks of the Cretaceous Skull Creek and Fall River formations are exposed on the claims.

The Fall River formation, which is one of the principal uranium-producing horizons in the Black Hills area, consists of an interbedded sandstone, siltstone, and mudstone series of marine origin. In the vicinity of the Black Vein claims the Fall River formation is approximately 125 feet thick and has the following generalized lithology:

	Feet
Skull Creek shale	--
Fall River formation	
Massive- to thin-bedded tan sandstone containing ripple marks and crossbedding. Calcareous in upper part. (SS No. 3)	10-20

	Feet
Interbedded siltstones, mudstone, and thin sandstones. A slightly radioactive carbonaceous shale, 1 to 2 feet thick, is consistently present at base.	20-25
Massive tan sandstone with ripple marks and crossbedding. (SS No. 2)	20
Interbedded sandstone, siltstone, and mudstone.	20-40
Massive tan sandstone. (SS No. 1)	20-30

Only Fall River rocks above SS No. 2 and the overlying Skull Creek shale are exposed on the property (fig. 3).

The structure in the claim area is apparently very simple and with the exception of the rocks in parts of the Black Vein claims Nos. 2 and 3, the average strike is NE, and the dip is 2° to 3° NW. On claims Nos. 2 and 3, however, there is a slight reversal of dip to the south (strike N. 70° E. to NW; dip 2° to 3° S.) indicating a small anticlinal or domal structure plunging southwest. According to R. Davis, U. S. Geological Survey geologist, these small structural rolls and/or domes are very common in this section of the Black Hills and do not appear to have any influence on the deposition of uranium ore.

Cursory scintillometer examination of the claims revealed only slight radioactivity anomalies. Highest readings were over the thin carbonaceous shale bed, which overlies SS No. 2, where values of 0.035 to 0.050 Mr/hr (background 0.005 to 0.01 Mr/hr) were obtained. In two other places the calcareous sandstone of SS No. 3 were very slightly radioactive, giving values of approximately 2X background.

The AEC, which core-drilled a deep hole (AEC D.H. No. 100) in the northwest corner of claim no. 6 (fig. 3), found only slight radioactivity, 40 feet below the surface in the carbonaceous shale, and 266 feet below the surface in the Lakota formation. The applicant has also done considerable drilling on the property but failed to keep any record of the work.

Chips of the strongest radioactive material from the thin carbonaceous shale chemically analyzed 0.095 percent U_3O_8.

The Western Uranium Company and the Sedak Uranium and Mining Company operate two small open-pit mines 2 and 2-1/2 miles, respectively, south of the Black Vein claims. Both mines are producing black-type uranium ore from the vicinity of the carbonaceous shale bed in the upper part of the Fall River formation. However, in these cases, the carbonaceous shale has apparently thickened, from the exposures observed to the north, to a bed, or series of beds, up to 8 feet thick. No ore control, other than this stratigraphic thickening, is known.

White Cloud, Marion, and Luckey claim groups

The consolidated rocks, exposed on the White Cloud, Marion, and Luckey claim groups in Pennington County, South Dakota, consist of metamorphic and sedimentary rocks ranging in age from Precambrian to Mississippian. The Paleozoic sedimentary rocks are essentially flat-lying; the Precambrian metamorphic rocks, unconformably underlying the Paleozoic rocks, are a series of tightly folded schists and quartzites.

The applicant's principal interest in these claim groups is in the Cambrian Deadwood formation, where a few very minor radioactivity anomalies have been found. The Deadwood formation, which directly overlies the truncated Precambrian rocks is, in the area examined, a marine-beach deposit consisting of a lower conglomeratic section, 45 feet thick, and an upper coarse sandstone section approximately 40 feet thick. The rocks are characteristically yellow-brown to brown, with the exception of the very top of the formation where a thin, glauconitic greenish shale is usually present. Rounded pebbles in the conglomerate are usually quartz, although many metamorphic rocks were observed. Overlying the Deadwood formation is a thick series of massive Mississippian limestone beds of the Pahasapa and Englewood formations (fig. 4).

No structures, either folded or faulted, were observed in the Paleozoic sedimentary rocks.

Scintillometer examinations were made in a number of small pits, in both the sandstone and conglomerate, where, according to the applicant, high radioactivity was present. The highest the writers could find was 0.025 Mr/hr (background 0.007 Mr/hr) in a pit in White Cloud No. 1. In two pits in the Marion claim group some very slight radioactivity (2X background) was noted. During the course of the examination it was determined that the two analyses _/ submitted with

_/ 0.035 percent U_3O_8; 0.09 percent ThO_2
0.30 percent U_3O_8; 0.05 percent ThO_2

the application did not come from the subject property, but from claims in the Deadwood formation, over a mile distant. It was the applicant's contention that similar material might also underly the subject property and apparently there was no hesitation in forwarding the analytical results. The applicant also has done considerable drilling on this property, but again has kept no record of the work.

The radioactivity is probably due to limited concentrations of uranium-and thorium-bearing minerals in beach sands derived from the old Precambrian land mass and deposited during Cambrian time in the Deadwood formation. The deposits on the subject property and in similar type occurrences throughout the Black Hills are not, at the present time, economically significant.

PRESENT STATUS

No equipment or improvements were seen on either of the claim groups. The applicant is reported to own a truck-mounted Fay hydraulic rotary core drill and a water truck, both being 1952 models.

APPLICANT'S PROPOSAL AND COST ESTIMATE

The applicant makes no specific proposal as to work division between the subject properties. Holes, drifts, and bulldozer cuts indicated on the applicant's claim map are only approximate as to location. Many of the indicated holes are on end lines or side lines of claims that are not contiguous with other company property.

Estimate of costs:

(a) Independent Contracts

Core drilling 20,000 ft. @ $4/ft.	$80,000.00	
Drifting 1,000 ft @ $30/ft.	30,000.00	
Material moved:		
Dirt 100,000 cu,yd @ $.20/yd.	20,000.00	
Rock 5,000 cu.yds.@ $2/yd.	10,000.00	
		$140,000.00

(b) Labor, supervision, consultants.

Labor: cutting trees, making trails, etc.	1,000.00	
Supervision: to direct the work of the crews drilling, drifting, bulldozing, etc.	8,000.00	
Consultants:		
Engineering	3,000.00	
Geologists	3,000.00	
		15,000.00

(c) Operating materials and Supplies:

1. Engineering stakes	1,000.00	
2. Engineering equipment (small)	600.00	
3. Blasting powder	300.00	
4. Misc. equipment	400.00	
		2,300.00

(d) Operating Equipment:

1. Pickup	2,000.00	
2. Operation costs of pickup	1,500.00	
3. Counters rental	500.00	
4. Light plant	650.00	
		4,650.00.

(e) Rehabilitation and repairs:

None.

(f) New buildings, Improvements, Installations:

None.

(g) Miscellaneous:

1. Analytical work, 2,000 holes @ $10	$20,000.00	
2. Accounting	4,000.00	
3. Workman's Compensation	2,500.00	
4. Employees Liability Insurance	700.00	
5. Payroll taxes	3,000.00	
		$ 30,200.00
(h) Contingencies:		10,000.00
Grand Total		$202,150.00

CONCLUSIONS AND RECOMMENDATIONS

It is concluded that an exploration program would not disclose commercial uranium mineralization on either of the two properties due to the following reasons:

1. In the Black Vein claim group the radioactive carbonaceous shale, which is apparently closely associated with uranium mineralization in two mines 2 miles distant, is very thin.

2. A representative sample of this carbonaceous shale, taken from the area of strongest radioactivity, chemically analyzed only 0.095 percent U_3O_8.

3. Holes drilled by the applicant and the AEC on the Black Vein claims failed to disclose any significant radioactivity.

4. The presence of a small anticlinal or domal structure on the Black Vein claims does not enhance the uranium potential of the property.

5. In the White Cloud, Marion, and Luckey claim groups only a few very weak radioactivity anomalies were observed. The strongest anomaly gave 0.025 Mr/hr against a background of approximately 0.005 - 0.01 Mr/hr.

6. The weak radioactivity is probably due to the scattered concentration of uranium- and thorium-bearing minerals in beach sands of the Deadwood formation. No economically significant deposits of this type are known to occur in the Black Hills.

It is recommended that the application for DMEA assistance be denied.

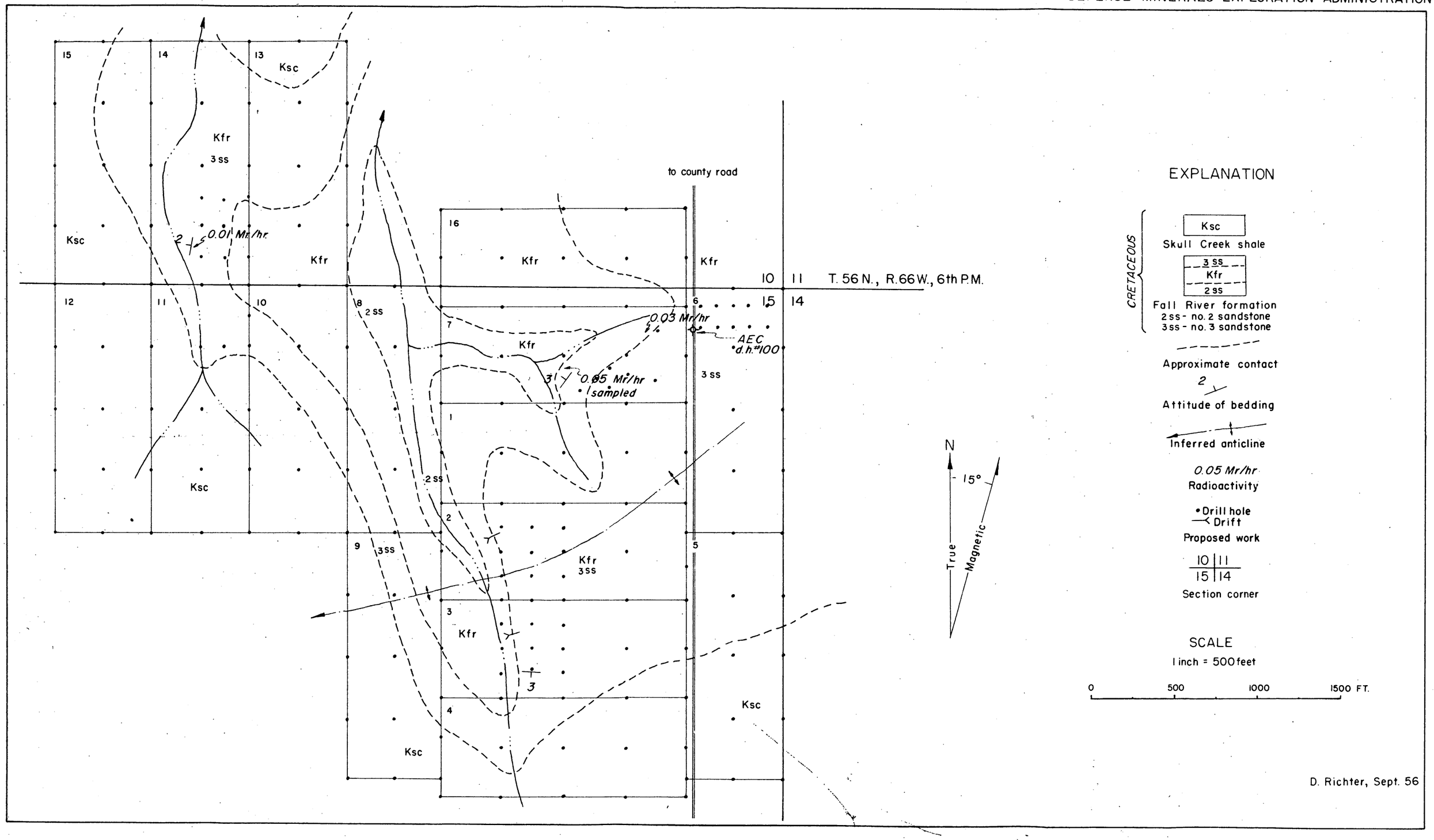

FIGURE 3. GEOLOGIC MAP OF THE BLACK VEIN CLAIMS, CROOK COUNTY, WYOMING.

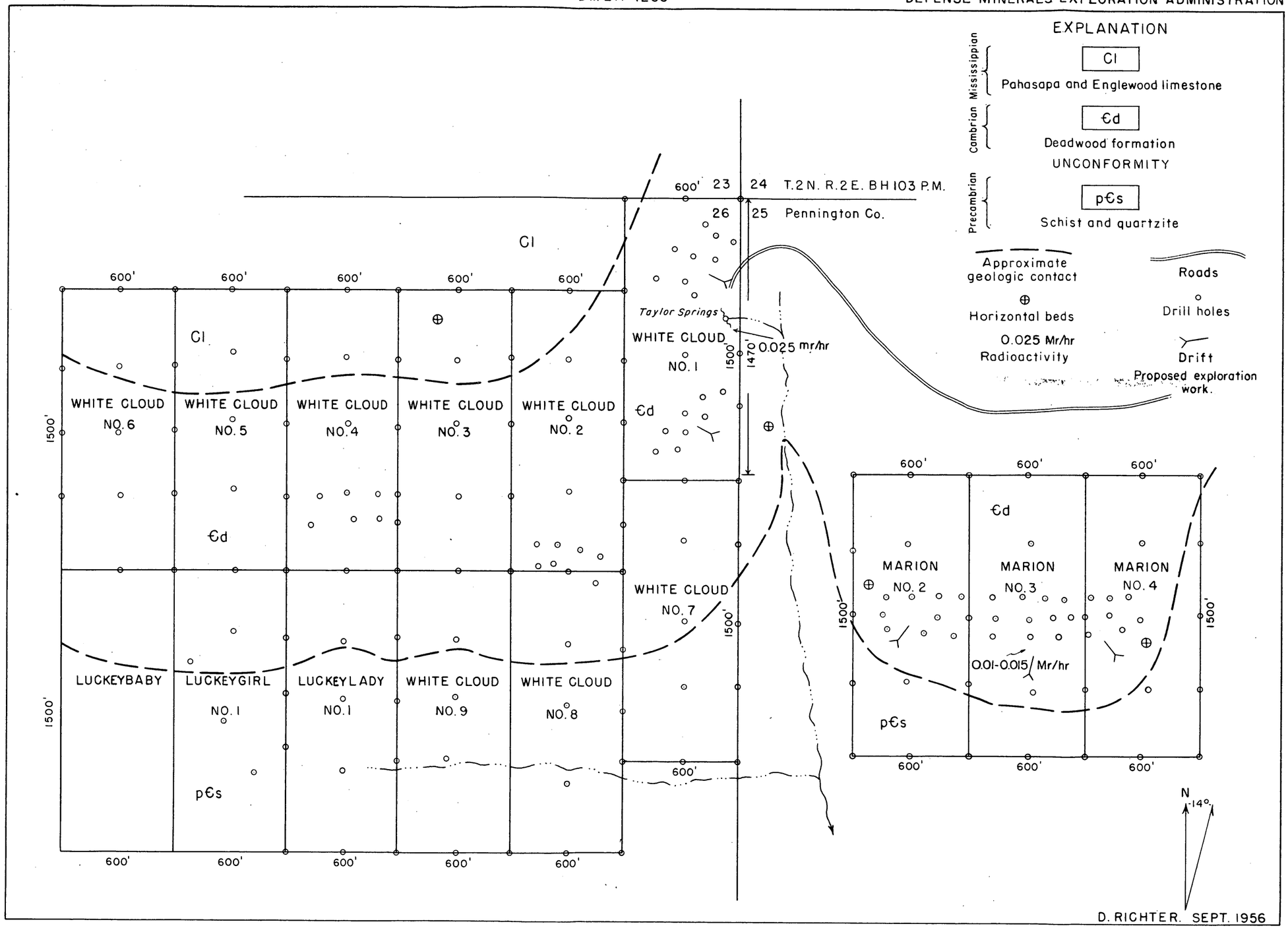

FIGURE 4. GEOLOGIC MAP OF THE WHITE CLOUD, MARION AND LUCKEY CLAIM GROUPS, PENNINGTON COUNTY, SOUTH DAKOTA

Scale: 1" = 500'
0 500 1000 1500 feet