700

FILE COPY
Surname:
Murphy
Nelson
Gibson
Selfridge
Johnston

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

APR 23 1956

Mr. George G. Travis, Manager
Price Exploration Company
615 North First Street
Grand Junction, Colorado

Re: Docket No. DMEA-4048 (Uranium)
Radium Cycle group
Montrose County, Colorado

Dear Mr. Travis:

Reference is made to your application for Government aid in an exploration project on the above-named group of claims.

Projects approved by the Defense Minerals Exploration Administration must, in its judgment, show definite promise of yielding materials of acceptable grade in quantities that will significantly improve the mineral supply position for the National Defense Program.

Careful study of all our information, although noting that some uranium ore has been produced from your property, indicates to us that the probability of disclosing significant ore reserves is not sufficiently promising to justify Government participation in an exploration program. We regret to advise you that, under these circumstances, your application for exploration assistance is denied.

We wish to thank you for your interest in the Defense Minerals Program and for bringing your property to our attention.

Sincerely yours,

C. O. Mittendorf

Administrator

FMMurphy/izm 4-20-56
cc to: Docket
Code 700
Mr. Murphy
Admr.'s Reading File
Operating Committee
DMEA Field Team, Region III (2)
Messers. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA

R.C.S.

Docket Copy

700

Murphy
Ellis

April 20, 1956

Summary of Proposed Project

Object: Denial of application for exploration aid.

Docket No.: DMEA-4048

Commodity: Uranium

Applicant: Price Exploration Company
George G. Travis, Manager
615 North First Street
Grand Junction, Colorado

Property: The Applicant is lessee of 4 unpatented mining claims, the Radium Cycle, R.C. Annex, Inspiration, and Sam, situated in sec. 8, T. 48 N., R. 19 W., N.M.P.M., Montrose County, Colorado

Date Of Application: October 15, 1955 (Received November 4, 1955)

Referred to Field Team: November 18, 1955

Field Examination made: February 9, 1956

Field Team Report received: April 12, 1956

Work Proposed and Costs:

16 holes, totaling 3,649 feet of plug drilling @ $1.50/ft.	$5,203.50	
Bulldozing - 15 days @ $100/day	1,500.00	
Supervision and Labor	1,875.00	
Operating Materials & Supplies	300.00	
Contingencies	837.50	
TOTAL		$9,716.00

Excerpts from Field Team Report:

The claims are located on the northeast flank of the Paradox Valley anticline, a large collapsed salt anticline. Rocks of the Jurassic age crop out over most of the claims. All of the known ore deposits in this area are confined to the upper series of sandstone lenses of the Salt Wash member of the Morrison.

Numerous faults strike in a northwesterly direction across the claims, exposing the Brushy Basin and Salt Wash members of

the Morrison, the Summerville formation, and the Entrada sandstone, in fault scarps. It is estimated that about 3,500 tons of good-grade ore was produced from a series of small, close spaced, ore bodies that extended in from a fault scarp, or cliff, on the Radium Cycle claim. From inspection, it is apparent that the reserves of the mine are virtually depleted. It does not appear that the ore trend can be projected in any direction from the present workings except parallel to the cliff face.

The Applicant stated that the proposed drilling was planned to intersect any parallel trends that might occur back from the cliff face. However, because of the small size of the individual deposits and their scattered distribution in the district, as indicated by a recent USGS reconnaissance study, it does not appear likely that another similar deposit will be found on the same claim. Further, it should be mentioned that the rocks in the proposed drilling area are highly fractured by numerous faults, and difficulty in drilling might well develop.

The field examiners and Field Team recommend the subject application be denied.

Commodity Members' Comments:

USGS, W. P. Williams, April 18, 1956:

Agrees with conclusions of field examiners and concurs in Field Team's recommendation of denial.

USBM, J. E. Crawford, April 19, 1956:

Summarizes the field examiners' conclusions and concurs in recommended denial.

Rare & Miscellaneous Metals Division, F. M. Murphy, April 20, 1956:

The conclusion reached by the field examiners, that because the ore bodies in the district are small and widely scattered, there is little possibility of making a significant discovery, seems well founded. Therefore, this Division concurs in the field examiners and Field Team's recommendation to deny the application.

Ernest Wm. Ellis

Ernest Wm. Ellis, Chief
Rare and Miscellaneous
Metals Division

4-20-56

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

RECEIVED
APR 20 1956

April 19, 1956

Memorandum

To: Ernest William Ellis, DMEA Member
Uranium Commodity Committee

From: John E. Crawford, Bureau of Mines Member
Uranium Commodity Committee

Subject: Report of Examination, DMEA Docket 4048, Price Exploration Company (Radium Cycle group of claims), Montrose County, Colo.

I have reviewed the report of examination, Docket 4048, Price Exploration Company (Radium Cycle group of claims), Montrose County, Colo., dated April 10 and received in this office April 16, 1956. I have also discussed it with Joseph O. Hosted, Washington representative of the Atomic Energy Commission.

The subject property is in an area in which orebodies are small and widely scattered. The only ore deposit on the subject property is the Radium Cycle mine, the reserves of which were found to be virtually depleted by the examining team.

The proposed drilling was planned to intersect parallel trends that might occur in the vicinity of the mine but, because of the nature of the deposits in the area, the possibilities of finding a deposit similar to the one mined out on the property are poor.

The field team recommends denial of the application for exploration assistance, and we concur with the recommendation of the field team.

John E. Crawford

John E. Crawford

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

RECEIVED
APR 20 1956

April 19, 1956

Memorandum

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Uranium Commodity Committee

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The field team recommends denial of the application for exploration assistance, and we concur with the recommendation of the field team.

John E. Crawford

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

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APR 20 1956

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The proposed drilling was planned to intersect parallel trends that might occur in the vicinity of the mine but, because of the nature of the deposits in the area, the possibilities of finding a deposit similar to the one mined out on the property are poor.

The field team recommends denial of the application for exploration assistance, and we concur with the recommendation of the field team.

John E. Crawford

4-19-56

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
APR 20 1956

April 18, 1956

Memorandum

To: E. W. Ellis, Defense Minerals Exploration Administration

From: W. P. Williams, U. S. Geological Survey

Subject: Review of field examination report, DMEA 4048, Price Exploration Company, Radium Cycle claims, Montrose County, Colorado.

According to the examining team's report the Radium Cycle mine has been completely depleted of its reserves, ore deposits in the vicinity are small and scattered, and the applicant's property is small. A direct extension of the Radium Cycle deposit apparently does not exist.

The fractured and faulted nature of the rocks on the property could raise drilling costs to a point out of proportion to the possible return from a small discovery. The proposed project does not appear to have reasonable chances for success. I therefore concur with the examining team's recommendation for denial of the application.

W. P. Williams

W. P. Williams

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

April 18, 1956

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W. P. Williams

WPWilliams:iml
G-4/18/56
cc: Director's reading, 4212
Branch reading, 4212
DMEA (3)
Docket file
J. E. Crawford, 3641
J. O. Hosted, 3210

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

April 18, 1956

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Docket file
J. E. Crawford, 3641
J. O. Hosted, 3210

W. P. Williams

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

April 18, 1956

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WPWilliams:iml
G-4/18/56

W. P. Williams

cc: Director's reading, 4212
Branch reading, 4212
DMEA (3)
Docket file
J. E. Crawford, 3641
J. O. Hosted, 3210

4-18-56

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

RECEIVED
APR 18 1956

April 16, 1956

224 New Customhouse
Denver 2, Colorado

Mr. George G. Travis, Manager
Price Exploration Company
615 North First Street
Grand Junction, Colorado

Re: Docket DMEA 4048 (Uranium)
(Radium Cycle group), Montrose
County, Colorado

Dear Mr. Travis:

This has further reference to our telephone conversation of April 13, 1956 regarding the status of the captioned application.

The Report of Examination has been forwarded to the Washington office, DMEA, and within a reasonable time they will advise you of their final action.

Very truly yours,

W. M. TRAVER

W. M. Traver
Executive Officer, DMEA
Field Team, Region III

HMC:ab

cc: Sec. Op. Comm. (2)
Docket 4048
Chron.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

April 16, 1956

224 New Customhouse
Denver 2, Colorado

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Grand Junction, Colorado

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W. M. Traver
Executive Officer, DMEA
Field Team, Region III

HMC:ab

cc: Sec. Op. Comm. (2)
Docket 4048
Chron.

4-17-56

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

RECEIVED
APR 12 1956

April 10, 1956

224 New Customhouse
Denver 2, Colorado

Memorandum

To: Secretary to the Operating Committee, DMEA

From: Field Team, Region III

Subject: Joint Report of Examination, Docket DMEA 4048 (Uranium), Price Exploration Company, (Radium Cycle group of claims), Montrose County, Colorado

Enclosed are the original and three copies of the joint engineering and geologic report on the subject property.

The field examiners note that the ore deposits in the area are known to be small and widely scattered. They believe that it is unlikely that another ore deposit will be found on the small amount of property held by the applicant. Under these circumstances, they deem it inadvisable to expend Government funds on this property, and they recommend that the application be denied. We concur in this recommendation.

DMEA Field Team, Region III

W. M. Traver

By W. M. Traver
Executive Officer

Enclosures

Reviewed by
DMEA OPERATING COMMITTEE
4-16-56
(date)

MINERAL DEPOSITS
DMEA
RECEIVED
MAR 27 1956
U. S.
GEOLOGICAL SURVEY,
DENVER, COLORADO

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
P. O. BOX 360
GRAND JUNCTION, COLORADO

DMEA
Date Rec'd MAR 1 3 1956

March 21, 1956

APR 9 1956
BUREAU OF MINES
Denver, Colorado
TRANSMITTED
APR 1 0 1956

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: J. William Hasler

Through: E. N. Harshman
J. F. Shaw

Subject: DMEA docket 4048 (Uranium) Price Exploration Company, Radium Cycle group of claims, Montrose County, Colorado

Enclosed is a geologic report by C. H. Roach, for inclusion in a joint engineering and geologic report of examination.

The Price Exploration Company applied to the Defense Minerals Exploration Administration for aid in exploring the Radium Cycle group of claims on the northeast flank of the Paradox Valley anticline. The application was referred to the field and an examination was made on February 9, by C. H. Roach of the U. S. Geological Survey, and Carl Belser, U. S. Bureau of Mines.

The Radium Cycle group of claims are located on the northeast flank of the Paradox Valley anticline, a large, collapsed salt anticline. The rocks exposed in the area consist of the Jurassic Morrison formation and they have been cut by many high angle faults, most of which have a small, vertical displacement. The ore deposits on the Radium Cycle group of claims have been mined intermittently for a number of years and has had a possible total estimated production of about 3,500 tons. During the field examination, the workings of the Radium Cycle mine were examined in detail to observe the habit and trend of the ore body. The applicant has stripped the overburden and has mined ore which was formerly contained in the pillars which were left in the old workings. The field inspection showed that there does not appear to be any reserves left, and there does not appear to be much chance that the ore body can be extended from the present workings.

The applicant proposes to explore by drilling the Radium Cycle and Inspiration claims. The ore deposits in the area are known to be small and widely scattered, as shown by reconnaissance study completed recently by the U. S. Geological Survey. It is concluded that the likelihood of finding another ore body on the small amount of property held by the applicant is not good. If the applicant had more ground, the likelihood might be increased. However, under the present circumstances it is not deemed advisable to expend Government funds on this property.

Reviewed by
DMEA OPERATING COMMITTEE
4-16-56

It is, therefore, recommended that the application be denied. I concur with the conclusions and recommendations of the examining team.

The Atomic Energy Commission was consulted relative to the appraisal of the property.

Enclosed are 10 copies of maps for inclusion in a joint report, as well as the applicant's brochure.

William B. Hazdik

For J. William Hasler,
Geologist

JWH/mlr

Enclosure

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

RECEIVED
APR 12 1956

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

TRANSMITTED
APR 10 1956

DMEA 4048

Radium Cycle Group

Price Exploration Company

Montrose County, Colorado

Uranium

Joint Engineering and Geologic Report

by

Carl H. Roach, Geologist
Geological Survey

Carl Belser, Mining Engineer
Bureau of Mines

April 6, 1956

Reviewed by
DMEA OPERATING COMMITTEE
4-16-56
(Date)

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Introduction and Summary..... 1

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ILLUSTRATIONS

Figure — Follows page

1. Location map, Radium Cycle group, Price Exploration Company, Montrose County, Colorado. DMEA 4048..... 2

2. Geologic map showing Radium Cycle group of claims, Price Exploration Company, Montrose County, Colorado. DMEA 4048..... 9

DMEA 4048

RADIUM CYCLE GROUP
PRICE EXPLORATION COMPANY
MONTROSE COUNTY, COLORADO

RECEIVED
APR 1 9 1956

INTRODUCTION AND SUMMARY

Price Exploration Company, 615 North First Street, Grand Junction, Colorado, on October 15, 1955, made application for aid in an exploration project on the Radium Cycle group of four unpatented claims in Montrose County, Colorado.

The applicant proposed a single stage drilling project consisting of 3,469 feet (16 holes) of non-core drilling at a total estimated cost of $9,766.

A field examination was made by an examining team from the Geological Survey and the Bureau of Mines on February 9, 1956.

The property is in sec. 8 T. 48 N., R. 19 W., N.M.P.M., Montrose County, Colorado, at altitudes ranging from 7,450 to 7,750 feet.

Rocks of the Jurassic Morrison formation crop out over most of the Radium Cycle claims. However, the underlying Jurrassic Entrada and Summerville formations crop out on the extreme southern portion of the group. The upper, or Brushy Basin member of the Morrison formation is normally about 300 feet thick but over most of the area the upper 100 feet has been removed by erosion. The lower, or Salt Wash member is about 300 feet thick and consists of fluviatile sandstones interbedded with variegated mudstones. Individual sandstone beds, or layers, are composed of a series of coalescing lenses, each lens being partially

surrounded by mudstone. All known ore deposits in this area are confined to the upper series of sandstone lenses in the Salt Wash member. Ore deposits are small and widely scattered.

It appeared unlikely to the examining team that another ore body will be found in the small amount of property held by the applicant and it is recommended that the application be denied.

ACKNOWLEDGMENTS

The examining team was accompanied by Charles W. Shannon, who represented the applicant.

The Atomic Energy Commission was consulted regarding the area before the examination was made.

Memorandums of G. C. Selfridge, John E. Crawford, and W. P. Williams were noted.

LOCATION, TOPOGRAPHY, AND CLIMATE

The property submitted in the application consists of four unpatented mining claims in sec. 8 T. 48 N., R. 19 W., N.M.P.M., Montrose County, Colorado (figs. 1 and 2). The claims lie in, and also to the north of a grabben near the top of Carpenter Ridge. Altitudes range from 7,450 to 7,750 feet. A steep 7-mile dirt road connects the mine with Colorado State Highway No. 90 at Paradox. From Paradox it is 23 miles east to Uravan, Colorado; 102 miles northeast to Grand Junction, Colorado; 59 miles northwest to Moab, Utah; and 97 miles northwest to Thompson, Utah. Paradox has telephone service.

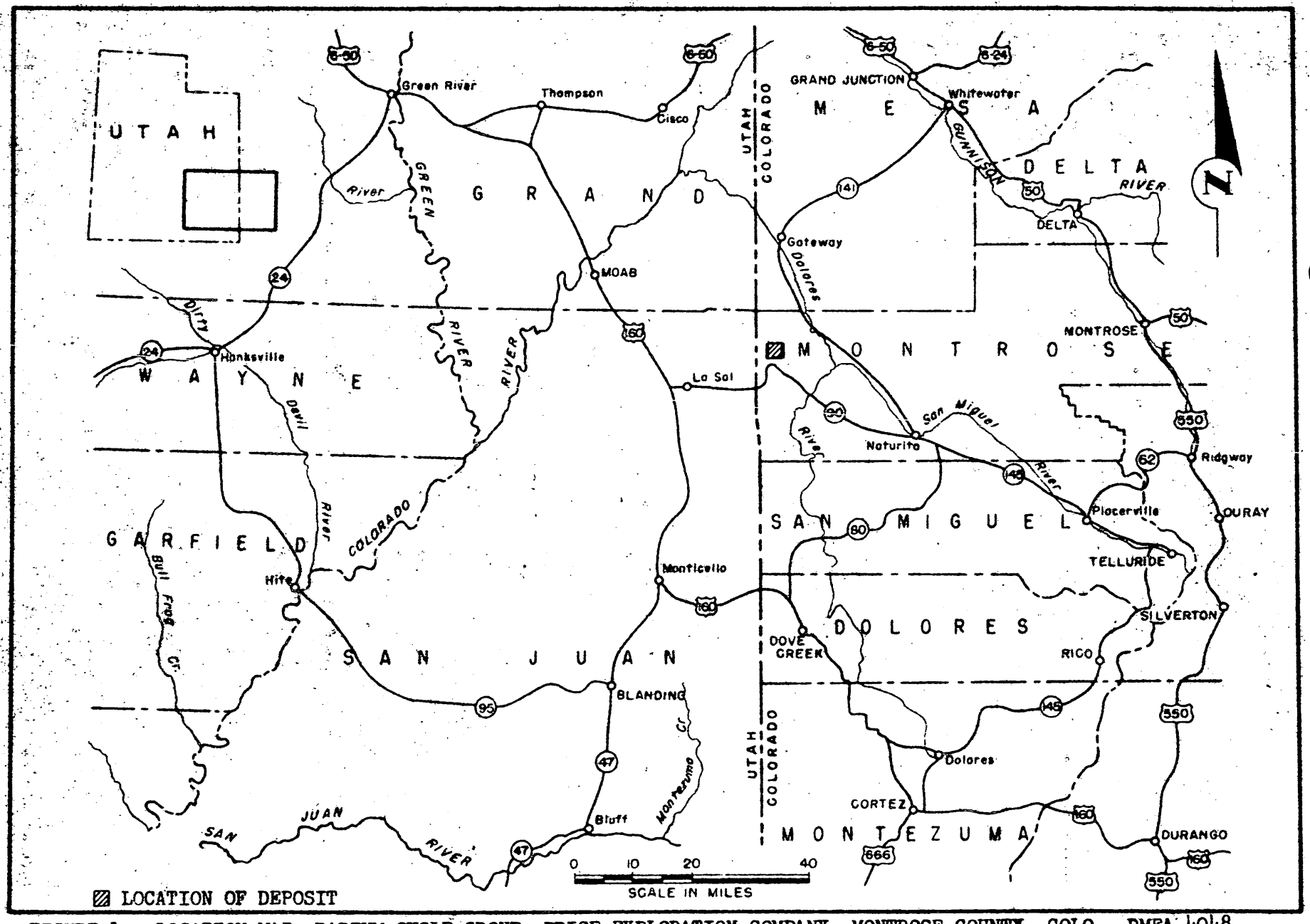

FIGURE 1.- LOCATION MAP, RADIUM CYCLE GROUP, PRICE EXPLORATION COMPANY, MONTROSE COUNTY, COLO. DMEA 4048

The nearest railroad is the Denver and Rio Grande Western at either Thompson, Utah or Grand Junction, Colorado. Labor and supplies can be obtained from Uravan or Moab. Government ore-buying depots are also maintained at Uravan and Moab. Water for drilling purposes may be obtained from Buckeye Reservoir.

Mining operations have been maintained throughout the present winter but at times the road becomes difficult to drive.

HISTORY AND PRODUCTION

The Radium Cycle is an old mine from which uranium ore was produced in the early 1900's. An access road was built in the 1930's from Paradox to the top of Carpenter Ridge. The Radium Cycle mine was relocated in 1948. Total production is estimated to have been about 3,500 tons containing an average of 0.40 percent U_3O_8 and 2.0 percent V_2O_5.

Production since 1948 is 450 tons containing an average of 0.40 percent U_3O_8 and 1.91 percent V_2O_5.

OWNERSHIP AND EXTENT

The four claims are recorded in the records of the County Clerk and Recorder of Montrose County, Colorado, as follows:

Claim	Book	Page	Date Located	Locator	Amended Book	Amended Page	Amended Date
Radium Cycle	296	421	6/1/48	Charles Proctor, et al.	364	41	10/17/53
Radium Cycle Annex	357	26	5/4/53	Charles Proctor			
Inspiration	390	538	10/6/54	Marquerite Colombo	365	111	
Sam	390	537	11/6/54	Charles Proctor et al.			

A "Contract of Sale" on the above claims was issued to H. C. Price on October 2, 1954 and is recorded in Book 396, page 83. The property is well known and the claims appear to be in order.

PRESENT STATUS

Exploration and Development

At least four adits have been run into the rim on the Radium Cycle claim and the mine has been worked by a very modified room and pillar system. However, since the last work began the rim has been removed to the limits of the old workings. Present workings consist of three short adits.

Mining and milling equipment and other facilities

Mining equipment consists of a 125 c.f.m. I.R. Gyro-flow compressor, I.R. 55 Jackhammer with jackleg, 1,000 pound mine car, 12 pound 18" track, 30 ton ore bin, hand tools and a Dodge power wagon (1954).

Ore is shipped to a Government ore-buying depot. Facilities consist of a few access roads.

GEOLOGY

The Radium Cycle group of claims is located on the northeast flank of the Paradox Valley anticline, a large collapsed Salt anticline in Montrose County, Colorado. The rocks exposed in the area have a regional dip of about 4 degrees to the north. Many high angle normal

faults cut the rocks, and locally cause the rocks to have dips as much as 8 or 10 degrees (see figure 2). Most of the normal faults have small vertical displacement.

Rocks of the Jurassic Morrison formation crop out over most of the Radium Cycle group of claims. However, the Jurassic Entrada and Summerville formations crop out on the southern parts of the Radium Cycle Annex and Sam claims (see figure 2).

The Morrison formation is divided into two members in the area of the subject property. The upper or Brushy Basin member, is normally about 300 feet thick in the area, but the upper part has been removed by erosion over most of the Radium Cycle group of claims. Over most of the area, the remaining Brushy Basin is not more than about 200 feet thick. The Brushy Basin member consists of variegated mudstones interbedded with minor amounts of fine-grained sandstone and conglomerate.

The lower member of the Jurassic Morrison formation is the Salt Wash member. It is about 300 feet thick in the area, and consists mainly of fluviatile sandstones interbedded with variegated mudstones. The sandstones are highly cross-bedded; a type known as "festoon troughs" being especially abundant. Individual sandstone beds, or layers, are composed of a series of coalescing lenses; each lens being partially surrounded by mudstone. The upper series of sandstone lenses of the Salt Wash member is referred to as "the ore-bearing sandstone" since all of the known ore deposits in this area are confined to that stratigraphic interval.

The Jurassic Summerville formation underlies the Morrison formation. It is about 100 feet thick and is composed mainly of red-brown shale and mudstone with some interbedded, white, calcareous, very fine-grained sandstone.

The Jurassic Entrada formation underlies the Summerville formation. It is about 100 feet thick, and is composed of yellow to red sandstone. The Entrada is massive and highly cross-bedded and contrasts markedly in appearance with the other stratigraphic units outcropping in the area.

ORE DEPOSITS

The known ore deposits in the general area of the subject property occur in the upper series of sandstone lenses known as the "ore-bearing sandstone". The ore deposits are oxidized and generally are of good grade. However, as W. P. Williams has pointed out in his review of the application, the results of work done by the U. S. Geological Survey indicate that the ore bodies are small and widely scattered in this area.

The only ore deposit on the subject property is the Radium Cycle mine (see figure 2). The complete history of the Radium Cycle mine is obscure, but it is known to have produced intermittently since the early 1900's when it was first worked for radium. Later, the ore was mined mainly for vanadium, and since 1953 for its uranium content. No production figures are available prior to 1948. However, AEC production records show that since 1948, the mine has produced a total of 450 tons of ore with an average grade of 0.40 percent U_3O_8 and 1.91 percent V_2O_5.

W. D. Carter, project geologist in the area for the USGS, has estimated the total production of the mine to date at about 3,500 tons.

During the field examination, the workings of the Radium Cycle mine were examined in detail with the main objective being to observe the habits and trend of the ore bodies. Since obtaining the property, the Price Exploration Company has stripped away the overburden and has recovered ore which was formerly contained in the pillars which were left in the old underground workings. From inspection, it is apparent that the reserves of the mine are virtually depleted. There does not appear to be much chance that the ore body can be extended in any direction from the present workings.

The ore deposit was composed of several small individual ore bodies which were closely spaced. Profitable operations were possible only because the deposit was exposed at the surface and it does not appear that the same ore deposit could be profitably mined under 200 to 250 feet of overburden. The trend of the ore bodies and the axis of thickening of the host rock both appear to be about N. 45° E., or about parallel to the Cliff face.

The applicant stated that the proposed drilling was planned to intersect any parallel trends that might occur behind the mine. However, because of the small size of the deposits and their scattered distribution in the district, it does not appear likely that another similar deposit will be found on the same claim. Further, it should be mentioned that the rocks in the proposed drilling area are highly fractured by numerous faults, and difficulty in drilling might well develop.

PROPOSED EXPLORATION AND COSTS

The applicant proposed a single stage drilling program consisting of 3,469 feet (16 holes) of dry drilling. The estimated costs follows:

Independent contractors		
3,469 feet of plug-bit drilling at $1.50/ft.	$ 5,203.50	
Bulldozing 15 days at $100/day	1,500.00	
Total independent contractors		$ 6,703.50
Labor and supervision		
Sampler and field assistant	$ 900.00	
Geological supervision and expenses	975.00	
Total labor and supervision		$ 1,875.00
Operating materials and supplies		
Drill log reproduction and office supplies	$ 150.00	
Auto expenses	150.00	
Total operating materials and supplies		$ 300.00
Operating equipment		
None		
Rehabilitation and repairs		
None		
New buildings, improvements, installations		
None		
Miscellaneous		
None		
Contingencies		
10 percent or		$ 837.50
Total estimated cost of project		$ 9,766.00
Estimated cost per foot		$ 2.82
Government participation 75 percent, or		$ 7,324.50

CONCLUSIONS AND RECOMMENDATIONS

The applicant proposes to explore, by drilling, their Radium Cycle and Inspiration claims (two claims) for uranium ore deposits. The Radium Cycle mine occurs on the property. It has been worked intermittently since the early 1900's. The ore bodies and the thick axis of the host rock trend about N. 45° E., or about right angles to the cliff face. The ore deposits in the area are known to be small and widely scattered and it seems unlikely that another ore deposit will be found on the small amount of property held by the applicant.

Because of the reasons discussed previously, it is recommended that DMEA assistance for the proposed project be denied.

4-17-56

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

RECEIVED
APR 1 0 1956

April 10, 1956

224 New Customhouse
Denver 2, Colorado

Memorandum

To: Secretary to the Operating Committee, DMEA

From: Field Team, Region III

Subject: Joint Report of Examination, Docket DMEA 4048 (Uranium), Price Exploration Company, (Radium Cycle group of claims), Montrose County, Colorado

Enclosed are the original and three copies of the joint engineering and geologic report on the subject property.

The field examiners note that the ore deposits in the area are known to be small and widely scattered. They believe that it is unlikely that another ore deposit will be found on the small amount of property held by the applicant. Under these circumstances, they deem it inadvisable to expend Government funds on this property, and they recommend that the application be denied. We concur in this recommendation.

DMEA Field Team, Region III

By W. M. Traver
Executive Officer

Enclosures

Reviewed by
DMEA OPERATING COMMITTEE
4-16-56
(date)

MINERAL DEPOSITS
DMEA
RECEIVED
MAR 27 1956
U. S.
GEOLOGICAL SURVEY
DENVER, COLORADO

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
P. O. BOX 360
GRAND JUNCTION, COLORADO

DMEA
Date Rec'd.
APR 9 1956

March 21, 1956

Memorandum

BUREAU OF MINES
TRANSMITTED
APR 10 1956
RECEIVED
APR 12 1956

To: Executive Officer, DMEA Field Team, Region III

From: J. William Hasler

Through: E. N. Harshman
J. F. Shaw

Subject: DMEA docket 4048 (Uranium) Price Exploration Company, Radium Cycle group of claims, Montrose County, Colorado

Enclosed is a geologic report by C. H. Roach, for inclusion in a joint engineering and geologic report of examination.

The Price Exploration Company applied to the Defense Minerals Exploration Administration for aid in exploring the Radium Cycle group of claims on the northeast flank of the Paradox Valley anticline. The application was referred to the field and an examination was made on February 9, by C. H. Roach of the U. S. Geological Survey, and Carl Belser, U. S. Bureau of Mines.

The Radium Cycle group of claims are located on the northeast flank of the Paradox Valley anticline, a large, collapsed salt anticline. The rocks exposed in the area consist of the Jurassic Morrison formation and they have been cut by many high angle faults, most of which have a small, vertical displacement. The ore deposits on the Radium Cycle group of claims have been mined intermittently for a number of years and has had a possible total estimated production of about 3,500 tons. During the field examination, the workings of the Radium Cycle mine were examined in detail to observe the habit and trend of the ore body. The applicant has stripped the overburden and has mined ore which was formerly contained in the pillars which were left in the old workings. The field inspection showed that there does not appear to be any reserves left, and there does not appear to be much chance that the ore body can be extended from the present workings.

The applicant proposes to explore by drilling the Radium Cycle and Inspiration claims. The ore deposits in the area are known to be small and widely scattered, as shown by reconnaissance study completed recently by the U. S. Geological Survey. It is concluded that the likelihood of finding another ore body on the small amount of property held by the applicant is not good. If the applicant had more ground, the likelihood might be increased. However, under the present circumstances it is not deemed advisable to expend Government funds on this property.

Reviewed by
DMEA OPERATING COMMITTEE
4-16-56
(Date)

It is, therefore, recommended that the application be denied. I concur with the conclusions and recommendations of the examining team.

The Atomic Energy Commission was consulted relative to the appraisal of the property.

Enclosed are 10 copies of maps for inclusion in a joint report, as well as the applicant's brochure.

William B. Gozdik
For J. William Hasler,
Geologist

JWH/mlr

Enclosure

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

TRANSMITTED
APR 1 0 1956

DMEA 4048

Radium Cycle Group

Price Exploration Company

Montrose County, Colorado

Uranium

Joint Engineering and Geologic Report

by

Carl H. Roach, Geologist
Geological Survey

Carl Belser, Mining Engineer
Bureau of Mines

April 6, 1956

Reviewed by
DMEA OPERATING COMMITTEE
4-16-56
(Date)

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Ownership and Extent	3
Present Status	4
Exploration and development	4
Mining and milling equipment and other facilities	4
Geology	4
Ore Deposits	6
Proposed Exploration and Costs	8
Conclusions and Recommendations	9

ILLUSTRATIONS

Figure	Follows page
1. Location map, Radium Cycle group, Price Exploration Company, Montrose County, Colorado. DMEA 4048	2
2. Geologic map showing Radium Cycle group of claims, Price Exploration Company, Montrose County, Colorado. DMEA 4048	9

DMEA 4048

RADIUM CYCLE GROUP
PRICE EXPLORATION COMPANY
MONTROSE COUNTY, COLORADO

RECEIVED
APR 1 4 1956

INTRODUCTION AND SUMMARY

Price Exploration Company, 615 North First Street, Grand Junction, Colorado, on October 15, 1955, made application for aid in an exploration project on the Radium Cycle group of four unpatented claims in Montrose County, Colorado.

The applicant proposed a single stage drilling project consisting of 3,469 feet (16 holes) of non-core drilling at a total estimated cost of $9,766.

A field examination was made by an examining team from the Geological Survey and the Bureau of Mines on February 9, 1956.

The property is in sec. 8 T. 48 N., R. 19 W., N.M.P.M., Montrose County, Colorado, at altitudes ranging from 7,450 to 7,750 feet.

Rocks of the Jurassic Morrison formation crop out over most of the Radium Cycle claims. However, the underlying Jurrassic Entrada and Summerville formations crop out on the extreme southern portion of the group. The upper, or Brushy Basin member of the Morrison formation is normally about 300 feet thick but over most of the area the upper 100 feet has been removed by erosion. The lower, or Salt Wash member is about 300 feet thick and consists of fluviatile sandstones interbedded with variegated mudstones. Individual sandstone beds, or layers, are composed of a series of coalescing lenses, each lens being partially

surrounded by mudstone. All known ore deposits in this area are confined to the upper series of sandstone lenses in the Salt Wash member. Ore deposits are small and widely scattered.

It appeared unlikely to the examining team that another ore body will be found in the small amount of property held by the applicant and it is recommended that the application be denied.

ACKNOWLEDGMENTS

The examining team was accompanied by Charles W. Shannon, who represented the applicant.

The Atomic Energy Commission was consulted regarding the area before the examination was made.

Memorandums of G. C. Selfridge, John E. Crawford, and W. P. Williams were noted.

LOCATION, TOPOGRAPHY, AND CLIMATE

The property submitted in the application consists of four unpatented mining claims in sec. 8 T. 48 N., R. 19 W., N.M.P.M., Montrose County, Colorado (figs. 1 and 2). The claims lie in, and also to the north of a grabben near the top of Carpenter Ridge. Altitudes range from 7,450 to 7,750 feet. A steep 7-mile dirt road connects the mine with Colorado State Highway No. 90 at Paradox. From Paradox it is 23 miles east to Uravan, Colorado; 102 miles northeast to Grand Junction, Colorado; 59 miles northwest to Moab, Utah; and 97 miles northwest to Thompson, Utah. Paradox has telephone service.

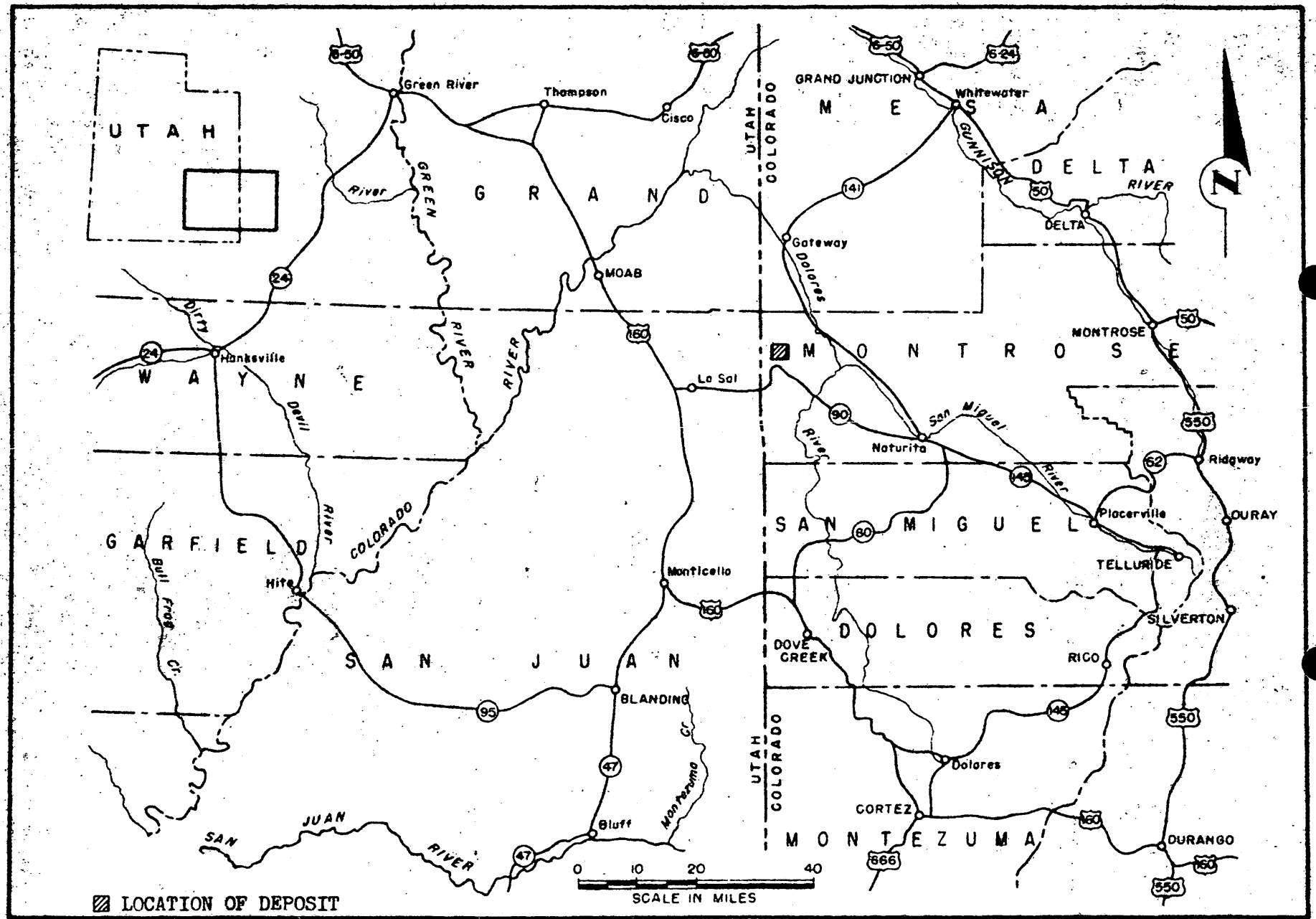

FIGURE 1 - LOCATION MAP, RADIUM CYCLE GROUP, PRICE EXPLORATION COMPANY, MONTROSE COUNTY, COLO. DMEA 4048

The nearest railroad is the Denver and Rio Grande Western at either Thompson, Utah or Grand Junction, Colorado. Labor and supplies can be obtained from Uravan or Moab. Government ore-buying depots are also maintained at Uravan and Moab. Water for drilling purposes may be obtained from Buckeye Reservoir.

Mining operations have been maintained throughout the present winter but at times the road becomes difficult to drive.

HISTORY AND PRODUCTION

The Radium Cycle is an old mine from which uranium ore was produced in the early 1900's. An access road was built in the 1930's from Paradox to the top of Carpenter Ridge. The Radium Cycle mine was relocated in 1948. Total production is estimated to have been about 3,500 tons containing an average of 0.40 percent U_3O_8 and 2.0 percent V_2O_5.

Production since 1948 is 450 tons containing an average of 0.40 percent U_3O_8 and 1.91 percent V_2O_5.

OWNERSHIP AND EXTENT

The four claims are recorded in the records of the County Clerk and Recorder of Montrose County, Colorado, as follows:

Claim	Book	Page	Date Located	Locator	Amended Book	Amended Page	Amended Date
Radium Cycle	296	421	6/1/48	Charles Proctor, et al.	364	41	10/17/53
Radium Cycle Annex	357	26	5/4/53	Charles Proctor			
Inspiration	390	538	10/6/54	Marquerite Colombo	365	111	
Sam	390	537	11/6/54	Charles Proctor et al.			

A "Contract of Sale" on the above claims was issued to H. C. Price on October 2, 1954 and is recorded in Book 396, page 83. The property is well known and the claims appear to be in order.

PRESENT STATUS

Exploration and Development

At least four adits have been run into the rim on the Radium Cycle claim and the mine has been worked by a very modified room and pillar system. However, since the last work began the rim has been removed to the limits of the old workings. Present workings consist of three short adits.

Mining and milling equipment and other facilities

Mining equipment consists of a 125 c.f.m. I.R. Gyro-flow compressor, I.R. 55 Jackhammer with jackleg, 1,000 pound mine car, 12 pound 18" track, 30 ton ore bin, hand tools and a Dodge power wagon (1954).

Ore is shipped to a Government ore-buying depot. Facilities consist of a few access roads.

GEOLOGY

The Radium Cycle group of claims is located on the northeast flank of the Paradox Valley anticline, a large collapsed Salt anticline in Montrose County, Colorado. The rocks exposed in the area have a regional dip of about 4 degrees to the north. Many high angle normal

faults cut the rocks, and locally cause the rocks to have dips as much as 8 or 10 degrees (see figure 2). Most of the normal faults have small vertical displacement.

Rocks of the Jurassic Morrison formation crop out over most of the Radium Cycle group of claims. However, the Jurassic Entrada and Summerville formations crop out on the southern parts of the Radium Cycle Annex and Sam claims (see figure 2).

The Morrison formation is divided into two members in the area of the subject property. The upper or Brushy Basin member, is normally about 300 feet thick in the area, but the upper part has been removed by erosion over most of the Radium Cycle group of claims. Over most of the area, the remaining Brushy Basin is not more than about 200 feet thick. The Brushy Basin member consists of variegated mudstones interbedded with minor amounts of fine-grained sandstone and conglomerate.

The lower member of the Jurassic Morrison formation is the Salt Wash member. It is about 300 feet thick in the area, and consists mainly of fluviatile sandstones interbedded with variegated mudstones. The sandstones are highly cross-bedded; a type known as "festoon troughs" being especially abundant. Individual sandstone beds, or layers, are composed of a series of coalescing lenses; each lens being partially surrounded by mudstone. The upper series of sandstone lenses of the Salt Wash member is referred to as "the ore-bearing sandstone" since all of the known ore deposits in this area are confined to that stratigraphic interval.

The Jurassic Summerville formation underlies the Morrison formation. It is about 100 feet thick and is composed mainly of red-brown shale and mudstone with some interbedded, white, calcareous, very fine-grained sandstone.

The Jurassic Entrada formation underlies the Summerville formation. It is about 100 feet thick, and is composed of yellow to red sandstone. The Entrada is massive and highly cross-bedded and contrasts markedly in appearance with the other stratigraphic units outcropping in the area.

ORE DEPOSITS

The known ore deposits in the general area of the subject property occur in the upper series of sandstone lenses known as the "ore-bearing sandstone". The ore deposits are oxidized and generally are of good grade. However, as W. P. Williams has pointed out in his review of the application, the results of work done by the U. S. Geological Survey indicate that the ore bodies are small and widely scattered in this area.

The only ore deposit on the subject property is the Radium Cycle mine (see figure 2). The complete history of the Radium Cycle mine is obscure, but it is known to have produced intermittently since the early 1900's when it was first worked for radium. Later, the ore was mined mainly for vanadium, and since 1953 for its uranium content. No production figures are available prior to 1948. However, AEC production records show that since 1948, the mine has produced a total of 450 tons of ore with an average grade of 0.40 percent U_3O_8 and 1.91 percent V_2O_5.

W. D. Carter, project geologist in the area for the USGS, has estimated the total production of the mine to date at about 3,500 tons.

During the field examination, the workings of the Radium Cycle mine were examined in detail with the main objective being to observe the habits and trend of the ore bodies. Since obtaining the property, the Price Exploration Company has stripped away the overburden and has recovered ore which was formerly contained in the pillars which were left in the old underground workings. From inspection, it is apparent that the reserves of the mine are virtually depleted. There does not appear to be much chance that the ore body can be extended in any direction from the present workings.

The ore deposit was composed of several small individual ore bodies which were closely spaced. Profitable operations were possible only because the deposit was exposed at the surface and it does not appear that the same ore deposit could be profitably mined under 200 to 250 feet of overburden. The trend of the ore bodies and the axis of thickening of the host rock both appear to be about N. 45° E., or about parallel to the Cliff face.

The applicant stated that the proposed drilling was planned to intersect any parallel trends that might occur behind the mine. However, because of the small size of the deposits and their scattered distribution in the district, it does not appear likely that another similar deposit will be found on the same claim. Further, it should be mentioned that the rocks in the proposed drilling area are highly fractured by numerous faults, and difficulty in drilling might well develop.

PROPOSED EXPLORATION AND COSTS

The applicant proposed a single stage drilling program consisting of 3,469 feet (16 holes) of dry drilling. The estimated costs follow:

Independent contractors		
3,469 feet of plug-bit drilling at $1.50/ft.	$ 5,203.50	
Bulldozing 15 days at $100/day	1,500.00	
Total independent contractors		$ 6,703.50
Labor and supervision		
Sampler and field assistant	$ 900.00	
Geological supervision and expenses	975.00	
Total labor and supervision		$ 1,875.00
Operating materials and supplies		
Drill log reproduction and office supplies	$ 150.00	
Auto expenses	150.00	
Total operating materials and supplies		$ 300.00
Operating equipment		
None		
Rehabilitation and repairs		
None		
New buildings, improvements, installations		
None		
Miscellaneous		
None		
Contingencies		
10 percent or		$ 837.50
Total estimated cost of project		$ 9,766.00
Estimated cost per foot		$ 2.82
Government participation 75 percent, or		$ 7,324.50

CONCLUSIONS AND RECOMMENDATIONS

The applicant proposes to explore, by drilling, their Radium Cycle and Inspiration claims (two claims) for uranium ore deposits. The Radium Cycle mine occurs on the property. It has been worked intermittently since the early 1900's. The ore bodies and the thick axis of the host rock trend about N. 45° E., or about right angles to the cliff face. The ore deposits in the area are known to be small and widely scattered and it seems unlikely that another ore deposit will be found on the small amount of property held by the applicant.

Because of the reasons discussed previously, it is recommended that DMEA assistance for the proposed project be denied.

12-5-55 [illegible]

DEC - [illegible]

November 30, 1955

Memorandum

To: W. M. Traver, Executive Officer, DMEA Field Team, Reg. III

From: Acting Superintendent, Denver Experiment Station, Reg. III

Subject: Docket DMEA 4048 (Uranium), Price Exploration Company, Radium Cycle group, Montrose County, Colorado

The above brochure was received in this office on November 30, 1955.

A field examination will be made and a report prepared by an engineer from the Denver or Grand Junction office.

JOHN F. SHAW
John F. Shaw

cc: 2 w/orig.
E. N. Harshman
J. W. Smaler
J. F. Shaw
See Op. Com. (2)

RECEIVED
DEC - 5 1955
DMEA
Grand Junction

November 30, 1955

Memorandum

To: W. M. Traver, Executive Officer, DMEA Field Team, Reg. III

From: Acting Superintendent, Denver Experiment Station, Reg. III

Subject: Docket DMEA 4048 (Uranium), Price Exploration Company, Radium Cycle group, Montrose County, Colorado

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JOHN F. SHAW
John F. Shaw

cc: 2 w/orig.
K. H. Marshman
J. W. Hasler
J. F. Shaw

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

RECEIVED
DEC - 1 1955

November 29, 1955

224 New Customhouse
Denver 2, Colorado

Memorandum

To: J. F. Shaw (With brochure)
J. W. Hunter

From: Acting Executive Officer, DMEA Field Team, Region III

Subject: Docket DMEA 4048 (Uranium), Price Exploration Company, Radium Cycle group, Montrose County, Colorado

Enclosed is the subject application in the amount of $9,766.00. Also enclosed is a copy of a letter from the Chairman of the Operating Committee with attached memoranda of review of the application by John E. Crawford and W. P. Williams.

A field examination and suitable report are requested.

E. N. Harshman

E. N. Harshman

Enclosures

HMC:ab

cc: Sec. Op. Comm. (2)

12-2-55 ign

RECEIVED
DEC - 1 1955

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

November 29, 1955

224 New Customhouse
Denver 2, Colorado

Memorandum

To: J. F. Shaw (With brochure)
J. W. Emsler

From: Acting Executive Officer, DMEA Field Team, Region III

Subject: Docket DMEA 4048 (Uranium), Price Exploration Company, Radium Cycle group, Montrose County, Colorado

Enclosed is the subject application in the amount of $9,766.00. Also enclosed is a copy of a letter from the Chairman of the Operating Committee with attached memoranda of review of the application by John E. Crawford and W. P. Williams.

A field examination and suitable report are requested.

E. M. Hershman

E. M. Hershman

Enclosures

HMC:ab

cc: Sec. Op. Comm. (2)

Surname Copy
700
Murphy
Selfridge

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

NOV 18 1954

Mr. W. M. Traver
Executive Officer
DMEA Field Team, Region III
224 New Customhouse Building
Denver 2, Colorado

Re: Docket No. DMEA-4048 (Uranium)
Price Exploration Company
Radium Cycle group
Montrose County, Colorado

Dear Mr. Traver:

The captioned application is referred to Region III Field Team for investigation, a field examination if deemed advisable, and recommendation. A copy of the application was forwarded to your office on November 4.

Enclosed are copies of memoranda, dated November 9, and 16, 1955, by J. E. Crawford, USBM, and W. P. Williams, USGS, respectively, relating to the subject application.

In the event the Field Team recommends a project on the subject property, it should advise the Applicant that we will require a copy of the "Contract of Sale," dated October 2, 1954, and also six (6) copies of a Subordination Agreement signed by the holders of the 16 percent overriding royalty mentioned in the application. The names of the sellers holding the royalty rights were not stated.

Sincerely yours,

George C. Selfridge
By ESY

Chairman, Operating Committee

APPROVED:

/s/ Robert W. Geeham
By ESY

Member, Bureau of Mines

N. E. Nelson
By ESY

Member, Geological Survey

FMMurphy/izm 11-18-55
cc to: Admr.'s Reading File
Operating Committee
Docket
Code 700
Mr. Murphy
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA

Surname Copy
700
Murphy
Ellis
Nelson
Geehan
Selfridge

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

1955

Mr. George G. Travis
Manager, Price Exploration Company
615 North First Street
Grand Junction, Colorado

Re: Docket No. DMEA-4048 (Uranium)
Radium Cycle group
Montrose County, Colorado

Dear Mr. Travis:

The application for assistance in exploring the subject property in Montrose County, Colorado, under the captioned docket number, has been reviewed by the Rare and Miscellaneous Metals Division of the Defense Minerals Exploration Administration. It has been referred to the Executive Officer of Region III at the following address:

Mr. W. M. Traver
Executive Officer
DMEA Field Team, Region III
224 New Customhouse Building
Denver 2, Colorado

The Regional Office will contact you in regard to your project if additional information is required.

Sincerely yours,

Frank E. Johnson

ACTING Administrator

FMMurphy/izm
11-18-55
cc to: Admr.'s Reading File
Operating Committee
Docket
Code 700
Mr. Murphy
DMEA Field Team, Region III (2)
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA

11-17-55 ign

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
NOV 16 1955

November 16, 1955

Memorandum

To: E. W. Ellis, Defense Minerals Exploration Administration

From: W. P. Williams, U. S. Geological Survey

Subject: Review of application, DMEA 4048, Price Exploration Company, Radium Cycle claims, Carpenter Ridge, Paradox District, Montrose County, Colorado (Uranium).

The applicant proposes an exploration project consisting of a total of 3,469 feet of plug-bit drilling at a total estimated cost of $9,766. The total cost includes road and drill site preparation, supervision and technical costs, operating materials and supplies, and contingencies.

The drilling would be performed around, and close to, the old Radium Cycle mine. The applicant states production figures for the Radium Cycle mine are unavailable but he estimates the past production at 6,000 tons of uranium ore that averaged 0.40 percent U_3O_8 and 2.0+ percent V_2O_5. Those figures are probably generous.

The U. S. Geological Survey has done considerable exploration drilling in the vicinity of Carpenter Ridge. Ore deposits in the area are known to be small and widely scattered. Because of the scattered distribution of ore bodies it would seem that drilling closely behind a known ore body might not be advisable.

It seems probable that previous exploration work has been completed near the Radium Cycle mine; but no mention of such work is made in the application.

Because of what may have been significant past production from the property, I recommend that the Field Team be asked to review the application and submit their comments. The Field Team may find it advisable to make a field examination of the property. The examining team should ascertain if previous exploration work has been completed on the property, what the results were, and what were the results of Government drilling in the vicinity.

W P Williams

W. P. Williams

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
NOV 16 1955

November 16, 1955

Memorandum

To: E. W. Ellis, Defense Minerals Exploration Administration

From: W. P. Williams, U. S. Geological Survey

Subject: Review of application, DMEA 4048, Price Exploration Company, Radium Cycle claims, Carpenter Ridge, Paradox District, Montrose County, Colorado (Uranium).

The applicant proposes an exploration project consisting of a total of 3,469 feet of plug-bit drilling at a total estimated cost of $9,76[illegible]. The total cost includes road and drill site preparation, supervision and technical costs, operating materials and supplies, and contingencies.

The drilling would be performed around, and close to, the old Radium Cycle mine. The applicant states production figures for the Radium Cycle mine are unavailable but he estimates the past production at 6,000 tons of uranium ore that averaged 0.40 percent U_3O_8 and 2.04 percent V_2O_5. These figures are probably generous.

The U. S. Geological Survey has done considerable exploration drilling in the vicinity of Carpenter Ridge. Ore deposits in the area are known to be small and widely scattered. Because of the scattered distribution of ore bodies it would seem that drilling closely behind a known ore body might not be advisable.

It seems probable that previous exploration work has been completed near the Radium Cycle mine; but no mention of such work is made in the application.

Because of what may have been significant past production from the property, I recommend that the Field Team be asked to review the application and submit their comments. The Field Team may find it advisable to make a field examination of the property. The examining team should ascertain if previous exploration work has been completed on the property, what the results were, and what were the results of Government drilling in the vicinity.

WPWilliams:iml
G-11/16/55
cc: Director's reading, 4212
Branch reading, 4212
DMEA (3)
Docket file; J. E. Crawford, 3641; J. O. Hosted, 3210

W. P. Williams

11/10/55 gh

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

November 9, 1955

RECEIVED

Memorandum

To: Ernest William Ellis, DMEA Member
Uranium Commodity Committee, Room 4445

From: John E. Crawford, Bureau of Mines Member
Uranium Commodity Committee

Subject: Application for Assistance, DMEA Docket 4048, Price Exploration Company, Paradox Mining District, Montrose County, Colorado

I have reviewed the attached application, DMEA Docket No. 4048, dated October 15 and received in this office on November 7. I have also discussed it with Joseph O. Hosted, Washington representative of the Atomic Energy Commission.

The applicant is desirous of exploring for uranium on the old Radium Cycle group of claims from which uranium has been produced intermittently for many years. An examination of the old workings by applicant has indicated that approximately 6,000 tons of 0.4 percent U_3O_8 ore remains in place. Because of the fact that mineralization occurs in the abandoned mine, and because there are favorable uranium mineral showings elsewhere on the claims, the Price Exploration Company believes an exploration program is justified.

Such a program would involve a first stage consisting of (1) drilling 4 holes on 500-foot centers on the Inspiration claim adjoining the Radium Cycle mine; (2) drilling 8 holes on 250-foot centers on the north half of the Radium Cycle claim, and (3) drilling 21 holes on the south half of the Radium Cycle claim. The second phase of the program would involve drilling holes on 125-foot centers throughout the complete claims area.

All drilling is stipulated to be plug drilling at an overall cost of $1.50 per foot which appears reasonable. A total of 33 holes consisting of 3,469 feet would be drilled in phase one. The second phase would consist of a maximum of 50 additional holes at an estimated footage of 5,250.

Apparently the Price Exploration Company, as outlined in their application, requests assistance for only phase one work which may cost $9,766, with Government participation at 75 percent of the total, or $7,324.50.

We suggest that the application be referred to the Field Team for review and discussion with E. R. Gordon, Atomic Energy Commission, Grand Junction, Colo., after which it may be necessary to schedule a field examination.

RECEIVED

It is recommended that the Field Team consider any exploration work conducted by previous owners of the Radium Cycle and adjacent claims, if results of such work are available.

John E Crawford

John E. Crawford

Attachment

November 4, 1955

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: Chief, Operation's Control and Statistics Division

Subject: Assignment of Docket Number

There is listed below the assigned docket number to an application recently received from Region III.

DMEA - 4048 Price Exploration Company

Robert E. Adams
Chief, Operation's Control
and Statistics Division

November 4, 1955
Subject: DMEA-4048
Re: Exploration Assistance
Radium Cycle Group

Price Exploration Company
615 N. First Street
Grand Junction, Colorado

Gentlemen:

The receipt of your application dated October 15, 1955, for exploration assistance under the Defense Production Act of 1950, as amended, is hereby acknowledged.

Your application has been assigned Docket Number DMEA-4048 and referred to the Rare & Misc. Metals Division.

Kindly identify all future correspondence relating to your application by this docket number.

Sincerely yours,

Robert E. Adams, Chief
Operations Control and
Statistics Division

PRICE EXPLORATION COMPANY
HAROLD C. PRICE—MANAGING PARTNER
BOX 1111
BARTLESVILLE, OKLAHOMA

RECEIVED
NOV - 4 1955

GEO. TRAVIS—MANAGER
POST OFFICE BOX 1283
615 N. FIRST ST.
GRAND JUNCTION, COLORADO

DARWIN QUIGLEY & CHAS. SHANNON
GEOLOGISTS
602 NEWHOUSE BUILDING
SALT LAKE CITY, UTAH

November 1, 1955

Mr. Ernest Wm. Ellis
Defense Minerals Exploration Administration
Department of the Interior
Washington 25, D. C.

Re: DMEA Application
Radium Cycle Group

Dear Mr. Ellis:

Enclosed find six copies of "Application For DMEA Project on Radium Cycle Group".

Commercial ore is now being mined from the Radium Cycle mine and showings of ore are present on the proposed exploration area. The proposed expenditure for exploration on the Radium Cycle Group is well within the economic range of costs involved in finding an additional ore body thereon. Accordingly, we believe our application for DMEA assistance meets your requirements and we therefore request your approval of the above captioned application.

Yours very truly,

PRICE EXPLORATION COMPANY

George G. Travis

By: George G. Travis,
Manager

GGT/ba

EXHIBIT NO. 1

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Form Approved.
Budget Bureau No. 42-R1035.2.

NOV 4 1955

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

Not to be filled in by applicant

Docket No. 4048-DMEA
Metal or Mineral Uranium
Date Received 11-4-55
Estimated Cost $9,766.00
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: PRICE EXPLORATION COMPANY
615 N. First Street
Grand Junction,
Colorado

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers.

(*d*) If a partnership, add to the above statement the names and addresses of all partners. See Exhibit 2.

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract See attached application, page 1.

(*b*) State any mine name by which the property is known. Radium Cycle group.

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise Owner.

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property.

(*e*) If you own the land, describe any liens or encumbrances on it There are no liens or encumbrances, except 16% ore payment, as per Contract of Sale dated October 2, 1954

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice. See Exhibit 3.

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes.

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades.

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you. See Exhibit4.

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points.

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore **The applicant plans to explore for all uranium and vanadium bearing minerals.**

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings, and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc. **See attached application, pages 2 and 3.**

(*c*) The work will start within 60 days and be completed within 1½ months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations.

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project:

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.).

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants.

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel.

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be.

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project.

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project.

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes.

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above.

NOTE.—No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs.

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)?

(*b*) How do you propose to furnish your share of the costs?

☐ Money ☐ Use of equipment owned by you ☐ Other

Explain in detail on acompanying paper. **See attached application for heading numbers 6 and 7.**

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

Dated October 15, 1955, 195__

PRICE EXPLORATION COMPANY
(Applicant)

By [signature]
Operating Manager

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

RECEIVED
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APPLICATION FOR DMEA PROJECT
ON
RADIUM CYCLE GROUP

October 15, 1955

PRICE EXPLORATION COMPANY
615 N. First Street
Grand Junction, Colorado

I N D E X

Heading No.		Page No.
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	B] Name of Property	1
	C] Interest in the Land	1
	D] Omitted	1
	E] Liens and Encumbrances	2
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4.	PHYSICAL DESCRIPTION	2
	A] Mining or Exploration Operations	2
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I N D E X

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4.	Geologic Report on Radium Cycle Group	-
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2.	Index Map of West Paradox Mining District.	
3.	Geological Section and Contour Map.	
4.	Isopach Map with Drill Hole Locations.	

APPLICATION FOR DMEA PROJECT ON THE RADIUM CYCLE GROUP
FOR
PRICE EXPLORATION COMPANY
615 N. First Street
Grand Junction, Colorado

RECEIVED
NOV - 4 1955

1. NAME OF APPLICANT

A] Price Exploration Company (See Form MF-103, Exhibit 1)
B] Omitted - not a corporation.
C] For names and addresses of partners, See Exhibit 2.

2. GENERAL

This report, together with Form MF-103, attached as Exhibit 1, is an application for a Defense Minerals Exploration Administration project contract of the short form or unit cost type. It is proposed that the project be divided into two phases. Phase 1 is a $9,766.00 project to determine the amount of uranium mineralization and will consist of 3,469 feet of drilling at an estimated unit cost of $2.80 per foot. Phase 2 will be dependent upon the results of Phase 1 and may be filed as an amended application on the Radium Cycle group. Twenty-five per cent of Phase 1, or $2,441.50 of the total expenditure of Phase 1, will be paid by the Price Exploration Company, the applicant herein; the Defense Minerals Exploration Administration is asked to loan the balance of $7,324.50.

Locations for thirty-three holes are suggested for Phase 1 and are shown on Figure 4. These locations are on 500, 250 and 125-foot centers in a hexagonal pattern and were selected and limited in respect to trend and proximity of ore and mineralization.

Locations for a maximum of fifty additional holes for Phase 2 will be requested by amended DMEA application, if the drilling results of Phase 1 warrant approval.

3. PROPERTY RIGHTS

A] Legal Description: The land on which exploration work is to be performed consists of two of the four contiguous mining claims known as the Radium Cycle group, located in the Paradox Mining District of Montrose County, Colorado. The location, with respect to the G.L.O. grid, is shown in Figures 1 and 2.

B] Name of Property: This property will be referred to in this report and further correspondence as the Radium Cycle group.

C] Interest in the Land: Price Exploration Company, through H. C. Price, purchased the Radium Cycle group and other lands by "Contract of Sale" dated October 2, 1954, and recorded in Montrose County, Colorado, Book 396, Page 83.

D] Omitted.

E] Liens and Encumbrances: There are no liens, encumbrances or royalty obligations against the property, except for the 16 per cent ore payment as per "Contract of Sale" dated October 2, 1954.

F] Record of Title: All transactions affecting titles to the property are recorded in the office of the County Recorder of Montrose County, Colorado. The location dates, recording dates, book and page numbers are tabulated in Exhibit 3.

4. PHYSICAL DESCRIPTION

A] Mining or Exploration Operations: The Radium Cycle mine at the south end of the property has been mined intermittently for many years, but production figures are unavailable. The applicant herein took possession on January 1, 1955, and commenced mining operations in May, 1955, by stripping the overburden from the old workings. Mining equipment has been moved in and pillars from the old workings have been removed. A portal has been built at the new workings and mining therein is proceeding. The mine is accessible and safe for examination purposes.

B] Production and Ore Reserves: Past production figures are unavailable, but have been estimated at 6,000 tons. Current production from October 3, 1955, is proceeding at approximately 50 tons per week and ore reserves are estimated at 2,000 tons of .40 per cent uranium and 1.75 per cent vanadium.

C] Geologic Features: A geologic report is attached as Exhibit 4.

D] Accessibility: The Radium Cycle group is accessible by an unimproved road from Paradox, Colorado. Uranium processing plants are located at Naturita and Uravan, within 40 miles of the property. There are Post Offices, permanent settlement facilities and motor freight depots at Paradox, Naturita and Uravan.

E] Availability of Manpower, Equipment, Supplies, etc.: Manpower skilled in the performance of drilling planned is available in the vicinity. The equipment and manpower to be employed on the project will be personnel and equipment of Price Exploration Company and of the drilling contractor. Price Exploration Company will also furnish the technical and supervisory personnel to carry out the program in an efficient manner. Drilling water is available within a few miles of the property. No electric power is available.

5. THE EXPLORATION PROJECT

A] Minerals for which Exploration is planned: It is planned to explore for all uranium and vanadium bearing minerals. (See MF-103, Exhibit 1.)

B] Proposed Work: Locations for Phase 1 holes have been staked and roads to locations will be built. A rotary type drill will be provided by the drilling contractor. It is estimated that Phase 1 project will require one and one-half months to complete.

Proposed holes for Phase 1 are shown on Figure 4, numbered A-1 through A-33. The estimated depth of each hole is tabulated on

Schedule 2. Spacing of the holes was made on the basis of adequately testing the ore potential with due regard to favorable areas and the economics involved.

A Price Exploration Company geologist will supervise the drilling, logging, sampling and probing of each hole to be drilled. No coring is planned for Phase 1 holes because expected core recoveries should be poor in the objective formation, which is known to be fractured in this area.

The Drilling Plan would proceed with plug drilling the 33 holes of Phase 1 and would be followed with Phase 2 holes, if the results of Phase 1 warranted additional exploration.

C] Beginning and Completion Dates: (See MF-103, Exhibit 1)

D] Ability of Applicant: The Price Exploration Company is a partnership, organized July 1, 1954, and with adequate capital supplied by the partners, have acquired lands in Colorado, New Mexico, Arizona, Utah and Wyoming. A considerable amount of drilling has been, and is being done in these states. The company is now mining and producing uranium ore at the Radium Cycle and Valley View mines in the Paradox Valley of Colorado and the Colorado No. 1 at North Pumpkin Buttes in Wyoming. Another ore body in the Lukachukai Mountains in Arizona is being outlined by drilling, in preparation for mining. The managing partner is Harold C. Price, a graduate engineer, class of 1913, Colorado School of Mines. At present, his H. C. Price Company is a general constructor of oil and gas pipelines in the United States, Alaska, Canada, South America and the Middle East.

The personnel of Price Exploration Company, conducting exploration, mining and managing operations are as follows:

M. Darwin Quigley -
Doctorate in Geophysics and Geology, Cal. Tech.
Four years geophysical work with the Government.
Seven years as District and Research Geologist with the Sinclair Oil and Gas Company.
One year in Uranium exploration.

Charles W. Shannon -
Graduate geologist from University of Minnesota.
Six years mining and exploration with the St. Joseph Lead Company.
Two years in Research Geophysics with the Sinclair Research Laboratories.
One year in Uranium exploration.

W. Donald Quigley -
Consultant geologist.
Seven years with the Government in Uranium mining and Atomic Energy work.
Four years as a geological consultant in connection with oil, uranium and mining work.

George G. Travis - Operating Manager
Thirty years, drilling, producing and managing oil company business.
One year, managing uranium business.

6. ESTIMATE OF COSTS

Price Exploration Company desires that this exploration project be placed on a unit cost basis. Schedule 1 gives the exact amount bid per unit by Price Exploration Company for performing the exploration work. Schedule 2 indicates the drilling depths per hole.

A] Independent Contracts: The drilling, road and location work will be performed by independent contractors. One D-7 Caterpillar Dozer should complete drill roads and locations in fifteen days and the rotary rig will thereafter be moved in to complete the project within the specified time (See 5 (3) MF-103, Exhibit 1).

PHASE 1

1] Plug drilling, 3,469 feet @ $1.50	$5,203.50	
2] Road and location building, 15 days @ $100.	1,500.00	
Total Independent Contract, Phase 1		$6,703.50

B] Labor, Supervision, Consultants:

1] Geological supervision and expenses	$ 975.00	
2] Sampler and field assistant	900.00	
Total 6-B		$1,875.00

C] Operating Materials and Supplies:

1] Drill log reproduction and office supplies	$ 150.00	
2] Auto Expenses	150.00	
Total 6-C		$ 300.00

D] Contingencies:

1] 10% is added to cover contingencies of increased depth of holes, supervisory costs, operating materials and supplies		
Total 6-D		$ 837.50

For Summary of Costs see Schedule 1.

7. APPLICANTS SHARE OF COSTS

In accordance with DMEA regulations, Price Exploration Company is prepared to pay 25 per cent of the cost of the project in the following manner:

Price Exploration Company will perform all of the necessary work and pay for all independent contracts, labor, supervision and materials. Reimbursement by DMEA will be in accordance with Schedule 1, less 25 per cent; i.e., the amount to be loaned by the Government for each unit of work performed will be 25 per cent less than the amounts shown on Schedule 1.

Respectfully submitted,

PRICE EXPLORATION COMPANY

By George P. Francis
Operating Manager

SCHEDULE 1

Summary of Costs
Project Cost Per Foot of Hole
Basis 3,469 Feet of Drilling

		Project Cost	Unit Cost Per Foot
6.			
A]	Independent Contract		
	1] Drilling	$5,203.50	$1.50
	2] Road and Location Work	1,500.00	.43
B]	Labor, Supervision, Consultants	1,875.00	.54
C]	Operating Materials and Supplies	300.00	.08
D]	Contingencies	887.50	.25
	Total	$9,766.00	$2.80
	DMEA, 75% Share Costs	$7,324.50	$2.10
	Price Exploration Company 25% Share of Costs	$2,441.50	$0.70

SCHEDULE 2

Drilling Depths - Phase 1

Hole Number	Depth of Hole 40 Ft. in Jms	Hole Number	Depth of Hole 40 Ft. in Jms
1	54 ft.	17	155 ft.
2	140 ft.	18	60 ft.
3	90 ft.	19	145 ft.
4	50 ft.	20	155 ft.
5	90 ft.	21	90
6	180 ft.	22	40 ft.
7	260 ft.	23	90 ft.
8	65 ft.	24	135 ft.
9	165 ft.	25	140 ft.
10	55 ft.	26	90 ft.
11	55 ft.	27	135 ft.
12	150 ft.	28	90 ft.
13	90 ft.	29	125 ft.
14	50 ft.	30	75 ft.
15	40 ft.	31	125 ft.
16	180 ft.	32	65 ft.
		33	40 ft.
Total Phase 1 Drilling			3,469 ft.

EXHIBIT NO. 2

Price Exploration Company is a partnership. The names, addresses and interest of partners are as follows:

Harold C. Price P. O. Box 1111 Bartlesville, Oklahoma	33-3/4 per cent
M. L. Price P. O. Box 1111 Bartlesville, Oklahoma	33-3/4 per cent
Harold C. Price, Jr. P. O. Box 1111 Bartlesville, Oklahoma	10 per cent
Joe D. Price P. O. Box 1111 Bartlesville, Oklahoma	10 per cent
E. L. Gallery P. O. Box 1111 Bartlesville, Oklahoma	5 per cent
R. K. Shivel P. O. Box 1111 Bartlesville, Oklahoma	5 per cent
Alton H. Rowland P. O. Box 1111 Bartlesville, Oklahoma	2-1/2 per cent

EXHIBIT NO. 3

Title Data

Claim Name	Recording Date	Book	Page
Radium Cycle	Jun. 28, 1948	296	421
Radium Cycle Annex	May 4, 1953	357	26
Inspiration	Nov. 6, 1954	390	538
Sam	Nov. 6, 1954	390	537

EXHIBIT No. 4

A BRIEF GEOLOGIC REPORT ON THE RADIUM CYCLE MINE AND CONTIGUOUS PROPERTY

The Radium Cycle property is in the Paradox Mining District, Montrose County, Colorado. The group is composed of four contiguous claims: Radium Cycle, Radium Cycle Annex, Sam, and Inspiration. All have been properly staked, notices posted and recorded. This property lies on the southwest flank of Carpenter Ridge in Section 8, T. 48 N., R. 19 W., approximately eight miles northwest of Paradox Store. The area is accessible throughout the year, except during extremely inclement weather.

Situated in one of the oldest vanadium-uranium provinces of the Colorado Plateau, the Radium Cycle mine has a long history of production. Originally, in the early part of the century, it was worked for radium and the ore was sent to France where Madame Curie used it in her experiments. At that time, mining was highly selective, and only that ore running ten per cent or better was taken. When radium from other sources became more important, mining ceased at the Cycle and the property lay idle until vanadium came into demand. Mining has been active most of the past decade, with the emphasis on recovery of uranium values.

Mining has consisted primarily of pillar robbing in recent years because the old workings were untenable for underground operations. As a result, most operators engaged in sporadic stripping of overburden to expose the rich pillars from which the ore could then be won. This method was practiced on a small scale until the property was purchased by the present owner. A large scope program was initiated, in which overburden was removed from the ore rim to the limits of the old workings. This will permit resumption of underground mining as soon as pillars and waste have been removed.

In the absence of any records of past production, an estimate of tonnage mined to date has been made on the basis of examination of the old workings. A figure of approximately 6,000 tons has been calculated, with an estimated average

value of 0.40 per cent U_3O_8 and 2.4 per cent V_2O_5.

STRATIGRAPHY

The property lies along the deeply dissected wall of Paradox Valley, which has a relief of about 3,000 feet. Consequently, a considerable section of stratigraphy is exposed, ranging in age from Permian on the valley floor to Cretaceous at the top. Figure 2 is a geologic index map of the northwest end of Paradox Valley, and shows the areal distribution of these formations. The Cycle property contains, primarily, outcrops of the Brushy Basin shale and Salt Wash sandstone members of the Morrison (Jurassic) formation. For the most part, the Brushy Basin shale section remaining is less than 150 feet in thickness.

The Salt Wash member, which is the ore objective, is composed of four sandstone beds or benches, separated by interbedded green and red shales and siltstones. These benches are lenticular, cross-bedded, fluviatile sandstone deposits of gray to brown color. The bottom and top benches are generally about twice as thick as the intervening benches, averaging near 40 feet. The entire Salt Wash section is about 180 feet thick in this area.

LITHOLOGY

Benches of the Salt Wash member are composed of fine to medium, frosted, sub-angular sand grains. Minor constituents are bentonite, feldspar, hematite, and tuff. In the Cycle area, about five per cent of the sand grains have a light red color. Sorting improves upward through the section, and the top bench may be classed as moderately well-sorted. Intercalated thin clay beds have a notable content of red and green clay gauls and these also extend into the sand.

$CaCO_3$ content runs as high as ten per cent in the top bench, and one highly calcareous zone about 6 feet thick, near the middle of this sand, contains 30 per cent carbonate.

Abundant carbonaceous material is present, as well as numerous trees and dinasaur bones.

STRUCTURE

Paradox Valley is one of the classic collapsed salt anticlines of the Colorado Plateau, and as a result, faulting is a common feature along the present valley walls. As shown on Figure 2, the Cycle group lies in a zone of rather complex faulting and shearing. Most of the faults are normal, and their traces are roughly parallel in a northwest trend. Some cross-faulting may be present, but none can be delineated.

Figure 3 is a topographic and areal geologic map of the claims and adjacent area. Fault I, shown on this map, is the major fault down to the south, with a displacement of 125 feet. Fault II is a very minor break, with 3 feet of throw. It, also, is down to the south. The next fault, III, has 30 feet of displacement up to the south. Fault IV is down to the south, with a throw of 10 feet. The last one pertinent to the area is Fault V, which is up to the south with a throw of 105 feet. In essence, this system constitutes a graben. The fault planes all dip 70 to 80 degrees, and apparently the lesser ones coalesce at moderate depth. Faults I and V are the bounding fractures and the others are a result of differential movement of the faulted block.

Relative movement of strata, south of Fault V and north of Fault I, is negligible. In fact, their positions are in accord with the regional dip. It is reasonable to attribute the formation of the graben to adjustment of the block between the bounding tension fractures. The latter, no doubt, resulted from collapse of the anticline.

This area is on the northeast flank of the pre-collapse anticlinal structure, and has an average regional dip of about 4 degrees to the north. The individual fault blocks display somewhat steeper inclination, averaging about 7 degrees, with strike varying 10 to 30 degrees from east. Differential slip of the various blocks has caused deviation of dip, but, in general, the strata retain a vestige of the original north dip.

Regional thinning of formations on the flank of the anticlinal structure is not evident, but local variation of Salt Wash sandstone benches is much in evidence. This latter feature, as discussed earlier, results from the lenticular nature of this formation.

Intra-formational structures consist of "rolls" and undulations in the sand beds accompanied by shale partings. The latter tend to drape the irregular surface of this underlying sand layer; in some places, thickening where the clay fills in scour channels; other places, showing no variance with top and bottom contour essentially parallel. Generally, these features are discontinuous and bedding planes are highly irregular.

MINERALIZATION

It has been reported that the original discovery of mineralization was made in the bottom Salt Wash bench, but this has not been substantiated by observation. Showings have been found at this horizon elsewhere in the district, but all commercial ore bodies are in the top bench, and the Radium Cycle mine is no exception. Normally, ore occurrences in the Salt Wash sandstone are associated with an underlying green clay or shale. This relationship is not dominant at the Cycle, although it does exist in portions of the ore bodies. The calcareous zone referred to in the discussion of lithology is of universal significance here, in that the main ore accumulation terminates on this layer. It is true that the calcareous zone contains some small bodies of commercial mineral, and in numerous places is overlain by a green shale mantle, but it is equally true that no ore exists below this layer. In another respect, the Cycle ore body departs somewhat from usual Salt Wash occurrence. Instead of being at or near the bottom of the bench, it lies about halfway up, which is also the position of the calcareous layer. The seeming emphasis placed on this facet of the mineralization is not intended to evolve into a discussion of depositional theory, but is rather pointed out as a possible guide to exploration.

Carnotite and dark vanadium minerals are the dominant source of values. The ratio of V_2O_5 to U_3O_8 is approximately 5 to 1 in mine run ore. Three types of ore are found: [1] disseminated ore, which commonly displays a spotty segregation of yellow and dark minerals, locally called "rattle-snake" ore; [2] soft, high-grade concentrations of only carnotite in streaks of several inches to several feet (this may assay as high as 15 per cent U_3O_8); [3] trees and occasional bones replaced by carnotite. Associated with the ore is abundant carbonaceous material, and varying amounts of manganese mineralization. Mud gauls are common in the enclosing sandstone.

The ore body most extensively mined lies in the horst block within the graben. Each of the blocks have some degree of mineralization, as shown by the lettered hatched areas in Figure 3, and this rather widespread distribution of "shows" and ore strongly suggests the existence of additional commercial accumulations. The areas "A", "B" and "C" of Figure 2 have been or are being actively mined and, as noted previously, about 6,000 tons have been produced from area "A". At "D", a rich tree yielded about 500 pounds of high grade ore. Showings at "E" and "F" have not been explored.

SUMMARY AND CONCLUSIONS

The Radium Cycle mine has had a long history of production, and a substantial amount of ore still remaining is indicated by the exposures of mineralization in the old workings. The fact that the known ore seems to be confined to one "roll", coupled with the existence of mineral showings elsewhere, strongly suggests the presence of other ore bodies similar to those presently exposed.

The dominant structural feature, aside from the faulting which is evidently post-mineral, is the pre-collapse anticline. It is known that anticlinal structures have some influence on deposition, since many ore deposits are found on the limbs of such features.

The lithology of the Salt Wash sand member is that of sediments of

fluviatile origin, and indicative of flood-plain deposition. Inter-stratified shales which drape the scoured and reworked sand surfaces, abundant carbonaceous material, logs, and dinosaur bones provide a copious source of precipitating agents.

The Salt Wash sandstone has dominantly a gray to buff color, rather than red, and this is a highly favorable indication that mineralizing solutions have permeated the area.

These geologic features of the area lend credence to the conclusion that ore potential is exceedingly good, and the following exploration program is unequivocally recommended.

EXPLORATION

A drilling program should be undertaken, which will most propitiously explore the area. The Radium Cycle and Inspiration claims are the only ones which have good potential for upper Salt Wash mineralization. As shown in Figures 2 and 3, the suggested drill hole locations may be divided into three groupings as a first phase program.

1. The Inspiration claim contains three locations on 500-foot centers from which the favorability of the formation, from the standpoint of lithology, can be determined. It is not expected that these few holes would locate an ore body, but the criteria attendant to mineralization should manifest themselves. While it would be advisable to employ a more dense pattern, this part of the area is of less immediate importance and more intensive search can be conducted in a second phase of exploration.

2. The north half of the Radium Cycle claim is to be drilled on a pattern of 250-foot spacing. Most of this area is on the upside of the main fault and is covered with Brushy Basin shale of the Morrison formation. Mineralization occurs at "F" in Figure 2, and drilling on the adjacent property to the east has shown mineralization also. It is felt that this portion of the area

should be explored with a density of drilling that provides a fair chance to locate possible ore bodies.

3. Of most importance is the south half of the Radium Cycle claim, since most of the known mineralization occurs there. The logical program in this portion of the area is to locate "rolls" parallel to, or otherwise related to that of the mine. It is evident from the size and configuration at the known ore bodies that a hole spacing of 125 feet is optimum to insure finding deposits of the expected size.

A second phase program should be conducted on 125 foot hole spacing throughout the entire area. It is obvious that a considerable number of the holes in such a pattern would not be drilled since second phase exploration would center around holes of the first phase which showed the more favorable criteria.

As outlined above, the first phase program would entail drilling 33 holes with a total footage of 3,469 feet. The second phase would consist of a maximum of 50 additional holes of an estimated footage of 5,250 feet.

Charles W. Shannon,
Geologist

APPLICATION FOR DMEA PROJECT
ON
RADIUM CYCLE GROUP

RECEIVED
NOV - 4 1955

October 15, 1955

PRICE EXPLORATION COMPANY
615 N. First Street
Grand Junction, Colorado

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APPLICATION FOR DMEA PROJECT ON THE RADIUM CYCLE GROUP
FOR
PRICE EXPLORATION COMPANY
615 N. First Street
Grand Junction, Colorado

RECEIVED
NOV - 4 1955

1. NAME OF APPLICANT

A] Price Exploration Company (See Form MF-103, Exhibit 1)
B] Omitted - not a corporation.
C] For names and addresses of partners, See Exhibit 2.

2. GENERAL

This report, together with Form MF-103, attached as Exhibit 1, is an application for a Defense Minerals Exploration Administration project contract of the short form or unit cost type. It is proposed that the project be divided into two phases. Phase 1 is a $9,766.00 project to determine the amount of uranium mineralization and will consist of 3,469 feet of drilling at an estimated unit cost of $2.80 per foot. Phase 2 will be dependent upon the results of Phase 1 and may be filed as an amended application on the Radium Cycle group. Twenty-five per cent of Phase 1, or $2,441.50 of the total expenditure of Phase 1, will be paid by the Price Exploration Company, the applicant herein; the Defense Minerals Exploration Administration is asked to loan the balance of $7,324.50.

Locations for thirty-three holes are suggested for Phase 1 and are shown on Figure 4. These locations are on 500, 250 and 125-foot centers in a hexagonal pattern and were selected and limited in respect to trend and proximity of ore and mineralization.

Locations for a maximum of fifty additional holes for Phase 2 will be requested by amended DMEA application, if the drilling results of Phase 1 warrant approval.

3. PROPERTY RIGHTS

A] Legal Description: The land on which exploration work is to be performed consists of two of the four contiguous mining claims known as the Radium Cycle group, located in the Paradox Mining District of Montrose County, Colorado. The location, with respect to the G.L.O. grid, is shown in Figures 1 and 2.

B] Name of Property: This property will be referred to in this report and further correspondence as the Radium Cycle group.

C] Interest in the Land: Price Exploration Company, through H. C. Price, purchased the Radium Cycle group and other lands by "Contract of Sale" dated October 2, 1954, and recorded in Montrose County, Colorado, Book 396, Page 83.

D] Omitted.

E] Liens and Encumbrances: There are no liens, encumbrances or royalty obligations against the property, except for the 16 per cent ore payment as per "Contract of Sale" dated October 2, 1954.

F] Record of Title: All transactions affecting titles to the property are recorded in the office of the County Recorder of Montrose County, Colorado. The location dates, recording dates, book and page numbers are tabulated in Exhibit 3.

4. PHYSICAL DESCRIPTION

A] Mining or Exploration Operations: The Radium Cycle mine at the south end of the property has been mined intermittently for many years, but production figures are unavailable. The applicant herein took possession on January 1, 1955, and commenced mining operations in May, 1955, by stripping the overburden from the old workings. Mining equipment has been moved in and pillars from the old workings have been removed. A portal has been built at the new workings and mining therein is proceeding. The mine is accessible and safe for examination purposes.

B] Production and Ore Reserves: Past production figures are unavailable, but have been estimated at 6,000 tons. Current production from October 3, 1955, is proceeding at approximately 50 tons per week and ore reserves are estimated at 2,000 tons of .40 per cent uranium and 1.75 per cent vanadium.

C] Geologic Features: A geologic report is attached as Exhibit 4.

D] Accessibility: The Radium Cycle group is accessible by an unimproved road from Paradox, Colorado. Uranium processing plants are located at Naturita and Uravan, within 40 miles of the property. There are Post Offices, permanent settlement facilities and motor freight depots at Paradox, Naturita and Uravan.

E] Availability of Manpower, Equipment, Supplies, etc.: Manpower skilled in the performance of drilling planned is available in the vicinity. The equipment and manpower to be employed on the project will be personnel and equipment of Price Exploration Company and of the drilling contractor. Price Exploration Company will also furnish the technical and supervisory personnel to carry out the program in an efficient manner. Drilling water is available within a few miles of the property. No electric power is available.

5. THE EXPLORATION PROJECT

A] Minerals for which Exploration is planned: It is planned to explore for all uranium and vanadium bearing minerals. (See MF-103, Exhibit 1.)

B] Proposed Work: Locations for Phase 1 holes have been staked and roads to locations will be built. A rotary type drill will be provided by the drilling contractor. It is estimated that Phase 1 project will require one and one-half months to complete.

Proposed holes for Phase 1 are shown on Figure 4, numbered A-1 through A-33. The estimated depth of each hole is tabulated on

Schedule 2. Spacing of the holes was made on the basis of adequately testing the ore potential with due regard to favorable areas and the economics involved.

A Price Exploration Company geologist will supervise the drilling, logging, sampling and probing of each hole to be drilled. No coring is planned for Phase 1 holes because expected core recoveries should be poor in the objective formation, which is known to be fractured in this area.

The Drilling Plan would proceed with plug drilling the 33 holes of Phase 1 and would be followed with Phase 2 holes, if the results of Phase 1 warranted additional exploration.

C] Beginning and Completion Dates: (See MF-103, Exhibit 1)

D] Ability of Applicant: The Price Exploration Company is a partnership, organized July 1, 1954, and with adequate capital supplied by the partners, have acquired lands in Colorado, New Mexico, Arizona, Utah and Wyoming. A considerable amount of drilling has been, and is being done in these states. The company is now mining and producing uranium ore at the Radium Cycle and Valley View mines in the Paradox Valley of Colorado and the Colorado No. 1 at North Pumpkin Buttes in Wyoming. Another ore body in the Lukachukai Mountains in Arizona is being outlined by drilling, in preparation for mining. The managing partner is Harold C. Price, a graduate engineer, class of 1913, Colorado School of Mines. At present, his H. C. Price Company is a general constructor of oil and gas pipelines in the United States, Alaska, Canada, South America and the Middle East.

The personnel of Price Exploration Company, conducting exploration, mining and managing operations are as follows:

M. Darwin Quigley -
Doctorate in Geophysics and Geology, Cal. Tech.
Four years geophysical work with the Government.
Seven years as District and Research Geologist with the Sinclair Oil and Gas Company.
One year in Uranium exploration.

Charles W. Shannon -
Graduate geologist from University of Minnesota.
Six years mining and exploration with the St. Joseph Lead Company.
Two years in Research Geophysics with the Sinclair Research Laboratories.
One year in Uranium exploration.

W. Donald Quigley -
Consultant geologist.
Seven years with the Government in Uranium mining and Atomic Energy work.
Four years as a geological consultant in connection with oil, uranium and mining work.

George G. Travis - Operating Manager
Thirty years, drilling, producing and managing oil company business.
One year, managing uranium business.

6. ESTIMATE OF COSTS

Price Exploration Company desires that this exploration project be placed on a unit cost basis. Schedule 1 gives the exact amount bid per unit by Price Exploration Company for performing the exploration work. Schedule 2 indicates the drilling depths per hole.

A] Independent Contracts: The drilling, road and location work will be performed by independent contractors. One D-7 Caterpillar Dozer should complete drill roads and locations in fifteen days and the rotary rig will thereafter be moved in to complete the project within the specified time (See 5 (3) MF-103, Exhibit 1).

PHASE 1

1] Plug drilling, 3,469 feet @ $1.50	$5,203.50	
2] Road and location building, 15 days @ $100.	1,500.00	
Total Independent Contract, Phase 1		$6,703.50

B] Labor, Supervision, Consultants:

1] Geological supervision and expenses	$ 975.00	
2] Sampler and field assistant	900.00	
Total 6-B		$1,875.00

C] Operating Materials and Supplies:

1] Drill log reproduction and office supplies	$ 150.00	
2] Auto Expenses	150.00	
Total 6-C		$ 300.00

D] Contingencies:

1] 10% is added to cover contingencies of increased depth of holes, supervisory costs, operating materials and supplies		
Total 6-D		$ 837.50

For Summary of Costs see Schedule 1.

7. APPLICANTS SHARE OF COSTS

In accordance with DMEA regulations, Price Exploration Company is prepared to pay 25 per cent of the cost of the project in the following manner:

Price Exploration Company will perform all of the necessary work and pay for all independent contracts, labor, supervision and materials. Reimbursement by DMEA will be in accordance with Schedule 1, less 25 per cent; i.e., the amount to be loaned by the Government for each unit of work performed will be 25 per cent less than the amounts shown on Schedule 1.

Respectfully submitted,

PRICE EXPLORATION COMPANY

By George P. Travis
Operating Manager

SCHEDULE 1

Summary of Costs
Project Cost Per Foot of Hole
Basis 3,469 Feet of Drilling

		Project Cost	Unit Cost Per Foot
6.			
A]	Independent Contract		
	1] Drilling	$5,203.50	$1.50
	2] Road and Location Work	1,500.00	.43
B]	Labor, Supervision, Consultants	1,875.00	.54
C]	Operating Materials and Supplies	300.00	.08
D]	Contingencies	887.50	.25
	Total	$9,766.00	$2.80
	DMEA, 75% Share Costs	$7,324.50	$2.10
	Price Exploration Company 25% Share of Costs	$2,441.50	$0.70

SCHEDULE 2

Drilling Depths - Phase 1

Hole Number	Depth of Hole 40 Ft. in Jms	Hole Number	Depth of Hole 40 Ft. in Jms
1	54 ft.	17	155 ft.
2	140 ft.	18	60 ft.
3	90 ft.	19	145 ft.
4	50 ft.	20	155 ft.
5	90 ft.	21	90
6	180 ft.	22	40 ft.
7	260 ft.	23	90 ft.
8	65 ft.	24	135 ft.
9	165 ft.	25	140 ft.
10	55 ft.	26	90 ft.
11	55 ft.	27	135 ft.
12	150 ft.	28	90 ft.
13	90 ft.	29	125 ft.
14	50 ft.	30	75 ft.
15	40 ft.	31	125 ft.
16	180 ft.	32	65 ft.
		33	40 ft.
Total Phase 1 Drilling			3,469 ft.

EXHIBIT NO. 1

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Form Approved.
Budget Bureau No. 42-R1035.2.

RECEIVED
NOV 1-4 1954

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

Not to be filled in by applicant

Docket No. DMEA 4048
Metal or Mineral
Date Received
Estimated Cost
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: PRIOR EXPLORATION COMPANY
615 N. First Street
Grand Junction,
Colorado

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers.

(*d*) If a partnership, add to the above statement the names and addresses of all partners. See Exhibit 2.

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract See attached application, page 1.

(*b*) State any mine name by which the property is known. Radium Cycle group.

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise Owner.

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property.

(*e*) If you own the land, describe any liens or encumbrances on it There are no liens or encumbrances, except 16% ore payment, as per Contract of Sale dated October 2, 1954.

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice. See Exhibit 3.

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes.

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades.

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you. See Exhibit 4.

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points.

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore The applicant plans to explore for all uranium and vanadium bearing minerals.

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc. See attached application, pages 2 and 3.

(*c*) The work will start within 60 days and be completed within 1½ months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations.

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project:

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.).

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants.

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel.

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be.

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project.

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project.

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes.

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above.

NOTE.—No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs.

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)?

(*b*) How do you propose to furnish your share of the costs?

☐ Money ☐ Use of equipment owned by you ☐ Other

Explain in detail on acompanying paper. See attached application for heading numbers 6 and 7.

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

Dated October 15, 1955, 195__

PRICE EXPLORATION COMPANY
(Applicant)

By George R. Francis
Operating Manager

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

EXHIBIT NO. 2

Price Exploration Company is a partnership. The names, addresses and interest of partners are as follows:

Harold C. Price P. O. Box 1111 Bartlesville, Oklahoma	33-3/4 per cent
M. L. Price P. O. Box 1111 Bartlesville, Oklahoma	33-3/4 per cent
Harold C. Price, Jr. P. O. Box 1111 Bartlesville, Oklahoma	10 per cent
Joe D. Price P. O. Box 1111 Bartlesville, Oklahoma	10 per cent
E. L. Gallery P. O. Box 1111 Bartlesville, Oklahoma	5 per cent
R. K. Shivel P. O. Box 1111 Bartlesville, Oklahoma	5 per cent
Alton H. Rowland P. O. Box 1111 Bartlesville, Oklahoma	2-1/2 per cent

EXHIBIT NO. 3

Title Data

Claim Name	Recording Date	Book	Page
Radium Cycle	Jun. 28, 1948	296	421
Radium Cycle Annex	May 4, 1953	357	26
Inspiration	Nov. 6, 1954	390	538
Sam	Nov. 6, 1954	390	537

EXHIBIT No. 4

A BRIEF GEOLOGIC REPORT ON THE RADIUM CYCLE MINE AND CONTIGUOUS PROPERTY

The Radium Cycle property is in the Paradox Mining District, Montrose County, Colorado. The group is composed of four contiguous claims: Radium Cycle, Radium Cycle Annex, Sam, and Inspiration. All have been properly staked, notices posted and recorded. This property lies on the southwest flank of Carpenter Ridge in Section 8, T. 48 N., R. 19 W., approximately eight miles northwest of Paradox Store. The area is accessible throughout the year, except during extremely inclement weather.

Situated in one of the oldest vanadium-uranium provinces of the Colorado Plateau, the Radium Cycle mine has a long history of production. Originally, in the early part of the century, it was worked for radium and the ore was sent to France where Madame Curie used it in her experiments. At that time, mining was highly selective, and only that ore running ten per cent or better was taken. When radium from other sources became more important, mining ceased at the Cycle and the property lay idle until vanadium came into demand. Mining has been active most of the past decade, with the emphasis on recovery of uranium values.

Mining has consisted primarily of pillar robbing in recent years because the old workings were untenable for underground operations. As a result, most operators engaged in sporadic stripping of overburden to expose the rich pillars from which the ore could then be won. This method was practiced on a small scale until the property was purchased by the present owner. A large scope program was initiated, in which overburden was removed from the ore rim to the limits of the old workings. This will permit resumption of underground mining as soon as pillars and waste have been removed.

In the absence of any records of past production, an estimate of tonnage mined to date has been made on the basis of examination of the old workings. A figure of approximately 6,000 tons has been calculated, with an estimated average

value of 0.40 per cent U_3O_8 and 2.4 per cent V_2O_5.

STRATIGRAPHY

The property lies along the deeply dissected wall of Paradox Valley, which has a relief of about 3,000 feet. Consequently, a considerable section of stratigraphy is exposed, ranging in age from Permian on the valley floor to Cretaceous at the top. Figure 2 is a geologic index map of the northwest end of Paradox Valley, and shows the areal distribution of these formations. The Cycle property contains, primarily, outcrops of the Brushy Basin shale and Salt Wash sandstone members of the Morrison (Jurassic) formation. For the most part, the Brushy Basin shale section remaining is less than 150 feet in thickness.

The Salt Wash member, which is the ore objective, is composed of four sandstone beds or benches, separated by interbedded green and red shales and siltstones. These benches are lenticular, cross-bedded, fluviatile sandstone deposits of gray to brown color. The bottom and top benches are generally about twice as thick as the intervening benches, averaging near 40 feet. The entire Salt Wash section is about 180 feet thick in this area.

LITHOLOGY

Benches of the Salt Wash member are composed of fine to medium, frosted, sub-angular sand grains. Minor constituents are bentonite, feldspar, hematite, and tuff. In the Cycle area, about five per cent of the sand grains have a light red color. Sorting improves upward through the section, and the top bench may be classed as moderately well-sorted. Intercalated thin clay beds have a notable content of red and green clay gauls and these also extend into the sand.

$CaCO_3$ content runs as high as ten per cent in the top bench, and one highly calcareous zone about 6 feet thick, near the middle of this sand, contains 30 per cent carbonate.

Abundant carbonaceous material is present, as well as numerous trees and dinasaur bones.

STRUCTURE

Paradox Valley is one of the classic collapsed salt anticlines of the Colorado Plateau, and as a result, faulting is a common feature along the present valley walls. As shown on Figure 2, the Cycle group lies in a zone of rather complex faulting and shearing. Most of the faults are normal, and their traces are roughly parallel in a northwest trend. Some cross-faulting may be present, but none can be delineated.

Figure 3 is a topographic and areal geologic map of the claims and adjacent area. Fault I, shown on this map, is the major fault down to the south, with a displacement of 125 feet. Fault II is a very minor break, with 3 feet of throw. It, also, is down to the south. The next fault, III, has 30 feet of displacement up to the south. Fault IV is down to the south, with a throw of 10 feet. The last one pertinent to the area is Fault V, which is up to the south with a throw of 105 feet. In essence, this system constitutes a graben. The fault planes all dip 70 to 80 degrees, and apparently the lesser ones coalesce at moderate depth. Faults I and V are the bounding fractures and the others are a result of differential movement of the faulted block.

Relative movement of strata, south of Fault V and north of Fault I, is negligible. In fact, their positions are in accord with the regional dip. It is reasonable to attribute the formation of the graben to adjustment of the block between the bounding tension fractures. The latter, no doubt, resulted from collapse of the anticline.

This area is on the northeast flank of the pre-collapse anticlinal structure, and has an average regional dip of about 4 degrees to the north. The individual fault blocks display somewhat steeper inclination, averaging about 7 degrees, with strike varying 10 to 30 degrees from east. Differential slip of the various blocks has caused deviation of dip, but, in general, the strata retain a vestige of the original north dip.

Regional thinning of formations on the flank of the anticlinal structure is not evident, but local variation of Salt Wash sandstone benches is much in evidence. This latter feature, as discussed earlier, results from the lenticular nature of this formation.

Intra-formational structures consist of "rolls" and undulations in the sand beds accompanied by shale partings. The latter tend to drape the irregular surface of this underlying sand layer; in some places, thickening where the clay fills in scour channels; other places, showing no variance with top and bottom contour essentially parallel. Generally, these features are discontinuous and bedding planes are highly irregular.

MINERALIZATION

It has been reported that the original discovery of mineralization was made in the bottom Salt Wash bench, but this has not been substantiated by observation. Showings have been found at this horizon elsewhere in the district, but all commercial ore bodies are in the top bench, and the Radium Cycle mine is no exception. Normally, ore occurrences in the Salt Wash sandstone are associated with an underlying green clay or shale. This relationship is not dominant at the Cycle, although it does exist in portions of the ore bodies. The calcareous zone referred to in the discussion of lithology is of universal significance here, in that the main ore accumulation terminates on this layer. It is true that the calcareous zone contains some small bodies of commercial mineral, and in numerous places is overlain by a green shale mantle, but it is equally true that no ore exists below this layer. In another respect, the Cycle ore body departs somewhat from usual Salt Wash occurrence. Instead of being at or near the bottom of the bench, it lies about halfway up, which is also the position of the calcareous layer. The seeming emphasis placed on this facet of the mineralization is not intended to evolve into a discussion of depositional theory, but is rather pointed out as a possible guide to exploration.

Carnotite and dark vanadium minerals are the dominant source of values. The ratio of V_2O_5 to U_3O_8 is approximately 5 to 1 in mine run ore. Three types of ore are found: [1] disseminated ore, which commonly displays a spotty segregation of yellow and dark minerals, locally called "rattle-snake" ore; [2] soft, high-grade concentrations of only carnotite in streaks of several inches to several feet (this may assay as high as 15 per cent U_3O_8); [3] trees and occasional bones replaced by carnotite. Associated with the ore is abundant carbonaceous material, and varying amounts of manganese mineralization. Mud gauls are common in the enclosing sandstone.

The ore body most extensively mined lies in the horst block within the graben. Each of the blocks have some degree of mineralization, as shown by the lettered hatched areas in Figure 3, and this rather widespread distribution of "shows" and ore strongly suggests the existence of additional commercial accumulations. The areas "A", "B" and "C" of Figure 2 have been or are being actively mined and, as noted previously, about 6,000 tons have been produced from area "A". At "D", a rich tree yielded about 500 pounds of high grade ore. Showings at "E" and "F" have not been explored.

SUMMARY AND CONCLUSIONS

The Radium Cycle mine has had a long history of production, and a substantial amount of ore still remaining is indicated by the exposures of mineralization in the old workings. The fact that the known ore seems to be confined to one "roll", coupled with the existence of mineral showings elsewhere, strongly suggests the presence of other ore bodies similar to those presently exposed.

The dominant structural feature, aside from the faulting which is evidently post-mineral, is the pre-collapse anticline. It is known that anticlinal structures have some influence on deposition, since many ore deposits are found on the limbs of such features.

The lithology of the Salt Wash sand member is that of sediments of

fluviatile origin, and indicative of flood-plain deposition. Inter-stratified shales which drape the scoured and reworked sand surfaces, abundant carbonaceous material, logs, and dinosaur bones provide a copious source of precipitating agents.

The Salt Wash sandstone has dominantly a gray to buff color, rather than red, and this is a highly favorable indication that mineralizing solutions have permeated the area.

These geologic features of the area lend credence to the conclusion that ore potential is exceedingly good, and the following exploration program is unequivocally recommended.

EXPLORATION

A drilling program should be undertaken, which will most propitiously explore the area. The Radium Cycle and Inspiration claims are the only ones which have good potential for upper Salt Wash mineralization. As shown in Figures 2 and 3, the suggested drill hole locations may be divided into three groupings as a first phase program.

1. The Inspiration claim contains three locations on 500-foot centers from which the favorability of the formation, from the standpoint of lithology, can be determined. It is not expected that these few holes would locate an ore body, but the criteria attendant to mineralization should manifest themselves. While it would be advisable to employ a more dense pattern, this part of the area is of less immediate importance and more intensive search can be conducted in a second phase of exploration.

2. The north half of the Radium Cycle claim is to be drilled on a pattern of 250-foot spacing. Most of this area is on the upside of the main fault and is covered with Brushy Basin shale of the Morrison formation. Mineralization occurs at "F" in Figure 2, and drilling on the adjacent property to the east has shown mineralization also. It is felt that this portion of the area

should be explored with a density of drilling that provides a fair chance to locate possible ore bodies.

3. Of most importance is the south half of the Radium Cycle claim, since most of the known mineralization occurs there. The logical program in this portion of the area is to locate "rolls" parallel to, or otherwise related to that of the mine. It is evident from the size and configuration at the known ore bodies that a hole spacing of 125 feet is optimum to insure finding deposits of the expected size.

A second phase program should be conducted on 125 foot hole spacing throughout the entire area. It is obvious that a considerable number of the holes in such a pattern would not be drilled since second phase exploration would center around holes of the first phase which showed the more favorable criteria.

As outlined above, the first phase program would entail drilling 33 holes with a total footage of 3,469 feet. The second phase would consist of a maximum of 50 additional holes of an estimated footage of 5,250 feet.

Charles W. Shannon,
Geologist

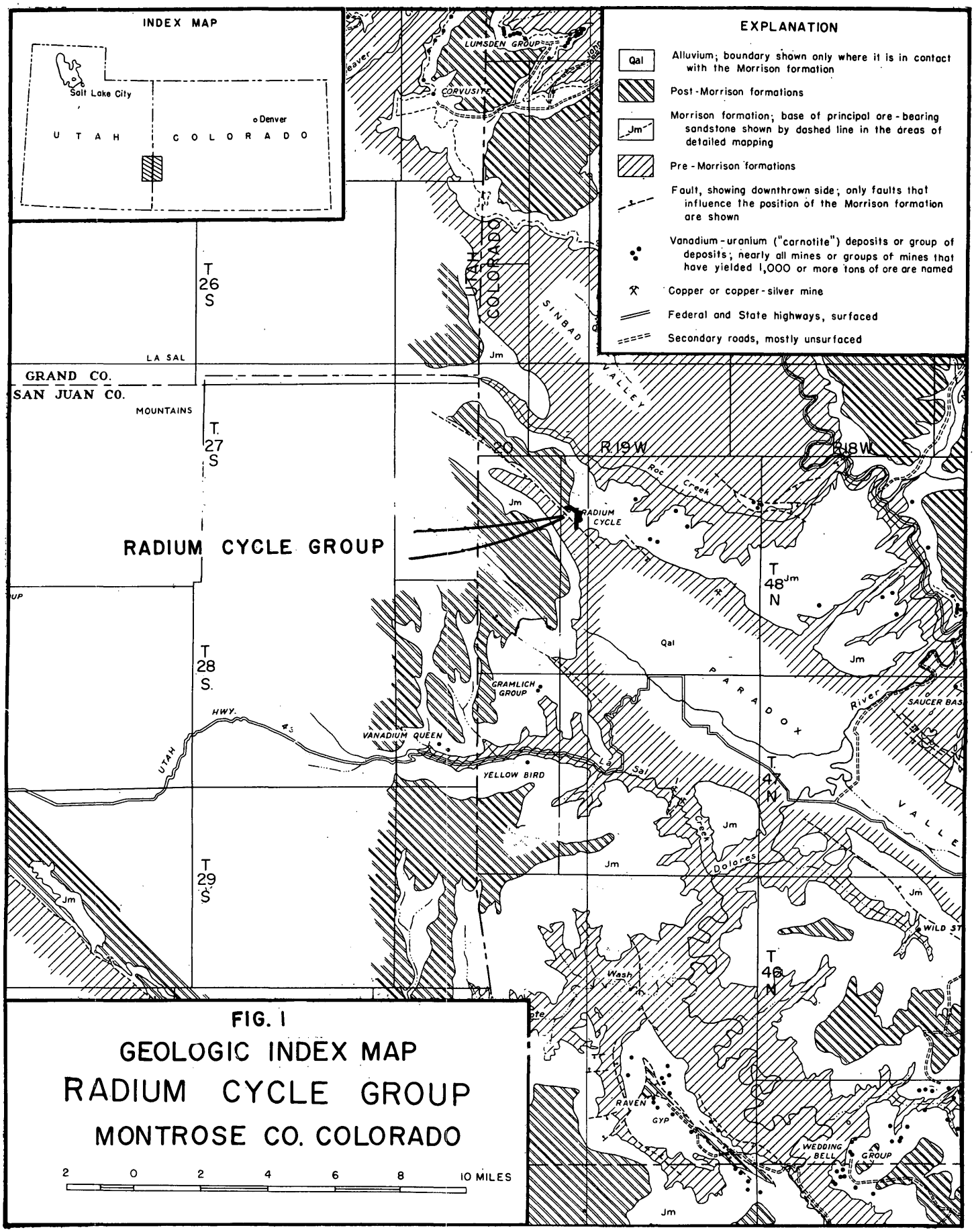


FIG. 1

GEOLOGIC INDEX MAP

RADIUM CYCLE GROUP

MONTROSE CO. COLORADO

2 0 2 4 6 8 10 MILES

4048

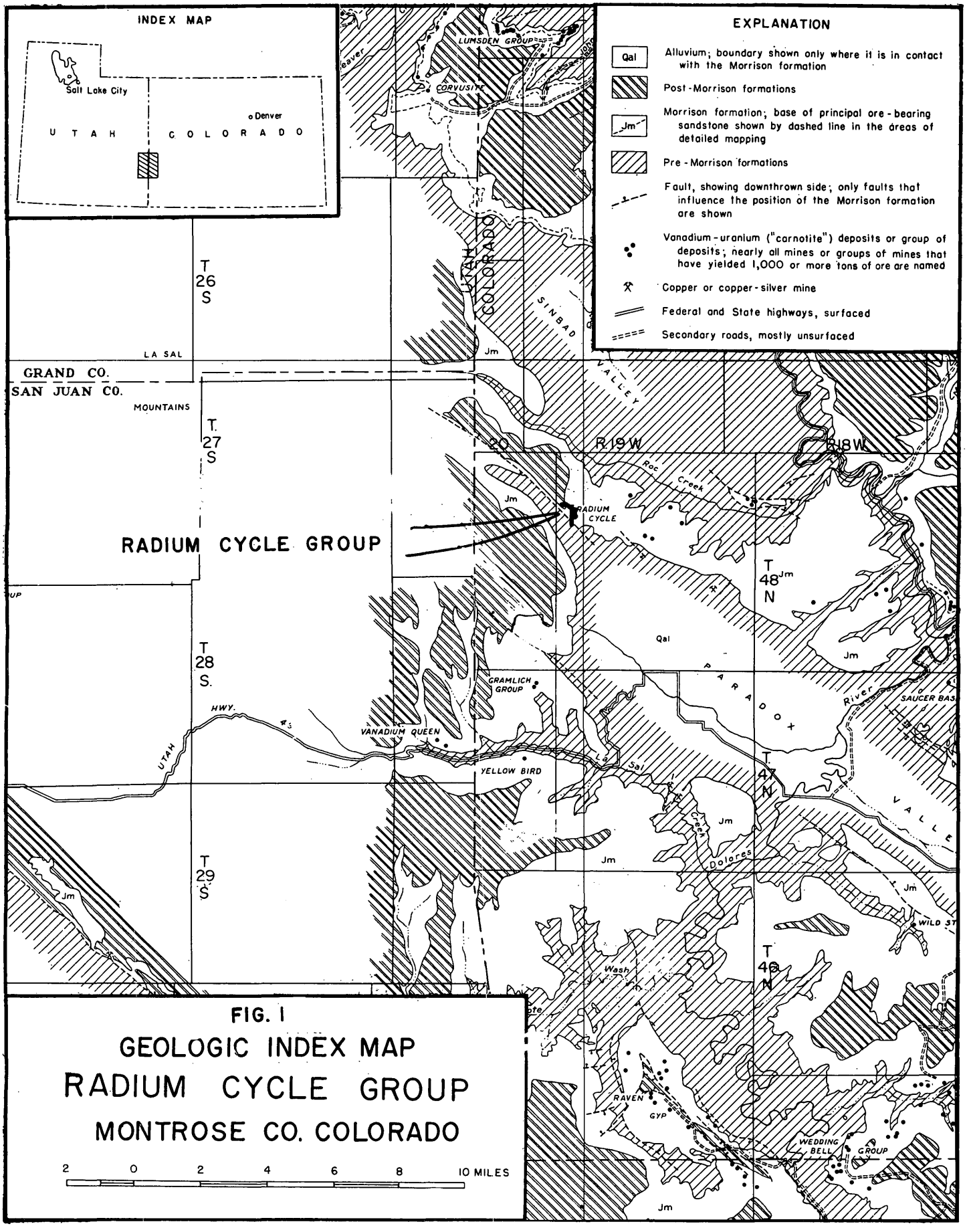
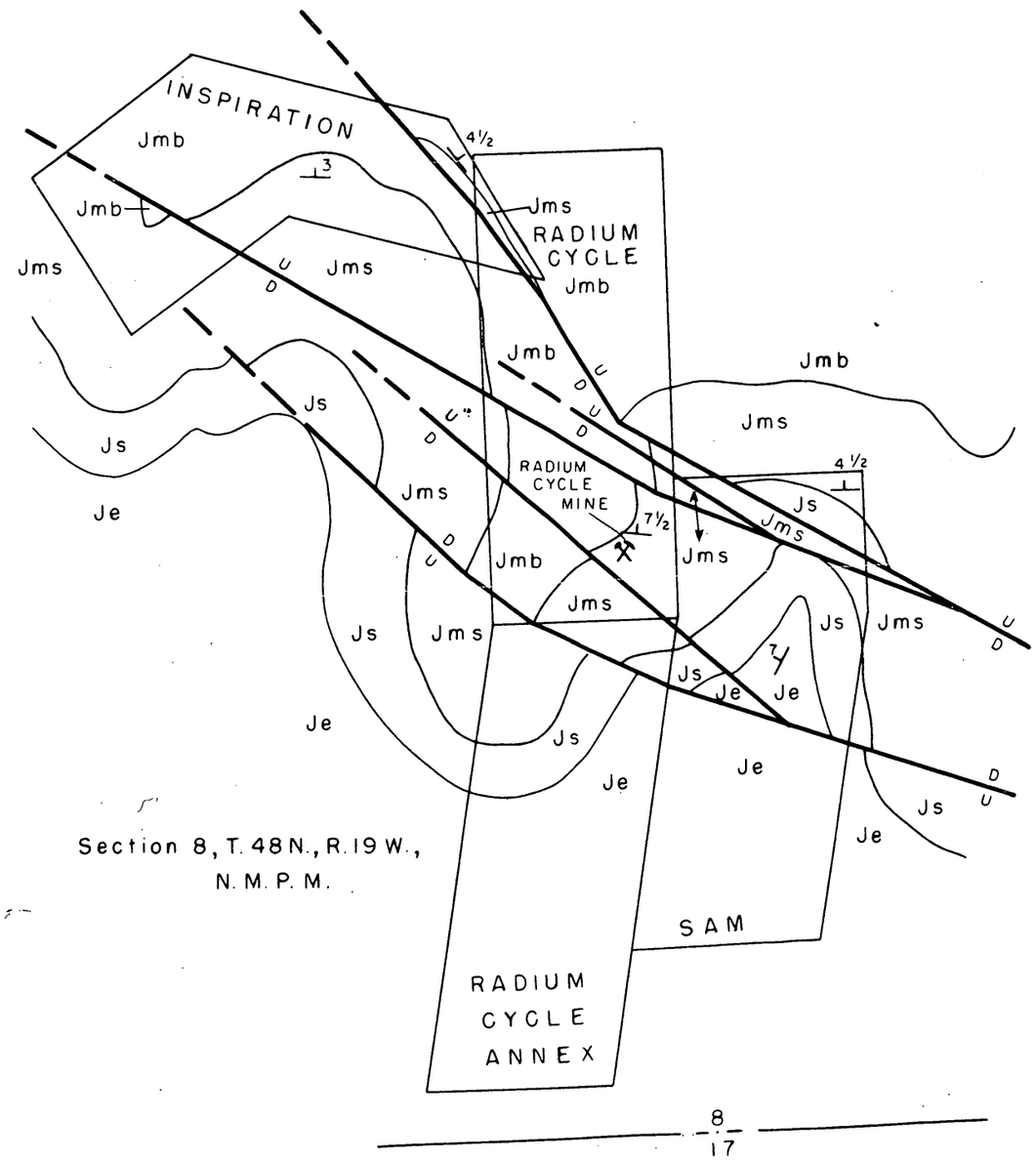


FIG. 1
GEOLOGIC INDEX MAP
RADIUM CYCLE GROUP
MONTROSE CO. COLORADO



EXPLANATION

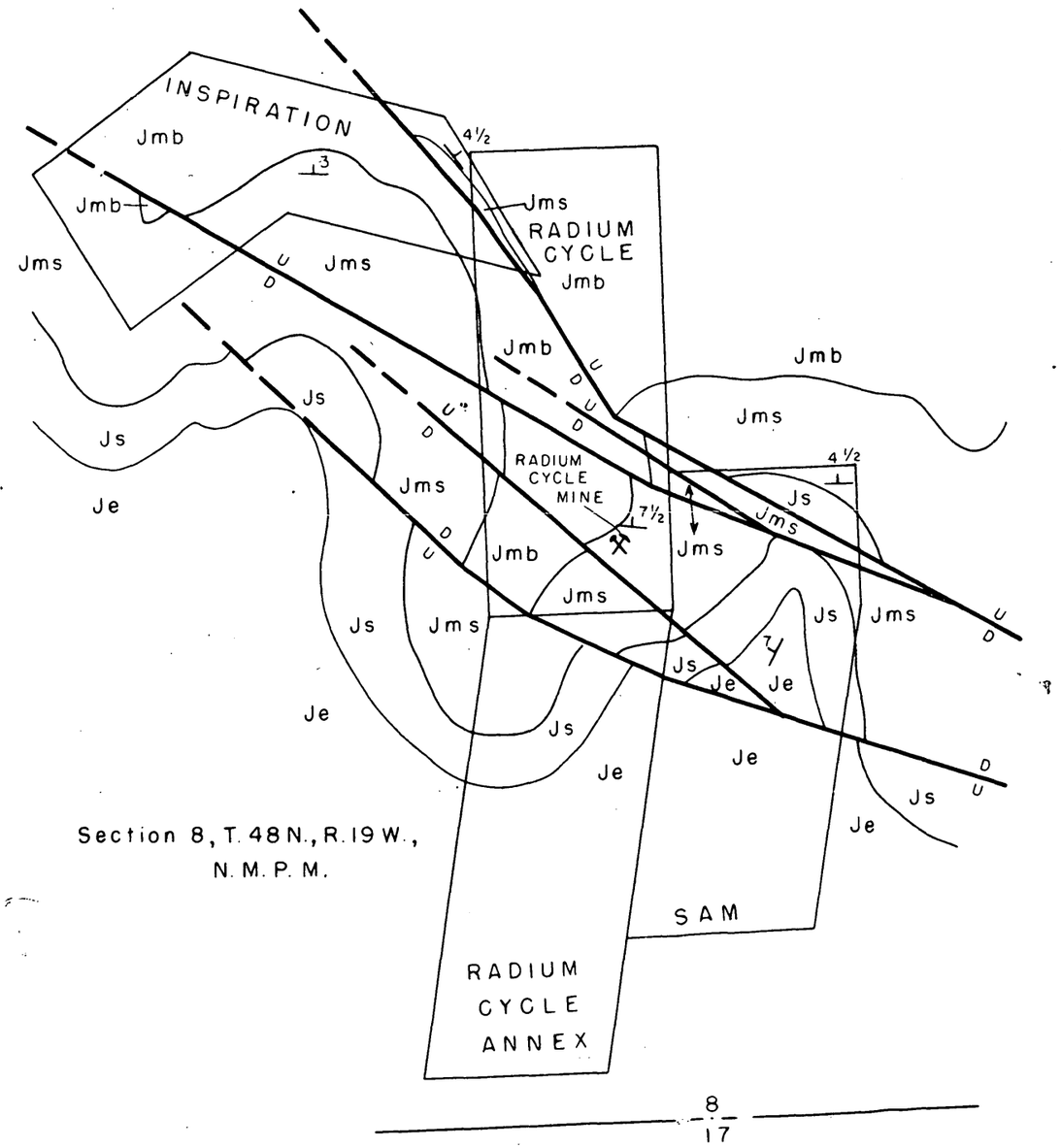
Jmb	BRUSHY BASIN MEMBER OF JURASSIC MORRISON FORMATION
Jms	SALT WASH MEMBER OF JURASSIC MORRISON FORMATION
Js	JURASSIC SUMMERVILLE FORMATION
Je	JURASSIC ENTRADA SANDSTONE
	GEOLOGIC CONTACT
U D	FAULT, SHOWING RELATIVE MOVEMENT
3	STRIKE AND DIP OF BEDS

Note: BASE MODIFIED FROM APPLICANTS MAP.

N

500 0 2000 FEET

FIGURE 2. GEOLOGIC MAP SHOWING RADIUM CYCLE GROUP OF CLAIMS, PRICE EXPLORATION, COMPANY, MONTROSE COUNTY, COLORADO.



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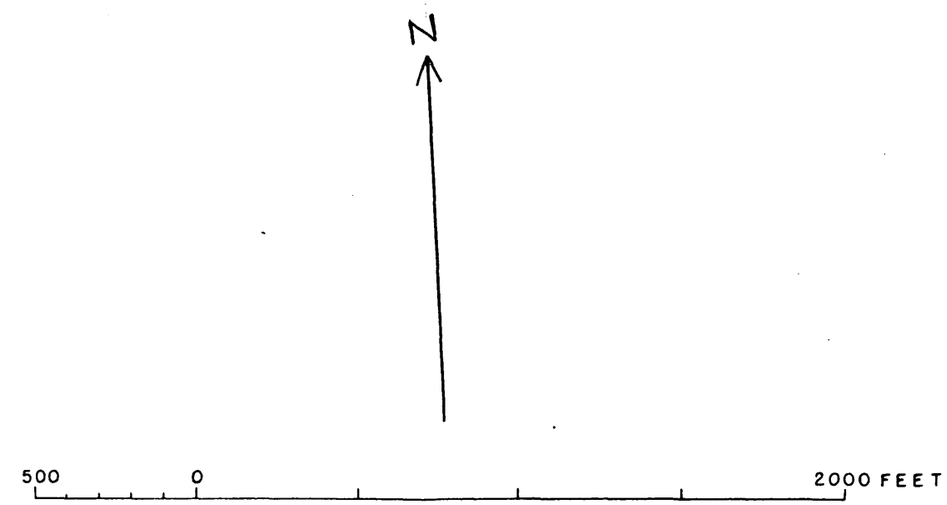

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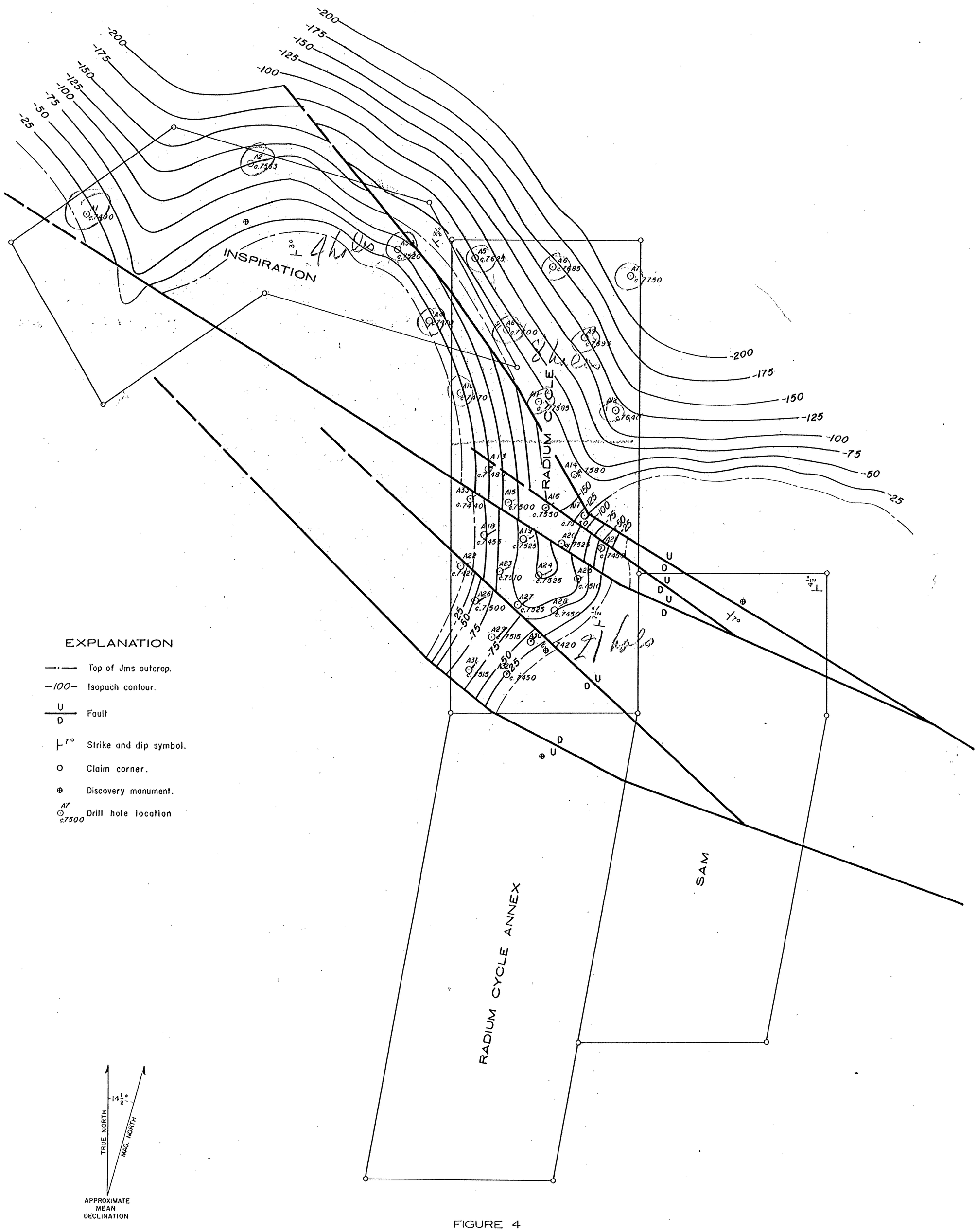

FIGURE 4

PRICE EXPLORATION COMPANY

RADIUM CYCLE GROUP

PARADOX MINING DISTRICT

Sec. 8., T. 48 N., R. 19 W.

MONTROSE COUNTY, COLORADO

ISOPACH MAP OF BRUSHY BASIN—
SURFACE TO TOP OF SALT WASH OUTCROP

(September, 1955)

SCALE 200 0 200 400 FEET

Isopach contour interval = 25 feet.