DMA Form 1

DEFENSE MINERALS ADMINISTRATION
Control Slip

CONTROLLED DOCUMENT

DMA Docket No. 3694

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Action on this document is recorded and controlled in Reports and Records Branch. Any movement of this document between divisions or offices of DMA or movement outside DMA must be reported to the Reports and Records Branch. Actions taken that affect status of the case must also be reported.

Cys to USBM, USGS, and Reg. III.

This document has been recorded as

Exploration

Any action taken to change the type of request for assistance must be promptly reported to the Reports and Records Branch. Use DMA Form 2 for submitting these reports.

Routing Slip

To:	700	Date	2/23/55
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Surname 700

Ellis

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

JUL 2 7 1955

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

Re: Docket No. DMEA-3694 (Uranium)
Willow Basin Claims
Montrose County, Colorado

Dear Mr. Travis:

This will acknowledge receipt of your letter dated July 23, 1955, implying that you desire to withdraw the subject application, and advising you will probably reapply for DMEA assistance if present work that you are conducting on the above-named property warrants it.

Accordingly, we are closing this docket on our records.

Sincerely yours,

C. O. Mittendorf

Administrator

EWEllis:am
7-26-55
cc to: Admr. Reading File
Docket
Messrs. J. E. Crawford, Rm. 3641
T. H. Kiilsgaard, Rm. 5222
J. O. Hosted, Rm. 3210, GSA
Code 700 - Mr. Ching
DMEA Field Team, Region III(2)

R.C.S.

7/25/55 gla

RECEIVED
JUL 25 1955

PRICE EXPLORATION COMPANY

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

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

July 23,1955.

Mr. Ernest W. Ellis, Chief,
Rare and Miscellaneous
Metals Division.
D. M. E. A.
Washington 25, D. C.

Re: Docket No.DMEA-3694 Ur.
Willow Basin Claims
Montrose Co, Colorado.

Dear Mr. Ellis:

Since filing DMEA application for the above captioned claims, we have drilled and cored 2734 feet of hole, with more or less negative results.

It is our plan to run several geological and geophysical suveys, and if the results should then warrant, we will drill and core additional confirmation holes. Then if the results are favorable, we will reapply for DMEA.

Sincerely yours,

Price Exploration Co.

by George Travis

700

Surname copy

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

JUN 2 4 1955

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

Re: Docket No. DMEA-3694 (Uranium)
Willow Basin Claims
Montrose County, Colorado

Dear Mr. Travis:

Your attention is directed to our letter of March 18, 1955, and your response of March 28 wherein you advised that you were making preparations for the drilling of a few preliminary holes for the purpose of securing more positive geological data on the subject property. You also stated that if the results were satisfactory you would supply such data to our field representative and request our reconsideration of the subject application.

Inasmuch as we have received no further information from you, we assume that you no longer desire to proceed with the application. We wish to cooperate with you in the matter of allowing ample time, but if the needed data has not been received within thirty days from the date of this letter, we will then consider the docket closed.

Sincerely yours,

SIGNED

Ernest Wm. Ellis, Chief
Rare and Miscellaneous
Metals Division

MChing/gla
6-23-55
cc to: Admr.'s Reading File
Docket
Messrs. J. E. Crawford, Rm. 3641
T. H. Kiilsgaard, Rm. 5224
J. O. Hosted, Rm. 3210, GSA
Code 700
Mr. Ching
DMEA Field Team, Region III (2)

R.L.

Surname 700

Ching
Ellis
Selfridge
Johnson
Hedges

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

APR - 4 1955

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

Re: Docket No. DMEA-3694 (Uranium)
Price Exploration Company
Willow Basin Claims
Montrose County, Colorado

Dear Mr. Traver:

Reference is made to a letter written by Mr. Ernest Wm. Ellis, Chief, Rare and Miscellaneous Metals Division to Mr. George G. Travis, Operating Manager of the above-named company, under date of March 18, 1955, copies of which were forwarded to you.

For your information we are forwarding a copy of Mr. Travis' reply. As indicated in our letter to the Applicant, we will withhold further action on this application until additional information is received either directly from the Applicant or through your office.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (JB)

Enclosure

APPROVED:

J. H. Hedges
Member, Bureau of Mines (JB)

/s/ R. D. Trace
Member, Geological Survey (JB)

MChing:am
3-30-55
cc to: Admr. Reading File
Operating Committee
Docket
Messrs. J. E. Crawford, Rm. 3641
T. H. Kiilsgaard, Rm. 5224
J. O. Hosted, Rm. 3210, GSA
Mr. Ching
Code 700

R.C.B.

3/30/55 gla

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAR 29 1955

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

March 28, 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

Mr. Ernest Wm. Ellis, Chief
Rare and Miscellaneous Metals Division
Defense Minerals Exploration Administration
Department of the Interior
Washington 25, D. C.

Re: Docket No. DMEA-3694 (Uranium)
Willow Basin Claims
Montrose County, Colorado

Dear Mr. Ellis:

Thank you for your letter of March 18th in re our application for DMEA aid on the above captioned property.

This is to advise that we are now making preparations for the drilling of a few preliminary holes for the purpose of securing more positive geological data in regard to both mineralization and stratigraphy. Drilling will commence within two weeks, depending upon when the snow goes out. We will be pleased to keep your field representative advised as to our progress and he will be furnished with the data derived from this operation.

If the results are satisfactory, we will then request your reconsideration of our pending DMEA application.

Sincerely yours,

PRICE EXPLORATION CO.

George Travis

by George Travis, Manager

GGT:Rb

Surname 700
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Matteson

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

MAR 1 8 1955

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

Re: Docket No. DMEA-3694 (Uranium)
Willow Basin Claims
Montrose County, Colorado

Dear Mr. Travis:

We have reviewed your application for aid in an exploration project and have concluded that it contains insufficient information of a favorable nature to justify further processing at this time.

We note particularly that there are no exposures, mine workings, or old drill holes on the property which might yield favorable geological information, and the favorable Salt Wash member of the Morrison formation is covered by a considerable thickness of Brushy Basin sediments. The nearest known mineralization appears to be on the Gramlich group of claims, about two miles to the south.

Under these circumstances you may wish to drill a few preliminary diamond drill holes for your own account in order to secure more conclusive evidence of the presence of mineralization or other favorable geological factors on your property. Pending word from you in this regard we shall hold your application in abeyance. However, it would be appreciated if you would advise us as soon as possible whether or not it is your intention to do such preliminary work as it would not be possible for us to hold your application in abeyance indefinitely.

Sincerely yours,

SIGNED

Ernest Wm. Ellis, Chief
Rare and Miscellaneous
Metals Division

MChingham
3-18-55
cc to: Admr. Reading File
Docket
Messrs. J. E. Crawford, Rm. 3641
T. H. Kiilsgaard, Rm. 5224
J. O. Hosted, Rm. 3210, GSA

Code 700
DMEA Field Team, Region III(2)

R.A.G.

3/15/55 gla

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

Defense Minerals Administration
RECEIVED
MAR 15 1955

March 14, 1955

Memorandum

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

From: Bureau of Mines Member
Uranium Commodity Committee

Subject: DMEA Docket 3694, Price Exploration Company,
Paradox Mining District, Montrose County, Colorado

I have reviewed the attached application of the Price Exploration Company, DMEA Docket 3694, and have discussed it with Joseph O. Hosted, Washington representative of the Atomic Energy Commission.

We agree that approval of the application be withheld for lack of interesting uranium mineralization or favorable geologic guides which might lead to discovery of a uranium occurrence.

It is suggested that the applicant put down a few holes at his own expense to obtain some definite information regarding the presence and dimensions of favorable geologic horizons. At the conclusion of such a project the applicant might submit the supplemental data to DMEA for study.

J. E. Crawford
J. E. Crawford

Attachment

Copy to: Branch of Rare and Precious Metals
Division of Minerals
J. O. Hosted (2)
J. E. Crawford (2)

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

March 14, 1955

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

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J. E. Crawford

Attachment

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Division of Minerals
J. O. Hosted (2)
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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

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J. E. Crawford

Attachment

Copy to: Branch of Rare and Precious Metals
Division of Minerals
J. O. Hosted (2)
J. E. Crawford (2)

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO :

DATE:

FROM :

SUBJECT: DMEA-3694 - Price Exploration Company
Estimated Cost 166,983.25

No Signs of mineralization or other favorable geologic guides
Suggest applicant put down a few holes at his own expense to obtain some definite information regarding presence & dimensions of favorable horizons.

3/2/55-gla

IN REPLY REFER TO:

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

February 28, 1955

Re: DMEA-3694
Price Exploration Co.
(Willow Basin Claims)
Montrose Co., Colo.
$166,983.25 - Uranium

Memorandum

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

From: E. L. Newcomb, U. S. Geological Survey

Subject: Review of application

The applicant has proposed a two-stage drilling project which will consist of 25,315 feet of non-core drilling and 14,400 feet of core drilling on 15 claims in the West Paradox mining district. The total program will involve 120 holes; however, an initial phase of 12 holes is planned to determine whether uranium mineralization is present on the operator's claims. In the event that favorable evidence is not found by this preliminary drilling, the remainder of the program will not be completed.

The objective of the proposed drilling is to test the Salt Wash member of the Morrison formation. The depth of the holes will increase as drilling progresses toward the northeast and will range from 195 feet to 445 feet. All of the first stage holes will collar in the Brushy Basin member. They will bottom at 120 feet below the Salt Wash-Brushy Basin contact.

There are no outcrops of the Salt Wash on the claims and no evidence presently available which indicates that uranium mineralization is present. The nearest known mineralization is on the Gramlich group of claims which is about 2 miles south of the Willow Basin claims.

On the basis of our present information, the applicant's proposal is prospecting. The initial 12 holes will serve to indicate whether more extensive exploratory drilling is warranted. This type of project is "wildcatting" and is not the type of program which should be assisted with DMEA funds.

This application should be sent to the Grand Junction office for a review based on data they may have in their files, but I do not recommend a request be made for a Field Team on-site examination.

On February 25th, this application and DMEA-3695 were discussed with Mr. G. G. Travis and Mr. W. D. Quigley in the Survey DMEA office. Mr. Travis is an engineer with the Price Exploration Co. and Mr. Quigley is a consulting geologist for both the Price Exploration Co. and the Yankee Uranium Co. The applications were briefly discussed, but no specific suggestions or recommendations were made regarding the two exploration projects.

E. L. Newcomb

E. L. Newcomb

IN REPLY REFER TO:

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

February 28, 1955

Re: DMEA-3694
Price Exploration Co.
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Montrose Co., Colo.
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E. L. Newcomb

ELNewcomb:hlm
G-2/28/55

Copy to: Director's reading, 4212
Branch reading, 4212
DMEA (3)
Docket file
J. E. Crawford, 3641 Interior

IN REPLY REFER TO:

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

February 28, 1955

Re: DMEA-3694
Price Exploration Co.
(Willow Basin Claims)
Montrose Co., Colo.
$166,983.25 - Uranium

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From: E. L. Newcomb, U. S. Geological Survey

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E. L. Newcomb

ELNewcomb:hlm
G-2/28/55

Copy to: Director's reading, 4212
Branch reading, 4212
DMEA (3)
Docket file
J. E. Crawford, 3641 Interior

IN REPLY REFER TO:

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

February 28, 1955

Re: DMEA-3694
Price Exploration Co.
(Willow Basin Claims)
Montrose Co., Colo.
$106,983.25 - Uranium

Memorandum

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

From: E. L. Newcomb, U. S. Geological Survey

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E. L. Newcomb

ELNewcomb:hlm
G-2/28/55

Copy to: Director's reading, 4212
Branch reading, 4212
DMEA (3)
Docket file
J. E. Crawford, 3641 Interior

February 23, 1955
Subject: DMEA 3694
Re: Exploration Assistance
Willow Basin Claims

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

Gentlemen:

The receipt of your application dated January 25, 1955 for exploration assistance under the Defense Production Act of 1950, as amended, is hereby acknowledged.

Your application has been assigned Docket Number DMEA 3694 and referred to the Rare and Miscellaneous 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

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
FEB 23 1955

APPLICATION FOR DMEA PROJECT ON

WILLOW BASIN

January 25, 1955

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

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I N D E X

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2. GEOLOGICAL SECTION AND CONTOUR MAP.

APPLICATION FOR DMEA PROJECT ON THE WILLOW BASIN CLAIMS
FOR
PRICE EXPLORATION COMPANY
615 N. First Street
Grand Junction, Colorado

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
FEB 23 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 $64,473.75 project to determine the amount of uranium mineralization and will consist of 15,555 feet of drilling and coring, at an estimated unit cost of $4.20 per foot. Phase 2 will be dependent upon the results of Phase 1, and if commenced, will be a $102,509.50 project to explore the potential uranium deposits on the subject lands, (See Fig. 1) and will consist of 24,160 feet of drilling and coring, at an estimated unit cost of $4.20 per foot. Twenty-five percent of Phase 1 or $16,118.44 of the total expenditure of Phase 1, and twenty-five percent of Phase 2 or $25,627.37 of the total expenditure of Phase 2, will be paid by the Price Exploration Company, the applicant herein; the Defense Minerals Exploration Administration is asked to loan the balance of $48,355.31 for Phase 1 and the balance of $76,882.13 for Phase 2.

Locations for forty-seven holes are suggested for Phase 1 and are shown on Fig. 2. These locations are on 500 foot centers in a hexagonal pattern and were selected and limited to that part of the property where the depth of the objective ore horizon is well within economic reach of exploration and development operations. Obviously, as drilling progresses, it will become evident that some of the proposed holes will prove to be in areas that are geologically unfavorable for ore. Therefore, Price Exploration Company would like the privilege of deciding whether or not locations in unfavorable areas shall be drilled. It is further requested that, with permission of the DMEA Field Team, the equivalent footage of holes eliminated be transferred to additional locations in the more favorable portions of the area.

3. PROPERTY RIGHTS

A) Legal description
The land on which the exploration work is to be performed consists of 15 contiguous unpatented mining claims, 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 Willow Basin Claims.

C) Interest in the land -

Price Exploration Company purchased all rights to the 15 claims from the original locators, Juddy Johnson, Earl Chiles, Golda Chiles, John Blair, Harold Stephens and Charles Shannon.

D) Omitted.

E) Liens and encumbrances -

There are no liens, encumbrances or royalty obligations against the property.

F) Record of Title -

All transactions affecting titles to the claims 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.

The mining deeds, conveying all of the claims to Price Exploration Company have been recorded, and abstracts of title have been certified to January 4, 1955, by the Montrose County Abstract Co.

4. PHYSICAL DESCRIPTION

A) Mining or Exploration Operations -

There are no mining workings on the claims. There has been no previous drilling on the claims by the U.S.G.S., AEC, or other agencies. The applicant has no knowledge of any drilling program being contemplated in the Willow Basin area by the aforementioned agencies.

B) Production and Ore Reserves -

There has been no past production and at present there are no proven ore reserves on the Willow Basin property.

C) Geologic Features -

A geologic report is attached as Exhibit 4.

D) Accessibility -

The Willow Basin claims are accessible by an unimproved road from Paradox, Colorado, five miles to the southeast. This road is shown as it crosses the claims on Fig. 1. Vanadium Corporation of America has a processing plant at Naturita, Colorado, 35 miles southwest via State Highway 90. The United States Vanadium Company processing plant is located 20 miles east via State Highway 90 and the Dolores River Canyon road.

Supplies for exploration and mining and all necessary equipment can be obtained at Uravan or Naturita, Colorado, and at Moab, Utah. There are Post Offices, permanent settlement facilities, and motor freight depots at these places. Paradox, Colorado also has a Post Office and motor freight service.

E) Availability of Manpower, Equipment, Supplies, etc. -

Manpower skilled in the performance of the type of drilling planned is readily available in the vicinity. Most of 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 and economical manner.

Water for drilling and coring will be hauled from the Buckeye Reservoir some five miles north of the area, or from a closer point along West Paradox Creek, if the latter maintains sufficient flow. No electric power is available at present, but no power is contemplated in the exploration phase. The San Miguel Power Association Inc. is erecting a 44,000 volt transmission line through Paradox and up La Sal Creek. This line is within five miles of the Willow Basin Claims and will be completed by the time any mining operations would begin.

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 -

The drills for the project will be provided by Dawn Drilling and Mining Company, and by Price Exploration Company. It is anticipated that the project will require approximately eight months to complete, in the event that mineralization is found in more than one of the Phase 1 holes. Two drills on this project can afford satisfactory progress, and permit adequate geological control to be maintained by the available personnel.

Proposed holes are shown on Fig. 2, with estimated depths for each location. There are locations for 47 holes plotted, which constitute the Phase 1 exploration plan. The experience of operators in this district has proven that one hole per acre is required to adequately evaluate ore potential. It is impossible to outline an economical and intelligent program of drilling on that basis until mineral indications and possible trends have been determined by the more widespaced drilling. Therefore, Phase 2 is planned to follow up indicative mineral finds of Phase 1. In this second phase, hole spacing will be reduced in conformity with the hexagonal pattern of Fig. 2. These subsequent holes will be located on the basis of geological information as drilling progresses. Mineral trends will be delineated with a minimum of holes, but the pattern will be reduced until adequate information has been obtained to properly evaluate the ore potential. Phase 2, if carried to completion over all of the claims, would require 240 holes. It is unlikely that mineralization will be found throughout the area, and it is estimated that the total can be reduced substantially. It is requested, therefore, that the DMEA contract allow 120 holes to be drilled on the Willow Basin Claims. Moreover, it is requested that the location of the 73 or more Phase 2 holes be made with the approval of the DMEA Field Team, after sufficient geological data has been accumulated from the drilling of Phase 1 holes.

Logging and Sampling - A sampler will be employed to supervise the logging and sampling of cores. An accurate log will be kept by the field geologist. Cores from each run will be carefully removed from the core barrel by the driller and placed in compartmented core boxes and properly marked as to hole number and depth. These cores will be stored at the drill site so that they will be preserved intact and will be available for inspection by supervisory personnel and DMEA Field Team members. The geologist will sample mineralized core, as determined at the site by a field gamma ray detecting device, and carefully describe it in a bound field book as the sample is placed in the sample bag. Core losses will be recorded where they appear in the section and prorated otherwise with regard to lithology. No more than one foot of core will be included in one sample. All samples will be sent to a commercial laboratory for analysis of U_3O_8, V_2O_5 and $CaCO_3$ content.

In addition to core classification, each hole will be radiometrically logged with a gamma ray detection probe to determine the presence of mineralization that may lie adjacent to the hole. These logs will be used for stratigraphic correlations in conjunction with the core data.

Geologic control of Drilling - Price Exploration Company asks the privilege of not drilling any of the proposed holes shown in Fig. 2, if, in the opinion of the technical personnel of Price Exploration Company, they fall in an area which, based on previous drilling, is considered unfavorable for mineralization. The footage thus saved would be used in more favorable areas in Phase 2. This would be done with the approval of the DMEA Field Team. The criteria used to determine unfavorable indications will be, in general, the same as that used by the USGS and AEC in their drilling programs, as discussed in USGS Bulletin 988B.

The Drilling Plan -

1. The drilling plan would proceed with 12 holes to be drilled in accordance with the hexagonal pattern, but well scattered over the entire 15 claims. In the event that unfavorable stratigraphic conditions and lack of indications of possible mineralization were found in each of the holes, then with the full appraisal and agreement of the DMEA Field Team, the drilling plan would be discontinued. Otherwise, the balance of the 47 proposed holes for Phase 1, as shown in Fig. 2, will be drilled at the sites indicated. As mentioned previously, holes which fall in areas shown to be unfavorably located, may be eliminated after Price Exploration Company has conferred with and received the DMEA Field Representative's approval to do so.
2. Phase 2 holes will be recommended to the DMEA as soon as any of the 73 holes can be intelligently located by criteria from the Phase 1 holes.
3. Phase 2 holes will be concentrated along only one developing trend at a time. Thus, any mineralized zone will be satisfactorily delineated before proceeding to another favorable area.
4. Any ore deposit found will be drilled at 100 foot intervals, since that is the minimum spacing which will permit determination of grade and tonnage.

5. The holes will be drilled with combination equipment, consisting of pump and compressor, because moisture is anticipated in the formation. It is planned to case each hole in the Salt Wash member of the Morrison with 4½ inch casing, so that each hole can be satisfactorily cored and probed.

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

D) Ability of Applicant -
Price Exploration Company, the applicant, is a partnership, consisting of four members. The net worth of the principal partners, Mr. H. C. Price and Mrs. M. L. Price, is in excess of $5,000,000. The partnership was formed July 1, 1954, for the purpose of exploring and producing uranium and other minerals.

Harold C. Price, managing partner, has had the following experience:
1913, Graduate engineer, Colorado School of Mines.
1913, Engineer for New Pennsylvania Mines Co., at Montezuma, Colo.
1914-15, Chemist with American Metals Co. at Salida, Colo.
1915-17, Superintendent of Bartlesville Zinc Co.
1918, In armed service, World War 1.
1919, Assistant Manager, American Metals Co. at Langeloth, Pa.
1919-21, Manager, Bartlesville Zinc Co.
1921, Established own electric welding shop in Bartlesville, Okla.
1922-28, Pioneered and contracted in electric welding.
1929-41, Electric welded over 17,000 miles of pipelines.
1941 to present, General constructor of oil and gas pipelines in the United States, Alaska, Canada, So. America and the Middle East. Manufacturer and licensee of "Somastic" pipe line coating.
Present executive and operating positions:
President, H. C. Price Company
Executive Partner, The Price Company
Major Construction Projects:
Major portion of the "Big Inch" and "Little Inch" pipelines for the War Emergency Pipe Lines, Inc.
The Canol Project in Canada and Alaska, constructed with associates.
The first "30 inch" pipeline, known as the "Biggest Inch", transmitting gas from Texas to So. California in 1947.
The "Toughest Inch" built in 1949, for Columbia Gas, 26 inch line between Charleston, W. Va., and Rockville, Maryland.
Professional Attainments and Awards:
American Institute of Mining and Metallurgical Engineers.
Engineers Club of San Francisco.
Engineers Club of Bartlesville.
American Petroleum Institute.
American Gas Association.
American Welding Society.
Mid-Continent Pipe Line Chapter of the Associated Contractors of America.
Additional Information:
Participated with associates in the extensive shipbuilding operations and airplane modification during World War 2.

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

Charles W. Shannon
Five years experience in Geology and Mining with U.S.G.S.
Six years Mining and Exploration experience with the St. Joseph Lead Co., a major base metals producer.
Two years experience in Research Geophysics with Sinclair Research Laboratories, Inc.
One year experience in Uranium exploration.

W. Donald Quigley, Consulting Geologist.
Seven years experience with the Government in electrical, physical, and geophysical work.
Four years experience with the Government in Uranium Mining and Atomic Energy work.
Three and one-half years experience as a Geological Consultant in connection with Oil, Uranium and Mining work.

W. G. Haldane, Consulting Mining Engineer
1913-15, Acting President, Colorado School of Mines.
1917-19, Plant Superintendent, Western Potash Co. of Nebraska
1919-36, Consulting Engineer, Denver, Colorado
1936-48, affiliated with United States Vanadium Co. as Vice-President of Union Mines Development Co., delegated by Government (Manhattan District) to survey Uranium resources of this and other countries.
1948-54, one of the founders of Minerals Engineering Co.
Author of a number of technical papers on Mining and Metallurgy, and co-inventor of several early patents covering processing of Uranium-Vanadium ores.

George G. Travis, Operating Manager
Thirty years experience, drilling, producing and managing oil company 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 and coring depths per hole. Custom assaying is not included in the cost per foot for drilling, because of the difficulty in making an accurate estimate. The $6.00 per sample figure bid for custom assaying is the exact amount which will be charged by Price Exploration Co.

A) Independent Contracts -
The drilling, coring, road and location work will be performed by the Dawn Drilling and Mining Co., Inc., of Grand Junction, Colorado, and by the Price Exploration Company. One D-7 Caterpillar Dozer and two core drill rigs will be placed on the project so as to complete the project within the specified time. (See 5 (C) MF-103, Exhibit 1.)

6. A) Independent Contracts - (See Schedule 2)

Phase 1 - 47 Holes

1. Plug drilling, 9,915 ft. @ $1.75		$17,351.25	
2. Core drilling, 5,640 ft. @$4.38 avg.		24,727.50	
A) 885 ft. @$3.50, 0-200'	$ 3,097.50		
B) 4,600 ft. @$4.50, 200-400'	20,700.00		
C) 155 ft. @$6.00, 400-600'	930.00		
3. Road and location building -			
A) D-7 Cat. @$100 per day for 75 days		7,500.00	
Total Independent Contract, Phase 1			$ 49,578.75

Phase 2 - 73 Holes

1. Plug drilling, 15,400 ft. @$1.75		$26,950.00	
2. Core drilling, 8,760 ft. @4.38 avg.		38,406.50	
A) 1,375 ft. @$3.50, 0 - 200'	$ 4,812.50		
B) 7,144 ft. @$4.50, 200 - 400'	32,148.00		
C) 241 ft. @$6.00, 400 - 600'	1,446.00		
3. Road and location building -			
A) D-7 Cat. @$100. per day for 116 days		11,600.00	
Total Independent Contract, Phase 2			76,956.50

TOTAL PROJECT, INDEPENDENT CONTRACT COST $126,535.25

	Phase 1 3 Months	Phase 2 5 Months	Project 8 Months
6. (B) Labor, Supervision, Consultants -			
1. Geological supervision and expenses	$ 1,950.00	$ 3,250.00	
2. Sampler and field assistant	1,800.00	3,000.00	
	$ 3,750.00	$ 6,250.00	
Total 6 (B)			$10,000.00
6. (C) Operating Materials and Supplies -			
1. Drill log reproduction and Off.Sup.	$ 300.00	$ 500.00	
2. Core boxes	470.00	730.00	
3. Fuel and oil	495.00	825.00	
a. Auto, field assistant, $100/mo.			
b. Auto, supervisory, $50./mo.			
c. Butane, house trailer, $15./mo.			
4. Aquagel, @$25. per hole	1,175.00	1,825.00	
	$ 2,440.00	$ 3,880.00	
Total 6 (C)			$ 6,320.00
6. (D) Equipment depreciation and loss -			
1. Auto, field assistant @$75./mo.	$ 225.00	$ 375.00	
2. Auto, supervision @$50./mo.	150.00	250.00	
3. House trailer @$50./mo.	150.00	250.00	
4. Loss and depreciation, 4,000' of 4½" casing	1,500.00	2,500.00	
5. Radiometric counter and probe	300.00	500.00	
6. Two sets 4½" elevators, spider and slips	120.00	200.00	
	$ 2,445.00	$ 4,075.00	
Total 6 (D)			$ 6,520.00
6. (E) Rehabilitation and repairs -			
1. Field autos	$ 150.00	$ 250.00	
2. Rethread casing and trucking	-	1,000.00	
	$ 150.00	$ 1,250.00	
Total 6 (E)			$ 1,400.00
6. (F) New buildings, improvements -	None	None	
6. (G) Miscellaneous			
1. Workmen's Compensation, etc.	$ 360.00	$ 600.00	
2. Accounting and monthly reports	300.00	500.00	
3. Insurance on equipment	90.00	150.00	
4. Rig time, 4 hrs. @$15. per hr. per hole. Running 4½" casing, running probe and pulling casing.	2,820.00	4,380.00	
	$ 3,570.00	$ 5,630.00	
Total 6 (G)			$ 9,200.00

	Phase 1 3 Months	Phase 2 5 Months	Project 8 Months
6. (H) Contingencies -			
1. 6(B), Labor and supervision payments may increase due to prolonging completion of project. 10% is added to cover such possible increase.	$ 375.00	$ 625.00	
2. 6(C) Operating materials and supplies are estimated at a minimum. Unforseen consumption of same might increase such costs 20%.	488.00	776.00	
3. 6(D) Operating equipment loss and depreciation may readily be increased 20% due to excessive loss of casing and counters.	489.00	815.00	
4. 6(E) Rehabilitation and repairs to field autos and to casing for holes may readily be increased 40%.	60.00	500.00	
5. 6(G) Miscellaneous costs should probably be increased 40% due to contingency of considerable more rig time required for probing and pulling casing in the event that cavings wedge the probe or casing.	1,128.00	1,752.00	
	$ 2,540.00	$ 4,468.00	
Total 6(H)			$ 7,008.00

7. APPLICANT'S SHARE OF COST -

In accordance with DMEA regulations, Price Exploration Company is prepared to pay 25% 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, materials, and supplies used. Reimbursement by DMEA will be in accordance with Schedule 1, less 25%; i.e., the amount to be loaned by the Government for each unit of work performed will be 25% less than the amounts shown on Schedule 1.

Respectfully submitted,

PRICE EXPLORATION COMPANY

By: George R. Trainis
Operating Manager

SCHEDULE I

Summary of Costs
Project Cost Per Unit, Basis 39,715 Foot Hole

	Phase 1 Cost	Phase 2 Cost	Project Cost	Unit Cost
6.				
(A) Independent Contract -				
1. Drilling	$ 17,351.25	$ 26,950.00	$ 44,301.25	$1.12
2. Coring	24,727.50	38,406.50	63,134.00	1.59
3. Road and Location Building	7,500.00	11,600.00	19,100.00	.48
(B) Labor, Supervision, etc. -	3,750.00	6,250.00	10,000.00	.25
(C) Operating Materials & Supplies	2,440.00	3,880.00	6,320.00	.16
(D) Equipment Depreciation & Loss	2,445.00	4,075.00	6,520.00	.16
(E) Rehabilitation and Repairs	150.00	1,250.00	1,400.00	.04
(F) New Buildings, etc.	None	None	None	-
(G) Miscellaneous	3,570.00	5,630.00	9,200.00	.23
(H) Contingencies	2,540.00	4,468.00	7,008.00	.17
Totals	$ 64,473.75	$102,509.50	$166,983.25	$4.20
DMEA, 75% Share Costs	$ 48,355.31	$ 76,882.13	$125,237.44	$3.15
Price Exploration Company 25% Share Costs	$ 16,118.44	$ 25,627.37	$ 41,745.81	$1.05

SCHEDULE 2

Drilling and Coring Depths

Phase 1

Hole Number	Depth of Hole 120' in MS	Drilling Footage Per Hole	Coring Footage per Hole 0 - 200'	200' - 400'	400' - 600'
1	195	75	120		
2	205	85	115	5	
3	230	110	90	30	
4	225	105	95	25	
5	275	155	45	75	
6	275	155	45	75	
7	330	210		120	
8	250	130	70	50	
9	310	190	10	110	
10	360	240		120	
11	285	165	35	85	
12	370	250		120	
13	310	190	10	110	
14	350	230		120	
15	380	260		120	
16	390	270		120	
17	270	150	50	70	
18	325	205		120	
19	390	270		120	
20	420	300		100	20
21	290	170	30	90	
22	335	215		120	
23	375	255		120	
24	445	325		75	45

SCHEDULE 2

Drilling and Coring Depths

Phase 1

Hole Number	Depth of Hole 120' in MS	Drilling Footage Per Hole	Coring Footage per Hole 0 - 200'	200' - 400'	400' - 600'
1 - 24, Incl. Totals			715	2,100	65
25	245	125	75	45	
26	300	180	20	100	
27	335	215		120	
28	360	240		120	
29	395	275		120	
30	275	155	45	75	
31	305	185	15	105	
32	355	235		120	
33	375	255		120	
34	385	265		120	
35	440	320		80	40
36	335	215		120	
37	345	225		120	
38	335	215		120	
39	310	190	10	110	
40	325	205		120	
41	365	245		120	
42	315	195	5	115	
43	375	255		120	
44	435	315		85	35
45	320	200		120	
46	320	200		120	
47	415	295		105	15
Totals Phase 1		9,915'	885'	4,600'	155'

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	46¼%
M. L. Price,	P. O. Box 1111, Bartlesville, Oklahoma	46¼%
E. L. Gallery,	P. O. Box 1111, Bartlesville, Oklahoma	5 %
Alton H. Rowland	P. O. Box 1111, Bartlesville, Oklahoma	2½%

EXHIBIT 3

Title Data

Claim Name	Location Date	Recording Date	Book	Page
Big Boy No. 1	Mar. 15, 1954	Apr. 7, 1954	368	357
Big Boy No. 2	Apr. 2, 1954	Apr. 7, 1954	368	358
Big Boy No. 3	Apr. 2, 1954	Apr. 7, 1954	368	359
Big Boy No. 4	Apr. 2, 1954	Apr. 7, 1954	368	360
Big Boy No. 5	Jun. 25, 1954	Jul. 14, 1954	377	454
Golda No. 1	Apr. 3, 1954	Apr. 14, 1954	369	22
Golda No. 2	Apr. 2, 1954	Apr. 14, 1954	369	23
Golda No. 3	Apr. 3, 1954	Apr. 14, 1954	369	24
Golda No. 4	Apr. 3, 1954	Apr. 14, 1954	369	25
Bill Dean No. 1	Jun. 10, 1954	Jun. 30, 1954	377	246
Bill Dean No. 2	Jun. 10, 1954	Jun. 30, 1954	377	247
Bill Dean No. 3	Jun. 10, 1954	Jun. 30, 1954	377	248
Deer Run No. 1	Jul. 15, 1954	Aug. 16, 1954	386	271
Deer Run No. 2	Jul. 15, 1954	Aug. 16, 1954	386	272
Ada No. 1	Sep. 23, 1954	Sep. 29, 1954	387	309

Since the above claims had been located on lands on which prior U. S. oil and gas leases had been issued, amended locations were filed under Public Law 585, on all except the Ada No. 1 claim, as follows:

Claim Name	Location Date	Recording Date	Book	Page
Big Boy No. 1	Sep. 9, 1954	Sep. 15, 1954	386	277
Big Boy No. 2	Sep. 9, 1954	Sep. 15, 1954	386	278
Big Boy No. 3	Sep. 9, 1954	Sep. 15, 1954	386	279
Big Boy No. 4	Sep. 9, 1954	Sep. 15, 1954	386	280
Big Boy No. 5	Sep. 24, 1954	Sep. 29, 1954	387	310
Golda No. 1	Sep. 10, 1954	Sep. 15, 1954	386	273
Golda No. 2	Sep. 10, 1954	Sep. 15, 1954	386	274
Golda No. 3	Sep. 10, 1954	Sep. 15, 1954	386	275
Golda No. 4	Sep. 10, 1954	Sep. 15, 1954	386	276
Bill Dean No. 1	Sep. 9, 1954	Sep. 15, 1954	386	269
Bill Dean No. 2	Sep. 9, 1954	Sep. 15, 1954	386	270
Bill Dean No. 3	Sep. 28, 1954	Sep. 29, 1954	387	308
Deer Run No. 1	Sep. 10, 1954	Sep. 15, 1954	386	271
Deer Run No. 1	Sep. 10, 1954	Sep. 15, 1954	386	272

EXHIBIT 3
(Continued)

The original locators of the five Big Boy, four Golda, three Bill Dean and two Deer Run claims sold and transferred all their rights by appropriate mining deeds to George G. Travis, as follows:

Big Boy claims 1 to 5 incl. by Mining Deed dated Oct. 13, 1954, and recorded Oct. 20, 1954 in Book 389, Page 75.
Gold claims 1 to 4 incl. by Mining Deed dated Oct. 13, 1954, and recorded Oct. 13, 1954 in Book 382, Page 559.
Bill Dean claims 1, 2 and 3, by Mining Deed dated Oct. 13, 1954, and recorded Oct. 20, 1954 in Book 389, Page 74.
Deer Run claims 1 and 2, by Mining Deed dated Oct. 13, 1954, and recorded Oct. 13, 1954 in Book 382, Page 559.

The Price Exploration Company received and recorded mining deeds on all the project claims as follows:

Big Boy claims 1 to 5 incl. by Mining Deed dated Dec. 10, 1954, and recorded Dec. 27, 1954, in Book 396, Page 57.
Golda claims 1 to 4 incl. by Mining Deed dated Dec. 10, 1954, and recorded Dec. 27, 1954, in Book 396, Page 55.
Bill Dean claims 1, 2 and 3, by Mining Deed dated Dec. 10, 1954, and recorded Dec. 27, 1954, in Book 396, Page 53.
Deer Run claims 1 and 2, by Mining Deed dated Dec. 10, 1954, and recorded Dec. 27, 1954, in Book 396, Page 55.
Ada claim No. 1, by Mining Deed dated Dec. 10, 1954, and recorded Dec. 27, 1954, in Book 396, Page 59.

BRIEF GEOLOGIC REPORT ON
A PROPERTY IN
WILLOW BASIN

Description and Location

Property of Price Exploration Company in the West Paradox mining district consists of 15 claims located in portions of Sections 25 and 26, T. 48 N; R. 20 W., Montrose County, Colorado. Fig. 1 shows the property and its relationship to local mines and known mineralization. Fourteen (14) of the 15 claims were originally filed in accordance with the provisions of "Circular 7" of the Atomic Energy Commission. The claims were staked, the location notices filed out, posted and recorded in the Montrose County Courthouse. Application for a mining lease has been made to the Atomic Energy Commission on all but three of the claims within the time provided by "Circular 7". On or about August 16, 1954 the claims were purchased from the original locators by George G. Travis, and that purchase has been recorded. Since that date the claims have been surveyed, discovery monuments and side-center monuments erected, discovery pits excavated, new notices posted and recorded pursuant to Public Law 585.

On September 23, 1954 the Ada #1 claim was located by C. W. Shannon, a Geologist of Price Exploration Company, to fill in the gap known to exist as a result of the surveying.

Stratigraphy

The subject property is mainly located on the Brushy Basin member of the Morrison formation of late Jurassic Age. The overlying Dakota-Burro Canyon formation covers a small portion of the north side of the property as shown by the accompanying map, Fig. 1.

The uranium ore objective, the Salt Wash member of the Morrison formation, underlies the Brushy Basin member. The Salt Wash is exposed just east and south

of the property, but it is not exposed anywhere on the claims. In this area the Salt Wash consists of four or more sandstone benches separated by interbedded vari-colored bentonitic shale and siltstone. The sandstone benches are composed of numerous discontinuous lenses of cross-bedded, fluviatile, coarse-grained, buff to gray channel sandstone, containing clay and mudstone inclusions and considerable carbonaceous material. The uranium mineralization in the region occurs usually near the base of the thicker sandstone lenses, and where abundant carbonaceous material, mudstone and siltstone impurities are present.

The Brushy Basin is expected to be about 320 feet thick and the Salt Wash is approximately 365 feet thick. The Dakota-Burro Canyon cover on a small portion of the area will increase the drilling depths by 100 feet.

The Columnar Section

A stratigraphic section was measured in a good outcrop area adjacent to the Willow Basin property. The section was measured, using a plane table, a rod and an alidade, with special care exercised in making vertical angle corrections on all distances. It is believed that the resulting thicknesses represent a true measure of the total Morrison and Burro-Canyon sections expected in the proposed drilling program on the Willow Basin claims.

The thicknesses measured are as follows:

Burro-Canyon - 90 ft.

Brushy Basin - 320 ft.

Salt Wash - 365 ft.

Summerville - 75 ft.

The lithologies of the various beds are indicated on the Columnar Section so they will not be repeated. It is noted that there are six distinctive sandstones measured in the Morrison-Salt Wash. In all probability, these sandstones will not all persist as separate ledges, but instead, two or more of them will merge to form the four ledges generally recognized in this area.

On the basis of the measured section, the topographic elevation and the structural contours on top of the Salt Wash member, the drilling depths through the first 120 feet of the Salt Wash sandstone have been estimated for the proposed holes and listed below:

Hole No.	Depth to Jms Plus 120 ft.	Hole No.	Depth to Jms Plus 120 ft.	Hole No.	Depth to Jms Plus 120 ft.
1	195	17	270	33	375
2	205	18	325	34	385
3	230	19	390	35	440
4	225	20	420	36	335
5	275	21	290	37	345
6	275	22	335	38	335
7	330	23	375	39	310
8	250	24	445	40	325
9	310	25	245	41	365
10	360	26	300	42	315
11	285	27	335	43	375
12	370	28	360	44	435
13	310	29	395	45	320
14	350	30	275	46	320
15	380	31	305	47	415
16	390	32	355		

The Hunt Oil Company is currently drilling the property immediately north of the Willow Basin claims. They have completed the first three holes whose locations are shown on Fig. 2.

Hole No. 1 was drilled to a depth of 465 feet; Nos. 2 and 3 were drilled to 350 feet. Cores from the three holes showed a section composed of mud, clay, siltstone, and a few thin sand layers. The USGS is of the opinion that the three holes are located in a fault zone, thus explaining the absence of identifiable Salt Wash.

Geologic Cross Section and Contour Map

A geologic cross section was constructed northeast-southwest, along line A-A on Figure 2, across the Willow Basin claims. The cross section shows the fault boundary on the southwest and the northeast dip of 10 to 20 degrees. The dip increases the drilling depths on the northeast portion of the property so that it is practical to confine the initial exploration for uranium mineralization to the shallower portion which lies south of the Burro-Canyon-Brushy Basin contact. The cross section indicates that drill holes testing the first 120 feet of the Salt Wash member will range in depth from 225 to 450 feet, providing the test holes are confined to the Brushy Basin outcrop area.

The cross section and structural contours on top of the Salt Wash member indicate the northeast dip toward the synclinal slump axis. The present dip is exactly the reverse of the dip known to exist during the growth of the Paradox Valley anticline. The present dip came about when the sub-crustal support of the anticlinal arch was removed by solution of the intruded salt so that the arch collapsed to form the present synclinal graben.

Ore Deposits

The ore deposits in the Paradox Valley and Monogram Mesa areas have been confined to the Salt Wash member. Recent exploration has indicated additional mineralization in the basal Chinle formation of Triassic Age. Some of the ore bodies in the Salt Wash can be traced over a distance of several thousand feet

with variable thicknesses, and contain a hundred thousand or more tons of relatively high grade uranium-vanadium ore.

The ore deposits are largely in the form of lenticular rolls or lenses. They lie parallel to the bedding planes and are usually related to the thickening of a sandstone lens within a certain zone. Most of the deposits in this region occur just beneath one or more of the four Salt Wash sandstone benches. It is reported that approximately 90% of the ore in the Paradox-Uravan area occurs in the ore horizons known as A and B in the upper sandstone benches of the Salt Wash member. These zones normally occur in the upper 120 feet of the Salt Wash member. For instance, it is known that the Radium Cycle mine, shown on Fig. 1, is located in ore horizon B, as is the Madame Curie mine. The Valley-View mine is associated with the Wingate Salt Wash thrust contact and is not confined to any one sandstone bench. Consequently, it is felt that the mineralization possibilities of the Willow Basin claims will be adequately tested if all the drill holes are carried through the upper 120 feet of the Salt Wash member. The ore bodies appear to parallel the northwest-southeast structural trend throughout the region, and are closely clustered along certain fault zones and lithological trends. The Salt Wash ore deposits are usually composed of the uranium-vanadium minerals: carnotite, vanoxite, hewettite, corvusite, tyuyamunite, and rauvite. The mineralization appears as black and yellow zones and streaks in porous sandstone lenses associated with carbonaceous material and clay impurities.

It is not known whether the secondary concentration of the uranium minerals came about before or after the collapse. There is conflicting evidence to support both theories. However, it is known that most of the ore bodies developed so far have been in or near the boundary zone of shearing, subsidence, and crushing. There seems to have been a definite structural control for the formation of commercial ore bodies. Since the uranium deposits and minerals in this area are secondary in nature, they must have been formed by resolution of the primary

mineralization, transportation downdip or along zones of increased permeability, and redeposition as caused by changes in dip or permeability or by the presence of precipitating agents such as carbonaceous material, vanadium, or certain clay minerals.

The ore deposits in the region have probably been formed by hydrothermal mineralizing solutions originating in the intrusions of the La Sal mountains in late Cretaceous or early Tertiary time. Faults, fractures, and porous zones may have facilitated the flow of solutions into the surrounding host rocks. Those same faults, fractures, and porous zones, together with channel sandstone deposits rich in vanadium, clay minerals, and carbonaceous materials may have controlled the resolution of the soluble uranium minerals and their redeposition in more concentrated bodies to form commercial ore.

Evaluation

The subject property appears to be ideally located in respect to the above factors so important in the formation of ore bodies. The property lies in a small basin down flank from the axis of the structural anticline, which has proven to be mineralized on both flanks. The old Madame Curie mine is located 1-3/4 miles to the northeast in the down-dropped block and much nearer the structural anticlinal axis. The Radium Cycle, Valley View and Red Bird mines are located on the opposite flank of the Paradox anticline in a similar faulted environment. The slump block position and the intersecting faults adjacent to the area are identical to the Monogram Mesa area where ore is so prevalent.

The Yellow Spot, Sumner, and Morning Star mines are located two miles south of Willow Basin, and likewise, adjacent to the "zone of shearing subsidence, and crushing". The famous Vanadium Queen, Grinning Ape, Gray Dawn, Little Don, and Little Peter mines are four miles southwest of the basin along LaSal Creek. Chiles coppor-vanadium Jackpot prospect is located four miles northeast of the basin. Consequently, it can be said that the Willow Basin claims are completely surrounded by mines or known mineralization within a radius of four miles.

Justification For Exploration

No definite mineralization could be found on the property as it is all covered by the Brushy Basin. However, mineralization has been found in the northeast corner of Sec. 25 T. 48 N, R. 19 W, where the Dakota is exposed just one half mile from the property. Rich uranium mineralization has been found on the Yankee Uranium Company Wren group of claims located just north of West Paradox Creek in S.E. cor. Sec. 19, T 48 N, R 19 W. This mineralization is one fourth mile south of the Madame Curie mine. Drilling is necessary to determine the presence of mineralization on the property, but as noted, it has been found in adjacent Salt Wash outcrops. Past experience in the area has indicated a success ratio of six ore bodies discovered by drilling to every ore body discovered by means of observed mineralization on the outcrop. The property selected for drilling is located in a favorable position in respect to mineralizing trends, operating mines, and structural controls. The drilling depths are expected to vary from 225 to 450 feet, depending on the extent of Brushy Basin cover, with an average depth to the base of the ore zones of the Salt Wash of 330 feet. Therefore, a systematic, two-stage drilling program covering that portion of the 15 claims below the Burro-Canyon-Brushy Basin contact would consist of approximately 4 holes per claim during Stage I drilling followed by Stage II, where an additional 16 holes per claim would be drilled, or a total of 20 holes per claim in those areas where mineralization was found during Stage I. It is unlikely that mineralization will be found in more than 40% of the Stage I holes, so that the total number of holes required can be reduced to 120, or to a total footage of 39,600 feet.

M. D. Quigley

M. Darwin Quigley
Geologist

MDQ:jb

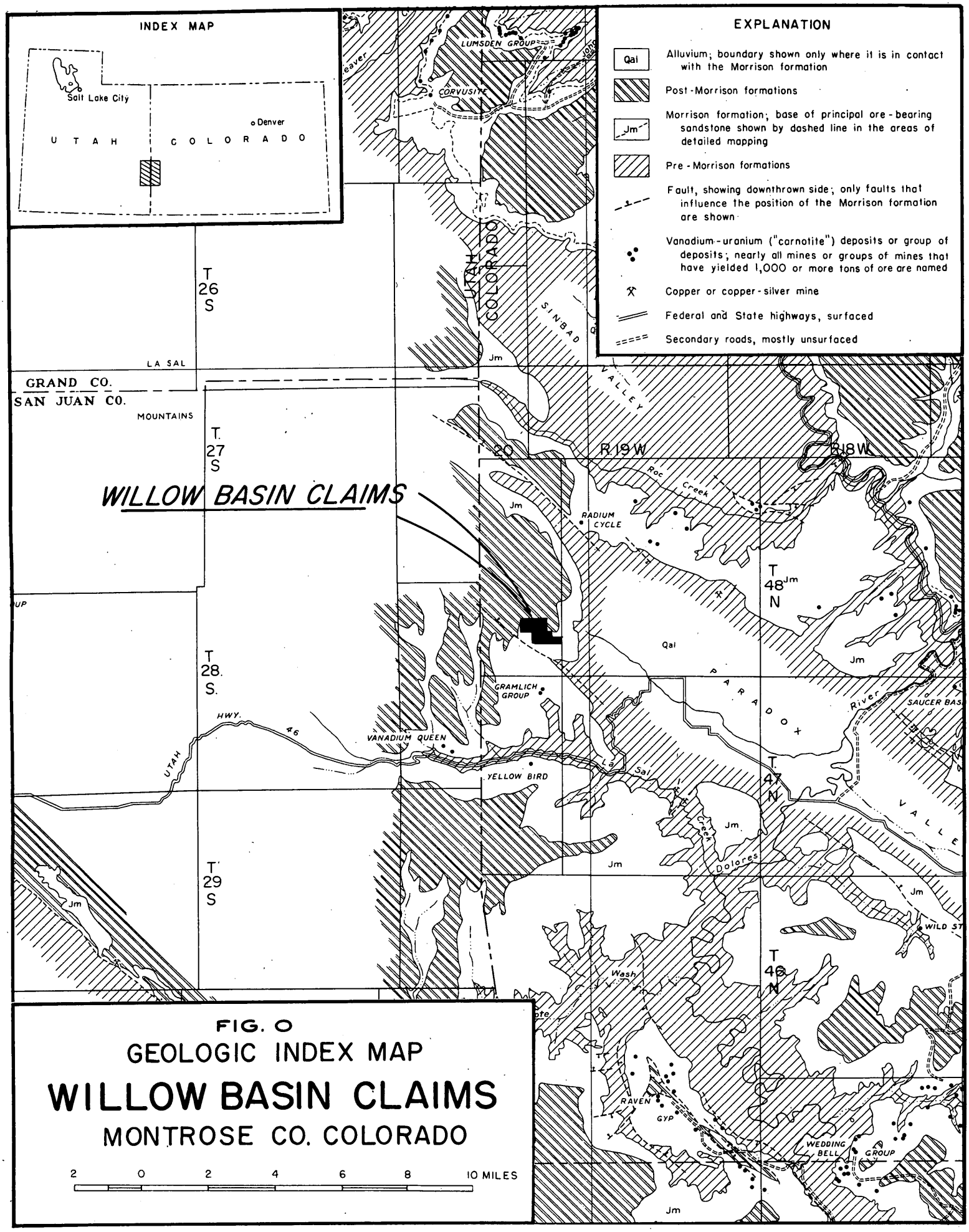

FIG. O
GEOLOGIC INDEX MAP
WILLOW BASIN CLAIMS
MONTROSE CO. COLORADO

2 0 2 4 6 8 10 MILES

no mineralization
efforts to [illegible]

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
FEB 23 1955

APPLICATION FOR DMEA PROJECT ON

WILLOW BASIN

January 25, 1955

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

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APPLICATION FOR DMEA PROJECT ON THE WILLOW BASIN CLAIMS
FOR
PRICE EXPLORATION COMPANY
615 N. First Street
Grand Junction, Colorado

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
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FEB 23 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 $64,473.75 project to determine the amount of uranium mineralization and will consist of 15,555 feet of drilling and coring, at an estimated unit cost of $4.20 per foot. Phase 2 will be dependent upon the results of Phase 1, and if commenced, will be a $102,509.50 project to explore the potential uranium deposits on the subject lands, (See Fig. 1) and will consist of 24,160 feet of drilling and coring, at an estimated unit cost of $4.20 per foot. Twenty-five percent of Phase 1 or $16,118.44 of the total expenditure of Phase 1, and twenty-five percent of Phase 2 or $25,627.37 of the total expenditure of Phase 2, will be paid by the Price Exploration Company, the applicant herein; the Defense Minerals Exploration Administration is asked to loan the balance of $48,355.31 for Phase 1 and the balance of $76,882.13 for Phase 2.

Locations for forty-seven holes are suggested for Phase 1 and are shown on Fig. 2. These locations are on 500 foot centers in a hexagonal pattern and were selected and limited to that part of the property where the depth of the objective ore horizon is well within economic reach of exploration and development operations. Obviously, as drilling progresses, it will become evident that some of the proposed holes will prove to be in areas that are geologically unfavorable for ore. Therefore, Price Exploration Company would like the privilege of deciding whether or not locations in unfavorable areas shall be drilled. It is further requested that, with permission of the DMEA Field Team, the equivalent footage of holes eliminated be transferred to additional locations in the more favorable portions of the area.

3. PROPERTY RIGHTS

A) Legal description
The land on which the exploration work is to be performed consists of 15 contiguous unpatented mining claims, 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 Willow Basin Claims.

C) Interest in the land -

Price Exploration Company purchased all rights to the 15 claims from the original locators, Juddy Johnson, Earl Chiles, Golda Chiles, John Blair, Harold Stephens and Charles Shannon.

D) Omitted.

E) Liens and encumbrances -

There are no liens, encumbrances or royalty obligations against the property.

F) Record of Title -

All transactions affecting titles to the claims 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.

The mining deeds, conveying all of the claims to Price Exploration Company have been recorded, and abstracts of title have been certified to January 4, 1955, by the Montrose County Abstract Co.

4. PHYSICAL DESCRIPTION

A) Mining or Exploration Operations -

There are no mining workings on the claims. There has been no previous drilling on the claims by the U.S.G.S., AEC, or other agencies. The applicant has no knowledge of any drilling program being contemplated in the Willow Basin area by the aforementioned agencies.

B) Production and Ore Reserves -

There has been no past production and at present there are no proven ore reserves on the Willow Basin property.

C) Geologic Features -

A geologic report is attached as Exhibit 4.

D) Accessibility -

The Willow Basin claims are accessible by an unimproved road from Paradox, Colorado, five miles to the southeast. This road is shown as it crosses the claims on Fig. 1. Vanadium Corporation of America has a processing plant at Naturita, Colorado, 35 miles southwest via State Highway 90. The United States Vanadium Company processing plant is located 20 miles east via State Highway 90 and the Dolores River Canyon road.

Supplies for exploration and mining and all necessary equipment can be obtained at Uravan or Naturita, Colorado, and at Moab, Utah. There are Post Offices, permanent settlement facilities, and motor freight depots at these places. Paradox, Colorado also has a Post Office and motor freight service.

E) Availability of Manpower, Equipment, Supplies, etc. -

Manpower skilled in the performance of the type of drilling planned is readily available in the vicinity. Most of 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 and economical manner.

Water for drilling and coring will be hauled from the Buckeye Reservoir some five miles north of the area, or from a closer point along West Paradox Creek, if the latter maintains sufficient flow. No electric power is available at present, but no power is contemplated in the exploration phase. The San Miguel Power Association Inc. is erecting a 44,000 volt transmission line through Paradox and up La Sal Creek. This line is within five miles of the Willow Basin Claims and will be completed by the time any mining operations would begin.

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 -

The drills for the project will be provided by Dawn Drilling and Mining Company, and by Price Exploration Company. It is anticipated that the project will require approximately eight months to complete, in the event that mineralization is found in more than one of the Phase 1 holes. Two drills on this project can afford satisfactory progress, and permit adequate geological control to be maintained by the available personnel.

Proposed holes are shown on Fig. 2, with estimated depths for each location. There are locations for 47 holes plotted, which constitute the Phase 1 exploration plan. The experience of operators in this district has proven that one hole per acre is required to adequately evaluate ore potential. It is impossible to outline an economical and intelligent program of drilling on that basis until mineral indications and possible trends have been determined by the more widespaced drilling. Therefore, Phase 2 is planned to follow up indicative mineral finds of Phase 1. In this second phase, hole spacing will be reduced in conformity with the hexagonal pattern of Fig. 2. These subsequent holes will be located on the basis of geological information as drilling progresses. Mineral trends will be delineated with a minimum of holes, but the pattern will be reduced until adequate information has been obtained to properly evaluate the ore potential. Phase 2, if carried to completion over all of the claims, would require 240 holes. It is unlikely that mineralization will be found throughout the area, and it is estimated that the total can be reduced substantially. It is requested, therefore, that the DMEA contract allow 120 holes to be drilled on the Willow Basin Claims. Moreover, it is requested that the location of the 73 or more Phase 2 holes be made with the approval of the DMEA Field Team, after sufficient geological data has been accumulated from the drilling of Phase 1 holes.

Logging and Sampling - A sampler will be employed to supervise the logging and sampling of cores. An accurate log will be kept by the field geologist. Cores from each run will be carefully removed from the core barrel by the driller and placed in compartmented core boxes and properly marked as to hole number and depth. These cores will be stored at the drill site so that they will be preserved intact and will be available for inspection by supervisory personnel and DMEA Field Team members. The geologist will sample mineralized core, as determined at the site by a field gamma ray detecting device, and carefully describe it in a bound field book as the sample is placed in the sample bag. Core losses will be recorded where they appear in the section and prorated otherwise with regard to lithology. No more than one foot of core will be included in one sample. All samples will be sent to a commercial laboratory for analysis of U_3O_8, V_2O_5 and $CaCO_3$ content.

In addition to core classification, each hole will be radiometrically logged with a gamma ray detection probe to determine the presence of mineralization that may lie adjacent to the hole. These logs will be used for stratigraphic correlations in conjunction with the core data.

Geologic control of Drilling - Price Exploration Company asks the privilege of not drilling any of the proposed holes shown in Fig. 2, if, in the opinion of the technical personnel of Price Exploration Company, they fall in an area which, based on previous drilling, is considered unfavorable for mineralization. The footage thus saved would be used in more favorable areas in Phase 2. This would be done with the approval of the DMEA Field Team. The criteria used to determine unfavorable indications will be, in general, the same as that used by the USGS and AEC in their drilling programs, as discussed in USGS Bulletin 988B.

The Drilling Plan -

1. The drilling plan would proceed with 12 holes to be drilled in accordance with the hexagonal pattern, but well scattered over the entire 15 claims. In the event that unfavorable stratigraphic conditions and lack of indications of possible mineralization were found in each of the holes, then with the full appraisal and agreement of the DMEA Field Team, the drilling plan would be discontinued. Otherwise, the balance of the 47 proposed holes for Phase 1, as shown in Fig. 2, will be drilled at the sites indicated. As mentioned previously, holes which fall in areas shown to be unfavorably located, may be eliminated after Price Exploration Company has conferred with and received the DMEA Field Representative's approval to do so.
2. Phase 2 holes will be recommended to the DMEA as soon as any of the 73 holes can be intelligently located by criteria from the Phase 1 holes.
3. Phase 2 holes will be concentrated along only one developing trend at a time. Thus, any mineralized zone will be satisfactorily delineated before proceeding to another favorable area.
4. Any ore deposit found will be drilled at 100 foot intervals, since that is the minimum spacing which will permit determination of grade and tonnage.

5. The holes will be drilled with combination equipment, consisting of pump and compressor, because moisture is anticipated in the formation. It is planned to case each hole in the Salt Wash member of the Morrison with 4½ inch casing, so that each hole can be satisfactorily cored and probed.

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

D) Ability of Applicant -
Price Exploration Company, the applicant, is a partnership, consisting of four members. The net worth of the principal partners, Mr. H. C. Price and Mrs. M. L. Price, is in excess of $5,000,000. The partnership was formed July 1, 1954, for the purpose of exploring and producing uranium and other minerals.

Harold C. Price, managing partner, has had the following experience:
1913, Graduate engineer, Colorado School of Mines.
1913, Engineer for New Pennsylvania Mines Co., at Montezuma, Colo.
1914-15, Chemist with American Metals Co. at Salida, Colo.
1915-17, Superintendent of Bartlesville Zinc Co.
1918, In armed service, World War 1.
1919, Assistant Manager, American Metals Co. at Langeloth, Pa.
1919-21, Manager, Bartlesville Zinc Co.
1921, Established own electric welding shop in Bartlesville, Okla.
1922-28, Pioneered and contracted in electric welding.
1929-41, Electric welded over 17,000 miles of pipelines.
1941 to present, General constructor of oil and gas pipelines in the United States, Alaska, Canada, So. America and the Middle East. Manufacturer and licensee of "Somastic" pipe line coating.
Present executive and operating positions:
President, H. C. Price Company
Executive Partner, The Price Company
Major Construction Projects:
Major portion of the "Big Inch" and "Little Inch" pipelines for the War Emergency Pipe Lines, Inc.
The Canol Project in Canada and Alaska, constructed with associates.
The first "30 inch" pipeline, known as the "Biggest Inch", transmitting gas from Texas to So. California in 1947.
The "Toughest Inch" built in 1949, for Columbia Gas, 26 inch line between Charleston, W. Va., and Rockville, Maryland.
Professional Attainments and Awards:
American Institute of Mining and Metallurgical Engineers.
Engineers Club of San Francisco.
Engineers Club of Bartlesville.
American Petroleum Institute.
American Gas Association.
American Welding Society.
Mid-Continent Pipe Line Chapter of the Associated Contractors of America.
Additional Information:
Participated with associates in the extensive shipbuilding operations and airplane modification during World War 2.

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

Charles W. Shannon
Five years experience in Geology and Mining with U.S.G.S.
Six years Mining and Exploration experience with the St. Joseph Lead Co., a major base metals producer.
Two years experience in Research Geophysics with Sinclair Research Laboratories, Inc.
One year experience in Uranium exploration.

W. Donald Quigley, Consulting Geologist.
Seven years experience with the Government in electrical, physical, and geophysical work.
Four years experience with the Government in Uranium Mining and Atomic Energy work.
Three and one-half years experience as a Geological Consultant in connection with Oil, Uranium and Mining work.

W. G. Haldane, Consulting Mining Engineer
1913-15, Acting President, Colorado School of Mines.
1917-19, Plant Superintendent, Western Potash Co. of Nebraska
1919-36, Consulting Engineer, Denver, Colorado
1936-48, affiliated with United States Vanadium Co. as Vice-President of Union Mines Development Co., delegated by Government (Manhattan District) to survey Uranium resources of this and other countries.
1948-54, one of the founders of Minerals Engineering Co.
Author of a number of technical papers on Mining and Metallurgy, and co-inventor of several early patents covering processing of Uranium-Vanadium ores.

George G. Travis, Operating Manager
Thirty years experience, drilling, producing and managing oil company 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 and coring depths per hole. Custom assaying is not included in the cost per foot for drilling, because of the difficulty in making an accurate estimate. The $6.00 per sample figure bid for custom assaying is the exact amount which will be charged by Price Exploration Co.

A) Independent Contracts -
The drilling, coring, road and location work will be performed by the Dawn Drilling and Mining Co., Inc., of Grand Junction, Colorado, and by the Price Exploration Company. One D-7 Caterpillar Dozer and two core drill rigs will be placed on the project so as to complete the project within the specified time. (See 5 (C) MF-103, Exhibit 1.)

6. A) Independent Contracts - (See Schedule 2)

Phase 1 - 47 Holes

1. Plug drilling, 9,915 ft. @ $1.75		$17,351.25
2. Core drilling, 5,640 ft. @$4.38 avg.		24,727.50
A) 885 ft. @$3.50, 0-200'	$ 3,097.50	
B) 4,600 ft. @$4.50, 200-400'	20,700.00	
C) 155 ft. @$6.00, 400-600'	930.00	
3. Road and location building -		
A) D-7 Cat. @$100 per day for 75 days		7,500.00
Total Independent Contract, Phase 1		$ 49,578.75

Phase 2 - 73 Holes

1. Plug drilling, 15,400 ft. @$1.75		$26,950.00
2. Core drilling, 8,760 ft. @4.38 avg.		38,406.50
A) 1,375 ft. @$3.50, 0 - 200'	$ 4,812.50	
B) 7,144 ft. @$4.50, 200 - 400'	32,148.00	
C) 241 ft. @$6.00, 400 - 600'	1,446.00	
3. Road and location building -		
A) D-7 Cat. @$100. per day for 116 days		11,600.00
Total Independent Contract, Phase 2		76,956.50

TOTAL PROJECT, INDEPENDENT CONTRACT COST $126,535.25

	Phase 1 3 Months	Phase 2 5 Months	Project 8 Months
6. (B) Labor, Supervision, Consultants -			
1. Geological supervision and expenses	$ 1,950.00	$ 3,250.00	
2. Sampler and field assistant	1,800.00	3,000.00	
	$ 3,750.00	$ 6,250.00	
Total 6 (B)			$10,000.00
6. (C) Operating Materials and Supplies -			
1. Drill log reproduction and Off.Sup.	$ 300.00	$ 500.00	
2. Core boxes	470.00	730.00	
3. Fuel and oil	495.00	825.00	
a. Auto, field assistant, $100/mo.			
b. Auto, supervisory, $50./mo.			
c. Butane, house trailer, $15./mo.			
4. Aquagel, @$25. per hole	1,175.00	1,825.00	
	$ 2,440.00	$ 3,880.00	
Total 6 (C)			$ 6,320.00
6. (D) Equipment depreciation and loss -			
1. Auto, field assistant @$75./mo.	$ 225.00	$ 375.00	
2. Auto, supervision @$50./mo.	150.00	250.00	
3. House trailer @$50./mo.	150.00	250.00	
4. Loss and depreciation, 4,000' of 4½" casing	1,500.00	2,500.00	
5. Radiometric counter and probe	300.00	500.00	
6. Two sets 4½" elevators, spider and slips	120.00	200.00	
	$ 2,445.00	$ 4,075.00	
Total 6 (D)			$ 6,520.00
6. (E) Rehabilitation and repairs -			
1. Field autos	$ 150.00	$ 250.00	
2. Rethread casing and trucking	-	1,000.00	
	$ 150.00	$ 1,250.00	
Total 6 (E)			$ 1,400.00
6. (F) New buildings, improvements -	None	None	
6. (G) Miscellaneous			
1. Workmen's Compensation, etc.	$ 360.00	$ 600.00	
2. Accounting and monthly reports	300.00	500.00	
3. Insurance on equipment	90.00	150.00	
4. Rig time, 4 hrs. @$15. per hr. per hole. Running 4½" casing, running probe and pulling casing.	2,820.00	4,380.00	
	$ 3,570.00	$ 5,630.00	
Total 6 (G)			$ 9,200.00

	Phase 1 3 Months	Phase 2 5 Months	Project 8 Months
6. (H) Contingencies -			
1. 6(B), Labor and supervision payments may increase due to prolonging completion of project. 10% is added to cover such possible increase.	$ 375.00	$ 625.00	
2. 6(C) Operating materials and supplies are estimated at a minimum. Unforseen consumption of same might increase such costs 20%.	488.00	776.00	
3. 6(D) Operating equipment loss and depreciation may readily be increased 20% due to excessive loss of casing and counters.	489.00	815.00	
4. 6(E) Rehabilitation and repairs to field autos and to casing for holes may readily be increased 40%.	60.00	500.00	
5. 6(G) Miscellaneous costs should probably be increased 40% due to contingency of considerable more rig time required for probing and pulling casing in the event that cavings wedge the probe or casing.	1,128.00	1,752.00	
	$ 2,540.00	$ 4,468.00	
Total 6(H)			$ 7,008.00

7. APPLICANT'S SHARE OF COST -

In accordance with DMEA regulations, Price Exploration Company is prepared to pay 25% 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, materials, and supplies used. Reimbursement by DMEA will be in accordance with Schedule 1, less 25%; i.e., the amount to be loaned by the Government for each unit of work performed will be 25% less than the amounts shown on Schedule 1.

Respectfully submitted,

PRICE EXPLORATION COMPANY

By: George R. Francis
Operating Manager

SCHEDULE I

Summary of Costs
Project Cost Per Unit, Basis 39,715 Foot Hole

	Phase 1 Cost	Phase 2 Cost	Project Cost	Unit Cost
6.				
(A) Independent Contract -				
1. Drilling	$ 17,351.25	$ 26,950.00	$ 44,301.25	$1.12
2. Coring	24,727.50	38,406.50	63,134.00	1.59
3. Road and Location Building	7,500.00	11,600.00	19,100.00	.48
(B) Labor, Supervision, etc. -	3,750.00	6,250.00	10,000.00	.25
(C) Operating Materials & Supplies	2,440.00	3,880.00	6,320.00	.16
(D) Equipment Depreciation & Loss	2,445.00	4,075.00	6,520.00	.16
(E) Rehabilitation and Repairs	150.00	1,250.00	1,400.00	.04
(F) New Buildings, etc.	None	None	None	-
(G) Miscellaneous	3,570.00	5,630.00	9,200.00	.23
(H) Contingencies	2,540.00	4,468.00	7,008.00	.17
Totals	$ 64,473.75	$102,509.50	$166,983.25	$4.20
DMEA, 75% Share Costs	$ 48,355.31	$ 76,882.13	$125,237.44	$3.15
Price Exploration Company 25% Share Costs	$ 16,118.44	$ 25,627.37	$ 41,745.81	$1.05

SCHEDULE 2

Drilling and Coring Depths

Phase 1

Hole Number	Depth of Hole 120' in MS	Drilling Footage Per Hole	Coring Footage per Hole 0 - 200'	200' - 400'	400' - 600'
1	195	75	120		
2	205	85	115	5	
3	230	110	90	30	
4	225	105	95	25	
5	275	155	45	75	
6	275	155	45	75	
7	330	210		120	
8	250	130	70	50	
9	310	190	10	110	
10	360	240		120	
11	285	165	35	85	
12	370	250		120	
13	310	190	10	110	
14	350	230		120	
15	380	260		120	
16	390	270		120	
17	270	150	50	70	
18	325	205		120	
19	390	270		120	
20	420	300		100	20
21	290	170	30	90	
22	335	215		120	
23	375	255		120	
24	445	325		75	45

SCHEDULE 2

Drilling and Coring Depths

Phase 1

Hole Number	Depth of Hole 120' in MS	Drilling Footage Per Hole	Coring Footage per Hole 0 - 200'	200' - 400'	400' - 600'
1 - 24, Incl. Totals			715	2,100	65
25	245	125	75	45	
26	300	180	20	100	
27	335	215		120	
28	360	240		120	
29	395	275		120	
30	275	155	45	75	
31	305	185	15	105	
32	355	235		120	
33	375	255		120	
34	385	265		120	
35	440	320		80	40
36	335	215		120	
37	345	225		120	
38	335	215		120	
39	310	190	10	110	
40	325	205		120	
41	365	245		120	
42	315	195	5	115	
43	375	255		120	
44	435	315		85	35
45	320	200		120	
46	320	200		120	
47	415	295		105	15
Totals Phase 1		9,915'	885'	4,600'	155'

SCHEDULE 2

Drilling and Coring Depths

Phase 2
(Based on Phase 1)

Hole Number	Drilling Footage	Coring Footage		
		0 - 200'	200' - 400'	400' - 600'
48 to 120 Incl.	15,400'	1,375'	7,144'	241'

Exhibit 1.

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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

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

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
FEB 23 1955

Not to be filled in by applicant

Docket No. 3694
Metal or Mineral Uranium, Vanadium
Date Received 2-23-55
Estimated Cost $166,983.25
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 St.
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. Willow Basin Claims.

(*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.

(*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 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 3 and 4.

(*c*) The work will start within 60 days and be completed within 10 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. See attached application.

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 January 25, 1955

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.

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	46¼%
M. L. Price,	P. O. Box 1111, Bartlesville, Oklahoma	46¼%
E. L. Gallery,	P. O. Box 1111, Bartlesville, Oklahoma	5 %
Alton H. Rowland	P. O. Box 1111, Bartlesville, Oklahoma	2½%

EXHIBIT 3

Title Data

Claim Name	Location Date	Recording Date	Book	Page
Big Boy No. 1	Mar. 15, 1954	Apr. 7, 1954	368	357
Big Boy No. 2	Apr. 2, 1954	Apr. 7, 1954	368	358
Big Boy No. 3	Apr. 2, 1954	Apr. 7, 1954	368	359
Big Boy No. 4	Apr. 2, 1954	Apr. 7, 1954	368	360
Big Boy No. 5	Jun. 25, 1954	Jul. 14, 1954	377	454
Golda No. 1	Apr. 3, 1954	Apr. 14, 1954	369	22
Golda No. 2	Apr. 2, 1954	Apr. 14, 1954	369	23
Golda No. 3	Apr. 3, 1954	Apr. 14, 1954	369	24
Golda No. 4	Apr. 3, 1954	Apr. 14, 1954	369	25
Bill Dean No. 1	Jun. 10, 1954	Jun. 30, 1954	377	246
Bill Dean No. 2	Jun. 10, 1954	Jun. 30, 1954	377	247
Bill Dean No. 3	Jun. 10, 1954	Jun. 30, 1954	377	248
Deer Run No. 1	Jul. 15, 1954	Aug. 16, 1954	386	271
Deer Run No. 2	Jul. 15, 1954	Aug. 16, 1954	386	272
Ada No. 1	Sep. 23, 1954	Sep. 29, 1954	387	309

Since the above claims had been located on lands on which prior U. S. oil and gas leases had been issued, amended locations were filed under Public Law 585, on all except the Ada No. 1 claim, as follows:

Claim Name	Location Date	Recording Date	Book	Page
Big Boy No. 1	Sep. 9, 1954	Sep. 15, 1954	386	277
Big Boy No. 2	Sep. 9, 1954	Sep. 15, 1954	386	278
Big Boy No. 3	Sep. 9, 1954	Sep. 15, 1954	386	279
Big Boy No. 4	Sep. 9, 1954	Sep. 15, 1954	386	280
Big Boy No. 5	Sep. 24, 1954	Sep. 29, 1954	387	310
Golda No. 1	Sep. 10, 1954	Sep. 15, 1954	386	273
Golda No. 2	Sep. 10, 1954	Sep. 15, 1954	386	274
Golda No. 3	Sep. 10, 1954	Sep. 15, 1954	386	275
Golda No. 4	Sep. 10, 1954	Sep. 15, 1954	386	276
Bill Dean No. 1	Sep. 9, 1954	Sep. 15, 1954	386	269
Bill Dean No. 2	Sep. 9, 1954	Sep. 15, 1954	386	270
Bill Dean No. 3	Sep. 28, 1954	Sep. 29, 1954	387	308
Deer Run No. 1	Sep. 10, 1954	Sep. 15, 1954	386	271
Deer Run No. 1	Sep. 10, 1954	Sep. 15, 1954	386	272

EXHIBIT 3
(Continued)

The original locators of the five Big Boy, four Golda, three Bill Dean and two Deer Run claims sold and transferred all their rights by appropriate mining deeds to George G. Travis, as follows:

Big Boy claims 1 to 5 incl. by Mining Deed dated Oct. 13, 1954, and recorded Oct. 20, 1954 in Book 389, Page 75.
Gold claims 1 to 4 incl. by Mining Deed dated Oct. 13, 1954, and recorded Oct. 13, 1954 in Book 382, Page 559.
Bill Dean claims 1, 2 and 3, by Mining Deed dated Oct. 13, 1954, and recorded Oct. 20, 1954 in Book 389, Page 74.
Deer Run claims 1 and 2, by Mining Deed dated Oct. 13, 1954, and recorded Oct. 13, 1954 in Book 382, Page 559.

The Price Exploration Company received and recorded mining deeds on all the project claims as follows:

Big Boy claims 1 to 5 incl. by Mining Deed dated Dec. 10, 1954, and recorded Dec. 27, 1954, in Book 396, Page 57.
Golda claims 1 to 4 incl. by Mining Deed dated Dec. 10, 1954, and recorded Dec. 27, 1954, in Book 396, Page 55.
Bill Dean claims 1, 2 and 3, by Mining Deed dated Dec. 10, 1954, and recorded Dec. 27, 1954, in Book 396, Page 53.
Deer Run claims 1 and 2, by Mining Deed dated Dec. 10, 1954, and recorded Dec. 27, 1954, in Book 396, Page 55.
Ada claim No. 1, by Mining Deed dated Dec. 10, 1954, and recorded Dec. 27, 1954, in Book 396, Page 59.

BRIEF GEOLOGIC REPORT ON A PROPERTY IN WILLOW BASIN

Description and Location

Property of Price Exploration Company in the West Paradox mining district consists of 15 claims located in portions of Sections 25 and 26, T. 48 N; R. 20 W., Montrose County, Colorado. Fig. 1 shows the property and its relationship to local mines and known mineralization. Fourteen (14) of the 15 claims were originally filed in accordance with the provisions of "Circular 7" of the Atomic Energy Commission. The claims were staked, the location notices filed out, posted and recorded in the Montrose County Courthouse. Application for a mining lease has been made to the Atomic Energy Commission on all but three of the claims within the time provided by "Circular 7". On or about August 16, 1954 the claims were purchased from the original locators by George G. Travis, and that purchase has been recorded. Since that date the claims have been surveyed, discovery monuments and side-center monuments erected, discovery pits excavated, new notices posted and recorded pursuant to Public Law 585.

On September 23, 1954 the Ada #1 claim was located by C. W. Shannon, a Geologist of Price Exploration Company, to fill in the gap known to exist as a result of the surveying.

Stratigraphy

The subject property is mainly located on the Brushy Basin member of the Morrison formation of late Jurassic Age. The overlying Dakota-Burro Canyon formation covers a small portion of the north side of the property as shown by the accompanying map, Fig. 1.

The uranium ore objective, the Salt Wash member of the Morrison formation, underlies the Brushy Basin member. The Salt Wash is exposed just east and south

of the property, but it is not exposed anywhere on the claims. In this area the Salt Wash consists of four or more sandstone benches separated by interbedded vari-colored bentonitic shale and siltstone. The sandstone benches are composed of numerous discontinuous lenses of cross-bedded, fluviatile, coarse-grained, buff to gray channel sandstone, containing clay and mudstone inclusions and considerable carbonaceous material. The uranium mineralization in the region occurs usually near the base of the thicker sandstone lenses, and where abundant carbonaceous material, mudstone and siltstone impurities are present.

The Brushy Basin is expected to be about 320 feet thick and the Salt Wash is approximately 365 feet thick. The Dakota-Burro Canyon cover on a small portion of the area will increase the drilling depths by 100 feet.

The Columnar Section

A stratigraphic section was measured in a good outcrop area adjacent to the Willow Basin property. The section was measured, using a plane table, a rod and an alidade, with special care exercised in making vertical angle corrections on all distances. It is believed that the resulting thicknesses represent a true measure of the total Morrison and Burro-Canyon sections expected in the proposed drilling program on the Willow Basin claims.

The thicknesses measured are as follows:

Burro-Canyon - 90 ft.

Brushy Basin - 320 ft.

Salt Wash - 365 ft.

Summerville - 75 ft.

The lithologies of the various beds are indicated on the Columnar Section so they will not be repeated. It is noted that there are six distinctive sandstones measured in the Morrison-Salt Wash. In all probability, these sandstones will not all persist as separate ledges, but instead, two or more of them will merge to form the four ledges generally recognized in this area.

On the basis of the measured section, the topographic elevation and the structural contours on top of the Salt Wash member, the drilling depths through the first 120 feet of the Salt Wash sandstone have been estimated for the proposed holes and listed below:

Hole No.	Depth to Jms Plus 120 ft.	Hole No.	Depth to Jms Plus 120 ft.	Hole No.	Depth to Jms Plus 120 ft.
1	195	17	270	33	375
2	205	18	325	34	385
3	230	19	390	35	440
4	225	20	420	36	335
5	275	21	290	37	345
6	275	22	335	38	335
7	330	23	375	39	310
8	250	24	445	40	325
9	310	25	245	41	365
10	360	26	300	42	315
11	285	27	335	43	375
12	370	28	360	44	435
13	310	29	395	45	320
14	350	30	275	46	320
15	380	31	305	47	415
16	390	32	355		

The Hunt Oil Company is currently drilling the property immediately north of the Willow Basin claims. They have completed the first three holes whose locations are shown on Fig. 2.

Hole No. 1 was drilled to a depth of 465 feet; Nos. 2 and 3 were drilled to 350 feet. Cores from the three holes showed a section composed of mud, clay, siltstone, and a few thin sand layers. The USGS is of the opinion that the three holes are located in a fault zone, thus explaining the absence of identifiable Salt Wash.

Geologic Cross Section and Contour Map

A geologic cross section was constructed northeast-southwest, along line A-A on Figure 2, across the Willow Basin claims. The cross section shows the fault boundary on the southwest and the northeast dip of 10 to 20 degrees. The dip increases the drilling depths on the northeast portion of the property so that it is practical to confine the initial exploration for uranium mineralization to the shallower portion which lies south of the Burro-Canyon-Brushy Basin contact. The cross section indicates that drill holes testing the first 120 feet of the Salt Wash member will range in depth from 225 to 450 feet, providing the test holes are confined to the Brushy Basin outcrop area.

The cross section and structural contours on top of the Salt Wash member indicate the northeast dip toward the synclinal slump axis. The present dip is exactly the reverse of the dip known to exist during the growth of the Paradox Valley anticline. The present dip came about when the sub-crustal support of the anticlinal arch was removed by solution of the intruded salt so that the arch collapsed to form the present synclinal graben.

Ore Deposits

The ore deposits in the Paradox Valley and Monogram Mesa areas have been confined to the Salt Wash member. Recent exploration has indicated additional mineralization in the basal Chinle formation of Triassic Age. Some of the ore bodies in the Salt Wash can be traced over a distance of several thousand feet

with variable thicknesses, and contain a hundred thousand or more tons of relatively high grade uranium-vanadium ore.

The ore deposits are largely in the form of lenticular rolls or lenses. They lie parallel to the bedding planes and are usually related to the thickening of a sandstone lens within a certain zone. Most of the deposits in this region occur just beneath one or more of the four Salt Wash sandstone benches. It is reported that approximately 90% of the ore in the Paradox-Uravan area occurs in the ore horizons known as A and B in the upper sandstone benches of the Salt Wash member. These zones normally occur in the upper 120 feet of the Salt Wash member. For instance, it is known that the Radium Cycle mine, shown on Fig. 1, is located in ore horizon B, as is the Madame Curie mine. The Valley-View mine is associated with the Wingate Salt Wash thrust contact and is not confined to any one sandstone bench. Consequently, it is felt that the mineralization possibilities of the Willow Basin claims will be adequately tested if all the drill holes are carried through the upper 120 feet of the Salt Wash member. The ore bodies appear to parallel the northwest-southeast structural trend throughout the region, and are closely clustered along certain fault zones and lithological trends. The Salt Wash ore deposits are usually composed of the uranium-vanadium minerals: carnotite, vanoxite, hewettite, corvusite, tyuyamunite, and rauvite. The mineralization appears as black and yellow zones and streaks in porous sandstone lenses associated with carbonaceous material and clay impurities.

It is not known whether the secondary concentration of the uranium minerals came about before or after the collapse. There is conflicting evidence to support both theories. However, it is known that most of the ore bodies developed so far have been in or near the boundary zone of shearing, subsidence, and crushing. There seems to have been a definite structural control for the formation of commercial ore bodies. Since the uranium deposits and minerals in this area are secondary in nature, they must have been formed by resolution of the primary

mineralization, transportation downdip or along zones of increased permeability, and redeposition as caused by changes in dip or permeability or by the presence of precipitating agents such as carbonaceous material, vanadium, or certain clay minerals.

The ore deposits in the region have probably been formed by hydrothermal mineralizing solutions originating in the intrusions of the La Sal mountains in late Cretaceous or early Tertiary time. Faults, fractures, and porous zones may have facilitated the flow of solutions into the surrounding host rocks. Those same faults, fractures, and porous zones, together with channel sandstone deposits rich in vanadium, clay minerals, and carbonaceous materials may have controlled the resolution of the soluble uranium minerals and their redeposition in more concentrated bodies to form commercial ore.

Evaluation

The subject property appears to be ideally located in respect to the above factors so important in the formation of ore bodies. The property lies in a small basin down flank from the axis of the structural anticline, which has proven to be mineralized on both flanks. The old Madame Curie mine is located 1-3/4 miles to the northeast in the down-dropped block and much nearer the structural anticlinal axis. The Radium Cycle, Valley View and Red Bird mines are located on the opposite flank of the Paradox anticline in a similar faulted environment. The slump block position and the intersecting faults adjacent to the area are identical to the Monogram Mesa area where ore is so prevalent.

The Yellow Spot, Sumner, and Morning Star mines are located two miles south of Willow Basin, and likewise, adjacent to the "zone of shearing subsidence, and crushing". The famous Vanadium Queen, Grinning Ape, Gray Dawn, Little Don, and Little Peter mines are four miles southwest of the basin along LaSal Creek. Chiles copper-vanadium Jackpot prospect is located four miles northeast of the basin. Consequently, it can be said that the Willow Basin claims are completely surrounded by mines or known mineralization within a radius of four miles.

Justification For Exploration

No definite mineralization could be found on the property as it is all covered by the Brushy Basin. However, mineralization has been found in the northeast corner of Sec. 25 T. 48 N, R. 19 W, where the Dakota is exposed just one half mile from the property. Rich uranium mineralization has been found on the Yankee Uranium Company Wren group of claims located just north of West Paradox Creek in S.E. cor. Sec. 19, T 48 N, R 19 W. This mineralization is one fourth mile south of the Madame Curie mine. Drilling is necessary to determine the presence of mineralization on the property, but as noted, it has been found in adjacent Salt Wash outcrops. Past experience in the area has indicated a success ratio of six ore bodies discovered by drilling to every ore body discovered by means of observed mineralization on the outcrop. The property selected for drilling is located in a favorable position in respect to mineralizing trends, operating mines, and structural controls. The drilling depths are expected to vary from 225 to 450 feet, depending on the extent of Brushy Basin cover, with an average depth to the base of the ore zones of the Salt Wash of 330 feet. Therefore, a systematic, two-stage drilling program covering that portion of the 15 claims below the Burro-Canyon-Brushy Basin contact would consist of approximately 4 holes per claim during Stage I drilling followed by Stage II, where an additional 16 holes per claim would be drilled, or a total of 20 holes per claim in those areas where mineralization was found during Stage I. It is unlikely that mineralization will be found in more than 40% of the Stage I holes, so that the total number of holes required can be reduced to 120, or to a total footage of 39,600 feet.

M. D. Quigley

M. Darwin Quigley
Geologist

MDQ:jb

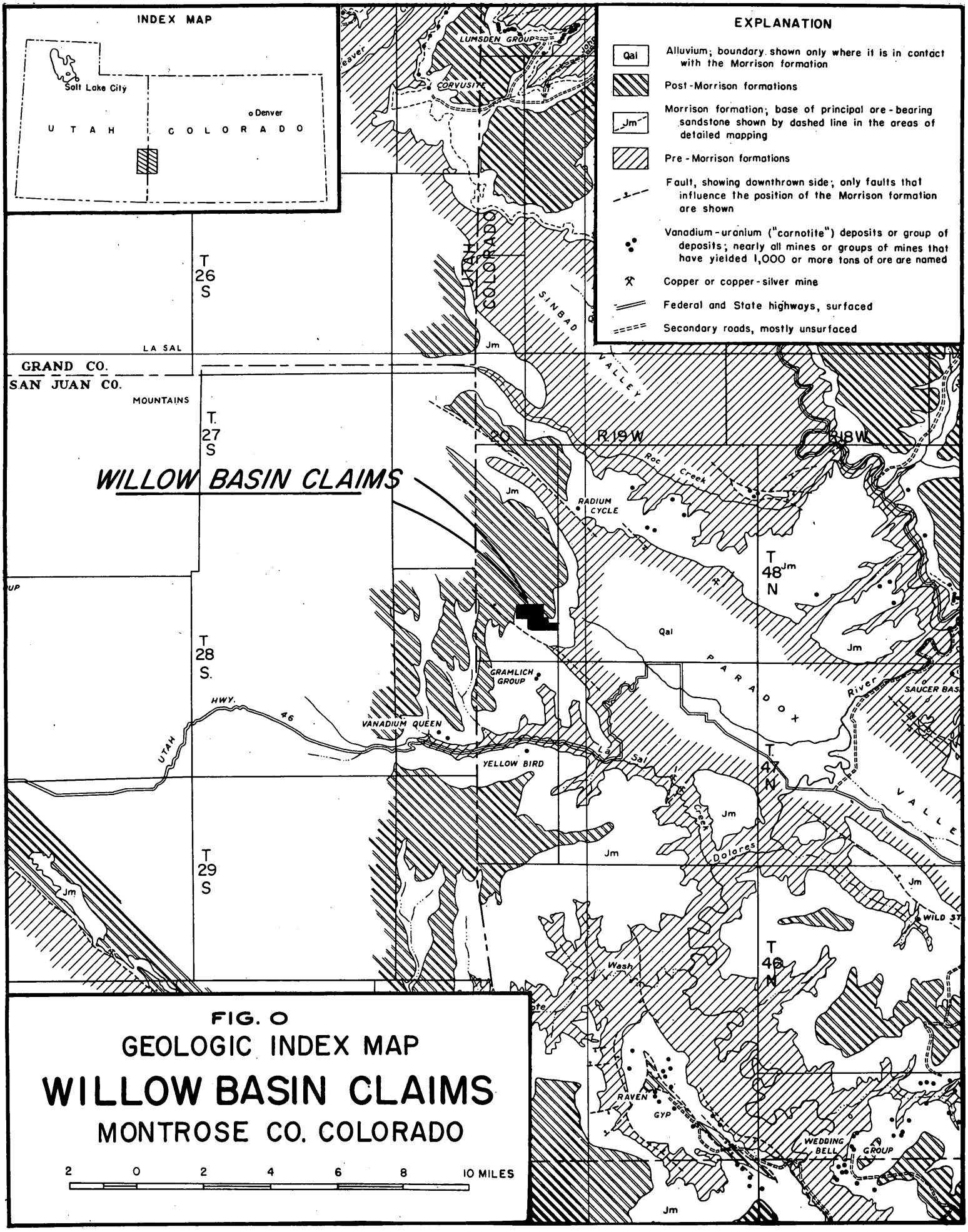

FIG. O

GEOLOGIC INDEX MAP

WILLOW BASIN CLAIMS

MONTROSE CO. COLORADO

2 0 2 4 6 8 10 MILES

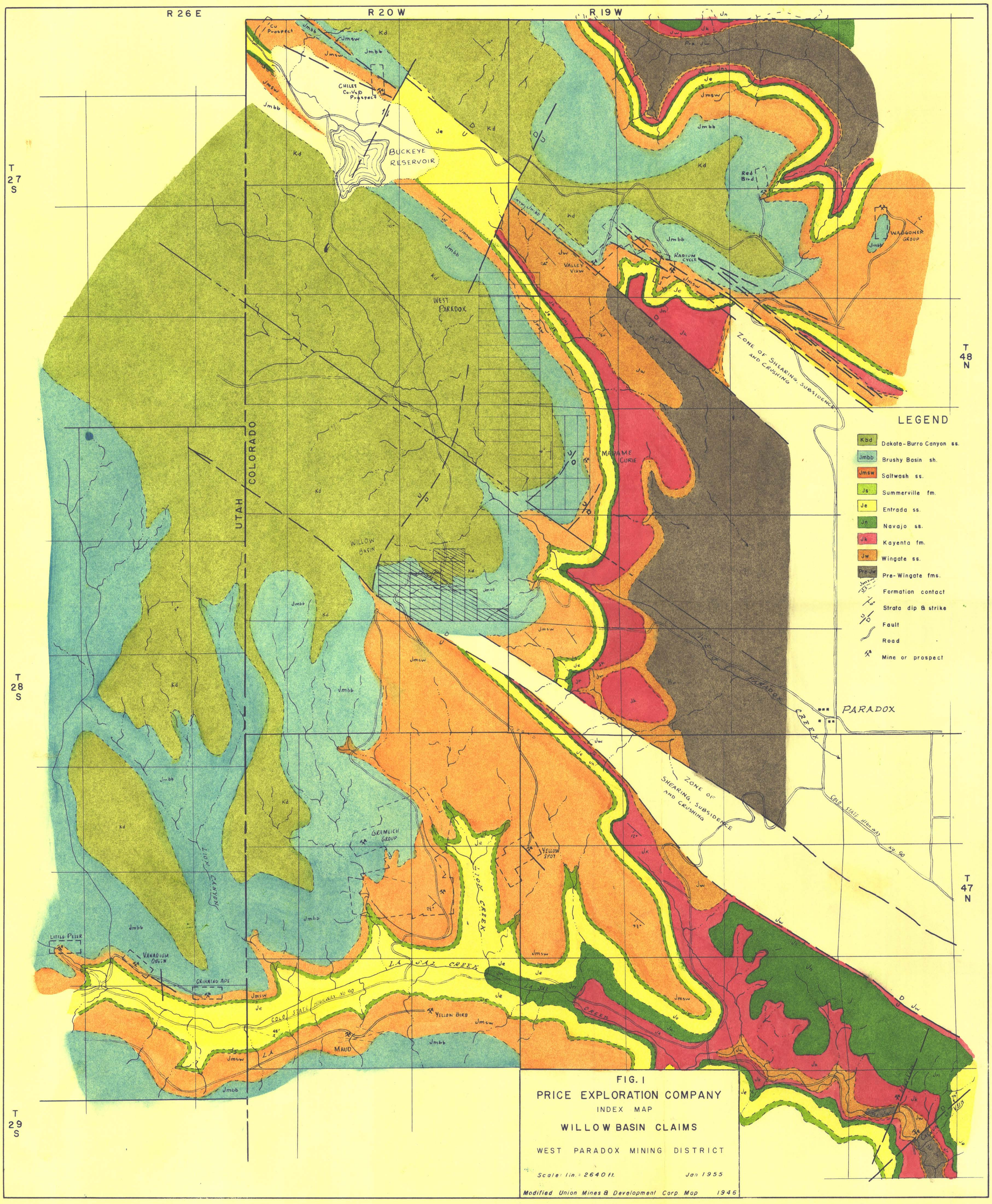

FIG. I
PRICE EXPLORATION COMPANY
INDEX MAP
WILLOW BASIN CLAIMS
WEST PARADOX MINING DISTRICT

Scale: 1in. = 2640 ft. Jan 1955

Modified Union Mines & Development Corp. Map 1946

— FIGURE 2 —

PRICE EXPLORATION COMPANY

WILLOW BASIN CLAIMS

Scale: 1 in. = 200 ft. October 1954

Contour Interval = 50 ft.

Structure Contours on top of the Salt Wash Fm.