DMA Form 1

DEFENSE MINERALS ADMINISTRATION
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DMA Docket No. 1478-X

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**CONTROLLED DOCUMENT**

Mr. [illegible]
Executive Officer
[illegible] Zone, Region IV
22[illegible] Federal Building
Denver 2, Colorado

Re: Docket No. [illegible]-1 [illegible] (Uranium)
Minerals Exploration & Mining & Rare Metals
Horse Canyon No. 1, and Silver Fall
1 and 2, Circle Cliffs Mining District
Kane and Garfield Counties, Utah

Dear Mr. [illegible]

Replying to your inquiry of March 31, 1953, please be advised that since we received no response to our request of February 16, 1952, to the applicant for copies of the leases and subordination agreements for the above-named claims, the Docket was subsequently closed on our records.

Sincerely yours,

George O. Schaffer

Chairman, Operating Committee

APPROVED:

E. R. Nelson

Director, Bureau of Mines

A. R. [illegible]

Director, Geological Survey

Schult/la 4-6-53
cc to: Adm. Reading File
Operating Committee
Docket
Messrs. [illegible] Butler, Jr. Rm. 3206 GSA
[illegible] Meiser, Rm. 3647
Ellis
Houk
[illegible] A Field Team, Region IV

The Hinds Uranium Mining and
Rare Metals Company
P. O. Box 191
Richfield, Utah

Subject: Docket No. DMEA-1473 - Uranium
Horse Canyon No. 1, and
Silver Falls 1 and 2
Circle Cliffs Mining District
Kane and Garfield Counties, Utah

Gentlemen.

Reference is made to our request that you supply us with copies of the leases and subordination agreements on the Horse Canyon No. 1, and Silver Falls 1 and 2 claims in the Circle Cliffs Mining District in Kane and Garfield Counties, Utah.

Inasmuch as considerable time has elapsed, and we have had no information on the ownership of the claims under lease, we assume you are no longer interested in obtaining exploration assistance. The Defense Minerals Exploration Administration wishes to allow you ample time but if the requested subordination agreements, and copies of leases, are not received in this office by March 15th, your application will be closed.

Sincerely yours,

Lawrence C. Houk, Acting Chief
Non-Metallic Minerals Division
Defense Minerals Exploration
Administration

LCHouk:gad
2/13/52
Copy to: Region IV (2)
Mr. Kauffman, 1347
Mr. A. F. Butler, Naval Gun Factory
Admin. Pending File
Docket File
Mr. Houk

Mr. Fred Hinds
P. O. Box 191
Richfield, Utah

Subject: Docket No. DMEA-1478 - Uranium
Horse Canyon No. 1, and
Silver Falls 1 and 2
Circle Cliffs Mining District
Kane and Garfield Counties, Utah

Dear Mr. Hinds:

Reference is made to our request that you supply us with copies of the leases and subordination agreements on the Horse Canyon No. 1, and Silver Falls 1 and 2 claims in the Circle Cliffs Mining District in Kane and Garfield Counties, Utah.

Inasmuch as considerable time has elapsed, and we have had no information on the ownership of the claims under lease, we assume you are no longer interested in obtaining exploration assistance. The Defense Minerals Exploration Administration wishes to allow you ample time but if the requested subordination agreements, and copies of leases are not received in this office by March 15th, your application will be closed.

Sincerely yours,

Lawrence G. Houk, Acting Chief
Non-Metallic Minerals Division
Defense Minerals Exploration
Administration

LGHouk:gad
2/13/52
Copy to: Region IV (2)
Mr. Kauffman, 1347
Mr. A. P. Butler, Naval Gun Factory
Admin. Reading File
Docket File
Mr. Houk

The Hinds Uranium Mining and
Rare Metals Company
P. O. Box 191
Richfield, Utah

Subject: Docket No. DMEA-1478 - Uranium
Horse Canyon No. 1, and
Silver Falls 1 and 2
Circle Cliffs Mining District
Kane and Garfield Counties, Utah

Gentlemen:

Reference is made to our request that you supply us with copies of the leases and subordination agreements on the Horse Canyon No. 1, and Silver Falls 1 and 2 claims in the Circle Cliffs Mining District in Kane and Garfield Counties, Utah.

Inasmuch as considerable time has elapsed, and we have had no information on the ownership of the claims under lease, we assume you are no longer interested in obtaining exploration assistance. The Defense Minerals Exploration Administration wishes to allow you ample time but if the requested subordination agreements, and copies of leases, are not received in this office by March 15th, your application will be closed.

Sincerely yours,

Lawrence G. Houk, Acting Chief
Non-Metallic Minerals Division
Defense Minerals Exploration
Administration

LGHouk:gad
2/13/52
Copy to: Region IV (2)
Mr. Kauffman, 1347
Mr. A. F. Butler, Naval Gun Factory
Admin. Reading File
Docket File
Mr. Houk

600

FEB 14 1952

Mr. Fred Hinds
P. O. Box 191
Richfield, Utah

Subject: Docket No. DMEA-1478 - Uranium
Horse Canyon No. 1, and
Silver Falls 1 and 2
Circle Cliffs Mining District
Kane and Garfield Counties, Utah

Dear Mr. Hinds:

Reference is made to our request that you supply us with copies of the leases and subordination agreements on the Horse Canyon No. 1, and Silver Falls 1 and 2 claims in the Circle Cliffs Mining District in Kane and Garfield Counties, Utah.

Inasmuch as considerable time has elapsed, and we have had no information on the ownership of the claims under lease, we assume you are no longer interested in obtaining exploration assistance. The Defense Minerals Exploration Administration wishes to allow you ample time but if the requested subordination agreements, and copies of leases are not received in this office by March 15th, your application will be closed.

Sincerely yours,

-S-

Lawrence G. Houk, Acting Chief
Non-Metallic Minerals Division
Defense Minerals Exploration
Administration

LGHouk:gad
2/13/52
Copy to: Region IV (2)
Mr. Kauffman, 1347
Mr. A. P. Butler, Naval Gun Factory
Admin. Reading File
Docket File
Mr. Houk

600

FEB 14 1952

Mr. John A. Robertshaw, Jr.
Robertshaw-Fulton Controls Company
Greensburg, Pennsylvania

Subject: Docket No. DMEA-1478 - Uranium
Hinds Uranium Company
Garfield and Kane Counties, Utah

Dear Mr. Robertshaw:

Reference is made to our telephone conversation of February 11, 1952, on the subject application.

The Defense Minerals Exploration Administration will be pleased to receive an application on your mineral deposits in Garfield and Kane Counties, Utah. The application should include work completed since the Field Team's examination, and all work done by the Hinds Uranium Company. The application should include copies of the leases and subordination agreements from the lessors.

My understanding is that there will be a four- to six-weeks delay in your application, because of the necessity of completing certain field and office work in Utah.

Sincerely yours,

-S-

Lawrence G. Houk, Acting Chief
Non-Metallic Minerals Division
Defense Minerals Exploration
Administration

LGHouk:gad
2/12/52

Copy to: Admin. Reading File
Docket File
Mr. Kauffman, Jr., 1347
Mr. Butler, Jr., Naval Gun Factory
Mr. Houk

FILE COPY
SURNAME:

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

Ellis
Houk
Selfridge
Gibson
Mitchell

Mr. W. L. King
Executive Officer
DMEA Field Team, Region IV
221 New Customhouse Building
Denver 2, Colorado

APR 9 1953

Re: Docket No. DMEA-1476 (Uranium)
Hinds Uranium Mining Share Metals
Horse Canyon No. 1, and Silver Fall
1 and 2, Circle Cliffs Mining District
Kane and Garfield Counties, Utah

J.C. 4/9/53

Dear Mr. King:

Replying to your inquiry of March 31, 1953, please be advised that since we received no response to our request of February 11, 1952, to the applicant for copies of the leases and subordination agreements for the above-named claims, the docket was subsequently closed on our records.

Sincerely yours,

George C. Selfridge (JHB)
Chairman, Operating Committee

APPROVED:

J. H. Hodges (JHB)
Member, Bureau of Mines

A. R. Mickel, Jr. (JHB)
Member, Geological Survey

GLAult/gla 4-6-53
cc to: Adm. Reading File
Operating Committee
Docket
Messrs. APButler, Jr. Rm. 3206 GSA
HDKeiser, Rm. 3647
Ellis
Houk
DMEA Field Team, Region IV

4/3/53 gla

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

224 New Customhouse
Denver 2, Colorado

March 31, 1953

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
APR 3 1953

Memorandum

To: Chairman, Operating Committee

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docket No. DMEA - 1478 (Uranium), Horse Canyon No. 1, and Silver Fall 1 and 2, Circle Cliffs Mining District, Kane and Garfield Counties, Utah

Reference is made to a letter dated February 14, 1952 signed by the Acting Chief, Non-Metallic Minerals Division to The Hinds Uranium Mining Company and Rare Metals Company. This letter stated that if copies of the leases and subordination agreements were not received by March 15, 1952 the application would be closed. We have not received any further information. Kindly advise us the status of this application.

W. H. King

W. H. King

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

224 New Customhouse
Denver 2, Colorado

March 31, 1953

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
APR 3 1953

Memorandum

To: Chairman, Operating Committee

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docket No. DMEA - 1478 (Uranium), Horse Canyon No. 1, and Silver Fall 1 and 2, Circle Cliffs Mining District, Kane and Garfield Counties, Utah

Reference is made to a letter dated February 14, 1952 signed by the Acting Chief, Non-Metallic Minerals Division to The Hinds Uranium Mining Company and Rare Metals Company. This letter stated that if copies of the leases and subordination agreements were not received by March 15, 1952 the application would be closed. We have not received any further information. Kindly advise us the status of this application.

W. H. King

W. H. King

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

March 19, 1952

Memorandum

To: Mails and Files

From: Grace L. Ault
Rare and Misc. Metals Division

Subject: Closed dockets

The following dockets are returned for closing upon expiration of the 30-day period given the applicants to submit additional information needed to process the applications. Replies have not been received from any of these applicants.

DMEA-1478 Hinds Uranium Mining & Rare Metals
DMA-1622X Hester, George A.
DMA-1689X Romero, Ralph F.
DMA-1781X Sligh, George A. Jr.

Grace L. Ault

C
O
P
Y

C
O
P
Y

March 19, 1952

Memorandum

To: Mails and Files

From: Grace L. Ault
Rare and Mic. Metals Division

Subject: Closed dockets

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DMEA-1478 Hidds Uranium Mining & Rare Metals
DMEA-1622 Hester, George A.
DMEA-1689 Romero, Ralph F.
DMEA-1781 Sligh, George A. Jr.

/S/ Grace L. Ault

sa

FILE COPY
SURNAME:

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION
WASHINGTON 25, D. C. 600

Hugh
Ellis
Utah

The Hinds Uranium Mining and
Rare Metals Company
P. O. Box 191
Richfield, Utah

Subject: Docket No. DMEA-1479 - Uranium
Horse Canyon No. 1, and
Silver Falls 1 and 2
Circle Cliffs Mining District
Kane and Garfield Counties, Utah

Gentlemen:

Reference is made to our request that you supply us with copies of the leases and subordination agreements on the Horse Canyon No. 1, and Silver Falls 1 and 2 claims in the Circle Cliffs Mining District in Kane and Garfield Counties, Utah.

Inasmuch as considerable time has elapsed, and we have had no information on the ownership of the claims under lease, we assume you are no longer interested in obtaining exploration assistance. The Defense Minerals Exploration Administration wishes to allow you ample time but if the requested subordination agreements, and copies of leases, are not received in this office by March 15th, your application will be closed.

Sincerely yours,

cc 2/14

Lawrence G. Houk, Acting Chief
Non-Metallic Minerals Division
Defense Minerals Exploration
Administration

LGHouk:gad
2/13/52
Copy to: Region IV (2)
Mr. Kauffman, 1347
Mr. A. P. Butler, Naval Gun Factory
Admin. Reading File
Docket File
Mr. Houk

FILE COPY
SURNAME:

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION
WASHINGTON 25, D. C. 600

Houk
Ellis
Utah

FEB 14 1952

Mr. Fred Hinds
P. O. Box 191
Richfield, Utah

Subject: Docket No. DMEA-1478 - Uranium
Horse Canyon No. 1, and
Silver Falls 1 and 2
Circle Cliffs Mining District
Kane and Garfield Counties, Utah

Dear Mr. Hinds:

Reference is made to our request that you supply us with copies of the leases and subordination agreements on the Horse Canyon No. 1, and Silver Falls 1 and 2 claims in the Circle Cliffs Mining District in Kane and Garfield Counties, Utah.

Inasmuch as considerable time has elapsed, and we have had no information on the ownership of the claims under lease, we assume you are no longer interested in obtaining exploration assistance. The Defense Minerals Exploration Administration wishes to allow you ample time but if the requested subordination agreements, and copies of leases are not received in this office by March 15th, your application will be closed.

Sincerely yours,

Signed D.H. 2-14-52

Lawrence G. Houk, Acting Chief
Non-Metallic Minerals Division
Defense Minerals Exploration
Administration

LGHouk:gad
2/13/52
Copy to: Region IV (2)
Mr. Kauffman, 1347
Mr. A. P. Butler, Naval Gun Factory
Admin. Reading File
Docket File
Mr. Houk

BY

FILE COPY
SURNAME:

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION
WASHINGTON 25, D. C. 600

Houk
Ellis
Utah

FEB 14 1952

Mr. John A. Robertshaw, Jr.
Robertshaw-Fulton Controls Company
Greensburg, Pennsylvania

Subject: Docket No. DMEA-1478 - Uranium
Hinds Uranium Company
Garfield and Kane Counties, Utah

Dear Mr. Robertshaw:

Reference is made to our telephone conversation of February 11, 1952, on the subject application.

The Defense Minerals Exploration Administration will be pleased to receive an application on your mineral deposits in Garfield and Kane Counties, Utah. The application should include work completed since the Field Team's examination, and all work done by the Hinds Uranium Company. The application should include copies of the leases and subordination agreements from the lessors.

My understanding is that there will be a four- to six-weeks delay in your application, because of the necessity of completing certain field and office work in Utah.

Sincerely yours,

Signed L.H. 2-14-52

Lawrence G. Houk, Acting Chief
Non-Metallic Minerals Division
Defense Minerals Exploration
Administration

LGHouk:gad
2/12/52

Copy to: Admin. Reading File
Docket File
Mr. Kauffman, Jr., 1347
Mr. Butler, Jr., Naval Gun Factory
Mr. Houk

OL

Mr. Hewett

DEFENSE MINERALS ADMINISTRATION WASHINGTON, D. C.

Nov 30 2 24 PM '51

DEPARTMENT OF THE INTERIOR RECEIVED

DEC 3 1951

Defense Minerals Administration, Production Expansion Division.

UNITED STATES
DEPARTMENT OF THE INTERIOR

BUREAU OF MINES
1600 EAST FIRST SOUTH STREET
SALT LAKE CITY 1, UTAH

November 29, 1951
Air Mail
Special Delivery

Memorandum

To: Laurence Houk, Defense Minerals Administration, Washington, D. C.

From: Chief, Utah-Wyoming Branch, Mining Division

Subject: DMA-1478X, Hinds Uranium Mining Co., Garfield and Kane Counties, Utah

Ralph Roberts has asked that I supply you with information, as per your telephone conversation with him, on estimated costs which were contained in the engineering report on the subject property. The following is a breakdown of the items in question:

Truck rental and transportation

| | |
|---|---|
| 3 pickup trucks at $8.00 per day each for 60 days -------- | $1,440.00 |
| Operating supplies for 3 pickups at $2.00 per day each for 60 days ---------- | $ 360.00 |
| ✓Transportation of supplies and equipment to projects from purchasing points ----- | $1,700.00 |
| Total ---------- | $3,500.00 |

Supervision

| | |
|---|---|
| 1 Superintendent, 2 months at $600.00 per month -------- | $1,200.00 |
| 1 Foreman, 2 months at $500.00 per month ----- | $1,000.00 |
| Total ---------- | $2,200.00 |

1 Assistant foreman at $450 per month, prorata, for direct supervision of all projects (900 feet of adits over the 2-month period, or $1.00 per foot).

Labor

| | | |
|---|---|---|
| 6 crews: | 1 miner at $12.50 per day + O.T., etc. | $14.55 |
| each : | 2 muckers at $12.00 per day + O.T., etc. | $28.10 |
| | Total ---------- | $42.65 |

Costs estimated on basis of 5 feet advance per shift.

At the time the property was examined by the field team, Horse Canyon No. 1, and Silver Falls Nos. 1 and 2 claims were among those held by lease, according to information supplied by the applicant. Copies of the lease were not available during the examination period, and none has been submitted to this office. Undoubtedly the applicant now has his leases in proper order and will be able to submit the necessary copies.

Stephen R. Wilson

Stephen R. Wilson

November 29, 1951
Air Mail
Special Delivery

Memorandum

To: Laurence Houk, Defense Minerals Administration, Washington, D. C.

From: Chief, Utah-Wyoming Branch, Mining Division

Subject: DMA-1478X, Hinds Uranium Mining Co., Garfield and Kane Counties, Utah

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| Operating supplies for 3 pickups at $2.00 per day each for 60 days | $ 360.00 |
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| Total | $3,500.00 |

Supervision

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| Total | $2,200.00 |

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## Labor

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| each : | 2 muckers at $12.00 per day + O.T., etc. | $28.10 |
| | Total | $42.65 |

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Stephen R. Wilson

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

224 New Customhouse
Denver 2, Colorado

November 7, 1951

Memorandum

To: Executive Secretary, Defense Minerals Administration

From: DMA Field Team, Region IV

Subject: Final Report, DMA Docket 1478-X, Fred Hinds, applicant; Hinds Uranium Mining and Rare Metals Deposit, Richfield, Utah

Enclosed herewith are the original and two copies of the report on the subject docket.

We concur with the conclusions and recommendations of the examining team that the exploration loan of $49,778 be approved.

The brochure has been mislaid, and upon receipt of it in this office, it will be forwarded to you.

J. H. East, Jr.

A. H. Koschmann

DEFENSE MINERALS ADMINISTRATION WASHINGTON, D.C.
NOV 13 9 02 AM '51

Mining Division
Region IV

November 7, 1951

Memorandum

To: DMA Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: Final Report, DMA Docket 1470-X, Fred Hinds, applicant; Hinds Uranium Mining and Rare Metals Deposit, Richfield, Utah

The application of the subject docket was for an exploration loan of $500,000.

The company did not submit a definite program of exploration other than a general statement proposing core drilling, bulldozing, and other preliminary mining to determine the extent of the ore bodies.

Uranium minerals consisting of torbernite, autunite, and uranophane in the upper Triassic Shinarump formation. Limited exploration on the principal claims by the applicant indicated probable widespread occurrence of uranium mineralization in the Shinarump formation. It is expected that the uranium mineralization will increase in grade as the oxidized and leached zone is penetrated. The geological probability of discovery of important reserves is favorable.

The examining team proposes a more moderate program consisting of rim-stripping and adits at an estimated total cost of $49,770, and they recommended approval of the loan, with which we concur.

Paul T. Allsman

Paul T. Allsman

Mining Division
Date Rec'd
NOV. 5 1951
BUREAU OF MINES
Denver, Colorado

November 2, 1951

Memorandum

To: Paul T. Allman, Chief, Mining Division, Region IV

From: Chief, Utah-Wyoming Branch, Mining Division

Subject: DMA-1476-X, Hinds Uranium Mining Co., Garfield and Kane Counties, Utah.

Enclosed are the original and nine copies of the subject report, with a section on Summary, Conclusions and Recommendations.

The Survey report covering the property, with the brochure, was submitted September 13, 1951. This report outlined proposed exploration at a total cost of $44,645. Subsequent revised estimates and proposals resulted in an overall exploration total of $49,778, as shown in the attached engineering report.

I concur with the recommendations in the engineering report.

Stephen R. Wilson

Stephen R. Wilson

Enclosures - 2

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Defense Minerals Administration
200 New Customhouse
Denver 2, Colorado

September 17, 1951

Memorandum

To: DMA Field Team, Region IV

From: A. H. Koschmann

Subject: DMA Docket 1478X, Fred Hinds, Richfield, Utah (Uranium)

Enclosed are eight copies of the geologic report by H. K. Thurber of the U. S. Bureau of Mines and R. W. Osterstock of the U. S. Geological Survey, covering the above docket.

A. H. Koschmann
A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (9)

Room 307, 320 South Main
Salt Lake City 1, Utah
12 September 1951

Memorandum

To: A. H. Koschmann, Region IV Field Team

From: Ralph J. Roberts

Subject: Docket DMA-1478X, Fred Minds, Richfield, Utah (Uranium)

Enclosed are eight copies of a geologic report on Docket DMA 1478X, Fred Minds, Richfield, Utah Uranium Corporation claims.

The ore deposits of the Circle Cliffs district appear to be confined to the upper (?) Triassic Shinarump formation. The ore is found in thin-bedded lenticular red sandstones, sandy siltstones, and sandy shales in erosion channels within the Shinarump formation.

The ore minerals have been tentatively identified as carnotite, torbernite, and uranophane. It is estimated that the ore bodies will contain about 0.20 percent $U_3O_8$. The lack of exploratory data does not permit the calculation of ore reserves, but there may be substantial tonnages of ore below some of the leached surface outcrops containing ore minerals.

A suggested exploratory program consisting of rim-clearing and drifting to define the limits of the ore bearing zones has been outlined. It is recommended that the Defense Minerals Administration enter into a contract with the Minds Uranium Corporation for an exploratory loan in the amount of $64,645. On the 90 percent participation basis the government will contribute as its share $58,181.

I concur with the conclusions and recommendations of the examining geologist.

UNITED STATES
DEPARTMENT OF THE INTERIOR
OSCAR L. CHAPMAN, SECRETARY

DEFENSE MINERALS ADMINISTRATION

# REPORT OF EXAMINATION BY FIELD TEAM
# REGION IV

## Docket DMA 1478X, Fred Hinds,

## Richfield, Utah

(Uranium)

H. K. Thurber, Mining Engineer
U. S. Bureau of Mines

R. W. Osterstock, Geologist
U. S. Geological Survey

September 11, 1951

## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By. H. K. Thurber, Jr., and
R. W. Osterstock

The Hinds Uranium Mining Co., with mining claims in Garfield and Kane Counties, Utah, has applied for a DMA exploratory loan under Docket 1478-X. The property was examined by personnel of the Geological Survey and Bureau of Mines during July, 1951, at the request of the DMA Field Team, Denver, Colorado.

Uranium deposits in the area appear to be confined to the upper (?) Triassic Shinarump formation which unconformably overlies the lower Triassic Moenkopi formation and conformably underlies the upper Triassic Chinle formation. The Shinarump was deposited on an irregular erosional surface of the Moenkopi. Channels cut in the Moenkopi have been filled with Shinarump grits and sands, in some areas 50 feet deep and 100 yards wide.

Uranium minerals consisting of torbernite, carnotite and uranophane occur in thin-bedded sandstone and siltstone in the bottoms of the channels. Secondary copper minerals and carbonaceous material are commonly associated with the uranium minerals.

Definite exploratory proposals were not made by the company in the application. The examining team suggests that an exploratory program on the property consist of approximately 10,000 linear feet of rim stripping by bulldozer, and 900 feet of adits on the Red Head

No. 27, Horse Canyon No. 1, Silver Falls No. 1 and Silver Falls No. 2 claims. Limited exploration on these claims accomplished by the operator indicates the probable widespread occurrence of uranium mineralization in the Shinarump formation. It is expected that the uranium mineralization will increase in grade as the oxidized and leached zone is penetrated.

It is concluded that the Circle Cliffs area is a potential producer of uranium. A DMA loan of $49,778 for the Hinds Uranium Mining Company is recommended.

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Figure 1. Location map, Hinds Uranium Mining Company, Circle Cliffs area, Garfield County, Utah.

Figure 2. Silver Falls No. 2 Uranium prospect, Garfield County, Utah.

Figure 3. Geology between Escalante River and Halls Creek, Garfield and Kane Counties, Utah.

Docket DMA 1478X, Fred Hinds,

Richfield, Utah

(Uranium)

## GEOLOGY

The ore deposits in the Circle Cliffs district (see fig. 1) appear to be confined to sedimentary rocks of Triassic age. The formations that have potential economic significance are, in decreasing order of age: the Moenkopi, the Shinarump, and the Chinle.

Moenkopi formation.—The lower Triassic Moenkopi formation forms an almost continuous floor in the Circle Cliffs district (see fig. 3). Underlying the Moenkopi unconformably is the Permian Kaibab limestone. A distinct erosion interval separates the upper Moenkopi from the overlying Shinarump formation. The thickness of the Moenkopi varies from 304 to 500 feet [1]; the wide variation

[1] Gregory, H. E., The Kaiparowits Region, A geographic and geologic reconnaissance of parts of Utah and Arizona: U. S. Geol. Survey Prof. Paper 164, pp. 47-52, 1931

is ascribed mainly to erosional unconformities at the top and bottom of the formation.

The Moenkopi formation consists dominantly of interlaminated mudstones, sandy micaceous shales, thin-bedded platy sandstones, and lenses of fine- to medium-grained sandstone. Grits, conglomerates, and clay shales are generally lacking. A few thin discontinuous beds of the sandstone are calcareous. Very little gypsum is present in the beds in the Circle Cliffs district, although to the north, in the Capitol Reef region, gypsum is quite abundant. Ripple marks

and very fine cross-bedding are common. The color of the formation varies from brick-red to reddish brown and chocolate brown, with some beds weathering buff or cream. Immediately underlying the erosion surface at the top of the Moenkopi the sandy shales and mudstones are locally bleached and altered to grayish-green.

The weathered slopes of the Moenkopi are generally uniform but are occasionally broken by small benches. The uppermost beds often form a cliff where the more resistant overlying Shinarump acts as a protective cap.

Moenkopi-Shinarump erosion interval.—An interval of erosion after the deposition of the Moenkopi is indicated by the removal of parts of the upper Moenkopi beds, the bevelling of these beds, erosion channels, and a marked change in sedimentation above and below the erosion surface. In the Circle Cliffs district channels carved in the Moenkopi 10 to 50 feet deep and 50 to 100 yards wide are filled with Shinarump siltstones, grits, and coarse sandstones.

Shinarump conglomerate.—The upper (?) Triassic Shinarump conglomerate unconformably overlies the Moenkopi formation and conformably underlies the Chinle formation. In the Circle Cliffs district (see fig. 3) it is a gray irregularly cross-bedded massive sandstone with few conglomeratic lenses. Most exposures include a lower soft sandstone bed, a middle group of greenish-gray shale, and an upper massive cross-bedded sandstone that forms a resistant ledge. The ore zone appears to be confined to the lower, soft, massive, brown sandstone and grayish siltstone locally containing thin grayish-green sandy shales. The lateral extent of the various beds is limited by their lens-like nature. H. E. Gregory [1] has stated that from the head of Halls Creek and along

[1] Gregory, H. E., op. cit., pp. 52-53.

Capitol Reef Wash the Shinarump ranges in thickness from less than 30 feet to more than 100 feet.

Chinle formation.—The upper Triassic Chinle formation (see fig. 3) conformably overlies the Shinarump conglomerate. A. A. Baker [1], E. T. McKnight [2], C. H. Dane [3], and H. E. Gregory [4] all believe that the Shinarump

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[1] Baker, A. A., Geology of the Monument Valley-Navajo Mountain Region, San Juan County, Utah: U. S. Geol. Survey Bull. 865, pp. 44-47, 1936.

[2] McKnight, E. T., Geology of the area between the Green and Colorado Rivers, Grand and San Juan Counties, Utah: U. S. Geol. Survey Bull. 908, pp. 63-66, 1940.

[3] Dane, C. H., Geology of the Salt Valley anticline and adjacent areas: U. S. Geol. Survey Bull. 863, pp. 54-65, 1935.

[4] Gregory, H. E., op. cit., p. 52.

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conglomerate grades laterally and vertically into the lowermost beds of the Chinle. Consequently, the Shinarump is often regarded as the basal conglomerate of the Chinle formation. The thickness of the Chinle in the Circle Cliffs district averages about 600 feet.

The Chinle is generally composed of two parts, the lower consisting of dark-red sandy beds and the upper of calcareous lighter-colored beds. The lower sandy beds, although persistent regionally, show considerable local variation in composition and color. Individual beds can rarely be traced more than a few hundred feet. The most distinctive features of the Chinle are abundant fossil trees and the variegated colors of the shales.

Structure.—Regionally, the Circle Cliff district exhibits a gentle upwarp to the east with a more distinct monoclinal flexure downward near Halls

Creek. Gentle westerly dips are dominant over the area with which this report is concerned.

## ORE DEPOSITS

All of the ore deposits examined in the Circle Cliffs district are in the lower portion of the Shinarump conglomerate, though it is reported by Fred Hinds, the applicant, that the Chinle and Wingate formations also contain ore in the form of "blankets".

The extremely fine grained ore minerals which have been tentatively identified by the naked eye are: carnotite ($K_2O \cdot 2UO_3 \cdot V_2O_5 \cdot 2H_2O$), torbernite ($CuO \cdot UO_3 \cdot P_2O_5 \cdot 12H_2O$), uranophane ($CaO \cdot 2UO_3 \cdot 2SiO_2 \cdot 6H_2O$). The operators have reported tyuyamunite ($CaO \cdot 2UO_3 \cdot V_2O_5 \cdot nH_2O$) to be associated with carnotite. Malachite ($CuCO_3 \cdot Cu(OH)_2$) and azurite ($2CuCO_3 \cdot Cu(OH)_2$) are commonly found in association with uranium minerals, but a higher concentration of these brilliantly colored copper minerals does not necessarily indicate the presence of a higher proportion of uranium. Considerable black carbonaceous material in seams, stringers, and blebs accompanies the uranium minerals. Cross-bedded sandstones overlying the ore zones show much iron stain, mostly limonite, as flecks, blebs, small concretion-like bodies and thin coats on fracture surfaces. Gypsum is not uncommon in thin stringers which are generally parallel to the bedding.

The ore minerals appear to be confined to the lowest sandy beds of the Shinarump formation. Channels cut into the Moenkopi are commonly filled with alternating beds of medium- and coarse-grained sandstones and grits with some thin sandy shales and sandy siltstones. The ore is generally restricted to individual beds in the channel fillings. About 1 to 1-1/2 feet above the top

of Moenkopi thin-bedded red to brown to tan sandstones underlie about 6 inches of greenish-gray shale; this shale zone is reported by the operators to contain the highest-grade ore. Cross-bedding on a small scale is common in the lower Shinarump.

Fracture surfaces (see fig. 2) sometimes have thin coats of ore minerals, but the wall-rock adjoining the fractures is generally unmineralized.

It is believed that meteoric waters, possibly somewhat activated by nearby hydrothermal activity, deposited the ore minerals in particular beds of sandstone, siltstone, and shale that were especially porous and permeable. Whether or not favorable composition of the sandstones was a factor during the ore mineral deposition is not known at this time; however, higher concentrations of carbonaceous material do not seem to indicate higher concentrations of ore minerals. The original source of the uranium is unknown.

Oxidation and leaching of the outcrops containing uranium minerals, according to Phillip Dodd [1], can reduce the $U_3O_8$ content as much as 0.15 percent;

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[1] Dodd, Phillip, Preliminary report on copper-uranium mineralization of the White Canyon-Happy Canyon type: Colorado Scientific Society, 1951.

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leaching may extend inward about 5 to 20 feet and oxidation as much as 75 feet inward from the rim outcrops. Strong radiometric indications along the rim may be the result of emanations from disintegration products of the original uranium, so that highly radioactive samples may give low uranium assays.

Each mineralized zone is limited in lateral extent by the lens-like form of the ore-bearing bed; the thickness of the zone is limited to the thickness of the individual ore-bearing bed, which has not been seen to exceed 4 feet. How far the mineralized beds extend inward has not yet been determined, but it

seems reasonable to assume that the inward extent will be at least as great as the lateral extent.

## ORE RESERVES

No reserve tonnages have been calculated for any of the four claims examined. At the present stage of development work there is no plausible basis upon which estimates of the lateral, inward, and vertical dimensions of the ore-bodies can be made. It is possible that substantial tonnages of ore may exist behind some of the surface exposures. In the Circle Cliffs district the Shinarump, which is potentially the largest producer, has been at least 80 percent removed by erosion.

The grade of the deposits may be inferred from assays of samples taken from oxidized and leached exposures at the surface.

TABLE I

Sample assays taken from the Shinarump formation in the Circle Cliffs district

| Sample Number | $U_3O_8$ (percent) | Type | Description |
|---|---|---|---|
| USBM 1 | 0.040 | chem. | 2.5' cut taken at small opening, Red Head No. 27 |
| " 2 | 0.047 | " | 1.5' cut taken at surface, Horse Canyon No. 1 |
| " 3 | 0.096 | " | Ore pile grab, Silver Falls No. 1 |
| " 4 | 0.055 | " | 3.5' cut taken at surface, Silver Falls No. 1 |
| " 5 (see fig. 2) | 0.222 | " | 2.5' cut taken in adit, Silver Falls No. 2 |
| " 6 " | 0.175 | " | 2.5' cut taken in face of adit, Silver Falls No. 2 |
| " 7 " | 0.037 | " | 2.0' cut taken in crosscut, Silver Falls No. 2 |
| " 8 " | 0.421 | " | Ore pile grab, Silver Falls No. 2 |

| Sample Number | $U_3O_8$ (percent) | Type | Description |
|---|---|---|---|
| Smith-Emery | | | |
| 338125 | 1.11 | (?) | Red Head No. 143 |
| " 338125 | 1.00 | spectro. | Red Head No. 29 |
| " 339302 | 5.00 | Geiger | Red Head No. 68 |
| | 4.77 | chem. | |
| " 339301 | 1.14 | umpire (?) | Silver Falls No. 2 |
| " 339300 | 0.33 | umpire (?) | Silver Falls No. 2 |

Three U. S. Bureau of Mines samples taken from widely separated areas of mineralization (Red Head No. 27, USBM 1; Horse Canyon No. 1, USBM 2; Silver Falls No. 1, USBM 4; see fig. 3) indicate an average outcrop assay of about 0.047 percent $U_3O_8$; with an expected increase of about 0.15 percent $U_3O_8$ beyond the leached zone, the ore-bearing beds may contain about 0.20 percent $U_3O_8$. Development workings have penetrated the leached zone on only one claim, the Silver Falls No. 2 (see fig. 2), USBM samples No. 5 and 6, taken in the adit, assay 0.222 and 0.175 percent $U_3O_8$ respectively. These assays tend to substantiate the overall average content of about 0.20 percent $U_3O_8$.

Samples taken by the Hinds Uranium Corporation and assayed by the Smith-Emery Company of Los Angeles, California, average about 1.67 percent $U_3O_8$. These assays have not been considered in arriving at the average grade of 0.20 percent $U_3O_8$, because the method of sampling is unknown.

## PROPOSED EXPLORATION

No exploration program has been proposed by the Hinds Uranium Corporation; the following program is therefore suggested.

Red Head No. 27, Lampstand area (see fig. 3).--This claim has an opening extending about 8 feet inward from the face of the cliff. Most of the mineralization is in a lens of thin-bedded, brown sandstone and a thin grayish-

green sandy shale. It is suggested that about 2000 feet of rim-clearing in this area may expose some hitherto unidentified channels, some of which may contain ore minerals. It is also suggested that the present small opening be extended about 100 feet farther inward. Another 100-foot drift should be driven along a mineralized zone not more than 300 yards along the rim from the opening already started. The exact location of the second adit may be designated by the operators, on the basis of radiometric indications and assay data.

The rim-clearing should precede the inward exploration, because the accuracy of radiometric determinative methods increases rapidly as the ore-bearing ledges are exposed; thus the location of the new adit may be determined by more accurate radiometric and assay data.

Horse Canyon No. 1 (see fig. 3).--About 30 feet of rim-clearing comprises the total amount of exploration work on this claim. Thin-bedded brownish-red sandstone and a few thin shales at the base of the Shinarump formation appear to contain the ore minerals. It is suggested that about 1500 feet of rim-clearing may expose further ore-mineral bearing beds. It is also suggested that two 100-foot drifts, not more than 400 feet apart along the rim, be driven on this claim. The exact locations of the drifts, based on radiometric indications and assay data, may be designated by the operators, but the rim-clearing should precede the drifting.

Silver Falls No. 1 (see fig. 3).--The ore on this claim is in the lowest Shinarump in beds of bleached sandstone and grit. About 300 feet of cliff-face has been cleared by bulldozer. It appears that the lens-like beds containing

ore minerals have a lateral extent of at least 250 feet. The lateral extent of these beds may be more accurately determined and new ore-bearing beds may be exposed by about 3000 feet of rim-clearing in this area. It is also suggested that two adits, each 100 feet long, be driven about 100 feet apart; about 50 feet from their portals these adits should be connected by a crosscut. The exact locations of the adits, chosen on the basis of radiometric indications and assay data, may be designated by the operators, but the rim-clearing program should be completed before the drifts are located.

Silver Falls No. 2 (see figs. 2 and 3).—The ore minerals on this claim are in beds of grayish sandstone, sandy siltstone, and gray-green sandy shale in the Shinarump. An adit about 45 feet long has penetrated beyond the leached zone. About 250 feet north of the adit along the rim an adit 10 feet long was driven along a fissure coated with ore minerals. The 45-foot adit appears to be on the northwest flank of a large northeasterly trending channel. It is suggested that about 3500 feet of rim-clearing in this area may aid in delimiting the lateral extent of the mineralized zone now under exploration and may uncover new mineralized channels. It is also suggested that the present 45-foot adit be extended about 75 feet; and about 100 feet south of the present adit a new adit (125 feet long) may be nearer the center of the channel. About 50 to 75 feet from the portal of the new adit a crosscut should be driven to connect with the present adit about 50 to 75 feet from its portal. The exact locations of the new adit and the crosscut, on the basis of radiometric indications and assay data, may be designated by the operators. The rim-clearing program should be completed before driving the new adit, because the increased accuracy of radiometric methods will permit more accurate location of the portal.

It is believed that the suggested exploration program will provide valuable information regarding the lateral and inward persistence of the ore-bearing beds. Penetration beyond the leached and oxidized zones should provide additional information regarding the expected increased $U_3O_8$ content in the unleached, unoxidized zones. The goals of the suggested program can be accomplished efficiently only by drifting and crosscutting; extremely rough terrain and lack of water make diamond-drilling impracticable. Radiometric investigations are not feasible except for roughly defining ore-zones near the surface or along the rims.

If possible the drifts should stay on the particular beds or channels in which they were started. The crosscuts, generally normal to the axes of the channels, should not attempt to follow high-grade zones; thus the crosscuts will provide a statistical basis for the calculation of the frequency of high-grade zones paralleling the axes of the channels.

The total cost of the exploration program suggested will be $64,645.

## SUMMARY AND CONCLUSIONS

The ore deposits of the Circle Cliffs district appear to be confined to the upper(?) Triassic Shinarump formation, which unconformably overlies the lower Triassic Moenkopi formation and conformably underlies the upper Triassic Chinle formation. The Shinarump was deposited on a very irregular erosion surface of the Moenkopi; channels cut in the Moenkopi and filled with Shinarump grits and sandstones may be as much as 50 feet deep and 50 to 100 yards wide.

Most of the ore is in thin-bedded lenticular, brown, gray-green, and red sandstones, sandy siltstones, and sandy shales in the bottoms of the channels. It is believed that porosity, permeability and possibly the favorable composition of individual beds have served to localize the mineralization, but abundant

carbonaceous material does not indicate high concentrations of uranium. Meteoric waters, possibly somewhat activated by nearby hydrothermal action, probably served as the mineralizing solutions.

The ore minerals that have been tentatively identified are carnotite, torbernite, and uranophane. The operators report that tyuyamunite is associated with carnotite. Secondary copper minerals, limonite, gypsum, and carbonaceous material are commonly associated with the uranium minerals. Oxidation and leaching apparently reduce the $U_3O_8$ content in the surface exposures by about 0.15 percent. Samples taken from the rims assay about 0.05 percent $U_3O_8$. It is believed, therefore, that the average ore body will contain about 0.20 percent $U_3O_8$. No ore reserve tonnages have been calculated because there has not been enough exploration work to delimit any ore bodies. There may be substantial tonnages of ore behind some of the leached surface outcrops containing ore minerals.

The suggested exploration program, consisting of rim-clearing and drifting on four claims, is designed to define the limits of the ore-bearing beds known to contain ore minerals along the rim. Further information regarding the expected increase of uranium content beyond the leached and oxidized zone will be provided by drifting. It is also possible that additional ore-bearing channels, thus far undiscovered, will be exposed by the rim-clearing. The Hinds Uranium Corporation property is only in the initial stages of development, it is, therefore, deemed advisable to continue exploration in a more prudent and methodical fashion than the large-scale $500,000 operation outlined by the applicant.

It is recommended that the Defense Minerals Administration enter into a contract with the Hinds Uranium Corporation for an exploratory loan in the amount of $64,645. On the 90 percent participation basis the government will furnish as its share $58,181.

HINDS URANIUM MINING CO.
GARFIELD AND KANE COUNTIES, UTAH
DMA-1478-X
Uranium

Engineering Report

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HINDS URANIUM MINING CO.
GARFIELD AND KANE COUNTIES, UTAH

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ILLUSTRATIONS


Fig. 1 Location map, Hinds Uranium Mining Co., Garfield County, Utah
Fig. 2 Silver Falls No. 2 Uranium Prospect, Garfield County, Utah
Fig. 3 Geology between Escalante River and Halls Creek, Garfield and Kane Counties, Utah
Fig. 4 View of camp looking westwardly, Hinds Uranium Mining Co., Circle Cliffs area, Garfield County, Utah

## INTRODUCTION

The Hinds Uranium Mining Co., Commercial Bank Building, Richfield, Utah, has requested a DMA exploratory loan of $500,000, Docket 1478-X, to explore the company's uranium properties in the Circle Cliffs area 35 miles east of Escalante, Utah.

No program of exploration has been advanced by the company, with the exception of proposals for clearing ore horizons in accessible areas and driving adits to explore the deposits at depth beyond outcrops.

The property was examined July 1951 by a team consisting of a geologist of the U. S. Geological Survey and a Bureau of Mines engineer. This report appraises the engineering feasibility of proposed exploration on the property and the advisability of a DMA exploratory loan.

## ACKNOWLEDGMENTS

The Bureau of Mines wishes to acknowledge the aid given by the representatives of the company in conducting the examining team over the property, and to Mr. Hinds for providing maps and other factual data concerning claims, equipment and assays.

## LOCATION AND PHYSICAL FEATURES

The numerous claims held by the company cover a large area in the vicinity of the Circle Cliffs, Garfield and Kane Counties, Utah (fig. 1). The exploration proposed in this report, however, is confined to three areas in which some previous exploration has been done. One of these areas is in Sec. 33, T. 32 S., R. 7 E. The other areas

are on land that has not been surveyed, but probably will be in Secs. 1 and 2, T. 36 S., R. 7 E., and Sec. 15, T. 34 S., R. 6 E., when a survey is made. The camp site, also on land which has not been surveyed, is approximately 44 miles by primitive road from Escalante, Garfield County, Utah.

The Circle Cliffs area is an anticlinal valley trending approximately N. 25° W. and floored by upper Permian Kaibab limestone and lower Triassic Moenkopi sandstone and shale. The valley is cut by washes that develop into canyons where intermittent streams flow westward to the Escalante River through the younger sediments on the gently-sloping west limb of the anticline. Erosional remnants of Triassic Shinarump and Chinle formations, capped in some places by Jurassic Wingate, form mesas rising from the valley floor. These conditions are illustrated in figure 4.

## HISTORY AND PRODUCTION

During most of 1949 and 1950 Mr. Hinds prospected the area of Circle Cliffs and south to the Colorado River for outcrops of ore-bearing lenses of the Shinarump formation. As a result of this prospecting, he located 645 claims in two groups along outcrops of the Shinarump formation.

The Hinds Uranium Mining Co. was formed in February 1951, and exploration was begun a short time later. At the time of the examination the company employed 8 men in exploration and mining operations.

A total of 60 tons of uranium-bearing material has been shipped from the deposits, but only 4.21 tons contained sufficient $U_3O_8$ to be classed as ore, the remainder being below the minimum grade of 0.10 percent $U_3O_8$ established by the Atomic Energy Commission. The accepted ore was paid for at the rate of $26.87 per ton, including development bonus, premium payment, and haulage allowance of $0.06 per ton mile for the first 100 miles. The total payment on the shipment was $113.11. This represents the only production from the Hinds property. Other properties in the area are reported to have shipped approximately 500 tons of uranium ores which assayed 0.12 to 0.84 percent $U_3O_8$.

OWNERSHIP AND EXTENT

The Hinds Uranium Mining Co. holds by location two groups of claims, the Red Head Nos. 1 to 300, and the Rusty Head Nos. 1 to 345 inclusive. The company also has leasing arrangements on approximately 2,500 claims in the area.

The claims are located along outcrops of the Shinarump formation and on mesas where the Shinarump formation may be covered by younger rocks. The claims are not contiguous and do not cover the entire area. The northernmost group lies in unsubdivided T. 32 S., R. 7 E. The southernmost of the claims lies in unsubdivided T. 39 S., R. 10 E., S.L.B. & M.

It is well to note that the work proposed by the examining team is confined to small areas that are accessible by existing roads and upon

which some work has been done. Figure 3 shows locations of proposed exploration.

## DESCRIPTION OF THE DEPOSITS

The Triassic and lower Jurassic rocks of the western limb of the anticline in the Circle Cliffs area dip gently to the west. The ore deposits lie at or near the base of the upper Triassic Shinarump formation. Channels in the Moenkopi are filled with coarse sandstone, conglomerates and sandy shales of the Shinarump formation and have provided favorable conditions for deposition of uranium minerals. In many areas this "channeling" is very readily observed and serves as an apparently reliable guide in prospecting.

The ore horizon sampled in the adit on the Silver Falls No. 2 claim consists of dark sandstone and siltstone showing some carbonaceous material and occasional secondary copper minerals. The horizon lies immediately above a gray-green, sandy siltstone which forms the contact with the underlying Moenkopi formation. In this area the "channeling" is evident in the difference in elevation of the two adits shown on figure 2. The northernmost adit is approximately 25 feet above the main adit, but immediately above the formation contact, yet the bedding in the underlying formation is nearly horizontal. The main adit apparently is near the lowest elevation in this channel.

The locations of samples taken on Silver Falls No. 2 claim are shown on figure 2, and these, with others taken on other claims, are listed below:

| Sample No. | Location | Length | Percent $U_3O_8$ | Percent Cu | Remarks |
|---|---|---|---|---|---|
| 1 | Adit, Red Head No. 27 | 2.5' cut | 0.040 | -- | Cut in face of adit |
| 2 | Surface, Horse Canyon No. 1 | 1.5' cut | .047 | 2.15 | Cut in outcrop |
| 3 | Ore pile, Silver Falls No. 1. | Grab | .096 | -- | Grab sample of ore stock |
| 4 | Open cut, Silver Falls No. 1 | 3.5' cut | .055 | -- | Cut in altered zone near vertical "fissure" |
| 5 | Adit, Silver Falls No. 2 | 2.5' cut | .222 | -- | Cut in north wall near face |
| 6 | Adit, Silver Falls No. 2 | 2.5' cut | .175 | -- | Cut in face |
| 7 | Cross-cut, Adit Silver Falls No. 2 | 2.0' cut | .037 | -- | Cut in face of cross-cut |
| 8 | Ore pile, Silver Falls No. 2 | Grab | .421 | -- | Grab sample of ore stock-pile. |

## MINABLE ORE RESERVES

In view of the few openings that have been made on the property and the limited penetration in the outcrops, a reliable estimate of minable ore reserves is not possible.

## PRESENT STATUS

Work accomplished to the time of the examination consisted of erecting a camp (fig. 4), building access roads to various working places, incomplete construction of a road from the area north through Dixie National Forest to Grover, and driving a few short adits on widely-separated claims. Only the main adit on Silver Falls No. 2 claim has been advanced sufficiently to indicate the presence of minable uranium ore (fig. 2).

In addition to the above work, some equipment to be installed in a concentrating plant has been purchased and delivered to the camp. This consists of a 15" x 30" jaw crusher, and a pulverizer of undetermined capacity. A Diesel-electric power plant has been purchased but not delivered.

PROJECT PROPOSALS WITH COSTS

The company has not advanced definite exploratory proposals in the application other than a general statement proposing "core drilling, bulldozing and other preliminary mining to determine the extent of each of the ore bodies..." The cost estimate for this work and supporting activities, including salaries, engineering and management, is $500,000.

Much of the outcrop of the ore horizon is covered by blocky talus from the thick overlying sandstones. The use of a bulldozer to expose fresh faces of the outcrop is a logical beginning of an exploratory program.

Exploratory work on the Silver Falls No. 2 claim and other deposits in the area present evidence that soluble uranium minerals have been leached from the ore horizons at or near the surface. Therefore, the exploratory program proposed for this property includes adits to penetrate outcrops which are known to contain small amounts of uranium minerals.

The equipment on the property at the time of the examination is listed as follows:

2 compressors, 185 cfm., portable rubber-tired, Jager
2 jackhammers, dry, with hose and accessories, hand held
1 bulldozer, D-7, Caterpillar and tractor
1 tractor, crawler type, HD-15, with loader attached
1 light plant, 5-kw., gasoline-driven
1 ea. 1,000-gallon water tank, 1,000-gallon gasoline tank, 1,000-gallon diesel fuel tank
1 Jeep station wagon, 4-wheel drive
Cook house and camp installation for approximately 20 men
Miscellaneous tools, welding equipment, and greasing facilities for equipment now in use

Some milling equipment has been delivered to the camp site, but a consideration of milling is beyond the scope of this report.

A plan for exploratory work on certain areas suggested by the examining team, to require approximately 60 days, follows:

Rim stripping by bulldozer as indicated by geologic conditions on and near the Red Head No. 27 claim, the Horse Canyon No. 1 claim, and the Silver Falls Nos. 1 and 2 claims, 10,000 linear feet at $0.50 per foot ------- $5,000.00

<u>Red Head No. 27 Claim, Lampstand Area</u>

2 adits, 100 ft. long, 200 ft. total at $23.55 per foot ---------- $4,710.00

The cost per foot is broken down as follows:

| | |
|---|---|
| Labor | $ 8.53 |
| OAB, employment insurance, workmen's compensation, etc. | .85 |
| Explosives | 3.18 |
| Caps and fuse | .48 |
| Repairs to equipment | 1.00 |
| Steel and bits | .55 |
| Gasoline and lubricants | .70 |

| | |
|---|---|
| Maintenance of drift ---------- | $ .56 |
| Pipe (air and water) and track ------- | 1.49 |
| Hand tools and miscellaneous hardware- | .10 |
| Water haulage ---------- | .70 |
| Total direct cost per foot ---------- | $ 18.14 |

Overhead Costs

| | |
|---|---|
| Engineering, sampling, and analyses -- | $ 2.10 |
| Supervision ---------- | 1.00 |
| Camp and commissary ---------- | .90 |
| Bookkeeping and office ---------- | .40 |
| Sales and use tax ---------- | .06 |
| Surface preparation, bulldozing, and-- labor | .95 |
| Total per foot of overhead ---------- | $ 5.41 |
| Total cost per foot of adit ---------- | $ 23.55 |

Horse Canyon No. 1 Claim

Two adits, each 100 feet long, are proposed on this claim.

Underground exploration conditions are similar to those on the Red Head No. 27 claim, thus the cost per foot is estimated to be

$23.55 per foot x 200 feet ---------- $4,710

Silver Falls No. 1 Claim

Two adits, each 100 feet long, are proposed, with a crosscut approximately 50 feet from the portals, a total of 250 feet. Underground exploration conditions are similar to those on the Red Head No. 27, thus the cost of the proposed work would be $23.55 per foot x 250 feet ---------- $5,888

Silver Falls No. 2 Claim

Two adits, each 100 feet long and connected with a crosscut approximately 50 feet from the portals, are proposed on this claim. Underground exploration conditions are similar to those on the Silver Falls No. 2 claim, thus the cost of the proposed adits would be $23.55 per foot x 250 feet, ---------- $ 5,888

Depreciation on equipment owned by Company

Equipment used in connection with actual exploration:

| | |
|---|---|
| 2 compressors, 185 cfm., portable, rubber-tired - Jager, $5,800 ea. | $11,600 |
| 2 jackhammers, dry, with hose and accessories --- $375 ea. | 750 |
| 1 bulldozer, Caterpillar, D-7 ---------- | 13,000 |
| 1 tractor-loader, Allis-Chalmers, HD-7 tractor -- | 6,000 |
| Total cost of equipment used in exploration | $31,350 |

Allowable depreciation on above equipment:

$$\$31,350 \times \frac{1}{60} = \$522.50 \text{ per month}$$

Allowable depreciation for length of project:

$522.50 x 2 months = $1,045

Equipment used in support of actual exploration:

| | |
|---|---|
| 1 Jeep station wagon, 4x4 ---------- | $ 1,400 |
| 1 electric generating plant, 5 k.w. ---------- gasoline driven | 1,500 |
| 1 1,000-gallon water tank, 1 1,000-gallon ------- diesel fuel tank, and 1 1,000-gallon gasoline tank, $150 ea. | 450 |
| Camp and cooking equipment, approx. value ----- | 1,500 |
| Total value of equipment owned by the ------ company used in support of exploration | $ 4,850 |

Allowable depreciation per month on above equipment:

$$\$4,580 \times \frac{1}{60} = \$80.83$$

Allowable depreciation for length of project:

$80.83 x 2 month = $162

Equipment that must be procured on a rental basis:

| | |
|---|---|
| 3 compressors, 210 cfm., portable, gasoline, $290 per month x 2 months x 3 | $ 1,740 |
| 4 jackhammers, wet, mounted with accessories $68.75 per month x 2 months x 4 | 550 |
| 4 receivers, air, 30" x 7' $33 per month x 2 months x 4 | 264 |
| 8 cars, mine, 24 cu. ft. $26 per month x 2 months x 8 | 416 |
| 1 bulldozer, D-8 Caterpillar $851 per month x 2 months | 1,702 |
| Total rental of equipment on project | $ 4,672 |

Expenditures in Support of Exploratory Work

| | |
|---|---|
| Improvements at main camp and establishment of outlying camps | $ 2,800 |
| Cook and helper (2 months) | 1,153 |
| Commissary for men not engaged in actual exploration | 1,200 |
| Water supply development | 800 |
| Supervision (superintendent and foreman) | 2,200 |
| Engineering (miscellaneous) | 1,750 |
| Mechanic and equipment maintenance man and helper | 1,400 |
| Truck rental and transportation | 3,500 |
| Miscellaneous bulldozer work cleaning camp sites and improving access roads | 900 |
| Manager, $600 per month x 2 months | 1,200 |
| Office expense (accounting, etc., other than chargeable to adits) | 550 |
| Gasoline and lubricants not chargeable to adits | 250 |
| | $17,703 |

omit ✓

SUMMARY

| | |
|---|---|
| Direct costs of stripping rims with bulldozer -------- | $ 5,000 |
| Underground adits on Red Head No. 27 claim ---------- | 4,710 |
| Underground adits on Horse Canyon No. 1 claim -------- | 4,710 |
| Underground adits on Silver Falls No. 1 claim -------- | 5,888 |
| Underground adits on Silver Falls No. 2 claim -------- | 5,888 |
| Total allowable depreciation on equipment ---------- owned by the company | 1,207 |
| Rental of equipment ---------- | 4,672 |
| Expenditures in support of exploration work ---------- | 17,703 |
| Total estimated cost of proposed exploration ---- project | $49,778 |

The most traveled route to the property is by an unimproved road from Escalante via Harris Wash and Silver Falls Creek. This road is dangerous or impassable during flood periods. A second road into the area from Boulder, Garfield County, is traversable in dry weather by four-wheel-drive vehicles only. This route is impractical for continuous heavy hauling.

The distance to the railhead at Marysvale via Escalante, Antimony, and Junction is 138 miles. A road under construction by the company from the area of the Lampstand north across the east side of the Dixie National Forest to the railhead at Sigurd, Sevier County, via Torrey and Loa, would reduce the ore-haul to 107 miles.

The company has built an airstrip at the main camp suitable for small aircraft.

The employees of the company live in Escalante and Richfield. It will be necessary to recruit some of the skilled laborers required for the project from larger centers of population in the state.

Any power required for the camp or shop equipment must be generated

at the project, since no power lines cross the area. The present generator capacity is probably sufficient for limited lighting or shop use anticipated on the proposed exploratory project.

Water supply in the Circle Cliffs area represents a major problem. At present, the culinary water is hauled from Escalante, 44 miles distant, and other water is hauled from the Escalante River, a distance of 10 miles. The examining team observed the possibility of developing water in Silver Falls Creek near its juncture with the Escalante River. An item of expense for such development was included in the cost of the proposed project.

It is estimated that the exploratory program as outlined will require approximately 45 days, but delays in procuring equipment and supplies may extend the time to as much as 60 days. Rim clearing and underground exploration may be carried on simultaneously as circumstances dictate.

No plan of development or mining after the exploratory program is completed can be advanced, since the size and character of the ore bodies cannot be accurately predicted. Moreover, the average grade of the ores cannot be estimated from the small amount of work done.

A recapitulation of the costs of the proposed exploratory program from the section on project proposals follows:

| | |
|---|---|
| Underground and surface exploration | $ 32,075 |
| Activities in support of actual exploration, including camp, commissary, water, transportation, etc. | 17,703 |
| Total cost of exploratory program | $ 49,778 |

The total above represents the entire cost of the program outlined in other sections of the report. No sound estimate can be made of either actual operating costs or possible profit until the exploratory program is complete to indicate the areal extent of the mineralization, the minable thickness, and possible discontinuity of the apparently lenticular ore bodies.

The only criterion for judging possible profit or loss is contained in a settlement sheet furnished the company by an authorized ore purchaser. This sheet showed that 4.21 tons of ore containing 0.25 percent $U_3O_8$ and 0.07 percent $V_2O_5$ was paid for at the rate of $26.87 per ton, or $113.11 for the shipment. This included a development allowance of $0.50 per pound of $U_3O_8$ contained, a premium for $U_3O_8$ in excess of 4 pounds per ton at $0.75 per pound, and a haulage allowance of $0.06 per wet ton mile for 100 miles. No deductions were made for excess lime.

## PROPOSED FINANCING

The physical assets owned by the company and the company's financial statement indicate ability to furnish the 10 percent of the project cost required under DMA regulations.

## CONCLUSIONS AND RECOMMENDATIONS

The limited underground work on the Silver Falls No. 2 claim and the surface work accomplished on the Silver Falls No. 1, the Red Head No. 27 claim, and the Horse Canyon No. 1 claim indicate the widespread occurrence of uranium mineralization in the Circle Cliffs area. The ore in the adit on Silver Falls No. 2 claim exhibits apparent increase in grade as the leached and oxidized surface zone is penetrated, a condition noted in other deposits in the Shinarump formation. Samples in this adit show that ore well above the minimum acceptable grade may be mined on this claim.

In view of the above facts, it is concluded that the Circle Cliffs area is a potential producer of uranium. Thus, it is recommended that a DMA exploratory loan of $49,778 be made to the Hinds Uranium Mining Co.

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

224 New Customhouse
Denver 2, Colorado

November 7, 1951

Memorandum

To: Executive Secretary, Defense Minerals Administration

From: DMA Field Team, Region IV

Subject: Final Report, DMA Docket 1478-X, Fred Hinds, applicant; Hinds Uranium Mining and Rare Metals Deposit, Richfield, Utah

Enclosed herewith are the original and two copies of the report on the subject docket.

We concur with the conclusions and recommendations of the examining team that the exploration loan of $49,778 be approved.

The brochure has been mislaid, and upon receipt of it in this office, it will be forwarded to you.

J. H. East, Jr.

A. H. Koschmann

DEFENSE MINERALS ADMINISTRATION WASHINGTON, D.C.
Nov 13 9 02 AM '51

Mining Division
Region IV

November 7, 1951

Memorandum

To: DMA Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: Final Report, DMA Docket 1478-X, Fred Hinds, applicant; Hinds Uranium Mining and Rare Metals Deposit, Richfield, Utah

The application of the subject docket was for an exploration loan of $500,000.

The company did not submit a definite program of exploration other than a general statement proposing more drilling, bulldozing, and other preliminary mining to determine the extent of the ore bodies.

Uranium minerals consisting of torbernite, autunite, and uranophane in the upper Triassic Shinarump formation. Limited exploration on the principal claims by the applicant indicated probable widespread occurrence of uranium mineralization in the Shinarump formation. It is expected that the uranium mineralization will increase in grade as the oxidized and leached zone is penetrated. The geological probability of discovery of important reserves is favorable.

The examining team proposes a more moderate program consisting of rim-stripping and adits at an estimated total cost of $49,770, and they recommended approval of the loan, with which we concur.

Paul T. Allsman

Paul T. Allsman

November 2, 1951

Memorandum

To: Paul T. Allsman, Chief, Mining Division, Region IV

From: Chief, Utah-Wyoming Branch, Mining Division

Subject: DDA-1479-X, Hinds Uranium Mining Co., Garfield and Kane Counties, Utah.

Enclosed are the original and nine copies of the subject report, with a section on Summary, Conclusions and Recommendations.

The Survey report covering the property, with the brochure, was submitted September 13, 1951. This report outlined proposed exploration at a total cost of $44,645. Subsequent revised estimates and proposals resulted in an overall exploration total of $49,778, as shown in the attached engineering report.

I concur with the recommendations in the engineering report.

Stephen R. Wilson

Stephen R. Wilson

Enclosures - 2

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Defense Minerals Administration
200 New Customhouse
Denver 2, Colorado

September 17, 1951

Memorandum

To: DMA Field Team, Region IV

From: A. H. Koschmann

Subject: DMA Docket 1478X, Fred Hinds, Richfield, Utah (Uranium)

Enclosed are eight copies of the geologic report by R. K. Thurber of the U. S. Bureau of Mines and R. W. Datersteck of the U. S. Geological Survey, covering the above docket.

A. H. Koschmann
A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (9)

Room 307, 320 South Main
Salt Lake City 1, Utah
12 September 1951

Memorandum

To: A. H. Koschmann, Region IV Field Team

From: Ralph J. Roberts

Subject: Docket DMA-1478X, Fred Hinds, Richfield, Utah (Uranium)

Enclosed are eight copies of a geologic report on Docket DMA 1478X, Fred Hinds, Richfield, Utah Uranium Corporation claims.

The ore deposits of the Circle Cliffs district appear to be confined to the upper (?) Triassic Shinarump formation. The ore is found in thin-bedded lenticular red sandstones, sandy siltstones, and sandy shales in erosion channels within the Shinarump formation.

The ore minerals have been tentatively identified as carnotite, torbernite, and uranophane. It is estimated that the ore bodies will contain about 0.20 percent $U_3O_8$. The lack of exploratory data does not permit the calculation of ore reserves, but there may be substantial tonnages of ore below some of the leached surface outcrops containing ore minerals.

A suggested exploratory program consisting of rim-clearing and drifting to define the limits of the ore bearing zones has been outlined. It is recommended that the Defense Minerals Administration enter into a contract with the Hinds Uranium Corporation for an exploratory loan in the amount of $64,645. On the 90 percent participation basis the government will contribute as its share $58,181.

I concur with the conclusions and recommendations of the examining geologist.

UNITED STATES
DEPARTMENT OF THE INTERIOR
OSCAR L. CHAPMAN, SECRETARY

DEFENSE MINERALS ADMINISTRATION

# REPORT OF EXAMINATION BY FIELD TEAM
# REGION IV

## Docket DMA 1478X, Fred Hinds,

## Richfield, Utah

(Uranium)

H. K. Thurber, Mining Engineer
U. S. Bureau of Mines

R. W. Osterstock, Geologist
U. S. Geological Survey

September 11, 1951

## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By. H. L. Thurber, Jr., and
R. W. Cattermole

The Hinds Uranium Mining Co., with mining claims in Garfield and Kane Counties, Utah, has applied for a DMA exploratory lease under Docket 1478-X. The property was examined by personnel of the Geological Survey and Bureau of Mines during July, 1951, at the request of the DMA Field Team, Denver, Colorado.

Uranium deposits in the area appear to be confined to the upper (?) Triassic Shinarump formation which unconformably overlies the lower Triassic Moenkopi formation and conformably underlies the upper Triassic Chinle formation. The Shinarump was deposited on an irregular erosional surface of the Moenkopi. Channels cut in the Moenkopi have been filled with Shinarump grits and sands, in some areas 50 feet deep and 100 yards wide.

Uranium minerals consisting of torbernite, autunite and uranophane occur in thin-bedded sandstone and siltstone in the bottoms of the channels. Secondary copper minerals and carbonaceous material are commonly associated with the uranium minerals.

Definite exploratory proposals were not made by the company in the application. The examining team suggests that an exploratory program on the property consist of approximately 18,000 linear feet of rim stripping by bulldozer, and 900 feet of adits on the Red Road

No. 27, Nerve Gagrm No. 1, Silver Falls No. 1 and Silver Falls No. 2 claims. Limited exploration on these claims accomplished by the operator indicates the probable widespread occurrence of uranium mineralization in the Shinarump formation. It is expected that the uranium mineralization will increase in grade as the oxidized and leached zone is penetrated.

It is concluded that the Circle Cliffs area is a potential producer of uranium. A DMA loan of $49,778 for the Hinds Uranium Mining Company is recommended.

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## LIST OF ILLUSTRATIONS


Figure 1. Location map, Hinds Uranium Mining Company, Circle Cliffs area, Garfield County, Utah.

Figure 2. Silver Falls No. 2 Uranium prospect, Garfield County, Utah.

Figure 3. Geology between Escalante River and Halls Creek, Garfield and Kane Counties, Utah.

Docket RMA 1478L, Fred Hinds,

Richfield, Utah

(Uranium)

## GEOLOGY

The ore deposits in the Circle Cliffs district (see fig. 1) appear to be confined to sedimentary rocks of Triassic age. The formations that have potential economic significance are, in decreasing order of age: the Moenkopi, the Shinarump, and the Chinle.

Moenkopi formation.—The lower Triassic Moenkopi formation forms an almost continuous floor in the Circle Cliffs district (see fig. 3). Underlying the Moenkopi unconformably is the Permian Kaibab limestone. A distinct erosion interval separates the upper Moenkopi from the overlying Shinarump formation. The thickness of the Moenkopi varies from 304 to 500 feet [1]; the wide variation

[1] Gregory, H. E., The Kaiparowits Region, A geographic and geologic reconnaissance of parts of Utah and Arizona: U. S. Geol. Survey Prof. Paper 164, pp. 47-52, 1931

is ascribed mainly to erosional unconformities at the top and bottom of the formation.

The Moenkopi formation consists dominantly of interlaminated mudstones, sandy micaceous shales, thin-bedded platy sandstones, and lenses of fine- to medium-grained sandstone. Grits, conglomerates, and clay shales are generally lacking. A few thin discontinuous beds of the sandstone are calcareous. Very little gypsum is present in the beds in the Circle Cliffs district, although to the north, in the Capitol Reef region, gypsum is quite abundant. Ripple marks

and very fine cross-bedding are common. The color of the formation varies from brick-red to reddish brown and chocolate brown, with some beds weathering buff or cream. Immediately underlying the erosion surface at the top of the Moenkopi the sandy shales and sandstones are locally bleached and altered to grayish-green.

The weathered slopes of the Moenkopi are generally uniform but are occasionally broken by small benches. The uppermost beds often form a cliff where the more resistant overlying Shinarump acts as a protective cap.

Moenkopi-Shinarump erosion interval.—An interval of erosion after the deposition of the Moenkopi is indicated by the removal of parts of the upper Moenkopi beds, the bevelling of these beds, erosion channels, and a marked change in sedimentation above and below the erosion surface. In the Circle Cliffs district channels carved in the Moenkopi 10 to 50 feet deep and 50 to 100 yards wide are filled with Shinarump siltstones, grits, and coarse sandstones.

Shinarump conglomerate.—The upper (?) Triassic Shinarump conglomerate unconformably overlies the Moenkopi formation and conformably underlies the Chinle formation. In the Circle Cliffs district (see fig. 3) it is a gray irregularly cross-bedded massive sandstone with few conglomeratic lenses. Most exposures include a lower soft sandstone bed, a middle group of greenish-gray shale, and an upper massive cross-bedded sandstone that forms a resistant ledge. The ore zone appears to be confined to the lower, soft, massive, brown sandstone and grayish siltstone locally containing thin grayish-green sandy shales. The lateral extent of the various beds is limited by their lens-like nature. H. E. Gregory [1] has stated that from the head of Halls Creek and along

[1] Gregory, H. E., op. cit., pp. 52-53.

Capitol Reef Wash the Shinarump ranges in thickness from less than 30 feet to more than 100 feet.

Chinle formation.—The upper Triassic Chinle formation (see fig. 3) conformably overlies the Shinarump conglomerate. A. A. Baker [1], E. T. McKnight [2], C. H. Dane [3], and H. E. Gregory [4] all believe that the Shinarump

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[1] Baker, A. A., Geology of the Monument Valley-Navajo Mountain Region, San Juan County, Utah: U. S. Geol. Survey Bull. 865, pp. 44-47, 1936.

[2] McKnight, E. T., Geology of the area between the Green and Colorado Rivers, Grand and San Juan Counties, Utah: U. S. Geol. Survey Bull. 908, pp. 63-66, 1940.

[3] Dane, C. H., Geology of the Salt Valley anticline and adjacent areas: U. S. Geol. Survey Bull. 863, pp. 54-65, 1935.

[4] Gregory, H. E., op. cit., p. 52.

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conglomerate grades laterally and vertically into the lowermost beds of the Chinle. Consequently, the Shinarump is often regarded as the basal conglomerate of the Chinle formation. The thickness of the Chinle in the Circle Cliffs district averages about 600 feet.

The Chinle is generally composed of two parts, the lower consisting of dark-red sandy beds and the upper of calcareous lighter-colored beds. The lower sandy beds, although persistent regionally, show considerable local variation in composition and color. Individual beds seem rarely be traced more than a few hundred feet. The most distinctive features of the Chinle are abundant fossil trees and the variegated colors of the shales.

Structure.—Regionally, the Circle Cliff district exhibits a gentle upwarp to the east with a more distinct monoclinal flexure downward near Halls

Creek. Gentle westerly dips are dominant over the area with which this report is concerned.

## ORE DEPOSITS

All of the ore deposits examined in the Circle Cliffs district are in the lower portion of the Shinarump conglomerate, though it is reported by Fred Hinds, the applicant, that the Chinle and Wingate formations also contain ore in the form of "blankets".

The extremely fine grained ore minerals which have been tentatively identified by the naked eye are: carnotite ($K_2O \cdot 2UO_3 \cdot V_2O_5 \cdot 2H_2O$), torbernite ($CuO \cdot UO_3 \cdot P_2O_5 \cdot 12H_2O$), uranophane ($CaO \cdot 2UO_3 \cdot 2SiO_2 \cdot 6H_2O$). The operators have reported tyuyamunite ($CaO \cdot 2UO_3 \cdot V_2O_5 \cdot nH_2O$) to be associated with carnotite. Malachite ($CuCO_3 \cdot Cu(OH)_2$) and azurite ($2CuCO_3 \cdot Cu(OH)_2$) are commonly found in association with uranium minerals, but a higher concentration of these brilliantly colored copper minerals does not necessarily indicate the presence of a higher proportion of uranium. Considerable black carbonaceous material in seams, stringers, and blebs accompanies the uranium minerals. Cross-bedded sandstones overlying the ore zones show much iron stain, mostly limonite, as flecks, blebs, small concretion-like bodies and thin coats on fracture surfaces. Gypsum is not uncommon in thin stringers which are generally parallel to the bedding.

The ore minerals appear to be confined to the lowest sandy beds of the Shinarump formation. Channels cut into the Moenkopi are commonly filled with alternating beds of medium- and coarse-grained sandstones and grits with some thin sandy shales and sandy siltstones. The ore is generally restricted to individual beds in the channel fillings. About 1 to 1-1/2 feet above the top

of Moenkopi thin-bedded red to brown to tan sandstones underlie about 6 inches of greenish-gray shale; this shale zone is reported by the operators to contain the highest-grade ore. Cross-bedding on a small scale is common in the lower Shinarump.

Fracture surfaces (see fig. 2) sometimes have thin coats of ore minerals, but the wall-rock adjoining the fractures is generally unmineralized.

It is believed that meteoric waters, possibly somewhat activated by nearby hydrothermal activity, deposited the ore minerals in particular beds of sandstone, siltstone, and shale that were especially porous and permeable. Whether or not favorable composition of the sandstones was a factor during the ore mineral deposition is not known at this time; however, higher concentrations of carbonaceous material do not seem to indicate higher concentrations of ore minerals. The original source of the uranium is unknown.

Oxidation and leaching of the outcrops containing uranium minerals, according to Phillip Dodd [1], can reduce the $U_3O_8$ content as much as 0.15 percent;

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[1] Dodd, Phillip, Preliminary report on copper-uranium mineralization of the White Canyon-Happy Canyon type: Colorado Scientific Society, 1951.

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leaching may extend inward about 5 to 20 feet and oxidation as much as 75 feet inward from the rim outcrops. Strong radiometric indications along the rim may be the result of emanations from disintegration products of the original uranium, so that highly radioactive samples may give low uranium assays.

Each mineralized zone is limited in lateral extent by the lens-like form of the ore-bearing bed; the thickness of the zone is limited to the thickness of the individual ore-bearing bed, which has not been seen to exceed 4 feet. How far the mineralized beds extend inward has not yet been determined, but it

seems reasonable to assume that the inward extent will be at least as great as the lateral extent.

## ORE RESERVES

No reserve tonnages have been calculated for any of the four claims examined. At the present stage of development work there is no plausible basis upon which estimates of the lateral, inward, and vertical dimensions of the ore-bodies can be made. It is possible that substantial tonnages of ore may exist behind some of the surface exposures. In the Circle Cliffs district the Shinarump, which is potentially the largest producer, has been at least 80 percent removed by erosion.

The grade of the deposits may be inferred from assays of samples taken from oxidized and leached exposures at the surface.

TABLE I

Sample assays taken from the Shinarump formation in the Circle Cliffs district

| Sample Number | | $U_3O_8$ (percent) | Type | Description |
|---|---|---|---|---|
| USBM 1 | | 0.040 | chem. | 2.5' cut taken at small opening, Red Head No. 27 |
| " 2 | | 0.047 | " | 1.5' cut taken at surface, Horse Canyon No. 1 |
| " 3 | | 0.096 | " | Ore pile grab, Silver Falls No. 1 |
| " 4 | | 0.055 | " | 3.5' cut taken at surface, Silver Falls No. 1 |
| " 5 | (see fig. 2) | 0.222 | " | 2.5' cut taken in adit, Silver Falls No. 2 |
| " 6 | " | 0.175 | " | 2.5' cut taken in face of adit, Silver Falls No. 2 |
| " 7 | " | 0.037 | " | 2.0' cut taken in crosscut, Silver Falls No. 2 |
| " 8 | " | 0.421 | " | Ore pile grab, Silver Falls No. 2 |

| Sample Number | $U_3O_8$ (percent) | Type | Description |
|---|---|---|---|
| Smith-Emery | | | |
| 338125 | 1.11 | (?) | Red Head No. 143 |
| " 338125 | 1.00 | spectro. | Red Head No. 29 |
| " 339302 | 5.00 | Geiger | Red Head No. 68 |
| | 4.77 | chem. | |
| " 339301 | 1.14 | umpire (?) | Silver Falls No. 2 |
| " 339300 | 0.33 | umpire (?) | Silver Falls No. 2 |

Three U. S. Bureau of Mines samples taken from widely separated areas of mineralization (Red Head No. 27, USBM 1; Horse Canyon No. 1, USBM 2; Silver Falls No. 1, USBM 4; see fig. 3) indicate an average outcrop assay of about 0.047 percent $U_3O_8$; with an expected increase of about 0.15 percent $U_3O_8$ beyond the leached zone, the ore-bearing beds may contain about 0.20 percent $U_3O_8$. Development workings have penetrated the leached zone on only one claim, the Silver Falls No. 2 (see fig. 2), USBM samples No. 5 and 6, taken in the adit, assay 0.222 and 0.175 percent $U_3O_8$ respectively. These assays tend to substantiate the overall average content of about 0.20 percent $U_3O_8$.

Samples taken by the Minds Uranium Corporation and assayed by the Smith-Emery Company of Los Angeles, California, average about 1.67 percent $U_3O_8$. These assays have not been considered in arriving at the average grade of 0.20 percent $U_3O_8$, because the method of sampling is unknown.

## PROPOSED EXPLORATION

No exploration program has been proposed by the Minds Uranium Corporation; the following program is therefore suggested.

Red Head No. 27, Lampstand area (see fig. 3).--This claim has an opening extending about 8 feet inward from the face of the cliff. Most of the mineralization is in a lens of thin-bedded, brown sandstone and a thin grayish-

green sandy shale. It is suggested that about 2000 feet of rim-clearing in this area may expose some hitherto unidentified channels, some of which may contain ore minerals. It is also suggested that the present small opening be extended about 100 feet farther inward. Another 100-foot drift should be driven along a mineralized zone not more than 300 yards along the rim from the opening already started. The exact location of the second adit may be designated by the operators, on the basis of radiometric indications and assay data.

The rim-clearing should precede the inward exploration, because the accuracy of radiometric determinative methods increases rapidly as the ore-bearing ledges are exposed; thus the location of the new adit may be determined by more accurate radiometric and assay data.

Morgan Canyon No. 1 (see fig. 3).—About 30 feet of rim-clearing comprises the total amount of exploration work on this claim. Thin-bedded brownish-red sandstone and a few thin shales at the base of the Shinarump formation appear to contain the ore minerals. It is suggested that about 1500 feet of rim-clearing may expose further ore-mineral bearing beds. It is also suggested that two 100-foot drifts, not more than 400 feet apart along the rim, be driven on this claim. The exact locations of the drifts, based on radiometric indications and assay data, may be designated by the operators, but the rim-clearing should precede the drifting.

Silver Falls No. 1 (see fig. 3).—The ore on this claim is in the lowest Shinarump in beds of bleached sandstone and grit. About 300 feet of cliff-face has been cleared by bulldozer. It appears that the lens-like beds containing

ore minerals have a lateral extent of at least 250 feet. The lateral extent of these beds may be more accurately determined and new ore-bearing beds may be exposed by about 3000 feet of rim-clearing in this area. It is also suggested that two adits, each 100 feet long, be driven about 100 feet apart; about 50 feet from their portals these adits should be connected by a crosscut. The exact locations of the adits, chosen on the basis of radiometric indications and assay data, may be designated by the operators, but the rim-clearing program should be completed before the drifts are located.

Silver Falls No. 2 (see figs. 2 and 3).—The ore minerals on this claim are in beds of grayish sandstone, sandy siltstone, and gray-green sandy shale in the Shinarump. An adit about 45 feet long has penetrated beyond the leached zone. About 250 feet north of the adit along the rim an adit 10 feet long was driven along a fissure coated with ore minerals. The 45-foot adit appears to be on the northwest flank of a large northeasterly trending channel. It is suggested that about 3500 feet of rim-clearing in this area may aid in delimiting the lateral extent of the mineralized zone now under exploration and may uncover new mineralized channels. It is also suggested that the present 45-foot adit be extended about 75 feet; and about 100 feet south of the present adit a new adit (125 feet long) may be nearer the center of the channel. About 50 to 75 feet from the portal of the new adit a crosscut should be driven to connect with the present adit about 50 to 75 feet from its portal. The exact locations of the new adit and the crosscut, on the basis of radiometric indications and assay data, may be designated by the operators. The rim-clearing program should be completed before driving the new adit, because the increased accuracy of radiometric methods will permit more accurate location of the portal.

It is believed that the suggested exploration program will provide valuable information regarding the lateral and inward persistence of the ore-bearing beds. Penetration beyond the leached and oxidized zones should provide additional information regarding the expected increased $U_3O_8$ content in the unleached, unoxidized zones. The goals of the suggested program can be accomplished efficiently only by drifting and crosscutting; extremely rough terrain and lack of water make diamond-drilling impracticable. Radiometric investigations are not feasible except for roughly defining ore-zones near the surface or along the rims.

If possible the drifts should stay on the particular beds or channels in which they were started. The crosscuts, generally normal to the axes of the channels, should not attempt to follow high-grade zones; thus the crosscuts will provide a statistical basis for the calculation of the frequency of high-grade zones paralleling the axes of the channels.

The total cost of the exploration program suggested will be $64,645.

## SUMMARY AND CONCLUSIONS

The ore deposits of the Circle Cliffs district appear to be confined to the upper(?) Triassic Shinarump formation, which unconformably overlies the lower Triassic Moenkopi formation and conformably underlies the upper Triassic Chinle formation. The Shinarump was deposited on a very irregular erosion surface of the Moenkopi; channels cut in the Moenkopi and filled with Shinarump grits and sandstones may be as much as 50 feet deep and 50 to 100 yards wide.

Most of the ore is in thin-bedded lenticular, brown, gray-green, and red sandstones, sandy siltstones, and sandy shales in the bottoms of the channels. It is believed that porosity, permeability and possibly the favorable composition of individual beds have served to localize the mineralization, but abundant

carbonaceous material does not indicate high concentrations of uranium. Meteoric waters, possibly somewhat activated by nearby hydrothermal action, probably served as the mineralizing solutions.

The ore minerals that have been tentatively identified are carnotite, torbernite, and uranophane. The operators report that tyuyamunite is associated with carnotite. Secondary copper minerals, limonite, gypsum, and carbonaceous material are commonly associated with the uranium minerals. Oxidation and leaching apparently reduce the $U_3O_8$ content in the surface exposures by about 0.15 percent. Samples taken from the rims assay about 0.05 percent $U_3O_8$. It is believed, therefore, that the average ore body will contain about 0.20 percent $U_3O_8$. No ore reserve tonnages have been calculated because there has not been enough exploration work to delimit any ore bodies. There may be substantial tonnages of ore behind some of the leached surface outcrops containing ore minerals.

The suggested exploration program, consisting of rim-clearing and drifting on four claims, is designed to define the limits of the ore-bearing beds known to contain ore minerals along the rim. Further information regarding the expected increase of uranium content beyond the leached and oxidized zone will be provided by drifting. It is also possible that additional ore-bearing channels, thus far undiscovered, will be exposed by the rim-clearing. The Hinds Uranium Corporation property is only in the initial stages of development, it is, therefore, deemed advisable to continue exploration in a more prudent and methodical fashion than the large-scale $500,000 operation outlined by the applicant.

It is recommended that the Defense Minerals Administration enter into a contract with the Hinds Uranium Corporation for an exploratory loan in the amount of $64,645. On the 90 percent participation basis the government will furnish as its share $58,181.

HIKIE URANIUM MINING CO.
GARFIELD AND KANE COUNTIES, UTAH
DMA-1479-K
Uranium

Engineering Report

by H. K. Thurber, Jr.
Mining engineer
U. S. Bureau of Mines

KINDS URANIUM MINING CO.
GARFIELD AND KANE COUNTIES, UTAH

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ILLUSTRATIONS


Fig. 1 Location map, Kinds Uranium Mining Co., Garfield County, Utah

Fig. 2 Silver Falls No. 2 Uranium Prospect, Garfield County, Utah

Fig. 3 Geology between Escalante River and Halls Creek, Garfield and Kane Counties, Utah

Fig. 4 View of camp looking westwardly, Kinds Uranium Mining Co., Circle Cliffs area, Garfield County, Utah

## INTRODUCTION

The Hinds Uranium Mining Co., Commercial Bank Building, Richfield, Utah, has requested a DMA exploratory loan of $500,000, Docket 1476-X, to explore the company's uranium properties in the Circle Cliffs area 35 miles east of Escalante, Utah.

No program of exploration has been advanced by the company, with the exception of proposals for clearing ore horizons in accessible areas and driving adits to explore the deposits at depth beyond outcrops.

The property was examined July 1951 by a team consisting of a geologist of the U. S. Geological Survey and a Bureau of Mines engineer. This report appraises the engineering feasibility of proposed exploration on the property and the advisability of a DMA exploratory loan.

## ACKNOWLEDGMENTS

The Bureau of Mines wishes to acknowledge the aid given by the representatives of the company in conducting the examining team over the property, and to Mr. Hinds for providing maps and other factual data concerning claims, equipment and assays.

## LOCATION AND PHYSICAL FEATURES

The numerous claims held by the company cover a large area in the vicinity of the Circle Cliffs, Garfield and Kane Counties, Utah (fig. 1). The exploration proposed in this report, however, is confined to three areas in which some previous exploration has been done. One of these areas is in Sec. 33, T. 32 S., R. 7 E. The other areas

are on land that has not been surveyed, but probably will be in Secs. 1 and 2, T. 36 S., R. 7 E., and Sec. 35, T. 34 S., R. 6 E., when a survey is made. The camp site, also on land which has not been surveyed, is approximately 44 miles by paved road from Escalante, Garfield County, Utah.

The Circle Cliffs area is an anticlinal valley trending approximately N. 25° W. and flanked by upper Permian Kaibab limestone and lower Triassic Moenkopi sandstone and shale. The valley is cut by washes that dumping into canyons where intermittent streams flow westward to the Escalante River through the younger sediments on the gently-sloping west limb of the anticline. Erosional remnants of Triassic Shinarump and Chinle formations, capped in some places by Jurassic Glen Canyon, form mesas rising from the valley floor. These conditions are illustrated in figure 4.

## HISTORY AND PROSPECTING

During most of 1949 and 1950 Mr. Kinds prospected the area of Circle Cliffs and north in the Colorado River for outcrops of ore-bearing layers of the Shinarump formation. As a result of this prospecting, he located 645 claims in two groups along outcrops of the Shinarump formation.

The Kinds Uranium Mining Co. was formed in February 1951, and exploration was begun a short time later. At the time of the examination the company employed 8 men in exploration and mining operations.

[illegible]

The Gaspe Basin is in the Matapedian Valley Depression (Cumberland, 1. 29) 1. and flanked by upper Devonian Gaspe Sandstone and lower Silurian Gaspe Limestone sediments and slate. The valley is cut by various lost streams into various more indurated strata. The [illegible] to the Devonian, thus leaving the Devonian sediments on the small-angled west side of the syncline. Structural studies of Ordovician Gaspe and Silurian formations, occurring in some places in [illegible] strata, have been [illegible] by [illegible]. These conditions are [illegible] in figure 4.

## WATER AND MOVEMENT

Spring rest of May and June 1938, a lake preserved the area of Gaspe Basin and added to the [illegible] the operation of [illegible] Lemon of the Gaspe Lumbering Corporation. As a result of this impoundment, it became not [illegible] to use [illegible] of the Gaspe Lumbering Corporation.

The Gaspe Lumber Company Co. was formed in February 1938, and engineers was [illegible] a [illegible] lake [illegible]. As the time of the [illegible] the company [illegible] [illegible] in [illegible] operations.

A total of 60 tons of uranium-bearing material has been shipped from the deposits, but only 4.21 tons contained sufficient $U_3O_8$ to be classed as ore, the remainder being below the minimum grade of 0.10 percent $U_3O_8$ established by the Atomic Energy Commission. The accepted ore was paid for at the rate of $26.37 per ton, including development bonus, premium payment, and haulage allowance of $0.06 per ton mile for the first 100 miles. The total payment on the shipment was $113.11. This represents the only production from the Hinds property. Other properties in the area are reported to have shipped approximately 300 tons of uranium ores which assayed 0.12 to 0.84 percent $U_3O_8$.

OWNERSHIP AND HISTORY

The Hinds Uranium Mining Co. holds by location two groups of claims, the Red Road Nos. 1 to 300, and the Rusty Road Nos. 1 to 145 inclusive. The company also has leasing arrangements on approximately 2,500 claims in the area.

The claims are located along outcrops of the Shinarump formation and on mesas where the Shinarump formation may be covered by younger rocks. The claims are not contiguous and do not cover the entire area. The northernmost group lies in unsubdivided T. 32 S., R. 7 E. The northernmost of the claims lies in unsubdivided T. 39 S., R. 10 E., S.L.B. & M.

It is well to note that the work proposed by the examining team is confined to small areas that are accessible by existing roads and upon

which some work has been done. Figure 3 shows locations of proposed exploration.

## DESCRIPTION OF THE DEPOSITS

The Triassic and lower Jurassic rocks of the western limb of the anticline in the Circle Cliffs area dip gently to the west. The ore deposits lie at or near the base of the upper Triassic Shinarump formation. Channels in the Moenkopi are filled with coarse sandstone, conglomerates and sandy shales of the Shinarump formation and have provided favorable conditions for deposition of uranium minerals. In many areas this "channeling" is very readily observed and serves as an apparently reliable guide in prospecting.

The ore horizon sampled in the adit on the Silver Falls No. 2 claim consists of dark sandstone and siltstone showing some carbonaceous material and occasional secondary copper minerals. The horizon lies immediately above a gray-green, sandy siltstone which forms the contact with the underlying Moenkopi formation. In this area the "channeling" is evident in the difference in elevation of the two adits shown on figure 2. The northernmost adit is approximately 25 feet above the main adit, but immediately above the formation contact, yet the bedding in the underlying formation is nearly horizontal. The main adit apparently is near the lowest elevation in this channel.

The locations of samples taken on Silver Falls No. 2 claim are shown on figure 2, and these, with others taken on other claims, are listed below:

| Sample No. | Location | Length | Percent U3O8 | Percent Cu | Remarks |
|---|---|---|---|---|---|
| 1 | Adit, Red Road No. 37 | 2.5' cut | 0.048 | — | Cut in face of adit |
| 2 | Surface, Moore Canyon No. 1 | 1.5' cut | .047 | 2.15 | Cut in outcrop |
| 3 | Ore pile, Silver Falls No. 1. | Grab | .096 | — | Grab sample of ore stock |
| 4 | Open cut, Silver Falls No. 1 | 3.5' cut | .055 | — | Cut in altered zone near vertical "fissure" |
| 5 | Adit, Silver Falls No. 2 | 2.5' cut | .222 | — | Cut in north wall near face |
| 6 | Adit, Silver Falls No. 2 | 2.5' cut | .175 | — | Cut in face |
| 7 | Open-cut, Adit Silver Falls No. 2 | 2.0' cut | .037 | — | Cut in face of open-cut |
| 8 | Ore pile, Silver Falls No. 2 | Grab | .421 | — | Grab sample of ore stockpile. |

## MINABLE ORE RESERVES

In view of the few openings that have been made on the property and the limited penetration in the outcrops, a reliable estimate of minable ore reserves is not possible.

## PRESENT STATUS

Work accomplished to the time of the examination consisted of erecting a camp (fig. 4), building access roads to various working places, incomplete construction of a road from the area north through Dixie National Forest to Grover, and driving a few short adits on widely-separated claims. Only the main adit on Silver Falls No. 2 claim has been advanced sufficiently to indicate the presence of minable uranium ore (fig. 2).

In addition to the above work, some equipment to be installed in a concentrating plant has been purchased and delivered to the camp. This consists of a 15" x 30" jaw crusher, and a pulverizer of undetermined capacity. A Diesel-electric power plant has been purchased but not delivered.

PROJECT PROPOSALS WITH COSTS

The company has not advanced definite exploratory proposals in the application other than a general statement proposing "core drilling, bulldozing and other preliminary mining to determine the extent of each of the ore bodies..." The cost estimate for this work and supporting activities, including salaries, engineering and management, is $500,000.

Much of the outcrop of the ore horizon is covered by blocky talus from the thick overlying sandstones. The use of a bulldozer to expose fresh faces of the outcrop is a logical beginning of an exploratory program.

Exploratory work on the Silver Falls No. 2 claim and other deposits in the area present evidence that soluble uranium minerals have been leached from the ore horizons at or near the surface. Therefore, the exploratory program proposed for this property includes adits to penetrate outcrops which are known to contain small amounts of uranium minerals.

The equipment on the property at the time of the examination is listed as follows:

2 compressors, 185 cfm., portable rubber-tired, Jaeger
2 jackhammers, dry, with hose and accessories, hand hold
1 bulldozer, D-7, Caterpillar and tractor
1 tractor, crawler type, HD-15, with loader attached
1 light plant, 5-kw., gasoline-driven
1 ea. 1,000-gallon water tank, 1,000-gallon gasoline tank, 1,000-gallon diesel fuel tank
1 Jeep station wagon, 4-wheel drive
Cook house and camp installation for approximately 20 men
Miscellaneous tools, welding equipment, and greasing facilities for equipment now in use

Some milling equipment has been delivered to the camp site, but a consideration of milling is beyond the scope of this report.

A plan for exploratory work on certain areas suggested by the examining team, to require approximately 60 days, follows:

Rim stripping by bulldozer as indicated by geologic conditions on and near the Red Road No. 27 claim, the Morse Canyon No. 1 claim, and the Silver Falls Nos. 1 and 2 claims, 10,000 linear feet at $0.50 per foot ——— $5,000.00

Red Road No. 27 Claim, Longwall Area

2 adits, 100 ft. long, 200 ft. total at $23.55 per foot ——— $4,710.00

The cost per foot is broken down as follows:

| | |
|---|---|
| Labor | $ 8.53 |
| OAB, employment insurance, workmen's compensation, etc. | .85 |
| Explosives | 3.18 |
| Caps and fuse | .48 |
| Repairs to equipment | 1.00 |
| Steel and bits | .55 |
| Gasoline and lubricants | .70 |

| | |
|---|---|
| Maintenance of drift | $ .56 |
| Pipe (air and water) and hose | 1.49 |
| Hand tools and miscellaneous hardware | .30 |
| Water hookups | .29 |
| Total direct cost per foot | $ 18.14 |

Overhead Costs

| | |
|---|---|
| Engineering, sampling, and analyses | $ 2.10 |
| Supervision | 1.00 |
| Camp and commissary | .90 |
| Bookkeeping and office | .40 |
| Sales and use tax | .06 |
| Surface preparation, hoisting, and labor | .95 |
| Total per foot of overhead | $ 5.41 |
| Total cost per foot of adit | $ 23.55 |

Bonnie Gamble No. 1 Claim

Two adits, each 100 feet long, are proposed on this claim.

Underground exploration conditions are similar to those on the Red Head No. 27 claim, thus the cost per foot is estimated to be $23.55 per foot x 200 feet ——— $4,710

Silver Falls No. 1 Claim

Two adits, each 100 feet long, are proposed, with a crosscut approximately 50 feet from the portals, a total of 250 feet. Underground exploration conditions are similar to those on the Red Head No. 27, thus the cost of the proposed work would be $23.55 per foot x 250 feet ——— $5,888

Silver Falls No. 2 Claim

Two adits, each 100 feet long and connected with a crosscut approximately 50 feet from the portals, are proposed on this claim. Underground exploration conditions are similar to those on the Silver Falls No. 2 claim, thus the cost of the proposed adits would be $23.55 per foot x 250 feet, ———————————— $ 5,888

Depreciation on equipment owned by Company

Equipment used in connection with actual exploration:

| | |
|---|---|
| 2 compressors, 105 cfm., portable, rubber-tired - $5,800 each | $11,600 |
| 2 jackhammers, dry, with hose and accessories - $375 ea. | 750 |
| 1 bulldozer, Caterpillar, D-7 ———————— | 13,000 |
| 1 tractor-loader, Allis-Chalmers, HD-7 tractor — | 6,000 |
| Total cost of equipment used in exploration | $31,350 |

Allowable depreciation on above equipment:

$$\$31,350 \times \frac{1}{60} = \$522.50 \text{ per month}$$

Allowable depreciation for length of project:

$522.50 x 2 months = $1,045

Equipment used in support of actual exploration:

| | |
|---|---|
| 1 Jeep station wagon, 4x4 ———————— | $ 1,400 |
| 1 electric generating plant, 5 k.w. ———— gasoline driven | 1,500 |
| 1 1,000-gallon water tank, 1 1,000-gallon ——— diesel fuel tank, and 1 1,000-gallon gasoline tank, $150 ea. | 450 |
| Camp and cooking equipment, approx. value ——— | 1,500 |
| Total value of equipment owned by the ——— company used in support of exploration | $ 4,850 |

Allowable depreciation per month on above equipment:

$$\$6,500 \times \frac{1}{60} = \$80.83$$

Allowable depreciation for length of project:

$80.83 x 2 month = $162

Equipment that must be procured on a rental basis:

| | |
|---|---|
| 3 compressors, 210 cfm., portable, gasoline, $290 per month x 2 months x 3 | $ 1,740 |
| 4 jackhammers, wet, mounted with accessories $68.75 per month x 2 months x 4 | 550 |
| 4 receivers, air, 30" x 7' $33 per month x 2 months x 4 | 264 |
| 8 camp, mine, 24 cu. ft. $26 per month x 2 months x 8 | 416 |
| 1 bulldozer, D-8 Caterpillar $851 per month x 2 months | 1,702 |
| Total rental of equipment on project | $ 4,672 |

Expenditures in Support of Exploratory Work

| | |
|---|---|
| Improvements at main camp and establishment of outlying camps | $ 2,800 |
| Cook and helper (2 months) | 1,153 |
| Commissary for men not engaged in actual exploration | 1,200 |
| Water supply development | 800 |
| Supervision (superintendent and foreman) | 2,200 |
| Engineering (miscellaneous) | 1,750 |
| Mechanic and equipment maintenance man and helper | 1,400 |
| Truck rental and transportation | 3,500 |
| Miscellaneous bulldozer work cleaning camp sites and improving access roads | 900 |
| Manager, $600 per month x 2 months | 1,200 |
| Office expense (accounting, etc., other than chargeable to adits) | 550 |
| Gasoline and lubricants not chargeable to adits | 250 |
| | $17,703 |

SUMMARY

| | |
|---|---|
| Direct costs of stripping pits with bulldozer | $ 3,000 |
| Underground adits on Red Rock No. 27 claim | 4,720 |
| Underground adits on Mizpah Compromise No. 1 claim | 4,720 |
| Underground adits on Silver Falls No. 1 claim | [illegible] |
| Underground adits on Silver Falls No. 2 claim | [illegible] |
| Total allowable depreciation on equipment owned by the company | 1,[illegible] |
| Rental of equipment | 4,[illegible] |
| Expenditures in support of exploration work | 11,[illegible] |
| Total estimated cost of proposed exploration project | $49,77[illegible] |

The most travelled route to the property is by an unimproved road from Escalante via Beaver Dam and Silver Falls Ranch. This road is dangerous or impassable during flood periods. A second road into the area from Beaver, Beaver County, is impassable in dry weather by four-wheel-drive vehicles only. This route is impractical for continuous heavy hauling.

The distance to the railhead at Marysvale via Escalante, Antimony, and Junction is 136 miles. A road under construction by the company from the area of the Longstaff north across the east side of the Dixie National Forest to the railhead at Sigurd, Sevier County, via Torrey and Lea, would reduce the ore haul to 107 miles.

The company has built an airstrip at the main camp suitable for small aircraft.

The employees of the company live in Escalante and Richfield. It will be necessary to recruit some of the skilled labor required for the project from larger centers of population in the state.

Any power required for the camp or shop equipment must be generated

[illegible]

[illegible]

[illegible]

at the project, since no power lines cross the area. The present generator capacity is probably sufficient for limited lighting or shop use anticipated on the proposed exploratory project.

Water supply in the Circle Cliff's area represents a major problem. At present, the culinary water is hauled from Escalante, 44 miles distant, and other water is hauled from the Escalante River, a distance of 10 miles. The consulting team observed the possibility of developing water in Silver Falls Creek near its junctions with the Escalante River. An item of expense for such development was included in the cost of the proposed project.

It is estimated that the exploratory program as outlined will require approximately 45 days, but delays in procuring equipment and supplies may extend the time to as much as 60 days. Bin sloping and underground exploration may be carried on simultaneously as circumstances dictate.

No plan of development or mining after the exploratory program is completed can be advanced, since the size and character of the ore bodies cannot be accurately predicted. Moreover, the average grade of the ores cannot be estimated from the small amount of work done.

A recapitulation of the costs of the proposed exploratory program from the section on project proposals follows:

at the project, since no power lines cross the area. The proposed generator, capacity is readily sufficient for the drill-rig and lighting of camp requirements of the proposed exploratory project.

Water supply in the Circle Cliffs area presents a major problem. In places, the culinary supply is hauled from Hanksville, 45 miles distant, and other water is hauled from the Escalante River, a distance of 10 miles. The drilling [illegible] showed the possibility of developing water in gravel fills near the junction with the Escalante River. An item of expense for such development was included in the cost of the proposed project.

It is estimated that the exploratory program as outlined will complete approximately 45 days, with delays in procuring equipment and supplies may extend the time to as much as 60 days. The drilling can [illegible] circumstances permit.

If a program of development or mining after the exploratory program is completed can be initiated, using the tools and knowledge of the ore control would be materially reduced. Therefore, the overall costs of the [illegible] from the small amount of work done.

A recapitulation of the costs of the proposed exploratory program items are mentioned in Project Proposals Follows:

| | |
|---|---|
| Underground and surface exploration | $ 32,075 |
| Activities in support of actual exploration, including camp, commissary, water, transportation, etc. | 17,703 |
| Total cost of exploratory program | $ 49,778 |

The total above represents the entire cost of the program outlined in other sections of the report. No sound estimate can be made of either actual operating costs or possible profit until the exploratory program is complete to indicate the areal extent of the mineralization, the minable thickness, and possible discontinuity of the apparently lenticular ore bodies.

The only criterion for judging possible profit or loss is contained in a settlement sheet furnished the company by an authorized ore purchaser. This sheet showed that 4.21 tons of ore containing 0.25 percent $U_3O_8$ and 0.07 percent $V_2O_5$ was paid for at the rate of $26.87 per ton, or $113.11 for the shipment. This included a development allowance of $0.50 per pound of $U_3O_8$ contained, a premium for $U_3O_8$ in excess of 4 pounds per ton at $0.75 per pound, and a haulage allowance of $0.06 per wet ton mile for 100 miles. No deductions were made for excess lime.

## PROPOSED FINANCING

The physical assets owned by the company and the company's financial statement indicate ability to furnish the 10 percent of the project cost required under DMA regulations.

## CONCLUSIONS AND RECOMMENDATIONS

The limited underground work on the Silver Falls No. 2 claim and the surface work accomplished on the Silver Falls No. 1, the Red Head No. 27 claim, and the Horse Canyon No. 1 claim indicate the widespread occurrence of uranium mineralization in the Cripple Creek area. The ore in the adit on Silver Falls No. 2 claim exhibits apparent increase in grade as the leached and oxidized surface zone is penetrated, a condition noted in other deposits in the Shinarump formation. Samples in this adit show that ore will above the minimum acceptable grade may be mined on this claim.

In view of the above facts, it is concluded that the Cripple Creek area is a potential producer of uranium. Thus, it is recommended that a DMA exploratory loan of $49,775 be made to the Kinda Uranium Mining Co.

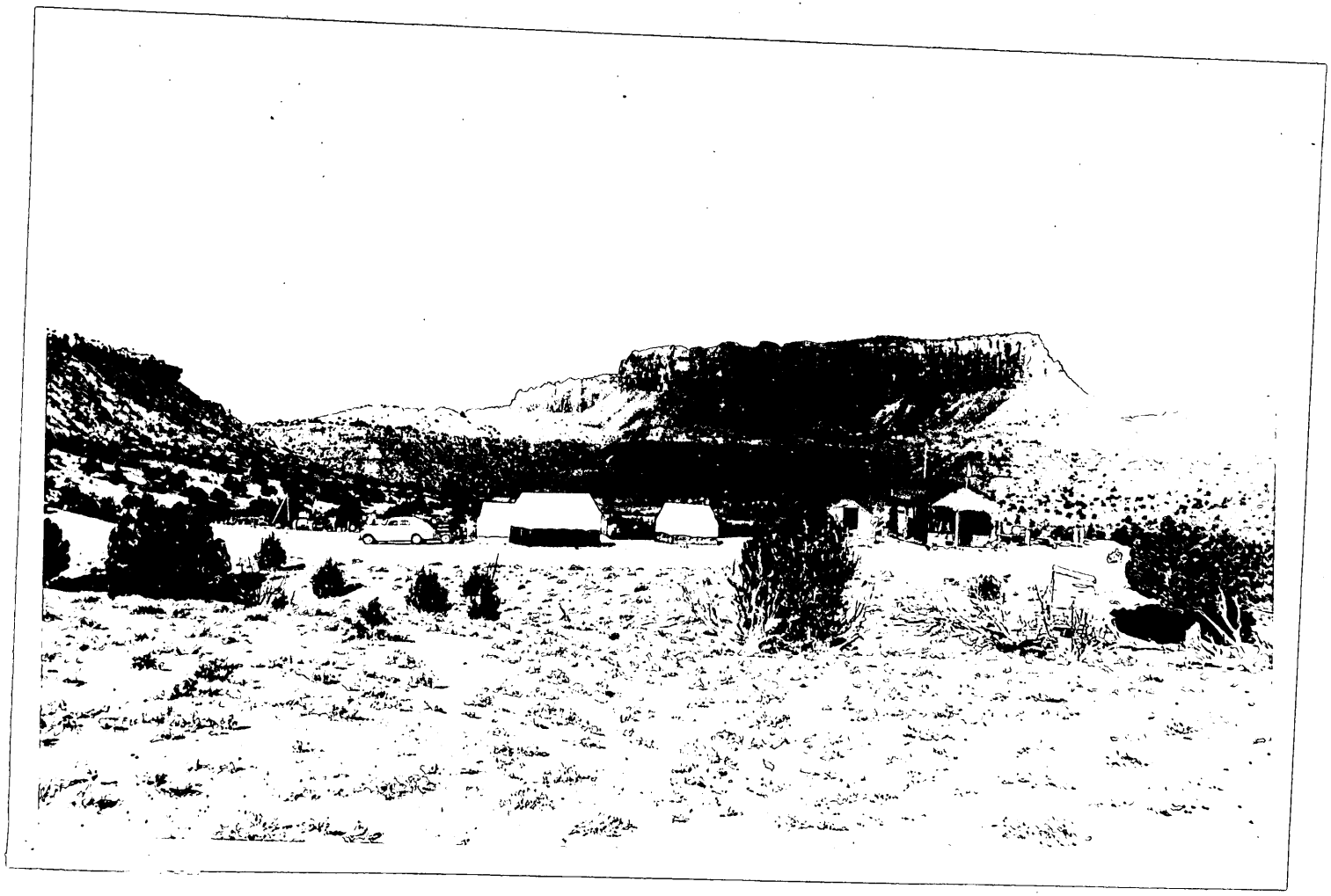

Fig. 4 View of camp looking westwardly, Hinds Uranium Co., Circle Cliffs area, Garfield County, Utah

FILE COPY
SURNAME:

Bourret.
Moon
McKnight for
Rabe

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

Docket mailed 6/21/51

June 19, 1951

Mr. Fred Hinds
Hinds Uranium Mining & Rare Metals
P. O. Box 191
Richfield, Utah

Dear Mr. Hinds:

Your application Docket DMA-1478 for exploration project in the amount of $500,000 has been received by the Minor and Rare Metals Branch of the Supply Division.

Before a decision can be reached on your request we find it is necessary to obtain additional information on your property. Your application therefore is being referred to the office of the Executive Officer of DMA field team IV, Mr. J. H. East Jr., 224 New Customhouse Building, Denver 2, Colorado, with the request that the needed information be supplied to us.

Yours very truly,

Tom Lyon, Director
Supply Division

WBourret/mh
cc: Adm. Read. File
Strobel
Lyon
Field Team IV
Bourret
Files

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

June 18, 1951

Mr. Fred Hinds
P. O. Box 191
Richfield, Utah

Dear Mr. Hinds:

Your request for aid in exploration of a manganese deposit in Garfield County, Utah has been reviewed by the Defense Minerals Administration. Inasmuch as yours is a new deposit we would like to aid in the exploration necessary to determine its value. However, the information you have submitted is inadequate to justify an exploration campaign costing $40,000. It is suggested that you submit reconnaissance reports including sketch maps and assays to substantiate the proposal. Possibly the geological studies you mention which resulted in estimates of 500,000 tons of material at 34-35% Mn would serve this purpose. If that information is not available, it would be desirable to scale down your proposal to a figure of approximately $10,000 to supply the reconnaissance information first, before undertaking a full-scale exploration job.

In order to facilitate your reply, I am enclosing copies of the contract form, DF-200, and would like to call your attention to certain information requested therein. (1) It is necessary to locate your property more accurately; I suggest you spot it on a photostat of Plate 1, U.S.G.S. Bull. 164, which covers the area of Harris, Wash. (2) The contract form should also be accompanied by a series of exhibits. Exhibit A requires a detailed statement of what work is to be done, and a map showing the location of the proposed trenches or drill holes. Exhibits B to E should also be prepared insofar as they are applicable. (3) Include a brief description of the nature and occurrence of the ore mineral in order to indicate whether it may be a direct shipping ore, or will be amenable to beneficiation if that proves necessary.

Very truly yours,

P. R. Bradley, Jr.

P. R. Bradley, Jr.
Chief, Manganese Branch

Enclosure

MDCrittenden:ec

CC: Adm. Reading File
Mr. Strobel
Mr. Holderer Mr. Crittenden Files

FILE COPY
SURNAME:

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

June 15, 1951

Mr. Fred Hinds
Post Office Box 191
Richfield, Utah

Subject: DMA-1478X
Re: Exploration Loan -
Red Head Nos. 1 to 300 and
Rusty Head Nos. 1 to 345
inclusive

My dear Mr. Hinds:

Receipt is acknowledged of your application and attachments of May 10, 1951 for an exploration loan under the Defense Production Act of 1950.

The application was assigned Docket Number DMA-1478X and referred to Mr. Weston G. Bourret, Acting Chief, Minor and Rare Metals Branch on June 6, 1951.

In any future correspondence relating to your application, kindly refer to DMA-1478X.

Sincerely yours,

LANDON F. STROBEL

Landon F. Strobel
Executive Secretary

L. F. Strobel:jc
cc: Strobel
File
Bourret
Lyon

[illegible]03
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

# APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. DMA-1478X

Date received 6/4/51

Participation

Fred Hinds, d.b.a. Hinds Uranium Mining & Rare Metals
P.O. Box 191
Richfield, Utah

Name and address of applicant

Date ~~May 10, 1951~~

FILL IN THIS BLOCK

Date of application May 10, 1951

Estimated cost $500,000.00

Mineral or metal Uranium

Percentage of Government participation 90%

Location of mine Circle Cliffs Mining District, bounded by Escalante River on West, Halls Creek on the East, Boulder Mountain on the North and the Colorado River on the South in Southeast Utah.

Date of filing MF-100

DMA Docket Number, if available

## INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

## THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

## THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

    NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.
*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.
*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.
*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.
15. State in detail how the ore could be shipped and how and where milled.
*16. History:
    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.
    (*b*) State briefly the known history and production of adjoining and neighboring properties.
    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.
*17. Production:
    (*a*) If mine is in production, furnish the following information:

| | *Tons per day* | *Grade or analysis* | *Cost per ton* | *Net value per ton* |
|---|---|---|---|---|
| (1) Mining | | | | |
| (2) Milling | | | | |
| (3) Shipped or sold | | | | |

*18. Ore or mineral reserves: (If property is or has been operating.)
    (*a*) Describe the ore or mineral deposits briefly.
    (*b*) Submit available maps and assay data.
    (*c*) Give estimated tonnage and grade of each class of ore reserves.
19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

## THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?
21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.
22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

## THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
    (*b*) Supervisors, by numbers and positions, with salaries of each.
    (*c*) Cost of necessary repairs to existing facilities, structures, and buildings.
    (*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.
    (*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.
    (*f*) Cost of rental for equipment which the operator proposes to rent.
    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.
    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.
    (*i*) Cost of power, water, utilities, and any other items not provided for above.
24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

## CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Hinds Uranium Mining & Rare Metals
(Name of company)

By Fred Hinds
(Signature of authorized official)

May 10, 1951
(Date)

Owner.
(Title)

**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.**

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

ESTIMATE OF INITIAL AND MONTHLY EXPENSES ON PROPOSED EXPLORATION OF URANIUM CLAIMS OWNED BY FOLD BINDS, P.O. BOX 191, RICHFIELD, UTAH

EQUIPMENT FOR CAMP & OPERATIONS

| | | |
|---|---|---|
| 10 | tents 10'x12' @ $85.00 | 850.00 |
| 50 | iron cots & mattresses @ 16.50 | 825.00 |
| 100 | blankets @ 5.00 | 500.00 |
| 50 | pillows @ 2.00 | 100.00 |
| 1 | cook shack | 350.00 |
| 1 | cook stove | 550.00 |
| 1 | refrigerator | 400.00 |
| 12 | heaters @ 15.00 | 180.00 |
| | Miscellaneous Cooking equipment | 500.00 |
| | Butane installation for heaters and cook stove | 300.00 |
| 1 | light plant | 1200.00 |
| | Drill Hole and install pump | 1500.00 |
| 10 | Geiger Counters | 985.00 |
| 1 | Scintillometer | 895.00 |
| 1 | Dodge Power wagon with winch | 2750.00 |
| 1 | Ryllis Jeep Station Wagon, 4 wheel drive | 2250.00 |
| 4 | Civilian Jeeps, 4 wheel drive with winches | 6600.00 |
| 2 | Core Drill Rigs mounted on Jeeps | 17,920.00 |
| 2 | D-7 Cat Tractors with dozers | 18,000.00 |
| 1 | Spectrometer and other Labratory equipment | 7500.00 |
| | Miscellaneous Hand mining equipment, shovels, picks, hammers, etc. | 646.24 |
| | Office Equipment | 1000.00 |
| 2 | Jaeger Portable Compressors, 185 cf, with hammers & hose | 9500.00 |
| 1 | 1000 gallon water tank | 200.00 |
| 2 | 500 gallon fuel tanks for diesel & gasoline @ 150.00 | 300.00 |
| | 4000' lumber for floors and sidewalls @ 160.00 per M' | 640.00 |
| | Transits, chains and miscellaneous surveying equipment | 2000.00 |
| 1 | Front End Loader mounted on Cat. 1 yd. | 6000.00 |
| 2 | Used 10 ton Euclid Dump trucks @ 8000.00 | 16,000.00 |
| | Equipment total | $100,441.24 |

EQUIPMENT INSURANCE

| | |
|---|---|
| On all vehicles and moving equipment | 1600.00 |

PAYROLL INSURANCE & PAYMENTS BASED ON $289,980.00 ANNUAL PAYROLL

| | |
|---|---|
| State Workman's Compensation @ 5% per $100.00 | 14,499.00 |
| State Unemployment Benefit Fund @ 2.7% per 100.00 | 7829.46 |
| Federal Social Security @ 1.5% | 4349.70 |
| Total State & Federal Payments on Payroll | 26,678.16 |

COPY

EXPLORATION EXPENSES [illegible], FIELD MINES, P.O. BOX 191, SICHULED, [illegible]

(2).

APPROXIMATE FIXED MONTHLY EXPENSES

| | |
|---|---|
| Office Rent | 75.00 |
| Office & Mapping supplies | 150.00 |
| Labratory supplies | 300.00 |
| Gasoline & Diesel Fuel | 1000.00 |
| Food for 50 men @ 3.00 per day each based on 30 day month | 4500.00 |
| Miscellaneous expense, transportation of equipment, etc. | 750.00 |
| Total approximate fixed expense for one month | 6775.00 |
| Total approximate fixed expense for 12 months | 81,300.00 |

SALARIES: EXECUTIVE, OFFICE & CAMP

| | |
|---|---|
| Fred Hinds - General Manager | 850.00 |
| J.H. McBroom - Ast. General Manager | 700.00 |
| Floyd Fattig - Superintendent | 600.00 |
| K.K. Pratt - Ast. Supt. | 400.00 |
| Chas. H. Dunning - Consulting Engineer | 400.00 |
| Geologist | 500.00 |
| Office Manager | 400.00 |
| Executive Secretary | 300.00 |
| Bookkeeper | 250.00 |
| Assayer | 300.00 |
| Map man | 250.00 |
| Cook & Camp Manager | 325.00 |
| Assistant Cook | 220.00 |
| 2 Camp handy men @ 150.00 each per month | 300.00 |
| Total salaries: executive, office & camp for one month | 5795.00 |
| Total salaries: executive, office & camp for 12 months | 69,540.00 |

SALARIES: FIELD CREW

| | |
|---|---|
| 2 Licensed Surveyors @ $400.00 per month each | 800.00 |
| 2 Ast. Surveyors @ 300.00 per month each | 600.00 |
| 2 Core Drill Foremen @ 450.00 per month each | 900.00 |
| 10 Prospectors @ 375.00 per month each | 3750.00 |
| 20 Miners @ 2.00 per hour based on 224 hour month | 8960.00 |
| 10 Laborers @ 1.50 per hour based on 224 hour month | 3360.00 |
| Total Salaries of Field Crew for one month | 18,370.00 |
| Total salaries of Field Crew for 12 months | 220,440.00 |
| APPROXIMATE GRAND TOTAL FOR 12 MONTHS EXPLORATION | 390,000.00 |

COPY

Dma-1478X

May 20, 1951

Defense Minerals Administration
Bureau of Mines
United States Department of the Interior
224 New Custom House
Denver 2, Colorado

Attention: J.H. East, Jr.
Regional Director

Gentlemen:

I am enclosing four copies of Forms MF-103 covering prospective exploration of my Uranium mining claims located in Kane and Garfield Counties of Utah. These claims are known, recorded and described as Red Head Nos. 1 to 300 inclusive and Rusty Head Nos. 1 to 345 inclusive. They are all located in the Circle Cliffs Mining District and are bounded on the West by the Escalante River, on the East by Halls Creek, on the North by Boulder Mountain and on the South by the Colorado River. These claims are all recorded and held by myself alone, having no liens or encumbrances against them.

I operate as an individual in the name of Fred Hinds, d.b.a. Hinds Uranium Mining and Rare Metals at the above adress, having no partners or stockholders. Attached is a summary of my education, business and mining experience.

You will note from my attached financial statement that I have already made a considerable investment in the preliminary exploration of this area and have on location the necessary equipment, camp, engineering and mining staff to start more extensive explorations immediately.

I have spent approximately two years in the area above described, prospecting and locating the above mentioned claims. On most of them uranium ore running from 0.08 to 4% may be detected in surface outcroppings. It will be necessary, however, to do extensive core drilling, bulldozing and other preliminary mining to determine the extent of each of the ore bodies together with accompanying assays for values, before any great production may be accomplished.

The Uranium on these claims occurs in secondary types of ores such as carnotite, torbenite, tyuyamunite, etc. in blanket formations in the Chinerup, Chinle and Wingate structures. The overburden runs from 5 feet to 40 feet in thickness.

To date since starting my exploratory mining operations on these properties in February of this year, we have made preliminary explorations of twelve of these claims and have found shipping ore on eight of them within a few feet of the surface. I have not yet made any shipments other than test shipments, pending our construction of a suitable trucking road. This road is now under construction and should be completed within three weeks. This will reduce our hauling distance to approximately 110 miles to the railroad at Richfield, Utah. The present road into Marysvale is a distance of 198 miles.

COPY

Other operators who are mining claims on a small scale adjacent to the Northern boundries of my claims have made shipments of Uranium ore to Maysvale this year in excess of 500 tons which has assayed from 0.12 to 0.84%. We have made an aerial scintillometer survey of my claims and have obtained in excess of 6000 counts per minute at an altitude of 3000 feet above our terain over much of the area. This compares with a count of approximately 200 to 500 per minute over the claims from which the aforementioned ore was shipped, taken at the same altitude. This would indicate that we have ore values in excess of theirs.

I am prepared to invest $50,000.00 in the further mineral exploration of these claims, providing that the Defense Minerals Administration or the proper United States Government Agency matches it with an additional $450,000.00 on the 90% participation basis as outlined under regulation M9-1.

It is my proposal to spend the above total of $500,000.00 over a period not to exceed one year of exploration. Attached is a summary of proposed distribution of expenses during that time.

If this proposed further exploration of these claims and adjacent areas discloses the indicated large amounts of uranium ore, I and some others of my associates plan to construct a concentration mill in this area to make possible the utilization of lower grade Uranium ores as well as those of higher values. We can raise approximately $1,500,000.00 for this purpose, however, we do not feel justified in making this investment until further exploration has been accomplished.

I trust that you will give this matter your earliest possible attention. If more data is required I will endevor to furnish it promptly upon your advise. It is not possible to supply geological maps or surveys on this project at this time as it is a new discovery on unsurveyed Federal Land. I believe that it will be found to be a major discovery that will add a huge amount of this critical material to our National Stockpile and will more than justify this proposed expenditure.

Very truly yours,

Fred Hinds

Fred Hinds.

FH/jm

COPY

EXPERIENCE SUMMARY
of
FRED HINDS, P.O. BOX 191, RICHFIELD, UTAH

Born in the Cherokee Strip of Oklahoma June 22, 1900. Received education in Kansas City, Kansas public schools, graduating from Wyandotte High School in June 1915. Attended Kansas University from 1915 to 1918 majoring in law. Received B.A. degree in Law upon entrance into the United States Army in 1918. Served eighteen months as private in the 85th Division of the Missouri National Guard.

Upon release from the army, entered the Rolla School of Mines, majoring in Mining Engineering and Geology. Graduated in 1925 with an M.A. in Mining Engineering and Geology.

In May 1926 went with the Anaconda Copper Co. at Lima, Peru as Superintendent of Production and Engineering, opening their operation in that area. Remained with them until 1930.

Then operated silver mines of his own in Guadalajara, Mexico from 1930 until 1932 at which time the Mexican government expropriated his mines. From 1932 until the latter part of 1943 served as consulting mining engineer for various mining companies and operated several mining operations in gold, silver and lead for himself.

In the latter part of 1943 accepted a commission as Lieutenant Commander in the Sea Bees with open assignment. Supervised various types of Air Base and Landing Base construction involving difficult engineering problems in the moving of large amounts of dirt and hard rock. Was honorably discharged in December 1945.

Then began prospecting for Uranium and Manganese ores in California, Utah, Wyoming, Idaho and Colorado, making an intensive study of the geology and mining operations in these areas. Has made several outstanding discoveries of major importance, notably the Uranium bearing formations of Circle Cliffs in Southeast Utah, extensive manganese deposits in the Clear Creek and Harris Wash areas of Utah and extensive Thorium rich monzonite sands in Idaho.

From 1945 until the Spring of 1951 also served as Consulting Engineer for various other mining companies in addition to his own operations.

In February 1951 organized his present company to develope his uranium and manganese discoveries in Southeast Utah. Has established a large well equipped permanent mining camp in this area and has in his employe an experienced staff of engineers and miners. Present estimated value of camp and mining equipment is in excess of $50,000.00 with no liens of any kind against it.

Mr. Hinds enjoys a considerable reputaion among the mining fraternity in the Western States as having an outstanding knowledge of the Uranium and Manganese bearing ores and formations of this area.

In addition to his own claims in the Circle Cliffs area he has a 20% interest in approximately 2500 other adjacent claims with a three year option to buy the other 80% interest for $1000.00 per claim.

COPY

MAY 10, 1951
FINANCIAL STATEMENT
OF
FRED HINDS, P.O. BOX 191, RICHFIELD, UTAH

| | |
|---|---|
| Cash in bank and at hand | $12,284.63 |
| Monies receivable in 60 days from royalties, leases, etc. | 25,460.00 |
| Camp equipment & supplies | 19,784.00 |
| 1 1951 Jeep Station Wagon | 1965.45 |
| 1 1951 Army type Jeep | 1334.21 |
| 1 D-7 Cat with Dozer & Ripper | 9000.00 |
| 1 D-5 Front End Loader, 1 yd. | 6000.00 |
| 1 Cletrac tractor | 1400.00 |
| 1 1950 Hudson Business Coupe | 1800.00 |
| Miscl. Mining equipment & supplies | 7000.00 |
| Office equipment | 842.00 |
| 645 Uranium mining claims (based on minimum value of 100.00 each. Some in production) | 64,500.00 |
| MINIMUM TOTAL ASSETS | $151,570.00 |

Since the above was compiled our field staff has uncovered and blocked out uranium ore on three of these claims valued in excess of $150,000.00. The ore values run from 0.50 to 1.5% uranium.

Also Mr. Hinds has a 20% interest in approximately 2500 uranium claims adjacent to the above listed claims, which is not listed in the above statement. Based on an absolute minimum valuation of $100.00 per claim this interest is worth in excess of $50,000.00

| | |
|---|---|
| TOTAL ASSETS | $251,570.00 |
| TOTAL LIABILITIES | NONE |

All bills are paid to date with no liens or encumbrances against any of the property or equipment.

COPY

Docket No. DMA 1478X
Commodity Uranium

UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

# EXPLORATION PROJECT CONTRACT [1]

It is agreed this _____ day of _____, 195__, between the United States of America, acting through the Department of the Interior, Defense Minerals Administration, hereinafter called the "Government," and [2] Fred Hinds, an individual D/BA The Hinds Uranium Mining and Rare Metals Co. P. O. Box 191 Richfield, Utah hereinafter called the "Operator," as follows:

1. *Authority for contract.* This agreement is entered into under the authority of the Defense Production Act of 1950, pursuant to Mineral Order 5, entitled "Regulations Governing Government Aid in Defense Exploration Projects."

2. *Operator's property rights.* The exploration project shall be conducted on that certain property situated in the State of Utah, County ~~of~~ ies Kane and Garfield described as follows: [3] Red Head Mining Claim, Nos. 1 to 300 and Rusty Head Mining Claim, Nos. 1 to 345 inclusive in Circle Cliffs Mining District, owned by applicant; in addition leases on Horse Canyon #1 and Silver Falls No. 1 and 2 with attached leases and subordination agreements.

with respect to which the Operator represents and undertakes:

(*a*) That he is the sole owner, in possession and entitled to possession of part of the property, and that the property is subject only to the following claims, liens, or encumbrances as to each of which the subordination agreement of the holder is attached: No encumbrances

Do not strike this line out

(*b*) ~~That he is a lessee, in possession and entitled to possession, and that the property is subject only to the following claims, liens, or encumbrances as to each of which the subordination agreement of the lessor is attached:~~ correct

3. *Exploration project.* The Operator, within thirty (30) days from the date of this contract shall commence work on a project of exploration for [5] uranium; shall prosecute the work efficiently, expertly, in a workmanlike manner, in accordance with good mining standards, with suitable and adequate equipment, materials, and labor, all properly designed to bring the project to completion within a period of [6] three (3) months from the date of this contract. The exploration project and the work to be performed are more fully described on Exhibit "A" attached hereto, which, with any maps or drawings thereto attached, is made a part of this contract.

4. *Performance of the work.* The work shall be performed by the Operator, under his sole direction and control: *Provided,* That with the consent of the Government and its written approval of the contract or contracts, all or any part of the work may be performed by the Operator through contract or contracts with independent contractors. The Government shall have the right to enter and observe and inspect the work at all reasonable times, and the Operator shall provide the Government with all available means for doing so. The Government may consult with and advise the Operator on all phases of the work.

5. *Fixtures and improvements.* The Operator shall devote the land and all existing improvements, facilities, buildings, installations, and appurtenances to the purposes of the exploration project without any allowance for the use, rental value, depreciation, depletion, or other cost of acquiring, owning, or holding possession thereof. Any additional facilities, buildings, and fixtures, to be purchased, installed, or erected by the Operator, with the estimated cost of each, to which the Government will contribute currently its agreed pro rata share, are listed in Exhibit "A" attached hereto. The difference between the cost of such additional facilities, buildings, or fixtures, and the salvage value thereof at the conclusion of the work, shall be charged as a cost of the project to which the Government has contributed its pro rata share.

6. *Operating equipment.* Any operating equipment to be rented, purchased, or furnished by the Operator, with the allowable rental, purchase price, or depreciation, as the case may be, is listed under appropriate headings in Exhibit "A" attached hereto. As to equipment purchased for the project, the Government will contribute its agreed pro rata share of the cost thereof, and the difference between the cost and the salvage value at the conclusion of the work shall be charged as a cost of the project to which the Government has contributed its pro rata share.

[1] If sufficient space is not provided in any blank, use an extra sheet of paper and refer to it in the blank.
[2] State name, address, and nature of organization if any.
[3] Give legal description or enough to identify the property.
[4] Strike out the provision not applicable.
[5] Name of mineral.
[6] Not in excess of 2 years.

7. *Title to and disposition of property.* All facilities, buildings, fixtures, equipment, or other items costing more [illegible] each, paid for or purchased with funds contributed jointly by the Operator and the Government, shall belong to the Operator and the Government jointly, in proportion to their respective contributions, and upon the termination of the contract, if they have any salvage value, shall be disposed of for their joint account unless the Government, in writing, waives its interest in any such items. The Government may require the dismantling, severance from land, and removal of any such items in order to realize its interest in the salvage value thereof, and the cost of any such removal and of the disposal of the items shall be for the joint account of the parties in proportion to their respective interests.

8. *Labor and supervision.* An itemized schedule of labor, by numbers and classes (miners, muckers, millmen, etc.), and of supervisors, by numbers and positions, with the maximum wages or salaries that may be paid to each as an allowable cost of the project is set forth in Exhibit "A" attached hereto.

9. *Rehabilitation and repairs.* A statement of the cost of any necessary rehabilitation or repairs to put existing facilities, buildings, installations, and fixtures into useful and operable condition and which are to be allowed as costs of the project is included in Exhibit "A."

10. *Allowable costs of the project.* The costs of the project in which the Government will participate are limited to the necessary, reasonable, direct costs of performing the exploration work, including the costs of materials, supplies, engineering, power, water, analytical work, accounting, and utilities, including items of equipment costing less than $50 each; and the costs referred to in Articles 5, 6, 8, and 9, and the exhibits annexed to and referred to in this contract. Although the Government may pay part of the cost of new or additional facilities, structures, buildings, and equipment, only the depreciation on such items, computed as indicated in Articles 5 and 6, will be charged as a cost of the project. No items of general overhead, corporate management, interest, taxes, or any other indirect costs not expressly allowed by these provisions, or work performed or costs incurred before the date of this contract, shall be allowed as costs of the project in which the Government will participate.

11. *Accounts and audits.* The Operator shall keep suitable records and accounts of operations, which the Government may inspect and audit at any time. The Government may at any time require an audit of the Operator's records and accounts by a certified public accountant, the cost thereof to be treated as a cost of the project. The Operator shall keep and preserve said records and accounts for at least 3 years after the completion of the project or the termination of this contract.

12. *Progress reports.* The Operator shall provide the Government with monthly reports of work performed under the contract upon forms to be provided by the Government. Each monthly progress report shall bear the certification of the Operator and shall constitute the Operator's invoice of costs incurred on the project during the period covered by the report.

13. *Payment to the Operator.* The monthly progress report (invoice), to the extent approved by the Government, shall be processed for payment by the Government. Payment shall be made in the amount of 90 percent of the approved costs incurred; *Provided,* That the aggregate total of all sums paid by the Government under this agreement shall not exceed $42,096.60, which is 90 percent of the agreed estimated total cost of this project, $46,774.00.

14. *Final reports by Operator.* Upon completion of the project or termination of this contract, the Operator shall provide the Government with a comprehensive geologic and engineering report, including an estimate of ore reserves, to the best of his ability. Four copies of all reports shall be furnished to the Government.

15. *Repayment by Operator.* If, upon the completion of the exploration project or termination of the contract, the Government considers that a discovery or development has resulted from the work from which commercial production of ore may be made, the Government, within 6 months thereafter, shall so certify to the Operator, particularly describing and delimiting its estimate of the discovery or the development. Thereafter, if and as ore is produced as a result of such discovery or development, the Operator and his successor in interest shall be and become obligated to pay to the Government a percentage royalty on the net smelter returns or other net proceeds realized from such ore, concentrates, or metal produced within ten (10) years from the date of this contract, until the total amount contributed by the Government, without interest, is fully repaid or said 10 years have elapsed, whichever occurs first, as follows:

Of net smelter returns or other net proceeds not in excess of eight dollars ($8.00) per ton of ore: One and one-half (1½) percent.

Of net smelter returns or other net proceeds in excess of eight dollars ($8.00) per ton of ore: One and one-half (1½) percent, plus one-half (½) percent for each additional full fifty cents ($0.50) in excess of eight dollars ($8.00) per ton of ore, but not in excess of a maximum of five (5) percent.

This obligation to repay from net returns or proceeds shall be and remain a claim and lien upon the mineral deposit which is the subject of the exploration project and upon any production resulting from such discovery or development, in favor of the Government, until fully paid, or until said 10-year period has elapsed; and this claim and lien and the Government's right to repayment shall survive any termination of the contract, whether by completion of the exploration project or otherwise. This article is not to be construed as imposing any obligation on the Operator or his successor in interest to produce ore from any such discovery or development.

16. *No assignment of contract.* Without the written consent of the Government, the Operator shall not assign or otherwise transfer or hypothecate this contract or any rights thereunder.

17. *Termination and completion.* The Government may, at any time, by written notice to the Operator, terminate this contract: (*a*) If the Operator fails to provide his share of the money necessary to prosecute operations pursuant to the terms of the contract; (*b*) if the Operator, in the opinion of the Government, fails to prosecute operations pursuant to the terms of the contract; or (*c*) if in the opinion of the Government, operations up to the time of the notice have not indicated the probability of making any worthwhile discovery and in the opinion of the Government further operations are not justified. Upon the completion of the project or any termination of the contract the Operator shall render to the Government a full and final accounting of his operations under the contract and his expenditures of money; shall dispose of any unused materials, supplies, and equipment for the joint account of the Operator and the Government in the proportion of their respective interests; and shall pay to the Government its pro-rata share of any money remaining.

Executed in sextuplicate the day and year first above written.

THE UNITED STATES OF AMERICA

Fred Hinds
(Operator)

By _____

By _____
Acting Administrator
Defense Minerals Exploration
Administration

U. S. GOVERNMENT PRINTING OFFICE 16-[illegible]

Docket No. DMA 1478X
Fred Hinds
Uranium
Exploration Project Contra

EXHIBIT "A"

Exploration Project:

This project will consist of rim stripping for 10,000 feet and 900 feet of underground drifting on the Red Head #27, the Horse Canyon #1, and the Silver Falls #1 and 2.

Time Schedule:

Working Time - 45 days

Calendar Days - 90 days

(4) Performance of work:

| | |
|---|---|
| 10,000 feet of rim clearing @ $0.50 | $ 5,000.00 |
| 900 feet of underground drifting @ $23.55 | 21,196.00 |
| Preparatory and supporting work | 20,578.00 |
| Total cost | $46,774.00 |

Rim stripping and underground exploration may proceed simultaneously as circumstances permit.

Cost Breakdown:

| | | |
|---|---|---|
| (4a) | Preparatory work | $ 8,455.00 |
| (5) | Fixtures and Improvements | 3,551.00 |
| (6) | Operating Equipment | 7,319.00 |
| (8) | Labor and Supervision | 18,077.00 |
| (9) | Rehabilitation and Repairs | 2,804.00 |
| (9a) | Supplies and Taxes | 6,568.00 |
| | Total Cost of Project | $46,774.00 |

(4) Rim clearing by bulldozer as indicated by geologic conditions on and near Red Head #27 claim, the Horse Canyon No. 1 claim, and the Silver Falls No. 1 and No. 2 claims.

10,000 feet at $0.50 per foot $5,000.00

~~Time required approximately 60 days.~~

on Red Head #27, Lampstand Area
2 Adits 100' long each 200' @ $23.55 $4,710.00
See Note 1 for cost breakdown

on Horse Canyon #1
2 Adits 100' long each 200' @ $23.55 $4,710.00

on Silver Falls #1
2 Adits 100' long with crosscut 50' long
250' @ $23.55 $5,888.00

on Silver Falls #2
2 Adits 100' long with crosscut 50' long
250' @ $23.55 $5,888.00

~~Time allowed - 60 working days.~~

(4a) Preparatory Work:

| | |
|---|---|
| Rim clearing 10,000 feet @ $0.50 | $5,000.00 |
| Clearing campsites and improving access roads | 900.00 |
| Transportation of supplies and equipment | 1,700.00 |
| Adit preparation | 855.00 |
| | $8,455.00 |

(5) Fixtures and Improvements:

| | |
|---|---|
| Establishment of outlying camps | $1,400.00 |
| Pipe,(air and water) and track | 1,341.00 |
| Camp and commissary | 810.00 |
| | $3,551.00 |

(6) Operating Equipment:

| | |
|---|---|
| (1) Equipment to be purchased | None |
| (2) Equipment to be rented for 2 months | |
| 3 Compressors, 210 cfm. @ $290.00 each month | $1,740.00 |
| 4 Jackhammers, wet, mounted with accessories @ $68.75 each | 550.00 |
| 4 Air Receivers 30"x 7' | 264.00 |
| 8 Mine Cars 24 cu. ft. | 416.00 |
| 1 Bulldozer D-8 Caterpillar $851.00 per month | 1,702.00 |
| 3 Pickup trucks @ $8.00 per day | 1,440.00 |
| Total monthly rental | $6,112.00 |

(3) Equipment to be furnished by Operator at 1/60 of replacement value per month.

| | value |
|---|---|
| 2 Compressors 185 cfm Jager @ $5800.00 each | $11,600.00 |
| 2 Jackhammers, dry with accessories $375.00 | 750.00 |
| 1 Bulldozer, Caterpillar D7 $13,000 | 13,000.00 |
| 1 Tractor-loader, Allis Chalmers HD7 @ $6000 | 6,000.00 |
| 1 Jeep station wagon 4 x 4 $1400 | 1,400.00 |
| 3 - 1000 gallon tanks (water, diesel, and gas) @ $150.00 each | 450.00 |
| 1 Generating plant 5KW gas driven | 1,500.00 |
| Camp and Cooking Equipment | 1,500.00 |
| Total Value | $36,200.00 |

1/30 of $36,200 = $1,207.00

(8) Labor and Supervision $18,077.00

Labor:

| | |
|---|---|
| 6 Miners @ $12.55 per day + O.T. $14.55 per day for 30 days | $ 2,619.00 |
| 12 Muckers @ $12.00 per day + O.T. $14.05 per day for 30 days | 5,058.00 |
| 1 Cook @ $315.00 per month for 2 months | 630.00 |
| 1 Cook helper @$260.00 for 2 months | 520.00 |
| 1 Mechanic @ $400.00 per month for 2 months | 800.00 |
| 1 Mechanic helper @ $300.00 per month for 2 months | 600.00 |
| | $10,227.00 |

Supervision:

| | |
|---|---|
| (1) 1 Superintendent @ $600.00 for 2 months | $1,200.00 |
| (1) 1 Manager @ $600.00 for 2 months | 1,200.00 |
| 1 Foreman @ $450.00 for 2 months | 900.00 |
| | $3,300.00 |

(1) Based on full time employment W.A.E.

Engineering:

| | |
|---|---|
| Miscellaneous Engineering | $1,750.00 |
| Engineering, sampling, and assaying | 1,890.00 |
| Bookkeeping and office | 910.00 |
| | $4,550.00 |

(9) Rehabilitation and Repairs:

| | |
|---|---|
| Improvements at main camp | $1,400.00 |
| Repair to equipment | 900.00 |
| Drift maintenance | 504.00 |
| | $2,804.00 |

(10) Supplies:

| | |
|---|---|
| Explosives $3.18 per foot for 900' | $2,862.00 |
| Caps and fuse $0.48 per foot for 900' | 432.00 |
| Steel and bits $0.55 per foot for 900' | 495.00 |
| Gasoline and lubricants | 1,240.00 |
| Hand Tools | 90.00 |
| Water Haulage | 630.00 |
| | $5,749.00 |

Taxes:

| | |
|---|---|
| Sales and use | $ 54.00 |
| Employees Insurance and Workmen's Compensation | 765.00 |
| | $819.00 |

## Note I

The footage cost on underground drifting:

Direct:

| | |
|---|---|
| Labor | $ 8.53 |
| Employees insurance & compensation | .85 |
| Explosives | 3.18 |
| Caps and fuse | .48 |
| Repair to equipment | 1.00 |
| Steel and ~~xxxxx~~ bits | .55 |
| Gasoline and lubricants | .70 |
| Maintenance of drift | .56 |
| Pipe (air and water) and track | 1.49 |
| Hand tools and miscellaneous hardware | .10 |
| Water haulage | .70 |
| Total direct cost: | $18.14 |

Overhead:

| | |
|---|---|
| Engineering, sampling and analysis | $2.10 |
| Supervision (1) | 1.00 |
| Camp and Commissary | .90 |
| Bookkeeping and office | .40 |
| Sales and Use Tax | .06 |
| Adit mouth preparation | .95 |
| Overhead | $5.41 |
| Total Cost of Drifting | $23.55 |

(1) Total time of foreman.