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To:	Oper Com	Date	7-28-55
To:	Operating Com.	Date	12-12-55
To:	F. E. Johnson	Date	12-14-55
To:	Mr Mittendorf	Date	12-14-55
To:	M & R	Date	12-14-55
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UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

DEC 1 5 1955

Mr. E. R. Lovell, President
Calumet and Hecla, Incorporated
172 South Michigan Avenue
Chicago 3, Illinois

Re: Docket No. DMEA-3060 (Uranium)
Cañoncito Area
Valencia, Bernalillo and
Sandoval Counties, New Mexico

Dear Mr. Lovell:

Your application for aid in an exploration project and other information available to us in Washington concerning your above-named property have been reviewed.

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

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

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

Sincerely yours,

C. O. Mittendorf
Administrator (2/B)

MChing/gla
12-12-55
cc to: Admr.'s Reading File
Operating Committee
Docket
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JCHosted, Rm. 3210, GSA
Code 700
Mr. Ching
DMEA Field Team, Region III (2)

R. C. G.

Ching Ellis

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

December 12, 1955

Object: Denial of application for an exploration project.

Docket No. DMEA-3880

Commodity: Uranium

Applicant: Calumet and Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

Property: Approximately 15,790 acres of tribal land covered by a Mineral Prospecting Permit granted by the Canoncito Band of the Navajo Tribe in Townships 9, 10, 11, and 12 North, Range 3 West, N.M.P.M., Valencia, Bernalillo, and Sandoval Counties, New Mexico, and 16 plots of land, approximating 2,560 acres, in and around the foregoing area, covered by 16 mineral prospecting permits on allotted Indian lands. One plot is covered by a mining lease. All other property rights of Applicant are held through mineral prospecting permits.

Date of Application: June 29, 1955

Amount of Application: $39,994.25

Work Proposed: In north end of property, explore the "Jackpile sandstone" unit of the Brushy Basin from the first bench of the Tres Hermanos (Mancos) sandstone by means of 141 rotary holes (31,725 feet) averaging 225 feet in depth. Then drill 52 holes (15,600 ft.) from the second bench of the same member. Cost $37,387.25.

In the south end of the property in the vicinity of the Chavez mine drill 65 holes, 50 feet deep, 10 feet apart, along an existing road that forms an arc to the northwest of the mine to explore the Recapture member of the Morrison formation. Cost - 3,300 ft. @ $0.79, or $2,607.00.

Field Team Report: November 10, 1955 - H. F. Albee, USGS
Glen Walker, USBM

The host rocks to be considered on the property are the Recapture member of the Morrison formation and the "Jackpile sandstone" in the Brushy Basin member. The

Westwater Canyon sandstone is mostly absent in the area and the Brushy Basin rests directly on the Recapture member.

In the northern part of the property in secs. 3 and 10, T. 11 N., R. 3 W., the "Jackpile sandstone" ranges from 50 feet to 137 feet in thickness. Preliminary drilling by Applicant outlined the most favorable areas for further drilling in the sections, the criterion being the thickness of the host sandstone. Of some 134 preliminary holes drilled in the northern section, the best showed 2 feet of possibly 0.1 percent U_3O_8 material. Practically all the other holes were barren, with a few weakly mineralized. Mineralization even in the thickest sandstone was thin, low grade, and discontinuous.

In the southern part of the property, at the Chavez mine, some small ore bodies have been mined from a thin sand in the Recapture member. This sand is from 4 to 6 feet thick, with claystone above and below. The ore bodies are small and similar in shape to the rolls in the Salt Wash. Total production from this mine amounts to approximately 200 tons of 0.21 percent U_3O_8 ore. Sixteen preliminary holes have been drilled near the Chavez mine, six of which showed a trace of mineralization, and ten proved barren. The limited size (30 tons) of the ore bodies that can be expected and their manner of distribution indicate that they could not be mined economically and would not add significantly to reserves.

Twenty-five holes were drilled to test the Recapture member in other areas. Nineteen holes were drilled in the south end to test the Jackpile sandstone. None proved encouraging. Total preliminary holes drilled by Applicant amounted to 194. Results of this rather extensive preliminary work are not encouraging. It is recommended that the application be denied.

Commodity Group comments:

Bureau of Mines - John E. Crawford - November 30, 1955

Report of examination discussed with the AEC representative. Concurs with the Field Team that the chances of finding ore in commercial quantities are not promising and that the application should be denied.

Geological Survey - N. E. Nelson - December 2, 1955

Concurs with the examiners that judging from the results of the prospect drilling and previous mining operations only small ore bodies, if any, are to be expected. Recommends denial.

Rare and Miscellaneous Metals Division - Michael Ching - December 7, 1955

Of the 134 preliminary holes drilled by Applicant in the northern area, 22 were offsets to holes showing traces of mineralization in the thickest Jackpile sandstone. Results were discouraging, leading to the conclusion that further work in this area is not justified. In the southern area, results to date of work around the Chavez mine indicate a very small potential.

Conclusions and Recommendations:

A considerable amount of preliminary drilling on the property has failed to indicate favorable possibilities. It is recommended that the application be denied.

Ernest Wm. Ellis

Ernest Wm. Ellis, Chief
Rare and Miscellaneous
Metals Division

12/6/55-gla

IN REPLY REFER TO:

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

RECEIVED
DEC - 5 1955

December 2, 1955

Re: DMEA 3880
Calumet and Hecla, Inc.
Canoncito Permit
Valencia, Bernalillo, and
Sandoval Counties, N. M.
$39,994.25 - Uranium

Memorandum

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

From: N. E. Nelson, U. S. Geological Survey

Subject: Review of Field Team report.

The applicant requested assistance in exploring by air blast drilling two relatively small parts of a large holding along the east edge of the Mesa Gigante. The holes would test the Jackpile sandstone, a part of the Brushy Basin member of the Morrison formation from which, in the general area, considerable ore has been produced.

Two hundred tons of 0.21% U_3O_8 ore has been mined on the Chavez lease, a part of the property of the applicant, and much prospect drilling done in the search for favorable appearing conditions. Little success has attended the work.

The examiners conclude that judging from the results of the mining and much drilling already done only small ore bodies, if any, are to be expected and recommend that the application be denied.

I agree with their conclusion and concur with the recommendation of the Field Team that the application be denied.

N. E. Nelson

N. E. Nelson

IN REPLY REFER TO:

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

RECEIVED
DEC - 5 1955

December 2, 1955

Re: DMEA 3880
Calumet and Hecla, Inc.
Cemenite Permit
Valencia, Bernalillo, and
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$39,994.25 - Uranium

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I agree with their conclusion and concur with the recommendation of the Field Team that the application be denied.

N. E. Nelson

N. E. Nelson

NENelson:iml
G-12/2/55
cc: Director's reading, 4212
Branch reading, 4212
DMEA (3)
Docket file
J. E. Crawford, 3641
J. O. Hosted, 3210

12-1-55 ejm

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

RECEIVED
DEC - 1 1955

November 30, 1955

Memorandum

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

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

Subject: Report of Examination, DMEA Docket 3880, Calumet and Hecla, Inc., Valencia, Bernalillo, and Sandoval Counties, New Mexico

I have reviewed the report of examination of Calumet and Hecla, Inc., DMEA docket 3880, dated November 16 and received in this office November 29. I have also discussed it with Joseph O. Hosted, Washington representative of the Atomic Energy Commission.

The field examiners visited the subject property on August 24, 1955, to determine the feasibility of DMEA participation in a uranium exploration program proposed by Calumet and Hecla, Inc., on some 19,000 acres of Navajo Indian lands in Valencia, Bernalillo, and Sandoval Counties, New Mexico. The Field Team concluded that the chances of finding ore in commercial quantities are not promising, and therefore recommend that the application for Government assistance be denied.

We concur in the recommendation of the examining team that the application be denied.

The report is being forwarded to the Chief, Division of Minerals, in accordance with the routing slip attached thereto.

John E. Crawford
John E. Crawford

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

RECEIVED
DEC - 1 1955

November 30, 1955

Memorandum

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

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

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We concur in the recommendation of the examining team that the application be denied.

The report is being forwarded to the Chief, Division of Minerals in accordance with the routing slip attached thereto.

John E. Crawford

11-28-55 ign

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

November 16, 1955

[illegible] New Customhouse
Denver 2, Colorado

Memorandum

To: Secretary to the Operating Committee, DMEA

From: Field Team, Region III

Subject: Joint Report of Examination, DMEA Docket 3880 (Uranium), Calumet and Hecla, Inc., (Canoncito Permit), Valencia, Bernalillo, and Sandoval Counties, New Mexico

Enclosed are the original and three copies of the report pertaining to the above application.

The field examiners concluded that there was little possibility of discovering a significant amount of uranium, and they recommend that the application be denied. We concur in this recommendation.

W. M. Traver

By J. W. Townsend
J. W. Townsend

E. H. Harshman
E. H. Harshman

Enclosures

Reviewed by
DMEA OPERATING COMMITTEE

11-30-55
(date)

Region III

Building 20
Denver Federal Center
Denver 2, Colorado
November 10, 1955

Memorandum

To: Executive Officer, DMEA Field Team, Region III

TRANSMITTED
NOV 16 1955

From: John F. Shaw
E. N. Hershman

Subject: DMEA 3880 (Uranium) Calumet and Hecla, Inc., (Concrete Permit)
Valencia, Bernalillo and Sandoval Counties, New Mexico

Enclosed are the original and nine copies of a joint engineering and geologic report by E. F. Albee, geologist, and Glen Walker, mining engineer, covering docket DMEA 3880.

Calumet and Hecla, Inc., requested exploration assistance in the amount of $39,994.25 to explore approximately 19,000 acres of Navajo Indian land by dry-rotary drilling 258 holes totaling 50,625 feet. A field examination was made on August 24, 1955, by Glen Walker, mining engineer, and E. F. Albee, geologist. The examining team concluded that there was little possibility of discovering a significant amount of uranium. It is recommended that the request be denied.

John F. Shaw
John F. Shaw
Supervising Mining Engineer

E. N. Hershman
E. N. Hershman
Member, Field Team

Enclosures

cc 9 ✓
EHershman
JMhaler
DMEA 3880
Chron

JFS/em

Reviewed by
DMEA OPERATING COMMITTEE
11-30-55
(date)

MINERAL DEPOSITS
DMEA
RECEIVED
NOV 2 1955
U. S.
GEOLOGICAL SURVEY
DENVER, COLORADO

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

October 27, 1955

Memorandum

To: E. N. Harshman, DMEA Field Team, Region III

From: J. W. Hasler

Subject: DMEA docket 3880 (Uranium), Calumet and Hecla, Inc., Valencia Bernalillo and Sandoval Counties, New Mexico

Enclosed is a joint geologic-engineering report and maps, prepared as a result of a field examination made August 24, 1955, by a Region III examining team consisting of H. F. Albee, U. S. Geological Survey, and Glen Walker, U. S. Bureau of Mines.

Calumet and Hecla, Inc., of Chicago, Ill., requested DMEA assistance to explore for uranium ore on some 19,000 acres of Navajo Indian lands in T. 9, 10, 11, and 12 N., R. 3 W., N.M.P.M., Valencia, Bernalillo, and Sandoval Counties, New Mexico. The applicant proposed a dry-rotary drilling project consisting of 258 holes totaling 50,625 feet at an estimated cost of $39,994.25.

The work proposed was to test the thickened portion of the "Jackpile" sandstone member of the Jurassic Morrison formation. The applicant has drilled the area and from this drilling they proposed the dry-rotary drilling program. The holes drilled tested only the thickness of the "Jackpile" sandstone and, for the most part, were negative insofar as discovering ore or mineralization was concerned.

Reviewed by
DMEA OPERATING COMMITTEE
11-30-55
(Date)

A study of the area revealed that the ore bodies to be expected in the Canoncita-Mesa Gigante area appear to be of a size to significantly increase the uranium ore reserves. The host rock is not too thick, and the ore bodies tend to form rolls, indicating a narrow width. The only mineralization found in the "Jackpile" sandstone in this area was shown to be thin, low-grade and discontinuous. It is concluded that the chances of finding ore in commercial quantities are not promising and it is, therefore, recommended that the application for Government assistance be denied. I concur with the recommendations of the examining field team.

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

Enclosed is the brochure.

J. William Hasler

J. William Hasler,
Geologist.

JWH/mlr

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

TRANSMITTED

NOV 16 1955

DMEA 3060

GALENDEZ AND MEZLA, INC.

GARDNERITE TRUAX LAND

VALENCIA, BERNALILLO AND

SANDOVAL COUNTIES, NEW MEXICO

Uranium

Reviewed by
DMEA OPERATING COMMITTEE
11-30-55
(date)

Joint Engineering and Geologic Report

by

H. F. Albee, Geologist
Geological Survey

Glen Uhler, Mining Engineer
Bureau of Mines

November 10, 1955

DMRA 3090

GALENEY AND HUELA, INC.
CANONCITO INDIAN LAND
VALENCIA, BERNALILLO AND
SANDOVAL COUNTIES, NEW MEXICO

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ILLUSTRATIONS

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1. Location map, Cancenito Permit, Calumet and Hecla, Inc., Sandoval, Bernalillo, and Valencia Counties, New Mexico 1
2. Geologic and contour map of the Chaves mine area, section 22, T. 10 N., R. 3 W., N.M.P.M., Calumet and Hecla, Inc., Valencia County, New Mexico 7
3. Geologic and isopachous map of part of the Cancenito Permit Area, showing previously drilled holes and proposed Stage I drill holes, Calumet and Hecla, Inc., Sandoval, Bernalillo, and Valencia Counties, New Mexico 8

DRAFT 3000

CALUMET AND NEELA, INC.
SANDSTONE INDIAN LAND
VALENCIA, BERNALILLO AND
SANDOVAL COUNTIES, NEW MEXICO

INTRODUCTION AND SUMMARY

Calumet and Neela, Inc., of Chicago, Illinois, requested DMEA assistance in the exploration for uranium ores on some 10,000 acres of Navajo Indian land in Tps. 9, 10, 11, and 12 N., R. 3 W., New Mexico principal meridian, Valencia, Bernalillo and Sandoval Counties, New Mexico.

The applicant proposed a dry-rotary drilling project consisting of 254 holes totaling 50,000 feet and estimated to cost $39,954.25. This work was to be conducted in NE/NW/4 sec. 14, T. 12 N., R. 3 W.; and sec. 3, and NE/4 sec. 9, and SE/4 sec. 16, T. 11 N., R. 3 W.; and NW/4 sec. 22, T. 10 N., R. 3 W., to test the Jackpile sandstone member of the Jurassic Morrison formation (fig. 1). The material included with the application did not indicate definite locations for the holes on the land, in fact no hole spacing was mentioned except for the 60 holes planned around the inactive Chavez mine in NW/4 sec. 22, T. 10 N., R. 3 W., where the holes were to be drilled 10 feet apart along an existing road which forms an arc to the northwest of the excavations.

A field examination was made on August 24, 1955, by a Region III examining team consisting of Glen Walker, U.S. Bureau of Mines and Howard F. Albee, U.S. Geological Survey. It is considered that although an area of local thickening in the Jackpile sandstone was found, the number of holes subsequently drilled through it have indicated insufficient mineralization on which to base a DMEA project.

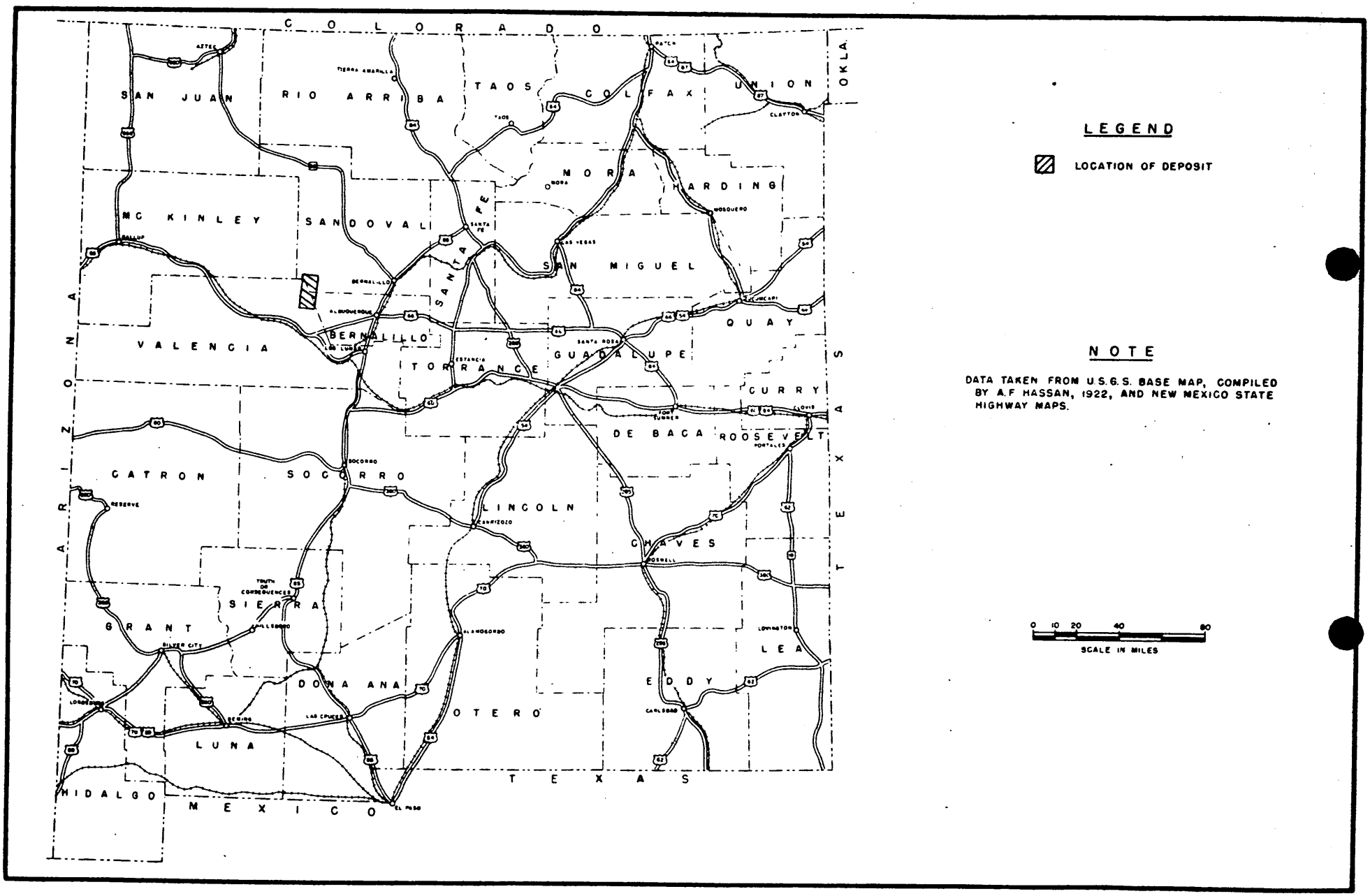


FIGURE 1 - LOCATION MAP, CANONCITO PEMIT, CALUMET AND HECLA, INC., SANDOVAL, BERNALILLO, AND VALENCIA COUNTIES, NEW MEXICO. DMEA 3880

It is recommended that the application for assistance be denied.

ACKNOWLEDGEMENTS

R. W. Kliebenstein, exploration engineer for the applicant, acted as guide to the examining team and offered considerable pertinent information. Hilpert, Gorey, Mensah, and Puffet of the U.S. Geological Survey accompanied the examining team and presented geologic information and opinions on the property.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The prospecting permit issued by the Bureau of Indian Affairs under which the applicant is operating includes the following land:

T. 9 N., R. 3 W. - NW1/4 sec. 3 (top of Ball Rock Mesa), SW1/4 sec. 4 (Top of Ball Rock Mesa), sec. 5 (top of Ball Rock Mesa).

T. 10 N., R. 3 W. - S1/2 sec. 3, sec. 4 (East of Laguna Boundary), sec. 5 (East of Laguna Boundary), sec. 8 (east of Laguna Boundary), sec. 9 (east of Laguna Boundary), W1/2 and NE1/4NE1/4 sec. 10, W1/2 and W1/2E1/2 and E1/2NE1/4, and SE1/4NE1/4 sec. 15, sec. 17 (east of Laguna Boundary), SE1/4 sec. 18, NE1/4 sec. 19, all sec. 20, all sec. 21, all sec. 27, SE1/4 sec. 28, all sec. 33, and W1/2 sec. 34.

T. 11 N., R. 3 W. - Sec. 3 (portion within Gamamite Navajo Area), sec. 5 (portion within Gamamite Navajo Area), sec. 8 (portion within Gamamite Navajo Area except Indian Trust Allotments within E1/2NE1/4 and NE1/4SE1/4), all sec. 9, E1/2E1/2 and SWSW, and that portion of E1/2 within Gamamite Navajo Area sec. 10, sec. 11 (Portion within Gamamite Navajo Area), E1/2 and NWSW and SWSW and SWSE of sec. 14, all sec. 15, sec. 17 (portion within Gamamite Navajo Area), part of NE1/4 east of Laguna Boundary, portion

of N1/2 within Gamamite Navajo Area of sec. 20, all sec. 21, all sec. 22, all sec. 23, N1/2 sec. 25, N1/2 sec. 26, portion of sec. 29 within Gamamite Navajo Area, the portion of sec. 30 within Gamamite Navajo Area, the portion of sec. 31 within Gamamite Navajo Area, and NE1/4 sec. 35.

T. 14 N., R. 1 W. - The part of sec. 27 within Gamamite Navajo Area, the part of sec. 28 within Gamamite Navajo Area, all sec. 33, the part of sec. 34 within Gamamite Navajo Area. The applicant also holds prospecting permits on the following Indian Allotment lands:

T. 9 N., R. 1 W. - Lots, 1, 2, and N1/2NE1/4, Lots 3, 4, and N1/2NW1/4 of sec. 4, Lots 1, 2 and N1/2NE1/4, NE1/4 sec. 4.

T. 10 N., R. 1 W. - W1/2E1/2 sec. 18, all sec. 22, (including a mining lease on SE1/4), NW1/4 sec. 26.

T. 11 N., R. 1 W. - NE1/4, SE1/4 sec. 20, all sec. 26.

The applicant's map No. 11 indicates there are 19,693 acres stipulated in the application.

The topography of Mesa Gigante, on which the subject property is located, is typical of the region. The mesa top is generally flat to rolling with a number of rock outcrops. A maximum relief of perhaps 300 feet occurs on sheer cliffs along the sides of the mesa.

The climate is generally arid but, there are large extremes of temperature and precipitation in both summer and winter. Surface operations in the area are hindered mostly by thunder storms occurring usually in early summer.

The vegetation is native grasses, sagebrush, cactii, and scattered patches of scrubby pinon and cedar. No timber of sufficient size for mining purposes was noted, but there are a number of sawmills within 50 miles of the property.

Water is very scarce and would have to be hauled a long distance. At the Cameronite Indian Day School there are a few wells of unknown depth and capacity, but it's believed no sizeable exploration or mining operation could depend on this source.

The property can be rather readily reached from Albuquerque, New Mexico, by traveling west on U. S. Highway 66 about 25 miles to the Cameronite road, thence north 8 miles to the Cameronite Indian Day School, from which roads lead to all portions of the subject land. Calumet and Hecla, Inc., maintain a field office to the rear of the Cameronite school house. The road from the highway to Cameronite is well maintained and in fairly good condition but the trails from there to the various parts of the property have been rather badly washed by the recent heavy rains and the usual passenger vehicle is not recommended for travel.

Common and unskilled labor is easily obtained from the local Indians but miners are at a premium in the general locality. The proposed work would be conducted by a contractor who would furnish skilled help.

HISTORY, PROSPECTING AND OWNERSHIP

A Mineral Prospecting Permit, covering part of the subject land, from the Cameronite Band of the Navajo Indian tribe to Samuel C. Johnson and John Lyons, principals of Cameronite Uranium Co. of Albuquerque, New Mexico, was signed December 2, 1953. This permit was granted to include 600 additional acres on April 19, 1954. On August 18 and October 20, 1954, Mineral Prospecting Permits were obtained by Cameronite Uranium Co. on 16 individual pieces of Indian Allotment land contiguous to land included in the former permit. Both these permits were assigned to Calumet and

Keela, Inc., on November 19, 1954. On March 1, 1955, Calumet and Keela, Inc., obtained a mining lease for uranium and associated minerals on SE1/4 sec. 22, T. 10 N., R. 3 W., from Antonio Jose Chavez, a Navajo Indian. The lease is for a period of 15 years on the basis of a sliding scale royalty ranging from 10 to 20 percent depending on the grade of ore sold.

No attempt was made to verify the applicant's claim to the subject property because all the previously mentioned transactions had the approval of the Secretary of the Interior.

About 200 tons of 0.2 percent U_3O_8 ore was sold by Calumet and Keela, Inc., from the Chavez lease. This deposit occurred in a thin sandstone lens of very limited extent near the base of the Jurassic Morrison Recapture formation. The deposit apparently has been exhausted. There has been no production from the Jackpile sandstone on the property.

GEOLOGY AND ORE DEPOSITS

The Cosmosite-Mesa Gigante area is in the Grants-Laguna district on the east flank of the Zuni uplift. All the productive deposits in the Grants-Laguna district have been found in sedimentary rocks of Jurassic and Cretaceous age. These rocks generally dip northeasterly at very low angles.

The rocks containing ore deposits are, in ascending order, the Todilto limestone, the Morrison formation of Jurassic age, and the Dakota sandstone of Cretaceous age. The Dakota formation unconformably overlies the Jurassic rocks.

The Morrison formation in this area is divided, from bottom to top, into the Recapture member, the Westwater Canyon member, and the Brushy

Basin member. The Recapture is composed of interstratified sandstone and claystone. The sandstone strata consist of pinkish-gray to light brown, fine- to medium-grained sandstone. The claystone strata consist of gray and reddish brown, silty to sandy claystone. The friable character of the sandstone causes the member to weather to a steep slope. The Westwater member is composed of sandstone and minor amounts of claystone. The sandstone is yellowish gray, yellowish orange, or light brown, fine- to medium-grained, and forms strata composed of lens-like, cross-laminated beds. The Westwater generally weathers to form a nearly vertical to ledgy cliff. The Brushy Basin member is composed predominantly of variegated claystone and varying amounts of silt and sand. Lenses of sandstone and conglomeratic sandstone are common and usually weather to form a steep rubble-covered slope with vertical cliffs.

A large portion of the significant ore bodies in the Grants-Laguna district are found in sandstone lenses in the Brushy Basin. At one time, two of these sandstone units contained all the known larger deposits in the district. Recently, however, a discovery of large deposits in the Westwater Canyon sandstone has been made in the Ambrosia Lake area northwest of Grants, New Mexico.

One sandstone unit of the Brushy Basin in the vicinity of Poison Canyon, northwest of Grants, is called the "Poison Canyon sandstone." Another unit north of Laguna which contains the Jackpile, the Woodrow, the Windwept, and other mines, is locally called the "Jackpile sandstone."

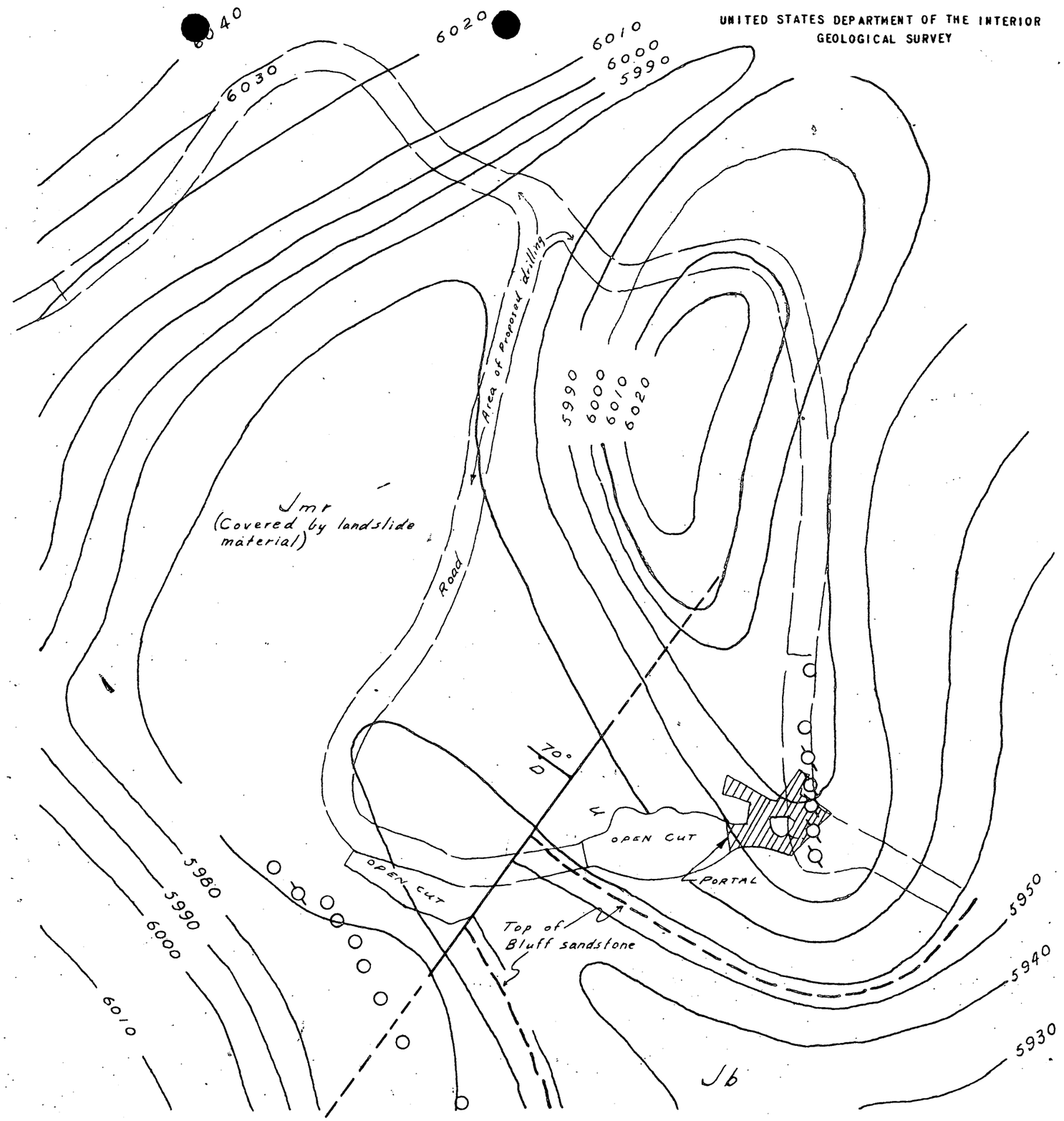
The "Poison Canyon sandstone" ranges from 35 to 90 feet in thickness and most of the uranium deposits in this member are found where the member is greater than 50 feet thick. The "Jackpile sandstone" constitutes the

upper part of the Brushy Basin member of the Morrison formation and ranges from about 60 to 175 feet in thickness. The known deposits in the "Jackpile sandstone" are in the area of its maximum thickness north of Laguna between Mesa Gigante and the Mount Taylor volcanic field, where the sandstone generally exceeds 150 feet in thickness. The Westwater Canyon sandstone member generally ranges from 60 to 100 feet in thickness; however, cuttings from drill holes in the Ambrosia Lake area indicate that the ore occurs where the Westwater Canyon sandstone member is greater than 200 feet thick.

Mesa Gigante, the area under consideration in this report is underlain by the Todilto formation, the Summerville formation, the Bluff sandstone, and the Morrison formation, all of Jurassic age, and the Dakota sandstone and Mancos formation of Cretaceous age.

The host rocks to be considered are the Recapture member of the Morrison formation and the "Jackpile sandstone" in the Brushy Basin member of the Morrison formation. The Westwater Canyon sandstone is mostly absent in the area and the Brushy Basin rests directly on the Recapture member. The thickness of the Morrison formation is variable, in part perhaps due to tectonic disturbances and in part due to erosion during Dakota time. The Morrison formation ranges in thickness from about 160 feet in the southern part of the area, to about 450 feet in the northern part.

At the Chavez mine, in the southern part of the subject area, in sec. 22, T. 10 N., R. 3 W., some small ore bodies have been mined from a thin sand in the Recapture member, about 30 feet above the Bluff sandstone (fig. 2). This sand is from 4 to 6 feet thick with claystone both above and below. The ore bodies are small, and similar in shape



EXPLANATION

Jmr — RECAPTURE MEMBER OF THE JURASSIC MORRISON FORMATION

Jb — JURASSIC BLUFF SANDSTONE

70° D U — FAULT, SHOWING DIP AND RELATIVE MOVEMENT

DRILL HOLE. DRILLED BY COMPANY

○ — BARREN

Q — WEAKLY MINERALIZED

MINE WORKINGS, UNDERGROUND

Note: TOPOGRAPHY, CULTURE, AND DRILL HOLE LOCATIONS FROM APPLICANTS MAP. GEOLOGY MODIFIED FROM SAME SOURCE

N

50 0 100 FEET

Figure 2. GEOLOGIC AND CONTOUR MAP OF THE CHAVES MINE AREA, SECTION 22, T. 10 N., R. 3 W., N.M.PM., CALUMET AND HECLA, INC., VALENCIA COUNTY, NEW MEXICO.

to the rolls in the dolt wash member of the Morrison formation. These roll-like structures have produced about 200 tons of ore averaging about 0.21 percent U_3O_8.

The ore bodies have been mined out at the Chaves mine, and the applicant has proposed an exploration program in the vicinity. The applicant proposes to drill about 65 holes along an existing road north and west of the mine. Sixteen holes have been drilled in the immediate vicinity of the mined out rolls, six of which showed a trace of mineralized material; the remaining holes were barren.

Underground observation showed the expected size of the ore rolls to be less than 30 tons. The expected size of ore bodies and the apparent distribution of the ore bodies is such that they would not be mined economically nor would they significantly increase the uranium ore reserves.

In the northern part of the subject area the "Jackpile sandstone" ranges in thickness from a knife edge to 137 feet. Where the "Jackpile sandstone" is thickest, in secs. 3 and 10, T. 11 N., R. 3 W., it comprises all of the Mesaverde Basin (fig. 3). The "Jackpile sandstone" as measured from drill holes in secs. 3 and 10, T. 11 N., R. 3 W., ranges from 50 feet to 137 feet in thickness.

The applicant has drilled a line of 68 holes on 500-foot centers, beginning in sec. 32, T. 11 N., R. 3 W., and ending in sec. 27, T. 12 N., R. 3 W. The company has also drilled 31 holes in sec. 9 and 3 holes in sec. 5, T. 11 N., R. 3 W., and 6 holes in sec. 33, T. 12 N., R. 3 W. From thicknesses obtained by this drilling, an isopach map was prepared as a basis to outline areas considered favorable for further drilling.

Drill holes show that the "Jackpile sandstone" in most of section 3 exceeds 100 feet in thickness and in the south half of this section four holes showed a trace of mineralization by radiometric count. The area near three of these holes was drilled with 22 holes offset at intervals of from 50 to 250 feet. One offset hole showed a mineralized zone 2 feet thick (184 to 186 feet) of possibly 0.1 percent U_3O_8.

The concept that ore deposits are found where the host sandstone is abnormally thick locally, has been developed in the Grants-Laguna area from the occurrence of ore deposits in thick sands. The concept is apparently valid in the Mesa Digonis area. The only mineralization found in the "Jackpile sandstone" is in the thickest part of the lens. The mineralization, however, is thin, low grade, and discontinuous.

MINABLE ORE RESERVES

There are no known minable ore reserves on the property.

PRESENT STATUS

There is no mining or milling equipment on the subject land. Most of the applicant's present activities are confined to the area northwest of Grants, New Mexico, where, no doubt, they consider the possibilities more promising.

The previous work includes the small mine (Chenoa Lode) in NW1/4 sec. 22, T. 10 N., R. 3 W., part of which is a small open-pit about 40 feet long by 8-10 feet wide; the remaining workings are underground and consist of two generally parallel drifts in which small "rolls" of ore were said to occur. There are few evidences of ore left from which estimates of the dimensions and attitude of the deposit could be made.

These two excavations together are reported to have produced about 200 tons of 0.2 percent U_3O_8 ore. This is the total production from the entire property.

A large amount of aerial scintillometer work has been done that resulted in a number of insignificant discoveries in the Recapture member of the Morrison.

The applicant states that 194 dry-rotary holes totaling 33,489 feet have been drilled, most of these, 134 totaling 22,161 feet, were spaced 500 feet apart in a general N-S line beginning near the south side of sec. 22, T. 11 N., R. 3 W., and extending almost half way across sec. 27, T. 12 N., R. 3 W., a distance of about 5-1/2 miles. Also in secs. 9 and 16, T. 11 N., R. 3 W., a number of these widely spaced holes were put down from the top of the Mesa near the rim; likewise in sec. 33, T. 12 N., R. 3 W., 6 wide spaced holes were drilled. The object of this work was mainly to obtain geologic data on the Jackpile sandstone member of the Jurassic Morrison formation. The resulting information indicated a local thickening of the Jackpile unit in secs. 3, 9, and 10, T. 11 N., R. 3 W. Four of the original widely spaced holes in the south-central part of sec. 3, T. 11 N., R. 3 W., had, what the applicant interpreted from radiometric probing, traces of mineralization. The south 3 of the weakly mineralized holes were offsets by 21 holes at intervals ranging from 50 to 200 feet. Of the 21 offsets 3 indicated traces and 1 is reported to have 2 feet of material probed as 0.05-0.125 percent U_3O_8; however, a hole 50 feet north of this one was barren although the Jackpile sand had thickened 7 feet. It is in this area the applicant has proposed the bulk of the subject exploration.

Forty-one holes totaling 2,000 feet have been drilled in three localities of slight Recapture mineralization; only those in sec. 22, T. 10 N., R. 3 W., around the Chavez mine were rewarding. Also near the west 1/4 corner of sec. 5, T. 9 N., R. 3 W., 19 holes totaling 3,328 feet were put down to test an air-borne anomaly in what was tentatively correlated as Jackpile sandstone; the results were discouraging.

PROJECT PROPOSALS

The applicant proposed drilling 259 dry-rotary holes totaling 50,625 feet. One hundred ninety-three were to be in five rows 600 feet apart with the holes at 200-foot intervals and averaging 245 feet deep. This work was to be done in S1/2S1/2 sec. 34, T. 12 N., R. 3 W., sec. 3, N1/2 sec. 9 and S1/2 sec. 10, T. 11 N., R. 3 W., and had the objective of finding ore in the Jurassic Morrison Jackpile sandstone. In the SE1/4 sec. 22, T. 10 N., R. 3 W., 66 holes were proposed, 50 feet deep, 10 feet apart along an existing road that forms an arc to the northwest of the Chavez mine and concave toward it. The work outlined in the application was estimated to cost $39,994.25.

SUMMARY AND CONCLUSIONS

In the southern part of the subject area ore bodies were found in the Recapture member of the Morrison formation. These ore-bodies occurred as small rolls or pods. They were found in a 4- to 6-foot thick sandstone enclosed between strata of claystone. About 200 tons of ore was mined that averaged 0.21 U_3O_8. Sixteen holes have been drilled in the immediate vicinity of the mined-out rolls, six of which showed only a trace of mineralized material, the remaining holes were barren. The applicant

proposed to drill about 65 holes that average 50 feet deep in the vicinity of the mined-out ore bodies. The expected ore bodies are not of a size to significantly increase the uranium ore reserves. The host rock, itself, is not thick, and the habit of the ore bodies to form rolls indicates a narrow width. This was borne out by underground observation of the mined-out area. The examining team, therefore, recommends that participation by DMEA in this part of the program be denied.

In the northern part of the area, in secs. 3 and 10, T. 11 N., R. 3 W., a program of drilling is requested for 193 holes to explore the "Jackpile sandstone". The sandstone in that area is relatively thick, which is the main criteria for a favorable host rock. The applicant company, however, has drilled a fence of holes 500 feet apart through both sections. Four holes in the thickest part of the sand showed a trace of mineralization. Three of these holes were offset by 22 drill holes at intervals of from 50 to 250 feet. One offset hole penetrated about 2 feet of mineralized material of possibly 0.10 percent U_3O_8. Secs. 3 and 10 also have outcrops of the thick parts of the "Jackpile sandstone". No anomalous radioactivity is known along these outcrops.

The examining team believes that secs. 3 and 10 have been adequately tested by drilling and outcrop examination, and it recommends that the request for DMEA assistance be denied.

12-1-55 rgm

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

November 16, 1955

224 New Customhouse
Denver 2, Colorado

Memorandum

To: Secretary to the Operating Committee, DMEA

From: Field Team, Region III

Subject: Joint Report of Examination, DMEA Docket 3880 (Uranium), Calumet and Hecla, Inc., (Canoncito Permit), Valencia, Bernalillo, and Sandoval Counties, New Mexico

Enclosed are the original and three copies of the report pertaining to the above application.

The field examiners concluded that there was little possibility of discovering a significant amount of uranium, and they recommend that the application be denied. We concur in this recommendation.

W. M. Traver

By J. W. Townsend
J. W. Townsend

E. N. Harshman
E. N. Harshman

Enclosures

Reviewed by
DMEA OPERATING COMMITTEE
11-30-55
(Date)

NOV 25 1955

Region III

Building 20
Denver Federal Center
Denver 2, Colorado
November 15, 1955

Memorandum

TRANSMITTED

NOV 16 1955

To: Executive Officer, DMEA Field Team, Region III

From: John F. Shaw
E. N. Harshman

Subject: DMEA 3880 (Uranium) Calumet and Hecla, Inc., (Concentrate Permit) Valencia, Bernalillo and McKinley Counties, New Mexico

Enclosed are the original and nine copies of a joint engineering and geologic report by E. F. Albee, geologist, and Glen Walker, mining engineer, covering docket DMEA 3880.

Calumet and Hecla, Inc., requested exploration assistance in the amount of $39,994.85 to explore approximately 19,000 acres of Navajo Indian land by dry-rotary drilling 256 holes totaling 39,605 feet. A field examination was made on August 24, 1955, by Glen Walker, mining engineer, and E. F. Albee, geologist. The examining team concluded that there was little possibility of discovering a significant amount of uranium. It is recommended that the request be denied.

John F. Shaw
Supervising Mining Engineer

E. N. Harshman

E. N. Harshman
Member, Field Team

Enclosures

cc 9
Kilkenneman
Jullmaier
DMEA 3880
Chron

JFS/cm

Reviewed by
DMEA OPERATING CO. MINERALS
11-30-55
(date)

MINERAL DEPOSITS
DMEA
RECEIVED
NOV 2 1955
U. S.
GEOLOGICAL SURVEY
DENVER, COLORADO

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

October 27, 1955

Memorandum

To: E. N. Harshman, DMEA Field Team, Region III

From: J. W. Hasler

Subject: DMEA docket 3880 (Uranium), Calumet and Hecla, Inc., Valencia Bernalillo and Sandoval Counties, New Mexico

Enclosed is a joint geologic-engineering report and maps, prepared as a result of a field examination made August 24, 1955, by a Region III examining team consisting of H. F. Albee, U. S. Geological Survey, and Glen Walker, U. S. Bureau of Mines.

Calumet and Hecla, Inc., of Chicago, Ill., requested DMEA assistance to explore for uranium ore on some 19,000 acres of Navajo Indian lands in T. 9, 10, 11, and 12 N., R. 3 W., N.M.P.M., Valencia, Bernalillo, and Sandoval Counties, New Mexico. The applicant proposed a dry-rotary drilling project consisting of 258 holes totaling 50,625 feet at an estimated cost of $39,994.25.

The work proposed was to test the thickened portion of the "Jackpile" sandstone member of the Jurassic Morrison formation. The applicant has drilled the area and from this drilling they proposed the dry-rotary drilling program. The holes drilled tested only the thickness of the "Jackpile" sandstone and, for the most part, were negative insofar as discovering ore or mineralization was concerned.

Reviewed by
DMEA OPERATING COMMITTEE
11-30-55

A study of the area revealed that the ore bodies to be expected in the Canoncita-Mesa Gigante area appear to be of a size to significantly increase the uranium ore reserves. The host rock is not too thick, and the ore bodies tend to form rolls, indicating a narrow width. The only mineralization found in the "Jackpile" sandstone in this area was shown to be thin, low-grade and discontinuous. It is concluded that the chances of finding ore in commercial quantities are not promising and it is, therefore, recommended that the application for Government assistance be denied. I concur with the recommendations of the examining field team.

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

Enclosed is the brochure.

J. William Hasler

J. William Hasler,
Geologist.

JWH/mlr

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

TRANSMITTED

NOV 16 1955

DMEA 3880

CALUMET AND HECLA, INC.

CANONCITO INDIAN LAND

VALENCIA, BERNALILLO AND

SANDOVAL COUNTIES, NEW MEXICO

Uranium

Reviewed by
DMEA OPERATING COMMITTEE
11-30-55
(date)

Joint Engineering and Geologic Report

by

H. F. Albee, Geologist
Geological Survey

Glen Walker, Mining Engineer
Bureau of Mines

November 10, 1955

DMEA 3880

CALUMET AND HECLA, INC.
CANONCITO INDIAN LAND
VALENCIA, BERNALILLO AND
SANDOVAL COUNTIES, NEW MEXICO

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Joint engineering and geologic report — Page

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Location, topography, and physical features..... 2
History, production and ownership..... 4
Geology and ore deposits..... 5
Minable ore reserves..... 9
Present status..... 9
Project proposals..... 11
Summary and conclusions..... 11

ILLUSTRATIONS

Figure — Follows page

1. Location map, Canoncito Permit, Calumet and Hecla, Inc., Sandoval, Bernalillo, and Valencia Counties, New Mexico..... 1
2. Geologic and contour map of the Chavez mine area, section 22, T. 10 N., R. 3 W., N.M.PM., Calumet and Hecla, Inc., Valencia County, New Mexico..... 7
3. Geologic and isopachous map of part of the Canoncito Permit Area, showing previously drilled holes and proposed Stage I drill holes, Calumet and Hecla, Inc., Sandoval, Bernalillo, and Valencia Counties, New Mexico..... 8

DMEA 3880

CALUMET AND HECLA, INC.
CANONCITO INDIAN LAND
VALENCIA, BERNALILLO AND
SANDOVAL COUNTIES, NEW MEXICO

INTRODUCTION AND SUMMARY

Calumet and Hecla, Inc., of Chicago, Illinois, requested DMEA assistance in the exploration for uranium ores on some 19,000 acres of Navajo Indian land in Tps. 9, 10, 11, and 12 N., R. 3 W., New Mexico principal meridian, Valencia, Bernalillo and Sandoval Counties, New Mexico.

The applicant proposed a dry-rotary drilling project consisting of 258 holes totaling 50,625 feet and estimated to cost $39,994.25. This work was to be conducted in S1/2S1/2 sec. 34, T. 12 N., R. 3 W.; and sec. 3, and E1/2 sec. 9, and S1/2 sec. 10, T. 11 N., R. 3 W.; and SE1/4 sec. 22, T. 10 N., R. 3 W., to test the Jackpile sandstone member of the Jurassic Morrison formation (fig. 1). The material included with the application did not indicate definite locations for the holes on the land, in fact no hole spacing was mentioned except for the 65 holes planned around the inactive Chavez mine in SE1/4 sec. 22, T. 10 N., R. 3 W., where the holes were to be drilled 10 feet apart along an existing road which forms an arc to the northwest of the excavations.

A field examination was made on August 24, 1955, by a Region III examining team consisting of Glen Walker, U.S. Bureau of Mines and Howard F. Albee, U.S. Geological Survey. It is concluded that although an area of local thickening in the Jackpile sandstone was found, the number of holes subsequently drilled through it have indicated insufficient mineralization on which to base a DMEA project.

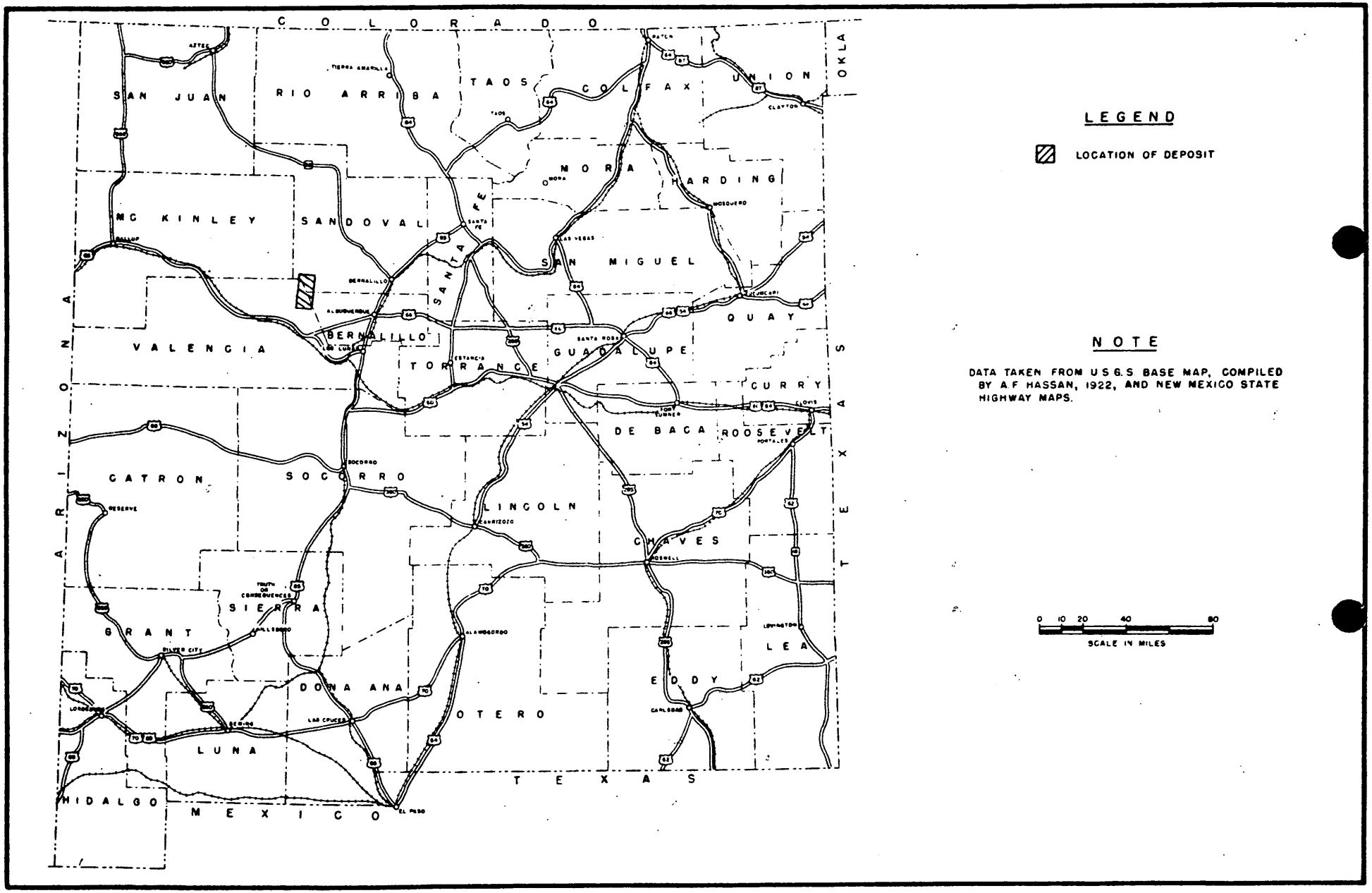

FIGURE 1 - LOCATION MAP, CANONCITO PEMIT, CALUMET AND HECLA, INC., SANDOVAL, BERNALILLO, AND VALENCIA COUNTIES, NEW MEXICO. DMEA 3880

It is recommended that the application for assistance be denied.

ACKNOWLEDGEMENTS

R. W. Kliebenstein, exploration engineer for the applicant, acted as guide to the examining team and offered considerable pertinent information. Hilpert, Corey, Muench, and Puffet of the U.S. Geological Survey accompanied the examining team and presented geologic information and opinions on the property.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The prospecting permit issued by the Bureau of Indian Affairs under which the applicant is operating includes the following land:

T. 9 N., R. 3 W. - NW1/4 sec. 3 (top of Bell Rock Mesa), SW1/4 sec. 4 (top of Bell Rock Mesa), sec. 5 (top of Bell Rock Mesa).

T. 10 N., R. 3 W. - S1/2 sec. 3, sec. 4 (east of Laguna Boundary), sec. 5 (east of Laguna Boundary), sec. 8 (east of Laguna Boundary), sec. 9 (east of Laguna Boundary), W1/2 and NE1/4NE1/4 sec. 10, W1/2 and W1/2E1/2 and E1/2SE1/4, and SE1/4NE1/4 sec. 15, sec. 17 (east of Laguna Boundary), SE1/4 sec. 18, NE1/4 sec. 19, all sec. 20, all sec. 21, all sec. 27, SE1/4 sec. 28, all sec. 33, and W1/2 sec. 34.

T. 11 N., R. 3 W. - Sec. 3 (portion within Canoncito Navajo Area), sec. 5 (portion within Canoncito Navajo Area), sec. 8 (portion within Canoncito Navajo Area except Indian Trust Allotments within E1/2NE1/4 and NE1/4SE1/4), all sec. 9, E1/2W1/2 and SWSW, and that portion of E1/2 within Canoncito Navajo Area sec. 10, sec. 11 (Portion within Canoncito Navajo Area), N1/2 and NWSW and SWSW and SWSE of sec. 14, all sec. 15, sec. 17 (portion within Canoncito Navajo Area), part of SE1/4 east of Laguna Boundary, portion

of W1/2 within Canoncito Navajo Area of sec. 20, all sec. 21, all sec. 22, all sec. 23, W1/2 sec. 25, E1/2 sec. 26, portion of sec. 29 within Canoncito Navajo Area, the portion of sec. 30 within Canoncito Navajo Area, the portion of sec. 31 within Canoncito Navajo Area, and NE1/4 sec. 35.

T. 12 N., R. 3 W. - The part of sec. 27 within Canoncito Navajo Area, the part of sec. 28 within Canoncito Navajo Area, all sec. 33, the part of sec. 34 within Canoncito Navajo Area. The applicant also holds prospecting permits on the following Indian Allotment lands:

T. 9 N., R. 3 W. - Lots, 1, 2, and S1/2NE1/4, Lots 3, 4, and S1/2NW1/4 of sec. 4, Lots 1, 2 and S1/2NE1/4, SE1/4 sec. 6.

T. 10 N., R. 3 W. - W1/2E1/2 sec. 10, all sec. 22, (including a mining lease on SE1/4), NW1/4 sec. 26.

T. 11 N., R. 3 W. - NE1/4, SE1/4 sec. 20, all sec. 28.

The applicant's map No. 11 indicates there are 19,690 acres stipulated in the application.

The topography of Mesa Gigante, on which the subject property is located, is typical of the region. The mesa top is generally flat to rolling with a number of rock outcrops. A maximum relief of perhaps 350 feet occurs as sheer cliffs along the sides of the mesa.

The climate is generally arid but, there are large extremes of temperature and precipitation in both summer and winter. Surface operations in the area are hindered mostly by thunder storms occurring usually in early summer.

The vegetation is native grasses, sagebrush, cactii, and scattered patches of scrawny pinon and cedar. No timber of sufficient size for mining purposes was noted, but there are a number of sawmills within 50 miles of the property.

Water is very scarce and would have to be hauled a long distance. At the Canoncito Indian Day School there are a few wells of unknown depth and capacity, but it's believed no sizeable exploration or mining operation could depend on this source.

The property can be rather readily reached from Albuquerque, New Mexico, by traveling west on U. S. Highway 66 about 25 miles to the Canoncito road, thence north 8 miles to the Canoncito Indian Day School, from which roads lead to all portions of the subject land. Calumet and Hecla, Inc., maintain a field office to the rear of the Canoncito school house. The road from the highway to Canoncito is well maintained and in fairly good condition but the trails from there to the various parts of the property have been rather badly washed by the recent heavy rains and the usual passenger vehicle is not recommended for travel.

Common and unskilled labor is easily obtained from the local Indians but miners are at a premium in the general locality. The proposed work would be conducted by a contractor who would furnish skilled help.

HISTORY, PRODUCTION AND OWNERSHIP

A Mineral Prospecting Permit, covering part of the subject land, from the Canoncito Band of the Navajo Indian tribe to Samuel C. Johnson and John Lynes, principals of Canoncito Uranium Co. of Albuquerque, New Mexico, was signed December 2, 1953. This permit was amended to include 800 additional acres on April 19, 1954. On August 10 and October 20, 1954, Mineral Prospecting Permits were obtained by Canoncito Uranium Co. on 16 individual pieces of Indian Allotment land contiguous to land included in the former permit. Both these permits were assigned to Calumet and

Hecla, Inc., on November 19, 1954. On March 1, 1955, Calumet and Hecla, Inc., obtained a mining lease for uranium and associated minerals on SE1/4 sec. 22, T. 10 N., R. 3 W., from Antonio Jose Chavez, a Navajo Indian. The lease is for a period of 15 years on the basis of a sliding scale royalty ranging from 10 to 20 percent depending on the grade of ore sold.

No attempt was made to verify the applicant's claim to the subject property because all the previously mentioned transactions had the approval of the Secretary of the Interior.

About 200 tons of 0.2 percent U_3O_8 ore was sold by Calumet and Hecla, Inc., from the Chavez lease. This deposit occurred in a thin sandstone lens of very limited extent near the base of the Jurassic Morrison Recapture formation. The deposit apparently has been exhausted. There has been no production from the Jackpile sandstone on the property.

GEOLOGY AND ORE DEPOSITS

The Canoncito-Mesa Gigante area is in the Grants-Laguna district on the east flank of the Zuni uplift. All the productive deposits in the Grants-Laguna district have been found in sedimentary rocks of Jurassic and Cretaceous age. These rocks generally dip northeasterly at very low angles.

The rocks containing ore deposits are, in ascending order, the Todilto limestone, the Morrison formation of Jurassic age, and the Dakota sandstone of Cretaceous age. The Dakota formation unconformably overlies the Jurassic rocks.

The Morrison formation in this area is divided, from bottom to top, into the Recapture member, the Westwater Canyon member, and the Brushy

Basin member. The Recapture is composed of interstratified sandstone and claystone. The sandstone strata consist of pinkish-gray to light brown, fine- to medium-grained sandstone. The claystone strata consist of gray and reddish brown, silty to sandy claystone. The friable character of the sandstone causes the member to weather to a steep slope. The Westwater member is composed of sandstone and minor amounts of claystone. The sandstone is yellowish gray, yellowish orange, or light brown, fine- to medium-grained, and forms strata composed of lens-like, cross-laminated beds. The Westwater generally weathers to form a nearly vertical to ledgy cliff. The Brushy Basin member is composed predominantly of variegated claystone and varying amounts of silt and sand. Lenses of sandstone and conglomeratic sandstone are common and usually weather to form a steep rubble-covered slope with vertical cliffs.

A large portion of the significant ore bodies in the Grants-Laguna district are found in sandstone lenses in the Brushy Basin. At one time, two of these sandstone units contained all the known larger deposits in the district. Recently, however, a discovery of large deposits in the Westwater Canyon sandstone has been made in the Ambrosia Lake area northwest of Grants, New Mexico.

One sandstone unit of the Brushy Basin in the vicinity of Poison Canyon, northwest of Grants, is called the "Poison Canyon sandstone." Another unit north of Laguna which contains the Jackpile, the Woodrow, the Windswept, and other mines, is locally called the "Jackpile sandstone."

The "Poison Canyon sandstone" ranges from 35 to 90 feet in thickness and most of the uranium deposits in this member are found where the member is greater than 50 feet thick. The "Jackpile sandstone" constitutes the

upper part of the Brushy Basin member of the Morrison formation and ranges from about 60 to 175 feet in thickness. The known deposits in the "Jackpile sandstone" are in the area of its maximum thickness north of Laguna between Mesa Gigante and the Mount Taylor volcanic field, where the sandstone generally exceeds 150 feet in thickness. The Westwater Canyon sandstone member generally ranges from 60 to 100 feet in thickness; however, cuttings from drill holes in the Ambrosia Lake area indicate that the ore occurs where the Westwater Canyon sandstone member is greater than 200 feet thick.

Mesa Gigante, the area under consideration in this report is underlain by the Todilto formation, the Summerville formation, the Bluff sandstone, and the Morrison formation, all of Jurassic age, and the Dakota sandstone and Mancos formation of Cretaceous age.

The host rocks to be considered are the Recapture member of the Morrison formation and the "Jackpile sandstone" in the Brushy Basin member of the Morrison formation. The Westwater Canyon sandstone is mostly absent in the area and the Brushy Basin rests directly on the Recapture member. The thickness of the Morrison formation is variable, in part perhaps due to tectonic disturbances and in part due to eroision during Dakota time. The Morrison formation ranges in thickness from about 180 feet in the southern part of the area, to about 450 feet in the northern part.

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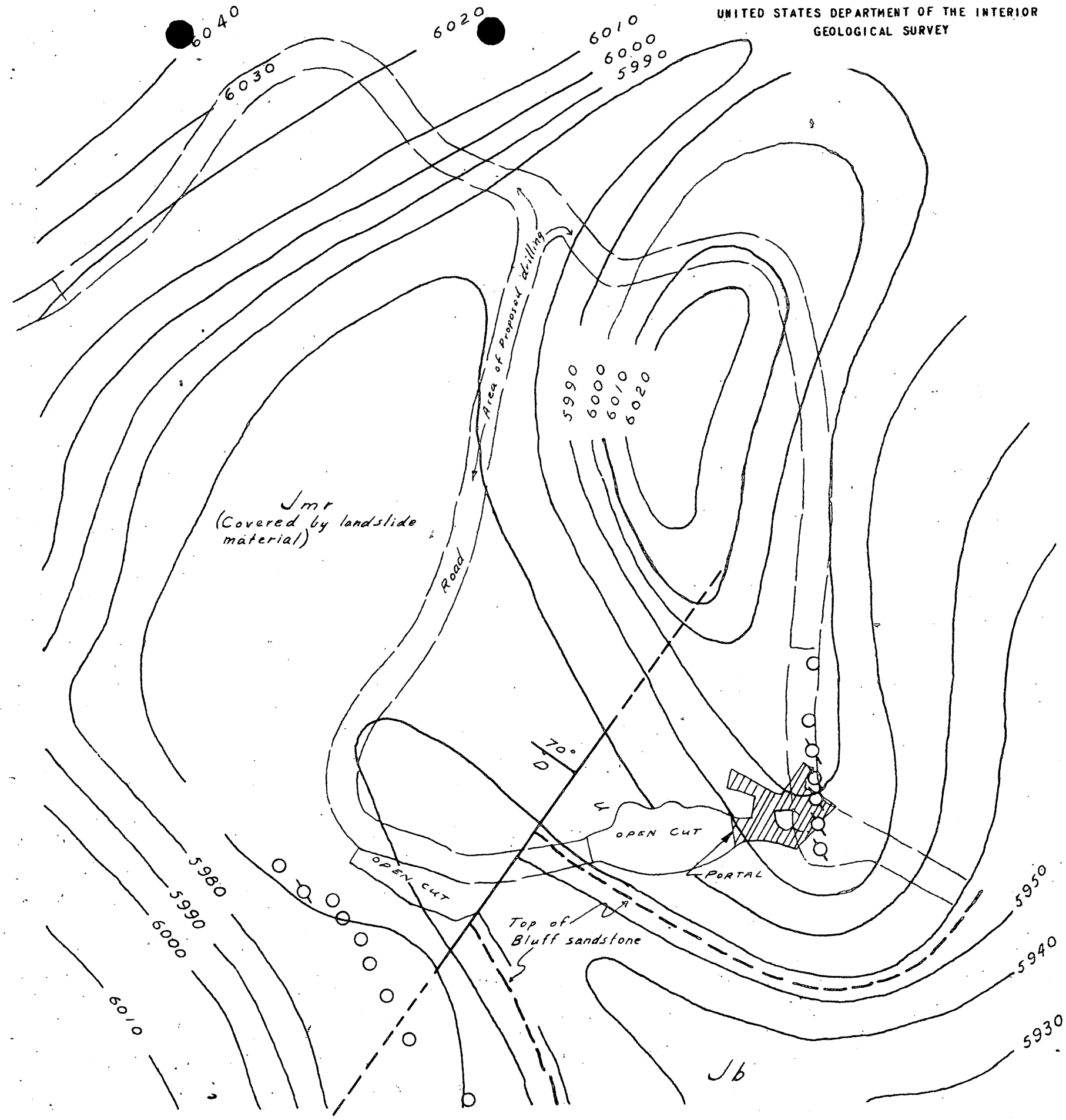

EXPLANATION

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Q — WEAKLY MINERALIZED

MINE WORKINGS, UNDERGROUND

Note: TOPOGRAPHY, CULTURE, AND DRILL HOLE LOCATIONS FROM APPLICANTS MAP. GEOLOGY MODIFIED FROM SAME SOURCE

N

50 0 100 FEET

Figure 2. GEOLOGIC AND CONTOUR MAP OF THE CHAVES MINE AREA, SECTION 22, T. 10 N., R. 3 W., N.M.PM., CALUMET AND HECLA, INC., VALENCIA COUNTY, NEW MEXICO.

to the rolls in the Salt Wash member of the Morrison formation. These roll-like structures have produced about 200 tons of ore averaging about 0.21 percent U_3O_8.

The ore bodies have been mined out at the Chavez mine, and the applicant has proposed an exploration program in the vicinity. The applicant proposes to drill about 65 holes along an existing road north and west of the mine. Sixteen holes have been drilled in the immediate vicinity of the mined out rolls, six of which showed a trace of mineralized material; the remaining holes were barren.

Underground observation showed the expected size of the ore rolls to be less than 30 tons. The expected size of ore bodies and the apparent distribution of the ore bodies is such that they could not be mined economically nor would they significantly increase the uranium ore reserves.

In the northern part of the subject area the "Jackpile sandstone" ranges in thickness from a knife edge to 137 feet. Where the "Jackpile sandstone" is thickest, in secs. 3 and 10, T. 11 N., R. 3 W., it comprises all of the Brushy Basin (fig. 3). The "Jackpile sandstone" as measured from drill holes in secs. 3 and 10, T. 11 N., R. 3 W., ranges from 50 feet to 137 feet in thickness.

The applicant has drilled a line of 68 holes on 500-foot centers, beginning in sec. 22, T. 11 N., R. 3 W., and ending in sec. 27, T. 12 N., R. 3 W. The company has also drilled 31 holes in sec. 9 and 3 holes in sec. 5, T. 11 N., R. 3 W., and 6 holes in sec. 33, T. 12 N., R. 3 W. From thicknesses obtained by this drilling, an isopach map was prepared as a basis to outline areas considered favorable for further drilling.

Drill holes show that the "Jackpile sandstone" in most of section 3 exceeds 100 feet in thickness and in the south half of this section four holes showed a trace of mineralization by radiometric count. The area near three of these holes was drilled with 22 holes offset at intervals of from 50 to 250 feet. One offset hole showed a mineralized zone 2 feet thick (184 to 186 feet) of possibly 0.1 percent U_3O_8.

The concept that ore deposits are found where the host sandstone is abnormally thick locally, has been developed in the Grants-Laguna area from the occurrence of ore deposits in thick sands. The concept is apparently valid in the Mesa Gigante area. The only mineralization found in the "Jackpile sandstone" is in the thickest part of the lens. The mineralization, however, is thin, low grade, and discontinuous.

MINABLE ORE RESERVES

There are no known minable ore reserves on the property.

PRESENT STATUS

There is no mining or milling equipment on the subject land. Most of the applicant's present activities are confined to the area northwest of Grants, New Mexico, where, no doubt, they consider the possibilities more promising.

The previous work includes the small mine (Chavez lease) in SW1/4 sec. 22, T. 10 N., R. 3 W., part of which is a small open-pit about 40 feet long by 8-10 feet wide; the remaining workings are underground and consist of two generally parallel drifts in which small "rolls" of ore were said to occur. There are few evidences of ore left from which estimates of the dimensions and attitude of the deposit could be made.

These two excavations together are reported to have produced about 200 tons of 0.2 percent U_3O_8 ore. This is the total production from the entire property.

A large amount of aerial scintillometer work has been done that resulted in a number of insignificant discoveries in the Recapture member of the Morrison.

The applicant states that 194 dry-rotary holes totaling 33,489 feet have been drilled, most of these, 134 totaling 28,161 feet, were spaced 500 feet apart in a general N-S line beginning near the south side of sec. 22, T. 11 N., R. 3 W., and extending almost half way across sec. 27, T. 12 N., R. 3 W., a distance of about 5-1/2 miles. Also in secs. 9 and 16, T. 11 N., R. 3 W., a number of these widely spaced holes were put down from the top of the Mesa near the rim; likewise in sec. 33, T. 12 N., R. 3 W., 6 wide spaced holes were drilled. The object of this work was mainly to obtain geologic data on the Jackpile sandstone member of the Jurassic Morrison formation. The resulting information indicated a local thickening of the Jackpile unit in secs. 3, 9, and 10, T. 11 N., R. 3 W. Four of the original widely spaced holes in the south-central part of sec. 3, T. 11 N., R. 3 W., had, what the applicant interpreted from radiometric probing, traces of mineralization. The south 3 of the weakly mineralized holes were offsets by 21 holes at intervals ranging from 50 to 200 feet. Of the 21 offsets 3 indicated traces and 1 is reported to have 2 feet of material probed as 0.05-0.125 percent eU_3O_8; however, a hole 50 feet north of this one was barren although the Jackpile sand had thickened 7 feet. It is in this area the applicant has proposed the bulk of the subject exploration.

Forty-one holes totaling 2,000 feet have been drilled in three localities of slight Recapture mineralization; only those in sec. 22, T. 10 N., R. 3 W., around the Chavez mine were rewarding. Also near the west 1/4 corner of sec. 5, T. 9 N., R. 3 W., 19 holes totaling 3,328 feet were put down to test an air-borne anomaly in what was tentatively correlated as Jackpile sandstone; the results were discouraging.

PROJECT PROPOSALS

The applicant proposed drilling 259 dry-rotary holes totaling 50,625 feet. One hundred ninety-three were to be in five rows 600 feet apart with the holes at 200-foot intervals and averaging 245 feet deep. This work was to be done in S1/2S1/2 sec. 34, T. 12 N., R. 3 W., sec. 3, E1/2 sec. 9 and S1/2 sec. 10, T. 11 N., R. 3 W., and had the objective of finding ore in the Jurassic Morrison Jackpile sandstone. In the SE1/4 sec. 22, T. 10 N., R. 3 W., 65 holes were proposed, 50 feet deep, 10 feet apart along an existing road that forms an arc to the northwest of the Chavez mine and concave toward it. The work outlined in the application was estimated to cost $39,994.25.

SUMMARY AND CONCLUSIONS

In the southern part of the subject area ore bodies were found in the Recapture member of the Morrison formation. These ore-bodies occurred as small rolls or pods. They were found in a 4- to 6-foot thick sandstone enclosed between strata of claystone. About 200 tons of ore was mined that averaged 0.21 U_3O_8. Sixteen holes have been drilled in the immediate vicinity of the mined-out rolls, six of which showed only a trace of mineralized material, the remaining holes were barren. The applicant

proposes to drill about 65 holes that average 50 feet deep in the vicinity of the mined-out ore bodies. The expected ore bodies are not of a size to significantly increase the uranium ore reserves. The host rock, itself, is not thick, and the habit of the ore bodies to form rolls indicates a narrow width. This was borne out by underground observation of the mined-out area. The examining team, therefore, recommends that participation by DMEA in this part of the program be denied.

In the northern part of the area, in secs. 3 and 10, T. 11 N., R. 3 W., a program of drilling is requested for 193 holes to explore the "Jackpile sandstone". The sandstone in that area is relatively thick, which is the main criteria for a favorable host rock. The applicant company, however, has drilled a fence of holes 500 feet apart through both sections. Four holes in the thickest part of the sand showed a trace of mineralization. Three of these holes were offset by 22 drill holes at intervals of from 50 to 250 feet. One offset hole penetrated about 2 feet of mineralized material of possibly 0.10 percent U_3O_8. Secs. 3 and 10 also have outcrops of the thick parts of the "Jackpile sandstone". No anomalous radioactivity is known along these outcrops.

The examining team believes that secs. 3 and 10 have been adequately tested by drilling and outcrop examination, and it recommends that the request for DMEA assistance be denied.

700

Surname copy

Ellis
Martin
Fitzpatrick
McKendry

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

Mr. W. M. Traver
Executive Officer
DMEA Field Team, Region III
22h New Customhouse Building
Denver 2, Colorado

AUG - 1 1955

Re: Docket No. DMEA-3880 (Uranium)
Cenoncite Area
Valencia, Bernalillo, and
Sandoval Counties, New Mexico

Dear Mr. Traver:

Reference is made to your memorandum of July 19, 1955, wherein you quote the last paragraph of our field referral letter of July 15, pertaining to the captioned application.

You are evidently under the impression that the paragraph in question presents a new policy in the matter of obtaining a performance bond in lieu of the Owner's Consent to Lien on Indian lands. Such impression is partly gained from the Administrator's letter of September 30, 1952. However, subsequent to that letter, the policy was actually spelled out and we refer you to the Operating Committee Minutes No. 396, dated July 27, 1954. A reference to said minutes will, no doubt, clarify the question.

There will probably be cases where individuals or small companies will be unable to comply with any of the requirements, thus leaving the Government in an unprotected position. On the other hand, there may be large financially responsible companies that, for one reason or another, can not or will not comply, in which event the question will be decided administratively. Such may be the case with the subject Applicant. It is suggested, in this case, that the examination of Applicant's property be made without reference to the performance bond or third-party guarantee. Upon receipt of the Field Team report, if a project is recommended, the question will be resolved in Washington.

You will notice from the above that much depends on the Applicant in question whether the documents are waived or not, which was the reason for inserting the word "usually" in the last paragraph of our letter to you of July 15.

Sincerely yours,

W. S. Martin

ACTING Chairman, Operating Committee (SHB)

Thor H. Kiilsgaard

(SHB)

APPROVED:

/s/ Robert W. Geehan (SHB)

Member, Bureau of Mines

Member, Geological Survey

EWEllis/glg 7-27-55
cc to: Admr.'s Reading File
Operating Committee
Docket
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA
Code 700
Mr. Ching

7/26/55 gla

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

RECEIVED
JUL 25 1955

224 New Customhouse
Denver 2, Colorado

July 19, 1955

Memorandum

To: Chairman of the Operating Committee

From: Executive Officer, DMEA Field Team, Region III

Subject: Docket DMEA-3880 (Uranium), Calumet & Hecla, Inc., Valencia, Bernalillo and Sandoval Counties, New Mexico

Reference last paragraph your letter July 15, 1955 on the subject docket, "You will note that the subject property is on Indian lands; consequently, an Owner's Consent to Lien will probably not be obtainable. If such is the case and a contract is recommended by the Field Team, it is suggested that you advise the Applicant that we usually require a performance bond or a third-party guarantee in lieu of the Owner's Consent to Lien".

A letter from C. O. Mittendorf, Administrator, dated September 30, 1952, re Waiver of Owner's Consent to Lien on Indian Tribal lands, etc. and his letter of September 2, 1952 states "You are advised that the DMEA is authorized to waive Owner's Consent to Lien on Indian lands. The applicant's lease must be for a minimum of four years, preferably five".

Will you please advise if the new DMEA policy is to obtain a performance bond in lieu of Owner's Consent to Lien on Indian lands.

W. M. Traver

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

RECEIVED
JUL 25 1955

224 New Customhouse
Denver 2, Colorado

July 19, 1955

Memorandum

To: J. F. Shaw (w/brochure)
J. W. Hasler

From: Field Team, Region III

Subject: Docket DMEA-3880 (Uranium), Calumet & Hecla, Inc., Valencia, Bernalillo and Sandoval Counties, New Mexico

Enclosed is the subject application in the amount of $39,994.25. A field examination and suitable reports are required.

A copy of the letter from the Chairman of the Operating Committee and memoranda from the Uranium Commodity Committee are attached for your information.

W. M. TRAVER,

W. M. Traver

E. N. Harshman

E. N. Harshman

DMEA Field Team, Region III

Enclosures

HMC:pw

cc: Subject
Chron
Harshman
Sec.Op.Comm. (2)

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

RECEIVED
JUL 25 1955

224 New Customhouse
Denver 2, Colorado

July 19, 1955

Memorandum

To: J. F. Shaw (w/brochure)
J. W. Hasler

From: Field Team, Region III

Subject: Docket DMEA-3880 (Uranium), Calumet & Hecla, Inc., Valencia, Bernalillo and Sandoval Counties, New Mexico

Enclosed is the subject application in the amount of $39,994.25. A field examination and suitable reports are required.

A copy of the letter from the Chairman of the Operating Committee and memoranda from the Uranium Commodity Committee are attached for your information.

W. M. TRAVER

W. M. Traver

E. N. Harshman

E. N. Harshman

DMEA Field Team, Region III

Enclosures

HMC:pw

cc: Subject
Chron
Harshman
Sec.Op.Comm. (2)

Surname 700

Ching
Kulsgaard
Gehdy
Selfridge
Fylman

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

JUL 15 1955

Mr. E. R. Lovell, President
Calumet and Hecla, Incorporated
122 South Michigan Avenue
Chicago 3, Illinois

Re: Docket No. DMEA-3880 (Uranium)
Canoncito Area
Valencia, Bernalillo and
Sandoval Counties
New Mexico

Dear Mr. Lovell:

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

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

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

Sincerely yours,

C. O. Mittendorf (for)

Administrator

MChing:am
7-12-55
cc to: Admr. Reading File
Docket
Code 700
Mr. Ching
DMEA Field Team, Region III(2)

R.C.S.

Surname 700

Ching
Selfridge
Ferguson

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

JUL 15 1955

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

Re: Docket No. DMEA-3880 (Uranium)
Calumet and Hecla, Incorporated
Canoncito Area
Valencia, Bernalillo and
Sandoval Counties
New Mexico

Dear Mr. Traver:

The subject application is being referred to you for investigation, a field examination if warranted, and recommendation. A copy of the application was forwarded to you on June 30.

Enclosed are two copies each of comments and recommendations by John E. Crawford and N. E. Nelson of the Uranium Commodity Committee, dated July 6 and July 12, 1955, respectively.

You will note that the subject property is on Indian lands; consequently, an Owner's Consent to Lien will probably not be obtainable. If such is the case and a contract is recommended by the Field Team, it is suggested that you advise the Applicant that we usually require a performance bond or a third-party guarantee in lieu of the Owner's Consent to Lien.

Sincerely yours,

George C. Selfridge
Chairman, Operating Committee (GB)

Enclosures

APPROVED:

/s/ Robert W. Geehan (GB)
Member, Bureau of Mines

Thor H. Kiilsgaard (GB)
Member, Geological Survey

MChing:am
7-12-55
cc to: Admr. Reading File
Operating Committee
Docket
Messrs. J. E. Crawford, Rm. 3641
T. H. Kiilsgaard, Rm. 5224
J. O. Hosted, Rm. 3210, GSA
Code 700
Mr. Ching

R.G.L.

7/13/55 gla

IN REPLY REFER TO:

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

RECEIVED
JUL 13 1955

July 12, 1955

Re: DMEA 3880
Calumet & Hecla, Inc.
Canoncita Permit
Sandoval, Bernalillo &
Valencia Counties, N. M.
$39,994.25 - Uranium

Memorandum

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

From: N. E. Nelson, U. S. Geological Survey

Subject: Review of Application.

The application has to do with further air blast drilling (50,625 ft.) of two small areas, parts of Calumet and Hecla's large holding (14,990 acres more or less) along the east edge of Mesa Gigante, 25 miles west of Albuquerque, New Mexico. Most of the large holding is underlain by the Morrison formation. Certain horizons in the Morrison in the general area are uranium bearing and the larger part of the proposed drilling (47,325 ft.) will test what are believed to be the most favorable localities underlain by the thickest part of the Jackpile (Westwater) sand. Readings of a scintillation survey are shown on an isopach map (No. 12 of application) and extensive drilling by Calumet and Hecla tend to justify the belief. Production is being obtained from the Jackpile sand eight to ten miles to the west of the C and H ground.

3,300 feet, 65 holes, of close drilling is proposed for the Chavez mine locality. The mine has produced 156.84 tons of 0.21% U_3O_8 from two small pods, and has a reserve estimated at 40 tons of .20% U_3O_8. The holes would be spaced on 10-foot centers and would virtually surround the operation at the mine.

134 drill holes totalling 28,161 feet were drilled by Calumet and Hecla in the northern ten square mile area, and the 47,000+ feet of proposed drilling would fill in on some of the widely spaced holes of that work. The results of the scintillation survey and the thickness of the Jackpile sands, as shown by the drilling (four holes showed traces), are the positive recommendations for the proposed additional drilling.

A review of the information and perhaps an examination by the Field Team are indicated. A referral is recommended.

N. E. Nelson

N. E. Nelson

IN REPLY REFER TO:

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

RECEIVED
JUL 13 1955

July 12, 1955

Re: DMEA 3[illegible]
Calumet & Hecla, Inc.
Cebolleta Permit
Sandoval, Bernalillo &
Valencia Counties, N. M.
$39,994.25 - Uranium

Memorandum

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

From: H. E. Nelson, U. S. Geological Survey

Subject: Review of Application.

The application has to do with further air blast drilling (50,625 ft.) of two small areas, parts of Calumet and Hecla's large holding (14,990 acres more or less) along the east edge of Mesa Gigante, 25 miles west of Albuquerque, New Mexico. Most of the large holding is underlain by the Morrison formation. Certain horizons in the Morrison in the general area are uranium bearing and the larger part of the proposed drilling (47,325 ft.) will test what are believed to be the most favorable localities underlain by the thickest part of the Jackpile (Westwater) sand. Readings of a scintillation survey are shown on an isogeph map (No. 12 of application) and extensive drilling by Calumet and Hecla tend to justify the belief. Production is being obtained from the Jackpile sand eight to ten miles to the west of the C and H ground.

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134 drill holes totalling 28,141 feet were drilled by Calumet and Hecla in the northern ten square mile area, and the 47,000+ feet of proposed drilling would fill in some of the widely spaced holes of that work. The results of the scintillation survey and the thickness of the Jackpile sands, as shown by the drilling (four holes showed traces), are the positive recommendations for the proposed additional drilling.

A review of the information and perhaps an examination by the Field Team are indicated. A referral is recommended.

N. E. Nelson

N. E. Nelson

NENelson:iml
G-7/12/55

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

7/7/55 gla

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

RECEIVED
JUL - 7 1955

July 6, 1955

Memorandum

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

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

Subject: Application for assistance, DMEA Docket 3880, Calumet & Hecla, Inc., Valencia, Bernalillo and Sandoval Counties, New Mexico

I have reviewed the attached application for assistance, Calumet & Hecla, Inc., DMEA Docket 3880; and I have discussed it with Joseph O. Hosted, Washington representative of the Atomic Energy Commission.

We suggest that the application be referred to the Field Team for examination and report, and that the Field Team be requested to consult with Ernest R. Gordon, Atomic Energy Commission, Grand Junction, Colorado.

John E. Crawford

John E. Crawford

Attachment

nelson
July 12

June 30, 1955
Subject: DMEA-3880
Re: Exploration Assistance

A.E. Petermann
122 South Michigan Ave.
Chicago 3, Illinois

Dear Mr. Petermann:

The receipt of your application dated June 29, 1955 for exploration assistance under the Defense Production Act of 1950, as amended, is hereby acknowledged.

Your application has been assigned Docket Number DMEA-3880 and referred to the Rare & Miscellaneous Metals Division.

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

Sincerely yours,

Robert E. Adams, Chief
Operations Control and
Statistics Division

CALUMET & HECLA, INC.
122 SOUTH MICHIGAN AVENUE
CHICAGO 3, ILLINOIS

A. E. PETERMANN
VICE PRESIDENT AND GENERAL COUNSEL

RECEIVED
JUN 30 1955

June 29, 1955

Defense Minerals Exploration Administration
Department of the Interior
Washington 25, D.C.

Gentlemen:

Enclosed is an application for aid in exploring for uranium. Will you please address any correspondence in connection with this to me at the above address.

Yours very truly,

A. E. Petermann
hp

AEP:hp
Enclosures

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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

RECEIVED
JUN 30 1955

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

Not to be filled in by applicant

Docket No. 3880
Metal or Mineral Uranium
Date Received 6-30-55
Estimated Cost $39,994.25
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: Calumet & Hecla, Inc., a Michigan corporation
122 South Michigan Avenue
Chicago 3, Illinois
See attached list of officers.

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

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

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

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

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

(*b*) State any mine name by which the property is known. None.

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise Exploration permits with right to lease, and leases.

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

(*e*) If you own the land, describe any liens or encumbrances on it

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

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

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

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

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

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

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore Uranium

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

(*c*) The work will start within 30 days and be completed within seven months from the date of an exploration project contract.

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

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

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

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

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

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

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

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

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

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

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

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

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

[X] Money [ ] Use of equipment owned by you [ ] Other

Explain in detail on acompanying paper.

CERTIFICATION

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

Dated June 29, 1955

Calumet & Hecla, Inc.
(Applicant)

By E R Lovell
PRESIDENT

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

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

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

1.(C) Titles, names and addresses of officers:

RECEIVED
JUN 30 1955

Name	Title	Address
E. R. Lovell	President	122 South Michigan Avenue Chicago 3, Illinois
H. Y. Bassett	Vice President, Operations	122 South Michigan Avenue Chicago 3, Illinois
C. C. Jung	Vice President, Finance and Treasurer	122 South Michigan Avenue Chicago 3, Illinois
A. E. Petermann	Vice President and General Counsel, and Secretary	122 South Michigan Avenue Chicago 3, Illinois
W. W. Lynch	Vice President, Metal Sales and Procurement	60 East 42nd Street New York 17, New York
D. W. Blend	Vice President and General Manager, Wolverine Tube Division	1411 Central Avenue Detroit 9, Michigan
A. S. Kromer	Vice President and General Manager, Calumet Division	1 Calumet Avenue Calumet, Michigan
F. J. Gibbons	Controller	122 South Michigan Avenue Chicago 3, Illinois

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

3. Applicant's Property Rights.

(a) Legal description. The following described lands in Valencia, Bernalillo and Sandoval Counties, New Mexico.

Tribal land - Canoncito Band of the Navajo Tribe.

Township Nine North, Range Three West:

Sec. 3, NW1/4, (that portion on top of Bell Rock Mesa)

Sec. 4, SW1/4, (that portion on top of Bell Rock Mesa)

Sec. 5, (that portion on top of Bell Rock Mesa)

Township Ten North, Range Three West:

Sec. 3, S1/2

Sec. 4, (that portion east of Laguna boundary)

Sec. 5, (that portion east of Laguna boundary)

Sec. 8, (that portion east of Laguna boundary)

Sec. 9, (that portion east of Laguna boundary)

Sec. 10, W1/2, NE1/4 NE1/4

Sec. 15, W1/2, W1/2E1/2, E1/2 SE1/4, SE1/4 NE1/4

Sec. 17, (that portion east of Laguna boundary)

Sec. 18, SE1/4

Sec. 19, NE1/4

Sec. 20, All

Sec. 21, All

Sec. 27, All

Sec. 28, SE1/4

Sec. 33, All

Sec. 34, W1/2

Township Eleven North, Range Three West:

Sec. 3, (that portion within Canoncito Navajo Area)

Sec. 5, (that portion within Canoncito Navajo Area)

Sec. 8, (that portion within Canoncito Navajo Area, except Indian Trust Allotments within E 1/2 NE 1/4 and NE1/4 SE1/4)

Sec. 9, All

Sec. 10, E1/2 W1/2, SW1/4 SW1/4, and that portion of E1/2 within Canoncito Navajo Area.

Sec. 11, (that portion within Canoncito Navajo Area)

Sec. 14, N1/2, NW1/4 SW1/4, SW1/4 SW1/4, SW1/4 SE1/4

Sec. 15, All

Sec. 17, (that portion within Canoncito Navajo Area)

Sec. 20, W1/2 (that portion within Canoncito Navajo Area)

Sec. 21, All

Sec. 22, All

Sec. 23, All

Sec. 29, (that portion within Canoncito Navajo Area)

Sec. 30, (that portion within Canoncito Navajo Area)

Sec. 31, (that portion within Canoncito Navajo Area)

Township Twelve North, Range Three West:

Sec. 27, (that portion within Canoncito Navajo Area)

Sec. 28, (that portion within Canoncito Navajo Area)

Sec. 33, All

Sec. 34, (that portion within Canoncito Navajo Area)

Allotted lands in and around Canoncito Permit:

1.	Nah-dieo Mahagano	T 9 N, R 3 W: Lots 3, 4, and S1/2 NW1/4, Sec. 4
2.	Hasha-da-ya Mehagano	T 9 N, R 3 W: Lots 1, 2, and S1/2 NE1/4, Sec. 6
3.	Jose Mehegano	T 9 N, R 3 W: SE1/4, Sec. 6
4.	Nicholas Zacatero	T 10 N, R 3 W: W1/2 E1/2, Sec. 10
5.	Nah-ch-des-bah Chavis	T 10 N, R 3 W: NW1/4, Sec. 22
6.	Alth-chee-ha-bah Chavis	T 10 N, R 3 W: NE1/4, Sec. 22
7.	Nah-glee-a-ha-ba Chavis	T 10 N, R 3 W: SW1/4, Sec. 22
8.	Antonio Jose Chavis (now mining lease)	T 10 N, R 3 W: SE1/4, Sec. 22
9.	Heirs of Francisco Be-esdan	T 10 N, R 3 W: NW1/4, Sec. 26
10.	Teodoro Mexicano	T 11 N, R 3 W: NE1/4, Sec. 20
11.	Yazzie Abeita	T 11 N, R 3 W: SW1/4, Sec. 28
12.	Gle-ha-pah Abeyta	T 11 N, R 3 W: SE1/4, Sec. 28
13.	Alfred Abeyta	T 11 N, R 3 W: NW1/4, Sec. 28
14.	To-Naz-bah Abeyta	T 11 N, R 3 W: NE1/4, Sec. 28
15.	Heirs of Be-chis-ne-pah	T 11 N, R 3 W: SE1/4, Sec. 20
16.	Heirs of Tom Manning	T 9 N, R 3 W: Lots 1, 2, and S1/2 NE1/4, Sec. 4

Calumet & Hecla, Inc.
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Chicago 3, Illinois

3 (d) Attached hereto are copies of the following:

Mineral Prospecting Permit dated December 2, 1953, approved March 8, 1954 running from the Canoncito Band of the Navajo Tribe to John Lynes and Samuel C. Johnson

Amendment to Mineral Prospecting Permit dated April 19, 1954, approved June 16, 1954 running from the Canoncito Band of the Navajo Tribe to Canoncito Uranium Corporation

Assignment of Mineral Prospecting Permit executed November 19, 1954, accepted December 1, 1954 and approved January 28, 1955 running from Canoncito Uranium Corporation to Calumet & Hecla, Inc.

Mineral Prospecting Permit dated August 10, 1954, approved October 13, 1954 running from Nah-dieo Mahagano to Canoncito Uranium Corporation. Allotted lands listed as numbers 2 to 7 inclusive and 9 to 14 inclusive are held under identical Permits. Allotted lands listed as numbers 15 and 16, except for being dated October 20, 1954 and approved November 19, 1954, are also held under identical Permits.

Assignment of Mineral Prospecting Permits on Allotted Indian Lands executed November 19, 1954, accepted December 1, 1954, approved January 23, 1955 running from Canoncito Uranium Corporation to Calumet & Hecla, Inc.

Lease dated March 1, 1955, approved March 21, 1955 running from Antonio Jose Chavis and Salina Chavez to Calumet & Hecla, Inc.

Letter dated May 31, 1955 from Mr. Guy C. Williams, General Superintendent, Office of Indian Affairs, U. S. Department of the Interior, to Mr. A. E. Petermann, Vice President and General Counsel, Calumet & Hecla, Inc., evidencing renewal of the Mineral Prospecting Permit dated March 8, 1954 as amended April 19, 1954.

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4. Physical Description

a. There has been only one mining operation to date on the lands covered by this application and this operation is of very minor importance in the general exploration program at Canoncito. It is located in the SE1/4, Sec. 22, T 10 N, R 3 W, on the allotment of Antonio Jose Chavez, and is referred to as the Chavez Mine. Total shipments to date have been 156.84 tons averaging .21% U^3O^8. It is estimated that 40 tons will be shipped in June and that there are no reserves.

The mine is still undergoing development and a small amount of exploratory drifting is going on as well. The ore occurs in small "pod-like" masses closely resembling "rolls" in the Salt Wash sandstone. A "pod" once found is quickly mined out and then more lean to dead drifting is required to find another.

With the exception of an air compressor, the mine is being operated strictly on a pick-shovel-wheelbarrow basis by Indians in our employ.

Subject to the royalties of the owner and the overriding royalties of the Canoncito Uranium Corporation, the applicant is sole holder of the mining lease on this ground. All workings are accessible for examination.

Past Exploration Work. The bulk of the exploratory work to date has been by air rotary drilling in the northern portion of the Permit. The object of this drilling was to test the Jackpile sand and determine the extent of its thicker portion. 134 holes totaling about 28,161 feet were spread over an area of ten square miles in this part of the mesa.

Some drilling was done to test three different prospects in the Recapture shale. These were located in SE1/4, Sec. 22, T 10 N, R 3 W; NE1/4, Sec. 27, T 10 N, R 3 W; and in NW1/4, Sec. 34, T 10 N, R 3 W. Only the prospect in Sec. 22 has emerged as of some importance and deserving of additional exploratory drilling. (See map No. 2.) Total of 41 holes were drilled, totaling about 2,000 feet in the Recapture tests.

At the extreme south end of our holdings, a thick sand body occurs with characteristics very similar to Jackpile sand and in the same position stratigraphically. This outcrop is located near the W1/4 corner, Sec. 5, T 9 N, R 3 W. As there were known to be a few airborne scintillation anomalies nearby, it was decided to test this sand body by drilling. Nineteen holes totaling 3,328 feet were drilled and showed only mineralization of mild interest in one hole. (See map No. 9.) The sand body being tested seemed to pinch out rapidly north, east and west. Southward it has been removed by erosion.

Other exploration of the Permit has been by flying scintillation survey, extensive foot prospecting, and trenching and test pitting of anomalies found by either of the above prospecting methods.

Past Production: 156.84 tons .21% U_3O_8

Ore Reserves: 40 tons .20% U_3O_8

General Geology of the Mesa Gigante Area: The area under consideration lies in a belt up to four miles wide (east-west) and fifteen miles long (north-south) along the east edge of Mesa Gigante. It is located about 25 miles due west of Albuquerque. The north-south belt comprising the Canoncito Permit is bisected diagonally by the Valencia-Bernalillo County line.

About two and one-half sections in the extreme north end of the Permit are located in Sandoval County. (See location maps attached, Nos. 10 and 11.)

Rocks exposed in the Mesa Gigante area range in age from Jurassic (Todilto) to Cretaceous (Mancos). The rim rock of the mesa is at the horizon generally known as Dakota but is believed to be the lower unit of the Tres Hermanos member of the Mancos formation. Two units of the Tres Hermanos member are commonly present in the area and the third unit is present in only one locality on the Permit (NE1/4, Sec. 34, T 11 N, R 3 W). The middle unit of the Tres Hermanos member commonly forms buttes and smaller mesas on Mesa Gigante requiring the use of very devious routes when traversing the top of the mesa. Drilling depths from the lowermost bench (lower Tres Hermanos) to the top of the Morrison formation average around 100 feet, while the depth to the Morrison from on top of the middle unit of the Tres Hermanos is approximately 200 feet.

The Morrison formation (base assumed to be top of Bluff sandstone) varies considerably in thickness over the fifteen-mile length of the Permit. In general, the thickness may be said to be proportional to the sand content. At the extreme southern end of Mesa Gigante, the Morrison is about 180 feet thick. Near the middle of the Permit Area, in Sec. 34, T 11 N, R 3 W, the Morrison is 340 feet thick and there is no Jackpile sand here. In Sec. 3, T 11 N, R 3 W, where the Jackpile sand attains a maximum thickness, the base of the Morrison is not exposed but a reasonable estimate for the Morrison thickness here would be about 450 feet.

The Morrison sands are everywhere lenticular and a sand of considerable thickness may disappear in a few hundred feet laterally. There are horizons within the Morrison where these lenticular sands are most common. The most important sand horizons to be concerned with here are: (1) about 20 feet above the lower contact and just above a zone of persistent gray-maroon mudstones, and (2) at the top of the Morrison section (Jackpile sand, also called Westwater by many workers). The upper sand is the most important locally from an economic point of view, as it is the host rock for the great Jackpile-North Jackpile ore bodies, also the Windswept, St. Anthony and also probably the Poison Canyon and related deposits north of Grants. The "Jackpile sand" attains by far the greatest thickness of any Morrison sand in this locality, reaching as much as 135 feet in Sec. 3, T 11 N, R 3 W. Despite this very considerable local thickness, drilling has shown this to be a lens-like sand body, pinching out one mile to the north, two and one-half miles to the south, and three miles to the west of Sec. 3. The former extent eastward of the sand body is not known due to its termination by erosion at the east edge of Mesa Gigante. (See Isopach map of Jackpile sand, No. 12.) Since the Poison Canyon and Jackpile ore bodies are associated with similar marked thickening in the sand horizon, the object of the bulk of the proposed drilling is to more exhaustively test the thickest parts of this sand lens in the S1/2 of S1/2, Sec. 34, Sec. 3 and most of Sec. 10; and the E1/2 of Sec. 9, all in T 11 N, R 3 W.

The lower sand horizon (20 feet above the Bluff) has proved to be most interesting in the southern half of the Permit Area. Nearly all of the better anomalies found by airborne scintillation surveys and ground prospecting have been at this horizon. The sand seldom exceeds five feet in thickness but in the center of SE1/4 of Sec. 22, T 10 N, R 3 W, it is the host rock of some small but high grade "rolls" rather similar to the Salt Wash ore bodies. It is believed that there may be several of these small deposits in the vicinity and we propose to drill about 3,000 feet to test this hypothesis (see map No. 2). This drilling will test the production potential of a horizon new to the Grants-Laguna district.

Should either drilling project have favorable results, a very wide area is held by Calumet & Hecla from which substantial production could be made which would ensure repayment of the DMEA loan.

No discussion of pre-Morrison stratigraphy will be made here because nothing of economic significance has been noted in these beds.

Accessibility of Project. The accessibility of the project is relatively good. Twenty-five miles west of Albuquerque on U.S. 66 to the Canoncito turn-off, then eight miles north to the Canoncito Day School where Calumet & Hecla maintains a small field office. From the school, roads lead north and south

along the foot of the mesa. About two miles south and four miles north of the school are roads that lead to the top of the mesa. All parts of the project are accessible by jeep or pick-up truck.

Haulage distance to Anaconda's mill at Bluewater is 69 miles from the mine in Sec. 22, T 10 N, R 3 W. This may be increased to as much as 80 or 85 miles from the northern end of the property.

Availability of Manpower, Materials, etc.

There is a ready supply of manpower on the Canoncito (Navajo) Indian Reservation. In fact, we are obliged to use Indians wherever possible.

Material, supplies and equipment are available in Albuquerque.

Water is exceedingly scarce. Drinking water would have to be hauled in from Albuquerque in all probability. If the operation justified it, a well could be drilled that would probably yield a few gallons per minute.

Electric power would probably be best supplied by a diesel generating plant.

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Chicago 3, Illinois

5. The Exploration Project

b. Proposed drilling on Canoncito Permit

T 12 N, R 3 W, Sec. 34 S1/2 of S1/2
T 11 N, R 3 W, Sec. 3 E1/2 of Sec. 9 and S1/2 of Sec. 10

All possible holes will be drilled from the first bench of the Tres Hermanos (Mancos) sandstone and will average about 225 feet in depth. 141 holes are called for in this location (31,725 feet @79¢, 60¢ per foot plus 19¢ per foot for supervision, etc. or $25,063.25).

About 15,600 feet additional drilling will be done from the second bench of the Tres Hermanos sandstone and will average 300 feet in depth. The cost will be $12,324.00 at 79¢ per foot (including supervision).

Only the thickest part of the Jackpile (Westwater) sand will be tested in the above drilling. Generally, the thickness will be in excess of 100 feet.

T 10 N, R 3 W, Sec. 22, SE1/4

About 65 holes averaging 50 feet in depth per hole are planned to virtually surround the operation at the Chavez Mine (refer to mine map attached, No. 2). These holes will follow the existing roads around the mine and will be spaced on ten foot centers. At least two high grade "pods" have been mined and it is thought very likely that others exist in the area.

The total footage will be 3,300 feet and the cost $2,607.00 (79¢ per foot includes supervision).

d. Operating Experience

Calumet & Hecla, Inc. has been mining since 1866. Supervising the exploration are R. R. Reynolds, Geologist, with 15 years of professional experience, 10 in exploration; and R. W. Kliebenstein, Engineer, with 16 years of professional experience, eight years of which were directly concerned with exploration.

Calumet & Hecla, Inc.
122 South Michigan Avenue
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6. Estimate of Costs

a. Contracts

Charles E. Farris, Truth or Consequences, New Mexico

Drilling - - - -air rotary, 60¢ per foot, sampled
Bulldozing - - - $10.00 per hour

b. Labor Supervision, Consultants

		$ per Mo.
R. W. Kliebenstein, engineering	50% time	$ 275.00
R. R. Reynolds, geologist	50% time	300.00
Dillon Platero, asst. surveyor hole logger	100% time	300.00
Arlene Kliebenstein, bookkeeper secretarial	75% time	90.00
Assaying		35.00
Per month		$1,000.00
Total project (6 months)		$6,000.00

c. Operating Materials and Supplies 000.00

d. Operating Equipment 000.00

e. Rehabilitation and Repairs

To transport and miscellaneous equipment such as Geiger counters, surveying equipment, etc., for six months 200.00

f, g, h Installations, Miscellaneous, Contingencies 1,300.00

$7,500.00

Calumet & Hecla, Inc.
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7. Estimate of Costs

Contract drilling	$ 0.60
Supervision, etc.	0.19
Total cost per foot	0.79

North end - Jackpile sand exploration:

Lower bench - 141 holes @ 225 feet = 31,725' @ 79¢/ft.	25,063.25
Upper bench - 52 holes @ 300 feet = 15,600 " " / "	12,324.00

South end - Recapture exploration in Sec. 22

50 ft. depth - 66 holes or 3,300 feet @ .79¢/ft.	2,607.00
Total cost	$39,994.25

Calumet

UNITED STATES DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

ASSIGNMENT OF MINERAL PROSPECTING PERMITS ON ALLOTTED INDIAN LANDS

WHEREAS the General Superintendent of United Pueblos Agency, Bureau of Indian Affairs, has pursuant to authority delegated to him by the Commissioner of Indian Affairs, heretofore approved fourteen Mineral Prospecting Permits (Nos.1 through 14) dated August 10, 1954, and two mineral prospecting permits (Nos. 15 and 16) dated October 20, 1954, by and between various members of the Canoncito Band of the Navajo Tribe, named hereinbelow, permittors, and CANONCITO URANIUM CORPORATION, a New Mexico corporation, permittee, covering the following described trust allotted lands in the State of New Mexico:

Permit Number	Permitter	Land Description
1	Mah-diee Mahagano, also called Matias Mexicano	Lots 3, 4, S½NW¼ Sec. 4, T. 9 N., R. 3 W. (Allotment No. 061955)
2	Nah-ka-de-yu Mahagano, also called Charley Mexicano, and Mary Mexicano, his wife	Lots 1, 2, S½NE¼ Sec. 6, T. 9 N., R. 3 W. (Allotment No. 061959)
3	Jose Mahagano, also called Jose Mexicano, and Francis Mexicano, his wife	SW¼ Sec. 6, T. 9 N., R. 3 W. (Allotment No. 061961)
4	Nicholas Zacatero, also called Nicanor Zacatero, and Salina Zacatero, his wife	W½NE¼ Sec. 10, T. 10 N., R. 3 W. (Allotment No. 061961)
5	Nah-ch-tee-bah-Chavis, also called Mrs. Gail Morito, and Gail Morito, her husband	N½ Sec. 22, T. 10 N., R. 3 W. (Allotment No. 061961)

Page 2 of Assignment to Calumet & Hecla, Inc. of Sixteen Mineral Prospecting Permits of Canoneite Uranium Corporation on Navajo allotted land.

Permit Number	Permittee	Land Description
6	Alth-chee-ha-bah Chavis, also called Mrs. Jose Manuel Chaves, and Jose Manuel Chaves, her husband	NE¼ Sec. 22, T. 10 N., R. 3 W. (Allotment No. 061965)
7	Mah-glee-e-ha-bah Chavis, also called Dorothy Begay, and Earl Begay, her husband	SW¼ Sec. 22, T. 10 N., R. 3 W., (Allotment No. 061967)
8	Antonio Jose Chavis, also called Tony Chaves, and Salina Chaves, his wife	SE¼ Sec. 22, T. 10 N., R. 3 W. (Allotment No. 061966)
9	Francisco Platero, Ramon Platero, Marie Platero, also called Mrs. Jeff Nelson, Joe G. Platero, Ben Platero, and Kalth-bah-pah, also called Charlie Platero, heirs of Francisco Be-esdan.	NE¼ Sec. 26, T. 10 N., R. 3 W. (Allotment No. 0[illegible]267)
10	Teodore Mexicano, also called Gurule Mexicano	NE¼ Sec. 20, T. 11 N., R. 3 W. (Allotment No. 0[illegible]264)
11	Bessie Abeita, also called Marie Chachee, and Claudie Chachee, her husband	SW¼ Sec. 28, T. 11 N., R. 3 W. (Allotment No. 061973)
12	Sle-ha-pah Abeyta, also called Peta Johnson	SE¼ Sec. 28, T. 11 N., R. 3 W. (Allotment No. 061972)
13	Alfred Abeyta, also called Fred Abeyta, and Bessie Abeyta, his wife	NW¼ Sec. 28, T. 11 N., R. 3 W. (Allotment No. 061974)
14	Te-Has-bah Abeyta, also called Juanita Abeyta, and Serafin Abeyta, her husband	NE¼ Sec. 28, T. 11 N., R. 3 W., (Allotment No. 061971)

[illegible] Assignment of Calumet & Hecla, Inc. of sixteen Mineral Prospecting Permits of Canoncito Uranium Corporation on Navajo allotted land.

Permit Number	Permittor	Land Description
15	Heirs of Be-Chis-Ne-Pah, deceased allottee of Canoncito Navajo allotment No. 043265	SE¼ Sec. 20, T. 11 N., R. 5 W. (Allotment No. 043265)
16	Heirs of Tom Manning, deceased allottee of Canoncito Navajo allotment No. 061956	Lots 1, 2, S½NE¼ Sec. 4, T. 9 N., R. 3 W.

NOW, THEREFORE, for and in consideration of $10.00 ten Dollars, the receipt of which is hereby acknowledged, the said Canoncito Uranium Corporation, the owners of the above-described Mineral Prospecting Permits, hereby bargain, sell, transfer, assign, and convey all its right, title and interest in and to said Mineral Prospecting Permits, subject to the approval of the Secretary of the Interior or his authorized representative, to CALUMET & HECLA, INC., a corporation organized and existing under the laws of the State of MICHIGAN and authorized to do business in the State of New Mexico, said assignment to be effective from date of approval hereby by the Secretary of the Interior or his authorized representative.

IN WITNESS WHEREOF, the said assignor has hereunto set its hand and seal this 19th day of November, 1954.

CANONCITO URANIUM CORPORATION

Attest:

Edward C. Oppenheimer

(corporate seal)

(president)

John Lynes

[illegible] of Assignment to Calumet & Hecla, Inc. of sixteen Mineral Pros-
[illegible] Permits of Canoncito Uranium Corporation on Navajo allotted land.

ACKNOWLEDGEMENT OF CORPORATION

STATE OF NEW MEXICO)
) SS.
COUNTY OF BERNALILLO)

On this 19th day of November, 1954, before me appeared John Lynes, to me personally known, who, being by me duly sworn, did say that he is the President of Canoncito Uranium Corporation, and that the seal affixed to said instrument is the corporate seal of said corporation and that said instrument was signed and sealed in behalf of said corporation by authority of its board of directors, and said John Lynes acknowledged said instrument to be the free act and deed of said corporation.

Witness my hand and seal on this the day and year first above written.

James T. Paulantis
Notary Public

My commission expires:
April 10, 1955

- -

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior or his authorized representative and the consent of the Permittors, hereby accepts said assignment and agrees to fulfill all the obligations, conditions, and stipulations in said described Mineral Prospecting Permits when assigned, and the rules and regulations of the Secretary of the Interior applicable thereto.

IN WITNESS WHEREOF the said assignee has hereto set its hand and seal this 1st day of December, 1954.

CALUMET & HECLA, INC.

Attest: by C. C. Jung

Vice President of Finance (title)

Assistant Secretary A. E. Petermann

(corporate seal)

[illegible] of Assignment to Calumet & Hecla, Inc. of sixteen Mineral Pros-[illegible]ing Permits of Canoncito Uranium Corporation on Navajo allotted land.

ACKNOWLEDGEMENT OF CORPORATION

STATE OF Illinois)
) ss.
COUNTY OF Cook)

On this 1st day of December, 1954, before me appeared C. C. Jung, to me personally known, who, being by me duly sworn, did say that he is the Vice President of Finance of Calumet & Hecla, Inc., and that the seal affixed to said instrument is the corporate seal of said corporation and that said instrument was signed and sealed in behalf of said corporation by authority of its board of directors, and said C. C. Jung acknowledged said instrument to be the free act and deed of said corporation.

WITNESS my hand and seal on this the day and year first above written.

By commission expires:
June 4, 1957

Elizabeth Ann Ryan
Notary Public

Date: [illegible]

R. D. Haltz
Area Director

Approved as per authority
contained in Office letter
under date of January 14, 1955

CONSENT TO ASSIGNMENT OF MINERAL PROSPECTING PERMITS

We, the undersigned permittors of certain Mineral Prospecting Permits dated August 10, 1954, approved October 15, 1954, by the General Superintendent of United Pueblos Agency, Bureau of Indian Affairs, issued to Canoneito Uranium Corporation on the hereinafter described trust allotted land, approve an assignment of said permits by the permittee to CALLAHAN & MECIA, Inc., subject to the approval of said assignment by the Secretary of the Interior or his duly authorized representative:

Permit Number	Land Description
1	Lots 3, 4, S½NW¼ Sec 4, T. 9 N., R. 3 W. (Allotment No. 061958)
2	Lots 1, 2, S½NE¼ Sec. 6, T. 9 N., R 3 W. (Allotment No. 061959)
3	SE¼ Sec. 6, T. 9 N., R. 3 W. (Allotment No. 061960)
4	W½E½ Sec. 10, T. 10 N., R. 3 W. (Allotment No. [illegible]261)
5	NW¼ Sec. 22, T. 10 N., R. 3 W. (Allotment No. 061968)
6	NE¼ Sec. 22, T. 10 N., R. 3 W. (Allotment No. 061965)
7	[illegible] (Allotment No. [illegible]967)
8	[illegible] (Allotment No. [illegible])
9	[illegible] (Allotment [illegible])

Page 2 of Assignment to Calumet & Hecla, Inc. of 16 Mineral Prospecting Permits of Canoncito Uranium Corporation on Navajo allotted land.

Permit Number	Land Description
10	NE¼ Sec. 20, T. 11 N., R. 3 W. (Allotment No. 048264)
11	SW¼ Sec. 28, T. 11 N., R. 3 W. (Allotment No. 061973)
12	SE¼ Sec. 28, T. 11 N., R. 3 W. (Allotment No. 061972)
13	NW¼ Sec. 28, T. 11 N., R. 3 W. (Allotment No. 061974)
14	NE¼ Sec. 28, T. 11 N., R. 3 W., (Allotment No. 061971)
15	SE¼ Sec. 20, T. 11 N., R. 3 W. (Allotment No. 048265)
16	Lots 1, 2, S½NE¼ Sec 4, T. 9 N., R. 3 W. (Allotment No. 061956)

Signed this _____ day of _____, 1954, at

Council hall of Canoncito Band of the Navajo Tribes

Witnesses to marks:

_____

address _____

_____

address _____

+ (His mark)
Matias Mexicano (for Permit Nos. 1 and 16)

+
Charley Mexicano (for Permit No. 2)

+ (Her mark)
Mary Mexicano (for Permit No. 2)

+
Juan Mexicano (for Permit No. 3)

+ (His mark)
Francisco Mexicano (for Permit No. 3)

(Signatures continued from Page 2)

Witnesses to marks:

_____ (His mark)
Eleanor Secatero (for Permit No. 4)

address _____

_____ (Her mark)
Salina Secatero (for Permit No. 4)

_____

address _____

_____ (Her mark)
Nah-ch-des-bah Chavis, also called Mrs. Gail Werito (for Permit No. 5)

_____ (His mark)
Gail Werito (for Permit No. 5)

_____ (Her mark)
Alth-chee-ha-bah Chavis, also called Mrs. Jose Manuel Chaves (for Permit No. 6)

_____ (His mark)
Jose Manuel Chaves (for Permit No. 6)

_____ (Her mark)
Dorothy Begay (for Permit No. 7)

_____
Earl Begay (for Permit No. 7)

_____
Tony Chaves (for Permit No. 8)

_____
Salina Chaves (for Permit No. 8)

FOR PERMIT NO. 9:

_____ (His mark)
Francisco Platero

_____ _____
Ramon Platero Marie Nelson

_____ (His mark) _____
Joe J. Platero Paddy Platero

Page 4 of Consent to Assignment to Calumet & Hecla, Inc. of 16 Mineral Prospecting Permits of Canonsite Uranium Corporation on Navajo allotted land.

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(Signatures continued from Page 3)

Witnesses to Marks:

_____ (His mark)
Teodoro Mexicano (for Permits Nos. 10,15,16)

address _____

_____ (Her mark)
Marie Chachee (for Permit No. 11)

address _____

_____
Claudio Chachee (for Permit No. 11)

_____ (Her mark)
Fota Johnson (for Permit No. 12)

_____
Fred Abeyta (for Permit No. 13)

_____ (Her mark)
Bessie Abeyta (for Permit No. 13)

_____ (Her mark)
Jimenita Abeyta (for Permits Nos. 14 and 15)

_____ (His mark)
Serafin Abeyta (for Permit No. 14)

_____

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CONSENT TO ASSIGNMENT OF MINERAL PROSPECTING PERMIT

We, the undersigned permittors of a Mineral Prospecting Permit dated October 20, 1954, executed by the heirs of Be-Chis-Ne-Pah, in favor of Canoncite Uranium Corporation on trust allotment No. 04,8265 described as SE¼ Section 20, Township 11 North, Range 3 West, N.M.P.M., APPROVE an assignment of said permit by the Permittee to CALUMET & HECLA, INC., subject to the approval of said assignment by the Secretary of the Interior or his duly authorized representative.

Earl Ball
Earl Ball (on Permit No. 15)

X Frances Ball
Frances Ball (Mrs. John Ration)
on Permit No. 15

CONSENT TO ASSIGNMENT OF MINERAL PROSPECTING PERMIT

I, the undersigned permitter in a certain Mineral Prospecting Permit dated October 20, 1954, approved by the General Superintendent of United Pueblos Agency, Bureau of Indian Affairs, issued to Cameneite Uranium Corporation on lots 1, 2, and S½NE¼ Section 4, Township 9 North, Range 3 West, N.M.P.M. (allotment No. 061956 of Tom Manning, deceased Cameneite Navajo) approve an assignment of said permit by permittee to GALBRAIT & MECLA, Inc.

Signed this ___ day of December, 195_ at Gallup, New Mexico.

Simplicio Molina

EXHIBIT A

UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Indian Affairs

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MINING LEASE - ALLOTTED INDIAN LANDS
(For Uranium and other Minerals Associated Therewith)

THIS INDENTURE OF LEASE, made and entered into in

duplicate this 1st day of March, 195[illegible]5,

ANTONIO JOSE CHAVIS, also called TONY CHAVEZ, and
SALINA CHAVEZ, his wife,

Cabezoncito Navajo Coop., Correo, N.Mex.

CALUMET & HECLA, INC., a Michigan corporation authorized to do business
in New Mexico

[illegible] South Michigan Ave., Chicago 3, Illinois

[illegible] designated [illegible], WITNESSETH

That the Lessor, for and in consideration of $1[illegible] receipt
whereof is hereby acknowledged, and of the rentals, covenants,
stipulations and conditions hereinafter contained to be paid, kept and observed by the Lessee, [illegible] grants unto the said Lessee, [illegible] following-described tract of land lying
[illegible] County, State of New Mexico, to-wit:

Section 22, Township 18 North, Range 7 West, N.M.P.M.,
containing 160 acres, more or less.
(Tract No. [illegible]).

for the full term of 15 years from the date of approval hereof, for the sole purpose of prospecting for and mining minerals, as follows: uranium and other minerals associated therewith, the lessee to occupy so much only of the surface of said land as may be reasonably necessary to carry on the work of prospecting for, mining, milling, storing and removing such minerals

2. As used herein, the term "Secretary" shall refer to the Secretary of the Interior or his authorized representative; General Superintendent shall refer to the General Superintendent of United Pueblos Agency, Box 1346, Albuquerque, New Mexico or other official in charge of the Indian Agency having jurisdiction over the lands leased.

Wherever used in this document the word "ore" shall mean only the ore of uranium and other minerals associated therewith; and the words "ores mined and sold" or similar words shall be construed and understood to mean ores mined and removed from the demised premises for the purposes of milling, treatment, stockpiling or other disposition, and not that ores must be sold as such.

3. In consideration of the foregoing, the Lessee hereby agrees:

(a) ROYALTY. To pay, or cause to be paid, to the Lessor (by checks or money orders payable to Tony Chavez and Salina Chavez, transmitted through the General Superintendent) as royalties the sums of money as follows, to-wit.

On any ores mined and sold by Lessee from the demised property, Lessee agrees to pay a percentage royalty of the mine value per dry ton as set forth in the following percentage royalty schedule:

PERCENTAGE ROYALTY SCHEDULE

Mine Value per Dry Ton	Royalty Percentage of Mine Value per Dry Ton
$ 0.01 to $ 10.00 inclusive	10%
10.01 to 20.00	11%
20.01 to 30.00	12%
30.01 to 40.00	13%
40.01 to 50.00 "	14%
50.01 to 60.00 "	15%
60.01 to 70.00	16%
70.01 to 80.00	17%
80.01 to 90.00	18%
90.01 to 100.00 "	19%
100.01 or more	20%

"MINE VALUE PER DRY TON", wherever used herein, is hereby defined as the dollar value per dry ton of crude ores at the mine as determined by the application to the valuable metal content of such ore of the price schedules for such ores established and currently in effect by the Atomic Energy Commission or other government authorized agencies before allowance for transportation and development. It is specifically understood that any mine production bonuses shall be included in the "mine value per dry ton". However, if the Government at any time hereafter does not establish or have in effect a price schedule for the purchase of such ores on a fixed or scheduled dollar value per dry ton of crude ores at the mine, or said ores contain salable minerals, some, or all, of which are disposed of to a custom treatment plant or smelter for the treatment and beneficiation of uranium bearing ores to be mined in the Grants and other districts of New Mexico, then mine value per dry ton shall be the gross value per dry ton of said crude ores as paid for by the Atomic Energy Commission, or other Government authorized agency, mill or other buyer, less any allowances or reimbursements for the following specific items

(1) Transportation of ores.

(2) Allowances paid to Lessee by the Atomic Energy Commission or other Government authorized agency for exploration for or development of ores.

(3) Treatment or beneficiation of ores

which specific items shall, in such event, be deducted from the gross sale price received from the metal content of said ores by the seller before said percentage royalty is calculated and paid. Any cost of treatment or beneficiation shall be the actual cost without any milling profit. It is specifically understood that any mine production bonuses shall be included in the mine value per dry ton.

Lessee agrees to pay the above percentage royalty payments on or before the fifteenth (15th) day of the month next following the removal from the demised premises, weighing and sampling by lessee of said ores, and lessee shall attach to each such payment made a statement of the mine value of said ores and the amount of royalty due on each lot so removed.

The royalty provisions of this lease will be subject to reasonable adjustment at the end of ten years, such adjustment being based upon market conditions as supported by evidence from the field, and subject to the approval of the Secretary of the Interior or his authorized representative.

(b) ANNUAL RENTAL. To pay, or cause to be paid, to General Superintendent for use and benefit of the Lessor in advance beginning with the date of approval of the lease, an annual rental $1.00 per acre for the first calendar year or fraction thereof and $1.00 per acre per annum in advance for each and every calendar year thereafter during the continuance of the lease, it being understood and agreed that said sum so paid shall be a credit on the royalties accruing during the year for which the payment of annual rental is made and that said annual rental when paid shall not be refunded to the Lessee because of any subsequent surrender or cancellation hereof.

(c) DILIGENCE, PREVENTION OF WASTE. To exercise diligence in the conduct of the prospecting and mining operations; to carry on development and operations in a workmanlike manner, and to the fullest extent possible, consistent with good mining practice; to commit no waste on said land, and to suffer none to be committed upon any portion thereof; to occupy or use; to comply with all the requirements and the laws of the State in which the land is located; to take appropriate steps for the preservation of the property and the health and safety of the workmen; promptly to surrender and return the premises upon the termination of this lease to whomsoever shall be lawfully entitled thereto in as good condition as received, except for the ordinary wear

[illegible]r and unavoidable accidents in their proper use and changes which may be due to the proper mining and use of the same under this lease Lessee may, upon any termination, move and remove, within sixty (60) days all tools, machinery, equipment and improvements placed thereon by him providing the payments agreed upon by the Lessee have been made and the lease terms and provisions applicable thereto have been fully complied with, provided, however, that Lessee, at the request of Lessor, shall not remove any roads or appurtenances thereto, fences or casing in water wells which may be necessary and desirable to continue the same as a producing well; not to permit any nuisance to be maintained on the premises under Lessee's control nor allow any intoxicating liquors to be sold or given away for any purpose on such premises and not to use such premises for any other purposes than those authorized in this lease.

(d) DEVELOPMENT. The land described herein shall not be held by the Lessee for speculative purposes, but in good faith for mining the minerals specified; and the failure by the Lessee in the diligent development and continued operation of the mine or mines, except when operations may be interrupted by strikes, the elements or casualties not attributable to the Lessee, shall be held as a want of compliance with the purposes of this lease and shall render it subject to cancellation. Provided, that whenever the Secretary shall consider the marketing facilities inadequate or the economic conditions unsatisfactory, he may after consultation with the Lessor authorize the suspension of operations for such time as he may deem advisable, but such action will not release the Lessee from the payment of the advance annual rental.

(e) MONTHLY STATEMENTS. To keep an accurate account of all mining operations and in the case of all ores mined and removed and not sold in the form of crude ores to third parties in title to which is retained by Lessee, to show the whole amount of such ores and minerals mined and the valuation thereof for royalty purposes under the terms of this Lease; in the case of ores which are sold or otherwise disposed of to third parties and title to which is not retained by Lessee, to keep an accurate account of all mining operations, showing the sales, prices, dates, purchasers and the whole amount of [illegible] mined, the [illegible] removed and the gross receipts derived therefrom, and in either [illegible] to furnish the General Superintendent and the Lessor sworn monthly reports thereon not later than the 15th of the succeeding month; and all sums due as royalty and advance rental shall be a lien on all implements,

tools, movable machinery and all other personal chattels used in operation upon said property, and upon all of the minerals obtained from the land herein leased, but not yet removed therefrom, as security for payment of said sums. An audit of the Lessee's accounts and books shall be made annually or at such times as may be directed by the General Superintendent by certified public accountants approved by the Secretary and at the expense of the Lessee. The Lessee shall furnish free of cost a copy of such audits to the Secretary through the General Superintendent and to the Lessor within thirty (30) days after the completion of such auditing.

(f) REGULATIONS. To abide by and conform to any and all regulations of the Secretary ~~now or hereafter~~ in force relative to such leases, PROVIDED, that no regulations hereafter approved shall effect a change in rate of royalty, the annual rental herein specified, or the term of this lease, without the written consent of the parties to this lease.

(g) ASSIGNMENT OF LEASE. Not to assign this lease or any interest therein by an operating agreement or otherwise, nor to sublet any portion of the leased premises, except with the approval of the Secretary and the Lessor. If this lease is divided by assignment of an entire interest in any part of it, each part shall be considered a separate lease under all the terms and conditions of the original lease.

(h) BOND. To furnish such bond as may be required by the regulations of the Secretary conditioned upon compliance with the terms of this lease.

4. INSPECTION. The leased premises and producing operations, improvements, machinery and fixtures thereon and connected therewith and all books and accounts of the Lessee shall be open at all times for inspection by the Lessor and the Secretary insofar as may be necessary or desirable in determining amounts to be paid to Lessor hereunder or to determine whether or not Lessee is complying with the terms and provisions of this lease.

5. DISPOSITION OF SURFACE. The lessor expressly reserves the right to use, lease, sell, or otherwise dispose of the minerals not covered by this lease and the surface of the land embraced within this lease under existing law or laws hereafter enacted, such

disposition to be subject at all times to the right of the Lessee herein to the use of so much of said surface as is necessary in the extraction and removal of the minerals from the land herein described in accordance with this lease.

6. SURRENDER AND TERMINATION. The Lessee shall have the right at any time during the term hereof to surrender and terminate this lease or any part thereof upon the payment of all rentals, royalties and other obligations due and payable hereunder and the further sum of $1.00, upon a showing satisfactory to the Secretary and the Lessor that full provision has been made for the conservation and protection of the property, the lease to continue in full force and effect as to the lands not so surrendered. If this lease has been recorded Lessee shall file a recorded release with his application to the General Superintendent for termination of this lease.

7. CANCELLATION AND FORFEITURE. When in the opinion of the Secretary, there has been a violation of any of the terms and conditions of this lease or of the applicable regulations before restrictions are removed, the Secretary shall have the right at any time after thirty (30) days' notice to the Lessee, specifying the terms and conditions violated, and after a hearing, if the Lessee shall so request within thirty (30) days of receipt of such notice, to declare this lease null and void, and the Lessor shall then be entitled and authorized to take immediate possession of the land

8. RELINQUISHMENT OF SUPERVISION BY THE SECRETARY. Should the Secretary at any time during the life of this instrument, relinquish supervision as to all or part of the acreage covered hereby, such relinquishment shall not bind lessee until said Secretary shall have given 30 days' written notice. Until said requirements are fulfilled, lessee shall continue to make all payments due hereunder as provided herein. After notice of relinquishment has been received by lessee, as herein provided, this lease shall be subject to the following further conditions.

(a) All rentals and royalties thereafter accruing shall be paid directly to lessor or his successors in title.

(b) If, at the time supervision is relinquished by theSecretary as to all lands included in this lease, Lessee shall have made all payments then due hereunder, and shall have fully performed all

obligations on its part to be performed up to the time of such relinquishment, then the bond given to secure the performance hereof, on file in the Indian Office, shall be of no further force or effect.

9. HEIRS AND SUCCESSORS IN INTEREST. It is further covenanted and agreed that each obligation hereunder shall extend to and be binding upon, and every benefit hereof shall inure to the heirs, executors, administrators, successors of, or assigns of the respective parties hereto.

10. GOVERNMENT EMPLOYEES CANNOT ACQUIRE LEASE. No lease, assignment thereof, or interest therein will be approved to any employee or employees of the United States whether connected with the Indian Service or otherwise, and no employee of the Interior Department shall be permitted to acquire any interest in such leases by ownership of stock in corporations having leases or in any other manner.

11. FENCING. It is understood by the parties hereto that any fences constructed by the Lessee shall be restricted to such of the above described lands on which active operations are being conducted which make it necessary or desirable to exclude livestock.

12. ROADS. Lessee may use existing roads, if any, on the land and shall also have the privilege of constructing and maintaining at its expense any additional roads across the land that are necessary in carrying on the mining work under this lease provided that the location of any additional roads be first approved in writing by Lessor and the General Superintendent. No part of any such road or roads shall inure to the benefit of the public which shall obtain no rights thereon, but upon termination of this lease for any cause whatsoever or at any time it shall become unnecessary for Lessee to use any such road for conducting the operations authorized under this lease, the Lessee's right to use said roads shall thereupon cease and all the rights shall revest in the Lessor in accordance with law. The Lessee shall hold the United States and the Lessor harmless and indemnify them against any and all loss or damage which might result from the construction or maintenance by Lessee of said roads in a negligent manner.

13. INDIAN LABOR. The Lessee shall employ Indians, giving priority to the Lessor and other members of his Band or Tribe in all positions for which they are qualified and available and shall pay the prevailing wage rates for similar services in the area. The

Lessee shall do everything practicable to employ qualified Indians, giving priority to the Lessor and other members of his Band or Tribe and their equipment in all hauling of materials under this lease, insofar as Lessee does not use its own equipment for that purpose. Lessee agrees to make special efforts to work Indians giving priority to the Lessor and other members of his Band or Tribe into skilled, technical, and other higher jobs in connection with the Permittee's operations under this lease

14. Lessee shall, and hereby agrees to indemnify, protect, and save harmless said Lessor and the United States from and against the following specific claims, demands, and damages (and none other) arising out of Lessee's negligence or actionable faults in connection with Lessee's work and operations hereunder, to-wit

(a) To property of Lessor and third persons, including members of Lessor's family.

(b) To Lessor and third persons, for injury or death.

(c) To the livestock of the Lessor and others and to the permanent buildings and structures of the Lessor situate on the property covered by this permit

(d) Liens or lien claims on account of labor performed upon or material furnished to the property covered by this lease at the instance of the Lessee.

15. Lessee agrees to carry such insurance covering all persons working in, on, or in connection with said property for Lessee as will fully comply with the provisions of the Statutes of the State of New Mexico, covering workmen's compensation and occupational disease, as are now in force or as they may hereafter be changed or amended. Further, Lessee agrees to comply with all of the terms and provisions of all applicable laws of the State of New Mexico and of the United States of America as now exist or as hereafter amended, pertaining to Social Security, Unemployment Compensation, wages, hours, and conditions of labor, and to indemnify and hold the Lessor and the United States harmless from payment of any damages occasioned by Lessee's failure to comply with said laws. Lessee shall pay all taxes lawfully assessed against production or its property or operations.

7-21-54 Allotted

16. Lessee shall not discriminate against any employee or applicant for employment because of race, creed, color or national origin, and shall require the identical provisions to be included in all subcontracts hereunder.

17. No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this lease or to any benefit that may arise therefrom, but this provision shall not be considered to extend to this lease if made with a corporation for its general benefit.

IN WITNESS WHEREOF we have executed this lease on the date first abovementioned.

Witnesses to signature of Lessor

Robert R. Reynolds

address 3431 Anderson
Albuquerque, New Mexico

address March 21

APPROVED: March 21, 1955
pursuant authority contained in Indian Office letter dated October 6, 1954 (Minerals 12768-54)

Guy C. Williams
General Superintendent
United Pueblos Agency
Bureau of Indian Affairs
Albuquerque, New Mexico

Antonio Jose Chavis, also called Tony Chaves

Salina Chaves

CALUMET & HECLA, INC.

by E. R. Lovell

President (title)

Attest:

A. E. Petermann
Asst Secretary

(corporate seal)

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF INDIAN AFFAIRS

United Pueblos Agency
Box 1346
Albuquerque, New Mexico
May 31, 1[illegible]

[illegible]

Sincerely yours,

/s/ Guy C. Williams

Guy C. Williams
General Superintendent

MINERAL PROSPECTING PERMIT

THIS AGREEMENT made and entered into this ~~2nd~~ day of ~~December~~, 19~~53~~ by and between the ~~GANONCITO BAND OF THE NAVAJO TRIBE~~, party of the first part, hereinafter called Permittor, whose address is ~~Cortez, New Mexico~~ and ~~John Lynes and Samuel C. Johnson~~ whose address is ~~P. O. Box 1356, Albuquerque, New Mexico~~, party of the second part, hereinafter called the Permittee.

In consideration of the sum of ~~Ten Thousand Five Hundred~~ Dollars ($~~10,500.~~) (~~to be paid at the time of delivery of the approved permit~~) the receipt of which is acknowledged and the covenants, stipulations and conditions hereinafter contained, it is agreed:

A. Permittor hereby grants the Permittee the exclusive right for a period of one year from the date of approval of this permit by the Secretary of the Interior or his authorized representative to prospect for uranium and minerals associated therewith upon the following described lands of Permittor, subject to valid existing rights, consisting of approximately ~~14,996~~ acres more or less:

Township Nine North, Range Three West:

Sec. 3, NW¼, (that portion on top of Bell Rock Mesa)
Sec. 4, SW¼, (that portion on top of Bell Rock Mesa)
Sec. 5, (that portion on top of Bell Rock Mesa)

(Continued on page 1-A)

Township Ten North, Range Three West:

Sec. 3, S½
Sec. 4, (that portion east of Laguna boundary)
Sec. 5, (that portion east of Laguna boundary)
Sec. 8, (that portion east of Laguna boundary)
Sec. 9, (that portion east of Laguna boundary)
Sec. 10, W½, NE¼NE¼ (that portion east of Laguna boundary)
Sec. 15, W½, W½E½, E½SE¼, SE¼NE¼
Sec. 17, (that portion east of Laguna boundary)
Sec. 18, SE¼
Sec. 19, NE¼
Sec. 20, All
Sec. 21, All
Sec. 27, All
Sec. 28, SE¼
Sec. 33, All
Sec. 34, W½

Township Eleven North, Range Three West:

Sec. 3, (that portion within Canoncito Navajo Area)
Sec. 5, (that portion within Canoncito Navajo Area)
Sec. 8, (that portion within Canoncito Navajo Area, except Indian Trust Allotments within E NE¼ and NE¼SE¼)
Sec. 9, All
Sec. 10, E½W½, SW¼SW¼, and that portion of E½ within Canoncito Navajo Area.
Sec. 11, (that portion within Canoncito Navajo Area)
Sec. 14, N½, NW¼SW¼, SW¼SW¼, SW¼SE¼
Sec. 15, All
Sec. 17, (that portion within Canoncito Navajo Area)
Sec. 20, W½ (that portion within Canoncito Navajo Area)
Sec. 21, All
Sec. 22, All
Sec. 23, All
Sec. 29, (that portion within Canoncito Navajo Area)
Sec. 30, (that portion within Canoncito Navajo Area)
Sec. 31, (that portion within Canoncito Navajo Area)

Township Twelve North, Range Three West:

Sec. 27, (that portion within Canoncito Navajo Area)
Sec. 28, (that portion within Canoncito Navajo Area)
Sec. 33, All
Sec. 34, (that portion within Canoncito Navajo Area)

which lands are designated on the map attached hereto marked Exhibit "A" and made a part hereof.

B. Said permit is granted upon the following express terms, covenants, and conditions:

1. The Permittee agrees to expend on actual prospecting and exploration work not less than the sum of Three thousand three hundred thirty-three and ~~34/100~~ Dollars ($3,333.34) per month for each of the first three (3) months of this permit and if Permittee fails to do so it shall be liable to Permittor for liquidated damages in the amount not so spent. At the end of said three months the Permittee may surrender this permit in writing. If the permit is not surrendered Permittee agrees to continue the prospecting and exploration work and to expend thereon a total of not less than Twenty Thousand Dollars ($ 20,000.) for actual prospecting and exploration work during the first year of the permit. If at the end of one year from the date of approval of the permit, or at the time of surrender or termination, if the permit is surrendered or terminated after the first three months but before the end of the first year, the Permittee shall not have expended $ 20,000.00 for said work, the Permittee agrees to pay to the Permittor through the Area Director as liquidated damages the difference between the sum expended and $ 20,000.00 said sum to be paid on surrender or termination of the permit.

2. At least thirty (30) days before the end of the first year from the effective date of this permit, the Permittee may give notice to the Permittor and Area Director that it desires to have said permit renewed for a one-year period, and upon the Permittee submitting to Permittor and the Area Director at the time of application for renewal evidence that the sum of $ 20,000.00 has been or will be expended on actual prospecting and exploration work during the first year, said permit shall be renewed for a one-year period upon payment to the Permittor through the Area Director of the same bonus as was bid for the first year (which sum shall be credited on rentals or royalties payable during the second year of the permit on any leases in effect during the second year) AND the performance of not less than the same amount of work as is required to be performed during the first year of the permit. If Permittee fails to spend said sum on actual prospecting and exploration work during the second year it shall be liable to Permittor for liquidated damages in the amount not so spent. No refund to Permittee shall be made of payments to the Permittor for renewal of this permit.

3. The Permittee may, subject to the provisions hereinbefore stated, surrender this permit in writing during the renewal period upon the performance of all of Permittee's obligations hereunder, upon the payment of $1.00 and upon a showing satisfactory to the Permittor and the Secretary of the Interior or his authorized representative that full provision

has been made for the conservation and protection of the property If this permit has been recorded, the Permittee shall file a recorded release with his application for termination of the permit.

4. Permittee shall begin actual prospecting and exploration work within thirty (30) days from the date of approval and receipt by Permittee of the completed instrument and shall diligently prosecute the same in accordance with approved methods unless prevented by strikes, acts of God, economic or other conditions over which Permittee has no control.

5. The Permittee shall have the privilege of constructing and maintaining at its own expense any additional roads or transportation facilities across Permittor's lands that are necessary in carrying on the actual prospecting and exploration work, PROVIDED that the location of such roads be approved in writing by **Chairman of Permittor** and the Area Director. No part of any such road or roads shall inure to the benefit of the public and the public shall obtain no rights thereon, but upon termination of this permit for any cause whatsoever or if at any time it shall become unnecessary for Permittee to use any such road for conducting the operations authorized under this permit or subsequent leases the right to use said road shall thereupon cease and all the rights shall revest in Permittor in accordance with law. The Permittee shall hold the

Permittor and the United States harmless and indemnify them against any and all loss or damage that might result from the construction or maintenance by Permittee of said roads in a negligent manner. Any installations made in connection with roads or transportation facilities by the Permittee may be removed by the Permittee.

6. Permittee shall have the right at its own expense to drill and equip water wells on said premises and agrees that at the termination of the permit by expiration of its term or otherwise all wells will be left intact and properly cased. Permittee shall have the right to remove all mechanical pumping equipment installed by it at any wells. If any of said wells shall produce water surplus to the needs of the Permittee, said water shall be available to the members of the Permittor.

7. Permittee shall have the right free of charge to install on the premises power and water lines which may be removed by the Permittee on termination of this permit.

8. Application for rights of way will be made by Permittee pursuant to the requirements of 25 C. F. R. 256.

9. Permittee shall comply with all proper laws and regulations of competent public authority with reference to oil prospecting. Particularly, the Secretary of the Interior or his authorized representative who is qualified by law or regulation to obtain such information shall have access to all

information obtained by the Permittee in carrying out the exploration and prospecting work hereunder.

10. In the event Permittee discovers a deposit or deposits of ore where its examinations and tests convince it there is a possibility or probability of developing a commercial mine and desires to work and mine the same and desires a lease thereon, the Permittor and all other necessary agency or agencies will, upon notice from Permittee in writing by registered United States mail, postage prepaid, addressed to ~~Chairman of Permittor~~ _____ at ~~Cortez, New Mexico~~ and to the Area Director, Bureau of Indian Affairs, Box 1346, Albuquerque, New Mexico, describing the particular lands desired, give and grant a mining lease on such lands under the terms and conditions provided for in the attached form of lease, which is identified as Exhibit "B" and which has been prepared as to royalty payments and terms and conditions specially for the purpose.

Leases shall only be granted for lands described by legal sub-divisions or fractions thereof or by survey description PROVIDED that areas of less than ten (10) acres may be included in a lease only if such area has been surveyed. Said parcels need not be contiguous. All leases shall be within the area covered by the permit at the time the application for lease is made. Such leases may be requested by Permittee on additional tracts from time to time during the effective period of the

permit. Permittee, however, shall include in request for leases only such acreage as in its judgment is necessary and desirable for the efficient and proper mining operations on the deposit or deposits concerned. All applications for leases must be submitte prior to the expiration or termination of the permit.

11. Prior to the approval of a lease in favor of Permittee no ores shall be removed except samples for examination or experimental purposes.

12. The maximum acreage that shall be taken under lease shall be in accordance with regulations of the Department of the Interior or such additional amount as may be authorized by any waiver under said regulations.

13. Before this permit shall become effective, Permittee shall furnish to the Area Director of the Albuquerque Area Office, Bureau of Indian Affairs, an acceptable surety bond in an amount equal to the guaranteed amount of expenditures for one year, as specified in clause B-1 on page 2 hereof.

14. This prospecting permit is exclusive to Permittee as it is recognized that much time and expenditure of substantial amounts of money and effort are necessary in order to properly and systematically prospect the properties, in which Permittee should be protected, if valuable deposits are found. No other permit or right shall be given to anyone else on any unsurrendered portion of the lands covered by this permit as to

the minerals covered hereby so long as this permit is in effect or on lands which may be covered by a lease or leases given pursuant hereto so long as such lease or leases are in force or effect.

15. The Permittee shall employ Indians, giving priority to the members of the Canoncito Navajo Band, in all positions for which they are qualified and available and shall pay the prevailing wage rates for similar services in the area. The Permittee shall do everything practicable to employ qualified Indians, giving priority to the members of the Canoncito Navajo Band, and their equipment in all hauling of materials under the permit and any leases taken and any work done thereunder, insofar as Permittee does not use its own equipment for that purpose. Permittee agrees to make special efforts to work Indians, giving priority to the members of the Canoncito Navajo Band, into skilled, technical, and other higher jobs in connection with the Permittee's operations under the permit and leases taken hereunder. However, it is recognized that exploratory and prospecting work requires the services of technically trained geologists, engineers, physicists and skilled workers and, to a large extent, mobile units and organizations.

16. The Permittee agrees that on termination of operations under this permit or leases taken thereunder it will make provisions for conservation and protection of the property and leave all of the areas on which it has worked in a condition that will not be hazardous to life or limb.

17. Permittee shall, and hereby agrees to indemnify,

protect, and save harmless said Permittor and the United States of America from and against the following specific claims, demands and damages (and none other) arising out of Permittee's negligence or actionable faults in connection with Permittee's work and operations, hereunder, to-wit:

(a) To property of third persons, including Navajo Indians.

(b) To third persons, including Navajo Indians, for injury or death.

(c) To the livestock of the Permittor and its members and to the permanent buildings and structures of the Permittor and its members situated on the property covered by this permit.

(d) Liens or lien claims on account of labor performed upon or material furnished to the property covered by this permit at the instance of the Permittee.

18. Permittee agrees to carry such insurance covering all persons working in or on said property for Permittee as will fully comply with the provisions of the statutes of the State of New Mexico, covering workmen's compensation and occupational disease, as are now in force or as they may hereafter be changed or amended. Further, Permittee agrees to comply with all of the terms and provisions of all applicable laws of the State of New Mexico and of the United States of America as now exist or as hereafter amended, pertaining to Social Security, Unemployment Compensation, wages, hours and conditions of labor, and to indemnify and hold Permittor and the United States harmless from payment of any damages occasioned by Permittee's failure to comply

with said laws. Permittee shall pay all taxes lawfully assessed against its property or operations.

19. The Permittor expressly reserves the right to use, lease, sell or otherwise dispose of the minerals not covered by this permit and the surface of the lands embraced within this permit under existing laws or laws hereafter enacted. Such disposition and use shall be subject at all times to the prior right of the Permittee herein to the use of so much of said surface as is necessary to carry on its prospecting and exploration work and to acquire leases under this permit.

20. When in the opinion of the Secretary of the Interior or his authorized representative there has been a violation of any of the terms and conditions of this permit, the Secretary or his authorized representative shall have the right at any time after thirty days notice to the Permittee, specifying the terms and conditions violated, and after a hearing if the Permittee shall so request within thirty days of receipt of notice, to declare this permit null and void.

21. Permittee shall not knowingly permit any nuisance to be maintained on the premises nor consent to any intoxicating liquor being sold or given away for any purpose on said premises and agrees not to use said premises for any purpose other than those authorized in this permit.

22. Permittee shall not discriminate against any employee or applicant for employment because of race, creed, color or national origin and shall require an identical provision to be included in all subcontracts hereunder.

23. The Permittee agrees not to assign this permit or any interest therein by an operating agreement or otherwise, nor to sublet any portion of the permitted premises, except with the approval of the Secretary of the Interior or his authorized representative and the Permittor.

24. No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this permit or to any benefit that may arise therefrom, but this provision shall not be considered to extend to this permit if made with a corporation for its general benefit.

IN WITNESS THEREOF we have executed this permit on the date first abovementioned.

Witnesses to signature of Permittor:

/s/ Richard Platero

/s/ Lorencito Platero

Witnesses to signature of permittee

/s/ Hazel G. Carrick

[illegible] Albuquerque, N.M.

[illegible] Dietrke

[illegible] Albuquerque, N.M.

CANONCITO BAND OF THE NAVAJO TRIBE

(his mark)

by /s/ Desidero Platero
Chairman

/s/ John Lynes
John Lynes

/s/ Samuel C. Johnson
Samuel C. Johnson

APPROVED: MAR [illegible]

Acting Area Director
Albuquerque Area Office
Bureau of Indian Affairs
Department of the Interior

EXHIBIT "B"

COPY

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

MINING LEASE - TRIBAL INDIAN LANDS
(For Uranium and Other Minerals Associated Therewith)

THIS INDENTURE OF LEASE, made and entered into in quintuplicate this ____ day of _____, 195__ by and between **Canoncito Band of the Navajo Tribe** _____, designated herein as "Lessor" and **John Lynes and Samuel C. Johnson of P.O. Box 1396, Albuquerque, New Mexico** ---------- _____, herein designated as "Lessee", WITNESSETH:

1. That the Lessor, for and in consideration of $1.00 receipt whereof is hereby acknowledged, and of the royalties, covenants, stipulations and conditions hereinafter contained and hereby agreed to be paid and observed by the Lessee, doth hereby demise, grant and lease unto the said Lessee, the following described tract of land lying in _____ County, State of **New Mexico** _____, to-wit:

(insert description)

for the full term of ten years from the date of approval hereof and as long thereafter as minerals are produced in paying quantities, for the sole purpose of prospecting for and mining minerals, as follows: uranium and other minerals associated therewith, the lessee to occupy so much only of the surface of said land as may be reasonably necessary to carry on the work of prospecting for, mining, milling, storing and removing such minerals.

2. The term "Secretary" or "Secretary of the Interior as used herein shall refer to the Secretary of the Interior or his authorized representative.

The term "Area Director" as used herein shall refer to the Area Director or other official in charge of the Indian Agency having jurisdiction over the lands leased.

Wherever used in this document the word "ore" shall mean only the ore of uranium and other minerals associated therewith; and the words "ores mined and sold" or similar words shall be construed and understood to mean ores mined and removed from the demised premises for the purposes of milling, treatment, stockpiling or other disposition, and not that ores must be sold as much.

3. In consideration of the foregoing, the Lessee hereby agrees:

(a) ROYALTY. To pay, or cause to be paid, to the Lessor, said payments to be made through the Area Director, as royalties the sums of money as follows, to-wit:

On any ores mined and sold by Lessee from the demised property, Lessee agrees to pay to Lessor a percentage royalty of the mine value per dry ton as set forth in the following percentage royalty schedule:

PERCENTAGE ROYALTY SCHEDULE

Mine Value per Dry Ton		Royalty Percentage of Mine Value per Dry Ton
$ 0.01 to $10.00	inclusive	10%
10.01 to $20.00	"	11%
20.01 to $30.00	"	12%
30.01 to $40.00	"	13%
40.01 to $50.00	"	14%
50.01 to $60.00	"	15%
60.01 to $70.00	"	16%
70.01 to $80.00	"	17%
80.01 to $90.00	"	18%
90.01 to $100.00	"	19%
100.01 or more		20%

"MINE VALUE PER DRY TON", wherever used herein, is hereby defined as the dollar value per dry ton of crude ores at the mine as determined by the application to the valuable meta content of such ore of the price schedules for such ores established and currently in effect by the Atomic Energy Commission or other government authorized agencies before allowance for transport tion and development. It is specifically understood that any **mine production bonuses shall be included** in the "mine value per dry ton". However, if the Government at any time hereafter does not establish or have in effect a price schedule for the purchase of such ores on a fixed or scheduled dollar value per dry ton of crude ores at the mine, or said ores contain salable minerals, some, or all, of which are disposed of to a custom treatment plant or smelter for the treatment and beneficiation of uranium bearing ores to be mined in the Grants and other districts of New Mexico, then mine value per dry ton shall be the gross value per dry ton of said crude ores as paid for by the Atomic Energy Commission, or other Government authorized agency, mill or other buyer, less any allowances or reimbursements for the following specific items:

(1) Transportation of ores,

(2) Allowances paid to Lessee by the Atomic Energy Commission or other Government authorized agency for exploration for or development of ores.

(3) Treatment or beneficiation of ores,

Such specific items shall, in such event, be deducted from the gross sale price received from the metal content of said ores by

the seller before said percentage royalty is calculated and paid. Any cost of treatment or beneficiation shall be the actual cost without any milling profit. It is specifically understood that any mine production bonuses shall be included in the mine value per dry ton.

Lessee agrees to pay the above percentage royalty payments on or before the fifteenth (15th) day of the month next following the removal from the demised premises, weighing and sampling by lessee of said ores, and lessee shall attach to each such payment made a statement of the mine value of said ores and the amount of royalty due on each lot so removed.

The royalty provisions of this lease will be subject to reasonable adjustment at the end of each successive 10-year period, such adjustment being based upon market conditions as supported by evidence from the field, and subject to the approval of the Secretary of the Interior or his authorized representative.

(b) ANNUAL RENTAL. To pay, or cause to be paid, to the Lessor, through the Area Director, in advance beginning with the date of approval of the lease, as annual rental, the following: 25 cents per acre for the first calendar year or fraction thereof, 50 cents per acre per annum for the second and third years, and $1.00 per acre per annum in advance for each and every calendar year thereafter during the continuance of the lease, it being understood and agreed that said sum so paid shall be a credit on the royalties accruing during the year for which the payment of annual rental is made and that said annual rental when paid shall not be refunded to the Lessee because of any subsequent surrender or cancellation hereof.

(c) DILIGENCE, PREVENTION OF WASTE. To exercise diligence in the conduct of the prospecting and mining operations; to carry on development and operations in a workmanlike manner, and to the fullest extent possible, consistent with good mining practice; to commit no waste on said land, and to suffer none to be committed upon the portion in its occupancy or use; to comply with all the requirements and the laws of the State in which the land is located; to take appropriate steps for the preservation of the property and the health and safety of the workmen; promptly to surrender and return the premises upon the termination of this lease to whomsoever shall be lawfully entitled thereto in as good condition as received, except for the ordinary wear and tear and unavoidable accidents in their proper use and changes which may be due to the proper mining and use of the same under this lease.

Lessee may, upon any termination, move and remove, within sixty (60) days all tools, machinery, equipment and improvements placed thereon by it, providing the payments agreed upon by the Lessee have been made and the lease terms and provisions applicable thereto have been fully complied with; provided, however, that Lessee, at the request of Lessor, shall not remove any roads or appurtenances thereto, fences or casing in water wells which may be necessary and desirable to continue the same as a producing well; not to permit any nuisance to be maintained on the premises under Lessee's control, nor allow any intoxicating liquors to be sold or given away for any purpose on such premises and not to use such premises for any other purposes than those authorized in this lease.

(d) DEVELOPMENT. The land described herein shall not be held by the Lessee for speculative purposes, but in good faith for mining the minerals specified; and the failure by the Lessee in the diligent development and continued operation of the mine or mines, except when operations may be interrupted by strikes, the elements or casualties not attributable to the Lessee, shall be held as a want of compliance with the purposes of this lease and shall render it subject to cancellation. The duties of Lessee, however, shall be fully performed when it has mined and operated in a manner consistent with good and sound economic mining practice considering the conditions which may from time to time confront the Lessee in its operations, provided, that whenever the Secretary of the Interior shall consider the marketing facilities inadequate or the economic conditions unsatisfactory, he may after consultation with the Lessor authorize the suspension of operations for such time as he may deem advisable, but such action will not release the Lessee from the payment of the advance annual rental.

(e) MONTHLY STATEMENTS. To keep an accurate account of all mining operations, and in the case of all ores mined and removed and not sold in the form of crude ores to third parties but title to which is retained by Lessee, to show the whole amount of such ores and minerals mined and the valuation thereof for royalty purposes under the terms of this Lease: in the case of ores which are sold or otherwise disposed of to third parties and title to which is not retained by Lessee, to keep an accurate account of all mining operations, showing the sales, prices, dates, purchasers and the whole amount of minerals mined, the amount removed and the gross receipts derived therefrom; and in either case to furnish the Area Director and the Lessor sworn monthly reports thereon not later than the 15th of the succeeding month; and all sums due as royalty and advance rental shall be a lien on all implements, tools, movable machinery and all other

personal chattels used in operation upon said property, and upon all of the minerals obtained from the land herein leased, but not yet removed therefrom, as security for payment of said sums. An audit of the Lessee's accounts and books shall be made annually or at such times as may be directed by the Area Director by certified public accountants approved by the Secretary of the Interior and at the expense of the Lessee. The Lessee shall furnish free of cost a copy of such audits to the Secretary of the Interior through the Area Director and to the Lessor within thirty (30) days after the completion of such auditing.

(f) REGULATIONS. To abide by and conform to any and all regulations of the Secretary of the Interior now or hereafter in force relative to such leases, PROVIDED, that no regulations hereafter approved shall effect a change in rate of royalty, the annual rental herein specified, or the term of this lease, without the written consent of the parties to this lease.

(g) ASSIGNMENT OF LEASE. Not to assign this lease or any interest therein by an operating agreement or otherwise, nor to sublet any portion of the leased premises, except with the approval of the Secretary of the Interior and the Lessor. If this lease is divided by assignment of an entire interest in any part of it, each part shall be considered a separate lease under all the terms and conditions of the original lease.

(h) BOND. To furnish such bond as may be required by the regulations of the Secretary of the Interior conditioned upon compliance with the terms of this lease.

4. INSPECTION. The leased premises and producing operations, improvements, machinery and fixtures thereon and connected therewith and all books and accounts of the Lessee shall be open at all times for inspection by agents of the Lessor, or any duly authorized representative of the Secretary of the Interior, insofar as may be necessary or desirable in determining amounts to be paid to Lessor hereunder or to determine whether or not Lessee is complying with the terms and provisions of this lease.

5. DISPOSITION OF SURFACE. The lessor expressly reserves the right to lease, sell, or otherwise dispose of the minerals not covered by this lease and the surface of the lands embraced within this lease under existing law or laws hereafter enacted, such disposition to be subject at all times to the right of the Lessee herein to the use of so much of said surface as is necessary in the extraction and removal of the minerals from the land herein described in accordance with this lease.

6. SURRENDER AND TERMINATION. The Lessee shall have the right at any time during the term hereof to surrender and terminate this lease or any part thereof upon the payment of all rentals, royalties and other obligations due and payable to the Lessor, and the further sum of $1.00, upon a showing satisfactory to the Secretary of the Interior and the Lessor that full provision has been made for the conservation and protection of the property, the lease to continue in full force and effect as to the lands not so surrendered. If this lease has been recorded Lessee shall file a recorded release with his application to the Area Director for termination of this lease.

7. CANCELLATION AND FORFEITURE. When, in the opinion of the Secretary of the Interior, there has been a violation of any of the terms and conditions of this lease before restrictions are removed, the Secretary of the Interior shall have the right at any time after thirty (30) days' notice to the Lessee, specifying the terms and conditions violated, and after a hearing, if the Lessee shall so request within thirty (30) days of receipt of such notice, to declare this lease null and void, and the Lessor shall then be entitled and authorized to take immediate possession of the land.

8. HEIRS AND SUCCESSORS IN INTEREST. It is further covenanted and agreed that each obligation hereunder shall extend to and be binding upon, and every benefit hereof shall inure to the heirs, executors, administrators, successors of, or assigns of the respective parties hereto.

9. GOVERNMENT EMPLOYEES CANNOT ACQUIRE LEASE. No lease, assignment thereof, or interest therein will be approved to any employee or employees of the United States Government whether connected with the Indian Service or otherwise, and no employee of the Interior Department shall be permitted to acquire any interest in such leases by ownership of stock in corporations having leases or in any other manner.

10. BUILDING SITES. Unless otherwise permitted in writing by the Secretary of the Interior and the Lessor, not in excess of ten (10) acres will be used by Lessee for the site of buildings.

11. FENCING. It is understood by the parties hereto that any fences constructed by the Lessee shall be restricted to such of the above described lands on which active operations are being conducted which make it necessary or desirable to exclude livestock.

12. ROADS. The Lessee shall have the privilege of constructing and maintaining at its own expense any additional roads or transportation facilities across Lessor's lands that are necessary in carrying on the mining work under this lease provided that the location of such roads be approved in writing by Chairman of Lessor and the Area Director. No part of any such road or roads shall inure to the benefit of the public, and the public shall obtain no rights thereon, but upon termination of this lease for any cause whatsoever or if at any time it shall become unnecessary for Lessee to use any such road for conducting the operations authorized under this lease, the Lessee's right to use said roads shall thereupon cease and all the rights shall revest in the Lessor in accordance with law. The Lessee shall hold the United States and the Lessor harmless and indemnify them against any and all loss or damage which might result from the construction or maintenance by Lessee of said roads in a negligent manner.

Any installations made in connection with roads or transportation facilities by the Lessee may be removed by the Lessee.

13. INDIAN LABOR. The Lessee shall employ Indians, giving priority to the members of the Canoncito Navajo Band, in all positions for which they are qualified and available and shall pay the prevailing wage rates for similar services in the area. The Lessee shall do everything practicable to employ qualified Indians, giving priority to the members of the Canoncito Navajo Band, and their equipment in all hauling of materials under this lease, insofar as Lessee does not use its own equipment for that purpose. Lessee agrees to make special efforts to work Indians giving priority to the members of the Canoncito Navajo Band, into skilled, technical, and other higher jobs in connection with the Permittee's operations under this lease.

14. Lessee shall, and hereby agrees to, indemnify, protect, and save harmless said Lessor and the United States from and against the following specific claims, demands, and damages (and none other) arising out of Lessee's negligence or actionable faults in connection with Lessee's work and operations hereunder, to-wit:

(a) To property of third persons, including Navajo Indians.

(b) To third persons, including Navajo Indians, for injury or death.

(c) To the livestock of the Lessor and its members and to the permanent buildings and structures of the Lessor and its members situate on the property covered by this permit.

(d) Liens or lien claims on account of labor performed upon or material furnished to the property covered by this lease at the instance of the Lessee.

15. Lessee agrees to carry such insurance covering all persons working in or on said property for Lessee as will fully comply with the provisions of the Statutes of the State of New Mexico, covering workmen's compensation and occupational disease, as are now in force or as they may hereafter be changed or amended. Further, Lessee agrees to comply with all of the terms and provisions of all applicable laws of the State of New Mexico and of the United States of America as now exist or as hereafter amended, pertaining to Social Security, Unemployment Compensation, wages, hours and conditions of labor, and to indemnify and hold the Lessor and the United States harmless from payment of any damages occasioned by Lessee's failure to comply with said laws. Lessee shall pay all taxes lawfully assessed against its property or operations.

16. Lessee shall not discriminate against any employee or applicant for employment because of race, creed, color or national origin, and shall require the identical provisions to be included in all subcontracts hereunder.

RECEIVED
JUN 3 0 1995

17. No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this lease or to any benefit that may arise therefrom, but this provision shall not be considered to extend to this lease if made with a corporation for its general benefit.

IN WITNESS WHEREOF we have executed this lease on the date first abovementioned.

RECEIVED
JUN 30 1955

AMENDMENT TO MINERAL PROSPECTING PERMIT

THIS AGREEMENT made and entered into this 19 day of April, 1954 by and between the CANONCITO BAND OF THE NAVAJO TRIBE, hereinafter called the Permittor, and CANONCITO URANIUM CORPORATION, a New Mexico corporation, whose address is P. O. Box 1427, Albuquerque, New Mexico, hereinafter called the Permittee, WITNESSETH:

Recitals

(a) On March 8, 1954 the Acting Area Director, Albuquerque Area Office, Bureau of Indian Affairs, approved a Mineral Prospecting Permit entered into on December 2, 1953 by and between the Canoncito Band of the Navajo Tribe and John Lynes and Samuel C. Johnson, the effective date of said permit being March 8, 1954.

(b) Said Mineral Prospecting Permit was duly assigned by the Permittee named therein to Canoncito Uranium Corporation, a New Mexico Corporation.

(c) The Permittee has requested, as specified in its letter of April 14, 1954 to the General Superintendent, United Pueblos Agency, the inclusion in the aforementioned permit of the following described lands of the permittor in Township 11 North, Range 3 West, N.M.P.M.: W½ Section 25, E½ Section 26 and NE¼ Section 35, a total of 800 acres, more or less.

NOW, THEREFORE, it is agreed by the parties hereto that the aforementioned 800 acres be included in said Mineral Prospecting Permit

RESOLUTION

6237

At a duly called meeting of the Council of the Canoncito Band of the Navajo Tribe on the 19 day of April, 1954 the following resolution was adopted:

BE IT RESOLVED that the Council of the Canoncito Band of the Navajo Tribe hereby consents to the amendment to the Mineral Prospecting Permit held by Canoncito Uranium Corporation on our lands to include in said permit the following additional lands in Township 11 North, Range 3 West: W½ Section 25, E½ Section 26 and NE¼ Section 35, a total of 800 acres, more or less, provided said Canoncito Uranium Corporation pays the sum of $800 for the inclusion of said additional lands in the Mineral Prospecting Permit.

BE IT FURTHER RESOLVED that the Chairman of the Canoncito Band of the Navajo Tribe be and he is hereby authorized to sign said amendment to said Mineral Prospecting Permit.

Witnesses to mark of Chairman

Tom Tracy

Fred Begay

X Raymond Platero
Chairman

Richard Pinto
Member of Council

Charlie Apodaca
Member of Council

approved on March 8, 1954 upon payment by the permittee to the permittor the sum of One Dollar ($1.00) per acre or a total of Eight Hundred Dollars ($800) for the addition of said 800 acres to the permit.

The aforesaid Mineral Prospecting Permit shall remain in full force and effect in all of its terms save and excepting the specific amendment made herein.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands on the 19 day of April, 1954.

CANONCITO BAND OF THE NAVAJO TRIBE

by X Deidine Peaten
Chairman

Witnesses to mark of Chairman:

Tom Francisco

Earl Begay

CANONCITO URANIUM CORPORATION

by John Lynes — President

Edward Oppenheimer — Secretary

Recommended for approval: 4-26, 1954

APPROVED June 16, 1954 (by authority Ind. Office letter 6-11-54)

Guy C. Williams
General Superintendent
United Pueblos Agency
Bureau of Indian Affairs

* *

CONSENT OF SURETY

Consent is hereby given to the foregoing amendment to Mineral Prospecting Permit dated December 2, 1953 by and between the Canoncito Band of the Navajo Tribe and John Lynes and Samuel C. Johnson which permit has been assigned to Canoncito Uranium Corporation, and the Bond to Accompany Mineral Prospecting Permit on form 5-154b dated February 24, 1954 shall continue in full force and effect.

Dated at Albuquerque, New Mexico on the 23 day of April, 1954.

ST. PAUL MERCURY INDEMNITY COMPANY

by Peter F. McCanna
Attorney-In-Fact

UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Indian Affairs

United Pueblos Agency
Box 1346
Albuquerque, New Mexico
June 17, 1952

Mr. Desidero Platero
Chairman, Ganemite Band of the Navajo Tribe
Gorrec, New Mexico

Dear Mr. Platero

Enclosed is check No. 21 of Ganemite Uranium Corporation payable to Chairman Ganemite Navajo Band of Indians in amount of $ 800.00, in payment for bonus payment on addition of 800 acres to Mineral Prospecting Permit. Approved copy of Amendment to Mineral Prospecting Permit is attached for your records.

Sincerely yours,

Harry Minnie
Real Property Officer

Copy to:

Mr. John Lynes
[illegible] Ganemite Uranium Corp.
[illegible] Albuquerque

with approved Amendment to Mineral Prospecting Permit.

UNITED STATES DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

16454

ASSIGNMENT OF MINERAL PROSPECTING PERMIT

WHEREAS, the Acting Area Director, Albuquerque Area Office, and General Superintendent, United Pueblos Agency, Bureau of Indian Affairs, pursuant to authority delegated to him by the Secretary of the Interior and the Commissioner of Indian Affairs, has heretofore approved a Mineral Prospecting Permit dated December 2, 1953, by and between the CANONCITO BAND OF THE NAVAJO TRIBE, permittor, and JOHN LYNES and SAMUEL C. JOHNSON, permittee, and an ASSIGNMENT thereof to CANONCITO URANIUM CORPORATION, a New Mexico corporation having its principal place of business at Albuquerque, New Mexico, and two amendments to said Permit, each dated April 19, 1954, covering the following described lands of the Canoncito Band of the Navajo Tribe in the State of New Mexico, to-wit:

> Approximately 15,790 acres, more or less, in Townships 9, 10, 11, and 12 North, Range 3 West, N.M.P.M., more particularly described in said Mineral Prospecting Permit and the Amendments thereto dated April 19, 1954.

NOW, THEREFORE, for and in consideration of $10.00** *****TEN***** Dollars, the receipt of which is hereby acknowledged, the said Canoncito Uranium Corporation, the owner of the above-described Mineral Prospecting Permit, as amended, hereby bargains, sells, transfers, assigns, and conveys all its right, title, and interest in and to said Mineral Prospecting Permit, as amended, subject to the approval of the Secretary of the Interior or his authorized representative,

to CALUMET & HECLA, INC., a corporation organized and existing under the laws of the State of MICHIGAN and duly authorized to do business in the State of New Mexico, said assignment to be effective from date of approval hereby by the Secretary of the Interior or his authorized representative.

IN WITNESS WHEREOF, the said assignor has hereunto set its hand and seal this 19th day of November, 1954.

CANCENCITO URANIUM CORPORATION

Attest:

/s/ Edward Oppenheimer
Secretary

/s/ John Lynes (President)

(corporate seal)

- -

ACKNOWLEDGEMENT OF CORPORATION

STATE OF NEW MEXICO)
COUNTY OF BERNALILLO) SS.

On this 19th day of November, 1954, before me appeared John Lynes, to me personally known, who, being by me duly sworn, did say that he is the President of Cancencito Uranium Corporation, and that the seal affixed to said instrument is the corporate seal of said corporation and that said instrument was signed and sealed in behalf of said corporation by authority of its board of directors, and said John Lynes acknowledged said instrument to be the free act and deed of said corporation.

Witness my hand and seal on this the day and year first above written.

My commission expires:
April 10, 1958

/s/ James T. Paulaute
Notary Public

Page 3 of Assignment of Mineral Prospecting Permit by Cameneite Uranium Corporation to Calumet & Hecla, Inc.

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior or his authorized representative and the Cameneite Band of the Navajo Tribe, hereby accepts said assignment and agrees to fulfill all the obligations, conditions, and stipulations in said described Mineral Prospecting Permit, as amended, whom assigned, and the rules and regulations of the Secretary of the Interior applicable thereto and to furnish proper bond guaranteeing faithful compliance with said Mineral Prospecting Permit, as amended, and this agreement.

IN WITNESS WHEREOF the said assignee has hereto set its hand and seal this 1st day of December, 1954.

CALUMET & HECLA, INC.

Attest:

/s/ A. E. Petermann
Secretary

by /s/ C. C. Jung
Vice President of Finance (title)

(corporate seal)

- -

ACKNOWLEDGMENT OF CORPORATION

STATE OF Illinois
COUNTY OF Cook } ss.

On this 1st day of December, 1954, before me appeared C. C. Jung, to me personally known, who, being by me duly sworn, did say that he is the Vice President-Finance of Calumet & Hecla, Inc., and that the seal affixed to said instrument is the corporate seal of said corporation and that said instrument was signed and sealed in behalf of said corporation by authority of its board of directors, and said C. C. Jung acknowledged said instrument to be the free act and deed of said corporation.

WITNESS my hand and seal on this the day and year first above written.

My commission expires:
June 4, 1957

/s/ Elizabeth Ann Ryan
Notary Public

APPROVED: (Date) Ap[illegible] 1955

/s/ W. Wade Hind
Area Director (per Commissioner's letter of Jan. 14, 1955)

RESOLUTION

At a duly called meeting of the Council of the Chaconcito Band of the Navajo Tribe on the 17 day of November, 1954, the following resolution was adopted:

BE IT RESOLVED that the Council of the Chaconcito Band of the Navajo Tribe hereby consents to the approval, by the Secretary of the Interior or his duly authorized representative, of an Assignment to Calumet & Hecla, Inc. of the Mineral Prospecting Permit dated December 2, 1953, as amended April 19, 1954, held by Chaconcito Uranium Corporation on approximately 15,790 acres of our tribal land.

Witnesses to marks

Ann M. McCallum

Ellen Platero

Alexander Platero
His Mark

Chairman

Richard Platero
Member of Council

Blanche Platero
Member of Council

Jerrito Platero
Member of Council

No. 4 - [illegible]

JUN 30 1955

BUREAU OF INDIAN AFFAIRS
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12760

MINERAL PROSPECTING PERMIT

THIS AGREEMENT made and entered into this 10 day of August, 1954 by and between Nab-diee Mohagano, also called Matias Mexicano, a widower, - - -

party of the first part, hereinafter called Permittor, whose address is c/o Canoncito Navajo Co-op., Correo, New Mexico and CANONCITO URANIUM CORPORATION, a New Mexico corporation, whose address is P. O. Box 1427, Albuquerque, New Mexico,

party of the second part, hereinafter called the Permittee.

Definitions: As used herein, "Secretary" means the Secretary of the Interior; "General Superintendent" means the General Superintendent of United Pueblos Agency, Box 1346, Albuquerque, New Mexico, or other official in charge of the Indian Agency having jurisdiction over the land.

In consideration of the sum of One Hundred Fifty-nine and 73/100 Dollars ($ 159.73), the receipt of which is hereby acknowledged, and the covenants, stipulations and conditions hereinafter contained, it is agreed:

A. Subject to the limitations hereinafter stated, Permittor grants the Permittee the exclusive right for a period of one year from the date of approval of this permit by the Secretary to prospect for uranium and minerals associated therewith upon the following described allotted lands of Permittor, consisting of 159.73 acres more or less situated in Valencia County, State of New Mexico:

Lots 3, 4, S½NW¼ Section 4, Township 9 North, Range 3 West, N.M.P.M. (Indian Trust Allotment No. 061958).

B. This permit is granted on the following express terms, covenants, and conditions:

1. The Permittee agrees to expend on actual prospecting and exploration work not less than the sum of One Hundred Dollars ($ 100.00). If Permittee fails to expend said amount, Permittee agrees to pay to the General Superintendent for the benefit of Permittor the difference between the sum spent on actual prospecting and exploration work and the sum agreed to be spent, said liquidated damages to be paid on expiration, surrender or termination of this permit.

2. At least thirty (30) days before the end of the first year from the approval of this permit, the Permittee may give notice to the Permittor and General Superintendent that it desires to have said permit renewed for a one-year period, and upon the Permittee submitting to Permittor and the General Superintendent at the time of application for renewal evidence that the sum agreed to be expended on actual prospecting and exploration work during the first year has been or will be spent this permit shall be renewed for a one-year period upon payment to the General Superintendent for the benefit of the Permittor of the same bonus as was paid for the first year (which sum shall be credited on rentals or royalties payable during the second year of the permit on any leases in effect during the second year) AND the expenditure of not less than the same amount on actual prospecting and exploration work as was required during the first year of the permit. If Permittee fails to spend said sum on actual prospecting and exploration work during the second year it agrees to pay to the General Superintendent for the benefit of the Permittor as liquidated damages the difference between the sum expended and the sum agreed to be spent, said liquidated damages to be paid on surrender, termination or expiration of the permit. No refund shall be made of payments for renewal of this permit.

3. The Permittee may, subject to the provisions hereinbefore stated, surrender this permit in writing during the renewal period upon the performance of all of Permittee's obligations hereunder, upon the payment of $1.00 and upon a showing satisfactory to the Permittor and the Secretary that full provision has been made for the conservation and protection of the property. If this permit has been recorded, the Permittee shall file a recorded release with its application for surrender.

4. Permittee shall begin actual prospecting and exploration work within thirty (30) days from the date of approval and receipt by Permittee of the completed instrument and shall diligently prosecute the same in accordance with approved methods unless prevented by strikes, acts of God, or other conditions over which Permittee has no control.

5. Permittee may use existing roads on the land and shall also have the privilege of constructing and maintaining at its expense any additional roads across the land that are necessary in carrying on the actual prospecting and exploration work, PROVIDED that the location of any additional roads be first approved in writing by Permittor and the General Superintendent. No part of any such road or roads shall inure to the benefit of the public which shall obtain no rights thereon, but upon termination of this permit for any cause whatsoever or if at any time it shall become unnecessary for Permittee to use any such road for conducting the operations authorized under this permit or subsequent leases acquired pursuant to this permit the right to use said road shall thereupon cease and all the rights shall revest in Permittor in accordance with law. The Permittee shall hold the Permittor and the United States harmless and indemnify them against any and all loss or damage that might result from the construction or maintenance by Permittee of said roads in a negligent manner.

6. Permittee shall have the right at its own expense to drill and equip water wells on said premises and agrees that at the termination of the permit by expiration of its term or otherwise all wells will be left intact and properly cased. Permittee shall have the right to remove all mechanical pumping equipment installed by it at any wells. If any of said wells shall produce water surplus to the needs of the Permittee, said water shall be available to the Permittor.

7. Permittee shall have the right free of charge to install on the premises power and water lines which may be removed by the Permittee on termination of this permit.

8. Application for rights of way will be made by Permittee pursuant to the requirements of 25 C. F. R. 256.

9. Permittee shall comply with all laws and regulations of competent public authority with reference to such prospecting. Particularly, the Secretary shall have access to all information obtained by the Permittee in carrying out the work hereunder.

10. In the event Permittee discovers a deposit or deposits of ore and desires to work and mine the same and desires a lease thereon, the Permitter will, upon notice from Permittee in writing by registered United States mail, postage prepaid, addressed to Permittor and to the General Superintendent describing the particular land desired, give and grant and the Secretary will, on compliance with the regulations applicable to the issuance of such leases, approve a mining lease on such lands under the terms and conditions provided for in the attached form of lease, which is identified as Exhibit "A".

Leases shall only be granted for lands described by legal sub-divisions or fractions thereof or by survey description PROVIDED that areas of less than ten (10) acres may be included in a lease only if such area has been surveyed. Said parcels need not be contiguous . All leases shall be within the area covered by the permit. Such leases may be requested by Permittee on additional tracts from time to time during the effective period of this permit. Permittee, however, shall include in request for leases only such acreage as is necessary and desirable for the efficient and proper mining operations on the deposit or deposits concerned. All applications for leases must be submitted prior to the expiration or termination of the permit. The maximum acreage that may be taken under lease or leases shall be in accordance with regulations of the Department of the Interior or such additional amount as may be authorized by any waiver of said regulations.

11. Prior to the approval of a lease in favor of Permittee no ores shall be removed except samples for examination or experimental purposes.

12. Before this permit shall become effective, Permittee shall furnish to the General Superintendent an acceptable surety bond in the amount of _____ Dollars ($_____).

13. This prospecting permit is exclusive to Permittee as it is recognized that expenditure of time, money and effort is necessary to prospect the property properly and systematically in which Permittee should be protected, if valuable deposits are found. No other permit or right for the minerals covered hereby shall be given to anyone else on any unsurrendered portion of the lands covered by this permit so long as this permit is in effect.

14. The Permittee shall employ Indians, giving priority to the Permitter and other members of his Band or Tribe in all positions for which they are qualified and available and shall pay the prevailing wage rates for similar services in the area. The Permittee shall do everything practicable to employ qualified Indians, giving priority to Permittor and other members of his Band or Tribe, and their equipment in all hauling of materials under the permit and any leases taken and any work done thereunder, insofar as Permittee does not use its own equipment for that purpose. Permittee agrees to make special efforts to work Indians, giving priority to Permittor and other members of his Band or Tribe, into skilled, technical, and other higher jobs in connection with the Permittee's operations under the permit and leases taken hereunder.

15. The Permittee agrees that on termination of operations under this permit or leases taken thereunder it will make provisions for conservation and protection of the property and leave all of the areas on which it has worked in a condition that will not be hazardous to life or limb.

16. Permittee shall, and hereby agrees to indemnify, protect, and save harmless said Permittor and the United States of America from and against the following specific claims, demands and damages arising out of Permittee's negligence or actionable faults in connection with Permittee's work and operations, hereunder, to-wit:

(a) To property of Permittor and third persons.

(b) To Permittor and third persons for injury or death.

(c) To the livestock of the Permittor and others and to the permanent buildings and structures of the Permittor situated on the property covered by this permit.

7-21-54 Allotted

(d) Liens or lien claims on account of labor performed upon or material furnished to the property covered by this permit at the instance of the Permittee.

17. Permittee agrees to carry such insurance covering all persons working in,on, or in connection with said property for Permittee as will fully comply with the provisions of the statutes of the State of New Mexico, covering workmen's compensation and occupational disease, as are now in force or as they may hereafter be changed or amended. Further, Permittee agrees to comply with all of the terms and provisions of all applicable laws of the State of New Mexico and of the United States of America as now exist or as hereafter amended, pertaining to Social Security, Unemployment Compensation, wages, hours and conditions of labor, and to indemnify and hold Permittor and the United States harmless from payment of any damages occasioned by Permittee's failure to comply with said laws. Permittee shall pay all taxes lawfully assessed against its property or operations.

18. The Permittor expressly reserves the right to use, lease, sell or otherwise dispose of the minerals not covered by this permit and the surface of the lands embraced within this permit under existing laws or laws hereafter enacted. Such disposition and use shall be subject at all times to the rights of the Permittee under this permit.

19. When in the opinion of the Secretary there has been a violation of any of the terms and conditions of this permit or the applicable regulations, the Secretary shall have the right at any time after thirty days notice to the Permittee, specifying the violations and after a hearing if the Permittee shall so request within thirty days of receipt of notice, to declare this permit null and void.

20. Permittee shall not knowingly permit any nuisance to be maintained on the premises nor consent to any intoxicating liquor being sold or given away for any purpose on such premises and agrees not to use said premises for any purpose other than those authorized in this permit.

21. Permittee shall not discriminate against any employee or applicant for employment because of race, creed, color or national origin and shall require an identical provision to be included in all subcontracts hereunder.

7 21-54 Allotted

22. The Permittee agrees not to assign this permit or any interest therein by an operating agreement or otherwise, nor to sublet any portion of the permitted premises, except with the approval of the Secretary and the Permitter.

23. No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this permit or to any benefit that may arise therefrom, but this provision shall not be considered to extend to this permit if made with a corporation for its general benefit.

IN WITNESS WHEREOF we have executed this permit on the date first abovementioned.

+

Nah-dieo Mahagano, also called Matias Mexicano, widower

APPROVED Oct. 13, 1954 pursuant authority Indian Office letter 10-6-54:

Guy C. Williams
General Superintendent
United Pueblos Agency

CANONCITO URANIUM CORPORATION

By John Lynes
President

ATTEST:
Edward Oppenheimer
Secretary

CORPORATE SEAL

Recommended for Approval:
Guy C. Williams

A.M. McCullom
Tony Chavez

7-21-54 Allotted

EXHIBIT "A"

UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Indian Affairs

MINING LEASE - ALLOTTED INDIAN LANDS
(For Uranium and other Minerals Associated Therewith)

_____

THIS INDENTURE OF LEASE, made and entered into in quintuplicate this _____ day of _____, 195__ by and between _____ whose address is _____, designated herein as "Lessor" and _____ _____ whose address is _____, herein designated as "Lessee", WITNESSETH:

1. That the Lessor, for and in consideration of $1.00 receipt whereof is hereby acknowledged, and of the royalties, covenants, stipulations and conditions hereinafter contained and hereby agreed to be paid and observed by the Lessee, doth hereby demise, grant and lease unto the said Lessee, the following described tract of land lying in _____ County, State of New Mexico, to-wit:

for the full term of 15 years from the date of approval hereof, for the sole purpose of prospecting for and mining minerals, as follows: uranium and other minerals associated therewith, the lessee to occupy so much only of the surface of said land as may be reasonably necessary to carry on the work of prospecting for, mining, milling, storing and removing such minerals.

2. As used herein, the term "Secretary" shall refer to the Secretary of the Interior or his authorized representative; General Superintendent shall refer to the General Superintendent of United Pueblos Agency, Box 1346, Albuquerque, New Mexico or other official in charge of the Indian Agency having jurisdiction over the lands leased.

Wherever used in this document the word "ore" shall mean only the ore of uranium and other minerals associated therewith; and the words "ores mined and sold" or similar words shall be construed and understood to mean ores mined and removed from the demised premises for the purposes of milling, treatment, stock-piling or other disposition, and not that ores must be sold as such.

3. In consideration of the foregoing, the Lessee hereby agrees:

(a) ROYALTY. To pay, or cause to be paid, to the _____

General Superintendent for the use and benefit of the Lessor

_____

as royalties the sums of money as follows, to-wit:

On any ores mined and sold by Lessee from the demised property, Lessee agrees to pay a percentage royalty of the mine value per dry ton as set forth in the following percentage royalty schedule:

PERCENTAGE ROYALTY SCHEDULE

Mine Value per Dry Ton	Royalty Percentage of Mine Value per Dry Ton
$ 0.01 to $ 10.00 inclusive	10%
10.01 to 20.00 "	11%
20.01 to 30.00 "	12%
30.01 to 40.00 "	13%
40.01 to 50.00 "	14%
50.01 to 60.00 "	15%
60.01 to 70.00 "	16%
70.01 to 80.00	17%
80.01 to 90.00	18%
90.01 to 100.00 "	19%
100.01 or more	20%

"MINE VALUE PER DRY TON", wherever used herein, is hereby defined as the dollar value per dry ton of crude ores at the mine as determined by the application to the valuable metal content of such ore of the price schedules for such ores established and currently in effect by the Atomic Energy Commission or other government authorized agencies before allowance for transportation and development. It is specifically understood that any mine production bonuses shall be included in the "mine value per dry ton". However, if the Government at any time hereafter does not establish or have in effect a price schedule for the purchase of such ores on a fixed or scheduled dollar value per dry ton of crude ores at the mine, or said ores contain salable minerals, some, or all, of which are disposed of to a custom treatment plant or smelter for the treatment and beneficiation of uranium bearing ores to be mined in the Grants and other districts of New Mexico, then mine value per dry ton shall be the gross value per dry ton of said crude ores as paid for by the Atomic Energy Commission, or other Government authorized agency, mill or other buyer, less any allowances or reimbursements for the following specific items

(1) Transportation of ores.

(2) Allowances paid to Lessee by the Atomic Energy Commission or other Government authorized agency for exploration for or development of ores.

(3) Treatment or beneficiation of ores.

which specific items shall, in such event, be deducted from the gross sale price received from the metal content of said ores by the seller before said percentage royalty is calculated and paid. Any cost of treatment or beneficiation shall be the actual cost without any milling profit. It is specifically understood that any mine production bonuses shall be included in the mine value per dry ton.

Lessee agrees to pay the above percentage royalty payments on or before the fifteenth (15th) day of the month next following the removal from the demised premises, weighing and sampling by lessee of said ores, and lessee shall attach to each such payment made a statement of the mine value of said ores and the amount of royalty due on each lot so removed.

The royalty provisions of this lease will be subject to reasonable adjustment at the end of ten years, such adjustment being based upon market conditions as supported by evidence from the field, and subject to the approval of the Secretary of the Interior or his authorized representative.

(b) ANNUAL RENTAL. To pay, or cause to be paid, to General Superintendent for use and benefit of the Lessor in advance beginning with the date of approval of the lease, as annual rental $1.00 per acre for the first calendar year or fraction thereof and $1.00 per acre per annum in advance for each and every calendar year thereafter during the continuance of the lease, it being understood and agreed that said sum so paid shall be a credit on the royalties accruing during the year for which the payment of annual rental is made and that said annual rental when paid shall not be refunded to the Lessee because of any subsequent surrender or cancellation hereof.

(c) DILIGENCE, PREVENTION OF WASTE. To exercise diligence in the conduct of the prospecting and mining operations; to carry on development and operations in a workmanlike manner, and to the fullest extent possible, consistent with good mining practice; to commit no waste on said land, and to suffer none to be committed upon the portion [illegible] occupancy or use; to comply with all the requirements and the laws of the State in which the land is located; to take appropriate steps for the preservation of the property and the health and safety of the workmen; promptly to surrender and return the premises upon the termination of this lease to whomsoever shall be lawfully entitled thereto in as good condition as received, except for the ordinary wear

and tear and unavoidable accidents in their proper use and charges which may be due to the proper mining and use of the same under this lease. Lessee may, upon any termination, move and remove, within sixty (60) days all tools, machinery, equipment and improvements placed thereon by it, providing the payments agreed upon by the Lessee have been made and the lease terms and provisions applicable thereto have been fully complied with; provided, however, that Lessee, at the request of Lessor, shall not remove any roads or appurtenances thereto, fences or casing in water wells which may be necessary and desirable to continue the same as a producing well, not to permit any nuisance to be maintained on the premises under Lessee's control, nor allow any intoxicating liquors to be sold or given away for any purpose on such premises and not to use such premises for any other purposes than those authorized in this lease.

(d) DEVELOPMENT. The land described herein shall not be held by the Lessee for speculative purposes, but in good faith for mining the minerals specified; and the failure by the Lessee in the diligent development and continued operation of the mine or mines, except when operations may be interrupted by strikes, the elements or casualties not attributable to the Lessee, shall be held as a want of compliance with the purposes of this lease and shall render it subject to cancellation. Provided, that whenever the Secretary shall consider the marketing facilities inadequate or the economic conditions unsatisfactory, he may after consultation with the Lessor authorize the suspension of operations for such time as he may deem advisable, but such action will not release the Lessee from the payment of the advance annual rental.

(e) MONTHLY STATEMENTS. To keep an accurate account of all mining operations, and in the case of all ores mined and removed and not sold in the form of crude ores to third parties but title to which is retained by Lessee, to show the whole amount of such ores and minerals mined and the valuation thereof for royalty purposes under the terms of this Lease; in the case of ores which are sold or otherwise disposed of to third parties and title to which is not retained by Lessee to keep an accurate account of all mining operations, showing the sales, [illegible] dates, purchasers and the whole amount of [illegible] obtained, the [illegible] removed and the gross receipts derived therefrom, and [illegible] other [illegible] to furnish the General Superintendent and the Lessor sworn monthly reports thereon not later than the 15th of the succeeding month; and all [illegible] due as royalty and advance rental shall be a lien on all implements,

tools, movable machinery and all other personal chattels used in operation upon said property, and upon all of the minerals obtained from the land herein leased, but not yet removed therefrom, as security for payment of said sums. An audit of the Lessee's accounts and books shall be made annually or at such times as may be directed by the General Superintendent by certified public accountants approved by the Secretary and at the expense of the Lessee. The Lessee shall furnish free of cost a copy of such audits to the Secretary through the General Superintendent and to the Lessor within thirty (30) days after the completion of such auditing.

(f) REGULATIONS. To abide by and conform to any and all regulations of the Secretary now or hereafter in force relative to such leases, PROVIDED, that no regulations hereafter approved shall effect a change in rate of royalty, the annual rental herein specified, or the term of this lease, without the written consent of the parties to this lease.

(g) ASSIGNMENT OF LEASE. Not to assign this lease or any interest therein by an operating agreement or otherwise, nor to sublet any portion of the leased premises, except with the approval of the Secretary and the Lessor. If this lease is divided by assignment of an entire interest in any part of it, each part shall be considered a separate lease under all the terms and conditions of the original lease.

(h) BOND. To furnish such bond as may be required by the regulations of the Secretary conditioned upon compliance with the terms of this lease.

4. INSPECTION. The leased premises and producing operations, improvements, machinery and fixtures thereon and connected therewith and all books and accounts of the Lessee shall be open at all times for inspection by the Lessor and the Secretary insofar as may be necessary or desirable in determining amounts to be paid to Lessor hereunder or to determine whether or not Lessee is complying with the terms and provisions of this lease.

5. DISPOSITION OF SURFACE. The lessor expressly reserves the right to use, lease, sell, or otherwise dispose of the minerals not covered by this lease and the surface of the lands embraced within this lease under existing law or laws hereafter enacted, such

disposition to be subject at all times to the right of the Lessee herein to the use of so much of said surface as is necessary in the extraction and removal of the minerals from the land herein described in accordance with this lease.

6 SURRENDER AND TERMINATION. The Lessee shall have the right at any time during the term hereof to surrender and terminate this lease or any part thereof upon the payment of all rentals, royalties and other obligations due and payable hereunder and the further sum of $1.00, upon a showing satisfactory to the Secretary and the Lessor that full provision has been made for the conservation and protection of the property, the lease to continue in full force and effect as to the lands not so surrendered. If this lease has been recorded Lessee shall file a recorded release with his application to the General Superintendent for termination of this lease.

7 CANCELLATION AND FORFEITURE. When in the opinion of the Secretary, there has been a violation of any of the terms and conditions of this lease or of the applicable regulations before re-[illegible] are [illegible], the Secretary shall have the right at any time after thirty (30) days' notice to the Lessee specifying the terms [illegible] violated and after a hearing, if the Lessee shall so request within thirty (30) days of receipt of such notice, to declare the lease null and void and the Lessee shall then be entitled and [illegible] to the same compensation as [illegible].

8 RELINQUISHMENT BY LESSEE OR REMOVAL BY THE SECRETARY. [illegible] the life of this instrument, [illegible] the acreage covered herein [illegible] said Secretary shall [illegible] requirements are [illegible] payments due hereunder [illegible] has been exercised [illegible] subject to the follow-[illegible]

[illegible] accruing shall be paid [illegible]

[illegible] relinquished by the Secretary [illegible] this lease, Lessee shall have made all [illegible] shall have fully performed all

obligations on its part to be performed up to the time of such relinquishment, then the bond given to secure the performance hereof, on file in the Indian Office, shall be of no further force or effect.

9. HEIRS AND SUCCESSORS IN INTEREST. It is further covenanted and agreed that each obligation hereunder shall extend to and be binding upon, and every benefit hereof shall inure to the heirs, executors, administrators, [illegible] and assigns of the respective parties hereto.

10. [illegible] SUBLEASE. No lease, assignment thereof or sublease hereof shall be approved to any employee or employees of the Indian Service connected with the Indian Service or otherwise, and no employee of the Bureau of Indian Affairs shall be permitted to [illegible] in such lease by [illegible] of stock in [illegible].

11. [illegible]. It is understood and [illegible] that any [illegible] by the Lessee shall be [illegible] by part of the [illegible] which either [illegible] the [illegible] destruction [illegible].

12. [illegible]. Lessee may use [illegible] roads, if any on the [illegible] other lands, the privilege of constructing and maintaining [illegible] roads across the land that [illegible] necessary [illegible] under this lease provided that the [illegible] of any additional roads be first approved in writing by Lessee and the Superintendent. The cost of any such road or roads [illegible] by the Lessee of the parties which shall obtain the rights [illegible] for any cause [illegible] or [illegible] roads necessary for Lessee in the exercise of the rights and operations authorized under this lease. The Lessee's right of use such roads shall terminate upon lease and all the roads shall revert to the Lessor in accordance with law. The Lessee [illegible] and the Lessee hereby [illegible] and indemnifies [illegible] any and all loss or damage which might result from the construction or maintenance by Lessee of said roads in accordance [illegible].

13. [illegible]. The Lessee shall employ Indians, giving preference to the Lessor and other members of the Band of Tribe in the [illegible] for which they are qualified and available and shall pay [illegible] prevailing wage rates for similar services in the area. The

[redacted]

7-21-54 Allotted

16. Lessee shall not discriminate against any employee or applicant for employment because of race, creed, color or national origin, and shall require the identical provisions to be included in all subcontracts hereunder.

17. No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this lease or to any benefit that may arise therefrom, but this provision shall not be considered to extend to this lease if made with a corporation for its general benefit.

IN WITNESS WHEREOF we have executed this lease on the date first abovementioned.

Mr. W. R. Griswold, DMEA

Room - 4060

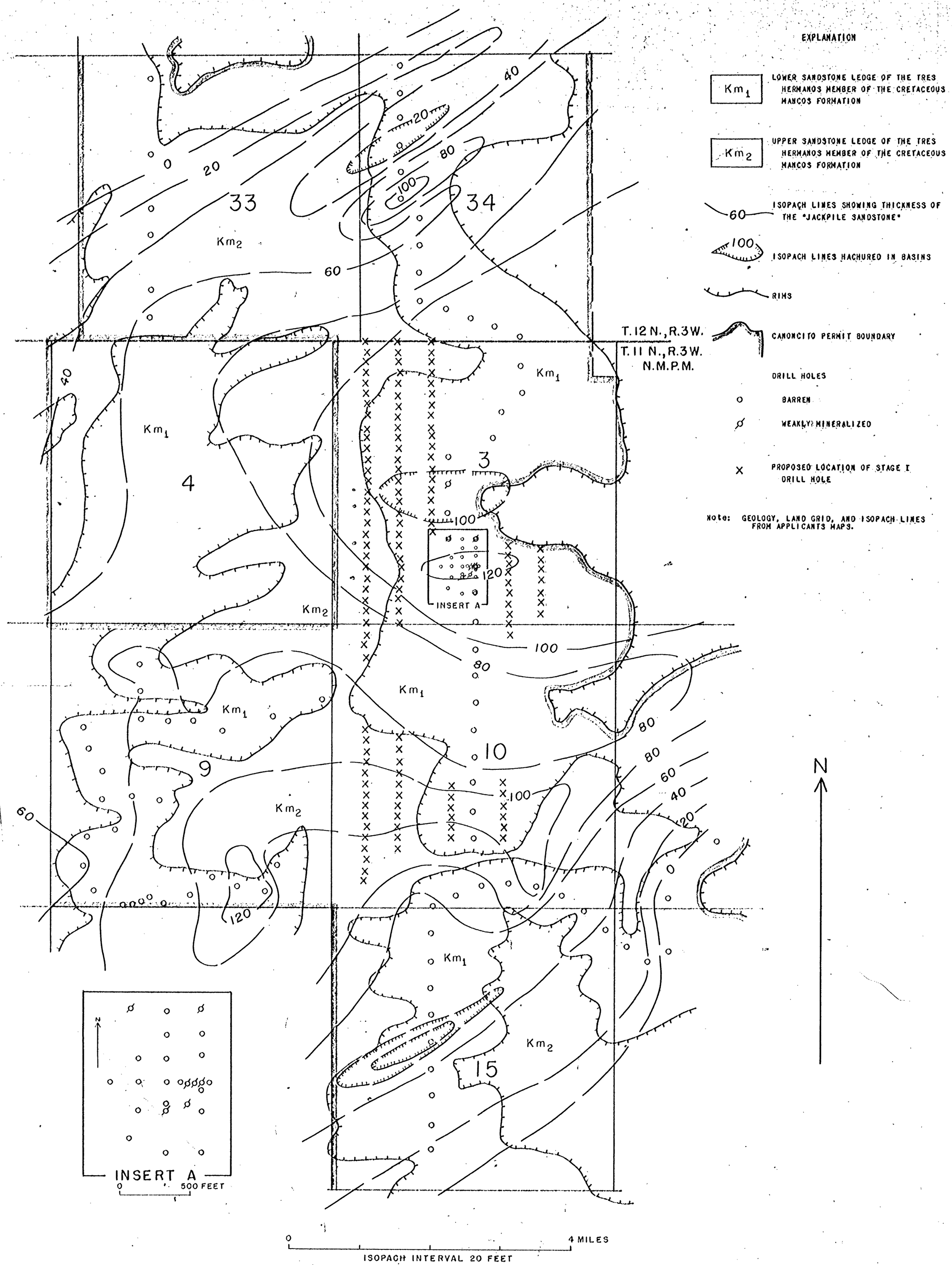
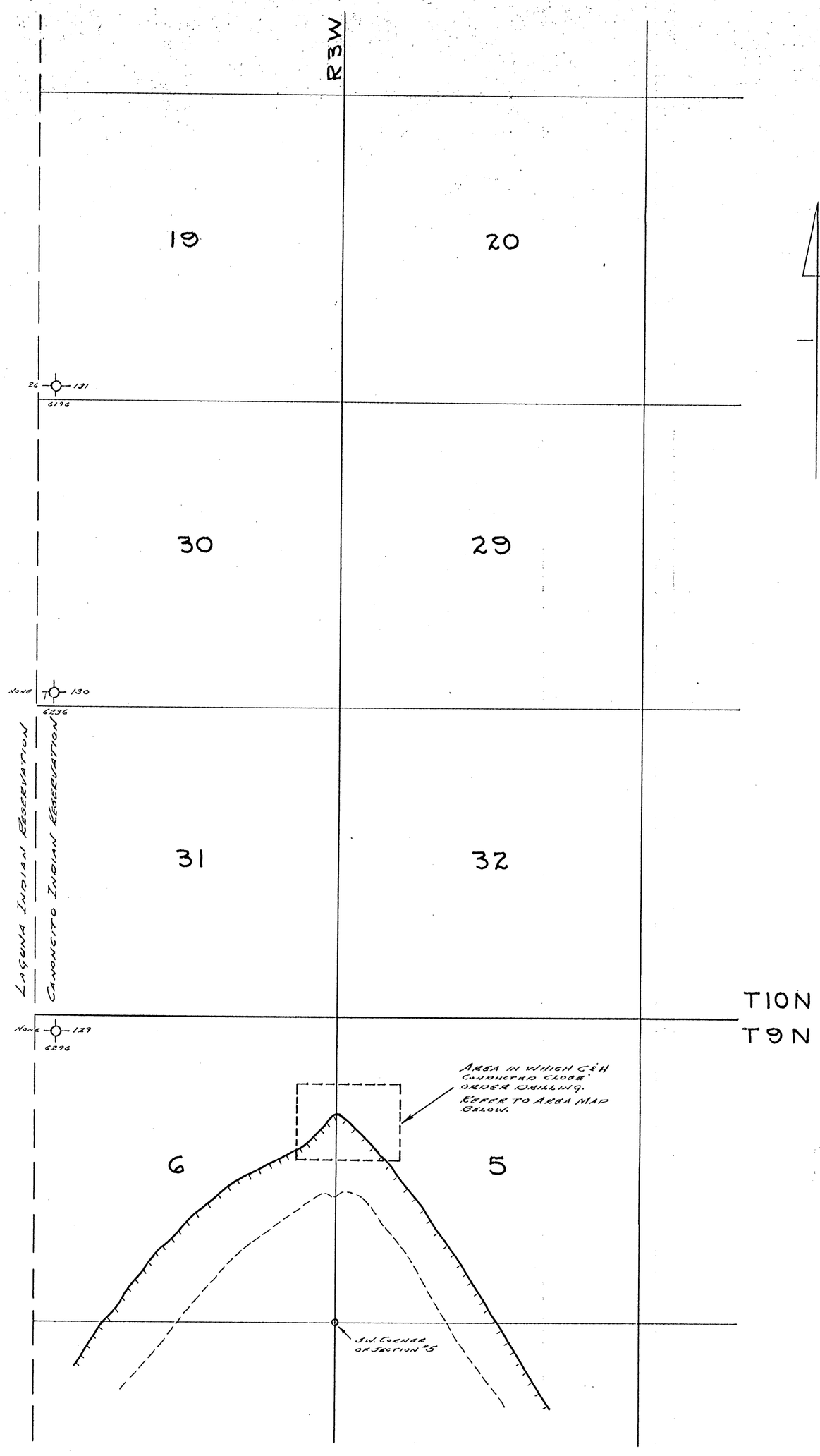
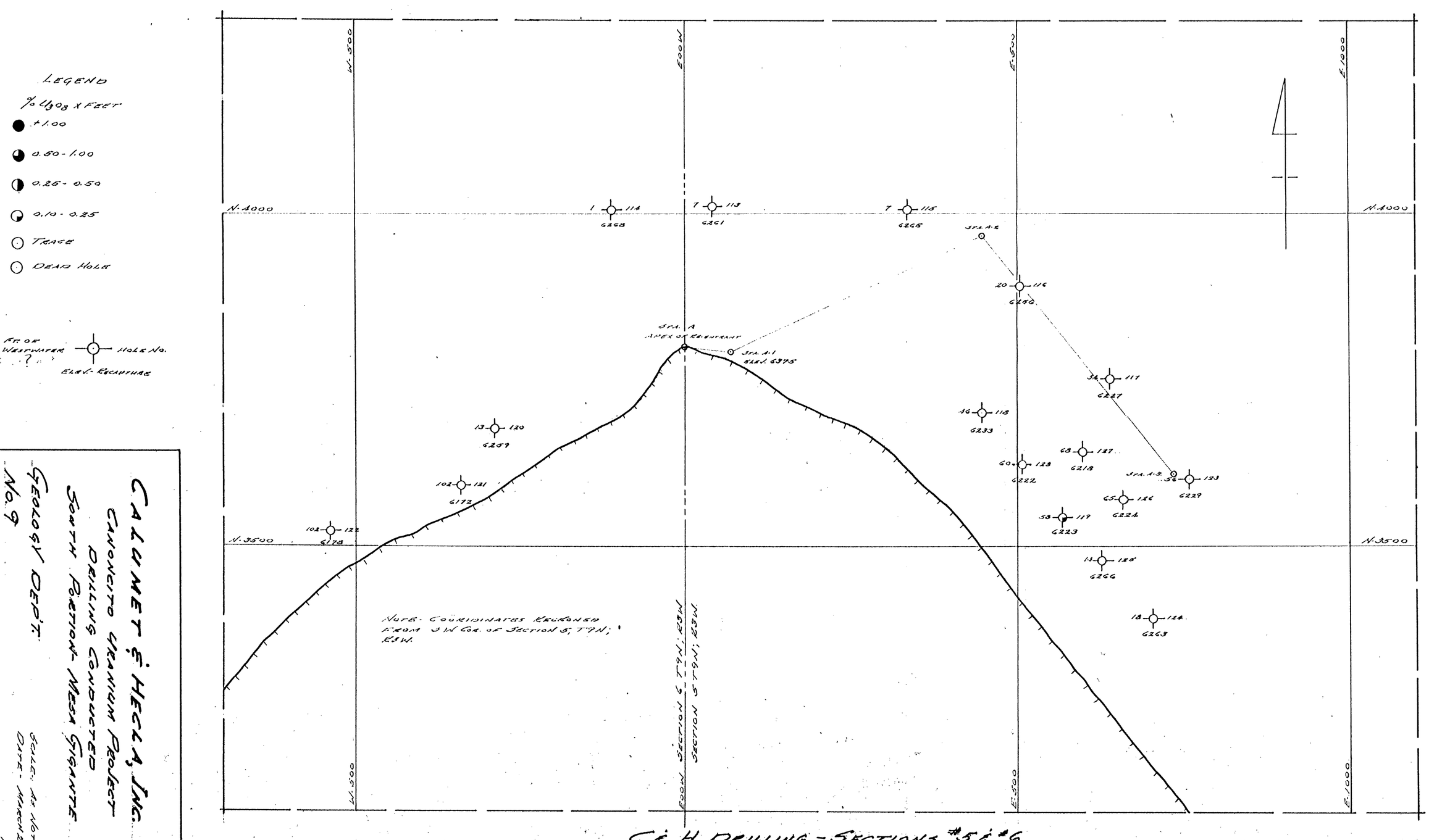


Figure 3. GEOLOGIC AND ISOPACHOUS MAP OF PART OF THE CANONCITO PERMIT AREA, SHOWING PREVIOUSLY DRILLED HOLES AND PROPOSED STAGE I DRILL HOLES, CALUMET AND HECLA INC., SANDOVAL, BERNALILLO, AND VALENCIA COUNTIES, NEW MEXICO



MAP SHOWING C&H DRILLING CONDUCTED ON SOUTH PORTION OF MESA GIGANTE

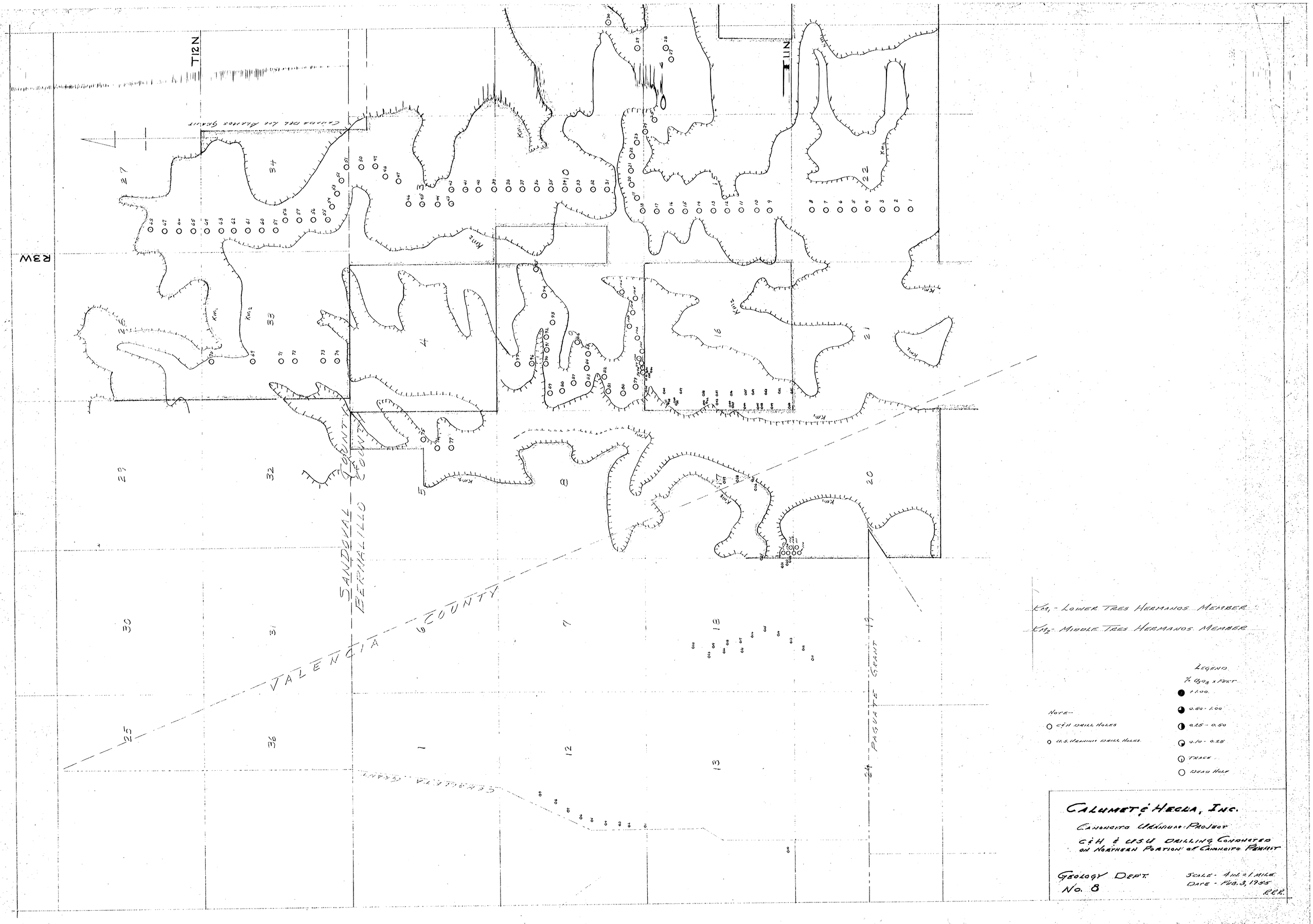
SCALE - 4 IN. = 1 MILE

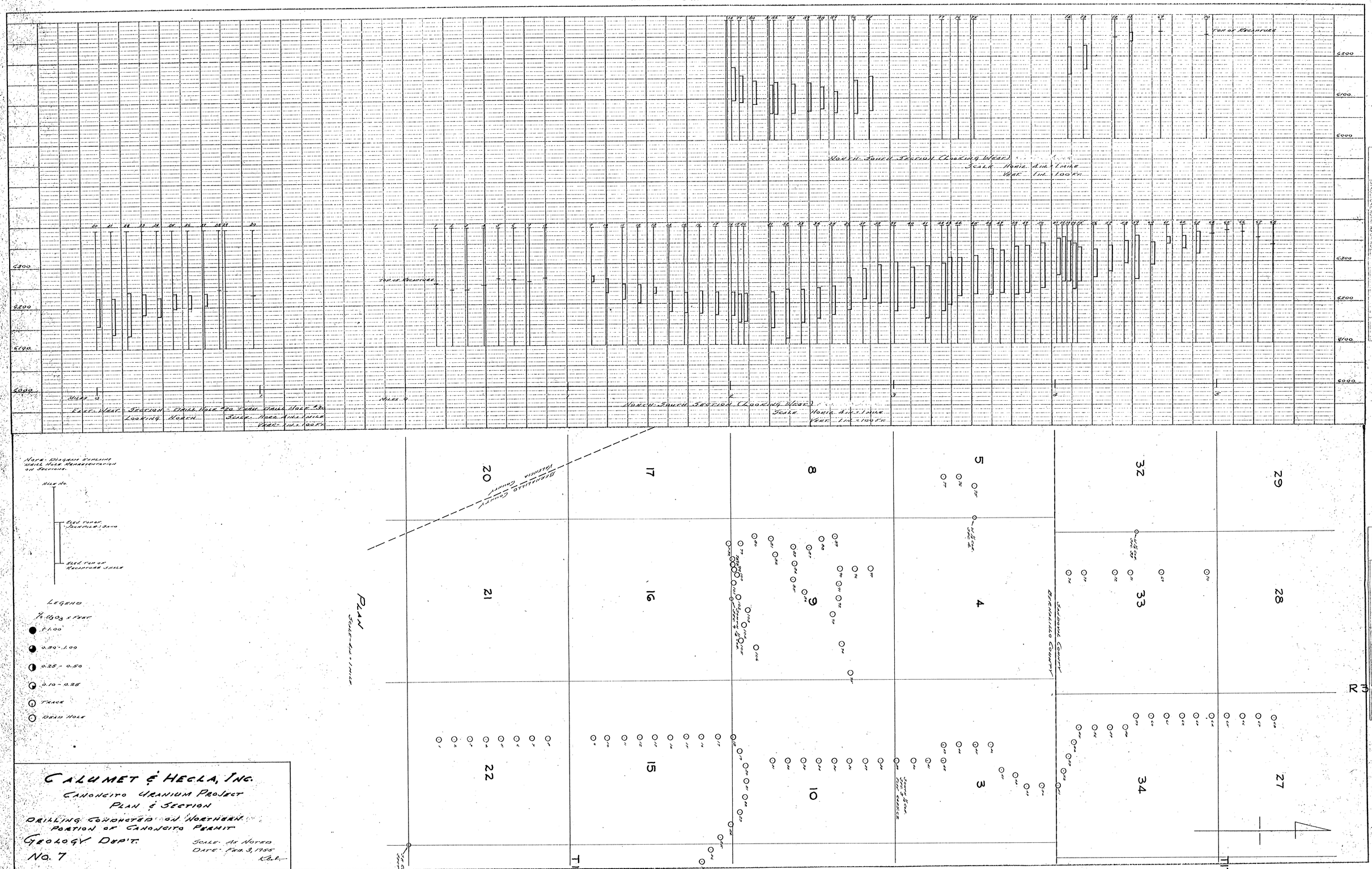


C&H DRILLING - SECTIONS #5 & #6

SCALE 1 IN. = 100 FT.

CALUMET & HECLA, INC.
CANONCITO URANIUM PROJECT
DRILLING CONDUCTED
SOUTH PORTION MESA GIGANTE
GEOLOGY DEP'T.
No. 9
SCALE: AS NOTED
DATE: MARCH, 1955


T12N
T11N
R3W
Cañada del Los Alamos Grant
Km1
Km2
SANDOVAL COUNTY
BERNALILLO COUNTY
VALENCIA COUNTY
CEBOLLETA GRANT
PAGUATE GRANT
Km1 - LOWER TRES HERMANOS MEMBER
Km2 - MIDDLE TRES HERMANOS MEMBER
LEGEND
% U3O8 x FEET
+1.00
0.50 - 1.00
0.25 - 0.50
0.10 - 0.25
TRACE
DEAD HOLE
NOTE-
C&H DRILL HOLES
U.S. URANIUM DRILL HOLES
CALUMET & HECLA, INC.
CANONCITO URANIUM PROJECT
C&H & USU DRILLING CONDUCTED ON NORTHERN PORTION OF CANONCITO PERMIT
GEOLOGY DEP'T
No. 8
SCALE - 4 in = 1 MILE
DATE - FEB. 3, 1955
RRR.



CALUMET & HECLA, INC.

CANONCITO URANIUM PROJECT

PLAN & SECTION

DRILLING CONDUCTED ON NORTHERN PORTION OF CANONCITO PERMIT

GEOLOGY DEP'T.

No. 7

SCALE: AS NOTED

DATE: FEB. 3, 1955

K.L.L.

PLATE I - PLAN-PROFILE. DR. F. A. E. STANCRAB

REPRO. A. HOOF CO. NEW YORK

PROFILE

SURVEYED

NOTE BOOK PLOTTED

NO. CALCULATED

PLANIMETERED

IN NOTES

STRUCTURE CONTOURS DRAWN

BY

DATE

PLAN

SURVEYED

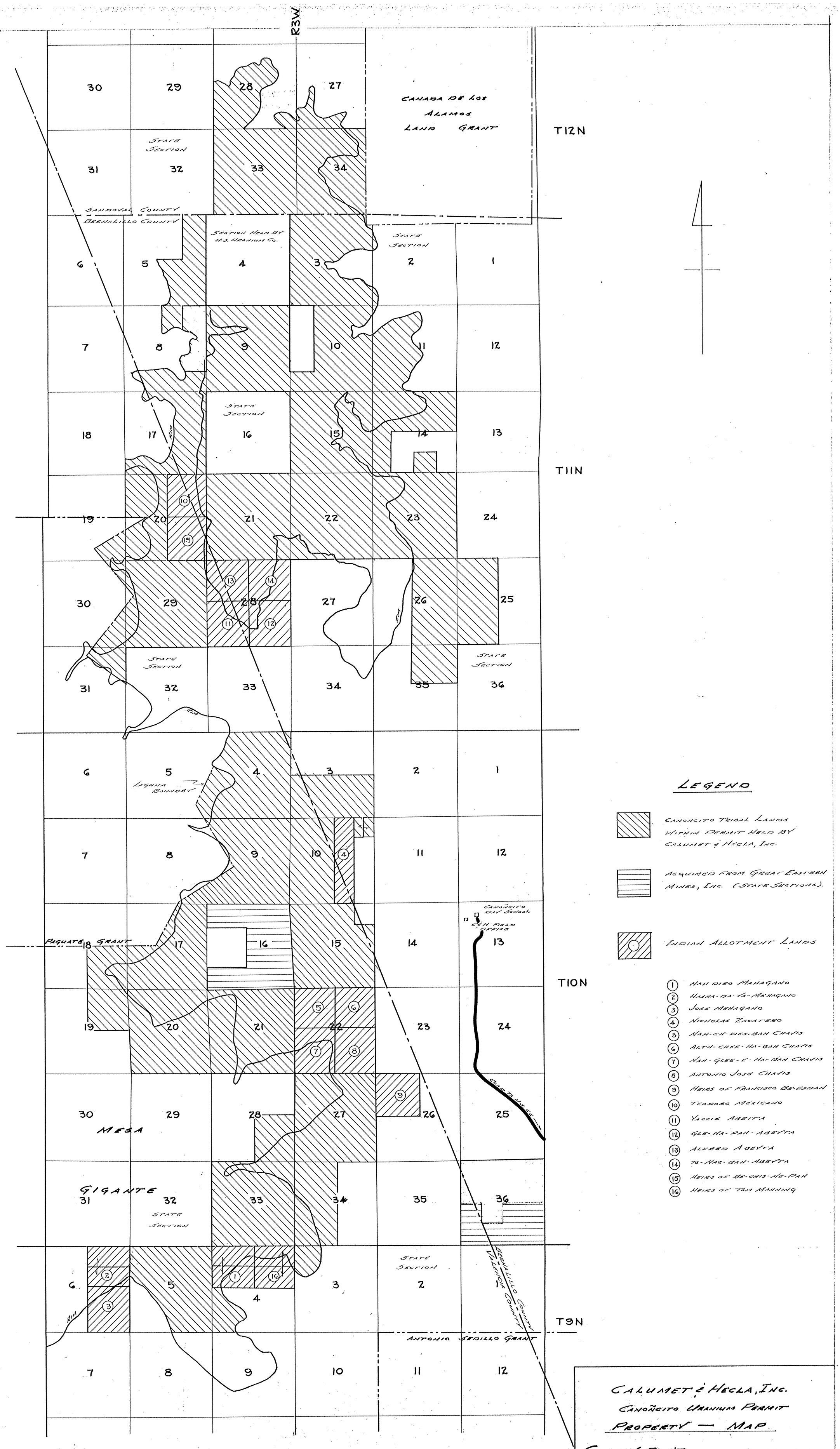
NOTE BOOK PLOTTED

NO. CALCULATED

AT ON WAY CHECKED

BY

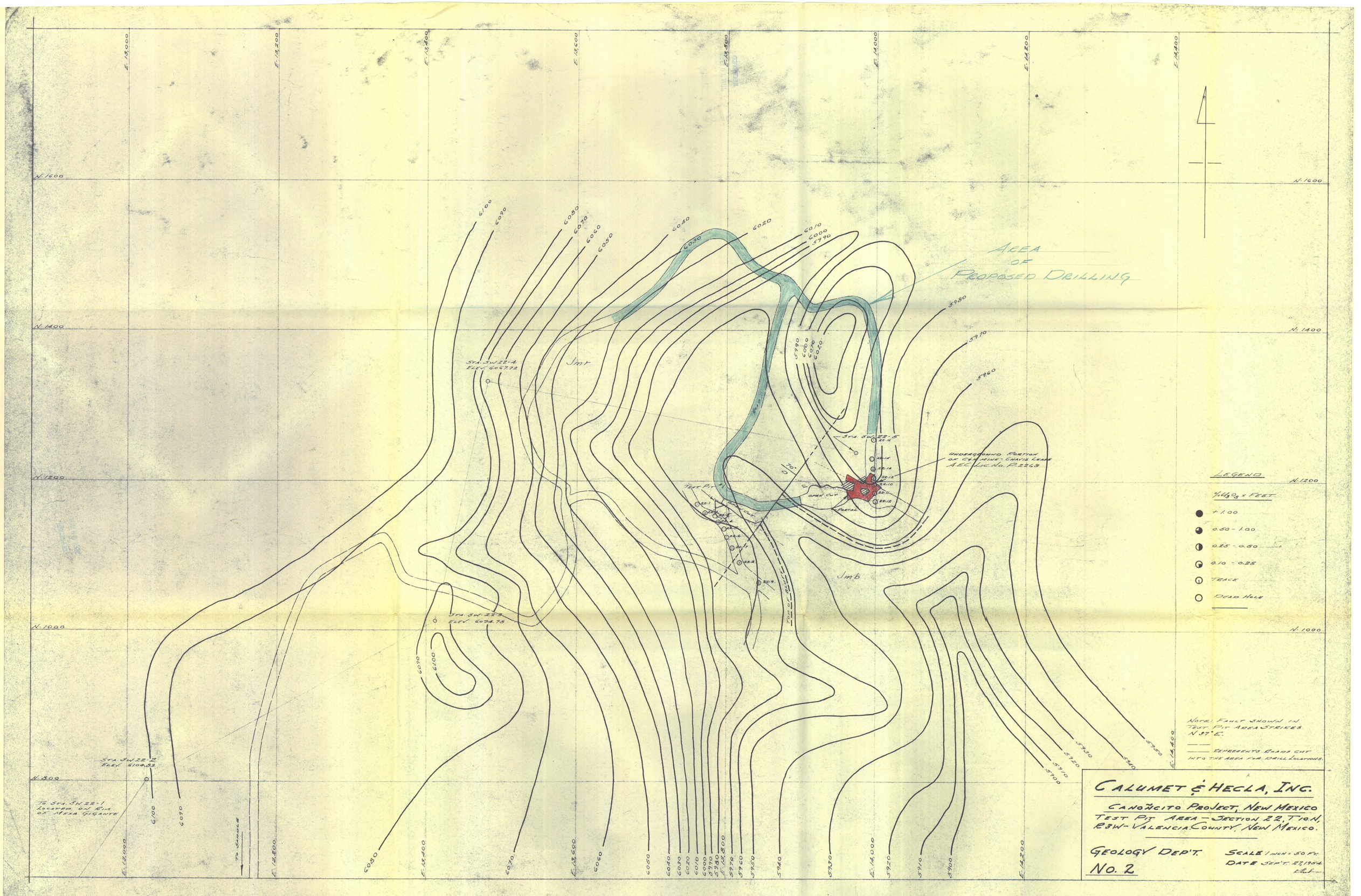
DATE

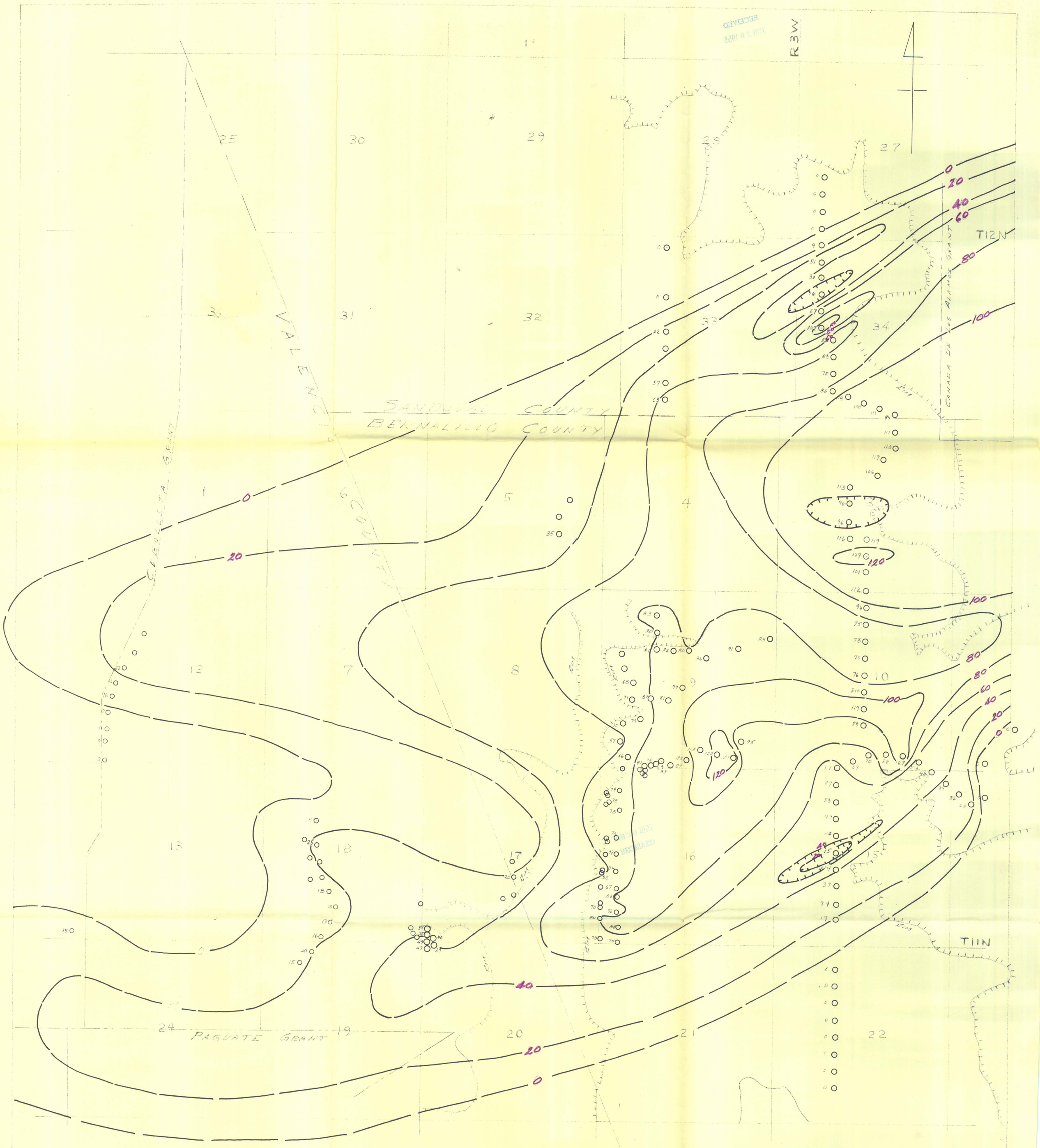


CALUMET & HECLA, INC.
CANOÑCITO URANIUM PERMIT
PROPERTY — MAP

GEOLOGY DEP'T.
No. 11

SCALE: 2IN = 1MILE
DATE: MARCH 22, 1955
ENG & ERR.


E. 13,000
E. 13,200
E. 13,400
E. 13,600
E. 13,800
E. 14,000
E. 14,200
E. 14,400
N. 1600
N. 1400
N. 1200
N. 1000
N. 800
AREA OF PROPOSED DRILLING
Jmt
Jmb
Sta SW 22-4
ELEV. 6067.72
Sta SW 22-5
Sta SW 22-3
ELEV. 6034.13
Sta SW 22-2
ELEV. 6104.33
To Sta SW 22-1 Located on Rim of Mesa Gigante
To Scale
Test Pit #1
Open Cut
Portal
Underground Portion of Calumet-Chavis Lease A.E.C. Lic. No. P-2263
LEGEND
% U_3O_8 x FEET
+1.00
0.50 - 1.00
0.25 - 0.50
0.10 - 0.25
Trace
Dead Hole
Note: Fault shown in Test Pit Area strikes N 37° E.
Represents roads cut into the area for drill locations.
CALUMET & HECLA, INC.
Canoncito Project, New Mexico
Test Pit Area — Section 22, T10N, R3W - Valencia County, New Mexico.
Geology Dep't.
No. 2
Scale 1 inch = 50 Ft.
Date Sep't. 27, 1954



—20— ISOPACH OF JACKPILE SANDSTONE

CALUMET & HECLA, INC.

CANOÑCITO URANIUM PROJECT

ISOPACH MAP - DRILLING CONDUCTED ON NORTHERN PORTION OF CANOÑCITO PERMIT

GEOLOGY DEP'T.

No. 12

SCALE - 4 IN. = 1 MILE

DATE - FEB. 3, 1955

R.R.R. & R.W.K.