700

FILE COPY
Surname:

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

JUN 28 1956

Mr. Elbert Norton
200 South Meldrum Street
Fort Collins, Colorado

Re: Docket No. DMEA-4227 (Uranium)
Wahketa Mine
Larimer County, Colorado

Dear Mr. Norton:

Your application for aid in an exploration project and other information available to us in Washington concerning the 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 the presence of low-grade 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. Such denial, however, is made without prejudice to the property. In the event further work on your part discloses new and more favorable evidence of worthwhile ore deposition on the property, we shall be pleased to consider a new application.

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

Sincerely yours,

G. O. Mittendorf

Administrator

MChing/ai/izm 6-26-56
cc to: Docket
Code 700
Mr. Ching
Admr.'s Reading File
Operating Committee
DMEA Field Team, Region III (2)
Messrs. JECrawford, Rm. 3643
THKiilsgaardm Rm. 5224
JOHosted, Rm. 3210, GSA

Ching
Ellis

June 25, 1956

SUMMARY OF PROPOSED PROJECT

Object: Denial of application for an exploration project.

Docket No.: DMEA-4227

Commodity: Uranium

Applicant: Elbert Norton
200 South Meldrum Street
Fort Collins, Colorado

Property: Lots 1, 2, and 3, sec. 18, T. 8 N., R. 69 W. 6th P.M. & B. Larimer County, Colorado. The property is known as the Wahketa Mine.

Date of Application: March 19, 1956.

Amount of Application: $ 20,399.00

Work Proposed: The applicant's program was rather indefinite. It includes proposals to extend an existing drift northward by 100 feet, crosscut from the old drift a distance of 40 feet to the east, drill test holes along the tunnel walls, roof, and floor, and bulldoze five open cuts at various intervals along the crest of the Dakota hogback. Estimated costs follow:

Labor, supervision, consultants	$ 9,276.00
Operating materials and supplies	2,858.00
Operating equipment	5,050.00
New buildings and installations	1,050.00
Miscellaneous	2,165.00
Total	$ 20,399.00
Government participation at 75%	$ 15,299.25

Report of Examination: May 21, 1956.
R. Vickers and G. Izett, USGS, and Charles R. Garret, Jr, USBM.

The host rock is probably the Plainview sandstone member of the South Platte formation of the Cretaceous Dakota group. It ranges from 40 to 50 feet in thickness and forms the crest of the Dakota hogback on the subject property.

Abnormal radioactivity (up to 0.5 MR/HR with background 0.02 MR/HR) is present at several points along the crest of the hogback. Yellow secondary uranium minerals, sparsely disseminated in the sandstone, were noted in three small pits and outcrops along the hogback. Underground, similar abnormal radioactivity and secondary uranium minerals are present along the workings. However, both on the surface and in the underground workings no ore-grade material was observed. Five grab samples taken from cuts and exposures of Plainview sandstone along the Hogback were analyzed and ranged from a high of 0.043% U_3O_8 to a low of 0.017% U_3O_8. Four channel samples taken from the most radioactive areas underground had a high assay of 0.086% U_3O_8 and a low assay of 0.01% U_3O_8.

The Applicant shipped 7 tons of material from underground and near surface workings, but the material assayed only 0.07% U_3O_8. Applicant has completed two open cuts, a pit, a short shaft and approximately 152 feet of underground drifting and crosscutting without encountering commercial grade ore. However, the apparently thoroughly oxidized character of the host rock, the widespread radioactivity, the presence of uranium minerals, and the lack of geologic data concerning habits of uranium mineralization in this area are favorable factors toward sanctioning a limited, drilling program. Disapproves of applicant's proposed program, but recommends a limited exploration program consisting of 225 feet of core drilling and 600 feet of non-core drilling.

Field Team and Supervising Mining Engineer and Geologist:

In a letter, dated May 25, 1956, transmitting the Report of Examination to the Field Team, John F. Shaw and D. R. MacLaren (for E. N. Harshman) believe that the proposed work is prospecting rather than exploration and recommend that the application be denied.

The Field Team believes that the applicant has a definite mineralized target area, though low-grade, and questions that work proposed would be of a prospecting nature. However, it makes no recommendation.

Commodity Group Comments:

USBM - James Paone - June 8, 1956.

Discussed the Report of Examination with the AEC representative. Recommends approval of the work proposed by field examiner.

USGS - T. H. Kiilsgaard - June 12, 1956.

The uranium mineralization is reported to be confined to a sandstone member of the South Platte formation and has been explored sufficiently to establish beyond doubt that a definite target area exists. Admittedly, the uranium content is very low in grade and for this reason the property probably does not warrant further exploration. While the grade could improve with depth in the primary zone, there is little surface evidence to support this. There is also reason to doubt that the suggested drilling would be deep enough to prove such a hypothesis. He does not believe enough evidence for ore has been presented to warrant a DMEA project, and recommends denial of the application based on improbability of making a significant discovery.

Rare and Miscellaneous Metals Division - Michael Ching - June 20, 1956:

The applicant has done sufficient surface and underground work to demonstrate that mineralization to a depth of 60 feet from the outcrop is quite low in grade and that the chances of finding worthwhile deposits at these horizons are not good. The only factor that might warrant further exploration is the the possibility that higher grade material may be found at depth in the primary zone. No evidence has been presented to support this viewpoint. The applicant did not request exploratory work at depth.

Conclusions and Recommendations:

The available information does not encourage the belief that significant ore bodies will be found by the work proposed by either the applicant or the field examiners. It is recommended that the application be denied without prejudice to the property.

Ernest Wm. Ellis

Ernest Wm. Ellis, Chief
Rare and Miscellaneous
Metals Division

6-13-56

IN REPLY REFER TO:

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

RECEIVED
JUN 13 1956

June 12, 1956

Memorandum

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

From: T. H. Kiilsgaard, U. S. Geological Survey

Subject: Review of Field Team report on Wahketa mine, DMEA Docket 4227.

Field examiners have studied the applicant's property, following which they have discussed with the applicant an exploration project modified from the original proposal. Instead of the drifting and crosscutting as originally requested, the examiners recommend that six holes be diamond drilled, the drilling footage to aggregate 825 feet. The applicant is reported to favor the revised proposal. The Field Team, however, does not concur with field examiners and recommends denial on the grounds that the work is prospecting rather than exploration.

The radioactive deposit occurs in a sandstone member of the South Platte formation. Secondary uranium minerals form incrustations on fracture surfaces and coatings on sand grains. Although several samples were taken, all assays both on the outcrop and in the mine workings were low in grade.

I do not concur with the Field Team's conclusion that the proposed work would be prospecting instead of exploration. The uranium mineralization is reported to be confined to one rock type and to have been explored sufficiently to establish beyond doubt that a definite target area exists.

Admittedly, the uranium content is very low in grade and for this reason the property probably doesn't warrant further exploration. The grade could, of course, improve with depth in the primary zone; however, there is little surface evidence to support this. There is also reason to doubt that the suggested drilling would be deep enough to prove such a hypothesis.

While I would favor the program recommended by the field examiners over that requested by the applicant, I do not believe enough

evidence for ore has been presented to warrant a DMEA contract, nor do I believe the proposed drilling is extensive enough to adequately test the property. I therefore recommend denial of the application, this recommendation based on the improbability of making a significant discovery.

T. H. Kiilsgaard

T. H. Kiilsgaard

IN REPLY REFER TO:

RECEIVED
JUN 13 1956

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

June 12, 1956

Memorandum

To: E. . Ellis, Defense Minerals Exploration Administration

From: F. H. Hillsgaard, U. S. Geological Survey

Subject: Review of Field Team report on Wahketa mine, DMEA Docket 4227.

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The radioactive deposit occurs in a sandstone member of the South Platte formation. Secondary uranium minerals form incrustations on fracture surfaces and coatings on sand grains. Although several samples were taken, all assays both on the outcrop and in the mine workings were low in grade.

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evidence for ore has been presented to warrant a DMEA contract, nor do I believe the proposed drilling is extensive enough to adequately test the property. I therefore recommend denial of the application, this recommendation based on the improbability of making a significant discovery.

THKiilsgaard:btr
G 6/12/56

T. H. Kiilsgaard

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

IN REPLY REFER TO:

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

RECEIVED
JUN 13 1956

June 12, 1956

Memorandum

To: [illegible] llis, Defense Minerals Exploration Administration

From: [illegible] Hillsgaard, U. S. Geological Survey

Subject: Review of Field Team report on Ambrosia mine, DMEA Docket 4227.

Field examiners have studied the applicant's property, following which they have discussed with the applicant an exploration project modified from the original proposal. Instead of the drifting and crosscutting as originally requested, the examiners recommend that six holes be diamond drilled, the drilling footage to aggregate 825 feet. The applicant is reported to favor the revised proposal. The Field Team, however, does not concur with field examiners and recommends denial on the grounds that the work is prospecting rather than exploration.

The radioactive deposit occurs in a sandstone member of the Morrison formation. Secondary uranium minerals form incrustations on fracture surfaces and coatings on sand grains. Although several samples were taken, all assays both on the outcrop and in the mine workings were low in grade.

I do not concur with the Field Team's conclusion that the proposed work would be prospecting instead of exploration. The uranium mineralization is reported to be confined to one rock type and to have been explored sufficiently to establish beyond doubt that a definite target area exists.

Admittedly, the uranium content is very low in grade and for this reason the property probably doesn't warrant further exploration. The grade could, of course, improve with depth in the primary zone; however, there is little surface evidence to support this. There is also reason to doubt that the suggested drilling would be deep enough to prove such a hypothesis.

While I would favor the program recommended by the field examiners over that requested by the applicant, I do not believe enough

evidence for ore has been presented to warrant a DMEA contract, nor do I believe the proposed drilling is extensive enough to adequately test the property. I therefore recommend denial of the application, this recommendation based on the improbability of making a significant discovery.

THKillsgaard:btr
G 6/12/56

T. H. Killsgaard

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

IN REPLY REFER TO:

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

RECEIVED
JUN 13 1956

June 12, 1956

Memorandum

To: T. . llis, Defense Minerals Exploration Administration

From: T. H. Willsgaard, U. . Geological urvey

Subject: Review of ield Team report on Dakota mine, DMEA Docket 4227.

Field examiners have studied the applicant's property, following which they have discussed with the applicant an exploration project modified from the original proposal. Instead of the drifting and cross-cutting as originally requested, the examiners recommend that six holes be diamond drilled, the drilling footage to aggregate 825 feet. The applicant is reported to favor the revised proposal. The Field Team, however, does not concur with field examiners and recommends denial on the grounds that the work is prospecting rather than exploration.

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THKiilsgaard:btr
G 6/12/56

T. H. Kiilsgaard

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

6-8-56

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

RECEIVED
JUN 8 1956

June 8, 1956

Memorandum

To: Ernest William Ellis, DMEA Member
Uranium Commodity Committee

From: James Paone, Bureau of Mines Alternate Member
Uranium Commodity Committee

Subject: Report of Examination, DMEA Docket 4227, (Uranium), Elbert Norton, (Wahketa Mine), Larimer County, Colorado

I have reviewed the report of examination, DMEA Docket 4227, Elbert Norton, Larimer County, Colorado, dated May 31, 1956, and received in this office June 7, 1956. I have also discussed it with Joseph O. Hosted, Washington representative of the Atomic Energy Commission.

The field examiners recommend that consideration be given to an exploration program consisting of 225 feet of core drilling and 600 feet of non-core drilling at a total estimated cost of $2,730.75; Government participation at 75 percent would amount to $2,048.06.

We recommend that the work proposed by the field examiners be approved as an exploration project.

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

James Paone

James Paone

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

RECEIVED

June 8, 1956

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BUREAU OF MINES
WASHINGTON 25, D. C.

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James Paone

6/11/56 gla

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

RECEIVED
JUN - 6 1956

May 31, 1956

224 New Customhouse
Denver 2, Colorado

Memorandum

To: Secretary to the Operating Committee, DMEA

From: Field Team, Region III

Subject: Joint Report of Examination, DMEA Docket 4227 (Uranium), Elbert Norton, (Wahketa Mine), Larimer County, Colorado

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

The field examiners recommend a modified program, approved by the Applicant, consisting of 225 feet of core drilling and 600 feet of non-core drilling. The total estimated cost is $2,730.75, Government participation $2,048.06. They conclude that the widespread radioactivity, the presence of uranium minerals, and the lack of geologic data concerning habits of uranium mineralization in this area are favorable factors in their recommendation for a limited drilling program.

The letter transmitting the Report of Examination to this office recommends denial based on the belief that the proposed work is of a prospecting nature.

It appears that the Applicant has a definite mineralized target area, though low-grade, and we question that the work proposed by the field examiners is of a prospecting nature.

Pending your final decision regarding this docket we have not requested Owner's Consent to Lien from Guy R. Lawrence and Mayme B. Lawrence which was requested in your letter of April 5, 1956 on the subject docket.

DMEA Field Team, Region III

W. M. Traver

W. M. Traver

Reviewed by
DMEA OPERATING COMMITTEE
6-8-56
(date)

E. N. Harshman

E. N. Harshman

Enclosures

DMEA
Date Rec'd.

MAY 28 1956

BUREAU OF MINES
Denver, Colorado

Region III

Building 20
Denver Federal Center
Denver 2, Colorado
May 25, 1956

Memorandum

RECEIVED
JUN - 6 1956

To: Executive Officer, DMEA Field Team, Region III

From: John F. Shaw
E. N. Harshman

Subject: Docket DMEA 4227, (Uranium), Elbert Norton Lease, (Wahkota Mine), Larimer County, Colorado

Enclosed are the original and 9 copies of a Joint Engineering and Geologic Report by Charles R. Garrett, Jr., mining engineer, R. Vickers, and G. Isett, geologists covering docket DMEA 4227.

Elbert Norton applied for DMEA assistance to explore lots 1, 2 and 3, sec. 18, T. 8 N., R. 69 W., Larimer County, Colorado for uranium by 100 feet of drifting and 40 feet of crosscutting at an estimated cost of $20,399.00.

The property was examined by R. Vickers and G. Isett, geologists and Charles R. Garrett, Jr., mining engineer. The examining team concluded that the proposed project would not properly explore the area over which anomalies had been observed. It was believed that a modified proposal which was approved by the applicant consisting of six holes and 825 feet of drilling at a total estimated cost of $2,730.75 would give information as to the existence of a favorable ore zone at depth.

It is believed that a proposal of this nature is prospecting rather than exploration. It is recommended that the application be denied.

John F. Shaw
John F. Shaw
Supervising Mining Engineer

D K MacLaren
for E. N. Harshman
Member Field Team

enclosures
as 9
DMEA 4227
Chron.

JFS/ch

Reviewed by
DMEA OPERATING COMMITTEE
6-8-56
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

RECEIVED
JUN - 6 1956

DEFENSE MINERALS EXPLORATION ADMINISTRATION

JOINT REPORT OF EXAMINATION BY EXAMINING TEAM
REGION III

DMEA 4227

ELBERT NORTON

Wahketa Mine

Larimer County, Colorado

Uranium

Joint Engineering and Geologic Report

Reviewed by
DMEA OPERATING COMMITTEE
6-8-56
(date)

By

R. Vickers, Geologist
G. Izett, Geologist
Geological Survey

Charles R. Garrett, Jr.
Mining Engineer
Bureau of Mines

May 21, 1956

DMEA 4227

ELBERT NORTON
WAHKETA MINE
LARIMER COUNTY, COLORADO

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DMEA 4227

ELBERT NORTON
Wahketa Mine
Lots 1, 2, 3; Sec. 18, T. 8 N., R. 69 W., 6th P.M.
Larimer County, Colorado

RECEIVED
JUN - 3 1956

SUMMARY AND INTRODUCTION

Elbert Norton of Ft. Collins, Colorado requested DMEA assistance in the exploration of uranium deposits on Lots 1, 2 and 3, sec. 18, T. 8 N., R. 69 W., sixth principal meridian, held under lease in Larimer County, Colo.

Recently, Mr. Norton acquired a lease on the eastern portion of sec. 13, T. 8 N., R. 70 W., sixth principal meridian. This ground adjoins the property covered by this application, on the west, but is not included as part of this project proposal.

The applicant performed considerable exploratory work on the property covered by this application which disclosed exposures of uranium minerals. The exploration work, thus far performed, consists of a crosscut and drift connecting with a shaft to the surface and three pits excavated into the rim-rock.

The applicant proposed to extend the drift 100 feet northward and drive a crosscut 40 feet eastward into the footwall. The total cost of the project was estimated at $20,399.00 or at an overall rate of $145.71 per linear foot of drifting.

The DMEA examining team consisting of R. Vickers and G. Izett, geologists, Geological Survey and C. R. Garrett, Jr., mining engineer, Bureau of Mines investigated the property on April 16, 1956. The team was accompanied by Mr. and Mrs. Elbert Norton, who supplied pertinent information regarding the property.

The examiners discussed the excessively high cost of the proposal with the applicant, pointing out that such drifting work should be done for about

$30.00 per linear foot. It was also pointed out that the proposed project would not properly explore the area over which anomalies have been observed. Subsequently, a modified proposal was approved by the applicant consisting of drilling six holes, each approximately 126 to 179 feet deep. The maximum amount of drilling would be 825 feet at a total estimated cost of $2,730.75 or at the average rate of $3.31 per foot.

ACKNOWLEDGMENT

The examiners conferred with members of the Atomic Energy Commission on this project.

LOCATION, TOPOGRAPHY AND PHYSICAL FEATURES

The subject land comprises lots 1, 2 and 3 in sec. 18, T. 8 N., R. 69 W. of the sixth principal meridian in Larimer County, Colorado (fig. 1). The mine is approximately 3 miles northwest of La Porte, Colorado and is reached by turning right or northward from U. S. Highway 287 about 2-1/2 miles west of La Porte schoolhouse. From this junction an all weather road traverses a short steep hill to the west embankment of the Poudre Valley Canal, follows along this embankment for about 1/2 mile, crosses to the north side of the canal and extends about 3/4 of a mile eastward to the mine.

The topography of the area is typical of the "hogback" hills that form the terrain between the foothills of the Rocky Mountain Front Range and the Great Plains. The mine is near the top of a ridge, approximately 60 feet lower in elevation than the crest at an estimated altitude of 5,550 feet.

The climate is temperate, warm summers with a moderate amount of rain and mild to cold winters with snowfall typical of the plateau regions of Colo.

There is no timber on the property. The nearest source of natural timber is the "foothills" about 3 to 4 miles westward. Cut timber and lumber, with other supplies, are available at Ft. Collins, approximately 10 miles by road to the southeast. There is no water on the property and the nearest

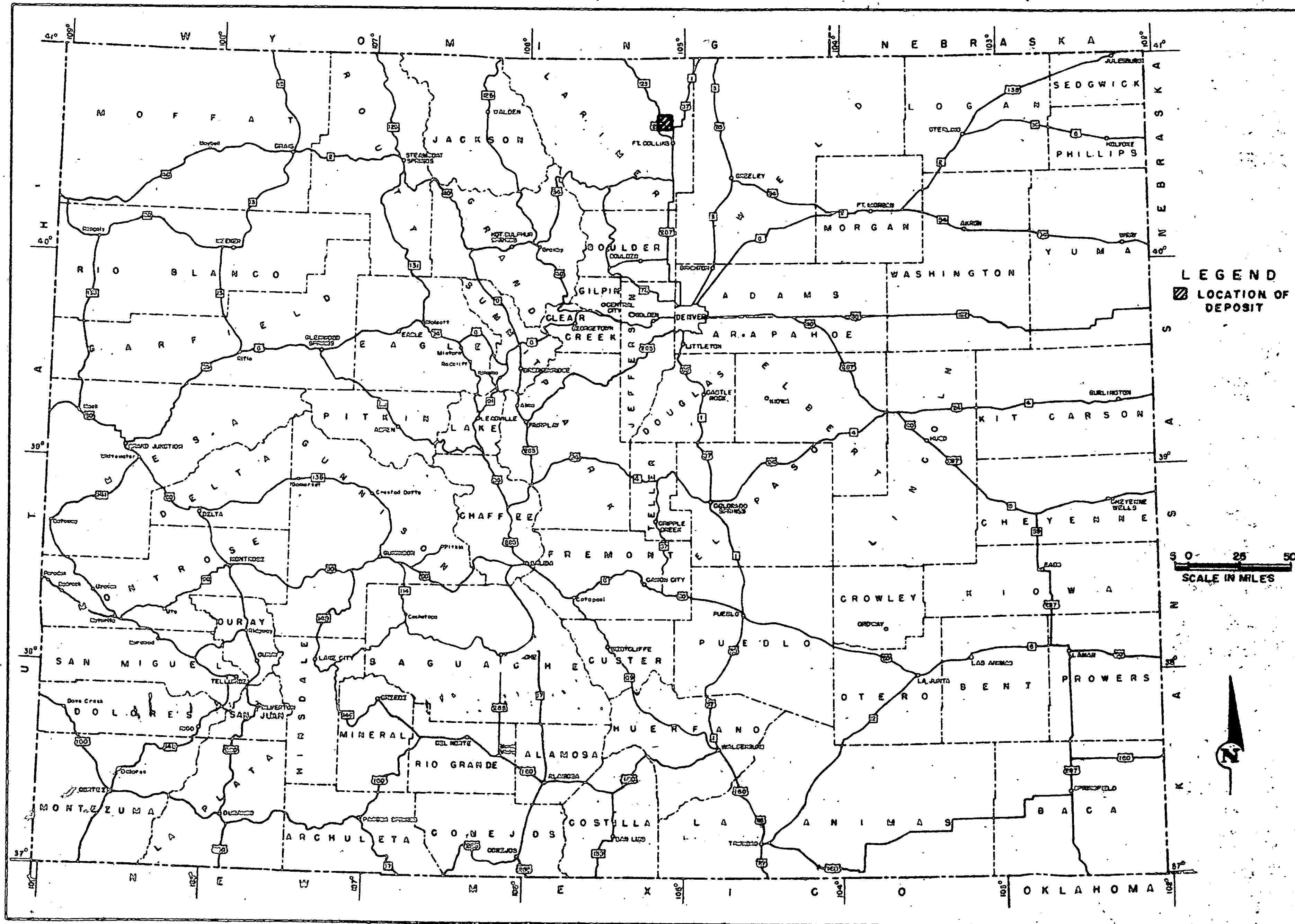

FIGURE 1 - MAP SHOWING LOCATION OF WAHKETA MINE, ELBERT NORTON LEASE, LARIMER COUNTY, COLO. DMEA 4227

source is the Cache La Poudre River which is about a mile to the west.

Labor having mining experience reportedly is available from the nearby towns of La Porte and Bellevue. Equipment and certain materials can be obtained in Ft. Collins or Denver. A single phase R.E.A. power line crosses the property about 1/4 mile from the mine.

HISTORY, PRODUCTION AND OWNERSHIP

Radioactive material was first discovered on this property on Jan. 9, 1955 by Elbert Norton, the applicant. On April 27, 1955 a mining lease on lots 1, 2 and 3, sec. 18, T. 8 N., R. 69 W., sixth principal meridian was obtained by Elbert Norton.

The only production reported from this property was 7 tons derived from underground and near surface workings. This material was shipped to the Atomic Energy Commission Buying Station at Edgemont, South Dakota. The shipment reportedly assayed 0.07 percent U_3O_8.

The property is owned by Guy R. Lawrence and Mayme B. Lawrence of La Porte, Larimer County, Colorado. Their ownership includes all surface and mineral rights. The property is leased to the applicant for mining only for a period of 5 years commencing April 27, 1955. The applicant, or the lessee, is to pay the lessor royalty on uranium ores at the rate of 8% of the net returns from ore valued at $50.00 or less a ton; 12% of the net returns from ores valued at $50.00 to $100.00 a ton and 18% from ores valued over $100.00 a ton. On all ores other than uranium, a royalty of 10% of the net returns. This lease was duly executed by the parties concerned and is recorded on page 17, book 992 in the Larimer County Court House at Fort Collins. The document was listed as Reception No. 694471 and recorded on April 28, 1956.

GEOLOGY

The Norton lease is located approximately 3 miles from Laporte, Colorado along the crest of the Dakota hogback. The exposed sedimentary rocks of the area in ascending order are: the Lykins formation of Permian and Triassic age, the Morrison formation of Jurassic age, and the Dakota group of Cretaceous age which consists of the Lytle formation disconformably overlain by the South Platte formation.

The host rock at the Norton lease is probably the Plainview sandstone member which is the lowermost unit of the South Platte formation. The Plainview sandstone consists of a few feet of carbonaceous shale, siltstone, and thin-bedded sandstone which grade upward into light-gray, fine-grained, medium to thin-bedded, cross-stratified sandstone. The sandstone ranges from 40- to 50-feet in thickness and forms the crest of the Dakota hogback at the Norton lease. Conformably above the Plainview sandstone is a series of intercalated siltstone, shale, silty limestone, and thin bentonitic strata.

The sedimentary rocks in the Laporte area are arched into the Bellevue fold which is an asymetric anticline that plunges to the north. The Norton lease is on the west flank of this structure, and the strata strike N. and dip 15 to 60° to the west. Slickensided surfaces are common along the stratification planes of the more competent sandstone units. No faults other than small amounts of movement along stratification planes were observed.

Uranium Deposits

Abnormal radioactivity (as much as 0.5 mr/hr, background 0.02 mr/hr) is present at several localities along the crest of the Dakota hogback near the base of the Plainview sandstone member. Yellow secondary uranium minerals, sparsely disseminated in the sandstone, were noted in a small prospect pit about 200 feet south of the Wahketa mine, in a small prospect pit about 300 feet north of the south boundary of the property, and about 300 feet north of the Wahketa mine (fig. 2). Material of ore grade was not observed in these

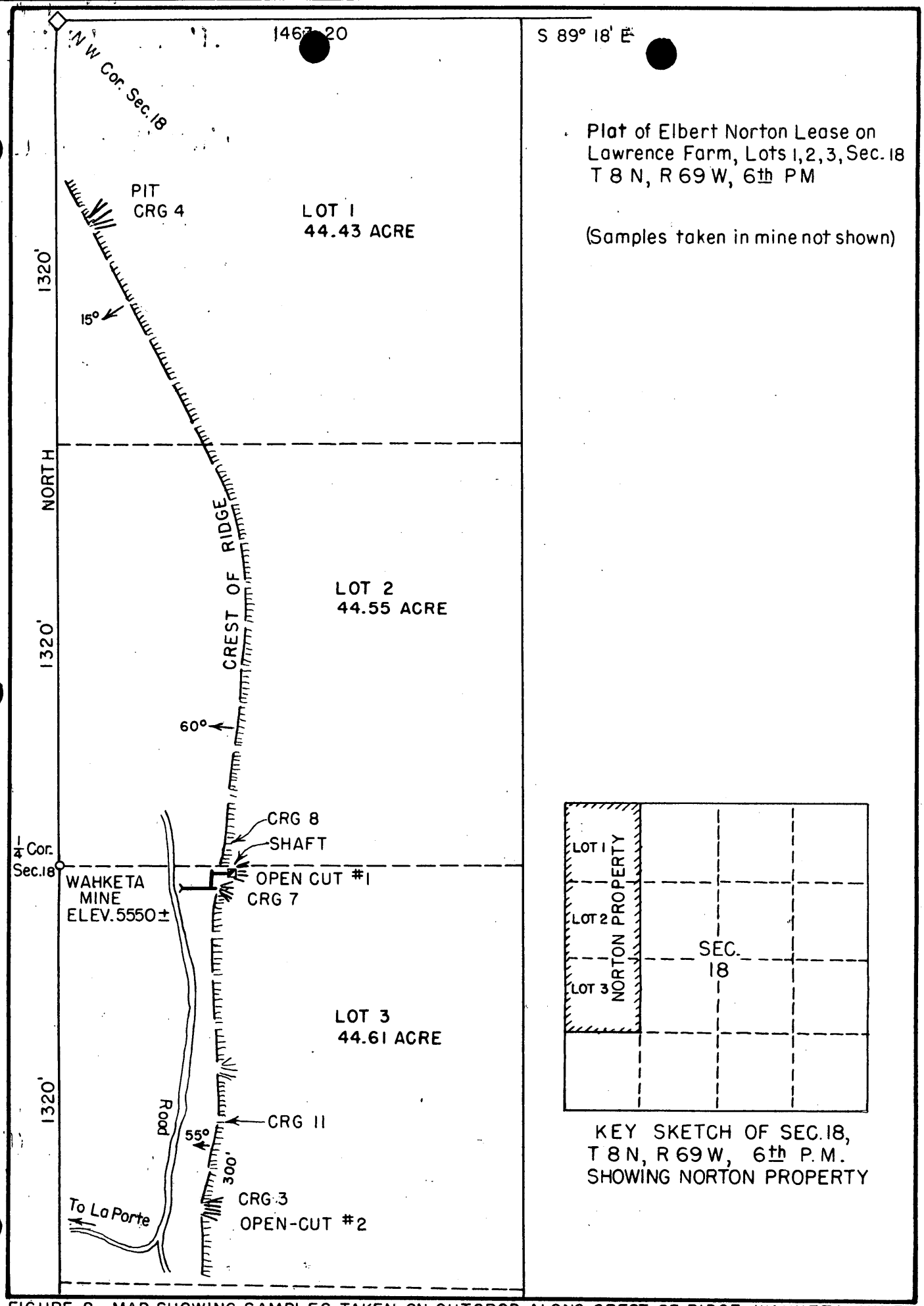

FIGURE 2 - MAP SHOWING SAMPLES TAKEN ON OUTCROP ALONG CREST OF RIDGE, WAHKETA MINE, LARIMER COUNTY, COLO. DMEA 4227

surface workings. Results of analyses of samples taken at the surface showings are tabulated below:

	U_3O_8 (Percent)	Remarks
CRG-3	0.030	grab sample of Plainview s.s. from open cut #2 300 feet south of mine
CRG-4	0.030	grab sample of Plainview s.s. from open pit 2100 feet north of mine
CRG-7	0.029	grab sample of Plainview s.s. from prospect near the Wahketa mine
CRG-8	0.043	grab sample of Plainview s.s. from 100 feet north of Wahketa mine
CRG-11	0.017	grab sample of Plainview s.s. from 250 feet south of the Wahketa mine

At the Wahketa mine abnormal radioactivity and secondary uranium minerals are present both at the surface and continuously along the shaft and drift. The workings are in the middle part of the Plainview sandstone member. Localization of the uranium-bearing solutions has been caused in part by favorable lithology in the middle part of the Plainview sandstone; 3 feet of the sandstone appears to be 'brecciated' but this appearance probably has been caused by the removal (oxidation) of abundant plant fragments. Several plant impressions were noted. In and near this porous bed, uranium minerals are common as incrustations on slickensided surfaces, along joints, and as disseminations coating sand grains. Although uranium minerals and abnormal radioactivity are widespread, mineable quantities of ore grade material were not observed. The results of analyses of channel samples taken of the most radioactive material underground are tabulated below:

	U_3O_8 (Percent)	Remarks
CRG-5	0.050	3 foot channel sample of Plainview s.s. north side of shaft
CRG-6	0.010	4 foot channel sample of Plainview s.s. south side of crosscut
CRG-9	0.040	3 foot channel sample of Plainview s.s. north side of stope
CRG-10	0.086	4 foot channel sample of Plainview s.s. east side of drift 30 feet north of crosscut.

ORE RESERVES

There are no ore reserves on the property. The one shipment of radioactive material made by the applicant had no commercial value, consequently the radioactive material disclosed in the mine workings and along the outcrop directly above, do not qualify as ore, nor does other radioactive material found along the outcrop on the property.

PRESENT STATUS

At the time of the examination the property was inactive. The applicant had unsuccessfully attempted to drill several holes with a small core drill that was gasoline powered but held by hand. The small bit would bind in the crevices of the sandstone and after it was impossible to extract the drill rods.

At present the applicant has the following equipment on the property which is available for the exploration project:

1 LeRoi portable compressor, 125 c.f.m.
1 Worthington portable compressor, 60 c.f.m.
1 Powerlite, portable light plant, 1000 watt
1 Cleveland jackleg and drill with air hose, connections, etc.
1 Steel mine car, 8-cu. ft. capacity
200 ft. of 10-pound mine rail
1 Geiger counter
1 Scintillator
1 Small core drill, hand held model, gasoline powered, with bit, barrel and rods.

Exploration and Development

At present the exploratory work consists of two open-cuts, a pit along the crest of the ridge, and a crosscut and drift driven into the hill about 57 feet below the crest of the hill. The crosscut and drift penetrated the same formations that are hosts to the uranium deposits found at the surface. An incline shaft connects the underground working with an open-cut at the surface (fig. 2). The initial exploration was performed at open-cut 1 along the crest of the ridge about 400 feet east of the western quarter corner of section 18. Open-cut 2 was excavated on the crest about 1000 feet south of

open-cut 1. The pit was excavated into the east side of the ridge just below the crest about 2,000 feet north of open-cut 1. Following this work a crosscut was driven into the hill about 100 feet southwest of open-cut 1 and approximately 60 feet lower in elevation than the crest of the ridge. The crosscut was driven 94 feet eastward; at 73 feet from the portal, a fractured and brecciated zone was encountered having a relatively strong radiometric count of 0.35 milliroentgens per hour (mr/hr) on a scintillation counter. The applicant drifted northward along this radioactive zone a distance of 58 feet. The drifting was stopped temporarily and a shaft sunk from open-cut 1 to intersect the drift below. Ultimately the shaft was connected with a sub-level about 12 feet above the drift (fig. 3).

Nine samples were collected from the property by the examiners -- 4 from the underground workings (fig. 3) and 5 from surface (fig. 2).

APPLICANT'S PROJECT PROPOSAL

The applicant proposed to extend the present drift 100 feet northward along the brecciated radioactive zone and to drive a crosscut 40 feet eastward from a point about 40 feet north of the present crosscut (fig. 4). The cost of the proposed project, as estimated by the applicant, is $20,399.00. The project would require 8 months for completion. Itemized costs of the project were as follows:

(a) Labor, Supervision, Consultants

2 miners at $336.00/mo. ea. for 8 mos.	$5,376.00
1 supervisor at $400.00/mo.	3,200.00
1 consultant at $100.00 per day	700.00

(b) Operating Materials and Supplies

Dynamite, 80 cases at $13.00 ea.	$1,040.00
Dynamite caps, 20 boxes at $13.00 ea.	260.00
Fuels:	
Gasoline, 600 gal. at $0.20 per gal.	120.00
Lub. oil, 30 gal. at $0.60 per gal.	18.00
Diesel fuel, 800 gal. at $0.15 per gal.	120.00

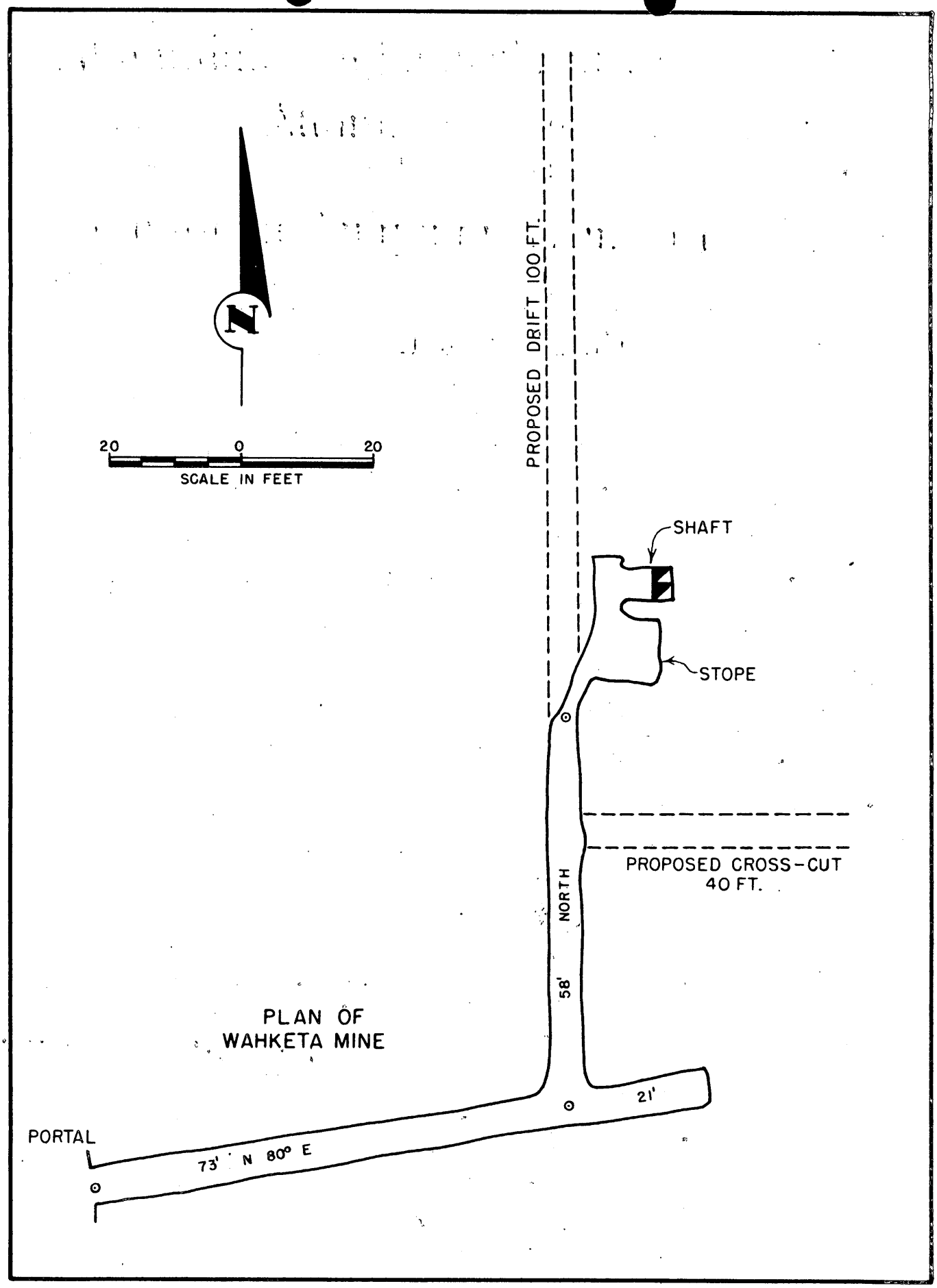

FIGURE 4 - SHOWING MINE WORKINGS AND EXPLORATORY WORK PROPOSED BY APPLICANT, WAHKETA MINE, LARIMER COUNTY, COLO. DMEA 4227

Drill steel	$125.00
Drill bits	300.00
Pipe, couplings, etc.	200.00
Picks	10.00
Shovels	10.00
Small tools	100.00
Rock drill oil	15.00
Track	100.00
Timber	420.00
Nails	10.00
Spikes	10.00

(c) Operating Equipment

LeRoi Compressor, 125 c.f.m. use allowance at $75.00 per month	$1,400.00
Jack leg, hammer and pressure tank at $30.00 per month	240.00
Cat and dozer, 2 mos. at $400 (rental)	800.00
Light plant, 8 mos. at $10.00	80.00
4-wheel-drive truck, used	1,000.00
Geiger counter & scintillation counter at $10.00	80.00
Hole probing equipment	250.00
Mucking machine, 6 mos. at $200.00/mo.	1,200.00

(d) New Buildings, Improvements, Installations

Supply and equipment building	$900.00
Privy	150.00

(e) Miscellaneous

Repairs and maintenance	
Repairs to drill steel and drills	$200.00
Repairs to truck	200.00
Sharpening picks,moils, etc.	25.00
Sharpening drill bits, etc.	50.00
Motor repairs	200.00
Analyses	300.00
Accounting costs	200.00
Workmen's compensation and employer's liability insurance	300.00
Payroll taxes	140.00

(f) Contingencies	$500.00	
TOTAL		$20,399.00

An analysis of the foregoing tabulation of costs shows that the applicant's estimate is greatly out of line with normal procedures. For example, 100 feet of drifting and 40 feet of crosscutting would not require

8 months for a crew of 2 men aided by a mucking machine; this work should be accomplished in about 30 to 35 days at most under comparable conditions. Other major costs could be reduced proportionately.

The applicant's proposal is not suitable to explore the subject property. A modified proposal was made which has the approval of the applicant.

MODIFIED PROPOSAL

A modified project was considered by the examiners and the applicant which would explore the property more economically.

The revised project proposes drilling six holes ranging in depth from 129 to 179 feet for a total of 825 feet. About 600 feet of non-core drilling and 225 feet of core drilling are planned (fig. 5).

Cuttings must be accurately checked by a Geiger counter, while drilling is in progress to determine when coring should start. All cores are to be saved and stored in adequately constructed core boxes for examination by DMEA inspectors. When coring starts all sludge material is to be saved and properly identified. The size of the hole is to be no less than 2-5/16 inches (BX diamond drill bit) in diameter, and the drilling should be performed in such a manner to assure maximum core recovery. Complete logs of each hole should be kept by the drill crew.

The six drill holes are to be located as follows (fig. 5): (a) drill hole 1 is 40 feet west and 60 feet north of the portal of the Wahketa mine. The hole is to be directed to the east at an angle of 45° from the horizontal and will penetrate the mineralized zone which is estimated to occur at a depth of 126 feet; (b) drill hole 2 is 65 feet west of drill hole 1 and should be directed eastward at an angle of 60° from the horizontal to an estimated depth of 179 feet; (c) drill hole 3 is located 300 feet north of the portal of the Wahketa mine, and will be directed eastward at an angle of 45° to an estimated depth of 130 feet; drill hole 4 is located 300 feet south of the

portal of the Wahketa mine and will be directed eastward at an angle of 45° to an estimated depth of 130 feet; drill hole 5 will be located by the field team after the completion of drill holes 1 to 4, although it probably will be located approximately 1,000 feet south of the portal of the Wahketa mine and will be directed eastward at an angle of 45° to an estimated depth of 130 feet; drill hole 6 will be located by the field team after the completion of drill holes 1 to 5, although it probably will be approximately 900 feet north of the portal of the Wahketa mine and directed eastward at an angle of 45° to an estimated depth of 130 feet. Figure 6 shows a geologic cross-section through Wahketa mine and drill holes 1 and 2.

This small project will require considerable preparatory work. It is necessary to construct about 1500 feet of access roads and level all drill sites. Road construction will require some blasting over rock outcrops. Drill hole locations can be surveyed by a supervisor-engineer. A small allowance is made for bookkeeping.

The costs of the project as modified are estimated as follows:

EXAMINERS PROPOSAL
ESTIMATED COSTS

Item	Distribution 225' Core	Distribution 600' Non-Core	Costs
1. Preparation for drill sites-dozer 20 hrs. at $10.00/hr. with operator	$50.00	$150.00	$200.00
2. Drilling -600 ft. non-core at $1.75 per ft.		$1,050.00	
225 ft. core at $2.75 per ft.	$618.75		
Core boxes, sample bags, etc.	25.00		$1,693.75
3. Supervision and Labor			
Supervising Engineer, 2 wks. at $125.00 per wk.	$125.00	$125.00	
Accounting - 2 wks, at $50.00 per wk.	50.00	50.00	
Labor - 1 man, 10 days at $1.50 per hr.	60.00	60.00	
	$235.00	$235.00	$470.00
4. Equipment Rentals			
1 LeRoi compressor, 125 c.f.m., 20 hrs. at $4.20 per hr.	$42.00	$42.00	
1 Cleveland drill, 20 hrs. at $0.30 per hr.	3.00	3.00	$90.00
5. Fuels, etc.			
Gasoline - 50 gals. at $0.29 per gal.			
Lub. Oil - 10 qts. at $0.45 per qt.			
Drill Oil - 1 gal. at $1.00 per gal.	$10.00	$10.00	$20.00
6. Explosives			
200 pounds - 40% Gel. at $22.00 cwt.			
200 caps - #6 at $1.50 per C			
400 feet - Fuse at $2.50 per C	$28.50	$28.50	$57.00
7. Incidental Expenses			
Miscellaneous Supplies $200.00	$100.00	$100.00	$200.00
TOTAL	$1,112.25	$1,618.50	$2,730.75
Average Cost per foot	4.943	2.70	3.31

PROPOSED FINANCING

Elbert Norton, the applicant is prepared to furnish his share of the costs of the proposed exploration in cash, supervision and supplying some equipment.

CONCLUSIONS

The results of this examination show that significant quantities of ore grade material are not present either at the surface or in the present underground workings. Further exploration by extending the present underground workings of the Wahketa mine, as proposed by the applicant, is not advisable.

However, the apparently thoroughly oxidized character of the host rock, the widespread radioactivity, the presence of uranium minerals and the lack of geologic data concerning habits of uranium mineralization in this area, are favorable factors toward sanctioning a limited drilling program. This drilling program would result in proving a new significant source-area for uranium.

RECOMMENDATIONS

The exploration project as outlined by the examiners is recommended for approval. The locations of the drill holes concerned in this project are shown on figures 5 and 6. It is also recommended that a short form contract be completed where all costs will be combined in non-core drilling and core drilling.

The Government's share of this project would be 75 percent of $2,730.75 or $2,048.06 calling for 225 feet of core drilling at $4.94 per foot and 600 feet of non-core drilling at $2.70 per foot. The drilling work must be done by a reputable drilling company which will be chosen from at least three bidders. Road and drill-site preparation can be done by contract or by the applicant.

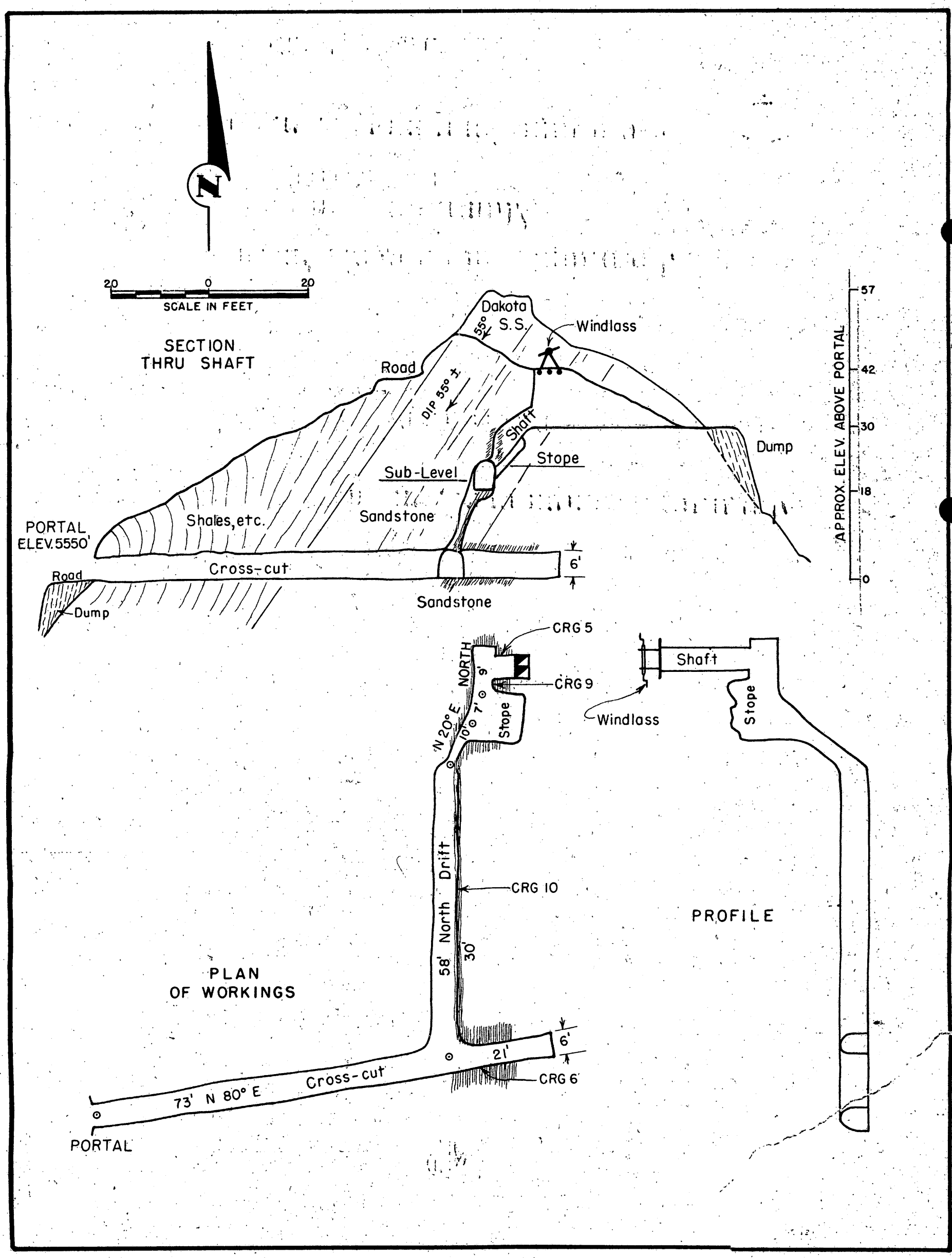

FIGURE 3 - MAP SHOWING PRESENT UNDERGROUND WORKINGS AND LOCATION OF SAMPLES COLLECTED EXAMINERS, NORTON LEASE, WAHKETA MINE, LARIMER COUNTY, COLO. DMEA 4227

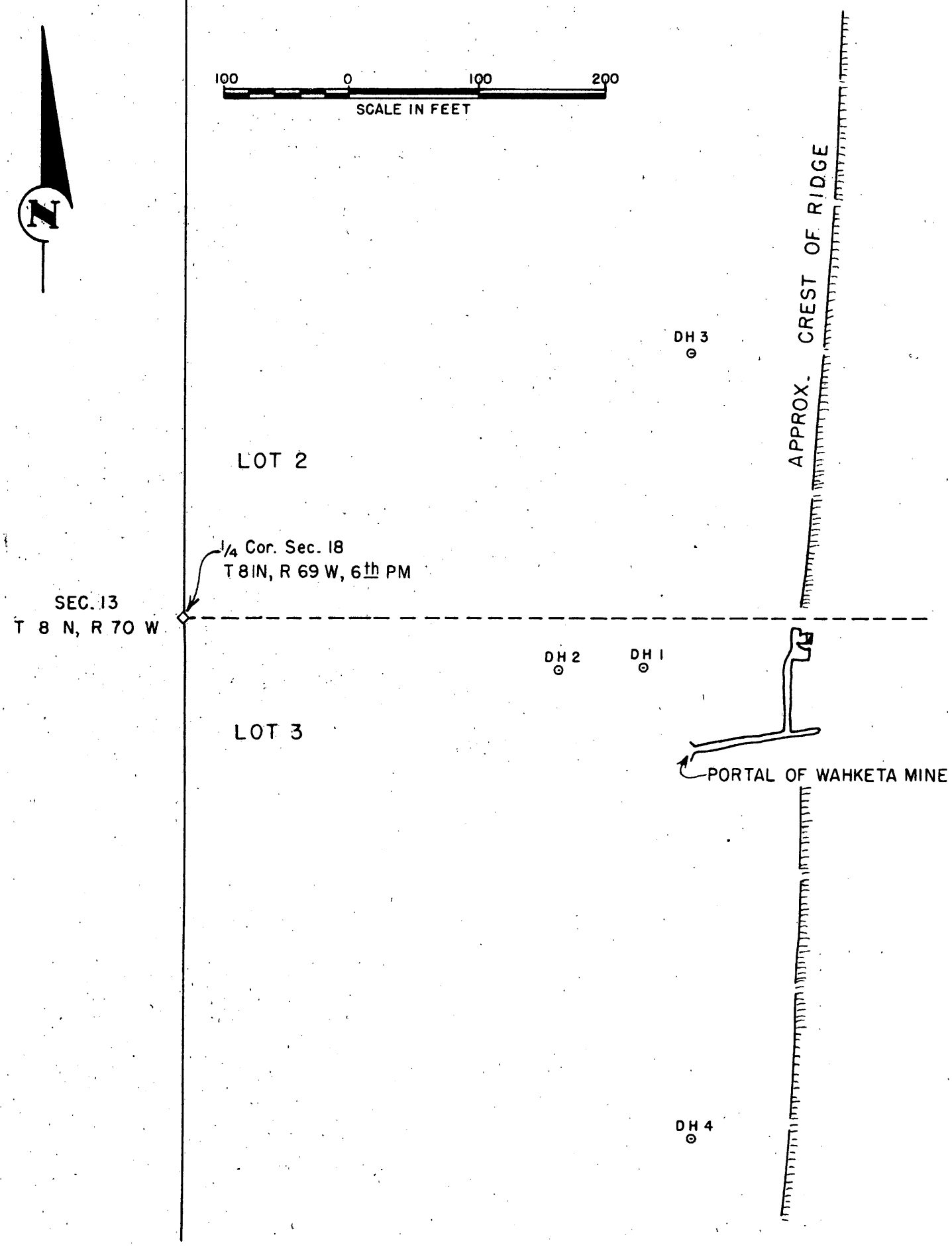

FIGURE 5 - SKETCH SHOWING LOCATION OF DRILL HOLES AS PROPOSED BY EXAMINERS, NORTON LEASE, WAHKETA MINE, LARIMER COUNTY, COLO. DMEA 4227

6-6-56

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

May 31, 1956

224 New Customhouse
Denver 2, Colorado

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JUN - 3 1956

Memorandum

To: Secretary to the Operating Committee, DMEA

From: Field Team, Region III

Subject: Joint Report of Examination, DMEA Docket 4227 (Uranium), Elbert Norton, (Wahketa Mine), Larimer County, Colorado

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

The field examiners recommend a modified program, approved by the Applicant, consisting of 225 feet of core drilling and 600 feet of non-core drilling. The total estimated cost is $2,730.75, Government participation $2,048.06. They conclude that the widespread radioactivity, the presence of uranium minerals, and the lack of geologic data concerning habits of uranium mineralization in this area are favorable factors in their recommendation for a limited drilling program.

The letter transmitting the Report of Examination to this office recommends denial based on the belief that the proposed work is of a prospecting nature.

It appears that the Applicant has a definite mineralized target area, though low-grade, and we question that the work proposed by the field examiners is of a prospecting nature.

Pending your final decision regarding this docket we have not requested Owner's Consent to Lien from Guy R. Lawrence and Mayme B. Lawrence which was requested in your letter of April 5, 1956 on the subject docket.

DMEA Field Team, Region III

W. M. Traver

W. M. Traver

Reviewed by
DMEA OPERATING COMMITTEE
6-8-56
(date)

E. M. Hirschman

E. M. Hirschman

Enclosures

DMEA
Date Rec'd.

MAY 28 1956

Region III

RECEIVED
JUN - 8 1956

Building 20 BUREAU OF MINES
Denver Federal Center Colorado
Denver 2, Colorado
May 25, 1956

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: John F. Shaw
R. N. Harshman

Subject: Docket DMEA 4227, (Uranium), Elbert Norton Lease, (Wahkata Mine), Larimer County, Colorado

Enclosed are the original and 9 copies of a Joint Engineering and Geologic Report by Charles R. Garrett, Jr., mining engineer, R. Vickers, and G. Izett, geologists covering docket DMEA 4227.

Elbert Norton applied for DMEA assistance to explore lots 1, 2 and 3, sec. 16, T. 5 N., R. 69 W., Larimer County, Colorado for uranium by 100 feet of drifting and 40 feet of crosscutting at an estimated cost of $20,999.00.

The property was examined by R. Vickers and G. Izett, geologists and Charles R. Garrett, Jr., mining engineer. The examining team concluded that the proposed project would not properly explore the area over which anomalies had been observed. It was believed that a modified proposal which was approved by the applicant consisting of six holes and 825 feet of drilling at a total estimated cost of $2,730.75 would give information as to the existence of a favorable ore zone at depth.

It is believed that a proposal of this nature is prospecting rather than exploration. It is recommended that the application be denied.

John F. Shaw
John F. Shaw
Supervising Mining Engineer

for D R Machaven
R. N. Harshman
Member Field Team

enclosures
as 9
DMEA 4227
Chron.

JFS/ch

Reviewed by
DMEA OPERATING COMMITTEE
6-8-56
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

RECEIVED
JUN - 1956

DEFENSE MINERALS EXPLORATION ADMINISTRATION

JOINT REPORT OF EXAMINATION BY EXAMINING TEAM
REGION III

DMEA 4227

ELBERT MONTH

Wahbata Mine

Larimer County, Colorado

Premium

Joint Engineering and Geologic Report

Reviewed by
DMEA OPERATING COMMITTEE
6-8-56
(date)

By

R. Vickers, Geologist
G. Izett, Geologist
Geological Survey

Charles R. Garrett, Jr.
Mining Engineer
Bureau of Mines

May 21, 1956

DMEA 4227

KIBBERT NORTON
WAHKETA MINE
LARIMER COUNTY, COLORADO

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DMEA 4227

ELBERT NORTON
Wahketa Mine
Lots 1, 2, 3; Sec. 16, T. 8 N., R. 69 W., 6th P.M.
Larimer County, Colorado

RECEIVED JUN - 6 1956

SUMMARY AND INTRODUCTION

Elbert Norton of Ft. Collins, Colorado requested DMEA assistance in the exploration of uranium deposits on Lots 1, 2 and 3, sec. 16, T. 8 N., R. 69 W., sixth principal meridian, held under lease in Larimer County, Colo.

Recently, Mr. Norton acquired a lease on the eastern portion of sec. 13, T. 8 N., R. 70 W., sixth principal meridian. This ground adjoins the property covered by this application, on the west, but is not included as part of this project proposal.

The applicant performed considerable exploratory work on the property covered by this application which disclosed exposures of uranium minerals. The exploration work, thus far performed, consists of a crosscut and drift connecting with a shaft to the surface and three pits excavated into the rim-rock.

The applicant proposed to extend the drift 100 feet northward and drive a crosscut 40 feet eastward into the footwall. The total cost of the project was estimated at $20,399.00 or at an overall rate of $145.71 per linear foot of drifting.

The DMEA examining team consisting of R. Vickers and G. Izett, geologists, Geological Survey and C. R. Garrett, Jr., mining engineer, Bureau of Mines investigated the property on April 16, 1956. The team was accompanied by Mr. and Mrs. Elbert Norton, who supplied pertinent information regarding the property.

The examiners discussed the excessively high cost of the proposal with the applicant, pointing out that such drifting work should be done for about

$30.00 per linear feet. It was also pointed out that the proposed project would not properly explore the area over which anomalies have been observed. Subsequently, a modified proposal was approved by the applicant consisting of drilling six holes, each approximately 126 to 179 feet deep. The maximum amount of drilling would be 825 feet at a total estimated cost of $2,730.75 or at the average rate of $3.31 per foot.

ACKNOWLEDGMENT

The examiners conferred with members of the Atomic Energy Commission on this project.

LOCATION, TOPOGRAPHY AND PHYSICAL FEATURES

The subject land comprises lots 1, 2 and 3 in sec. 18, T. 8 N., R. 69 W. of the sixth principal meridian in Larimer County, Colorado (fig. 1). The mine is approximately 3 miles northeast of La Porte, Colorado and is reached by turning right or northward from U. S. Highway 287 about 2-1/2 miles west of La Porte schoolhouse. From this junction an all weather road traverses a short steep hill to the west embankment of the Poudre Valley Canal, follows along this embankment for about 1/2 mile, crosses to the north side of the canal and extends about 3/4 of a mile eastward to the mine.

The topography of the area is typical of the "hogback" hills that form the terrain between the foothills of the Rocky Mountain Front Range and the Great Plains. The mine is near the top of a ridge, approximately 60 feet lower in elevation than the crest at an estimated altitude of 5,550 feet.

The climate is temperate, warm summers with a moderate amount of rain and mild to cold winters with snowfall typical of the plateau regions of Colo.

There is no timber on the property. The nearest source of natural timber is the "foothills" about 3 to 4 miles westward. Cut timber and lumber, with other supplies, are available at Ft. Collins, approximately 10 miles by road to the southeast. There is no water on the property and the nearest

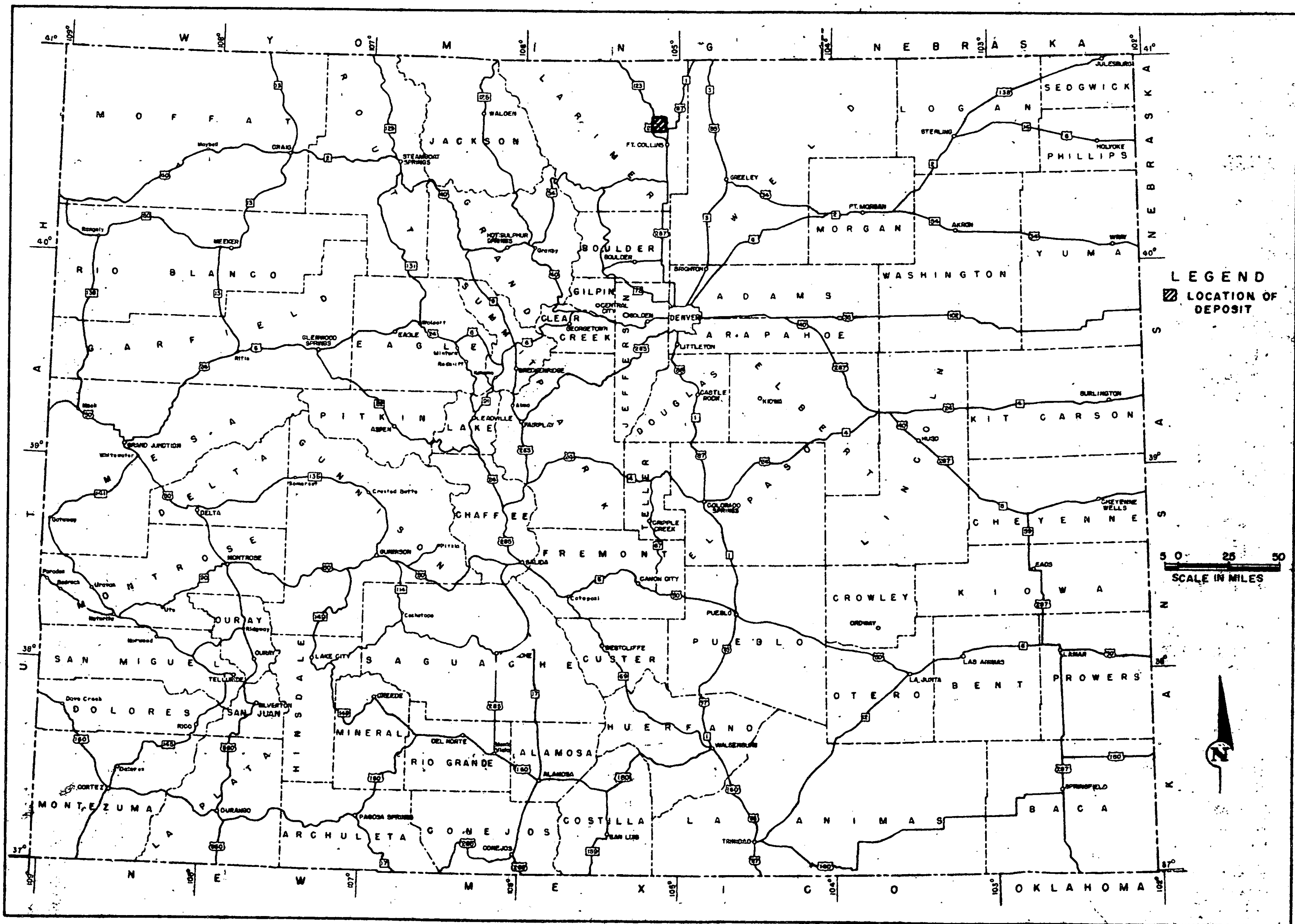

FIGURE 1 - MAP SHOWING LOCATION OF WAHKETA MINE, ELBERT NORTON LEASE, LARIMER COUNTY, COLO. DMEA 4227

source is the Cache La Poudre River which is about a mile to the west.

Labor having mining experience reportedly is available from the nearby towns of La Porte and Bellevue. Equipment and certain materials can be obtained in Ft. Collins or Denver. A single phase R.E.A. power line crosses the property about 1/4 mile from the mine.

HISTORY, PRODUCTION AND OWNERSHIP

Radioactive material was first discovered on this property on Jan. 9, 1955 by Elbert Norton, the applicant. On April 27, 1955 a mining lease on lots 1, 2 and 3, sec. 18, T. 8 N., R. 69 W., sixth principal meridian was obtained by Elbert Norton.

The only production reported from this property was 7 tons derived from underground and near surface workings. This material was shipped to the Atomic Energy Commission Buying Station at Edgemont, South Dakota. The shipment reportedly assayed 0.07 percent U_3O_8.

The property is owned by Guy R. Lawrence and Mayme B. Lawrence of La Porte, Larimer County, Colorado. Their ownership includes all surface and mineral rights. The property is leased to the applicant for mining only for a period of 5 years commencing April 27, 1955. The applicant, or the lessee, is to pay the lessor royalty on uranium ores at the rate of 8% of the net returns from ore valued at $50.00 or less a ton; 12% of the net returns from ores valued at $50.00 to $100.00 a ton and 18% from ores valued over $100.00 a ton. On all ores other than uranium, a royalty of 10% of the net returns. This lease was duly executed by the parties concerned and is recorded on page 17, book 992 in the Larimer County Court House at Fort Collins. The document was listed as Reception No. 694471 and recorded on April 28, 1956.

GEOLOGY

The Norton lease is located approximately 3 miles from Laporte, Colorado along the crest of the Dakota hogback. The exposed sedimentary rocks of the area in ascending order are: the Lykins formation of Permian and Triassic age, the Morrison formation of Jurassic age, and the Dakota group of Cretaceous age which consists of the Lytle formation disconformably overlain by the South Platte formation.

The host rock at the Norton lease is probably the Plainview sandstone member which is the lowermost unit of the South Platte formation. The Plainview sandstone consists of a few feet of carbonaceous shale, siltstone, and thin-bedded sandstone which grade upward into light-gray, fine-grained, medium to thin-bedded, cross-stratified sandstone. The sandstone ranges from 40- to 50-feet in thickness and forms the crest of the Dakota hogback at the Norton lease. Conformably above the Plainview sandstone is a series of intercalated siltstone, shale, silty limestone, and thin bentonitic strata.

The sedimentary rocks in the Laporte area are arched into the Bellevue fold which is an asymetric anticline that plunges to the north. The Norton lease is on the west flank of this structure, and the strata strike N. and dip 15 to 60° to the west. Slickensided surfaces are common along the stratification planes of the more competent sandstone units. No faults other than small amounts of movement along stratification planes were observed.

Uranium Deposits

Abnormal radioactivity (as much as 0.5 mr/hr, background 0.02 mr/hr) is present at several localities along the crest of the Dakota hogback near the base of the Plainview sandstone member. Yellow secondary uranium minerals, sparsely disseminated in the sandstone, were noted in a small prospect pit about 200 feet south of the Wahkota mine, in a small prospect pit about 300 feet north of the south boundary of the property, and about 300 feet north of the Wahkota mine (fig. 2). Material of ore grade was not observed in these

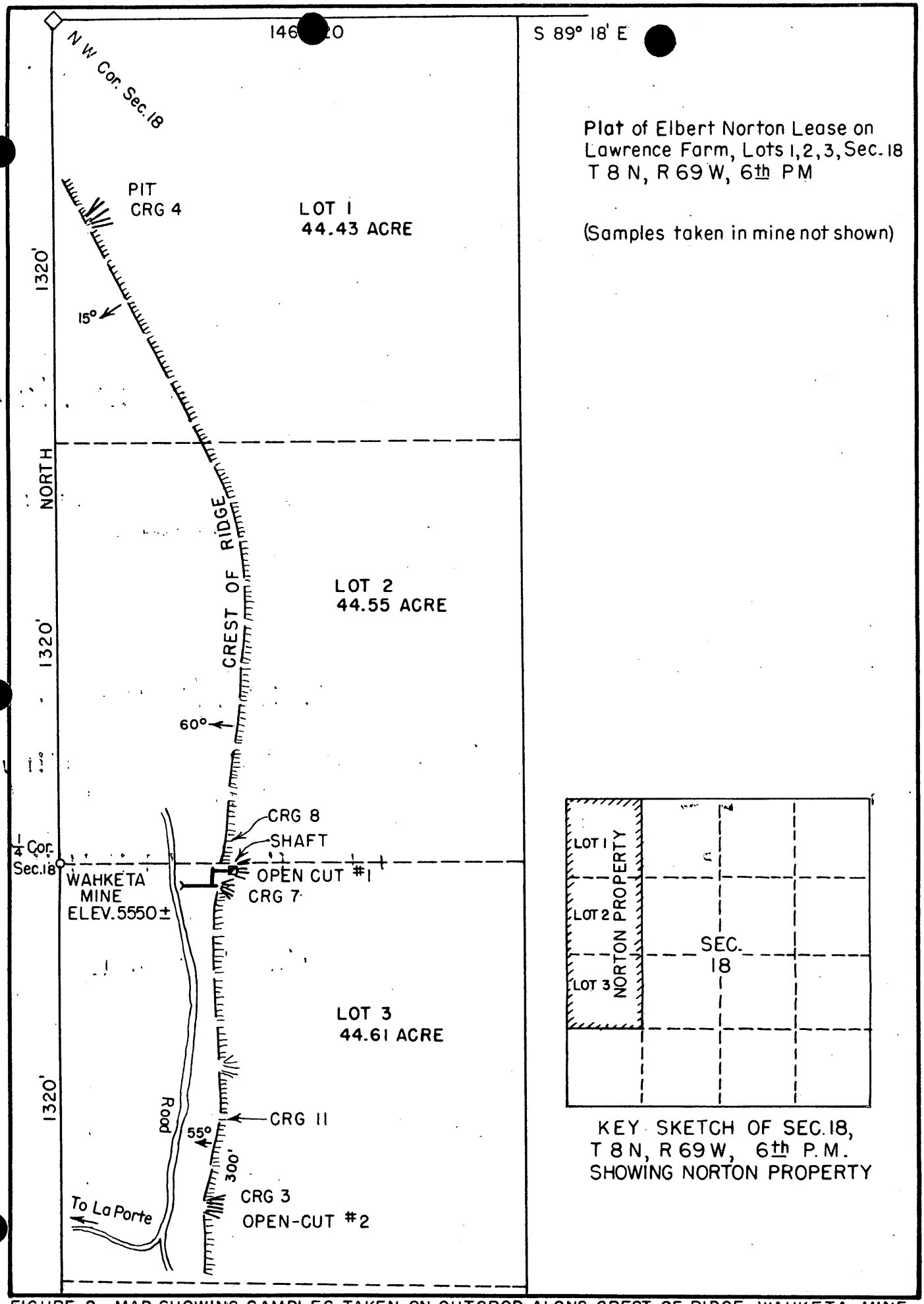

FIGURE 2 - MAP SHOWING SAMPLES TAKEN ON OUTCROP ALONG CREST OF RIDGE, WAHKETA MINE, LARIMER COUNTY, COLO. DMEA 4227

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	U_3O_8 (Percent)	Remarks
CRG-3	0.030	grab sample of Plainview s.s. from open cut #2 300 feet south of mine
CRG-4	0.030	grab sample of Plainview s.s. from open pit 2100 feet north of mine
CRG-7	0.029	grab sample of Plainview s.s. from prospect near the Wahketa mine
CRG-8	0.043	grab sample of Plainview s.s. from 100 feet north of Wahketa mine
CRG-11	0.017	grab sample of Plainview s.s. from 250 feet south of the Wahketa mine

At the Wahketa mine abnormal radioactivity and secondary uranium minerals are present both at the surface and continuously along the shaft and drift. The workings are in the middle part of the Plainview sandstone member. Localization of the uranium-bearing solutions has been caused in part by favorable lithology in the middle part of the Plainview sandstone; 3 feet of the sandstone appears to be 'brecciated' but this appearance probably has been caused by the removal (oxidation) of abundant plant fragments. Several plant impressions were noted. In and near this porous bed, uranium minerals are common as incrustations on slickensided surfaces, along joints, and as disseminations coating sand grains. Although uranium minerals and abnormal radioactivity are widespread, mineable quantities of ore grade material were not observed. The results of analyses of channel samples taken of the most radioactive material underground are tabulated below:

	U_3O_8 (Percent)	Remarks
CRG-5	0.050	3 foot channel sample of Plainview s.s. north side of shaft
CRG-6	0.010	4 foot channel sample of Plainview s.s. south side of crosscut
CRG-9	0.040	3 foot channel sample of Plainview s.s. north side of stope
CRG-10	0.086	4 foot channel sample of Plainview s.s. east side of drift 30 feet north of crosscut.

ORE RESERVES

There are no ore reserves on the property. The one shipment of radioactive material made by the applicant had no commercial value, consequently the radioactive material disclosed in the mine workings and along the outcrop directly above, do not qualify as ore, nor does other radioactive material found along the outcrop on the property.

PRESENT STATUS

At the time of the examination the property was inactive. The applicant had unsuccessfully attempted to drill several holes with a small core drill that was gasoline powered but held by hand. The small bit would bind in the crevices of the sandstone and after it was impossible to extract the drill rods.

At present the applicant has the following equipment on the property which is available for the exploration project:

1 Lokoi portable compressor, 125 c.f.m.
1 Worthington portable compressor, 60 c.f.m.
1 Powerlite, portable light plant, 1000 watt
1 Cleveland jackleg and drill with air hose, connections, etc.
1 Steel mine car, 8-cu. ft. capacity
200 ft. of 10-pound mine rail
1 Geiger counter
1 Scintillator
1 Small core drill, hand held model, gasoline powered, with bit, barrel and rods.

Exploration and Development

At present the exploratory work consists of two open-cuts, a pit along the crest of the ridge, and a crosscut and drift driven into the hill about 57 feet below the crest of the hill. The crosscut and drift penetrated the same formations that are hosts to the uranium deposits found at the surface. An incline shaft connects the underground working with an open-cut at the surface (fig. 2). The initial exploration was performed at open-cut 1 along the crest of the ridge about 400 feet east of the western quarter corner of section 18. Open-cut 2 was excavated on the crest about 1000 feet south of

open-cut 1. The pit was excavated into the east side of the ridge just below the crest about 2,000 feet north of open-cut 1. Following this work a crosscut was driven into the hill about 100 feet southwest of open-cut 1 and approximately 60 feet lower in elevation than the crest of the ridge. The crosscut was driven 94 feet eastward; at 73 feet from the portal, a fractured and brecciated zone was encountered having a relatively strong radiometric count of 0.35 milliroentgens per hour (mr/hr) on a scintillation counter. The applicant drifted northward along this radioactive zone a distance of 58 feet. The drifting was stopped temporarily and a shaft sunk from open-cut 1 to intersect the drift below. Ultimately the shaft was connected with a sub-level about 12 feet above the drift (fig. 3).

Nine samples were collected from the property by the examiners -- 4 from the underground workings (fig. 3) and 5 from surface (fig. 2).

APPLICANT'S PROJECT PROPOSAL

The applicant proposed to extend the present drift 100 feet northward along the brecciated radioactive zone and to drive a crosscut 40 feet eastward from a point about 40 feet north of the present crosscut (fig. 4). The cost of the proposed project, as estimated by the applicant, is $20,399.00. The project would require 8 months for completion. Itemized costs of the project were as follows:

(a) Labor, Supervision, Consultants

2 miners at $336.00/mo. ea. for 8 mos.	$5,376.00
1 supervisor at $800.00/mo.	3,200.00
1 consultant at $100.00 per day	700.00

(b) Operating Materials and Supplies

Dynamite, 80 cases at $13.00 ea.	$1,040.00
Dynamite caps, 20 boxes at $13.00 ea.	260.00
Fuels:	
Gasoline, 600 gal. at $0.20 per gal.	120.00
Lub. oil, 30 gal. at $0.60 per gal.	18.00
Diesel fuel, 800 gal. at $0.15 per gal.	120.00

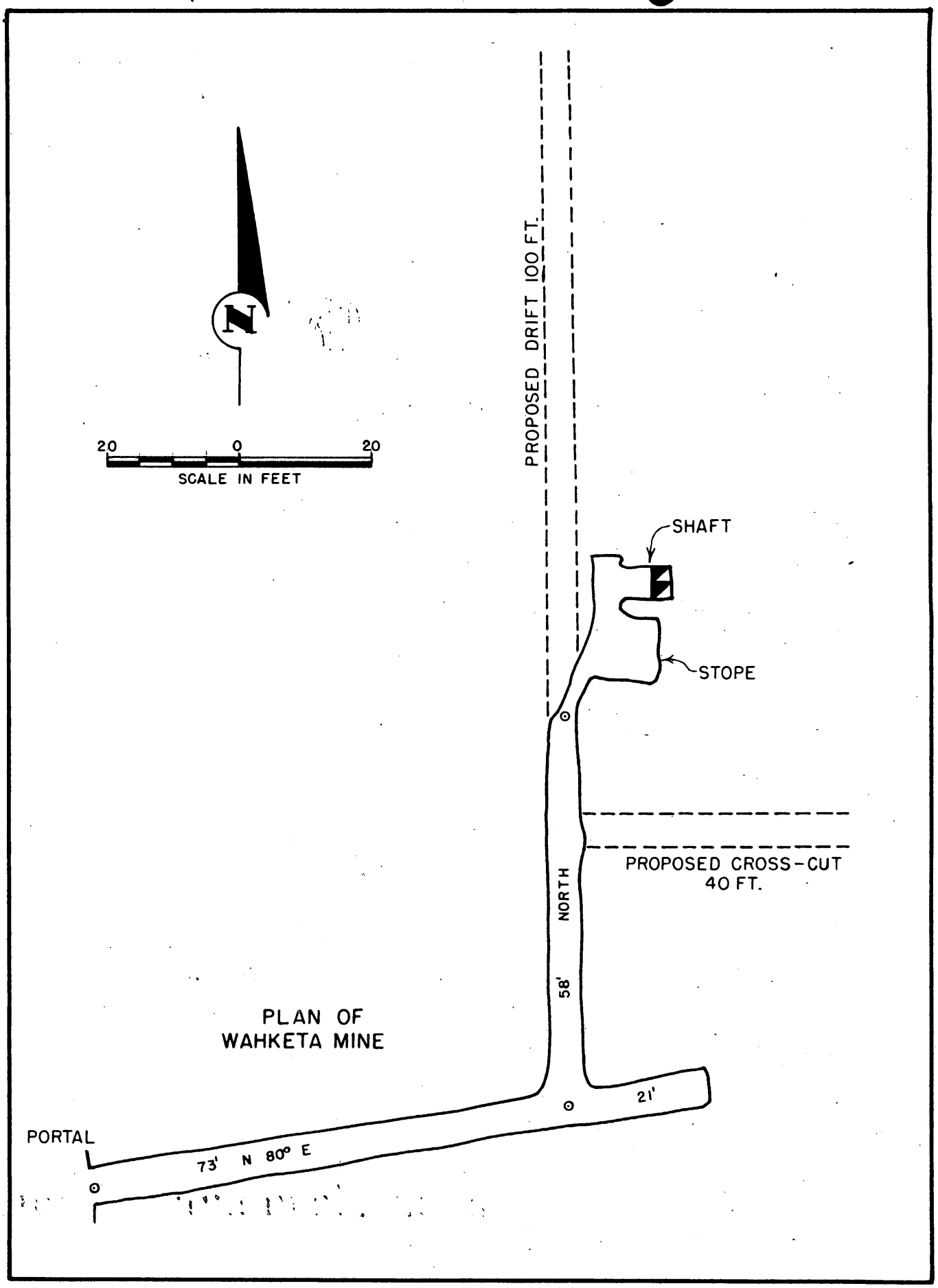

FIGURE 4 - SHOWING MINE WORKINGS AND EXPLORATORY WORK PROPOSED BY APPLICANT, WAHKETA MINE, LARIMER COUNTY, COLO. DMEA 4227

Drill steel	$125.00
Drill bits	300.00
Pipe, couplings, etc.	200.00
Picks	10.00
Shovels	10.00
Small tools	100.00
Rock drill oil	15.00
Track	100.00
Timber	420.00
Nails	10.00
Spikes	10.00

(c) Operating Equipment

LeRoi Compressor, 125 c.f.m. use allowance at $75.00 per month	$1,400.00
Jack leg, hammer and pressure tank at $30.00 per month	240.00
Cat and dozer, 2 mos. at $400 (rental)	800.00
Light plant, 8 mos. at $10.00	80.00
4-wheel-drive truck, used	1,000.00
Geiger counter & scintillation counter at $10.00	80.00
Hole probing equipment	250.00
Micking machine, 6 mos. at $200.00/mo.	1,[illegible].00

(d) New Buildings, Improvements, Installations

Supply and equipment building	$900.00
Privy	150.00

(e) Miscellaneous

Repairs and maintenance	
Repairs to drill steel and drills	$200.00
Repairs to truck	200.00
Sharpening picks, moils, etc.	25.00
Sharpening drill bits, etc.	50.00
Motor repairs	200.00
Analyses	300.00
Accounting costs	200.00
Workmen's compensation and employer's liability insurance	300.00
Payroll taxes	140.00

(f) Contingencies	$500.00	
TOTAL		$20,399.00

An analysis of the foregoing tabulation of costs shows that the applicant's estimate is greatly out of line with normal procedures. For example, 100 feet of drifting and 40 feet of crosscutting would not require

8 months for a crew of 2 men aided by a mucking machine; this work should be accomplished in about 30 to 35 days at most under comparable conditions. Other major costs could be reduced proportionately.

The applicant's proposal is not suitable to explore the subject property. A modified proposal was made which has the approval of the applicant.

MODIFIED PROPOSAL

A modified project was considered by the examiners and the applicant which would explore the property more economically.

The revised project proposes drilling six holes ranging in depth from 129 to 179 feet for a total of 825 feet. About 600 feet of non-core drilling and 225 feet of core drilling are planned (fig. 5).

Cuttings must be accurately checked by a Geiger counter, while drilling is in progress to determine when coring should start. All cores are to be saved and stored in adequately constructed core boxes for examination by DMEA inspectors. When coring starts all sludge material is to be saved and properly identified. The size of the hole is to be no less than 2-5/16 inches (EX diamond drill bit) in diameter, and the drilling should be performed in such a manner to assure maximum core recovery. Complete logs of each hole should be kept by the drill crew.

The six drill holes are to be located as follows (fig. 5): (a) drill hole 1 is 40 feet west and 60 feet north of the portal of the Wahketa mine. The hole is to be directed to the east at an angle of 45° from the horizontal and will penetrate the mineralized zone which is estimated to occur at a depth of 126 feet; (b) drill hole 2 is 65 feet west of drill hole 1 and should be directed eastward at an angle of 60° from the horizontal to an estimated depth of 179 feet; (c) drill hole 3 is located 300 feet north of the portal of the Wahketa mine, and will be directed eastward at an angle of 45° to an estimated depth of 130 feet; drill hole 4 is located 300 feet south of the

portal of the Wahketa mine and will be directed eastward at an angle of 45° to an estimated depth of 130 feet; drill hole 5 will be located by the field team after the completion of drill holes 1 to 4, although it probably will be located approximately 1,000 feet south of the portal of the Wahketa mine and will be directed eastward at an angle of 45° to an estimated depth of 130 feet; drill hole 6 will be located by the field team after the completion of drill holes 1 to 5, although it probably will be approximately 900 feet north of the portal of the Wahketa mine and directed eastward at an angle of 45° to an estimated depth of 130 feet. Figure 6 shows a geologic cross-section through Wahketa mine and drill holes 1 and 2.

This small project will require considerable preparatory work. It is necessary to construct about 1500 feet of access roads and level all drill sites. Road construction will require some blasting over rock outcrops. Drill hole locations can be surveyed by a supervisor-engineer. A small allowance is made for bookkeeping.

The costs of the project as modified are estimated as follows:

[illegible] PROPOSAL
ESTIMATED COSTS

Item	Distribution 285' Core	Distribution 600' Non-Core	Costs
1. Preparation for drill sites-dozer 20 hrs. at $10.00/hr. with operator	$50.00	$150.00	$200.00
2. Drilling -600 ft. non-core at $1.75 per ft.		$1,050.00	
285 ft. core at $2.75 per ft.	$618.75		
Core boxes, sample bags, etc.	25.00		$1,693.75
3. Supervision and Labor			
Supervising Engineer, 2 wks. at $125.00 per wk.	$125.00	$125.00	
Accounting - 2 wks, at $50.00 per wk.	50.00	50.00	
Labor - 1 man, 10 days at $1.50 per hr.	60.00	60.00	
	$235.00	$235.00	$470.00
4. Equipment Rentals			
1 Lobai compressor, 125 c.f.m., 20 hrs. at $4.20 per hr.	$42.00	$42.00	
1 Cleveland drill, 20 hrs. at $0.30 per hr.	3.00	3.00	$90.00
5. Fuels, etc.			
Gasoline - 50 gals. at $0.20 per gal.			
Lub. Oil - 10 qts. at $0.45 per qt.			
Drill Oil - 1 gal. at $1.00 per gal.	$10.00	$10.00	$20.00
6. Explosives			
200 pounds - 40% Gel. at $22.00 cwt.			
200 caps - #6 at $1.50 per C			
400 feet - Fuse at $2.50 per C	$28.50	$28.50	$57.00
7. Incidental Expenses			
Miscellaneous Supplies $200.00	$100.00	$100.00	$200.00
TOTAL	$1,112.25	$1,618.50	$2,730.75
Average Cost per foot	4.943	2.70	3.31

PROPOSED FINANCING

Elbert Norton, the applicant is prepared to furnish his share of the costs of the proposed exploration in cash, supervision and supplying some equipment.

CONCLUSIONS

The results of this examination show that significant quantities of ore grade material are not present either at the surface or in the present underground workings. Further exploration by extending the present underground workings of the Wahkota mine, as proposed by the applicant, is not advisable.

However, the apparently thoroughly oxidized character of the host rock, the widespread radioactivity, the presence of uranium minerals and the lack of geologic data concerning habits of uranium mineralization in this area, are favorable factors toward sanctioning a limited drilling program. This drilling program would result in proving a new significant source-area for uranium.

RECOMMENDATIONS

The exploration project as outlined by the examiners is recommended for approval. The locations of the drill holes concerned in this project are shown on figures 5 and 6. It is also recommended that a short form contract be completed where all costs will be combined in non-core drilling and core drilling.

The Government's share of this project would be 75 percent of $2,730.75 or $2,048.06 calling for 225 feet of core drilling at $4.94 per foot and 600 feet of non-core drilling at $2.70 per foot. The drilling work must be done by a reputable drilling company which will be chosen from at least three bidders. Road and drill-site preparation can be done by contract or by the applicant.

4-16-56

RECEIVED
APR 1 3 1956

April 11, 1956

Memorandum

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

From: Superintendent, Denver Experiment Station, Reg. III

Subject: Docket DMEA 4227 (Uranium), Elbert Norton (Wahketa Mine) Larimer County, Colorado

The subject application in the amount of $20,399.00 was received in this office on April 11, 1956.

A field examination will be made and suitable report prepared by an engineer from the Denver office.

JOHN F. SHAW
John F. Shaw

cc: W. M. Traver (2)
E. M. Harshman
J. F. Shaw
Sec. Op. Com. 2

RECEIVED
APR 1 1 1956

April 11, 1956

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cc: W. M. Traver (2)
E. N. Karshman
J. F. Shaw
Sec. Op. Com. 2

4-12-56

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

RECEIVED
APR 1 3 1956

April 10, 1956

224 New Customhouse
Denver 2, Colorado

Memorandum

To: J. F. Shaw (2) (With brochure)
E. N. Harshman

From: Field Team, Region III

Subject: Docket DMEA 4227 (Uranium), Elbert Norton (Wahketa Mine)
Larimer County, Colorado

Enclosed is the subject application in the amount of $20,399.00. A field examination and suitable report are requested.

Also enclosed for your information are a copy of a letter from the Chairman, Operating Committee dated April 5, 1956 and memoranda of review of the application by N. E. Nelson and James Paone.

DMEA Field Team, Region III

W. M. TRAVER,

By W. M. Traver
Executive Officer

Enclosures

HMC:ab

cc: Chair. Op. Comm. (2)
Docket 4227
Chron.

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

RECEIVED
APR 1 0 1956

April 10, 1956

224 New Customhouse
Denver 2, Colorado

Memorandum

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E. N. Harshman

From: Field Team, Region III

Subject: Docket DMEA 4227 (Uranium), Elbert Norton (Wahketa Mine)
Larimer County, Colorado

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Also enclosed for your information are a copy of a letter from the Chairman, Operating Committee dated April 5, 1956 and memoranda of review of the application by N. E. Nelson and James Paone.

DMEA Field Team, Region III

W. M. TRAVER,

By W. M. Traver
Executive Officer

Enclosures

HMC:ab

cc: Chair. Op. Comm. (2)
Docket 4227
Chron.

Surname copy

700

Ching
Nelson
Selfridge

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

APR 5 1956

Mr. W. H. Traver
Executive Officer
DMEA Field Team, Region III
124 New Customhouse
Denver 2, Colorado

Re: Docket No. DMEA-4227 (Uranium)
Elbert Marton
Wahkeena Mine
Larimer County, Colorado

Dear Mr. Traver:

The subject application is being referred to you for investigation, a field examination if warranted, and recommendations. A copy of the application was retained by your office.

Enclosed are two copies each of memoranda, dated March 28 and 29, 1956, from N. E. Nelson, USGS, and James Fraome, USBM, respectively.

In the event a contract is recommended by the Field Team a Consent to Lien would be required of Guy R. Lawrence and Wayne R. Lawrence.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (HB)

Enclosures

MChing/gla
4-3-56

APPROVED:

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

N. E. Nelson (HB)
Member, Geological Survey

cc to: Admr.'s Reading File
Operating Committee
Docket
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA
Code 700
Mr. Ching

R.C.L.

Surname copy

700

Ching
Ellis
Nelson
Gelhaus
Selfridge
Fitzsimmons

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

APR 5 1956

Mr. Elbert Norton
200 South Meldrum Street
Fort Collins, Colorado

Re: Docket No. DMEA-4227 (Uranium)
Wahkota Mine
Larimer County, Colorado

Dear Mr. Norton:

The application for assistance in exploring your property, 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:

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

Administrator

MChing/gla
4-3-56
cc to: Admr.'s Reading File
Docket
Code 700
Mr. Ching
DMEA Field Team, Region III (2)

R.C.G.

3/30/56

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

March 29, 1956

Memorandum

To: Ernest William Ellis, DMEA Member
Uranium Commodity Committee

From: James Paone, Bureau of Mines Alternate Member
Uranium Commodity Committee

Subject: Application for Assistance, DMEA Docket 4227, Lawrence Farm Uranium Prospect, Larimer County, Colorado

I have reviewed the attached application, Lawrence Farm Uranium Prospect, dated March 19 and received in this office March 27. I have also discussed it with Joseph O. Hosted, Washington representative of the Atomic Energy Commission.

The applicant has requested Federal aid to explore for uranium on a group of claims located in Larimer County, Colorado. Several methods of exploring the property have been suggested and from them it is inferred that the project would include a significant footage of tunneling and drifting, a considerable amount of bulldozing, and an undetermined number of diamond-drill long holes. The total estimated cost of the project is $20,399.

The purpose of the project is to investigate an anomalous surface area. Some surface rock shipped to the Edgemont, South Dakota, buying station assayed .07 percent U_3O_8. Samples from existing tunnels failed to indicate the presence of ore-grade material.

It appears that the property does not merit an exploration program at this time; however, the application could be referred to the field for information they may have regarding the subject area.

Mr. Hosted recommends that the application be sent to the Field Team and that they consult with D. L. Everhart, Atomic Energy Commission, Denver, Colorado.

James Paone

James Paone

Attachment

3/30/56 gla

IN REPLY REFER TO:

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

RECEIVED
MAR 29 1956

March 28, 1956

Re: DMEA 4227
Elbert Norton
Wahketa Mine
Larimer Co., Colorado
$20,399.00 - Uranium

Memorandum

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

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

Subject: Review of application.

The applicant requests assistance in exploring by stripping, crosscutting, and drifting occurrences of radioactive material in brecciated upturned shales, believed to be rocks of the Dakota formation. Apparently a considerable width of shale under the rim rock is slightly radioactive and a gouge zone somewhat more so. The gouge zone has been explored by open cuts, a drift, a stope and an upraise to a large open cut. From the near surface openings, 7 tons of material was saved and shipped which assayed 0.07% U_3O_8.

The applicant conceives that the uranium has been leached from the broken, near surface rocks and has been redeposited down dip.

The drift work proposed will gain depth as the drift is advanced northward into the hill and will reach a point down dip of a "hot spot" in an open cut. MR/Hr readings of 1.0 to 2.0 appear to have been obtained in several places and an assay of 1.84% U_3O_8 is reported. Radiometric readings of variable intensity are reported as having been had for three-fourths of a mile.

Underground work proposed consists of a 40-foot crosscut in the shales in the footwall of the gouge zone, and a 100-foot extension to the 70 drift which follows the zone. The estimated cost of the work is $20,399.00.

Referral to the Field Team for suitable action 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
MAR 29 1956

March 28, 1956

Re: DMEA 4227
Elbert Norton
Nahketa Mine
Larimer Co., Colorado
$20,399.00 - Uranium

Memorandum

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

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

Subject: Review of application.

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The applicant conceives that the uranium has been leached from the broken, near surface rocks and has been redeposited down dip.

The drift work proposed will gain depth as the drift is advanced northward into the hill and will reach a point down dip of a "hot spot" in an open cut. MR/Hr readings of 1.0 to 2.0 appear to have been obtained in several places and an assay of 1.04% U_3O_8 is reported. Radiometric readings of variable intensity are reported as having been had for three-fourths of a mile.

Underground work proposed consists of a 40-foot crosscut in the shales in the footwall of the gouge zone, and a 100-foot extension to the 70 drift which follows the zone. The estimated cost of the work is $20,399.00.

Referral to the Field Team for suitable action is recommended.

N. E. Nelson

N. E. Nelson

NENelson:iml
G-3/28/56
cc: Director's reading, 4212
Branch reading, 4212
DMEA (3); Docket file
J. E. Crawford, 3641; J. G. Rosted, 3210

Subject: DMEA-4227
Re: Wahketa Mine

Elbert Norton
200 South Meldrum St.,
Fort Collins, Colorado

March 26, 1956

Dear Sir:

The receipt of your application dated March 19, 1956 for exploration assistance under the Defense Production Act of 1950, as amended, is hereby acknowledged.

Your application has been assigned Docket Number DMEA-4227 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

March 26, 1956

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: Chief, Operation's Control and Statistics Division

Subject: Assignment of Docket Number

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

DMEA - 4227 Elbert Norton

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

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

RECEIVED
MAR 26 1956

March 23, 1956

224 New Customhouse
Denver 2, Colorado

4227

Memorandum

To: Secretary to the Operating Committee, DMEA

From: Field Team, Region III

Subject: Application for DMEA Aid (Uranium), Elbert Norton, Wahketa Mine, Larimer County, Colorado

Enclosed are three copies of the subject application in the amount of $20,399.00. One copy of the application is being retained in our file.

DMEA Field Team, Region III

By W. M. Traver
Executive Officer

Enclosures

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

DMEA
Date Rec'd.
Form Approved.
Budget Bureau No. 42-R1035.2.

MAR 23 1956

DMEA Date Rec'd. MAR 20 1956

RECEIVED MAR 23 1956 BUREAU OF MINES Denver, Colorado

BUREAU OF MINES DENVER, Colorado

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. 4727
Metal or Mineral Graphite
Date Received 3-26-56
Estimated Cost 70,399.
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: Elbert Norton
200 South Meldrum Street
Fort Collins, Colorado

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

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

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

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 Lots 1, 2, and 3, Section 18, TWP 8N, Range 69 W., of the 6th P.M. Larimer, County, Colo.

(*b*) State any mine name by which the property is known. Wahketa Mine

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

(*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. Lease enclosed

(*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 minerals

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

(*c*) The work will start within 10 days and be completed within 8 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.). NONE

(*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 [X] 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 March 19, 1956

Elbert Norton
(Applicant)

By

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

4. Physical description --

(a) The mine workings consist of a crosscut, two open cuts, and a small open pit. An explosives storage compartment and a steel cap storage box have been located an appropriate distance from the workings.

In the No. 1 open cut, the well mineralized cracks and crevices show radiometric readings of 0.30 to 1.2 MRHr and wet assays range from .03% to 1.84% U_3O_8. The original brecciated area, carrying the uranium minerals, was not wide. A shaft was made, and as this shaft deepened, the original streak was found to be well mineralized, especially on freshly broken surfaces which read 1.0 to 2.0 MRHr. 3.3 feet of this was bordered by a clearly defined fault and a narrow shale bed. The shaft was later joined by a crosscut from the opposite or west side of the Dakota ridge.

This crosscut passed through beds of shale and bentonite and encountered a gouge and breccia filled fissure at 74 ft. and was carried on to 94 ft. in length. The gouge-breccia fissure encountered here was followed northerly and a stope was made to connect to the bottom of the shaft from the No. 1 open cut. To a distance of 70 ft. from the entrance, very little mineralization occurs. The remaining 25 ft. have consistent radiometric readings of 0.10 MRHr or more. The 3 ft. at the end of the crosscut have readings from .16 to .20 MRHr.

The drift, 65 ft. in length, has radiometric readings varying from 0.10 MRHr to 1.0 MRHr.

In open cut No. 2 the radiometric readings range up to 0.90 MRHr. The cut is 130 feet south of cut No. 1, and is 7 feet deep and 25 feet wide.

The exploratory open pit is at the south end of the lease and only 3 feet in depth. Rock from this pit assayed .08% U_3O_8. The radiometric readings range from 0.10 to 0.70 at numerous places along the outcrop for a distance of three fourths of a mile.

(For more detailed information see enclosed Engineer's Report and Preliminary Evaluation.)

(b) There are no defined ore reserves. A preliminary shipment of 7 tons of rock to Edgemont, South Dakota, assayed .07% U_3O_8 This was virtually surface rock.

(c) The geological structure is a portion of the Dakota Hogback, running northerly through the lease, with its ridge about 500 feet east of the west line. At the south end of the area the ridge is at 5540 feet above sea level. At the NW corner of Lot No. 2 the ridge is at 5660 feet. A prominent gulch comes into this ground at the NW corner at an elevation of 5600 feet. This Dakota ridge has a steep easterly slope and a more gentle slope into a basin southwesterly.

Below the Dakota Sandstone ridge which varies in depth from 30 to 100 ft., is the upturned strata of the Morrison formation. These Morrison beds extend down the East slope 400 feet to the slick rock. The Morrison consists here of alternate shale and crossbedded sandstones.

The crest of the ridge is composed of black shales and white sandstones, in which movement along the bedding planes has taken place, as shown by slickensided surfaces.

It is in these beds that the uranium minerals have been found, in cracks and on surfaces and slightly infiltrated into the grain of the sandstone. In the surface rock the uranium is fluorescent. This fluorescence is lost as depth is gained.

(See Engineer's Report and Preliminary Evaluation for further detail.)

(d) Access roads: A mine access road has been bulldozed along the ridge on its west side. This road on its upward course crosses the Poudre Valley Canal and winds around the basin in Sec. 13. It is passable by jeep, pickup or truck, except when the canal carries water. A shortcut, lower level road has recently been dozed to the entrance of the crosscut. Highway 287 is 3/4 mile from the subject property.

Distances to shipping: A railroad siding at Ted 's Place is about four miles distance from the mine entrance. Shipping could be done from here to Edgemont, South Dakota.

Residence and Supply Points: LaPorte is within three miles of the lease and there are ample facilities for housing and supplying families of workmen at this town. Three fourths of a mile from the mine are several small cabins where miners might live at a very reasonable rental rate.

(e) Availability

Manpower is available for this project. Four miners of many years' experience live within four miles of the mine location and all have expressed their desire to work on the proposed project.

Materials, supplies and equipment are available either in Fort Collins (7 miles distant) or Denver (65 miles distant). Anything not available in Fort Collins can be sent out by truck from Denver on regular truck lines.

Water is available one-half mile from project.

Power -- The R.E.A. power line is one fourth mile from this lease. At present a small gasoline generator furnishes lights and there is a 125 C.F.M. gasoline air compressor on the property.

5. The exploration project --

(b) In sketch No. 1 the approximate locations of the proposed developments are given. Proposal (7) would extend the tunnel under an area of high surface readings on the outcrop in a brecciated area (8). At likely appearing areas along tunnel walls, ceiling and floors, 5 ft. to 10 ft. test holes will be drilled and probed. (For details see Engineer's Report, Preliminary Evaluation, Map of Lease, Plats 1 and 2.)

(d) Elbert Norton, the applicant, has been engaged in exploring and developing the subject property for the past year. He has an A.B. degree from Colorado State College, and graduate work at the University of Chicago. He has served in administrative capacities in schools in Weld, Otero, and Washington counties in Colorado, and in Vista, California. In these capacities it was necessary to supervise employees. At Consolidated Vultee Aircraft Corporation in San Diego, California, he received further experience in supervisory capacity as Lead Man and Foreman of Inspection on the PB2 Y3 production line. During the past year he has supervised the exploration and development work at the Norton mining lease. The present tunnel and drift are 164 ft. in length.

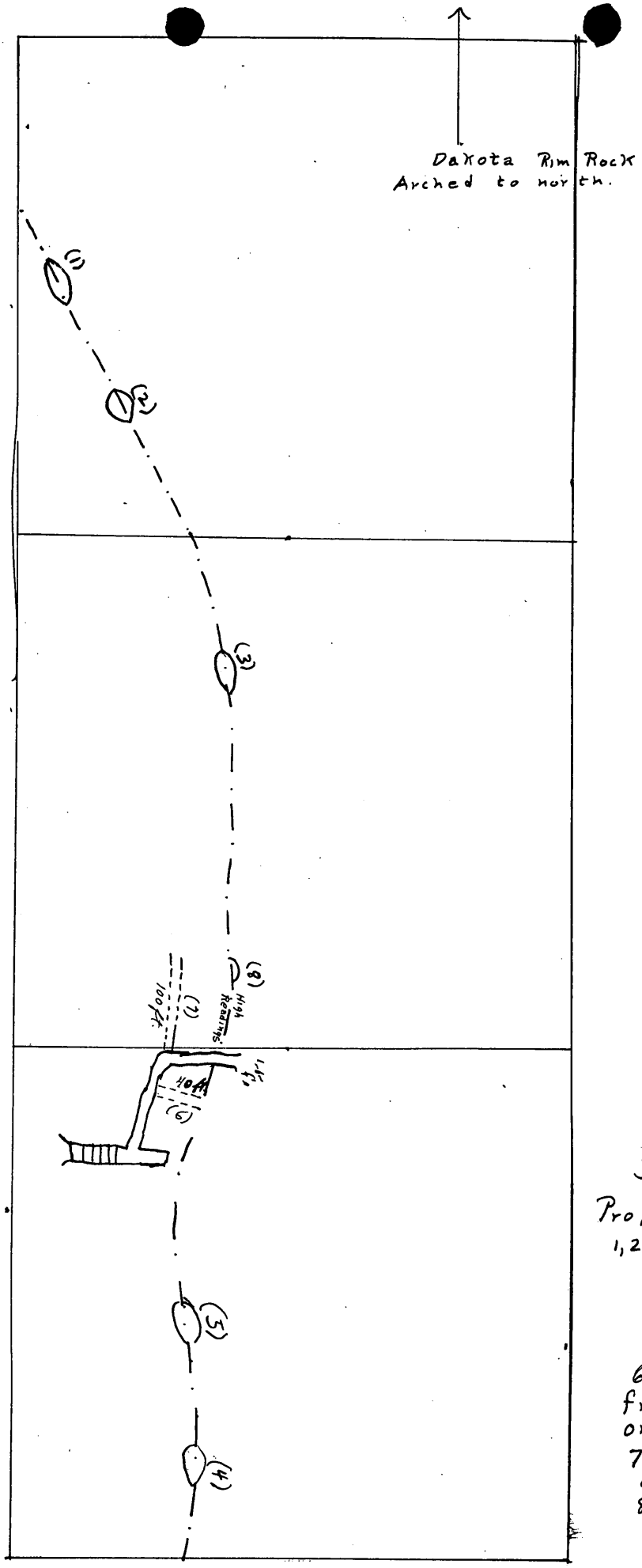
Mr. Warren C. Prosser is an outstanding mining engineer of long experience (Colorado Registered Professional Engineer No. 30). He will act in a consultant capacity.

The men who will be doing the labor are experienced miners and prospect developers, having worked at this for thirty years.

6. Estimate of costs —

(b)	Labor, supervision, consultants	
	2 miners, @ $336 mo. ea.	$5,376
	1 supervisor, @ $400 mo.	3,200
	1 consultant, 7 days, @ $100 per day	700
(c)	Operating materials and supplies	
	Dynamite, 80 cases @ $13.00 ea.	1,040
	Dynamite caps, 20 boxes @ $13 ea.	260
	Fuel	
	Gasoline, 600 gal. @ 20¢	120
	Oil, 30 gal. @ 60¢	18
	Deisel fuel, 800 gal. @ 15¢	120
	Drill Steel	125
	Bits	300
	Pipe, couplings, etc.	200
	Picks	10
	Shovels	10
	Small tools	100
	Rock drill oil	15
	Track	100
	Timber	420
	Nails	10
	Spikes	10
(d)	Operating equipment	
	125 C.F.M. Leroi Compressor, use allowance @ $175 mo.	1,400
	Jack leg, hammer and pressure tank, $30 mo.	240
	Cat & dozer, 2 mo. @ $400 (rental)	800
	Light plant, 8 mo. @ $10	80
	4 wheel drive truck, used	1,000
	Geiger counter Scintillation counter) @ $10 mo.	80
	Hole probing equipment	250
	Mucker, 6 mo. @ $200	1,200
(f)	New buildings, improvements, installations	
	Supply and equipment building	900
	privy	150
(g)	Miscellaneous	
	Repairs and Maintenance	
	Repairs to drill steel and drills	200
	Repairs to truck	200
	Sharpening picks, moils, etc.	25
	Sharpening drill bits, etc.	50
	Motor repairs	200
	Analyses	300
	Accounting costs	200
	Workmen's compensation & employer's liability ins.	300
	Payroll taxes	140
(h)	Contingencies	500
	Total	~~$20,399~~ ($20,399)

7. (b) Use allowance on equipment which I either own at present or am in the process of purchasing will amount to $1720 for an eight month period. The remaining $3,380 will be paid in cash as needed.



Sketch I of
Proposed development
1, 2, 3, 4, 5, = Proposed open cuts (Readings at Surface = 4 to 10 times background)

6. = Proposed crosscut from north drift of orriginal development.
7. = Proposed extension of orriginal tunnel.
8. = Surface Reading at base of Rimrock 1.0 M.R. Hr.

E. Norton

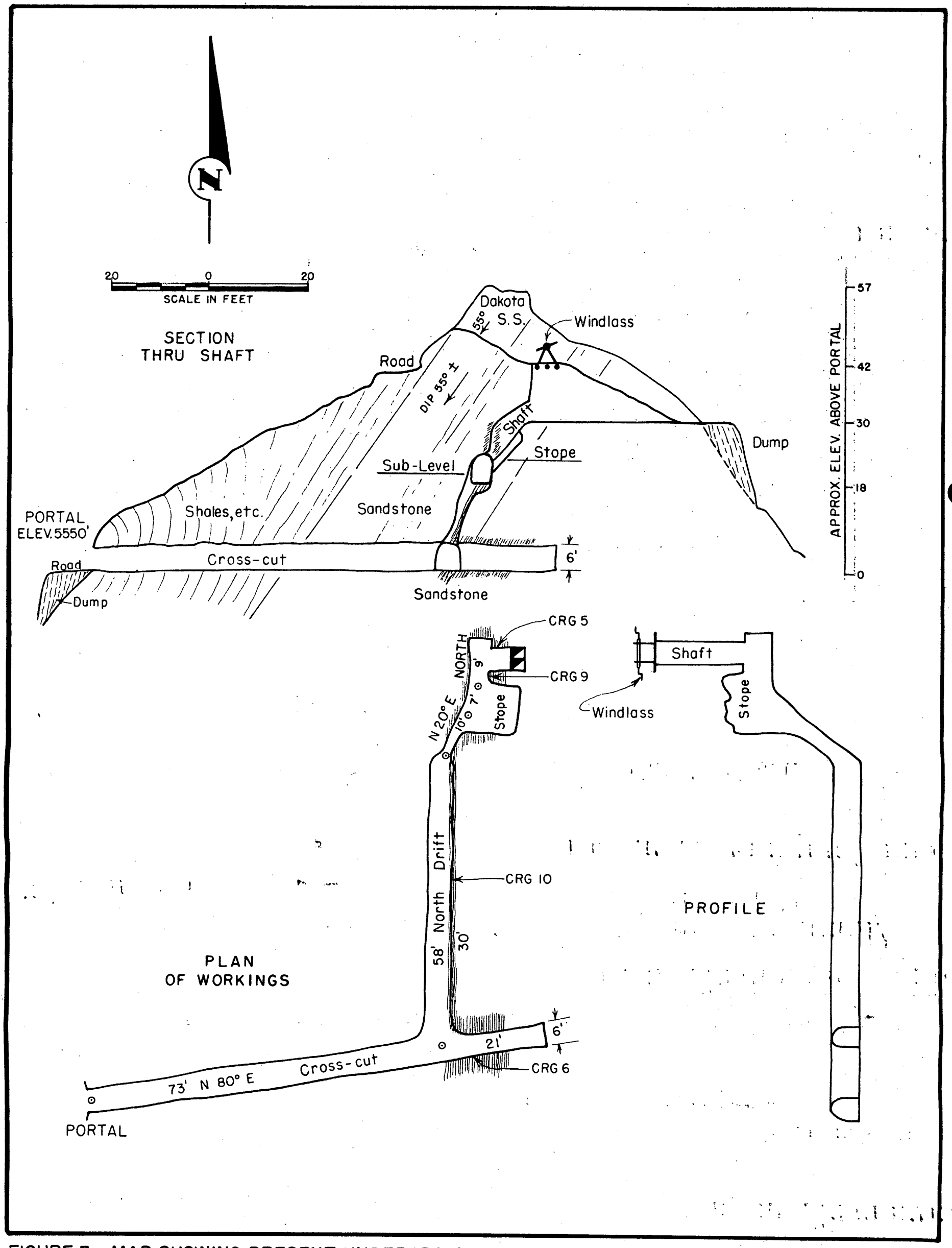


FIGURE 3 - MAP SHOWING PRESENT UNDERGROUND WORKINGS AND LOCATION OF SAMPLES COLLECTED EXAMINERS, NORTON LEASE, WAHKETA MINE, LARIMER COUNTY, COLO. DMEA 4227

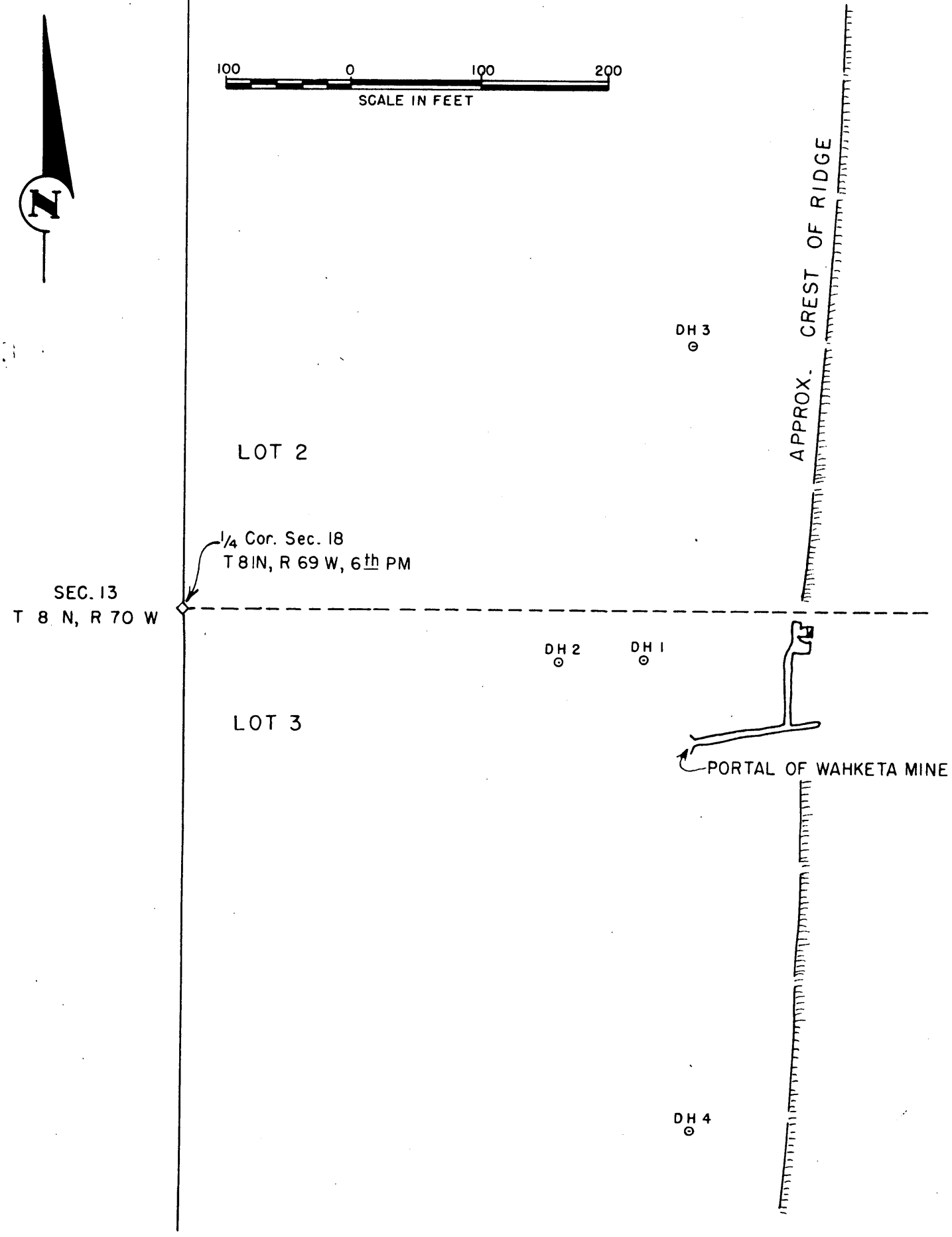


FIGURE 5 - SKETCH SHOWING LOCATION OF DRILL HOLES AS PROPOSED BY EXAMINERS, NORTON LEASE, WAHKETA MINE, LARIMER COUNTY, COLO. DMEA 4227

Additional Report in the PRELIMINARY EVALUATION OF THE NORTON LEASE, LAWRENCE FARM Larimer County, Colorado. Warren [redacted], Consulting Mining Engineer. March 1, 1956

This additional Report is part of the Preliminary Evaluation of the Elbert Norton Uranium Lease on part of the Lawrence Farm, in Larimer County, Colorado, more particularly described as the W½ of the NW¼ and the N½ of the W½ of the SW¼ of Sec. 18, T 8 N, R 69 W of the 6th Prin. Mer.

It is made at the request of Elbert Norton of Fort Collins to cover a crecent examination, February 23, 1956, of the new development work accomplished on this lease, in opening a uranium deposit in the Dakota Rim Rock existing there.

In the No. 1 open cut, described in previous reports, situated at the top of the Dakota Rim Rock, the well mineralized surface cracks and crevices showed radiometric readings of 0.30 to 1.2 MRHr. The original brecciated area, carrying the uranium minerals, was not wide. Across 12 to 14 ins. of its width it read 0.20 MRHr. As the shaft deepened and broke over to the west, the original streak was found to be well mineralized, especially on freshly broken surfaces in quartzose rock that showed little evidence of leaching. Surfaces of broken pieces here read 1.0 to 2.0 MRHr. 3.3 ft. of this was bordered by a clearly defined fault and a narrow shale bed.

About half way to the entrance of the open cut, a patch of carnotite ore appeared in brecciated, quartzose Dakota sandstone and read 0.01 MRHr net. This in appearance is a good indicator.

As work progressed down the shaft, the 3.6 ft. area across the north end of the sub level read 0.15 MRHr. Below this sub level in the stope the brecciation increased and liberal gouge filling of the fractures put in an appearance. Across 3.2 ft. of the shale, surmounting the gouge in the south end of the stope a reading of 0.20 to .30 MRHr was taken. In this stope, brown seams and slickensided surfaces gave similar readings.

From the west slope of the ridge, leading into the basin, a crosscut has been driven W 75° E as shown on Plat 2. This passed through beds of shale and bentonite and encountered a gouge and breccia filled fissure at 74 ft. and was carried on to 94 ft. in length. The gouge-breccia fissure encountered here was followed northerly and eventually a stope was made to connect to the bottom of the shaft from the No. 1 open cut. In this crosscut, the country rock from the portal to the gouge filled fissure read .02 to .03 MRHr or nothing over the backcount, apparently barren of uranium minerals. Northeast of the gouge filled fissure which was followed north the radiometric readings were 0.10 MRHr consistently and 3 ft. at the end of the crosscut read 0.16 to 0.20 MRHr.

Several drill holes have been run into the walls of the north drift and one of these in the footwall and one in the hanging wall, between Stations d and e showed a count on probing of 150 counts per minute.

In this drift and in the stope, seams of clay were developed ¼ in. thick, consisting of fine grained brown to pinkish clay minerals, surfaced with greenish colored, waxy textured crystals, which showed no radio activity.

Throughout the workings there is evidence of leaching and the accumulation of clay and gouge in openings. In freshly broken rock, which shows no signs of leaching, some relatively fresh uranium minerals exist on fracutured surfaces. Secondary minerals which fluoresce have been found generally, only near surface.

Assuming that the original uranium minerals may have been any of the following: Hydrated oxides, Sulphates, Carbonates, Phosphates, Asrenates and Silicates; at the outcrop, the ore carrying such minerals together with Jarosite and Alunite (the potassium, iron and potassium aluminum, hydrated sulphates) could easily become oxidesed and as such made water soluble, subject to leaching and being carried downward into the porous and brecciated, siliceous Dakota sandstone, which at this position is dipping -62° to the west with the horizontal.

In general the effect of oxidation would be to decrease the mineralogic tie up of the Uranium and Vanadium, release Uranium, Iron and possible copper to form new compounds and these oxidized compounds would be rapidly removed from the outcropping parts of the deposit. Vanadium, fixed in Carnotite or tyuyaminite would be relatively insoluble but most of the other Vanadates have a significant solubility in ordinary ground water.

For comparative values in connection with this examination, any Geiger counter readings over 0.60 MRHr. should constitute pay uranium ore.

The greatest depth here below the outcrop is approximately 65 ft. The appearance of residual gouge and clay indicates that leaching was carried to this depth and beyond. Recrystallized minerals of uranium and vanadium would be found below the tunnel level and could be found within a few tens of feet, depending upon the depth of the water level.

The inclination of the Dakota Ridge, leads into a closed basin, which presents a natural trap for both original and leached and recrystallized minerals. It presents a prospect which can be best proved by drilling, prior to other types of exploration.

OTHER SURFACE INDICATIONS

At Stations 1 & 2, Plat 1, a slick rock is exposed which appears to be Morrison. Here the dip of the Strate is -67° Westerly. 40 ft. up the slope of 20° from the top of the slick rock is Sta. A. In the next 115 ft. up the slope are met tan and yellow colored sandstones, conglomerate and chert. For the next 155 ft. the slope is covered with wash, until a 4 ft. bed of conglomerate is reached, which may mark the base of the Dakota sandstones. Here the strata dips 55° to the west. The next 93 ft. up the slope traverses brown, tan crossbedded sandstones; yellow sandstones with iron nodules and bleached sandstones with blue manganese stained surfaces. At 411 ft. up the slope from Sta. A is the top of the sandstone with the blue surfaces, which provides the similar float on the hillside below. At this point a swale 111 ft. across in a westerly direction is present, where the radiometric reading is 0.02 to 0.03 MRHr above the backcount.

North of this line of section just described, 300 ft. the slope is marked by hummocks and ridges of detritus which consistently give readings of 0.01 to 0.02 MRHr above the backcount. This was followed up the slope to the Dakota rim rock. Here the shale beneath the rim rock increased in count by 0.02 to 0.03 MRHr. The dip of the rim rock here is -15° Westerly, preceptably flattened and in great contrast to the steep rim rock xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx to the south. To the north of this position of the rim rock some several hundred feet the strata is completely arched in about Section 7. This arching probably covered the strata to the southeast, which is now eroded away.

CONCLUSIONS.

Based on evidence which I must admit is fragmental and incomplete, THE CHANCES OF URANIUM MINERAL EXISTING BELOW THE PRESENT WORKINGS IN COMMERCIAL QUANTITIES IS GOOD AND WORTHY OF FURTHER DEVELOPMENT.

A zone of the Dakota sandstone, now opened for 30 ft. in the open cut and 21 ft. on the east end of the crosscut, is crackled, brecciated, slickensided, and in this narrow gouge filled faults and fissures occur, so that the zone presents itself as a prospective mineralized area. At lower elevations approaching the ground water level this zone may be found mineralized in a commercial manner with uranium minerals. Any part of the zone may participate in such mineralization, not just the strata which would be the downward extension of that which has held the best exposures above.

We can be reasonably sure about the presence of the Morrison formation in conformity with the Dakota beds and there is no reason to believe that it also may not be equally as well mineralized.

RECOMMENDATIONS

The several suggested areas under the Dakota rimrock should be opened by surface cuts to expose the sources of the present indicated radiation. Special effort should be made toward the north where the dip of the Dakota is lower and where the mineralized area may be better protected against extensive leaching. When this has been done and the needed information developed, a drilling program should be developed to reach the lower elevations of the ridge, to test the result of re-crystallization of possibly leached uranium minerals.

It should be noted that if the basin proves uranium bearing, the ground to the west of this base will become interesting immediately.

Respeftfully submitted

(signed) Warren C. Prosser

Consulting Mining Engineer.

COPY

RECONNAISSANCE REPORT

Lawrence Farm Uranium Deposit.

This occurence is located in Sec. 18, T 8 N, R 69 W of the 6th Prin. Mer. in Larimer County, Colorado. It is 7½ miles northwest of Fort Collins, Colorado on State Highway No. 287, whence a dirt road is followed along the Poudre Valley and Reservoir Company Canal, northeast to the Lawrence Farm.

That portion of the farm held under lease by Elbert Norton, consists of the W ½ of the N W ¼ and the N ½ of the SW¼ of Sec. 18, a total of 133.59 acres, more or less. The West Sec. line of Sec. 18 is a correction line. The lines are laid out as shown on the accompanying plat.

Physical Features.

The geological structure present is a portion of the Dakota Hogback, running northerly through the leased ground, with its ridge about 500 ft. East of the West line. At the south end of the area the ridge is at 5540 ft. above sea level. At the NW Cor. of Lot No. 2, the ridge is at 5660 ft. A prominent gulch comes into this ground at the NW Cor, at an elevation of 5600 ft., runs southeasterly crossing the east line of the tract at 5340 ft., This Dakota ridge has a steep easterly slope and a more gentle slope into a basin southwesterly.

A mine access road has been bulldozed along the ridge on its west side. This road on its upward course, crosses the Poudre Valley canal and winds around the basin in Sec. 13. It is passable by Jeep or pickup, except when the canal carries water.

Mine workings.

The workings consist of two open cuts. No. 1 is the main working cut and is on the ridge, just south of the center line of Section 18. It is 45 ft. in length through the top of the ridge

and 17 ft. in width at the ore bearing sandstone just east of the ridge crest.

The upturned strata that constitute this ridge and which are outcropping or buried under talus on the east slope are almost entirely of the Morrison formation. At Sta 1 (see map) what looks like the slick rock member of the Entrada or here the Lykins formation, outcrops, marking the base of the Morrison. Above this in [illegible] variegated beds of sandstone and colors, are two separate beds of light colored sandstone. One is 30 ft. above the slick rock, the other 300 ft. These beds are 4 and 6 ft. thick respectively and consist of crossbedded sandstones. They dip -53° west and both may be good prospects deserving of further attention. The upper and middle part of the east slope of the ridge is almost everywhere covered with talus and float rock derived from the strata. The crest of the ridge is composed of black shales and white sandstones, which latter are more or less quartzose. In these crest beds, some movement along the bedding planes has taken place, as shown by slickensided surfaces.

It is in these quartzose beds that the uranium minerals have been found, in cracks and on surfaces and slightly infiltrated into the grain of the sandstone. In the upper oxidized portion of the outcrop the uranium are partly at least fluorescent. In the lower exposures they are not, but have a bright greenish yellow color, and exist as relatively soft, greasy lustered flakes. As exposed on the surface these minerals give radiometric count of 0.1 to 0.5 MRHr When not exposed the weathered rocks count around 0.11 to 0.16 MRHr.

At the main No. 1 cut on the ridge near the center line

of Sec. 18, it has been excavated for 45 ft. in length through the ridge and 17 ft. wide at the uranium bearing sandstones and 4 to 8 ft. deep. A cross section of the sandstone exposed consists of, top to bottom- 1.6 ft. black shale; 3.3 ft. gray sandstone; 1.0 ft. black shale; 3.0 ft. gray quartoze sandstone; 1.7 ft. black shale and 4.8 ft. of gray quartoze sandstone which is the uranium bearing member. The dip of these strata is 64 to 70° to the west. Below these are additional black shales and white sandstones, which are now buried, by the dump rock of this cut. A second cut has been made on the East slope of the crest, 120 ft. to the south of Cut. No. 1. Here, in a relatively shallow cut is exposed the same white uranium bearing sandstone and gives a count of 0.16 to 0.28 MRHr 25 ft. south of the south border of this tract a large cut has been made through the crest of the ridge. This is 25 ft. wide along the ridge and has a longitudinal cut along the east side of the crest for 36 ft. This cut shows 6 ft. of shale on top of 18 ft. of white quartzose sandstones, similar to those exposed on the cuts on this tract. The base of the white sandstone here is of a sugary nature. The dip of the strate here is 65° W.

Because a large portion of the ridge is covered by slide material a few beds only are exposed and these may not be sufficiently characteristic to fully identify them as Jurassic beds. The so-called slick rock at the base may contain the Dr. Bond sandstone however. The white quartzose sandstones at the crest of the ridge closely resemble the lower Dakota formation beds. Below these are clays and shales that closely resemble those of the Jurassic. It seems proper therefore to follow the designation of the U.S. Geological survey as to their identification.

On the west slope of the ridge, detritus and talus fills the slope and the basin. The ridge is the western slope of a dome which has been eroded down through the center to the bottom of the Morrison formation. East of the Lawrence farm the regular easterly dip of the strata is obvious. West of the ridge the strata dip into the basin referred to and then resume their regular easterly dip on the flank of the foothills. The reverse fold thus created appears to have been faulted by a north and south fault which according to the Geological Survey maps lies in the normal dipping Morrison formation at the base of the foothills. There is a circular rim of the Dakota, which creates a closed basin south of the Lawrence Farm Ridge. The North-South fault and the Bellvue cross fault may have had something to do with its formation. The intercolated slipping along the ridge strata, in which the uranium minerals lie, and the other faults referred to may have in some way been the source of the mineralizing solutions. The situation is not clear and it appears that we must look outside the Lawrence leased ground for the source.

Future development of the favorable sandstones of this ridge may be done in one of several ways:

1.. Sink a shaft at the No. 1 Cut as deep as desired. Difficult access here is a detriment.

2. Bulldoze a road from the Lawrence Farm buildings, up under the east slope of the ridge and from this excavate open cuts in the favorable sandstones and shales.

3. Drive a crosscut from the exposed slick rock, brown sandstone at Sta. No. 1 for 670 ft. to cut the favorable beds on the dip at 240 ft. below the outcrop. This could be preceeded by

a long diamond drill hole at the same location. It would serve to prospect all the exposed members of the Morrison formation.

The ridge presents a natural opportunity for drilling to cut the favorable beds at different elevations. A small drill program has been suggested for short distances on the west side of the ridge at -45° dip. Here a 75 ft. hole might cut the favorable beds at 75 ft. depth along the incline. By drilling 150 ft west of the rim a vertical hole might cut the favorable beds at 240 ft. and 330 ft. along the incline.

If good results were obtained by drilling and were followed up by driving the suggested tunnel, this would make a fine working tunnel for the entire lease.

For immediate physical contact, I recommend the road to be bulldozed up the slope of the hill to within 30 to 50 ft. of the rim of the ridge. Such a road would also give access to the location where the present work has been done, for open cut work on the mineralized beds and for the sinking of a shaft for deeper elevation. This road would also serve to assist in prospecting the Morrison beds across the slope.

Owing to the concealment of some of the beds a complete log of the Morrison Strata is hard to get. N.M.Fenneman of the Geological survey has published the following description of the Morrison Beds in Boulder County.

Lower Dakota-	firm sandstones, often quartzitic, cross bedded with ripple marks. At the base is usually a pebble conglomerate, pebbles of limestone, quartzite, clay, flints, jasper with rocks of granitic composition.
Morrison;	Dense hard clays and argillaceous sandstones colored, 30 to 75 ft. Atlantasauras beds. rather persistent sandstones, calcareous, stained with iron, limonite dots composing the Saurian sandstone 15 ft.

Limestones generally interbedded with clays, formations usually obscured, covered by atlantasauras beds above, eroding.
Beds of sandstones with purple hues, irregular, closely laminated, flow and plunge structure at places and scaly along bedding planes.
Resistant beds between limestones, brown inside cracks, so natural gray color obscured. Limestone turning brown on weathering. The lowest limestone 15 ft. above the base of this formation.

Total including Saurian
75 to 100 ft.

Lowest bed of the Morrison is of intermediate character. Abrupt change to light colored
20 ft.

The lower 10 ft. is a white to tan sandstone known as the Dr. Bond sandstone, building stone.

Lykins formation (entrada) — Brown Crinkled sandstone.

We have no evidence in this locality that the Morrison members are uranium bearing. There are few better places to try it out.

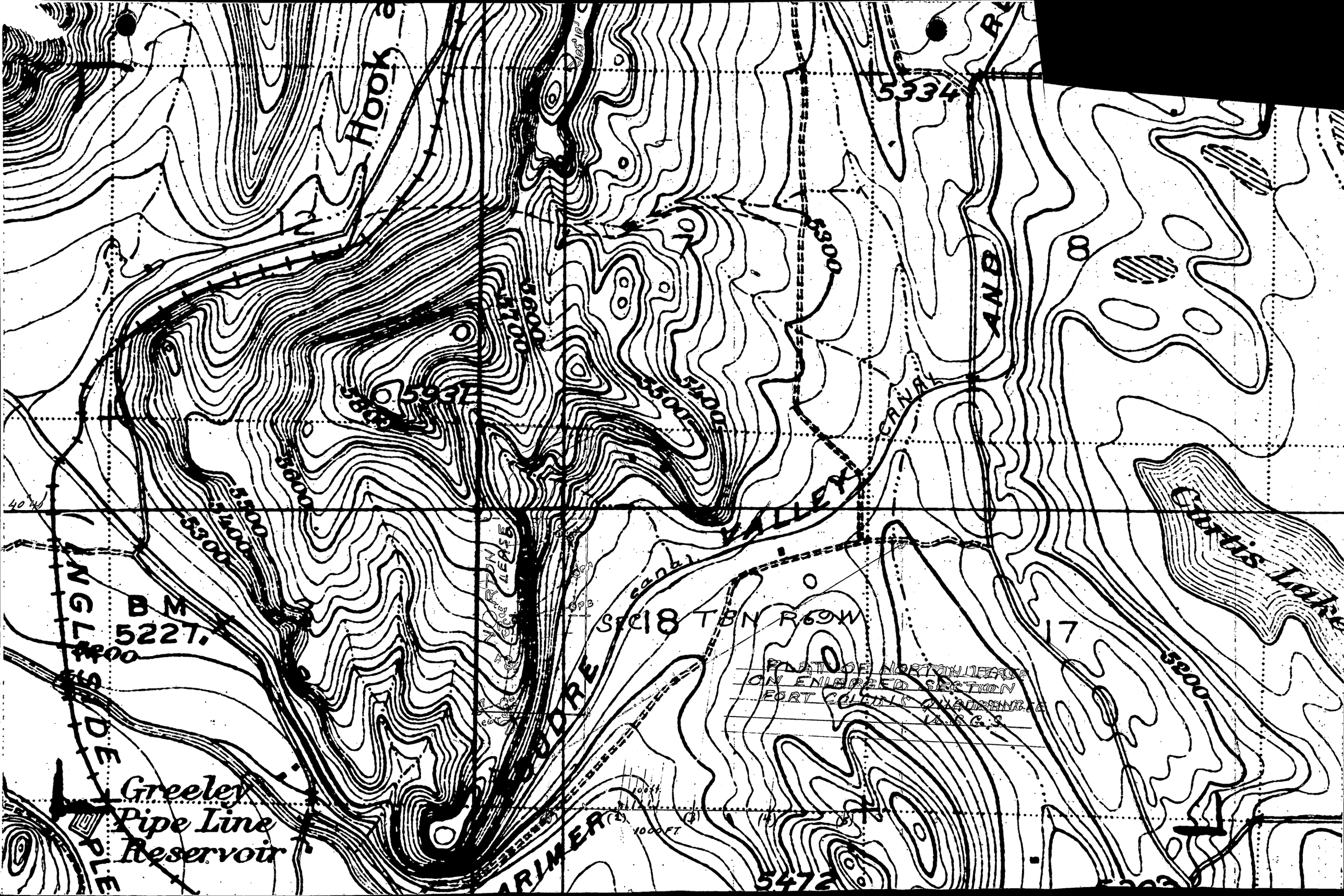
Judicious exploration is justified here to ascertain the extent and importance of the mineralization discovered.

Respectfully submitted.

Warren C. Prosser

Consulting Mining Engineer.
Professional Engineer No. 30
Colorado Registered.

July 7, 1955


Hook
5334
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B.M.
5227.
NORTON LEASE
SEC 18 T8N R69W
17
PLAT OF NORTON LEASE
ON ENLARGED SECTION
FORT COLLINS QUADRANGLE
U.S.G.S.
CANAL
AND
VALLEY
Curtis Lake
Greeley
Pipe Line
Reservoir
MOORE
ARIMER
5472
1000 FT

(209)

Recorded APR 28 1955 at 1:16 o'clock P M
Reception No. 694471

BOOK 992 PAGE 17

MINING LEASE

THIS AGREEMENT OF LEASE, Made and entered into this 27th day of April, 1955, by and between GUY R. LAWRENCE and MAYME B. LAWRENCE, Lessors, whose address is LaPorte, Larimer County, Colorado, and Elbert Norton, whose address is 11534 East Colfax Avenue, Denver, Colorado, Lessee,

WITNESSETH, THAT

The said lessors for and in consideration of the rents, royalties, covenants and agreements hereinafter expressed to be paid, kept and performed by the said lessee, have leased, let and demised, and by these presents do lease, let and demise unto the said lessee for the purpose of mining and for no other purpose, the following described real property and premises situate in the County of Larimer, State of Colorado, to-wit:

Lots 1, 2 and 3, ~~and the NE¼ of NW¼~~ of Section 18, Twp. 8N., Range 69 W. of the 6th P.M., ~~EXCEPT, however, the East 20 acres, more or less, in the NE¼ of the NW¼ on which the house and other improvements of the Lessors are located;~~

4/27/55
G.R.L.
E.N.
M.B.L.

And, for the same consideration the said lessors, being the owners of the surface of other lands adjacent and in the vicinity of the lands above described, agree that as long as this lease remains in force and effect said lessee shall have the right, without payment of any additional compensation, to enter upon said other lands for the purpose of building roads for the removal of ores and and minerals from the demised premises.

TO HAVE AND TO HOLD the above described premises for the full term of 5 years from and after midnight of the date hereof, unless sooner forfeited or terminated as hereinafter provided.

1. The lessee shall have the right to work and operate upon any and all of the demised property; mine, extract, take and market the ores and minerals therefrom; to build and maintain access roads; to concentrate or otherwise treat said ores and minerals in a plant to be erected on said property, or to ship or take the same to any other plant or mill for concentration or sale; to erect and operate on said property a plant or plants and other facilities for the mining or processing of ores and minerals, and for the processing of the content thereof into any obtainable products; and generally, may do any and all things which he may deem desirable in connection with mining operations on the property.

2. Lessee shall pay to lessors on or before the 25th day of the month following that in which the same are sold or milled, royalties on all ores produced and sold from the demised premises as follows:

On ores containing uranium: 8% of the proceeds of ores of a value of less than $50.00 per ton; 12% of the proceeds of ores of a value of $50.00 or more per

ton and less than $100.00 per ton; and 18% of the proceeds of ores of a value over $100.00 per ton. By "proceeds" is meant the amount paid by the purchaser for such ores, including all bonuses or allowances paid, except transportation allowances.

On all ores other than uranium ores, whether sold crude or in the form of concentrates, 10% of the net returns. By "net returns" is meant the proceeds of sale after deduction of smelting charges, costs of hauling and milling, and costs of transportation of ores or concentrates to the smelter or other ore purchaser.

If the lease is sold or sublet for a cash amount, lessee shall pay to lessors 12½% of that amount.

Lessee agrees that he will during the first year of the term of this lease, mine and deliver to an authorized ore purchaser at least one acceptable minimum lot of uranium ore; failing in which he will surrender this lease within 30 days after the expiration of the first year of the term.

Unless the lessee shall within 30 days after the end of the second year of this lease pay to the lessors the sum of $1,000.00 this lease shall terminate as to all parties. Said payment shall be an advance against royalties to accrue during the third year of the term, and lessee shall retain royalties on the first ores sold during said third year until the royalties so retained equal $1,000.00.

Commencing with the third year of the lease term, if royalties hereinabove provided to be paid do not in the aggregate equal the sum of $1,000.00 on ores produced and sold in any year of the term, lessee shall pay to lessors on or before 30 days after the termination of such year of the term, a sum which in addition to the amount of royalties already paid on ore so produced and sold, shall equal $1,000.00; failing in which the lessee shall surrender this lease within such 30 day period, and by such surrender shall be relieved from the obligation to make such payment. If any sum so payable be not paid when due and lessee fails to pay and fails to surrender within the thirty day period allowed therefor, then in such case this lease shall terminate and the obligation of the lessee to pay the deficiency between the aggregate royalties and $1,000.00 shall not be extinguished.

3. Lessee shall work the demised premises in mine fashion and manner consistent with good and economical mining, and with due regard to the development and preservation thereof as workable mining properties.

4. The lessee shall not adulterate or mix any ores broken or mined from the demised premises with ores broken or mined from other premises.

5. The lessee shall before commencing work, obtain, pay premiums on and maintain in full force and effect policies of insurance adequate to protect the lessors and lessee from liability under the Colorado Workmen's Compensation Act

and the Colorado Disease Disability Act as they are now or may hereafter be amended, and from liability of Lessor and Lessee to any and all other persons.

6. The lessee shall allow any duly authorized agent of the lessors to enter upon and descend into all parts of said demised premises at any and all reasonable times for the purpose of inspection, surveys, or taking samples therefrom.

7. The lessee shall keep books of account of the mining and shipping of ores, and of ores, if any, processed; and said books shall be open at all reasonable times for the inspection of the lessors for the purpose of comparing and verifying the accounts and statements of royalty as rendered.

8. The lessee shall well and sufficiently timber all workings through which he shall work in accordance with good and safe mining, and shall keep the drifts, shafts and other workings through which he works drained and cleared of loose rock and rubbish unless prevented by extraordinary mining casualty. The lessee shall have the right to suspend work at any place and abandon any workings whenever, in his opinion, ore is exhausted or further mining would be unprofitable.

9. The lessee shall pay promptly and punctually for all labor performed and materials furnished in his operations of the property, and said property shall not become liable for any such labor performed or materials furnished. Lessee shall post and keep posted conspicuously and continually in one or more places on said property proper and sufficient notices in writing to the effect that said property has been leased, and that the title or interest of lessors therein shall not be subject to any mechanic's lien or lien of any kind whatsoever on account of labor performed or materials furnished to lessee in connection with the working, operation or development of said property.

10. So long as general taxes on the property hereby demised are assessed on the basis of a non-producing mine, the lessors shall pay such general taxes.

The lessee shall make proper annual returns of his production to the County Assessor of Larimer County, Colorado. In the event that the property demised be assessed as a producing mine or as part of a producing mine, the lessee and lessors shall pay such taxes (assessed on the basis of production during the preceding year) in proportion as they shall have received the proceeds of ores sold during the year prior to the year in which the tax assessment is made.

Upon settlement for each lot of ore 2% of the "proceeds" or "net returns", as the case may be, in addition to the royalties specified above (computed in the same manner as royalties) shall be deposited in a savings account in The Poudre Valley National Bank, OF Fort Collins, Colorado, to the credit of the lessors. Money so deposited shall be used for the payment of taxes assessed against the property for the year next following that in which the deposits are made.

It is recognized that the production in a given year may become the basis

for valuing the property for tax assessment in the following year, and that in such case the taxes assessed will be due and payable after January first of the year following the assessment. In paying taxes for any given year, the lessors shall use the sums deposited during the year next prior to one in which the taxes were assessed. After payment for any taxable period, any excess accumulated in the year prior to the one in which the taxes were assessed, shall be divided between the lessors and the lessee in proportion to their ownership of proceeds of the lots from which the funds were derived. If the amount deposited in any year shall be insufficient to pay the taxes assessed for the year following, lessee shall promptly pay to the lessors, when the amount of the deficiency is determined, lessee's proportionate part of such deficiency. If production in any year be insufficient to case the property to be classified as a "producing mine," as defined by the statutes of Colorado then in effect, the money deposited during such year shall be divided between the lessors and the lessee in proportion to their ownership of proceeds of lots from which the funds were derived. The lessee shall pay all taxes on his own personal property and on any plant or plants erected by him.

11. The lessee shall have the right to sublet at such rentals and royalties as the lessee may determine, subject to the other conditions in this agreement contained; provided, however, that if this agreement be terminated by forfeiture, or otherwise, such termination shall immediately work a cancellation and forfeiture of any and all subleases. The lessee shall have the right to assign this lease as to the whole thereof, or as to any legal subdivision of not less than 20 acres, only upon the written consent of the lessor herein named.

12. If operations under this lease are delayed, interrupted, or prevented by acts of God, fires, riots, Wars, strikes, inability to obtain equipment due to governmental order or action, or failure of carriers to transport equipment, or regulations by state or federal action, or on account of lack of reasonable market, this lease shall not terminate or be forfeited, and no right of damages shall exist against lessee by reason thereof, provided operations are commenced or resumed within a reasonable time after removal of such cause or causes; but nothing in this paragraph shall relieve the lessee from the payment of the annual minimum royalty or surrender of this lease herein provided.

13. The lessee, providing he is not in default hereunder with respect to the payment of royalty or taxes, upon giving the lessors 30 days notice in writing by registered mail addressed to the lessors at LaPorte, Larimer County, Colorado of his intention to surrender and cancel this lease, shall at the end of such 30 days, be released from all further obligations under this lease, and said lease shall automatically terminate; provided, however, that such surrender shall not

operate to relieve the lessee of any obligations which he should have performed to the effective date of such surrender, and if surrender occurs subsequent to the end of the second year of the term that the minimum royalty of $1,000.00 per year shall be apportioned to date of surrender.

14. Upon violation of any of the covenants hereinabove reserved and upon the part of the lessee to be paid, kept, done, and performed, the lessors may, at their option and upon written notice to said lessee specifying the violation or violations complained of, and giving notice of their intention so to do, cancel and annul this lease, unless the lessee shall within 30 days after receipt of such written notice cease such violation or violations and pay to the lessors all moneys then due under this lease and otherwise remedy the matter or matters in which he is in default.

15. If this lease be terminated for any cause whatever, then said demised premises shall be and become forfeited to said lessors, and said lessors may thereupon enter upon said premises and dispossess any persons occupying the same with or without force and with or without process of law, or, at the option of the lessors, the lessee and all persons found in occupation may be proceeded against as guilty of unlawful detainer.

16. Upon termination of this lease by expiration or otherwise, the lessee shall have 3 months thereafter to remove all machinery, rails, piping, equipment and other improvements placed upon the demised premises by him, and any property of the lessee not removed within said three months' period shall be and become the property of the lessors.

17. Lessee shall have the privilege of renewal of this lease for 5 years longer, provided said lessee be not in default at the expiration of the term hereby granted, said renewal to be upon the same terms and conditions as this lease.

18. This lease and all of its terms, conditions, and stipulations shall extend to and be binding upon all heirs, devisees, representatives, successors or assigns of the lessors or the lessee.

IN TESTIMONY WHEREOF, The lessors and the lessee have hereunto subscribed their names the day and year first above written.

Tom R. Lawrence

Maxine B. Lawrence

Lessors

Elbert Norton

Lessee

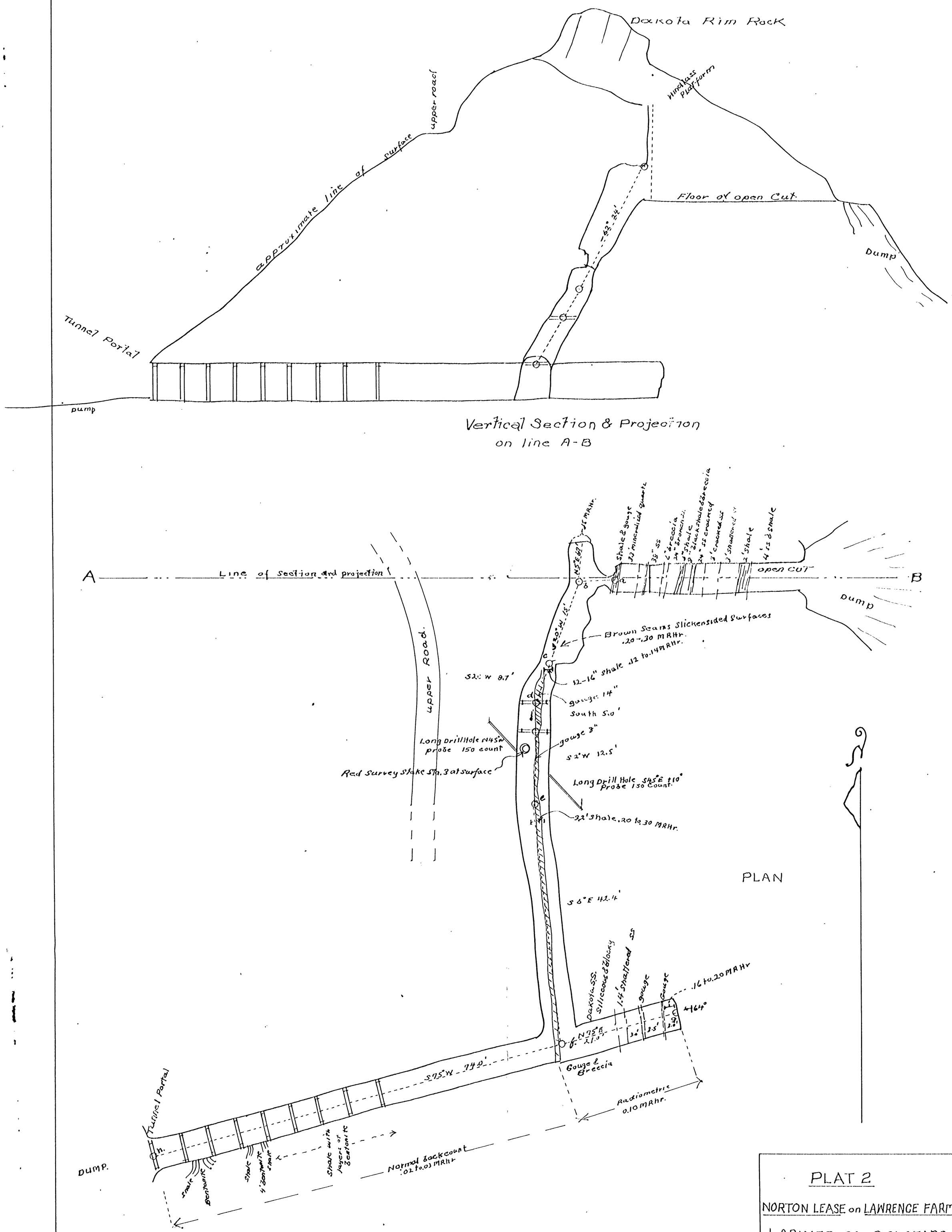
9944

COMPARED

Recorded at request of
the Denver Title Co. at 1:16
P. M. APR 29 1955
and duly recorded in book 992
page 17
Dorothy D. Smith
Recorder
Dorothy D. Smith
Deputy

APRIL 29 1955 DENVER, COLO.

Albert Norton
11534 East Colfax Ave.
Denver, Colo.



PLAT 2

NORTON LEASE on LAWRENCE FARM

LARIMER CO., COLORADO

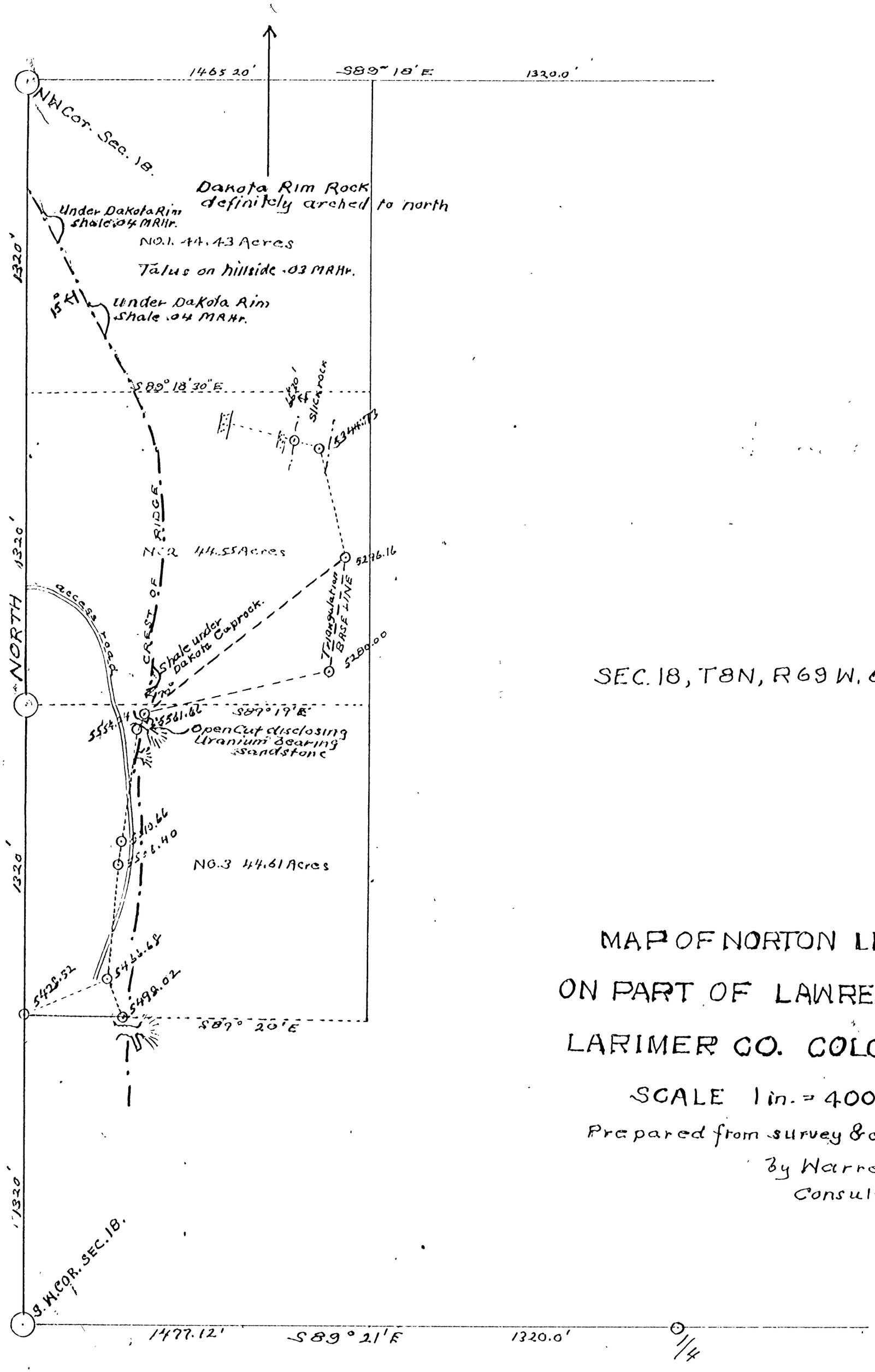
— Scale 1 in = 10 ft —

-COMPASS SURVEY BY-

- Warren C. Prosser

Consulting Mining Engineer—

RECEIVED
MAR 26 1956



SEC. 18, T8N, R69 W. 6th P.M.

MAP OF NORTON LEASE
ON PART OF LAWRENCE FARM
LARIMER CO. COLORADO

SCALE 1 in. = 400 ft.

Prepared from survey & official records.
By Warren C. Prosser
Consulting Mining Engineer

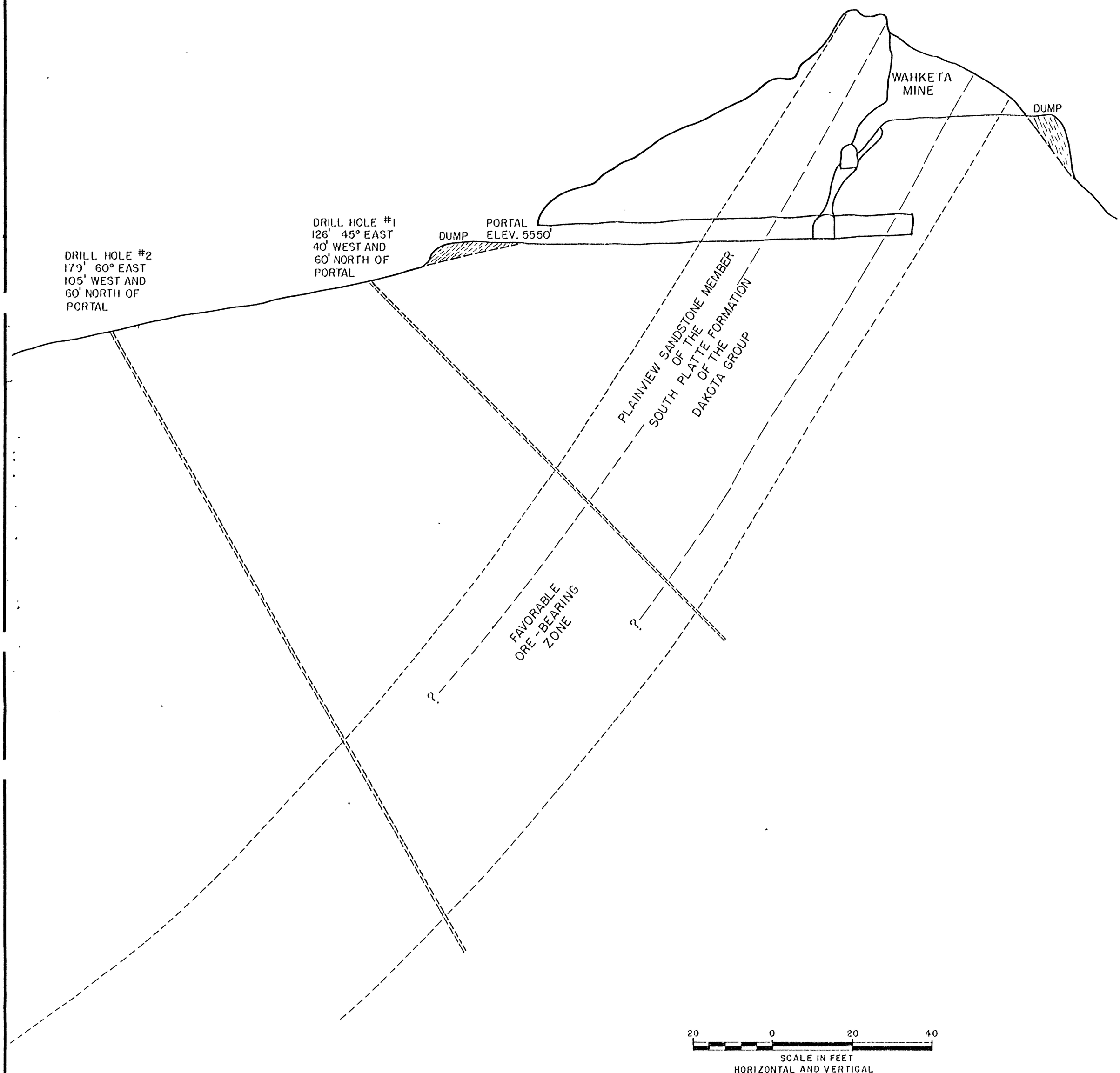
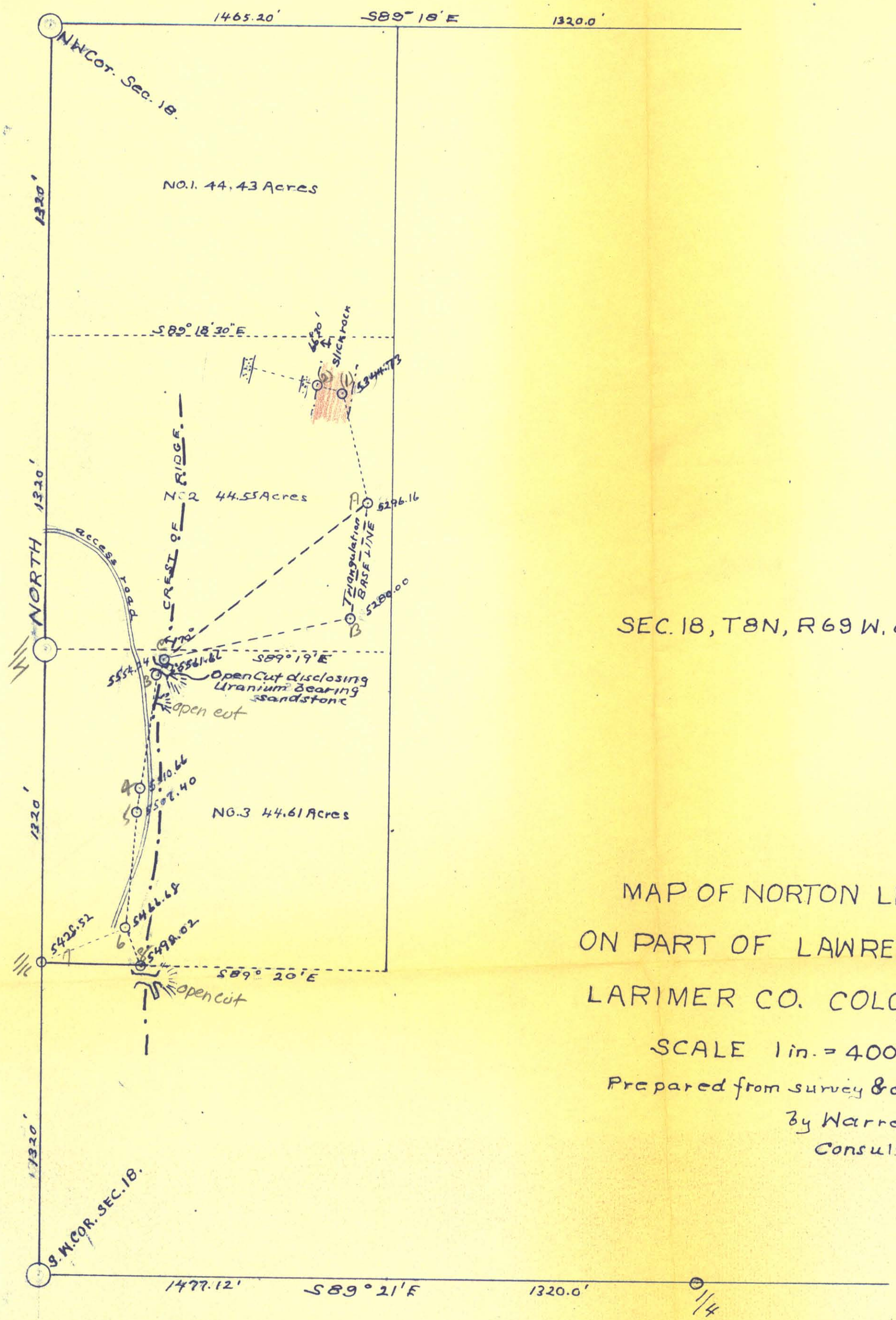


FIGURE 6 - GENERALIZED E-W CROSS-SECTION AT THE WAHKETA MINE SHOWING PROJECTED LOCATION OF DRILL HOLES 1 AND 2, ELBERT NORTON LEASE, LARIMER COUNTY, COLO. DMEA 4227



SEC. 18, T8N, R69 W. 6th P.M.

MAP OF NORTON LEASE

ON PART OF LAWRENCE FARM

LARIMER CO. COLORADO

SCALE 1 in. = 400 ft.

Prepared from survey & official records.

By Warren C. Prosser

Consulting Mining Engineer