WORCESTER MINES
1501 WHITE AVENUE
GRAND JUNCTION, COLORADO

May 6, 1954

Administrator
Defense Minerals Exploration Administration
Region IV
Bureau of Mines
224 New Customhouse Building
Denver 2, Colorado

Application for Exploration Project

Dear Sir:

We submit herewith, in quadruplicate, an application for a Defense Minerals Exploration Project on the Ruth K Group of uranium claims. The claims are located in the Vixen Mining District, Montrose County, Colorado.

The application was prepared for Worcester Mines by Geo-Engineering, 304 Main Street, Grand Junction, Colorado -- Messrs. Louis P. Gaggini and Harold A. Culp.

Worcester Mines is currently drilling one exploratory diamond drill hole on the Ruth K No. 4 claim. The drill hole was located to off-set the United States Geological Survey hole No. L.P.538 that was completed, to a depth of 450 feet, in September of 1952.

That hole was classified as favorable by the Survey.

We would appreciate your early consideration of this application.

Very truly yours,

John W. Hill

John W. Hill
Manager

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

224 New Customhouse
Denver 2, Colorado

May 10, 1954.

Memorandum

To: C. O. Mittendorf, Administrator, DMEA

From: Executive Officer, DMEA Field Team, Region IV

Subject: (Uranium) Application of Worcester Mines, Grand Junction, Colorado.

Enclosed are two copies of an application for exploration assistance in the amount of $141,788.25 submitted by Worcester Mines.

A copy of this application has been sent to Mr. A. P. Butler, Building 21-TEPCO, at the Denver Federal Center.

W. H. King

Enclosures

Geo - Engineering
Room 14
304 Main Street
Grand Junction, Colorado

Application For

DMEA PROJECT

on the

RUTH K. GROUP

Prepared For

WORCESTER MINES
1501 White Avenue, Grand Junction, Colorado

on

May 18, 1954

by

Louis P. Gaggini
and
Harold A. Culp

of

GEO - ENGINEERING

Geo - Engineering
304 Main Street (Room 14) - Grand Junction, Colorado

Application for DMEA Project on the Ruth K. Group Prepared for

WORCESTER MINES
1501 White Avenue, Grand Junction, Colorado

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501 White Avenue, Grand Junction, Colorado

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1. NAME OF APPLICANT

a. WORCESTER MINES - See form MF-103 attaches as Exhibit 1
b. Omitted, not a corporation
c. For names and addresses of partners, See Exhibit 2

2. GENERAL

This report with Form MF-103 (Numbers and Letters in front of headings used in this report refer to parts of Form MF-103) attached as Exhibit 1, is an application for a defense Minerals Exploration Administration Exploration project contract of the short form or unit cost type. A $141,788.25 project is proposed for exploring uranium lands in Montrose County, Colorado. (See Exhibit 2) The proposed project will consist of 34,565 feet of diamond core drilling on the Ruth K. Group of claims in the Long Park area near Uravan, Colorado. (See figure 1) A unit cost of $4.05 per foot is estimated for the work. Not included in this unit cost is an estimated $1,800.00 for custom assaying which is, however, included in the total proposed expenditure. One hole totaling 445 feet will be drilled prior to DMEA participation, at an estimated cost of $1802.25. Twenty-five percent, or $34,996.50 of the total expenditure will be born by the Worcester Mines, the applicant, leaving $104,989.50 to be loaned by DMEA.

Fourteen hole locations have been previously determined and are shown on figure 3. As the work progresses, however, it will likely become evident that some of the proposed holes might fall in areas geologically unfavorable for ore, the Worcester Mines would, therefore, like the privilege of deciding whether or not any previously proposed hole should be drilled. It is requested that footage saved, when proposed holes are omitted, be transferred with the permission of the DMEA Field Team, to other parts of the Ruth K. Group which might be more favorable for ore.

SUMMARY

The Ruth K. Group, because it is located within, but near the eastern boundary of the Uravan Mineral Belt can thus be compared quite favorably with the best uranium land on the Colorado Plateau. (See figure 1) Skilled labor, materials and equipment necessary for the project is readily available in the Uravan District, which is in the heart of the Uranium Region. The writer, who will act as consulting geologist for the exploration project, has had almost eleven years experience in uranium exploration and mining, with a good record of discoveries and correct appraisals of speculative areas. Worcester Mines, the partnership which will under take the exploration, is an aggressive mining organization under the management of John W. Hill, one of the foremost and most experienced men in the Colorado Plateau Uranium Field.

3. PROPERTY RIGHTS

a. b. Legal Description and Name of Property

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WORCESTER MINES
1501 White Avenue, Grand Junction, Colorado

The land upon which the exploration work is to be performed consists of six adjoining unpatented mining claims which shall be referred to in this report and future correspondence as the Ruth K. Group. The claims are located in the Vixen Mining District of Montrose County, Colorado. There position with respect to the G.L.O. Grid is shown on figures 2 and 3.

c. Interest in Land

Worcester Mines has a lease and option to purchase on the Ruth K. Group from Engineer Associates Inc., owners of the propesty. The lease, a copy of which is included as Exhibit 4, was originally in favor of Louis P. Gaggini, the writer, as Lessee. The document included as Exhibit 5, assigns the lease to Worcester Mines.

d. Outstanding Liens

The only obligation against the property are the royalty obligations agreed to in the documents included in Exhibits 3 and 4. The obligations mentioned above are binding only as long as the lease is in effect. The lien of the government for money loaned by the DMEA is, however, consented to by Engineers Associates, owners of the property and is to remain in effect until the amount loaned is returned to the government. (See Form MF-203 Owners consent to Lien, attached as Exhibit 5)

e. Record of Title

All transactions affecting titles to the claims are recorded in the office of the county recorder of Montrose County at Montrose, Colorado. The three Ruth K. claims were discovered and located on the 22nd day of August, 1950 and recorded on the 21st day of November, 1950 by H. D. Clark. The Sylvia claims were discovered and located on the 11th day of February, 1951, and recorded on May 7th by H. D. Clark and S. W. Jones. Book and page for these original recordings is given on page 1 of Exhibit 4. A deed dated April 14, 1952 and recorded in book 348 on page 256 conveys Jones' one-third interest in the Sylvias to Clark. On April 20, 1953 H. D. Clark conveyed by deed recorded on June 9, 1953 (Book 360, page 104) one-half interest in all six claims to Charles W. Yetter. Clark and Yetter then conveyed the six claims to Engineers Associates Inc., the present owner. This final deed, dated May 4, 1953, was recorded June 9, 1953 in Book 360, page 105.

Engineers Associates Inc. filed amended location certificates pursuant to Public Law 250 on November 4, 1953. These certificates are recorded in Book 384 on pages 219 to 224 inclusive.

4. PHYSICAL DESCRIPTION OF PROPERTY

a. Operations

There are no mine workings on the claims. Logs for two drill holes drilled on the property by the United States Geological Survey are shown as Exhibits 6 and 7. Exhibit 8 explains the symbols and abreviations used on the drill logs.

Hole No. 1 of the proposed exploration project will be drilled prior to May 31, 1954.

Long Park is being considered for another USGS drilling program, which possibly will include some more exploration drilling on the Ruth K. Group.

b. Production and Ore Reserves

There has been no past production and there are at present no proven ore reserves on the Ruth K. Group.

c. Geologic Features

Stratigraphy: Most of the proposed drill holes will be collared in the massive conglomeratic sandstone of the Cretaceous Burro Canyon Formation. (See figure 4). Non core drilling will be used to penetrate the varigated mudstones of the Brushy Basin Member of the Morrison Formation. All holes will be drilled to the red clay underlying sandstone lenses, which occur near the center of the Morrison Formation at or near the top of the Salt Wash Member. Sandstone lenses occuring in the central stratigraphic zone mentioned above, have been the host rocks for at least 90% of the Morrison uranium production. Sandstone was cut at this stratigraphic zone by both of the holes drilled by the USGS. The depth to the top and bottom of the sandstone and the thickness thereof are given in the interpretive summary of the log following the designation OBSS. (See Exhibit 6 and 7) No attempt was made to separate the members of the Morrison on the section shown on figure 4.

There are some ore horizons in the Brushy Basin which have been productive in the Uravan District. These will, of course, be tested in the proposed program incidental to the exploration for ore in the deeper more productive horizon which lies near the top of the Salt Wash.

Figure 4 shows the main ore horizon as a continuous unit merely for the purpose of illustration. There is no intent to imply that the ore sandstone or ore bodies are continuous.

Formations older than the Morrison are not differentiated or discussed in this report as they do not have any bearing on the exploration project.

Structure: The regional dip of the Uravan District is uniformly to the northeast. A strike of N 45° W. with a dip of about 7° to the northeast was used for the purpose of projecting ore horizons to calculate the approximate estimated drilling depths given on figure 4.

Ore Deposits of the Uravan district are on the average much larger than most of the Morrison Uranium Deposits. The presence of grey green mudstone at the base of a potentially ore-bearing sandstone has been an excellent guide to ore on Long Park. Drilling close to holes which cut one foot or more of grey green mudstone at the base of

sandstones occuring at the main ore horizon has, in every case experienced by the writer, led to the discovery of an ore body. It should be noted by those considering the proposed project for approval that hole LP-538 (see exhibit 6) penetrated 2.2 feet of grey green mudstone at the base of the ore bearing sandstone. This factor plus the very good thickness of sandstone are no doubt the reason for the USGS geologist calling the hole "favorable" in his interpretive summary of the log.

Justification of exploration: The Ruth K. Group is located within the Uravan Mineral Belt, the area which is generally recognized as containing most of the more valuable uranium ore bodies in the Morrison Formation (See figure 1). Recent exploration drilling performed by the USGS has been encouraging. The area is still withdrawn for further government drilling. The DMEA project proposed, therefore, is a good proposition for the government in that Worcester Mines will assume 25% of the exploration costs and will probably eventually repay the total cost at the rate of 5% on subsequent production.

It is the writer's opinion that $141,788.25 can be spent for exploration drilling on the Ruth K. Group with very reasonable assurance that a 5% royalty on the ore discovered will reimburse the total cost.

d. Accessibility

The Ruth K. Group lies about 7 miles airline from Uravan, Colorado and is approximately 12 miles over a graveled, all-weather road from the U.S. Vanadium Company Uranium Mill at Uravan. It is approximately 15 miles over a graveled all-weather road to the Vanadium Corporation of American Mill at Naturita, Colorado.

Supplies for mining and all necessary equipment could be obtained either at Uravan or Naturita. There are postoffices, permanent settlements and motor freight depots at both places. Railroad and airline terminals are located at Grand Junction, which lies at a distance of 110 miles by road and 50 miles by air.

e. Availability of Manpower, Equipment, Supplies, etc.

Manpower skilled in performing the type of drilling planned is readily available in the area, as are dependable outlets for materials and supplies.

Most of the equipment to be used in the project will be supplied by Johnson & Youvon Core Drilling Contractors of Naturita, Colorado. Geo - Engineering, a professional engineering firm, headed by the writer, will supply surveying instruments and transportation for technical personnel pursuant to the agreement included as Exhibit 4. Geo - Engineering has principal offices at Norwood, Colorado which lies about 45 miles by road from the Ruth K. Group. A bulldozer, complete with operator, can also be rented at Norwood. Water for drilling will be hauled from the San Miguel River, or from some nearer reservoirs. There are no power lines in the immediate area, but no immediate need for electricity is anticipated as no camp will be established until mining operations are begun. The San Miguel Power Association, Incorporated, R.E.A., Nucla, Colorado plans to erect a 44,000 volt transmission system within five miles of the project during 1954.

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1501 White Avenue, Grand Junction, Colorado

5. THE EXPLORATION PROJECT

a. See MF-103 Exhibit 1 - Will Explore for Uranium
b. Proposed Work

Drills for the project will be provided by Johnson and Youvon, who are probably the most experienced drilling contractors in the Uravan District. It is estimated that it will take one year to complete the project if two drills are employed. The employment of more than two drills would result in inadequate geological control, wasted footage, and an increase in exploration costs per ton of ore discovered.

Proposed holes are shown on figure 4. Estimated hole depths are listed in the tabulation beneath the map. Although only 14 holes are shown and tabulated on the map, it is estimated from the writer's experience in the Long Park area, that at least 10 holes per claim will be required to even sparsely explore the property. Intelligent selection of locations for 60 holes is, however, impossible at this stage. It is recommended, therefore, that a DMEA contract be allowed for a 60 hole project but that the selection of locations for the 46 Stage II holes be made with the approval of the DMEA field team after data from some of the preliminary drilling has been accumulated. It is anticipated that most of this Stage II drilling will be around Stage I holes which have penetrated ore. Certainly all of the Stage II locations will be in areas where Stage I drilling has revealed favorable geology.

Logging and Sampling: A Sampler who will also act as a field assistant for surveying will be employed to supervise the logging and sampling. An accurate log will be kept by the driller and all barren core will be arranged on the ground and properly marked so that the geologist or sampler can accurately check the drillers log. Core from each run will be carefully dropped out of the core barrel into a wooden trough provided for the purpose by the drilling contractor. The sampler or other competent individual will then examine the core, using a field gamma ray detecting device. If any trace of mineralization is found the complete core 'run' will be arranged in a core box provided with a hinged lid, and will be kept until such time as the geologist will have been able to properly sample the core.

Each sample will be carefully described by the geologist in a bound field book as it is placed in the sample sack. Core losses will be pro-rated proportionately regardless of lithology. No more than 1 foot of core will be included in one sample. All samples will be sent to a commercial laboratory for $\%U_3O_8$, $\%V_2O_5$, and $\%CaCO_3$ determination.

Geologic Control of Drilling: Worcester Mines asks the privilege of not drilling any of the proposed holes shown on figure 3, if in the opinion of the company's manager they fall in an area, which, based on previous drilling information, is considered unfavorable. Footage thus saved would be used in more favorable areas, at locations approved by the DMEA field team. The criteria used to determine unfavorableness will in general, be the same as those used by the USGS and the U.S. AEC in their drilling programs. These are discussed in a report by Doris Blackman Wier and the reader is referred to her publication for the information lacking in the brief discussion given below.

"Wier, Doris Blackman, 1952, 'Geologic Guides to Prospecting For Carnotite Deposits On Colorado Plateau', U.S. Geological Survey Bull. 988-B"

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Previous experience on Long Park has taught the writer that although all of the criteria listed by Mrs. Wier are important, sandstone thickness and color of basal mudstone are by far the best guides in this area.

When Stage I holes penetrate one foot or more of green gray mudstone at the base of a potentially ore bearing sandstone, which is over 30 feet thick, Worcester Mines might recommend to the DMEA field team Stage II drilling around such holes. Footage for such Stage II drilling could come from the additional footage included in the estimate for the 46 holes or from footage saved from the elimination of holes.

The Drilling Plan recommended to Worcester Mines and theDMEA is as follows.

1. The fourteen proposed holes shown of figure 3 should be drilled at the sites selected unless previous information makes it advisable to move the holes.

2. Hole No. 1 (see figure 3) should be drilled within the next 30 days, since this will probably precede DMEA participation the cost of this hole is deducted from the estimated cost of the proposed DMEA project. (See schedule 1)

3. Proposed holes 1 to 7 which are located to test the favorable area indicated by LP-538 should be drilled first as information gained from this drilling might lead to amending the locations of some of the other holes.

4. Proposed holes 7 to 14 are 'wildcat' holes recommended to find other favorable areas or to eliminate large areas as being unfavorable.

5. Stage II drilling should be recommended to the DMEA as soon as the location of any of the 46 holes recommended can be intelligently determined.

6. Stage II drilling should be performed only in those areas which can be recommended as favorable. The proposed Stage I drilling is sufficient to produce the negative information necessary to delineate unfavorable areas.

7. All deposits of ore or uraniferous and/or vandiferous sandstone encountered should be tested by drilling at 70 to 100 foot intervals as this is the minimum spacing which will permit a satisfactory determination of tonnage and grade. (The usual 50 foot pattern is not recommended here because of drilling depths.)

c. See MF-103
Attached as Exhibit - 1

d. Ability of Applicant

Worcester Mines was organized May 1, 1953 as a limited partnership consisting of thirteen members. The partnership investment is $88,000.00. The partnership was formed originally to develop and mine a uranium ore body under lease from the United States Atomic Energy Commission. The lease, which is located near Atkinson Mesa. (See figure 2), is identified as N^{o} AT (05-1) - ML-47.

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WORCESTER MINES
1501 White Avenue, Grand Junction, Colorado

Worcester Mines completed a 275 foot development shaft on this lease in Oct. 1953 and ore mining started in December 1953.

John W. Hill, who is manager of Worcester Mines, has 18 years experience in Uranium mining. A summary of this experience is given below

Dates	Employer	Type of Mining	Tons Per Day	Actual Time Years	Position Held
1936-39	U.S. Vanadium Corp.	Vanadium	100	4	Mining Engineer
1940-41	U.S. Vanadium Corp.	All metals	Exploration Project	2	Mining Engineer
1942-44	Metal Reserve Co.	Vanadium	300	3	Supervising Eng. in charge of Ore Proc.
1945-47	Union Mines Devel. Corporation	Uranium	Exploration Project	3	Mining Engineer
1948-52	U.S.Vanadium Corporation	Vanadium Uranium	400	5	General Superintendent
1952-53	U.S. Vanadium Corporation	Vanadium Uranium	400	1	Mgr. of Mines
1953-54	Worcester Mines	Uranium	25	2 mos.	Manager

Geo - Engineering, a new firm of professional engineers and geologists, with office conveniently located at Norwood will act as consulting geologists to Worcester Mines for this DMEA Project.

The writer, who is Chief Geologist for Geo - Engineering, began working in Uranium in 1943, as a Geologist for the Union Mines Development Corp., a contractor for the U.S. Army Manhattan Engineering Project. Subsequent experience in Carnotite exploration included almost two years with the Exploration Branch of the Atomic Energy Commission in Grand Junction and 6 months with the United States Vanadium Company. While working for the United States Vanadium Company the writer conducted successful exploration activities in an area adjacent to the Ruth K. Group. This is the area which is now penetrated by the Long Park No. 1, Triangulation and Whitney Shafts. (See figure 2) Following the United States Vanadium employment, the writer was for two years, Mine Superintendent of the Dulaney Mining Company, where he was in charge of all mining and exploration. This company is at present mining large tonnages from ore bodies which were discovered during this period.

From August 1952 to February 1954, the writer was manager of the Colorado Uranium Division of the J.R.Simplot Company. During this period he successfully prepared applications for and administered for several months, two large DMEA projects.

6. 6. ESTIMATE OF COSTS

It is the desire of the Worcester Mines that this exploration project contract be

placed on a unit cost basis. Schedule 1 gives the exact amount bid per unit by Worcester Mines for performing the exploration work. Custom assaying is not included in the cost per foot for drilling because of the difficulty in making an accurate estimate. The $6.00 per sample figure bid for custom assaying is the exact amount which will be charged to Worcester Mines.

a. Independent Contracts

All drilling and bulldozer work will be performed by Independent Contractors.

Drilling will be done by Johnson and Youvon of Naturita. The prices quoted by this firm are given on figure 3, and in schedule 2 in the unit cost column. Estimate for the cost of the 46 holes proposed for Stage II drilling is based on an estimated depth of 600 feet making a cost of $1,537.50 per hole or a total of $70,725.00 for all Stage II drilling. (See schedule 2)

Reaming is quoted by Johnson and Youvon at $1.50 per foot. Several drilling contractors familiar with Long Park were contracted for estimates of the amount of reaming which might be required. All of them suggested that at least 10% of the total footage might have to be reamed. Since the holes to be drilled in the proposed program are rather deep it seems reasonable to estimate 4000 feet of reaming and to allow $6000.00 to cover the cost thereof. (See schedule 2)

Bulldozer and tractors are readily available at Norwood, Colorado for about $100.00 per day. Because many of the hole locations will be selected from results of previous drilling it will be necessary to have a bulldozer hauled to the group at least 6 different times at a cost of about $100.00 for each round trip. It is estimated that the tractor will work at least 10 days during each visit to the property.

b. Labor Supervision Consultants

Geo - Engineering will supervise direct and act as geological consultants for $650.00 per month and reasonable expenses. (See Exhibit 4) A draftsman and stenographer will be employed on a part time hourly basis to prepare necessary maps, and reports. (See Schedule 3) The field assistant will be employed by Geo - Engineering or Worcester Mines at a minimum of $14.00 per day, to help with the surveying and to act as a sampler.

c. Operating Materials and Supplies

$150.00 per month is estimated for the cost of map reproduction and office supplies.

$20.00 is estimated for the cost of field supplies. (See schedule 3)

d. Operating Equipment

All operating equipment will be provided by independent contractors or by Geo - Engineering.

e. Rehabilitation and Repairs

None needed

f. New Building Improvements and Installations

None needed

g. Miscellaneous (See schedule 3)

$100.00 per month is allowed to cover office and miscellaneous supervision to be performed by the personnel of Worcester Mines.

Payroll taxes on the field assistant salary are estimated at 10%.

The cost of analytical work is not covered in the cost per foot. A separate unit cost of $6.00 per sample is added on Schedule 1.

h. Contingencies (See schedule 1)

Independent Contractors vary the charge for drilling with the depth of hole. No attempt was made when calculating Schedule 2 to over estimate hole depths. A glance at figure 3 will show that it is possible that some of the Stage II drilling will exceed 700 feet. Cost of drilling in the 700 foot to 800 foot interval is $4.75 per foot whereas the most expensive category used in the estimate is $3.75 per foot for the 500 to 600 foot interval.

Estimates for the payments to contractors for trail building and drill site preparation may be inadequate as they are based on an hourly rate for tractor and bulldozer only. It is possible that some of the trails crossing the conglomerate ledges of the Burro Canyon Formation might require rock drills and blasting.

In view of the above, it seems reasonable to add for contingencies, 15% to the estimate of amounts to be paid to independent contractors.

Labor Supervision and consultants payments are on a monthly, or hourly basis. Any event which might prolong the project will increase the cost of this item. 10% is added to cover these possible increases.

Operating Material and Supplies are estimated at a minimum, the destruction of a few core boxes or some other unforseen consumption of materials and supplies, might easily increase the cost of the item 20%.

Miscellaneous costs are estimated at $135.00 per month. If the manager of Worcester Mines makes a weekly trip from Grand Junction to the project, the cost of his time and expenses is likely to exceed $200.00 per month. 50% is added for contingencies under this item.

7. APPLICANT'S SHARE OF COST

In accordance with DMEA regulations, Worcester Mines is prepared to assume 25% of the cost of the project in the following manner:

The company will perform all of the necessary work and pay for all of the labor, materials, and supplies used. Reimbursement by DMEA will be in accordance with schedule 1, less 25% i.e., the amount to be loaned by the Government for each unit of work performed will be 25% less than the amounts shown on schedule 1.

Respectfully submitted,
Geo - Engineering

Louis P. Gaggini

Louis P. Gaggini

Harold A. Culp

Harold A. Culp

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Schedule 1

Geo-Engineering Application for DMEA Project on Ruth K. Group for WORCESTER MINES

Summary of Costs

	Units	No. of Units	Cost Per Unit	Total Cost Each Item	Grand Totals
a. Independent Contracts See Schedule 2	Feet	34565	2.910	100 58 415	
b. Labor Supervision and Consultants (see Schedule 3)	Feet	34565	.502	17 35 163	
c. Operating Materials and Supplies (See Schedule 3)	Feet	34565	.053	1 83 195	
d. Operating Equipment	None				
e. Rehabititation and Repairs	None				
f. New Building Improvements, etc.	None				
g. Miscellaneous (See Schedule 3)	Feet	34565	.047	1 62 456	
h. Contingencies					
For (a) above 15%				15 87 622	
For (b) above 10%				1 73 516	
For (c) above 20%				33 639	
For (g) above 50%				81 228	
Calculated Unit Cost			.405	140 15 234 / 34565	
Calculated Cost of Project using Unit cost bid and before allowance for any litical work	Feet	34565	4 05		13998825
Any Litical Work					
U_3O_8 Analysis	Sample	3 00	3 50	1050 -	
V_2O_5 Analysis	Sample	300	1 50	450 -	
$CaCO_3$ Analysis	Sample	300	1 00	300 -	
				1800 -	1800 -
Total Recommended For Project					14178825
Less cost of Hole No. 1 to be drilled before DMEA participation	Feet	445	4 05		180225
Cost of Project during DMEA participation					13998600
Less 25% to be paid by WORCESTER MINES					3499650
Amount of DMEA Loan requested					10498950

Schedule 1

BRUNING COPYFLEX 289-5

Schedule 2

Geo-Engin[illegible]ing Application for DMEA Project on Ruth K. G[illegible]p for

WORCESTER MINES

Estimate of Amounts to be paid to Independent Contractors

Explanation	Units	No. of Units	Cost Per Unit	Total Cost Each Item	Grand Totals
Drilling Contractor					
Stage I (See figure 3)	Feet	6965 -	17260 -	17260 -	17260 -
Stage II Drilling					
46 Holes @ 600 feet					
Non Core Drilling	Feet	16100	200	32200 -	
0-200' Core Drilling	Feet		225		
200-300' Core Drilling	Feet		250		
300-400' Core Drilling	Feet	2300	275	6325 -	
400-500' Core Drilling	Feet	4600	325	14950 -	
500-600' Core Drilling	Feet	4600	375	17250	
600-700' Core Drilling	Feet		425		
700-800' Core Drilling	Feet		475		
Total Stage II Drilling	Feet	27600		70725 -	70725 -
Reaming	Feet	4000'	150		6000 -
Bulldozer and Tractor Contractor					
Moving on and off property round trip		6	100 -		600 -
Rental with operator Day		60	100 -		6000 -
Total estimate amounts to be paid Independent Contractors.	Feet	34565 -			100585 -
Calculated Average Cost Per Foot			291		

Schedule 2

BRUNING COPYFLEX 289-5

Schedule 3

Geo-Engineering Application for DMEA Project on Ruth K. Group for WORCESTER MINES

Estimated Cost Under Headings 6(b), 6(c), 6(g) Form MF-103

Explanation Heading Letter	Cost Per Hour	Cost Per Day	Cost Per Month	Cost For Project	Calc. Cost For MF-103 Heading
(b) Labor, Supervision, and Consultants					
Geo-Engineering fees			650 -	7800 -	
Geo-Engineering expenses		10 -	250 -	3000 -	
Draftsman 48 hrs/month	3 -		144 -	1728 -	
Typist 24 hrs/month	2 20		52 80	633 60	
Sampler and Field Assistant		14 -	350 -	4200 -	
Total Under 6b of MF-103				17361 60	.502
				34565	
(c) Operating Materials and Supplies					
Office supplies and map and drill log reproductions for monthly reports and other correspondence with DMEA.			150 -	1800 -	
Survey stakes timber crayon, water bags and other field supplies.				20 -	
Total Under 6c of MF-103				1820 -	.053
				34565	
(g) Miscellaneous					
Worcester Mines expense for accounting, etc.			100 -	1200 -	
Payroll taxes estimated at 10% of $350.00			35 -	420 -	
Total Under 6g of MF-103				1620 -	.047
				34565	

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAY 13 1954

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

Not to be filled in by applicant

Docket No. 3350
Metal or Mineral Uranium
Date Received
Estimated Cost $141,788
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: Worcester Mines, 1501 White Avenue, Grand Junction, Colorado. Please address all correspondence regarding application to Geo - Engineering 304 Main, (Room 14), Grand Junction, Colorado, and send copies to Worcester Mines.

(*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 The six unpatented claims to be covered by project are as follows: Sylvia, Sylvia No. 2, Sylvia No. 3, Ruth K. No. 2, Ruth K. No. 3, Ruth K. No. 4. Claims are recorded in Montrose, Colorado. Book and page is given on page 1 of exhibit 4.

(*b*) State any mine name by which the property is known. Ruth K. Group

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise See part 3 c of report, page 3.

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property. See exhibit 3 and 4

(*e*) If you own the land, describe any liens or encumbrances on it See part 3 d of report, page 3.

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice. See page 1 of exhibit 3.

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

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

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

(*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. Exhibit 1

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

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

(*c*) The work will start within 30 days and be completed within 12 months from the date of an exploration project contract.

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

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

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

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

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

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

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

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

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

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

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

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

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

☒ Money ☐ Use of equipment owned by you ☐ Other

Explain in detail on acompanying paper.

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 _____, 195__

WORCESTER MINES
(Applicant)

By John W. Hill

John W. Hill, Managing Partner

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

Louis P. Gaggini
Chief Geologist
Lewis D. Anderson
Mining Engineer
Harold A. Culp
Geologist-Geophysicist

GEO ENGINEERING

P. O. Box 223 **Phone 99**
NORWOOD, COLORADO

Phone 2294
P. O. Box 382
Grand Junction
Colorado

GEOLOGY MINING
GEO
ENGINEERING
RELATED SERVICES

GEO - ENGINEERING
304 Main Street (Room 14) - Grand Junction, Colorado

Application for DMEA Project on the Ruth K. Group Prepared for

Worcester Mines
1501 White Avenue - Grand Junction, Colorado

Partners of Worcester Mines

Managing Partner: John W. Hill
1501 White Avenue
Grand Junction, Colorado

Other Partners: Margaret Worcester
Montrose, Colorado

E. L. Bacon
1405 Ouray Avenue
Grand Junction, Colorado

A. H. Gould
1055 N. 12th Street
Grand Junction, Colorado

B. H. Kellogg
Grand Junction, Colorado

Le Roy Bacon
1850 N. 18th
Grand Junction, Colorado

Silmon Smith
U. S. Bank Building
Grand Junction, Colorado

W. E. Dalby
First National Bank Building
Grand Junction, Colorado

H. B. Manuel
710 Hill Avenue
Grand Junction, Colorado

C. E. Poister
2005 N. 5th
Grand Junction, Colorado

Claud Smith
2040 N. 6th
Grand Junction, Colorado

Geno Saccomanno
1925 N. 5th
Grand Junction, Colorado

Charles Holmes
U. S. Bank Building
Grand Junction, Colorado

Exhibit 2

MINING LEASE

THIS AGREEMENT, Made and entered into in duplicate as of March 1, 1954, between ENGINEERS ASSOCIATES, INC., a Colorado corporation of Grand Junction, Colorado, first party, hereinafter called Lessor, and LOUIS P. GAGGIRI, of Norwood, Colorado, second party, hereinafter called Lessee, WITNESSETH:

In consideration of the sum of $50.00, in hand paid by Lessee to Lessor, the receipt of which is hereby acknowledged, and of the further royalty payments and covenants to be paid and performed by Lessee, Lessor does hereby lease unto Lessee the following-described mining claims in Vixen Mining District, County of Montrose, State of Colorado, to-wit:

Name of Claim	Location Certificate recorded in Book	Page
the Sylvia	343	433
the Sylvia No. 2	343	433
the Sylvia No. 3	343	434
the Ruth K.No. 2	343	234
the Ruth K.No. 3	343	235
the Ruth K.No. 4	343	228

TO HAVE AND TO HOLD Unto Lessee for the term of 10 years from date hereof, together with the right to renew this lease for an additional term of 10 years upon the same terms and conditions, unless sooner forfeited through the violation of any covenant herein required to be paid, kept and performed by Lessee, and with the right in Lessee to surrender this lease; all as hereinafter set forth.

IN CONSIDERATION Of such lease, Lessee covenants and agrees with Lessor as follows:

1. To pay Lessor the following sums, which, together with said $50.00 payment, shall constitute advance royalty payments, to-wit:

$250.00 on or before March 31, 1954; $300.00 on or before April 30, 1954; and $400.00 on or before May 31, 1954.

2. To cause to be paid Lessor a royalty of 15% of the proceeds of ores mined and sold from any of said claims, including 15% of any bonus payments paid by the A. E. C., less, however, development and haulage allowances. Lessee shall be entitled to deduct from ore proceeds as above defined said 15% royalty until such deductions shall equal said advance royalty payments of $1,000.

3. On or before May 31, 1954, to enter upon said mining claims and to do and perform thereon, at such points and places as Lessee may be advised, a minimum of 7500 feet of wagon or diamond drilling and to complete the same within one year from the date of commencement thereof.

4. To keep full and accurate records of all operations carried on hereunder, including drilling records, maps and assays open to the inspection of Lessor at all reasonable times, and to permit Lessor full and free access to said claims for the purpose of inspection.

5. In the event of the discovery of commercial ores, to mine the same with due and reasonable diligence so as to take out the greatest amount of ore possible; to carry on mining operations in strict conformity with all laws and regulations pertaining to such operations; to carry Workmen's Compensation Insurance; and to pay all

State and Federal taxes and exactions under operations hereunder, including any production taxes; and to save and keep harmless Lessor from any and all liability of every kind and character arising out of his mining operations hereunder.

6. So long as this lease may be in effect to do and perform, within the time prescribed by law, the annual labor required for the retention of possessory rights upon said mining claims, and to make and file affidavit so showing, beginning with the period ending June 30, 1954.

7. Lessee agrees that after the first year period of this lease, he will expend aminimum of $100.00 per month in operations hereunder, or, in lieu thereof, pay Lessor such sum monthly as advance royalty.

8. Lessee agrees that in the event Lessor or his assigns make application for an exploratory loan from any government agency to explore for uranium upon said mining claims, Lessee will subordinate its royalty rights on any ores so discovered by such exploration work performed with funds from such loan to the extent of permitting Lessee or his assigns to repay such loan according to its terms; it being understood and agreed, however, that the provisions of this paragraph shall apply only to ores discovered as the result of work done by the use of such funds and that any such payments to the government as heretofore set forth shall in no event reduce the royalty payments heretofore specified to be paid Lessor. Upon application for such loan, Lessor will promptly execute its consent to the same and the terms thereof when presented to it.

9. Lessor agrees that upon the payment in full of said advance royalty payments of $1,000 as heretofore provided, it will place in escrow in the First National Bank in Grand Junction, Colorado, its mining deed conveying to Lessee or assigns the mining claims herein described, with escrow instructions that same be delivered upon payment in full of the purchase price therefor as provided in the option provision hereinafter set forth.

IT IS MUTUALLY AGREED Between the parties hereto:

1. That Lessee shall have the right to surrender this lease at any time upon giving Lessor at least 30 days written notice, sent by registered mail to it at Grand Junction, Colorado, and, upon such surrender or cancellation as hereinafter provided, Lessee shall have the right, within a reasonable time, to remove his machinery, equipment and personal property upon said claims, but Lessor shall keep and retain, as its sole property, all royalty payments theretofore made, and Lessee shall have no claim thereto.

2. That upon violation by Lessee of any of the covenants in this lease, the term thereof shall, at the option of Lessor, expire, and the same and said mining claims shall become forfeited to Lessor, and Lessor may thereupon enter upon said mining claims and dispossess all persons occupying the same, or, at its option, Lessee and all persons found in occupation thereof may be proceeded against as guilty of unlawful detainer; provided, however, that if said lease is forfeited upon the election of Lessor by reason of the failure of Lessee to perform any covenant thereof, Lessor shall give Lessee at least 30 days notice in writing, by registered mail, sent to him at the above address notifying him of such failure to perform and setting out in such notice the substantial facts as to any such default or breach, and, upon failure or refusal by Lessee to cure and correct such default within 30 days from the receipt of such

notice, Lessee shall surrender and deliver up the possession of all such mining claims, and his rights under this lease shall thereupon cease and determine.

3. Lessee shall have the right to transfer and assign this lease and the option in connection therewith and all of his right thereunder without the consent of Lessor.

4. In the event Lessee desires to extend the term of this lease as heretofore provided, he or his assigns shall give Lessor at least six months' written notice of such intention to renew prior to the expiration of the original term.

OPTION PROVISION

In consideration of the acceptance of the foregoing lease and the payment of said advance royalties and the expenditures to be made thereunder and the well and faithful keeping of the covenants thereof, Lessee shall have the right to purchase the said mining claims for the total sum of $90,000; all royalties paid under the above lease to be applied upon said purchase price. Upon its exercise and tender of payment during the period of said lease, Lessor shall make and deliver, at its cost and charges, a good and sufficient deed conveying said mining claims to Lessee, clear and free of any liens of encumbrances made or suffered by it. The forfeiture, surrender or termination of said lease shall render this option void.

IT IS FINALLY AGREED That each of the terms and conditions herein shall inure to and be binding upon the successors and assigns of Lessor and the heirs, personal representatives and assigns of Lessee.

WITNESS The names of the parties.

ENGINEERS ASSOCIATES, INC.

By Charles H. Yetter
President

ATTEST:

E. O. Lamm
Secretary

Lessor

Louis P. Dygnani
Lessee

AGREEMENT

THIS AGREEMENT, made and entered into, in duplicate, as of March 15, 1954, between Louis P. Caggini of Norwood, Colorado, party of the first part, hereinafter called Lessor, and WORCESTER MINES, a partnership consisting of Margaret Worcester of Montrose, Colorado, and V. L. Bacon, A. M. Gould, B. H. Kellogg, LeRoy Bacon, Silmon Smith, W. E. Dalby, H. B. Manuel, C. E. Foister, Claud Smith, Gene Saccomanno, Charles Holmes and John W. Hill, all of Grand Junction, Colorado, parties of the second part, hereinafter called Lessee, WITNESSETH:

In consideration of the sum of $650.00 in hand paid by Lessee to Lessor, the receipt of which is hereby acknowledged, and of the further payments and royalty payments and covenants to be paid and performed by Lessee, Lessor does hereby sell, assign, transfer and set over to Lessee that certain mining lease and option between Engineers Associates, Inc., of Grand Junction, Colorado, and the Lessor herein dated March 1, 1954, whereby the Lessor herein obtained a lease and option on the following described mining claims in the Vixon Mining District, County of Montrose, State of Colorado, to-wit:

The Sylvia	The Ruth K. No. 2
The Sylvia No. 2.	The Ruth K. No. 3
The Sylvia No. 3	The Ruth K. No. 4

In consideration of the Lessor transferring and assigning said lease and option to the Lessee herein, the Lessee covenants and agrees with Lessor as follows:

1. To pay said Engineers Associates, Inc. the sums specified in said mining lease and option of March 1, 1954, to pay the royalty and other payments and perform and comply with all the terms and conditions of said lease and option, unless the Lessee herein elects to surrender back to Lessor the said lease and option, as hereinafter provided.

2. To complete one drill hole sufficient to do the annual assessment

work for 1953-54, by May 1, 1954. Said hole to be located by mutual agreement between Lessor and Lessee and to file Affidavit of annual labor as required by Law for the period ending June 30, 1954.

3. To pay Lessor the sum of $650.00 on April 15, May 15 and June 15, 1954, which sums, together with the $650.00 consideration paid this day, shall constitute a professional geologist's consultant fee. For these payments Lessor agrees to prepare for the Lessee good and proper application to Defense Minerals Exploration Administration for an exploration project contract for the above claims, and to submit the same to Lessee as soon as possible, but not later than April 15, 1954.

4. If a D.M.E.A. contract is approved, Lessor agrees to act as Geological consultant for Lessee so long as the exploration project is active, and shall receive a fee of $650.00 a month, and reasonable expenses for such services. Lessor shall perform such geological services, from time to time, as may be requested by Lessee in connection with such project.

5. To pay the Lessor, as additional consideration for this assignment, the following royalty payments from the proceeds of ore mined and sold from the above claims, less development and haulage allowances:

Dry tons mined	
0 tons to 20,000 tons	2% royalty
20,000 tons to 100,000 tons	5% royalty
more than 100,000 tons	10% royalty

The Lessee shall pay Lessor no part of any bonus payments or other gratuities paid by A.E.C. Lessee agrees to direct the ore buyers to pay Lessor's royalties direct to him.

6. Lessor agrees to execute and place in escrow a good and sufficient mining deed with the First National Bank of Grand Junction, with appropriate instructions to deliver the same to the Lessee upon Lessee exercising its option and paying the purchase price to Engineers

Associates Inc., as provided for in said mining lease of March 1, 1954. Lessor further agrees to execute Consent to Lien, and such other necessary instruments as may be required by the D.M.E.A. in connection with its contract.

7. It is mutually specifically understood and agreed that the only definite and binding commitment made by the lessee under this agreement is to drill as aforesaid, to make the monthly payment of $650.00 to lessor on April 15, May 15 and June 15 as aforesaid, to make the cash advance royalty of $950.00 to Engineers Associates Inc., and to pay Lessor for his services during D.M.E.A. drilling contract. That subject to above, the lessee may at any time surrender this agreement by assigning back to lessor all its right, title and interest in and to this agreement. Such assignment may be either mailed to lessor, by registered mail addressed to him at Norwood, Colorado, or served on him personally, and thereupon lessee shall be released from any further obligation hereunder and under the said mining lease of March 1, 1954, provided, however, that if such surrender and assignment is made after April 15th of any year after April 15, 1954, then the lessee shall do and perform all of the annual assessment labor which may be required to keep the claims in good standing to June 30th following such surrender.

It is agreed that each of the terms and conditions herein shall inure to and be binding upon the heirs, administrators, successors and assigns and personal representatives of the parties hereto.

Witness the signatures of the Parties,

Louis P. Dayppin
Lessor

WORCESTER MINES, a co-partnership

BY John W. Hee

U. S. Geological Survey

GEOLOGIC AND ASSAY LOG

Colorado Plateau project
Graphic Log
1" = 50'

Drill hole No. LP-537
Total depth 410.0'
Collar elev 6249.8'
Map coord 142,510 N, 94,500 E

Claim Sylvia No. 2
Area Long Park
Co., State Montrose County, Colo.
Sec. 1,36 T.46,47N R. 17 W

Date drilled 7/28/52-8/6/52
Date logged 8/7/52
Logged by Navias

Interpretative summary of log Unfavorable: OBSS 12.1' (385.7'-397.8'); 0.9' GyGn MS; No Cbn.

Footage			Chemical assay(%)			Gamma-ray	Description						
From	To	Feet	U_3O_8	V_2O_5	$CaCO_3$	% of eU_3O_8	Rock	Color	Grain	Bdg	MS in SS	Cbn	Other remarks
0.0	170.0	170.0											Solid bit, no core
	290.4	120.4					MS-ST	GyGn-RBr	-	-	-	N	-
	294.9	4.5					SS	LGy	VF	N	S;GyGn;P, Int	N	S R,Gn CH.S Fe stain
	306.2	11.3					MS-ST	RBr-Gy	-	-	-	N	-
	307.2	1.0					MS-ST	Gy-Gn	-	-	-	N	
	312.3	5.1					SS	Gy-LBr	F	N	S;Gn;Int	N	S Fe stain.R CH
	385.1	62.8					MS-ST qtzc	RBr-GyGn	-	-	-	N	
	385.7	0.6					MS	GnGy	-	-	-	N	
	397.8	12.1					SS	LBr-Gy	F	S	S;Gy-Gn; Sms;Int	N	S RBr MS P
	398.1	0.3					MS	Gy-Gn	-	-	-	N	
	410.0	11.9					MS	RBr	-	-	-	N	

Probed by field gamma-ray instrument
No count above background

GPO 8 F50

Hole No. LP-537

Geo Engineering. Application for DMEA Project on the Ruth K Group
EXHIBIT 6

U. S. Geological Survey

GEOLOGIC AND ASSAY LOG

Colorado Plateau project
Graphic Log
1" = 50'

Drill hole No. LP-538
Total depth 450.0'
Collar elev. 639.2'
Map coord 141,750 N, 93,180 E

Claim Ruth K. No. 4
Area Long Park
Co., State Montrose County, Colo.
Sec. 2,35 T. 46,47 N R. 17 W

Date drilled 7/29/52-8/6/52
Date logged 8/9/52
Logged by Navias

Interpretative summary of log Favorable: OPSS 48.0'(384.5'-432.5') with A Cn MS; S Cbn. 2.2' GyGn MS at base OBSS.

Footage			Chemical assay(%)			Gamma-ray	Description						
From	To	Feet	U_3O_8	V_2O_5	$CaCO_3$	% of eU_3O_8	Rock	Color	Grain	Bdg	MS in SS	Cbn	Other remarks
0.0	200.0	200.0											Solid bit, no core
	258.1	58.1					MS-ST	RBr-GyGn	-	-	-	N	
	266.7	8.6					SS	LBr-RBr	F	S	A;Br;Sm, Int	N	R,Gn CH
	384.5	117.8					MS-ST	RBr-GyGn	-	-	-	N	S Gy P,Sms
	430.6	46.1					SS	LGy-Gn	VF-F	S	A;Gy Gn;P, Sms	N	S Gy P,Sms.A Int Gn MS
	432.5	1.9					SS	LBr-LGy	F	S	A;Int,Sm; Gn	S	
	434.7	2.2					MS	GyGn	-	-	-	N	
	450.0	15.3					MS-ST	RBr-Gn	-	-	-	N	

Probed by field gamma-ray instrument
No count above background

Hole No. LP-538

GPO 9 F50

Geo Engineering. Application for DMEA Project on the Ruth K Group
EXHIBIT 7

EXHIBIT 8

EXPLANATION OF U. S. G. S. LOGS

ABBREVIATIONS FOR GEOLOGIC AND ASSAY LOGS

Rock Name

CG--conglomerate or conglomeratic
SS --sandstone
MS--mudstone
ST --siltstone
CS --claystone
LS --limestone
CH --chert or cherty

Color Description

Wh--white
Br --brown
R ---red
Gy --gray
Bl --blue
Gn--green
Yw--yellow
Bk--black
Pp--purple
L ---light
D ---dark

Grain sizes

Wentworth scale (modified)	Millimeters
VF--very fine	0.060 - 0.125
F--fine	0.125 - 0.210
MF--medium fine	0.210 - 0.300
M--medium	0.300 - 0.420
MC--medium coarse	0.420 - 0.600
C--coarse	0.600 - 1.000
VC--very coarse	1.000 - 2.000

Relative abundance
(use only for accessory minerals, carbon and mudstone in sandstone)

N--none
S --sparse
A--abundant

Chemical abbreviations

Cbn--carbon
For all other elements use the standard chemical symbols, Cu for copper, Fe for iron, Mn for manganese, etc.

Classification of mudstone in sandstone

P ----pebbles, round or angular fragments of pebble size (more than 4 mm or 0.15 in.).
G ----granules (less than 4mm or 0.15 in., and more than 2 mm or 0.08 in.).
Fk ---flakes, paper thin, with two longer dimensions.
Sm ---seams, less than 0.1 ft. thick.
Fm---films, usually along lamination or cross-lamination planes.
Int ---interstitial.

Miscellaneous abbreviations

1. fav--favorable
2. semifav--semifavorable
3. unfav--unfavorable
4. alt--altered
5. Bby--Barnaby
6. carn--carnotite
7. cond--condense or condensed
8. disc--discard or discarded
9. frac--fracture
10. grad--gradational
11. itbd--interbedded
12. lim--limonite
13. mot--mottled
14. OBSS--ore-bearing sandstone
15. op--opaques or opaque
16. qtzc--quartzitic
17. H--high)
18. L--low) use only for U_3O_8
19. Tr--trace)

Additional Information for Claim Owners

The additional information contained in this supplement is useful in interpreting the GEOLOGIC AND ASSAY LOG form.

Collar elevation.--Generally this is the elevation above mean-sea level of the drill-hole collar. Elevations marked T (temporary) are estimates. Those marked P (permanent) or those with no letter following the elevation are determined by plane-table survey methods.

Summary of log.--Each of the terms "favorable", "semifavorable" or "unfavorable" sums up the geologic factors that determine whether or not the hole is in ground considered favorable for the presence of ore. For instance, the term "favorable" indicates that the hole is in ground that shows most of the criteria that are present near ore deposits. A favorable hole is not necessarily one that is in mineralized rock.

Gamma-ray. --In the column headed "gamma-ray" the values are given in terms of equivalent U_3O_8 (eU_3O_8) and are determined in the laboratory by a geiger counter. Equivalent U_3O_8 is calculated by converting the geiger-counter reading of counts per minuts to percentage U_3O_8.

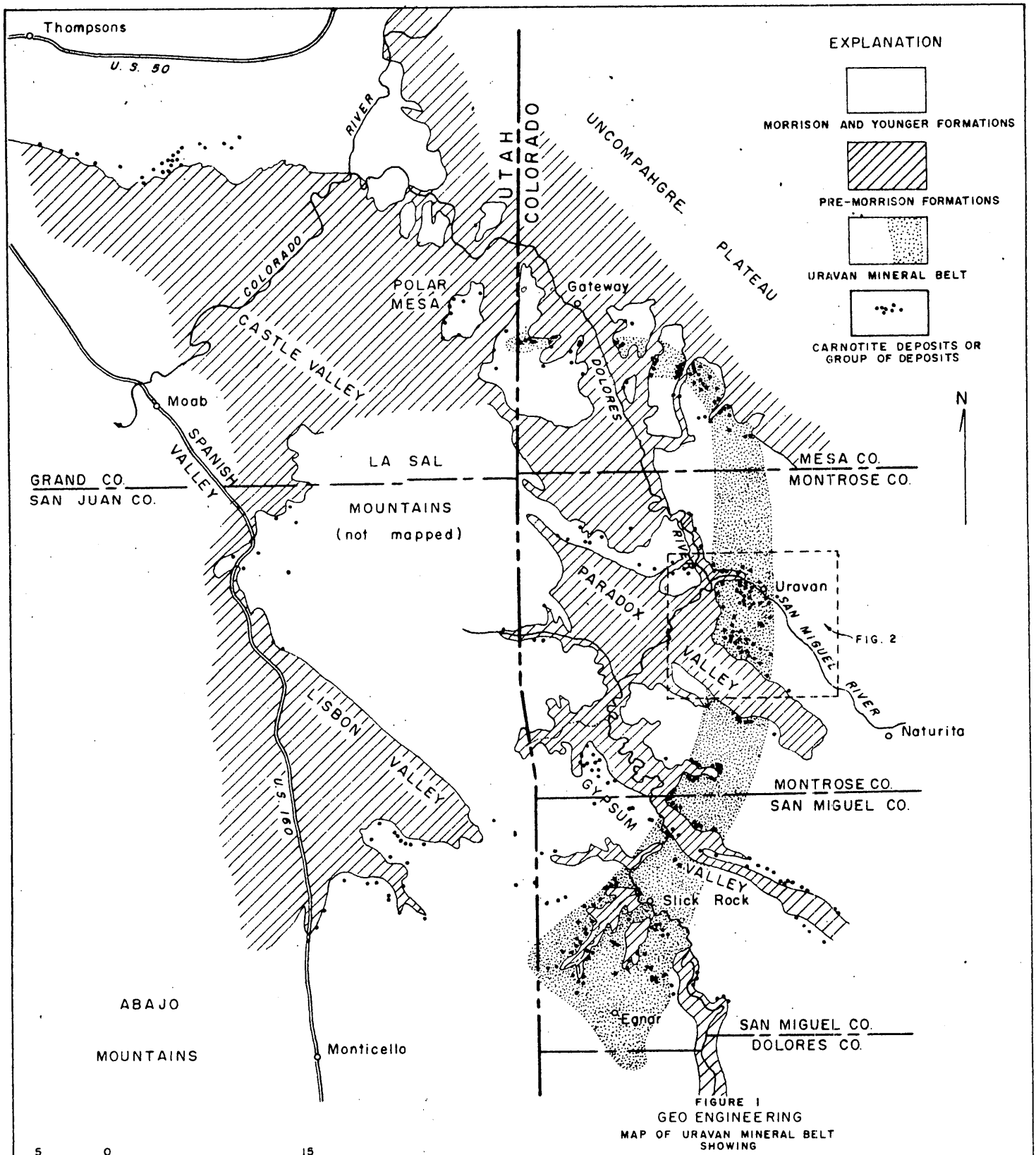


FIGURE 1
GEO ENGINEERING
MAP OF URAVAN MINERAL BELT
SHOWING

Position of figure 2 of the Application for DMEA Project on the Ruth K. group prepared for WORCESTER MINES.

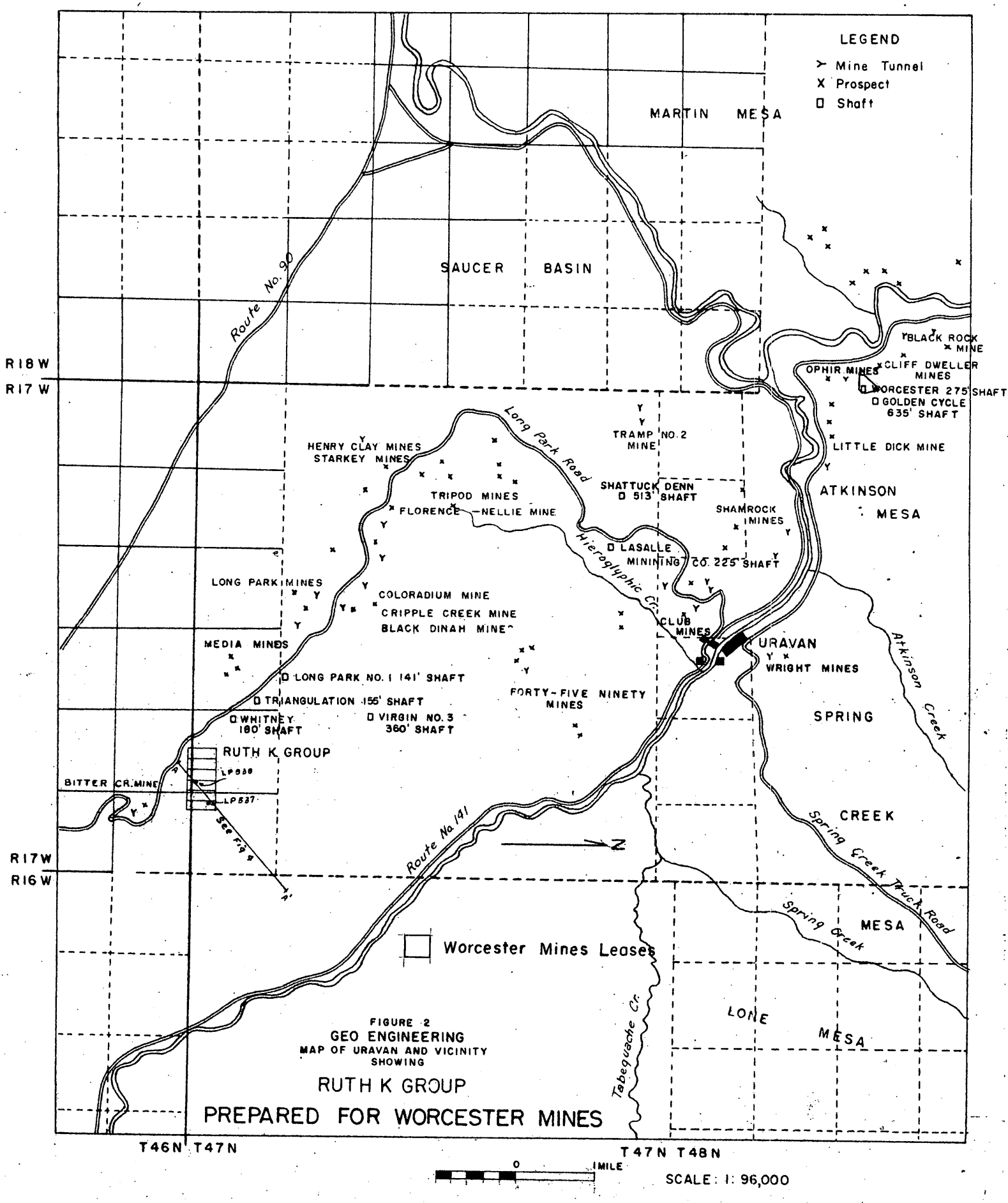
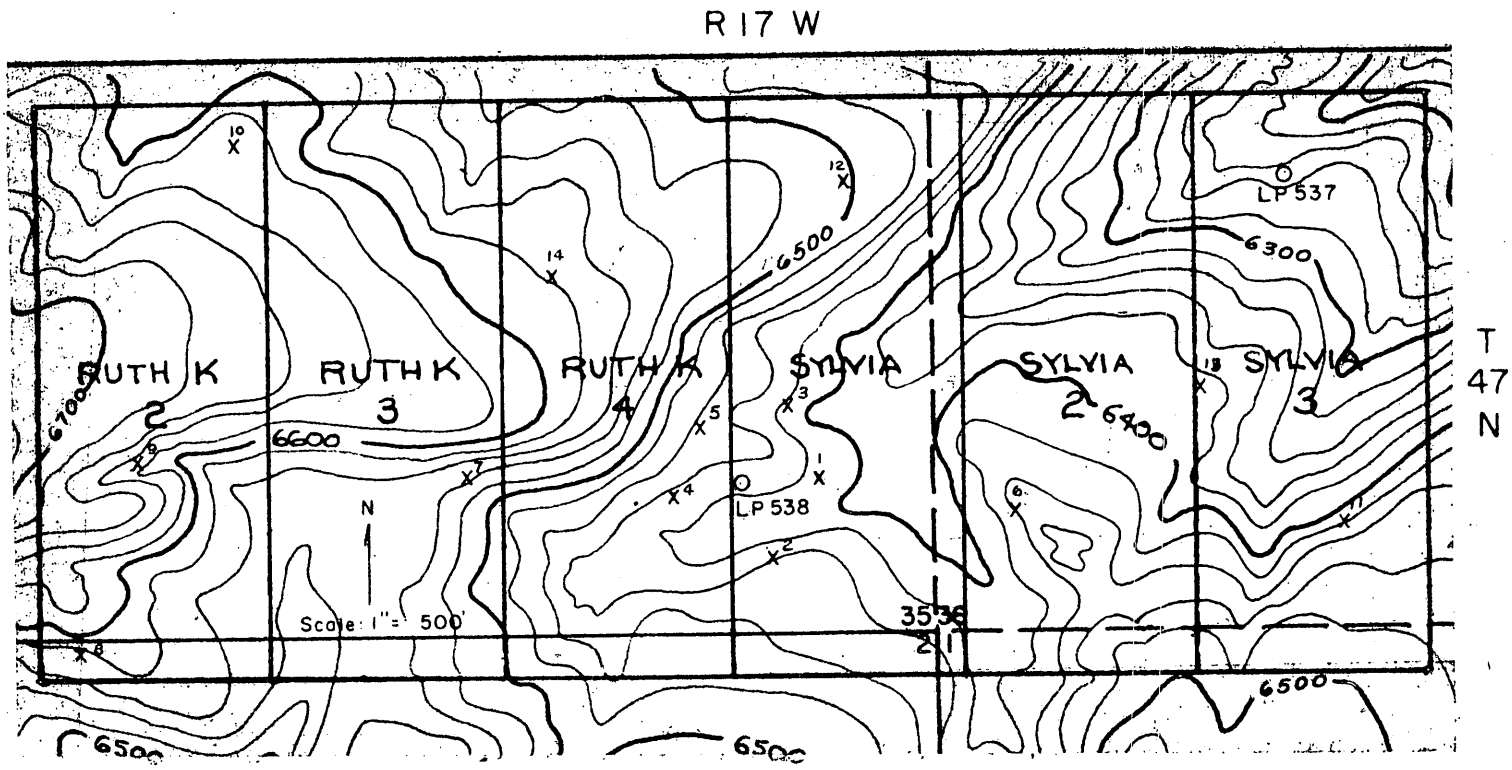


FIGURE 2
GEO ENGINEERING
MAP OF URAVAN AND VICINITY
SHOWING
RUTH K GROUP
PREPARED FOR WORCESTER MINES



PROPOSED DRILLING (Stage I)

HOLE NO.	ESTIMATED TOTAL DEPTH	ESTIMATED NO. CORE DRILLING	ESTIMATED CORE DRILLING 0-200'	ESTIMATED CORE DRILLING 200-300'	ESTIMATED CORE DRILLING 300-400'	ESTIMATED CORE DRILLING 400-500'	ESTIMATED CORE DRILLING 500-600'	ESTIMATED CORE DRILLING 600-700'
1	445	195	5	100	100	45		
2	435	185	15	100	100	35		
3	460	210		90	100	60		
4	425	175	25	100	100	25		
5	465	215		85	100	65		
6	440	190	10	100	100	40		
7	530	280		20	100	100	30	
8	385	135	65	100	85			
9	500	250		50	100	100		
10	600	350			50	100	100	
11	560	310			90	100	60	
12	605	355			45	100	100	5
13	525	275		25	100	100	25	
14	590	240		60	100	100	90	
Totals	6965	3365	120	830	1270	970	405	5
Price/ft		2.00	2.25	2.50	2.75	3.25	3.75	4.25
Total Price Drilling	$17260.00	$6730.00	$270.00	$2075.00	$3492.50	$3152.50	$1518.75	$21.25

Figure 3
GEO - ENGINEERING
Topographic Map showing Proposed Drilling
Application for DMEA Aid in an Exploration Project on the
Ruth K. Group
PREPARED FOR WORCESTER MINES

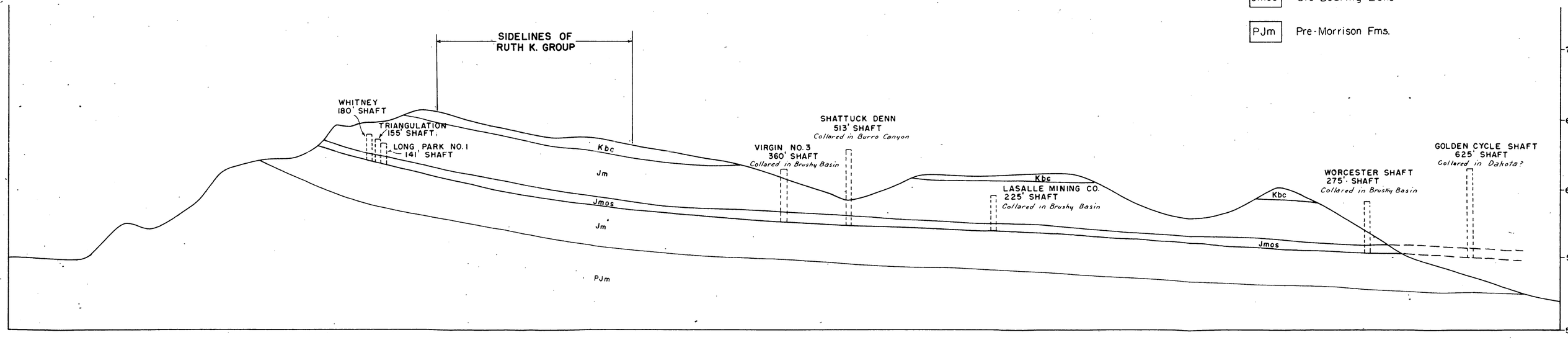
SCHEMATIC SECTION

TAKEN ALONG REGIONAL DIP
DEEP SHAFTS OF URAVAN DISTRICT
ARE PROJECTED ALONG STRIKE TO LINE OF SECTION
SEE FIG. 2

FIGURE NO. 4

GEO ENGINEERING
SECTION A-A'
SHOWING
PRINCIPAL SHAFTS AND ORE SANDSTONE
OF THE URAVAN DISTRICT
RUTH K. GROUP
PREPARED FOR WORCESTER MINES

SCALE: HORIZONTAL - 1" = 1000'
VERTICAL - 1" = 500'

LEGEND

Kbc	Burro Canyon Fm.
Jm	Morrison Fm.
Jmos	Ore Bearing Zone
PJm	Pre-Morrison Fms.