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

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224 New Customhouse
Denver 2, Colorado

August 2, 1955

Memorandum

To: Secretary to the Operating Committee, DMEA

From: DMEA Field Team, Region III

Subject: Joint Report of Examination, DMEA Docket 3806 (Tungsten), W. R. Cochran, (Wild Tiger mine), Boulder County, Colorado

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

The field examiners concluded that there is little possibility of discovering a significant amount of tungsten by the proposed exploration.

We concur in their recommendation that the application be denied.

DMEA Field Team, Region III

W. M. Traver

W. M. Traver

E. N. Harshman

E. N. Harshman

Enclosures

DMEA
Date Rec'd,

AUG 1 1955

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AUG 10 1955
BUREAU OF MINES
Denver, Colorado

Building 20, Room 137
Denver Federal Center
Denver 2, Colorado
July 29, 1955

TRANSMITTED

AUG - 3 1955

Region III

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: John F. Shaw
E. N. Harshman

Subject: Examination Report, Docket No. DMEA 3806, W. R. Cochran, Wild Tiger Mine (Tungsten), Boulder County, Colorado

Enclosed are the original and 8 copies of the Joint Geologic and Engineering report by M. H. Salsbury, Mining Engineer and J. E. O'Rourke, Geologist covering Docket No. DMEA 3806.

W. R. Cochran applied for exploration assistance in the amount of $16.630.19 to explore the Wild Tiger Mine by 100 feet of shaft sinking and 200 feet of drifting. The field examination was made on June 15, 1955.

The examining team concluded that there was little possibility of discovering a significant amount of tungsten by the proposed exploration. It is recommended that the application be denied.

John F. Shaw
John F. Shaw
Supervising Mining Engineer

E. N. Harshman
E. N. Harshman
Member Field Team

JFS:jw

cc: 8
DMEA 3806
Subj.
ENHarshman

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

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AUG 10 1955

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

DMEA 3806

W. R. Cochran

Wild Tiger Mine

Boulder County, Colorado

Tungsten

Joint Engineering and Geologic Report

By

M. H. Salsbury, Mining Engineer
Bureau of Mines

J. E. O'Rourke, Geologist
Geological Survey

July 28, 1955

DMEA 3806

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AUG 10 1955

D. R. Cochran
WILD TIGER MINE
BOULDER COUNTY, COLORADO

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DMEA 3806

W. R. COCHRAN
WILD TIGER MINE
BOULDER COUNTY, COLORADO

JOINT ENGINEERING AND GEOLOGIC REPORT

By M. H. Salsbury and J. E. O'Rourke

INTRODUCTION

W. R. Cochran, Sugarloaf, Colorado, lessee of the Wild Tiger Mine, Boulder County, Colorado, has applied for Government assistance in underground exploration for tungsten under the Defense Minerals Exploration Administration. The application, dated May 9, 1955, calls for 100 feet of shaft-sinking, continuing an existing 60 foot shaft, and 200 feet of drifting, all to be driven on the Wild Tiger or Pisgah vein. The estimated cost, arrived at by completing the applicant's cost computations, is $16,630.19 in which Government participation at 75 percent would be $12,472.64.

A field examination was made on June 15, 1955, by E. N. Harshman and Joseph O'Rourke of the Geological Survey and M. H. Salsbury of the Bureau of Mines. The applicant accompanied the examiners. A second visit was made on July 5, 1955 after the Wild Tiger shaft had been unwatered. Salsbury, O'Rourke, and Alberto Manrique, a Point 4 trainee, participated in the second examination.

The property consists of 5 patented mining claims on North Boulder Creek, ½ mile northwest of the Good Friday tungsten mine, covering the outcrops of several tungsten and gold veins. Three of these claims are included in the DMEA application. There are vein exposures at surface in several open cuts and shallow holes but no appreciable tungsten

mineralization except in the vicinity of the Wild Tiger shaft at the West end of the Mt. Pisgah claim. Different outcrops cannot be correlated as being the same vein with any certainty.

There has been minor recorded production by the applicant from surface workings southwest of the shaft, and eariler production is reported. There was probably a small tonnage mined from the cutout at the 44 foot level of the Wild Tiger shaft, but no records are available. It is doubtful that any of the operations were profitable.

The applicant suggests that the size and grade of the ore would be likely to increase at depth. There is no evidence, however, to support this view. There appears to be a reasonable possibility that tungsten mineralization of the tenor found in the shaft and surface workings probably repeats in depth, but there is certainly no reason to predict an improvement. The vein structure is not nearly as strong as in the well-defined Good Friday vein which has the best production record in the immediate area. Justification for further exploration would therefore have to be based on the assumption that ore bodies similar to those now exposed might be significant under conditions of national emergency. This appears to be a remote possibility, and only small amounts of tungsten production would be likely to result from further exploration. Denial of the application for Government assistance in exploration under DMEA 3806 is recommended.

ACKNOWLEDGEMENTS

The applicant furnished a claim map and production figures. Data from DMEA examinations of nearby properties were utilized in considering

the proposed project. The property is described very briefly on page 173 of the Geological Survey Professional Paper 245, "Geology and Ore Deposits of the Boulder County Tungsten District, Colorado", by T. S. Lovering and Ogden Tweto.

LOCATION, TOPOGRAPHY AND PHYSICAL FEATURES

The Wild Tiger mine, at an altitude of 7,500 feet, is in section 36, T. 1. N., R. 72 W., sixth principal meridian, Boulder County, Colorado. (Fig. 1). The claims lie on the north slope of North Boulder Creek, 2.3 miles by poor access road southeast of Sugar Loaf, Colorado. Sugar Loaf is 11.6 miles from the county seat at Boulder, Colorado and 39 miles from Denver, Colorado, the nearest major supply center. All but the access road are all-weather highways. There are three concentrating plants which accept custom ore within 12 miles of the property.

Power lines of the Public Service Company of Colorado cross the west end of the property. Water and a limited stand of timber are available at or near the Wild Tiger shaft. Equipment for the proposed project would be powered by gasoline-driven units.'

An adequate supply of labor for a small operation is available in Nederland, Colorado, Boulder, Colorado and other nearby communities. The current wage rate for miners is $1.75 per hour with time and one-half over forty hours per week. The wages for other classes of labor range from $1.50 to $1.75 per hour.

HISTORY, PRODUCTION AND OWNERSHIP

The Wild Tiger and Mt. Pisgah claims antedate tungsten mining in

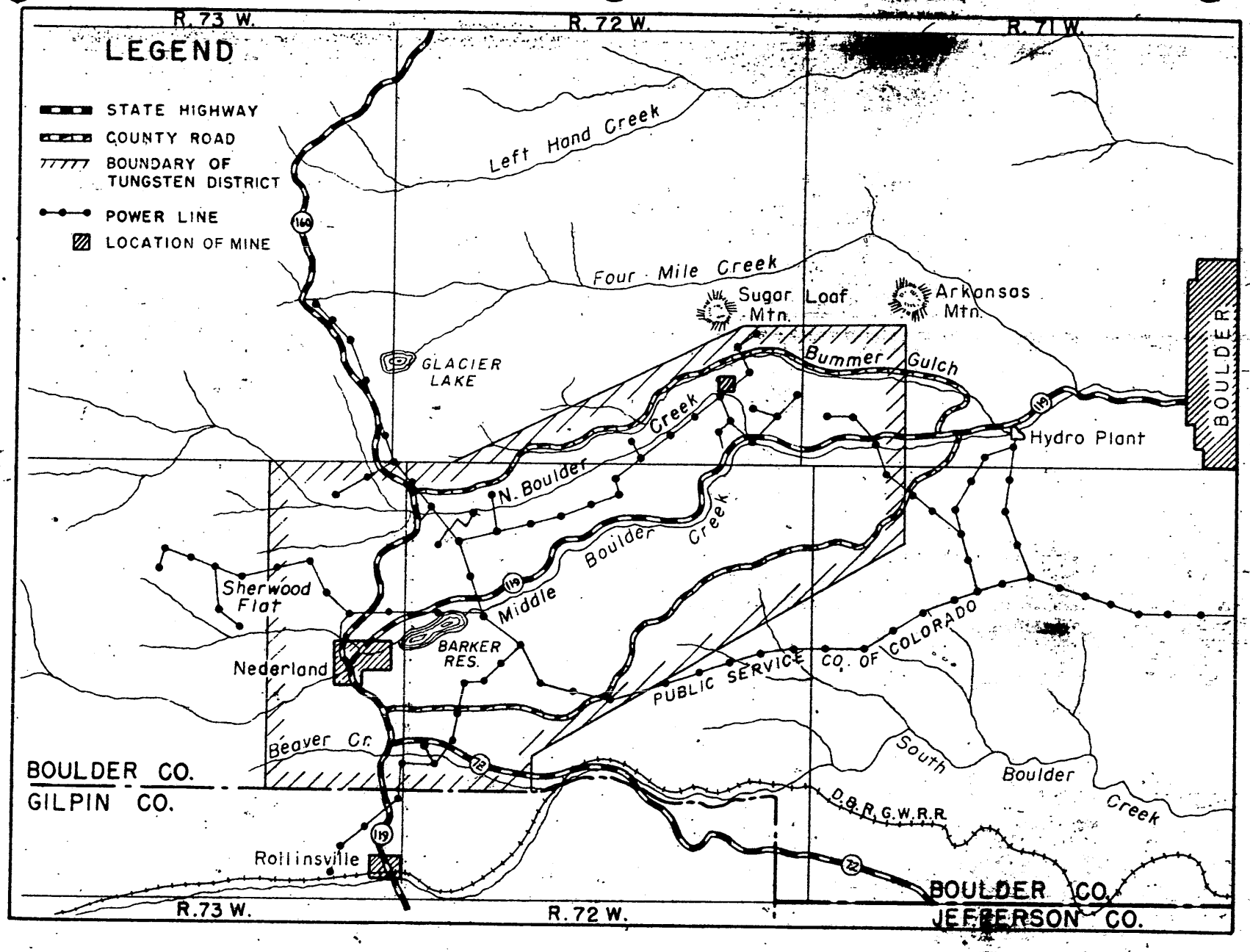


FIGURE 1 - LOCATION MAP OF WILD TIGER MINE, W. R. COCHRAN, BOULDER COUNTY, COLO. DMEA 3806

Boulder County and were explored primarily for gold. Tungsten mining dates from before World War I.

The Wild Tiger group is surrounded by properties which have a record of small to moderate production such as the Good Friday, Eureka, and Castastrophe. There have been DMEA projects on the Good Friday (DMEA 2343), and the Eureka (DMA 1567X). These projects were certified and are currently paying royalties on production to the Government.

There is no record of early production on the Wild Tiger but it was undoubtedly small. The present owner of the claims has shipped some tungsten ore, largely through lessee operations, but has not retained the shipment records. These totals were also probably insignificant. The applicant has been engaged at intervals since the summer of 1954 in mining a surface pillar west of the Pisgah shaft, and has shipped sorted ore as follows:

Mill Lot No. and Mill	Date Shipped	Dry weight pounds	CONTENT Percent WO_3	CONTENT Pounds WO_3	Price Per Pound	Net Return After Hauling, Sampling, Penalties Et Cetera
Hetzer #1291	9-13-54	891.0	3.5	31.19	1.52	$ 32.50
Wah-Chang #13	9-28-54	87.12	19.2	16.72	1.726	25.85
Hetzer #1347	10-27-54	3559.0	5.0	177.95	1.65	273.92
Wah-Chang #28	12-26-54	3461.0	2.5	84.70	1.43	105.42
Hetzer #1543	4-16-55	1960.0	4.9	96.04	1.645	127.99
Tungsten Ref. #243	5-20-55	281.0	19.34	544.0	1.86	101.18
Wah Chang?	5-7-55	5025.0	5.03	252.76		403.00
Totals		15,264.12		713.76		$1,069.86

The above production came from an estimated 75 tons of broken ore. The average return per ton mined would be about $14.00 on this basis.

The Mt. Pisgah, Wild Tiger and Wild Tiger No. 2 Lodes are patented mining claims, U. S. Survey No. 5272, (Fig. 2). Two additional claims, the Wild Tiger No. 3, and No. 4, are north of the other three, and were patented under U. S. Survey No. 7371 A. There is considerable open ground surrounding the patented claims, which presumably cover the apex of the Wild Tiger vein but there is some possibility that portions of the vein apex on open ground. In fact, the examining teams Branton survey indicates that the shaft is very close to the west side of the Mt. Pisgah claim, and the surface workings may be on open ground. Cochran has located the Wild Tiger Extension Lode to cover the possible position of the surface workings and any vein extension across the Wild Tiger No. 2 claim, as well as the block bounded by the west ends of the Mt. Pisgah and Wild Tiger No. 4 claims and the south end of the Wild Tiger No. 3 claim (Fig. 2). He is willing to subordinate this claim if required.

The position of the shaft on the Mt. Pisgah claim, as indicated by the applicant, was checked by the examining team by tying it to a corner monument designated by Cochran as Corner No. 5 of the Wild Tiger No. 2 claim, although there were no workings to identify it.1 Cochran had not found any marked claim corners, and closer verification would necessiatate a survey. The map furnished by the applicant checks with the Land Office survey plat.

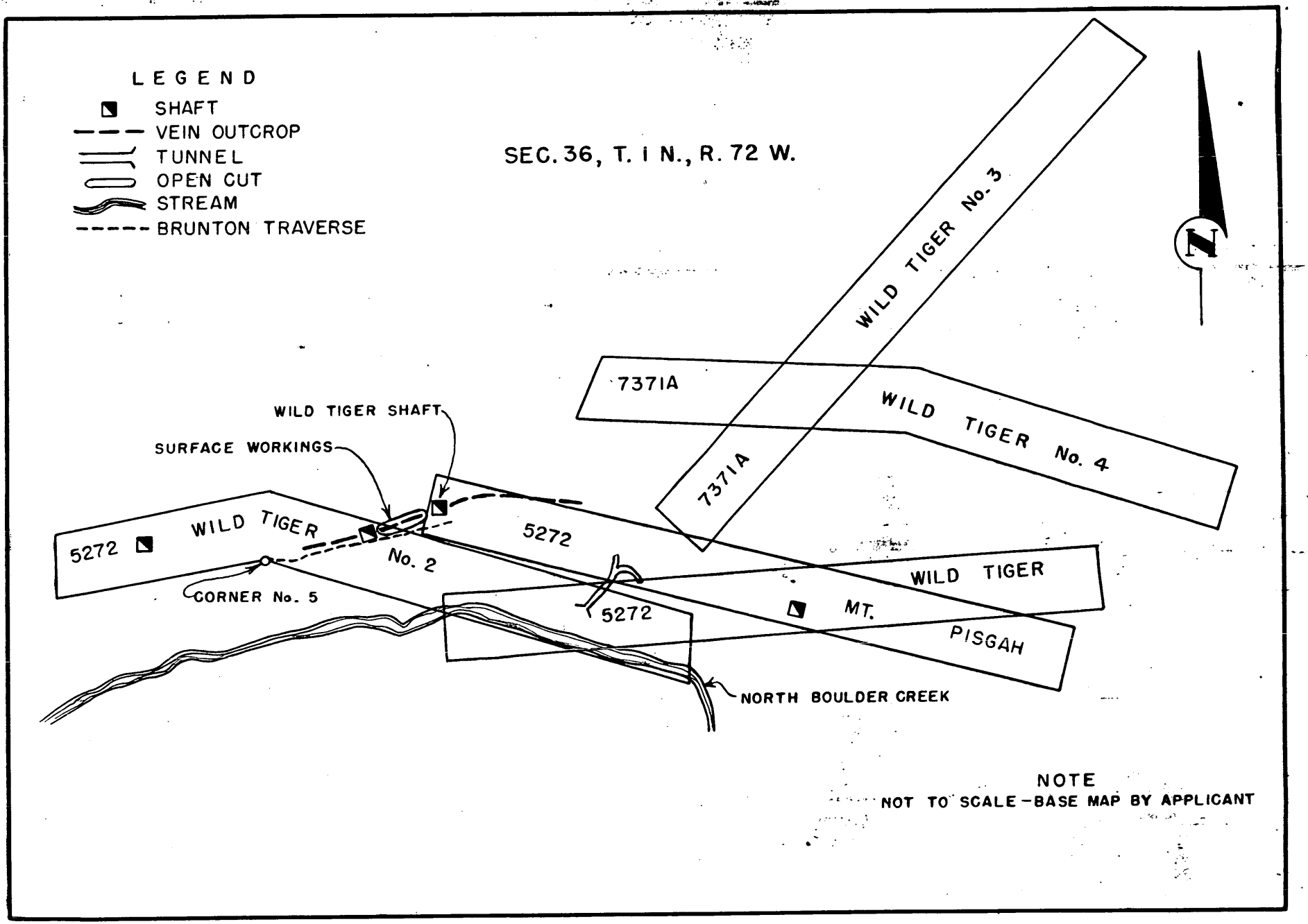


FIGURE 2 - CLAIM MAP OF WILD TIGER GROUP, W. R. COCHRAN, BOULDER COUNTY, COLO. DMEA 3806

Only the three claims patented under Survey No. 5272 are included in the DMEA application. The other two do not appear to be essential to the project.

The claims are owned by Albert B. Pace of Boulder, Colorado holding an undivided three-fourths, and Philip J. Perry of Riverside, California who owns the remaining one-fourth. All taxes are reported to be paid up but county records were not checked.

The applicant has a lease and option agreement with Pace covering his three-fourths interest calling for 15 percent royalty to apply to the purchase price of from $7,000.00 to $10,000.00, with the maximum of $10,000.00 to be due if not paid before the expiration date of the lease, March 18, 1958.

Cochran has been unable to obtain a lease from the other owner and plans to operate under the Colorado "Tenants in Common" law (L. 23, p. 451, Section 1, CSA, C92, Section 8), whereby he will operate as the lessee of the consenting owner, accounting to the other owners for the latter's share of any net profits. An opinion dated February 1, 1955 has been rendered by the Acting Assistant Solicitor, Defense Minerals, stating that a DMEA project could be approved with the usual Owner's Consent to Lien for Pace's interest, and a surety bond or third-party guaranty for the remaining interest if the Administrator does not choose to waive Owner's Consent to Lien.

GEOLOGY

The Boulder County tungsten district has been described thoroughly

in a recent publication by T. S. Lovering and O. Tweto (U. S. Geol. Surv. Prof. Paper 245, 1953). Much of the following general description was derived from that source.

The tungsten deposits of the Nederland district are cavity-filling, quartz-ferberite veins that follow faults in pre-Cambrian schistose and granitic rocks. The faults are generally several hundred yards long, but tungsten mineralization along them is sporadic. A vein may grade abruptly into a barren, gouge-filled fracture, or expand into a sizeable ore-shoot. The element of risk in prospecting is great.

Most of the veins in the area are between 6 inches and three feet wide, but veins as little as 1 inch wide have been worked. Much of the ore has been taken from irregular shoots that range from 50 to 100 ft. in stope length and 100 to 200 feet in pitch length.

Ore shoots tend to occur in zones of fracturing near fault intersections, and in steep segments of normal faults or gently inclined portions of reverse faults.

The granitic country rocks have been argillized and then sincitized by the hydrothermal ore-bearing solutions that deposited ferberite. Most of the veins are surrounded by a zone of argillization, but only the larger, richer veins have a halo of sinsitized rock.

The Mt. Pisgah vein of the Wild Tiger prospect follows a fault in porphyritic gneissic granite. The fault strikes N45° - 60°E, and dips 55-80°NW. It has been exposed along strike for 140 feet by trenching and 46 feet by drifting and was followed down dip for 56 feet by means of an inclined shaft. The vein is present nearly continuously along the fault except for gaps a few feet long.

It ranges in thickness from ½ inch to 4 inches. The fine-grained ferberite is present in reticulating stringers or as interstitial cement in brecciated quartz. The vein material is said to average 3 to 5% WO_3 but may be hand sorted to give a concentrate of about 20% WO_3. It averages about 0.1 percent "phosphorous".

Short lenticular quartz veins, some containing ferberite, were noted in the walls of the fault at several places. If these veins are tension "gashes" related to movement along the fault, their attitude indicates that the northwest side of the fault moved northeastward and upward.

In many mines of the district, ore shoots have been formed in veins following faults where the dip of the fault decreases appreciably. The dip of the Mt. Pisgah fissure flattens from 75 degrees to 57 degrees in the bottom 20 feet of the shaft, but no change in the thickness or grade of the vein is perceptible. Presumably, differential movement on the fault did not produce sufficient brecciation and open space to have effected a significant increase in ore-deposition.

In sum, the Mt. Pisgah vein is uniformly low grade in all of the mine workings. It does improve in quality where improvement is most likely to be expected. No grounds exist for assuming that it will become economically minable at greater depth.

MINABLE ORE RESERVES

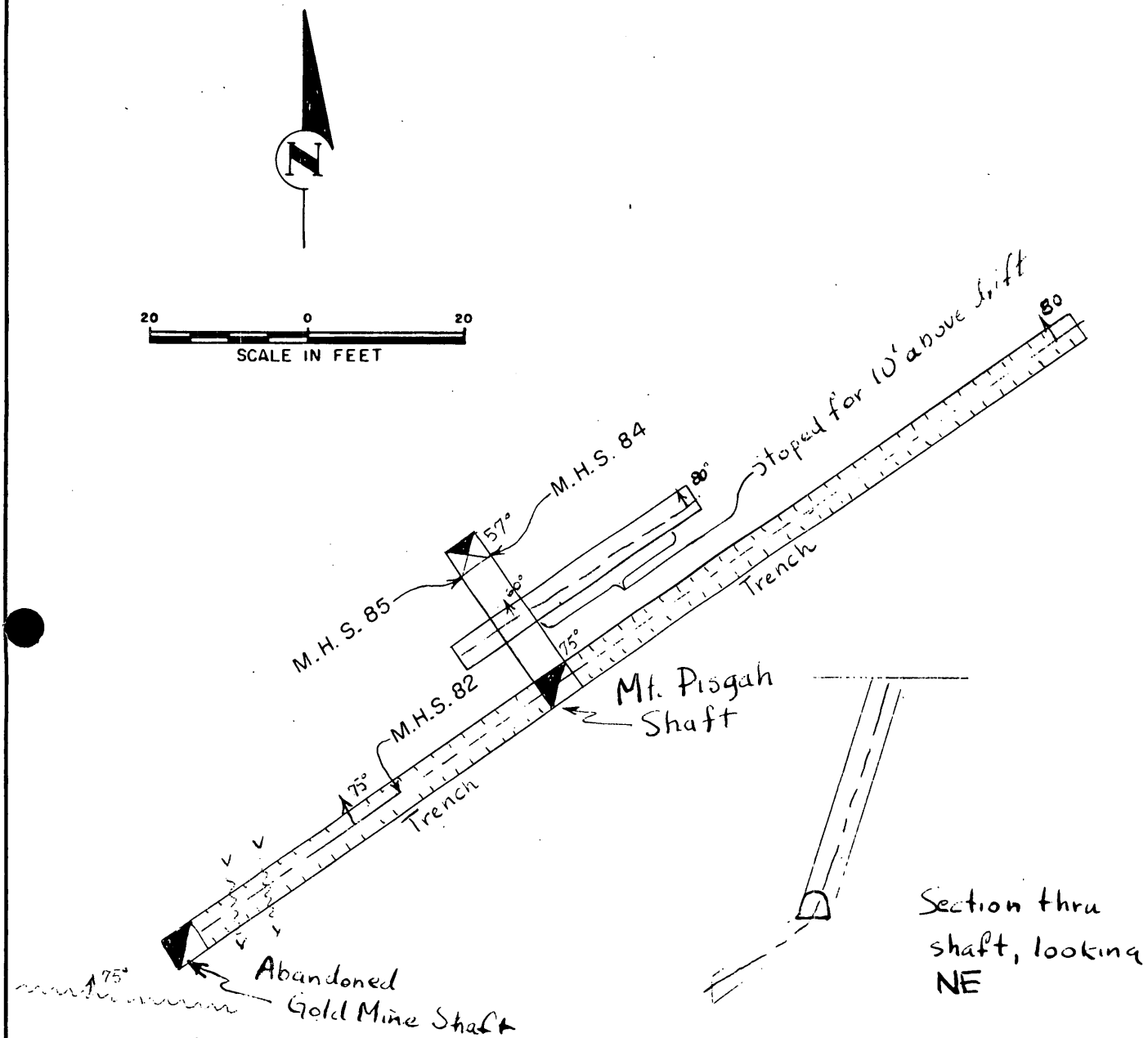
There are no ore reserves on the property. Four samples were taken during the examination as follows:

Sample No.	Width cut (feet)	Descriptions	Content Percent WO_3
M.H.S. 82	0.25	Stringer in surface pillar 25 feet southwest of Wild Tiger shaft. Heavy ferberite streak varies from 0.25 foot to knife-blade seam.	3.1
M.H.S. 83	0.1 to 0.2	Chip sample along 6 feet of streak in back of cutout 12 feet above 44 foot level NE of Wild Tiger shaft.	6.3
M.H.S. 84	0.1 to 0.2	Sample of pod of heavy ferberite in several stringers in NE end of Wild Tiger shaft 51 feet below collar. Pod is about 7 feet long vertically, extending down from floor of 44 foot level but pinching out to a knifeblade seam above the water level.	7.2
M.H.S. 85	0.1 to 0.2	Sample of ore pod 3 feet long in SW end of shaft 30 feet below collar. Streak pinches above and below.	5.1

PRESENT STATUS

Exploration and Development

Vein outcrops on the Wild Tiger claims have been explored by at least 4 open pits or trenches, 3 shafts and one tunnel. One of the shafts and the tunnel in the center of the Mt. Piagah claim were driven while exploring for gold (fig. 2). They are inaccessible. The Wild Tiger shaft at the west end of the Mt. Piagah claim, which the applicant proposes to sink, was pumped out for examination. It was sunk 60 feet on the Wild Tiger vein, and a drift was driven 28 feet northeast, at the 44-foot level and a level cutout made on the southwest side of the shaft at 38 feet. (fig. 3) A cutout was made for a distance of



Explanation:

60° Quartz-Ferberite Vein

75° Shear Zone

" " Vert.

M.H.S. 82 Bureau of Mines Samples

FIGURE 3 - PLAN AND SECTION, WILD TIGER MINE, BOULDER COUNTY, COLORADO

20 feet northeast of the shaft, and was carried up two or three rounds. The southwest end breaks back into a fill along the northeast end of the shaft. At surface about 60 feet of the vein has been explored by trenching and by what appears to be another shaft which is now filled in. This is the area in which the applicant has been mining surface pillars. The available ore here is nearly exhausted. There is good tungsten mineralization in 0.1 to 0.25-foot widths in a surface pillar about 25 feet southwest of the Wild Tiger shaft, and in the back of the cutout on the northeast drift. Similar mineralization showing in both ends of the shaft below the 44 foot level appears to pinch to a knife-blade seam in the bottom. The northeast end of the shaft above the level is lagged with fill behind it and could not be seen. The extent of the mining done behind this timber is not known. The streak along the southwest end of the shaft and in the level station cut at 38 feet is very narrow and shows very little tungsten. If any stoping has been carried on southwest of the shaft other than the work at surface, it must have been done from the other shaft which is now filled. None of the exposures appear to be commercial ore deposits.

Veins in the other accessible trenches and pits are fairly well defined but show very little tungsten mineralization.

Equipment and Facilities

The applicant owns a 75 cubic-foot gasoline-driven compressor, a 300 cubic-foot converted Norwalk compressor, a gasoline hoist, drill and auxiliary equipment, shaft bucket and materials for a headframe. A

surface building and a sinking pump or equivalent would be required.

PROJECT PROPOSALS WITH COSTS

The applicant proposes to sink the Wild Tiger shaft another 100 feet and drift 200 feet at the new depth. Originally he proposed 100 feet along the vein each way but during the second examination indicated that drifting to the southwest only might be the better plan.

The cost estimate offered by the applicant was not complete. The cost of equipment rental was given only as $150.00 per month. Operations are planned on a five day week and dividing the total cost of supervision for shaft sinking, $1950.00, by the weekly rate for a supervisor, $150.00, total time for sinking is 13 weeks. Similarly total time for drifting is 11 weeks. Time for completion of the project is thus approximately 6 months. On this basis the estimated cost (applicant's figures) is as follows:

Sinking		
Supervision	$1,950.00	
Labor	3,213.60	
Supplies	1,988.65	
Equipment rental	486.00	
Miscellaneous	329.65	
Total Direct sinking costs		$7,867.90
Drifting		
Supervision	$1,650.00	
Labor	2,760.40	
Supplies	1,807.88	
Equipment rental	414.00	
Miscellaneous	280.81	
Total Direct drifting costs		6,912.29
New buildings, improvements and installations		900.00

Road repairs, shaft repairs	$ 950.00	$ 950.00
Total estimated cost of project		$16,630.19
Government participation at 75 percent		12,472.64
Direct cost of sinking per foot	$\frac{7,867.90}{100}$ =	78.68
Direct cost of drifting per foot	$\frac{6,912.89}{200}$ =	34.56

Estimated progress rates

Sinking -- 1.54 feet per day
One round every other day

Drifting -- 3.63 feet per day
One round per day

The rate of advance estimated by the applicant is reasonable. The costs are somewhat high by comparison with unit cost prices allowed in a recent contract E748, DMEA 3483 at the Gale shaft in Boulder County where conditions are very similar. Contract E-748 allows $75.00 per foot for sinking and $30.00 per foot for drifting. The difference is in the labor costs. The applicant provides for supervision for 24 weeks but labor is computed for 29 weeks at a total cost of $5,974.00, or $1,030.00 more than the cost for 24 weeks. With an adjustment to correct this, the applicant's costs become $74.73 per foot for sinking, and $32.08 per foot for drifting.

CONCLUSIONS

It is concluded that there is little possibility of finding a significant amount of tungsten ore by the proposed exploration. While ore similar to that which has been mined might result from deeper work, the actual amount of tungsten produced would be small, even if the price should be high enough to make it profitable.

RECOMMENDATIONS

It is recommended that the application for Government assistance in exploration under DMEA 3806 be denied.

/jw