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UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

STAATS FLUORSPAR MINE, BEAVER COUNTY, UTAH

MEMORANDUM REPORT

By Donald C. Wyant

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ILLUSTRATIONS

STAATS FLUORSPAR MINE, BEAVER COUNTY, UTAH

MEMORANDUM REPORT

By Donald G. Wyant

INTRODUCTION

Location and previous work

The Staats fluorspar mine is in the southern part of the Wah Wah mountains, about 35 miles by graded road northwest from Lund, Utah (fig. 1). The mine is in T. 29 S., R. 16 W., Salt Lake base and meridian, Beaver County, Utah in what is sometimes called the Pine Grove mining district _/.

_/ Thurston, R. R., Fluorspar deposits of Utah: manuscript for publication by the University of Utah; ms. pp. 19, 20, 21, (1946).

The area was examined and sampled by the writer from November 15 to 20, 1947. Mr. A. E. Granger of the Geological Survey's Salt Lake City regional office acted as guide during the early part of the examination and summarized existing information concerning the geology, production, and owners.

The Staats mine was previously examined for fluorspar by Cox and Granger _/, and Thurston _/; and for trace elements by Chesterman and

_/ Cox, D. C., and Granger, A. E., Fluorspar investigations memorandum on the Staats mine, Beaver County, Utah: U. S. Geol. Survey file memorandum, May 19, 1943.

_/ Thurston, R. R., op. cit.

Main _/.

_/ Chesterman, C. W., and Main, P. H., Reconnaissance investigations for trace elements in Utah, Colorado, Nevada, California, and Oregon, preliminary report: U. S. Geol. Survey Trace Elements Investigations Rept. 24, pp. 24-25, 41, unpublished, 1947.

The purpose of the present examination was to study workings not previously examined by Chesterman and Main, to take standard 2- by 5-inch channel samples of representative rock types, and to reappraise the geology in view of the relatively high percentages of uranium determined in the 4 samples taken by Chesterman and Main, (Table 1).

Table 1. Analyses of samples taken by Chesterman and Main

Sample number	Description	Feet	Percent equivalent uranium field	Percent equivalent uranium lab.	Percent uranium chemical
C-11-90	altered rhyolite	5	.010	.093	.06
C-11-91	fluorspar vein near fault	?	.048		
C-11-92	fluorspar and irritating gas	?	.051		
C-11-93	massive fluorspar	3	.238	.625	.45

Reserves given by Chesterman and Main based on exposures seen by them in 1945, and analyses tabulated above, were 8,000 tons containing .07 percent equivalent uranium.

History and production

Fluorite was discovered in the area about 1935, and some fluorspar has been mined yearly since then. Total production to January 1946 is estimated by Thurston _/ to be 3500 tons of fluorspar of

_/ Thurston, W. R., op. cit.

metallurgical grade (approximately 85 percent or more effective CaF_2).

The property, including about 10 claims now called the Monarch group, belongs to Mr. Fred Staats of Salt Lake City. Formerly, the mine was variously called the Monarch mine, the Skougard mine, the Roberts and Skougard mine, or the Roberts and Staats mine, reflecting the successive owners' names.

GEOLOGY

The geology is, in general, simple; in detail, complex.

Small bodies of fluorite occur in breccia within shear zones, which apparently form the contact between rhyolite porphyry, and Cambrian (?) limestone. The body of rhyolite porphyry is roughly elliptical in shape, and on the order of 3,000 feet in length, and 500 feet in width. It is entirely surrounded by limestone. Because the visible contacts between rhyolite and limestone are fault zones, it is not known whether the rhyolite porphyry is intrusive or extrusive in origin. No significant contact metamorphism was observed.

The term latite (?) has been used in previous memoranda because Granger reports that several thin sections showed the approximate composition of quartz monzonite. The rock is porphyritic and contains phenocrysts of feldspar, probably orthoclase, and quartz in a fine-grained groundmass. Thurston calls the rock rhyolite porphyry. No plagioclase was noted megascopically. Provisionally the term rhyolite porphyry should be used pending additional study of thin sections. Unaltered rhyolite porphyry is dark gray.

As seen in the workings, the breccia zone formed by faulting at the contact of rhyolite porphyry and limestone is thoroughly altered. Alteration obliterated most of the original textural features of the porphyry and left a mass of soft clay containing a few unaltered, relict quartz phenocrysts. The altered rock is white or light buff.

Faults within the contact zone are numerous. They show many variations in strike and dip within short horizontal distances. Presumably the breccia zones served as channels for hydrothermal solutions that introduced fluorite and other minerals. Faulting probably occurred both before and after some of the fluorite was introduced.

Deep purple, nearly black fluorite occurs as veins, veinlets, irregular masses, and brecciated fragments in small pods or irregular zones within the fault breccia. The fluorite-bearing pods range from 6 inches to 6 feet in width and from 5 feet to 15 feet in length, and are reported to extend more than 25 feet in depth.

Small areas of fluorite in the lower workings are coated with uranium-bearing minerals that fluoresce under ultra-violet light. According to Granger, samples of this material sent to Dr. W. F. Foshag, U. S. National Museum, by Mr. Staats were reported to contain autunite and uranophane. No uraninite has been identified. As the autunite and uranophane coat some of the fluorite, they were evidently formed after the fluorite, probably by alteration of some other unidentified mineral contained in the fluorite or associated with it.

WORKINGS

The workings consist of an open cut, a shaft, four adits, and

several small pits (fig. 1). The open cut and shaft are approximately 300 feet north of the portal of the adit, here called the Lower adit. This adit is about 230 feet long, penetrates the fault breccia at the contact between limestone and rhyolite, and exposes a small fluorspar pod. About 600 feet northeast of the portal of the Lower adit are a group of small pits, called in this report the Saddle workings, which expose some fluorite masses in the fault zone.

Approximately one-half mile southeast of the Lower adit and outside the area of figure 1, another small fluorite pod has been reached by an adit approximately 200 feet long, and a winze, reported to be 85 feet deep. The adit and winze will be called the Point workings. About 500 feet southeast from the Point workings two short adits have been driven in altered rhyolite porphyry. A few small pieces of fluorite were observed in the walls of the adits.

RADIOACTIVITY

Measurements at the outcrop

Radioactivity was measured at the outcrop on all types of rock, and a Geiger counter traverse was made across the body of rhyolite porphyry. The fluorite-bearing zones showed the most radioactivity; the limestone is not radioactive; and the body of rhyolite porphyry is from 3 to 4 times as radioactive as the background observed in the limestone (see fig. 1 - Geiger traverse). Counts at the outcrop, including background, in or near fluorspar-bearing areas ranged from approximately 50 to 150 per minute, in rhyolite porphyry from 21 to 37 per minute, and in limestone from 8 to 15 per minute.

Samples in the vicinity of the Siaala fluorspar mine

Samples were taken of all rock types observed. The 23 samples were reduced in the Denver sample preparation laboratory and counted in the office with field instrument number G.S. 2, and impulse register.

Quality control methods were used in measurement of the radioactivity of the samples /. Samples of altered and unaltered rhyolite

---

/ Schlecht, W. G., Control chart method applied to errors in radioactive counting: U. S. Geol. Survey Trace Elements Investigations Rept. 28 (MTEC-695), unpublished, 1946.

---

showed a relatively high percentage of equivalent uranium. Four of these samples, believed to be representative of the altered and unaltered rhyolite, were chosen for chemical analyses.

The results of the radioactivity determinations and of chemical analyses of four samples (Table 2, Appendix) indicate:

1) That the sample containing the most radioactivity (0.4 percent equivalent uranium) is No. 1328, a sampled picked by ultra-violet light for its high autunite content.

2) That samples of fluorite and fluorspar ore, excluding No. 1328, contain from 0.02 (No. 1316) to 0.07 percent equivalent uranium (No. 1322).

3) That samples of altered rhyolite porphyry adjacent to fluorspar ore contain from 0.03 (No. 1317) to 0.057 percent equivalent uranium (No. 1326). Sample No. 1324 contained 0.04 percent equivalent uranium, 0.032 percent U., and 0.001 percent ThO_2.

4) That samples of altered rhyolite porphyry not adjacent to fluorspar ore contain from less than 0.005 (Nos. 1315, 1320, 1321) to 0.007 percent equivalent uranium (Nos. 1318, 1327). Sample No. 1318 contained 0.007 percent equivalent uranium, 0.003 percent U, 0.004 percent ThO_2.

5) That samples of unaltered rhyolite porphyry, Nos. 1323, and 1333, contain 0.01 percent equivalent uranium, 0.001 percent or less U, and 0.002 percent ThO_2; and 0.006 percent equivalent uranium, 0.001 percent U, and 0.003 percent ThO_2, respectively.

6) That the limestone is not radioactive.

7) That 0.06 percent equivalent uranium is left in the tailings after the fluorspar is extracted from the mill.

Other igneous bodies

There are in the general area other bodies of igneous rock similar to the one at the Staats mine. Their size, and number are not known, nor is it known whether or not they are radioactive.

One such body of rhyolite (?) is perhaps a mile east-northeast from the lower adit of the Staats mine. The area is known as the Blende Mountain area, and claims covering gossan, which may be valid, are owned by Leroy Wilson of Enterprise, Utah (now in the Utah State Penitentiary), and Edward H. Parry of Cedar City, Utah.

Samples were taken of gossan exposed in a shallow shaft at the contact of the igneous rock and surrounding limestone.

Sample No. 1312 taken across 5 feet of gossan contains 0.006 percent equivalent uranium. At the time when the samples were taken it

was not known that the unaltered rhyolite porphyry at the Stants mine contained radioactive material so no samples were taken of the igneous rock of Blonde Mountain.

RESERVES

The data are insufficient for anything but rough approximations of reserves.

It was first believed that the samples of unaltered rhyolite porphyry contained more than 0.01 percent equivalent uranium and, therefore, that the large tonnage of unaltered rhyolite porphyry would be of interest. Subsequent chemical analyses show these samples contain only 0.001 percent, or less, U and 0.0025 percent ThO_2. Therefore, the main body of rhyolite is presumably not of interest.

Analysis of the sample data shows that some of the brecciated altered rhyolite adjacent to the fluorite masses and veinlets contains approximately the same amount of equivalent uranium as does the fluorite. This shell of more highly radioactive, altered rhyolite is from 2 to more than 5 feet wide. In two of the three places sampled the shell was on the rhyolite porphyry side of the fluorite mass.

Reserves of fluorspar ore and the shell of altered rhyolite porphyry adjacent to the fluorite in the Stants workings are estimated to be 10,000 tons of rock containing 0.03 percent equivalent uranium, 0.032 percent U, and 0.001 percent ThO_2. The estimate is based on the analyses of samples, on the amount of fluorspar produced, the amount of fluorspar in sight, and on the probability that more fluorspar will be discovered.

According to the map (fig. 1) there are over 2,000,000 tons of altered, brecciated rock for each 100 feet of depth around the body of unaltered rhyolite porphyry. It is within this zone that the known fluorite ore bodies occur.

The sample data suggest that most of this altered rock not closely associated with fluorspar ore bodies contains no more radioactivity than does the main body of rhyolite porphyry. The average of six field analyses is 0.006 percent equivalent uranium. One of the six samples contained 0.003 percent U, and 0.004 percent ThO_2.

SUMMARY AND RECOMMENDATIONS

Radioactive fluorite, altered rhyolite porphyry, and unaltered rhyolite porphyry occur at the Starts mine.

Some of the altered rhyolite porphyry closely associated with fluorite contains as much uranium as does the fluorite. The two rock types can be lumped together to give a reserve of approximately 10,000 tons containing 0.03 percent equivalent uranium, 0.032 percent U, 0.001 percent ThO_2.

Most of the altered and brecciated rhyolite contains as little uranium and thorium as does the unaltered rhyolite. The combined reserves of altered and unaltered rhyolite are more than 12,000,000 tons for each 100 feet of depth but the grade averages only 0.006 percent equivalent uranium and about 0.001 percent U and 0.003 percent ThO_2.

Chemical analysis of four samples has demonstrated that the main body of igneous rock, both altered and unaltered, contains insufficient

uranium and thorium to be of great interest. Chemical analysis has verified that, were there sufficient tonnage, the fluorspar and associated altered rhyolite might be of interest.

The desirability of doing more work in the area depends on several factors:

a) The desire and need for more detailed knowledge of the occurrence of radioactive ores in general.

b) The possibility that more material containing 0.03 percent U may be discovered.

c) The possibility that more work would bring to light other bodies of radioactive rock in the general area.

d) The fact that all examinations of the Staats mine to date have been of the reconnaissance type, and the data, therefore, are sufficient for only a tentative estimate of ore reserves.

The relatively small tonnage of ore that can be inferred from present workings and surface exposures make doubtful the possibility of any substantial production from the Staats mine and vicinity. A more definitive appraisal would require either uncovering the zone of alteration along the contact between the rhyolite and limestone by trenching, or drilling. Drilling would test the extent of the radioactive alteration zone at depth. A few drill holes to moderate depths would be the most conclusive method of determining whether the radioactive zone of altered rock is extensive and distributed uniformly enough to amount to a significant tonnage of the grade now inferred. If the distribution of material of suitable grade is

unsatisfactory other detailed work would not be warranted. Drilling is favored over trenching, because drill holes would probably intersect the zone of altered rock below the depth at which it is affected by weathering. Trenching below the depth of possible weathering may not be feasible.

APPENDIX

Table 2. Description, location and analyses of samples.

Sample number	Thickness in feet	Description 1/	Location	Outcrop counts per minute net	Equivalent uranium field	Chemical analyses percent U	Chemical analyses percent ThO_2
1311	---	grab of tailings (clay)	Mill at Lund, Utah	---	0.06		
1312	5.0	red gossan	Blonde Mt. shaft	25-36	0.006		
1313	1.7	halloysite (?)	Blonde Mt. shaft	25-36	0.000		
1314	3.5	altered rhyolite-porphyry, <1% fluorite fragments.	adit 500 ft. SE. of point wkgs.	31-44	0.006		
1315	2.0	same as 1314 but ± 10% fluorite	" "	31-44	< 0.005		
1316	3.0	brecciated fluorite	Saddle wkgs., large pit	26-40	0.02		
1317	5.0	altered breccia rhyolite, ± 6% fluorite	" "	58-66	0.03		
1318	3.0	same as above, no (?) fluorite	" "	37-40	0.007	0.003	0.004
1319	1.0	altered limestone	" "	13-21	0.000		
1320	5.0	altered breccia of rhyolite and limestone, <5% fluorite	E. face open cut 300 ft. E. Lower adit	7-9	< 0.005		
1321	3.0	altered, sheared rhyolite, <1% fluorite in veinlets	E. Wall open cut 300 ft. E. Lower adit		< 0.005		
1322	---	chips from 3 ft. square block of dark fluorite, gas-bearing	" "	70	0.07		
1323	---	chips from rhyolite outcrops along traverse, (fig. 1)	between Lower adit and Saddle wkgs.	11-19	0.01	≦0.001	0.002
1324	3.0	altered rhyolite	Lower adit, 102 ft. in from portal	90-160	0.04	0.032 ± .001	0.001
1325	2.0	fluorite vein and breccia at contact of limestone and rhyolite	Lower adit, 131-133 ft. from portal	" "	0.036		

1/ All samples are channel samples except where otherwise noted.

Sample number	Thickness in feet	Description 1/	Location	Outcrop counts per minute net	Equivalent uranium field	Chemical analyses percent U	Chemical analyses percent ThO_2
1326	3.0	altered rhyolite adjacent to and east of 1325	Lower adit 128-131 ft. from portal	90-160	0.06		
1327	3.0	breccia of altered rhyolite and limestone <1% fluorite	Lower adit, north drift 185 ft. from portal	" "	0.007		
1328	1.0	high-grade autunite and fluorite	Lower adit, east drift 168 ft. from portal	± 200	0.41		
1329	3.0	gossan in fault zone, and gouge	Point workings first stub to west of portal	49-52	0.006		
1330	2.5	fluorite veinlets in gossan; adjacent to and west of 1329	Point workings	110	0.02		
1331	1.7	gossan, fault zone west from 1330 to limestone	Point workings		0.03		
1332	5.0	gouge, breccia	Point workings, first raise 10 ft. from portal	45	0.006		
1333	---	chips from rhyolite outcrops	± 400 ft. SE. of Point workings	19-30	0.006	≦0.001	0.003

1/ All samples are channel samples except where otherwise noted.

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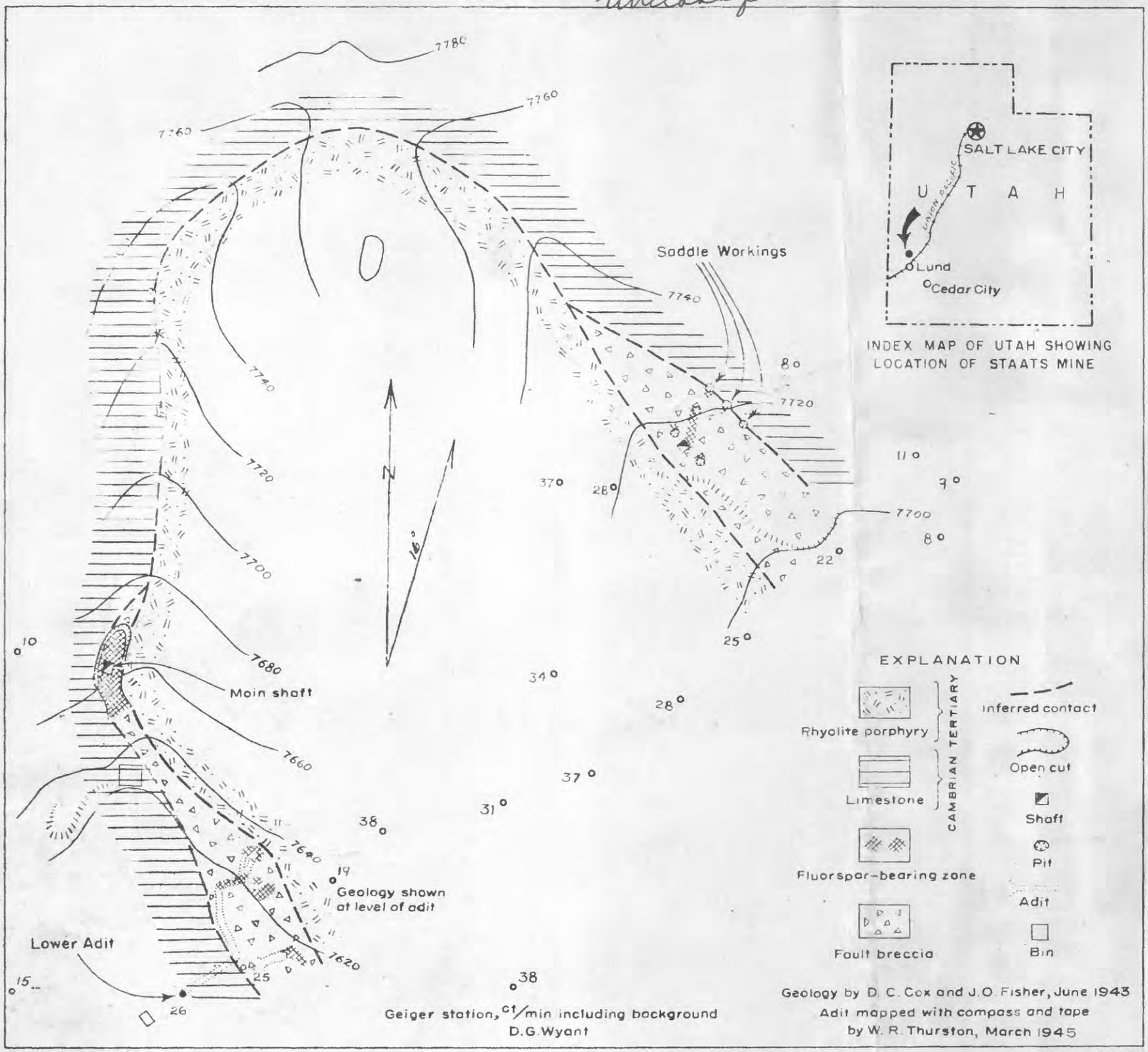

G.H.B.

SKETCH MAP OF GEOLOGY IN VICINITY OF MAIN SHAFT
STAATS MINE, BEAVER COUNTY, UTAH

0 100 200 FEET

Contour interval 20 feet
Datum assumed

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NO. RA-52

RECLASSIFICATION AUTHORIZATION

In accordance with the authority delegated to me by memorandum from the General Manager, dated December 6, 1948, subject, "Security Procedures and Policies relating to the Domestic Raw Materials Program" and based on criteria for determining classification, as outlined in Appendix A attached thereto, the document(s) listed below are reclassified as indicated.

		Present Classification	Revised Classification
(1)	USGS - TEI Report No. 38 --- "Trace Elements Reconnaissance along Highways in the Tanana and Upper Copper River Valleys, Alaska" by H. Wedow, Jr., and J. J. Matzko, dated March 1947	OFFICIAL USE ONLY	UNCLASSIFIED
(2)	USGS - TEI Report No. 50 -- - "Staats Fluorspar Mine, Beaver County, Utah (Memorandum Report)" by Donald G. Wyant, (undated).	SECRET	UNCLASSIFIED
(3)	USGS - TEI Report No. 52 --- "Radioactivity of Sediments in Parts of Oklahoma and Kansas" by Garland B. Gott, September 1948.	RESTRICTED	UNCLASSIFIED

Feb 3, 1949
Date

JESSE C. JOHNSON
Manager
Raw Materials Operations

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When detached from enclosure handle as restricted.

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

3

March 24, 1948

Mr. William P. Huleatt,
U. S. Geological Survey,
Box 2746, Lakewood Branch,
Denver 15, Colorado.

Dear Bill:

Enclosed for Don Wyant's and your approval is a revised draft of Wyant's memorandum report on the Staats Fluorspar Mine.

The chief changes are editorial and have been made to make this report correspond more closely to the format and editorial arrangement of the more formal reports. This has been done for uniformity in presentation of all reports in order that we may adhere to one editorial standard rather than several. This simplifies the editing job as only one type of procedure has to be followed. We have eliminated certain explanations with regard to the standard sample, and with reference to the quality control method as being our own problem and not pertinent information for transmission to the Atomic Energy Commission.

It also seemed that the statements about "Other igneous bodies" fitted into the general composition of the report better by including this section under "Radioactivity measurements" instead of placing it after "Economic significance". The chief change, however, is in "Recommendations". Tom Hendricks wonders whether we would ever get an answer by surface work alone chiefly because of the difficulty of getting samples that would not have been affected by weather. For this reason drilling has been suggested as the best means of determining whether the bodies of radioactive rock are sufficiently continuous to give the hope of any sizeable tonnage. We have not changed the appendix table and for that reason it is not included with this draft of the report. It will be included in the final report in the form in which you submitted it.

We are planning to prepare 8 copies of the final draft of the report for the use of the Atomic Energy Commission and ourselves. When you have looked this draft over, will you please return it with your approval or with your suggestions for any other changes. We should also like to have enough copies of the map to go with this number of reports. I believe it is not necessary to include the control charts. If, however, you wish to have them included, they should be drawn on tracing cloth and prints should be me.

Sincerely yours,

Arthur P. Butler, Jr.
Trace Elements Office

Box 2746 Lakewood Branch
Denver 15, Colorado

May 20, 1948

Mr. Thomas A. Hendricks
U. S. Geological Survey
FWA Building
Washington 25, D.C.

Attention: A. P. Butler, Jr.

Dear Tom:

Enclosed is the Staats report.

I agree with your suggestion to substitute core drilling for trenching.

On page 12, I am inclined to agree with Wyant with regards to his marginal note concerning lines 11, 12, and 13.

The Shinarump Mesa report should reach you by Monday at the latest and Brill's report (Reconnaissance of Pegmatite Dikes and Associated Rocks in the Front Range of Colorado) will follow as soon thereafter as we can get it out.

Sincerely,

Wm. P. Hulsatt
Geologist

Enclosure
WPH/fd
(Secret report - 14 pages, No. 1 of 2 copies with 8 sketch maps enclosed, report is original copy)
Sent Registered Mail- Air mail.

Copy 3 of 3 copies.
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Denver, Colorado

STAATS MINE BEAVER COUNTY, UTAH

Examined and sampled in 1945 by Chesterman and Main
Examined and sampled in November, 1947 by D. G. Wyant

Chesterman & Main's Samples

No.	Description	% EU Field	% EU Lab	% U Lab
-90	Altered rhyolite	0.010	0.093	0.06
-91	Fluorspar in vein near fault	0.048		
-92	Fluorspar (gassy)	0.051		
-93	Massive fluorspar	0.238	.625	.45

Reserve by Chesterman and Main: 8000 Tons of .07% U.

Wyant's Samples (23)

No.	Description	%EU Field	Chem. Anal. % U	Chem. Anal. % ThO_2
1311	Mill tails	0.100		
1312	Reddish gossan	0.009		
1313	Halloysite ?	0.000 Low		
1314	Altered latite	0.009		
1315	Altered latite & fluorite	0.007		
1316	Brecciated fluorite	0.032		
1317	Altered brecciated fluorite	0.044		
1318	Altered latite	0.011	0.003	0.004
1319	Altered limestone	0.000 Low		
1320	Altered breccia	0.004		
1321	Altered latite	0.007		
1322	Dark, gassy fluorite	0.117		
1323	Latite outcrop	0.016	0.001	0.002
1324	Altered latite	0.065	0.032	0.001
1325	Fluorite vein	0.059		
1326	Altered latite	0.092		
1327	Altered latite breccia	0.012		
1328	Fluorite & autunite	0.660 high		
1329	Gossan	0.009		
1330	Fluorite veinlets in gossan	0.033		
1331	Gossan	0.050		
1332	Gouge from drift	0.010		
1333	Latite	0.010	0.001	0.003

Four samples (1318, 1323, 1324 & 1333) selected for chemical analysis on basis of tonnage represented.

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		% U	% ThO_2
Samples 1323 & 1333 represent app.	10,000,000 T of	0.001	0.0025
" 1318 & 1324 " "	10,000 T of	0.0175	0.0025

Chemical analyses appreciably lower than field counts.

Month of January

Chemical analyses received January 29, 1948

Conclusion: Results of work completed to date are not too encouraging. disappointing.
Additional work advisable

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No 1 of 3 copies

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DENVER OFFICE

TRACE ELEMENTS SECTION

Staats Fluorite Project, Utah

Monthly Progress Report for December, 1947

Introduction: The Staats fluorite mine, in the southern part of the Wah Wah Range, Beaver County, Utah (see attached index map) was examined briefly in November. The report, including detailed recommendations for future work is ready for final typing.

Progress during December:

(a) Geologic results....
On the basis of percent eU determined in samples at Denver, highest grade ore (o.1 to 0.66% eU) is associated with fluorite. The amount of such material "in sight" is small. Samples of fresh latite(?) porphyry contain 0.01% or more eU, and the amount of such material "in sight" is large.

(b) Changes in objectives:
Emphasis should be placed on determining the amount of radioactivity in the latite(?). See recommendations below.

(c) Specific recommendations for any reorientation....
A long range project should be established involving:
1) detailed mapping of mine workings and the body of radioactive igneous rock;
2) areal mapping of parts of several 7½ minute quadrangles to establish the general geology and locate for detailed work several other igneous bodies which may be radioactive;
3) sampling of the latite(?) porphyry at the Staats mine, to be followed by diamond drilling if sampling warrants it;
4) investigating in the laboratory the mineralogy and petrology of the rocks.

(d) An estimate of the economic results to date....
There are roughly 10,000,000 tons of latite(?) porphyry for every 100 feet of depth at the Staats mine. On the basis of field sample count the latite (?) contains 0.01% or more eU.

(e) Probable date of completion....
No long range project has been set up (see recommendations above). The report of the examination made in November is ready for final typing.

(f) Degree of completion and probable date of transmittal....
Not pertinant, see (e) above.

Conclusion: If chemical analysis of the four samples sent to Washington confirms the amount of eU determined by field sample count (0.01% or more), the long range program outlined in (c) above, and more fully detailed in the forth-coming report of the November examination, should be started .

The Wah Wah Range is relatively high but should be sufficiently snowfree by April to permit field work.

Man months completed in December: Proffessional--0.3 of one man-month, office work.
Personnel: Donald G. Wyant

Donald G. Wyant
geologist

January 3, 1948

DGW/dw

Figure 1 attached

1 cc Washington (Hendricks)
1 cc Denver
1 cc author (originator)

The Staats mine is near the southern end of the Wah Wah Range in the southwestern part of Beaver County, about 32 miles by road from Lund. The ore is a deep purple fluorspar which occurs as lenses and veins in altered rhyolite and silicified limestone. The mineralized zone, which includes the fluorspar veins and the adjoining altered rhyolite, is from 5 to 7 feet wide and is well exposed in lower and upper mine workings which are about 200 feet apart horizontally. The fluorspar in several small lenses contains an irritating gas.

C-11-90 altered rhy. - .0010
C-11-91 fluor-vein ca fault - .0048
C-11-93 massive fluor. - .0238
C-11-92 fluor & gas - .0051

Both mine workings 8000 - .007

		# sta.	# S	Ft.	F	L	C
C-11	Fluor	8	3	3	.0238	.0625	.045
	Rhy	11	1	5	.0010	.0093	.006
	Limestone	3					

(Chesterman, C.W, & Main, F.H: Reconnaissance investigations for TE in Utah, Colorado, Nevada, California, & Oregon - Prelim. Report. T.E.I. Report No. 24, pp 24, 25, 41 9 June 1947)

No. 117

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FLUORSPAR INVESTIGATIONS
Memorandum on the Staats Mine
Beaver County, Utah
D.C. Cox and A.H. Granger

May 19, 1943

On April 22, the Staats mine was visited with J. O. Fisher also of the Geological Survey and F. D. Everett of the Bureau of Mines. The mine is situated in the Wah Wah Mountains, 47 miles by road southwest of Milford, and about 30 miles northwest of Lund, Utah. Roads from both towns are graded and the nearest railhead is Lund on the Union Pacific R. R.

The property is owned or leased by Mr. Fred Staats of Salt Lake City, Utah, and consists of at least 10 claims.

It was last operated in 1942 under contract by Mr. V. Waddups of Milford, Utah. The following production figures are reported by Mr. Staats for the Staats or Monarch claims and the Skougard mine, all of which are probably the same property.

Year	Tons metallurgical fluorspar shipped from Staats Mine	Skougard Mine	
1938	351		
1939		385	527
1940		142	1370
1941	748	527	1897 tons fr. 1938-41 inc
1942	271		
	1370		

The principal deposit consists of shoots or lenses of fine-crystalline to massive dark purple fluorite in a fault breccia between a limestone and an acid porphyry (probably extrusive). The limestone-porphyry contact can be traced by float for about 200 feet, in a north-south direction. At the north end of the exposed area the contact swings sharply to the southeast (see sketch). This may possibly be owing to an intersecting fault. About 300 feet southeast of this sharp turn and along the contact, several pits have been dug which expose a body of fluorite 30 feet wide (if continuous between pits) in a white, altered breccia. The length is unknown. Some fluorite was also seen in a shallow pit dug along the north trending contact about 150 feet north of the main mine workings.

Besides the dark massive fluorite in the principal ore body, there is also a little green fibrous fluorite, probably younger than the purple. The purple fluorite emits a marked but unidentified odor when struck with a hammer and is said to yield so much gas (?) when drilled as to make drifts and stopes unpleasant or even dangerous.

From the description of Mr. Waddups, the best ore seems to occur largely in shoots en echelon within the larger lens-shaped ore body. The shoots apparently were about 10 feet by 8 feet in cross section.

A sample taken by the Bureau of Mines assayed as follows:

CaF_2	$CaCO_3$	SiO_2	CaO
69.0%	2.1%	3.6%	30.5%

This body has been mined by a combination of open pit and underground stope methods. The open pit extends to at least 25 feet below the haulage level and to a maximum depth of about 50 feet according to a report by S. D. Hendricks of the Bureau of Mines. A shaft developes the mine to the 85-foot level, and at this level a stope drift extends south for 65 feet.

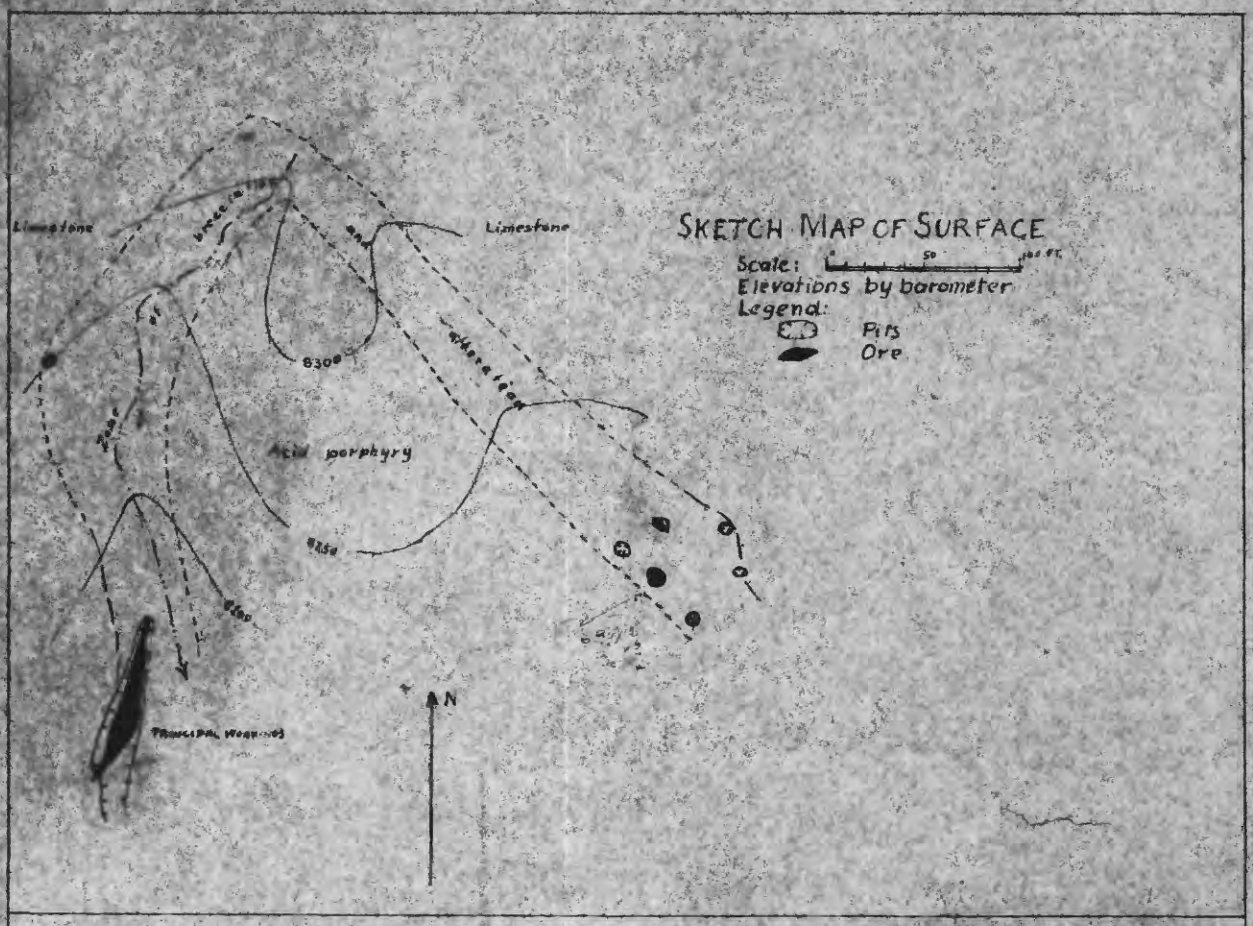
Owing to the poor condition of the shaft and ladders, the underground areas were unsafe and were not visited by the writers.

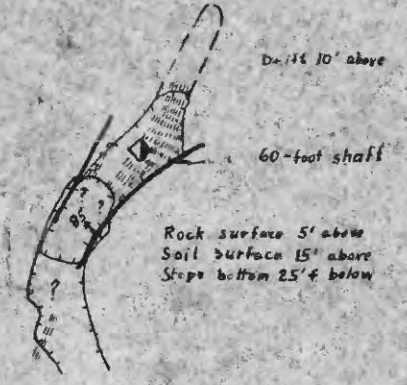
No reserves can be estimated for the main ore body with inspection of the underground workings, but it is possible that considerable ore can still be mined from this body from and below the lower workings. Extension of the body along the strike appear to be narrow and of low grade.

The body to the northeast of the mine is too poorly exposed to estimate tonnage. While the grade appears to be low, a sample from one of the pits (see sketch) assayed 68.11% CaF_2. Another more representative sample was taken on a subsequent visit, but the results are not yet available.

Recommendations

No further work is necessary in the vicinity of the main workings since that area is already developed and ready for actual mining when a market is available. On the other hand surface trenching and sampling of the area to the northeast of the mine workings is necessary to give a better picture of the value of the deposit as a whole, if the need for Utah fluorite, either nationally or in the Utah region, make this desirable.





SKETCH PLAN ON HAULAGE LEVEL

Scale:

Legend:

Fault

Ore

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STAATS MINE

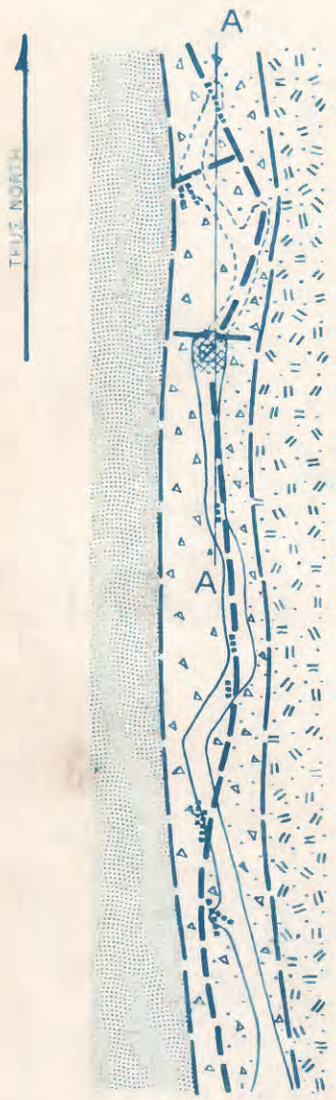
BEAVER COUNTY, UTAH

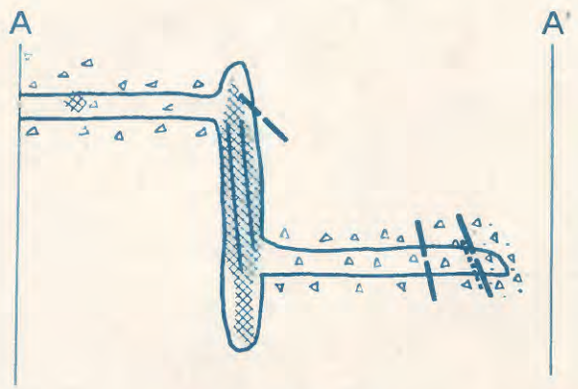
Geology & Topography by:
D.C. Cox, J.O. Fisher, A.E. Granger

D.C.C.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STRATEGIC MINERALS INVESTIGATIONS
PRELIMINARY MAPS





SECTION A-A'

Workings in part projected to plane of section

Pace and compass sketch by W. R. Thurston
March 1945

EXPLANATION

CAMBRIAN TERTIARY

- Rhyolite porphyry
- Limestone
- Fault breccia predominantly rhyolite porphyry
- Fault breccia predominantly limestone
- Fluorspar zone
- Small fault
- Adit level
- Lower level
- Winze

0 25 50 100 FEET

Fig. 14.—GEOLOGIC SKETCH MAP OF WINZE OPERATION, STAATS MINE, BEAVER COUNTY, UTAH

Fluorspar Deposits of Utah
by
W. R. Thurston ; pp 19, 20, 21.

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EXCERPT - ~~STAATS REPORT,~~ UTAH

Monarch (Staats) claims

The Monarch claims are located in the Wah Wah Mountains, 47 miles by road southwest of Milford, Utah, and about 35 miles by road northwest of Lund, Utah (see fig. 3). The mine is in T. 29 S., R. 16 W., in what is sometimes called the Pine Grove mining district. The claims are owned by Fred Staats of Salt Lake City. Fluorspar was first discovered in the area in about 1935, and some ore has been mined there every year since. The total production up to January 1946 is about 3,500 tons. The claims have been in several hands and called by various names; the Monarch mine, the Skougard mine, and Roberts and Skougard mine, and the Roberts and Staats mine. Recently the area has been referred to solely by the name of the present operator and is called the Staats area. In April 1943 Cox and Fisher visited the Staats mine and mapped the relation of the pits and trenches to the upper(?) shaft. In March 1945 the writer examined the underground workings and mapped part of them.

The fluorspar deposits occur along the faulted contact of a Tertiary rhyolite porphyry and a Cambrian limestone. The character of each deposit is controlled by local conditions, but the deposits are similar. The silica content of the ore is low and is probably derived from inclusions of rhyolite porphyry; quartz veins are not present in the ore. The lime content is due to the inclusion of limestone fragments. No assays are available to show the range in CaF_2 content of the crude fluorspar. Two grab samples of material from some of the pits northeast of the main shaft contained 50 to 68 percent of CaF_2. Assays of carload shipments

of fluorspar that had been selectively mined and sorted ranged from 80 to 91 percent of CaF_2 and averaged in excess of 85 percent of CaF_2. The SiO_2 and $CaCO_3$ content did not exceed 5 percent, respectively, and averaged about 2 percent of each. The fluorspar occurs in lenticular shoots within larger podlike ore zones. The waste between shoots is composed of brecciated limestone and rhyolite porphyry. Apparently the depth of each shoot is greater than the length: the shoots vary from 2 to 6 feet wide and from 5 to 10 feet long, but are reported to extend more than 25 feet in depth. The shoots are oriented roughly parallel to the irregular contact zone of the limestone and rhyolite porphyry. The contact zone is intricately faulted with many variations in strike and dip, and sharp undulations in the trace.

Two separate areas of fluorspar mineralization on the Staats property have been explored. Most of the prospecting centers around the main deposit at the head of the valley. (See fig. 13) A small deposit has been opened about half

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Fig. 13. - Sketch map of geology in vicinity of main shaft, Staats mine, Beaver County, Utah.

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a mile southeast. (See fig. 14.)

Fig. 14. - Geologic sketch map of winze operation, Staats mine, Beaver County, Utah.

The principal workings at the Staats mine are an 85-foot shaft, an open cut, and an adit. The main deposit was first explored by an open cut. A shaft was sunk at about the center of the open cut, and stopes were driven at various legels beneath the cut. At the 85-foot

level a drift extends 65 feet southward. About 400 feet southeast of the shaft an adit exposed several pockets of fluorspar along a faulted segment of the contact between the rhyolite porphyry and limestone. (See fig. 13.) Because of caving ground only a small part of the shaft-workings was accessible for examination. Apparently enough fluorspar remains in the vicinity of the shaft to be worth recovering. Within 600 feet to the north northeast, and southeast, several pits and trenches show fluorspar in the contact zone.

To the southeast, about half a mile, an adit leads to a winze operation from which 200 tons of ore was mined in 1944. (See fig. 14.) The ore in the winze formed a shoot 10 feet long, 6 feet wide, and about 55 feet high.