COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

DEPARTMENT OF SUPPLY AND SHIPPING.

MINERAL RESOURCES SURVEY BRANCH.

GEOLOGICAL REPORT ON THE PINE MOUNTAIN FLUORITE LODE.

Report No. 1943/38

Plans Nos. 929-932.

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GEOLOGICAL REPORT ON THE PINE MOUNTAIN FLUORITE LODE.

(Report No.1948/38.)

SITUATION: The Pine Mountain Fluorite Mine is thirteen miles by road from Walwa in the Parish of Cudgewa, County of Benambra, north-eastern Victoria. The lease, which is held by Minerals Pty. Ltd., is situated in the north-east corner of the Parish, where it adjoins the Parishes of Walwa and Tintaldra. The Murray Valley Highway from Walwa to Tintaldra is followed for nine miles, then a rough bush track up to the valley of Pine Mountain Creek in a south-south-westerly direction for nearly four miles. Ore from the mine is carted to the railway at Cudgewa, a distance of twenty-five miles. Height above sea level at the workings is about 1400 feet. Timber is plentiful near the mine, but the only local water supply is Pine Mountain Creek, which carries no water during dry times.

The mine was examined on Monday, June 21st, and the surface and underground workings were mapped by tape, compass and clinometer on a scale of 40 feet to an inch. Plans of the surface and of the two levels, and a longitudinal section of the lode accompany this report.

HISTORY: In a report on Silver-Lead Ore at Pine Mountain written in May, 1907, E.J. Dunn describes two adits which correspond to the upper adit (Plate 1) and to the long adit to the north-west, which is marked inaccessible. The lode in those days was being prospected for lead and silver, though apparently the stage of production was not reached. Between 1918 and 1921 and again in 1938 several hundred tons of fluorite were mined. Most of this production was consumed by the Broken Hill Pty. Co. Ltd. During 1941, the mine was re-opened by Minerals Limited and at present five men are employed. The following table shows the production up to the end of 1941.

FLUORITE PRODUCTION - VICTORIA.

Year	Pine Mountain Quantity Tons	Pine Mountain Value £
1918	100	200
1919	314	1,020
1920	13.25	43
1921	196	635
1922-37	-	-
1938	791	1,616
1939-40	-	-
1941	134	804
Total :	1,548.25	4,318

GENERAL GEOLOGY: The geology of the district has been described in an interesting paper by A.B. Edwards and J.G. Easton (Igneous Rocks of North-Eastern Benambra, Proceedings of the Royal Society of Victoria Volume 50, Part 1, 1937), and reference should be made to this paper for details of the complex series of igneous intrusions which have taken place.

During the present examination only the area in the immediate neighbourhood of the lode outcrop and the workings was mapped. The lode occupies, for the most part, a contact between a quartz-porphyry dyke and the upper Ordovician schist. The quartz-porphyry dyke, which is 65 feet wide in the lower adit, has itself been intruded between

the metamorphic rocks and a medium-grained biotite granite which probably belongs to the older, Corryong granite batholith. The younger red granite outcrops conspicuously in the Pine Mountain mass to the north of Pine Mountain Creek and it is likely that this intrusive is responsible for the mineralisation.

ECONOMIC GEOLOGY: The lode was mapped on the surface for a distance of 920 feet and it is said that fluorite can be found along the line of strike several hundred feet distant in both directions, but these occurrences could not be examined in the time available. Above the principal workings the lode outcrops continuously along the contact of schist and porphyry for 400 feet and ranges up to nearly 6 feet in width, the average being 3 to 4 feet (Plate 1). The outcrop material consists of fluorite quartz and silicified rock. Silica of chalcedonic type, showing a banded or nodular concentric structure, and often a brecciated appearance, is common in the outcrop. Strong fissuring appears to have taken place along the contact and just east of the workings the lode fissure is entirely within the schist. In this section the width is reduced to a few inches of comparatively impure material, but the lode resumes its normal character farther along the strike where the fissure again occupies the porphyry-schist contact. The general strike of the lode is east-south-east and the dip is very steep to the south.

The upper level consists of an adit, 82 feet in length, with a drive westerly along the lode, which at the time of mapping was 151 feet from the adit (Plate 2). The lode was cut in the adit, which up to that point is entirely in porphyry, at 43 feet from the portal, and was there about 3 feet in width. The cross-cut was continued another 40 feet, passing through 8 feet of silicified and poorly mineralised country with occasional streaks of fluorite up to 8 inches in width and showing strong shearing and fissuring, then a further 12 feet of broken country with one 8 inch streak of fluorite, and finally another 2 foot lode of fairly good fluorite. The last 10 feet of the adit is in a broken silicified rock, which looks like a mudstone that has been sheared, silicified and slightly mineralised. No definite dip could be determined. The main lode along the level varied from 12 inches to nearly 5 feet in width and had been stoped above for heights varying up to 25 feet above the level. Stoping was proceeding near the end of the drive and the drive itself is being continued to develop the wide portion shown on the outcrop some 40 to 50 feet further west.

The No. 2 level consists of an adit 180 feet in length with drives 45 feet east and 112 feet west (Plate 3). For 110 feet the adit was in biotite granite, and then struck 4 feet of silicified lode material with considerable quartz, and a little fluorite on the hangingwall, which dipped south at 75 to 80 degrees. The next 65 feet to the main fluorite lode was in porphyry.

The lode is similar in appearance and dimensions to that on the level above, except that near the west end of the level it widens out to 12 feet or more of mineralised formation which consists of mixed fluorite and broken silicified country with some good streaks of fluorite. Slickensiding on the wall of the lode pitches east at 45 degrees. 30 feet back from the end of the drive another lode which is probably the principal branch lode cut in the upper adit and which can also be seen on the surface joins the main lode on the hangingwall side. The lode has been stoped out to the level above for 90 feet west of the adit and partly stoped for 40 feet east of the adit. The dip has flattened appreciably on the bottom level and averages about 70 degrees whereas on the upper level and the surface it is usually above 85 degrees.

The longitudinal section (Plate 4) shows a fairly steep pitch of the wider portion of the lode, as exposed at present, towards the west. This pitch is reflected by the position of the junction of the hangingwall vein with the main vein. The junction of the porphyry and schist on the footwall of the lode, that is, the point

where the lode leaves the contact and passes wholly into the schist, also seems to pitch in the same direction.

The ore consists of fairly pure fluorite, generally white or violet in colour. Principal impurities are quartz and silicified country rock and in places such as the west end of the lower level the lode widens out and consists mainly of such impurities with a few streaks and lenses of fluorite. A not uncommon condition is a horse of country up to 12 inches wide separating 2 good bands of fluorite. Galena is common, particularly near the surface. It occurs in nodules and massive veinlets which have obviously been deposited later than the fluorite, as the galena veins cut right across the fluorite. Sphalerite, usually associated with the galena, can also be seen in the ore. The galena is readily separated from the fluorite by hand sorting, and the siliceous material can be picked out to give a grade of 90 per cent. CaF2. Broken Hill Pty. Co. Ltd., report that the average grade of several hundred tons from Pine Mountain used during 1921-22 was as follows :-

CaF_2	-	72 to 88%
SiO_2	-	11 to 18%
$CaCO_3$	-	1 to 2%

and during 1937-38 the average of a similar amount was -

CaF_2	-	80 to 90%
SiO_2	-	6 to 20%
Pb	-	From a trace to 2%

The Manager of Minerals (Victoria) Ltd. advises that they have conducted experiments on flotation with the ore from this mine and were successful in obtaining concentrates of 98.3 per cent. CaF_2.

A sample of the clean galena was chipped off and sent to the Victorian Mines Department for assay of its silver content and was found to contain 20 oz. of silver per ton of galena.

ORE RESERVES: The amount of fluorspar selected per ton of ore mined was not ascertained accurately but an estimate of the amount of ore mined compared with the tonnage recorded as shipped from the mine suggests a recovery factor of about 70 per cent. Many parts of the lode can be taken out with very little dilution, but others contain lenses or bands of mullock which have to be rejected. For the purposes of calculation 60 per cent. recovery of the lode is assumed and a tonnage factor of 12 cubic feet to the ton.

Ore reserves calculated are :-

Positive ore - Above upper level as developed at time of examination - 600 tons.

Probable ore - Above upper level west of present workings - 1500 tons.

Between lower and upper levels west of present workings - 1000 tons.

Tonnage per foot of depth below lower adit - 45 tons.

These figures are necessarily only an approximation but they serve to give an idea of the potentialities of the lode. Ore left in pillars between the levels and immediately above the upper level has not been taken into consideration, nor has the eastern block of ore, where also quite appreciable reserves could probably be developed.

(N.H. Fisher)
CHIEF GEOLOGIST

24th August, 1943.

(H.B. Owen)
GEOLOGIST.

SURFACE PLAN
PINE MOUNTAIN FLUORSPAR MINE
PARISH OF CUDGEWA
COUNTY OF BENAMBRA
VICTORIA

0 40 80 120 FT.

N 9°30' E

M.N.

LEGEND

- Schist
- Granite
- Porphyry
- 80° Lode outcrop
- Fault

Approximate contours at 20' intervals; referred to level of bottom adit, taken as 100'

Adit inaccessible R.L. 85'

68' to portal

Datum 100'

Lower Adit R.L. 100'

Upper Adit R.L. 143'

Lease Peg 205'

Broken on Hanging wall

Strong Lode 4' to 6' wide with Galena

Broken

Large outcrop broken fluorspar

Irregular veins of fluorspar dying out to east

Gully

Por

Sch

Plane of Longitudinal Section

Strong 4' Lode

Drive R.L. 162'

Shaft 12'

Not much outcrop

1'-2' Good fluorspar on F.W. then horse up to 1' wide, then 1' or more fluorspar

Flt

M.H. Fisher
Chief Geologist
Mineral Resources Survey Branch
Aug. 1943.

GEOLOGICAL PLAN
UPPER LEVEL
PINE MOUNTAIN FLUORSPAR MINE
R.L. 143'

0 40 80 FT.

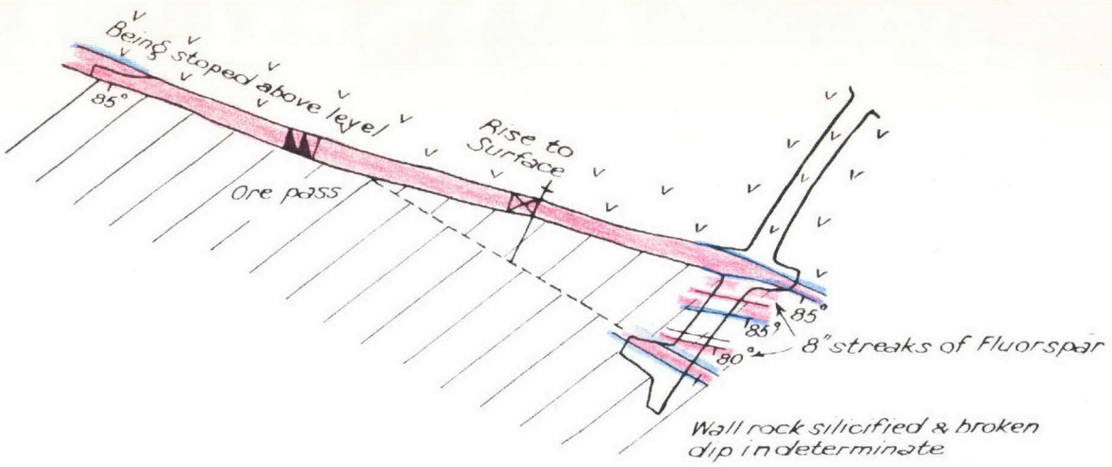
LEGEND

Schist

Porphyry

Fluorspar Lode 85°

Fault 80°



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Aug. 1943

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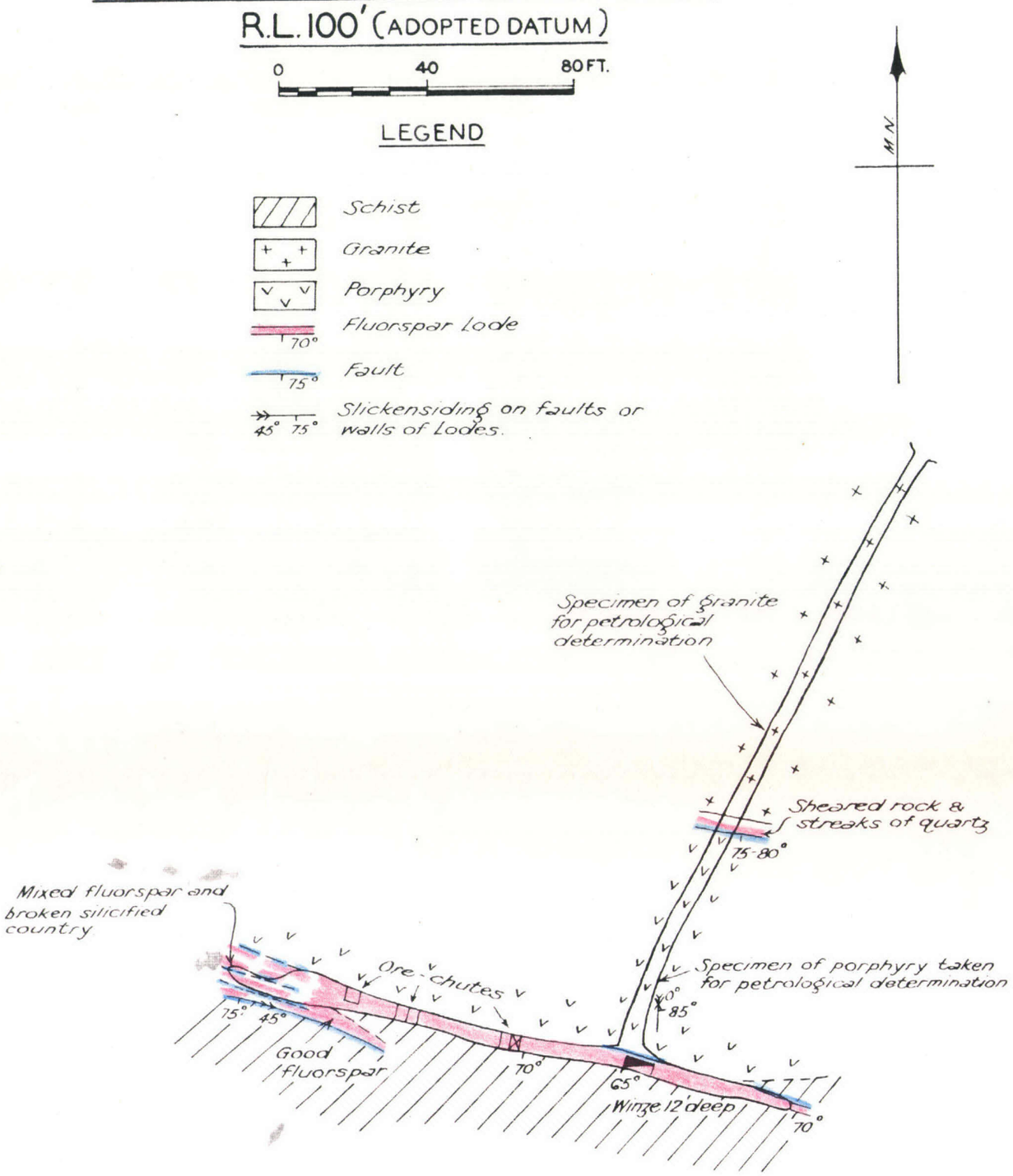
GEOLOGICAL PLAN
LOWER LEVEL
PINE MOUNTAIN FLUORSPAR MINE
R.L. 100' (ADOPTED DATUM)

0 40 80 FT.

LEGEND

- Schist
- Granite
- Porphyry
- Fluorspar Lode 70°
- Fault 75°
- Slickensiding on faults or walls of Lodes. 45° 75°



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Aug. 1943.

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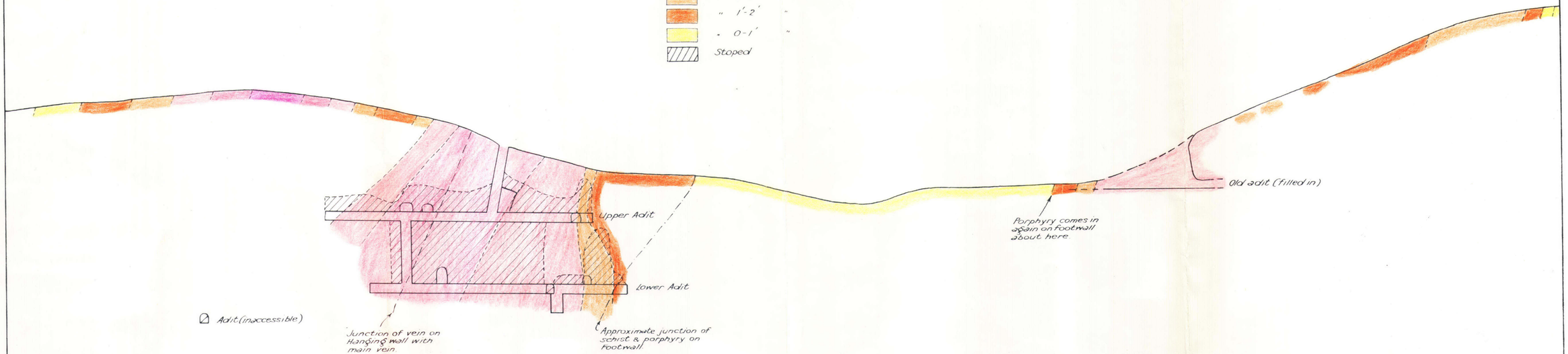
LONGITUDINAL SECTION
PINE MOUNTAIN FLUORSPAR LODE

LOOKING NORTH NORTH EAST

0 40 80 120 160FT.

LEGEND

- Lode > 5' thick
- " 4'-5' "
- " 3'-4' "
- " 2'-3' "
- " 1'-2' "
- " 0-1' "
- Stoped



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