2330

Lightning Peak Group of Claims, Vernon Mining Division
49° 52' N, 118° 33' W. N.T.S. Area 82E (east half)

held by

Great Horn Mining Syndicate Inc.

GEOLOGICAL REPORT

on program of exploration conducted by
International Mine Services Ltd. between
July 1st and November 15th, 1969

Written by: J.M. McMullin, B.Sc.
Supervised by: J.L. Tindale, P.Eng.

Toronto, Ontario
25th March, 1970.

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CONTENTS



APPENDICES (in folder)

## 1. INTRODUCTION

The work and results described in this report form a continuation of a program of exploration started on the property by Great Horn Mining Syndicate Inc. in the spring of 1968. For a description of the program and results so far, reference should be made to the report by W.J. Stephen M.A. dated January 10, 1969 and entitled "A Report on the 1968 Field Program conducted by International Mine Services Limited for the Great Horn Mining Syndicate Inc. on the Lightning Peak property, Vernon Mining Division, B.C." Stephen's report also gives a good outline of the claims held and their dates of acquisition with descriptions of the physical features and general geology of the area and a short history of previous explorations. No repetitious descriptions of these topics are included with this report.

The first visit to the property in 1969 was made on June 24th, a few days after the end of a prolonged heat-wave which caused numerous forest fires throughout British Columbia, but which also melted all the snow in the Lightning Peak area with the exception of a few drifts. The Waterloo road from Inonoaklin Crossing was found to be in better condition than expected with only one bad washout, and only two deadfalls. After a week or two of wet weather and violent thunderstorms the area was favoured with perfect weather and high temperatures until the middle of September, during which period the road continued to dry and improve. After the weather broke again with thunder and hailstorms the Forest Service took in a "cat" to improve a long section of the road, which unfortunately resulted in several inches to a foot of porridge-like mud, until the onset of winter when all the ruts set hard with frost for the remainder of the season.

Snow was fairly frequent during the fall but short thaws kept the accumulations low until November. At the time the camp was vacated in mid-November the roads were covered to a depth of 12 inches.

## 2. PERSONNEL

The 1969 exploration program, carried out by International Mine Services Ltd. of Toronto, Ontario for the Great Horn Mining Syndicate Inc. was under the direction and guidance of J.L. Tindale, P.Eng., Chief Geologist for International Mine Services Ltd. and was supervised at the property by J.M. McMullin (Geologist and Project Manager).



ii) Surveying

... of course been surveyed

#'s 11-20 Cross sections of Diamond Drill Holes GHW-1 to GHW-16.



The latter would like to thank the following International Mine Services Limited personnel whose capable and cheerful assistance in sometimes unpleasant conditions contributed greatly to the smooth running and advancement of the program.

| | | | |
|---|---|---|---|
| Alex Watt | (1st July - 16th August) | | engineer, surveyor draughtsman |
| Ivan Menard | (21st June - 11th September) | | senior assistant |
| Rog Thomas | (5th July - 13th September) | | assistant |
| Harry Hartwig | (11th July - 31st August) | | assistant |
| Eugene Ropchan | (19th July - 28th July) | | assistant |
| J. Dickie | (1st July - 17th November) | | cook |

## 3. WATERLOO PROPERTY

### Underground Work

i) Adit Rehabilitation. All the underground work performed on the Waterloo property was on the fourth level (Adit-drift No. 4) - a rather crooked 1780 ft. drift on the main Waterloo vein. The drift was originally worked and small stopes, raises and winzes were developed during the period 1931-1934, but the larger stope which extends 200 feet from the portal was not developed until the early 1950's.

The condition of the adit-drift reflected its age. Although rotting of the timbers beneath the main stope is well established it was considered that this section was secure enough to carry out a limited exploration program without major reconstruction.

Two sections 200 feet in length were flooded to a depth of 18-20 inches by natural groundwater being dammed behind collapsed and caved sections. One of these was at the portal and the other involved a 30 foot section in a strong shear at 1400 feet from the portal. Prior to rehabilitation this latter blockage prevented access to the remaining 400 feet of drift. It is not certain whether this section caved naturally or was the start of a new raise - the badly fractured nature of some of the basalt dyke in the centre of the sheared biotite schist would suggest that it had been blasted but no mineralization was seen while mucking to indicate a reason for raising at this location.

Two other timbered sections along shears had collapsed also but sloughing was mainly confined to the walls and did not prevent access. These collapses were at 740-800 feet and 870-900 feet from the portal. At 500 feet from the portal an inclined winze reported to be 28 feet deep forms an adequate sump for drilling and washing. A new bridge was constructed across it early in the rehabilitation program.

A railway line between the portal and the sump was still in good condition and a small flat car on it was fixed up for use in transporting air pipe and drill equipment. An ore wagon also on the line was removed.

The old portal was re-excavated with a 2½ cu. yd. four-wheel-drive payloader rented from Vernon and a new portal was constructed. The floor of the drift was cleaned up and ditched to remove all the water. Muck and old timbers were dug out and cut away to provide sufficient access through the next two collapsed sections and new timbering installed where necessary.

The major cave which was totally preventing access was very bad and necessitated several days shovelling, sledgehammering and retimbering. It is conservatively estimated that about 500 cubic feet of muck and basalt blocks were removed from this collapse, which left the back 20 feet high.

Installation of 4 inch diameter steel pipe in 20 foot lengths and 1 inch diameter plastic hose in 300 foot lengths followed the mucking operations. About one dozen of the steel pipes had to be bent to negotiate tight corners but otherwise the pipe laying was quite straightforward. The plastic pipe proved to be somewhat unsatisfactory owing to frequent punctures caused by vibration from the pump.

As soon as the underground diamond drilling equipment arrived and was set up the supply pump at the sump was used for washing down the whole length of the back and walls of the adit drift, where considerable and tenaceous mud was impeding mapping and sampling.

The final step in the"working rehabilitation" was extensive scaling of the back and walls and mucking of the floor.

ii) Surveying

The Waterloo area has of course been surveyed before, both during 1968 when the surface area around the old workings was surveyed by chain and compass and the adit-drift No. 2 was surveyed by transit, and previously by other operators. Numerous numbered aluminum tags on surface and spads in the underground workings are all the work of previous owners. Sets of notes pertaining to the aluminum tags on surface were available to us but not records of the previous underground survey. A few of the aluminum tags (generally nailed to tree stumps) were checked for accuracy and then were used as a basis for the new survey, using the same coordinates and elevations so that all the surveys would be on the same system and would tie together.

As soon as underground mucking and scaling operations permitted, new survey stations were established where necessary, and a transit survey of the whole of the fourth level was completed. A total of 44 stations was surveyed, and mine plans on a scale of 20 feet to the inch were drafted on three sheets.

iii) Geological Mapping

Mapping of the back on the fourth level got under way at the same time as the rehabilitation operations but was found to be very time consuming owing to the dirt on the back and the complex geology and strong alteration. Mapping was on a scale of 20 feet to the inch and the detail on the field sheets was later transferred on to the mine plans prepared by Mr. Watt on the same scale. Later on, after washing of the adit-drift was complete, mapping became easier and more detail could be seen.

Geology - As described in Stephen's report the Lightning Peak area is underlain by a belt of thermally altered and sheared sediments and volcanics probably of Permain age (Anarchist Group) forming a remnant roof pendant above Lower Cretaceous batholithic intrusions of granite, granodiorite and monzonite. According to the G.S.C. Map of the area (Map 6-1957, sheet 82E,(East Half) by H.W. Little) the Anarchist Group consists of greenstone, greywacke, limestone and paragneiss.

In the immediate vicinity of the Waterloo workings these two groups are seen as a complex intermixing of hornfels, recrystallised white limestone (partly siliceous) and grey granite, with younger crosscutting dykes of basalt and lamprophyre. The Waterloo vein follows a strong shear striking approximately east-west and is especially strong where the shear is hosted by limestone and especially well mineralized particularly with respect to zinc where hosted

by limestone-calcite breccia. Lead is very localized usually forming a negligible percentage although there are short sections where rich lead is found. Native silver is also very localized and appears to favour highly siliceous zones.

Around 1210 feet from the portal the limestone disappears. Up to within 40 feet of this point the vein is continually present to some degree although variable in width and mineral content, but beyond the limit of the limestone there are only traces of calcite and sulphides of the vein type.

Hornfels is a major lithological type in this locality and is variable but is most commonly seen as a dark greenish grey, fine to medium grained banded rock and is nearly always tightly interbanded with uniform medium-grained grey granite. The granite bands are more or less parallel to the banding in the hornfels and vary in width considerably from less than one inch up to several feet. These bands frequently have a slight gneissose texture. Brown biotite is a common constituent of the hornfels and sometimes enriches a section enough to be called biotite schist. This unit of hornfels and granite (or syenite or quartz-felspar-porphyry) dips about vertically or steeply north and was cut by all diamond drill holes on the north side of the vein.

It appears that these granite bands are confined almost entirely to the upper part of the series as encountered in the drill holes.

The hornfels is considerably altered in parts with an irregular olive green mineral, probably chlorite in origin, and contains numerous white felspar lathes in some sections.

Cross-cutting intrusions of porphyritic basalt and lamprophyre are common. These vary in width from a few inches to a few feet. Medium grained grey felspar porphyries occur throughout but these do not appear very fresh.

White and grey-and-white banded crystalline limestones occur in bands of up to 50 feet or more in width but they tend to vary in width as well as lensing and are cut by numerous dykes of lamprophyre and basalt so that correlation across drill holes is not very straightforward.

Quartz veins are not very common but zones of silicification within the limestone cause hardening and discolouration, often resulting in pink cherts where especially intense.

A kind of hybrid rock occurs beneath the main limestone bands. It varies between a brown-grey limey hornfels and chert, is frequently sheared and altered and is usually present very close to, if not actually hosting, the Waterloo vein. It sometimes carries minor amounts of disseminated sphalerite. Limestone bands within this zone are frequently dolomitised.

Mineralization The Waterloo vein and its smaller and thinner hanging wall comparison are found either in limestone or in the "hybrid rock" type mentioned in the previous section. The gangue material is almost always silicified calcite, although sometimes the lime content is very low, and brecciation is common.

Silver is found as the native element and dissolved in galena, and occasionally as ruby silver. Other silver minerals have been previously reported but none were identified during 1969.

Lead is found in the form of fine grained galena but tends to be patchy, favouring as does silver, the more siliceous gangue material and host rock.

Zinc, in the form of reddish brown and honey coloured sphalerite, massive in places, is the commonest metallic mineral present and appears to carry low silver values in places. The zinc tends to favour a lime-rich rather than a silica-rich environment.

Pyrite and chalcopyrite occur sometimes but only in very minor quantities.

Bronze coloured pyrrhotite and pyrite with very minor chalcopyrite do occur within the hornfels, usually very fine grained, disseminated and in small proportions, but patches of heavy sulphides were encountered in two drill holes. These were tested for nickel but proved to be of no interest.

iv) Sampling

The Waterloo vein is known to be more or less continuous over a length of 1200 feet, but is considerably variable in terms of width, strength and grade.

All the assay results were weight averaged across the total width (or brought up to a 4 ft. minimum width) and then averaged out over sections as shown on the 1":20 ft. longitudinal section of the western part of the drift.

Although locally results achieved were very interesting the overall picture produced by averaging over realistic widths proved to be disappointing.

A total of 156 samples were taken from the back and all were assyed for lead, zinc, and silver by Technical Service Laboratories of Vancouver.

v) Diamond Drilling

Underground drilling equipment arrived on the property at the same time as the surface equipment (at the end of July) but owing to the unavailability of an underground crew the underground drilling program did not get properly under way until mid-September.

Five hundred feet of drilling on holes GHU-1 (300') and GHU-2 (200') were completed however during the last ten days of August during the period that the pressure pump for the surface drill was broken down.

Sixteen underground holes all coring AQ with a total of 1736 feet were completed by mid-October. Holes GHU-1 to GHU-4 were all exploratory in nature, long flat holes in the eastern part of the fourth level. GHU-4 was planned to go to 600 feet in order to test the downdip southerly extension of the Au veins but was halted at 216 feet owing to slow progress due to frequent icing and lack of sufficient pressure from the temperamental rented compressor, and owing to the delay in commencing the program.

Holes GHU-5 to GHU-16 were all 40 to 90 feet long, mostly from crosscuts to cut the vein above or below the drift. As with some of the surface holes the existence of a second shorter and thinner vein about 30 feet in the hanging wall was proven.

Water in the winze at 500 feet from the portal was found to be quite adequate for the drilling and it was found that most of the flat holes and up holes made water, thereby increasing the supply.

All the core was taken outside, logged and stored (close to the portal) the mineralized sections being split and assayed. Sludge was collected from most of the holes but was only sent for assay when deemed necessary through loss of core.

B. Surface Work

i) Surveying

As mentioned in the section on underground surveying, the Waterloo area had been previously surveyed and most of the original aluminum tagged survey stations were still in position. Using these, together with pertinent survey notes, a transit and chain survey was run over the vicinity of the adits, roads and camp was extended by transit and stadia along the Au road to include the two old Au shafts. In this way the whole immediate area of the camp and underground workings was tied into a common grid and a map produced on a scale of 1 inch to 50 feet, which is included in the appendix.

Layouts for the first nine drill holes were surveyed prior to drilling and several holes were surveyed while being drilled (see next section).

ii) Diamond Drilling

A total of 5885 feet in 16 holes was drilled between the end of July and mid-November. All were drilled from the north side of the vein at angles of 34° to 60° (mostly 50°-60°) intersecting the vein between 50 feet and 220 feet vertically below the fourth level. A strike length of 800 feet was tested in this way, and the vein was cut in most of the holes.

The machine used was a gas-driven BBS-1 using wireline equipment and cutting AQ core. The creek immediately to the south of the mine provided water for the drill until shortly after the completion of the underground drilling program, when a pump failure necessitated replacement of the pump and freezing conditions necessitated use of a coil stove. The new pump and coil stove were installed at the portal to adit-drift 4 where natural mine drainage provided an adequate water supply particularly with much of the water from the drill returning to the supply by way of fractures into the stope.

Vertical and horizontal control for collaring the drill holes was provided using survey stations established during the transit survey of the area. Holes GHW-1 to GHW-9 were laid out by transit and the actual collars, where these had to be moved to provide better set-ups were measured off from the layouts by chain and compass. Holes GHW-10 to GHW-13 were laid out by chain and compass from the adjacent drill holes (GHW-9, GHW-8 and GHW-7). Holes GHW-14 to GHW-16 were drilled from the same set-up

as GHW-1 and GHW-2. The actual collars of GHW-1, GHW-2 GHW-12 and GHW-13 were surveyed by transit either during or after drilling.

Mineralized sections of the core were split and sent for assay after logging and the results of these assays are shown on the 1" to 20 ft. cross sections. The assays relating to the main Waterloo vein (or best mineralization) are plotted on the vertical longitudinal sections on the 1" to 20 ft. mine plans, and the weight-averaged assays brought up to a minimum of 4 feet are plotted on the same 1" to 20 ft. longitudinal section as the averaged back sample assays.

Coring was generally good, apart from GHW-4 which cut a great deal of fault material and GHW-16 where the lower 100 feet were in a soft muddy shear. Sludge was collected from many of the holes but was generally not sent for assay.

## 4. PAYDAY PROPERTY

It was intended to drill three 200-250 foot holes at 50 foot lateral spacing beneath the Payday adit upon completion of the surface diamond drilling at Waterloo. However, two extensions of the Waterloo program from an original 1000 feet to nearly 6000 feet did not allow sufficient time during the season to carry out the Payday drilling.

The three holes were laid out by chain and compass from the detailed grid cut over the property in 1968 and later the vicinity of the drill hole collars and the adit were surveyed by transit to establish reliable vertical and horizontal control. A map on a scale of 1" to 20 feet was prepared, a copy of which is in the appendix.

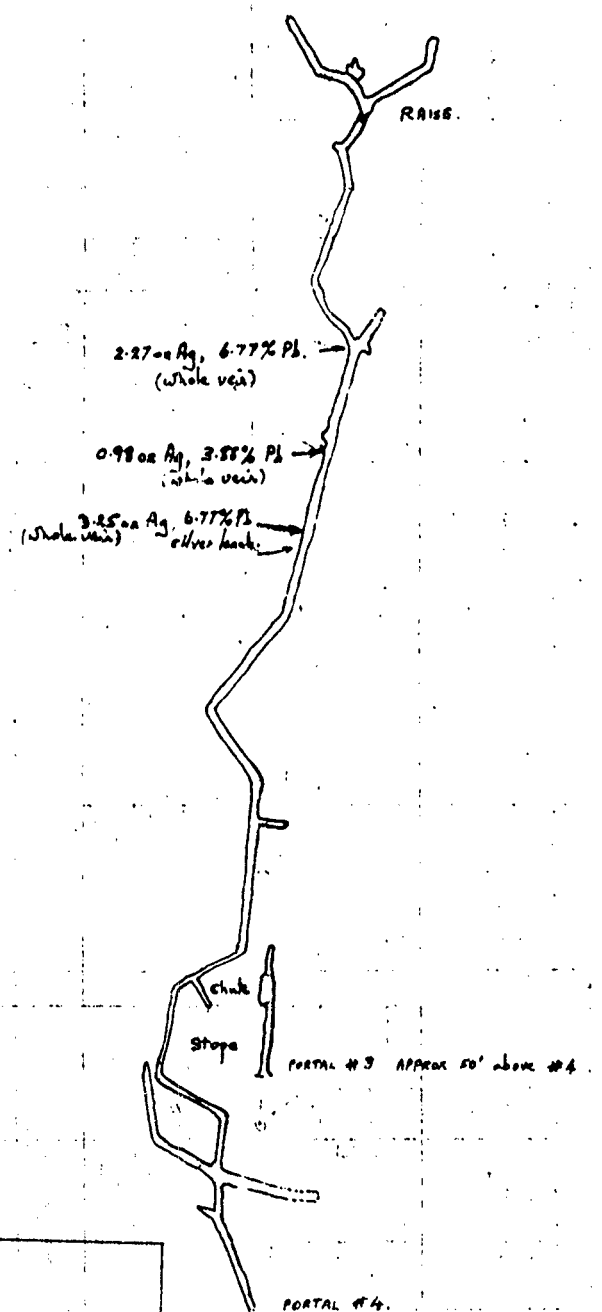
The road bridge before the Payday cabin was strenthened to accommodate vehicular traffic and the drill but no further work was carried out at this property.

## 5. LIGHTNING PEAK ADIT

Access to the two lower levels of the Lightning Peak workings have been somewhat restricted for many years. Dump material outside the lowest level (no. 4?) indicates

SKETCH PLAN, LIGHTNING PEAK WORKINGS.

1" : 100'



interesting mineralization but access was restricted to the first 60 feet of the adit which was itself partly blocked by ice and cave. At 60 feet from the portal the muck pile due to caving of the back was so high that further access was prevented.

Consideration was given to entering the fourth level by way of a large stope from the 75 foot long adit on the third level (50 feet above No. 4), but as an overhang and reverse curve hid the bottom from view this was not attempted. It was later discovered that the stope descends to a chute at the end of a cross cut on the fourth level, but the chute is blocked by loose.

A short mucking operation permitted a breakthrough to the remainder of the fourth level which was found to be dry. The fourth level consists of a rather crooked and low backed drift on a vein averaging about four inches in width. The drift is about 700 feet long with a raise at the inner end and two exploratory cross cuts extend for 70-80 feet from this point. Other short cross cuts also occur along the drift.

The most important mineral found was fairly fine galena, locally rich, with some silver leach, associated with minor quartz in a gangue of altered greenstone following a tight fracture in fine grained greenish volcanics. Three samples were taken, as shown on the accompanying sketch plan, but results proved to be disappointing. The sketch was prepared from a rapid chain and compass survey and while probably bearing a good resemblance to the actual workings it does not profess to be any more than a working sketch.

Air throughout this level is very fresh. Ventilation is thought to be by way of the raise at the eastern end of the drift. A faint westerly flow of air is detectable. Rats inhabit parts of the workings.

Generally speaking apart from the cave in the adit, the fourth level is in good condition. No large muddy faults or strong alteration occur as in the Waterloo workings and the back and walls are very sound. Timbering remains in good condition apart from the timbered raise and chute at the east end which has slipped out of place.

## 6. OTHER PROSPECTS

i) Au Showing The "Au" consists of two shafts, one of which has caved in, some 1100 feet due east of the Waterloo

camp cookhouse. The second shaft is inclined and flooded nearly to the collar so an underground inspection of the drift has not been possible. Prospecting of the dump material revealed no interesting mineralization.

Two drill holes had been planned to test the Au veins. One was to be from underground on the fourth level of the Waterloo workings but as previously mentioned this hole (GHU-4) was abandoned before completion.

It was also planned to drill a hole from surface in the vicinity of the shaft but as with the Payday drilling this was shelved when the Waterloo drilling program was extended.

The Au dump, shafts and trenches were included in the surface transit survey of the Waterloo area but no other work was done.

ii) Soil Sampling

Several areas carrying anomalous amounts of various metal in the soil (Pb, Zn, Cu, Ag) were discovered during the 1968 sampling program. Two of these, high with respect to silver, were further investigated during 1969.

223 soil samples were collected at 50 foot intervals from the 'B' and surface horizons over an area 1550 feet long and 300 feet wide down the west side of claims Peak 93 and Peak 95 (refer to Grid 1 on the soil sampling map in the appendix).

221 soil samples were collected as for Grid 1 over an area 800 feet long and 600 feet wide forming parts of Peak 91, 92, 93 and 94. (Refer to Grid 2).

During 1968, results indicated that soil in these areas contained up to 7.5 parts per million silver, but during 1969 the anomalies were not confirmed in either area and no values above 1 ppm silver were obtained.

## 7. CONCLUSIONS

Waterloo Area - Much detailed examination of the Waterloo vein was carried out during the period July 1st - November 15th 1969. Detailed geological mapping of the vein, intensive sampling of the vein in the fourth level and in diamond drill hole intersections all point towards the same conclusions:

that while high grade native silver does occur in the Waterloo vein, its inconsistency and the overall low grade do not point to commercial grade ore nor to a mineable tonnage.

Zinc mineralization is more consistent and extensive but the low price of zinc does not permit consideration of development for this metal either alone or in conjunction with the silver.

Payday area - Our knowledge of this mineral occurrence has not increased since 1968 and this showing remains as a potential ore body. However it is thought to be very small and is unlikely to be economic unless developed with other and preferably larger ore bodies. No such ore bodies are known at this time.

Lightning Peak area - Further sampling on the vein may show a better grade of lead/silver mineralization than indicated by the very limited sampling undertaken during 1969. However the vein is narrow and appears to be no larger than 700 feet. Its tonnage potential is poor.

## RECOMMENDATIONS

The exploration program undertaken on the Lightning Peak properties during 1969 was concentrated almost entirely on the Waterloo vein as this was thought to have the best potential both in terms of grade and tonnage. Very rich values were discovered in the vein and the vein was shown to be more extensive than formerly thought but the overall picture is not of an economic ore body.

Consequently recommendations for further work on the area would have no viable justification. The whole of the Lightning Peak roof pendant is an interesting area with many mineral showings but extensive exploration of the whole area carried out during two seasons has failed to come up with anything new and has shown the deposit with the best potential to be uneconomic so it must be recommended that no further work be undertaken by the company.

Respectfully submitted:

John McMullin B.Sc.

J. McMullin, B.Sc.,
Geologist.

# CERTIFICATE

This is to certify that I, John M. McMullin, sometime resident of Vernon, British Columbia

1. Am a geologist by profession, having graduated from the Grant Institute of Geology, University of Edinburgh, Scotland in 1967 with the degree of Bachelor of Science (Honours, 2nd Class in Geology).

2. Am employed by International Mine Services Limited as a geologist and project manager in the field of mineral exploration.

3. Did personally conduct the geological investigations described in this report and did supervise the exploration program during the period June - November 1969.

4. Hold no interest in the Great Horn Mining Syndicate Inc.

Dated 26th March, 1970

Signed John McMullin B.Sc.
John McMullin, B.Sc.