

GM 10661

REPORT OF THE PROPERTY OF THE FEDERAL ZINC AND LEAD CO

Documents complémentaires

Additional Files



Licence



License

Cette première page a été ajoutée
au document et ne fait pas partie du
rapport tel que soumis par les auteurs.

Énergie et Ressources
naturelles

Québec 

Lemieux trap

REPORT ON THE PROPERTY
-OF THE-
FEDERAL ZINC AND LEAD CO., LTD
GASPE COUNTY, QUEBEC, CANADA

-by-

WALTER HARVEY WEED, E.M.

QTS.

- 1918 -

Ministère des Richesses Naturelles, Québec
SERVICE DE LA
DOCUMENTATION TECHNIQUE

Date:

No GM: *10661*

TABLE OF CONTENTS

	<u>Page</u>
Letter of Transmissal	
Summary of Report.....	1
Location.....	3
Climate and Vegetation.....	4
Topography.....	5
Geology.....	5
Ore Occurrence.....	5
Vein Outcrops.....	7
Development.....	10
Underground Work.....	11
Detailed Description of Mine Workings.....	12
Porphyry Vein.....	15
Bois Shaft.....	17
Ore Values.....	17
List of Samples.....	18
Value of the Property.....	18
Costs.....	19
Prices.....	21

New York City, N.Y.

September 20th, 1918

Mr. T.O.Lyall,
315 Transportation Building,
Montreal, Canada.

Dear Sir:

In accordance with your request I have visited the Federal Zinc & Lead Company's properties on Berry Mountain Brook, Gaspé County, Quebec, and have made a detailed examination thereof.

In your letter of instructions, you have asked my opinion of the vital factors affecting the commercial value and the future of the property in seven questions. As a direct and brief answer to those queries, it is my opinion that:-

- 1 The property is of value and from the evidence at hand may be considered of very great possible value: it may make one of the great zinc mines of the country.
- 2 Its approximate life cannot be foretold as the development is too limited, and most of the Company's ground unexplored. The underground workings expose an ore-body with one year's ore supply for a 200-ton mill above the tunnel level. The geological evidence indicates that the ore will extend a great distance downward. A depth of 1500 ft. or 15 years supply for a 200-ton mill from this one ore-shoot is quite possible. This does not take into account the probabilities of a large tonnage from the McKinley vein, the Bois shaft, or the various other known veins on the cleared part of the property. From the rich float observed for two miles and from the exposures on the Bois tract, it looks as if you had possibilities of ore production for many years to come.
3. The approximate percentage of zinc and lead in the ore produced will depend upon how low a grade of ore can be mined, and this depends upon metal prices. The ore-body

thus far developed may be safely assumed to average 3.8% lead and 8% zinc; but as the property contains much ore, though not as rich as this, yet is capable of yielding a good profit, the average yield, when the property is worked on a large scale, will, undoubtedly, be around 1½% lead and 5% zinc.

4 The quality of the ore is excellent. It is a high grade ore and will command high grade prices as it is devoid of any deleterious elements, comparing favourably with the best ores of the Joplin region.

5 Concentration of the ore will, in my opinion, be easy because of its simple mineral composition and favourable mechanical analysis.

6 The method of concentration advised, is to follow accepted milling practice at the Missouri-Oklahoma field, but to supplement it by oil flotation to recover the lead slimes.

7 The actual costs for August 1918, at producing-properties in the Miami-Oklahoma field for a combined mining and milling were \$2.41 per ton. These costs can, I believe, be bettered at your property. The average costs for 1917 for 32 operating properties in the Miami-Oklahoma field were \$1.89, and conditions in Quebec will, I believe, enable you to do as well.

The above paragraphs cover all the Queries given in your letter of instructions. The appended report gives in detail, the results of my examination, and contains maps showing assay values of samples cut at the mine, a reconnaissance map of vein out-crops near the camp, and notes on the geology and ore occurrence.

Yours very truly,

(Signed) Walter Harvey Weed.

SUMMARY OF REPORT ON THE
FEDERAL ZINC AND LEAD COMPANY, LTD.

LOCATION

In the centre of the Gaspé Peninsula, easternmost Quebec, 45 miles to tidewater; elevation 2,000 ft., - no heavy grades, good wagon road metal, and very little rock work for railroad or automobile road; no swamp.

SURROUNDINGS:

In virgin forest of practically unexplored country, with mineral 'float' at many places.

GEOLOGY:

Fissure veins in Devonian slates cut by intrusives-quartz porphyry and later basic rocks. Veins are large, well-mineralized. Ore is simple, - no iron or deleterious elements, merely sphalerite and galena in a gangue of quartz and spar, crushing readily and freeing the blende in large pieces. Geologic conditions and facts already known, show that the region is a probable centre of future mining activity and development.

DEVELOPMENT:

By 1400 ft. of drift and crosscut work with tunnel entrance and a connection with shaft at depth of 92 ft. vertically, or 100 feet on the vein. A 15 foot sump shows ore. This development is merely indicative of what future work may show. The probably greatest value of the mine is its undeveloped portion.

ORE:

Length of ore-body - Federal vein	600 feet
width of " " " "	11.5 "
Length of " " Porphyry "	200 "
Average face as sampled	8 "
Average assay - zinc	7.9%
Average " - lead	3.8%
Average recovery - probable80%
Tonnage developed above tunnel	90,000 tons
Gross value of ore developed	\$860,000.00
Net " " " "	\$479,500.00

REPORT ON THE PROPERTY OF THE
FEDERAL ZINC AND LEAD COMPANY,
LTD., GASPE COUNTY, QUEBEC,
CANADA.

LOCATION:

The mining lands of the Federal Zinc & Lead Co., Ltd., lie in the central part of the Gaspe Peninsula, the easternmost part of Quebec, Canada. They are near the summit of the Shick-shock range, about midway between the Gulf of the St. Lawrence and Chaleur Bay. To the north, Matane on the St. Lawrence is the nearest railway point. Access to the mine is at present only feasible by wagon trail from Cascapedia, a railway point on the Quebec Oriental, a local railway, some 60 miles east of Matapedia on the Intercolonial system of the Canadian Government Railways.

CLIMATE AND VEGETATION:

The climate is rigorous but healthy, the summers being short and the winters long. The country is snowbound from about November to April or later, and travel is easiest during this period. Experience shows that vegetables can be raised at the mine and the region would, if cleared of its virgin forest, make good agricultural land, comparable with that of Nova Scotia. The rainfall is heavy but not troublesome. The prevailing timber is spruce and white birch which forms a thick forest, the fallen trees and rocks alike being thickly carpeted, with a heavy growth of ferns and moss.

Road building will not be unduly costly as it involves practically no rock work, being a water gradient averaging less than 50 feet per mile to the base of the 400 foot hill at the mine.

TOPOGRAPHY:

The Company's tract lies ten miles from the Grand Cascapedia river. The region is one of smooth slopes, rolling hills, part of a broad tableland cut by streams whose channels are 400 to 500 feet below the summits. The tract covered by your mining claims is hilly, but nowhere precipitous and the slopes are only steep near the streams.

GEOLOGY:

The Federal Zinc & Lead Co., Ltd., tract shows thinly bedded, gray to green shaly rocks, often arenaceous but with no large amount of sandstone. These rocks contain thin beds of dark gray limestone showing crinoid stems and shell remains which appear to me to be Carboniferous, though the rocks have been officially classed as of Devonian age. The beds dip southward at dips varying from 30 to 50 degrees, as shown in the underground workings.

The sedimentary beds are cut by large and small intrusive bodies of igneous rock. To the south of the Federal mine there is an extensive area of basaltic rock, in part vesicular and amygdaloidal and resembling the trap rocks of the Michigan copper range.

At the mine where the forest has been cut down and burnt and the rocks exposed, there is a low hillock of granitic porphyry showing distinct quartz phenocrysts. In the mine a flat, dike-like intrusion of light colored rock, bears a close resemblance to the eye, to the syenite found by Prof. Mailhot in the bed of Berry Mountain Brook just east of the mine.

ORE OCCURRENCE:

The ore occurs in well-defined fissure veins whose outcrops on the cleared tract are distinct and traceable across the claims. The veins are not well enough

exposed however to warrant any conclusions as to relative age. They appear to go into and through the granitic rock mentioned and underground lie upon the "syenite porphyry" exposed in the mine workings. While no definite statement as to the genetic relation of ore and rock is perhaps warranted, an experience of many years in the mining fields of North America, makes me feel positive that the observed geological relations are extremely favorable.

The veins contain zinc-lead ore. The zinc occurs as a honey-yellow blende, the lead as galena. The gangue is quartz with considerable dolomite or spar. The sphalerite (blende) is usually in large or small masses of clean mineral varying from 1/8 inch to several inches across, though smaller particles also occur. The galena is often in fair sized masses, but very generally occurs in quite tiny particles mixed with the quartz and sometimes shot into the edges of the zinc blende particles. Close observation shows that these minerals are all of about the same age. The vein fissure healed with bands of comby amethystine quartz; vugs in this are lined with dolomite crystals showing occasional galena and blende crystals on, or intergrown with them.

The vein structure is peculiar in that the fissures cross the bedded rocks at almost right angles and show in places a solid, central vein of quartz flanked by a greater width of breccia composed of sharply angular, splintery slate fragments cemented by white matrix identical with the vein filling. In places the vein splits into stringers and shows marginal offshooting veinlets.

The conditions just noted, together with others, which need not be described here, show movement indicating deep fracturing and persistence of ore values downward. I see no valid reason why these deposits should not be as rich

1,000 ft. below as at the surface, though experience indicates that the blende will be darker. There is practically no pyrite or marcasite in the ore, - it does occur, however, but in scanty amounts. All the observed conditions are favourable. The ore is high grade and closely resembles the best Joplin ore in its nature, showing the same breccia structure and same ore minerals. Its occurrence is, however, different, the Quebec ore being in veins of unknown, but probably great vertical extent.

The ore seen in the inderground workings is typical of that seen in the other veins nearby. The main, or Federal vein, cuts through slates; the wall rock is shattered and shows many white quartz-spar veinlets which run at 90 degrees to the bedding. These seams, and a very few that lie on the bedding planes of the shales, reticulate the rock so that, where slight movement has taken place, it is a breccia composed of dark gray, or blackish splinters and triangular fragments of slate cement by white spar containing yellow blende and some galena.

Fracturing determined the location of the ore and there is little evidence of movement on the bedding planes, fissuring being mostly at 90 degrees to it.

VEIN OUTCROPS:

At Blende, the mine camp, the cleared tract exposes the out-crops of six veins. The Federal, or main vein, on which the mine workings are driven, runs along the Eastern edge of the plateau where it breaks off into the slopes that descend to the course of Berry Mountain Brook. This vein runs north 20 to 25 degrees East, and though only exposed for about 600 feet along the outcrop, lines up

almost exactly with the ore exposed one-half mile to the south, at the forks of Berry Mountain Brook and not far from the Bois shaft, the northermost opening on the property. The Federal vein is seemingly the trunk vein of the group, - the other five veins appearing to branch off from it, on the westerly side at angles of 20 to 35 degrees west. The Federal vein, as it may be called, for purposes of description, dips westward at 70 degrees from the surface down to the tunnel level, 100 feet below and is nearly vertical, or steeply eastward below. - The No.3. or pump house vein dips at 60 to 63 degrees easterly. The No.4. or Porphyry vein dips at 50 to 55 degrees, easterly. The other veins are not sufficiently developed to show their dip.

The McKinley or southernmost vein is that shown in the big outcrop 20 to 30 feet high, that rises above the slopes at the McKinley tunnel, which is a compound vein with a horse of waste between, the entire width being 60 feet with breccia on the north. This is a big and very promising vein, showing patches of high grade sulphide ore in the outcrop. The vein runs about North 15 degrees west, but has not been traced across the southern slope or end of the plateau.

11. The next known vein (No.2.) runs by the cook-house. Its course is north 30 degrees west. It shows a strong outcrop on the slope near the end of the mine dump, and alongside of the mess-house, which is traceable westward, until lost in the quartz porphyry hillock. The vein has two bands of quartz, with two feet of waste between, the total width being 8 feet in the outcrop near the mine dump, and it shows sulphide ore in place.

1.11 The third, or Pump House vein outcrops near the building and is nearly continuously exposed to the vicinity of the warehouse and westward to the bare, rock exposure of quartz-diorite forming the low knell north of the stables. This vein is strong, shows much white quartz, and contains ore wherever opened. It appears to contract into stringers in the granitic rock. Its outcrop passes directly above the south drift and the brecciated area of this part of the mine is probably due to the coming together of this and the main vein. Underground, the vein is shown in the No.1. West crosscut, north of the main tunnel where it shows in the wall and is exposed by a drift 27 feet long. Its dip is 60 degrees East and there is about four feet of quartz in a vein seven feet wide.

IV The porphyry vein outcrops just outside of the power house and in a pit south of it, and is traceable by occasional outcrops and trenches westerly almost to the roadside shaft, sunk near the south line of the Gilker claim "G". Though the vein appears to dip steeply at the surface, there seems little doubt that it is the vein seen underground lying over a porphyry intrusion and shown in the northern drift of the mine. In fact, the vein corresponds to the fault that cuts off the main vein. From the evidence at hand, one cannot positively determine the displacement, but the porphyry vein appears to throw the Federal vein to the right. This would bring the Federal vein east of the present workings and into tract " E " of the Claim Map.

The outcrop of another vein appears to be a split of the Porphyry vein. It is seen in the trench in the vegetable garden and in the oat-field near the powder

magazine. This vein needs further development to show its thickness, course and character.

East of the Federal shaft, a trench on the slope about 75 feet vertically below the tunnel portal shows another vein six feet or more thick containing good zinc-lead ore.

Still another vein was seen in the timber east of the cleared space, and about 1,000 feet from the common corner of the Bois-Caine claims nearest the powder magazine. This vein also contains good ore,

Another outcrop seen opposite the road, up the branch creek from Berry Mountain Brook to the camp has not been prospected, but shows high grade ore at the surface. The rocks dip south 60 degrees West at 10 to 15 degrees, and the vein runs South 60 degrees East.

DEVELOPMENT:

The underground development of the property is confined to a tract of a few acres at Biende, the Company's camp. The work comprises a vertical shaft, 142 feet deep, connecting 92 feet below the surface with a level whose workings aggregate 1424 feet and reach daylight at the south end. In addition to this work at the Federal mine, some prospecting work is seen at the McKinley tunnel, at the roadside shaft (near the powder magazine), at the Bois Shaft, and the exposures seen in half a dozen pits and trenches besides, all show payable ore, similar in character to that developed in the underground workings and of workable width.

The property map accompanying this report shows the location of the Bois shaft, Federal shaft, McKinley tunnel

and of two cuts that expose ore in place, but the latter being now filled by a cloudburst, were not seen by the writer. The map also shows the Bois shaft east of Berry Mountain Brook.

The second Map submitted herewith shows the vein outcrops traceable across the cleared tract adjacent to the camp.

Trenching and pits on the Bois property expose similar ore near the company line and because the veins pass into company ground, practically prove that ground to be mineral bearing. Only prospecting and development work will prove up the extent and value of the veins on the outlying claims from which the rich ore has come, that is now found on the slopes and in the stream channels. The heavy covering of moss and thick growth of timber with rotting logs and fallen trees, made a mere inspection of such ground valueless, save to show its possibilities.

UNDERGROUND WORK:

The underground development is practically confined to one level which is 100 feet on the dip of the vein below the outcrop. This level is about 900 feet long from north to south, and with its crosscuts and a lateral that runs out to the surface near the pump-house, aggregates 1424 feet of development. The original shaft was an incline following down the ore on a dip of about 78 degrees from the surface to the 100 foot level. This incline has since been straightened and made into a vertical shaft and deepened 50 feet below the level. The walls below the level, show a vein of good ore that is outside of, and independent of, the Federal vein.

The mine level is driven along the Federal vein, but both north and south of the shaft, it encountered cross veins and seams faulting the ore. To the south the vein is thrown Westward, and is developed by the south drift. To

the north the Porphyry vein and its accompanying intrusion, cut off the Federal vein and the level turning westerly follows the porphyry vein for 200 feet or more, and in fact, almost to its present face. The Federal vein is thought to lie to the East of the workings.

A north crosscut (North No.1.West) exposes the No.3. vein, whose outcrop goes past the pumphouse just above the tunnel portal. This vein is smaller than the Federal vein but contains good grade ore where exposed in the crosscut. It is very definitely recognizable, however, in the main drift southward, though existing exposures do not permit a definite statement as to whether it joins or intersects and crosses the Federal vein. The brecciation observed where projection shows it should cross, convinces me that it is a fault fracture, but the mineralization is of practically the same age as the bigger vein.

DETAILED DESCRIPTION OF MINE WORKINGS:

From the portal of the Federal tunnel northward, for 50 feet or so, the rocks exposed are shales or slates, in beds 2 to 6 inches thick. The beds dip at 40 degrees southward, but are shattered and show quartz veinlets at right angles to the bedding planes.

At 75 feet from the portal, brecciation becomes prominent, and the white cementing material, which is the usual mixture of quartz and spar, contains zinc which for 12 feet or so, appears worthy of consideration. Barren slates, with a dip of about 60 degrees south intervene between this breccia vein and the deposit at the forks of the workings, whose southerly limit is about 20 feet from the junction. This breccia mass is a tangle of white stringers in black slate with occasional bunches of high

grade zinc ore. On the western side of the drift, the breccia is composed of cubes, one to two inches in diameter, and for 20 feet may be considered as possible mill feed. This ore breccia extends westerly, the crosscut to the south drift exposing a total thickness of 30 feet, including the main vein, 6 feet thick, on the western or footwall side.

The south drift has disclosed the main ore band, or vein proper, for a distance of 170 feet, being driven along a post-mineral fault fracture that forms the west wall of the drift. This fault has 1/2 to 6 inches of crushed black slate, and 1/4 inch to 1/2 inch of gray clay salvage. The vein is exposed for a width of 6 feet to 8 feet and consists of solid quartz and spar containing pale yellow blende, and a little galena, but grading in some places into a breccia of crushed slate fragments with a quartz spar matrix. This drift runs almost exactly at right angles to the strike of the bedded slates, whose dip is 36 degrees south. The sharp wall and good vein exposed in the south drift, passes into the wall at the north end and re-appears in the main drift near the shaft. A crosscut driven west for 50 feet along the bedding of the rocks discloses a patch of ore at the face, but no other definite vein.

The main tunnel north of the forks is driven along the footwall breccia zone of the vein and this breccia contains zinc and lead values.

From the forks just noted, northward to the shaft, the walls of the tunnel give an excellent idea of the character of the vein, showing occasional slipping, but only rare mineralization on the bedding planes, while there is abundant fracturing and mineralization of the fissures at 90 degrees to the bedding. These cross

fissures which show cracking but not brecciation of the mass, can be seen running into the main quartz vein, and are clearly offshoots from that main channel of mineralization. A notable feature is a big slate inclusion at 50 feet from the forks, a mass 6 feet by 8 feet across of solid slate encased in breccia. A bedding fault or slip is seen at 40 feet from the forks.

At 65 feet north of the turnsheet, or forking of the drifts, Survey station 16, the cross vein or Pump House vein is exposed. It is a 6 foot vein which in the roof shows a steep dip and has well-developed stringers and bunches along its borders. Beyond this point the tunnel shows only slate with splotches and bunches of ore and no distinct vein structure, until the main vein and fault wall come into the drift 55 feet south of the inclined shaft.

Though the actual intersection of veins is not exposed, the evidence indicates that the cross vein faults the Federal vein, throwing it to the right about 16 feet, and the brecciation observed, is due to the movement and crushing incident to this crossing of fissure in the V shaped area near the intersection. This accounts for the lack of vein structure and of ore seen in the tunnel between Survey stations 13 and 14.

In general, the drift northward to the shaft, and for several hundred feet beyond, it follows the main quartz streak of the vein. The eastern wall of the drift shows bedded slates and occasional cross veinlets at 90 degrees to the bedding.

Most of the quartz observed is a sheet or plate of quartz on the wall of the main streak of the vein, but

there are also expansions of vein into and alongside of it along cross cracks at 90 degrees to the vein and to some extent along the bedding. Slates are all cracked and netted to the vertical shaft.

Beyond the shaft the Federal vein is cut off sharply by a fault fracture that accompanies the Porphyry (No.4) vein. The east wall of the drift beyond this fracture shows ore and breccia, but the main vein is probably thrown east about 25 feet and is not exposed.

PORPHYRY VEIN:

The northern part of the mine level is driven on a vein that has a flat dip and lies above an intrusive sheet of porphyry that varies from a few inches to several feet in thickness. The quartz is from 1-1/2 to 3 feet thick, but is in places, accompanied by breccia ore which at the east crosscut is 30 feet thick and for ten feet of this thickness carries payable values in zinc. The accompanying porphyry is whitened and leached by vein-forming solutions, and the feldspars are altered to a pale greenish mass. The lack of quartz and the size of the feldspars indicate that it is part of the syenite mass exposed in the channels and slopes adjacent to Berry Mountain Brook just east of the mine.

The upper surface of the porphyry is scored and striated by a fault plane, or fissure. Above it, there is from one to three feet of black slate separating the porphyry from the quartz vein proper. The fault fissure dips easterly at 50 to 53 degrees, and where it crosses the drift, it shows an open fissure or water course and cuts off the Federal vein very sharply.

The drift follows this porphyry vein for 200 feet, or until it is in turn cut off by a fault, but it is picked

up again further north in the turn or elbow of the level at the Bois boundary line. The crosscuts driven from the drift west prove that the vein is not a stringer. The southernmost crosscut exposes dense and dark crinoidal limestone beneath the vein. The second crosscut (North No.2. west) proves that the fault has not thrown the Federal vein to the west. Strangely enough, this crosscut does not disclose the cross fault that in the main drift cuts off and displaces the Porphyry vein 7 feet or so to the west. The east crosscut, nearly opposite North No.2. West, exposes 25 feet of breccia, which carries low zinc values, as shown in samples Nos. 17, 18 and 20.

Briefly summarized, the mine workings disclose three distinct veins, the largest one called the Federal, showing an average thickness of 8 feet of ore, carrying about 4% lead and 8% zinc. The other two veins fault and displace the Federal, but are themselves ore-bearing. The northerly extension of the Federal vein beyond its cut-off by the Porphyry vein is not known, but should be sought. The fault-fissure is probably post-mineral, and of later age than the veins. It is comparable in this respect with the strong post-mineral fracture, which forms the West wall of the Federal vein, showing as a clay seam or selvage, along the wall of the south drift, and in the main level near the shaft.

As noted in mentioning the vein outcrops of the tract, this porphyry vein has a good outcrop, traceable over the surface, and where it is exposed in the Roadside shaft, it carries good ore. Samples Nos. 19, 21 and 22 show the zinc content of the ore, averaging 4.7% zinc and 0.8% lead.

The ore breccia samples-Nos. 17, 18 and 19,-is probably too low grade to mill, Nos. 17 and ^{19 /} averaging 3.6% zinc and

no lead, while sample No. 18 from the central portion of the mass is barren.

BOIS SHAFT: - This, the northernmost working on the property is at the north end of the wagon road, about 1/2 mile north of the Company's camp. The shaft is shallow, not over 10 ft. deep, but with the adjacent trenches exposes a strong vein of somewhat oxidized and brownish stained quartz showing galena and blende. This vein runs north 25 degrees East and has a dip of 59 degrees East. The intervening space is too great to positively identify it with the veins seen at the camp, but the vein is certainly worthy of development as six feet of ore is seen in the shaft, though the East wall is not exposed. The adjacent trenches are said to show the ore to be 12 feet across and the vein 18 feet thick. The zinc ore at this shaft is darker than at the Federal mine and carries much lead. The Bois shaft has a hoist and boiler plant on the ground not yet installed.

ORE VALUES: - In order to determine the zinc and lead content of the ore as mined, grooves were cut across the veins. The 21 samples, therefore, show exactly the quality of ore that will be mined and milled. Most of the samples were cut across the quartz vein proper, but a number were taken to determine the zinc and lead content of the breccia. The samples show that the lead content of the vein varies from nothing up to 14% and the zinc from 3.2% up to 15.3%. Lower values were, of course, found in the breccia, as it is composed mainly of slate particles, but inasmuch as some of the breccia samples carry over 3% zinc, this material also will, sooner or later, be mined and milled.

A composite sample representing equal parts of material from 12 cuts across the Federal vein from the extreme south end to the northernmost point exposed, shows 3.8% lead and 7.9% zinc with 9.46% lime and 43.85% silica. This composite sample is considered as representative, since it checked up closely with the calculated average of the individual assays, and it may be accepted as an average for the entire vein so far as exposed underground.

LIST OF SAMPLES

<u>Sample No.</u>	<u>Location</u>	<u>Thickness</u>	<u>Lead</u>	<u>Zinc</u>
1	Between tunnel and S. drift.....	12	-	-
2	Quartz-spar vein next to wall opposite S.drift.....	8.4	2.8	8.2
3	Breccia east of No. 2.....	9.5	0.0	1.0
4	Across vein; N. end S. drift....	6.3	3.1	11.1
5	South face, end S. drift.....	6.5	14.1	5.8
6	Vein at 61' S. of incline shaft, F-W	6.0	6.6	4.4
7	" " " " " " " " H-W	5.4	3.4	3.9
8	Point 20' N of No.7; 41' from shaft H. W.	6.0	0.9	3.6
9	" " " " East of F. W. side	6.0	0.9	6.8
10	At first crosscut W. N. of shaft..	8.2	1.5	3.2
11	30' N. of No. 10.....	6.0	2.5	15.3
12	22' N. of No. 11.....	6.0	3.0	8.3
13	30' N. of No. 12.....	4.8	2.2	8.4
14	16.2' S. of Survey point No. 8-20' N. of 13	3.5	9.5	15.3
15	12' N. of " " " 8..	6.0	9.2	8.3
16	48' " Peg No. 8.....	6.0	1.2	5.7
17	Crosscut to East Breccia at end of E. crosscut.....	10.00	0.0	3.9
18	Breccia east (west) of 17.....	10.00	0.0	trace
19	Across vein over porphyry, West cross for 10' from drift.	7.5	0.0	3.3
20	Breccia corner of E. crosscut N. side, next to drift and to No. 18	4.3	0.0	1.1
21	35' from E. Crosscut (17-18-20)..	4.0	0.2	2.7
22	12.6' beyond No. 21 opposite fault	10.0	2.3	8.2

VALUE OF THE PROPERTY:

Since the value of the property depends upon its profit producing possibilities, there are four factors involved; viz:- quantity of ore, quality of ore, cost of producing merchantable concentrate and price receivable. From the statements already made, I have shown that the property has a considerable body of commercial ore already opened up but this is only a very small percentage of what may be expected from deeper and more extensive mine development; moreover, the property has possibilities of a large tonnage from other veins and from other claims as yet unprospected.

The quality of the ore at every point exposed is excellent and it has no troublesome components. This leaves cost and price to be considered.

COSTS:

Any estimate of mining and milling costs for the Federal mine must, of necessity, be based on experience elsewhere. In making a comparison with other districts as a basis for such an estimate, one naturally selects the newly opened Miami-Oklahoma field as showing what costs obtain in a high grade district where labor is relatively scarce, supplies high and "boom conditions exist.

The average 1917 costs of eleven Oklahoma properties for mining and milling was \$1.89, the highest being \$2.55 and the lowest \$1.40. At the Woodchuck Mine in this district, the cost for 6 months in 1918 was \$2.25 per ton for mining and milling, the recovery being 11% of the amount of ore treated and producing concentrate at a cost of \$24.83 per ton that sold for \$52.00 per ton. This cost is not representative, however, as the costs at other mines in the Miami field vary from \$30.00 to \$40.00 per ton of concentrates. A comparison may also be made with the Interstate-Callahan mine in Idaho, whose ore occurs in fissure veins. In this property, whose output for 1917 was 466 tons of 20% ore milled daily, the combined mining and milling costs for 1917 were \$5.90 per ton of ore, and the average cost of the concentrates was but \$14.11 per ton, which was sold for \$37.65 per ton, according to the Company's published report. The 1918 price averages about the same as in 1917, viz., 9 cts. a pound for spelter.

The following estimate of costs is presented as approximate only:-

Costs of mining, milling and exploration per crude ton.....	\$2.40
Amortization of equipment and mill.....	.68
Depreciation.....	.09
Freight to smelter.....	1.00
General expense.....	<u>.05</u>
	\$4.22

These costs should be very materially lowered, when after the war, labor and supplies are cheaper. The value of 60% concentrate at the Oklahoma mines, when spelter is 9¢ is \$58.50 per ton. With 8¢ spelter the price is \$52.50, and with 7¢ spelter \$50.00.

Present high costs more than absorb the increase of existing prices above the normal of pre-war times. If we assume 5¢ zinc, the average 25 year price before 1914, we can safely assume a reduced labor and supply cost,- in other words, a resultant profit almost as great as now.

Note: 11% in Miami means, 11 buckets of concentrates (usually 60%) from each 100 buckets milled.

The average cost of producing zinc before the war was 4¢ in the Mississippian fields, and average selling price 5¢, as deduced from the average sale price of concentrate sold on 60% basis. The lead content should yield about 1/3rd as much profit as that derived from the zinc. The ore now developed will keep a 200-ton mill busy for about 400 days, but as mill construction will take at least 8 months, double this tonnage can be developed during that period by deepening the shaft 200 ft. and opening new levels. I confidently expect a large tonnage for both the McKinley Vein and the Bois Shaft, and see no reason why these 2 veins should not develop as large an orebody as Federal.

Costs in Quebec will, I believe, approximate those of the Mississippi Valley, but an uncertainty comes from the transportation problems. Given a good road to the Camp, using tractors and trailers, the concentrate can be hauled out for about ten dollars (\$10.) per ton of concentrate, equivalent to

0.70 per ton. This estimate being based upon far Western experience may be too high. If it be correct then the total cost of mining and milling will approximate \$4.22 per ton, or about \$5.00 per ton profit. It is apparent that if an expenditure of say \$200,000 can put a large enough tonnage in sight to warrant a railroad, that the road would soon pay back its cost regardless of the profit from the timber resources.

PRICES:

The average price of zinc for 25 years before the World War was 5¢ a lb. and of lead 4 1/8¢ a pound. In my opinion prices will never be so low again save possibly for a very brief period. It is I think safe to figure on 7¢ for zinc and 6¢ for lead as a minimum. Should such prices prevail for any protracted period, one may confidentially also expect lower prices for labor and supplies than those of to-day and a corresponding good margin of profit. Zinc mining is generally considered to be a better business in Canada than in the United States because of Government aid and encouragement.

I do not present detailed estimates of mill construction, mine development or road construction, since such estimates can be supplied by your able, technical associate. I understand it is my task to give you my opinion concerning the points outlined in your letter but I have also included in this report much detail that I hope may prove useful in future development work.

I can heartily recommend the energetic, further development of the property, both by deeper levels in the mine and by extensive prospect work on the ore deposit exposed nearby. I do not believe it wise to install a large mill at the present time, believing that a 200-ton mill, will answer every purpose of an experimental plant, solving the many problems of ore

treatment that always come up in handling the ores of a new district and at the same time making a handsome profit.

Respectfully submitted,
(signed) Walter Harvey Weed.

New York City,
September 20th. 1918