

(1) AFTER WRITING REMOVE GREEN SHEET AND FORWARD THE BALANCE OF THE SET (INTACT)
(2) WHEN REPLYING AFTER WRITING YOUR REPLY KEEP THE PINK SHEET FOR YOUR FILE, FORWARD WHITE SHEET

92I/2w

92I/SE 35

TO
WC Robinson

FROM
S. P. Mac Connery
010438

SUBJECT CRAIGMONT - Current Operating Status DATE June 12, 1981

- For Your Information
- Please O.K. and Return
- Please Discuss With Me
- Per Your Request
- For Your Signature
- Please Process
- Return With More Details
- Investigate and Report
- Please Answer
- For Your File

Craigmont have depleted all surface stockpiles of low grade copper ore and, at this time, are operating the concentrator 50% of the time on underground copper ore, 50% of the time on surface stockpiles of coarse iron product.

They expect to operate in this way for another 20-24 months.

The iron (magnetite) concentrate, which is used in coal beneficiation as heavy media material, will be stockpiled at The Craigmont mine site to be shipped as required to the various coal mine customers.

02257

WHP

DATE OF REPLY
WRITE YOUR REPLY AND RETURN THIS SHEET.

SIGNATURE

EVEREEN PAPER LIMITED - CARBON READY PETS

MEMOGRAM



Province of
British Columbia

Ministry of
Energy, Mines and
Petroleum Resources

MEMORANDUM

To: W.C. Robinson, Chief Inspector
Inspection Division
Mineral Resources Branch

Date: April 16, 1981

Our File: M1-3-1-1

Re: Termination - Craigmont Iron Ore Royalty Agreement

I am enclosing herewith for your information and comment, a copy of Craigmont's letter of April 8, 1981, together with enclosures. Your attention is specifically directed to their comments relative to paragraph 1(c) of the agreement and the data submitted which purports to fulfill that requirement.

If additional data is required, would you correspond directly with Mr. Bill Diment and provide a copy of the correspondence to complete my records.

MINISTRY OF ENERGY, MINES AND PETROLEUM RESOURCES	
APR 27 1981	
Rec'd	
<i>WR</i>	

W.W. Ross, Director
Mineral Revenue Division

WWR/js
Encl.

cc: Mr. A. Sutherland Brown
Chief Geologist

CRAIGMONT MINES LIMITED

April 8, 1981

File: 02-03-051D

Province of British Columbia
Ministry of Energy, Mines and
Petroleum Resources
Parliament Buildings
Victoria, British Columbia
V8V 1X4

Attention: W.W. Ross

Dear Sirs:

Re: Termination Agreement for Royalty Payments on Iron Ore.

Pursuant to paragraphs (1) (b) and (1) (c) of the above Agreement, we enclose the required returns and hope that you find same satisfactory.

Bill Diment, Mine Manager for Craigmont Mines, has furnished us with the basis of calculation for these returns as follows:

- (1) Paragraph (1) (b) - Iron Statistics for 1 January - 30 December 1980.

Yearly totals (produced and shipped) in short dry tons were obtained from operating and shipping statistics for fine iron concentrate and for coarse iron. % contained iron for the fine and coarse iron is variable but falls in the range of 65 - 68% for fine iron and 45 - 50% for coarse iron. (Based on a 1975 chemical analysis.)

- (2) Paragraph (1) (c) - Iron Inventory at December 31, 1980.

- a) Unmined ore underground in place was obtained from the Geological Ore Reserve Calculation as of 30 October 1980 less the in place material mined from 1 November 1980 - December 1980.
- b) Surface stockpiles of broken ore was again based on the Geological Ore Reserve Calculation as of 30 October 1980 less the changes in the transfer system and 2400 waste dump from 1 November - 31 December 1980.
- c) The coarse iron stockpile calculation is obtained from an October 1980 survey. No coarse iron was produced from the time of the survey to the 31st of December 1980.
- d) The fine iron stockpile inventory is based on a March 25, 1981 survey and then back calculated to 31 December 1980 by allowing for the difference in fine iron produced and shipped between 1 January 1981 and 25 March 1981.

cont'd . . .

- (3) Iron grades for the fine and coarse iron are obtained as in 1 above. In place and broken iron grades are from the Ore Reserve Calculations.

Should you require any further information or supporting material regarding the enclosed statistics, please telephone Bill Diment at 378-2590 (Merritt). Any other queries should be directed to the attention of the undersigned.

Yours truly,

CRAIGMONT MINES LIMITED

Sheryl Thomson
Sheryl Thomson
Solicitor

ST/11
encls.

c.c.: W.Diment

CRAIGMONT MINES LIMITED

RE: ORDER IN COUNCIL NO. 2386 PARAGRAPH 1 (b)

1 January 1980 - 31 December 1980 Iron Statistics

	<u>PRODUCED</u>			<u>SHIPPED</u>		
	*SDT	**LDT	% Contained Iron	SDT	LDT	% Contained Iron
Fine Iron Concentrate	43478.9	38820.4	± 66%	45813.8	40905.2	± 66%
Coarse Iron	36281.4	32394.1	± 45%	2920.0	2607.1	± 45%

* SDT = Short Dry Tons

** LDT = Long Dry Tons

W.D. Diment

W.D. Diment
Mine Manager
Craigmont Mines Limited

CRAIGMONT MINES LIMITED

RE: ORDER IN COUNCIL NO. 2386 PARAGRAPH 1 (c)

Iron Ore Inventory at 31 December 1980

1. Unmined ore underground in place (geological proven reserves)	436000 S.D.T. @ 23.3% Fe
2. Surface stockpiles of broken ore (2400 waste dump, #2 stockpile)	135000 S.D.T. @ 11.0% Fe
3. Coarse iron stockpile	1043000 S.D.T. @ 45% Fe
4. Fine iron stockpile	21050 S.D.T. @ 66% Fe

S.D.T. = Short Dry Tons

W.D. Diment

W.D. Diment
Mine Manager
Craigmont Mines Limited

A.J. Petrina P. Eng.

A.J. Petrina, P.Eng.
Senior Vice-President and
Chief Operating Officer

November 25th 1964

Mr. R. G. Duthie,
Craigmont Mines Limited,
700 Burrard Building,
VANCOUVER 5, B. C.

Dear Mr. Duthie:

This will acknowledge your letter of November 16th
re Iron-Craigmont Backfill.

Some questions arise:

- (1) What period is covered by the data tabulated on page 2
of your letter?
- (2) During that period what tonnage was deslimed and what were
the iron and magnetite contents of the sands and the slimes?
- (3) What is the anticipated quantity of deslimed tailings
required for backfill underground, in the 12 months to end
September 30th 1965?
- (4) What is the current policy re further research?

I note that a copy of the report by Kaiser Engineering,
Montreal, will be forwarded when you have received it.

The data requested will permit me to pass on your
application for continued permission to use tailings as backfill.

Yours very truly,

MINISTER

CRAIGMONT MINES LIMITED

700 BURRARD BUILDING

VANCOUVER 5, B. C. CANADA

16 November 1964.

Department of Mines &
Natural Resources,
Province of British Columbia,
Victoria, B. C.

DEPT. OF MINES AND PETROLEUM RESOURCES		
Rec'd NOV 18 1964 HS		

3761

Attention: Honorable D. Brothers
Minister of Mines

Dear Sirs:

Re: Iron - Craigmont Backfill

Further to our correspondence and conditions imposed by the Honorable K. Kiernan on the use of mill tails for backfill at Craigmont, I submit the following report.

Metallurgical Testing:

Due to the drop of magnetite in the mill feed, metallurgical testing for the recovery of the iron oxides was confined mainly to the flotation process. Results to date do not indicate that the ore is amenable to this process, a conclusion that is borne out in the review of technical literature which indicates high pH ores create considerable difficulty, if not impossible conditions for flotation. A summary of the test work completed is attached.

Some test work was also carried out on gravity processes. The chief difficulty in this method is to make a mass separation economically of the slimes before proceeding to the more expensive tabling process. As can be seen from the years' results on desliming the mill tails, there is no concentration of the iron oxide minerals by cycloning the mill tailing. Fair results with regard to concentrate grade can be made by putting the deslimed tailing over tables, but the overall recovery of iron in mill feed is very low and does not indicate reasonable economic returns.

On 13 August, a meeting was held with a Mr. A. Wallach, technical representative of Kaiser Engineering, Montreal, to discuss the facilities of the company with regard to iron treatment testing. Kaiser Engineering have been engaged to study the economics of treatment and the value of pelletizing iron concentrates.

It was hoped that Kaiser's report would be completed by 15 October 1964 and this letter has been delayed hoping that the report could be included. During the recent CIM convention, I discussed Kaiser's progress with their Mr. L.J. Trew and decided our report could no longer be delayed, but a copy will be sent to your office on receipt.

Backfill:

As requested by your Department when the backfill system was placed in operation a record has been kept of the iron content of the products. In the table shown below all tons are 2,000 lbs, dry; total iron refers to all iron contained in the product, including iron contained in silicates, carbonate and sulphide minerals as well as iron oxides. Oxide iron refers to the iron contained in both magnetic and non-magnetic oxides and magnetic iron in the iron contained in the magnetic portion and consists mainly of the mineral magnetite.

<u>Product</u>	<u>Tons</u>	<u>% Fe.</u>	<u>Tons Total Iron</u>	<u>% Oxide Iron</u>	<u>Tons Oxide Iron</u>	<u>% Mag. Iron</u>	<u>Tons Mag. Iron</u>
Mill Tailing	1,992,419	20.78	413,999.6	16.62	331,199.7	5.30	105,656.4
Back Fill to U/G	28,414	20.55	5,838.4	16.44	4670.7	5.42	1541.3
Tailing to Pond	1,964,005	21.29	418,161.2	16.63	326,529.0	5.30	104,115.1

If further information is required regarding our backfill operation or testing is required by your Department Personnel, please advise this office.

With kindest regards,

Yours truly,

CRAIGMONT MINES LIMITED

Original Signed By
R. G. DUTHIE

R. G. Duthie

RGD:ga

cc: Mr. P.J. Mulcahy (3)
Deputy Minister of Mines
Wm. Peck (1)
Chief Inspector of Mines

H. Sargent, Chief, Mineralogical Branch ✓
R. E. Hallbauer
G. A. Gordon
J. D. Little
H. A. Steane

MEMORANDUM

TO Mr. P.J. Mulcahy,
 Deputy Minister

FROM THE

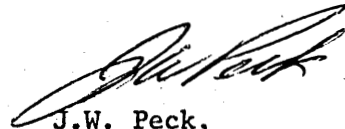
**DEPARTMENT OF MINES
 AND PETROLEUM RESOURCES**

VICTORIA, B.C., Oct. 14, 1964

WHEN REPLYING PLEASE REFER
 TO FILE No.....

Re: Cragmont Mill Tailings.

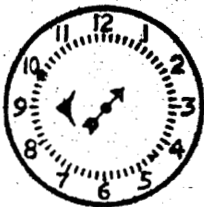
The Cragmont Mill tailings are being dumped underground and used as support for mined out stopes. They do contain a small percentage of iron and thus permission for the use of the iron is required from our Department. Permission was granted last year on a year to year basis. This year was up on October 1st, 1964, but no required feasibility study has been received. This is brought to your attention, as the feasibility study was a requirement of Mr. W.K. Kiernan, the former Minister.



J.W. Peck,
 Chief Inspector of Mines.

JWP/ln

OCT 15 '64 AM



**DEPT. OF MINES
 AND PETROLEUM RESOURCES**

REFERRED TO	DATE	INITIAL
D.M.	✓ 15/10	PM
C.C.		
D.C.G.C.		
D.C.C.		
G.C.		
ACCTS.		
C.M.B.	✓ 20/10	HS
C.I.	✓ 2/11/10	RW
C.A.		
R. T.		
C.P.E.		
FILING CLERK		MT

min'l Br. file 700.
 see letter to GA Gordon. Nov 1 '63
 By phone 20 Oct '64 Gordon
 said report called for was considered
 some time back, he will check whether
 sent, & if not refer to Mr Duffie.
 same date Mrs Rolfe says no letter recd. yet.
 HS

07811

Dec. 9th 1963

Mr. G. A. Gordon,
Vice President,
Craigmont Mines Ltd.,
700 Burrard Bldg.,
Vancouver 5, B.C.

Re: Use of Craigmont Tailings as Backfill

Dear Mr. Gordon:

Thank you for your letter of the 6th of December re the above.

I am sorry this matter was left up in the air for a period--we will blame the Provincial election for this delay.

Hoping you are making a good recovery and will soon be fit again.

Kindest regards.

Yours sincerely,

Minister

MSK

CRAIGMONT MINES LIMITED

~~(NON-PERSONAL LIABILITY)~~

700 BURRARD BUILDING

VANCOUVER 5, B. C. CANADA

6 December 1963

Our File: 6-11

The Honourable W. K. Kiernan,
Minister of Mines,
Department of Mines and Petroleum Resources,
Victoria, B. C.

Re: Use of Craigmont Tailing as Backfill

Dear Mr. Kiernan:

On 5 October 1963 I suffered a coronary heart attack and dictated, while in the hospital, two letters to you dated 9 October 1963, which were signed on my behalf by my secretary.

Your reply dated 1 November 1963 was distributed to the executive officers of Craigmont Mines Limited.

My doctor has permitted me to come to work during the afternoons for the next two weeks with the hope that at the end of this time I can resume full time.

I am advised by Mr. R. G. Duthie, Mine Manager, Craigmont Mines Limited, Merritt, B. C., that on receipt of your letter he immediately initiated complete sampling of the backfill products, feed to the plant, a portion going to fill and a portion going to the tailing pond.

I am also advised that your Dr. H. Sargent and our Mr. H. A. Steane, Chief of Research, reviewed the extensive research we have carried out on iron recovery.

Mr. Duthie further advised me that the data requested in your letter is being obtained and will be sent to you in September 1964, as you request.

The Honourable W. K. Kiernan,
6 December 1963,
Page 2.

Our research on material suitable for backfill is continuing but no new conclusions have been reached at the time of writing this letter.

Yours very truly,

CRAIGMONT MINES LIMITED



G.A. Gordon,
Vice President.

GAG:mlg

cc: Mr. P. Mulcahy
Mr. R. G. Duthie

CRAIGMONT MINES LIMITED

700 BURRARD BUILDING

VANCOUVER 5, B. C. CANADA

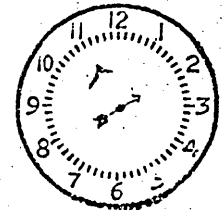
6 December 1963

Our File: 6-11

09703

DEC 9 '63 AM

The Honourable W. K. Kiernan,
Minister of Mines,
Department of Mines and Petroleum Resources,
Victoria, B. C.



DEPT. OF MINES
AND PETROLEUM RESOURCES

Re: Use of Cragmont Tailing as Backfill

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CRAIGMONT MINES LIMITED

700 BARRARD BUILDING

VANCOUVER 5, B. C. CANADA

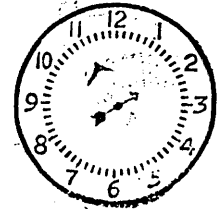
6 December 1963

Our File: 6-11

09703

DEC 9 '63 AM

The Honourable W. K. Kiernan,
Minister of Mines,
Department of Mines and Petroleum Resources,
Victoria, B. C.



Re: Use of Craigmont Tailing as Backfill

DEPT. OF MINES
AND PETROLEUM RESOURCES

Dear Mr. Kiernan:

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Mr. Duthie further advised me that the data requested in your letter is being obtained and will be sent to you in September 1964, as you request.

November 1, 1963.

Mr. G.A. Gordon,
Vice President,
Craigmont Mines Limited,
700 Burrard Building,
Vancouver 5, B.C.

Dear Mr. Gordon:

Re: Use of Craigmont Tailings as Backfill.

Thank you for your letters of 9 October. I am glad that you have reviewed the technical problems in determining the oxide iron content and have touched on the research you are doing, the problems related to the iron concentrates that might be produced, and the economic reasons for using as backfill the mill tailings including the oxide iron contained.

I am seriously concerned about the loss of the potential iron ore in backfill, however recognizing that economic solutions of the problems are necessary, I grant you, subject to reservations that follow, permission to continue use of the iron oxide containing tailings, as backfill until October first 1964.

The reservations relate to the continuing of research and the supplying to my technical officers of information on your research and on your practise in separating from the rest of the tailings the sands used for backfilling.

Before October first 1964, please give me a report on the progress of your research. At the same time you should advise as to whether you are in a position to separate iron concentrates from the ore or tailings. The report is also to include a statement of the quantity of sands used in backfill to that date, the total iron content per ton, and an estimate of the magnetite and hematite contained.

Mr. G.A. Gordon,

November 1, 1963.

I understand that your plant for producing sands for backfilling has been in operation for some time. Please let me have figures on the iron content of the tailings going to the plant, and of the iron content of the two products, ie. of the sands and the finer part. These analyses would preferably be those obtained daily over a period of say one month, or analyses of composite samples representing increments from the samples for each day, in a similar period.

My technical officers might wish to discuss the whole matter including the research with your technical officers.

HS:ln

Yours sincerely,

Minister.

Minister suggests
giving permission
to October 1, 1964
asking for further
report before that date

Jeff

MEMORANDUM

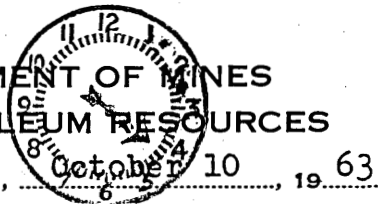
OCT 10 '63 PM

TO Mr. P.J. Mulcahy
 Deputy Minister
 Dept. of Mines & Petroleum Resources

FROM THE

DEPARTMENT OF MINES
 AND PETROLEUM RESOURCES

VICTORIA, B.C.,



DEPT. OF MINES
 AND PETROLEUM RESOURCES
 WHEN REPLYING PLEASE REFER
 TO FILE NO.

Re: Use of mill tailings at Craigmont
 as backfill.

08144

I have read the two letters, dated October 9th, from Mr. J.A. Gordon, and may say he has given a much clearer picture of what is involved. There is certainly considerable expense involved for going into iron production and at present costs this would not be feasible. However, it is unfortunate that we are presented with a "fait accompli" in that the backfill program is well underway with \$241,000 having been spent to the end of August 1963. I am sure this discourtesy would not have occurred if Mr. Gordon had not been ill for several months.

Another point which is difficult to reconcile is that the Company failed to go into the iron production stage when the price of iron was about \$2.00 higher per ton. A good contract could have been obtained two years ago which would be making money for the Company today. It is also my understanding that part of the iron regulations were specifically drawn up to encourage Craigmont to go into iron production. Once the iron tailings go underground they are lost forever.

I would recommend that permission be given to Craigmont for the use of mill tailings as underground support but only on a year to year basis. If the price of iron should rise, or the cost of transportation should be lowered (through pipeline movement, etc.) this permission would be suspended. I would suggest the Company be required to give a feasibility report at the end of each year of permission.

It is my understanding iron tailings are owned by the Crown and if this is so I am sure Craigmont Mines Limited would prefer to pay some nominal sum for purchase of same to avoid any further complications re ownership.

J.W. Peck
 Chief Inspector of Mines

INITIALS	JWPY	11b																		
DATE	12/10																			
TO																				
FROM																				
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C.C.																				
D.C.G.C.																				
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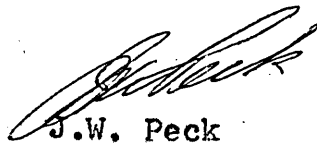
copy to Dr. Sargent
 12/10/63

The Honourable W.K. Kiernan,
Minister of Mines and Petroleum
Resources,
Buildings.

October 24 63

Re: Order-in-Council 2304

I have gone over the letters dated October 9th, from Mr. G.A. Gordon, in respect to the use of mill tailings at Craigmont and find that the use of the tailings as backfill would not be incompatible with condition 8(d) of the above Order-in-Council. This is because at present the economic conditions make the cost of getting the iron ore to market prohibitive. As discussed with you however, the situation should be reviewed annually as the economics of the situation are not static.



J.W. Peck
Chief Inspector of Mines

JWP/jlb
Copy for Mr. Mulcahy

*Note: Dr. Sargent will be preparing letter for
Minister's signature giving permission
for use of tailings until Oct 1, 1964
and requiring another feasibility
study submitted before that date.*



MEMORANDUM

TO The Honourable W.K. Kiernan,
Minister of Mines and Petroleum
Resources,
Buildings.

FROM THE

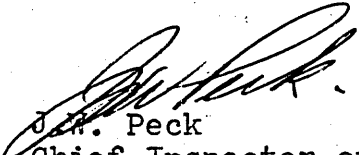
DEPARTMENT OF MINES
AND PETROLEUM RESOURCES

VICTORIA, B.C., October 24, 1963

WHEN REPLYING PLEASE REFER
TO FILE No.....

Re: Order-in-Council 2304

I have gone over the letters dated October 9th, from Mr. G.A. Gordon, in respect to the use of mill tailings at Craigmont and find that the use of the tailings as backfill would not be incompatible with condition 8(d) of the above Order-in-Council. This is because at present the economic conditions make the cost of getting the iron ore to market prohibitive. As discussed with you however, the situation should be reviewed annually as the economics of the situation are not static.


J.W. Peck
Chief Inspector of Mines

JWP/jlb

CRAIGMONT MINES LIMITED

~~XXXXXXXXXXXXXXXXXXXX~~

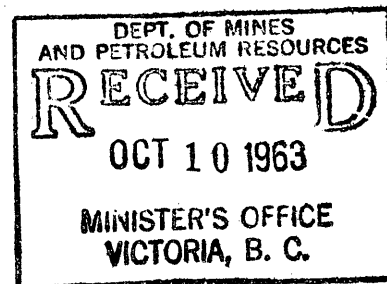
700 BARRARD BUILDING

VANCOUVER 5, B. C. CANADA

9 October 1963

Our File: 6-11

Mr. W. K. Kiernan,
Minister of Mines,
Department of Mines & Petroleum Resources,
Victoria, B. C.



Re: A Summary Concerning Iron at Craigmont

Dear Mr. Kiernan:

It is suggested that this letter be read in conjunction with a reply to you of the same date concerning use of tailing at Craigmont.

ASSAYING:

When Craigmont was in the early exploration phase, samples were sent to custom assayers, who reported both total copper and total iron.

Iron occurs in most of the rocks at the Craigmont mine, e.g., there is almost as much iron in the copper ore, chalcopyrite, as there is copper. Iron also occurs in various forms in the waste rocks, such as carbonates, say, Ankerite, and silicates. It also occurs as iron oxide in the form of hematite, which is approximately 70% iron, and magnetite, which is approximately 72% iron.

There is no assaying method which will quickly and cheaply determine the percentage of recoverable iron in the form of magnetite and hematite. The nearest estimate we can make is HCL Soluble Iron and in the tabulation appended to the attached letter you will note that it refers to HCL Soluble. However, Mr. H. A. Steane, our Chief of Research and General Mill Superintendent, informs me that 20% of the "HCL Soluble Iron" is NOT available for concentration as magnetite or hematite. It follows that the "HCL Soluble Iron" should be reduced by 1/5 or 20% to arrive at iron oxide which, if it could be concentrated in a 62% iron concentrate, might be a commercial product.

Mr. W. K. Kiernan,
9 October 1963,
Page 2.

RESEARCH:

Research into methods of iron oxide recovery and the pertinent economics has been practically continuous since Craigmont started operation. Special technical men have been employed for this work.

They have attempted to discover an economic method of recovering magnetite only in the hope that, although it would represent low recovery, it would still be saleable. Secondly, they have endeavoured, by other tests, such as flotation, Humphrey spirals, etc., to investigate higher recovery, embracing both magnetite and hematite. This work continues.

GRINDING:

Craigmont ore is ground to 65% minus 200 mesh, then copper concentrate is separated from the rest of the rock.

At this stage a rougher iron concentrate would be much finer than most iron ores and it would also be low in grade.

Regrinding would be necessary and this would be followed by cleaning stages. The product would be an extremely finely ground iron ore.

Steel mills do not normally purchase iron ore of this fineness because of difficulty in handling, in-transit dust losses and serious dust losses in the steel mill. When purchased the price of finely ground ore is considerably less than ordinary iron ore.

In the George Cross News Letter #152 of 7 August 1963, the following was published:

"Kawasaki Steel of Japan has recently contracted with Benson Lake, subsidiary of Cominco, as follows:

- (a) Quantity: 350,000 tons to be split into 80,000 tons each in the first three years starting 1964 and 60,000 tons in the fourth year.
- (b) Price: \$7.40 per dry metric ton (\$6.71 per short dry ton) f.o.b., on the following basis - Fe 62% basis, 60% min., Cu 0.10% basis, 0.15% max., size 100% -200 mesh, 80% -325 mesh.
- (c) Scale: Plus or minus 30¢ per unit iron, plus or minus 10¢ per 0.01% of Cu.

Mr. W. K. Kiernan,
9 October 1963,
Page 3.

- (d) Ex Port McNeill with loading rate of 3,400 tons, dispatch/demurrage being \$400/800.
- (e) Continued shipments after fourth year at \$6.40 per dry metric ton (\$5.80 per short dry ton)."

You will note that if a similar contract was signed with Craigmont, that Craigmont would be producing the iron ore at a loss, due to the nature of the product, its distance from tidewater and Vancouver port storage and loading costs.

BACKFILLING:

Several engineering studies were made of a suitable fill to be used underground at the Craigmont Mine.

- (a) The use of waste rock from the open pit was rejected because of the cost of handling and/or the cost of crushing and grinding to turn it into a fill that could be piped underground cheaply.
- (b) Overburden or gravels were rejected as a result of tests and cost estimates of the various types of material in the immediate vicinity.

Even if an ideal gravel source was located near the mine, preparation and distribution costs were estimated at \$0.79 per ton versus \$0.62 for mill tailing.

GENERAL:

I trust that these two letters and the explanations contained therein are adequate. I hope that permission will be granted to use approximately 1/3 of the Craigmont tailing as fill in the underground mine to make underground mining safer.

Yours very truly,

CRAIGMONT MINES LIMITED

G.A. Gordon
G.A. Gordon,
Vice President.

GAG:mlg
cc: Mr. P. Mulcahy
Mr. W. Peck

Mr. P. Mulcahy ✓

CRAIGMONT MINES LIMITED

700 BURRARD BUILDING

VANCOUVER 5, B. C. CANADA

9 October 1963

Our File: 6-11

Mr. W. K. Kiernan,
Minister of Mines,
Department of Mines & Petroleum Resources,
Victoria, B. C.

Re: A Summary Concerning Iron at Craigmont

Dear Mr. Kiernan:

It is suggested that this letter be read in conjunction with a reply to you of the same date concerning use of tailing at Craigmont.

ASSAYING:

When Craigmont was in the early exploration phase, samples were sent to custom assayers, who reported both total copper and total iron.

Iron occurs in most of the rocks at the Craigmont mine, e.g., there is almost as much iron in the copper ore, chalcopryrite, as there is copper. Iron also occurs in various forms in the waste rocks, such as carbonates, say, Ankerite, and silicates. It also occurs as iron oxide in the form of hematite, which is approximately 70% iron, and magnetite, which is approximately 72% iron.

There is no assaying method which will quickly and cheaply determine the percentage of recoverable iron in the form of magnetite and hematite. The nearest estimate we can make is HCL Soluble Iron and in the tabulation appended to the attached letter you will note that it refers to HCL Soluble. However, Mr. H. A. Steane, our Chief of Research and General Mill Superintendent, informs me that 20% of the "HCL Soluble Iron" is NOT available for concentration as magnetite or hematite. It follows that the "HCL Soluble Iron" should be reduced by 1/5 or 20% to arrive at iron oxide which, if it could be concentrated in a 62% iron concentrate, might be a commercial product.

Mr. W. K. Kiernan,
9 October 1963,
Page 2.

RESEARCH:

Research into methods of iron oxide recovery and the pertinent economics has been practically continuous since Craigmont started operation. Special technical men have been employed for this work.

They have attempted to discover an economic method of recovering magnetite only in the hope that, although it would represent low recovery, it would still be saleable. Secondly, they have endeavoured, by other tests, such as flotation, Humphrey spirals, etc., to investigate higher recovery, embracing both magnetite and hematite. This work continues.

GRINDING:

Craigmont ore is ground to 65% minus 200 mesh, then copper concentrate is separated from the rest of the rock.

At this stage a rougher iron concentrate would be much finer than most iron ores and it would also be low in grade.

Regrinding would be necessary and this would be followed by cleaning stages. The product would be an extremely finely ground iron ore.

Steel mills do not normally purchase iron ore of this fineness because of difficulty in handling, in-transit dust losses and serious dust losses in the steel mill. When purchased the price of finely ground ore is considerably less than ordinary iron ore.

In the George Cross News Letter #152 of 7 August 1963, the following was published:

"Kawasaki Steel of Japan has recently contracted with Benson Lake, subsidiary of Cominco, as follows:

- (a) Quantity: 350,000 tons to be split into 80,000 tons each in the first three years starting 1964 and 60,000 tons in the fourth year.
- (b) Price: \$7.40 per dry metric ton (\$6.71 per short dry ton) f.o.b., on the following basis - Fe 62% basis, 60% min., Cu 0.10% basis, 0.15% max., size 100% -200 mesh, 80% -325 mesh.
- (c) Scale: Plus or minus 30¢ per unit iron, plus or minus 10¢ per 0.01% of Cu.

Mr. W. K. Kiernan,
9 October 1963,
Page 3.

- (d) Ex Port McNeill with loading rate of 3,400 tons, dispatch/demurrage being \$400/800.
- (e) Continued shipments after fourth year at \$6.40 per dry metric ton (\$5.80 per short dry ton)."

You will note that if a similar contract was signed with Craigmont, that Craigmont would be producing the iron ore at a loss, due to the nature of the product, its distance from tidewater and Vancouver port storage and loading costs.

BACKFILLING:

Several engineering studies were made of a suitable fill to be used underground at the Craigmont Mine.

- (a) The use of waste rock from the open pit was rejected because of the cost of handling and/or the cost of crushing and grinding to turn it into a fill that could be piped underground cheaply.
- (b) Overburden or gravels were rejected as a result of tests and cost estimates of the various types of material in the immediate vicinity.

Even if an ideal gravel source was located near the mine, preparation and distribution costs were estimated at \$0.79 per ton versus \$0.62 for mill tailing.

GENERAL:

I trust that these two letters and the explanations contained therein are adequate. I hope that permission will be granted to use approximately 1/3 of the Craigmont tailing as fill in the underground mine to make underground mining safer.

Yours very truly,

CRAIGMONT MINES LIMITED

G.A. Gordon
G. A. Gordon,
Vice President.

GAG:mlg

cc: Mr. P. Mulcahy ✓

Mr. W. Peck

700 BURREARD BUILDING

Copy to Dr. Sargent 12/10/63

CRAIGMONT MINES LIMITED

~~XXXXXXXXXXXXXXXXXXXX~~

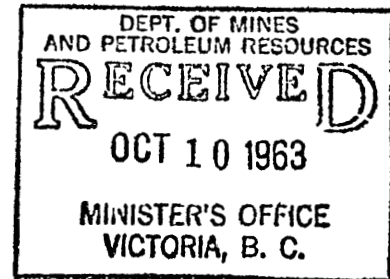
700 BARRARD BUILDING

VANCOUVER 5, B. C. CANADA

9 October 1963

Our File: 6-11

Mr. W. K. Kiernan,
Minister of Mines,
Department of Mines & Petroleum Resources,
Victoria, B. C.



Re: Use of Craigmont Tailing as Backfill

Dear Mr. Kiernan:

This letter is in reply to your letter of 21 August 1963 to our Mr. R. G. Duthie concerning Iron Ore Tax Order 2304, dated 6 October 1960, and, in particular, Section 8(d) of the Order.

I have drafted and redrafted this reply several times in an attempt to condense a mountain of engineering and research reports to a self-explanatory summary.

I have come to the conclusion that the best way of answering would be to answer the questions raised in your letter and then supplement this reply by a second letter outlining the highlights of this problem.

Your questions:

- (1) Backfilling at Craigmont has already commenced. An estimate of the total cost of the Backfill Plant was \$341,000, of which \$241,000 had been spent at the end of August 1963.
- (2) The cost of extracting magnetite from the tailing will vary, depending on the size of plant and percentage of magnetite. Appended please find tabulations for the months of March, April, May, June, July and August 1963. You will note that during these months operation of a magnetite recovery plant would have been hopeless.

Mr. W. K. Kiernan,
9 October 1963,
Page 2.

- (3) We have not been able to define a cost for extracting hematite because, due to the flakey nature of the hematite, we have been unable so far to make a satisfactory separation.

Your next question includes several items:

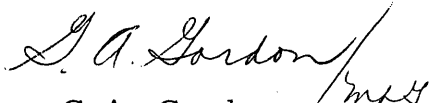
- (a) Capital cost of magnetite rougher separation followed by regrind followed by magnetic cleaning separation has been estimated at about \$500,000.
- (b) Provided mill tails consistently contain 6% magnetic iron and 95% of this magnetic iron was recovered, then the breakdown would be 57¢ per short dry ton of magnetic concentrates for magnetic separation, 60¢ per short dry ton for regrind and \$5.79 for transportation, which would include cartage at Craigmont, rail car covers, rail freight Coyle to Vancouver of \$3.25 per short wet ton, equivalent to \$3.54 per short dry ton. The rest of this is made up of switching charges, stockpiling, ship loading, cargo rates, ship surveying, sampling and assaying. Total cost on the above basis would be \$6.96 per short dry ton.

At this time the geological staff estimate that neither the total tonnage in the open pit nor the total tonnage underground, will exceed 20% iron.

Please read the above in conjunction with the appended general comments.

Yours very truly,

CRAIGMONT MINES LIMITED


G.A. Gordon,
Vice President.

GAG:mlg
App.

cc: Mr. P. Mulcahy
Mr. W. Peck

Day	MARCH			APRIL			MAY		
	HCL Soluble Fe	Est. Fe Oxide	Mag. Fe	HCL Soluble Fe	Est. Fe Oxide	Mag. Fe	HCL Soluble Fe	Est. Fe Oxide	Mag. Fe
1	12.65	10.12	-	13.85	11.08	-	16.35	13.08	0.70
2	13.6	10.88	1.95	14.05	11.24	-	16.6	13.28	.85
3	12.4	9.92	1.0	15.45	12.36	-	15.65	12.52	-
4	12.75	10.2	.70	13.3	10.64	-	16.65	13.32	.89
5	10.45	8.36	.69	14.4	11.52	-	13.95	11.16	1.1
6	10.1	8.08	.81	14.05	11.24	1.63	14.45	11.56	.64
7	10.95	8.76	.65	14.25	11.4	1.39	15.9	12.72	.59
8	11.9	9.52	-	14.15	11.32	.97	15.4	12.32	.71
9	11.9	9.52	1.1	15.00	12.00	1.17	13.2	10.56	.95
10	11.25	9.00	.35	13.15	10.52	2.45	11.7	9.36	-
11	11.05	8.84	.63	13.3	10.64	-	11.85	9.48	.86
12	13.00	10.4	1.04	14.5	11.6	-	12.9	10.32	.81
13	13.75	11.00	1.07	13.6	10.88	2.03	11.4	9.12	.94
14	11.8	9.44	.97	12.1	9.68	0.95	11.95	9.56	.85
15	14.65	11.72	-	12.55	10.04	0.75	12.45	9.96	1.05
16	14.00	11.2	.83	13.95	11.16	1.03	12.8	10.24	.86
17	13.05	10.44	.67	16.7	13.36	0.89	13.1	10.48	-
18	13.85	11.08	.56	18.1	14.48	1.41	12.6	10.08	.96
19	13.65	10.92	-	13.3	10.64	-	11.25	9.00	.8
20	14.1	11.28	-	9.7	7.76	.87	12.95	10.36	.42
21	12.65	10.12	-	11.05	8.84	.72	12.2	9.76	.49
22	10.95	8.76	-	15.75	12.6	.94	12.5	10.00	.73
23	10.2	8.16	-	17.15	13.72	.63	12.1	9.68	.85
24	10.5	8.4	-	18.4	14.72	1.19	13.57	10.86	-
25	12.9	10.32	-	16.6	13.28	.93	15.75	12.6	.97
26	15.3	12.24	-	13.75	11.00	-	18.55	14.84	.84
27	17.35	13.88	-	10.1	8.08	1.01	17.6	14.08	.63
28	-	-	-	10.0	8.00	1.02	17.9	14.32	.86
29	17.85	14.28	-	6.4	5.12	.57	15.00	12.00	1.05
30	16.4	13.12	-	8.6	6.88	.41	13.2	10.56	.96
31	14.8	11.84	-	-	-	-	12.25	9.8	-

Day	JUNE			JULY			AUGUST		
	HCL	Est.	Mag.	HCL	Est.	Mag.	HCL	Est.	Mag.
	Soluble Fe	Fe Oxide		Soluble Fe	Fe Oxide		Soluble Fe	Fe Oxide	
1	-	-	0.90	15.45	12.36	0.70	16.45	13.16	0.71
2	-	-	0.86	16.95	13.56	0.36	17.00	13.60	-
3	14.30	11.44	0.55	14.85	11.88	0.74	17.00	13.60	1.29
4	20.30	16.24	0.90	15.05	12.04	0.97	16.10	12.88	0.90
5	19.10	15.28	1.21	18.44	14.75	-	18.85	15.08	0.97
6	19.45	15.56	1.02	17.90	14.32	1.07	16.70	13.36	1.1
7	17.55	14.04	-	16.55	13.24	1.16	18.60	14.88	0.92
8	15.45	12.36	-	16.85	13.48	0.95	20.60	16.48	0.91
9	13.60	10.88	1.64	19.25	15.40	0.77	19.37	15.50	-
10	15.65	12.52	1.72	20.50	16.40	1.41	21.20	16.96	1.05
11	18.65	14.92	0.95	17.50	14.00	1.96	20.50	16.40	1.03
12	16.85	13.48	1.10	15.80	12.64	-	21.05	16.84	1.45
13	16.30	13.04	1.56	15.00	12.00	-	21.00	16.80	2.07
14	15.10	12.08	-	14.80	11.84	1.07	21.10	16.88	1.54
15	14.90	11.92	0.92	20.40	16.32	0.96	18.05	14.44	1.44
16	12.05	9.64	1.24	22.30	17.84	0.78	19.15	15.32	-
17	10.35	8.28	0.90	18.25	14.60	1.35	17.35	13.88	1.13
18	14.50	11.60	1.11	16.30	13.04	1.13	18.80	15.04	1.14
19	13.20	10.56	1.17	19.25	15.40	-	22.50	18.00	0.77
20	13.40	10.72	0.69	21.00	16.80	1.09	22.90	18.32	1.07
21	13.80	11.04	-	16.90	13.52	1.04	20.45	16.36	1.1
22	14.40	11.52	0.54	18.25	14.60	1.22	18.40	14.72	1.18
23	12.90	10.32	0.69	16.50	13.20	1.44	18.62	14.90	-
24	14.80	11.84	1.20	17.35	13.88	1.14	18.73	14.98	-
25	15.10	12.08	0.99	18.65	14.92	0.89	19.80	15.84	1.12
26	17.70	14.16	1.16	16.96	13.57	-	21.00	16.80	1.17
27	20.60	16.48	1.18	15.15	12.12	0.60	25.75	20.60	0.99
28	16.85	13.48	-	15.35	12.28	0.99	21.85	17.48	1.02
29	19.75	15.80	-	17.90	14.32	1.09	22.60	18.08	0.86
30	16.90	13.52	-	16.85	13.48	0.99	21.25	17.00	-
31	-	-	-	15.85	12.68	0.95	23.85	19.08	4.50

August 21st 1963

Mr. R. G. Duthie,
Mine Manager,
Craigmont Mines Ltd.,
Merritt, B.C.

Dear Mr. Duthie:

Your letter of the 6th of August was placed before me on my return to the office recently and in order to further assess the merit of your proposal to use tailings for backfill purposes, the following information would be useful:

(1) How soon is it considered necessary to commence backfill?

(2) What would be the cost of extracting the magnetite from the tailings prior to using it for backfill?

(3) What would be the cost of extracting the hematite from the tailings prior to use for backfill?

A breakdown of the costs-capital and operating-for the above extraction would be helpful as would be the rate per ton as quoted for transportation after extraction, to tidewater.

What is the present estimated tonnage of ore from which percentages of iron, both hematite and magnetite, could be extracted in volume of a grade in excess of 20%.

Upon receipt of the above information your proposal will be given further consideration.

Yours sincerely,

Minister

MEMORANDUM

TO..... Mr. P.J. Mulcahy,
 Deputy Minister,

FROM THE

**DEPARTMENT OF MINES
 AND PETROLEUM RESOURCES**

VICTORIA, B.C., August 13, 1963

WHEN REPLYING PLEASE REFER
 TO FILE No.....

AUG 13 '63 AM

06792



The letter of Craigmont Mines Ltd., dated 6 August 1963 is returned herewith.

It requests permission to use iron bearing tailings for fill in underground mining, "until such time as our investigation of the economics of the recovery of the iron content of the tailing is completed".

**DEPT. OF MINES
 AND PETROLEUM RESOURCES**

Order-in-Council 2304, approved Oct. 7th, 1960, provides two measures of control;-

under 8(c) The Minister may order the holder to sell up to half his output of iron concentrate or other iron product to a bona fide buyer for use in British Columbia.

and, under 8(d) The Chief Inspector of Mines is invested with power to close the operation if need be in order to ensure "the maximum economic recovery of iron ore".

The letter purports to show that the potential value of the magnetite content of the tailings is less than the extra cost of obtaining alternative material for use in back filling.

The argument could be accepted for temporary and limited use of the tailings including their iron content, for back filling underground.

I recommend that permission be given for such use of tailings in the six months ending February 15, 1964, with the requirements:-

1. That before that date a statement shall be submitted showing the quantity of tailings so used to Dec.31,1962 and the approximate contents of (a) iron as magnetite (b) iron as hematite.

A report on the milling and economic studies made to Dec. 31, 1962, relative to the recovery of the iron mineral or minerals, the probable costs of recovery, and the potential value, including probable or actual market value and cost of shipping to market.

REFERRED TO	DATE	INITIAL
D.M.	✓ 12/8	fm
C.C.		
D.C.G.C.		
D.C.C.		
G.C.		
ACCTS.		
C.M.B.		
C.I.		
C.A.		
R. T.		
C.P.E.		
FILING CLERK		AT

*Chapman report
 Page 9 Iron reserves.*

H. Sargent

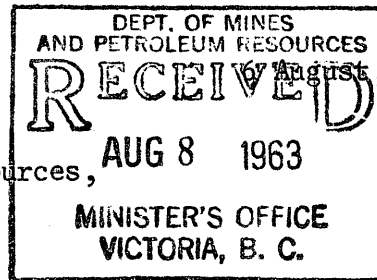
H. Sargent,
 Chief, Mineralogical Branch.

HS:ln
 Attach: Letter - Craigmont

CRAIGMONT MINES LIMITED

MINE OFFICE

MERRITT, B. C. CANADA



The Honourable W. K. Kiernan,
Minister of Mines & Petroleum Resources,
Province of British Columbia,
Victoria B. C.

Dear Sir:

During a recent conversation with Mr. David Smith, Inspector of Mines, it was brought to our attention that permission must be obtained from the Minister of Mines and Petroleum Resources to utilize iron bearing mill tailing as a source of backfill. Mr. Smith referred to Clause 8 (d) and 9 of the Iron Ore Tax Order No. 2304, dated 6th October, 1960.

To date, over 95 percent of the ore mined at Craigmont has been by open pit methods. During this period no iron has been recovered but all mill tailing has been impounded in the tailing pond. Investigations into the economics of iron recovery have been carried out almost continuously since the start of production. To date, there has been no success in arriving at economical methods of recovering iron. Further investigations are currently being carried out and it is expected that conclusions will be reached in the next few months.

In the future an increasing amount of mill feed will be supplied from the underground mine. Thorough investigation and evaluation of possible mining methods for the extraction of the underground ore have been made. A cut-and-fill system has been selected as the most efficient and economic method of mining. In conjunction with the evaluation of mining methods, detailed engineering studies were conducted on the potential of various types of backfill. The criteria governing the selection of a backfill system were: flexibility; speed of filling; provision of the best possible insurance against ground movement; favourable capital and operating costs.

Studies indicated that a hydraulic fill system best satisfied these requirements. Two possible sources of fill material for a hydraulic system were examined:- 1. Mill tailing; 2. free draining surface gravels. Investigation of all possible areas indicated that adequate reserves of clean surface gravels at an economic distance are non-existent.

Overall costs favour the mill tailing alternative. The estimated cost of hydraulic gravel fill if it were available is \$0.79 per ton of ore mined, while the estimated cost of mill tailing fill is \$0.62 per ton of ore mined.

CRAIGMONT MINES LIMITED

MINE OFFICE

MERRITT, B. C. CANADA

- 2 -

It should be noted that at a milling rate of 5,400 tons per day, a total of 5,040 tons of tailing is produced daily. The proposed backfill plant will be capable of producing 1,680 tons of backfill per day, thus utilizing 33 percent of the available tailing. Additional capacity of backfill production will be required at a later date.

An analysis of the Craigmont underground ores, yields the following mineral constituent:

Chlorite	20%					
Magnetite	14%	FE 304	= 7070	FE = 9.8%	FE	
Hematite	12%	FE 203	= 7240	FE = 8.7%	FE	
Epidote	11%					
Calcite	8%					
Silica	8%					
Feldspars	7%					
Other Minerals	<u>20%</u>					
						<u>18.5% FE</u>
	<u>100%</u>					

X If the feasibility studies of iron production indicate economic production by magnetic methods, the hematite content would not be recovered. Sufficient sands, excluding the magnetite content, would still be available then to satisfy the requirements of the proposed 70 ton per hour (1,680 tons per day) backfill plant.

It should be pointed out that an increase in the cost of backfill from \$0.62 to \$0.79 per ton of ore raises the overall cost by \$0.17 per ton, thus in effect raising the cutoff grade of copper ore by 0.68 pounds of copper.

It can thus be concluded that if it were not possible to utilize mill tailing as a source of backfill, cutoff copper grade would be increased by at least 0.03 percent copper (at \$0.25 per pound net smelter return).

This increase in cutoff grade will definitely reduce the tonnage of copper ore that can be recovered. There would seem to be little point in losing substantial tonnages of copper ore for all time for the sake of conserving iron that may never be recovered economically.

X At this time we request permission to use iron bearing tailing as mine backfill until such time as our investigation of the economics of the recovery of the iron content of the tailing is completed. This request is based on Clause 9 of the Order No. 2304 which gives the Minister permission to exempt a company from payment of royalties on iron if the iron minerals occur with other minerals that will yield a greater monetary return than the

CRAIGMONT MINES LIMITED

MINE OFFICE

MERRITT, B. C. CANADA

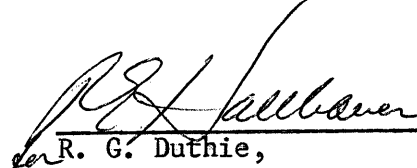
- 3 -

iron minerals, providing that the iron ore output is disposed of, and the mining operations are conducted subject to the provisions of the Order. Clause 8 (d) of the Order provides that "the system and operation of mining, including the disposal of spoil, waste, and tailing, shall be such as to ensure so far as can be reasonably foreseen the maximum economic recovery of iron minerals in the mining operations."

If there are any additional details that you may require I will be pleased to supply any information which we have available.

Yours truly,

CRAIGMONT MINES LIMITED


R. G. Duthie,
Mine Manager.

REH/ns

September 6, 1961.

Mr. J.L. McPherson, Secretary,
Craigmont Mines Limited,
700 Burrard Building,
Vancouver 5, B.C.

Re: Order in Council No. 2304
October 7th, 1960.

Dear Mr. McPherson:

Thank you for your letter of August 24th with supporting material including:-

(A) List of mineral claims and fractional mineral claims held in the name of your Company, and constituting the Craigmont property at Merritt in the Nicola Mining Division.

(B) Comparison of monetary yield of copper and iron contained in orebody of Craigmont Mines Limited (N.P.L.) near Merritt, B.C.

1. The second item establishes to my satisfaction that for a ton of ore of average grade from the Craigmont orebody the monetary return from copper, under the conditions now envisaged would exceed the return that might be derived from the iron content.

Accordingly, as provided under clause 9 of the Order, I hereby grant to your Company permission to mine on the Company's behalf all the ores of iron within the Craigmont orebody subject to the requirement that reasonable care shall be taken to ensure that the said ore minerals shall be preserved for future recovery if not recovered during the mining and milling operations.

The foregoing paragraph assumes that for the present you do not propose to recover the iron minerals but will accumulate them in your tailings pond or ponds, and that it will be possible to reclaim the tailings for retreatment designed to recover the iron content.

Mr. J.L. McPherson, Secretary,

September 6, 1961.

11. Your letter requests exemption from payment of royalty under clauses 8(a) and 8(b) of the order.

Inasmuch as no royalty would be payable unless and until you ship iron concentrates it does not appear necessary to grant exemption from royalty payment now. The application for exemption may be renewed when it appears that you may be able to produce and ship iron concentrates.

W.K. Kiernan,
Minister.

MEMORANDUM

FROM THE

DEPARTMENT OF MINES
AND PETROLEUM RESOURCES

VICTORIA, B.C., Sept. 6, 1961

TO Mr. W.K. Kiernan
Minister

WHEN REPLYING PLEASE REFER
TO FILE NO.

Re: Order in Council No. 2304 - Application
Craigmont Mines Limited.

The letter to you of August 24th from Mr. McPherson and the accompanying material are returned herewith.

Attached to this memorandum is a draft of the proposed reply. Granting permission to mine the iron from the Craigmont orebody is in order however, it seems to be desirable to record that it shall be preserved. In view of the fact that we understand that the sale of iron concentrate is not contemplated at present, it would appear that the request for exemption from payment of royalty need not be dealt with at the present time.

H. Sargent

H. Sargent,
Chief, Mineralogical Branch.

HS:ln

Enc: Letter from McPherson and draft reply.

*Correspondence returned
to Mineralogical - 675 -
by mail letter of Aug. 24/61.
with attachments.
C.C. reply drafted by Dr. Sargent
for Minister's signature dated Sept. 6/61.*

CRAIGMONT MINES LIMITED

(NON-PERSONAL LIABILITY)

700 BURRARD BUILDING

VANCOUVER 5, B. C. CANADA

COMPARISON OF MONETARY YIELD OF COPPER AND IRON CONTAINED IN THE ORE BODY OF CRAIGMONT MINES LIMITED (N.P.L.) NEAR MERRITT, B.C.

AIM: To evaluate the relative monetary yield of copper and iron contained in the known ore body of Craigmont Mines Limited (N.P.L.).

1. Metal Content:

The published reserves of Craigmont Mines Limited (N.P.L.) show an average grade of 2.08% copper and 19.6% iron. The foregoing is equivalent to 41.6 lbs. of copper per ton of ore and 392 lbs. of iron per ton of ore.

2. Unit Value of Metals:

(a) Copper:

Copper price is currently 30¢ to 31¢ per lb. Freight, handling and smelting charges reduce the price at the mine to approximately 20¢ per lb.

(b) Iron:

Iron concentrates are currently selling between \$8.50 and \$10.00 per long ton for 60% iron f.o.b. ships at west coast ports.

Assuming the top price of \$10.00 per ton of 60% iron concentrates the price per lb. of iron is, therefore, \$10.00 divided by $\frac{60}{100} \times 2240 = 0.744¢$ per lb.

Freight and handling charges of \$3.75 per ton of concentrate (0.279¢ per lb. of contained iron) will reduce the effective price at the mine to 0.465¢ per lb. of iron.

3. Net Value at Mine Site:

From the above information the values per ton of ore at the mine site will be (assuming 100% recovery of both metals):

Copper 41.6 lbs. @ 20¢/lb. = \$8.32/ton

Iron 392 lbs. @ 0.465¢/lb. = \$1.82/ton

CONCLUSIONS:

1. The copper content of the ore will return \$6.50 more per ton of ore than will the iron content (considering 100% recovery of both metals).
2. If 90% recovery is taken for copper and 60% recovery is taken for iron (maximum recovery attainable by tests to date) then the copper will return \$7.49 per ton of ore before operating costs, while the iron will return only \$1.09 per ton of ore before operating costs. The copper would, therefore, return \$6.40 more per ton of ore than would the iron.
3. Even if a total mining and milling charge of \$4.00 per ton of ore is applied against the copper, the copper content will still return more money than will the iron content.
4. The above analysis has been based upon assumptions that iron would be sold as a concentrate at Vancouver. At the present time this is the only feasible method of marketing the iron.



W. A. Triggs, P. Eng.
24 August 1961.

WAT:mb

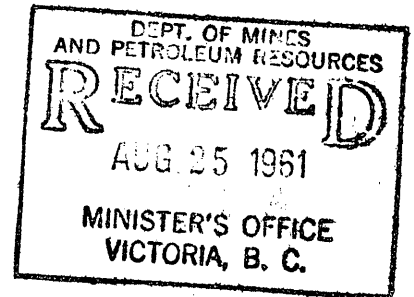
CRAIGMONT MINES LIMITED

(NON-PERSONAL LIABILITY)

700 BURRARD BUILDING

VANCOUVER 5, B. C. CANADA

August 24, 1961



The Honourable W.K. Kiernan
Minister of Mines and Petroleum Resources
VICTORIA, B.C.

Dear Sir:

Re: Order-in-Council No. 2304 -
Iron Ore

Pursuant to Article 9 of the above Order-in-Council, please consider this letter as a formal request for exemption from payment of the royalty provided for in Clauses 8 (a) and 8 (b) of the subject Order.

Attached to this application for exemption is a report by Mr. W.A. Triggs, a Professional Engineer registered in the Province of British Columbia, setting out the required information concerning monetary return from iron minerals as compared to the monetary return from the other minerals, i.e., copper, occurring with the iron minerals.

This exemption is requested on the mineral claims and leases held by this company which are listed on the attached schedules.

Yours very truly,

CRAIGMONT MINES LIMITED (N.P.L.)


J.L. McPherson
SECRETARY

JLMcP/nr
Enc.

cc: Dr. H. Sargent
Chief - Mineralogical Branch
Dept. of Mines & Petroleum Resources
Victoria, B.C.

Section A

Mineral claims and Fractional Mineral Claims in the Nicola Mining Division northwest of Merritt, B.C. recorded at the office of the Mining Recorder at Merritt, British Columbia, in the name of Craigmont Mines Limited (Non-Personal Liability) free and clear of all encumbrances and reservations, bearing the names and numbers hereinafter set out, namely:

	<u>Name of Claim</u>	<u>Record Number</u>	<u>Tag Number</u>
1.	AL 2 Fraction	5294	252872
2.	AL #6 Fraction	5298	260229
3.	AL #7 Fraction	5299	260230
4.	B #1 Fraction	4673	258402
5.	B #2 Fraction	4674	258403
6.	B #19	4670	258399
7.	B #20	4671	258400
8.	B #21	4672	258401
9.	Bill #1 Fraction	11389	287420
10.	Bill #2 Fraction	11390	287419
11.	Craig #1	4340	287487
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13.	Don #1	8452	317725
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17.	Don #5	8456	317729

	<u>Name of Claim</u>	<u>Record Number</u>	<u>Tag Number</u>
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19.	Edith #1	1775	B48923
20.	Edith #2	1776	B48924
21.	Hec #1	4804	299341
22.	Hec #2	4805	299342
23.	Hec #3	4806	299343
24.	Hec #4	4807	299344
25.	Hec #6	4809	299346
26.	Hec #7	4810	299347
27.	Hec #8	4811	299348
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31.	Hec #11 Fraction	4814	299351
32.	Little Fraction	12035	252820
33.	Merchants #1	4934	287405
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35.	Merchants #3	4936	287407
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47.	Ned #3	8624	287473
48.	Ned #4	8625	287474
49.	Ned #5	8626	287475
50.	Ned #6	8627	287476
51.	Paystin #1	4930	287401
52.	Paystin #2	4931	287402
53.	Paystin #3 Fraction	4932	287403
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56.	Paystin #6	1146	B21306
57.	Price #1 Fraction	4907	287411
58.	Price #2 Fraction	4908	287412
59.	Price #3	4909	287413
60.	Price #4	4910	287414
61.	Price #5	4911	287415
62.	Price #6	4912	287416
63.	Price #7	4913	287417

	<u>Name of Claim</u>	<u>Record Number</u>	<u>Tag Number</u>
64.	Price #8	4914	287418
65.	Quartzite #1	4232	B10869
66.	Quartzite #2	4233	B10868
67.	Quartzite #3	4234	B10877
68.	Quartzite #4	4235	B10878
69.	Quartzite #5	4236	B10879
70.	Quartzite #6	4237	B10870
71.	Small Fractional	11971	287470
72.	T.B. #1 Fraction	8703	287478
73.	T.B. #2 Fraction	8704	287482
74.	T.B. #3 Fraction	8705	287483
75.	T.B. #4 Fraction	8706	287484
76.	T.B. #5	8707	287485
77.	Willy #1	11980	287428
78.	Willy #2	11981	287427
79.	Willy #3	11982	287429
80.	Willy #4	11983	287430
81.	Willy #5	11984	287469
82.	Willy #6	11985	252870
83.	Willy #7	11986	287439
84.	Willy #8	11987	287440
85.	Willy #1 Fractional	12117	287409
86.	Willy #2 Fractional	12118	287410

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87.	Willy #3 Fractional	12214	370202
88.	Willy #5 Fractional	12216	370203
89.	Willy #6 Fractional	12217	370204
90.	Last Time #1	12618	425019
91.	Last Time #2	12619	425020
92.	Last Time #3	12620	425021
93.	Last Time #4	12621	425022
94.	Quartzite Fraction	13372	287480

Section B

Mineral leases situate in Nicola Mining Division registered at the office of the Gold Commissioner at Merritt, British Columbia in the name of Craigmont Mines Limited (Non-Personal Liability) bearing the numbers and dates, for the locations, including the mineral claims, having a term of 21 years from the date thereof and subject to the reservations and encumbrances hereinafter set out, namely:-

1. A. Number and date: M 1 G, June 12, 1958.

B. Included Mineral Claims:

<u>Name</u>	<u>Record Number</u>	<u>Tag Number</u>	<u>Certificate of Improvement Number</u>
McLeod #7	1773	B48917 (B48910)	Not applicable
McLeod #8	1774	B48916 (B48911)	

2. A. Number and date: M 2 P November 12, 1958.

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Merrell #6	1261	B23455	None
Merrell #7	1262	B23456	None
Merrell #8	1263	B23457	None
McLeod #1	1767	B48911 (B48916)	None
McLeod #2	1768	B48910 (B48917)	None
McLeod #3	1769	B48913 (B48914)	None
McLeod #4	1770	B48912 (B48915)	None

<u>Name</u>	<u>Record Number</u>	<u>Tag Number</u>	<u>Certificate of Improvement Number</u>
McLeod #5	1771	B48915 (B48912)	None
McLeod #6	1772	B48914 (B48913)	None
AL #1 Fr.	5293	252871	None
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3. A. Number and date: M 7 K, August 19, 1960.

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AL #3 Fraction	5295	252873	22

4. A. Number and date: M 10 N, October 5, 1960.

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<u>Name</u>	<u>Record Number</u>	<u>Tag Number</u>	<u>Certificate of Improvement Number</u>
Hec #12 Fraction	4815	299352	23

5. A. Number and date: M 11 N, October 5, 1960.

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<u>Name</u>	<u>Record Number</u>	<u>Tag Number</u>	<u>Certificate of Improvement Number</u>
Hec #13 Fraction	4816	299353	24

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<u>Name</u>	<u>Record Number</u>	<u>Tag Number</u>	<u>Certificate of Improvement Number</u>
Hec #14 Fractional	4817	299340	25

CRAIGMONT MINES LIMITED

(NON-PERSONAL LIABILITY)

700 BURRARD BUILDING

VANCOUVER 5, B. C. CANADA

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2587

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Minister of Mines and Petroleum Resources
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Iron Ore

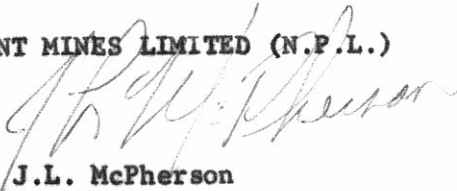
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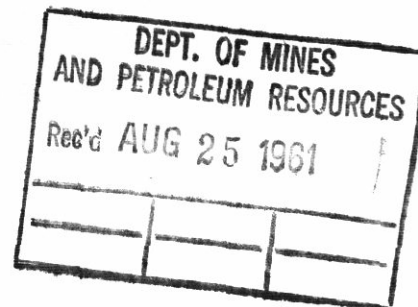
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SECRETARY

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<u>Name</u>	<u>Record Number</u>	<u>Tag Number</u>	<u>Certificate of Improvement Number</u>
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2. A. Number and date: M 2 P November 12, 1958.

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CRAIGMONT MINES LIMITED

(NON-PERSONAL LIABILITY)

700 BARRARD BUILDING

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24 August 1961.

WAT:mb