DMEA Form 9
Rev. 6/57

UNITED STATES
DEPARTMENT OF THE INTERIOR
Defense Minerals Exploration Administration

OFFICIAL DOCKET FILE — Idm-E NO. 756 — DMEA NO. 3522

Application
- [ ] Denied
- [ ] Withdrawn

Contract
- [ ] Terminated - Not Certified
- [x] Terminated - Certified
- [ ] Cancelled
- [ ] Royalty Agreement

The records contained in this file are marked (x) and arranged in this order:

Folder No. 1:

Left Side

- [X] Royalty Audits
- [X] Certification of Discovery] 11-18-58
- [X] Closing Letter]
- [X] Cost Audits
- [X] Termination Notice or Agreement] 2-1-58
- [ ] Recision Notice]
- [ ] Assignment of Contract
- [X] Contract Amendments
- [X] Contract with all exhibits and annexes
- [ ] Owner's Consent to Lien and Subordination Agreement
- [X] Application and attachments

Right Side

- [X] Project summary (final) 5-6-59
- [X] Work Completed analysis (final)

All other material filed in chronological order including the following reports if checked:

- [ ] Field Team Semi-Annual Report for Certified Project
- [X] Final Field Team Report (Tab) 9-5-58
- [X] Operator's Final Report (Tab) 3-12-59
- [ ] Interim Field Team Reports
- [ ] Operator's monthly reports and all attachments
- [x] On-site Exam Report (Tab) 11-17-54
- [ ] Settlement Sheets
- [ ] Drill Logs

Additional Folders:

Left Side

Folders No. _____ : Reports
- [X] Analysis of Semi-Annual Inspection Reports
- [ ] Project Summary (Interim) by DMEA Engineers

Right Side

- [X] Field Team Semi-Annual Report for Certified Project
- [X] Field Team Interim Reports
- [X] Operator's Monthly Reports with transmittal, narrative and maps.

Folders No. _____ : Maps (Use pocket folder or envelope)

Folders No. 3 : Settlement Sheets

Folders No. _____ : Drill Logs

Folders No. _____ : Royalty material

17963

OFFICE OF MINERALS EXPLORATION
CONTRACT ADMINISTRATION AND AUDIT DIVISION

ROYALTY AUDIT CERTIFICATE

I have examined the records and sales documents pertaining to the sale of copper for the period November 2, 1960, through March 31, 1962, by

Calumet & Hecla, Inc.
Calumet, Michigan

produced from Caledonia Mine, located in Ontonagon County, Michigan, on which royalty is payable to the U. S. Government under terms of Contract Idm-8765, Docket DMSA-3522 (copper), dated February 10, 1955.

My examination was made in accordance with generally accepted standards applicable in the circumstances.

The audit did not disclose any production or sales of copper for this period that would be subject to Government royalty. Accordingly, the royalty account remains as stated in prior reports of audits and reviews, which found the sales subject to royalty to be $527,737.62 and the royalty account to be:

Total royalty due	$16,386.89
Total royalty paid	16,386.89
Balance of royalty due	$ -0-

C. E. Fisher, OME Auditor

May 25, 1962

OFFICE OF MINERALS EXPLORATION
CONTRACT ADMINISTRATION AND AUDIT DIVISION

ROYALTY AUDIT REPORT

I. INTRODUCTION

On April 24 and 25, 1962, an audit was made of the production, sales and royalty accounts and records of

Calumet & Hecla, Inc.
Calumet, Michigan

pertaining to the sale of copper during the period November 2, 1960, through March 31, 1962, produced from Caledonia Mine located in Ontonagon County, Michigan, on which royalty is payable to the U. S. Government under terms of Contract Idm-5765, Docket DMEA-3522 (copper), dated February 10, 1955.

The production and sales records pertaining to this contract are maintained at the Operator's Calumet Division general plant office building in Calumet, Michigan, under the supervision of George S. Lengyel, Controller.

This audit was made concurrently with an audit pertaining to royalty payable to the Government under provisions of exploration project Contract Idm-598, Docket DMA-1207X.

II. GENERAL INFORMATION AND FINDINGS

Article No. 8 and Amendment No. 2 of this contract provide that, if the Government makes a certification of discovery or development, the Operator shall pay to the Government a royalty on all minerals mined or produced from the land for a period of 12 years from the date of the contract or until the total net amount contributed by the Government toward the cost of the exploration without interest is fully repaid, whichever occurs first. The land subject to the exploration contract is described in Article 2 and Annex I of the contract. A certification of discovery or development was issued on November 18, 1958.

A Report of Review in lieu of final cost audit dated October 14, 1958, indicated accepted costs under the exploration contract amounting to $61,279.79 with the Government's contribution, on a 50 percent basis, being $30,639.89.

Prior royalty audits relating to production from land subject to this contract covered the period February 10, 1955, through

September 30, 1956. A Report of Royalty Review dated November 2, 1960, related to royalty paid by the Operator for the period October 1, 1956, through November 1, 1960. The present audit included an on-site confirmation of the royalty computations during the latter period. It was also determined during the audit that there had not been any production subject to Government royalty subsequent to June 1958. Furthermore, I was advised during this audit visit that production from the property is not likely in the foreseeable future, as exploitation costs would be excessive in relation to probable returns.

C. E. Fisher

C. E. Fisher, O.E Auditor

May 25, 1962

OFFICE OF MINERALS EXPLORATION
CONTRACT ADMINISTRATION AND AUDIT DIVISION

REPORT OF ROYALTY REVIEW

I have reviewed the files of the Office of Minerals Exploration, Washington, D. C., pertaining to Contract No. Idm-E765, Docket No. DMEA-3522 (Copper), dated February 10, 1955, with

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago, Illinois

for the purpose of determining the amount of royalty due the U. S. Government on sales of minerals from property referred to as Caledonia Mine located in Ontonagon County, Michigan, during the period October 1, 1956, through November 1, 1960.

A certification of discovery or development was issued on November 18, 1958, and, in accordance with Article 8 and Amendment No. 2 of the contract, royalty is payable on all minerals mined or produced from the land described in Article 2 of the contract for a period of 12 years from the date of the contract or until the total net amount contributed by the Government without interest is fully repaid, whichever occurs first. A Report of Review in lieu of final audit dated October 14, 1958, indicated accepted costs under the exploration contract amounting to $61,279.79 with the Government's contribution, on a 50 percent basis, being $30,639.89.

The status of the project, the scope of review, and the reasons therefor are stated on page 2.

This review established the total sales of copper for the period to be $175,066.94. Royalty due the Government at rates specified in the contract is $8,753.36.

A prior Royalty Audit Report and Certificate found the sales subject to Government royalty through September 30, 1956, to be $152,670.62 which added to the sales for this subsequent period make a total of $327,737.56. The royalty account as of September 30, 1956, was:

Total Royalty Due	$ 7,633.53
Total Royalty Paid	7,633.53
Balance of Royalty Due	$ -0-

At November 1, 1960, the royalty account of this project was found to be:

Total Royalty Due	$16,386.89
Total Royalty Paid	16,386.89
Balance of Royalty Due	$ -0-

C. E. Fisher

November 2, 1960 C. E. Fisher, OME Auditor

STATUS OF PROJECT, SCOPE OF REVIEW AND REASONS THEREFOR

There has not been any production from the Caledonia Mine since June 1958.

During the period covered by the present review the Operator reported production and paid royalty through June 1958 in the same manner as has been explained in prior royalty audit reports. My review included the recomputation and tabulation of copies of monthly statements on file in the Washington office supporting royalty payments made. This tabulation is filed with my audit work-papers and is summarized as follows:

Item	Knowlton Lode Drift	Knowlton Lode Stope	Butter Lode Stope	Totals
Copper Rock - Tons	6,526	45,482	6,727	58,735
Mine Captains' Estimates of Cu Contents - Pounds	86,812	694,815	145,303	926,930
Average Smelter Recovery	99.06%	98.45%	98.36%	98.49%
Recovered Cu - Pounds	86,004	684,054	142,920	912,978
Average Recovery per Ton of Rock - Pounds	13.18	15.04	21.25	15.54
Average Selling Price Per Pound of Cu	$ 0.4288	$ 0.3695	$ 0.2665	$ 0.3590
Per Ton of Cu Rock	5.6520	5.5576	5.6613	5.5799
Value of Copper	$36,885.10	$252,768.56	$38,083.90	$327,737.56
Royalty at 5%	$ 1,844.25	$ 12,638.44	$ 1,904.20	$ 16,386.89

This review was made in lieu of an on-site audit of the Operator's accounts and records for the following reasons:

(1) Inspection reports by field representatives of the Government and other information contained in the Washington office files indicate that all production from the property has been reported and proper royalty has been paid the Government; and

(2) The administrative cost to the Government of an on-site royalty audit at this time would be excessive in relation to the amount of possible additional royalty which might be disclosed.

OFFICE OF MINERALS EXPLORATION
CONTRACT ADMINISTRATION AND AUDIT DIVISION

REPORT OF ROYALTY REVIEW

I have reviewed the files of the Office of Minerals Exploration, Washington, D. C., pertaining to Contract No. Idm-E765, Docket No. DMEA-3522 (Copper), dated February 10, 1955, with

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago, Illinois

for the purpose of determining the amount of royalty due the U. S. Government on sales of minerals from property referred to as Caledonia Mine located in Ontonagon County, Michigan, during the period October 1, 1956, through November 1, 1960.

A certification of discovery or development was issued on November 18, 1958, and, in accordance with Article 8 and Amendment No. 2 of the contract, royalty is payable on all minerals mined or produced from the land described in Article 2 of the contract for a period of 12 years from the date of the contract or until the total net amount contributed by the Government without interest is fully repaid, whichever occurs first. A Report of Review in lieu of final audit dated October 14, 1958, indicated accepted costs under the exploration contract amounting to $61,279.79 with the Government's contribution, on a 50 percent basis, being $30,639.89.

The status of the project, the scope of review, and the reasons therefor are stated on page 2.

This review established the total sales of copper for the period to be $175,066.94. Royalty due the Government at rates specified in the contract is $8,753.36.

A prior Royalty Audit Report and Certificate found the sales subject to Government royalty through September 30, 1956, to be $152,670.62 which added to the sales for this subsequent period make a total of $327,737.56. The royalty account as of September 30, 1956, was:

Total Royalty Due	$ 7,633.53
Total Royalty Paid	7,633.53
Balance of Royalty Due	$ -0-

At November 1, 1960, the royalty account of this project was found to be:

Total Royalty Due	$16,386.89
Total Royalty Paid	16,386.89
Balance of Royalty Due	$ -0-

C. E. Fisher

November 2, 1960

C. E. Fisher, OME Auditor

Idm-8765 Calumet & Hecla, Inc. DMRA-3522

STATUS OF PROJECT, SCOPE OF REVIEW
AND REASONS THEREFOR

There has not been any production from the Caledonia Mine since June 1958.

During the period covered by the present review the Operator reported production and paid royalty through June 1958 in the same manner as has been explained in prior royalty audit reports. My review included the recomputation and tabulation of copies of monthly statements on file in the Washington office supporting royalty payments made. This tabulation is filed with my audit work-papers and is summarized as follows:

Item	Knowlton Lode Drift	Knowlton Lode Stope	Butter Lode Stope	Totals
Copper Rock - Tons	6,526	45,482	6,727	58,735
Mine Captains' Estimates of Cu Contents - Pounds	86,812	694,815	145,303	926,930
Average Smelter Recovery	99.06%	98.45%	98.36%	98.49%
Recovered Cu - Pounds	86,004	684,054	142,920	912,978
Average Recovery per Ton of Rock - Pounds	13.18	15.04	21.25	15.54
Average Selling Price Per Pound of Cu	$ 0.4288	$ 0.3695	$ 0.2665	$ 0.3590
Per Ton of Cu Rock	5.6520	5.5576	5.6615	5.5799
Value of Copper	$36,885.10	$252,768.56	$38,083.90	$327,737.56
Royalty at 5%	$ 1,844.25	$ 12,638.44	$ 1,904.20	$ 16,386.89

This review was made in lieu of an on-site audit of the Operator's accounts and records for the following reasons:

(1) Inspection reports by field representatives of the Government and other information contained in the Washington office files indicate that all production from the property has been reported and proper royalty has been paid the Government; and

(2) The administrative cost to the Government of an on-site royalty audit at this time would be excessive in relation to the amount of possible additional royalty which might be disclosed.

MM[illegible]orm 22
April 59

DEPARTMENT OF THE INTERIOR
Office of Minerals Exploration

CHECK SHEET OF EXAMINING ENGINEER

Operator's Name Calumet and Hecla, Inc.

Address 122 South Michigan Avenue

Chicago, Illinois

Exploration Contract No. Idm-E765 Docket No. DMEA-3522

		Check One Yes	Check One No.
1.	(a) Does the Operator stockpile ore subject to royalty repayment?		X
	(b) If so, is segregation and identification procedure adequate?		
2.	(a) Does Operator commingle production subject to DMEA or OME royalties with exempt production?		X
	(b) If so, do you consider the allocation of the commingled production equitable?		
3.	(a) Does the Operator stockpile mine or mill rejects (low grade ore, tailing, middlings, etc.) that may have potential value within the royalty payment period?		X
	(b) If so, are adequate records maintained on such material to protect the Government's interest?		
4.	Do you consider the assay controls in effect are adequate?	X	
5.	Do you consider that the manner of disposing of production gives the Government its fair royalty returns?	X	
6.	Do your periodic examinations of operations indicate the Operator is properly reporting his production of ores subject to DMEA or OME royalties?	X	
7.	Does the Operator buy from or sell to other Operators?		X
8.	Comment on any item 2 (b) to 6 if answer is No.		

There has not been any production from the Caledonia Mine since June 1958.

November 1, 1960
Date

George C. Selfridge
Mining Engineer

53362

Original
~~Expected~~

DEFENSE MINERALS EXPLORATION ADMINISTRATION
CONTRACT ADMINISTRATION AND AUDIT DIVISION

SECOND ROYALTY AUDIT CERTIFICATE

I have examined the production records and sales documents pertaining to the sale of copper for the period June 1 to September 30, 1956, by

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago, Illinois

produced from Caledonia Mine, located in Ontonagon County, Michigan, on which royalties are due the U. S. Government under terms of Contract Ida-E765, Docket No. DMEA-3522 (Copper), dated February 10, 1955.

My examination was made in accordance with generally accepted standards applicable in the circumstances.

The audit established the total sales of copper for this period, subject to DMEA royalties, to be $20,418.76. Royalty due the Government at the contract rate of five percent is $1,020.94.

A prior audit conducted by this auditor for the period February 10, 1955, to May 31, 1956, found the sales as of the last date to be $132,251.86, which added to the sales for this period make a total of $152,670.62 as of September 30, 1956. The royalty account as of May 31, 1956, was

Total Royalty Due	$6,612.99
Total Royalty Paid	6,612.99
Balance of Royalty Due	$ -0-

As of September 30, 1956, the royalty account of this project was found to be

Total Royalty Due	$7,633.53
Total Royalty Paid	7,633.53
Balance of Royalty Due	$ -0-

C. E. Fisher
C. E. Fisher, Auditor

November 9, 1956

SECOND ROYALTY AUDIT REPORT

I. INTRODUCTION

During the period October 16 to 19, 1956, an audit was made of the production, sales, and royalty accounts and records of

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago, Illinois

pertaining to the sale of copper during the period June 1 to September 30, 1956, produced from Caledonia Mine located in Ontonagon County, Michigan, on which royalties are due the U. S. Government under terms of Contract IDm-2765, Docket No. DMA-3522 (Copper), dated February 10, 1955.

The production and sales records pertaining to this contract are maintained at the Operator's Calumet Division general plant office building in Calumet, Michigan.

During the on-site audit the following representatives of the company were consulted as necessary:

Mr. B. C. Peterson, Controller
Mr. Thomas R. Thomas, Internal Auditor

Their cooperation greatly facilitated the audit work.

A second interim audit of exploration costs incurred under terms of this contract was made concurrently with this second royalty audit. Also, a final audit of costs and a third audit of royalties payable to the Government under terms of Exploration Project Contract No. IDm-298, Docket No. DMA-1207X, with this Operator, were made during such period. The results of these audits are included in separate audit reports.

II. GENERAL INFORMATION

Article 6 of the contract provides that, regardless of any certification of discovery or development, the Government shall be entitled to a percentage royalty on all minerals mined or produced from the land described in Annex I of the contract from February 10, 1955, until the lapse of time in which the Government may make such certification of discovery or development (within six months after a sufficient final report and final account has been rendered by the operator), or until the total net amount contributed by the Government, without interest, is fully repaid, whichever occurs first.

According to the second interim cost audit report prepared by this auditor concurrently with this second royalty audit report, the total accepted costs of the exploration and the Government's valid and proper contribution, on a 50 percent basis, to July 31, 1956, amounted to

$61,707.56 and $30,853.78, respectively. The contract provides for estimated total cost of the project in amount of $113,110.00 with Government participation in the amount of $56,555.00, and had not been completed or terminated at the date of this audit.

III. SCOPE OF AUDIT AND FINDINGS

A. Conference with Examining Engineer

The examining engineer (Charles J. Stehlik) has reported the following:

(a) The Operator does not stockpile ore subject to DMEA royalties; nor are low grade ores, tailings, or middlings stockpiled.

(b) All production from the mine during the period was subject to DMEA royalty. Production from this mine has been commingled with production from other mines operated by the company. The examining engineer and this auditor consider that an equitable basis has been followed in allocating the proceeds from commingled production as more fully explained in Section III B of this report.

(c) The sampling and assay controls in effect are considered adequate.

(d) The manner of disposing of production is considered as giving the Government its fair royalty returns.

(e) Periodic examinations by the examining engineer indicate that the Operator is properly reporting the current production subject to DMEA royalties.

(f) The Operator does not buy from or sell to other operators.

B. Audit of Settlement Statements.

During the on-site audit a listing was made of statements furnished by the Operator in support of monthly payments showing computation of royalties payable to the Government in connection with ore recovered during exploratory drifting and from ore recovered from stoping operations in that portion of the mine delineated in Annex I of the contract. All computations were verified and the data reported was checked with production and sales records and monthly statistical data prepared by the Operator in connection with its entire operation of the Calumet Division. This listing, which is filed as a part of my audit work papers, was verified and found to be in agreement with deposits made by the regional Finance Officer as indicated by copies of certificates of deposit on file in DMEA office, Washington, D. C.

The basic production record is a daily report made by the Mine Captain to the Mine Superintendent showing the tonnage of "poor rock" and of copper bearing rock removed from the mine, together with the source of the material, that is, whether connected with exploration or stoping operations, and the captain's estimate of the quantity of copper contained in the ore deemed to be of sufficient value to warrant transportation to the mill and the smelter for processing. All rock which the captain estimates to contain less than nine pounds of copper per ton is designated as "poor rock" and is dumped at the mine site. This is standard operating procedure of the company in all of its copper mining operations in the Calumet Division.

The copper bearing ore is then transported by truck and rail a distance of approximately 50 miles to the Operator's mill at Hubbell, Michigan, where it is commingled with other company production. After milling the ore is taken to the company's smelter at Lake Linden, Michigan, for final processing.

The actual number of pounds of copper recovered at the smelter each month is determined and the ratio of actual recovery to the estimated weight of copper in the ore produced during the month is determined. Such ratio is applied to the captain's estimate of total copper in the ore shipped from Caledonia Mine during the month and the number of pounds thus determined is considered to be the actual production of copper from that mine during such month.

The total proceeds from sale of copper produced during a month is divided by the number of pounds of copper sold during that month to establish an average sales price of copper during the month. Such average price is applied to the production from Caledonia Mine during the month and royalty due the Government at 5 percent is computed on the value thus determined.

IV. CONCLUSIONS

A summary analysis of the Operator's production and sales subject to DMEA royalties from Caledonia Mine follows:

Item	Exploration Drift	Stoping	Total
Copper Rock (Tons)	6,526	16,873	23,399
Mine Captain's Estimates of Copper Contents (Pounds)	86,812	269,222	356,034
Average Smelter Recovery	99.06%	98.77%	98.84%
Recovered Copper (Pounds)	86,004	265,926	351,930
Average Recovery per Ton of Rock (Pounds)	13.18	15.76	15.04
Average Selling Price (Per pound of copper)	$.4288	$.4354	$.4338
Value of Copper	$36,885.10	$115,785.52	$152,670.62
Royalty Due (5%)	$1,844.25	$5,789.28	$7,633.53
Royalty Paid	$1,844.25	$5,789.28	$7,633.53
Balance of Royalty Due	-0-	-0-	-0-

The audit has confirmed the accuracy and propriety of the royalty payments received by the regional Finance Officer applicable to copper sales during the period February 10, 1955, to September 30, 1956. It has also determined that all indicated sales during such period have been properly accounted for.

At the conclusion of the audit Mr. Peterson was informed of the audit findings.

C. E. Fisher

C. E. Fisher, Auditor

November 9, 1956

Check Sheet of Examining Engineer

Operator's Name Calumet & Hecla Inc.

Address Calumet, Michigan

RECEIVED OCT 26 1956

Exploration Contract No. Idm-E765 Docket No. 3522

	Check One Yes	No
1. (a) Does the Operator stockpile ore subject to royalty repayment?		X
(b) If so, is segregation and identification procedure adequate?		
2. (a) Does Operator commingle production subject to DMEA royalties with exempt production?	X	
(b) If so, do you consider the allocation of the commingled production equitable?	X	
3. (a) Does the Operator stockpile mine or mill rejects (low grade ore, tailing, middlings, etc.) that may have potential value within the royalty payment period?		X
(b) If so, are adequate records maintained on such material to protect the Government's interest?		
4. Do you consider the assay controls in effect are adequate?	X	
5. Do you consider that the manner of disposing of production gives the Government its fair royalty returns?	X	
6. Do your periodic examinations of operations indicate the Operator is properly reporting his production of ores subject to DMEA royalties?	X	
7. Does the Operator buy from or sell to other Operators?	X	
8. Comment on any item 2 (b) to 6 if answer is No.		

Charles J. Stehlik
Mining Engineer

Date Oct 23, 1956

82448

DEFENSE MINERALS EXPLORATION ADMINISTRATION
GENERAL ADMINISTRATION AND AUDIT DIVISION

FINAL ROYALTY AUDIT CERTIFICATE

I have examined the production records and sales documents pertaining to the sale of copper for the period February 10, 1955, to May 31, 1956, by

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago, Illinois

produced from Calumet Mine, located in Ontonagon County, Michigan, on which royalties are due the U. S. Government under terms of Contract Ida-E765, Docket No. DMEA-3522 (Copper), dated February 10, 1955.

My examination was made in accordance with generally accepted standards applicable in the circumstances.

The audit established the total sales of copper for this period, subject to DMEA royalties, to be $132,251.86. Royalty due the Government at the contract rate of five percent is $6,612.59. The royalty paid and balance due are as follows:

Total Royalties Due	$6,612.59
Total Royalties Paid	6,612.59
Balance of Royalties Due	$ -0-

C. E. Fisher
C. E. Fisher, Auditor

July 13, 1956

FIRST ROYALTY AUDIT REPORT

I. INTRODUCTION

During the period June 11 to 28, 1956, an audit was made of the production, sales, and royalty accounts and records of

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago, Illinois

pertaining to the sale of copper during the period February 10, 1955, to May 31, 1956, produced from Calumet Mine located in Ontonagon County, Michigan, on which royalties are due the U. S. Government under terms of Contract Idm-2765, Docket No. DMA-3522 (Copper), dated February 10, 1955.

The production and sales records pertaining to this contract are maintained at the operator's Calumet Division general plant office building in Calumet, Michigan.

During the on-site audit the following representatives of the company and the Bureau of Mines were consulted as necessary:

Mr. B. C. Peterson, Controller
Mr. Thomas R. Thomas, Internal Auditor
Mr. Charles J. Stehlik, Mining Engineer,
Bureau of Mines, Houghton, Michigan

The cooperation of all concerned greatly facilitated the audit work.

An interim audit of exploration costs incurred under terms of this contract was made concurrently with this first royalty audit. Also, a fourth interim audit of costs and a second audit of royalties payable to the Government under terms of Exploration Project Contract No. Idm-298, Docket No. DMA-1207X, with this operator, were made during such period. The results of these audits are included in separate audit reports dated July 13, 1956.

II. GENERAL INFORMATION

Article 8 of the contract provides that, regardless of any certification of discovery or development, the Government shall be entitled to a percentage royalty on all minerals mined or produced from the land described in Annex I of the contract from February 10, 1955, until the lapse of time in which the Government may make such certification of discovery or development (within six months after a sufficient final report and final account has been rendered by the operator), or until the total net amount contributed by the Government, without interest, is fully repaid, whichever occurs first.

According to the interim cost audit report prepared by this auditor concurrently with this first royalty audit report, the total accepted costs of the exploration and the Government's valid and proper contribution, on a 50 percent basis, to May 31, 1956, amounted to $56,867.82 and $28,433.91, respectively. Exploration under the contract is continuing. The contract provides for estimated total cost of the project in amount of $113,110.00 with Government participation in the amount of $56,555.00.

III. SCOPE OF AUDIT AND FINDINGS

A. Conference with Examining Engineer.

A conference with the examining engineer (Mr. Stehlik) disclosed the following:

(a) The operator does not stockpile ore subject to DMEA royalties; nor are low grade ores, tailings, or middlings stockpiled.

(b) All production from the mine during the period was subject to DMEA royalty. Production from this mine has been commingled with production from other mines operated by the company. The examining engineer and this auditor consider that an equitable basis has been followed in allocating the proceeds from commingled production as more fully explained in Section III B of this report.

(c) The sampling and assay controls in effect are considered adequate.

(d) The manner of disposing of production is considered as giving the Government its fair royalty returns.

(e) Periodic examinations by the examining engineer indicate that the operator is properly reporting the current production subject to DMEA royalties.

(f) The operator does not buy from or sell to other operators.

B. Audit of Settlement Statements.

During the on-site audit a listing was made of statements furnished by the operator in support of monthly payments showing computation of royalties payable to the Government in connection with ore recovered during exploratory drifting and from ore recovered from stoping operations in that portion of the mine delineated in Annex I of the contract. All computations were verified and the data reported was checked with production and sales records and monthly statistical data prepared by the

operator in connection with its entire operation of the Calumet Division. This listing, which is filed as a part of my audit work papers, was verified and found to be in agreement with deposits made by the regional Finance Officer as indicated by copies of certificates of deposit on file in DMEA office, Washington, D. C. A summary analysis of this listing is included in section IV of this audit report.

The basic production record is a daily report made by the Mine Captain to the Mine Superintendent showing the tonnage of "poor rock" and of copper bearing rock removed from the mine, together with the source of the material, that is, whether connected with exploration or stoping operations, and the captain's estimate of the quantity of copper contained in the ore deemed to be of sufficient value to warrant transportation to the mill and the smelter for processing. All rock which the captain estimates to contain less than nine pounds of copper per ton is designated as "poor rock" and is dumped at the mine site. This is standard operating procedure of the company in all of its copper mining operations in the Calumet Division.

The copper bearing ore is then transported by truck and rail a distance of approximately 50 miles to the operator's mill at Mohawk, Michigan, where it is commingled with other company production. After milling the ore is taken to the company's smelter at Lake Linden, Michigan, for final processing.

The actual number of pounds of copper recovered at the smelter each month is determined and the ratio of actual recovery to the estimated weight of copper in the ore produced during the month is determined. Such ratio is applied to the captain's estimate of total copper in the ore shipped from Caledonia Mine during the month and the number of pounds thus determined is considered to be the actual production of copper from that mine during such month.

The total proceeds from sale of copper produced during a month is divided by the number of pounds of copper sold during that month to establish an average sales price of copper during the month. Such average price is applied to the production from Caledonia Mine during the month and royalty due the Government at 5 percent is computed on the value thus determined.

IV. CONCLUSIONS

A summary analysis of the operator's production and sales subject to DMEA royalties from Caledonia Mine follows:

Item	Exploration Drift	Stoping	Total
Copper Rock (Tons)	6,468	12,722	19,190
Mine Captain's Estimates of Copper Contents (Pounds)	86,177	210,704	296,881
Average Smelter Recovery	99.08%	98.54%	98.70%
Recovered Copper (Pounds)	85,382	207,637	293,019
Average Recovery per Ton of Rock (Pounds)	13.20	16.32	15.27
Average Selling Price (Per pound of copper)	$.4295	$.4603	$.4513
Value of Copper	$36,673.12	$95,578.74	$132,251.86
Royalty Due (5%)	$1,833.65	$4,778.94	$6,612.59
Royalty Paid	$1,833.65	$4,778.94	$6,612.59
Balance of Royalty Due	-0-	-0-	-0-

The audit has confirmed the accuracy and propriety of the royalty payments received by the regional Finance Officer applicable to copper sales during the period February 10, 1955, to May 31, 1956. It has also determined that all indicated sales during such period have been properly accounted for.

At the conclusion of the audit Mr. Peterson was informed of the audit findings.

C. E. Fisher
C. E. Fisher, Auditor

July 13, 1956

Check Sheet of Examining Engineer

Operator's Name Calumet & Hecla Inc.

Address Calumet, Michigan

Exploration Contract No. Idm-E765 Docket No. 3522

	Check One Yes	No
1. (a) Does the Operator stockpile ore subject to royalty repayment?		x
(b) If so, is segregation and identification procedure adequate?		
2. (a) Does Operator commingle production subject to DMEA royalties with exempt production?	x	
(b) If so, do you consider the allocation of the commingled production equitable?	x	
3. (a) Does the Operator stockpile mine or mill rejects (low grade ore, tailing, middlings, etc.) that may have potential value within the royalty payment period?		x
(b) If so, are adequate records maintained on such material to protect the Government's interest?		
4. Do you consider the assay controls in effect are adequate?	x	
5. Do you consider that the manner of disposing of production gives the Government its fair royalty returns?	x	
6. Do your periodic examinations of operations indicate the Operator is properly reporting his production of ores subject to DMEA royalties?	x	
7. Does the Operator buy from or sell to other Operators?	x	
8. Comment on any item 2 (b) to 6 if answer is No.		

Charles J. Stuhlik
Mining Engineer

Date June 26, 1956

82448

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
11-10	Griswold	500
	Rubin	140
	Sawyer	140
11-17	Chambliss	800
11/18	Selfridge	130
11/18	Stoter	130
	Nelson	130
		~~110~~ HB
		100
		220
		500

CERTIFICATION BY THE UNITED STATES OF AMERICA
OF A DISCOVERY OR DEVELOPMENT UNDER
AN EXPLORATION PROJECT CONTRACT

To: Mr. E. R. Lovell, President
Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

Pursuant to the provisions of Exploration Project Contract No. Idm-E765, dated February 10, 1955, Docket No. DMEA-3522, hereinafter called the "contract", between Calumet & Hecla, Inc. a corporation, and the United States of America, hereinafter called the "Government"; to establish and fix the Government's percentage royalty on production and its lien thereon and on the land described in the contract, the Government considers and therefore certifies that discovery or development from which production may be made has resulted from the exploration work.

The nature of said discovery or development is described broadly or indicated as follows: Drifting on the amygdaloidal Knowlton Lode of the Evergreen flow series has proved the existence of copper ores occurring within this lode.

Date: NOV 18 1958

WRGriswold/er 11-10-58
Copy to: Docket
Mr. C.A. Fredell, Dir.TDS,DMS
Mr. Lamb, USBM
Mr. Kiilsgaard, USGS
Dir. Read. File
Op. Committee
Cont. Adm & Audit Div.
Finance Office
Region V (2)
Mr. Johnson
W.R. Griswold
Chron.

THE UNITED STATES OF AMERICA

By Frank E. Johnson
ACTING Acting Director, Office of
Minerals Exploration

RECEIVED
NOV 12 1958
ASSOC. SOLICITOR
MINERAL RESOURCES

8623

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code

AIRMAIL

MAR 13 1967

Calumet Division
Calumet & Hecla, Inc.
1 Calumet Avenue
Calumet, Michigan 49913

Re: DMEA-3522 (Copper
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan

Gentlemen:

By the terms of the subject Exploration Project Contract, as amended, and the certification of discovery or development dated November 18, 1958, all minerals mined or produced from February 10, 1955, to February 10, 1967, were subject to the Government's royalty as set forth in said contract.

As the period during which production was subject to royalty has now expired, the Government according to its present records retains no claim or lien against the property subject to the contract or any future production therefrom. We, therefore, are closing our books and records on this contract. Your attention, however, is called to the provisions of the contract which require the Operator to keep and preserve certain records for the periods indicated.

Sincerely yours,

FRANK E. JOHNSON

Frank E. Johnson
Chief, Office of
Minerals Exploration

cc: Director's Reading File
Division File
Econ. Geol. File
OME Reading File
DMEA Docket
Region IV w/cy inc. 63
120M
Br. of Budget & Finance

MMerrithew/mm (3/10/67)

23263

OFFICE OF MINERALS EXPLORATION
CONTRACT ADMINISTRATION AND AUDIT DIVISION

REPORT OF REVIEW

I have reviewed the Monthly Reports of:

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

pertaining to Exploration Project Contract No. Idm-E765, DMEA No. 3522, including Amendments Nos. 1 and 2, for March 1955 to January 1958, inclusive, covering a copper project at the Caledonia Mine, Ontonagon County, Michigan.

My review included an examination of the Monthly Reports (Forms MF-104) and supporting documents, comparison of the claimed costs with the contract and pertinent schedules, verification of work performed by reference to Field Team reports and correspondence, and a determination of the reasonableness and propriety of the costs.

This review was made in lieu of a final audit of the Operator's accounts and records for the reasons that:

(a) the major portion ($61,774.22) of the billed costs was covered by an interim audit report and certificate issued by C. E. Fisher, DMEA Auditor, on November 9, 1956;

(b) the balance($2,534.21) of the billed costs for 1,493 feet of diamond drilling is deemed to be reasonable; and

(c) the administrative cost to the Government of an audit would be excessive in relation to the estimated amount of possible disallowances.

The findings of this review are stated in the following summary:

Total cost billed by Operator		$64,308.43
Less: Proceeds from property disposition		2,961.98
Net cost claimed by Operator		$61,346.45
Exceptions:		
Prior to this review	$66.66	
Herewith	-0-	66.66
Total accepted cost		$61,279.79

The contract calls for a 50 percent contribution of the allowable costs by the Government. Therefore, if the project is otherwise accepted as having met the terms of the contract, payments as follows are valid and proper:

Payable on audited claim	$30,639.89
Paid to date	30,639.89
Balance due Operator	-0-

C. E. Fisher

October 14, 1958 C. E. Fisher, Auditor

DEFENSE MINERALS EXPLORATION ADMINISTRATION
CONTRACT ADMINISTRATION AND AUDIT DIVISION

REPORT OF REVIEW

I have reviewed the Monthly Reports of

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

pertaining to Exploration Project Contract No. Idm-E765, DMEA No. 3522, including Amendments Nos. 1 and 2, for March 1955 to January 1958, inclusive, covering a copper project at the Caledonia Mine, Ontonagon County, Michigan.

My review included an examination of the Monthly Reports (Forms MF-104) and supporting documents, comparison of the claimed costs with the contract and pertinent schedules, verification of work performed by reference to Field Team reports and correspondence, and a determination of the reasonableness and propriety of the costs.

This review was made in lieu of a final audit of the Operator's accounts and records for the reasons that:

(a) the major portion ($61,774.22) of the billed costs was covered by an interim audit report and certificate issued by C. E. Fisher, DMEA Auditor, on November 9, 1956;

(b) the balance ($2,534.21) of the billed costs for 1,493 feet of diamond drilling is deemed to be reasonable; and

(c) the administrative cost to the Government of an audit would be excessive in relation to the estimated amount of possible disallowances.

The findings of this review are stated in the following summary:

Total cost billed by Operator		$64,308.43
Exceptions:		
Prior to this review	$66.66	
Herewith	-0-	66.66
Total accepted cost		$64,241.77

The contract calls for a 50 percent contribution of the allowable costs by the Government. Therefore, if the project is otherwise accepted as having met the terms of the contract, payments as follows are valid and proper:

Payable on audited claim	$32,120.88
Paid to date	32,104.86
Balance due Operator	$ 16.02

August 27, 1958

C. E. Fisher, Auditor

Approved
[illegible]
Betty

DEFENSE MINERALS EXPLORATION ADMINISTRATION
CONTRACT ADMINISTRATION AND AUDIT DIVISION

SECOND INTERIM AUDIT CERTIFICATE

I have examined the records and transactions of

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

pertaining to Exploration Project Contract No. Idm-E765, Docket No. DMEA-3522, dated February 10, 1955, covering a project for the exploration of copper on property known as Caledonia Mine located in Ontonagon County, Michigan, for the period February 10, 1955, to July 31, 1956.

My examination was made in accordance with generally accepted standards applicable in the circumstances.

The audit disclosed the following facts in regard to the amount to be paid the contractor:

Total cost as billed by contractor		$61,774.22
Exceptions (see Audit Report for details):		
Prior to this audit	$ -0-	
During this audit	66.66	66.66
Total accepted cost		$61,707.56

The contract calls for a 50 percent participation of exploration expenses by the United States Government. Therefore, payment to the contractor by the Government in the amount of Thirty thousand eight hundred fifty-three and 78/100

$30,853.78

is valid and proper.

This certificate is issued on the provision that the Regional Executive Officer, the Administrator, or other competent official has accepted or will accept the project as having otherwise met the terms of the contract.

C. E. Fisher
C. E. Fisher, Auditor

November 9, 1956

SECOND INTERIM AUDIT REPORT

I. INTRODUCTION

During the period October 16 to 19, 1956, a second interim audit (covering the months of June and July, 1956) was made of the records and transactions pertaining to Exploration Project Contract No. Idm-8765, Docket No. DMEA-3522, dated February 10, 1955, with:

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

covering a project for the exploration of copper on property known as Caledonia Mine located in Ontonagon County, Michigan.

An audit of production and sales records relating to ore mined and sold by this Operator, subject to percentage royalty due the Government under the provisions of this contract, was made concurrently with this cost audit. Also, a final audit of costs incurred and a third audit of royalties payable to the Government under the terms of Exploration Project Contract No. Idm-8[illegible], Docket No. DMA-1207X, with this Operator, were made during such period. The results of these audits are included in separate audit reports.

The original accounting records pertaining to these audits are located in the Calumet Division general plant office building of the company in Calumet, Michigan, and were made available to this auditor by Mr. B. C. Peterson, Controller, and Mr. Thomas R. Thomas, Internal Auditor, of the Calumet Division. Their cooperation, together with that of other members of the Operator's staff, greatly facilitated the audit work.

II. GENERAL INFORMATION ON RECORDS

The accounting records for the exploration project are completely integrated with the general accounts covering the Calumet Division's exploration, development, underground mining, mill, smelter and other operations.

The Operator employs modern bookkeeping and cost accounting methods including extensive use of IBM machines. A system of internal check and control is maintained. The records were found to be accurate and well maintained so that reliable results were obtained with respect to the exploration project during the period under review.

The Operator's accounts are audited annually by Flaherty, Bliss and Company, Certified Public Accountants, Boston, Massachusetts.

III. SCOPE OF AUDIT AND FINDINGS

The audit was limited to ascertaining the accuracy, propriety and validity of the costs shown in the "Totals to Date" column of the Form MF-104 for the month of July, 1956, which had been adjusted to reflect the amount of disallowances made in the prior interim audit of this contract.

The Operator's reported costs for exploration drifting during July, 1956, amounted to $3,032.03 for 121 feet of drifting making a total of 2,135 feet since the start of the contract. This was 55 feet in excess of 2,080 feet set forth in Exhibit "A" of the contract. In claiming costs on Form MF-104 for July, 1956, the Operator deducted an amount of $1,378.20 described as "Less adjustment for footage". This deduction was based on 55/121 of the total costs for July, 1956. For purpose of this audit, the amount of $1,378.20 has been prorated to the various "Items of Costs" reported on Form MF-104 for July, 1956, on the same basis.

The extent of the audit and the findings under each of the "Items of Cost", as adjusted, follow:

(1) Independent Contracts

This contract makes provision for diamond drilling which may be performed under independent contracts or by the Operator's own force. None of the diamond drilling was accomplished to the date of this audit.

(2) Labor and Supervision

Item	Costs for Period Claimed	Costs for Period Accepted	Accepted Costs to 7-31-56
Labor			
Miners	$1,324.26	$1,324.26	$14,480.82
Trammers	602.47	602.47	6,946.95
Surfacemen	202.38	202.38	6,657.10
Total labor	$2,129.11	$2,129.11	$28,084.87
Supervision			
Mine Captain	$ 37.45	$ -0-	$ -0-
Shift Foremen (2)	71.15	46.04	736.64
Total supervision	$ 108.60	$ 46.04	$ 736.64
Total labor and supervision	$2,237.71	$2,175.15	$28,821.51

Labor

The claimed and accepted costs for wages of miners were found to represent amounts paid to the miners engaged in advancing the drift under the contract at the prevailing days-pay rates in the district, including premium pay; and in addition a bonus of $5.00 per foot for each foot of advance in excess of 3½ feet per shift worked determined on basis of measurements made for each weekly pay period.

Trammers were paid at days-pay rates, plus overtime. They did not participate in the bonus. The shift foremen reported the time of trammers divided between stoping and exploration on basis of actual time engaged in each operation. Only the wages earned in connection with exploration were charged to costs under this contract.

Surfacemen were paid at days-pay rates, plus overtime. A portion of the total wages paid to surfacemen each month was allocated to exploration costs on basis of ratio of relative number of tons of ore and poor rock removed from the exploration drift to total tons of ore and poor rock removed from the entire mine during that month.

The accepted labor costs per foot of advance and per shift worked were as follows:

Item	Accepted Costs	Per foot (2,080 feet)	Per shift worked Shifts	Per shift worked Average
Miners	$14,480.82	$ 6.95	708.8	$20.33
Trammers	6,946.95	3.34	509.6	13.63
Surfacemen	6,657.10	3.20	550.3	12.10
Totals	$28,084.87	$13.49	1,768.7	$15.87

The United Steel Workers of America, C.I.O., is the bargaining agent for employees (except supervisory, technical and clerical employees) of the Calumet Division located in Houghton and Keweenaw Counties, Michigan. The employees at Caledonia Mine, which is located in Ontonagon County, Michigan, are not organized. Such employees receive wage rates and fringe benefits comparable to those of the company employees represented by the Union.

Supervision

The contract provides for two supervisors at $384.00 per month each which are allowable maximums. Also the period of 16 months as well as the total amount of $12,288.00 provided for supervision in the cost estimate are maximums. These maximums were placed in the contract in anticipation of the exploration work being the only work in the mine at the time over which supervision costs could be spread. Inasmuch as mining operations have been conducted concurrently with the exploration, the supervision costs have been prorated and have been substantially less than the contract maximums.

The accepted costs for salaries of two shift foremen amount to $736.64 at rate of $46.04 per month for the maximum period of 16 months provided by the contract. The monthly rate, $46.04, was based on estimates of 10 hours per month by each foremen devoted to supervision of the exploration at $2.302 per hour, the average hourly rate of wages on basis of $384.00 per month, the prevailing rate for shift foremen at the time the contract was entered into. Disallowance of $25.11 has been made in connection with such salaries representing amount claimed for July, 1956, subsequent to the expiration of the 16 month period.

The amount of $37.45 claimed for supervision of the mine captain during the period has been disallowed for the reason that the contract provides for but two supervisors at rates not to exceed $384.00 per month.

(3) Operating Materials and Supplies

Item	Claimed and Accepted Costs for Period	Total Accepted Costs
Timber	$ -0-	$ 123.49
Explosives	1,087.76	10,437.75
Pipe	226.80	2,358.76
Track	206.26	4,253.95
Power	355.26	3,970.56
Drill Steel	-0-	767.81
Miscellaneous	55.41	346.69
Totals	$1,931.49	$22,259.01

All charges for material and supplies during the period covered by this audit were checked against monthly detailed cost summaries and analysis was made to determine propriety of the items charged. Materials are issued from stock on requisitions of mine captains and are priced on average cost basis without addition of a handling markup.

(4) Operating Equipment

(a) Rental

This subcategory is not applicable to this contract.

(b) Purchase

This subcategory is not applicable to this contract.

(c) Depreciation

Items	Monthly Rates (Contract)	Claimed and Accepted Costs Period (1 month)	Claimed and Accepted Costs Total (36 months)
2 tram cars @ $9.00	$ 18.00	$ 18.00	$ 288.00
2 drill machines @ $9.00	18.00	18.00	288.00
1 Eimco loader	76.67	76.67	1,226.72
1 battery locomotive	100.00	100.00	1,600.00
1 compressor	183.33	37.44	925.89
1 truck	260.00	26.55	656.55
Totals	$656.00	$276.66	$4,985.16

The contract specifically enumerates the above items of company-owned equipment to be used in connection with this exploration work and provides that the monthly rates shown above shall be allowable maximums. In addition the contract provides for allowable maximum total charge for depreciation of company-owned equipment amounting to $10,496.00 and for a maximum period of 16 months. None of these maximums have been exceeded.

The tram cars, drill machines, Kinco loader and battery locomotive were used exclusively in the exploration work under the contract and the claimed costs applicable to these items have been accepted for purposes of this audit.

The rate of $260.00 per month for depreciation of the truck was stated in the contract, however, as set forth in the prior interim audit it was agreed with the Operator's representatives that a fair rental rate of the truck was $130.00 per month and such rate has been used in computing the claimed and accepted costs shown above.

The truck, as well as the compressor, served all operations at the mine, including production operations. In accord with agreement reached with the Controller of the Calumet Division at the time of the prior interim audit, the depreciation charges properly applicable to the truck at $130.00 per month and the compressor at $183.33 per month have been allocated to exploration costs on basis of ratio of number of tons of ore and poor rock removed from the exploration drift to the total number of tons of ore and poor rock removed from the entire mine during the month, that is, the same basis as has been used to prorate the cost of surface labor at the mine.

(5) Initial Rehabilitation and Repairs

This item is not applicable to this contract.

(6) New Buildings, Improvements, etc.

This item is not applicable to this contract.

(7) Miscellaneous

Items	Costs for Period Claimed	Costs for Period Accepted	Total Accepted Costs
Payroll Taxes	$ 66.92	$ 65.17	$ 895.90
Workmen's Compensation Ins.	66.42	65.92	1,012.84
Health & Accident Ins.	92.08	90.23	814.62
Vacation Allowances	42.39	42.39	1,046.66
Holiday Pay	90.00	90.00	616.33
Total fringe benefits	$357.81	$353.71	$4,386.35
Accounting	86.54	86.54	926.54
Telephone and Telegraph	16.19	16.19	299.22
Maintenance of Equipment	-0-	-0-	29.77
Totals	$460.54	$456.44	$5,641.88

The claimed costs for Payroll Taxes, Workman's Compensation Insurance, Health and Accident Insurance, Vacation Allowance and Holiday Pay represent the cost to the Operator of "fringe benefits" accruing to employees based on laws of the United States and the State of Michigan. The amounts charged to exploration costs were determined each month on basis of ratios of actual costs accrued during the month to total payrolls during the month. Percentages thus established for the various items were applied to total wages paid to employees as listed under (2) Labor and Supervision, except that no charge was made to exploration costs for Vacation Allowance and Holiday Pay applicable to supervisors (Mine Captain and Shift Foreman).

As set forth under (2) Labor and Supervision disallowances aggregating $62.56 ($25.11 plus $37.45) have been made in connection with supervision charges during this audit. Fringe benefits applicable to such disallowances are as follows:

Item	Amount
Payroll Taxes	$1.75
Workman's Compensation Insurance	.50
Health and Accident Insurance	1.85
Total	$4.10

The total accepted cost for fringe benefits amounts to $4,386.35, or 15.22 percent of $28,821.51, total accepted costs of labor and supervision and is considered to be reasonable and proper for inclusion in exploration costs.

The charge for accounting amounted to $56.00 per month and is an estimate of actual costs. The charge for accounting is authorized by the contract and the rate of $56.00 per month is considered to be reasonable.

The charge for Telephone and Telegraph represents a proportion of the cost of telephone service at the mine allocated to exploration costs on basis of relative number of tons of ore and poor rock removed from the exploration drifts to the total number of tons of ore and poor rock removed from the mine during the month. The basis used for allocating such cost is considered to be equitable.

IV. CONCLUSIONS

The audit disclosed that all costs charged to this project, with the exception of the disallowances aggregating $66.66, as itemized in the preceding section of this report, are reasonable and proper under the terms of the contract.

The adjustment between "Items of Costs" as shown on the July, 1956, Form MF-104, the disallowances, and the accepted costs as disclosed by this audit are summarized as follows:

Item	Totals July MF-104	Corrected Distribution	Disallowances	Accepted
(2) Labor & Supervision:				
Labor	$28,749.05	$28,084.87	$	$28,084.87
Supervision	831.14	799.20	62.56	736.64
(3) Oper. Matls. & Supp.:				
Timber	123.49	123.49		123.49
Explosives	10,673.67	10,437.75		10,437.75
Pipe	2,358.76	2,358.76		2,358.76
Track	4,410.36	4,253.95		4,253.95
Drill Steel		767.81		767.81
Power	4,071.60	3,970.56		3,970.56
Miscellaneous	1,160.69	346.69		346.69
(4) Operating Equip.:				
Depreciation	4,985.16	4,985.16		4,985.16
(7) Miscellaneous:				
Payroll Taxes	918.47	897.65	1.75	895.90
Workmen's Comp.Ins.	1,034.05	1,013.34	.90	1,012.84
Health & Acc. Ins.		816.47	1.85	814.62
Vacation Allowance		1,046.66		1,046.66
Holiday Pay		616.33		616.33
Accounting		926.54		926.54
Main. of Equip.		29.77		29.77
Tel. & Tel.		299.22		299.22
Miscellaneous	3,835.98			
Adjustment for Postage	(1,378.20)			
Totals	$61,774.22	$61,774.22	$66.66	$61,707.56

This contract contained numerous items of cost expressly designated as "allowable maximums". The status of these allowable maximums, after the adjustments discussed in Section III of this report, is summarized as follows:

	Allowable Maximum	Acceptable Cost	Balance
Independent Contracts:			
3,300 feet of diamond drill.	$16,500.00	(a)	$16,500.00
Cost per foot	$ 5.00	(a)	
Supervision:			
Number of supervisors	2	2	
Time period	16 months	16 months	
Rates of pay ($384/mo.ea.)	$ 768.00	$ 46.04	$ 721.96
Total pay	$12,288.00	$ 736.64	$11,551.36

Item	Allowable Maximum	Acceptable Cost	Balance
Operating Equipment-Depreciation:			
Time period	16 months	16 months	
Monthly rates:			
2 Tram cars	$ 18.00	$ 18.00	
Drill machines (2)	18.00	18.00	
1 Rimes loader	76.67	76.67	
1 Battery locomotive	100.00	100.00	
1 Compressor	183.33	57.87	$ 125.46
1 Truck	260.00	41.03	218.97
Total	$ 656.00	$ 311.57	$ 344.43
Total depreciation of equipment	$10,496.00	$ 4,985.16	$ 5,510.84
Total cost of contract (rounded)	$113,110.00	$61,707.56	$51,402.44
Government participation (50%)	56,555.00	$30,853.78	$25,701.22

(a) None of the diamond drilling work was accomplished prior to the date of this audit.

At the conclusion of the audit on October 19, 1956, the findings were discussed with Mr. B. C. Petersen, Controller, and Mr. Thomas R. Thomas, Internal Auditor, Calumet Division, Calumet & Hecla, Inc., who indicated their concurrence.

C. E. Fisher

C. E. Fisher, Auditor

November 9, 1956

Transcribed

[redacted]

DEFENSE MINERALS EXPLORATION ADMINISTRATION
CONTRACT ADMINISTRATION AND AUDIT DIVISION

INTERIM AUDIT CERTIFICATE

I have examined the records and transactions of

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

pertaining to Exploration Project Contract No. Im-2765, Docket No. DMA-1322, dated February 10, 1955, covering a project for the exploration of copper on property known as Caledonia Mine located in Ontonagon County, Michigan, for the period February 10, 1955, to May 31, 1956.

My examination was made in accordance with generally accepted standards applicable in the circumstances.

The audit disclosed the following facts in regard to the amount to be paid the contractor:

Total cost as billed by contractor		$65,028.99
Exceptions (see Audit Report for details):		
Prior to this audit	$ -0-	
During this audit	$ 3,160.77	$ 3,160.77
Total Accepted Cost		$61,867.22

The contract calls for a 50 percent participation of exploration expenses by the United States Government. Therefore, payment to the contractor by the Government in the amount of Twenty-eight thousand four hundred thirty-three and 91/100 Dollars

$28,433.91

is valid and proper.

This certificate is issued on the provision that the Regional Executive Officer, the Administrator, or other competent official has accepted or will accept the project as having otherwise met the terms of the contract.

C. E. Fisher
C. E. Fisher, Auditor

July 13, 1956

INTERIM AUDIT REPORT

I. INTRODUCTION

During the period June 11 to 28, 1956, an interim audit (covering the period February 10, 1955, to May 31, 1956, inclusive) was made of the records and transactions pertaining to Exploration Project Contract No. Idm-2765, Docket No. DMA-3522, dated February 10, 1955, with:

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

covering a project for the exploration of copper on property known as Caledonia Mine located in Ontonagon County, Michigan.

An audit of production and sales records relating to ore mined and sold by this operator, subject to percentage royalty due the Government under the provisions of this contract, was made concurrently with this cost audit. Also, a fourth interim audit of costs incurred and a second audit of royalties payable to the Government under the terms of Exploration Project Contract No. Idm-298, Docket No. DMA-1207X, with this operator, were made during such period. The results of these audits are included in separate audit reports dated July 13, 1956.

The original accounting records pertaining to these audits are located in the Calumet Division general plant office building of the company in Calumet, Michigan, and were made available to this auditor by Mr. R. C. Peterson, Controller, and Mr. Thomas R. Thomas, Internal Auditor, of the Calumet Division. Their cooperation, together with that of other members of the operator's staff and Mr. Charles J. Stehlik, Mining Engineer, Bureau of Mines, Houghton, Michigan, greatly facilitated the audit work.

II. GENERAL INFORMATION ON RECORDS

The accounting records for the exploration project are completely integrated with the general accounts covering the Calumet Division's exploration, development, underground mining, mill, smelter and other operations.

The operator employs modern bookkeeping and cost accounting methods including extensive use of IBM machines. A system of internal check and control is maintained. The records were found to be accurate and well maintained so that reliable results were obtained with respect to the exploration project during the period under review.

The operator's accounts are audited annually by Flaherty, Bliss and Company, Certified Public Accountants, Boston, Massachusetts.

III. SCOPE OF AUDIT AND FINDINGS

The audit was limited to ascertaining the accuracy, propriety and validity of the costs shown in the "Totals to Date" column of the Form MP-104, Operator's Monthly Report and Voucher, for the month of May, 1956.

The extent of the audit and the findings under each of the "Items of Cost" follow:

(1) Independent Contracts

This contract makes provision for diamond drilling which may be performed under independent contracts or by the operator's own force. None of the diamond drilling was accomplished during the period under review.

(2) Labor and Supervision

Item	Costs Claimed	Costs Accepted
Labor		
Miners	$13,156.56	$13,156.56
Trammers	6,344.48	6,344.48
Surfacemen	5,672.47	6,454.72
Total Labor	$25,173.51	$25,955.76
Supervision		
Mine Captain	$ 363.45	$ -0-
Shift Foremen (2)	690.40	690.40
Total Supervision	$ 1,053.85	$ 690.40
Technical Services	None	None
Total Labor and Supervision	$26,227.36	$26,646.36

Labor

The claimed and accepted costs for wages of miners were found to represent amounts paid to the miners engaged in advancing the drift under the contract at the prevailing days-pay rates in the district, including premium pay; and in addition a bonus of $5.00 per foot for each foot of advance in excess of 3½ feet per shift worked determined on basis of measurements made for each weekly pay period.

Trammers were paid at days-pay rates, plus overtime. They did not participate in the bonus. The shift foremen reported the time of trammers divided between stoping and exploration on basis of actual time

engaged in each operation. Only the wages earned in connection with exploration were charged to costs under this contract.

Surfacemen were paid at days-pay rates, plus overtime. A portion of the total wages paid to surfacemen each month was allocated to exploration costs on basis of ratio of relative number of tons of ore and poor rock removed from the exploration drift to total number of tons of ore and poor rock removed from the entire mine during that month. During March, April, and May, 1955, errors were made in transcribing wages paid to surfacemen from IBM records to work sheets supporting Forms MF-104 which resulted in undercharges to exploration costs amounting to $782.25, which amount has been included in the accepted costs shown in the above tabulation.

The accepted labor costs per foot of advance and per shift worked during the period were as follows:

Item	Accepted Costs	Per foot (1879 feet)	Per shift worked Shifts	Per shift worked Average
Miners	$13,156.56	$ 7.00	645.8	$20.37
Trammers	6,344.48	3.38	467.1	13.58
Surfacemen	6,454.72	3.43	533.5	12.10
Totals	$25,955.76	$13.81	1,646.4	$15.77

The United Steel Workers of America, C.I.O., is the bargaining agent for employees (except supervisory, technical and clerical employees) of the Calumet Division located in Houghton and Keweenaw Counties, Michigan. The employees at Caledonia Mine, which is located in Ontonagon County, Michigan, are not organized. Such employees receive wage rates and fringe benefits comparable to those of the company employees represented by the Union.

Supervision

The contract provides for two supervisors at $384.00 per month each which are allowable maximums. Also the period of 16 months as well as the total amount of $12,288.00 provided for supervision in the cost estimate are allowable maximums. These maximums were placed in the contract in anticipation of the exploration work being the only work in the mine at the time over which supervision costs could be spread. Inasmuch as mining operations have been conducted concurrently with the exploration, supervision costs have been prorated and have been substantially less than the contract maximums.

The claimed and accepted costs for salaries of two shift foremen amounting to $690.60 at rate of $48.04 per month were based on estimates of 10 hours per month by each foreman devoted to supervision of the exploration at $2.302 per hour, the average hourly rate of wages on basis of $384.00 per month, the prevailing rate for shift foremen at the time the contract was entered into.

The claimed cost for supervision of the mine captain amounting to $24.23 per month was based on estimate of 20 hours per month devoted to supervision of the exploration. Such claimed costs, aggregating $363.45 for the period, have been disallowed by this auditor for the reason that the contract provides for but two supervisors at rates not to exceed $384.00 per month each.

(3) Operating Materials and Supplies

Item	Costs Claimed	Costs Accepted
Timber	$ 123.49	$ 123.49
Explosives	9,349.99	9,349.99
Pipe	2,131.96	2,131.96
Track	4,047.69	4,047.69
Power	3,615.30	3,195.34
Drill Steel	-0-	767.81
Miscellaneous	4,615.72	[illegible]
Totals	$23,884.15	$19,907.36

All charges for material and supplies during the period covered by this audit were checked against monthly detailed cost summaries and analysis was made to determine propriety of the items charged. Materials are issued from stock on requisitions of mine captains and are priced on average cost basis without addition of a handling mark-up.

The cost of Power was charged to the exploration project at standard rates per machine-day during which such machines were in use. The daily rates, based on the operator's cost experience, and the total claimed and accepted costs for power for 309 days of operation during the period were as follows:

Item	Daily Rates	Costs Claimed	Costs Accepted
Drill Machines	$ 4.95	$1,529.55	$1,529.55
Rimes Loader	4.75	1,467.75	1,467.75
Charging Locomotive	2.00	618.00	618.00
Totals	$11.70	$3,615.30	$3,615.30

Of Miscellaneous claimed costs amounting to $4,615.72 it was determined that $767.81 represented cost of Drill Steel which has been shown separately in accepted costs in the above tabulation.

Claimed costs under Miscellaneous also included charges during the period January to May, 1956, inclusive, aggregating $3,556.63, representing the cost of 10,028 feet of Simplex cable, plus certain shop and

other costs in connection with the installation of ventilation in the drift. Other charges in connection with this ventilation incurred prior to January, 1956, were not charged to exploration costs under the contract. The amount of $3,556.43 has been disallowed for the reason that the contract does not provide for Government contribution to ventilation costs.

The accepted cost for miscellaneous material amounting to $291.28 includes cost of small equipment, hand tools, hardware, etc.

(4) Operating Equipment

(a) Rental

This subcategory is not applicable to this contract.

(b) Purchase

This subcategory is not applicable to this contract.

(c) Depreciation

Items	Monthly Rate	Costs-(15 months, March, 1955, to Mar. 1956, inclusive) Claimed	Accepted
2 Trum cars @ $9.00	$ 18.00	$ 270.00	$ 270.00
2 Drill machines @ $9.00	18.00	270.00	270.00
1 Rimes loader	76.67	1,150.05	1,150.05
1 Battery locomotive	100.00	1,500.00	1,500.00
1 Compressor	183.33	2,749.95	888.15
1 Truck	260.00	1,950.00	650.00
Totals	$656.00	$9,840.00	$4,728.20

The contract specifically enumerates the above items of company-owned equipment to be used in connection with this exploration work and provides that the monthly rates shown above shall be allowable maximums. In addition the contract provides for allowable maximum total charge for depreciation of company-owned equipment amounting to $10,296.00 and for a maximum period of use of 16 months. None of these maximums had been exceeded during the period covered by the audit.

The trum cars, drill machines, Rimes loader and battery locomotive were used exclusively in the exploration work under the contract and the claimed costs applicable to these items have been accepted for purposes of this audit.

The rate of $260.00 per month for depreciation of the truck was stated in the contract as including the cost of gasoline and oil used by the truck. The audit did not disclose any separate charges to the exploration costs for such items nor for any other costs of operating the truck such as repairs, tires, etc. The $260.00 rate could not be substantiated by the operator's records and it was agreed by the operator's representatives and this auditor that a fair rental rate for the truck would be $130.00 per month, based on average actual costs during the period September, 1954, to August, 1955, inclusive, computed as follows:

Item	Monthly Average
Gasoline, oil, tires, repairs, etc.	$101.00
Insurance	3.00
License fees	2.00
Depreciation (1/60th of $1,433.75 cost of the truck)	24.00
Total	$130.00

Disallowance of $1,990.00 has been made based on 15 months at excessive rate of $130.00 per month.

The truck, as well as the compressor, served all operations at the mine, including production as well as exploration operations. It was agreed with the Controller of the Calumet Division that a fair basis for allocating the depreciation charges properly applicable to the truck at rate of $130.00 per month and the compressor at $183.33 per month would be the ratio of number of tons of ore and poor rock removed from the exploration drift to the total number of tons of ore and poor rock removed from the entire mine during the month, that is, the same basis as has been used to prorate cost of surface labor at the mine. This resulted in a further disallowance of $1,320.00 applicable to the truck and a disallowance of $1,861.50 applicable to the compressor.

(5) Initial Rehabilitation and Repairs

This item is not applicable to this contract.

(6) New Buildings, Improvements, etc.

This item is not applicable to this contract.

(7) Miscellaneous

Item	Costs Claimed	Costs Accepted
Payroll Taxes	$ 809.01	$ 830.73
Workmen's Compensation Insurance	984.47	946.92
Health and Accident Insurance	711.63	724.39
Vacation Allowance	969.85	1,004.27
Holiday Pay	509.12	526.33
Totals - Fringe Benefits	$3,984.08	$4,032.64
Accounting	840.00	840.00
Telephone and Telegraph	283.03	283.03
Maintenance of Equipment	29.77	29.77
Totals	$5,076.88	$5,185.44

The claimed costs for Payroll Taxes, Workmen's Compensation Insurance, Health and Accident Insurance, Vacation Allowance and Holiday Pay represent the cost to the operator of "fringe benefits" accruing to employees based on laws of the United States and the State of Michigan. The amounts charged to exploration costs were determined each month on basis of ratios of actual costs accrued during the month to total payrolls during the month. Percentages thus established for the various items were applied to total wages paid to employees as listed under (2) Labor and Supervision, except that no charge was made to exploration costs for Vacation Allowance and Holiday Pay applicable to supervisors (Mine Captain and Shift Foreman).

As set forth under (2) Labor and Supervision an additional allowance amounting to $782.25 has been made in this audit report covering omitted wages of surfaceman and disallowance of $363.45 has been made representing portion of salary of the mine captain. Adjustment is hereby made in claimed cost of fringe benefits applicable to such salaries and wages as follows:

Item	Additional Allowance (Surfaceman)	Disallowance (Mine Captain)
Payroll Taxes	$ 28.16	$ 6.44
Workmen's Compensation Insurance	30.19	7.74
Health and Accident Insurance	19.20	6.44
Vacation Allowance	34.42	-0-
Holiday Pay	17.21	-0-
Totals	$129.18	$20.62
Disallowances	20.62	
Net additional allowance	$108.56	

The total accepted costs for fringe benefits amounts to $4,032.64, or 15.93% of $26,646.36, total accepted costs of labor and supervision and is considered to be reasonable and proper for inclusion in exploration costs.

The charge for accounting amounted to $56.00 per month and is an estimate of actual costs. The charge for accounting is authorized by the contract and the amount of $56.00 per month is considered to be reasonable.

The charge for Telephone and Telegraph represents a proportion of the cost of telephone service at the mine allocated to exploration costs on basis of relative number of tons of ore and poor rock removed from the exploration drifts to the total number of tons of ore and poor rock removed from the mine during the month. The basis used for allocating such cost is considered to be equitable.

The charge for Maintenance of Equipment amounting to $29.77 relates to repairs made to equipment used by miners in the exploration drift.

IV. CONCLUSIONS

The audit disclosed that all costs charged to this project, with the exception of the net disallowances aggregating $5,360.77, as itemized in the preceding section of this report, are reasonable and proper under the terms of the contract.

The adjustment between "Items of Cost" as shown on the May, 1956, Form MF-104, the allowances and disallowances, and the accepted costs as disclosed by this audit are summarized as follows:

	Totals May MF-104	Corrected Distribution	Audit Allowances (Disallowances)	Accepted Cost
(2) Labor & Supervision:				
Labor	$25,173.51	$25,173.51	$ 782.25	$25,955.76
Supervision	1,054.85	1,054.85	(364.45)	690.40
(3) Oper. Matls. & Sup.:				
Timber	123.49	123.49		123.49
Explosives	9,349.99	9,349.99		9,349.99
Pipe	2,131.96	2,131.96		2,131.96
Track	4,047.49	4,047.49		4,047.49
Drill Steel	-0-	767.81		767.81
Power	3,615.30	3,615.30		3,615.30
Miscellaneous	4,615.72	3,847.91	(3,556.63)	291.28

	Totals May NF-104	Corrected Distribution	Audit Allowances (Disallowances)	Accepted Cost
(4) Operating Equip.:				
Depreciation	9,840.00	9,840.00	(5,131.50)	4,708.50
(7) Miscellaneous:				
Payroll Taxes	809.01	809.01	21.72	830.73
Workmen's Comp.Ins.	904.47	904.47	22.45	926.92
Health & Accident Insurance	711.63	711.63	12.76	724.39
Vacation Allowance	969.85	969.85	34.42	1,004.27
Holiday Pay	509.12	509.12	17.21	526.33
Accounting	840.00	840.00		840.00
Maintenance of Equip.	29.77	29.77		29.77
Tel. & Tel.	283.03	283.03		283.03
Totals	$65,028.39	$65,028.39	$(8,160.77)	$56,867.62

This contract contained numerous items of cost correctly designated as "allowable variations". The status of these allowable variants, after the adjustments discussed in Section III of this report, is summarized as follows:

	Allowable Variance	Acceptable Cost	Balance
Independent Contracts:			
3,300 feet of diamond drilling	$ 16,500.00	(a)	$16,500.00
Cost per foot	$ 5.00	(a)	
Supervision:			
Number of supervisors	-- 2	-- 2	--
Time period	16 months	15 months	1 month
Rates of pay ($384.00/mo. each)	$ 766.00	$ 46.04	$ 721.96
Total pay	$ 12,288.00	$ 690.60	$11,597.40
Operating Equipment- Depreciation:	--	--	--
Time period	16 months	15 months	1 month
Monthly rates:			
2 Tram Cars	$ 18.00	$ 18.00	
2 Drill Machines	18.00	18.00	
1 Rinse Loader	76.67	76.67	
1 Battery Locomotive	100.00	100.00	
1 Compressor	183.33	59.23	$ 124.10
1 Truck	260.00	42.00	218.00
Total	$ [illegible]	$ [illegible]	$ [illegible]
Total	$ 10,496.00	$ 4,708.50	$ 5,787.50
Total Cost of Contract (Rounded)	$113,110.00	$56,867.62	$56,242.38
Government Participation (50%)	$ 56,555.00	$28,433.81	$28,121.09

(a) None of the diamond drilling work was accomplished during the period covered by this interim audit.

At the conclusion of the audit on June 28, 1956, the findings were discussed with Mr. B. C. Peterson, Controller, and Mr. Thomas R. Thomas, Internal Auditor, Calumet Division, Calumet & Hecla, Inc., who indicated their acceptance of the proposed disallowances.

C. E. Fisher

C. E. Fisher, Auditor

July 13, 1956

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TERMINATION AGREEMENT

It is agreed this 7th day of April, 1958, between the United States of America, acting through the Department of the Interior, Defense Minerals Exploration Administration, hereinafter called the "Government", and Calumet & Hecla, Inc., hereinafter called the "Operator", parties to that certain Exploration Project Contract No. Idm-E765, Docket No. DMEA-3522, dated February 10, 1955, as amended, hereinafter called the "Contract", that:

1. Effective February 1, 1958, the Contract and all obligations of the parties thereunder, except as otherwise herein expressly provided, shall be and are hereby terminated.

2. The Government shall contribute to allowable costs incurred prior to said effective date; and shall contribute to allowable costs incurred or to be incurred beginning with said effective date in performing winding-up or settlement actions provided for in the contract, including (a) the preservation and disposal of property to the cost of which the Government has contributed, and (b) the making and rendering of reports and accounts.

3. The Operator shall promptly perform all winding-up and settlement actions provided for in the Contract, including the disposal of any facilities, buildings, fixtures, equipment, or other items to the cost of which the Government has contributed; and the rendering of the final report and final account.

4. All rights of the Government respecting certification of discovery or development, percentage royalty and liens to secure payment thereof, reports (including preservation of Operator's records), accounts, audits, and the right to recover any overpayment, are hereby preserved.

5. The Operator hereby releases and agrees to save the Government harmless from all claims or demands under or arising out of said Contract, except as otherwise provided in this Termination Agreement.

App'd. Sol. Off.

IN WITNESS WHEREOF, these parties have executed this agreement as of the day and year first above written.

THE UNITED STATES OF AMERICA

By C O Mittendorf
Administrator, Defense Minerals
Exploration Administration

CALUMET & HECLA, INC.

By J S Crome

Title Vice President

RECEIVED
MAY 8 - 1958
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

Government's copy

App'd. Sol. Off.

EXPLORATION PROJECT CONTRACT
CALUMET & HECLA, INC.
DOCKET NO. DMEA-3522

AMENDMENT NO. 2

It is agreed this 25th day of October, 1957, between the United States of America, acting through the Department of the Interior, Defense Minerals Exploration Administration, and Calumet & Hecla, Inc., that Exploration Project Contract No. Idm-E765 (Docket No. DMEA-3522), dated February 10, 1955, as amended, is further amended effective October 10, 1957, as follows:

1. In Article 3 the time fixed for completion of the work is further extended from October 10, 1957, to April 10, 1958.

2. In Article 8(b)(2), the period "twelve years" is substituted for the period "eleven years."

This amendment shall not be construed to increase the estimated total cost of the project, the aggregate total amount which the Government may be required to contribute, or the amount of any item designated as "maximum."

Executed in quintuplicate the day and year first above written.

THE UNITED STATES OF AMERICA

By O P Mitteudorf
Administrator, Defense Minerals
Exploration Administration

CALUMET & HECLA, INC.

By [illegible]

Title Vice President & General Manager

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EXPLORATION PROJECT CONTRACT
CALUMET & HECLA, INC.
DOCKET NO. DMEA-3522

AMENDMENT NO. 1

It is agreed this 22nd day of October, 1955, between the United States of America, acting through the Department of the Interior, Defense Minerals Exploration Administration, and Calumet & Hecla, Inc., that Exploration Project Contract No. Idm-8765 (Docket No. DMEA-3522), dated February 10, 1955, is amended, effective October 1, 1956, as follows:

1. (a) Work under the Contract shall be suspended during the period beginning October 1, 1956, and ending not later than May 1, 1957.

(b) No costs incurred by the Operator during the period of suspension shall be allowable for contribution by the Government, and the Government shall not contribute to any costs of rehabilitation or repair which, in its opinion, would not have occurred if there had been no suspension of the work.

(c) The Operator at his own cost and expense, without contribution by the Government, during the period of suspension shall preserve and protect the project work and any property in which the Government has an interest.

2. The time fixed for the completion of the work is extended to October 10, 1957.

3. In Article 8(b)(2), the period "eleven years" is substituted for the period "ten years."

This amendment shall not be construed to increase the estimated total cost of the project, the aggregate total amount which the Government may be required to contribute, or the amount of any item designated as "maximum."

Executed in sextuplicate the day and year first above written.

THE UNITED STATES OF AMERICA

By C. J. Mathews
Administrator, Defense Minerals Exploration Administration

CALUMET & HECLA, INC.

By A. E. Petermann

Title Vice President

Docket Copy

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAR 29 1955

MF-200
(Revised June 1954)

Docket No. DMEA 3522

Commodity Copper

Contract No. Idm-E 765

UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

EXPLORATION PROJECT CONTRACT[1]

It is agreed this 10th day of February, 1955, between the United States of America, acting through the Department of the Interior, Defense Minerals Exploration Administration, hereinafter called the "Government," and [2] Calumet & Hecla, Inc., a Michigan Corporation, whose mailing address is 122 South Michigan Avenue Chicago 3, Illinois, hereinafter called the "Operator," as follows:

ARTICLE 1. *This contract* is entered into under the authority of the Defense Production Act of 1950, as amended. It consists of this form (MF-200), the attached Exhibit "A," Annex I, and

The Operator shall not transfer or assign this contract or any right thereunder without the written consent of the Government.

ARTICLE 2. *Operator's property rights.*—(a) The land which is the subject of this contract (hereinafter called "the land") is in the State of Michigan, County of Ontonagon, and is described in Annex I.[3]

(b) The Operator represents and undertakes that:

(1) The Operator is the [4] owner of [5] the entire interest in the land, in possession and entitled to possession for all of the purposes of this contract, under and by virtue of a [6] **, [7] ** recorded in Book **, page **, official records of said County; and

(2) The Operator's right, title, or interest (whether as owner, lessee, or otherwise) is subject only to the following claims, liens, or encumbrances: None

(c) The Subordination Agreement of the holder of any claim, lien, or encumbrance listed above, and (if the Operator does not hold the legal title) the Consent to Lien of any holder of the legal title

[1] If sufficient space is not provided in any blank, use an extra sheet of paper and refer to it in the blank.
[2] Insert name, and if an organization, its nature (corporation and place of incorporation, partnership with names of partners, etc.).
[3] State on a separate sheet marked "Annex I" the legal description or enough to identify the property, particularly excluding any areas from which the production is not to be subject to the Government's percentage royalty.
[4] Insert "owner," "lessee," "contract purchaser," "locator," etc.
[5] Insert "the entire interest," "the mineral rights," "an undivided one-third," etc.
[6] Insert "deed," "lease," "contract," "location notice," "patent," etc.
[7] If not recorded, so indicate by inserting "un."

of the land (lessor, seller, optionor, etc.), are attached, as follows: .....

.....

.....

(d) The Operator shall preserve and maintain his right, title, and interest in the land and his right to the possession thereof for the purposes of this contract, and shall devote the land and all existing improvements, facilities, buildings, installations, and appurtenances to the purposes of this contract. Until the lapse of the time within which the Government may make a certification of discovery or development without any such certification having been made, and after any such certification has been made, the Operator shall neither transfer, convey, nor surrender the land nor any right, title, or interest therein, nor permit nor suffer any claim, lien, or encumbrance thereon, without expressly referring to and providing in the instrument of conveyance, lien, or encumbrance for the preservation of the Government's right to a percentage royalty on production and lien for the payment thereof. If the Government makes no certification of discovery or development within the time limited in Article 8, it shall thereafter have no claim against the land or any production therefrom except for any production referred to in Article 8(b)(1).

ARTICLE 3. *The exploration project.*—The project is a search for indicated or undeveloped deposits of Copper. The work to be performed is described in Exhibit "A." The Operator on or before 60 days from date / of contract shall commence the work, and on or before 2 yrs. from date of/ contract (unless the Operator's obligation to prosecute the work is terminated—see Article 10) shall either have completed the work or shall have incurred allowable costs (see Article 6) in a sum not less than the estimated total allowable cost set forth in Exhibit "A."

ARTICLE 4. *Performance of the work.*—(a) *Operator's responsibility.*—The work shall be performed with reasonable diligence, efficiently, expertly, in a workmanlike manner, in accordance with good mining standards and State regulations for health and safety and for liability insurance covering employment; and with suitable and adequate equipment, facilities, materials, supplies, and labor, to bring it to completion within the time fixed.

(b) *Independent contracts.*—To the extent that the allowable costs are estimated in Exhibit "A" with express reference to performance by independent contractors on a unit-price basis (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations), the work may be so performed; but if the reference in Exhibit "A" to any such independent contract requires the Government's approval thereof, payments under such contract will not be allowable costs unless the Government gives its written approval of the contract. Any such independent contract shall refer to some specific and identifiable part of the work, and shall be subject to all of the pertinent terms and conditions of this exploration contract; but the Government shall not be considered a party thereto, and its rights under this contract, including the right to terminate its contributions, shall not be affected thereby. Regardless of the provisions of any such independent contract and regardless of the Government's approval thereof, the Government will participate in payments to the independent contractor only on account of work performed in accordance with the provisions of this exploration project contract, and only to the extent that the Government deems the unit prices for the work under the independent contract to be reasonable.

(c) *Government may inspect.*—The Operator shall consult with and inform the Government on all phases of the work as it progresses. The Government may enter at all reasonable times to inspect the work under the contract, and also after a certification of discovery or development to inspect production operations and underground workings. The operator shall provide the Government with all reasonable means of access for such inspections.

ARTICLE 5. *Contribution by the Government.*—The estimated total allowable cost of the project, set forth in Exhibit "A," is the sum of $113,110.00. The Government shall contribute 50 percent of the allowable costs as they are incurred in a total sum not in excess of $56,555.00: *Provided,* That until the Operator has rendered to the Government his final report, and any final auditing required by the Government has been made, and a final settlement of the contract has been made, the Government may withhold from the last

voucher or vouchers such sums as it sees fit not in excess of 10 percent of the estimated total cost of the work or not in excess of the amount of the Government's contribution to the cost of property which is or may become subject to disposal as provided in Article 9(c), whichever is greater. The Government will make its contribution on the basis of the monthly vouchers referred to in Article 7(b), but all payments by the Government are provisional only, subject to audit, until the account between the Operator and the Government is finally audited and settled. "Costs incurred" mean costs that have been paid or have become due and payable, or that in the opinion of the Government have become an obligation. The Government may make payments directly to independent contractors and suppliers for the account of the Operator rather than to the Operator.

ARTICLE 6. *Estimated costs.*—(a) *Categories of costs.*—The allowable costs of the work to which the Government shall contribute are limited to those that are direct, reasonable, necessary, and that are estimated in Exhibit "A" by categories as specified in this article. If any category or subcategory is omitted from the estimate of costs, or if the word "none" is annexed to the listing thereof, costs under such category or subcategory are not allowable. Any excess over any estimate which is indicated as the maximum of any category, subcategory, or item, either as to requirement or related cost, and any excess over the estimated total allowable cost of the work, shall not be allowable. Any excess over the estimate of any category, subcategory, or item, either as to requirement or related cost, not indicated as a maximum shall be allowable within the limit of the estimated total allowable cost of the work. To the extent that excesses over maximums other than the estimated total allowable cost of the work may be necessary for the performance of the work, the Operator shall incur such excesses for his own account without contribution by the Government; but except for any such necessary excesses in categories, subcategories, or items thereunder the Operator is not obligated to incur more than his agreed percentage of the estimated, total allowable cost of the work.

To the extent specified in this article or in Exhibit "A" the following categories, subcategories, and elements thereof are maximums; but if not so specified either here or in Exhibit "A" they are not maximums, and may be exceeded within the limit of the estimated total allowable cost of the work:

CATEGORY (1)—INDEPENDENT CONTRACTS.—Work to be performed under independent contracts (see Article 4(b)). The estimated total amount of this category and the estimated cost of each unit of work for performance under an independent contract are maximums.

CATEGORY (2)—PERSONAL SERVICES.

Subcategory (a)—Supervision.—All elements of this subcategory (number of supervisors, periods of employment, rates of pay, and total) are maximums.

Subcategory (b)—Technical services.—All elements of this subcategory (number of technicians, periods of employment, rates of pay, and total) are maximums.

Subcategory (c)—Labor.

CATEGORY (3)—OPERATING MATERIALS AND SUPPLIES.—Includes such items as drill bits and steel, explosives, fuel, pipe, power, small tools costing less than $50 each, timber, track.

CATEGORY (4)—OPERATING EQUIPMENT.

Subcategory (a)—Rental.—The number of each object to be rented [6 mine cars, 1 truck], the rate of rental [$100 per month, $5 per hour], and the total of this subcategory are maximums.

Subcategory (b)—Purchases.—The estimated total of this subcategory is a maximum.

Subcategory (c)—Depreciation.—All elements of this subcategory (time periods, rate of depreciation, and subcategory total) are maximums.

CATEGORY (5)—INITIAL REHABILITATION AND REPAIRS.—Estimates under this category include all requirements and related costs, such as labor, materials and supplies, and supervision at a rate not higher than provided for in Category (2), and shall not be duplicated under any other category. The estimated total of this category is a maximum.

Subcategory (a)—Initial rehabilitation and repairs of existing buildings, fixtures, and installations (exclusive of mine workings).—The estimated total of this subcategory is a maximum.

Subcategory (b)—Initial rehabilitation and repairs of operating equipment.—The estimated total of this subcategory is a maximum.

CATEGORY (6)—NEW BUILDINGS, FIXTURES, AND INSTALLATIONS (EXCLUSIVE OF MINE WORKINGS).—Estimates under this category include all requirements and related costs, such as labor, materials and supplies, and supervision at a rate not higher than provided for in Category (2), and shall not be duplicated under any other category. The estimated total of this category is a maximum.

CATEGORY (7)—MISCELLANEOUS.—Repairs and maintenance (other than initial) of operating equipment, analytical work, prints and other reproductions, accounting, Operator's share of payroll taxes, liability insurance covering employment, travel, communications, and any other items of requirement or cost that do not fall within any of the first 6 categories.

THE ESTIMATED TOTAL ALLOWABLE COST of the work is a maximum.

(b) *Nonallowable costs.*—The following costs are not allowable for contribution by the Government:

(1) *Costs of the land,* such as rental, depreciation, depletion, or other cost of acquiring, owning, or holding possession;

(2) *Indirect costs,* such as general overhead, corporate management, interest, taxes (other than payroll and sales taxes), insurance (other than liability insurance covering employment), damages to persons, damages to property (other than necessary repairs or replacements of equipment or other property used in the work);

(3) *Previous work* performed or costs incurred before the date of this contract; and

(4) *Deferred payments.*—Any costs incurred by the Operator under any rental-purchase agreement, installment-purchase agreement, or any agreement for the purchase of goods under the provisions of which payment of the full purchase price is deferred more than 90 days from the delivery of the goods; unless the purchase agreement is approved by the Government in writing.

(c) *Reductions in costs.*—The Operator shall account for and give the Government credit for any incidental benefits, credits, or money received in the ordinary course of business in prosecuting the work (as by salvage or sale of materials or equipment, furnishing of room or board, furnishing of power or services to third persons, rebates or discounts on purchases, etc.), in the same ratio in which the Government contributes to costs; and such amounts shall be treated as a reduction in costs incurred so that they are available for use within the limit of the original estimated total cost. This provision does not apply to receipts from production which are subject to the Government's percentage royalty under the provisions of Article 9.

ARTICLE 7. *Reports, accounts, audits.*—(a) *Operator's records.*—The Operator shall keep suitable records and accounts of the work performed and of any production in which the Government may have an interest; and shall preserve those with respect to work performed for at least three years after final payment by the Government, and those with respect to production for at least three years after any obligation to pay royalties to the Government has terminated. The Government may inspect and audit said records and accounts at any time, either by itself or by a certified public accountant. If the Government elects to audit said records and accounts relating to the exploration work by certified public accountant, it may do so as a cost of the work to which the Operator shall contribute. The Comptroller General of the United States or his representative, until the expiration of said three-year periods, shall have access to and the right to examine any pertinent books, documents, papers, and records of the Operator. All of the Operator's vouchers and records and accounts relating thereto and the Government's payments thereof remain subject to adjustment until final audit by the Government. If work under this contract is carried on in conjunction with any other operations, or if labor, supervision, services, materials, supplies, equipment, facilities, or other requirements for carrying on the work are also used in connection with other operations, the costs shall be segregated and accounted for on a basis and by methods and accounts that are satisfactory to and approved by the Government.

(b) *Progress reports and vouchers.*—The Operator shall provide the Government with five copies of monthly progress reports in three sections as follows: (1) Operator's Monthly Report and Voucher showing detailed costs incurred during the reporting period; (2) Operator's Unit Cost and Progress Report showing the various types of work performed during the reporting period and costs incurred for each type of work; and (3) a Narrative Report of the work performed during the reporting period including adequate engineering-geological maps or sketches, drill hole logs and locations, and assay reports on samples taken concurrently with advance in mineralized ground. (Forms for reporting under (1) and (2) above will be provided by the Government.)

(c) *Final report.*—Upon completion of the work or termination of the Government's obligation to contribute to costs, the Operator shall furnish the Government with five copies of a final report (in addition to the final progress report and voucher). This final report shall include a geological and engineering evaluation of the results of the work performed under the contract with an estimate of the ore reserves resulting from such work, complete assay data, adequate geological and engineering maps or sketches, and a summary of the work performed and related costs incurred.

(d) *Report of sales.*—The Operator shall provide the Government with suitable accounting and documentary evidence covering all production to which the Government's percentage royalty relates, such as copies of smelter or concentrator settlement sheets, and certified accounts of production and sale or other disposition of production.

(e) *Compliance with requirements.*—If in the opinion of the Government any of the Operator's reports, records, or accounts are insufficient or incomplete, or if the Operator fails to make them, the Government may procure the making or completion of such with suitable attachments as an expense of the work to which the Operator shall contribute. The Government may withhold approval and payment of any vouchers relating to insufficient or incomplete reports, records, or accounts.

ARTICLE 8. *Repayment by Operator.*—(a) *Certification.*—If the Government considers that a discovery or development from which production may be made has resulted from the work, the Government, at any time not later than six months after a sufficient final report and final account (see Article 7) has been rendered, may so certify in writing to the Operator. Such certification shall describe broadly or indicate the nature of the discovery or development.

(b) *Royalty on production.*—The Operator, as principal if the Operator is the producer, or as surety if the Operator is not the producer, shall pay to the Government a royalty on all minerals mined or produced from the land, as follows: (1) regardless of any certification of discovery or development, from the date of the contract until the lapse of the time within which the Government may make such certification, or until the total net amount contributed by the Government without interest is fully repaid, whichever occurs first; or (2) if the Government makes a certification of discovery or development, within a period of ten years from the date of the contract, or until the total net amount contributed by the Government without interest is fully repaid, whichever occurs first.

(c) *Basis for computation.*—The Government's royalty shall be a percentage of the gross proceeds (including any bonuses, premiums, allowances, or other benefits) from the production sold, in the form sold (ore, concentrates, metal, or equivalent), at the point of delivery (the f. o. b. point); *except,* that charges of *the buyer* arising in the regular course of business, and shown as deductions on the buyer's settlement sheets, on account of the cost of treatment processes performed by *the buyer,* sampling and assaying to determine the value of the production sold, and freight paid by *the buyer* to a carrier (not the Operator), shall be allowed as deductions in arriving at the "gross proceeds" as that term is used herein. Any costs of treatment processes, sampling or assaying, or transportation, performed or paid by the Operator or by anyone other than the buyer, are not deductible in arriving at the "gross proceeds" as that term is here used. The term "treatment processes," as here used, means those processes (such as milling, concentrating, smelting, refining, or equivalent) applied to the crude ore or other production after it is extracted from the ground, to put it into a commercially marketable form; excluding fabricating or manufacturing.

(d) *Unsold production.*—If any production (ore, concentrates, metal, or equivalent), after the lapse of six months from the date the ore was extracted from the ground, remains neither sold nor used by the Operator in integrated manufacturing or fabricating operations (for instance, if it is stockpiled), the Government, at its option, as long as it so remains, may require the computation and payment of its royalty on the value of such production in the form (ore, concentrates, metal, or equivalent) it is in when the Government elects to require computation and payment. If any production is used by the Operator in integrated manufacturing or fabricating operations before the Government makes its election, the Government's royalty on such production shall be computed on the value therof in the form in which and at the time when it is so used. "Value" as here used means what is or would be gross income from mining operations for percentage depletion purposes in Federal income tax determination, or the market value, whichever is greater.

(e) *Percentages of royalty.*—The percentages of the Government's royalty shall be as follows:

One and one-half (1½) percent of amounts ("gross proceeds" or "value") not in excess of eight dollars ($8.00) per ton of production in the form in which sold, held, or used, plus one-half (½)

percent for each additional full fifty cents ($0.50) by which such amounts exceed eight dollars ($8.00) per ton, but not in excess of five (5) percent of such amounts.

(For instance: the royalty on an amount of five dollars ($5.00) per ton would be one and one-half (1½) percent; on an amount of ten dollars ($10.00) per ton, three and one-half (3½) percent.)

(f) *Time for computation and payment.*—The Government's royalty shall be computed and paid currently upon each lot sold, held, or used in integrated operations, as the case may be, as above provided in this article.

(g) *Lien for payment.*—To secure the payment of its percentage royalty, there is hereby granted to the Government a lien upon the land or the Operator's interest in the land and upon any production of minerals therefrom, until the royalty claim is extinguished by lapse of time or is fully paid.

(h) *Notice to purchasers.*—The Operator shall give notice of the Government's claim for royalty to any purchaser of the production, and shall authorize and direct such purchaser to pay the royalty directly to the Government and to furnish the Government with copies of the settlement sheets. If the records of any production and sales or other disposition of production, whether the production is by the Operator or by others, are not made available to the Government, the amount of the royalty may be estimated by the Administrator, Defense Minerals Exploration Administration, or his successor, and his estimate thereof shall be final and binding upon the Operator.

(i) *No obligation to produce.*—Nothing in this contract is to be construed as imposing any obligation on the Operator or the Operator's successor in interest to engage in any production operations.

(j) *Government not obligated to buy.*—Nothing in this contract shall be construed as imposing any obligation on the Government to purchase any minerals mined or produced from the land.

ARTICLE 9. *Interests in purchased property.*—(a) *Title and ownership.*—All costs under this contract shall be incurred by the Operator in the Operator's own name and for the Operator's own account; but any property acquired to the cost of which the Government contributes shall belong to the Operator and the Government jointly in proportion to their respective contributions, although title thereto shall be taken in the name of the Operator.

(b) *Preservation of property.*—Until the final disposal of any property in which the Government has an interest the Operator shall preserve and protect same for the best interest of the Government, any reasonable and necessary costs thereof to be treated as an allowable cost of the project. After the completion of the work or termination of the Government's obligation to contribute, or when such property is not in use for or needed for the work, the Operator shall neither use it without the written consent of the Government nor without paying a reasonable rental to be fixed by the Government for its interest.

(c) *Disposal of property.*—Upon the completion of the work or termination of the Government's obligation to contribute to costs, or when the property is no longer needed for the work, the Operator shall promptly dispose of salable or salvageable property in which the Government has an interest for the joint account of the Government and the Operator, either by return to the vendor, by sale to others, or purchase by the Operator or the Government at a price at least as high as could be obtained from others, unless the Government in writing waives its interest in any such property. Without advance approval of the sales price by the Government the Operator shall not sell at any price any item of property the cost of which was more than $500, and shall not sell at less than 25 percent of the purchase price any item of property which cost $500 or less. The Government, in lieu of approving the sales price for any such item, may itself purchase the item at the best price which the Operator is able to obtain or himself cares to give. Property remaining upon any termination of the work shall be considered in groups or categories (such as drill steel, or explosives, or pipe, or rails), and if the original cost of the remaining unexpended portion of any such group or category is less than $50, the Government waives its interest therein. If necessary to accomplish the disposal of any item the Operator shall dismantle and sever it from the land, the cost thereof to be treated as a cost of the project.

(d) *Default of the Operator re disposal.*—If within 90 days after the completion of the work or termination of the Government's obligation to contribute to costs, or after the property is no longer needed for the work, or after such further time as the Government may in writing allow, the Operator has failed to sell or otherwise liquidate or dispose of any property in which the Government has an interest, the Government, at any time prior to final settlement under the contract, may pursue one of the following two courses: (1) the Government, by written notice to the Operator, may place upon such property what in its opinion is a fair valuation thereof, not in excess of the cost less 1.66 percent per month from the

date such property was purchased under this contract to the termination of said 90-day period; and such property shall thereupon be considered and accounted for as having been purchased by the Operator at the valuation so fixed by the Government; or (2) the Government may enter and take possession of such property wherever it may be found, and remove and dispose of it for the joint account of the parties.

ARTICLE 10. *Termination of the Government's obligations.*—(a) If in the opinion of the Government operations at any time have failed to achieve anticipated results that indicate the probability of making a worthwhile discovery, and in the opinion of the Government further operations are not justified, the Government may give the Operator written notice thereof, and thereupon: (1) the Government shall be free of all obligation to contribute to costs not then incurred other than such as may be allowable under the provisions of the contract as necessary and incidental to winding up, reporting, and accounting; and (2) the Operator shall be free of all obligation to prosecute the work other than such as may be necessary and incidental to winding up, reporting, and accounting.

(b) If in the opinion of the Government the Operator is in any manner in default under the terms of the contract, the Government may give the Operator written notice of such default with a specification of reasonable time within which the default must be cured; and if the Operator fails to cure such default as required, thereupon: (1) the Government shall be relieved of all obligation to contribute to costs not incurred when the notice was given, other than such as may be allowable by the provisions of the contract as necessary and incidental to winding up, reporting, and accounting; and (2) the Operator shall be free of all obligation to prosecute the work other than such as may be necessary and incidental to winding up, reporting, and accounting. The remedy provided for the Government in this paragraph "(b)" is in addition to any other remedy provided in this contract, and in addition to any other remedy the law may provide for breach of contract.

(c) The giving of any notice by the Government under the provisions of this Article 10 shall not affect the Government's rights as provided for in the contract with respect to a percentage royalty, and such rights shall be fully preserved.

ARTICLE 11. *Notices to be given by the Government* may be delivered to the Operator, or may be sent by registered mail addressed to the Operator at his mailing address stated in this contract. If mailed, notices are deemed to have been delivered five days after the date of mailing.

ARTICLE 12. *Officials not to benefit.*—No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE 13. *Changes and added provisions.*—

Executed in sextuplicate the day and year first above written.

THE UNITED STATES OF AMERICA

By O. Meitzendorf

Administrator, Defense Minerals Exploration Administration

Rubin
Hollund
Approved for Off.
Gruwell
Talbert
Hofmann
Ofnage

CALUMET & HECLA, INC.
(Operator)

By E. R. Lowell
President

I, A. E. Petermann, certify that I am the Assistant secretary of the corporation named as Operator herein; that E. R. Lowell who signed this contract on behalf of the Operator, was then President of said corporation; that said contract was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

A. E. Petermann
Assistant Secretary

[CORPORATE SEAL]

U. S. GOVERNMENT PRINTING OFFICE 16—70617-1

EXPLORATION PROJECT CONTRACT
CALUMET & HECLA, INC.
DOCKET NO. DMEA-3522

ANNEX I

The land referred to in Article 2 of the Contract is outlined in red on a map entitled, "Plan of Exploration in Mass-Flint Steel Area, Calumet & Hecla Consolidated Copper Co. . . .February 1939 . . .Revised to May 1954," attached hereto and made a part hereof.

The land is comprised of that part of Township 50 North, Range 39 West, and Township 51 North, Range 38 West, in the County of Ontonagon, State of Michigan, which lies northeast of a vertical plane which strikes N60°W and passes through a point "A" 5,801.5 feet N 78° - 21' - 30" E of the section corner of Sections 1, 2, 11, 12, Township 50 North, Range 39 West and southwest of a vertical plane striking N 60° W which passes thru a point 2,720 feet N 30° E of the above point "A".

Exclusion From the Land

Any lode which is not a part of the Evergreen Series of lodes is excluded from the land described in this Annex I. The "Evergreen Series of lodes" is defined as those lodes lying between and including the Knowlten and Evergreen lodes.

EXPLORATION PROJECT CONTRACT
CALUMET & HECLA, INC.
DOCKET NO. DMEA-3522

Exhibit "A"

Description of the Work

The purpose of the project is to explore for copper ores. The work consists of diamond drilling and drifting on the Knowlton Lode, both on the level of the Caledonia No. 4 Adit, as follows:

Extend the Caledonia No. 4 Adit a distance of 2,080 feet. This drift shall be approximately 9 feet by 9 feet in cross section. The drift shall be timbered as necessary.

3,300 feet of diamond drilling shall be done to explore parallel lodes from locations within the Caledonia Adit. The drilling shall be done with AX size bits, unless conditions make it necessary to complete some of the holes with EX size bits.

The location, inclination, direction, and extent of all work are subject to the approval of the Government.

ESTIMATED COSTS OF THE PROJECT

Category (1) Independent Contracts [1]

3,300 feet of diamond drilling @ $5.00/ft.	$ 16,500.00

The Operator may elect to do all or part of the diamond drilling itself and in such event all schedules in Article 6 are waived, provided that the allowable actual costs may not exceed the maximum unit cost of $5.00 per foot.

The schedules of actual costs which follow below apply to drifting only. The Government will contribute to those allowable actual costs of drifting which do not exceed an average of $46.45 per foot, computed monthly. However,

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[1] The costs of supervision, assaying, and all other costs whatsoever shall be borne by the Operator without contribution by the Government.

allowable costs which exceed said maximum unit cost of $46.45 per foot may be credited against subsequent monthly vouchers up to said maximum unit cost.

Category (2) Personal Services

(a) (b) Supervision and Technical Services

2 supervisors @ $384.00/mo. each

$768.00/mo. for 16 months $ 12,288.00

(c) Labor

2 miners @ $380.46/mo. each	$ 760.92	
2 trammers @ $294.66/mo. each	589.32	
2 surface men @ $240.93/mo. each	481.86	
	1,832.10	

$1832.10/mo. for 16 months 29,313.60

Category (3) Operating Materials and Supplies

Explosives per month	$ 715.00	
Pipe per month	276.90	
Truck per month	403.00	
Small tools & misc. per month	146.90	
Power per month	217.10	
Drill steel per month	299.00	
	$ 2,057.90	

$2,057.90/mo. for 16 months $ 32,926.40

(Gas and oil for truck is not allowable cost under this category.)

Category (4) Operating Equipment

(a) and (b) Rental and Purchases
None

(c) Depreciation

2 tram cars @ $9.00/mo. each	$ 18.00	
2 drill machines @ $9.00/mo. each	18.00	
1 Kimco loader, rate per mo.	76.67	
1 Battery locomotive, rate per mo.	100.00	
1 Compressor, rate per mo.	183.33	
1 truck (includes gas & oil) rate per month.	260.00	
	$ 656.00	

$656.00/mo. for 16 months $ 10,496.00

Category (5) Initial Rehabilitation and Repairs

None

Category (6) New buildings, fixtures and installations

None

Category (7) Miscellaneous

Employers' Liability Insurance	$ 100.62	per	month
Vacation pay	104.00	"	"
Holiday pay	62.40	"	"
Health and Accident Insurance	76.96	"	"
Pay Roll Taxes	85.80	"	"
Maintenance of equipment	195.00	"	"
Telephone and telegraph	43.33	"	"
Accounting	56.00	"	"
	$ 724.11	per	month

$724.11/mo. for 16 months $ 11,585.76

Estimated Total Cost of Project (rounded to) $113,110.00

Government's participation @ 50% $ 56,555.00

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Defense Minerals Administration
RECEIVED
OCT 6 1954

Form Approved:
Budget Bureau No. 42-R1035.2.

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

Not to be filled in by applicant

Docket No. 3522
Metal or Mineral Copper
Date Received
Estimated Cost $126,792
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois
A corporation organized and existing under the laws of the State of Michigan.

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers. See attached statement

(*d*) If a partnership, add to the above statement the names and addresses of all partners. Not applicable

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract See attached statement

(*b*) State any mine name by which the property is known. See attached statement

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise Owner

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property. Not applicable

(*e*) If you own the land, describe any liens or encumbrances on it None

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice. Not applicable

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes. See attached statement

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades. See attached statement

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you. See attached statement

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points. See attached statement

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power. See sttached statement

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore Copper

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings, and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc. See attached statement

(*c*) The work will start within 30 days and be completed within 24 months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations. See attached statement

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project:

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.). See attached statement

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants. See attached statement

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel. See attached statement

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be. See attached statement

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project. See attached statement

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project. See attached

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes. See attached statement

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above. See attached statement

NOTE.—No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs.

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)? Yes

(*b*) How do you propose to furnish your share of the costs?

[x] Money [x] Use of equipment owned by you (rental value) [ ] Other

Explain in detail on acompanying paper.

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

Dated October 5, 1954

Calumet & Hecla, Inc.
(Applicant)

By E. R. Lovell
President

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

APPLICATION FOR AID IN AN EXPLORATION PROJECT,
PURSUANT TO DMEA ORDER 1,
UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

1. (a) Calumet & Hecla, Incorporated

Mailing and executive address:

122 South Michigan Avenue
Chicago 3, Illinois

(b) Calumet & Hecla is incorporated under the laws of the state of Michigan.

(c)

President -	E. R. Lovell 122 South Michigan Avenue Chicago 3, Illinois
Vice President of Operations -	H. Y. Bassett 122 South Michigan Avenue Chicago 3, Illinois
Vice President and Treasurer -	C. C. Jung 122 South Michigan Avenue Chicago 3, Illinois
Vice President and General Counsel	A. E. Petermann 122 South Michigan Avenue Chicago 3, Illinois
Vice President -	D. W. Blend Wolverine Tube Division Calumet & Hecla, Inc. 1411 Central Avenue Detroit 9, Michigan
Vice President -	A. S. Kromer 1 Calumet Avenue Calumet, Michigan
Secretary -	J. H. Elliott 12 Ashburton Place Boston 8, Massachusetts
Controller -	F. J. Gibbons 122 South Michigan Avenue Chicago, Illinois
Assistant Treasurer -	W. E. Haines 122 South Michigan Avenue Chicago 3, Illinois

2. —

3. (a) The land it is proposed to explore comprises that part of Section 6, T50N, R38W, and Section 1, T50N, R39W, in the townships of Greenland and Rockland, County of Ontonagon, state of Michigan, which lies northeast of a vertical plane which strikes N60°W and passes through a point 5,801.5 feet N72°-21'-30" E of the section corner of Sections 1, 2, 11, 12, T50W, R39W and southwest of a vertical plane striking N60°W which passes through a point 2,120 feet N30°E of the above reference point and excluding any portion thereof not included in the Evergreen Series of lodes.

(b) The present mine name is the "Caledonia" and the adit it is proposed to extend is known as the "Caledonia Adit." Within the ground above described, lie the Old Mass workings and the "C" Shaft workings of the Mass Consolidated Company. Adjoining portions of the property have been known by the name of Flint Steel and Knowlton mines. See map attached.

(c) The land is owned in fee by Calumet & Hecla, Inc.

(d) Not applicable.

(e) None

(f) Not applicable.

4. (a) In the general area of that portion of the copper-bearing series known as the Evergreen Series, which is under consideration, exploration and mining has been conducted for many years. On various lodes of the Evergreen Series, exploration was initiated in 1857 and intermittently pursued from then on at the Flint Steel, Knowlton, Caledonia and Old Mass mines with minor attendant production. Substantial mining operations were carried on from 1900 - 1919 at the Mass Consolidated Mine. All this early work is prior to interest by Calumet and Hecla. Since 1919, no effective mining has been done in this area.

Calumet & Hecla interest dates from consideration of the property in 1937 and exploration of the Mass-Michigan mine area by underground openings and surface and underground diamond drilling to 1939. In 1952, interest was renewed here and stoping above the Caledonia Adit was started with a purpose of taking a large-scale sample of the Knowlton Lode. Extension of the Caledonia Adit to unwater the Old Mass workings was started on March 1, 1954 and is now nearing completion.

This exploration of the Knowlton Lode is at present continuing at the company's own expense. Upon approval of this application either the funds alloted should be made retroactively applicable to the work done, or the area explored between the present time and approval of the application should be excluded from the scope of this contract.

In order to conduct this test stoping, Calumet & Hecla has installed complete mining equipment and the mine is well equipped to conduct the proposed exploration. No milling facilities exist on the property as these small lots of trial ore have been shipped via truck and rail to the Ahmeek Mill at Lake Linden.

At the present time, the old workings of the Knowlton, Caledonia and Old Mass mines and the area test-stoped by Calumet & Hecla, are accessible above the elevation of the Caledonia Adit. See attached map.

(b) There has been no production from the Knowlton lode on the land which it is proposed to explore.

Past production shown below has come from a number of the members of the Evergreen Series, primarily the Butler, the Evergreen, and to a minor extent, the Knowlton Lodes, principally to the east of the land now under consideration.

Past Production Prior to Calumet & Hecla Explorations

Date	Average Grade in Lbs. of Copper Per Ton	Production in Lbs. of Copper
1853 - 1919	10 - 20* (Estimated)	60,114,699
1902 - 1919	14.53	
1916 - 1919	16.42	

Estimated content of tailings - 5.00 pounds

* Tonnage of ore not given by old records

Current Production

	Lots	Tons	Lbs. Copper	Lbs. Copper Per Ton
Test Stoping C & H on Knowlton Lode, Jan.1952 Through Aug. 20, 1954	1 - 175	101,855	2,656,040 lbs.	26.08

(c) See geological report enclosed and attached photostats of Pages 212 - 216, U.S.G.S. Professional Paper 144, "The Copper Deposits of Michigan."

(d) In general, these factors are not a problem. The project is two miles from the town of Greenland over an improved road and six miles from the present shipping point, Lake Mine, on the Copper Range Railroad.

Ample living quarters are available in the nearby towns of Greenland, Mass City and Rockland and the railroad connects with the Chicago, Milwaukee & St. Paul Railroad at Houghton, a center of supply, 35 miles to the northeast.

(e) Ample experienced miners are available. The mine is well equipped and has been operating since January, 1952 on a test-stoping program, so that there is no problem with any of these factors.

5. (a) This exploration is for native copper.

(b) As shown on the enclosed map, the work proposed is to extend the existing Caledonia Adit from the present face at the Old Mass workings to the "C" Shaft workings of the Mass Consolidated Company for the purpose of exploring the copper-bearing lode known as the Knowlton Lode, the top member of the Evergreen Series. This will require approximately 2,100 feet of drifting. The drift will then be used as a base for diamond drilling to cut the Evergreen Series to the southeast down to the Butler Lode with six holes at intervals of roughly 350 feet. These holes will be approximately 550 feet long. It is not proposed to drill to the Evergreen Lode as this would require much longer holes and it is felt that the nature of the mineralization on the Evergreen Lode could not be adequately tested by drilling.

(c) The work will start immediately and be completed 24 months from the date of the exploration contract.

(d) Calumet & Hecla is a recognized mining company and has satisfactorily carried out previous DMEA contracts.

6. See Schedule "A" attached for detail

Drifting 2,100 feet @ $52.52 per foot	=	$110,292.00
Drilling 3,300 feet @ $ 5.00 per foot	=	16,500.00
		$126,792.00

7. (a) Yes.

(b) Money.

because much of the copper is in rather fine particles. From 1902 to 1907 about 3,350,000 pounds of copper was produced. The mine was then idle till 1911, when the company was reorganized as the Winona Copper Co., and it was then active till 1920, when operations were suspended except for a little development work. Its total recorded production, from 1902 to 1920 is 1,262,678 tons of rock, yielding 17,684,234 pounds of copper—an average of 14 pounds to the ton.

The Winona lode is about 400 feet above No. 8 conglomerate, at the general horizon of the Isle Royale lode.

On the Winona property the Winona lode is developed by six shafts—from north to south Nos. 1 to 4 Winona and Nos. 1 and 2 King Philip. Development has been carried for about 9,000 feet along the lode.

The northern part of the developed portion of the lode crops out just at the base of a prominent bluff. On this outcrop the Indians dug shallow pits, and it was eventually opened by the northern Winona shafts. The southern part of the developed portion of the lode, which is opened by the southern Winona shafts and the King Philip shafts, was covered by glacial drift.

The writers did not examine the mine. The following description is made up from the mine maps, from examination of the dump, and from descriptions by Messrs. T. S. Woods and R. R. Seeber.

The lode, which is of the fragmental type and fairly well oxidized, appears to be very irregular, changing from thick to thin within short distances. There is a persistent "slide" or gouge zone a few feet above the lode—Mr. Seeber says about 14 feet. In places the lode extends to this "slide."

The mineralization was of the same general type as that of the other lodes. Pumpellyite, quartz, epidote, and calcite are plentiful. Prehnite, laumontite, and probably other minerals are present. The copper is associated with quartz and pumpellyite.

As indicated by present developments, the ore lies in a flat southward-dipping shoot (see pl. 42) that crops out near Winona No. 2 shaft. The northern Winona shafts seem to pass through the shoot, but in the King Philip shafts it is several hundred feet below the surface. The ore-bearing ground is apparently made up of a series of small nearly parallel shoots, interspersed with poor streaks. Even the smaller shoots contain areas in which the lode is thick and relatively high in copper and areas in which the lode is thin and poor. Where the lode extends to the hanging-wall slip it is said to be thick and rich.

The Winona lode in many ways resembles the Isle Royale lode with which it is commonly correlated. So far as learned, however, it does not show the tendency for the ore to form near the footwall, which is so persistent and unusual a feature of the Isle Royale lode.

WYANDOT MINE

The Winona lode was opened at the Wyandot mine by a shaft to the 1,000-foot level, from which short drifts were run. The lode was reported as carrying some copper, but operations in this mine were soon discontinued.

ELM RIVER MINE

The Elm River Copper Co. opened a lode at the general horizon of the Winona by a shaft to the 500-foot level, where drifts were extended for about 1,000 feet. The lode was also opened on the first level for a few hundred feet. The results were apparently not very encouraging. At No. 6 shaft the lode was entered by a crosscut at a depth of about 250 feet and was followed for about 700 feet.

CHEROKEE MINE

The Cherokee Copper Co. opened a lode that is farther from No. 8 conglomerate and possibly stratigraphically higher than the Winona lode. A shaft was sunk to the fourth level and short drifts carried on each level. It was reported that some stretches of commercial ground were opened. There is a fault south of the shaft (see pl. 12) that displaces the rocks on the south about 500 feet to the east.

WYANDOT NO. 8 LODE

The Wyandot Copper Co. opened a lode in a crosscut from the 700-foot level, No. 11 shaft, about 1,100 feet horizontally (950 feet stratigraphically) below the hanging wall of No. 8 conglomerate. The lode was opened on this level and by a winze to the 800, 900, and 1,000 foot levels, on each of which drifts were carried. The lode is fragmental in character, and the results were reported as somewhat encouraging. A test shipment of 1,605 tons of rock made in 1917 yielded 12.54 pounds of copper to the ton.

EVERGREEN AND SUCCEEDING LODES

All the mines on the Evergreen and succeeding lodes were idle at the time the region was examined, and only very meager observations underground were made at the Mass and Adventure mines.

OCCURRENCE

From the Lake mine at the north to the Victoria mine at the south there have been rather extensive developments on a series of lodes whose base is about 400 to 500 feet above No. 8 conglomerate and which extends through a thickness of about 500 feet of flows. This series is at the general horizon of the Winona and Isle Royale beds, to the north, and of the Forest ("Victoria") lode, to the south. The correlation of individual flows from one development to another is probably somewhat uncertain, but in each of the openings in the Lake, South Lake, Adventure, Mass, and Michigan mines there are several lodes that carry

sufficient copper to have encouraged extensive development, and a substantial amount of copper has been produced from the series as a whole.

From higher to lower horizons the lodes are the Knowlton, Merchant, Mass, North Butler, Butler, South Butler, Ogima, and Evergreen, with other amygdaloids present in places. (See pls. 43–46.) The position of these lodes is shown in Plate 13. The lodes that have been most developed and most productive are the Butler, Evergreen, and Knowlton. The Butler lode has yielded the largest amount, but the Evergreen and Knowlton lodes have made a considerable output.

PRODUCTION

The records of production from the several lodes of the series have not usually been kept separate by the mining companies, but the total for the series is essentially the production of the companies mentioned below, with the exception of the production from the Minesota fissure and the Calico lode by mines that have become a part of the present Mohawk Mining Co. (Michigan mine) and from the Lake lode by the Lake Mining Co., which is not here included with the group.

Production from Evergreen and succeeding lodes to end of 1923

Mine	Period	Rock treated (tons)	Copper produced (pounds)	
			Total	Per ton
Lake	1909–1923	--------	[a] Small.	--------
South Lake	1915–1923	80, 075	1, 042, 211	13. 02
Adventure	1851–1923	--------	10, 783, 889	--------
Mass			50, 616, 877	--------
Michigan	1916–1920	--------	[b] 4, 065, 175	--------
		--------	66, 508, 152	--------

[a] Does not include production from the Lake lode.
[b] Estimated; does not include production from the Minesota fissure and Calico lode.

CHARACTER OF FLOWS

The flows of the Evergreen and succeeding lodes are intermediate in composition, falling toward the andesite end of the basaltic series. Texturally they are chiefly melaphyres and glomeroporphyrites, but ophitic texture occurs in some of the thicker flows.

STRUCTURE

Next to the general tilting of the beds and the Keweenaw fault the largest structural feature affecting this series of beds is the pronounced anticline with its crest at Mass. This fold extends southward nearly to Flintsteel River and northward to the Lake mine. Like the Baltic anticline, it does not show a gradual change in strike around the fold but a very sharp change at Mass City of about 35°.

The Lake mine syncline extends into this region, and this series of beds are involved in that fold, but the correlation of the individual beds in the Lake mine basin with the normally dipping beds to the north is somewhat uncertain, and the lodes have therefore been considered separately. There are many fissures and faults with small throw on the Mass anticline, as is usual where the rocks have been folded to that extent. The opportunity for observing these fissures has been too meager to warrant any generalizations regarding them. It may be noted, however, that many of them are probably tension fissures resulting from the folding, though some are essentially strike fissures that dip in an opposite direction to the lode. All the fissures noted are mineralized and were evidently formed before the period of mineralization, though there has been movement on some of them since mineralization.

CHARACTER OF AMYGDALOIDS

Wherever seen the amygdaloids of this series of flows are fragmental to some degree. Very commonly the fragmental material is rather coarse and trappy. Like all other fragmental amygdaloids these differ greatly in different places, but characteristically areas in which the lode is moderately thick and fragmental alternate with areas in which it is thin and cellular or trappy and fragmental. The relative extent of these areas varies from place to place.

Some of the lodes, especially parts of the Evergreen lode opened in the Mass mine, show locally a distinct tendency to pass into amygdaloid of the coalescing type, though this tendency was not seen to persist over very large areas.

MINERALIZATION

The result of mineralization in all the lodes of the series is similar. The abundant minerals are quartz, feldspar, pumpellyite, chlorite, calcite, and epidote. Red feldspar is usually abundant in all the lodes. The less abundant minerals are prehnite, datolite, and laumontite. Zeolites other than laumontite were not noted though possibly present. Anhydrite was found on the dump at the Mass mine, but this mineral seems to be relatively rare in these as in other lodes.

Copper in small and large masses is irregularly distributed through the lode. In the Evergreen lode, in the Mass mine at least, much of the copper is present in masses—in fact a rather large percentage of the copper in all the lodes is coarse.

ROCK ALTERATION

The quartz-pumpellyite rock is the characteristic product of rock alteration associated with the copper, though there has been much replacement of rock by red feldspar and less by chlorite and epidote.

RELATION OF MINERALIZATION TO CHARACTER OF LODE

A close relation between character of lode and mineralization is evident wherever the lodes have been examined. Rich ground is wholly confined to frag-

mental parts of the lode, and the areas of good ground usually coincide with areas in which the lode is also relatively thick. The thin, cellular, and trappy parts of the lode are consistently poor. There is apparently some tendency for the favorable rock to form belts or "shoots," but observation in the mines has been too scanty to make this certain.

BUTLER LODE

MASS MINE

The Butler lode (pl. 45) has been the most productive of the lodes of this series and has been most extensively developed in the Mass mine, where it has been opened for about 5,000 feet along the strike and rather extensively to the thirteenth level. Large areas have been stoped in the ground adjacent to shaft C. Near shaft B and, more especially, near shaft A the stoping has not been as continuous, and presumably the ground is less regularly mineralized.

Lithologic character.—Where examined, as it has been over small areas only, the lode is generally fragmental but largely of rather coarse trappy character. As in most other fragmental lodes, areas of definitely fragmental rock are interspersed with areas of thin trappy or cellular rock. Mr. E. W. Walker, the superintendent, states that in places the lode was unusually wide and was mineralized near the footwall and hanging wall but barren in the middle. In such places two stopes were carried.

Structure.—The main structural feature of the lode in this mine is a series of mineralized fissures. Locally these may show slight displacement, but they rarely offset the lode as much as its width. A "crossing" near shaft A is said to displace the lode along a brecciated zone. No mapping of the fissures has been carried over the area, but there is one series striking northeast and one northwest. There are also fissures striking approximately with the lode, some of which dip with the lode and others across the lode at a high angle. All the fissures contain essentially the same minerals as the lode and were evidently formed before the mineralization, though there has been movement on some of them since mineralization. According to Mr. Walker, no close relation between fissuring and mineralization of the lode has been recognized, though the fissures have evidently rendered the lode more permeable.

Mineralization.—The most abundant minerals of the lode are quartz, calcite, pumpellyite, epidote, and feldspar. Datolite is not uncommon but apparently not abundant. The pumpellyite type of bleaching was the characteristic alteration associated with the deposition of copper. The fine copper of the stamp rock is said to be more evenly distributed in this lode than in the Evergreen lode. That there is considerable coarse copper, however, is indicated by the fact that mass copper constituted about 26 per cent of the total mine production. In the present stage of development, no definite trend of ore shoots has been recognized on a large scale. Minor shoots of good and poor ground are recognized.

Yield.—During the late years of mining by the Mass Consolidated Mining Co. the yield was about half a ton of stamp rock per square foot of lode. As about 50 per cent of the rock was discarded underground, about a ton of rock per square foot of lode was broken, or an average thickness of around 12 feet. The rock milled yielded 15 to 17 pounds of copper to the ton.

ADVENTURE MINE

In the Adventure mine the Butler lode has been opened for about 2,500 feet along the strike and down to the eighth level, but only relatively small areas have been stoped. Where seen in the upper levels fragmental rock seems to form a relatively small proportion of the lode, and the areas between the fragmental portions are "tight" and poor. The mineralization was similar to that in the Mass mine. No records of the grade of rock or production are available.

SOUTH LAKE MINE

The Butler lode has been opened to a small extent in the South Lake mine from the surface to the 600-foot level. It is stated in the company reports that the openings made on the lode before operations were suspended were encouraging and that it gave the most promise of all the lodes in the mine. Rock milled in 1918 amounted to 7,694 tons and averaged 28 pounds of copper to the ton. It is not stated to what extent this rock was selected.

LAKE MINE

Development work on the Butler lode was done in the Lake mine from 1917 to 1919 through a crosscut on the 600-foot level of the Knowlton shaft. The lode was opened for about 1,400 feet along the strike and was reported to contain stretches of fair copper ground. The lode had been earlier opened by the No. 1 and No. 2 Butler shafts from the surface to the third level and for about 1,000 feet along the strike. Some stoping was done on the first and second levels, but no record of the results is available.

NORTH LAKE MINE

The North Lake Co.'s report for 1918 states that the Butler lode was cut in the 800-foot crosscut and followed by a drift for 30 feet. It was said to contain an encouraging amount of copper.

EVERGREEN LODE

MASS MINE

In the Mass mine the Evergreen lode (pl. 46) has been opened for about 3,500 feet along the strike. It has been rather extensively opened down to the eleventh level from shaft B and to a lesser depth and

lateral extent from shaft A. There was no good opportunity to examine this lode in its best-mineralized portions. It is evidently fragmental, though not so highly fragmental as the Butler lode, and in places is coalescing. The fragmental part of the lode is of the rather coarse trappy type. Its mineralization was similar to that of the other lodes of the series. Quartz, calcite, pumpellyite, epidote, and feldspar are the common minerals. Like the adjoining lodes, this lode is cut in the Mass mine by numerous fissures. All are mineralized, and some contain considerable copper. The copper is coarser than in the Butler lode, yielding a larger proportion of mass—in fact, stamp rock is relatively unimportant. The copper is said by Mr. Walker to show a slight tendency to occur in shoots with a southwesterly pitch.

The production from this lode, in recent years at least, has been much less than that from the Butler lode.

ADVENTURE MINE

In the Adventure mine the Evergreen lode has been opened for a few hundred feet on the adit level and to a slight extent on the sixth level. Little stoping has been done in this mine. The lode where seen in the adit level is fragmental but relatively thin. It contained copper rather persistently for a foot or so near the hanging wall.

SOUTH LAKE MINE

The Evergreen lode was cut in the South Lake workings, but no record of its character as there shown has been found.

LAKE MINE

In the Lake mine the Evergreen lode was cut on the 600-foot level from the Knowlton shaft and opened for about 700 feet along the strike. The report of the company for 1919 states that the lode as opened is very encouraging and is considered the best of the series as opened in the Lake mine. A stope over 200 feet long was started. Small test shipments, roughly picked at the surface, yielded from 18 to 34 pounds to the ton.

NORTH LAKE MINE

The Evergreen horizon was reached in the North Lake workings, but no description of the character of the lode is available.

KNOWLTON LODE

The Knowlton lode (pl. 43) has been most extensively opened in the Mass, Adventure, and Lake mines. It was seen in only a few places in the Mass mine, where it is of the fragmental type. As judged from the material on the dumps, it is fragmental in the other places where it has been opened.

MASS MINE

In the Mass mine the Knowlton lode has been most extensively opened from shaft C. On the third level a drift has been carried on the lode for about 2,000 feet. The lode has been largely stoped for 200 to 300 feet each side of shaft C to the eighth level. In shaft B the lode has been opened on the fourth, seventh, tenth, and eleventh levels, but little ground has been stoped. From shaft A it has been opened on the tenth level only. Near shaft C, according to Mr. Walker, it was of good grade.

ADVENTURE MINE

The main operations of the Adventure mine were on the Knowlton lode. In Nos. 1, 2, and 3 shafts the lode was opened for about 2,000 feet along the strike, and in No. 3 shaft it was opened to the thirteenth level. Only a relatively small proportion of the ground opened was stoped. The largest areas stoped were near No. 2 shaft to the tenth level and midway between Nos. 3 and 4 shafts on levels 7 to 10.

No. 4 shaft was supposed to be located on the Knowlton lode, but later a lode was found about 60 feet from the hanging wall of the one on which the shaft was sunk, and it was thought that this might be the Knowlton. The lode as opened in the Adventure mine has averaged rather low in copper. Prior to 1906, according to the company's report of 1907, all rock stamped averaged 12.29 pounds to the ton; in the first half of 1907 it fell to 8.7 pounds, but it improved during the second half of that year, when the mine was closed. The mine was operated for a short time in 1916–17 but was soon closed again.

LAKE MINE

The Knowlton lode has been opened at the Lake mine for about 1,200 feet along the strike and as deep as the sixth level in the main Knowlton shaft. Stoping has been done near this shaft from the first to the sixth levels. Some areas of fair ground were said to have been opened.

MICHIGAN MINE

A lode that is locally known as the Butler lode but appears to be higher, possibly at the Knowlton horizon, has been opened by shaft E of the Michigan mine to the eighth level and for a maximum distance along the strike of about 1,400 feet. The most extensive stoping has been done in what appears to be a westward-pitching shoot that crosses the shaft below the fifth level. (See pl. 43.) As indicated by material on the dump the lode is fragmental, and the character of mineralization is similar to that at other places where the lode has been opened.

OGIMA LODE

The Ogima lode (pl. 44) has been opened to a slight extent in shafts C and B of the Mass mine and in the Adventure mine. It contains patches of fragmental rock, and some of these are fairly well mineralized. The openings on the whole have apparently not been encouraging.

OTHER LODES

There has been slight development of the Merchant and North Butler lodes in the Mass and Adventure mines and of a lode in the foot of the Evergreen at the Lake mine. These lodes are somewhat fragmental and in places carry copper, but as yet they have offered little encouragement to extensive development.

FOREST ("VICTORIA") LODE

The statements regarding the Forest lode (pl. 47) are based on a brief visit to the Victoria mine in August, 1923, on the mine maps and records, and on statements by the late George Hooper, superintendent during the later operations, and by Charles Hooper.

PRODUCTION

The Victoria mine, on the Forest lode west of Ontonagon River, is the westernmost mine on the main range that has made a notable production. It was also one of the earliest producers in that part of the district.

Production of Forest lode in Victoria mine to end of 1923

Period	Rock treated (tons)	Copper produced (pounds)	
		Total	Per ton of rock
1855–1878		375, 279	
1904–1923	1, 700, 518	19, 649, 134	11. 55
		20, 024, 413	

GEOLOGIC HORIZON

The Forest lode is one of the series a short distance above No. 8 conglomerate, but with which one, if any, of those developed to the east it is to be correlated is not certain, and it is therefore considered separately. It is low in the series and probably near the Evergreen horizon. This lode has been slightly prospected for several miles to the south on the Tremont-Devon, Cass, and other properties but not extensively developed.

CHARACTER OF AMYGDALOID

Where seen in the Victoria mine the lode shows alternations of areas of rather thin cellular to coalescing amygdaloid with smaller areas of fragmental rock. The areas of fragmental rock seemed to bulge rather deeply into the underlying material, but Mr. Hooper stated that there were bulges of this character into the hanging wall also. The fragmental parts of the lode are 50 feet thick in places. The thicker masses of fragmental rock are irregularly distributed in the developed area, though they show some tendency to form shoots.

MINERALIZATION

Quartz, pumpellyite, epidote, and calcite are the most abundant minerals associated with the copper. Prehnite is fairly abundant. The rock alteration is mainly of the quartz-pumpellyite type.

Much of the copper occurs as relatively large masses. Mr. Hooper stated that in the later operation mass copper had run as much as 50 per cent of the total production and that the stamp rock was of low grade, carrying less than 10 pounds of copper to the ton. The thick bulges of fragmental rock are by far the richest portions of the mine, though Mr. Hooper stated that such rich areas have not yielded a very large proportion of the total output. The richness of the ground seems to show a close relation to the degree to which the lode is fragmental.

EXTENT OF DEVELOPMENT

The lode has been opened in the Victoria mine for about 3,800 feet along the strike and to the twenty-eighth level. The area in which extensive stoping has been done is considerably less, as can be seen by reference to Plate 47.

Some work was done in the early days on the Tremont-Devon property, west of the Victoria, and more recently diamond drilling has been done in order to locate the Forest amygdaloid. An amygdaloid that was thought to be the Forest was encountered and was reported to contain some copper.

LAKE LODE

PRODUCTION

The Lake lode (pl. 48) was located by diamond drilling in 1907. Development began in 1908, and the first production was made in 1909. From 1909 to 1918, when production was suspended, the Lake lode had yielded 7,326,227 pounds of copper. The yield ranged from about 16.0 to 26.5 pounds per ton of ore milled and averaged about 23 pounds. The rock was sorted to a varying degree. The company's report for 1918 states that "All new stopes opened in the Lake shaft showed a steadily decreasing copper content of rock. * * * In the newer stopes 5 or 6 tons had to be discarded for every ton shipped."

LOCATION

The Lake lode was discovered and first opened near the Keweenaw fault. Developments on the lode in the Lake and South Lake mines show that this portion of the lode is on the north end of a synclinal basin pitching southwest.

The openings on the lode were not accessible when the writers visited the region, and the statements concerning the lode are taken largely from the records

Geology of Michigan Copper Deposits

With Special Reference to the Evergreen Series

The Evergreen Series of lodes is the name applied to a group of several lava flows within the thick series of Pre-Cambrian lava flows with occasional interbedded conglomerate layers which forms the Keweenaw Peninsula. This general sequence of flows and conglomerates is the host rock for the native copper deposits of Michigan and it outcrops in a belt 2 - 4 miles wide and more than 100 miles long. The outcrop of the Evergreen Series is a portion approximately 800 feet thick of this total 2 - 4 mile thick section.

As no deposits in the conglomerates are found within the Evergreen Series, these are not considered here. The ore in the lavas is found in the so-called amygdaloid lodes. These are the blocky and rough tops of lava flows which formed on cooling of the flow. Large quantities of gas in each flow collected into bubbles as the flow cooled and rose to the surface of the flow, where they first escaped. As the flow cooled and became viscous, the bubbles were finally trapped, forming a cellular capping. In some flows, the vesicular crust was further rendered permeable by flow movement which broke it into blocky fragments. This fragmental and vesicular top has localized mineralization because of its greater permeability.

The thick series of flows underlies the Lake Superior Basin in the form of a vast syncline. Native copper has been found in many places in the flows but important commercial production is limited to the Keweenaw Peninsula, largely from one conglomerate and five amygdaloid ore bodies. The ore is found in the amygdaloids in large ill defined shoots, the ore shoots in important mines having long dimensions measured in thousands of feet and extending to great depth. For example, the ore shoot in the Kearsarge amygdaloid extended six miles laterally and has been mined to an inclined depth of over 5,000 feet. The Quincy mine was mined down dip approximately 10,000 feet. The general grade of ore from the amygdaloid mines is 1%, although some are higher.

The work which has been done on the Knowlton lode over the past years by Calumet and Hecla from the Caledonia Adit strongly suggests that the past stoping operations on this lode have been confined to patches of what is actually one of the typical large ore shoots of the district. Past mining operations were patchy because of split up ownership, and also work could only be carried on a limited distance from a shaft because of the limitations of hand tramming. Extensive development was not encouraged by the marginal nature of the operations.

Our test stoping to date has now demonstrated the continuity of mineralization between the old workings of the Caledonia, Knowlton and Old Mass mines. The work proposed under this application for aid will test the supposition that this ore shoot is similarly continuous at least to the Mass Consolidated "C" shaft where substantial production was made from the Knowlton lode. There would then be indicated at Caledonia an ore shoot in the Knowlton lode of 5,000 - 6,000 feet minimum length and with a depth which could be reasonably inferred to be of the order of 5,000 or more feet, with ore known to exist on the parallel Butler and Evergreen lodes. The grade of

this ore, if it continues to be of the same grade as that test stoped, would be somewhat better than that historically produced from the amygdaloid lodes.

Successful completion of the recommended exploration would be of more than local significance since establishment of a going mine in the area would encourage exploration of other old producing areas such as the "Minesota" and Michigan E Shaft.

James Pollock

SCHEDULE "A"

Items of Cost	Cost Per Foot
(1) Independent) Short Form) Contracts:	
Drilling	None
Bulldozing	"
Crosscutting	"
Drifting	"
Diamond Drilling	$5.00
(2) Labor and Supervision:	
*Labor	$17.80
*Supervision	5.91
Technical Services	-
(3) Operating Mat'ls and Supplies:	
Timber	-
Explosives	6.80
Pipe	2.13
Track	4.10
Miscellaneous	1.13
Power (Electricity)	1.67
(4) Operating Equipment:	
*Rental	6.30
Purchase	-
Depreciation	-
(5) Initial Rehabilitation and Repairs	-
(6) New Bldgs., Improvements, etc.	-
(7) Miscellaneous:	
Repairs to Equipment	1.50
Sampling and Analysis	-
Payroll Taxes	.78
Liability Insurance	-
*Fringe Benefits	3.17
*Other	1.23
(8) Contingencies (Specify)	-
Totals	$52.52

* Detail on following sheet

DETAIL SHEET

(Assumed advance 30 feet per week)

Detail		Per Week	Per Foot
(2)	Labor -		
	2 Miners @ $1.57/hr. + incentive pay:		
	8 x 1.57 = $12.56 + 5.00 = 17.60 x 10 shifts	$ 175.60	$ 5.85
	2 Trammers @ $1.45/hr. + incentive pay:		
	8 x 1.45 = $11.60 + 2.00 = 13.60 x 10 shifts	136.00	4.53
	4 Surface @ $1.39/hr., 8 x $1.39 = $11.12 x 20 shifts	222.40	7.42
		$ 534.00	$ 17.80
	Supervision - 2 men (one for each shift)	177.23	5.91
	Labor - GRAND TOTAL	$ 711.23	
(4)	Rentals (Per Week)		
	2 Tram Cars @ $16.67 per month = $3.85 per week	7.70	.26
	3 Drill Machines @ 16.67 per month = $3.85 per week	11.55	.39
	1 Eimco Loader @ 76.67 per month	17.69	.59
	2 U.G. Battery Locomotives @ $100.00 per month	46.00	1.53
	1 Compressor $11,000.00 @ $200.00 per month	46.00	1.53
	1 Truck (G & O & Repairs) @ $60.00 per week	60.00	2.00
		$ 188.94	$ 6.30
(7)	Fringe Benefits		
	W/C Insurance 3.87% x 711.23)		
	Vacation Pay 4.00% x 711.23) 10.27% x $711.23	73.04	2.43
	Holiday Pay 2.40% x 711.23)		
	Health & Accident Insurance		
	9.64 per month = $2.22 per week x 10 men	22.20	.74
		$ 95.24	$ 3.17
(7)	Other		
	Telegraph & Telephone		.33
	Accounting Service		.53
	Fire & E. C. Insurance		.37
			$ 1.23

MINERAL LEASE

Calumet & Hecla, Inc.

to

Copper Range Company

This Agreement, made and entered into this 3RD day of August, A. D. 1962, by and between CALUMET & HECLA, INC., a Michigan corporation having its principal offices at 122 South Michigan Avenue, Chicago, Illinois, (hereinafter referred to as the "Lessor"), and COPPER RANGE COMPANY, a Michigan corporation having its principal offices at 630 Fifth Avenue, New York, New York, (hereinafter referred to as the "Lessee"):

WITNESSETH:

For good and valuable consideration, the receipt and sufficiency whereof are hereby acknowledged, and in further consideration of the mutual agreements herein contained, Lessor does hereby let and lease unto the Lessee all its right, title and interest in and to any and all ores, metals and minerals, as hereinafter defined, in, upon, or under the premises located in Ontonagon and Houghton Counties, Michigan, more particularly described in Exhibit A attached hereto and hereby made a part hereof, together with such other lands in the same general area as may be made subject to this lease by agreement of the parties, which premises are hereinafter referred to as the "Leased Premises", for the full term of ninety-nine (99) years from and after the date hereof unless sooner surrendered or terminated as provided herein, together with the following rights and privileges and subject to the following terms and conditions:

1. Grant of Mining Rights

To the extent of the right, title and interest of the Lessor, Lessor hereby grants to Lessee the sole and exclusive right and privilege to mine, remove, transport, mill, smelt, refine or otherwise beneficiate and sell any and all ores, metals and minerals in, upon, or under said Leased Premises. As used herein, the terms ores, metals and minerals shall mean and include any and all materials in, upon, or under said Leased Premises primarily valuable for mineral or metallic content, except stone, sand, dirt and gravel. To the extent of the right, title and interest of Lessor, rock deposited upon the Leased Premises through prior mining operations and "tailings" deposited on the Leased Premises after prior mining and beneficiation are specifically included as ores, metals, and minerals, whether the same are removed for the purpose of recovering mineral content or for sale or other use. The privilege of mining, removing, beneficiating and selling ores, metals and minerals from the Leased Premises as herein granted shall not in any manner obligate the Lessee to do so and the determination as to whether any ores, metals and minerals shall, during the period of the lease, be mined, removed, beneficiated, or sold, and the place, manner and time of production from the Leased Premises shall at all times lie in the uncontrolled discretion of the Lessee, except as herein specifically provided.

It is hereby understood and agreed that the Lessor retains all other rights and interests not inconsistent with the rights herein granted, to the extent that the same may be exercised, used or retained without

in any way interfering with the full and free exercise by the Lessee of its rights and privileges hereunder.

All operations of Lessee in or upon the Leased Premises shall be conducted in a proper and workmanlike manner and in accordance with good mining practice. Lessee may sink, drift, or construct shafts, drifts, cross-cuts, winzes, raises, stopes, and such other underground openings as it may deem advisable. It may enter upon the said Leased Premises through underground openings from other lands and may remove ores, metals and minerals through shafts or other openings on said other lands. It may utilize openings on the Leased Premises for the purpose of mining adjoining lands and may hoist and transport ores from other lands through shafts or other openings located on the Leased Premises.

2. Exploration

Lessor grants to Lessee to the extent of its present right, title and interest, the right to enter upon the surface of the Leased Premises and to conduct explorations for ores, metals and minerals by any or all methods it may deem necessary or desirable. Such exploration for ores, metals, and minerals shall be conducted in such a manner as not to unreasonably interfere with the present or future use of the surface of the Leased Premises by Lessor, its tenants or its assigns, or to result in unnecessary damage thereto. If such exploration shall result in damage to the surface of said Leased Premises or shall unreasonably impair or interfere with the present or future use thereof, Lessee shall pay the reasonable value of such damage, impairment or interference.

3. Surface Rights

To the extent of the right, title and interest of Lessor, Lessee is hereby granted the right to use so much of the surface of the Leased Premises as may be required for the conduct of mining operations therein or thereon. It may construct and operate thereon shaft houses, hoists and such other surface installations as may be desirable for mining purposes, and may construct, use and maintain on the Leased Premises roads, railroads, pole lines, pipe lines, conduits, launders, and such other services as may be required by it. Lessee shall notify Lessor, and any other person or persons having rights in the Leased Premises which may be affected, of its intention to make use of the surface of the lands as granted in this paragraph. Such notice shall specify the purpose for which each separate parcel is to be used, the extent of such use, and the time at which such use will begin, not sooner than ninety (90) days from the date of such notice. Within ninety (90) days from the date of such notice, the amount to be paid by Lessee for such use shall be determined, either by agreement or by arbitration, as provided herein, and such amount shall be paid by Lessee prior to entering upon the use of the surface for such purposes. For the purpose of determining such compensation, it is agreed that as to any parcel specified in such notice, the surface of which is then owned by Lessor, or is owned by Lessor and leased to another under an instrument subject to the terms of this lease, Lessee shall pay to Lessor or its lessee, as their interests may appear, the reasonable

value of any and all sand, gravel or timber and for damage to any then existing improvements thereon, but need not pay for any land value as such. As to any portion of the Leased Premises owned by another, but subject to the terms of this lease, Lessee shall pay such owner, in addition to the above, the reasonable value of the land. As to any portion of the Leased Premises specified in the notice, the surface of which is at that time owned by another or held by a lessee under a lease not subject to the provisions of this lease, negotiations shall be conducted directly by the Lessee with such owner or lessee. To assist such Lessee in such negotiations, Lessor agrees to assign or transfer to Lessee or to exercise for its benefit any rights Lessor may have in connection with such surface, including rights to use, the right to repurchase, the right to cause subsidence, or the right to terminate a lease.

4. Titles

Lessor does not warrant title to any of the Leased Premises covered by this lease. If Lessee deems it necessary or desirable to perfect Lessor's title to any of such Leased Premises, Lessee shall at its own uncontrolled option have the right to do so, and Lessor will cooperate with Lessee by furnishing any information or records in its possession or by becoming a party to litigation. The cost of perfecting such title shall be borne by Lessee, except that any reasonable amounts expended for deeds, releases, or discharges necessary to perfect such title shall be recoverable by Lessee only from royalties due to Lessor on account of production thereafter from the portion of the Leased Premises as to which title was perfected.

5. Taxes Payable by Lessee

Lessee will pay on behalf of itself or Lessor any and all taxes, registration fees or other assessments imposed or assessed solely by reason of mineral values in or on said Leased Premises or any portion thereof. Lessee will also take such action as may be necessary to prevent any unpaid taxes imposed on a surface owner other than Lessor from impairing Lessor's rights to the minerals underlying such surface description. Lessee further agrees to pay when due, any and all taxes levied or assessed upon any of the surface of said Leased Premises used by it under the terms of paragraph 3. Lessee may pay any of said taxes, registration fees or other assessments under protest provided said action is done in Lessee's name and at its own cost and expense.

6. Taxes Payable by Lessor

Except as provided in paragraph 5 hereof, Lessor undertakes and agrees to protect Lessee's rights hereunder by payment of taxes on the surface of the Leased Premises owned by Lessor, at the time such taxes become due and payable. If Lessor shall desire to contest any such taxes, it may do so, but undertakes to pay the amount of taxes adjudicated to be due prior to the time when such unpaid taxes might deprive Lessee of its rights hereunder.

7. Release in Lieu of Taxes

In lieu of paying taxes as provided in paragraph 6 hereof, Lessor may offer to convey any portion of the surface of the Leased Premises

to Lessee at any time prior to the time when the non-payment of such taxes might deprive Lessee of its rights hereunder. Such offer shall be made by notice in writing accompanied by a validly executed Quit Claim Deed. Lessee shall have the right to accept or reject such conveyance, and shall promptly notify Lessor of its decision. In either case, the portion of the Leased Premises specified in the notice and conveyed by the Quit Claim Deed shall be released from the provisions of this lease and all rights and duties with respect to said portion of the Leased Premises shall cease and terminate as between the parties hereto. Lessee, in lieu of continuing the payment of taxes, registration fees or other assessments imposed or assessed solely by reason of mineral values in or on said Leased Premises, as provided in paragraph 5 hereof, may by instrument in writing suitable for recording, release any portion of the Leased Premises to the Lessor, in which case Lessee's rights hereunder and all obligations of Lessor with respect to such Leased Premises so released shall cease and terminate, provided, however, Lessee shall have paid all such taxes, registration fees or other assessments owing by it as provided in paragraph 5 hereof, including the taxes, registration fees or other assessments imposed or assessed for the year in which said release is executed and delivered.

8. Royalties

Lessee shall pay royalties to the Lessor on all ores, metals and minerals removed from the Leased Premises.

(a) In the case of copper, the royalty per pound shall be calculated by application of the following formula:

$$R = 1/10 \left[P - \left(\frac{553}{G} + 4 \right) \left(\frac{W}{173} \right) \right]$$

The total royalty shall be determined by multiplying the royalty per pound as calculated above by the total pounds of copper contained in concentrates and direct smelting material produced from the Leased Premises during the settlement period. In no event shall the royalty per pound of copper, irrespective of the foregoing formula, be less than one-tenth of a cent.

In the above formula

R = The royalty in cents per pound of copper.

P = The current price per pound of copper delivered U. S. basis, to be determined by taking the average of the monthly average prices for the three calendar months preceding the settlement date as published by the Engineering and Mining Journal. If the Engineering and Mining Journal published prices on copper should be discontinued, the Lessor and the Lessee do agree to accept a similar published average price.

G = The grade in pounds per ton (2,000 pounds) which shall be determined by dividing the total pounds of copper contained in concentrates and direct smelting material produced from the Leased Premises during the settlement period by the total tons of ore treated to produce said copper, all calculated on a dry basis.

W = The hourly rate of pay in cents for Job Class 1 in effect during the settlement period for employees of the Lessee who are engaged in mining and other activities directly related to the Lessee's operation of the Leased Premises. Should Lessee's present method of classifying jobs be discontinued, the Lessor and Lessee do agree to accept for the purpose of "W" the hourly rate of pay of a job equivalent to Job Class 1, as classified in accordance with Lessee's present Job Evaluation Manual for production and maintenance employees.

(b) In the case of silver, silver will be included as copper unless the quantity of silver exceeds one troy ounce per ton of ore treated, in which case, Lessee will pay to Lessor as royalty therefor ten (10) per cent of the averaged published price of silver reported by Handy and Harman during the settlement period multiplied by the quantity of silver in excess of one troy ounce per ton of ore treated.

(c) If other ores, metals or minerals are recovered and marketed by the Lessee, a separate agreement covering the royalty payments therefor will be negotiated by the Lessor and Lessee and said separate agreement shall provide for royalty payments designed, as nearly as possible, to equal ten (10) per cent of the Lessor's operating profit before income taxes.

(d) In the case of copper contained in copper concentrates recovered from previously mined rock and tailings, the royalty per pound of copper shall be one-tenth of one cent.

(e) In the case of previously mined rock and tailings removed from the Leased Premises for purposes other than the extraction of metals and minerals, the royalty will be either ten (10) per cent of the sales price, if sold by Lessee, or, if not sold by Lessee, ten (10) per cent of the reasonable market value.

The "settlement period" will be a calendar or fiscal quarter at the option of the Lessee.

The "settlement date" will be the last working day of each said elected calendar or fiscal quarter and royalties will become due and payable within fifteen (15) days of the settlement date.

9. Records and Inspection

Lessee agrees to keep accurate records showing the quantity of ores produced by it from the Leased Premises and the metal recovered therefrom. All ores produced from the Leased Premises shall be kept separate and distinct from ores produced by Lessee from other premises so far as such practice shall be deemed by Lessee to be practical and economic and at least to such point in the milling or refining process where such product may be accurately weighed and sampled. If it shall be deemed by the Lessee to be impractical or uneconomic to keep such ores separate until accurate weighing and sampling, such ores may be commingled with other ores of the Lessee and the recoverable content thereof shall be determined by such other method as may be in accordance with good mining practices and agreed upon by both parties. Lessee shall furnish to Lessor a statement showing in reasonable detail the method used to determine the quantity of ore from which metals were produced and the copper content of concentrates therefrom, and shall furnish Lessor with information regarding any change in such method. Lessor at its own expense shall have the right through its authorized representatives to enter into and upon the Leased Premises as often as reasonably necessary and to inspect and examine any and all mine openings and working places on the Leased Premises and to do such checking, measuring and surveying as may be desired by the Lessor. Lessor shall also have the right to check the movement of ore from the workings of the Leased Premises

to the rock bins and to the mill, to be present at all weighing and sampling and to make such observations from time to time as Lessor may deem advisable. Provided, however, that said Lessor, insofar as it is empowered by law to do so, agrees to save the Lessee harmless from all claims for damages to property or arising out of any death or personal injuries sustained by any such agents or servants of the Lessor while in or upon said premises as herein permitted, unless the death or injury or property damage arises as the result of negligence of the Lessee, its agents, servants, or employees.

10. Royalty Reports

Lessee will furnish to the Lessor on or before the settlement date provided for the payment of royalties, a statement showing for the previous royalty period the tonnage of ore from the leased premises from which recovery was obtained, the copper content of concentrates recovered from the same, and the computation of royalty. Lessor by its duly authorized agent or agents shall have the right for a period of sixty (60) days after the furnishing of such statement to audit the same and the records from which the same were prepared and to make any objections to any item or computation therein contained. Failure to make objection in writing within sixty (60) days shall operate as consent to and approval of the correctness of such statement and as a waiver of the right of Lessor to question the accuracy of the same thereafter.

It is expressly understood and agreed by and between the

Lessor and the Lessee that the rental, royalty, and minimum royalty herein stated and to be received by the Lessor, where the Lessor's interest in the demised premises as described in this lease is an undivided fractional interest, shall be that proportion of the rental, royalty, and minimum royalty hereinabove stated which the Lessor's ownership of any undivided fractional interest bears to the total interest.

11. Indemnification of Lessor

Lessee agrees that it will elect to come, and will remain, under the provisions of the Michigan Workmen's Compensation Act with reference to operation under this lease and that it will comply therewith; that it will pay for all labor used by it upon the Leased Premises and for all material supplied to it thereto; that it will indemnify and save harmless Lessor from any and all liability arising out of Lessee's interest in, operations on, or use of, the Leased Premises, including any and all damages to the public ensuing from the malfeasance or non-feasance of any duty imposed upon the Lessor or Lessee by law by reason of its right, title and interest in the Leased Premises or the surface rights thereof relative to the fencing of existing and future shafts, pits or areas of subsidence, and other statutory regulations of like nature. Lessee further covenants and agrees that while this lease continues in force it will comply with, at its own cost and expense, all federal, state and local rules and regulations relating to or affecting said Lessee's interest in, operations on, or use of, the Leased Premises.

12. Sale by Lessor

Lessor expressly covenants and agrees that while this lease continues in force, it will not sell, lease, convey or dispose of the Leased Premises or any portion thereof, except expressly subject to the provisions of this document, nor will the Lessor sell the mineral estate underlying the same to third parties without first offering such whole or part, as the case may be, to the Lessee by written notice served personally or by registered mail, at the same price and on the same terms offered by a bona fide purchaser thereof. If the Lessee shall not at the end of thirty (30) days after the receipt of such notice have accepted such offer, the Lessor shall be free to proceed with such third party, subject to the provisions of this document. Lessor shall not be obligated to make such offer prior to a sale or transfer to another corporation, a majority of whose stock is owned by Lessor or resulting from a consolidation or merger to which Lessor is a party.

13. Default

If Lessee shall make default in the payment of taxes as specified in paragraph 5 hereof, or in payment for labor or materials used by it in, or upon the same, or in any other manner subject such property or any part thereof to any lien or encumbrance, or if it shall fail to pay the royalties hereunder when the same shall become due, and if such default or lien or encumbrance shall continue for sixty (60) days after notice thereof shall have been given by the Lessor to the

Lessee, Lessor may terminate this lease by notifying the Lessee of its election to do so.

14. Notices

Any notices required to be given to the Lessor hereunder shall be in writing and shall be addressed to it as follows:

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

Any notices to be given to the Lessee hereunder shall be in writing and shall be addressed to it as follows:

Copper Range Company
630 Fifth Avenue
New York 20, New York

Any such notice shall be deemed to have been given when delivered, but a Registered Mail Return Receipt shall be deemed conclusive proof of such delivery. Either party, by notice in writing, may change its address as above given.

15. Covenants Running with the Land

This agreement shall be deemed to be made under the laws of the State of Michigan and shall be construed in accordance therewith. The provisions of this agreement are covenants running with the land and are binding upon the successors, assigns or lessees of the Lessor. Subject to the requirement that any conveyance of the land or any interest therein or any portion thereof shall be made expressly

subject to the provisions of this lease, Lessor's interest in any part of the Leased Premises may be conveyed, assigned, leased or otherwise disposed of by it, subject however to the provisions of paragraph 12 with respect to the sale of said Leased Premises. Lessee may assign its rights hereunder or any portion thereof, provided however that such assignment shall be expressly subject to the duties of Lessee herein contained and such duties shall be assumed in writing by Lessee's assignee.

16. Arbitration

In case Lessee, its successors or assigns, is unable to agree with Lessor or with the successors, assigns or lessees of Lessor upon the construction of this agreement or any part thereof, or upon any determination herein, whether expressly specified to be subject to arbitration or not, such question or questions shall be determined by arbitration under the Laws of the State of Michigan in accordance with the terms of a separate arbitration agreement concurrently executed by Lessor and Lessee. A copy of said arbitration agreement is recorded in Liber _____ of _____ in the Office of the Registrar of Deeds in and for Keweenaw County, Michigan; and in Liber _____ of _____ in the Office of the Registrar of Deeds in and for Houghton County, Michigan; and in Liber _____ of _____ in the Office of the Registrar of Deeds for Ontonagon County, Michigan.

17. Rights on Termination

Upon the termination of this agreement, whether by expiration of the term hereof or in any other manner provided herein, all

rights, obligations and liabilities of both parties hereunder shall cease as to the portion of the Leased Premises covered by such termination, except as expressly provided and except as may have occurred or arisen prior to the date of termination. Upon said termination, the title to any building or other improvements of a permanent character that shall be erected or placed upon the Leased Premises by the Lessee, shall forthwith vest in the Lessor, except that the Lessee shall have six (6) months time within which to remove the contents thereof if it so desires. Title to the contents shall be vested in the Lessor upon the failure of Lessee to so remove the same.

18. Force Majeure

The operation of any provisions of this agreement which cannot be complied with by reason of any act of God, or war, the elements, labor difficulties, delays in transportation, State or Federal statutes, rules or regulations, inability to obtain labor, material or supplies by reason thereof, or for any other cause, either of a like or different nature, beyond the control of the parties shall be suspended until such cause shall be removed or such emergency shall cease.

IN WITNESS WHEREOF, Calumet & Hecla, Inc. has caused this instrument to be signed, and its corporate seal to be hereunto affixed, by its President and Secretary, they being thereunto duly

authorized, and Copper Range Company has caused this instrument to be signed, and its corporate seal to be hereunto affixed, by its President and Secretary, they being thereunto duly authorized, all on the day and year first above written.

In the presence of:

CALUMET & HECLA, INC.

By /s/ H. Y. Bassett
Its President

And /s/ W. E. Haines
Its Secretary

COPPER RANGE COMPANY

By /s/ James Boyd
James Boyd, Its President

And /s/ J. Roland Ackroyd
J. Roland Ackroyd, Its Secretary

STATE OF ILLINOIS)
) ss.
COUNTY OF COOK)

On this _____ day of _____, in the year of our Lord one thousand nine hundred sixty-two, before me, a Notary Public in and for said county, appeared _____ and _____, to me personally known, who being by me sworn, did each for himself say that they are respectively the President and Secretary of Calumet & Hecla, Inc., one of the corporations named in and which executed the within instrument, and that the seal affixed to said instrument is the corporate seal of said corporation, and that said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors; and said _____ and _____ acknowledged said instrument to be the free act and deed of said corporation.

_____
Notary Public
In and for the County of Cook, State of Illinois.
My commission expires _____

STATE OF NEW YORK)
CITY OF NEW YORK) ss.
COUNTY OF NEW YORK)

On this _____ day of _____,

in the year of our Lord one thousand nine hundred sixty-two, before me, a Notary Public in and for said county, appeared James Boyd and J. Roland Ackroyd, to me personally known, who being by me sworn, did each for himself say that they are respectively the President and Secretary of Copper Range Company, one of the corporations named in and which executed the within instrument, and that the seal affixed to said instrument is the corporate seal of said corporation, and that said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors; and said James Boyd and J. Roland Ackroyd acknowledged said instrument to be the free act and deed of said corporation.

_____
Notary Public
In and for the City of New York, County of New York, and State of New York.
My commission expires_____

EXHIBIT "A"

Subdivision	Section	Township North	Range West	Acres	County
NE 1/4 of NW 1/4	2	52	34	37.40	Houghton
S 1/2 of NW 1/4	2	52	34	54.65	"
NE 1/4 of SW 1/4	2	52	34	40.00	"
S 1/2 of SW 1/4	2	52	34	80.00	"
SW 1/4 of NE 1/4	8	52	34	40.00	"
SW 1/4 of NW 1/4	8	52	34	40.00	"
N 1/2 of SW 1/4	8	52	34	80.00	"
SE 1/4 of SW 1/4	8	52	34	40.00	"
NW 1/4 of SE 1/4	8	52	34	40.00	"
N 1/2 of NE 1/4	10	52	34	80.00	"
SE 1/4 of NE 1/4	10	52	34	40.00	"
SW 1/4 of SE 1/4	18	52	34	40.00	"
E 1/2 of SW 1/4	20	52	34	80.00	"
SE 1/4	20	52	34	160.00	"
SW 1/4 of NE 1/4	22	52	34	40.00	"
W 1/2 of NW 1/4	22	52	34	80.00	"
NE 1/4	24	52	34	160.00	"
W 1/2 of SW 1/4	24	52	34	80.00	"
SE 1/4 of SW 1/4	24	52	34	40.00	"

Exhibit "A" - Page 2

Subdivision	Section	Township North	Range West	Acres	County
NW 1/4 of SE 1/4	24	52	34	40.00	Houghton
SE 1/4 of SE 1/4	24	52	34	40.00	"
N 1/2 of NE 1/4	26	52	34	80.00	"
SE 1/4 of NE 1/4	26	52	34	40.00	"
NW 1/4	26	52	34	160.00	"
NE 1/4 of SW 1/4	26	52	34	40.00	"
SW 1/4 of SW 1/4	26	52	34	40.00	"
N 1/2 of SE 1/4	26	52	34	80.00	"
SW 1/4 of SE 1/4	26	52	34	40.00	"
NE 1/4 of NW 1/4	28	52	34	40.00	"
SW 1/4 of NW 1/4	28	52	34	40.00	"
E 1/2 of SW 1/4	28	52	34	80.00	"
NW 1/4 of NE 1/4	32	52	34	40.00	"
S 1/2 of NE 1/4	32	52	34	80.00	"
SW 1/4 of NW 1/4	32	52	34	40.00	"
W 1/2 of SW 1/4	32	52	34	80.00	"
SE 1/4 of SW 1/4	32	52	34	40.00	"
N 1/2 of SE 1/4	32	52	34	80.00	"
SE 1/4 of SE 1/4	32	52	34	40.00	"
E 1/2 of NE 1/4	34	52	34	80.00	"
SE 1/4 of SW 1/4	34	52	34	40.00	"
SE 1/4	34	52	34	160.00	"

Exhibit "A" - Page 3

Subdivision	Section	Township North	Range West	Acres	County
NE 1/4	15	54	34	160.00	Houghton
NE 1/4 of NW 1/4	15	54	34	40.00	"
S 1/2 of NW 1/4	15	54	34	80.00	"
N 1/2 of SW 1/4	15	54	34	80.00	"
SW 1/4 of SW 1/4	15	54	34	40.00	"
N 1/2 of SW 1/4	26	52	35	80.00	"
SW 1/4 of SW 1/4	26	52	35	40.00	"
SE 1/4	34	52	35	160.00	"
Entire fractional	2	55	35	427.60	"
SE 1/4 of NE 1/4	10	55	35	40.00	"
Lot 2	10	55	35	50.25	"
Lot 4	10	55	35	36.40	"
SE 1/4 of SW 1/4	10	55	35	40.00	"
SE 1/4	10	55	35	160.00	"
Entire fractional	36	56	35	377.75	"
N 1/2	5	52	36	320.84	"
SW 1/4	5	52	36	160.00	"
W 1/2	7	52	36	319.02	"
SW 1/4	1	53	36	160.00	"
E 1/2	3	53	36	320.24	"
N 1/2 of S 1/2	6	53	36	158.67	"
SW 1/4	13	53	36	160.00	"

Exhibit "A" - Page 4

Subdivision	Section	Township North	Range West	Acres	County
E 1/2 of SE 1/4	11	53	36	80.00	Houghton
NE 1/4	15	53	36	160.00	"
N 1/2	16	53	36	320.00	"
SW 1/4	16	53	36	160.00	"
Entire	18	53	36	637.68	"
Entire	19	53	36	640.02	"
NW 1/4	21	53	36	160.00	"
SE 1/4	21	53	36	160.00	"
NE 1/4	23	53	36	160.00	"
S 1/2	23	53	36	320.00	"
Entire	27	53	36	640.00	"
E 1/2	29	53	36	320.00	"
W 1/2	31	53	36	318.38	"
SE 1/4	31	53	36	160.00	"
Entire	2	54	36	639.60	"
Entire fractional	4	54	36	208.30	"
Entire fractional	8	54	36	90.05	"
Entire	10	54	36	640.00	"
Entire	12	54	36	640.00	"
S 1/2 of NE 1/4	14	54	36	80.00	"
N 1/2 of SE 1/4	14	54	36	80.00	"
Entire fractional	20	54	36	620.75	"
Entire	22	54	36	640.00	"

Exhibit "A" - Page 5

Subdivision	Section	Township North	Range West	Acres	County
E 1/2	25	54	36	320.00	Houghton
W 1/2 of E 1/2	26	54	36	160.00	"
W 1/2	26	54	36	320.00	"
N 1/2 of NE 1/4	28	54	36	80.00	"
SW 1/4 of NE 1/2	28	54	36	40.00	"
W 1/2	28	54	36	320.00	"
SE 1/4	28	54	36	160.00	"
Lots 1 & 2	30	54	36	84.40	"
E 1/2 of SE 1/4	30	54	36	80.00	"
Entire	32	54	36	640.00	"
Entire, except NE 1/4 of NE 1/4	34	54	36	600.00	"
Entire fractional	26	55	36	7.00	"
Entire fractional	36	55	36	640.00	"
E 1/2	1	52	37	321.72	Ontonagon
NE 1/4	3	52	37	160.88	"
NW 1/4 of NE 1/4	12	53	37	40.00	"
S 1/2 of NE 1/4	12	53	37	80.00	"
NW 1/4	12	53	37	158.50	"
S 1/2 of SW 1/4	12	53	37	80.00	"
SE 1/4	12	53	37	160.00	"
Entire, except NE 1/4 of NE 1/4	14	53	37	600.00	"

Exhibit "A" - Page 6

Subdivision	Section	Township North	Range West	Acres	County
NW 1/4 (Lots 3 and 4)	16	53	37	114.35	Ontonagon
E 1/2 of SW 1/4	16	53	37	80.00	"
W 1/2 of SE 1/4	16	53	37	80.00	"
SW 1/4 of SW 1/4	18	53	37	40.42	"
N 1/2	20	53	37	320.00	"
N 1/2 of S 1/2	20	53	37	160.00	"
SW 1/4 of SW 1/4	20	53	37	40.00	"
SW 1/4 of SE 1/4	20	53	37	40.00	"
Entire	22	53	37	640.00	"
S 1/2 of SW 1/4	23	53	37	80.00	"
SW 1/4	24	53	37	160.00	"
N 1/2	25	53	37	320.00	"
SE 1/4	25	53	37	160.00	"
N 1/2	28	53	37	320.00	"
SW 1/4	28	53	37	160.00	"
NE 1/4	30	53	37	160.00	"
NE 1/4 of NW 1/4	30	53	37	40.00	"
S 1/2 of NW 1/4	30	53	37	80.63	"
SW 1/4	30	53	37	161.32	"
N 1/2 of SE 1/4	30	53	37	80.00	"
SE 1/4	33	53	37	160.00	"
S 1/2	34	53	37	320.00	"

Exhibit "A" - Page 7

Subdivision	Section	Township North	Range West	Acres	County
NE 1/4	35	53	37	160.00	Ontonagon
SW 1/4	4	50	38	160.00	"
NE 1/4 of NE 1/4	5	50	38	17.88	"
SE 1/4 of NE 1/4	5	50	38	40.00	"
S 1/2 of NW 1/4	5	50	38	80.00	"
S 1/2	5	50	38	320.00	"
Entire	6	50	38	535.72	"
Entire, except E 1/2 of SE 1/4	7	50	38	534.57	"
Entire	8	50	38	640.00	"
W 1/2 of NE 1/4 of NE 1/4	9	50	38	20.00	"
NW 1/4 of NE 1/4	9	50	38	40.00	"
NW 1/4	9	50	38	160.00	"
SW 1/4	30	50	38	149.48	"
S 1/2 of SW 1/4	27	51	38	80.00	"
Entire	33	51	38	640.00	"
W 1/2	34	51	38	320.00	"
SE 1/4	34	51	38	160.00	"
N 1/2 of SW 1/4	35	51	38	80.00	"
SW 1/4 of SW 1/4	35	51	38	40.00	"
SE 1/4 of SW 1/4	35	51	38	40.00	"
Lot 3	20	53	38	39.00	"
Lot 5	20	53	38	50.50	"

Exhibit "A" - Page 8

Subdivision	Section	Township North	Range West	Acres	County
N 1/2 of SE 1/4	20	53	38	80.00	Ontonagon
SE 1/4 of SE 1/4	20	53	38	40.00	"
SW 1/4 of SE 1/4	30	53	38	40.00	"
Entire	1	50	39	560.56	"
E 1/2 of E 1/2	2	50	39	139.83	"
SW 1/4	2	50	39	160.00	"
W 1/2 of SW 1/4	9	50	39	80.00	"
E 1/2 of SE 1/4	9	50	39	80.00	"
E 1/2 of NE 1/4	10	50	39	80.00	"
S 1/2	10	50	39	320.00	"
Entire	11	50	39	640.00	"
Entire	12	50	39	640.00	"
W 1/2	14	50	39	320.00	"
Entire	15	50	39	640.00	"
Part of NE 1/4	16	50	39	84.01	"
SE 1/4	16	50	39	160.00	"
S 1/2 of NE 1/4, except 9.26 acres	17	50	39	70.74	"
S 30 acres of SE 1/4 of SW 1/4	17	50	39	30.00	"
SE 1/4	17	50	39	160.00	"
E 1/2 of E 1/2	21	50	39	160.00	"
NW 1/4	21	50	39	160.00	"
Entire	22	50	39	640.00	"

Exhibit "A" - Page 9

Subdivision	Section	Township North	Range West	Acres	County
Entire	23	50	39	640.00	Ontonagon
W 1/2 of E 1/2	24	50	39	160.00	"
W 1/2	24	50	39	320.00	"
W 1/2 of NE 1/4	25	50	39	80.00	"
NW 1/4	25	50	39	160.00	"
N 1/2	26	50	39	320.00	"
N 1/2	27	50	39	319.20	"
Lots 1 and 5	28	50	39	75.60	"

Including all descriptions, whether or not the same are described herein in which the Lessor has any right, title or interest in the ores, metals and minerals, lying west of the common range between Range 33 West and Range 34 West, in Houghton and Ontonagon Counties in the State of Michigan.

PROJECT SUMMARY REPORT

By: J. W. Alt May 6, 1959

1. Docket No. DMEA-3522 (Copper)
Contract No. Idm-E765
Property: Caledonia Mine
Ontonagon County, Michigan

Operator: Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

Operator's Property Rights: Owner

2. Contract dated February 10, 1955. To complete February 10, 1957.

Work Authorized

The purpose of the project is to explore for copper ores. The work consists of diamond drilling and drifting on the Knowlton Lode, both on the Caledonia No. 4 Adit, as follows:

Extend the Caledonia No. 4 Adit a distance of 2,080 feet.

3,300 feet of diamond drilling shall be done to explore parallel lodes from locations within the Caledonia Adit. The drilling shall be done with AX size bits, unless conditions make it necessary to complete some of the holes with EX size bits.

Estimated Costs of the Project

Category (1) Independent Contracts

3,300 feet of diamond drilling, @ $5.00/ft. $16,500.00

The schedules of Actual Costs which follows below apply to drifting only. The Government will contribute to those allowable actual costs of drifting which do not exceed an average of $46.45 per foot, computed monthly.

Category (2) Personal Services

(a) & (b) Supervision & Technical Services

2 supervisors @ $384.00/mo. each $768.00/mo. for 16 months	$ 12,288.00
(c) Labor	
$1,832.10/mo. for 16 months	29,313.60
Category (3) Operating Materials & Supplies	
$2,057.90/mo. for 16 months	32,926.40
Category (4) Operating Equipment	
(c) Depreciation	
$656.00/mo. for 16 months	10,496.00
Category (7) Miscellaneous	
$724.11/mo. for 16 months	11,585.76
Estimated Total Cost of Project (rounded to)	$113,110.00
Government's participation, 50%	$ 56,555.00

Amendments

No. 1 Agreed October 22, 1956, effective October 1, 1956.

Suspends work of the project from October 1, 1956, to not later than May 1, 1957.

Completion time extended to October 10, 1957.

Royalty payment period increased from 10 years to 11 years.

Amendments (continued)

No. 2 Agreed October 25, 1957, effective October 10, 1957.

Completion time further extended from October 10, 1957 to April 10, 1958.

Royalty payment period increased from 11 years to 12 years.

Work Completed

Drifting, 2,080 feet, @ $28.24/ft.	$58,745.58
Diamond drilling, 1,493 feet, @ $1.697/ft.	2,534.21
Total Cost of Project	$61,279.79

The drifting was started in March 1955 and ended on July 16, 1956. Diamond drilling was started on May 1, 1957, and ended on December 27, 1957.

The contract was terminated by mutual agreement, effective February 1, 1958.

3. Audit - Report of Review dated October 14, 1958.

Total cost billed by Operator	$64,308.43
Less proceeds from property disposition	2,961.98
Net cost claimed by Operator	61,346.45
Less exceptions	66.66
Total Accepted Cost of Project	$61,279.79
Government's participation, 50%	$30,639.89

Operator's final report dated March 12, 1959.
Field Team's final report dated September 5, 1958.

4. Certification of Discovery or Development dated November 18, 1958.

This discovery consisted of copper ores occurring within the amygdaloidal Knowlton Lode of the Evergreen flow series. The estimated ore reserves resulting from the work of exploration under the contract is 100,000 tons with an average grade of 18 pounds of copper per ton.

5. Comments:

A discovery was made through the drifting, but diamond drilling brought unsatisfactory results.

The mine is, at present, closed down due to current economic problems, but production could be recommenced relatively less expensively than most mining in the area since the mine is entered by an adit which drains the mine water regardless of operation. The DMEA drift, though it was exploratory in purpose, was also a development and stopes could be raised from it into the indicated ore. The Operator, however, apparently visualizes no immediate economic uplift and has salvaged all equipment and supplies other than the track and pipe lines and has boarded up the mine buildings. The close down was of June 1, 1958.

A serious deterrent to possible production is the isolation of the mine from the Operator's central milling facilities. There is no mill on the property, so either the raw ore would have to be shipped by truck and rail to their mill at Lake Linden, or a mill would have to be constructed on the site.

This property warrants further exploration on a large scale which would involve crosscutting from Caledonia Adit level to the different lodes and drifting on them, also shaft sinking would be necessary to explore at depth. Unquestionably a large tonnage of copper ore could be developed which would probably average about 18 pounds of copper per ton. If the property was explored and developed, it would necessitate the building of a mill of a size to handle a large production.

J. W. Alt

J. W. Alt

JWAlt/er
CC: Docket
Dir Read File
Mr. Johnson
Chron.

DMEA Form 17
Feb. 58

DEFENSE MINERALS EXPLORATION ADMINISTRATION

WORK COMPLETED ANALYSIS

After final audit or review report is received, prepare original only and file in official docket

Operator CALUMET & HECLA, INC.		Actual Cost	X
State MICHIGAN		Agreed Unit Cost	
Final Report of Audit		Commodity COPPER	Docket No. DMEA-3522
Final Report of Review	X		Contract No. Idm-E765

Operation	Authorized by Contract and Amendments		Completed		Net cost after sale of Government Property
	Units	Cost	Units	Cost	
Drifting & Crosscutting (9' x 9')	2,080' @ $46.45/ft. Max.	$ 96,610.0	2,080'	$ 61,707.56	$ 58,745.58
Raising					
Shafts					
Winzes					
Drilling (Specify) Diamond AX EX	3,300' @ $5.0/ft. Max.	16,500.0	1,493'	2,534.21	2,534.21
Surface Excavation					
Underground Excavation					
Roads and Trails					
Operating Equipment Purchased					
Surface Rehabilitation & Repairs					
Underground Rehabilitation					
New Building, Improvements, etc.					
Other (Specify)					
Totals		$113,110.00		$ 64,241.77 *	$ 61,279.79

* Net cost total must agree with final report of audit or review.

Material Salvage $ 2,961.98

Prepared by W. P. Klugescheid Date 2/5/59.

31398

☒ Audited 8/27/58 [illegible] WORK ANALYSIS SHEET - DMEA PROJECT allowable max. ☒ Actual Cost

☒ Certified 11/18/58. Analysis as of _____ ☐ Agreed Unit Costs

Incl. Voucher for December 1957 and Report of Review

Name CALUMET & HECLA, INC. Docket No. 3,522

State MICHIGAN Commodity COPPER Idm-E No. 765

OPERATION	AUTHORIZED Units	AUTHORIZED Cost	COMPLETED Units	COMPLETED Cost	NET COST
Drifting & Crosscutting 9' x 9'	2,080' @ $46.45/ft. Max.	$ 96,610.00	2,080'	$61,707.56	Checks Records Interim Audits.
Raising					
Shafts					
Winzes					
Drilling (Specify) Diamond AX EX	3,300' @ $5.00/ft. Max.	~~16,500.00~~	1,493'	2,534.21	
Surface Excavation					
Underground Excavation					
Roads and Trails					
Operating Equipment Purchased					
Surface Rehabilitation & Repairs					
Underground Rehabilitation					
New Building, Improvements, etc.					
Other (Specify)					
Totals		$113,110.00		$64,241.77	

Checks Audit

Date of Contract--February 10, 1955.
Completion date October 10, 1958
Expiration date of Royalty Payments Feb. 10, 1967.
Amendment No. 1 Recess from October 1, 1956 to May 1, 1957. Completion date extended to October 10, 1957. Royalty Payment Period increased to 11 years.
Amendment No. 2--Completion date extended to April 10, 1958. Royalty period increased to 12 years.
Termination Agreement--dated April 7, 1958.
Total Royalties paid to 9/16/58. $ 16,386.89 T

Field Team Final Report received: October 27, 1958. Ore found under DMEA project--100,000 tons @ 17-18 lbs. Cu per ton.

Prepared by [illegible]

52,008 tons of the reserve have already been mines and royalties paid thereon.

71626

E-765.

Calumet & Hecla, Inc. — Michigan — 5522.

3,300' Diamond Drilling (AX) or (EX) @ $5.00 max. = $16,500.00

(9'x9') 2,080' Drifting @ $46.45 max = 96,610.00

$113,110.00

Drilling @ 5.00 max 796' 850' ~~285' 717'~~ ~~1,489'~~ 1493' (Corr. Audit) ~~1,111.31 1,242.26~~ ~~2,502.19 2,590.10 517.91~~ 2,534.21 (Corr. Audit)

1957 December. ~~June July~~ 1957 ~~June July Aug. Sept. Oct.~~ 1956 ~~January Mar. Apr. May~~ ~~July. Aug. Sept. Oct. Nov. Dec.~~ ~~June~~ ~~Nov. March~~ 1955. ~~Spent~~ ~~2,014'~~ 2,080' ~~1,879' 1,721' 1,593'~~ 1,452' ~~2,639.39~~ ~~242' 357' 472' 573' 681' 707' 1,042' 1,207' 1,350'~~ ~~6,662.25~~ ~~152'~~ Drifting ~~15,314.44~~ ~~15,481.66~~ ~~60,120.39~~ ~~19,607.52~~ ~~23,117.45~~ ~~61,771.33~~ ~~36,178.02~~ ~~32,126.19~~ Totals Audit Corr. 61,707.56 ~~41,205.15~~ ~~45,283.47~~ ~~39,678.75~~ ~~46,175.63~~ ~~65,028.59~~ ~~55,000.11~~ ~~56,867.82~~ Corr. with Audit March 1955 Exception 20.46 for Supervision ~~63,211.66~~ ~~63,684.25~~ ~~64,204.45~~ (62,977.82) 64,221.77 (Corr. Audit) ~~65,255.47~~

Royalty Payments

1955 - may, June, July, August		$ 763.07		
	Sept.	393.80		
	Oct.	389.48		
	Nov.	230.27		
	Dec.	989.10		
1956	Jan.	477.75	May 1957.	759.17
	Feb.	489.26	June	535.22
	Mar.	851.33		
	April	824.84		
	May	955.74		
March 1 - April 30, 1955		247.95		
	November	542.76		
	October	619.12		
	September	424.07		
	July	310.98		
	August	626.45		
	June	83.51		

Total Royalties to May 31, 1956 $6,612.59 audit Report

" " " Sept 30, 1956 7,633.53 " "

IN REPLY REFER TO:
Office of Minerals Exploration

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON, D.C. 20242

February 16, 1967

Calumet Division
Calumet & Hecla, Inc.
1 Calumet Avenue
Calumet, Michigan 49913

Re: DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E765

OFFICIAL COPY
O. M. E.
RECEIVED
MAR 7 1967

INITIALS	CODE
	120
	110

Gentlemen:

After the completion of the approved exploration work under the contract identified above, we asked to be informed about changes in the status of the property and production from it during the period of royalty obligation.

To assist you to furnish this information and to assure the accuracy of our records, please answer the questions on the back of this letter and return two copies to this office with copies of any pertinent documents.

Sincerely yours,

Frank E. Johnson

Frank E. Johnson
Chief, Office of
Minerals Exploration

3/13/67
a check with the USBM indicates no production for the period 1959-1966 incl.
FEJ.

MME Form 63
Revised 7-65

REQUEST FOR INFORMATION ON CERTIFIED PROJECT AND PROJECT UNDER ROYALTY AGREEMENT

April 1966 to February 10, 1967

1. ~~XXXXXX~~ , has there been a change in ownership, lease, or sublease? If yes, please state details of the transaction below and provide a true or signed copy of the pertinent documents, unless they have been provided before. Yes [ ] No [x]

Is the cross-lease agreement with Copper Range Company still in full force and effect? If not, please give details. **Yes/ x /No/ /**

April 1966 to February 10, 1967

2. ~~Since~~ , has there been any production from the land subject to the contract? Yes [x] No [x]

A. If so and it was shipped, give quantity, value, and name and address of purchaser.

	Quantity	Value
Copper Range Co.		
Houghton, Michigan	148,152 Lbs. Cu.	$18.15

B. If stockpiled awaiting sale, state quantity, grade, and location.

Type	Quantity		Estimated Grade	Location
Ore		Tons		
Concentrates		Tons		
Other		Tons		

3. Since **Feb. 1, 1967** through workings (see of contract)? , has any production been transported Yes [ ] No [x]

If so, state quantity, value, and disposition of material.

Disposition of Material	Quantity	Value

Submitted by:

Name G. E. Lengyel Title **Director of Finance**

Address **1 Calumet Avenue** Date **February 28, 1967**
Calumet, Michigan 49913

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON, D.C. 20242

OFFICIAL COPY
IN REPLY REFER TO:
O. M. E.
RECEIVED
APR 18 1966

INITIALS	CODE
MM 4/18	120
~~FG~~	~~110~~
HK	~~120K~~
RMB	120 S
	220

April 5, 1966

Calumet Division
Calumet & Hecla, Inc.
1 Calumet Avenue
Calumet, Michigan

Re: **DMEA-3522 (Copper)**
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E765

Gentlemen:

After the completion of the approved exploration work under the contract identified above, we asked to be informed about changes in the status of the property and production from it during the period of royalty obligation.

To assist you to furnish this information and to assure the accuracy of our records, please answer the questions on the back of this letter and return two copies to this office with copies of any pertinent documents.

Sincerely yours,

FRANK E. JOHNSON

Frank E. Johnson
Chief, Office of
Minerals Exploration

MME Form 63
Revised 7-65

DMEA-3522
Idm-E765

REQUEST FOR INFORMATION ON CERTIFIED PROJECT AND PROJECT UNDER ROYALTY AGREEMENT

1. Since March 1965, has there been a change in ownership, lease, or sublease? If yes, please state details of the transaction below and provide a true or signed copy of the pertinent documents, unless they have been provided before. Yes [ ] No [ ]

Is the cross-lease agreement with Copper Range Company still in full force and effect? If not, please give details. Yes /x/ No/ /

2. Since March 1965, has there been any production from the land subject to the contract? Yes [ ] No [x]

A. If so and it was shipped, give quantity, value, and name and address of purchaser.

	Quantity	Value

B. If stockpiled awaiting sale, state quantity, grade, and location.

Type	Quantity		Estimated Grade	Location
Ore		Tons		
Concentrates		Tons		
Other		Tons		

3. Since , has any production been transported through workings (see of contract)? Yes [ ] No [ ]

If so, state quantity, value, and disposition of material.

Disposition of Material	Quantity	Value

Submitted by:

Name G. E. Lengyel ~~1 Calumet Avenue~~ Title Assistant Secretary

Address Calumet, Mich. Date 4-14-66

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
WASHINGTON 25, D. C.

March 23, 1965

Re: DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E765

Calumet Division
Calumet & Hecla, Inc.
Calumet, Michigan

Gentlemen:

After the completion of the approved exploration work under the contract identified above, we asked to be informed about changes in the status of the property and production from it during the period of royalty obligation.

To assist you to furnish this information and to assure the accuracy of our records, please answer the questions on the back of this letter and return two copies to this office with copies of any pertinent documents.

Sincerely yours,

confirmed sending C & H

George C. Selfridge

George C. Selfridge, Chief
Division of Exploration Operations

OFFICIAL COPY
O. M. E.
RECEIVED
APR 7 1965

INITIALS	CO. E
ama	800
~~[illegible]~~	~~700~~
~~[illegible]~~	~~110~~
~~[illegible]~~	~~120~~
	~~120~~

220

MME Form 63
Revised 3-62

DMEA-3522
Idm-E765

REQUEST FOR INFORMATION ON CERTIFIED PROJECT AND PROJECT UNDER ROYALTY AGREEMENT

1. Since December 1963, has there been a change in ownership, lease, or sublease? If yes, please state details of the transaction below and provide a true or signed copy of the pertinent documents, unless they have been provided before. Yes [X] No [ ]

   Cross-lease agreement with Copper Range Company.

2. Since December 1963, has there been any production from the land subject to the contract? Yes [ ] No [X]

   A. If so and it was shipped, give quantity, value, and name and address of purchaser.

	Quantity	Value

   B. If stockpiled awaiting sale, state quantity, grade, and location.

Type	Quantity	Estimated Grade	Location
Ore	Tons		
Concentrates	Tons		
Other	Tons		

3. Since Sept 16, 1958, has any production been transported through workings (see of contract)? Yes [ ] No [X]

   A. If so, state quantity, value, and disposition of material.

Disposition of Material	Quantity	Value

Submitted by: G. E. Lengyel

Name: Calumet & Hecla, Inc.
Address: 1 Calumet Avenue, Calumet, Michigan

Title: Assistant Treasurer
Date: April 5, 1965

4511

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
WASHINGTON 25, D. C.

October 31, 1963

Re: DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E765

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

See new address

Gentlemen:

After the completion of the approved exploration work under the contract identified above, we asked to be informed about changes in the status of the property and production from it during the period of royalty obligation.

To assist you to furnish this information and to assure the accuracy of our records, please answer the questions on the back of this letter and return two copies to this office with copies of any pertinent documents.

Sincerely yours,

F M Murphy

F. M. Murphy, Acting Chief
Division of Minerals

OFFICIAL FILE COPY
O. M. E
RECEIVED DEC 9 1963

DATE	INITIALS	CODE
12/9		800
		100
~~12/9~~	~~MD~~	~~110~~
~~12/11~~	~~Murphy~~	~~500~~
		220

MME Form 63
Revised 3-62

REQUEST FOR INFORMATION ON CERTIFIED PROJECT AND PROJECT UNDER ROYALTY AGREEMENT

1. Since August 15, 1962, has there been a change in ownership, lease, or sublease? If yes, please state details of the transaction below and provide a true or signed copy of the pertinent documents, unless they have been provided before. Yes ☐ No ☒

2. Since August 15, 1962, has there been any production from the land subject to the contract? Yes ☐ No ☒

   A. If so and it was shipped, give quantity, value, and name and address of purchaser.

	Quantity	Value

   B. If stockpiled awaiting sale, state quantity, grade, and location.

Type	Quantity		Estimated Grade	Location
Ore		Tons		
Concentrates		Tons		
Other		Tons		

3. Since August 15, 1962, has any production been transported through workings (see of contract)? Yes ☐ No ☒

   A. If so, state quantity, value, and disposition of material.

Disposition of Material	Quantity	Value

Submitted by:

Name H. D. Stott

Address CALUMET DIVISION
Calumet & Hecla, Inc.
Calumet, Michigan

Title Director, Employee & Community Relations

Date 12/5/63

4511

MME Form 7
(10-58)

OFFICIAL FILE COPY

Date	Surname	Code
8/22	Griswold	500
8/27	Talbot	800
"	Van Lenne	120
8/23	Johnson	110
8-23	Fumich	100
		220

Mr. W. E. Haines
Associate General Counsel
Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

AUG 2 2 1962

Re: DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E765

Dear Mr. Haines:

Thank you for your August 15 letter, with MME Form 63, and the copy of your lease to the Copper Range Company.

We must point out that, under Article 2(d) of the contract, your company should have cited the Government's royalty rights in the lease made to Copper Range. However, we are not greatly exercised over this omission since, in any event, under the contract terms your company remains as surety for whatever royalties might accrue to the Government. Therefore, in the case of any future royalties which might become due, we would look to your company for settlement.

Sincerely yours,

George Fumich, Jr.

Director

WRGriswold/gla
8-22-62
cc to: Director's Reading File
Contract Division
Region IV (2) w/2 cys letr. 8/15/62 and 1 cy MME Form 63
Docket
Code 500

43683

CALUMET & HECLA, INC.

122 SOUTH MICHIGAN AVENUE

CHICAGO 3, ILLINOIS

A. E. PETERMANN
VICE PRESIDENT AND GENERAL COUNSEL

W. E. HAINES
ASSOCIATE GENERAL COUNSEL

August 15, 1962

OFFICIAL FILE COPY
O. M. E.
RECEIVED AUG 16 1962

DATE	INITIALS	CODE
8/17	[illegible]	800
8/17	On leave	120
8-20	[illegible]	100
8/21	[illegible]	110
"	Processed	500
		220

Mr. W. R. Griswold, Chief
Division of Minerals
United State Department of the Interior
Office of Minerals Exploration
Washington 25, D. C.

Dear Sir:

Re: DMEA-3533 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine, Ontonagon County, Mich.
Contract Idm-E765

Enclosed is the completed U. S. Department of the Interior MME Form 63 pertaining to the subject property.

Also enclosed is a copy of the lease dated August 3, 1962 by and between Calumet & Hecla, Inc. and Copper Range Company.

The subject property is included in the properties leased to Copper Range.

Very truly yours,

W. E. Haines

WEH:pf
Enclosures
cc: Mr. J. R. Ackroyd
Copper Range Company

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
WASHINGTON 25, D. C.

JUL 24 1962

Re: DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Mich.
Contract Idm-E765

Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

Gentlemen:

After the completion of the approved exploration work under the contract identified above, we asked to be informed about changes in the status of the property and production from it during the period of royalty obligation.

To assist you to furnish this information and to assure the accuracy of our records, please answer the questions on the back of this letter and return two copies to this office with copies of any pertinent documents.

Sincerely yours,

W. R. Griswold, Chief
Division of Minerals

MME Form 63
Revised 3-62

REQUEST FOR INFORMATION ON CERTIFIED PROJECT AND PROJECT UNDER ROYALTY AGREEMENT

1. Since September 2, 1960 , has there been a change in ownership, lease, or sublease? If yes, please state details of the transaction below and provide a true or signed copy of the pertinent documents, unless they have been provided before. Yes [x] No [ ]

By Lease Agreement dated August 3, 1962, the subject property was leased to Copper Range Company

2. Since September 2, 1960 , has there been any production from the land subject to the contract? Yes [ ] No [x]

A. If so and it was shipped, give quantity, value, and name and address of purchaser.

	Quantity	Value

B. If stockpiled awaiting sale, state quantity, grade, and location.

Type	Quantity		Estimated Grade	Location
Ore		Tons		
Concentrates		Tons		
Other		Tons		

3. Since , has any production been transported through workings (see of contract)? Yes [ ] No [x]

A. If so, state quantity, value, and disposition of material.

Disposition of Material	Quantity	Value

Submitted by:

Name Calumet & Hecla, Inc. By: W. E. Haines Title Secretary

Address 122 South Michigan Avenue Chicago 3, Illinois Date August 15, 1962

4511

Form 7
(10-58)

OFFICIAL FILE COPY

Date	Surname	Code
5/29	[illegible]	120
		220

MAY 29 1962

Mr. G. E. Lengyel
Controller
Calumet and Hecla, Inc.,
Calumet, Michigan

Re: DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E765

Dear Mr. Lengyel:

Enclosed for your information and files is a copy of a Royalty Audit Report dated May 25, 1962, prepared by our Division of Contract Administration and Audit.

Sincerely yours,

George C. Selfridge

Chief, Division of Field Operations

Enclosure

GCSelfridge/bih
5/29/62
cc to: Docket
Dir. reading file
CA&A Division
G.C.Selfridge
Mr. Laurence, Reg. IV

43683

Form 7
(10-58)

OFFICIAL FILE COPY

Date	Surname	Code
5/29	GCS	120
		220

MAY 29 1962

Memorandum

To: Chief, Fiscal Section, Division of Administrative Services, Office of the Secretary

From: Chief, Division of Field Operations, OME

Subject: DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E765

Enclosed for your files is the original of a Royalty Audit Report on the subject contract.

George C. Selfridge

Enclosure

GCSelfridge/bih
5/29/62

cc to: Docket
Dir. reading file
CA&A Division
GCSelfridge
R. A. Laurence, USGS, Reg. IV, w/cy of Report of Royalty Audit Report dated 5/25/62 & orig. cy of memo dated 5/28/62 to Chief, Div. of Field Operations from CA&A Division.
Avery Reed, USBM, Reg. IV, w/cy of each item sent to Mr. Laurence.

43683

Form 7
(10-58)

OFFICIAL FILE COPY

Date	Surname	Code
5/28	Fisher	800
		220

MAY 28 1962

Memorandum

To: Chief, Division of Field Operations

From: E. D. Talbert, Acting Chief (Signed) E. D. Talbert
Contract Administration and Audit Division

Subject: DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E765

Enclosed are the original and three copies of a Royalty Audit Certificate and Royalty Audit Report covering the subject Region IV contract. If you concur in the facts stated therein, please make the following distribution:

(a) Original to the Fiscal Section, Division of Administrative Services, Office of the Secretary;
(b) One copy to the Operator; and
(c) Two copies to Region IV files.

As evidence of your concurrence, a copy of your letter transmitting the Operator's copy should be furnished this Division. If for any reason you do not concur, the original and all copies should be returned to this Division with your comments.

Enclosures

CEFisher/ama 5-28-62

cc:
Docket
Director's Reading File
CA & A Division
Mr. Rothrock

43683

MME Form 7
(10-58)

OFFICIAL FILE COPY

Date	Surname	Code
4/5	Talbert	800
	Amarnath	500
4/5	Fellows	120
4/11	Johnson	110
4-8	Smith	100
		220

APR 5 1962

Mr. G. E. Langyel, Controller
Calumet & Hecla, Inc.
Calumet, Michigan

Re: DMA-1207X (Copper)
Calumet & Hecla, Inc.
Centennial Mine, et al.
Keweenaw and Houghton Counties,
Michigan
Contract Idm-898
and
DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-8765

Dear Mr. Langyel:

The records pertaining to production and sales subject to royalty under the referenced contracts were last examined by an auditor representative of this office on October 16, to 19, 1956. The audit covered sales through September 30, 1956.

Clarence E. Fisher, our auditor who performed that examination, will again visit your office on April 24 and 25, 1962, for the purpose of confirming the status of the royalty accounts. Your cooperation in making available to Mr. Fisher the sales and production records for the period of October 1, 1956, to date will be appreciated.

Sincerely yours,

Director

EDTalbert/ama 4-4-62

cc:
Docket - DMEA-3522
Director's Reading File
CA & A Division
Mr. Fisher
Region IV

43683

REQUEST FOR INFORMATION
FROM OPERATOR ON CERTIFIED PROJECT
AND PROJECT UNDER ROYALTY AGREEMENT

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION

From: ACTING Field Officer, OME
Region IV
Washington 25, D. C.

Date: August 29, 1960

Concerning:
Docket No. DMEA-3522
Property Calumet & Hecla, Inc.
Caledonia
Location Ontonagon County, Michigan
Contract Idm-E765

Calumet & Hecla, Inc.
122 South Michigan Ave.
Chicago 3, Illinois

With the certification of the exploration project identified above, you were asked to inform our office about changes in the status of the property and production from it.

To assist you to furnish this information and to assure the accuracy of our records, we ask that you answer the questions below and return one copy to this office with copies of any pertinent documents.

ACTING Field Officer Lawrence G. Houck

1. Since Sept. 16, 1958, has there been a change in ownership, lease, or sublease about which the OME has not been notified? If yes, please state details of the transaction below and provide a true or signed copy of the pertinent documents. Yes ☐ No ☒

2. Since Sept. 16, 1958, has there been any production from the property?* Yes ☐ No ☒

A. If so and it was shipped, give name and address of purchaser?

	Quantity	Value

B. If stockpiled awaiting sale, state quantity, grade, and location.

Type	Quantity		Estimated Grade	Location
Ore		Tons		
Concentrates		Tons		
Other		Tons		

Submitted by: B C Peterson

Name Calumet & Hecla, Inc. Title Assistant Treasurer

Address 1 Calumet Avenue, Calumet, Michigan Date September 2, 1960

MME Form 63 8-60 * Property means land subject to the contract. 79340-60

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
ROOM 11 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

OFFICIAL FILE COPY
IN REPLY REFER TO:
O. M. E
RECEIVED NOV 21 1960

DATE	INITIALS	[illegible]
11/21	[illegible]	124

November 17, 1960

Memorandum

To: Mr. George C. Selfridge, Chief
Division of Field Operations, OME, Washington, D. C.

From: Robert A. Laurence

Subject: Knoxville file

Recently we have received copies of letters transmitting Reports of Review and Reports of Royalty Review on various DMEA dockets, but they are never accompanied by copies of the Reports being transmitted.

If it is intended to maintain a complete file on these dockets in Knoxville, I would suggest that a copy of the Report of Review or Report of Royalty Review be sent us at the same time as the transmittal letter. If it is not intended to maintain such a file, please let me know.

The latest transmittal letters received here concern Reports of Royalty Review for DMEA-3522 and DMEA-3813. We do not have the Reports mentioned in those letters.

Robert A. Laurence

Robert A. Laurence

1 copy each sent 11-21-60

OFFICIAL FILE COPY
O. M. E
RECEIVED NOV 15 1960

DATE	INITIALS	CODE
11-15	gad	VVO
11/15	[illegible]	800
	[illegible]	500
		VVO

NOV 15 1960

Mr. E. R. Lovell, President
Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

Re: DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E765

Dear Mr. Lovell:

Enclosed for your information and records is a copy of a Report of Royalty Review prepared by the Office of Minerals Exploration which has succeeded the Defense Minerals Exploration Administration.

Sincerely yours,

George C. Selfridge

George C. Selfridge
Chief, Division of
Field Operations

Enclosure

LQHouk:gad 11/14/60
Copy to: Washington Office (2)
Region IV (2)
Mr. Houk

OFFICIAL FILE COPY
O. M. E
RECEIVED NOV 15 1960

DATE	INITIALS	CODE
11-15	gad	VVO
11/15		800
	Brunwell	500
		VVO

November 14, 1960

Memorandum

To: Chief, Fiscal Section, Division of Administrative Services, Office of the Secretary

From: Chief, Division of Field Operations, OME

Subject: DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E765

Attached for your files is the original of a Report of Royalty Review on the subject contract.

George C. Selfridge

George C. Selfridge
Chief, Division of Field Operations

Attachment

LQHouk:gad 11/14/60

Copy to: Region IV (2)
Wash.OFF. (2)
Mr. Houk

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
WASHINGTON 25, D. C.

NOV 7 1960

Memorandum

To: Chief, Division of Field Operations

From: E. D. Talbert, Acting Chief (Signed) E. D. Talbert
Contract Administration and Audit Division

Subject: Reports of Royalty Review

Attached are the original and two copies of each of the following Reports of Royalty Review:

Idm-E636	DMEA-3154	Byrd Mica Miners
Idm-E765	DMEA-3522	Calumet & Hecla, Inc.
Idm-E835	DMEA-3813	T. B. Vance

If you concur in the facts stated in these reports distribution should be made as follows:

(a) Original of each report to the Fiscal Section, Division of Administrative Services, Office of the Secretary, Department of the Interior, Washington 25, D. C.
(b) One copy to the Operator; and
(c) One copy for the Region IV file.

As evidence of your concurrence, a copy of your letter transmitting the Operator's copy should be furnished to this Division. If for any reason you do not concur, the original and both copies of the report should be returned to this Division with your comments.

Attachments

Operating Com
M & F

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
REGION V
Box 337
White Pine, Michigan

August 14, 1959

Memorandum

To: V. J. Lynch, Member, OME Field Team, Knoxville, Tenn.

From: Mining Engineer, White Pine, Mich.

Subject: Semi-Annual Report, DMEA Contracts Idm-E98 and E765, Calumet and Hecla, Inc.

Attached are the two subject reports.

file

DMEA-3522

On E-765 (Caledonia), there is no change in the picture. The mine is still bearded up and will remain so in the foreseeable future.

On E-98, drifting has been stopped on the 37th level due to unfavorable results. It appears that the shoot does not reach that high, so, in consequence, the Operator's plans to sink another shaft have been dropped. They have instead deepened the No. 2 shaft to the 50th level and will drift out into the DMEA contract property to see if the shoot goes deeper than the 48th level. Note that steping has turned up a quite high-grade of ore.

CHARLES J. STEHLIK

Attachments

AUG 19

Semiannual Report of Certified Projects

Reporting period: February 10, 1955 - June 30, 1959
Date of examination: August 11, 1959
Operator: Calumet & Hecla, Inc., Calumet Division, Calumet, Mich.
Mine name: Caledonia
County and State: Ontonagon County, Mich.
Docket No. and commodity: DMEA 3522, Copper
Contract No.: E-765

Date of contract:	February 10, 1955
Date of certification:	November 18, 1958
Expiration date of royalty payments:	February 10, 1966

Total amount of contract:	$113,110.00
Total expenditures under contract:	61,279.79
Amount of Government participation at 50%:	30,639.89

Royalty payments this period:	$ 16,386.89
Previous royalty payments:	~~16,386.89~~
Total royalty payments to date:	16,386.89
Percent Government participation repaid:	53.48 percent

Royalty due on production to date: None
Royalty remarks: None

Original estimate of reserves (from final Engr.-Geol. Report):	100,000 tons at 17-18 lb/ton Cu
Increase (or Decrease) of Reserves by work performed subsequent to original and last Field Team estimates:	None
Revised estimate of reserves:	None
Production this period (Ore or Concentrates) in suitable detail:	58,725 tons at 15.89 lb/ton recovered
Amount of previous production (since date of contract):	Same as above
Total DMEA production to date:	Same as above
Percent of revised reserves mined:	58.73 percent

Production remarks: Mine was closed as of June 1, 1958, and has not been reopened.

Charles J. Stehlik
CHARLES J. STEHLIK

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
ROOM 2-B POST OFFICE BLDG.
KNOXVILLE 2, TENN.

OFFICIAL FILE COPY
O. M. E.
RECEIVED JUL 10 1959

DATE	INITIALS	CODE
7-10	gad	VRO
7-10	~~G~~	500
		225

July 8, 1959

Memorandum

To: Operating Committee, OME, Washington 25, D. C.

From: Acting Executive Officer, OME Field Team, Region V, Knoxville

Subject: DMEA-3522, Contract No. Idm-E765 (Copper)
Calumet & Hecla, Inc., Calumet, Michigan
Caledonia mine, Ontonagon County, Michigan

Attached are three copies of a letter from the Chief Geologist, Calumet and Hecla Company, giving the estimated ore reserves developed under the subject exploration contract.

Please attach a copy to each copy of the Operator's Final Engineering and Geological Report.

V. J. Lynch

V. J. Lynch

Attachments 3

CALUMET DIVISION
CALUMET & HECLA, INC.
CALUMET, MICHIGAN

JUL 10 1959
O.M.E.

July 6, 1959

Mr. Robert A. Laurence
Executive Officer
OME Field Team, Region V
U. S. Department of the Interior
Office of Minerals Exploration
Room 2-B Post Office Building
Knoxville 2, Tennessee

Re: DMEA-3522 (Copper)
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-E765

Dear Mr. Laurence:

In reply to your letter of April 7 requesting an estimate of ore reserves developed at Caledonia under the above DMEA contract, I have studied the matter and report the reserves below. As you are aware, estimation of ore reserves in the native copper deposits here, where mineralization is sporadic and unevenly distributed, is a knotty problem. We do not cut channel samples, nor compute reserves in the customary manner, and visual estimates by experienced people are used to determine grade.

In this case, I have assumed that an amount of indicated ore equal to that produced by test stoping will exist below the adit level which can be classed as indicated ore, and an additional amount below that as inferred ore. Production and reserve figures are given below.

		Tons	Grade
Production	Butler Lode	6,727	21.25 lbs.
	Knowlton Lode		
	Drift	6,506	13.22 "
	Stope	45,482	15.04 "

		Indicated Tons Grade	Inferred Tons Grade
Reserves	Evergreen Lode	None	None
	Butler Lode	None	None
	Knowlton Lode	46,000 @ 15 lbs.	46,000 @ 15 lbs.
	Total	92,000 @ 15 lbs.	

RECEIVED
JUL 8 - 1959
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

Very truly yours,

James P. Pollock
Chief Geologist

JPP:eln

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION

ROOM 2-B POST OFFICE BLDG.
KNOXVILLE 2, TENN.

April 7, 1959

Memorandum

To: Operating Committee, OME, Washington, D. C.

From: Field Team, Region V, Knoxville, Tennessee

Subject: Operator's final report, DMEA-3522 (Copper)
Calumet & Hecla, Inc., Calumet, Michigan
Caledonia mine, Ontonagon County, Michigan
Contract No. Idm-E765

Enclosed are the original and two copies of the Operator's final report on the Caledonia exploration project.

The report and accompanying map give a good factual account of the work done, and the basic data obtained, but do not contain the Operator's estimate of reserves. We are writing to the Operator's Chief Geologist to request this estimate.

Robert A. Laurence
Robert A. Laurence
Executive Officer

V. J. Lynch
V. J. Lynch
Member, Bureau of Mines

Enclosures

OFFICIAL FILE COPY
O. M. E.
RECEIVED APR 9 1959

DATE	INITIALS	CODE
4-9	C	
4/9	mw	220
4/9	WMB	800
4/9		500

CALUMET DIVISION
CALUMET & HECLA, INC.
CALUMET, MICHIGAN

OFFICIAL FILE COPY
O. M. E.
RECEIVED APR 9 1959
DATE | INITIALS

March 12, 1959

RECEIVED
APR 7 - 1959
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

OPERATOR'S FINAL REPT

Mr. Robert A. Laurence
Executive Officer OME
Field Team Region V
Room 2-B, Post Office Bldg.
Knoxville 2, Tennessee.

Re: Caledonia Mine
Ontonagon County, Michigan
Idm E765
DMEA No. 3522
Geological Report

Dear Mr. Laurence:

The following is a geological report of work done under the above contract. Attached is a visual estimate of copper values encountered in drifting and a report of the engineering aspects of our work by Mr. Emory Miller, Mine Captain of the Caledonia Mine.

Drifting

The drifting under the contract was started February 28, 1955 and completed July 16, 1956. Drifting was all in the Knowlton lode, the hanging-wall member of the Evergreen series of lodes.

From draft mark 2833 to draft mark 2969, drifting was all in the underlying trap, by-passing the Old Mass workings. From draft mark 2969 to 3297, the drift was in copper rock visually estimated in accordance with district practice to run from 0 - 30 pounds per ton. Test stoping shows this material is slightly lower grade than that previously test stoped at Caledonia, but could probably be mined out if an operation was started.

From 3297 to 3400, drifting was in a fissure zone which was not test stoped because of the broken nature of the ground which causes excessive dilution of the ore.

From 3400 to 3600, an additional area was test stoped.

From 3600 on, drifting was disappointing. While occasional cuts of copper were found, these small pockets became fewer and farther between so that from 3297 to the end of DMEA, drifting is not regarded as commercial ground. Attached are details of the captain's daily estimate.

One area from 3900 to 4000 was tried but the low grade discouraged further work. The details of this stoping are shown on the attached map.

C & H Drifting - Own Expenditures

As a result of the DMEA drifting, Calumet & Hecla crosscut to the footwall to the Butler lode and drifted to the south on this lode. Minor cuts of copper rock were found but the work was unsuccessful.

The crosscut to the old "C" shaft was then rehabilitated and a drift driven on the Butler lode from a point near the shaft. The drift undercut an unextracted block of Butler lode which was test stoped to obtain grade figures. The area is shown on the map.

The above crosscut was also extended to the Evergreen lode and a drift driven about 700 feet south on this lode. The lode proved to be barren.

Royalty was paid to the DMEA on all above test stoping which was actually conducted at a loss to Calumet & Hecla.

Diamond Drilling

Hole 57-1 was drilled as shown below the level to cut the Butler lode at depth. The Butler series of three amygdaloids was cut, and only the central one had much copper. From 753 to 758 was fair to good, i.e., 20 to 30 pounds per ton.

Because of the expense of drilling this type of hole and the indefinite results, permission was obtained to use the drilling appropriation in testing the Knowlton and South Knowlton lodes. In the "C" shaft workings which were on the South Knowlton 57-2, 57-3, 57-10 were drilled to test the true Knowlton lode with poor results. Holes 57-4, 57-5, 57-6, 57-8, and 57-9 were drilled from the drift on the Knowlton to test the South Knowlton. Nothing of interest was found.

On the attached map at the Butler crosscut the several holes shown, among them 15, 16, and 20, were drilled by Calumet & Hecla to unwater the "C" shaft.

Detailed logs of all drilling have been submitted to the DMEA.

Very truly yours,

James Pollock

James P. Pollock
Chief Geologist

JPP:eln
Encs.

C O P Y

CALUMET DIVISION

CALUMET & HECLA, INC.

For Inter-Office Correspondence Only.

To Mr. J. P. Pollock

Date February 10, 1959

Form 201

SUBJECT Description of the 2080 ft. of drifting covered in the DMEA contract at Caledonia

Drift Location: All on the Knowlton Lode within the boundaries of the DMEA contract, from DM2833 to DM4913, for a distance of 2080 ft. Drift was advanced on the variable strike of the Lode, exposing the hanging wall and footwall with every cut.

Drift Size: The drift heading was carried 9' high by 9' wide (minimum), with the length of each cut varying between 5' - 7', depending on the immediate conditions.

Crew Size: Two (2) men worked in the contract per shift with supervision and additional labor as required.

Description of Method: Two (2) miners drilled and fired a 36 - 44 hole burn cut in one shift, and advanced temporary facilities for mining and tramming. Two (2) trammers cleaned out the round on the following shift. Non-contract labor was used periodically to install permanent track and pipe.

Description of Equipment: The Copco 656-4W jackleg machine was used with three (3) runs of integral drill steel for all mining. The holes were charged with Class I, 1" x 8" Gelodyne powder and fired electrically with standard gasless delays.

Temporary facilities advanced with each cut consisted of expendable short lengths of rails and pipe, with timber as required.

Tramming equipment consisted of a trackmaster 3-71 diesel locomotive and 5-ton end dump cars. These cars were loaded with a model 21B Eimco loader.

General Data

A 40-lb. rail haulage system was carried on a grade of 0.5% or better, with the loaded trips moving down grade to surface.

Work in the DMEA area was started on February 28, 1956, periodically discontinued for short intervals, and completed without incident on July 16, 1956.

/s/ Emory W. Miller

EMORY W. MILLER

RECEIVED
APR 7 - 1959
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

COPY

RECEIVED
APR 7 - 1959
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

Mr. C. J. Stehlik
Michigan College of Mining & Technology
Ore Research Building, Room 201
Houghton, Michigan

Dear Sir:

In reply to your request, I am submitting the following as my estimate of the 2080 feet of drifting under the D.M.E.A. contract at the Calumet & Hecla #4 Caledonia Adit from March, 1955 through July, 1956.

Date	D. M.	Ft. Adv.	Lb./Ton Grade Est.
2/28/55	D.M. 2833 -		
4/4/55	2969	136'	Foot
4/5/55	D.M. 2969 - 2975	6'	0 - 9
4/7/55	D.M. 2975 - 2981	6'	10 - 14
4/11/55	D.M. 2981 - 2987	6'	0 - 9
4/12/55	D.M. 2987 - 2994	7'	15 - 19
4/13/55	D.M. 2994 - 3000	6'	15 - 24
4/14/55	D.M. 3000 -		
4/15/55	- 3009	9'	25 +
4/18/55	D.M. 3009 - 3016	7'	15 - 19
4/19/55	D.M. 3016 -		
4/21/55	3034	18'	10 - 14
4/22/55	D.M. 3034 - 3039	5'	Foot
4/25/55	D.M. 3039 - 3045	6'	25 +
4/26/55	D.M. 3045 - 3051	6'	20
4/27/55	D.M. 3051 - 3058	7'	25
4/28/55	D.M. 3058 - 3063	5'	30
4/29/55	D.M. 3063 - 3075	12'	25
5/2/55	D.M. 3075 - 3081	6'	20
5/3/55	D.M. 3081 - 3085	4'	25
5/4/55	D.M. 3085 -		
5/5/55	3097	12'	15
5/6/55	D.M. 3097 - 3109	12'	10
5/9/55	D.M. 3109 -		
5/10/55	3123	14'	Foot
5/11/55	D.M. 3123 - 3129	6'	20
5/12/55	D.M. 3129 - 3133	4'	10
5/13/55	D.M. 3133 - 3135	2'	15
5/16/55	D.M. 3135 - 3141	6'	18
5/17/55	D.M. 3141 - 3147	6'	13
5/18/55	D.M. 3147 - 3154	7'	12
5/19/55	D.M. 3154 -		
5/20/55	3170	16'	0 - 9

Date	D. M.	Ft. Adv.	Lb./Ton Grade Est.
5/23/55	D.M. 3170 -		
5/27/55	3190	20'	Foot
6/1/55	D.M. 3190 -		
6/3/55	3207	17'	0 - 9
6/6/55	D.M. 3207 - 3212	5'	20
6/7/55	D.M. 3212 - 3216	4'	25
6/8/55	D.M. 3216 -		
6/9/55	3220	4'	15
6/13/55	D.M. 3220 - 3223	3'	10
6/14/55	D.M. 3223 -		
6/15/55	3232	9'	25
6/16/55	D.M. 3232 -		
6/20/55	3244	12'	10
6/21/55	D.M. 3244 - 3250	6'	20
6/22/55	D.M. 3250 - 3256	6'	10
6/23/55	D.M. 3256 - 3262	6'	0
6/24/55	D.M. 3262 - 3272	10'	10
6/27/55	D.M. 3272 - 3279	7'	20
6/28/55	D.M. 3279 - 3284	5'	25
6/29/55	D.M. 3284 - 3291	7'	20
6/30/55	D.M. 3291 - 3297	6'	15
7/1/55	D.M. 3297 -		
7/13/55	3342	45'	0
7/14/55	D.M. 3342 -		
7/26/55	3387	45'	Hanging
7/27/55	D.M. 3387 -		
7/28/55	3399	12'	0
7/29/55	D.M. 3399 - 3406	7'	10
8/1/55	D.M. 3406 -		
8/2/55	3414	8'	20
8/3/55	D.M. 3414 - 3419	5'	15
8/4/55	D.M. 3419 -		
8/9/55	3445	26'	0
8/10/55	D.M. 3445 - 3450	5'	10
8/11/55	D.M. 3450 - 3456	6'	0
8/12/55	D.M. 3456 - 3465	9'	15
8/23/55	D.M. 3465 -		
8/24/55	3470	5'	0
8/25/55	D.M. 3470 -		
8/26/55	3483	13'	10
8/27/55	D.M. 3483 - 3489	6'	15
8/29/55	D.M. 3489 - 3496	7'	10
8/30/55	D.M. 3496 -		
9/6/55	3521	25'	0
9/7/55	D.M. 3521 -		
9/8/55	3527	6'	10
9/9/55	D.M. 3527 - 3532	5'	15
9/12/55	D.M. 3532 - 3540	8'	12
9/13/55	D.M. 3540 - 3547	7'	10
9/14/55	D.M. 3547 - 3553	6'	0

Date	D. M.	Ft. Adv.	Lb./Ton Grade Est.
9/15/55	D.M. 3553 - 3560	7'	20
9/16/55	D.M. 3560 -		
9/17/55	3572	12'	25
9/19/55	D.M. 3572 -		
9/20/55	3585	13'	15
9/21/55	D.M. 3585 - 3592	7'	0
9/22/55	D.M. 3592 - 3600	8'	15
9/23/55	D.M. 3600 - 3607	7'	20
9/24/55	D.M. 3607 -		
9/27/55	3627	20'	15
9/29/55	D.M. 3627 -		
10/3/55	3657	30'	0
10/4/55	D.M. 3657 - 3663	6'	12
10/5/55	D.M. 3663 -		
10/6/55	3678	15'	10
10/7/55	D.M. 3678 -		
10/8/55	3694	16'	12
10/18/55	D.M. 3694 - 3701	7'	10
10/20/55	D.M. 3701 -		
10/21/55	3716	15'	12
10/22/55	D.M. 3716 - 3717	1'	0
10/24/55	D.M. 3717 - 3724	7'	17
10/25/55	D.M. 3724 - 3731	7'	14
10/26/55	D.M. 3731 - 3735	4'	15
10/28/55	D.M. 3735 -		
10/31/55	3746	11'	0
11/3/55	D.M. 3746 - 3753	7'	20
11/4/55	D.M. 3753 - 3760	7'	10
11/5/55	D.M. 3760 -		
11/7/55	3767	7'	0
11/8/55	D.M. 3767 -		
11/9/55	3780	13'	10
11/10/55	D.M. 3780 -		
11/21/55	3850	70'	0
11/22/55	D.M. 3850 - 3857	7'	12
11/23/55	D.M. 3857 - 3862	5'	15
11/25/55	D.M. 3862 - 3869	7'	20
11/26/55	D.M. 3869 - 3875	6'	15
11/28/55	D.M. 3875 - 3882	7'	12
11/30/55	D.M. 3882 - 3890	8'	15
12/1/55	D.M. 3890 - 3897	7'	10
12/2/55	D.M. 3897 - 3905	8'	15
12/3/55	D.M. 3905 - 3913	8'	10
12/5/55	D.M. 3913 - 3918	5'	12
12/6/55	D.M. 3918 - 3923	5'	10
12/7/55	D.M. 3923 - 3928	5'	20
12/8/55	D.M. 3928 -		
12/9/55	3942	14'	0
12/10/55	D.M. 3942 - 3950	8'	12
12/12/55	D.M. 3950 -		
12/13/55	3963	13'	0
12/14/55	D.M. 3963 -		
12/17/55	3987	24'	0 - 9

Date	D. M.	Ft. Adv.	Lb./Ton Grade Est.
12/19/55	D.M. 3987 - 3994	7'	10
12/20/55	D.M. 3994 - 4001	7'	22
12/21/55	D.M. 4001 -		
12/22/55	4008	7'	23
12/23/55	D.M. 4008 - 4013	5'	18
12/27/55	D.M. 4013 - 4019	6'	12
12/28/55	D.M. 4019 - 4025	6'	10
12/29/55	D.M. 4025 -		
12/31/55	4040	15'	0
1/3/56	D.M. 4040 - 4047	7'	0 - 9
1/4/56	D.M. 4047 -		
1/9/56	4080	33'	0
1/10/56	D.M. 4080 - 4087	7'	0 - 9
1/11/56	D.M. 4087 -		
2/21/56	4250	163'	0
2/22/56	D.M. 4250 - 4257	7'	5
2/24/56	D.M. 4257 - 4265	8'	0
2/27/56	D.M. 4265 - 4272	7'	5
2/28/56	D.M. 4272 -		
3/6/56	4313	41'	0
3/7/56	D.M. 4313 -		
3/8/56	4327	14'	5
3/9/56	D.M. 4327 - 4331	4'	9
3/12/56	D.M. 4331 -		
3/16/56	4363	32'	0 - 9
3/20/56	D.M. 4363 -		
3/23/56	4392	29'	0
3/26/56	D.M. 4392 - 4399	7'	5
3/27/56	D.M. 4399 - 4406	7'	7
3/28/56	D.M. 4406 - 4412	6'	5
3/29/56	D.M. 4412 - 4419	7'	0
3/30/56	D.M. 4419 - 4426	7'	10
4/2/56	D.M. 4426 - 4432	6'	5
4/3/56	D.M. 4432 -		
4/4/56	4445	13'	7
4/5/56	D.M. 4445 - 4452	7'	10
4/6/56	D.M. 4452 - 4459	7'	7
4/9/56	D.M. 4459 -		
4/10/56	4472	13'	0 - 9
4/11/56	D.M. 4472 -		
4/12/56	4484	12'	10
4/13/56	D.M. 4484 - 4490	6'	0
4/16/56	D.M. 4490 - 4497	7'	5
4/17/56	D.M. 4497 - 4505	8'	8
4/18/56	D.M. 4505 - 4512	7'	0
4/19/56	D.M. 4512 -		
4/25/56	4543	31'	8
4/26/56	D.M. 4543 -		
4/30/56	4560	17'	5
5/1/56	D.M. 4560 -		
5/3/56	4580	20'	0

Date	D. M.	Ft. Adv.	Lb./Ton Grade Est.
5/4/56	D.M. 4580 -		
5/7/56	4595	15'	0 - 9
5/8/56	D.M. 4595 - 4602	7'	5
5/9/56	D.M. 4602 - 4608	6'	8
5/10/56	D.M. 4608 - 4613	5'	7
5/11/56	D.M. 4613 -		
5/14/56	4628	15'	8
5/15/56	D.M. 4628 -		
5/16/56	4641	13'	7
5/17/56	D.M. 4641 -		
5/23/56	4673	32'	0
5/24/56	D.M. 4673 -		
5/25/56	4691	18'	12
5/28/56	D.M. 4691 - 4697	6'	3
5/31/56	D.M. 4697 -		
7/6/56	4875	178'	0
7/9/56	D.M. 4875 -		
7/10/56	4888	13'	0 - 9
7/11/56	D.M. 4888 - 4894	6'	0
7/12/56	D.M. 4894 - 4900	6'	0 - 9
7/13/56	D.M. 4900 - 4909	9'	0
7/16/56	D.M. 4909 - 4913	4'	0
		2080'	

Sincerely yours,

/s/ E. W. M.
(a)
E. W. MILLER

EWM/aw

cc: J. Pollock

OFFICIAL FILE COPY
O. M. E.
RECEIVED APR 9 1959

DATE	INITIALS	CODE
4-9	C	220
4/9		800
4-9	WPB	300

April 7, 1959

Mr. James P. Pollock, Chief Geologist
Calumet Division
Calumet & Hecla, Inc.
Calumet, Michigan

Re: DMEA-3522 (Copper)
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-K765

Dear Mr. Pollock:

This will acknowledge, with thanks, the receipt of your final report on the Caledonia exploration project.

However, on reviewing the report, I note that no estimate of reserves is included. Although, of course, an independent estimate can be made from the basic data provided in your final and monthly reports, we need to have an estimate of grade and tonnage made by the Operator's own staff, using their regular methods and based on their experience in the district.

Will you please send me, at your earliest convenience, your estimate of the reserves indicated by the DMEA work, regardless of whether they are considered to be economic, marginal, or non-economic?

Sincerely yours,

Robert A. Laurence
Executive Officer
OME Field Team, Region V

RAL/mg
cc - Operating Committee (2)
Mr. V. J. Lynch
Mr. Charles J. Stehlik
File

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
ROOM 2-B POST OFFICE BLDG.
KNOXVILLE 2, TENN.

March 26, 1959

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DATE	INITIALS	CODE
3/30		
4/20		220
4/1		800
		500

Mr. James P. Pollock, Chief Geologist
Calumet & Hecla Inc.
P.O. Box 231
Calumet, Michigan

Re: DMEA-3522 (copper)
Caledonia Mine
Antonagon County, Mich.
Contract Idm-E765

Dear Mr. Pollock:

Although the Caledonia project has been terminated for more than a year, we have not received your final engineering and geologic report on the project.

Will you please send me your report (five copies) as soon as possible. Please refer to Article 7c of the contract for information on the data required in the report.

Sincerely yours,

Robert A. Laurence
Executive Officer, OME
Field Team, Region V

RAL/xm
cc
Opr. Com-2
Lynch
Stehlik
Files

CALUMET & HECLA, INC.
122 SOUTH MICHIGAN AVENUE
CHICAGO 3, ILLINOIS

A. E. PETERMANN
VICE PRESIDENT AND GENERAL COUNSEL

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O. M. E.
RECEIVED NOV 28 1958

DATE	INITIALS	CODE
11/28	C	220
12/1	[illegible]	~~500~~

November 25, 1958

3522 -

Mr. Frank E. Johnson, Acting Director
United States Department of the Interior
Office of Minerals Exploration
Washington 25, D. C.

Dear Mr. Johnson:

We acknowledge receipt of your letter of November 18, 1958, and the attached certification of discovery of Exploration Project Contract No. Idm-E765.

Very truly yours,

A. E. Petermann

AEP:pm

Form 7
56)

OFFICIAL FILE COPY

Date	Surname	Code
11-10	Griswold	500
		140
		140
11-17	Chandler	800
11/18	Selfridge	130
11/18	Moto	130
	Nelson	130
11/18	Johnson	110 HB
		~~100~~
11/19	C	220
		500

NOV 18 1958

Mr. E. R. Lovell, President
Calumet & Hecla, Inc.
122 South Michigan Avenue
Chicago 3, Illinois

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-E765

Dear Mr. Lovell:

Transmitted herewith is a certification of discovery or development related to the Exploration Project Contract No. Idm-E765, dated February 10, 1955, on the lands described in the contract.

By the terms of the Exploration Project Contract and of the certification, all minerals mined or produced from February 10, 1955, to February 10, 1967, are subject to the Government's percentage royalty as set forth in the contract until the sum of $30,639.89 is repaid.

Royalty payments should be made as in the past, but addressed to Executive Officer, OME Field Team, Region V, Room 2-B, Post Office Building, Knoxville 2, Tennessee. Checks should be made payable to the Office of Minerals Exploration.

Royalty payments to the Government should be accompanied by suitable evidence, such as copies of the settlement sheets, showing quantity and grade of the product and the price and charges, certified to be correct by the purchaser.

You are requested to notify the Executive Officer of any changes in ownership or production rights that may have any effect on the Government's right to its percentage royalty. Your attention is especially called to Article 2(d), relating to the preservation of the Government's right to a percentage royalty on production. Also, if production ceases at any time for an extended period, please notify the Executive Officer at six-month intervals that such is the case.

Sincerely yours,

Frank E. Johnson

Acting Director

WRGriswold/er 11-10-58
Copy to: Docket
Mr. C.A.Fredell,Dr.TDS.DMS
Mr. Laumb, USBM
Mr. Kiilsgaard, USGS
Dir.Read.File
Op. Committee - Mr. Johnson
Cont.Adm & Audit Div
Finance Office
Region V(2) - WRGriswold
Chron.

Enclosure

8623

DMEA Form 7
(12-56)

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Date	Surname	Code
11-10	Griswold	500
		140
		140
11-17	Chambers	800
11/18	Lodge	130
	Kelsch	130
11/18	Mote	130
"	Johnson	110
		HB ~~100~~ 220 500

NOV 18 1958

Mr. Clarence A. Fredell, Director
Technical Research & Development Division
Defense Materials Service
General Services Administration
Room 3034
7th and D Streets, S.W.
Washington 25, D. C.

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-8765

Dear Mr. Fredell:

Enclosed is a copy of a certification of discovery or development related to Exploration Project Contract No. Idm-8765.

The contract was dated February 10, 1955, with the Government participating to the extent of 50 per cent in an exploration project estimated to cost $113,110.00. Actual expenditures were $61,279.79, with the Government's share being half of such amount or $30,639.89.

The total amount of work provided for under the contract consisted of 2,080 feet of drifting and 3,300 feet of diamond drilling. The work actually done consisted of 2,080 feet of drifting and 1,493 feet of diamond drilling.

The discovery consisted of copper ores occurring within the amygdaloidal Knowlton Lode of the Evergreen flow series. The estimated ore reserve resulting from the work of exploration under the contract is 100,000 tons with an average grade of 18 pounds of copper per ton.

Sincerely yours,

Frank E. Johnson (for)

Acting Director

WRGriswold/er 11-10-58
Copy to: Docket
Mr. Lamb, USBM
Mr. Kiilsgaard, USGS
Rdm. Read File
Op. Committee
Cont. Adm & Audit Div.
Region V (2)
Mr. Johnson
Mr. Griswold
Chron.

Enclosures

8623

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

November 4, 1958

Memorandum

To: W. R. Griswold, Office of Minerals Exploration

From: Commodity Specialist, Branch of Base Metals

Subject: Review of Field Team final report, Docket No. DMEA 3522 (copper), Calumet & Hecla, Inc., Caledonia Mine, Ontonagon County, Michigan, Idm-E765

The examiners point out that a reserve of 100,000 tons of rock containing approximately one-percent copper was discovered by drifting done under the contract and recommend that the project be certified.

I concur in that recommendation.

A. D. McMahon

A. D. McMahon

Copy to: Division of Minerals
Branch of Base Metals (2)
Thor Kiilsgaard, U.S.G.S.
F. D. Lamb
Files

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O. M. E.
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11/4 5 copies. 220 500

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
ROOM 2-B POST OFFICE BLDG.
KNOXVILLE 2, TENN.

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DATE	INITIALS	CODE
10/27	C	
10/27	ey	220
		120
10/31		110
10/31	C	130
11/4	wpa.	220
		~~200~~

October 24, 1958

Memorandum

To: Operating Committee, OME - Washington, D. C.

From: DMEA Field Team, OME - Region V - Knoxville, Tenn.

Subject: DMEA-3522, Idm-E765(copper) Calumet & Hecla, Inc. Calumet, Michigan. Caledonia Mine, Ontonagon County, Michigan.

Enclosed are the original and two copies of the Field Team final report on the Caledonia exploration project.

We agree with the Examiners' recommendation for certification, as the reserves outlined may well be mined, under slightly different economic conditions. More than 40 percent of the Government's contribution has already been returned as royalty on production during the contract period.

The Operator's final report has not yet been received, although we have been informed that it is preparation.

Robert A. Laurence
Robert A. Laurence
Executive Officer, OME - Reg. V

V. J. Lynch
V. J. Lynch, Member
Bureau of Mines

Reviewed by
OME OPERATING COMMITTEE
10-31-58
(date)

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DATE | INITIALS | CODE
10/31 | 246 | 130
220

FINAL FIELD TM REPORT

UNITED STATES
DEPARTMENT OF THE INTERIOR

DEFENSE MINERALS EXPLORATION ADMINISTRATION

FINAL GEOLOGICAL-ENGINEERING REPORT
BY FIELD TEAM REGION V

DOCKET NO. 3522
CONTRACT NO. Idm-E765
COMMODITY: Copper

Calumet & Hecla Inc., in
Ontonagon County, Michigan

Charles J. Stehlik, Mining Engineer
U.S. Bureau of Mines
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Joint Report
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Summary:

On February 10, 1955, the DMEA contracted with Calumet & Hecla Inc. for exploration for native copper by drifting and diamond drilling in the Caledonia Mine located in Ontonagon County, Michigan.

The contract called for 2080 feet of drifting and 3300 feet of diamond drilling. Two amendments were executed both of which extended the completion time and consequently the repayment time. Upon termination of the project on April 7, 1958 all of the drifting had been completed and 1493 feet of diamond drilling had been done.

A discovery was made through the drifting, but diamond drilling brought unsatisfactory results. The indicated ore reserve made by the drifting is estimated to be 100,000 tons of rock containing 17-18 lbs. of native copper per ton.

The contract amount was set at $113,110.00. Total expenditure was $64,241.77. Royalties paid on production up to the closing of the mine in May 1958 totalled $12,638.44. A salvage settlement and some royalty remains to be paid.

Location:

The contract property described in Annex I of the contract is owned in fee by the Operator. Figures 1 and 2

of this report have been prepared to graphically orient the reader as to the geographic location and its significance to the regional mining picture. Roughly, the trend of the copper bearing range follows Michigan highway 26 North-East from Greenland - Massto Houghton, and thence along U. S. highway 41 to the tip of the Keweenaw peninsula. (Figure 1). Figure 2, is of a South-West part of the range and illustrates the position of the Caledonia Mine relative to other mining ventures. (The Victoria Mine, the last notable mine within this range lies approximately 3 ½ miles South-West of the Minesota Mine.)

Figure 3 is a detailed map of the Caledonia Mine indicating the contract property boundaries as described in Annex I of the contract. No total enclosure is shown in this property delineation on the North-West or South-East sides since, in actuality, these boundaries are the Knowlton lode and the Evergreen lode to a depth unknown and with surface expression difficult to make graphic. The contract property, more clearly defined is those lodes lying between and including the Knowlton and Evergreen lodes, with the two described vertical planes being the lateral limits.

Contract Provisions and Amendments:

The contract, dated February 10, 1955 provided for native copper exploration by underground drifting which, in effect, would provide the Operator with a continuous sample along the strike of the lodes, plus visual inspection, and diamond drilling from the drift to explore adjacent lodes.

Drifting was estimated to cost $96,609.76 and Diamond drilling $16,500.00. Government participation was to be 50% of the total rounded figure of $113,110.00 or $56,555.00.

Completion was expected in two years. Article 8(g) constituted a lien upon the land; the time period being set by Article 8(b) (2) at ten years.

The drift was to be in the Knowlton lode, 9 x 9 feet in section, and 2080 feet in total length. Total expenditure was based on allowable actual costs but was not to exceed $46.45 per foot in total. Actual cost items made allowable were personal services, operating materials and supplies, operating equipment, and miscellaneous which included such items as employee fringe benefits, taxes, and facilitating services. (See Annex I, Estimated Costs of the Project). Assaying, initial rehabilitation and repairs, and new buildings, fixtures and installations

were not to be a part of the actual cost.

The diamond drilling was to be done from the completed drift to explore adjacent lodes. It provided for 3300 feet of AX or, if necessary, EX size drill hole. Unlike the drifting, the drilling cost provisions were not itemized, were to be actual cost, excluding supervision and assaying, and were not to exceed $5.00 per foot. Option to perform the drilling by independent contract or by the Operator was provided.

Amendment No 1, dated October 22, 1956, provided for suspension of activity for a seven month period (October 1, 1956 to May 1, 1957) to allow drainage of old adjoining workings prior to diamond drilling. It extended the completion date to October 10, 1957 and extended the repayment period from 10 to 11 years. It did not provide for alteration of original cost estimates.

Amendment No. 2, dated October 25, 1957 extended the completion date from October 10, 1957 to April 10, 1958 and extended the repayment period from 11 to 12 years.

The project was terminated by mutual agreement on April 7, 1958.

Reserves, Possible Exploitation and Certification:

Reserves indicated within the contract area as a result of the drifting are 100,000 tons of rock containing 17-18 lbs of copper per ton. The diamond drilling has not contributed to a discovery. (Discussion of the above is contained in the Execution of Project section).

The mine is, at present, closed down due to current economic problems, but production could be recommenced relatively less expensively than most mining in the area since the mine is entered by an adit which drains the mine water regardless of operation. The DMEA drift, though it was exploratory in purpose, was also a developement and stopes could be raised from it into the indicated ore. The Operator, however, apparently visualizes no immediate economic uplift and has salvaged all equipment and supplies other than the track and pipe lines and has boarded up the mine buildings. The close down was as of June 1, 1958.

A serious deterrent to possible production is the isolation of the mine from the Operator's central milling facilities. There is no mill on the property, so either the raw ore would have to be shipped by truck and rail to their mill at Lake Linden, or a mill would have to be constructed on the site.

Under favorable economic conditions, extraction of the indicated ore could be expected. It is therefore recommended that the project be certified.

Technical Control - Supervision:

Supervision of the program was the direct responsibility of the Operator, and the mineral estimation, surveying, and mapping and drifting conduct were handled by their geologic and engineering departments. Mine maps and records of drift advance and ore estimation were furnished to the field team as necessary.

During the program members of the field team made frequent inspections of the work. Results of the drifting and drilling were reviewed as the program progressed and plans for future work was discussed.

Expenditures:

Total expenditures as of January, 1958 (last submitted voucher) is $64,241.77. The Government's participation was $32,120.89.

Of the total expense, the 2080 feet of drifting cost $61,707.56, or $29.667 per foot. The 1493 feet of diamond drilling cost $2,534.21, or $1.697 per foot.

Salvaged items such as track, pipe, and wire were

estimated by the Operator to be worth $2,961.98. Since Calumet & Hecla already has 50% ownership in these items their offer to pay the salvage value should amount to $1,480.99.

Royalty has been paid on production from April 1955 to March, 1958. Total production was 52,008 tons of rock containing 770,062 lbs of recoverable copper. Value of that production was listed to be $252,769.56 and royalty paid amounted to $12,638.44.

Royalty remains to be paid on one stope in the "C" shaft workings on the Butler lode.

General Geology:

The native copper deposits of the Michigan district occur in a thick series of basaltic lava flows, the Portage Lake lava series. This formation is at least 16,000 feet thick in places, and may be considerably thicker. It consists of over 200 individual lava flows, ranging in thickness from less than 5 feet to over 1,000 feet, and averaging 43 feet. Some of the thicker flows (over 100 feet) have great extent, and may be traced for over 50 miles along the strike of the formation; such flows must have poured out as very widespread sheets over a relatively flat surface, like the basalts of the Columbia River Plateau.

Each flow consists of two parts. The bulk of the flow is massive crystalline basalt or andesite, generally referred to as "trap". The top of each flow is a layer of amygdaloidal basalt or andesite, representing the original frothy or vesicular top of the sheet of molten lava. Cellular amygdaloids are composed of relatively unbroken fine-grained lava with numerous scattered mineral-filled vesicles. Fragmental amygdaloids are composed of amygdaloidal lava that is broken into fragments up to a foot or more across. Fine-grained detritus (sand or silt) occurs locally in the interstices of some fragmental amygdaloids and in

cracks in cellular amygdaloids. Secondary minerals, principally calcite, chlorite, epidote, quartz, prehnite, and feldspar, probably about in that order of abundance, fill most of the vesicles and interfragmental spaces in the amygdaloids.

Beds of rhyolite conglomerate or sandstone lie between some of the lava flows. Individual conglomerate beds are typically less than 10 feet thick, but locally attain thicknesses of more than 100 feet. These conglomerate beds occur only sporadically within the stratigraphic column, and are typically separated stratigraphically from one another by 500 to 1,000 feet of lava flows; they make up about 3 percent of the rocks of the Portage Lake lava series in the area east of Calumet, increasing to 8 percent in the vicinity of the Caledonia adit.

The Portage Lake lava series is overlain by many thousands of feet of conglomerate, sandstone, and shale, with only a few thin lava flows in the lowermost 4,000 feet of this sedimentary series.

This thick sequence of lavas and sediments has been bowed down to form a large structural basin, the axis of which more or less follows the axis of the present Lake Superior basin. The Michigan copper district lies on the

southern flank of this basin, and the rocks dip uniformly northward or northwestward toward the center of Lake Superior. The oldest rocks, the lavas, are exposed farthest from the center of the Lake, and the youngest rocks, generally the younger conglomerates or sandstones, are exposed along the lake shore, from Keweenaw Point westward into Wisconsin. The southern or southeastern boundary of the lavas in the Michigan copper district is a major fault, the Keweenaw fault, along which the lavas have been thrust up over much younger sandstone, the Jacobsville sandstone, of latest pre-Cambrian or Cambrian age.

The northwestward or northward dip of the lava flows in the Michigan copper district ranges from about 20 to about 80 degrees. In general the oldest lava flows, exposed farthest from the center of Lake Superior and closest to the Keweenaw fault, dip most steeply and the stratigraphically highest flows dip most gently. Except for this tilting, the rocks are not much deformed. In some places they have been sufficiently folded to give the outcrop of individual beds a gently sinuous course on maps, but the obtuse angle between opposite limbs of most folds is considerable more than 160 degrees.

Faults are locally abundant and a few have displacements of many hundreds of feet. Most of the faults, however, show little or no offset between opposite walls, and might be more properly described as mineral-filled fissures. These small faults and fractures are very abundant in some mines and negligible in number in others.

The Copper Deposits:

The ore mineral of the Michigan copper district is native copper. The only important exception is the chalcocite of the Nonesuch shale, which is both stratigraphically and geographically far removed from the copper deposits of the rest of the district.

The native copper locally occurs in sufficient abundance to form ore deposits in the amygdaloidal tops of lava flows, in rhyolite conglomerate beds interbedded with the flows, and in fractures cutting across the layered rocks. In the amygdaloidal deposits, the copper occurs as one of a number of minerals filling the amygdules and the spaces between fragments. Individual pieces of copper range in size from tiny particles to masses several tons in weight. In the conglomerate deposits, the copper occurs in the interstices between pebbles and sand grains, or as replacements of pebbles. In the fissure deposits, copper

occurs as small grains disseminated through the gangue minerals of the vein, or as large masses of solid copper weighing tens or even hundreds of tons; all gradations in size are found.

Within these tabular ore bodies a few feet thick, but a square mile or more in lateral extent, the copper generally has an extremely irregular distribution, particularly in the amygdaloid deposits. The irregular shape and distribution of rich and lean areas are readily apparent on mine maps (see U.S.G.S. Prof. Paper 144, pls. 39-41). Similar irregularity in the distribution of copper exists within areas of only a few square feet.

The controls of copper distribution in the amygdaloidal deposits are poorly defined. They may be considered as having three fairly well-defined orders of magnitude: (1) major controls that determine the localization of major deposits a mile or so across within the district as a whole; (2) secondary controls that determine the localization of ore shoots, with dimensions measured in terms of 200 or 300 up to 2,000 or 3,000 feet; and (3) minor controls that determine the location of the many small rich spots, a few feet to a few tens of feet across. Clusters of small rich spots make up the ore shoots, and several ore

shoots, separated by more or less lean or barren ground, make up the major deposits.

In the amygdaloidal ore deposits, least is known about the major controls, and a discussion of the problem would be beyond the scope of this report.

The ore shoots and large areas of above-average ground within the major deposits seem to be controlled in good part, at least, by the character of the amygdaloidal layer. In general copper is most abundant in areas where the amygdaloidal layer is thick and fragmental, and places where a flow top is thin and nonfragmental tend to be lean or barren, even within the richest parts of ore bodies. In some places both rich and barren areas are distinctly elongate, and the orientation of shoots is well defined. Ore shoots with well-defined orientations may persist for many levels, and can be projected ahead of development with considerable confidence. There has not been enough mining at the Caledonia adit yet to define shoots of this intermediate size. In many mines in the district as a whole, most of the areas of rich and lean ground have no well-defined or uniform orientation and permit little or no reliable projection ahead of development.

The smallest units considered here are patches of copper-

bearing ground that range in diameter or length from 10 feet or less to 200 or 300 feet. They are commonly separated by patches of lean or barren ground. Richness of the large ore shoots is controlled at least in part by the ratio of such rich spots to lean intervening ground.

The amygdaloid and conglomerate ore deposits may be very large in terms of area. The amygdaloidal top of the Kearsarge flow, largest of the amygdaloid deposits, is generally only 8 to 10 feet thick, but it has been almost continuously mined for a distance of about 6 miles along the strike and to an average depth of 4,800 feet down the dip, an aggregate area of over 5.5 square miles. The Calumet & Hecla conglomerate ore body has been more or less stoped out over an area exceeding 2½ square miles. In general the yield per square mile, a measure of productivity that is less affected by variations in the selectivity of mining than is grade, is definitely larger in the large ore bodies than in the smaller, which means that the large deposits tend to be the richest, thickness being more or less equal. The yield per square mile on the Knowlton lode from the Caledonia adit, including production from contiguous mines prior to 1900, is definitely lower than that from profitable

mines, despite the relative success of the Caledonia mine as an adit operation.

Except in fissure mines, rich ore shoots are far more likely to occur within large deposits than small ones, and one would not, on the basis of experience to date, expect to find an isolated small high-grade deposit.

The thickness of amygdaloidal layers and conglomerate beds may, as indicated above, range from the vanishing point up to many tens of feet. The average thickness of amygdaloid mined on the Knowlton lode at the Caledonia adit is 8 or 9 feet, but in local bulges the amygdaloidal layer may be more than 20 feet thick. In general copper occurs most abundantly where the amygdaloidal layer is thick, and the thin places in between tend to be lean or barren.

Geology of the Caledonia Mine

The deposits explored at the Caledonia mine are in the amygdaloidal tops of a group of contiguous flows known as the Evergreen series. This group of flows lies 1500 to 2000 feet stratigraphically below the horizon at which the Kearsarge flow would occur if it could be traced this far southwest. The sequence of flows within the Evergreen series is as follows, from top to bottom:

Ophitic basalt flows above the Evergreen series

Evergreen series

Knowlton flow, glomeroporphyritic basalt	30 - 70'
South Knowlton flow, glomeroporphyritic basalt	up to 50'
One thick flow or a group of thin flows glomeroporphyritic basalt	250 - 300'
Butler flow, glomeroporphyritic basalt	50 - 90'
Ogima flow, ophitic, slightly glomeroporphyritic basalt	100 - 140'
Evergreen flow, feldspathic melaphyre	10 - 50'

Ophitic basalt and melaphyre flows below the Evergreen series

These flows dip about 45° North-West, toward Lake Superior. There are relatively few faults with dis-

placements of more than a few feet, so the structure is simple.

The Caledonia adit follows the amygdaloidal top of the Knowlton flow for most of its length. The main stopes raised from the adit, and the stopes of the nineteenth-century Knowlton and Old Mass mines are on the Knowlton lode. The stopes of the Mass mine "C" shaft, which the Caledonia adit reached at about 5100 feet from its portal, are on the South Knowlton lode. Explorations within the area of the DMEA contract include drill holes to the South Knowlton lode, a drill hole to the Butler lode, and a drill hole to a flow top about 140 feet below the Knowlton lode, as well as a crosscut to the Butler lode and an exploratory drift along it.

Of these various flow tops, most is known about the Knowlton lode because of the extent of the workings on it. Within the area of the mine, this is typically a fragmental amygdaloid in which the amygdules and spaces between fragments are filled with calcite, chlorite, epidote, quartz, and red microcline; prehnite and datolite are also found. Native copper, the ore mineral, is generally present in small amounts, and locally makes up several percent of the rock; with it are traces of native

silver. Compared with loose-textured fragmental amygdaloids like the Osceloa and Iroquois, the Knowlton has a relatively small proportion of interstitial filling.

A considerable amount of the copper is definitely associated with cross-cutting fractures, and not only occurs in part as small to large masses in the fracture itself, but is notably more abundant on one or both sides of the fracture. Most of these fractures are too small to be called faults, and a majority are little more than slightly mineralized joints. Although copper is most abundant on these fractures where they cut amygdaloid, it is known from drill holes that they also contain copper at various spots within the massive interiors of the lava flows.

Though the other amygdaloids of the Evergreen series are not extensively explored by drifting, drill holes in the area, both surface and underground, suggest that these other flow tops are similar to the Knowlton in thickness, lithology, mode of occurrence of copper, and associated minerals.

Mining and Exploration Practice.

The amygdaloidal copper deposit at the Caledonia adit is mined by open stoping directly from the drift, or adit.

Stopes have been raised as much as 250 feet up the dip from the drift, and ore is loaded directly into diesel-hauled cars through chutes spaced 18 - 20 feet apart. With the dip of 45°, most of the ore runs without scraping.

One special aspect of mining practice at the Caledonia adit should be emphasized because of its bearing on use of past production as an indication of future prospects. The low cost of haulage at this adit mine compared to the cost of haulage plus hoisting at the larger shaft mines of the district has made it profitable to do a certain amount of selection after the rock has already been mined and loaded into the cars. Cars with lean-appearing rock are simply dumped on the poor-rock pile. This not only raises the average grade of the material sent to the mill, but it also permits a considerable amount of stoping to be done in doubtful ground that could not be done in a deep mine, where disposal of poor rock is far more expensive - - the higher the proportion of ground opened up, the fewer the patches of rich ground that are missed, and the higher the recovery of copper per unit area. Production from the Caledonia adit since 1950 has averaged almost 25 lbs. Cu/T, and at least part of the reason for this grade, which is high compared with that of the average current

production from the district, is the selection described above.

No hard and fast line can be drawn everywhere between exploration and development of these ore deposits. Because of the enormous extent of profitable amygdaloid deposits and because the abundance of rich patches is probably even more significant, in appraising blocks of ground, than the grade in individual patches, an exceptionally large amount of opening must be done to obtain an adequate sample. An exploration drift may be regarded, in a sense, as a channel sample thousands of feet long. Unlike most ore deposits, these probably have no such thing as an assay wall in the conventional sense, but rather, as the drifts extend out into leaner and leaner ground, patches of ore become fewer and farther between, until the cost of drifting to find them exceeds the expectable return.

In modern practice, there is no difference between the size of a development drift and an exploration drift, in part because the distinction is not always clear, and in part for another reason. In the past some exploration drifts were made smaller than the normal development drift, which is 9 x 12 feet in section, but it has been found that these smaller drifts did not give

a complete enough cross-section of the amygdaloidal layer and very commonly missed patches of ore at the top or base. They therefore gave the impression that the ground contained less ore than it actually did. Finally, a larger drift can be driven straighter than a smaller, with savings in exploration cost and time, because the hanging and footwalls are more continuously exposed along the drift and there is less tendency for the drift to become deflected by a minor irregularity in the course of the amygdaloid.

Grade of Ore and its Estimation:

Conventional sampling and assaying have never been used to any extent in the native copper mines of the district. The coarse texture of the distribution of the copper in many places, particularly in rich spots, would probably require so many ordinary channel samples to obtain an adequate sample of the ground that the cost would be prohibitive for the information gained in ordinary operations. Quality control of the mine product is therefore obtained solely by visual estimation of the ground as it is opened up. The mine captains and shift bosses are generally able to estimate the copper content of ground fairly closely, though it is

inevitable that estimating is somewhat subjective.

In drifting done under DMEA contract, a number of patches of copper ore were found in the first 1000 feet. On the basis of the captain's estimates, the average grade of amygdaloid encountered in this 1000 feet was about 13 lbs. Cu/T. If a cutoff of about 10 lbs./T is used, the remaining 60% of the ground averages about 17 lbs. Cu/T. The second 1000 feet of DMEA drift was mostly in lean amygdaloid.

Execution of Project:

The 9 x 9 drift was started at draft mark 2833 in March 1955, and ended at draft mark 4913 on July 16, 1956, for a total of 2080 feet. Figure 4 is the grade chart of the drift.

Diamond drilling was started on May 1, 1957 with hole No. 57-1 and ended on December 27, 1957 with hole 57-10. Total contract footage is 1493 feet. Logs of these drill holes are attached to this report. Holes No. 57-2 and 57-3 were not under the DMEA contract and are not contained in this report.

Knowlton Lode

As indicated, the DMEA drifting on the Knowlton lode showed about 1000 feet with patches of minable ground and

1000 feet that was generally poor. Reserves developed by the drifting may be estimated at a little over 100,000 T of rock containing 17 - 18 lbs. Cu/T. The block of ground containing these reserves is wholly above the adit level; it is unlikely that the results of this drifting will be deemed encouraging enough to warrant sinking a shaft to deeper levels, so no ground below the level is included in the estimate. Of the estimated reserves, 52,008 tons have already been mined, and royalties paid on 770,062 lbs. of copper.

Butler Lode

Drill hole 1 was put down to intersect the Butler lode, about 300 feet stratigraphically below the Knowlton. The original plan called for several deep holes to explore the Butler in depth, since this amygdaloid had been found to contain significant amounts of copper in two surface holes nearby. The hole was put down in the direction of the dip, at an angle ($68\frac{1}{2}^{\circ}$ North-West) steeper than the dip, in order to make the intersection deep. The hole intersected three amygdaloids near the stratigraphic position of the Butler lode. Data on these amygdaloids from the company log may be summarized as follows:

Amygdaloids near Butler horizon in

Drill Hole No. 1

Interval	True thickness	Character	Copper
702 - 730	11'	Nonfragmental	None. A little finely disseminated copper in overlying trap.
750.5-765	6'	Nonfragmental	Scattered pea-size chunks 753-758 (2' true thickness); rest poor.
787 - 798	4'	Nonfragmental	A few scattered pea-size chunks, but poor over-all.

The relatively high cost of the inconclusive information obtained in this hole led the company to request that the original plan of drilling several holes to the Butler be abandoned in favor of a number of shorter holes to the South Knowlton.

South Knowlton Lode

The unexpected discovery was made, on reaching the Mass mine at the end of the DMEA exploration drift, that this mine was on the South Knowlton lode (about 45 feet horizontally South-East of the Knowlton), and not on the Knowlton lode as had been believed. The discovery was

confirmed by holes 2, 3, and 10, which showed the Knowlton on the hanging-wall side of the Mass mine drift. The Knowlton lode is relatively thin, not very fragmental, and generally lean in copper for the last 1000 feet of the DMEA drift on this lode (4000 - 5000 feet from portal). The South Knowlton lode in the Mass mine, on the other hand, is more fragmental and evidently richer in copper (grade not known). Several drill holes were therefore put through the South Knowlton from the Knowlton drift southwest of the Mass mine as a supplementary part of the DMEA exploration. The results of this drilling, including data from longer holes to deeper lodes, is summarized in the following table.

South Knowlton lode in DMEA drill holes

(data from company logs of drill holes)

Drill hole	Distance from portal	Interval	True thick-ness	Character	Copper
1	4225'	52.5-68'	6'	Slightly fragmental	None visible
4	5036'	11 -18'	5'	2' frag-mental, rest tight, non-fragmental	Poor: only a little copper in vesicles
5	4790'	39.5-49.5	7'	1' slightly fragmental at top, rest nonfragmental 40.5-43' epidotized, with copper	Estimated 1% Cu in epidotized rock, none visible above and sparse below
6	4768'	56 -71'	8'	Nonfragmental	From 65-71' (3.5' true thickness) a little copper in vesicles Estimated 0.25% Cu for whole lode
7	4768'	111.5-128	4'	Slightly fragmental at top	Very little visible
8	4612	37 -44'	5'	Nonfrag-mental	None visible
9	4408	36.5-43	4.5'	1' slightly fragmental at top, rest nonfragmental	Poor: only a little copper in vesicles in lower part of lode

These holes suggest that the South Knowlton lode is not very promising within the area of the DMEA drifting.

LOG OF DIAMOND DRILLING AT CALEDONIA ADIT

Number		From	To	Remarks
57-1		0	52.5'	Trap
(D.M. 4225', 68½° down, bearing N. 54°W.)		52.5'	68 '	Amygdaloid; tight, cellular with no mineralization
		68'	198.5'	Trap; some Cu in basal amygdaloid.
		198.5'	352'	Alternating tight, cellular amygdaloids and trap. With occasional blebs of copper
		352'	702'	Trap. Shot copper from 391' - 393' and thin fissure copper in quartz and chlorite fissures.
		(702'	730'	Amygdaloid; cellular & moderately oxidized. To 712'. No oxidation from 712' to 730'. No mineralization.
	Butler Series	(730'	750.5'	Trap.
		(750.5'	765'	Amygdaloid; cellular with upper 4 feet moderately oxidized. Fair grade (12-15 lbs.) from 753' - 758'
		(765'	787'	Trap
		(787'	798'	Amygdaloid; cellular with upper 2 feet well oxidized. Some copper from 789.5' to 797' (poor grade; less than 10 lb.)
		798'	850'(end)	Trap.

Number	From	To	Remarks
57-4 (D.M. 5036' flat into F. W.)	0	11'	Trap
	11'	18'	Amygdaloid (S. Knowlton). Upper 2' fragmental & moderately oxidized. Occasional bleb of copper.
	18'	55'	(end) Trap.
57-5 (D.M. 4790' flat into F. W.)	0'	39.5'	Trap.
	39.5'	49.5'	Amygdaloid (S. Knowlton); upper 1' slightly oxidized and poorly fragmental. Good copper (20 lbs.) from 40.5' to 43'.
	49.5'	58.5'	(end) Trap. Trace copper.
57-6 (D.M. 4768', 73° down bearing N. 55° W.)	0'	5'	Amygdaloid; tight cellular. (F. W. of Knowlton). No mineralization.
	5'	56'	Trap.
	56'	71'	Amygdaloid (S. Knowlton); cellular, top 2' slightly oxidized. Occasional blebs of copper from 65' to 71'. Grade poor (less than 5 lbs.)
	71'	91'	(end) Trap.
57-7 (D.M. 4768', 26½° up, bearing S. 55° E.)	0'	10'	Amygdaloid; tight, cellular (F. W. of Knowlton). Occasional fragment of copper
	10'	111.5'	Trap
	111.5'	128'	Amygdaloid (S. Knowlton); upper 5' moderately oxidized, tight fragmental. A few blebs of copper at 116'.
	128'	159'	(end) Trap.
57-8 (D.M. 4612', flat into F. W.)	0'	37'	Trap
	37'	44'	Amygdaloid (S. Knowlton) Upper 1' cellular and moderately oxidized. No mineralization.
	44'	58'	(end) Trap.

Number	From	To	Remarks
57-9 (D.M. 4408', flat into F.W.)	0'	36.5'	Trap.
	36.5'	43'	Amygdaloid (S. Knowlton) Upper 1' tight fragmental. Scattered blebs of Cu from 41' - 43'.
	43'	117'	Trap. Few blebs of copper from 83' to 84'.
	117'	129'	Amygdaloid. Very tight cellular. No mineralization.
	129'	177'	Trap.
	177'	181'	Amygdaloid (mass) tight cellular. 6" of shot copper at H.W. (177')
	181'	185' (end)	Trap.
57-10 (D.M. 5195' flat into H. W.)	0'	10.5'	Trap.
	10.5'	13.5'	Amygdaloid (Knowlton) tight cellular with upper 6" at H. W. (13.5') moderately oxidized. 1' of shot copper at H. W. contact.
	13.5'	37' (end)	Trap. (Feldspathic melaphyre)

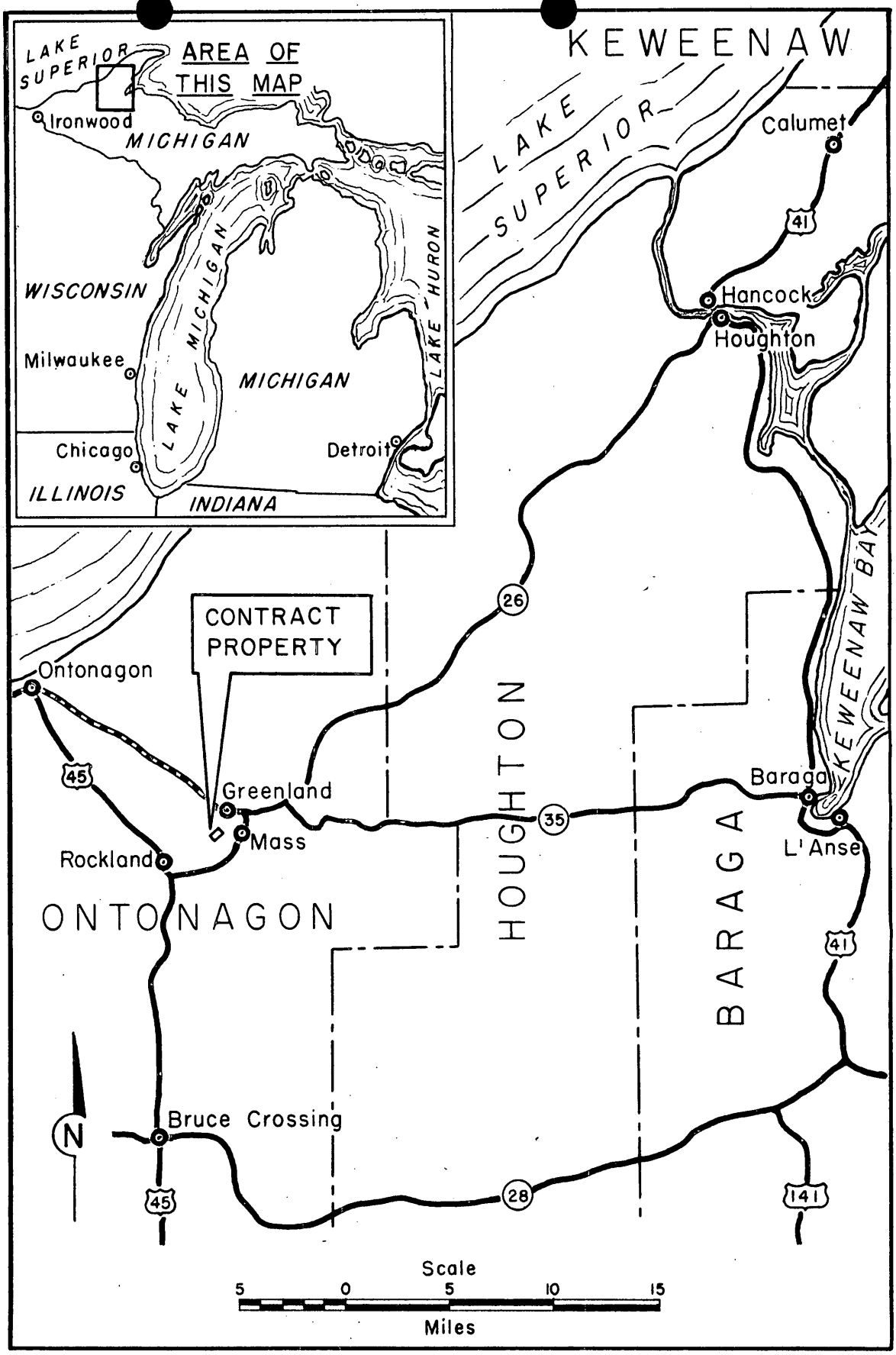

Figure 1.—Project area location, DMEA Contract Idm-E765, Docket 3522, Calumet & Hecla, Inc., Caledonia Mine

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RECEIVED
1958
CODE

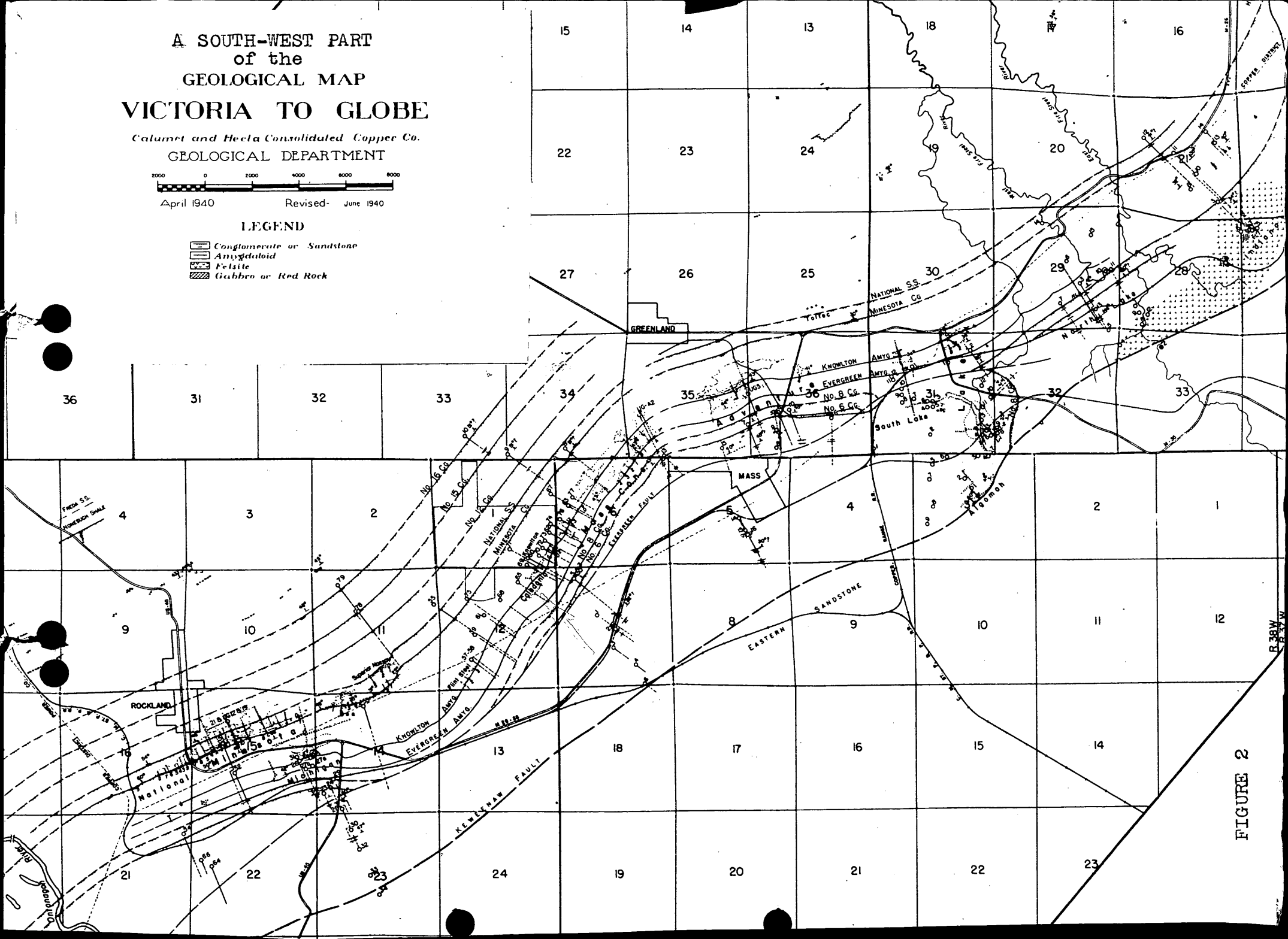

A SOUTH-WEST PART
of the
GEOLOGICAL MAP
VICTORIA TO GLOBE
Calumet and Hecla Consolidated Copper Co.
GEOLOGICAL DEPARTMENT
2000 0 2000 4000 6000 8000
April 1940
Revised- June 1940
LEGEND
Conglomerate or Sandstone
Amygdaloid
Felsite
Gabbro or Red Rock
GREENLAND
ROCKLAND
MASS
NATIONAL S.S.
MINNESOTA CG
KNOWLTON AMYG
EVERGREEN AMYG
No. 8 CG
No. 6 CG
No. 16 CG
No. 15 CG
No. 14 CG
EVERGREEN FAULT
KEWEENAW FAULT
EASTERN SANDSTONE
South Lake
Algomah
R.38W
R.37W

FIGURE 2

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
10/15	Fisher	800
10/16	C	220
10/17	Wells	500

OCT 16 1958

Mr. Robert A. Laurence
Executive Officer
OME Field Team, Region V
Room 2-B, Post Office Building
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Contract No. Idm-E765

Dear Mr. Laurence:

Thanks for your memorandum dated October 13, 1958 with which you returned copies of the Report of Review dated August 27, 1958. Enclosed are the original and three copies of a revised Report of Review.

If you concur with the facts as stated in this revised report, will you please arrange for its appropriate distribution as a substitute for the previous report.

Sincerely yours,

(Signed) J. L. Chambers

Jay L. Chambers
Contract Administration
and Audit Division

Enclosures

CEFisher/GMcC
October 15, 1958

cc: Docket
Director's Reading File
Mr. Chambers

8623

UNITED STATES DEPARTMENT OF THE INTERIOR

Bureau of Mines

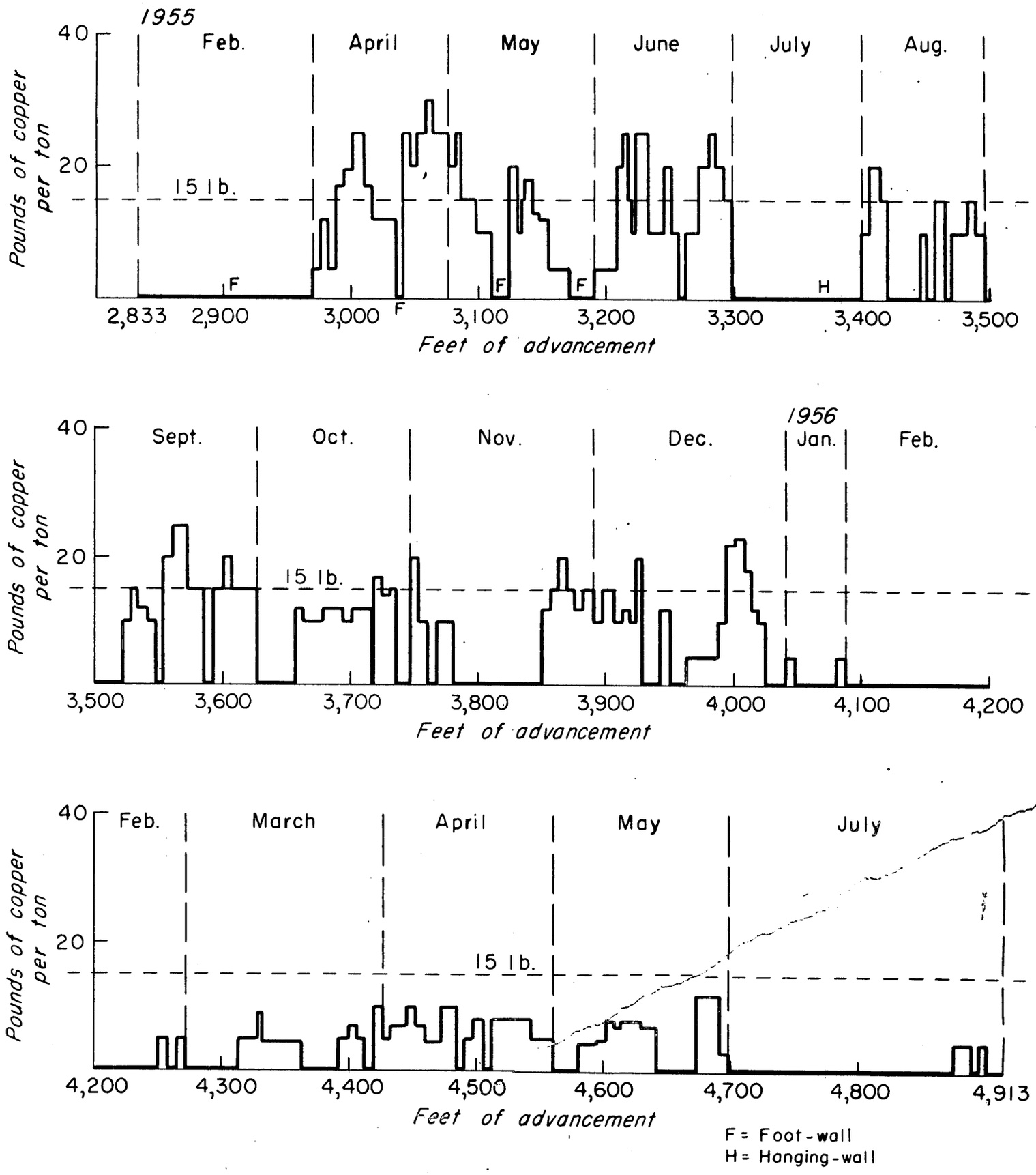


Figure 4 - Grade chart, Caledonia drift from D.M. 2833 to D.M. 4913, D.M.E.A. contract Idm-E765, Docket 3522 (copper) Calumet and Hecla Inc.

6225

Official File

DMEA
RECEIVED SEP 8

DATE	INITIALS	CODE
9-10	C	220
9-11	[illegible]	500

September 5, 1958

Memorandum

To: Jay L. Chambers, Defense Minerals Exploration Administration
Interior Building, Washington 25, D. C.

From: Executive Officer, DMEA, Region V, Knoxville, Tennessee

Subject: Docket No. DMEA-3522, Idn-E765 (Copper)
Calumet and Hecla, Inc.
Caledonia Mine, Ontanagon County, Michigan

Reference is made to your telegram of September 3:

Copies of the Report of Review were distributed on August 29, and as soon as we retrieve them, they will be returned to you.

For some reason, your telegram was not delivered, and the first we knew of it was when the confirmation copy arrived in today's mail. I checked with Western Union, and they have no record of having received it. Someone should check with western Union in Washington, to determine whether it was actually sent.

Robert A. Laurence

This has been check with telefax room and they checked with Western Union They advised this has been delivered: 9.43 9/3/58

9

Del. 9-3-58

C. Curtin 9-10-58

RAL/mg
cc - Operating Committee (2)
Mr. Lynch
Mr. Stehlik
Files

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
9/3	Fisher	800
	"	800
9/3	C	220
"	Gris	500

14X4401(01) Revolving Fund, Defense Production Act, Interior (Allocated Working Fund to Office of the Secy.)

HCQ

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, Post Office Building
Knoxville 2, Tennessee

Please return all copies of report of review, E765, DMEA-3522, Calumet and Hecla, sent you August 27. Report prematurely issued and proceeds from disposition of property omitted.

(Signed) J. L. Chambers

Jay L. Chambers, Director
Contract Admin. & Audit Division

CEFisher/ama
September 3, 1958

Copy to: Docket
Admr. Reading File
Mr. Chambers

8623

RECEIVED SEP 2 1958
9/2 C 220
" Gris 500

August 27, 1958

Calumet & Hecla, Inc.
Calumet, Michigan

Re: DMEA-3522, Idm-E765, copper.
Caledonia Mine
Ontonagon County, Michigan

Attention: Mr. James P. Pollock, Chief Geologist

Reference is made to your letter of June 30 with which you enclosed a list of material salvaged from Caledonia mine exploration project.

We recently received a similar list from C. J. Stehlik, Bureau of Mines Engineer. He revised the list by reducing the lengths of pipe, rails, cable and wire from 2300 feet each, as given in your list, to 2080 feet the total feet of drifting under the contract. This reduced the total salvage value from $3255.77 to $2961.98.

The salvage value placed on the material by Mr. Stehlik is satisfactory and a check for one-half the total amount of $1480.99 will be acceptable to the Government.

VJL/zm.
cc: Opr. Com.-2
Lynch
Laurence
Stehlik

V. J. Lynch, Acting
Executive Officer, DMEA
Field Team, Region V

Form 7
-56)

OFFICIAL FILE COPY

Date	Surname	Code
8/27	Fisher	800
8/28	C	220
		500

AUG 27 1958

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, Post Office Building
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Contract No. Idm-E765

Dear Mr. Laurence:

Enclosed are the original and three copies of a Report of Review, as requested by your August 20 memorandum. Also enclosed is the Operator's final (January 1958) MF-104, which was submitted with your request.

If you concur with the facts as stated in this report, please make the usual distribution. If for any reason you do not concur, please return the original and all copies with your comments to this Division.

Sincerely yours,

(Signed) J. L. Chambers

Jay L. Chambers, Director
Contract Administration
and Audit Division

Enclosures

CEFisher/GMcC
August 27, 1958

cc: Docket
Admr. Reading File
Helen R. Miller
Mr. Chambers
Mr. Talbert

8623

Form 7
(56)

OFFICIAL FILE COPY

Date	Surname	Code
8/15	Mirand	500
8-15	Chambers	800
	Rubin	140
	Dunger	140
		1300
8/20	Gittleson	1800
		200
	J. F.	220
		500
8/20	Lefferdge	120

AUG 21 1958

Mr. R. A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, Post Office Bldg.
Knoxville 2, Tennessee

INTERIOR DEPT.
AUG 15 1958
SOLICITOR

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-E765

Dear Mr. Laurence:

We have your memorandum of August 12, 1958, with enclosures, regarding settlement of the equipment account under the cited contract.

The terms outlined by Charles J. Stehlik of $1,480.99 for the Government's equity would be satisfactory to us. You may advise the Operator accordingly.

Sincerely yours,

C. O. Mittendorf (for)

Administrator

WRG/dl 8-15-58
cc to: Docket
Admr. R. File
Oper. Comm.
FT. REG V
Mr. McMahon, USBM
Mr. Killsgaard, USGS
Chron.

RECEIVED
AUG 15 1958
ASSOC. SOLICITOR
MINERAL RESOURCES

8623

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

8/25 ~~Gris~~ 500

August 20, 1958

Memorandum

To: Jay L. Chambers, Director, Audit Division -DMEA

From: Executive Officer, DMEA - Region V - Knoxville, Tenn.

Subject: Completion of DMEA-3522, Idm-E765 (copper) Calumet & Hecla, Inc., Caledonia Mine, Ontonagon County, Michigan.

Work on the subject contract was terminated February 1, 1958.

The following unitsd of work were completed after the Second Interim Audit certificate was issued November 9, 1956:

(1) A total of 1493 feet of diamond drilling completed.

A Termination Agreement has been received and signed.

The Operator's final engineering and geological report has not been received, but is in preparation. In order that our Field Examiners may complete their final report we would appreciate a final audit.

Robert A. Laurence

VJL/sm
cc
Opr. Com-2
Lynch
Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

August 12, 1958

RECEIVED AUG 14 1958

DATE	INITIALS	CODE
8/14	N.g.	225
		500

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V - Knoxville, Tennessee

Subject: DMEA-3522, Idm-E765 (copper) Calumet & Hecla, Inc., Calumet, Michigan. Caledonia Mine, Ontonagon County, Michigan.

Enclosed are two copies of the Operator's bid for salvage value of equipment purchased for the subject exploration contract, and two copies of Mr. Stehlik's letter commenting on the bid.

We agree with Mr. Stehlik that the bid is reasonable and should be accepted, but for only 2,080 feet instead of 2,300 feet.

Please advise us whether this bid is acceptable, so that we may advise the Operator.

Robert A. Laurence

Robert A. Laurence,
Executive Officer, DMEA - Reg. V

Wm A Beck

Wm. A. Beck for V. J. Lynch
Member, Bureau of Mines

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

REGION V
c/o Michigan College of Mining and Technology
Institute of Mineral Research, Houghton, Michigan

August 8, 1958

To: V. J. Lynch, Acting Executive Officer, DMEA, Region V

From: Charles J. Stehlik, Mining Engineer, Houghton, Michigan

Subject: Salvaged Materials, DMEA Contract Idm-E765, Docket 3522 (copper), Calumet & Hecla Inc., Caledonia Mine.

Investigation has been made relative to the subject contract salvage items and values submitted by the Operator. The following expansion and correction is offered:

Since the contract drifting totalled 2080 feet, not 2300 feet as shown on the Operator's offer, pipe, track, splice bars, and wire have been reduced in footage and value. In addition the cost per unit and percentage of original value has been listed.

Item	present unit value	% orig value	salvage value
2080 ft. of 1" pipe	.065	46	$135.20
2080 ft. of 3" pipe	.33	46	686.40
4160 ft. of 40# rail	.40	42	1,664.00
140 40# splice bars	.30	44	42.00
70 chute rails	1.20	40	84.00
70 long chute bolts	.75	38	52.50
70 short chute bolts	.66	38	46.20
2080 ft. Tirex 2-strand #10 cable	.12	40	249.60
2080 ft. phone wire	.10/100	40	2.08
			$2,961.98

The above corrected offer, if accepted by the Operator appears reasonable and I recommend approval.

Note that the $2,961.98 is the present total value. Since Calumet & Hecla already has 50% ownership their offer should be $1,480.99.

RECEIVED
AUG 11 1958
U. S. BUREAU OF MINES
DEF. MIN. ADM.
Knoxville, Tennessee

Charles J. Stehlik
Charles J. Stehlik
Mining Engineer
U. S. Bureau of Mines

CALUMET DIVISION
CALUMET & HECLA, INC.
CALUMET, MICHIGAN

DMEA
RECEIVED AUG 14 1958
DATE | INITIALS | CODE

June 30, 1958

Mr. Robert A. Laurence
Executive Officer of DMEA
Field Team, Region V
Room 13, P. O. Building
Knoxville 2, Tennessee

Subject: DMEA-3-2522 (copper)
Caledonia Mine
Ontonagon County, Michigan
Contract Idm-E-765

Dear Mr. Laurence:

I submit for your acceptance a list of material salvaged from the DMEA project at Caledonia as supplied to me by the Mining Department. The present worth values have been furnished by our Supply Department.

Very truly yours,

James P. Pollock
Chief Geologist

JPP:eln
Enc.

cc: A.E.Petermann
A.S.Kromer
B.C.Peterson
C.A.Campbell

RECEIVED
JUN 25 1958
U. S. Geological Survey

CENTRAL FILE COPY
D.M.E.A.
RECEIVED
DATE | INITIALS

CALUMET DIVISION

CALUMET & HECLA, INC.
CALUMET, MICHIGAN

The following material was salvaged from the D.M.E.A. project at Caledonia - Idm-E-765:

2300 ft. of 1" pipe	$ 149.50
2300 ft. of 3" pipe	759.00
4600 ft. of 40 lb. rail	1,840.00
154 - 40 lb. splice bars	46.20
70 chute rails	84.00
70 long chute bolts	52.50
70 short chute bolts	46.20
2300 ft. Tirex 2-strand #10 cable	276.00
2300 ft. phone wire	2.30
Total	$3,255.70

6-5-58

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

CENTRAL FILE CODE
DMEA
RECEIVED JUL 23 1958

DATE	INITIALS	CODE
7/23	C	220
		500

July 21, 1958

Memorandum

To: Operating Committee - DMEA - Washington, D. C.

From: DMEA Field Team, Region V - Knoxville, Tennessee

Subject: DMEA-3522, Idm-E765 (copper) Calumet & Hecla, Inc., Calumet, Michigan. Caledonia Mine, Ontonagon County, Michigan.

Reference is made to your letter of July 18.

On May 5, 1958, Mr. James P. Pollock, the Operator's Chief Geologist wrote that "we will prepare the final engineering and geological report in the near future." Therefore, we know that the Operator is aware of its obligation.

The Field Team final report is also in preparation, and will probably be ready at about the same time as the Operator's report, or shortly afterwards.

Robert A. Laurence

Robert A. Laurence, Exdcutive Officer
DMEA Region V

V. J. Lynch

V. J. Lynch, Member,
Bureau of Mines

7/21	C	220
21	Com	100
"	Tel	110
7/		800
		500

REGION V
MONTHLY REPORT

July 1958

(No. C. Exp. Sta.) Services to the Defense Mineral Exploration Administration

Charles J. Stehlik, Project Leader

Upper Peninsula of Michigan

Contract IdM-E765, Docket 3522 (copper), Calumet & Hecla Inc., Caledonia Mine

The subject Final Engineering-Geological Report has been started. Three of the illustrations have been prepared, writing has begun, and agreement between the Bureau-USGS co-authors has been reached.

C. J. S.
Charles J. Stehlik

Note 22 hours charged to DMEA Month of June
26 hours pp 1
All on final report writing.

How about Company final report?
m

RECEIVED
JUL 17 1958
U. S. BUREAU OF MINES
DEF. MIN. ADM.
Knoxville, Tennessee

RECEIVED
JUL 17 1958
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

OFFICIAL FILE COPY

Date	Surname	Code
7/17	Griswold	500
7/18	Martin	130
"	Johnson	110
"	Hartenstein	100
7/21	C O	220
		500

(FS-2) DLEV Form 1

500

JUL 18 1958

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, Post Office Bldg.
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-E765

Dear Mr. Laurence:

We have not as yet received the Operator's Final Report on the cited terminated project. Will you please advise this Operator as to its obligation.

After we have this report, we desire to make a certification. Hence, if the final Field Team report might be delayed, we would appreciate having a very brief synopsis, to enable us to certify.

Sincerely yours,

W. S. Martin
ACTING Chairman, Operating Committee (SLB)
WRGriswold/er 7/17/58
Copy to: Docket
Admr R File
Op. Committee
Mr. McMahon, USBM
Mr. Kiilsgaard, USGS
Chron.

APPROVED:

Frank D. Lamb (SLB)
Member, Bureau of Mines

N. E. Nelson (SLB)
Member, Geological Survey

8623

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

May 8, 1958

OFFICIAL FILE COPY
DMEA
RECEIVED MAY 13 1958

DATE	INITIALS	CODE
5/13	C	220
5/13	[illegible]	500

Memorandum

To: Operating Committee, DMEA - Washington

From: Executive Officer, DMEA - Region V - Knoxville, Tenn.

Subject: Signed Termination Agreement - DMEA-3522, Idm-E765 (copper) Calumet & Hecla Inc. Caledonia Mine, Ontonagon County, Michigan

Attached is the Government and Audit copies of the signed termination agreement on the subject contract.

Robert A. Laurence

Robert A. Laurence

z

OFFICIAL FILE COPY

Date	Surname	Code
4/8	Morrison	500
4-7	Chambers	800
4/7	[illegible]	130
"	Johnson	110
"	Mattendorf	100
		220
		500

500

APR 7 1958

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, Post Office Bldg.
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-E765

Dear Mr. Laurence:

As recommended in your March 24 memorandum, we have prepared a proposed Termination Agreement (2 pages) for the cited contract. The original and four copies are enclosed, which have been signed by the Administrator for the Government.

If the agreement meets with your approval, please present it to the Operator for approval and signature and, when completed, distribute the copies in the usual manner. Otherwise, and if any proposed change should lie beyond your delegated authority, please return all copies to us, with your recommendations.

Since, we understand, this project will be certified, we would appreciate receiving the Final Field Team report within the next couple of months.

Two extra copies of the agreement are enclosed for the use of the Field Team.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (SGS)

Enclosures
APPROVED:

Frank D. Lamb (SGS)
Member, Bureau of Mines

Thor H. Kiilsgaard (SGS)
Member, Geological Survey

WRGriswold/er 4/4/58
Copy to: Docket
Admr R File
Op. Committee
Mr. McMahon
Mr. Kiilsgaard, USGS
Chron.

8623

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code

500

March 31, 1958

Memorandum

To: Associate Solicitor, Division of Minerals Resources

From: Director, Division of Base Metals

Subject: Preparation of Termination Agreement for Docket No. DMEA-3522, Calumet & Hecla, Inc., Caledonia Mine, Ontonagon County, Michigan, Contract No. Idm-E765, Copper.

Will you kindly prepare a Termination Agreement for the cited contract, effective February 1, 1958.

Please reserve the right to make certification as we shall take such action a little later on.

W. R. Griswold

W. R. Griswold

8623

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

March 24, 1958

OFFICIAL FILE COPY
DMEA
RECEIVED MAR 26 1958

DATE	INITIALS	CODE
3/26	C	220
		300
3/27	wpb.	500

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V - Knoxville, Tennessee

Subject: Request for Termination - DMEA-3522, Idm-E765(copper)
Calumet & Hecla, Inc. Caledonia Mine,
Calumet, Michigan

Enclosed are three copies of a memorandum from C. J. Stehlik, Mining Engineer, Bureau of Mines, Houghton, Michigan concerning the subject contract.

The Field Team agrees with Mr. Stahlik that further diamond drilling would not add substantially to discoveries all ready made by the contract work. We therefore recommend termination of the contract by mutual agreement. If the Operating Committee agrees with this recommendation, please have the necessary agreement prepared.

We do not recommend an amendment to provide for further drift work as suggested in Mr. Stehlik's letter.

V. J. Lynch

V. J. Lynch, Acting
Executive Officer, DMEA-Region V

Helmuth Wedow

Helmuth Wedow, Jr., Geologist
Geological Survey

OFFICIAL FILE COPY
DMEA
RECEIVED MAR 26 1958
DATE | INITIALS | CODE

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

REGION V
c/o Michigan College of Mining and Technology
Institute of Mineral Research, Houghton, Michigan

March 21, 1958

To: V. J. Lynch, Supv. Mining Engineer, DMEA, Knoxville, Tennessee

From: Charles J. Stehlik, Mining Engineer, USBM, Houghton, Michigan

Subject: DMEA Contract Idm-E765, Docket 3522 (copper), Calumet & Hecla Inc., Caledonia Mine

I have conferred with Mr. James P. Pollock, geologist and project supervisor for Calumet & Hecla relative to the requested termination of the subject contract.

It was not denied by Mr. Pollock that the remaining contract funds and diamond drill footage cpuld not be used to advantage. Its return however, probably would not justify the expense since the work done to date has been sucessful in achieving their primary objective to examine the potential of the Knowlton lode by drift sampling and to create access to the Butler and Evergreen lodes adjacent to the "C Shaft" workings for similar sampling. They are satisfied that a reasonably well defined discovery has been made by this work, and feel that additional drilling would not add substantially to that discovery.

Another problem faced by the Operator is the serious situation brought about by the declining copper market. In an earnest effort to remain in operation they have cut many less essential expenses and are faced with further cut-backs. Since the remaining DMEA contract work is not viewed as possibly bringing large returns they are requesting that they be relieved of the obligation.

Consideration was given to transferring the remaining drill funds and that left from drifting to additional drifting on the Evergreen lode which they are now entering. They are reluctant however, to agree to such an amendment since they feel it will obligate them at a time when they are extremely uncertain of the future.

I am in agreement with the Operator that the remaining drilling would not add substantially to the discovery. At best it may create inferred reserves but not indicated reserves; certainly not measured reserves. The advisability of additional drifting involves geologic and economic analysis that is complex and I therefor can not make a recommendation. And this, after all, would be like asking them to agree to a new contract which they have a right to refuse.

If they are reluctant to enter into a new drifting amendment I would recommend that their request for termination be granted.

Charles J. Stehlik

Charles J. Stehlik

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

OFFICE PROC. CENTER
DMEA
RECEIVED MAR 24 1958

DATE	INITIALS	CODE
3/24	C	230
		130
3/25	copy	500

March 21, 1958

Memorandum

To: Operating Committee, DMEA, Washington, D. C.

From: Field Team, DMEA, Region V, Knoxville, Tennessee

Subject: Docket No. DMEA-3522, Contract No. Idm-E765 (Copper)
Calumet & Hecla, Inc., Calumet, Michigan
Caledonia Mine, Ontonagon County, Michigan

Enclosed are the original and two copies of a letter from the Operator, requesting termination of the project. If the request is not approved, it will be necessary to amend the contract, extending the time beyond April 10, 1958.

We expect to receive the comments of Mr. Stehlik, the Bureau of Mines engineer at Houghton, in the near future and will submit our recommendation on this request as soon as we hear from him.

Robert A. Laurence
Robert A. Laurence
Executive Officer

V. J. Lynch
V. J. Lynch, Member
Bureau of Mines

Enclosures 3

CALUMET DIVISION
CALUMET & HECLA, INC.
CALUMET, MICHIGAN

OFFICIAL FILE COPY
DMEA
RECEIVED MAR 24 1958
DATE | INITIALS | CODE

March 13, 1958

Mr. Robert A. Laurence
Executive Officer DMEA
DMEA Region V
P. O. Building, Room 13
Knoxville, Tennessee

Subject: DMEA 3522, Idm E765 Copper
CALEDONIA MINE

Dear Mr. Laurence:

With reference to the above contract, the drifting authorized was completed some time ago. In addition to the drifting 3,300 feet of diamond drilling was authorized to test the Butler lode at depth. One hole was actually drilled to the Butler with disappointing results. We then requested and received permission to divert the drilling funds to testing the South Knowlton and Knowlton lodes. Ten short holes were drilled also with disappointing results.

In all, 1,489 feet of the proposed 3,300 feet were drilled at an actual unit cost of $1.6804 per foot against authorized cost of $5.00 per foot.

The original contract authorized government participation to the amount of $56,555 and of these funds $32,120.89 has actually been expended in drifting and drilling. Royalty on ore produced from the contract area to February 3, 1958 had repaid $13,907.69 of this expenditure.

In view of the disappointing drill results to date, we feel that additional drilling will be of questionable value, and since the major objective of the contract, the drifting to the "C" shaft workings, has been achieved, request that the government relieve us from the obligation to complete the remainder of the drilling originally proposed.

Very truly yours,

James Pollock

James P. Pollock
Chief Geologist

JPP:eln

cc: A. S. Kromer (4)
C. A. Campbell
B. C. Peterson
C. J. Stehlic

RECEIVED
MAR 17 1958
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

3522

CALUMET DIVISION
CALUMET & HECLA, INC.
CALUMET, MICHIGAN

February 26, 1958

3/5 ~~WRB JW~~

Mr. R. A. Laurence
D.M.E.A. - Region V
Room 13, P. O. Bldg.
Knoxville, Tennessee

Dear Mr. Laurence:

Attached please find two checks in payment of royalties due on copper produced from D.M.E.A. exploration areas by this Division.

Our check in the amount of $367.73 represents payment on copper produced from stoping at our Caledonia exploration, Contract Idm-E765, Docket No. DMEA 3522, for January 1958.

Our check in the amount of $1,696.70 represents royalty on copper produced in January 1958 from our Centennial Mine under Contract Idm-E98, Docket No. DMEA 1207X.

Very truly yours,

B. C. Peterson
Controller

BCP:pmh
Encls.
cc: JP
CJ Stehlic

RECEIVED
MAR - 5 1958

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.
KNOXVILLE 2, TENN.

OFFICIAL FILE COPY
DMEA
RECEIVED NOV 14 1957

DATE	INITIALS	CODE
11/14	gb	220
		500

November 12, 1957

Memorandum

To: Operating Committee, DMEA - Washington

From: Executive Officer, DMEA - Region V - Knoxville, Tenn.

Subject: Signed Amendment No.2 on DMEA-3522, Idm-E765.
Calumet & Hecla, Inc. Calumet Michigan
Caledonia Mine, Ontaoagon County, Mich.

Attached are two copies of the subject amendment.

The usual distribution of the other copies has been made by this office.

Robert A. Laurence

Robert A. Laurence

Amendment

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
10/23	Williams	500
10/25	Talbert	800
10/25	[illegible]	130
"	Johnson	110
		100
		HB
10/28	[illegible]	225
		500

500

OCT 28 1957

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, Post Office Bldg.
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-E765

Dear Mr. Laurence:

With reference to your memorandum of October 2, we are enclosing the original and four copies of a proposed Amendment No. 2 to the contract, which has been signed by the Administrator, for the Government. Also enclosed are two extra copies of the amendment for the use of the Field Team.

We are not clear as to why an amendment was requested to provide for drilling into the South Knowlton Lode, instead of the Butler. Exhibit "A" of the contract states " . . . diamond drilling shall be done to explore parallel lodes from locations within the Caledonia Adit." Hence, if the Field Team believes that the South Knowlton is a logical target, no action is required other than an expression of your approval to the Operator.

If the amendment meets with your approval, please present it to the Operator for approval and signature and, when completed, distribute the copies in the usual manner. Otherwise, and if any proposed change should lie beyond your delegated authority, please return all copies to us, with your recommendations.

8623

In the September 23 letter of the Operator we note the following:

" . . . short holes . . . . on section 100 feet apart with three to four holes on each section."

Such concentrated drilling could only be considered as development work. We realize that, due to the erratic distribution of native copper in these veins, more intersections may be required than ordinarily would be the case, but certainly two holes per section should be ample for purposes of exploration.

We note (your letter of October 2) that approval was given to the Operator for extension of the completion period. It is not within the delegated authority of the Field Teams to make such extensions beyond a two-year period from the original date for commencement of work. See Order No. 2808, January 4, 1956.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (GCB)

Enclosures

APPROVED:

Frank D. Lamb (GCB)

Member, Bureau of Mines

W. P. Williams (GCB)

Member, Geological Survey

WRGriswold/er 10/22 & 23/57
Copy to: Docket
Admr R File
Op. Committee
Mr. McMahom, USBM
Mr. Kiilsgaard, USGS
Chron.

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
10/22	Swansel	500
10/22	Talbot	800
		130
		110
		100
		HB
		225
		500

500

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, Post Office Bldg.
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-E765

Dear Mr. Laurence:

With reference to your memorandum of October 2, we are enclosing the original and four copies of a proposed Amendment No. 2 to the contract, which has been signed by the Administrator, for the Government.

We are not clear as to why an amendment was requested to provide for drilling into the South Knowlton Lode, instead of the Butler. Exhibit "A" of the contract states ". . . diamond drilling shall be done to explore parallel lodes from locations within the Caledonia Adit." Hence, if the Field Team believes that the South Knowlton is a logical target, no action is required other than an expression of your approval to the Operator.

If the amendment meets with your approval, please present it to the Operator for signature and, when completed, distribute the copies in the usual manner, Otherwise, and if any proposed change should lie beyond your delegated authority, please return all copies to us, with your recommendations.

Two extra copies of the amendment are enclosed for use of the Field Team.

Sincerely yours,

Chairman, Operating Committee
WRGriswold/er 10/22/57
Copy to: Docket
Admr R File
Op. Committee
Mr. McMahon, USBM
Mr. Kiilsgaard, USGS
Chron.

Enclosures
APPROVED:

Member, Bureau of Mines

Member, Geological Survey

8623

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code

500

October 11, 1957

Memorandum

To: Associate Solicitor, Division of Mineral Resources

From: Director, Division of Base Metals

Subject: Preparation of Amendment No. 2 for Docket No. DMEA-3522, Calumet & Hecla, Inc., Caledonia Mine, Ontonagon County, Michigan, Contract No. Idm-E765

Will you kindly prepare an Amendment No. 2 to the cinted contract which will:

Extend the completion time to April 10, 1958.

Extend the repayment period to twelve years.

The Operator has also requested that the amendment provide for a change in the diamond drilling but actually the Exhibit A of the contract is sufficiently generalized so that no amendment proviso is necessary.

W. R. Griswold

W. R. Griswold

WRG/er
Copy to: Docket
Chron.

8623

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

October 11, 1957

Memorandum

To: W. R. Griswold, Defense Minerals Exploration Administration

From: Commodity Specialist, Branch of Base Metals

Subject: Amendment of Contract Idm-E 765, Docket No. DMEA 3522, (copper), Calumet & Hecla, Inc., Caledonia Mine, Ontonagon County, Michigan

The Operator has applied for an amendment of the contract to permit transfer of the remaining diamond drilling footage (2,550 feet) to test the South Knowlton lode rather than additional drilling into the Butler lode. The examiner indicates that this is the most logical way to use the remaining diamond drill footage and the Field Team recommends approval of the amendment.

I concur in that recommendation.

A. D. McMahon

A. D. McMahon

Copy to: Division of Minerals
Branch of Base Metals (2)
Thor Kiilsgaard, U.S.G.S.
F. D. Lamb
F i l e s

OFFICIAL FILE COPY
DMEA
RECEIVED OCT 11 1957

DATE	INITIAL	CODE
10/11	C	220
10/11	~~HRH~~	500

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

OFFICIAL FILE COPY
IN REPLY REFER TO:
DMEA
RECEIVED OCT 14 1957

DATE	INITIALS	CODE
10/15	C	220
10/15	WRY	500

Memorandum

October 10, 1957

To: W. R. Griswold, Defense Minerals Exploration Administration

From: W. P. Williams, U. S. Geological Survey

Subject: Review of request for contract amendment, DMEA 3522, Idm-E765 (copper), Calumet & Hecla, Caledonia mine, Ontonagon County, Michigan

The Operator has requested an amendment to Contract Idm-E765. The revisions he desires are:

1. Extension of the contract termination date to April 10, 1958

2. Permission to apply remaining contract funds to short-hole testing of the South Knowlton lode.

The Operator points out that revision no. 2, if granted, would permit ten penetrations of a potential ore zone to one penetration as originally planned.

I agree with the Field Team, in recommending approval of the requested amendment. I discussed the proposed amendment with W. S. White, U. S. Geological Survey, who has had wide experience with Michigan copper deposits. He sees no objections to the amendment.

W. P. Williams

W. P. Williams

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

WASHINGTON 25, D.C.

October 2, 1957

OFFICIAL FILE COPY
DMEA
RECEIVED OCT 4 1957

DATE		CODE
10/4	C	220
~~10/7~~	6	130
10/7	WRY.	500

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V - Knoxville, Tennessee

Subject: DMEA-3522, Idm-E765-Copper. Caledonia Mine, Ontonagon County, Michigan. Calumet & Hecla Inc., Operators

Enclosed are 3 copies of a request from the Operator for an amendment, and 3 copies of Mr. Stehlick's memorandum commenting on the request.

We recommend approval of an amendment to revise the drilling plan as requested, and to extend the time for completion to April 10, 1958.

Robert A. Laurence
Robert A. Laurence
Executive Officer, DMEA-Reg. V

V. J. Lynch
V. J. Lynch, Member
Bureau of Mines

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 13 POST OFFICE BLDG.
KNOXVILLE, TENN.

October 2, 1957

EXTRA COPY
DMEA
RECEIVED

DATE		CODE

Mr. James P. Pollock, Chief Geologist
Calumet & Hecla, Inc.
Calumet, Michigan

Re: DMEA-3522, Idm-E765-copper
Caledonia Mine
Ontonagon County, Michigan

Dear Mr. Pollock:

Your letter of September 23, requesting a revision of the contract, has been forwarded to our Washington office, as the Field Team does not have the authority to make that type of amendment. You may consider the request for time extension to April 10, 1958 as approved, and it will be incorporated in the amendment if your request is approved; if it is not we will then prepare an amendment for the time extension only.

We will advise you promptly upon receipt of advice from the Washington office.

Sincerely yours,

Robert A. Laurence
Executive Officer, DMEA
Field Team, Region V

RAL/zm
cc
Opr. Com-3
Lynch
Stehlik
White
Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

REGION V

c/o Michigan College of Mining and Technology
Bureau of Mineral Research, Houghton, Michigan

RECEIVED
OCT 2 - 1957
U. S. Geologic Division
Knoxville, Tenn.

DMEA
RECEIVED OCT 4 1957
DATE CODE

September 30, 1957

To: Robert A. Laurence, Executive Officer, DMEA, Region V

From: Charles J. Stehlik, Mining Engineer, Houghton, Michigan

Subject: Contract Idm-E765, Docket 3522 (copper), Calumet & Hecla Inc., Caledonia Mine

Transmitted herewith is Calumet & Hecla's explanation for delay in the completion of the subject contract and a request for an amendment which calls for an extension of the time period, and a revision of the diamond drilling plans.

The proposed drilling revision could not have been made when the contract was first formulated. Apparently the operators of the old "C" shaft workings knew only that they were on the Knowlton series of lava flows but not which one. Similarily, Calumet & Hecla was not aware of the fact that the "C" shaft workings were not on the same vein as their Mass Mine. This discovery was made shortly after the completion of the DMEA drift which was driven some 100 feet beond the completion point into the old "C" shaft workings. As a result a second vein of unknown mineralization is now known to exist in the footwall of the DMEA drift which could conceivably increase the mine potential.

Though the original plan of drilling into the Butler series could likewise increase the potential it would be at a far greater expense per ton of ore proven. Furthermore, once proven it would be relatively inaccesable. If a discovery is made in the South Knowlton vein a short cross-cut from the DMEA drift would be all that was necessary to develope the upper half of the ore. In the Butler series, at the depth drilled by the first hole a discovery would require a winze or a shaft and the necessary equipment such as a hoist, pumps, and shaft station to develope it.

The only deterent to the plan is that the area of possible discovery is limited. To the East the old "C" shaft workings cut off extension in that direction and to the West a cross-cut driven from the DMEA drift to the Butler lode crossed the South Knowlton and it was found to be poor at that point. The intervening distance, as stated in Mr. Pollock's

proposal, has potential for a distance of 500 to 700 feet. Considering this proposal from the standpoint of proving a block 700 feet long, no matter where it is, on the other hand, makes this the most logical way to use the remaining 2550 feet of drilling under the contract. I have prepared the attached sketch to illustrate this. In this sketch I have assumed: 1) the separation of the Knowlton, south Knowlton, and Butler lodes is 55 and 440 feet respectively, 2) all beds dip 43 degrees to horizontal, 3) contacts on the blocks should be on a 100 foot grid to have proven ore, ? 4) tonnage factor, in place, is 12 cu. Ft. per ton, and 5) recovery would be 80%.

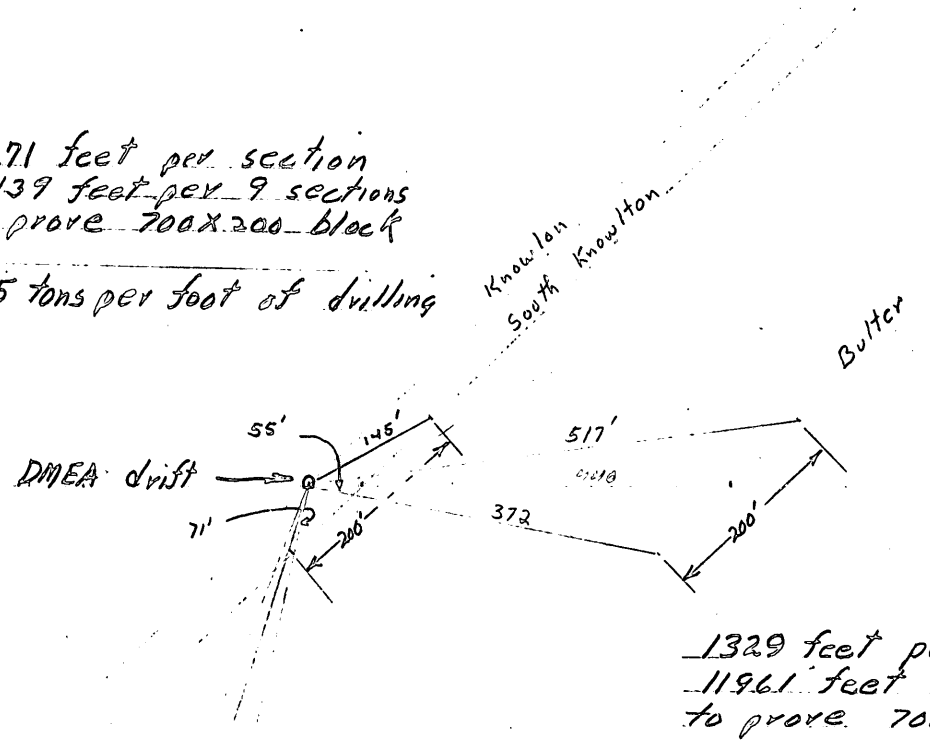
If additional information is needed to draw up the requested amendment I shall try to learn of details required.

Charles J. Stehlik

Charles J. Stehlik

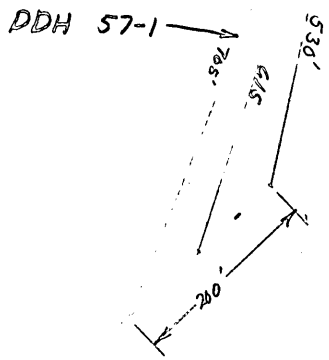
271 feet per section
2439 feet per 9 sections
to prove 700 X 200 block

30.75 tons per foot of drilling



1329 feet per section;
11961 feet for 9 sections
to prove 700 X 200 block

6.27 tons per foot of drilling



1850 feet per section
16650 feet for 9 sections
to prove 700 X 200 block

4.50 tons per foot of drilling

Section
Knowlton, South Knowlton
Butler lodes
Scale 1" = 200'

CALUMET DIVISION

CALUMET & HECLA, INC.

CALUMET, MICHIGAN

September 23, 1957

OFFICIAL FILE COPY
DMEA
RECEIVED OCT 4 1957

DATE	INITIALS	CODE

RECEIVED
OCT 2 - 1957
Knoxville, Tenn.

Mr. Robert A. Laurence
Executive Officer
D.M.E.A. Field Team, Region V
Post Office Building
Knoxville 2, Tennessee

DMEA 3522
Idm E-765
Caledonia Mine

Dear Mr. Laurence:

Progress on our diamond drilling has been slow and disappointing for the following reasons:

1. Breakdown of the drill.

2. The first hole to the Butler lode has had to go over 700 feet to cut the Butler lode instead of 550 feet as anticipated.

3. Diversion of our drill crew to other urgent work--completing work at Osceola No. 13, which will be shut down; and drilling drainage holes at Centennial No. 3 shaft.

We will, therefore, be unable to meet the specified date of October 10, 1957 for completion of this drilling.

Our drifting under the contract, when the old "C" shaft workings were holed, showed that the "C" shaft Knowlton workings were actually on the lode we term the South Knowlton. Our geologic mapping shows that the South Knowlton probably exists in the footwall of the DMEA drift about 50 to 60 feet in the footwall. This lode has a chance of commercial mineralization parallel to the DMEA drift for a distance of 500 - 700 feet. We can obtain a penetration of this lode with a 80 - 100 foot drill hole, or, roughly, ten penetrations of this lode for each penetration of the Butler lode, in drilling similar to that originally planned. If ore was developed, it could be readily extracted from the adit level with existing equipment. I have discussed this proposal with Mr. C. J. Stehlic and am sending him this letter to forward to you with his thoughts on the matter.

We request:

1. An extension of the contract period to April 10, 1958.

2. Permission to apply such funds remaining in the diamond drilling portion of the contract to short hole testing of the South Knowlton lode in the existing contract area.

> This could be done by modifying our application Item 5, paragraph (b) to read in part " . . . The drift will then be used as a base for diamond drilling to cut the South Knowlton lode of the Evergreen series to the southeast with short holes approximately 80 - 100 feet long on sections 100 feet apart with three to four holes on each section." development drilling

It is my opinion that this change would greatly increase the discovery rate per dollar spent in exploration.

Sincerely yours,

James Pollock

James P. Pollock
Chief Geologist

JPP:eln

cc: A. E. Petermann
A. S. Kromer

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
9/9	P	220
9/13	~~ARG~~	500

SEP 9 1957

Mrs. Helen R. Miller
Personal Assistant
Bureau of Mines, Region V
P. O. Box 217
Morris, Tennessee

Re: Docket Nos. DMFA-1207 and
DMFA-3522 (Copper)
Calumet & Hecla, Inc.
Contract Nos. Idm-598 & Idm-1765

Dear Mrs. Miller:

Thank you for your letter dated August 30, 1957, calling attention to the difference of $0.50 in the amount shown on DMFA Form 14 and the amount reported as valid and proper for payment in connection with Contract Idm-598. A revised Form 14 will be issued correcting the amount of the contract to $273,499.01. Thus the net amount due the Operator is $140.49.

With regard to the last paragraph of your letter, the policy in this matter is stated in Section 1 of DMFA Circular 19, Supplement 4, dated October 9, 1952, as follows:

> "The procedure described herein will adequately relieve the certifying officer of all responsibility if payment is made in accordance with an Audit Certificate covering either a final or interim audit, or a Report of Review, issued by an auditor representative of the Contract Administration and Audit Division."

Sincerely yours,

(Signed) E. D. Talbert

E. D. Talbert, Acting Chief
Contract Administration
and Audit Division

CEFisher/wb
September 9, 1957

Copy to: Docket (2)
R. A. Laurence, Reg. V (2)
Admr. Reading File
Mr. Chambers

8623

Form 7
(56)

OFFICIAL FILE COPY

Date	Surname	Code
8/23	[illegible]	220
8/23	[illegible]	500

Mrs. Helen R. Miller
Personal Assistant
Bureau of Mines, Region V
P. O. Box 217
Norris, Tennessee

AUG 22 1957

Re: Docket Nos. DMA-1207 and
DMA-3522 (Copper)
Calumet & Hecla, Inc.
Contract Nos. Idm-E98 and Idm-E765

Dear Mrs. Miller:

Reference is made to payments of $2,450.61 and $258.95 on August 9, 1957, by vouchers Nos. 22 and 23 applicable to exploration contract Idm-E98 and Idm-E765, respectively. In each instance the amount paid was based on 50 percent of claimed cost on Forms MF-104 submitted by the Operator.

According to our records the net disbursements applicable to contract Idm-E98 amounts to $273,358.52, whereas the final audit report and certificate dated April 16, 1957, indicates $273,499.01 as valid and proper for payment. With respect to contract Idm-E765, disbursements applicable to the period through July 1956 aggregated $30,887.11, whereas the approved Government participation for that period amounted to $30,853.78 according to the second interim audit report and certificate dated November 9, 1956.

It thus appears that $140.49 is due to the Operator in connection with contract Idm-E98 and that he has been overpaid $33.33 applicable to contract Idm-E765. Apparently the audit adjustments indicated in the two audit reports have been overlooked. It is suggested that appropriate adjustments for both the underpayment and the overpayment be made in the payment of the next voucher under contract E765.

Sincerely yours,

(Signed) J. L. Chambers

Jay L. Chambers, Director
Contract Administration
and Audit Division

CEFisher/wb
August 22, 1957

Copy to: Docket (2)
R. A. Laurence, Reg. V (2)
Admr. Reading File
Mr. Chambers

8623

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 19 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

OFFICIAL FILE COPY
DMEA
RECEIVED AUG 8 1957

DATE	INITIALS	CODE
8/8	P. K.	220
8/9	[illegible]	800
8/9	[illegible]	500

August 6, 1957

Memorandum

To: Mr. Chas. J. Stehlik, Mining Engineer - Houghton, Mich.

From: DMEA Field Team, Region V - Knoxville, Tennessee

Subject: DMEA-3522, Idm-E765(copper) Calumet & Hecla, Inc.
Caledonia Mine, Ontonagon County, Michigan

We are forwarding the Operator's May-June voucher for payment, with the unit cost of drilling at $1.82 as submitted by the Operator. This is based on footnote 1 of Exhibit "A", under estimated costs of the project, which states "The costs of Superivision, assaying and all other costs whatsoever shall be borne by the Operator without contribution by the Government." The cost of raising and timbering seems to be one of these "all other costs whatsoever" and therefore not a permissible item under the contract.

We have just received, direct from James Pollock, the Company's final report on DMEA-1207. Have you seen it?

V. J. Lynch, Member
Bureau of Mines

Robert A. Laurence
Executive Officer, DMEA
Region V

RAL/zm
cc
Opr. Com.-2 Needham-files

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
~~WASHINGTON 25, D.C.~~
ROOM POST OFFICE BLDG.
KNOXVILLE 2, TENN.

April 9, 1957

Mr. Charles Stehlik
U. S. Bureau of Mines
Houghton, Michigan

Re: DMEA-3522, Idm-E765 (Copper)
Calumet and Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan

Dear Mr. Stehlik:

Under the terms of the recess agreement signed on October 22, 1956, Calumet and Hecla agreed to begin the drilling at the Caledonia Mine on or before May 1, 1957. Will you please find out from them when they plan to begin this drilling? If they are unable to begin by May 1, we can probably obtain an extension of the recess period, but it will have to be approved by the Washington office.

Sincerely yours,

Robert A. Laurence
Executive Officer, DMEA
Region V

RAL/as
cc
Opr. Com. 2
Lynch
Files

OFFICIAL FILE COPY
DMEA
RECEIVED APR 1957

DATE	INITIALS	CODE
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4/11	[illegible]	800
	[illegible]	500

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 1, POST OFFICE BLDG.
WASHINGTON 25, D. C.
KNOXVILLE 2, TENNESSEE

November 16, 1956

Memorandum

To: Operating Committee, DMEA - Washington

From: Executive Officer, DMEA - Region V - Knoxville

Subject: Signed Amendment No.1. Idm-E765, DMEA-3522 (copper)
Calumet & Hecla, Inc. Ontonagon County, Mich.

Transmitted are three executed copies of the subject amendment. The usual distribution of the other copies has been made.

Robert A. Laurence

Robert A. Laurence

RECEIVED
NOV 19 1956
D.M.E.A.

Fisher
Talbert

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

NOV 15 1956

Mr. Robert A. Lawrence
Executive Officer
DMEA Field Team, Region V
Room 14, Post Office Building
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-E765

Dear Mr. Lawrence:

Enclosed herewith are Second Royalty Audit Certificate and Report and Second Interim Audit Certificate and Report pertaining to the subject exploration contract.

If you concur with the findings set forth in these Reports, the original of each should be forwarded to the Regional Finance Officer for filing with the contract, copies should be furnished to the Operator, and a copy of each should be retained in your files. The extra copy of the Second Interim Audit Certificate should be forwarded to the Regional Finance Office for filing in the voucher file.

Mr. Fisher's third royalty audit and final cost audit reports pertaining to Contract Idm-E96, Docket No. DEA-1207X, Calumet & Hecla, Inc., are being withheld pending final determination of salvage credit to the contract costs which matter was referred to Mr. Stahlick for his consideration by Mr. Lynch's memorandum dated October 15, 1956.

Sincerely yours,

(Signed) E. D. Talbert

E. D. Talbert, Acting Chief
Contract Administration
and Audit Division

Enclosure

CEFisher/wb 11-15-56

Copy to: Docket
Admr. Reading File
Mrs. Miller
Mr. Chambers

RCS.

File Copy
Surname

Griswold
Champlin
Selfridge
Mitchell

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

OCT 23 1956

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, Post Office Bldg.
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-E765

Dear Mr. Laurence:

With reference to your memorandum of October 4, covering the cited project, we are enclosing the original and five copies of Amendment No. 1 to this contract, which have been signed by the Administrator. Also enclosed are two extra copies of the amendment for the use of the Field Team.

The amendment provides as follows:

1. Seven months recess period.
2. Completion time for work extended to October 10, 1957.
3. Royalty repayment period extended to eleven years.

If it meets with your approval, please present it to the Operator for signature and, when completed, distribute the copies in the usual manner. Otherwise, and if any proposed change should lie beyond your delegated authority, please return all copies to us, with your recommendations.

Sincerely yours,

George C. Selfridge
Chairman, Operating Committee (2/6)

Enclosures

WRGriswold/er 10/19/56

APPROVED:

Frank D. Lamb (2/6)
Member, Bureau of Mines

Thor H. Kiilsgaard (2/6)
Member, Geological Survey

Copy to: Docket
Admr R File
Op. Committee
Base Metals
Mr. Pennington, USBM
Mr. Kiilsgaard, USGS
Chron.

File Copy
Surname

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION 500
WASHINGTON 25, D. C.

October 15, 1956

Memorandum

To: Associate Solicitor, Division of Mineral Resources

From: Chief, Base Metals Division

Subject: Preparation of an Amendment No. 1 for Docket No. DMEA-3522, Calumet & Hecla, Inc, Caledonia Mine, Ontonagon County, Michigan, Copper.

Will you kindly prepare an Amendment No. 1 to the cited contract which will:

1. Recess the work under the project from October 1, 1956 to May 1, 1957.
2. Extend the completion period from two years from date of contract to October 10, 1957.
3. Extend the repayment period to eleven years.

W. R. Griswold

W. R. Griswold

WRG/er
Copy to: Docket
Base Metals
Chron.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
ROOM 1 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
OCT - 8 1956

October 4, 1956

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V - Knoxville, Tenn.

Subject: DMEA-3522, Idm-E765 (copper) Calumet & Hecla, Inc. Calumet, Michigan. Caledonia Mine, Ontonagon County, Michigan.

Enclosed is a copy of a letter from the Operator, requesting an amendment for nine months' additional time in which to complete the proposed diamond drilling, and a copy of our reply. The present expiration date is 2 years from the contract date, so that the Field Team cannot authorize the extension.

The request is entirely reasonable, and we agree with Mr. Pollock that the drilling can be planned more intelligently after draining and examination of the old workings.

Therefore, we request approval of an amendment extending the date for completion at least to November 10, 1957.

Robert A. Laurence
Robert A. Laurence
Executive Officer, DMEA
Field Team, Region V

V. J. Lynch
V. J. Lynch,
Member, Bureau of Mines

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
ROOM POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
OCT - 8 1956

October 4, 1956

Mr. James P. Pollock,
Chief Geologist
Calumet & Hecla, Inc.
P.O. Box 231
Calumet, Michigan

Re: DMEA-3522, Idm-E765 (copper)
Caledonia Mine
Ontonagon County, Mich.

Dear Mr. Pollock:

This is in reply to your letter of October 1, requesting an extension of time for the Caledonia contract, in order to permit drainage and examination of the Mass Consolidated "C" shaft workings before starting the diamond drilling. Examination of these old workings certainly should be completed before the drilling is carried out.

However, the Field Team does not have the authority to extend a contract beyond two years from its original date, and February 10, 1957, the present expiration date is two years from the contract date. Therefore, I am referring your request to the Washington office, and if they authorize the extension, we will forward an amendment for signature. If the time is extended, the contract will also be amended to provide for a corresponding extension of the royalty repayment period.

Sincerely yours,

Robert A. Laurence
Executive Officer, DMEA
Field Team, Region V

RAL/sm
cc
Lynch
Stehlik
Files
Walter White
Opr. Com.-2

CALUMET & HECLA, INC.
122 SOUTH MICHIGAN AVENUE
CHICAGO 3, ILLINOIS

OCT 1 1956

Reply to
Box 231, Calumet, Michigan

October 1, 1956

Mr. Robert E. Laurence
Executive Officer, DMEA
DMEA - Region V
Room 13, Post Office Building
Knoxville, Tennessee

Subject: IDM-E 765, DMEA Docket No. 3522, Caledonia Drift

Dear Mr. Laurence:

On October 1, Mr. Stehlic visited this office and we discussed the progress of the above DMEA contract. This contract expires February 10, 1957. The drifting contemplated by the contract has now been completed. There remains 3,300 feet of diamond drilling and Mr. Stehlic wished to know our plans with respect to this drilling.

At the present time we have tapped into the Mass Consolidated "C" shaft workings by long steel drill holes from the end of the Caledonia Adit. We began to drain these workings through these drill holes to the level of the adit, but it will be several months before the workings are drained and access can be gained to the old workings. Examination of the old workings would permit us to determine the accuracy of the maps which we possess of the old workings and allow us to more intelligently direct our diamond drill holes to these footwall lodes. It is apparent therefore that it would be highly desirable for us to have an extension of time of this contract if it is in accord with the policies of the DMEA.

Roughly five months will be necessary to complete the anticipated footage of diamond drilling, therefore, please advise me as to whether it will be possible to extend this contract at least a period of six months, and preferably nine months.

Sincerely yours,

James P. Pollock

James P. Pollock
Chief Geologist

JPP:eln

cc: C.A.Campbell
A.S.Kromer
B.C.Peterson

C.J.Stehlic, Mining Engineer
U. S. Bureau of Mines, Houghton, Michigan

RECEIVED
OCT 3 - 1956
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 4 WASHINGTON POST OFFICE BLDG.
KNOXVILLE 2, TENN.

August 24, 1956

Mr. Charles J. Stehlik, Mining Engineer
U. S. Bureau of Mines
Minerals Research Bldg.
Michigan College of Mining & Technology
Houghton, Michigan

Re: DMEA-3522, Idm-2765 (copper) Idm-765
Calumet & Hecla, Inc.
Caledonia Drift
Ontonogan County, Michigan

Dear Mr. Stehlik:

The total footage for drifting in the subject contract was completed in July. Before we can process the July voucher we would like to know whether there will be any more charges. As you know there was set up in the contract an item of $16,500.00 for diamond drilling, 3,300 feet at $5.00 per foot, to explore parallel lodes from locations within the Caledonia Adit. Does the Company wish to take advantage of this item? If not the Operator's final report as stipulated in Article 7 (c) of the contract should be submitted and property purchased under the contract should be disposed of according to Article 9 (c) of the contract form.

Please advise as soon as possible the status of this contract. Until we hear from you no action will be taken on the July voucher.

Very truly yours,

Robert A. Lawrence
Executive Officer, DMEA
Region V

RAL/mm
cc:
Opr. Com.
Lynch
Needham
Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
ROOM POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
JUL 3

July 27, 1956

RECEIVED
JUL 30 1956

Mr. Charles J. Stehlik, Mining Engineer
U. S. Bureau of Mines
Minerals Research Bldg.
Michigan College of Mining & Technology
Houghton, Michigan

Re: DMEA-3522, Idm-E765
Caledonia Mine
DMEA-1207, Idm-E98-Centennial

Dear Mr. Stehlik:

Mr. C. E. Fisher will be here next Monday, so we are holding the May and June vouchers for Calumet & Hecla for him to see, before approving them. Copies of his audit reviews were received yesterday.

Regarding additional footage on the Caledonia adit: I believe the wording of the contract would permit more than 2,080 feet provided the average unit cost does not exceed $46.45 and the total for drifting does not exceed $96,610.00. However, the contract map shows a large stoped area just beyond the end of the proposed 2,080 feet of drifting, suggesting that only a little additional footage would extend the adit into these workings.

Unless the Company specifically requests the additional footage, we will consider the drifting phase of the contract to have been completed on July 16, when the 2,080 foot total was reached. If they do request the additional footage, I will then ask the Washington office for authorization of an amendment, if one is considered necessary. If there is a request for additional footage, it should be accompanied by a map showing the drifting accomplished under the contract, and the location of the proposed drifting with respect to the old workings and the boundary of the contract land area.

Sincerely yours,

Robert A. Laurence, Executive Officer
DMEA Field Team, Region V

RAL/sm
cc:
Cpr. Com.-2
Moehlen
Griswold
Lynch
Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

C. E. Fisher
Talbert

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, P. O. Building
Knoxville 2, Tennessee

20 JUL 1956

Re: Calumet and Hecla, Inc.
Docket No. DMEA-1207X
Contract No. Idm-E98
and
Docket No. DMEA-3522
Contract No. Idm-E765

Dear Mr. Laurence:

Enclosed herewith are copies of audit certificates and audit reports pertaining to the above-cited projects as follows:

Contract No.	Report	Number of copies Certificates	Reports
E- 98	Fourth Interim Audit	4	3
98	Second Royalty	3	3
765	Interim	4	3
765	First Royalty	3	3

If you concur with the facts stated therein distribution should be made in accordance with instructions on page 48 of Procedure for Royalty Audits and page 73 of Audit Procedure for Exploration Work.

Sincerely yours,

(Signed) E. D. Talbert

E. D. Talbert, Acting Chief
Contract Administration
and Audit Division

Enclosure

CEFisher/wb
July 20, 1956

Copy to: Docket (2)
Admr. Reading File
Helen R. Miller
Mr. Chambers

R.C.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
DEC 28 1955

December 20, 1955

Mr. Charles J. Stehlik
Mining Engineer
U. S. Bureau of Mines
Houghton, Michigan

Re: DMEA-1207, Idm-198 (Copper)
DMEA-3522, Idm-1765 (Copper)
Calumet & Hecla, Inc.

Dear Mr. Stehlik:

The October vouchers for both Calumet & Hecla contracts have been approved and forwarded for payment.

Mr. Beck and I studied the contract and amendments carefully, and we agree with your conclusion as stated in paragraph two of your December 2 memo, that the unit cost to date is below the permissible figure as provided by Amendment No. 7. For that reason, we approved the voucher without change. We accepted $31.03 as the allowable unit cost.

It will be appreciated if you can send us (in quintuplicate) an interim report after inspections of these contracts as outlined in DMEA Memorandum No. 9.

With best wishes for a Merry Christmas.

Sincerely yours,

Robert A. Laurence
Executive Officer, DMEA
Field Team, Region V

RAL/mg
cc - Operating Committee (4)
Mr. Lynch (2)
Files (2)
Mr. Stehlik

Docket copy
Surname: Talbot
Trimmed

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

AUG - 4 1955

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, P. O. Building
Knoxville 2, Tennessee

Re: Docket No. DMA-3522 (Copper)
Calumet & Hecla, Inc.
Ontonagon County, Michigan
Contract No. [illegible]-F765

Dear Mr. Laurence:

The purpose of this letter is to confirm our telephone conversation of August 3, 1955, in regard to the Government's contribution to drifting costs under the subject Exploration Project Contract.

You requested advice as to whether a recently received Form MF-104 claiming costs in excess of $46.45 per foot could be processed for payment without deduction of excess costs. The question has arisen as a result of the following provision in Exhibit "A" of the contract:

> "The Government will contribute to those allowable actual costs of drifting which do not exceed an average of $46.45 per foot, computed monthly. However, allowable costs which exceed said maximum unit cost of $46.45 per foot may be credited against subsequent monthly vouchers up to said maximum unit cost." (Underscoring supplied.)

Prior Forms MF-104 applicable to this contract have claimed costs considerably less than the maximum rate authorized. Therefore, it did not appear to the Field Team that it would be equitable to deduct the excess on the current claim for possible credit against subsequent vouchers when prior vouchers were available for such credit.

I advised you that it was my opinion that: (a) the purpose of the quoted provision of the Exhibit "A" was to assure that the Government did not contribute, at any time, to costs averaging in the aggregate more than $46.45 per foot; (b) that the use of the word "subsequent" appeared to be unfortunate; and (c) that for the intent and purpose of the provision the word "other" could be substituted for "subsequent". Mr. Griswold, Chief of the Base Metals Division, has verified that this was the intent and purpose of the provision and he concurs with my opinion.

R.C.S.

Accordingly, in the audit or review of this project, the auditor representatives of the Contract Administration and Audit Division will not take exception to costs of drifting exceeding an average of $46.45 per foot in any one month, provided that the costs are otherwise allowable and the cumulative costs do not exceed such average.

Sincerely yours,

(Signed) E. D. Talbert

E. D. Talbert, Acting Chief
Contract Administration
and Audit Division

EDTalbert/wb
August 4, 1955

Copy to: Docket
Admr. Reading File
Helen Miller
Mr. Selfridge
Mr. Griswold
Mr. Chambers

File Copy
Surname
Griswold
Selfridge
Johnson
Mattendorf

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

500

APR - 1 1955

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13, Post Office Bldg.
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan
Contract No. Idm-E765

Dear Mr. Laurence:

Referring to your letter of February 23 covering the cited project, we are enclosing the Field Team and Finance Office copies of the contract which have now been signed by the Applicant. You will note that the effective date of the contract is February 10.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (JHB)

Enclosures

WRGriswold/er 3/30/55

APPROVED:

J. H. Hedges (JHB)
Member, Bureau of Mines

/s/ R. D. Trace (JHB)
Member, Geological Survey

Copy to: Docket
Admr R. File
Op. Committee
Base Metals
Mr. M. E. Volin, USBM
Mr. Kiilsgaard, USGS
Chron.

R.C.S.

CALUMET & HECLA, INC.
122 SOUTH MICHIGAN AVENUE
CHICAGO 3, ILLINOIS

A. E. PETERMANN
VICE PRESIDENT AND GENERAL COUNSEL

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAR 29 1955

March 28, 1955

Mr. C. O. Mittendorf, Administrator
United States Department of the Interior
Defense Minerals Exploration Administration
Washington 25, D. C

Re: Docket No. DMEA-3522 (Idm-E765)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan

Dear Mr. Mittendorf:

Thank you for your letter of March 22, 1955. I believe the letter and the conversation we had in your office on March 16 adequately take care of our objections to the contract.

We have therefore signed all six copies and are retaining the Operator's Copy and enclose the other five herewith.

Sincerely yours,

A. E. Petermann

AEP:hp
Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

Kulgaard
Hedges
Selfridge
Johnson

MAR 22 1955

Mr. A. E. Petermann, Vice President
Calumet & Hecla, Incorporated
122 South Michigan Avenue
Chicago 3, Illinois

Re: Docket No. DMEA-3522 (Copper)(Idm-E765)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan

Dear Mr. Petermann:

Reference is made to your letter dated February 21, 1955, addressed to Mr. V. J. Lynch, Acting Executive Officer, Region V, which transmitted the unsigned copies of the contract prepared for the cited project. The letter and enclosures have been referred to this office for reply.

Fortunately, your visit to my office on March 16 in connection with the Calumet & Hecla project (Contract Idm-E98) afforded the opportunity for a full discussion of the points raised in your letter of February 21, the comments made thereon by the Acting Assistant Solicitor, and the contents of my reply which, at the time, was ready to mail to your Chicago address.

As a result of our discussions it is my impression that only two of the four points raised in your letter now require clarification. Those points are as follows:

1) The development of a method for determining the tonnage and grade of exploration ore subject to Government royalty.

This same point arises in the case of Contract Idm-E98 and during our conference on March 16 you, and Messrs. Pollack and Campbell of your mine staff, were able to explain your mining, sampling, milling and smelting practices in far greater detail than was covered in your letter of February 21.

As a result of our discussions I expressed my willingness to accept your long established methods of determining tonnage and grade of ores derived from the many producing areas of your operations as being properly applicable to DMEA ore. It is my understanding that you intend to supplement that part of your letter of February 21, which deals with this matter, by another letter which will describe your sampling

R.S.J.

methods in greater detail and submit it to me for formal acceptance of a method to be applicable to both DMEA contracts.

Royalty payments will be based on the market value of the refined copper resulting from the DMEA work, whether routed to your Wolverine Tube Division or into normal market channels.

2) The other point which requires clarification pertains to Article 8(h) of the contract. You state that it would be impossible to determine the ultimate purchaser of metallic copper produced from the exploration and therefore you could not, under any circumstances, give the notices required under Article 8(h). You request that the Article be eliminated from the contract.

The Acting Assistant Solicitor has rendered the following opinion regarding your above comment:

> "Inasmuch as the contract does not deal with production beyond the stage of refined metal, it is clear that this applicant would not be required to give the notice [as required by Article 8(h) of the contract] to its customers for fabricated copper. There would be no point in eliminating the article as suggested by the applicant."

I assume that the foregoing will adequately clarify the points which you have raised and am therefore returning the original and five copies of the contract for your further consideration.

Sincerely yours,

C. O. Mittendorf
(by ESF)
Administrator

Enclosures

WRGriswold/COMittendorf/esf
3/18/55
Copy to: Docket
Region V (2)
Admr. R. File
Operating Committee
Base Metals
Mr. M. E. Volin, USBM
Mr. T. H. Kiilsgaard, USGS
Chron.

File Copy
Surname

Sirsurd
Chamberlin
Kilsgaard
Hedges
Selfridge
Johnson

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

Mr. A. E. Petermann, Vice President
Calumet & Hecla, Incorporated
122 South Michigan Avenue
Chicago 3, Illinois

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan

Dear Mr. Petermann:

We have your letter of February 21, transmitting the unsigned copies of the contract prepared for the cited project.

It is our understanding that as ore might be produced from the driving of the project drift, it would be practically impossible to mill it separately and to thereby obtain an exact determination of its copper content.

We have various other projects of a similar nature where DMEA ores are commingled with ores from other sources before milling. Your procedure should be as follows:

Ore grade, as you suggest, may be determined by daily estimates of the supervisory personnel at the exploration, if such procedure is the common and accepted practice of the district.

Ore tonnages will be dtermined by scale weights if such is practical. If not, tonnages may be determined by whatever method as may be acceptable to the Field Team.

Obviously, it is very much to the best interest of your company to obtain the closest possible approximation as to tonnage and copper content; otherwise, the entire purpose of the project is nullified.

Regarding royalty payments, we are not at all concerned with the sale of fabricated copper products by your Wolverine Tube division. After milling, and knowing the calculated grade and tonnage of the project ore, it would be very simple to calculate royalty payments on the refined copper resulting from the DMLA work. The value should be taken on a base of "shipping point market value" and five percent royalty paid upon such valuation. Whatever actual disposal is thereafter made of the copper is not pertinent to the contract. Whether you choose to route it to your fabricating division or into normal market channels is your own affair.

Referring to your inquiry on "unsold production", it is difficult to imagine such a problem arising with copper metal. Certain low-grade ores or mill products may at times have to be stockpiled for one reason or another, but in this particular case there is little likelihood of such a problem arising, since copper is always readily marketable.

We are therefore returning the original and five copies of the contract for your signature since there seems to be no necessity for any contract change.

Sincerely yours,

Administrator

WRGriswold/ (3/10/14/55)

Copy to: Docket
Region V (2)
Admr. R. File
Op. Committee
Base Metals
Mr. M. E. Volin, USBM
Mr. Kiilsgaard, USGS
Chron.

C. O. Mittendorf, Administrator,

Defense Minerals Exploration
Administration
14X1101(01) Revolving Fund,
Defense Production Act, Interior
(Allocated Working Fund to the Office of
the Secretary)

MAR 1 0 1955

3522

MR. A. E. PETERMAN
CALUMET & HECLA, INC.
122 SOUTH MICHIGAN AVENUE
CHICAGO, ILLINOIS

WOULD BE GLAD TO CONFER MARCH 16 REGARDING MATTERS DISCUSSED YOUR

LETTER MARCH 7.

C. O. Mittendorf (for)

C. O. MITTENDORF, ADMINISTRATOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

COMittendorf/fw
3/9/55

cc: Mails& Files
Admr. Read. File
Mr.Ellis
Mr. Chambers
Mr. Mittendorf

R.C.B.

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SOLICITOR
WASHINGTON 25, D. C.

MAR - 9 1955.

Memorandum

To: The Administrator, DMEA
Attention: Mr. W. R. Griswold

From: Acting Assistant Solicitor, Defense Minerals

Subject: Docket No. DMEA-3522, Calumet & Hecla, Inc. (Copper)

By memorandum to the Acting Assistant Solicitor dated February 25, the Chief of the Base Metals Division has submitted to this office for reply a letter from the applicant in which it makes some inquiries about the contract which we had prepared and submitted to it and which it returned unsigned with its letter. The applicant does not indicate that it will not sign the contract in the form submitted, but rather that it wishes to make some inquiries concerning the proposed contract and possibly to change some of its provisions.

I am unable to reply to this letter because it requires a determination of some technologic matters that are outside of the province of this office; but I will indicate herewith my ideas on those matters and also state positively for your use suitable replies to the queries that are strictly legalistic.

I

The applicant states that all production, both exploration production and ultimate resulting production, will be milled, smelted, and refined at the applicant's plants at Hubbell, Michigan; and that in this process the production will lose its identity and be combined with production from other sources. In other words, the applicant states that the refined metal from the ore which is subject to the Government's royalty will not be identifiable, and that therefore some device must be formulated for estimating the royalty on the ore rather than on the refined metal.

In this connection, the applicant states: "We believe the only feasible way to take care of this is by requiring daily estimates from the supervisory personnel at the exploration"; and I suppose intends that the same method would be employed with respect to ultimate production. Commenting on this, Mr. Griswold says: "Since, it is very much to the Applicant's own interest to obtain a close approximation of the value of the ore from the project, the Government will accept any method which is a common and accepted practice of the district." I do not understand this statement because it seems to me, in the first place, that it would be to the applicant's interest to appraise the ore as low as possible; and in the second place, I doubt if there is any "common and accepted practice" which can be relied upon.

In view of the foregoing, and assuming that the applicant's statements are correct with respect to the impossibility of identifying the refined metal, I think the engineers will have to devise some method for inclusion in the contract, as a supplement, for determining just how the Government's royalty is to be computed.

II

The applicant states that a large part of its production of refined copper is used by it for fabrication at its Wolverine Tube Division. Under those circumstances, the Government's royalty ordinarily would be computed on the value of the refined metal, as provided in Article 8(d) of the contract form. This provision states that: "If any production is used by the Operator in integrated manufacturing or fabricating operations . . . the Government's royalty on such production shall be computed on the value thereof in the form in which and at the time when it is so used."

III

I do not understand the applicant's difficulty with the word "value" and the words "gross income from mining operations for percentage depletion purposes" as used in Article 8(d) of the contract form. It is clear that the definition of the word "value" applies to that word wherever it is used in the contract, and certainly wherever it

is used in Article 8(d) where the definition appears. The Government's royalty is to be computed upon this "value" and not on "gross income from mining operations for percentage depletion purposes" unless, as stated in the contract, the royalty would be greater if so computed.

IV

The applicant states that it will not under any circumstances give the notice required by Article 8(h) of the contract form to its customers for fabricated copper, and inquires if this article may be eliminated. Inasmuch as the contract does not deal with production beyond the stage of refined metal, it is clear that this applicant would not be required to give the notice to its customers for fabricated copper. There would be no point in eliminating the article as suggested by the applicant.

J. L. Hofflund
Acting Assistant Solicitor
Defense Minerals

File Copy
Surname

UNITED STATES
DEPARTMENT OF THE INTERIOR 500
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

February 25, 1955

Memorandum

To: Acting Assistant Solicitor, Defense Minerals

From: Chief, Base Metals Division

Subject: Docket No. DMEA-3522, Calumet & Hecla Corp., Caldonia Mine, Ontonagon County, Michigan, Copper.

We call your attention to the attached letter from the Applicant, with which it returned a contract unsigned.

Obviously, since this is a matter dealing with contract changes, we feel you should prepare the reply. However, our attitude regarding some of the points brought up in the letter, is as follows.

2nd paragraph.

We realize that an operation often involves commingling of ores so that completely precise sampling of ore from an individual heading becomes a practical impossibility. At the same time there are various means by which a close approximation can be made. If this was not done there would be little point in either the Applicant or the Government utilizing funds for the project.

Since, it is very much to the Applicant's own interest to obtain a close approximation of the value of the ore from the project, the Government will accept any method which is a common and accepted practice of the district.

Paragraph 3 and top of page 2.

We would, of course, not expect anything as ridiculous as having Wolverine Tube ask its customers to pay Government royalty on fabricated copper products. Such contract provision is intended to apply to custom mills and smelters and possibly, in a few cases to purchasers of base bars, metal ingots, or chemical precipitates.

It would seem that the common sense method here would be for the Operator to pay royalty upon shipping point market value of the metal at the time when it was forwarded to a fabricating plant.

WRG/er
Copy to: Docket
Base Metals
Chron.

W. R. Griswold
W. R. Griswold

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 25, POST OFFICE BLDG.
KNOXVILLE 2, TENN.

February 23, 1955

Memorandum

To: Operating Committee, DMEA - Washington

From: Executive Officer, DMEA - Region V, Knoxville, Tenn.

Subject: DMEA-3522 (copper) Calumet & Hecla Corp., Caldonia Mine, Ontonagon County, Michigan

Transmitted are the original and five copies of the subject contract which were sent to the Operator for signature but returned unsigned along with his objections and recommended changes for consideration. His letter to this office is attached. As these changes are beyond the authority vested in the field team we are asking you to consider them and formulate a reply to the Operator.

Robert A. Laurence

Robert A. Laurence

CALUMET & HECLA, INC.
122 SOUTH MICHIGAN AVENUE
CHICAGO 3, ILLINOIS

A. E. PETERMANN
VICE PRESIDENT AND GENERAL COUNSEL

RECEIVED
FEB 23 1955
U. S. BUREAU OF MINES
DEF. MIN. ADM.
Knoxville, Tennessee

RECEIVED
FEB 23 1955
Knoxville, Tenn.

February 21, 1955

Mr. V. J. Lynch
Acting Executive Officer
DMEA Field Team, Region V
Room 13, Post Office Building
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522 (Copper)
Caledonia Mine
Ontonagon County, Michigan

Gentlemen:

We have the original and five copies of a contract for the above project. We have reviewed this contract and have certain comments, as follows:

This project involves exploration for an extension of an ore body from which we are now producing copper. During the period of the exploration, production from drifting is expected to contain copper. Because of the nature of the ore, accurate sampling is impossible. Because of the nature of the operation, it is likewise impossible to segregate the exploration ore to a point in the milling process where an accurate sample can be made. Some method of determining the grade of exploration ore must be developed. We believe the only feasible way to take care of this is by requiring daily estimates from the supervisory personnel at the exploration. Will this be satisfactory?

Ore from this exploration and from any production resulting from the exploration will be milled, smelted and refined by us at our plants at Hubbell, Michigan. In the process this production will lose its identity and be combined with our production from other sources. A large part of our production of refined copper is used by us for further fabrication at our Wolverine Tube Division. For convenience, we will account for this particular copper as though it were actually physically delivered to the Wolverine Tube Division.

It will be impossible for us to determine the ultimate purchaser of the physical copper produced from the exploration. We would not, under any circumstances, give the notice specified in paragraph 8 ~~9~~(h) to our customers for fabricated copper.

May paragraph 8 ~~9~~(h) be eliminated?

The definition of the word "value" is given in the last sentence of Article 8(d). Does that definition apply to the first sentence in that paragraph as well as the second sentence?

As we interpret the contract, if the copper is sold currently, the basis for royalty under paragraph 8(c) is the actual selling price of the copper. If the copper is not sold currently but is retained for a period of six months, royalty is payable on "gross income from mining operations for percentage depletion purposes". What is the significance of this different valuation?

In accordance with your instructions, we are returning unsigned all copies of the contract.

Yours very truly,

A. E. Petermann

AEP:hp
Enclosures

File Copy
Surname

Griswold
Talbot
Selfridge
Hedges
Kiilsgaard

500

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

FEB 1 0 1955

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 13
Post Office Building
Knoxville 2, Tennessee

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan

Dear Mr. Laurence:

Referring to Mr. A. B. Needham's letter of January 17, we are enclosing the original and five copies of a contract for the cited project. It closely follows the revised cost outline, with only a minor change in the depreciation allowance.

The Applicant had requested that the contract be made retroactive to January 1, but such an arrangement would be contrary to established procedure and the request must be denied.

If the contract meets with your approval kindly present it to the Applicant for approval and signature, and make distribution of the copies in the usual manner. If you should not be in accord with any of the contract provisions, and any proposed change should lie beyond the range of your delegated authority, all copies should be returned to this office with your recommendations.

Sincerely yours,

George C. Selfridge (JHB)

Chairman, Operating Committee

Enclosures 6

APPROVED:

J. H. Hedges (JHB)
Member, Bureau of Mines

Thor H. Kiilsgaard (JHB)
Member, Geological Survey

WRGriswold/bjl (2/7/55)

Copy to: Docket
Admr. R. File
Op. Committee
Base Metals
Mr. M. E. Volin
Mr. Kiilsgaard
Chron.

R.C.L.

EXPLORATION PROJECT CONTRACT
CALUMET & HECLA, INC.
DOCKET NO. DMEA-3522

EXHIBIT "A"

Description of the Work

The purpose of the project is to explore for copper ores. The work consists of diamond drilling and drifting on the Knowlton Lode, both on the level of the Caledonia No. 4 Adit, as follows:

Extend the Caledonia No. 4 Adit a distance of 2,080 feet. This drift shall be approximately 9 feet by 9 feet in cross section. The drift shall be timbered as necessary.

3,300 feet of diamond drilling shall be done to explore parallel lodes from locations within the Caledonia Adit. The drilling shall be done with AX size bits, unless conditions make it necessary to complete some of the holes with EX size bits.

The location, inclination, direction, and extent of all work are subject to the approval of the Government.

ESTIMATED COSTS OF THE PROJECT

Category (1) Independent Contracts ‡

3,300 feet of diamond drilling @ $5.00/ft. ~~This maximum unit cost includes the costs of supervision and assaying and all other costs whatsoever.~~ $ 16,500.00

Deed

The Operator may elect to do all or part of the diamond drilling ~~on the basis of the actual costs set forth in Article 6,~~ and in such event all schedules in Article 6 are waived, provided that the allowable actual costs may not exceed the maximum unit cost of $5.00 per foot.

The schedules of actual costs which follow below apply to drifting only. The Government will contribute to those allowable actual costs of drifting which do not exceed an average of $46.45 per foot, computed monthly. However,

‡ The costs of supervision, assaying, and all other costs whatsoever shall be borne by the Operator without contribution by the Gov't.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

FEB 3 1955.

Memorandum

To: The Administrator, DMEA
Through: W. R. Griswold

From: Acting Assistant Solicitor, Defense Minerals

Subject: Docket No. DMEA-3522, Calumet & Hecla, Inc. (Copper)

The subject contract has been drafted in this office and is approved for your signature if the following presents no obstacle:

In Annex I, where the land is described, it is stated that: "Any lode which is not a part of the Evergreen Series of lodes is excluded from the land described in this Annex I." The description of the work in Exhibit "A" recites that the work is to be done "on the Knowlton Lode." The "Evergreen Series of lodes" is not anywhere described nor indicated on the map which accompanies the contract. If this series of lodes is sufficiently identifiable merely by naming it, no doubt that is sufficient for the purposes of the contract, but that is a matter for the determination of engineers and geologists.

J. L. Hofflund
Acting Assistant Solicitor
Defense Minerals

Attachments

NOTE: The contract was rewritten to cover the above.
WRG

File Copy
Surname

UNITED STATES 500
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

January 28, 1955

Memorandum

To: Acting Assistant Soliciter, Defense Minerals

From: Chief, Base Metals Division

Subject: Docket No. DMEA-3522, Calumet & Hecla, Inc. — new contract for copper project

Will you kindly prepare a contract along the general lines of the attached rough draft.

W. R. Griswold

W. R. Griswold

WRGriswold/bjl

copy to: Docket
Base Metals
Chron.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

January 25, 1955

Memorandum

To: W. R. Griswold, DMEA

From: M. E. Volin, Bureau of Mines

Subject: Docket DMEA-3522 (Copper) Application for exploration project, Calumet and Hecla, Inc., Ontonagon County, Michigan

I have reviewed the subject application with respect to the proposed cost of drifting and the attached correspondence concerning revision of the originally proposed unit cost.

Taking into consideration the operating difficulties at this location and the unusually large size of exploratory drift to be driven, 9' x 9', it is my opinion that the revised cost of $46.94 per foot is in the upper range justifiable for this sort of project. Because of local weather and other physical conditions about which nothing can be done, costs in this mining district are unusually high and cannot be directly compared with those in other districts. I do not find anything in the correspondence from DMEA criticizing the oversize of the proposed drift and therefore consider that you think 9-foot by 9-foot cross section necessary. I would guess that the applicant's reasons for this size of drift as given in the application are tenable, and if these are accepted then reasons for the 6-foot length of round given by Mr. Pollock in his letter of January 5, 1955 also should be accepted.

In the revised cost estimate submitted by applicant, I can find little if any "fat". The necessity for supervisors on both shifts might be questioned for performing only the work of surveying, geologic mapping and record keeping, but if one of the shift bosses helps in the drilling or tramming operations then his place on the team cannot be criticized.

If applicant is firm in the necessity for two supervisors, it is recommended that the revised costs of $46.94 be accepted as reasonable for this project.

M. E. Volin

M. E. Volin

Attachment

Copy to - T. H. Killsgaard - 5227 Files
Division of Minerals
J. H. Hedges - Room - 3612
Branch of Base Metals
Miss Meyer

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
~~WASHINGTON 25, D. C.~~
Region V
2908 Colfax Avenue South
Minneapolis 8, Minnesota

DEPARTMENT
Defense Minerals
REC'D
JAN 19 1955

January 17, 1955

Memorandum

To: Operating Committee, Defense Minerals Exploration Administration, Washington, D. C.

From: Executive Officer, Field Team, Region V

Subject: Docket DMEA 3522, Calumet & Hecla, Inc., Caledonia Mine - Michigan

In addition to the copy of the subject application which is on file in this office, it is necessary that our field representative at Houghton, Michigan have available a copy of the application also.

It would be appreciated if you would forward to this office another copy of the application.

A. B. Needham

A. B. NEEDHAM

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
~~WASHINGTON 25, D. C.~~
Region V
2908 Colfax Avenue South
Minneapolis 8, Minnesota

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JAN 19 1955

January 17, 1955

Memorandum

To: Operating Committee, Defense Minerals Exploration Administration, Washington, D. C.

From: Executive Officer, Field Team, Region V

Subject: Docket DMEA 3522, Calumet & Hecla, Inc., Caledonia Mine - Michigan

Reference is made to your letter of December 20, 1954, in which you indicate the proposed cost for drifting pertinent to the subject application was considerably in excess of what you thought would be generally acceptable. The information contained in your letter was submitted to our Field Team who reconsidered their report and discussed further the proposed costs with the company. The revision which is attached, together with correspondence pertinent to the reconsideration of costs indicates that the costs can be lowered from $52.50 to $46.94.

If this is now acceptable, you undoubtedly can proceed with further consideration of the application. This office is in accord with the opinion of our Field Team as stated in the last paragraph of Mr. Schroeder's memorandum of January 11, that those are the estimated costs and further discussion with the company in the hopes of reducing those costs would be useless. It appears now that the decision to execute a contract is up to your office.

A. B. Needham
A. B. NEEDHAM

Attachments

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
c/o Michigan College of Mining & Tech.
Houghton, Michigan

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JAN 19 1955

January 11, 1955

Memorandum

To: A.B. Needham, Executive Officer, Field Team, Region V

From: Mine Exploration and Examination Engineer, Region V

Subject: Docket DMEA 3522, Calumet and Hecla, Ind., Caledonia Mine.

In response to the specific questions asked by the operating committee regarding the subject application, I have rechecked these items with company personnel.

The conclusion was that the costs as submitted originally are a good estimate of what will be incurred by the company in the process of driving the drift, excepting that it is agreed that only one locomotive is needed. Two tram cars are deemed essential, since it is more efficient to install a siding at convenient intervals and then haul out two cars in one trip. Because of the location, the four hour break between shifts, and the technical duties performed by supervisors (explained in more detail in the original field team report) it was not felt that the amount allotted for supervisors could be reduced.

The attached letter by J. Pollack, Chief Geologist, will explain the reasons for only using a six foot advance per round. Another factor in the 30 foot average week advance is that the beginning and end of the drift is through old stoped areas, mapping of which is questionable; past experience has shown that where these stopes are encountered, old fill and caving ground has caused a serious reduction in progress.

A revised cost estimate has been prepared, eliminating the insuranceand watchman not allowed by DMEA as well as the excess locomotive. This reduces the total cost to $46,94 per foot. Attached sheets shows the detailed breakdown of the component items and the method of arriving at these costs has been explained in the previous field team report.

It ~~should be~~ should be re-emphasized that these figures are based upon the assumption that no stoping will be carried on in conjunction with the proposed drifting to the Old Mass Mine. This is logical since, if ore was known to exist, the proposal

could hardly be classed as exploratory in nature. However, it is possible that some stoping ground will be encountered and, if so, the intent is to carry on stoping concurrently which will reduce overhead expenses. In the past, work at Caledonia the stoping ground accounted for about 80 percent of the total tonnage and the assigned cost for drifting was then $37.50 per foot. For this reason an actual cost contract would probably be advisable.

As a final comment, I agree completely with the criticism of the cost of exploration in this district. A part of it is due to physical conditions beyond control of anyone. It must also be admitted that management and labor here have been backward in adopting advances in the mining technology of recent years. There are a few healthy signs that this may change, but at present it appears estimated costs will need to be based upon current practices. Dwindling reserves, very largely of marginal gradeare factors that have been frequently cited as reasons underlying the reluctance to put out the capital outlay necessary to effect a changeover in mining equipment. The potential of the Caledonia area is unquestionably one of the brightest hopes on the horizon for the company's mining future in the district.

In my opinion further discussion in hopes of reducing the company's estimated costs is useless. It reduces to the fact that if DMEA wishes to participate in this exploratory work, the presently revised cost estimates will need to be accepted. Else the only other alternative appears to be a denial due to the excessive cost.

H. J. Schroeder

H. J. Schroeder

P. S. As noted in Pollack's letter, work has allready begun and if possible, the contract should be retroactive to that date.

Encl. - Letter by J. Pollack.
3 cost estimate sheets

CALUMET & HECLA, INC.
122 SOUTH MICHIGAN AVENUE
CHICAGO 3, ILLINOIS

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JAN 19 1955

Reply to
Box 231, Calumet, Michigan

January 5, 1955

Mr. Harold Schroeder
U. S. Bureau of Mines
Michigan College of Mines & Technology
Houghton, Michigan

Dear Mr. Schroeder:

Enclosed is a summary of the recomputed drifting cost at Caledonia with supporting detail.

In reply to the questions raised as to the round of only 6 feet in a 9' x 9' drift, I have consulted Mr. Campbell. The condition that the drift follow the hanging wall of the Knowlton lode is geologically imposed by the fact that in drifting ~~away from~~ along this contact, past openings have become lost and ended up many feet in the foot wall on the South Knowlton lode. As this contact is the top of an old lava flow, it is quite irregular and has many rolls, as you know from personal inspection. A short round is taken partially because a long round tends to break into the hanging wall where the lode turns abruptly, and as the hanging wall is slabby, this may necessitate timbering. Also because of the long tram, which will grow considerably longer, there is no great gain in a longer round as it cannot be completely mucked out in the next shift. The six-foot advance is an experience figure at Caledonia.

Work has commenced on this project January 1, and, as we have requested in the application, the contract should be made retroactive to January 1.

Very truly yours,

James Pollock

James Pollock
Chief Geologist

JPP:eln
Enc.

CALUMET DIVISION
Calumet & Hecla, Inc.

CALEDONIA ADIT - DRIFTING COSTS
Revised to Exclude Costs Not Allowed by DMEA

When drifting only with no production to absorb indirect costs.

Summary

Labor	$600.03
Fringe Benefits	99.18
Supplies	425.10
Maintenance	45.00
Power	50.00
Equipment Rentals	165.94
General and Administrative	23.20
	$1,408.45

Estimated Advance 30 Feet Per Week

Cost Per Foot of Advance $46.94

CALUMET DIVISION
Calumet & Hecla, Inc.

DEPARTMENT OF THE INTERIOR
Minerals Administration
RECEIVED
JAN 19 1955

Labor $600.03	
2 Miners @ 1.57 per hour plus Contract Earnings	
8 X 1.57 = $12.56 + $5.00 = $17.56/ man shift	175.60
2 Trammers @ 1.45 per hour plus Contract Earnings	
8 X 1.45 = $11.60 + $2.00 = $13.60 / man shift	136.00
2 Surface @ 1.39 per hour	
8 X 1.39 = $11.12/ man shift	111.20
2 Supervisors (One for each shift)	177.23
	$600.03
Fringe Benefits $99.18 per week	
Pay Roll Taxes 3.30%	
W/C Insurance 3.87%	
Vacation Pay 4.00%	
Holiday Pay 2.40% 13.57% of $600.03 =	81.42
Health & Accident Insurance	
9.64/man/month = $2.22/week x 8 men	17.76
	$99.18
Supplies $425.10 per week	
Average cost per foot - 3 months - $14.17	
30 X 14.17 =	$425.10
Maintenance $45.00 per week	
Surface	$45.00
Power $50.00	
Electricity	$50.00
Equipment Rentals $165.94 per week	
2 Tram Cars @ $16.67/month = 3.85 =	7.70
3 Drill Machines @ $16.67/month = 3.85 =	11.55
1 Eimco Loader @ $76.67/month =	17.69
1 U. G. Battery Locomotive @ 100.00/month=	23.00
1 Compressor (Per R.R.S.) $11,000.00 200.00/month =	46.00
1 Truck (G & O & Repairs) @ 60.00/week =	60.00
	$165.94
General and Administrative $23.20 per week	
Telephone and Telegraph	10.00
Accounting Service (2.2% of Labor)	13.20
	$23.20

Form MF-104 (Rev.)
(April 1952)

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Budget Bureau No. 42-R1036.3.
Approval expires 6-30-53.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JAN 19 1955

OPERATOR'S MONTHLY REPORT AND VOUCHER

Month of _____, 195____ Docket No. DMEA _____ Contract No. _____
Operator's Name _____ Minerals _____
Address _____
Contract Amount, $_____ Government Participation: _____% Amount, $_____

ITEMS OF COSTS	FOR OPERATOR'S USE			FOR GOVERNMENT USE ONLY		
	Monthly Per Week	Totals Previously Reported Per Foot	Totals To Date	Approved Monthly Total	Approved Totals Previously Reported	Approved Totals To Date
(1) Independent Short Form Contracts:						
Drilling						
Bulldozing						
Crosscutting						
Drifting						
(2) Labor and Supervision:		14.09				
Labor		5.91				
Supervision						
Technical Services						
(3) Operating Mat'ls. and Supplies:						
Timber		6.80				
Explosives		2.13				
Pipe		4.10				
Track		1.14				
Misc.						
Power (Electricity)		1.67				
(4) Operating Equipment:		5.52				
Rental						
Purchase						
Depreciation						
(5) Initial Rehabilitation and Repairs						
(6) New Bldgs., Improvements, etc.						
(7) Miscellaneous:		1.50				
Repairs to Equipment						
Sampling and Analysis		.66				
Payroll Taxes						
Liability Insurance		2.65				
Fringe Benefits						
Other		.77				
(8) Contingencies (specify):						
TOTALS		46.94				

I certify that the above bill is correct and just and that payment therefor has not been received.

Date _____ *Payee _____

Per _____ Title _____

*When a voucher is signed or receipted in the name of a company or corporation, the name of the person writing the company or corporate name, as well as the capacity in which he signs, must appear. For example: "John Doe Company, per John Smith, Secretary," or "Treasurer," as the case may be.

→ NOTE.—Title 18, U. S. Code (Crimes), section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

(Instructions on reverse)

Pursuant to authority vested in me, I certify that this account is correct and proper for payment in the amount of:

$_____

Signature _____
(Authorized Certifying Officer)

Date _____ Vou. No. _____
(See other side)

(For Government use only)

CERTIFICATION BY GOVERNMENT REPRESENTATIVE:

I certify that to the best of my knowledge and belief the contractor submitting this voucher is operating a Defense Minerals Exploration Administration project under Contract No. ..... in accordance with the terms of the contract.

Signature ..... Title ..... Date .....

APPROVAL BY DMEA EXECUTIVE OFFICER OR ALTERNATE:

Signature ..... Title ..... Date .....

MONTHLY REPORT OF OPERATOR

The Operator (Contractor) of an exploration project is required to make a monthly report to the Government through the Regional Executive Officer. This report consists of three parts as follows:

(*a*) *Form MF-104—Operator's Monthly Report and Voucher.*—This form details expenditures and constitutes a voucher for reimbursing the Operator for the Government's share of costs;

(*b*) *Form MF-104A—Operator's Unit Cost and Progress Report.*—This is a statistical report of expenditures which shows costs for the various types of operation; and

(*c*) *Narrative.*—A concise narrative description of progress made, results accomplished, and any unusual difficulties encountered must be furnished as an attachment to this Report and Voucher. Wherever possible, the narrative is to be illustrated with maps or sketches showing formations penetrated and location and assays of samples taken as well as advances in workings. In the case of diamond drilling or churn drilling, the location and inclination of holes is to be shown on a map; logs and assays also are to be submitted.

The Monthly Report of Operator should be prepared in an original and four copies all of which must be sent to the Executive Officer of the Region not later than the 15th of the month following.

Preparation of Form MF-104—Operator's Monthly Report and Voucher.—All the applicable spaces in Form MF-104 should be filled in by the Operator, and the Operator or his agent should sign the certification in the lower left corner of the form.

The items of costs are arranged in the order they appear in Article 6 (a) of Form MF-200 (Revised February 1952), however, this form is readily adaptable for use in reporting activities under other contract forms.

Under Item (1) delete words "Short Form" if the contract is a sub-contract under Form MF-200; and delete word "Independent" if the contract reported is on Form MF-200 (A). Also, report work paid for on a unit basis under contract Form MF-200 as though it were performed under an independent contract.

Under Item (2) include labor, supervision and technical services incurred for the exploratory operations. Do not include labor, supervision and technical services used for work performed under items (5) and (6).

Under Item (3) include the costs of material and supplies used in the project other than that used under items (5) and (6).

Under Item (4) appear the three types of operating equipment expenditures, that is, rental, purchase and depreciation. The expenditures made for renting equipment belonging to a third party will be reported under "Rental". The amount paid or duly obligated for payment for the purchase of equipment will be reported under "Purchase". The amount of expenditures due the Operator to reimburse him for depreciation of equipment owned will be reported under "Depreciation".

Item (5) comprises costs of labor, supervision, technical services, materials, etc., which are used in the initial rehabilitation and repair of existing buildings, installations, fixtures, and equipment. These costs, therefore, should not be reported under items (2) and (3).

Item (6) includes the labor, supervision, technical services, materials, etc., used in the installation or construction of new buildings, fixed improvements, etc., necessary for the project. These costs, therefore, should not be reported under items (2) and (3).

Item (7) covers miscellaneous types of expenditure such as payroll taxes, liability insurance, workmen's compensation insurance, repairs to equipment and sampling and analysis. Only that part of payroll taxes, liability insurance and workmen's compensation which are paid by the operator should be reported under item (7). The share paid by the employee as a payroll deduction is to be included under item (2) as labor costs.

Item (8) includes any unforeseen costs not included in the other seven categories.

The original of Form MF-104 when submitted for reimbursable expenses incurred under contract Form MF-200 must be supported by original documentation or by certified copies of purchase orders, payrolls or transcripts of payrolls, unless such documentation has been waived by the Regional Executive Officer. This certification may be stated thus, "Certified True Copy (or Transcript)", followed by appropriate signature. If the Executive Officer of the Region determines that a contract under Form MF-200 should have an "on-site" audit, that is, a Government auditor should make an audit of the Operator's books and records of account, the Operator need not support his monthly voucher with original or certified documents except in cases of equipment purchases whose individual costs exceed $50.00. In these cases the original or a certified copy of the purchase order or invoice should be attached to the Monthly Voucher. N. B.—Only the *original* of Form MF-104 is required to be documented. The four copies of Form MF-104 are not to be thus supported.

Form MF-104 submitted for reimbursement under fixed price contracts on Form MF-200 (A), however, are not required to be supported by documentation of any kind. The Operator will submit his claim under item (1) of Form MF-104 by deleting as stated above the word "Independent" and by showing the number of feet or other units immediately after the appropriate descriptive word, such as, drilling, bulldozing, crosscutting, drifting, etc., and giving the "Monthly Total" amount due. "Totals Previously Reported", and "Totals to Date" columns should also be filled in.

GPO 83-38476

UNITED STATES
DEPARTMENT OF THE INTERIOR 500
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

January 13, 1955

Memorandum for Files

From: Chief, Base Metals Division

Subject: Docket No. 3522, Calumet & Hecla, Inc., Caledonia Mine, Ontonagon County, Michigan, Copper.

I had a phone conversation today with Mr. Needham regarding the cited application. He advised me that revised cost figures for the proposed project work should reach us in a few days.

W R Griswold

W. R. Griswold

WRG/er

Copy to: Docket
Base Metals
Chron.

File Copy
Surname

500

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

DEC 20 1954

Mr. A. B. Needham
Executive Officer
DMEA Field Team, Region V
2908 Colfax Avenue South
Minneapolis 8, Minnesota

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan

Dear Mr. Needham:

This will acknowledge your letter of December 8, with enclosures, referring to the cited application. Before we could give it serious consideration, the proposed costs for drifting of $52.52 per foot would have to be revised downward sharply; perhaps the present costs of $37.00 per foot might be considered as acceptable. It would be quite out of the question for us to accept cost estimates which are so far out of line with projects of a generally similar nature.

Many features of the Applicant's cost outline are out of order; four men on surface to service four men underground is unheard of. Incidentally, we do not provide for watchmen on DMEA projects. Nor is insurance an allowable charge, other than workmen's compensation.

It is noted that on the mucking cycle, two men, using modern equipment, require a full shift to clean out a heading (some 40 tons). It is not clear why only two tram cars are used for a 2600-foot tram. Nor is it clear why two battery locomotives are needed to service one heading. The supervision outlined, for a supervisor on each shift to supervise two men (who are already being given incentive pay), is beyond comprehension. Nor can we understand why, in a 9 x 9 foot heading, it is only possible to break a six-foot round.

In any event, it is not within our province to attempt to tell an Applicant how it should conduct its operations, nor do we desire to be unduly officious, but if the Government is to share in the

R.C.G.

expense of an exploration project, it has every right to insist that the project costs be in line with generally accepted averages prevailing over an industry-wide and nation-wide base.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (JHB)

APPROVED:

/s/ Robert W. Geehan (JHB)

Member, Bureau of Mines

Thor H. Kiilsgaard (JHB)

Member, Geological Survey

WRGriswold/bjl (12/16/54)

Copy to: Docket
Admr. R. File
Op. Committee
Base Metals
Mr. C. H. Johsnon
Mr. Kiilsgaard
Chron.

P. S. Please submit a breakdown of costs as estimated by field examiner and required by existing instructions.

IN REPLY REFER TO:

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

DEC 26 1954

December 17, 1954

Re: DMEA-3522
Calumet & Hecla, Inc.
(Caledonia Mine)
Ontonagon Co., Mich.
$126,792 - Copper

Memorandum

To: W. R. Griswold, Defense Minerals Exploration Administration

From: E. L. Newcomb, U. S. Geological Survey

Subject: Recommendation for approval

The geologic merits of the proposed exploration drifting and drilling have been presented in the memorandum of November 17, 1954, by H. R. Cornwall and W. S. White to A. B. Needham.

This memorandum, which recommends approval of the proposed exploration work, has been incorporated in the Field Team report as the geology section.

The Field Team has recommended this application be approved, and we concur with their recommendation.

E. L. Newcomb

E. L. Newcomb

R.M.E.A.

Grunwald
Betz

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

~~WASHINGTON 25, D.C.~~
Region V
2908 Colfax Avenue South
Minneapolis 8, Minnesota

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
DEC 10 1954

ON-SITE Report

December 8, 1954

Memorandum

To: Operating Committee, Defense Minerals Exploration Administration, Washington, D. C.

From: Executive Officer, Field Team, Region V

Subject: Docket 3522 - Calumet & Hecla, Inc., Caledonia Mine - Michigan

Reference is made to the subject referral made on November 1, 1954.

Here are the original and two copies of separate reports from Mines and Survey, taking favorable action on the subject application.

One copy of the application and cited reports have been retained in this office.

A. B. NEEDHAM

Attachments

Reviewed by
DMEA OPERATING COMMITTEE
12-15-54
(date)

Defense Minerals Administration
RECEIVED
DEC 10 1954

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

DMEA DOCKET 3522 - Calumet & Hecla, Inc. - Caledonia Mine

Calumet, Michigan

Harold J. Schroeder, Mining Engineer
U. S. Bureau of Mines

Geology by H. R. Cornwall and W. S. White

U. S. Geological Survey

November 17, 1954

Reviewed by
DMEA OPERATING COMMITTEE
12-15-54
(date)

Conclusions and Recommendations

1. The exploration program is well planned, would be carried out by a competent operator, and gives every indication of proving the existence of a significant copper deposit.

2. Estimated cost of drifting is unusually high but remoteness, absence of production to defray overhead, and presence of mass copper will all contribute to make this a cost that will be incurred and therefore it is recommended the submitted cost be accepted.

3. Boundary area for the contract be moved 600 feet to the northeast as recommended by the U. S. Geological Survey.

4. If possible, write the contract prior to December 31, 1954, to coordinate the work with termination of present stoping operations.

Introduction

An application for a DMEA loan to conduct exploration for copper ore on the Caledonia Mine property, Houghton County, Michigan, was submitted by Calumet and Hecla, Inc. on October 5, 1954. The present report is in response to the subsequent request for a review and field examination. An inspection was made of the mine workings and surface facilities at the Caledonia property on November 22, 1954 by H. J. Schroeder, U. S. Bureau of Mines, accompanied by T. M. Broderick, Calumet and Hecla Consulting Geologist, J. Laizzio, Assistant Mine Manager, and E. Miller, Mine Captain. Desired information, access to pertinent maps and available cost data were freely supplied by the company personnel.

Review of the application shows that in general the proposal is clearly and accurately stated. Therefore, the scope of this report will be limited to discussing the specific deficiencies noted in the Washington office reviews or where additional data are felt to be of significance in the preparation of a contract.

Previous Mining, Milling and Exploratory Work

The map submitted with the application shows the workings on the Knowlton lode. The shafts for mining the Caledonia, Knowlton and Old Mass mines were on the Knowlton lode. In the Mass Consolidated area, shaft "C" was on the Butler lode while "A" and "B" were on the Evergreen lode. Shaft "D" was also on the Butler, but was only 254' in depth and had neither drifts nor production stopes from it.

The Butler lode was very largely mined out down to 900-foot depth (inclined distance) from "A" shaft to 1,300 feet west of "C" shaft. Several drifts continued west another 400 feet to about the vicinity of "D" shaft but several hundred feet below the shaft bottom. Likewise, the Evergreen lode was considerably stoped out between "A" and "C" shafts and about 300 feet west of "C" on the 5th and 7th levels.

Mining on the Knowlton lode from "C" shaft was by means of 400' crosscuts and from "A" and "B" shafts by 800' crosscuts. The increased haulage and ventilation problems as distances from the shafts increased may have been a large factor in the relatively small stoping on this lode by the Mass Consolidated Mining Company. Specifically, it could be the answer to the absence of stopes along the 3rd level drift. The only information as to grade of this drift is a clipping from the Daily Mining Gazette of September 12, 1905, as follows: "..... 3rd level 'C' shaft Knowlton was driven 1280' with a fair amount of copper distributed throughout, but has been idle for some time ....." It is further assumed by Calumet & Hecla geologists that the length of the drift indicates the ground must have been encouraging.

Old records of the Mass Mines seldom differentiate between the production from the various lodes so that the grade is an average of all

three lodes. Because the Knowlton lode produced such a small percentage of the total, its grade could deviate considerably from the average; however, reference to Figure 1 of this report will give a good indication of the production and grade of the Mass Consolidated Mines. In evaluating the data it is well to keep in mind the fact that milling facilities were very inadequate and the emphasis was upon the mass copper and "barrel work" not requiring milling. Adding the mass copper and the estimated tailings loss to that recovered by the stamp mill, it appears that 25 pounds per ton is the average grade of the ore that was hoisted.

The drill holes shown on the application map were drilled by Calumet & Hecla in the 1937-39 period. Of those holes north of the Flint Steel River, 60, 62, 63, 65, 67, 68 and 71 were drilled through the Evergreen lode. Holes 69, 70, 72, 73, 74 and 77 were drilled through the Ogima lode, while hole 76 was drilled only through the Knowlton. Caledonia No. 4 adit was also begun during this period, but work was terminated before completing sampling of the Caledonia-Knowlton mines.

Present Exploratory Work

Continuation of driving the Caledonia No. 4 adit to the Old Mass Mine workings is in progress. Along the length of this adit the portions of the lode up dip that had not been previously stoped are being mined to provide large scale mill samples.

The 9 x 9' drift is advanced so that normally the upper left-hand corner is at the hanging wall contact of the lode and unless the lode thins or thickens appreciably the lower right-hand corner is at the footwall contact. Thus, the drift is a representative sample of the lode. Visual grade estimates of the face at the end of each round is made and all rock estimated to be in excess of 9 pounds of copper per

Fig 1 MISCELLANEOUS DATA, M[illegible] CONSOLIDATED MINING Co.

Total Production 1853-1919 = 60,114,699 lb Refined Cu

Average Recovery per ton Milled { 1902-1919 = 14.53 lb; 1916-1919 = 16.42 lb.

Average Copper content of tailings (M.C.M.T Est, 5.00 lb.

Mass Copper about 26% of total Production.

Average discard Underground = 50% of Rock Broken.

Some production continously, 1853-1919, (Shutdown).

Dividends Paid — { 1916 = $194,634; 1917 = $291,951. } Total = $486,585.

Silver sold = $16,935.77 (1899 to close.)

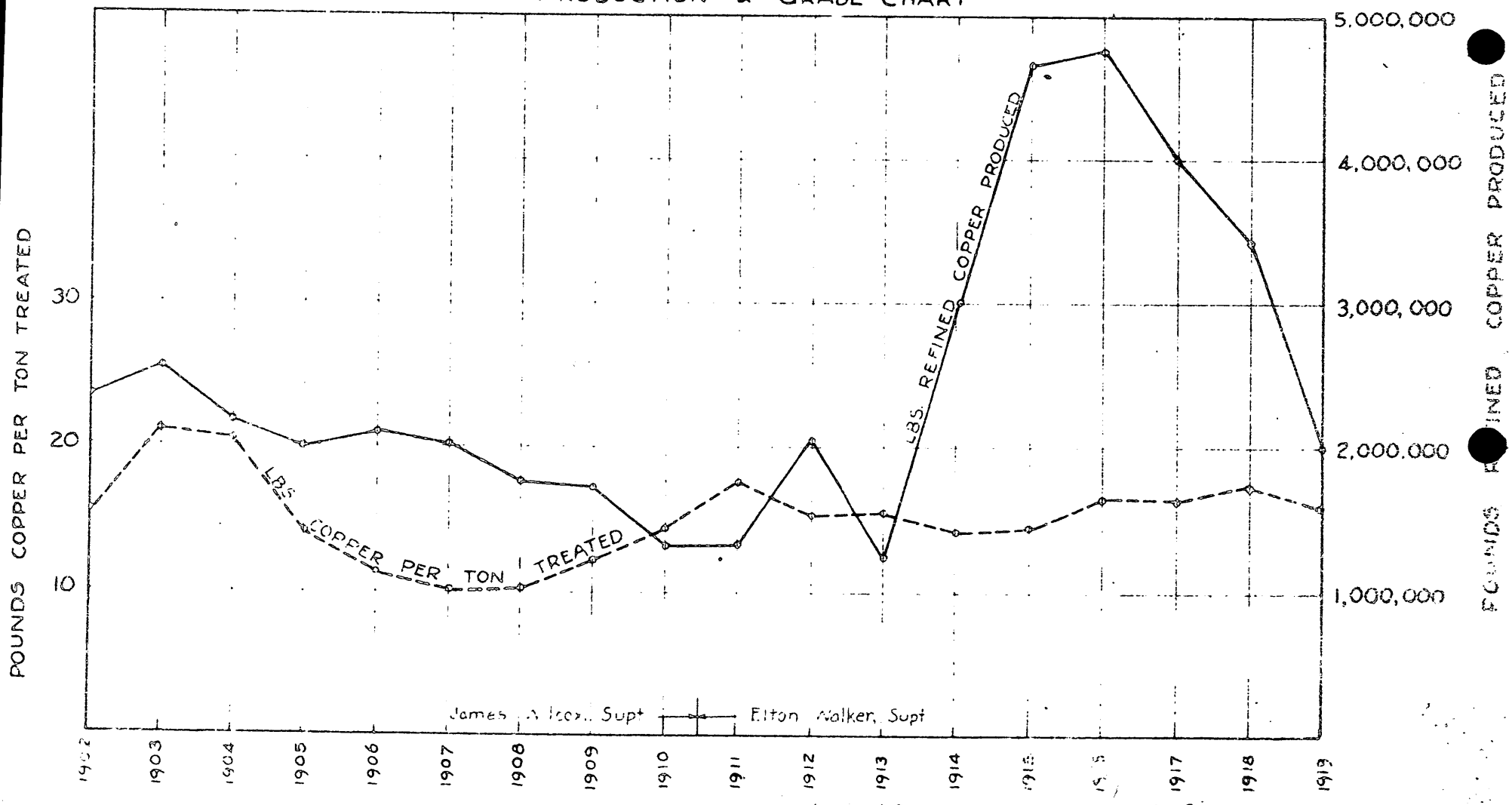
Average Stope width = 12 feet (U.S.G.S.)

Average discard at Surface = 17% of Rock Hoisted.

Developed for about 5,000 feet by 3 shafts 1600 feet deep, sunk on an incline of 43°.

Proportion - stamp rock from various Lodes (1914-1919 incl.) - Butler 71.3%, Evergreen 23.2%, Ogima 3.1%, Knowlton 2.2%, Others .2%.

PRODUCTION & GRADE CHART



Geological Department, Cal. & Hecla Cons. Copper Co. Jan. 6, 1936

ton is shipped to the mill at Lake Linden. That below the cutoff grade goes to the poor rock dump just outside the adit. Mill run rock is loaded into railroad cars at the Lake Mine siding 6 miles away until 8 50-ton cars are loaded and then they are hauled to the mill at Lake Linden. Thus, 400-ton mill batches, which is approximately equal to 60 feet of drift, can be used to check the visual estimates. To date about 75 percent has been shipped.

Drilling is done by means of drifters mounted on air-legs and use carbide tipped drill rod. A 40-hole drill round including a 9-hole burn cut is used. The center holes are drilled 7-1/2 feet and the remaining ones for a 6-foot advance. Blasting is by fuse and cap. Two miners drill, load and blast the round in one shift. Mucking out the blast with an Eimco loader and battery locomotive is done by a two-man crew on a second shift with a four-hour interval between shifts. Thus, the normal advance is 30 feet per week.

Surface facilities include a trestle to deliver the rock to a crusher and ore storage bin with a chute arrangement for bypassing the poor rock to a truck for the waste disposal. The change house also houses the air compressor, battery charging station and miscellaneous equipment.

Proposed Exploratory Work

The present program of stoping all accessible ground above the existing drift and reaching "C" shaft in the Old Mass Mine is expected to be completed before December 31. Thereafter, all work would be expended on the proposed drift to the Mass Consolidated Mine. Presence of mass copper which hampers drilling speed and length of tramming distance makes any improvement over the 30-foot weekly advance unlikely. This

rate is comparable to that in development drifts at several of the producing mines under more favorable conditions.

The diamond drilling would be done by company operated machines using AX bits, although conditions may make it necessary to complete some of the holes in EX size. Holes are planned as horizontal and would explore the area west of the stoped ground in the Butler as well as the intervening lodes.

The question of area to be included in the contract was discussed with J. Pollack, Chief Geologist, who finally agreed that the company would not object to moving the boundary of the proposed contract area 600 feet to the northeast as suggested by R. D. Trace, of the U. S. Geological Survey. It is interesting to note that the unstoped area of the Knowlton lode within this area would be approximately 4,500,000 square feet and if a stoping width of 12 feet is assumed, there would be the same number of tons. Further, assuming a 20 pound per ton copper recovery and present market prices, mining 210,000 square feet of the lode would repay the loan. The exploration will also give access to and obligate for repayment to the Evergreen, Butler, Ogima and other lodes in the series, therefore if the program is successful and mining follows, there is no question that ample ground is included to guarantee repayment.

Cost of the Work

Although the cost per foot of advance seems unusually high, after examination of past cost records and consideration of all the factors, it is concluded that the application costs reflect accurately the true cost to the company and it would be difficult to reduce this figure by any significant amount. Also, none of the cost of transporting the ore from the mine to the mill has been included and inasmuch as this serves

to give the grade of the deposit as well as representing production, a portion of this cost could probably have been included as exploration. Present assigned costs to advancing the drift is $37 per foot. However, the production from the stoping ground absorbs a large part of the overhead costs which will be borne entirely by the drift in the very near future.

Explanation of the various items of cost that have been questioned follows:

Labor and Supervision

The major question here was the reason four surfacemen were required. Part of the answer lies in the fact that the operation is on a two-shift, five-day week and watchmen are required for the off shift and weekend which accounts for two men. Remoteness also requires extra manpower to obtain supplies, snow removal and road maintenance. Other surface duties include crusher operation, waste rock disposal, cutting timber, compressor operation, lamp charging, battery charging, pump maintenance and change house duties. Supervision is also high because of remoteness which does not make it feasible to use supervisory personnel from Calumet. Technical duties such as estimating grade of ore, mapping and surveying are included under supervision.

Operating Materials and Supplies

This is based largely upon a three-month average of actual supplies consumed.

Equipment Rentals

The tram cars, drill machines, Eimco loader, and battery locomotive rentals are identical to the charges approved for the operating contract Idm E-98. The original cost of the compressor was $11,000

and the rental charge includes cost of operation of approximately $90 per month, therefore time rental is $110 or 1 percent per month. The truck operating costs were variable from month to month, but on the average the $60 would represent actual operating cost with very little or nothing for rental.

Fringe Benefits and Other

These items are similar to those contained in contract Idm E-98, whose charges have apparently been approved by a DMEA auditor.

IN REPLY REFER TO:

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

November 17, 1954

Memorandum

To: Mr. A. B. Needham, Executive Officer
DMEA Field Team, Region V
2908 Colfax Avenue South
Minneapolis 8, Minnesota

From: H. R. Cornwall and W. S. White
U. S. Geological Survey

Subject: Review of the geologic aspects of application DMEA-3522 (copper)

In this application, Calumet and Hecla, Inc., propose to extend their exploration for native copper in the Caledonia mine near Greenland, Ontonogan County, Michigan. The U. S. Geological Survey members of this DMEA Field Team, Cornwall and White, have just completed an 11-year study of the Michigan copper district, and we have examined the active workings of the Caledonia mine several times in the past two years (1952-1954). It is our opinion that the geology of the deposit is accurately described in the DMEA application by the Calumet and Hecla geologist, James Pollock, and by included photostats from U. S. Geological Survey Prof. Paper 144 (Butler, Burbank, et al., 1929). The following statement may help to further clarify the geologic setting of the Caledonia mine.

The Keweenawan lava flows with massive interiors, and amygdaloidal, fragmental tops dip 43 degrees to the northwest in the Caledonia mine. The Knowlton lode, which the company proposes to explore by drifting, is the uppermost of several fragmental, amygdaloidal flow tops that have been mined for copper in the Caledonia mine area. If, as proposed, six diamond drill holes are drilled from the proposed extension of the Caledonia adit to the underlying Butler lode, approximately 4 other amygdaloids, each potentially copper-bearing, will be intersected. Maps and sections of the proposed exploration area in USGS Prof. Paper 144 (Pls. 13 and 45) indicate that the northeast half of the area, adjacent to C shaft of the Mass mine, is underlain by mined-out workings on the Butler lode to a depth of over 700 feet. The three northeastern holes will consequently have to be inclined steeply northwestward, or in the direction of dip of the flows, to avoid penetrating old workings in the Butler lode.

The amygdaloidal flow tops in the area of proposed exploration are probably predominantly fragmental, which is the type most favorable for the occurrence of copper, and their average thickness may be between 10 and 15 feet. Copper mineralization is most common near the bottoms and tops of the amygdaloids, particularly the former, but locally the entire amygdaloid contains copper. The copper is commonly irregularly distributed in small to large discrete masses. Uniform fine-grained disseminations of copper are unusual and localized, even in amygdaloid that may be classed as rich ore. Because of these peculiarities of distribution of native copper in amygdaloids, it is desirable to expose as much as possible of the amygdaloid with exploratory drifts; it is particularly important to expose the base of the amygdaloid because copper is usually most abundant there. In diamond drilling, individual blank holes are not significant. Experience has shown that if a number of holes are drilled in an area of rich ore, only part of the holes will encounter commercial copper mineralization.

In conclusion, the present writers believe that the exploration proposed by Calumet and Hecla, Inc., in the Caledonia mine is sound and desirable. If the Knowlton lode is found to be ore-bearing in the proposed 2100-foot extension of the Caledonia adit, the company will have developed an ore body with a strike length of 1 mile, and exploration of the deposit at depth will be clearly justified. The profitable mines of the Michigan copper district have lateral extents of this order or greater. We also approve the proposed drilling of 6 diamond drill holes to explore the amygdaloids below the Knowlton lode down to the Butler lode. The available information indicates that here, as in the Quincy mine at Hancock, Michigan, 2 or more overlapping amygdaloids in the same area may contain commercial copper ore. Any holes drilled from the Caledonia adit level within 1300 feet southwest of C shaft of the Mass mine, may have to be directed steeply northward to avoid old workings in the Butler lode.

We have not considered the cost or other operating aspects of the proposed exploration in this review, as it is our understanding that Bureau of Mines representatives on the Field Team will investigate these matters.

H R Cornwall

H. R. Cornwall

W. S. White

File Copy
Surname

Griswold
Selfridge
Johnson

UNITED STATES
DEPARTMENT OF THE INTERIOR 500
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

NOV 1954

Mr. A. B. Needham, Executive Officer
DMEA Field Team, Region V
2908 Calfax Avenue, South
Minneapolis 8, Minnesota

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan

Dear Mr. Needham:

The cited application is referred to you for review and recommendation and for such field examination as you may consider necessary or advisable. We are enclosing copies of a memorandum dated October 19, by Mr. O. M. Bishop, USBM, and the preliminary memorandum of the USGS, dated October 22, by Mr. R. D. Trace. It is our understanding that the full USGS memorandum will be forwarded directly to you.

We call your attention to the notations in both memorandums to the effect that the proposed costs seem to be out of line. Such is likewise our impression, and the suggested weekly advance of only 30 feet is absurd. Furthermore, all costs require much better substantiation and a much more detailed breakdown. Incidentally, we note no provision is made for sampling and assaying, as visual examination may not always be sufficient.

Any provision for rental allowance on equipment would have to be accompanied by a statement of value and time period used as a depreciation base.

What is the size of the proposed drift? Would the diamond drilling be done by a contractor or by the applicant, and what size bit will be used?

We also call your attention to Mr. Trace's notation that the northern boundary of the property subject to royalty should be extended farther. It is never our policy to authorize project work which goes very close to the borders of the land subject to certification.

Sincerely yours,

George C. Selfridge
Chairman, Operating Committee (JHB)

Enclosures 2

APPROVED:

J. H. Hedges (JHB)
Member, Bureau of Mines

Thor H. Kiilsgaard (JHB)
Member, Geological Survey

WRGriswold/er 10/27/54

Copy to: Docket
Op. Comm.
Admr. R. File
Base Metals
Mr. C. H. Johnson, USBM
Mr. Kiilsgaard, USGS
Chron.

File Copy
Surname

Insured
Kiilsgaard
Hodges
Helfrdge
F.S. Johnson

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

NOV 1 - 1954

Calumet & Hecla, Incorporated
122 South Michigan Avenue
Chicago 3, Illinois

Re: Docket No. DMEA-3522 (Copper)
Calumet & Hecla, Inc.
Caledonia Mine
Ontonagon County, Michigan

Gentlemen:

Your application for Government assistance to explore your property has been reviewed by the Base Metals Division of the Defense Minerals Exploration Administration, and has been referred for a field examination to:

Mr. A. B. Needham
Executive Officer
DMEA Field Team, Region V
2908 Celfax Avenue South
Minneapolis 8, Minnesota

The Regional Office will contact you at an early date as to when the examination is to be made. Any assistance that you may give the members of the Field Team during the examination will be appreciated.

Sincerely yours,

C. O. Mittendorf (for)

Administrator

WRGriswold/er 10/27/54

Copy to: Docket
Admr R. File
Op. Committee
Base Metals
Region V (2)
Mr. C. H. Hohnson, USBM
Mr. Kiilsgaard, USGS
Chron.

R.C.S.

IN REPLY REFER TO:

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

Defense Minerals Administration
RECEIVED
OCT 25 1954

October 22, 1954

Memorandum

REVIEW OF APPLICATION DMEA-3522 (Copper)

To: W. R. Griswold, Defense Minerals Exploration Administration
From: R. D. Trace, U. S. Geological Survey
Applicant's name and address: Calumet & Hecla, Inc., 122 South Michigan Avenue, Chicago, Illinois
Name of property: Caledonia mine
Location of property: Ontonagon County, Michigan
Summary of applicant's proposal:
1) Extend Caledonia adit 2,100 feet.
2) Diamond drill 6 holes, totalling 3,300 feet.
Sources of information on applicant's property:
U. S. G. S. Prof. Paper 144

Walter White and Henry Cornwall, Survey geologists, were recently transferred to Washington from the Survey's Michigan copper project. Both men are familiar with the proposed project area.

Comments:

According to White and Cornwall, the proposed project, in general, is sound and warranted. It is recommended that a Field Team examination be requested.

Inasmuch as White and Cornwall returned from the Michigan copper country late in the summer of 54, and as they are very familiar with the Caledonia mine, Mr. Kiilsgaard has asked them to write the Survey's portion of the Field Team report. This report will be submitted to the Executive Officer of Region V to be included with the Bureau of Mines part of the field report.

The cost figure for drifting of $52 per foot seems high, in view of the fact that C. & H. cost figures on existing DMEA work range from $28 to $32 per foot. As the area around the Mass Consolidated mine will benefit from the proposed exploration, we suggest moving the north end line of the area subject to royalty payment 600 feet northeast.

RECOMMENDATION: Refer to Field Team for the Bureau of Mines part of the Field Team report.

R. D. Trace

R. D. Trace

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

Defense Minerals Administrator
RECEIVED
OCT 19 1954

October 19, 1954

Memorandum

To: W. R. Griswold, DMEA

From: O. M. Bishop (for C. H. Johnson), Bureau of Mines

Subject: DMEA-3522 (Copper) Application for $126,792 for exploration project, Calumet and Hecla Incorporated, Ontonagon County, Michigan

I have reviewed the subject application in which Calumet and Hecla proposes to extend the Caledonia adit from the present face in the Old Mass workings northeasterly some 2,100 feet to connect with the No. 4 level of the "C" shaft workings of the Mass Consolidated Company. The drift will explore the Knowlton lode. After completion of the drift, diamond drill holes will be drilled to a depth of 550 feet at 350-foot intervals to test other lodes of the Evergreen series down through the Butler lode. In all, the company plans 2,100 feet of drift at $52.52 per foot and 3,300 feet of diamond drilling at $5.00 for a total project cost of $126,792.

The applicant presents the reasonable thesis that under unified ownership the joint Caledonia-Knowlton-Old Mass, and Mass Consolidated may be developed into a commercial enterprise, and notes that the 102,000 tons of ore mined on a test basis between January 1952 and August 20, 1954 yielded 26.08 pounds of copper per ton or somewhat more than the average for amygdaloid mines.

I recommend that this application be referred to the field and that other evidence such as the grade of ore mined in the past at the Old Mass, and Mass Consolidated be determined, also if possible, the grade of ore in the drift faces adjacent to the 2,100-foot block to be explored. It is noted that drill holes 63 and 77 were not encouraging, and the very lack of stopes along the southeast extent of No. 2, 3, and 8 levels from the "C" shaft suggests the area to have been non-commercial.

The cost details in drifting seem unduly high. I think some examination of the proposed drilling-mucking cycle would be worthwhile to determine planned output per man, why four surface men are needed to keep a four-man crew underground, and why a supervisor is required full time for one heading.

O. M. Bishop.

O. M. Bishop for
C. H. Johnson

Copy to - T. H. Kiilsgaard, Room 5227
Minerals Division
C. H. Johnson
Files

October 10, 1954

Calumet & Hecla, Incorporated
122 South Michigan Avenue
Chicago 3, Illinois

Gentlemen:

This will acknowledge receipt of your application dated October 5, 1954, for exploration assistance under the Defense Production Act of 1950, as amended, delivered in person by Mr. A. E. Petermann.

Your application has been assigned Docket Number 3522 and referred to the Base Metals Division.

Kindly identify all future correspondence relating to your application by this docket number.

Sincerely yours,

ROBERT E. ADAMS

Robert E. Adams, Chief
Operations Control and
Statistics Division

REAdams/la/10-6-54

Copy to: Adm. R. File
Mails & Files

10/6/54

Mr. Griswold -

DMEA -
Calumet and Hecla
Caldonia Adit

Bill:

Subject application delivered in person by Mr. Peterman and Mr. Lynch. They advised that drifting cost is based on actual cost of past work. Drilling cost of $5.00 per foot for long horizontal DD holes is extremely abl. If contract made they want option of subcontracting DD or doing it on company account.

Frank E. Johnson

DEFENSE MINERALS ADMINISTRATION
~~WASHINGTON 25, D.C.~~

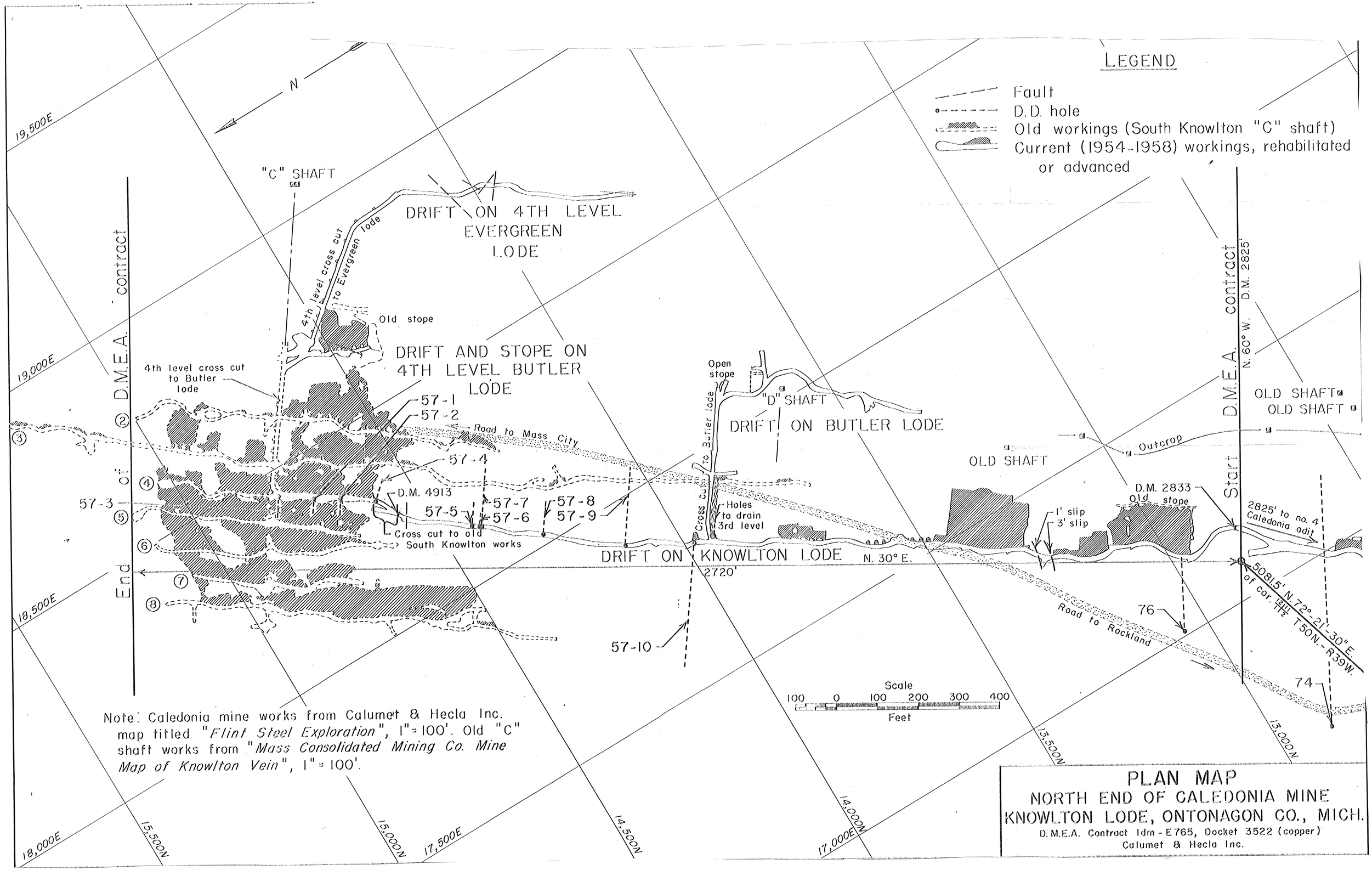
OFFICIAL BUSINESS

Region V
2908 Colfax Avenue South
Minneapolis 8, Minnesota

MINNEAPOLIS AUG 27 7 PM 1954 MINN.

Operating Committee
Defense Minerals Exploration Administration
Interior Building
Washington 25, D. C.

FIRST CLASS MAIL

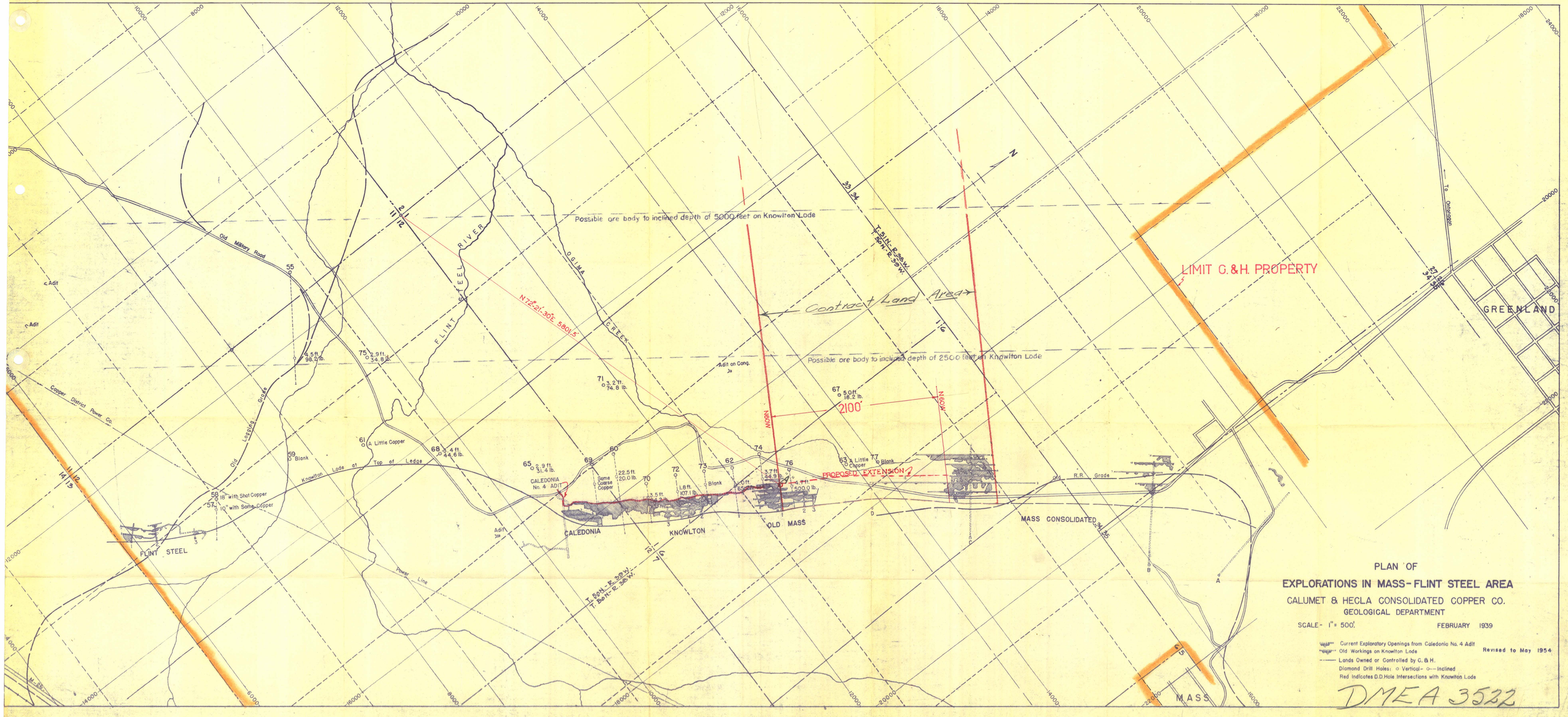


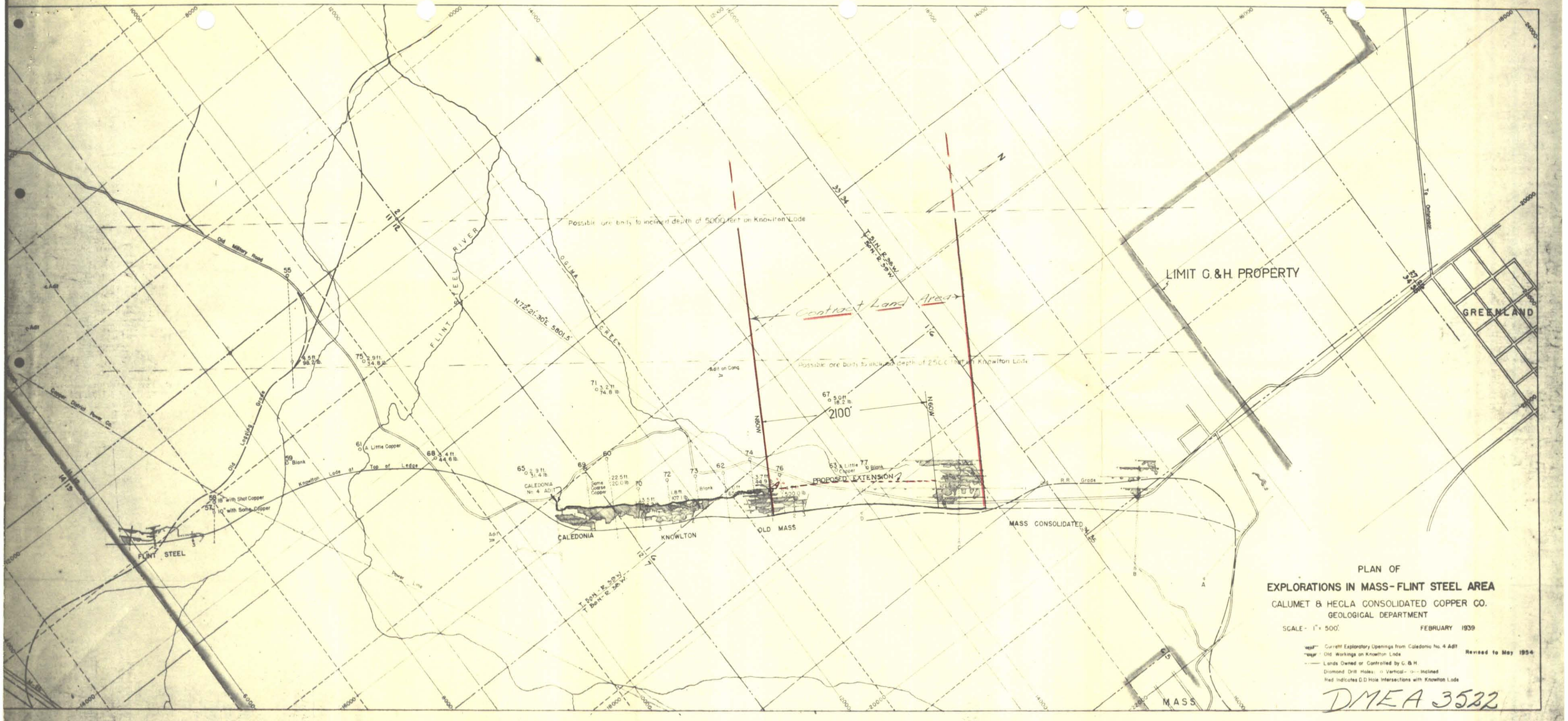
Note: Caledonia mine works from Calumet & Hecla Inc. map titled "*Flint Steel Exploration*", 1" = 100'. Old "C" shaft works from "*Mass Consolidated Mining Co. Mine Map of Knowlton Vein*", 1" = 100'.

PLAN MAP
NORTH END OF CALEDONIA MINE
KNOWLTON LODE, ONTONAGON CO., MICH.

D.M.E.A. Contract Idm - E765, Docket 3522 (copper)
Calumet & Hecla Inc.

Evergreen Series Of Lodes On Adit Level
Boundaries Of D.M.E.A. Contract - On Evergreen Series Of Lodes
N. 30° E. 27.20'
End Of D.M.E.A. Contract N. 60° W.
Start Of D.M.E.A. Contract Line N. 60° W.
Drainage Diamond Drill Holes
Knowlton Lode
Knowlton No. 1
Knowlton No. 2
Knowlton No. 3
Knowlton Tod No. 1
Knowlton Tod No. 2
Calumet & Hecla Adit
Legend
D.M.E.A. Drifting
D.M.E.A. Test Stoping - Royalty Paid
Calumet & Hecla Drifting Beyond D.M.E.A. Contract
D.M.E.A. Drill Holes
D.D. Hole #20
D.D. Hole #26
D.D. Hole #74
D.D. Hole #22
D.D. Hole #73
D.D. Hole #72
D.D. Hole #70
D.D. Hole #69
D.D. Hole #60
D.D. Hole #71
Calumet & Hecla, Inc.
Flint Steel Exploration
Scale 1" = 100'


PLAN OF
EXPLORATIONS IN MASS-FLINT STEEL AREA
CALUMET & HECLA CONSOLIDATED COPPER CO.
GEOLOGICAL DEPARTMENT
SCALE- 1" = 500'.
FEBRUARY 1939
Current Exploratory Openings from Caledonia No. 4 Adit
Old Workings on Knowlton Lode
Lands Owned or Controlled by C. & H.
Diamond Drill Holes: o Vertical- o— Inclined
Red Indicates D.D. Hole Intersections with Knowlton Lode
Revised to May 1954
LIMIT C.&H. PROPERTY
Contract Land Area
Possible ore body to inclined depth of 5000 feet on Knowlton Lode
Possible ore body to inclined depth of 2500 feet on Knowlton Lode
N72°21'30"E 5801.5
PROPOSED EXTENSION
2100'
N60W
FLINT STEEL RIVER
OGIMA CREEK
Old Military Road
Old Logging Grade
Copper District Power Co.
Knowlton Lode at Top of Ledge
Power Line
Old R.R. Grade
To Ontonagon
GREENLAND
FLINT STEEL
CALEDONIA
KNOWLTON
OLD MASS
MASS CONSOLIDATED
MASS
CALEDONIA No. 4 ADIT
Adit on Conq.
Adit
T. 51N.-R. 39W.
T. 50N.-R. 39W.
T. 50N.-R. 38W.
DMEA 3522


PLAN OF
EXPLORATIONS IN MASS-FLINT STEEL AREA
CALUMET & HECLA CONSOLIDATED COPPER CO.
GEOLOGICAL DEPARTMENT
SCALE - 1" = 500'
FEBRUARY 1939
Revised to May 1954
Current Exploratory Openings from Caledonia No. 4 Adit
Old Workings on Knowlton Lode
Lands Owned or Controlled by C. & H.
Diamond Drill Holes: Vertical - Inclined
Red Indicates D.D. Hole Intersections with Knowlton Lode
LIMIT C.&H. PROPERTY
GREENLAND
FLINT STEEL
CALEDONIA
KNOWLTON
OLD MASS
MASS CONSOLIDATED
MASS
FLINT STEEL RIVER
OGIMA CREEK
Old Military Road
Old Logging Grade
Copper District Power Co.
Knowlton Lode at Top of Ledge
CALEDONIA No. 4 ADIT
PROPOSED EXTENSION
Contract Land Area
Possible ore bodies to inclined depth of 5000 feet on Knowlton Lode
Possible ore bodies to inclined depth of 2500 feet on Knowlton Lode
N 78°21'30" E 5801.5
2100'
N60W
Old R.R. Grade
To Ontonagon
DMEA 3522