DMEA Form 9

UNITED STATES
DEPARTMENT OF THE INTERIOR
Defense Minerals Exploration Administration

OFFICIAL DOCKET FILE

DMEA NO. 4728

Application (Denied
(Withdrawn ✓
(After disposition, delete items not applicable)

Contract (Terminated - not Certified
(Cancelled
(Terminated - Certified
(Royalty Agreement

This is the official contract file containing all official records of the project. The records contained in the files are checked and are arranged in this order:

Left Side

Interim Royalty Audits
Reports of Royalty Review
Certification of Discovery
Certificate of Audit (Final)
Interim Audit(s)
Report of Review
Termination Notice or Agreement
Recision Notice
Assignment of Contract
Contract Amendments (latest on top)
Contract with all exhibits and annexes
Owner's Consent to Lien
Subordination Agreement
Leases and assignments of leases
✓ Application and attachments
(3) Envelope for maps

Right Side

Project summary
Work completed analysis
All other material is filed in chronological order with correspondence including the following reports as checked:

Final Field Team Report (Tab)
Operator's Final Report
(2R) Interim Reports
(2R) Operator's monthly reports and all attachments (latest on top)
On-site Exam Report(s) (Tab)
(4) Settlement Sheets

When the volume of records is expected to warrant additional folders, or when convenience of reference warrants separate folders for certain records, they should be set up in this order:

Left Side

Folder No. 2: (In chron. order)
Interim Summary Reports by W. O. Engineers

Right Side

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

Folder No. 3: Maps (Use pocket folder or envelope. Fold maps with title block out and show reference to related document or correspondence.)

Folder No. 4: Settlement Sheets

Folder No. 5: Drill Logs

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

OFFICIAL FILE COPY
DMEA
RECEIVED APR 15 1957

DATE	INITIALS	CODE

P. O. Box 2688
Juneau, Alaska

April 12, 1957

Memorandum

To: Operating Committee, Defense Minerals Exploration Admin., Department of the Interior, Washington 25, D.C.

From: Executive Officer, Alaska District, Region I.

Subject: Application by Bornite Copper Corp., Ltd. re claims on Gravina Island S. E. Alaska (copper)

Enclosed are the four copies of the subject application and one copy of a report by the company's consulting engineer, Mr. Alan C. Lee. We are retaining one copy of Mr. Lee's report in this office. We will plan to make copies of the report so that, ultimately, it may be returned to him as he requests.

The application is presented very nicely but it is, fundamentally, unsound for several reasons, as follows:

1. The larger part of the proposed drilling (Holes P-30 to P-35) is on patented ground ("Dall" claims 1, 3, and 4, Pat. Survey 339, Rossland and Deer Park Mining Co.) which does not appear to have been acquired or even recognized by the applicant. The Rossland and Deer Park Mining Co. is no longer in existence but the patent is still valid to whoever may hold the company assets.

2. The proposal is to drill longer, deeper holes below relatively short, shallow holes which already have demonstrated that the deposit (or, at least, this part of the deposit) is submarginal. This proposal is based on two false premises, i.e.:

   (a) The ore will be better at greater depth below the "surface alteration". - We all know that this country has been subjected to recent glaciation; therefore oxidation has not progressed more than a few feet below the existing surface.

(b) Assays were unduly low because of poor recovery which will be better at greater depth. - The poor recovery was, of course, caused by broken ground which, in turn, was caused by fracturing and/or hydrothermal alteration; the recovery will be no better at depth. With adequate provision for sludge recovery the core assays could have been checked. We see no evidence that any serious attempt was made to save sludges. Even granting some loss of sulfides, the copper occurrences appear low grade and erratic.

I had discussed this application, in person, with drill foreman, Mr. Jewell and, by letter, with Mr. Lee and with the lawyers. I had given them some encouragement to submit a program; however, it did not occur to me that a "consulting engineer with 20 years experience" would submit anything like this. Probably there is some place in the area that would deserve additional work but they have not presented any evidence to that effect.

S. H. Lorain

Enclosure-3

cc: Velikanje
Herdlick

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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DATE		CODE

P. O. Box 2688
Juneau, Alaska

April 12, 1957

Day, Wilson, Kelly, Martin & Morden,
Federal Building,
85 Richmond Street, West,
Toronto 1, Canada.

Gentlemen:

This will acknowledge receipt of your letter of March 30, with four copies of an application for a Defense Minerals Administration contract for diamond drilling certain claims on Gravina Island, Southeastern Alaska by the Bornite Copper Corporation Limited. Also enclosed were two copies of an engineering report by Mr. Alan C. Lee; these reports are marked for return to Mr. Lee.

We have reviewed the applications and reports in this office and are forwarding them, by air mail, to the Washington office of D.M.E.A. for further review. We do not plan to return Mr. Lee's reports to him until after the consideration of the application has been completed.

Yours very truly,

S. H. Lorain,
Executive Officer,
Alaska District,
Region I.

cc: Operating Committee, DMEA
Velikanje
Herdlick

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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

RECEIVED APR 15 1957 D.M.E.A.

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. 4728
Metal or Mineral Copper
Date Received 4-15-57
Estimated Cost $70,431
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: See attached

(*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.

(*d*) If a partnership, add to the above statement the names and addresses of all partners.

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

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

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

See attached

(*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.

(*e*) If you own the land, describe any liens or encumbrances on it

See attached

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice. See attached

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.

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

(*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.

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

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

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. and be completed as expeditiously as possible after

(*c*) The work will start/~~within xxxxxx days and be completed within xxxxxxxxxxxxxxxxxxxx~~ 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.

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.).

(*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.

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

(*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.

(*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.

(*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.

(*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.

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

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)?

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

[X] Money [ ] Use of equipment owned by you [ ] 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 MARCH 29, 1957

BORNITE COPPER CORPORATION LIMITED
(No Personal Liability)

(Applicant)

By L. Charlebois - VICE-PRES.

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

1. Bornite Copper Corporation Limited (N.P.L.), 34 Gamble Street East, Rouyn, Quebec, a company duly incorporated under the provisions of the Quebec Mining Companies Act;

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President: Noble Harbinson
67 Chaplin Cres.
Toronto, Ontario

Vice-President: Clarence Charlebois
Val d'Or Highway
Val d'Or, Quebec

Secretary-Treasurer: Donald Stilwell Leipham
148 Culver Road
Rochester 9, New York

3. The properties held by the company are known as the Bornite claims, Gravina Island, Alaska. The company holds an 80% interest in:-

Paula Group Nos. 1 - 58 inclusive, except Nos. 17, 34, 37, 39, 41 and 49 - 54.

Bear Group, Nos. 1 - 44 inclusive

Salt Chuck Group Nos. 1 - 12 inclusive

Kitz Group, Nos. 1 and 2

The remaining 20% interest is held by Northwest Ventures Limited (N.P.L.), Suite 515, 85 West Hastings Street, Vancouver, B.C.

These properties are held pursuant to agreements dated the 16th day of April, 1956, 18th day of July, 1956 and the day of December, 1956. The only lien or other encumbrance on the aforesaid properties is the 20% interest retained by Northwest Ventures Limited aforesaid.

The book and page numbers for each recorded group of claims are as follows:

Paula Group - Nos. 1 - 58 inclusive, except Nos. 17, 34, 37, 39, 41 and 49 - 54. Recorded in Vol. 14 of the Mining Records, at Ketchikan, Alaska, at pages 230 to 257 inclusive.

Bear Group - Nos. 1 - 44 inclusive. Vol. 14, P. 417 - 439 incl.

Salt Chuck Group - Nos. 1 - 12 inclusive. Vol. 14, P. 449

Kitz Group - Nos. 1 and 2. Vol. 14, P. 259

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BORNITE COPPER CORPORATION OPTION

GRAVINA ISLAND

SOUTHEASTERN ALASKA

U. S. A.

February 20, 1957.

This report has been written to outline a program of work for the summer of 1957 for which an application for aid is being made to the Defense Minerals Exploration Administration of the U. S. Department of the Interior.

Property

The program of work proposed in this report will be done on the Paula group of claims consisting of Nos. 1 to 58 inclusive except 17, 34, 37, 39, 41 and 49 to 54. Included will be the adjoining Kitz claims Nos. 1 and 2 which are added for protection in case the showings should extend eastward in them.

Physical Description (4)

Former Work (4a)

Last summer, 1956, a total of 8454 feet of exploratory diamond drilling was carried out on this property by Bornite Copper Corporation Limited. Half this work was done at the south end near Dall Bay on claims Paula No. 33, 40, 45, 47 and 48. The rest of the drilling was done at the north end of the property near Seal Cove on Paula No. 1, 2, 7, 8, 9, and 10.

A complete report describing this work was made on November 13th, 1956, by the writer and a copy of it accompanies this report.

Past and Current Production (4b)

There is no record of production from this property, as far as is known.

Geologic Features (4c)

These have been fully described by Theodor Chopin in Professional Paper 120D of the U.S.G.S. issued by the U.S. Government Printing Office 1918.

Briefly, the Dall Bay copper occurrences are associated with irregular quartz monzonite intrusions into a coarse grained more basic granitic rock. Mineral concentrations occur in brecciated areas which have been seamed and cut up by quartz-carbonate stockworks over widths of 100 to 300 feet for an overall length 600 feet. Mineralization consists of pyrite and chalcopyrite disseminated and in heavy to massive narrow bands up to 1/4 inch.

PROFESSIONAL ENGINEER
ALAN C. LEE
PROVINCE OF QUEBEC

Eight holes, Nos. 1, 2, 2A, 3, 4, 5, 6 and 7, explored this area down to 200 feet vertically and showed copper across most of the zone. The widest continuous section was in hole No. 3 assaying 0.47% copper across 73.9 feet, with a core loss of 11% for the entire hole, but more for the mineralized part. The values obtained are not commercial but due to the excessive core lost by grinding there is a possibility that minable widths might be found to grade over 1% copper. There is a greater possibility if the zone could be intersected at a depth greater than 200 feet vertically, below surface weathering effects. In order to improve the recovery under all conditions it would be necessary to carefully supervise the drilling so as to minimize the chalcopyrite loss through grinding in the core barrel.

Seven holes are recommended to further test this area, for a total of 3000 feet, as outlined in "5b" hereunder.

Seal Cove

The North Pauk occurrences at Seal Cove are similar to those at Dall Bay except that there is a larger proportion of the included hybrid volcanic rocks and less quartz monzonite. However, the silicification and bleaching accompanying the intrusion is similar and so is the mineralization. So far it does not seem to be as wide spread but on the other hand it is more concentrated, tending to a better average grade across narrower widths.

Work done last year explored an area of nearly 17,000 square feet near the mouth of the creek entering the north end of Seal Cove from the northwest. It is now proposed to explore the southeastern part of this area by drilling approximately 2000 feet in the most promising section at a depth below the surface weathering. In order to make adequate core recovery and properly sample the showing it will be necessary to use first class drilling technique and to have the work closely and intelligently supervised.

The writer regards this property as an interesting copper prospect because of the multiplicity of showings in its 4 square miles of area and because of its accessibility and cheap ocean transportation. If a large tonnage of material carrying 1% copper could be outlined in one compact mass whose shape would lend itself to open pit mining then this prospect could quickly develop into an important mine.

Accessibility of Property (4d)

These claims border the Pacific Ocean at a point where the mean range of tides is about 15 feet from low to high water. The coastline is fairly steep and rocky but shelter for landing supplies at Dall Bay is afforded by islands and reefs to the south during all stages of the tides, except during unusual storms.

At Seal Cove good shelter is provided from the south by reefs at low water, but southeast gales pound the shore unmercifully at high tide.

PROFESSIONAL ENGINEER
ALAN C. LEE
PROVINCE OF QUEBEC

Availability (4e)

Supplies may be landed in good weather from shallow draft boats and seaplanes at almost any stage of water. Both craft are plentiful for hire in Ketchikan, which is less than 15 minutes by air, 10 miles in a direct line. It is about the same distance north of Annette Island Airport which is a regular port of call for airliners plying the coast of Southeastern Alaska from Seattle.

Labour seems to be relatively plentiful at Ketchikan which is an excellent supply point. Fresh water and timber are abundant on the property, and gas and oil fuel can be laid down at the property from ocean vessels cheaply, so that power for initial stages of mining should be no problem. For larger quantities, hydro electric power might be obtainable if justified by developments.

5a - The mineral for which it is proposed to explore is copper.

Proposed Drilling (5b)

Dall Bay - South Paula group - Gravina Island

			Length
P-30	vertical hole 160' S along baseline	185 ft. E.	500 Ft.
P-31	60 degrees 55' S along baseline	365 ft. E.	600 Ft.
P-32	60 degrees 45' S along baseline	300 ft. E	600 Ft.
P-33	60 degress 145' S along baseline	300 ft. E.	600 Ft.
P-34	60 degrees 245' S along baseline	300 ft. E.	600 Ft.
P-35	to be located where engineer in charge deems best in view of results.		

Above holes are subject to change of location and length upon consultation.

This program is laid out with a view to cutting the best parts of this area at greater depth than in previous work in an effort to penetrate beneath surface weathering. It is also planned to make better core recovery in the new drilling in the hope of bettering the copper grade. This may be accomplished by improving the drilling technique i.e. by pulling the rods more frequently as soon as a "block" occurs and by closer supervision, not only by the engineer, butby a skilled and experienced diamond driller employed directly by the Company.

The locations of the above holes is shown in the accompanying plan.

North Paula Group - Seal Cove

Footage recommended, 2000 feet minimum. Hole No. 16 should be deepened an additional 500 feet if it is possible to re-enter this hole. If not, then a new hole should be drilled, P-36, from near the end of No. 16, at 50 degree dip for a length of 500 feet to explore the area between "C" and "D" picket lines south of the creek.

PROFESSIONAL ENGINEER
ALAN C. LEE
PROVINCE OF QUEBEC

A second hole, P-37, is recommended 100 feet south of No. 16 and parallel to it, but collared back 100 feet further east, at 50° dip for a length of 500 feet at least. If results in P-35 are encouraging then it may be advisable to allow it to run past the 500 feet mark.

A third hole, P-38, should be collared 100 feet south of P-37 and parallel to it to investigate anything found in P-36 or P-37. Additional drilling here would depend upon results obtained, although it might be profitable to deepen No. 15 which has only 16 feet of casing and so may be accessible. The urgency to do this would depend upon results in P-36.

Location of these proposed holes is shown on the accompanying plan.

5c - the work is planned to start on May 15th, 1957, and would be completed within 4 months if confined to the 5,500 feet laid out using one drill.

5d - The applicant, Bornite Copper Corporation Limited, operated the previous drilling program described by the writer in an accompanying report. The program now contemplated would be under his direction with one or more thoroughly experienced employees in charge of the job. One would be a driller of 25 years experience and the other an engineer with 30 years experience in that work. The writer has been a consultant in exploration for 25 years in Noranda, Quebec.

Estimate of Costs

Independent Contract - (6a) Diamond Drilling

Price - $7.00 per foot for 5,500 feet	$38,500
plus extras for: -	
Moving -	10,000
Piping to bedrock -	2,000
Cementing and Reaming -	1,000
Casing holes -	2,000
	$53,500

Labour (6b)

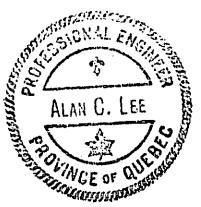
Prospector and core grabber - 3 months @ $500	$1,500
Supervision - diamond driller - 3 months @ $600	1,800
- engineer - 3 months @ $1,000	3,000
Consultant - general - 4 months @ $500	2,000
Board for the above 3 men - 100 days @ $5	1,500

Operating Materials, Supplies (6c)

Gasoline for outboard and lamps	200
Fuel oil	200
Core boxes	1,100
Transportation, air and sea	2,000

PROFESSIONAL ENGINEER ALAN C. LEE PROVINCE OF QUEBEC

Operating Equipment (6D)	
Core racks	$ 500
Board and outboard motor rental	500
New Buildings (6f)	
Tents, walls and floors	750.
Miscellaneous, Accounting, Workmen's Compensation, Liability Insurance (6g)	500
Contingencies (6h) - 20% of above	1,381.
	$70,431



Noranda, Quebec.

A. C. Lee, B.A. Sc.
Professional Engineer
Province of Quebec.

MF-205
(Combine[illegible] supersedes MF[illegible]1 and MF-203)
June 1956

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DATE	INITIALS	CODE

For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator
Docket No. DMEA-
Contract No. Idm-E
Contract Date

CONSENT TO LIEN
and
SUBORDINATION AGREEMENT 1/

To the ~~United States of~~ America:

Referring to ~~that certain~~ land in the County of Gravina Island, ~~xxxxxxx~~ Alaska, described as follows: 2/

Paula Group - Nos. 1 - 58 inclusive, except Nos. 17, 34, 37, 39, 41 and 49 - 54. Recorded in Vol. 14 of the Mining Records, at Ketchikan, Alaska, at pages 230 to 257 inclusive.
~~Bear Group - Nos. 1 - 44 inclusive. Vol. 14, P. 417-439 incl.~~
Salt Chuck Group - Nos. 1 - 12 inclusive. Vol. 14, P. 449
Kitz Group - Nos 1 and 2. Vol. 14, P. 259

which is the subject of a proposed exploration project contract, hereinafter called the "contract," with the United States of America, hereinafter called the "Government;" in consideration of the contract and as an inducement to the Government to enter into it, the undersigned hereby--

1. Undertakes and agrees that property in which the Government may acquire an interest or equity under the contract may be dismantled, severed from the land, and removed, as may be provided in the contract; and the Government's interest and equity in such property shall be prior and superior to any adverse right or claim of the undersigned;

2. Grants to the Government a lien upon all of the undersigned's right, title, and interest in the land and upon any production of minerals therefrom, to secure the payment to the Government of a percentage royalty on production as may be provided for by the Contract;

3. Subordinates the undersigned's right, title, claim, or interest in or against the land and in any production therefrom to the rights of the Government under the contract with respect to royalty on production and liens to secure same;

4. Represents and undertakes that there is no claim, lien, or encumbrance upon the undersigned's right, title, claim, or interest in or against the land other than the following: (If "none" insert the word "none." Do not leave lines blank.)

a 20% interest in the land is retained by Northwest Ventures Limited (N.P.L.), Suite 515, 85 West Hastings Street, Vancouver, B.C.

1/ Mining or production from the land is not required, and in the absence of production there is no obligation to pay royalty to the Government.

2/ Either (a) insert the legal description of the land, or (b) strike out the words "as follows" and insert "in a lease [or contract, deed, or other document] dated _____, and recorded in Book _____, Page _____, official records of said county." If (b) is used, the book and page of recordation cannot be dispensed with. If the space provided is insufficient, use an Annex, and refer to the Annex in the space.

5. Undertakes and agrees (a) neither to commit any act nor assert any claim in conflict with the provisions of this Agreement; and (b) to give advance notice of the Government's rights under this Agreement to any subsequent transferee, mortgagee, encumbrancer, or lessee of any of the undersigned's right, title, claim, or interest in or against the land, or any production therefrom furnishing the Government with two copies of such notice; and

6. Consents to all amendments (including an agreement of termination) and assignments of the contract without notice thereof, and undertakes and agrees that this Agreement shall extend and apply thereto.

_____	[Seal]	[Address]
_____	[Seal]	[Address]
_____	[Seal]	[Address]
_____	[Seal]	[Address]
_____	[Seal]	[Address]
_____	[Seal]	[Address]

I, L. Reed Naylor certify that I am the acting Secretary (Secretary, etc.) of the corporation named herein; that John A. Borthwick who signed this agreement was then Vice-President (President or Vice-President, etc.) of said corporation; that said agreement was duly signed for and in behalf of said corporation by authority of its governing body, and was within the scope of its corporate powers.

NORTHWEST VENTURES LIMITED

[Corporate Seal]

J. A. Borthwick
Attorney-in-fact

MF-205
(Combines and supercedes MF-201 and MF-203)
June 1956

For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator _____
Docket No. DMEA- _____
Contract No. Idm-E _____
Contract Date _____

CONSENT TO LIEN
and
SUBORDINATION AGREEMENT 1/

To the United States of America:

Referring to that certain land in the County of Gravina Island, State of Alaska, described as follows: 2/
Paula Group - Nos. 1 - 58 inclusive, except Nos. 17, 34, 37, 39, 41 and 49 - 54. Recorded in Vol. 14 of the Mining Records, at Ketchikan, Alaska, at pages 230 to 257 inclusive.
Bear Group - Nos. 1 - 44 inclusive. Vol. 14, P. 417-439 incl.
Salt Chuck Group - Nos. 1 - 12 inclusive. Vol. 14, P. 449
Kite Group - Nos 1 and 2. Vol. 14, P. 259

which is the subject of a proposed exploration project contract, hereinafter called the "contract," with the United States of America, hereinafter called the "Government;" in consideration of the contract and as an inducement to the Government to enter into it, the undersigned hereby--

1. Undertakes and agrees that property in which the Government may acquire an interest or equity under the contract may be dismantled, severed from the land, and removed, as may be provided in the contract; and the Government's interest and equity in such property shall be prior and superior to any adverse right or claim of the undersigned;

2. Grants to the Government a lien upon all of the undersigned's right, title, and interest in the land and upon any production of minerals therefrom, to secure the payment to the Government of a percentage royalty on production as may be provided for by the Contract;

3. Subordinates the undersigned's right, title, claim, or interest in or against the land and in any production therefrom to the rights of the Government under the contract with respect to royalty on production and liens to secure same;

4. Represents and undertakes that there is no claim, lien, or encumbrance upon the undersigned's right, title, claim, or interest in or against the land other than the following: (If "none" insert the word "none." Do not leave lines blank.)

a 20% interest in the land is retained by Northwest Ventures Limited (N.P.L.), Suite 515, 85 West Hastings Street, Vancouver, B.C.

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6. Consents to all amendments (including an agreement of termination) and assignments of the contract without notice thereof, and undertakes and agrees that this Agreement shall extend and apply thereto.

7. Added provision: _____ (State "None" or "See Annex No. ____")

Dated this _____ day of _____, 195__.

_____	[Seal] _____	[Address]
_____	[Seal] _____	[Address]
_____	[Seal] _____	[Address]
_____	[Seal] _____	[Address]
_____	[Seal] _____	[Address]
_____	[Seal] _____	[Address]

I, L. Reed Naylor certify that I am the Acting Secretary (Secretary, etc.) of the corporation named herein; that John A. Borthwick who signed this agreement was then Vice-President (President or Vice-President, etc.) of said corporation; that said agreement was duly signed for and in behalf of said corporation by authority of its governing body, and was within the scope of its corporate powers.

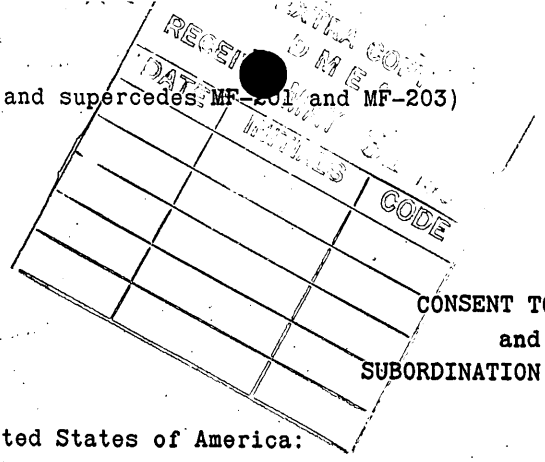
NORTHWEST VENTURES LIMITED

[Corporate Seal]

J. A. Borthwick

L. Naylor

MF-205
(Combines and supercedes MF-201 and MF-203)
June 1956



For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator
Docket No. DMEA-
Contract No. Idm-E
Contract Date

CONSENT TO LIEN
and
SUBORDINATION AGREEMENT 1/

To the United States of America:

Referring to that certain land in the County of Gravina Island, ~~xxxxxxx~~ Alaska, described as follows: 2/

Paula Group - Nos. 1 - 58 inclusive, except Nos. 17, 34, 37, 39, 41 and 49 - 54. Recorded in Vol. 14 of the Mining Records, at Ketchikan, Alaska, at pages 230 to 257 inclusive.
Bear Group - Nos. 1 - 44 inclusive. Vol. 14, P. 417-439 incl.
Salt Chuck Group - Nos. 1 - 12 inclusive. Vol. 14, P. 449
Kitz Group - Nos 1 and 2. Vol. 14, P. 259

which is the subject of a proposed exploration project contract, hereinafter called the "contract," with the United States of America, hereinafter called the "Government;" in consideration of the contract and as an inducement to the Government to enter into it, the undersigned hereby--

1. Undertakes and agrees that property in which the Government may acquire an interest or equity under the contract may be dismantled, severed from the land, and removed, as may be provided in the contract; and the Government's interest and equity in such property shall be prior and superior to any adverse right or claim of the undersigned;

2. Grants to the Government a lien upon all of the undersigned's right, title, and interest in the land and upon any production of minerals therefrom, to secure the payment to the Government of a percentage royalty on production as may be provided for by the Contract;

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	[Seal]	[Address]
	[Seal]	[Address]
	[Seal]	[Address]
	[Seal]	[Address]
	[Seal]	[Address]

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NORTHWEST VENTURES LIMITED

[Corporate Seal]

J. A. Borthwick

L. Naylor

MF-205
(Combines and supercedes MF-201 and MF-203)
June 1956

RECEIVED DMEA MAY 31 195
DATE | INITIALS | CODE

For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator
Docket No. DMEA-
Contract No. Idm-E
Contract Date

CONSENT TO LIEN
and
SUBORDINATION AGREEMENT 1/

To the United States of America:

Referring to that certain land in the County of Gravina Island, ~~State of~~ Alaska described as follows: 2/

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Bear Group - Nos. 1 - 44 inclusive. Vol. 14, P. 417-439 incl.

Salt Chuck Group - Nos. 1 - 12 inclusive. Vol. 14, P. 449

Kitz Group - Nos 1 and 2. Vol. 14, P. 259

which is the subject of a proposed exploration project contract, hereinafter called the "contract," with the United States of America, hereinafter called the "Government;" in consideration of the contract and as an inducement to the Government to enter into it, the undersigned hereby--

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~~7. Added provision:~~ _____ ~~(State "None" or "See Annex No. ____")~~

~~Dated this~~ _____ ~~day of~~ _____, ~~195__~~.

_____	~~[Seal]~~	~~[Address]~~
_____	~~[Seal]~~	~~[Address]~~
_____	~~[Seal]~~	~~[Address]~~
_____	~~[Seal]~~	~~[Address]~~
_____	~~[Seal]~~	~~[Address]~~
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NORTHWEST VENTURES LIMITED

[Corporate Seal]

J. A. Borthwick

L. Naylor

MF-205
(Combines and supercedes MF-201 and MF-203)
June 1956

Official

For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator_____
Docket No. DMEA-_____
Contract No. Idm-E_____
Contract Date_____

CONSENT TO LIEN
and
SUBORDINATION AGREEMENT 1/

To the United States of America:

Referring to that certain land in the County of Gravina Island, State of Alaska, described as follows: 2/

Paula Group- Nos.1-58,inc;usive,except Nos.17,34,37,39,41 and 49 - 54. Recorded in Vol.14 of the Mining Records at Ketchikan,Alaska,at pages 230 to 257,inclusive. Bear Group Nos. 1 - 44,inclusive, recorded in Vol.14 of Mining Records at Ketchikan,pages 417-439,incl. Salt Chuck Group No.1 - 12 inclusive,Vol.14 page 449. Kitz Group- Nos. 1 and 2.recorded in Vol.14 of Mining Records at page 259. All in the office of the Recorder at Ketchikan,Alaska.

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7. ~~Added provision: _____ (State "None" or "See Annex No. ____")~~

~~Dated this _____ day of _____, 195__.~~

_____ [Seal] _____ [Address]

_____ [Seal] _____ [Address]

_____ [Seal] _____ [Address]

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_____ [Seal] _____ [Address]

_____ [Seal] _____ [Address]

I, Kenneth Sampson certify that I am the Acting Secretary (Secretary, etc.) of the corporation named herein; that Lester O. Gore who signed this agreement was then President (President or Vice-President, etc.) of said corporation; that said agreement was duly signed for and in behalf of said corporation by authority of its governing body, and was within the scope of its corporate powers.

Northwest Ventures Alaska, Inc.

[Corporate Seal]

Lester O. Gore President

Kenneth P. Sampson Secretary

MF-205 extra
(Combined ~~ORIGINAL FILE COPY~~ MF-201 and MF-203)
June 1956

DMEA
RECEIVED MAY 31 1957

DATE	INITIALS	CODE

For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator
Docket No. DMEA-
Contract No. Idm-E
Contract Date

CONSENT TO LIEN
and
SUBORDINATION AGREEMENT 1/

To the United States of America:

~~Referring to that certain~~ land in the County of ~~Gravina Island~~, State of ~~Alaska~~, described as follows: 2/

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2. Grants to the Government a lien upon all of the undersigned's right, title, and interest in the land and upon any production of minerals therefrom, to secure the payment to the Government of a percentage royalty on production as may be provided for by the Contract;

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Dated this _____ day of _____, 195__.

_____ [Seal] _____ [Address]

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Northwest Ventures Alaska, Inc.

[Corporate Seal]

Lester O. Gore President

Kenneth P. Sampson Secretary

MF-205
(Combines and supercedes MF-202 and MF-203)
June 1956

For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator
Docket No. DMEA-
Contract No. Idm-E
Contract Date

RECEIVED MAY 3 1956
DATE | INITIALS | CODE
EXTRA COPY DMEA

CONSENT TO LIEN and SUBORDINATION AGREEMENT 1/

To the United States of America:

Referring to that certain land in the County of Gravina Island, State of Alaska, described as follows: 2/

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[Corporate Seal]

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Kenneth P. Sampson Secretary

MF-205
(Combines and supercedes MF-201 and MF-203)
June 1956

For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator
Docket No. DMEA-
Contract No. Idm-E
Contract Date

EXTRA COPY
D M E A
RECEIVED MAY 31
DATE
INITIALS
CODE

CONSENT TO LIEN
and
SUBORDINATION AGREEMENT 1/

To the United States of America:

Referring to that certain land in the County of Grevine Island, State of Alaska, described as follows: 2/

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~~Dated this~~ _____ ~~day of~~ _____ ~~195~~.

_____ [Seal] _____ [Address]

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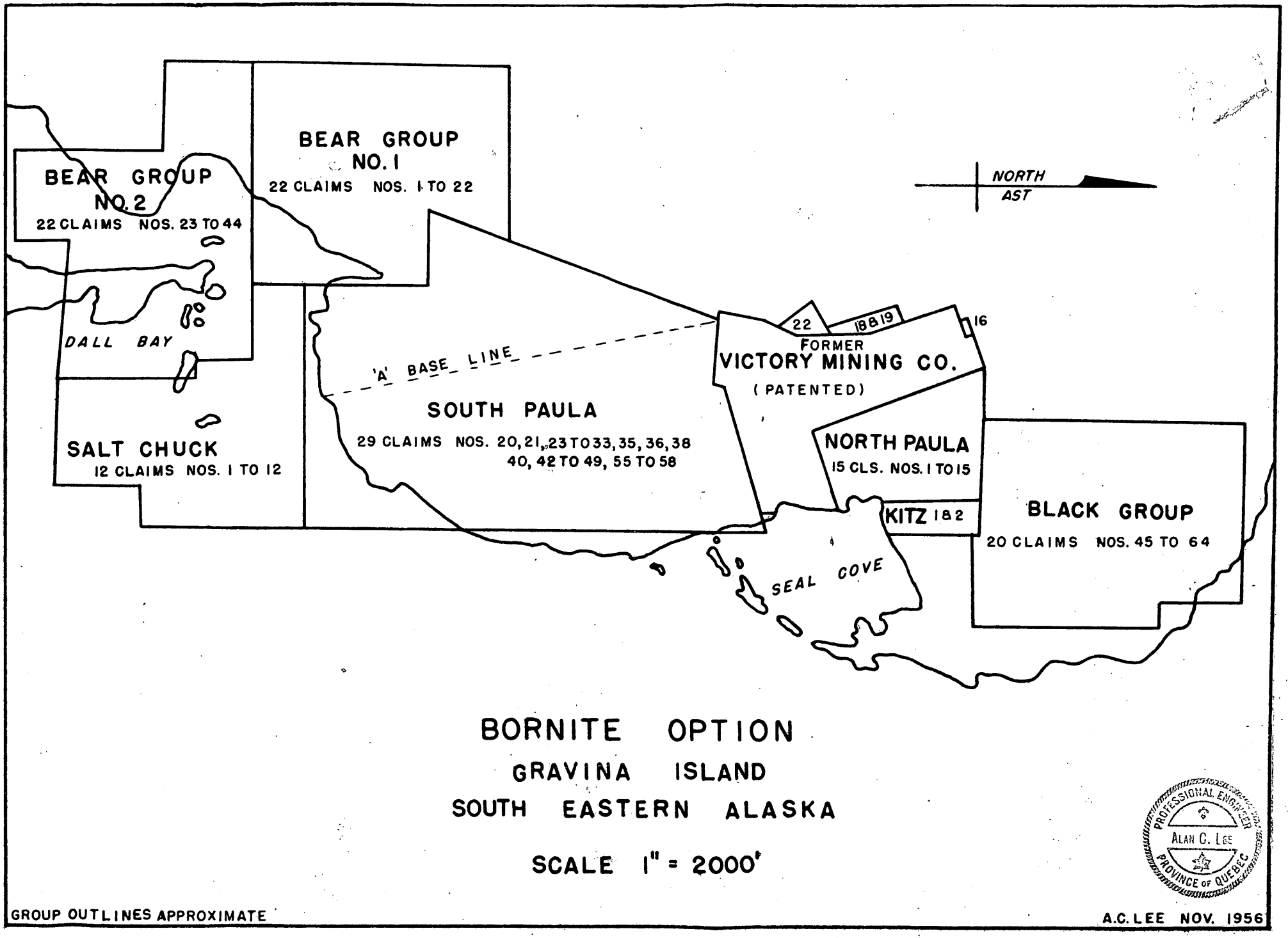
~~Northwest Ventures Alaska, Inc.~~
[Corporate Seal]

Lester O Gore President

Kenneth P. Sampson Secretary


BEAR GROUP NO. 2
22 CLAIMS NOS. 23 TO 44
BEAR GROUP NO. 1
22 CLAIMS NOS. 1 TO 22
NORTH
AST
DALL BAY
'A' BASE LINE
SOUTH PAULA
29 CLAIMS NOS. 20, 21, 23 TO 33, 35, 36, 38
40, 42 TO 49, 55 TO 58
22
18 19
16
FORMER
VICTORY MINING CO.
(PATENTED)
NORTH PAULA
15 CLS. NOS. 1 TO 15
SALT CHUCK
12 CLAIMS NOS. 1 TO 12
KITZ 1 & 2
BLACK GROUP
20 CLAIMS NOS. 45 TO 64
SEAL COVE
BORNITE OPTION
GRAVINA ISLAND
SOUTH EASTERN ALASKA
SCALE 1" = 2000'
PROFESSIONAL ENGINEER
ALAN C. LEE
PROVINCE OF QUEBEC
GROUP OUTLINES APPROXIMATE
A.C. LEE NOV. 1956

Bureau of Mines
Report of Investigations 5320

COPPER MINES AND PROSPECTS ADJACENT TO LANDLOCKED BAY, PRINCE WILLIAM SOUND, ALASKA

BY MIRO MIHELICH AND R. R. WELLS

United States Department of the Interior — April 1957

COPPER MINES AND PROSPECTS ADJACENT TO LANDLOCKED BAY, PRINCE WILLIAM SOUND, ALASKA

BY MIRO MIHELICH AND R. R. WELLS

* * * * * * * * * **Report of Investigations 5320**

UNITED STATES DEPARTMENT OF THE INTERIOR
Fred A. Seaton, Secretary
BUREAU OF MINES
Marling J. Ankeny, Director

Work on manuscript completed June 1956. The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is made: "Reprinted from Bureau of Mines Report of Investigations 5320."

April 1957

COPPER MINES AND PROSPECTS ADJACENT TO LANDLOCKED BAY, PRINCE WILLIAM SOUND, ALASKA

by

Miro Mihelich[1] and R. R. Wells[2]

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SUMMARY

The mines and prospects in the vicinity of Landlocked Bay, 25 miles southwest of Valdez, Alaska (fig. 1), were examined, mapped, and sampled in July and August 1955 as part of a comprehensive investigation by the Bureau of Mines of ore deposits adjacent to Prince William Sound. The purpose of the investigation is to establish and record the location, nature, extent, and metallurgical characteristics of copper and associated metallization in the Prince William Sound district and to indicate, if possible, those areas in which additional exploration and development may be justified. Of particular interest are the possibly numerous deposits of massive iron sulfides that were neglected during early mining operations. These deposits may constitute important reserves of sulfur and iron. At Landlocked Bay deposits of copper-bearing iron sulfide minerals have been mined or partly explored through mine workings, which are in a zone about 1 mile wide along the western side of a large overthrust fault known as the Landlock Overthrust. Eight of the principal mines along this zone were examined and sampled. Although only three of the mines have a recorded production of shipping-grade copper ore, all have deposits of copper-bearing iron sulfide minerals that are similar in occurrence. The deposits occur as lenticular masses and disseminations of chalcopyrite, pyrite, and pyrrhotite which replace crushed rock or fill cavities along shear zones in greenstones and in sedimentary rocks that are exposed between sea level and an altitude of 2,500 feet. These lenticular masses of sulfide minerals range in size from small pods to ore bodies that have been stoped to maximum widths of 9 feet, strike lengths up to 70 feet, and dip lengths as much as 350 feet. Where accessible for sampling, the copper content of the deposits ranged from a few hundredths of a percent to over 8 percent; zinc, gold, and silver are present in negligible amounts. Flotation tests of a sample composited to represent typical mine-run ore indicate that 81 percent of the copper is recoverable in a product assaying 28 percent copper at a concentration ratio of 17.5 : 1.

INTRODUCTION

Statistical records indicate that approximately 110,000 tons of metallic copper (about 16 percent of total Alaskan production) was produced from mines adjacent to Prince William Sound during the 40-year period ended in 1938. Although the principal production was from a large-scale mining and milling operation on Latouche Island (Kennecott Copper Corp., Beatson mine), a substantial amount of the total copper was derived from direct-shipping ores selectively mined or hand-sorted from numerous other deposits in the district. No production has been made since 1938; many of the claims have long been abandoned, and mine workings are either caved or deteriorating rapidly.

Much of the selectively mined copper ore was associated with iron sulfide minerals, which often occurred in massive deposits whose copper content was too low for profitable extraction; these deposits were not removed or explored. Because of the increased interest in iron sulfide minerals as a possible source of sulfur and iron and also because of the impending shortage of copper, the Bureau of Mines began a

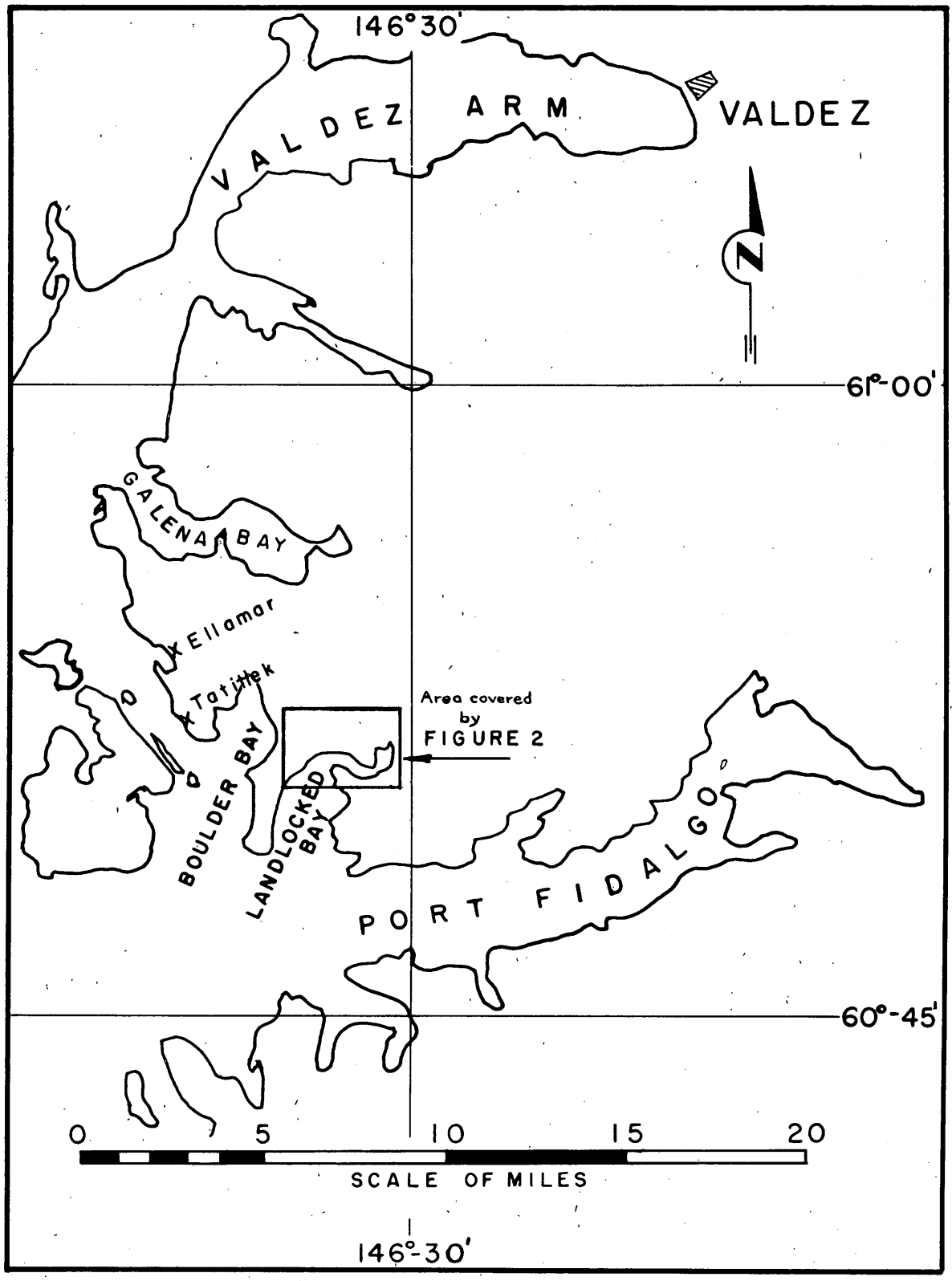


Figure 1. - Landlocked Bay, Alaska.

comprehensive investigation of the district to reappraise the deposits in the light of improved mining and metallurgical practices, higher prices for copper, and the possibility of recovering byproduct iron and sulfur. The work was begun at Landlocked Bay in 1955. This report summarizes general information on the area immediately adjacent to Landlocked Bay and presents factual data resulting from this phase of the Prince William Sound investigation.

ACKNOWLEDGMENTS

Many of the data concerning mining history and regional geology of Landlocked Bay have been obtained from several bulletins published by the Geological Survey.3/

LOCATION AND ACCESSIBILITY

Landlocked Bay is a small embayment on the north shore of Prince William Sound; it is about 2 miles northwest of Port Fidalgo and 25 miles southwest of Valdez (fig. 1). The area described in this report is between latitudes 60°51' to 60°52' N. and longitudes 146°31' to 146°35' W.

Travel to Landlocked Bay may be completed by charter flight of small, pontoon-equipped planes from Cordova, 30 miles southeast of Landlocked Bay, or by boat from Cordova or Valdez; these town are the nearest terminals of scheduled passenger and freight carriers from other Alaskan cities and from the States. A biweekly schedule of airmail and passenger service is maintained from May to November between Cordova and Tatitlek (a small native village 6 miles northwesterly by boat from the head of Landlocked Bay). During the winter months mail and supplies are delivered to Tatitlek and nearby Ellamar by small boat from Cordova.

Valdez and Cordova are regular ports of call by freighters of the Alaska Steamship Co. In 1955 ocean freight rates, including wharfage, from Seattle to Valdez ranged from $31.00 to $113.00 per ton, depending on class of freight.

Narrow Landlocked Bay is navigable by ocean-going vessels for almost its entire length. It also affords secure anchorage, protected from storms. The average tide range at Landlocked Bay is 12 feet; the maximum tide range is 22 feet from mean lower low water.

Travel on land is difficult because of the steep slopes or heavy vegetation; no roads or trails are available.

PROPERTY AND OWNERSHIP

The claims shown on figure 2 are those surveyed for patent between 1903 and 1907. At that time claim ownerships were as follows:

(1) The Threeman Mining Co. patented the Redemption, Keystone, Discovery, Scorcher, Jay, Buckeye, Ajax, Cliff, Daisy, and Montezuma claims. Subsequently the Threeman Mining Co. acquired the holdings of the Alaska Commercial Co. which had one patented claim named ACCo (see fig. 2).

(2) The Standard Copper Mines held the Apex No. 1, Apex No. 2, Odelle D, Alice T., Virginia No. 1, and Cornet mining claims and the Apex No. 1 millsite claim.

3/ See footnotes 4, 5, and 6, p. 6.

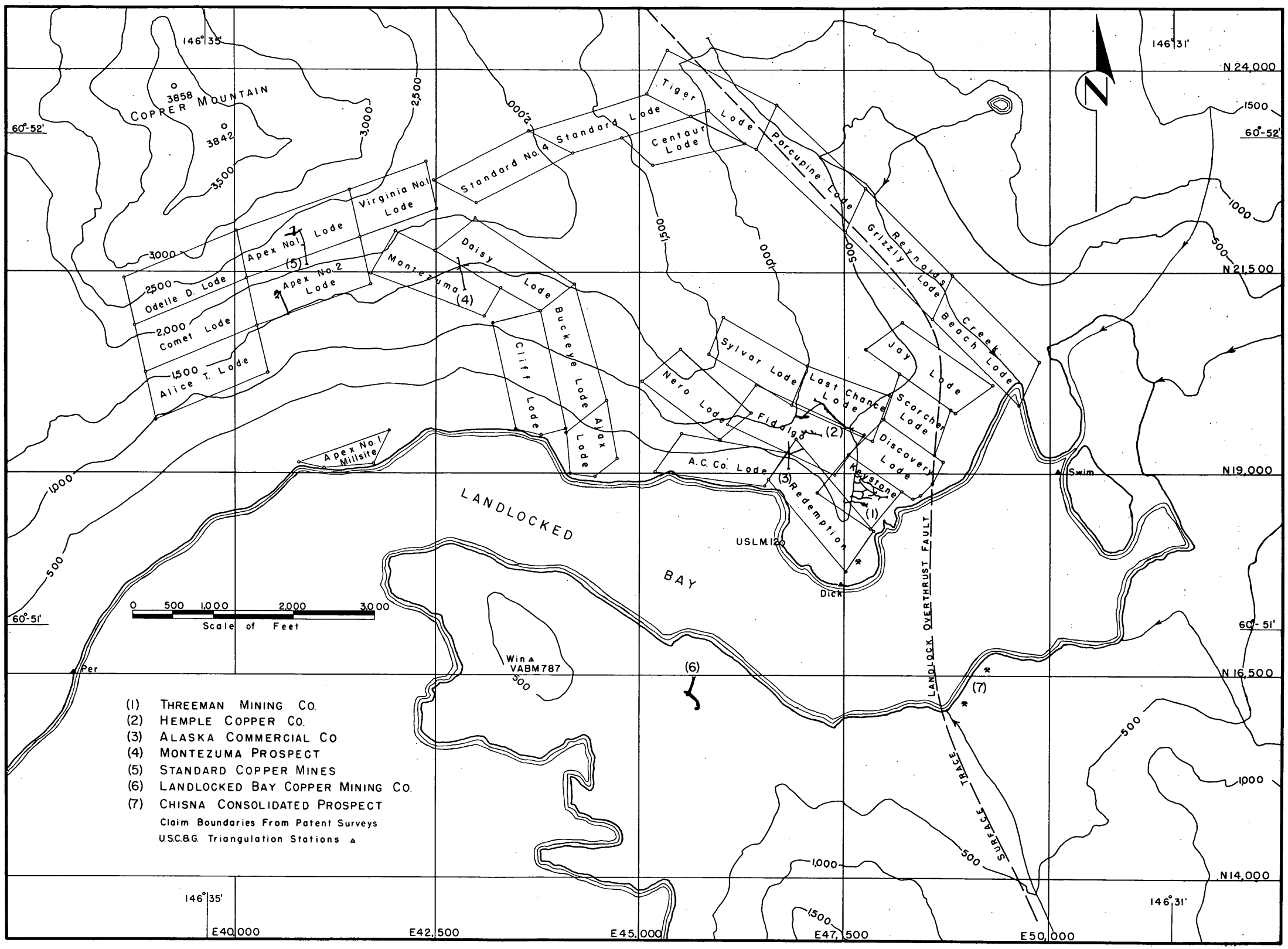


Figure 2. - Copper mines and prospects, Landlocked Bay, Alaska.

(3) Hemple Copper Co. was granted a patent on the Fidalgo, Nero, Last Chance, and Sylvar claims.

(4) The Reynolds Alaska Development Co. held the Standard, Standard No. 4, Centaur, Grizzly, Tiger, Porcupine, and Beach claims.

The present status of the various claims is not known definitely, but it may be assumed that title to many of the unpatented claims has lapsed. Title to the patented claims would remain in the companies that may still maintain a corporate existence, but the legal status of claims that were patented in the name of corporations now defunct is doubtful. All of the above-mentioned companies are listed in the "Mines Register" for 1950 as "inactive," but it is known that the Threeman Mining Co. maintains an office address in New York City.

PHYSICAL FEATURES AND CLIMATE

Landlocked Bay is a narrow indentation on the southern border of Chugach Mountain Range. The area is one of high, sharp relief; in most places the land rises steeply from the shores, which, in many places, are border by vertical cliffs. The top of Copper Mountain, although only four-fifths of a mile from the beach, is 3,858 feet above sea level.

When not too steep to afford a foothold for trees, the slopes up to altitudes of 2,000 feet usually are covered by a dense growth of mature spruce and hemlock. Alder, willow, and bushy plants grow thickly between the trees in the evergreen forests of spruce and hemlock. Lowlands at the head and on the south side of Landlocked Bay support scattered groves of trees interspersed by marshy meadows of sphagnum moss.

As a result of the deep indentation of the coast and of the high relief of the land, the stream gradients are steep everywhere, and the valleys are short, with few tributaries. Adequate fresh water for an operation of almost any size is to be found in Reynolds Creek and in another large, permanent, but unnamed stream that discharges into the head of Landlocked Bay. Numerous intermittent streams are in the area.

Temperatures at Landlocked Bay are modified by the Japanese Current. The winter temperatures seldom fall below zero, and the summers are mild. Mean annual temperature is about 40° F. A maximum of 86° F. and a minimum of 2° F. has been recorded at a temporary weather station 26 miles northwest of Landlocked Bay. Deep winter snows accumulate at all altitudes; even below the perpetual snowline the snow lingers until late in the summer. At Cordova, the nearest source of records, annual precipitation ranges from 140 to 190 inches.

HISTORY AND PRODUCTION

According to old reports the first copper deposit discovered on Prince William Sound was staked on Landlocked Bay in 1897. Between 1897 and 1907 numerous claims were staked on Landlocked Bay; of these, 7 groups were surveyed for patent during the latter part of the period (fig. 2).

The mining of copper, with small shipments of high-grade ores, began in 1904, soon after the first discovery. Extensive surface installations and underground development at the Threeman, Standard, and Landlocked Bay mines were completed by 1911; by this time a significant amount of hand-sorted ore had been shipped to the smelter

at Tacoma, Wash. The Hemple, Alaska Commercial Co., and Chisna Consolidated holdings were prospected actively by trenching and by underground exploration during the same period; however, no shipments of ore were made from these properties. Mining activity at all of the properties ceased by 1917. Only obscure ruins remain of the buildings, aerial trams, ore bunkers, and piers that existed at the Threeman, Standard, and Lanlocked Bay mines.

Recorded production from Landlocked Bay is summarized in table 1. The massive sulfide ore was upgraded to as high as 13.0 percent copper by hand sorting. The average grade of all hand-sorted ore shipments from Landlocked Bay was 7.5 percent copper. No attempt was made to mine and treat the copper and iron sulfides that remain in the mines as small lenses, minor stringers, and disseminations of sulfides that could not be economically hand-sorted.

TABLE 1. - Ore shipments, Landlocked Bay, Alaska[1/]

Date	Ore, tons	Copper, percent	Metal content			Mine
			Copper, lbs.	Gold, oz.	Silver, oz.	
1904	12.5	12.0	3,000	(2)	(2)	Threeman.
1906	45.0	13.0	11,700	(2)	(2)	Do.
1907	1,000.0	.4	8,000	36	518	Standard.
1909	100.0	12.0	24,000	(2)	(2)	Do.
1911	739.0	11.8	173,960	14	608	Threeman.
1912	3,300.0	9.1	601,000	48	3,300	Do.
1915	1,500.0	8.3	250,000	39	1,400	Do.
1916	928.0	4.0	74,240	(2)	(2)	Landlocked Bay.
Totals	7,624.5	7.5	1,145,900	137	5,826	

1/ From records, Federal Bureau of Mines, Juneau, Alaska.
2/ Gold and silver content not reported.

GENERAL GEOLOGY

Study of the geology of Prince William Sound by the Geological Survey began almost as soon as the search for mineral deposits. The most comprehensive investigation and detailed description of the regional geology and ore deposits of Landlocked Bay were made by Capps and Johnson[4/] in 1912. Moffitt[5 6/] subsequently contributed to the literature of Prince William Sound geology. The following description of regional geology is based chiefly on the above reports.

The Landlocked Bay area is underlain predominantly by greenstones bounded on the east by a major overthrust fault known as the Landlock overthrust. East of the fault are interbedded slates and greywackes of older rocks that have been thrust from the northwest over younger rocks. The younger rocks are known as the Orca group and the older as the Valdez group. The Orca group is composed of black slates, interbedded slates and greywackes, some limestones, greenstones ranging from rather coarse diabasic intrusives to lava flows, and conglomerates. The presence of greenstones and conglomerates is one of the chief criteria for distinguishing the

4/ Capps, S. R., and Johnson, B. L., The Ellamar District, Alaska: Geol. Survey Bull. 605, 1915, 125 pp.
5/ Moffitt, Fred H., and Fellows, Robert E., Copper Deposits of the Prince William Sound District, Alaska: Geol. Survey Bull. 963-B, 1950, pp. 47-80.
6/ Moffitt, Fred H., Geology of the Prince William Sound Region, Alaska: Geol. Survey Bull. 989-E, 1954, pp. 225-310.

Orca rocks from the more intensely metamorphosed Valdez group. Both the Valdez and Orca groups have been folded and intricately faulted; consequently, accurate determination of the thickness of each group is impossible. The greenstones are several thousand feet thick at Landlocked Bay. The scarcity of fossils and other diagnostic evidence does not permit conclusive assignment of ages to the rock groups; however, the Valdez and Orca groups have been classed as late Mesozoic.7/

The rocks underlying and bordering the major Landlock overthrust fault are extensively sheared and faulted. Numerous shear zones visible on the south flank of Copper Mountain are traceable for considerable distances as shallow troughs or gullies where erosion has removed some of the soft, sheared material. Two fairly well defined systems of shearing, faulting, and fracturing are recognizable. The more prominent system, which contains the larger number of shears and faults, strikes northwest and parallels in a general way the strike of the Landlock overthrust fault; the other system generally strikes east or almost normal to the strike of the Landlock overthrust. The dips of both systems are steep, generally 55° to 90°.

All mineral deposits of Landlocked Bay are connected closely with faults or fissures; they are most abundant near the Landlock-overthrust fault where the shattering has been most intense.

The copper deposits at Landlocked Bay were formed by replacements of the crushed rock in shear zones and by the filling of fractures. The ore minerals are predominantly chalcopyrite, pyrrhotite, and pyrite. Associated with the ore minerals are minor amounts of sphalerite, galena, arsenopyrite, chalmersite, silver, and gold. Pyrite, where present, invariably was the first mineral to be deposited, but deposition of the other ore minerals followed soon thereafter. Sphalerite was the last to be deposited.8/ Masses of nearly solid sulfides, lenticular both in plan and section, are distributed irregularly within the sheared material. The thickness of known ore lenses ranged from mere films to several feet but seldom were more than 5 feet; the maximum recorded width was 9-1/2 feet.

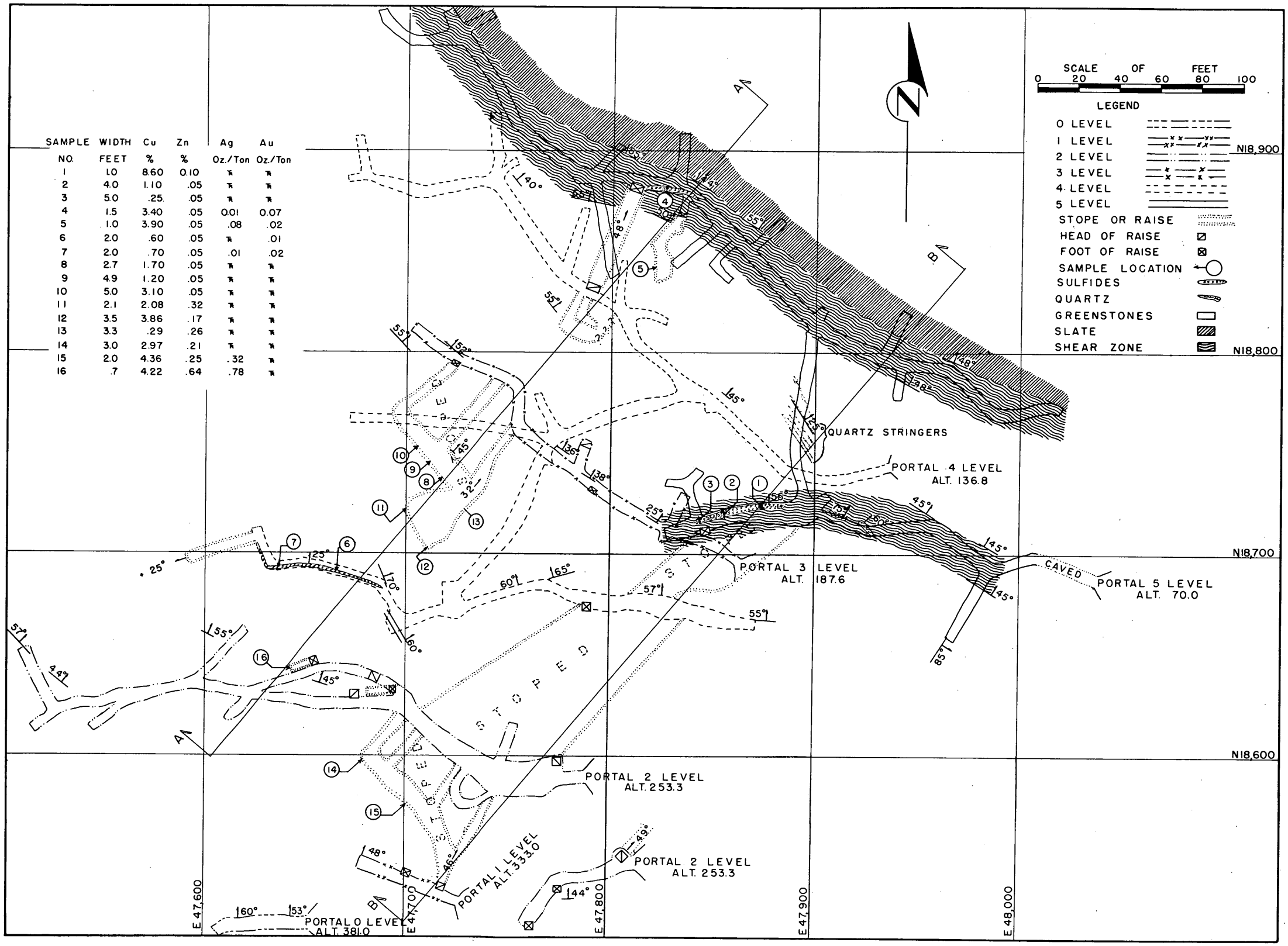
The intense recent glacial scouring of this area afforded little opportunity for surface alteration or for secondary enrichment of the ore deposits. Secondary copper minerals are of little importance; they consist, chiefly, of malachite or azurite stain and of small flakes of native copper.

WORK PERFORMED BY BUREAU OF MINES

Field Investigations

Eight of the principal mines and prospects adjacent to Landlocked Bay were examined by the Bureau of Mines. Fieldwork included clearing brush from access trails, reopening caved portals, surveying, sampling, and mapping. Over a mile of new trail was cleared of dense brush. The No. 4 level of the Threeman mine, which was caved for 25 feet from the portal, was reopened and retimbered; debris was removed from the portals of most of the other mines and prospects examined. Each mine working was located by triangulation from stations established by the United States Coast and Geodetic Survey, and all of the important underground workings were surveyed by transit and tape. Thirty-eight channel samples were obtained from the various deposits and were analyzed for copper, zinc, lead, sulfur, gold, and silver. Sample locations and analyses are shown on figures 2 through 10; mines and prospects examined are described below.

7/ Work cited in footnote 5 (p. 6), p. 273.
8/ Work cited in footnote 6 (p. 6), p. 298.



SAMPLE NO.	WIDTH FEET	Cu %	Zn %	Ag Oz./Ton	Au Oz./Ton
1	1.0	8.60	0.10	*	*
2	4.0	1.10	.05	*	*
3	5.0	.25	.05	*	*
4	1.5	3.40	.05	0.01	0.07
5	1.0	3.90	.05	.08	.02
6	2.0	.60	.05	*	.01
7	2.0	.70	.05	.01	.02
8	2.7	1.70	.05	*	*
9	4.9	1.20	.05	*	*
10	5.0	3.10	.05	*	*
11	2.1	2.08	.32	*	*
12	3.5	3.86	.17	*	*
13	3.3	.29	.26	*	*
14	3.0	2.97	.21	*	*
15	2.0	4.36	.25	.32	*
16	.7	4.22	.64	.78	*

Figure 3. - Plan of Threeman mine, Landlocked Bay, Alaska.

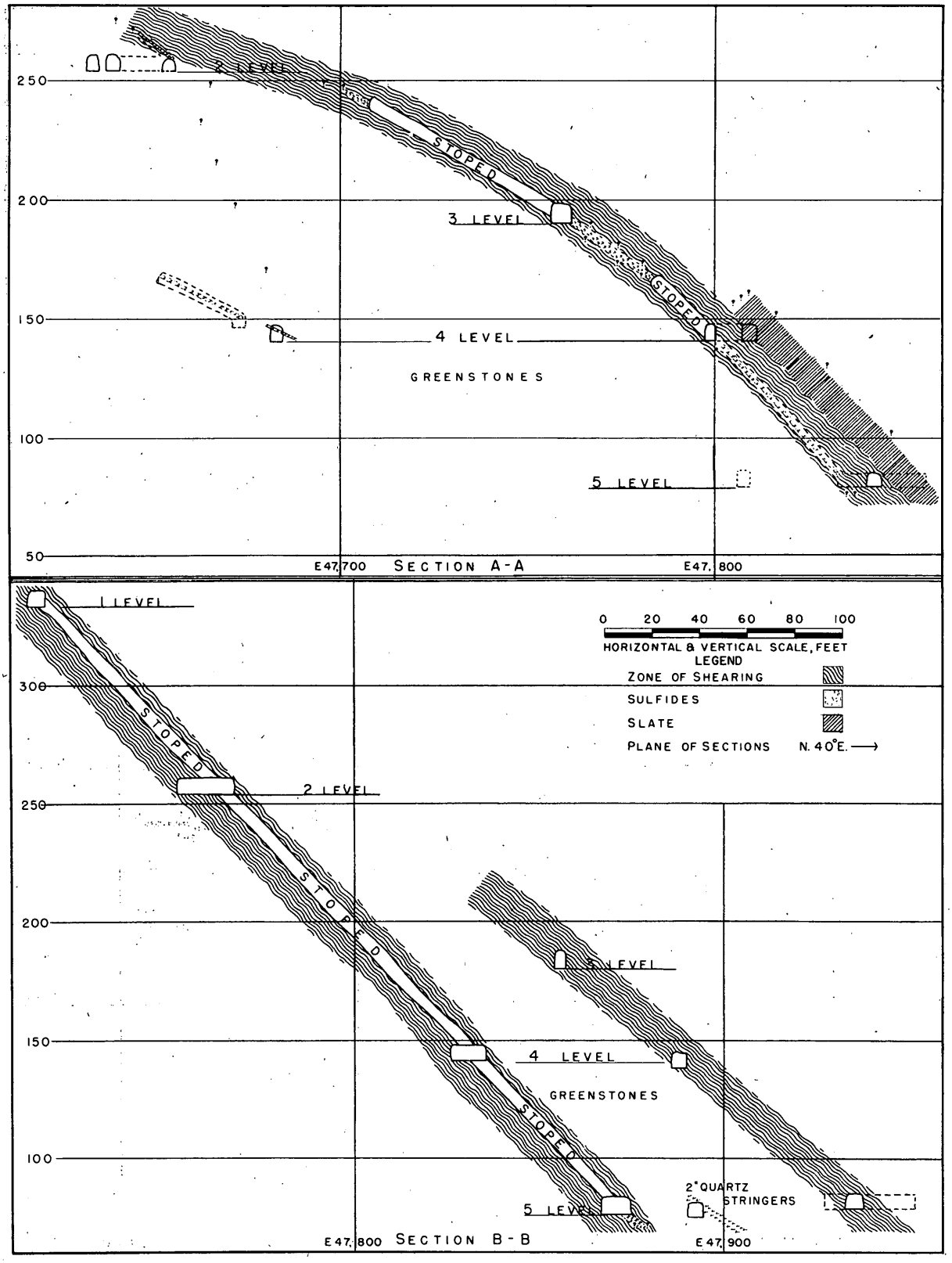
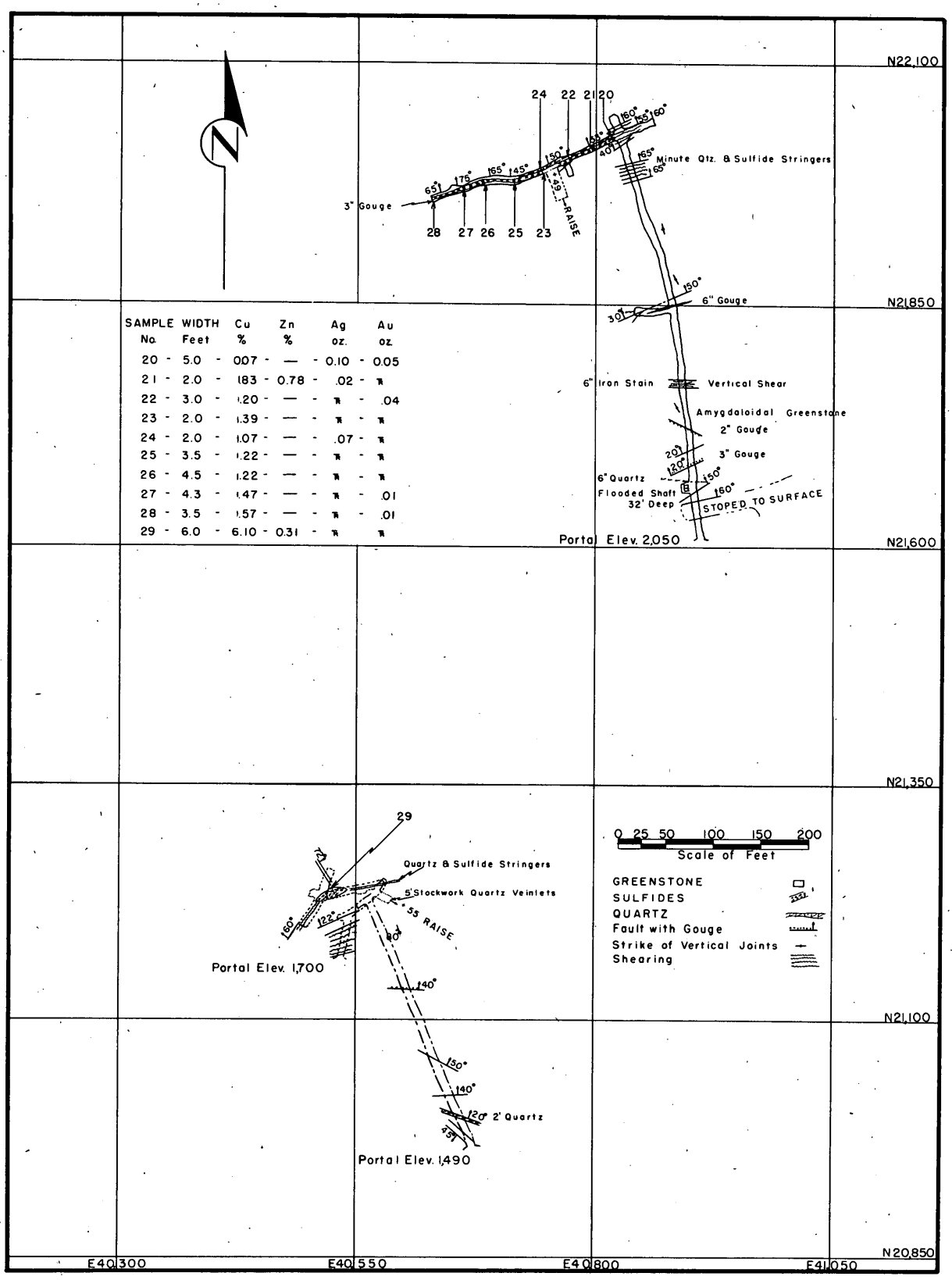


Figure 4. - Sections A-A and B-B, Threeman mine.



SAMPLE No.	WIDTH Feet	Cu %	Zn %	Ag oz.	Au oz.
20	5.0	0.07	—	0.10	0.05
21	2.0	1.83	0.78	.02	tr
22	3.0	1.20	—	tr	.04
23	2.0	1.39	—	tr	tr
24	2.0	1.07	—	.07	tr
25	3.5	1.22	—	tr	tr
26	4.5	1.22	—	tr	tr
27	4.3	1.47	—	tr	.01
28	3.5	1.57	—	tr	.01
29	6.0	6.10	0.31	tr	tr

Figure 5. - Standard mine, Landlocked Bay, Alaska.

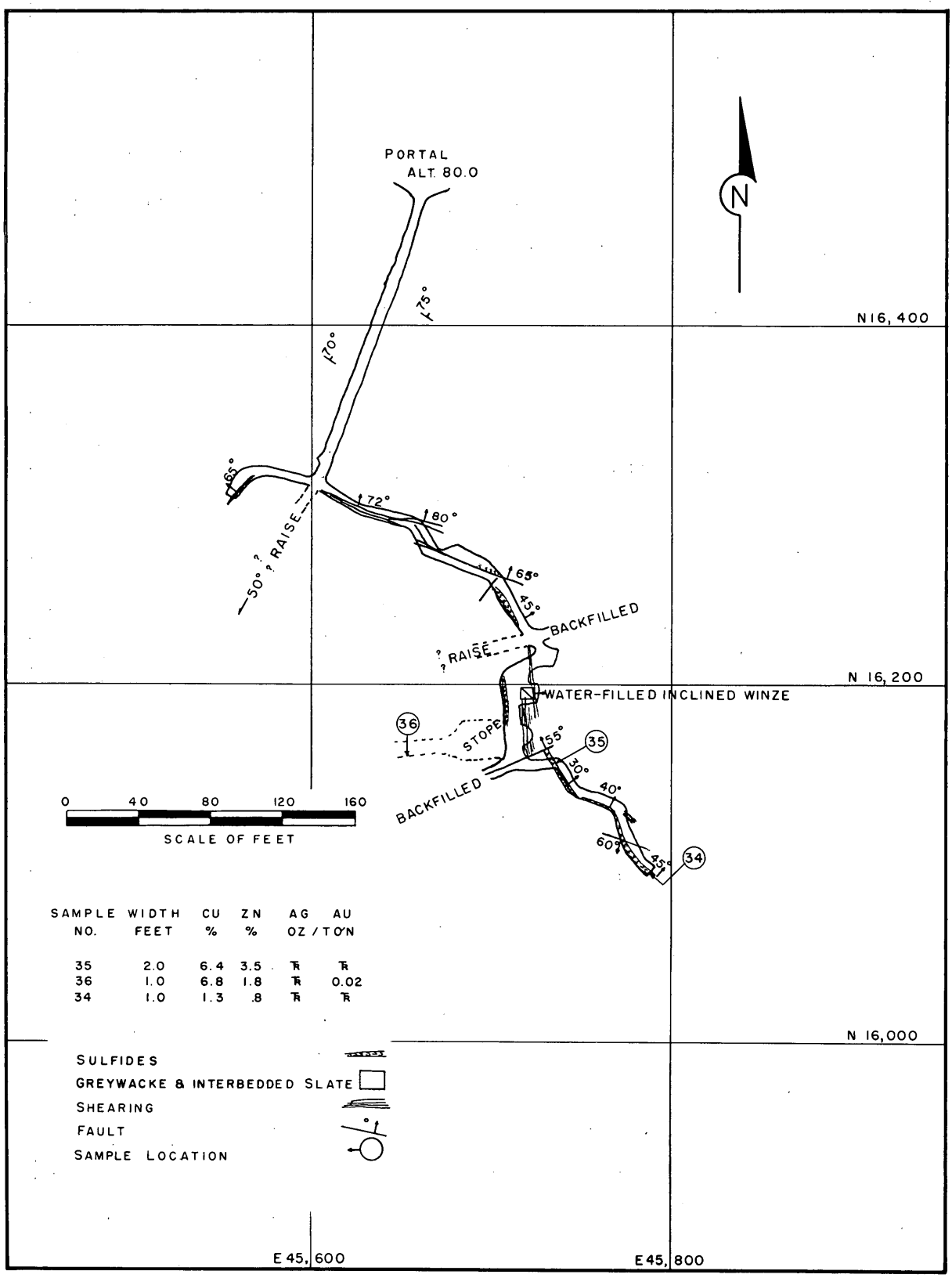


Figure 6. - Landlocked Bay Copper Mining Co.

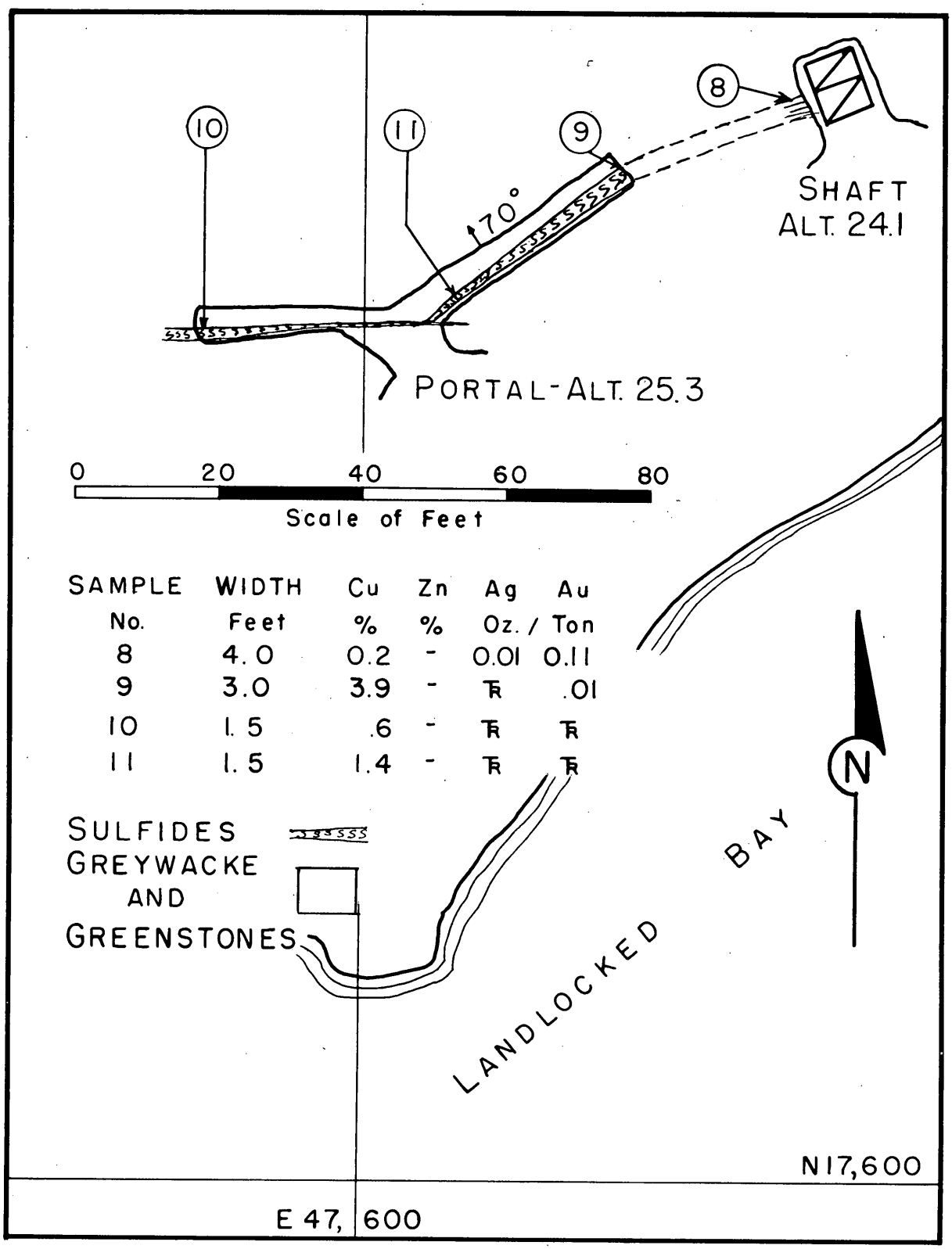
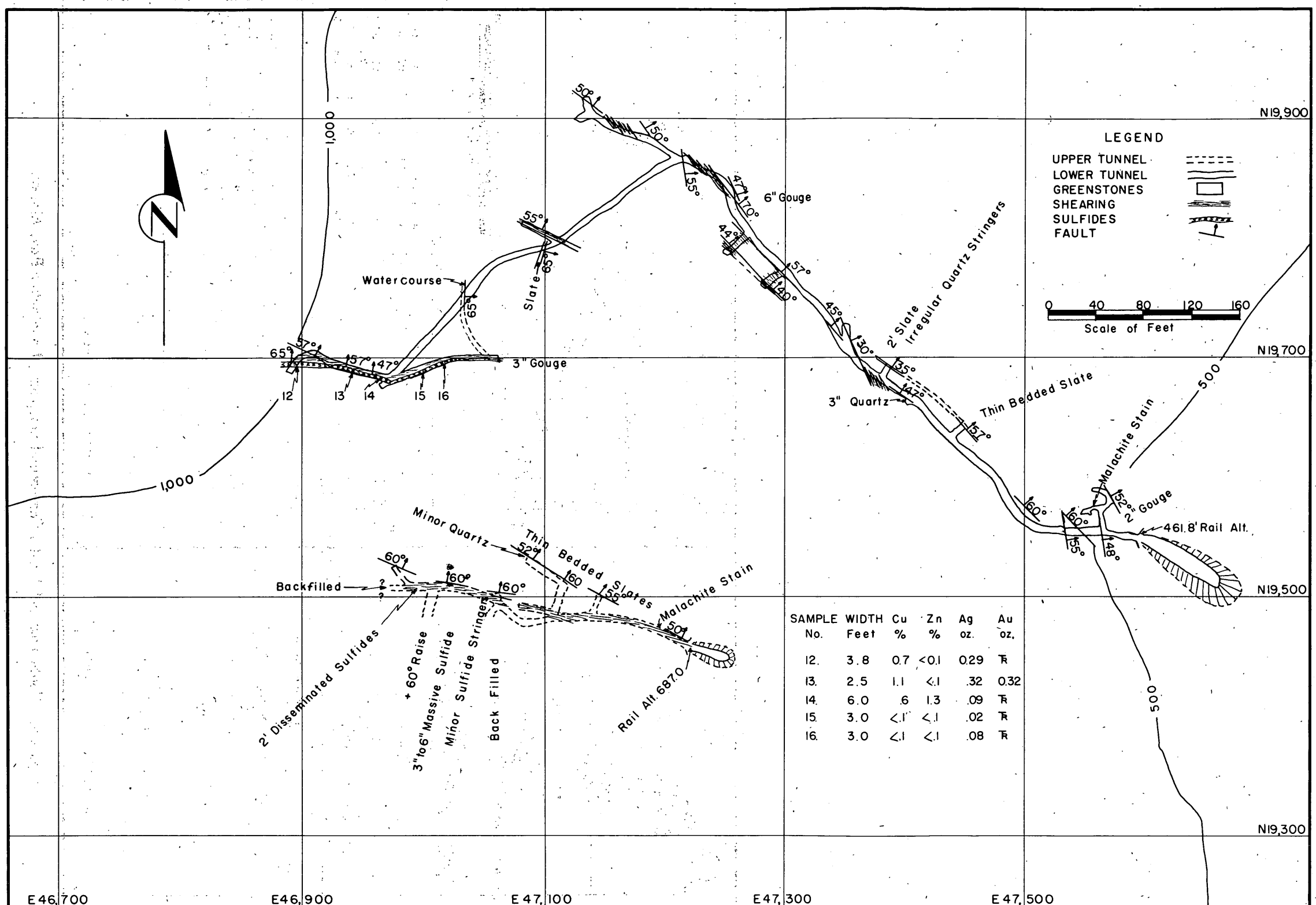
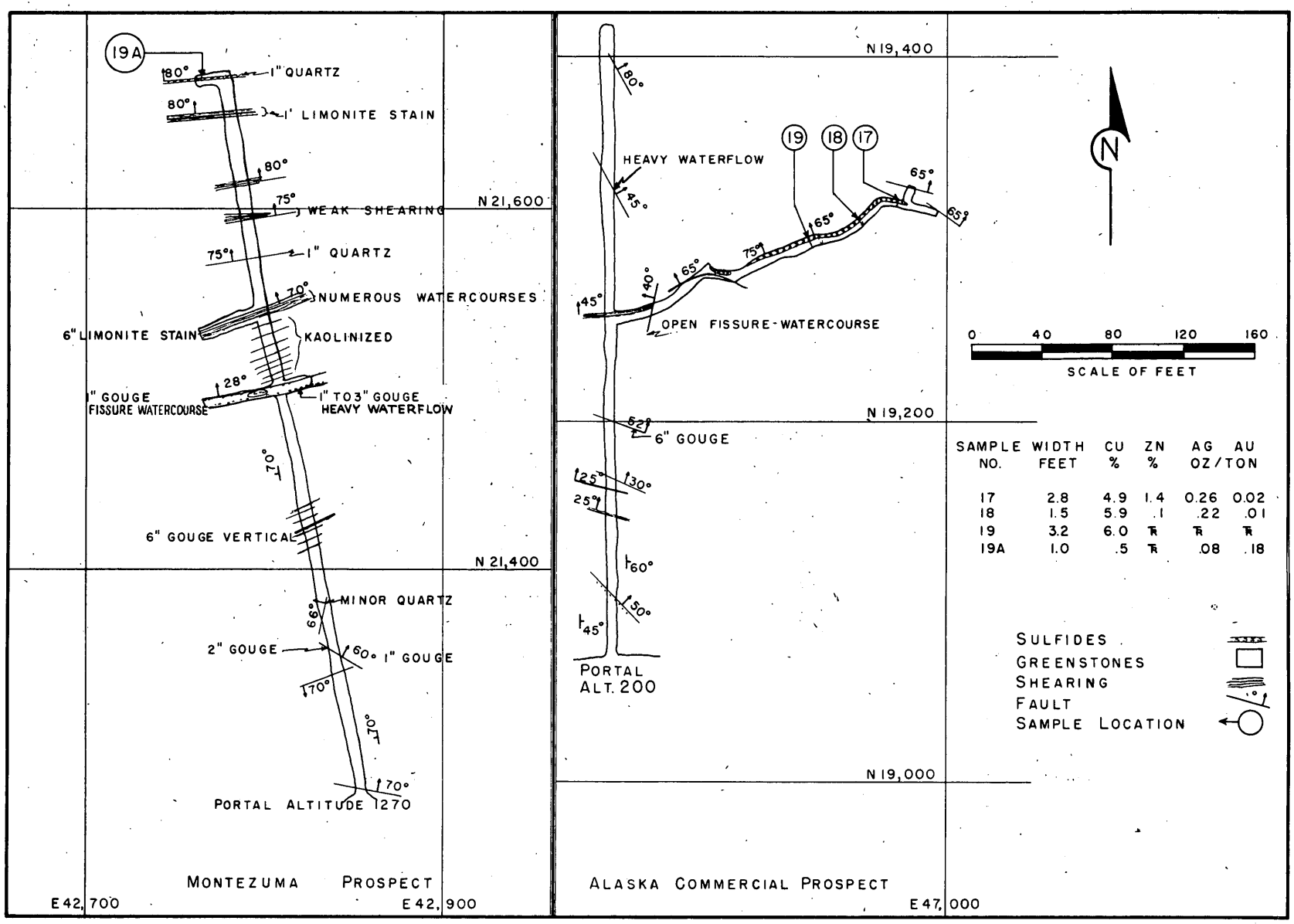


Figure 7. - Alaska Pioneer & Sourdough prospects.



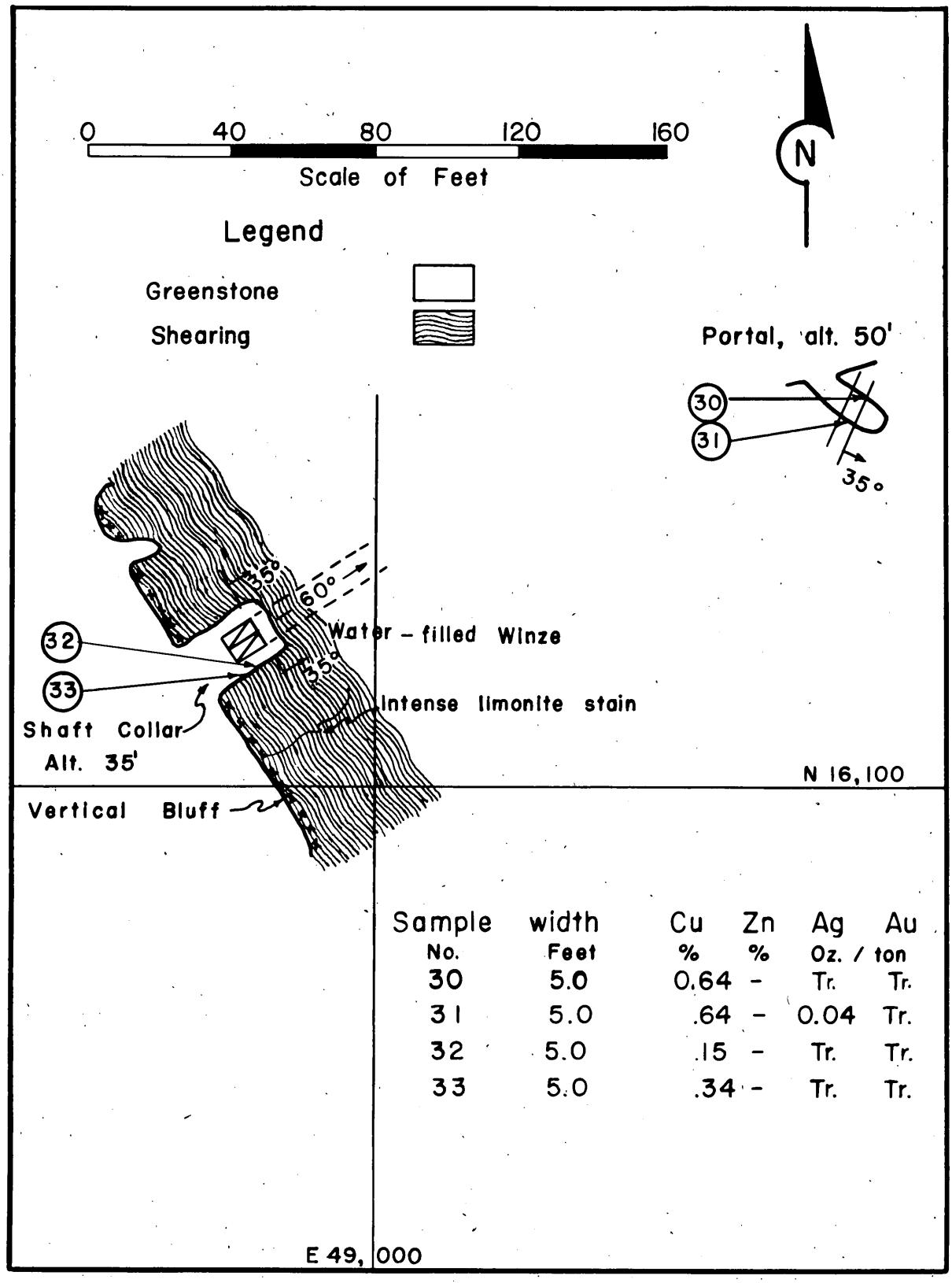
SAMPLE No.	WIDTH Feet	Cu %	Zn %	Ag oz.	Au oz.
12.	3.8	0.7	<0.1	0.29	Tr
13.	2.5	1.1	<.1	.32	0.32
14.	6.0	.6	1.3	.09	Tr
15.	3.0	<.1	<.1	.02	Tr
16.	3.0	<.1	<.1	.08	Tr

Figure 8. - Hemple Copper Co., Landlocked Bay, Alaska.



SAMPLE NO.	WIDTH FEET	CU %	ZN %	AG OZ/TON	AU OZ/TON
17	2.8	4.9	1.4	0.26	0.02
18	1.5	5.9	.1	.22	.01
19	3.2	6.0	Tr	Tr	Tr
19A	1.0	.5	Tr	.08	.18

Figure 9. - Montezuma and Alaska Commercial prospects, Landlocked Bay, Alaska.



Sample No.	width Feet	Cu %	Zn %	Ag Oz. / ton	Au
30	5.0	0.64	-	Tr.	Tr.
31	5.0	.64	-	0.04	Tr.
32	5.0	.15	-	Tr.	Tr.
33	5.0	.34	-	Tr.	Tr.

Figure 10. - Chisna Consolidated prospect.

Mines and Prospects

Threeman Mine

The Threeman mine is on the north shore of Landlocked Bay, approximately 1,000 feet west of the major Landlock overthrust fault (fig. 2). The deposit, on the Keystone claim, was staked in 1903. The first of several shipments of hand-sorted sulfide ore was made in 1904, and subsequent ore shipments were made at irregular intervals until 1915. The total recorded production was 5,596.5 tons of ore with an average metal content of 9.2 percent copper and minor amounts of gold and silver. Mining activity at the Threeman mine ceased in 1916. At present, only vestiges remain of the several buildings, a short aerial tram, a sorting bin, an ore bunker, and a pier that once existed on the property.

The mine was developed by 5 adits at altitudes of 70, 137, 186, 253, and 333 feet; these adits were named No. 5 to No. 1 respectively (fig. 3). Over 5,000 feet of development and exploration tunnels and crosscuts was completed in 2 rudely parallel shear zones. Except for the timbered portals of No. 4 and No. 5 levels, which were caved, all drifts and crosscuts were accessible at the time of examination. For the most part stopes are inaccessible, and where timbered and partly accessible, the timber is decayed.

The workings of the Threeman mine are in the extensively faulted and sheared greenstones, greywackes, and slates in the footwall of the Landlock-overthrust fault. Two shear zones are the most pronounced structural features and loci for ore deposition at the Threeman mine. The shear zones, which range in width from 15 to 50 feet, strike N. 60° to 70° W.; both shear zones dip to the north but diverge downward from their surface intersection above the No. 1 level (figs. 3 and 4). The ores are partly replacements of the crushed material of the shear zones and partly the filling of fractures in the shattered rocks.

The shipping-grade ore was obtained from two lenticular, almost massive bodies of chalcopyrite and pyrrhotite in the shear zones (fig. 3). The largest ore body mined was in the southernmost shear zone; its maximum stope length was about 70 feet; its width ranged from 2 to 9-1/2 feet. This ore shoot was mined from the No. 5 level to the surface, a distance of 350 feet on the dip. In the bottom of the drift on the No. 5 level the ore continues downward as a group of thin, parallel, chalcopyrite-pyrite stringers whose aggregate width averages slightly more than 3 feet throughout a strike length of about 50 feet. The other ore shoot was in the northern shear zone; it was stoped to short distances above the No. 3 and No. 4 levels. Where mined, this ore shoot was, according to the records, about 1 foot to 6 feet wide.

Petrographic studies of a composite of ore samples obtained from the Threeman mine show that the ore contains chlorite, altered ferromagnesian minerals, altered feldspar, quartz, some chalcopyrite, and small amounts of calcite, pyrite, pyrrhotite, and epidote and a very small amount of sphalerite. Channel samples that range in width from 0.7 to 5.0 feet show that the remaining ore contains 0.3 to 8.6 percent copper, up to 0.6 percent zinc, and unimportant amounts of gold and silver.

Standard Copper Mines

The underground workings of the Standard Copper mines are over 1 mile west of the Threeman mine (fig. 2). Exploration and development tunnels of the Standard Copper mines are in the precipitous south slope of Copper Mountain at altitudes

between 1,490 and 2,050 feet (fig. 5). An aerial tram once connected the tunnels to a 500-ton ore bin and wharf on the north shore of Landlocked Bay. The Standard Copper mine claims were explored and developed actively from 1906 until 1911. Shipments of 1,100 tons of hand-sorted sulfide ore, containing almost 1.5 percent copper with some gold and silver, were made in 1907 and in 1909.

The ore bodies are small, lenticular masses of chalcopyrite, pyrite, and pyrrhotite at or near the intersection of shear zones or faults. The country rock is predominantly greenstone but includes some greywacke and slate. The geology is complex because of much shearing and faulting. Most of the deposits are exposed at the surface as small, rust-colored outcrops where several lines of shearing intersect. The strongest shear zones strike predominantly almost east and are indefinite in length; the rust-colored outcrops in the shear zones generally are less than 100 feet long, 1 to 20 feet wide, and mostly dip to the north at fairly steep angles.

Three adits, whose combined length is 1,250 feet, were driven at altitudes of 1,490, 1,700, and 2,050 feet to crosscut and explore the most intensely metallized shear zones (fig. 5).

The adit at the 2,050-foot altitude was driven to intersect 3 ore-bearing zones that crop out on the mountain above. The lowest of these zones, which strikes N. 80° E. and dips 60° N., was intersected 30 feet from the portal of the adit. The ore shoot on this shear zone was stoped to the surface; it produced the 1,000 tons of ore shipped in 1907. A vertical shaft 32 feet deep and 50 feet from the portal was sunk on this lead; the shaft now is filled with water. Four hundred and twenty feet from the portal of the adit a drift was driven 250 feet S. 60° W. along a metallized shear zone which contains a lens of pyrite-chalcopyrite and quartz 2 to 5 feet wide; the lens dips 45° to 75° N. Samples from this lens contained 0.07 to 0.83 percent copper, with unimportant amounts of zinc, gold, and silver.

A short adit at 1,700 feet altitude exposed a vertical, ellipsoidal, massive lens of chalcopyrite and iron sulfides whose maximum length is 32 feet and maximum width 6.0 feet. The major axis of the lens strikes N. 65° E. The massive chalcopyrite lens occurs at the intersections of several shears in greenstone. A sample across the maximum width of the lens contained 6.1 percent copper, 0.3 percent zinc, and traces of gold and silver. The adit at the 1,490-foot altitude was driven 280 feet to intersect this lens in depth but encountered no bodies of sulfides; however, it was stopped about 40 feet before reaching the vertical projection of the sulfide lens in the upper adit. A short inclined raise was driven on a stockwork of quartz veinlets found in the end of the adit at the 1,490-foot altitude (fig. 5).

Landlock Bay Copper Mining Co.

The main underground working of the Landlock Bay Copper Mining Co. is slightly more than 500 feet of tunnel on the south shore of Landlocked Bay. The portal of the tunnel, at an altitude of 80 feet, is about half a mile southwest of the Threeman mine (fig. 2). Discovery of copper ore on the property was made in 1898; underground exploration of the mine and installation of an 800-ton-capacity ore bunker near the portal of the mine were completed after 1906. Mining activity culminated in 1916 with the shipment of 928 tons of hand-sorted sulfide ores containing 4 percent copper.

The ore occurs as small lenses of chalcopyrite, pyrite, and pyrrhotite in a shear zone in greenstones or greywacke with interbedded slate (fig. 6). The shear zone is 4 to 15 feet wide; along the drift its strike changes from almost east to south and its dip flattens from 80° N. to 30° N. The localization and attitude of

the sulfide lenses in the shear zone appear to have been controlled by the intersection of the shear zone with north-dipping faults. Three lenses of chalcopyrite and pyrite are exposed in the drift. The ore lenses are 25 feet to about 100 feet long; their average width is slightly more than 1 foot. One of the lenses of sulfides was partly stoped and was explored below the drift level by a winze reported to be 25 feet deep. Samples of the ore lenses contain 1.3 percent to 6.8 percent copper, 0.8 to 3.5 percent zinc, and traces of gold and silver.

Alaska Pioneer and Sourdough Prospect

The Alaska Pioneer and Sourdough prospect, originally held by the Alaska Commercial Co., is on the north shore of Landlocked Bay 1,700 feet southwest of the Threeman mine (fig. 2). At this location 65 feet of tunnel and a shallow vertical shaft were driven to explore a shear zone that strikes N. 60° E. and dips 70° N. (fig. 7). The shear zone has a well-defined hanging wall but an indistinct foot wall. The country rock includes greenstones, slate, and greywacke. All of the workings are in greenstones.

The tunnel, at an altitude of 25 feet, exposed an almost massive lens of chalcopyrite and pyrrhotite which is 1.5 to 3.0 feet wide throughout a length of 35 feet. Samples of this lens contained 1.4 to 3.9 percent copper. A vertical shaft 25 feet deep was sunk in the shear zone 27 feet east of the tunnel face but when examined was filled with water. A sample of the shear zone above the collar of the shaft contained 0.2 percent copper.

Hemple Copper Co. Prospect

Underground exploratory tunnels of the Hemple Copper Co. are about 1,500 feet north of the Threeman mine. A tunnel, at 462 feet altitude was driven about 1,100 feet, and a tunnel at 687 feet altitude was driven 240 feet to explore a shear zone that strikes almost east and dips about 60° N. (fig. 8).

The country rock is greenstone, black slate, and greywacke. A lens chiefly composed of stringers of pyrite and pyrrhotite was exposed in the lower tunnel throughout a length of approximately 150 feet. The width of the lens ranged from 2.5 to 6.0 feet. Samples of this lens contained 0.1 to 1.1 percent copper, with unimportant amounts of other metals. The tunnel at 687 feet altitude exposed a short lens of sulfides about 6-inches wide.

Alaska Commercial Prospect

This prospect, reported to have been the first discovery of copper ore at Landlocked Bay, was located in 1897. Exploratory openings are in a nearly vertical cliff on the north shore of Landlocked Bay one-half mile west of the Threeman mine (fig. 2). A tunnel at an altitude of 200 feet was driven north into the greenstone cliff to intersect a large shear zone that outcrops above. A drift was driven 200 feet along a northeast-striking shear zone 190 feet from the portal of the tunnel (fig. 9). The drift exposed two lenses of chalcopyrite, pyrrhotite, and pyrite. The combined length of the 2 lenses exceeded 100 feet; their width ranged from 1.5 to 3.2 feet.

The strike of the largest sulfide lens is about N. 70° E.; its dip ranges from 65° to 75° N. Samples of this lens contained 4.9 to 6.0 percent copper, 0.1 to 1.4 percent zinc, and minor amounts of gold and silver.

Other exploratory openings and trenches that are said to have been driven above the tunnel are obscured by talus and brush.

Montezuma Prospect

Exploratory openings on the Montezuma claim are on the steep south side of Copper Mountain at an altitude of 1,270 feet, about 1 mile west of the Threeman mine (fig. 2). The major structure on the Montezuma claim outcrops at an altitude of 1,400 feet as a mineralized shear zone that strikes east and dips 65° N. Erosion of the outcrop of this shear zone has resulted in a well-defined, shallow trough about 50 feet wide that is traceable for over 1 mile toward the head of Landlocked Bay. Several smaller shear zones, which contain some pyrite and quartz, outcrop at altitudes of 1,500, 1,700, and 2,000 feet, respectively. These smaller shear zones generally strike N. 80° to 85° E. and dip N. at angles between 50° and vertical; their width ranges from 1 to 15 feet throughout strike lengths up to 50 feet.

The tunnel at 1,270 feet altitude was driven north 400 feet but did not intersect the major shear zone or encounter significant sulfide mineralization (fig. 9). The tunnel is driven in greenstones; it crossed several northeast-striking faults that dip 25° N. to 80° N. Most of the faults contain limonite and gouge up to 1 foot wide. A quartz-filled fracture about 1 foot wide, which strikes N. 80° E. and dips 80° N., was exposed in the end of the drift. A sample of this vein contained 0.5 percent copper, traces of zinc, 0.08 ounce of silver, and 0.18 ounce of gold per ton.

Chisna Consolidated Prospect

Exploratory workings of the Chisna Consolidated prospect are on the south shore of Landlocked Bay in the hanging wall of the Landlock overthrust fault (fig. 2). The principal underground working is an inclined shaft reported to be 40 feet deep. The collar of the shaft, a short distance from the shoreline, is at an altitude of 35 feet at the base of a rust-stained, vertical scarp or bluff slightly more than 100 feet high. The shaft was sunk to explore a zone of closely spaced fracturing or shearing about 40 feet wide which strikes N. 30° W. and dips 35° NE. Thin films of chalcopyrite, and of pyrite with gouge, fill the fractures in greenstone. A sample taken above the collar of the shaft across 10 feet of the zone contained 0.15 to 0.34 percent copper and traces of gold and silver (fig. 10). About 200 feet east of the bluff 20 feet of tunnel was driven to crosscut an outcropping fracture 5 feet wide which strikes N. 30° E. and dips 35° E. Samples of the most highly mineralized parts of the tunnel contain 0.64 percent copper and traces of gold and silver.

Laboratory Investigations

A 600-pound sample of ore for metallurgical testing was composited from 14 samples of the Threeman mine to provide a sample similar in grade and character to the ore bodies of the Threman deposit.

Character of the Ore

Detailed physical and chemical studies were made of the composite sample from the Threeman mine; the results follow:

Physical

Petrographic study showed that the composite sample essentially contains chlorite, altered ferromagnesian minerals, altered feldspar, quartz, some chalcopyrite, and small amounts of calcite, pyrite, pyrrhotite, and epidote, and a very small amount of sphalerite.

Maximum liberation occurs in the minus-65- plus-100-mesh fraction, but the bulk of the chalcopyrite is liberated in the coarser minus-48-plus-65-mesh fraction.

Chemical

Representative head samples of the composite sample were analyzed chemically and spectrographically. The results of partial chemical analyses are shown in table 2. A semiquantitative spectrographic analysis revealed the presence and approximate quantities of the following metals: Over 10 percent Al; 5 to 10 percent Ca; about 1 percent Cu; 1 to 5 percent Mg; 0.001 to 0.01 percent Ag; 0.01 to 0.1 percent Zn; 0.01 to 0.1 percent Cr; about 0.1 percent Co; over 10 percent Fe; about 0.1 percent Mn; 0.01 to 0.1 percent Ni; over 10 percent Si; about 1 percent Ti; and 0.01 to 0.1 percent V. Any other elements present are in amounts lower than the minimum detectable by the routine technique employed. A spectrographic analysis of sample 5 of the Threeman mine showed a selenium content of less than 0.01 percent.

TABLE 2. - Chemical analysis

Assay, percent						Oz. per ton	
Cu	Fe	Insol.	Zn	Ni	Co	Au	Ag
1.65	15.1	49.3	1/ 0.05	0.01	0.02	Tr	0.36

1/ Less than.

Concentration Tests

A series of flotation tests to determine the grind and reagent combination required for maximum recovery of copper from the ore was completed. Although good recoveries of copper were obtained by rougher flotation of ore ground to minus-48- or 65-mesh, it was difficult to clean the rougher concentrate. Several tests were made in which the rougher concentrate was reground before cleaning. The results shown in table 3 are typical of tests using this procedure. For this test ore was ground in a laboratory ball mill to pass a 48-mesh sieve. The pulp was conditioned with lime and collector for 5 minutes and a rougher concentrate was made. The rougher concentrate was reground 12 minutes and cleaned 3 times. Operation data of the test are shown in table 4.

By flotation 81 percent of the copper was recovered in a concentrate assaying 28.4 percent Cu, 35.3 percent Fe, and 1.9 percent acid-insoluble matter. Over 13 percent of the total copper reported in the cleaner tailings, which could be retreated to increase the recovery of copper slightly. The small amount of cobalt in the ore, which apparently is associated with pyrrhotite, was concentrated to some extent in the cleaner tailing.

Partial oxidation of the ore samples as received reduced the flotability of the copper minerals and activated the iron sulfides, making separation of copper and iron minerals more difficult.

TABLE 3. - Flotation, Threeman-mine ore

Product	Weight, percent	Assay, percent				Distribution, percent		
		Cu	Co	Fe	Insol.	Cu	Co	Fe
Concentrate	4.28	28.4	0.01	35.3	1.9	81.1	2.8	10.2
Cleaner tail, 3	1.17	6.3	.10	43.1	12.1	4.9	8.4	3.4
Cleaner tail, 2	.89	9.2	.03	26.4	24.2	5.5	2.1	1.6
Cleaner tail, 1	6.02	.8	.06	24.7	37.6	3.2	25.2	10.1
Rougher tail	87.64	.09	.01	12.6	51.7	5.3	61.5	74.7
Calculated head	100.00	1.5	.014	14.8	48.0	100.0	100.0	100.0
Combined cleaner tails..	8.08	2.5	.06	27.5	32.4	13.6	35.7	15.01

TABLE 4. - Operation data, flotation test

Circuit	pH	Reagents, pounds per ton			
		CaO	NaCN	Z-3 1/	M.I.C. 2/
Grinding	-	-	-	-	-
Conditioner	9.8	1.0	0.1	0.25	0.1
Rougher	9.8	-	-	-	-
Regrind	-	1.0	-	-	-
Cleaner 1	10.0	-	-	-	.05
Cleaner 2	9.5	-	-	-	-
Cleaner 3	7.5	-	-	-	-
Total		2.0	.1	.25	.15

1/ Potassium ethyl xanthate.
2/ Methyl isobutyl carbinol frother.

INT.-BU.OF MINES,PGH.,PA. 8141

OFFICIAL BUSINESS

[illegible] NEW [illegible]
DENVER 2, COLORADO

Defense Minerals Exploration Adm.
U. S. Department of the Interior
Interior Building
Washington 25, D. C.

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
2/7	Griswold	500
"	Johnson	110
"	Gottendorf	100
		225

Mr. S. Taylor, Asst. Secretary
Bornite Copper Corporation, Ltd.
Suite 1024
85 Richmond Street, West
Toronto, Ontario, Canada

Re: Docket No. DMEA-4728 (Copper)
Bornite Copper Corporation, Ltd.
Bornite Claims
Gravina Island, Alaska

Dear Mr. Taylor:

Your letter of January 22, 1958, to the Spokane, Washington, office has been forwarded to us. Since you state that your company no longer has an interest in the claims covered in your application of March 29, 1957, we are considering the application as having been withdrawn.

As requested, we are returning the report by Alan C. Lee, dated November 13, 1956.

Sincerely yours,

Administrator

Enclosure

WRGriswold/er 2/7/58
Copy to: Docket
Admr R File
Op. Committee
Mr. McMahon, USBM
Mr. Kiilsgaard, USGS
Region I (2)
Chron.

8623

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DMEA
RECEIVED FEB 3 1958

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UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
So. 157 Howard Street
Spokane 4, Washington

January 30, 1958

Mr. George C. Selfridge, Chairman
Operating Committee, DMEA
Department of the Interior
Washington 25, D. C.

A

Re: Docket No. DMEA-4728 (Copper)
Bornite Copper Corporation, Ltd.
Bornite Claims
Gravina Island, Alaska

Dear Mr. Selfridge:

Enclosed are two copies of a letter dated January 22, 1958, from Mr. S. Taylor, Assistant Secretary of the referenced company.

In view of this letter we recommend that this application be withdrawn.

By Field Team, Region I

A. E. Weissenborn

A. E. Weissenborn, Exec. Officer
U. S. Geological Survey

Thomas E Howard

for: Wing G. Agnew, Member
U. S. Bureau of Mines

Enclosures

cc: USBM (2)
MacKevett

BORNITE COPPER CORPORATION LTD.

(No Personal Liability)

SUITE 1024 - 65 RICHMOND ST. WEST
TORONTO, ONTARIO

Telephone: EM. 3-2642

Mac
al
USBM
DMEA
MacKenzie

22nd January, 1958.

DMEA
FEB 3 1958

United States Department of the Interior,
Defense Minerals Exploration Administration,
So. 157 Howard Street,
Spokane 4, Washington.

Re: Docket No. DMEA-4728 (Copper)

Dear Sirs:

We have your letter of 13th January and beg to advise you that our Company is no longer interested in the claims referred to in your letter, having surrendered our interest therein during the past year.

Yours faithfully,

BORNITE COPPER CORPORATION LTD.
(No Personal Liability)

S. Taylor, Asst. Secretary

ST:MR

RECEIVED
JAN 28 1958
U.S.G.S.
SPOKANE, WA.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
So. 157 Howard Street
Spokane 4, Washington

January 13, 1958

Mr. George C. Selfridge, Chairman
Operating Committee, DMEA
Department of the Interior
Washington 25, D. C.

Re: Docket No. DMEA-4728 (Copper) ~~All~~
Bornite Copper Corporation, Ltd.
Bornite Claims
Gravina Island, Alaska

Dear Mr. Selfridge:

In reference to your letter of December 27, 1957, we are enclosing two copies of a letter we have written to Mr. Noble Harbinson, President of the applicant company, to learn the status of the subject application.

As soon as we receive a reply, we will forward you copies.

By Field Team, Region I

A. E. Weissenborn

A. E. Weissenborn, Exec. Officer
U. S. Geological Survey

Wing G. Agnew

Wing G. Agnew, Member
U. S. Bureau of Mines

Enclosures

cc: USBM (2)
MacKevett

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So. 157 Howard Street
Spokane 4, Washington

Air Mail

January 13, 1958

Mr. Noble Harbinson, President
Bornite Copper Corporation, Ltd.
34 Gamble Street East
Rouyn, Quebec, Canada

Re: Docket No. DMEA-4728 (Copper)
Bornite Copper Corporation, Ltd.
Bornite Claims
Gravina Island, Alaska

Dear Mr. Harbinson:

During the past summer the DMEA office in Juneau was closed and the records were transferred to this office which now administers the Alaska DMEA applications and contracts.

We cannot find in our files any reply to Mr. S. H. Lorains letter of May 17, 1957, addressed to Mr. R. Y. W. Campbell in which he states that it will be necessary that your company obtain title to or lease on the patented Dall claims 1, 3, and 4, Patent Survey 339, Rossland and Deer Park Mining Company. It appears that the Rossland and Deer Park Mining Company is no longer in existence, but the patent is still valid to whomever may hold the company assets. In his letter Mr. Lorain also raises certain questions regarding your proposed program.

We would appreciate knowing whether or not you are still interested in this application and, if so, what progress is being made toward acquiring the land in question, and receiving your comments regarding the questions raised by Mr. Lorain.

By Field Team, Region I

A. E. Weissenborn, Exec. Officer
U. S. Geological Survey

Wing G. Agnew, Member
U. S. Bureau of Mines

cc: DMEA (2)
USBM (2)
MacKevett

DMEA Form 7
(12-56)

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DEC 27 1957

Mr. A. E. Weissenborn
Executive Officer
DMEA Field Team, Region I
South 157 Howard Street
Spokane 4, Washington

Re: Docket No. DMEA-4728 (Copper)
Bornite Copper Corporation, Ltd.
Bornite Claims
Gravina Island, Alaska

Dear Mr. Weissenborn:

Will you kindly bring us up to date on the status of the cited application.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (24B)

APPROVED:

Frank D. Lamb (24B)
Member, Bureau of Mines

N. E. Nelson (24B)
Member, Geological Survey

WRGriswold/er 12/23/57
Copy to: Docket
Admr R File
Op. Committee
Mr. McMahon, USBM
Mr. Kiilsgaard, USGS
Chronl

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UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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6/4/57

P. O. Box 2688
Juneau, Alaska

May 28, 1957

Memorandum

To: Operating Committee, Defense Minerals Exploration Admin., Department of the Interior, Washington 25, D. C.

From: Executive Officer, Alaska District, Region I.

Subject: Consent to lien,
Docket No. DMEA-4728 (copper)
Bornite Copper Corp., Ltd.

Enclosed are four copies of "Consent to Lien" Form MF-205 signed by Northwest Ventures Ltd., and four copies signed by Northwest Ventures Alaska, Ltd.

These forms cover claims as listed below:

Paula Group - Nos. 1 - 58 inclusive, except Nos. 17, 34, 37, 39, 41 and 49 - 54. Recorded in Vol. 14 of the Mining Records, at Ketchikan, Alaska, at pages 230 to 257 inclusive.
Bear Group - Nos. 1 - 44 inclusive, Vol. 14, P. 417 - 439 incl.
Salt Chuck Group - Nos. 1 - 12 inclusive. Vol. 14, P. 449.
Kitz Group - Nos 1 and 2. Vol. 14, P. 259

S. H. Lorain

Enclosure-2

cc: Velikanje
Wilcox
Herdlick

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

DMEA-4148

P. O. Box 2688
Juneau, Alaska

May 17, 1957

OFFICIAL FILE COPY
DMEA
RECEIVED MAY 20 1957

DATE	INITIALS	CODE
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5/23

Mr. H. Y. W. Campbell,
Director,
Bornite Copper Corp., Ltd.,
Federal Bldg.,
85 Richmond Street West,
Toronto 1, Ontario,
Canada.

Dear Mr. Campbell:

When you called me yesterday morning from Ketchikan I was preparing a letter to your company about the proposed exploration program. I was very sorry to learn from you that you had not been aware of the existence of the patented claims; however I think that your chances of getting it straightened out without excessive cost are very good. I am enclosing prints of the "Rosaland and Deer Park" claims and of the "Victory" claims. Inasmuch as the Victory claims are located on your own maps, you will be able to tie in the "Rosaland and Deer Park" claims without much trouble. The surveys of individual claims (with bearings and distances) are obtainable from the "Bureau of Land Management, Anchorage, Alaska"; most other information about claims can be obtained from the "Territorial Department of Mines, Juneau, Alaska".

As I explained during our phone conversation, it will be necessary that your company obtain title to or lease on the claims before DMEA could participate in a project in that particular area. Also we find ourselves obliged to raise a couple of questions with regard to the proposed program, as follows:

(a) Your hope of getting better core recovery and higher copper content at greater depth is not supported by our knowledge of southeastern Alaska ore occurrences nor by our very considerable drilling experience in southeastern Alaska. Because of recent glaciation, oxidation is extremely shallow; therefore you can expect essentially the same conditions at 600 feet that you found at 300 feet. By proper attention to sludge recovery you should have been able to obtain accurate samples from the diamond drilling but it does not appear that your drillers paid any attention to sludge. The sampling of last season could be checked by a few diamond drill holes to about the same depth as before (provided sludge is handled carefully) or by a few churn drill holes to the same depth. We could not recommend DMEA participation in a deep drilling program until the near-surface ore has been delineated with some accuracy.

(b) Although bedrock is exposed along considerable parts of the beach line, in old mine workings, in a few outcrops, and could be further exposed by trenching, your engineers appear to have made no effort to map the structural control of the ore deposition nor to indicate any geologic conditions which might define the ore limitations or the relationships between the ore occurrences that have been drilled; consequently there is no basis on which to suggest an alternate program.

We think that, probably, the area deserves more work but, as indicated above, we also think that more detailed geological work should be done before a costly exploration program is undertaken.

If you wish, our staff will be happy to cooperate with your engineers in working up a program which might be acceptable to DMFA.

Yours sincerely,

F. H. Lorain,
Executive Officer,
Alaska District,
Region I.

Enclosures

cc: Operating Committee
Velikanje
Kerdlick

DMEA Form 7
(12-56)

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"	[illegible]	100
5/14	[illegible]	225
		500

MAY 13 1957

Mr. S. H. Lorain, Executive Officer
DMEA Field Team, Region I
Alaska District
Post Office Box 2688
Juneau, Alaska

Re: Docket No. DMEA-4728 (Copper)
Bornite Copper Corporation, Ltd.
Bornite Claims
Gravina Island, Alaska

Dear Mr. Lorian:

The cited application is being referred to your office for consideration, a field examination of the property if warranted, and recommendation.

In the event that you should consider the application favorably, the Applicant should be requested to obtain a Consent to Lien and Subordination Agreement from the Northwest Ventures Limited. It is stated that this company has a 20 per cent interest in the property. Also, we would appreciate receiving a property map showing the proposed work, of a size which can be attached to the copies of the contract.

Actually, we see little reason for you to waste much time on the application until the Applicant has secured the necessary ground, as cited in Item 1 of your April 12 memorandum. He should be advised accordingly.

We are not favorably disposed toward entering into projects involving the exploration of massive, low grade deposits by means of diamond drilling. It is only rarely that such type of deposits will permit a core recovery which can be considered as reliable. The standard method, when dealing with deposits of this type, is to churn drill. The results of churn drilling, if the work is properly done, are dependable and are precise within close limits. We suggest that you also take up this matter with the Applicant.

8623

Copies of memoranda dated April 22 and May 2, 1957, by A. D. McMahon, Bureau of Mines, and N. E. Nelson, Geological Survey, respectively, relating to the project are enclosed for your information.

Also, enclosed is one copy of the application for the cited property and Bureau of Mines Report of Investigations 5320 for the use of the Field Team.

Sincerely yours,

George C. Selfridge
(by ey)
Chairman, Operating Committee

Enclosures:

APPROVED:

Frank D. Lamb (by ey)
Member, Bureau of Mines

Thor H. Kiilsgaard (by ey)
Member, Geological Survey

JWAlt/er 5/8 & 13/57
Copy to: Docket
Admr R File
Op. Committee
Mr. McMahon, USBM
Mr. Kiilsgaard, USGS
Chron.

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

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Mr. S. H. Lorain, Executive Officer
DMEA Field Team, Region I
Alaska District
Post Office Box 2688
Juneau, Alaska

Re: Docket No. DMEA-4728 (Copper)
Bornite Copper Corporation, Ltd
Bornite Claims
Gravina Island, Alaska

Dear Mr. Lorain:

The cited application is being referred to your office for consideration, a field examination of the property if warranted, and recommendation.

In the event that you should consider the application favorably, the Applicant should be requested to obtain a Consent to Lien and Subordination Agreement from the Northwest Ventures Limited. It is stated that this company has a 20 per cent interest in the property. Also, we would appreciate receiving a property map showing the proposed work of a size which can be attached to the copies of the contract.

If bids are available for diamond drilling for this location, we would like to have bids from two independent contractors. However, if bids are not available, please let us have your recommendations regarding costs for this work.

Copies of memoranda dated April 22 and May 2, 1957, by A. D. McMahon, Bureau of Mines, and N. E. Nelson, Geological Survey, respectively, relating to the project are enclosed for your information.

Also, enclosed is one copy of the application for the cited property and Bureau of Mines Report of Investigations 5320 for the use of the Field Team.

Sincerely yours,

Enclosures
APPROVED:

Chairman, Operating Committee
JWAlt/er 5/8/57
Copy to: Docket
Amdr R File
Op. Committee
Mr. McMahon, USBM
Mr. Kiilsgaard, USGS
Chron.

Member, Bureau of Mines

Member, Geological Survey

8623

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	Kilsgaard	
5/13	Johnson	110
	Mittendorf	100
		225
		500.

MAY 13 1957

Mr. Noble Harbinson, President
Bornite Copper Corporation, Ltd.
34 Gamble Street East
Rouyn, Quebec, Canada

Re: Docket No. DMEA-4728 (Copper)
Bornite Copper Corporation, Ltd.
Bornite Claims
Gravina Island, Alaska

Dear Mr. Harbinson:

Your application for Government assistance to explore the cited property has been reviewed by the Base Metals Division of the Defense Minerals Exploration Administration and is being referred to:

Mr. S. H. Lorain
Executive Officer
DMEA Field Team, Region I
Alaska District
Post Office Box 2688
Juneau, Alaska

If additional information concerning your application is needed, the Field Team will get in touch with you at an early date.

Sincerely yours,

G. O. Mittendorf (for)

Administrator

JWAlt/er 5/8/57
Copy to: Docket
Admr R File
Op. Committe
Mr. McMahon, USBM
Mr. Kiilsgaard, USGS
Region I, Alaska Dist. (2)
Chron.

8623

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

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D M E A
RECEIVED MAY 6 1957

DATE	INITIALS	CODE
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May 2, 1957

Re: DMEA 4728
Bornite Copper Corp. Ltd.
Gravina Island
Alaska
$70,431.00 - Copper

Memorandum

To: W. R. Griswold, Defense Minerals Exploration Administration

From: N. E. Nelson, U. S. Geological Survey

Subject: Review of application.

The applicant requests assistance in continuing the exploration by diamond drilling of two zones, indicated, by drilling in 1956, to carry low grade copper-bearing material over substantial widths.

In 1956, 8,454 feet of drilling was done on 3 zones. The results of the drifting of one zone were unfavorable but 2 zones gave some indications of worthwhile mineralization. No details of the core sampling or assays accompany the report, but in one hole, No. 3 in the Nichols Passage zone, a continuous section across 73.9 feet assayed 0.47% copper.

In the opinion of the consultant, the work was poorly supervised, and chalcopyrite may have been 'ground up' as it occurs as narrow veinlets in a sericitic schist. Some grinding may have occurred. That it was enough to affect the grade materially remains to be proven.

The application says a purpose of the proposed deep drilling is to get below the zone of surface weathering effects. The drilling was done near sea level and as all were 'down' holes, much of the core came from below sea level. I question whether surface weathering materially affected the values in the core.

Referral of the application to the Field Team for appropriate action is recommended.

N. E. Nelson

N. E. Nelson

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

OFFICIAL FILE COPY
DMEA
RECEIVED APR 22 1957

DATE	INITIALS	CODE
4/22	JWG	220
April	22, 1957	500
4/22	JWA	

Memorandum

To: W. R. Griswold, Defense Minerals Exploration Administration

From: Commodity Specialist, Branch of Base Metals

Subject: Review of application, Docket No. DMEA 4728 (copper), Bornite Copper Corporation Limited (N.P.L.), Bornite Claims, Gravina Island, Alaska. $70,431

The applicant seeks assistance in a core drilling program designed to amplify information derived from previous drilling in the Dall Bay and Seal Cave areas. The drilling proposed consists of 3,000 feet in five holes in the Dall Bay drilling plan and 2,500 feet in the Seal Cave drilling plan. Both plans locate holes so as to intersect horizons below those cut previously in the most favorable sections. Assay results of hole No. 3 show 73.9 feet of 0.47% copper. The applicant explains the low value is due to loss of chalcopyrite through grinding in the core barrel and believes there is a possibility that minable widths of 1% or more might be found if more care is exercised in drilling and sampling.

It would seem that two holes in each area would furnish the same information as the number proposed by the applicant if the target areas are worth future development.

Referral of the application to the Field Team is recommended.

A. D. McMahon

A. D. McMahon

Attachment

Copy to: Division of Minerals
Branch of Base Metals (2)
Thor Kiilsgaard, U.S.G.S.
F. D. Lamb
F i l e s

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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DMEA
RECEIVED APR 29 1957

DATE	INITIALS	CODE
4/29	C	220
4/29	JWA	500

P. O. Box 2688
Juneau, Alaska

April 26, 1957

Day, Wilson, Kelly, Martin & Morden,
Barristers & Solicitors,
Federal Building,
85 Richmond Street, West,
Toronto 1, Canada.

re: Docket No. DMEA-4728 (copper)
Bornite Copper Corporation Ltd.

Gentlemen:

I have your letter of April 15 in which you ask when you may expect further information about the status of the referenced application.

I cannot tell you exactly how long will be required for the operating committee in Washington to complete the preliminary consideration of your application but I think that you might expect to hear from them at any time now. I think that it is very possible that the operating committee will want to have some discussions about this project and that they will contact you or Mr. Lee directly.

Yours very truly,

S. M. Lorain,
Executive Officer,
Alaska District,
Region I.

cc: Operating Committee, DMEA

UNITED STATES
DEPARTMENT OF THE INTERIOR
Defense Minerals Exploration Administration
Washington 25, D. C.

April 16, 1957

Mr. Noble Harbinson, President,
Bornite Copper Corporation, Ltd.,
34 Gamble Street East,
Rouyn, Quebec, Canada.

Subject: DMEA 4728
Re: Exploration Assistance

Dear Mr. Harbinson:

Your application for exploration assistance, dated March 29, 1957, submitted to our office at Juneau, Alaska, has been assigned Docket Number DMEA 4728 and referred to the Base Metals Division in the Washington office. Kindly identify all future correspondence relating to your application by this Docket Number.

Sincerely yours,

Allen S. Dakan, Chief
Operations Control and
Statistics Division

Copy to: Region I-Alaska.

PLAN

BORNITE COPPER CORPORATION LIMITED

GRAVINA ISLAND, KETCHIKAN, ALASKA.

SHOWING DIAMOND DRILL HOLES, SURFACE WORKINGS, AND GEOLOGY, MAINLY FROM DIAMOND DRILL CORES

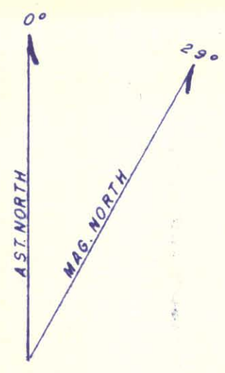
1" = 500'

LEGEND

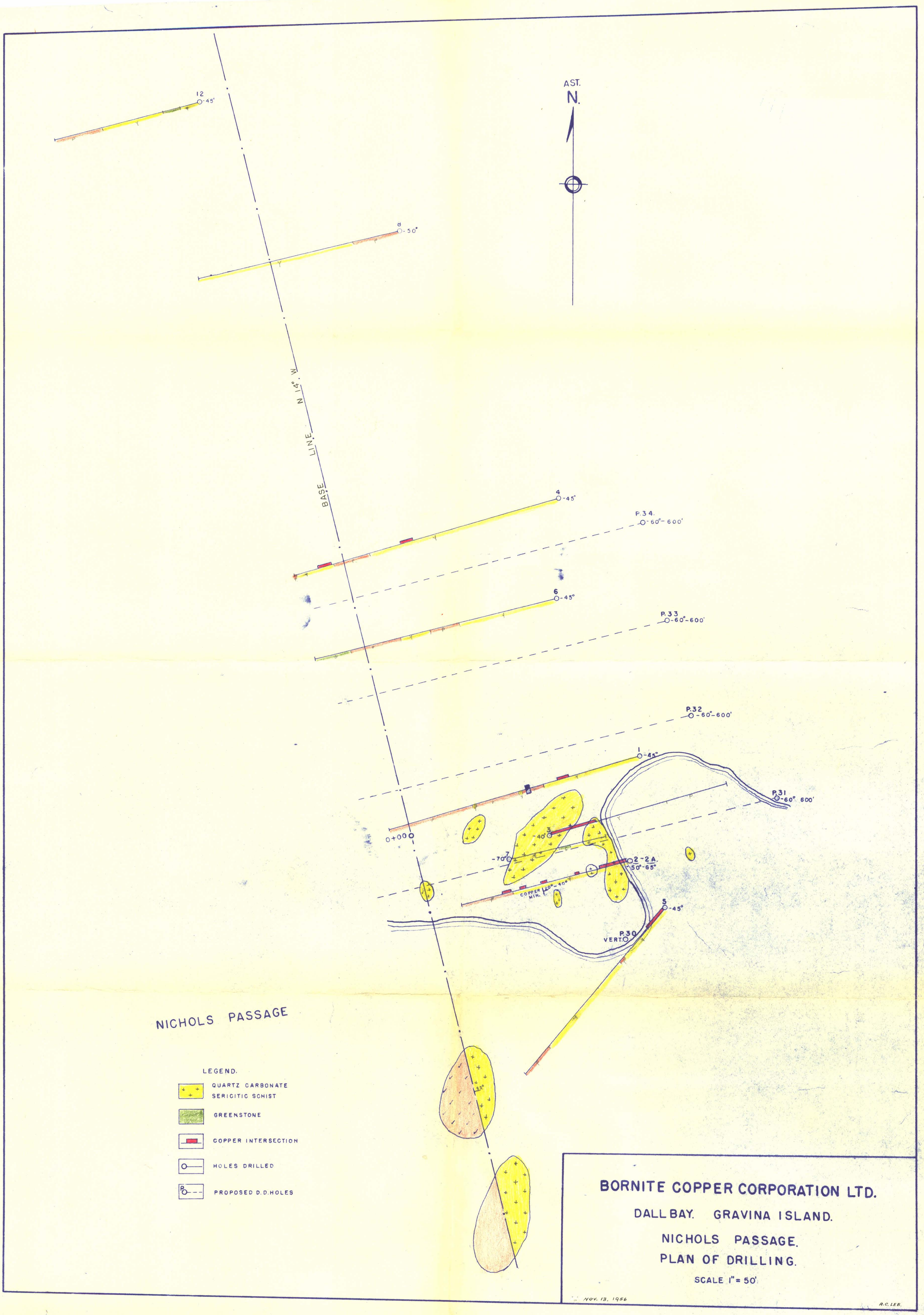
- QUARTZ, SERICITIC, SCHIST
- GRANITIC INTRUSIVE
- ALTERED, SILICIFIED, MONZONITE
- DIORITE
- GREENSTONE
- AGGLOMERATE

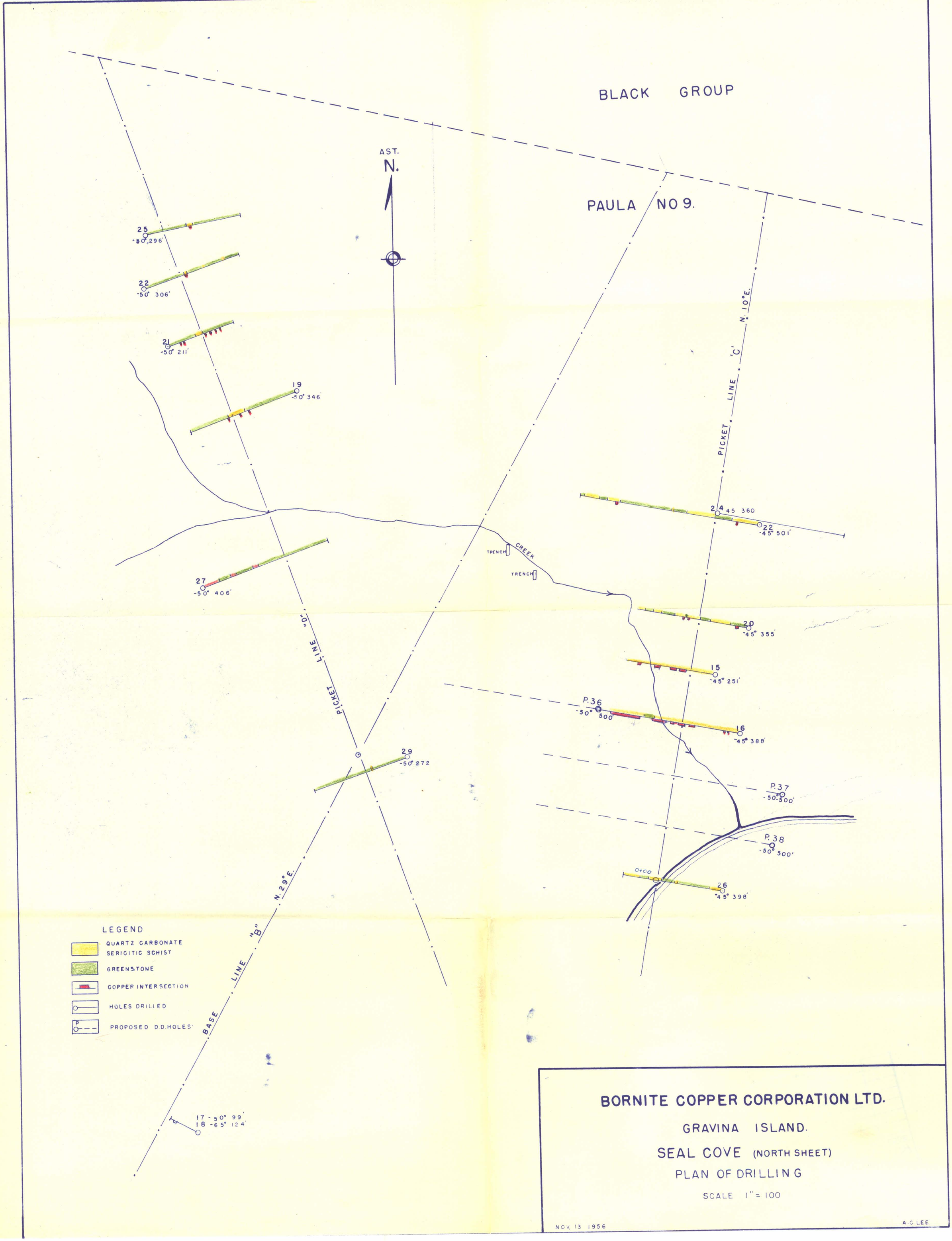
SYMBOLS

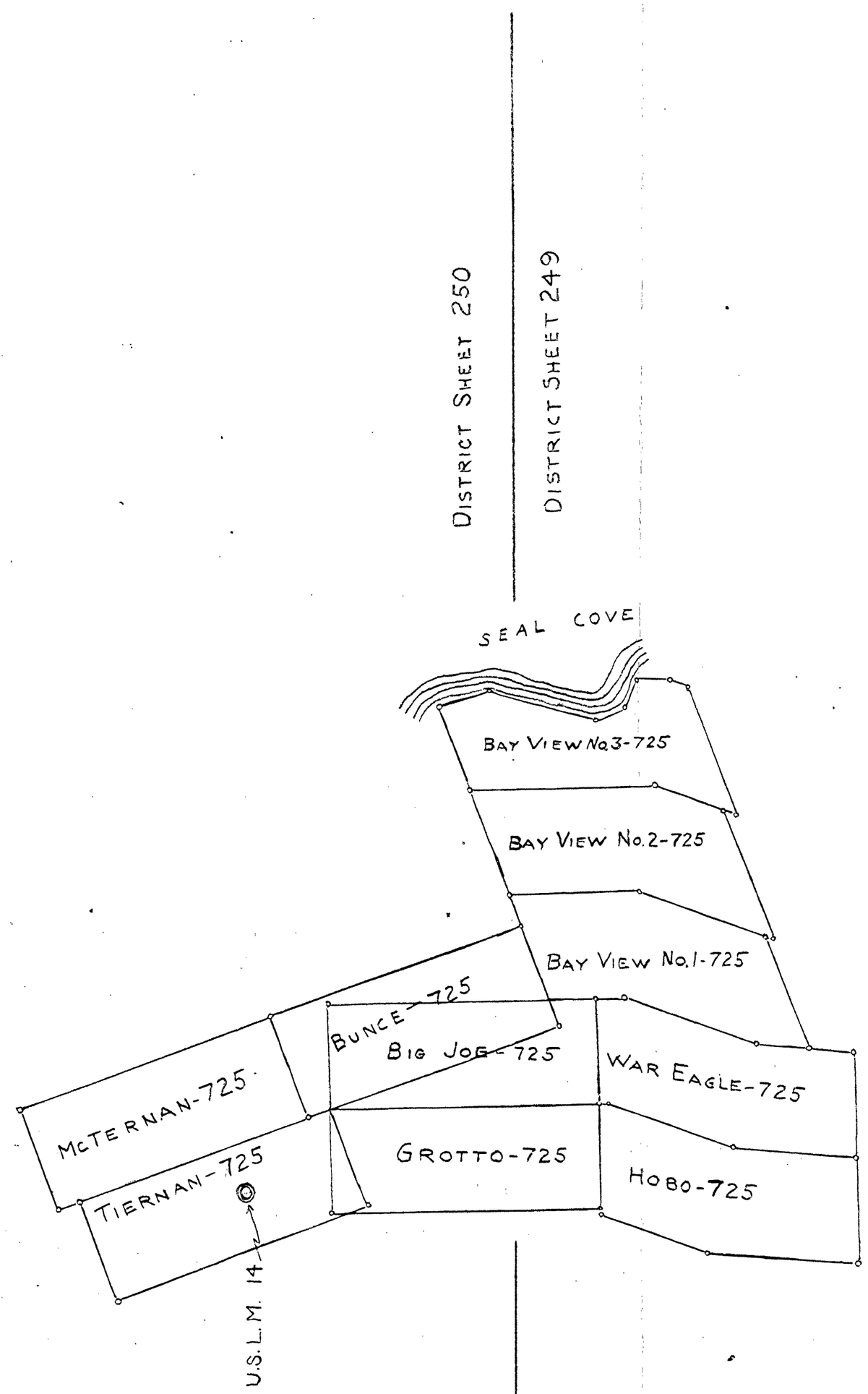
- TRENCH
- SHAFT OR PIT
- 12 DIAMOND DRILL HOLES
- TRAIL
- STREAM

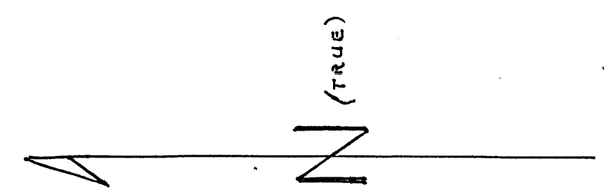


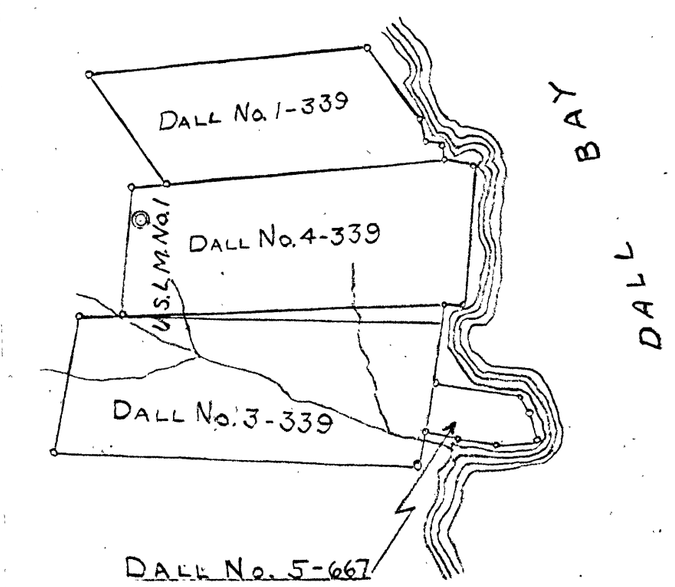
J.P. JEWELL OCT. 31, 1956


AST.
N.
12
-45°
8
-50°
BASE LINE N 14° W
4
-45°
P.34.
-60°-600'
6
-45°
P.33
-60°-600'
P.32
-60°-600'
1
-45°
P.31
-60° 600'
0+00
3
-40°
7
-70°
2-2A.
-50°-65°
COPPER MIN.
20°-40°
5
-45°
P.30
VERT.
NICHOLS PASSAGE
LEGEND.
QUARTZ CARBONATE SERICITIC SCHIST
GREENSTONE
COPPER INTERSECTION
HOLES DRILLED
PROPOSED D.D.HOLES
BORNITE COPPER CORPORATION LTD.
DALL BAY. GRAVINA ISLAND.
NICHOLS PASSAGE.
PLAN OF DRILLING.
SCALE 1" = 50'
NOV. 13. 1956
A.C. LEE.


BLACK GROUP
PAULA NO 9.
AST.
N.
25
-50° 296'
22
-50° 306'
21
-50° 211'
19
-50° 346'
27
-50° 406'
29
-50° 272
17 -50° 99'
18 -65° 124'
24 45 360
22
-45° 501'
20
-45° 355'
15
-45° 251'
P.36
-50° 500'
16
-45° 388'
P.37
-50° 500'
P.38
-50° 500'
0+00
26
-45° 398'
TRENCH
TRENCH
CREEK
PICKET LINE "C" N. 10°E.
PICKET LINE "D"
BASE LINE "B" N. 29°E.
LEGEND
QUARTZ CARBONATE SERICITIC SCHIST
GREENSTONE
COPPER INTERSECTION
HOLES DRILLED
PROPOSED D.D. HOLES
BORNITE COPPER CORPORATION LTD.
GRAVINA ISLAND.
SEAL COVE (NORTH SHEET)
PLAN OF DRILLING
SCALE 1" = 100
NOV. 13 1956
A.C. LEE







Ketchikan Mining District
Seal Cove-Dall Bay, Gravina Island
Scale: 1 inch = 600 ft.
(From U.S.L.M. District Sheets)