

6407

AN INTERIM REPORT
ON THE
COPPER LEACHING POTENTIAL
OF THE
MWC CLAIMS

by

R. Somerville, P.Eng.
For Imperial Oil Ltd.
September 1977

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT

NO. _____

LOCATION:

Nanaimo Mining District
NTS 92 F 14
Lat. 49° 48'
Long. 125° 20'

DISTRIBUTION

COPY	1	Imperial Oil File
	2	Mt. Washington Copper Co. Ltd.
	3	Department of Mines
	4	<u>Department of Mines</u>

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AN INTERIM REPORT
ON THE
COPPER LEACHING POTENTIAL
OF THE MWC CLAIMS

INTRODUCTION

Summary

Mt. Washington Copper Co.'s Courtenay area property (the MWC claims, see Location maps #1 and 2) has been recognized since the 1940's as a geologically interesting area of widespread copper mineralization of the porphyry-intrusive breccia type. A number of companies, Imperial Oil being the most recent, have explored the property in some detail. Near the top of the mountain, north and west of McKay Lake, there is an area of widespread very low grade copper mineralization (see location map #3). Contained in this area was a very small tonnage of 1 to 2% copper ore in a vein deposit. This was in part mined in the late 1960's by Mt. Washington Copper Co.

A small creek, locally called Pyrrhotite Creek, has its headwaters 2800 feet north west of McKay Lake. During the course of normal exploration on the MWC claims, silt and water samples in Pyrrhotite Creek were found to be abnormally high, so high that it was felt that the possibility of extracting copper by the leaching process should be considered.

The following report records the steps taken and later required to make a preliminary assessment of the potential of this process.

All the samples were taken from MWC 204 and all the work was done by employees of Imperial Oil Ltd. who also paid for the work.

Location and Access

The MWC claims are located on Mt. Washington on Vancouver Island, 105 miles northwest of Vancouver and 15 miles northwest of Courtenay. Access is provided around the circumference of the mountain and along the east flanks by a network of logging roads operated by Crown Zellerbach. A road built by Mt. Washington Copper Company provides access, when snow conditions permit, to the open pit area at an elevation of 4400'.

LEACHING STUDYIntroduction

Most economically successful copper leaching operations depend on the recirculation of acid water through a mine dump heap of sub-milling grade and the subsequent removal of copper by replacement on scrap iron. Occasionally, copper rich ground water which drains out of, or is pumped from, a mining area has been treated (with scrap iron) to extract the copper, on an economical basis. Anaconda's Britannia Mine on Howe Sound near Vancouver, B.C. have operated a successful leaching operation for over 19 years by treating of natural mine waters.

In order to properly assess the potential of recovering copper from the water of Pyrrhotite Creek on the Mt. Washington property it was recognized that the following data should be obtained:

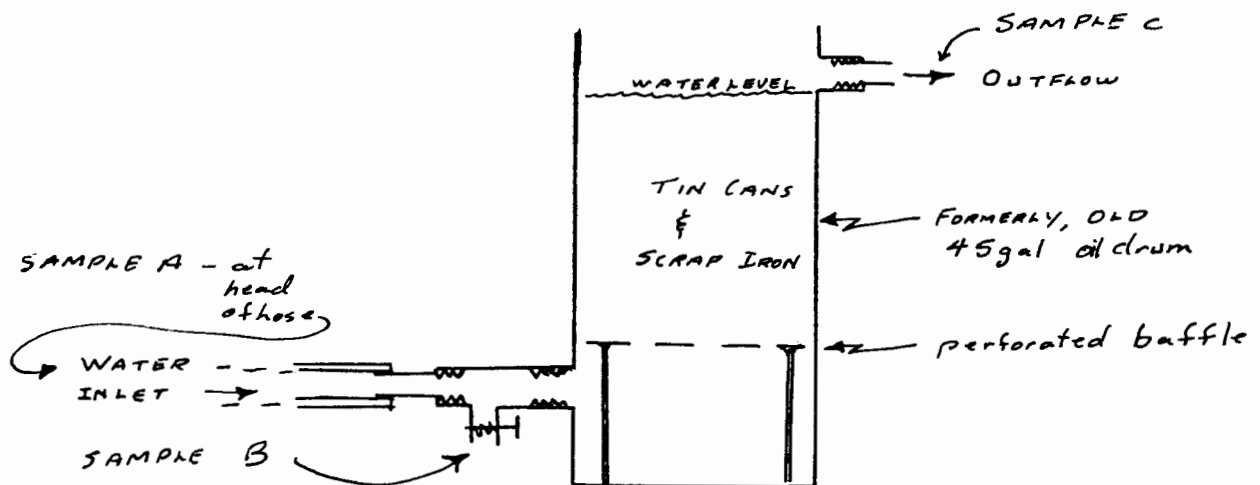
- 1) An estimate of the annual volume of copper rich water available for treatment over the seasonal period during which the creeks are not frozen.
- 2) A reasonable idea of the "grade" of the water over the same seasonal period.
- 3) A reasonable estimate of the consumption of scrap iron in the replacement process.

- 4) Also, it was decided to run a small test operation to determine conclusively that copper could be recovered.

This report details our efforts, to date, to determine these variables.

Method

A number of water sample sites were chosen on the streams and seeps leading into Pyrrhotite Creek. (See Map No. 4.) At four locations leaching tanks were set up. (See enclosed photos and sketch below.)



Water sample sites A, B and C as marked on Map No. 4 on streams 1, 2, and 3 represent the inflow, barrel "head", and barrel "tail" as shown in the foregoing sketch. For the leaching tanks themselves old oil drums were converted by adding spigots, valves and baffles (as shown).

The scrap iron replacement medium was obtained by purchasing cleaned flattened tin cans from SPEC. The cans were thoroughly burned to remove any coatings. The barrels and scrap metal were weighed on each sampling occasion to attempt to get some idea of the metal consumption.

The volume of water was the most difficult item to measure. A large proportion of the water flowing into streams 1, 2 and 3, and moving downhill from the mineralized area, is moving through the soil and along the bedrock. However, some estimates were made with the aid of a 5 gallon pail and a watch.

All water samples were collected and delivered on a next day basis (or frozen and delivered two days later) to Min En Laboratories in North Vancouver. A total of 95 samples were collected. Initially the samples were all analysed for arsenic as well as copper.

Since no relationship seemed to exist between copper in the water and arsenic and since the arsenic did not seem to interfere with the copper recovery, no further analyses were made for this element after July 20th.

For the first couple of weeks, pH was only measured casually with litmus-type paper on a once-a-day basis. However, laterly the pH has been measured routinely by the laboratory.

Results

1) The data obtained by analysis of the routinely collected water samples is tabulated in Tables I, II and III for streams No. 1, 2 and 3 respectively.

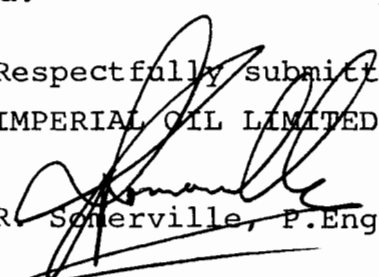
2) From rough measurements taken in the field it is estimated the average volume of water derived from the mineralized area which is available for copper recovery is as follows:

Stream No. 1 -	300	gpm
Stream No. 2 -	150	gpm
Stream No. 3 -	<u>150</u>	gpm
Total	600	gpm

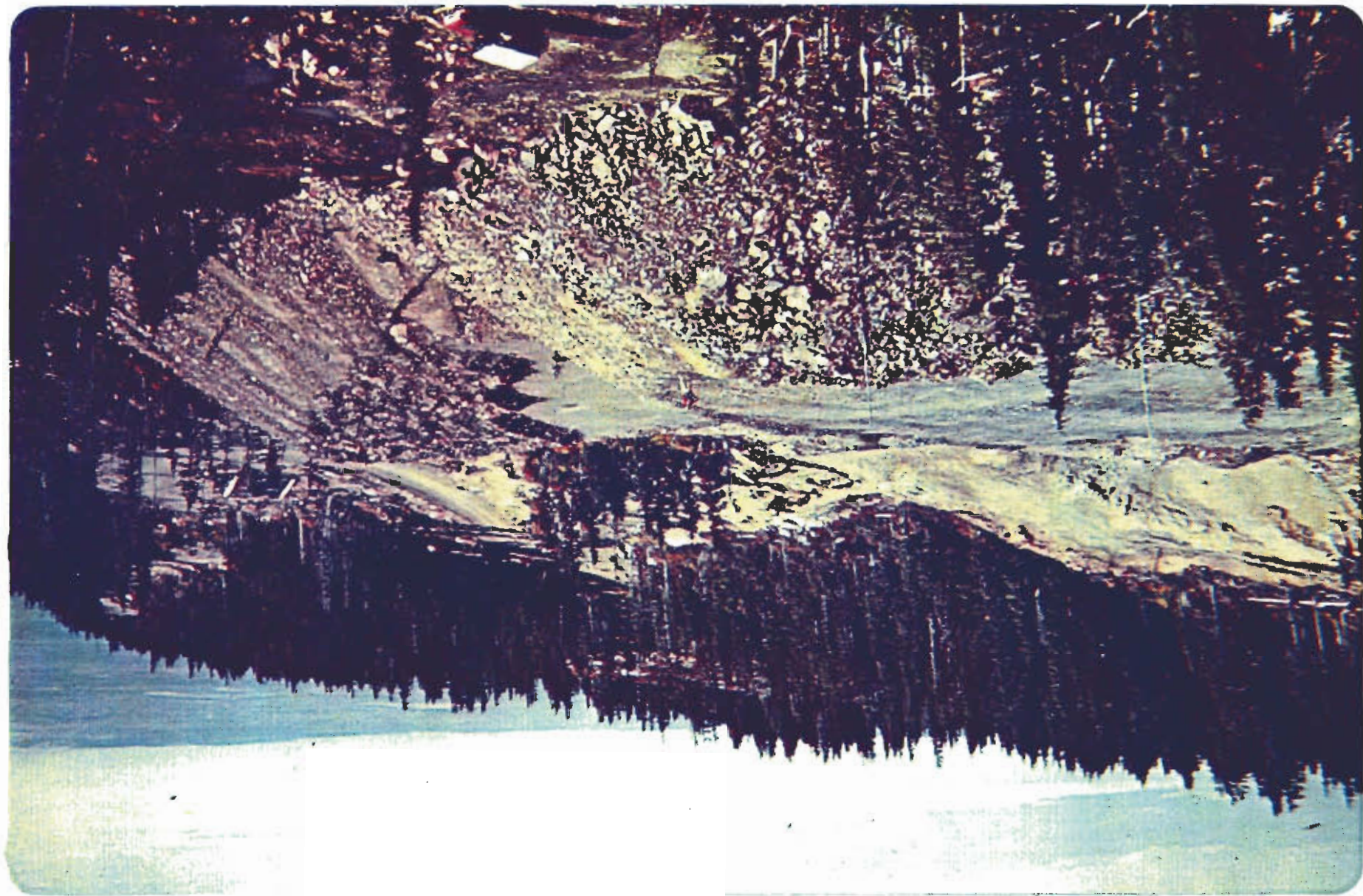
As an educated guess, this average volume could be as high as 3000 gpm or as low as 300 gpm. Also, this volume would probably only be available for 150 days/year due to winter conditions.

3) No useful idea of iron consumption per pound of copper produced could be obtained.

Respectfully submitted,
IMPERIAL OIL LIMITED


R. Scherville, P.Eng.

MT. WASHINGTON WASTE DUMP





LEACHING TANK AT STREAM #2



LEACHING TANK SHOWING ADDITION OF SPIGOT



LEACHING TANK AT STREAM #1



LEACHING TANK AT "P"

T A B L E I

Stream No. 1

Cu (ppm) As (ppb)

Sample Location	July 6		July 14		July 20			July 28		Aug. 27		Sept. 9	
	Cu	As	Cu	As	Cu	As	pH	Cu	pH	Cu	pH	Cu	pH
A	14.0	0.5	14.3	3.9	15.9	<0.5	3.60	14.5	3.63	12.0	3.9	12.1	3.66
B	23.0	0.5	14.3	<0.5	16.6	0.9	3.65						
C	19.5	1.7	13.1	0.8	14.5	<0.5	3.85	10.4	3.72	9.6	4.2		
D	27.5	8.8	13.9	59.0	15.4	0.9	3.65	14.1	3.59	10.4	3.9		
E			10.8	1.9	10.2	2.9	3.25						
F			21.5	0.8	25.1	2.9	3.25			16.0	3.7		
G			14.2	2.9	15.6	<0.5	3.80						
H			3.3	0.8	3.1	<0.5	4.80						
I			25.4	<0.5	27.0	<0.5	3.55						
J			2.8	2.9	2.6	<0.5	5.15						
K			25.3	4.9	26.5	<0.5	5.55						
L			2.5	2.9	2.2	<0.5	5.30						
M					1.8	<0.5	5.20					0.5	8.89
N			2.4	6.8	1.8	<0.5	5.30	1.5	4.45	0.5	6.5		
O			25.4	3.9	26.3	<0.5	3.55	26.4	3.55	20.9	3.8		
P			28.9	<0.5	30.2	<0.5	3.20	31.8	3.29	21.1	3.8		
Q			14.8	3.9	17.9	<0.5	3.40	19.3	3.37			24.6	3.39
R					0.02	<0.5	5.90						
S					0.9	55.5	7.05						

T A B L E II

Stream No. 2

Cu (ppm) As (ppb)

Sample Location	July 6		July 14		July 20			July 28		Aug. 27		Sept. 9	
	Cu	As	Cu	As	Cu	As	pH	Cu	pH	Cu	pH	Cu	pH
A	8.8	<0.5	7.2	9.8	7.3	0.9	3.85	10.9	3.77	8.6	4.2	12.2	3.89
B	9.1	<0.5	9.8	6.8	9.8	<0.5	3.95						
C	7.5	0.9	7.8	1.9	8.3	2.9	4.15	10.2	4.01	8.3	4.4		
D	6.1	0.8	6.6	0.8	6.7	0.9	4.05	7.1	3.90	5.9	4.2		
E			14.3	1.9	10.1	<0.5	3.90						
F			17.1	4.9	16.0	<0.5	3.80						
G			13.8	3.9	10.4	<0.5	3.85			9.5	4.3		
H					2.0	14.8	4.00						

T A B L E III

Stream No. 3

Cu (ppm) As (ppb)

Sample Location	July 6		July 14		July 20			July 28		Aug. 27		Sept. 9	
	Cu	As	Cu	As	Cu	As	pH	Cu	pH	Cu	pH	Cu	pH
A					10.4	11.8	4.25	9.3	3.72	9.0	4.5	22.8	3.99
B								9.1	3.88	1.0	4.9		
C								7.8	3.99				

COST STATEMENT

1977 Leaching Project

Mt. Washington Property

June 27 to September 12, 1977

WAGES

Mr. C. Aird, P. Eng. July 20	1 day @ \$150.00	=	\$150.00
Mr. G. Hodgson July 4-7	4 days @ 30.00	=	120.00
Mr. T. Samoil July 6, 14, 20, 27, Aug. 25, 27	6 days @ 75.00	=	450.00
Mr. T.P. Samoil July 27, Aug. 27	2 days @ 25.00		50.00
Mr. R. Somerville, P. Eng. July 5-7, 12-15, Sept. 8-12	12 days @ 150.00		<u>1,800.00</u>
SUBTOTAL LABOUR			<u>2,570.00</u>

TRAVEL EXPENSES

(Food, Lodging, misc. expenses)

July 3	93.17	
August	69.95	
September	<u>58.75</u>	
SUBTOTAL TRAVEL	221.87	<u>221.87</u>

EQUIPMENT SUPPLIES AND SERVICES

(Leaching tanks, hoses & preparation, etc.)

June	64.70	
July	39.42	
August	<u>42.71</u>	
SUBTOTAL SUPPLIES & SERVICES	146.83	<u>146.83</u>

A P P E N D I X

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COST STATEMENT

TRANSPORTATION

(Vehicle rental, ferry charges, gasoline, etc.)

July	98.10	
August	249.86	
September	<u>95.50</u>	
SUBTOTAL TRANSPORTATION	443.46	\$ <u>443.46</u>

LABORATORY

(Analysis of water samples)

July	382.00	
August	<u>52.50</u>	
SUBTOTAL LABORATORIES	434.50	<u>434.50</u>

TOTAL COST \$3,816.66

To the best of my knowledge this statement is complete and accurate.



MIN-EN Laboratories Ltd.

Specialists in Mineral Environments

Corner 15th Street and Bewicke
705 WEST 15th STREET
NORTH VANCOUVER, B.C.
CANADA

SAMPLED SEPT 9
September 13, 1977.

Imperial Oil,
314-1281 W. Georgia St.,
Vancouver, B.C.

SEP 15 RECD

Attn: R. Somerville

File No: 4517

WATER SAMPLES

<u>Sample Number</u>	Cu <u>ppb</u>	pH —
W 89	510	5.89 1-N
90	24600	3.39 1-P
91	12100	3.66 1-A
92	12200	3.89 2-A
W 93	22800	3.99 3-A


Certified By

*MIN-EN Laboratories Ltd.**Specialists in Mineral Environments*

Corner 15th Street and Bewicke
 705 WEST 15th STREET
 NORTH VANCOUVER, B.C.
 CANADA

August 29, 1977.

Sampled Aug 27/77

Imperial Oil-Mineral Section,
 314-1281 W. Georgia St.,
 Vancouver, B.C.

File No: 4469

Project: 6023

Sample NumberWATER SAMPLES

	<u>Cu</u> <u>ppb</u>	<u>pH</u> <u>—</u>	
1977W 72	500	6.5	1-N
73	20950	3.8	1-O
74	21100	3.8	P-A
75	27050	3.5	P-B
76	26700	3.6	P-C
77	16000	3.7	P-F
78	12000	3.9	1-A
79	4550	4.4	1-C
80	10400	3.9	1-D
81	9600	4.2	1-C
82	5850	4.2	2-D
83	8550	4.2	2-A
84	8300	4.4	2-C
85	9450	4.3	2-G
86	950 ?	4.9	3-C
87	8950	4.5	3-A
1977W 88	19200	3.9	P-A

[Signature]
 Certified By

Copy 2: 7.1.D.

MIN-EN Laboratories Ltd.

Specialists in Mineral Environments

Corner 15th Street and Bewicke
705 WEST 15th STREET
NORTH VANCOUVER, B.C.
CANADASampled July 28

Aug. 1, 1977.

AUG 4 RECD

Imperial Oil Limited,
314-1281 W. Georgia,
Vancouver, B.C.

Project No: 6023

File No: 4362

WATER SAMPLESSample Number

Cu

pH

ppb

STR. #12

1977-W58 A

10,900

3.77

W59 D

7,100

3.90

W60 C

10,200

4.01

W60A C

10,100

4.05

STR. #3

W61 A

9,300

3.72

W62 B

9,100

3.88

W63 C

7,800

3.99

STR. 1

W64 Q

19,300

3.37

W65 P

31,800

3.29

W66 O

26,400

3.55

W67 N

1,500

4.45

W68 A

14,500

3.63

W69 C

10,400

3.72

W70 D

14,100

3.59

1977-W71 C

11,900

3.70

Imperial Oil
Certified By

MIN-EN Laboratories Ltd.

Specialists in Mineral Environments
 Corner 15th Street and Bewicke
 705 WEST 15th STREET
 NORTH VANCOUVER, B.C.
 CANADA

July 22, 1977.

Sampled July 20/77

Imperial Oil,
 314-1281 W. Georgia,
 Vancouver, B.C.

File No: 4326

WATER SAMPLES

<u>Sample Number</u>	<u>Cu</u> ppb	<u>As</u> ppb	<u>pH</u> <i>litmus paper</i>	<u>pH</u>
<i>STR #2</i> 1977-W-32 A	7300	0.9	3.75	3.85 ✓
33 E	10050	<0.5	4.00	3.90 ✓
34 F	16000 ?	<0.5	4.00	3.80 - ?
35 G	10400	<0.5	3.75	3.85 ✓
36 C	8300	<0.5	—	4.15 <i>Bot. outflow</i>
37 B	9800	2.9	—	3.95 <i>in flow</i>
38 D	6700	0.9	3.75	4.05
39 <i>Pond. H</i>	2030	14.8	4.00	4.00
<i>STR #3</i> 40 A	10400	11.8	3.75	4.25
<i>STR #1</i> 41 Q	17900	<0.5	3.50	3.40 ✓
42 P	30200	<0.5	3.50	3.20 ✓
43 O	26300	<0.5	3.50	3.55 ✓
44 K	26500	<0.5	3.50	3.55 ✓
45 <i>N Pond.</i>	1800	<0.5	4.50	5.20
46 M	1800	<0.5	4.50	5.30
47 L	2200	<0.5	4.50	5.30
48 J	2600	<0.5	4.50	5.15
49 H	3100	<0.5	4.50	4.80
50 I	27000	<0.5	3.50	3.55
51 G	15600	<0.5	4.00	3.80
52 F	25100	2.9	3.75	3.25
<i>STR #1</i> 53 E	10180	2.9	3.50	3.25
54 A	15900	<0.5	3.50	3.60
55 C	14500	<0.5	—	3.85 <i>Paras. out.</i>
56 B	16600	0.9	—	3.65 <i>in flow</i>
1977-W-57 D	15400	0.9	3.5	3.65
Lake	15	<0.5	4.5	5.90
Cut	910	55.5	5.0	7.05

[Signature]
 Certified By

Copy 1: R. Somerville
C. Aird
#

Copy 2: 7.1.D

July 15, 1977.

Sampled July 14/77

R. Somerville,
Imperial Oil-Mineral Section,
314-1281 W. Georgia St.,
Vancouver, B.C.

File No: 4311

WATER SAMPLES

<u>Sample Number</u>	<u>Cu</u> <u>ppb</u>	<u>As</u> <u>ppb</u>	<u>STATION</u>
1977W 9	7200	9.8	A
10	9800	6.8	B
11	7800	1.9	C
12	6600	0.8	D
13	14300	1.9	E
14	17050	4.9	F
15	13800	3.9	G
16	14300	3.9	A
17	14300	<0.5	B
18	13100	0.8	C
19	13900	59.0	D
20	10800	1.9	E
21	21500	0.8	F
22	14200	2.9	G
23	25400	<0.5	I
24	3300	0.8	H
25	2800	2.9	J
26	25300	4.9	K
27	2500	2.9	L
28	2400	6.8	N
29	25400	3.9	O
30	28900	<0.5	P
1977W 31	14800	3.9	Q

Stream 2

Stream 1

D. J. Williams
Certified By

Location Map No.2

To accompany a Report
by R.Somerville, P.Eng.
dated September, 1977



NOTE:
 ----- DENOTES ROADS
 _____ DENOTES LEASE BOUNDARY
 SCALE 1" = 3200'

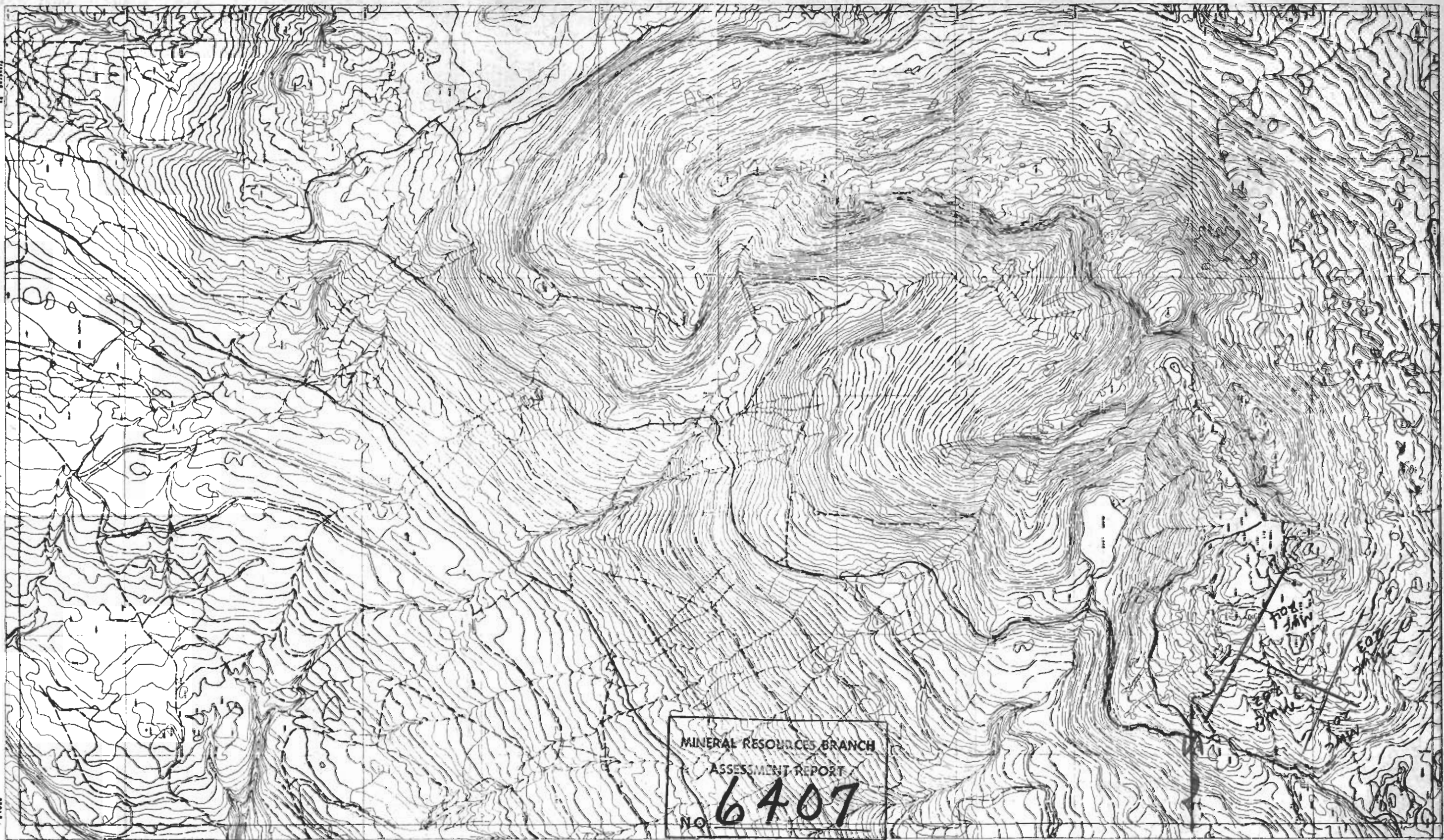
IMPERIAL OIL LTD.
MT. WASHINGTON PROJECT
MINERAL CLAIM LOCATION

McELHANNEY ASSOCIATES
 PROFESSIONAL LAND SURVEYORS
 1200 WEST PENDER STREET
 VANCOUVER 1, B.C.
 NOV. 1, 1973 JOB NO 03741-1

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT

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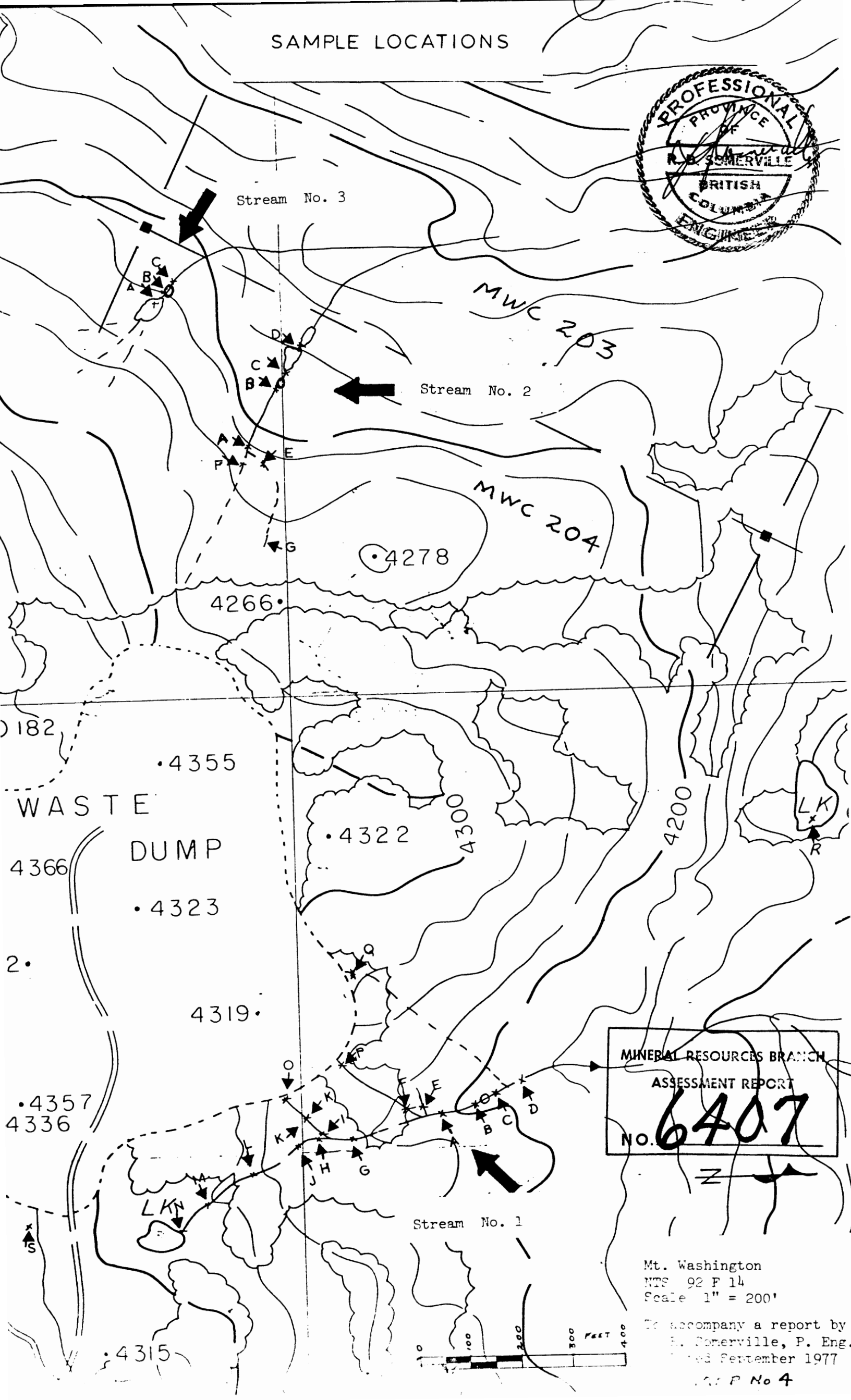


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To Accompany a report by R. Somerville P. Eng dated Sept 1977

LOCATION MAP NO. 3

SAMPLE LOCATIONS



MINERAL RESOURCES BRANCH
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No. **6407**



Mt. Washington
NTS 92 F 14
Scale 1" = 200'

To accompany a report by
R. Somerville, P. Eng.
dated September 1977

Map No 4