

Expo Project

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Cordilleran roundup 1991 snapshot review

MGR

MORAGA Resources Ltd.

Authors:

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Property/Project

Name:	Expo	NTS:	92L12/10219
Claims:	Expo, Pemberton, Hep, Wanokana, Red Dog	Acreage:	35,000 acres
Commodities:	Copper, Gold, Molybdenum		

Agreements

Moraga is in the process of earning a 45% interest in the Expo and Pemberton claims from BHP-Utah Mines Ltd., a 55% interest in the Wanokana claims from Acheron Resources Ltd. and a 50% interest in the Red Dog claims from Crew Natural Resources Ltd. Various NSR's accrue to original landholders in the Acheron and Red Dog options.

History

The Expo property was staked in 1966 by Utah Mines Ltd. to protect a number of strong magnetic anomalies, similar to that which identified the Island Copper deposit. A thorough mapping and geochemical sampling program across the entire Expo property highlighted a number of anomalous zones.

Expo Claims:

Period 1	Operator	Amount	Type	Cost
(1966 to 1974)	BHP-Utah Mines Ltd.	600 line miles	Geochem	
		300 line miles	Mag	\$4.5m
		10 line miles	IP	
		45,000 feet	D. Drilling	
Period 2				
(1979 to 1982)	BHP-Utah Mines Ltd.	5,000 feet	D. Drilling	\$500,000
Period 3				
(1987 to Present)	Moraga Resources Ltd.	16,400 feet	Re-assay	\$1.3m
			D. Drilling	

Moraga optioned the Expo property from BHP-Utah in 1987, and the Red Dog and Wanokana properties in 1990.

Geology - Regional

A northwest trending syncline of Lower Jurassic Bonanza Volcanics, bordered to the north and south by Upper Triassic Parsons Bay Sediments and Quatsino Limestone is intruded by Upper Jurassic Quartz Diorite, Diorite and Quartz Monzonite of the Island Intrusives.

Late stage quartz-feldspar porphyry dykes (QFP) intrude the Bonanza Volcanics along northwest strike slip fault zones, and are associated with porphyry copper mineralization.

The 280 million ton porphyry copper gold deposit at Island Copper is hosted in the Bonanza Volcanics adjacent to a QFP dyke. The mine was commissioned in 1971 and currently mines at 50,000 T/day.

Local Geology

The Hushamu porphyry copper-gold deposit is exposed in the valley of Hepler Creek, and dips under the adjacent silica cap which forms McIntosh Mountain to the south.

Recent deep drilling (holes to 1,500 feet) through the silica cap on McIntosh Mountain has intersected ore grade copper-gold mineralization.

Copper-gold mineralization occurs as extensive replacement in the andesitic volcanics adjacent to the QFP dykes, and gold occurs separately in the silica cap rocks.



Alteration/Ore Forming Minerals

The porphyry copper-gold mineralization occurs as magnetite-bornite-chalcopyrite-gold mineralization close to the QFP dykes, progressively grading outwards into chalcopyrite-pyrite-molybdenite mineralization. Gold is found within the chalcopyrite, and as free grains attached to pyrite.

Current Exploration Results

1. Geology

Drilling and recent mapping has indicated that the Hushamu porphyry copper-gold deposit extends underneath McIntosh Mountain to the south and along strike to the northwest. Extensive copper mineralization has been shown in drill holes 1,000 metres south of the previously drilled zone. Closer in drilling on the southern boundary of the Hushamu zone has enabled modelling of a mineable reserve which doubles the earlier BHP reserve, and reduces the strip ratio from 2.2:1 to 0.7:1.

2. Geochemistry

Soil surveys for gold indicate that the large area of silica-pyrite-pyrophyllite mineralization south of the Hushamu Zone has anomalous gold mineralization of 30-900 ppb Au. This area is over 2,000 metres x 1,000 metres in extent.

Rock chip and soil sampling along new road cuts up to 800 metres northwest of the Hushamu copper-gold deposit show highly anomalous copper values (over 100 ppm Cu in soils, and 0.1-1% Cu in rocks).

3. Geophysics

A detailed re-evaluation of earlier property wide magnetometer and local IP surveys has indicated extensions of the known area of copper-gold mineralization at Hushamu, and suggested exploration targets on four other areas of the property: Pemberton, South McIntosh, East Red Dog and Northwest Expo.

4. Sampling

Rejects from the 1968-1974 drill program, and the 1968-1970 soil sampling programs, previously not analyzed, have been retrieved from storage for re-analysis for gold and molybdenum.

Reserves

The recalculation of the Hushamu copper-gold deposit reserves in November and December 1990, by Steffen Robertson and Kirsten (B.C.) Inc., utilizing drilling up to August 31, 1990 has increased the probable-possible mining reserve to 107 million tons at 0.53% Cu equivalent.

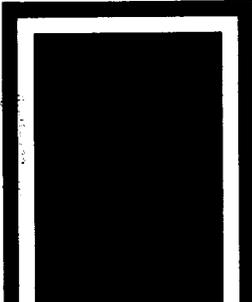
Three optimized pits were modelled in the engineering calculations. The parameters of the reserve are as follows:

Copper NSR - \$0.68; \$0.78; \$0.88	(copper price \$0.90US; \$1.00US; \$1.08US)
Mining Cost - \$1.00	Cu Recovery - 85%
Processing Cost - \$2.70	Au Recovery - 70%
Overhead Cost - \$1.00	Mo Recovery - 70%
Transportation - \$0.10	Pit Slope - 50°
SCdn: Gold \$397.73/oz; Moly \$3.00/lb.	

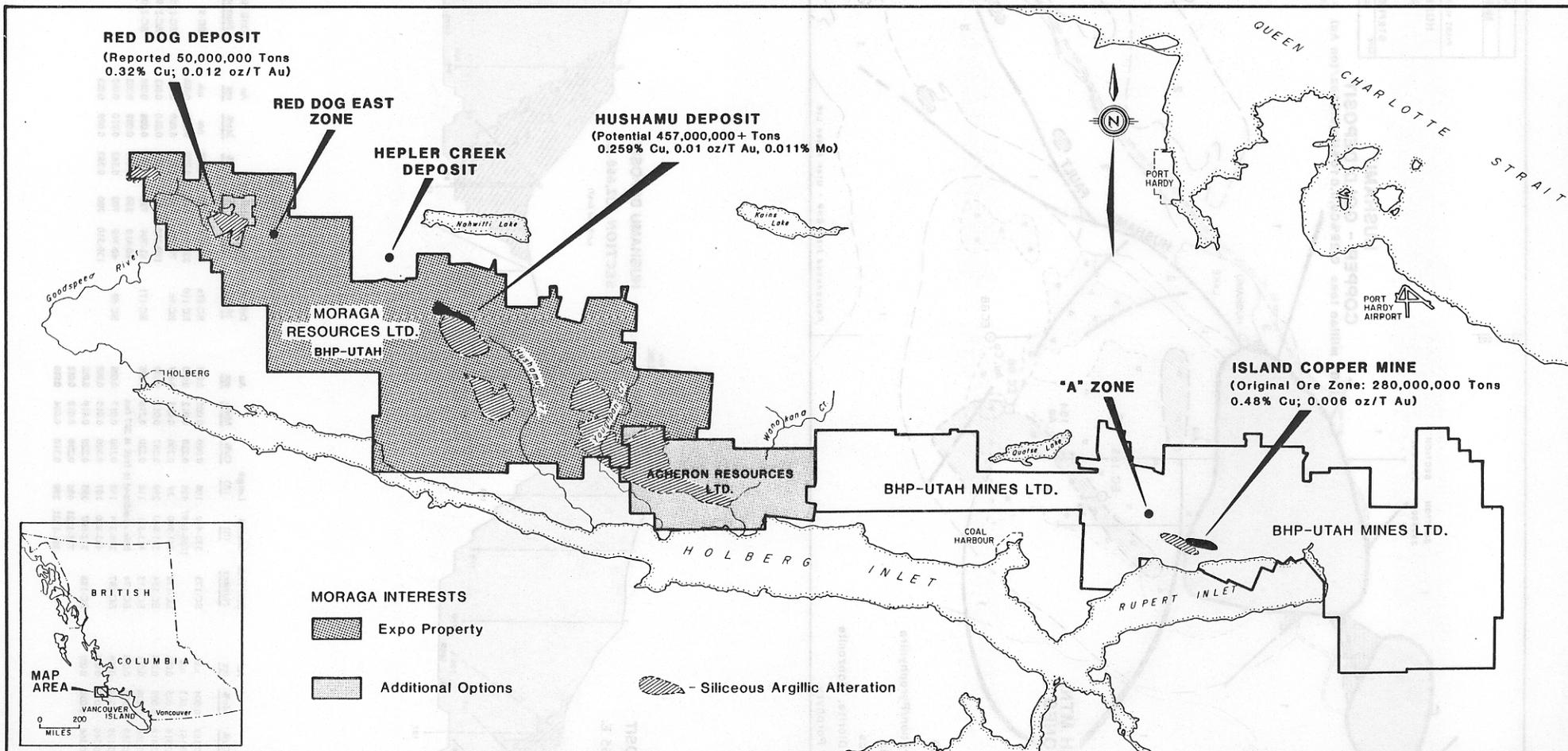
Reserves for each of the sets of parameters are calculated as follows:

107 M tons - 0.53% Cu equivalent (0.29% Cu; 0.010 opt Au; 0.010% Mo) Strip Ratio 0.7:1
 76.7 M tons - 0.60% Cu equivalent (0.30% Cu; 0.010 opt Au; 0.010% Mo) Strip Ratio 0.7:1
 61.7 M tons - 0.67% Cu equivalent (0.30% Cu; 0.020 opt Au; 0.010% Mo) Strip Ratio 0.6:1

For the 107 million ton pit, pre-capital profit is calculated at \$254 million Cdn.



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MORAGA RESOURCES LTD.

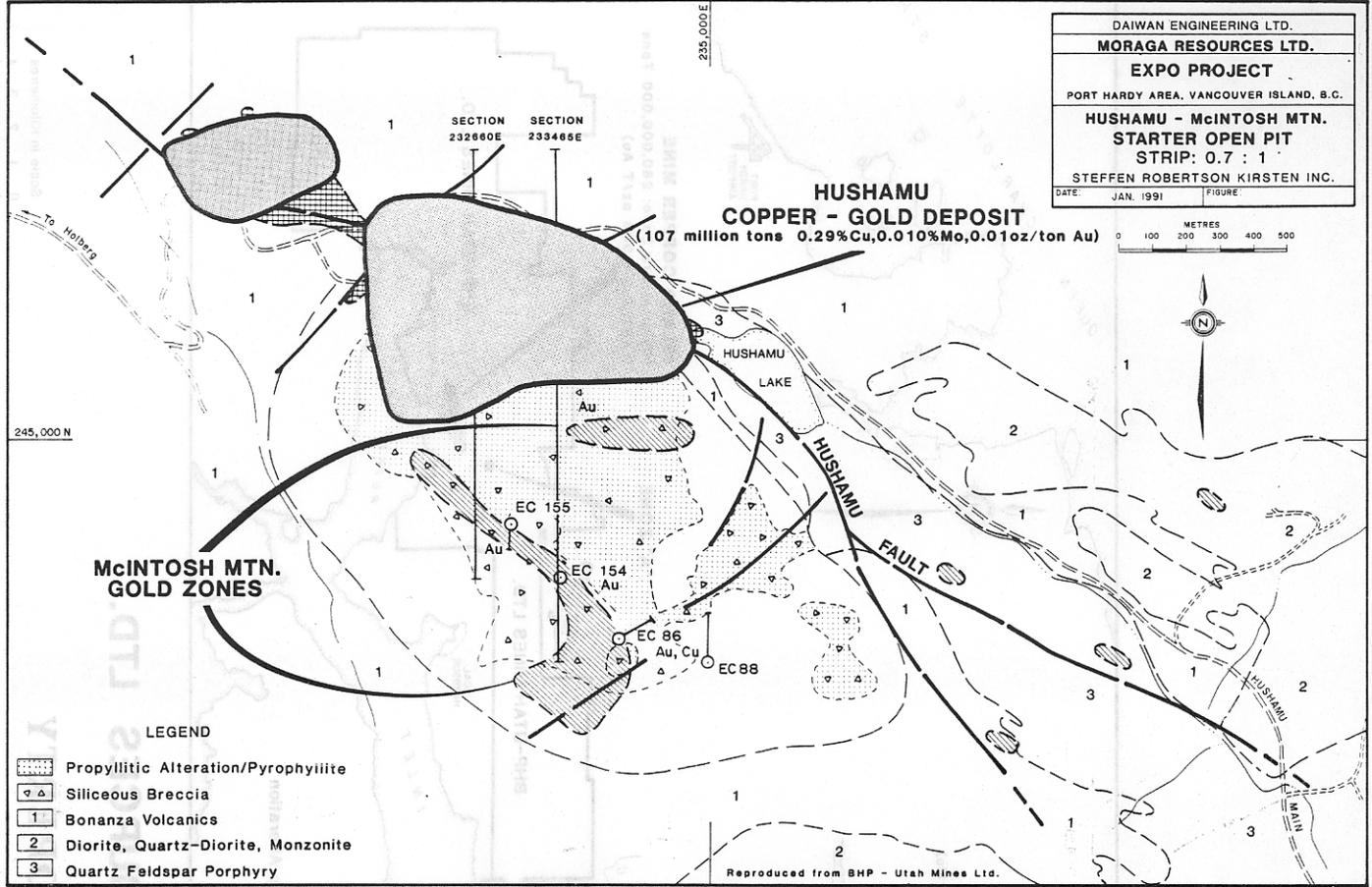
EXPO PROPERTY

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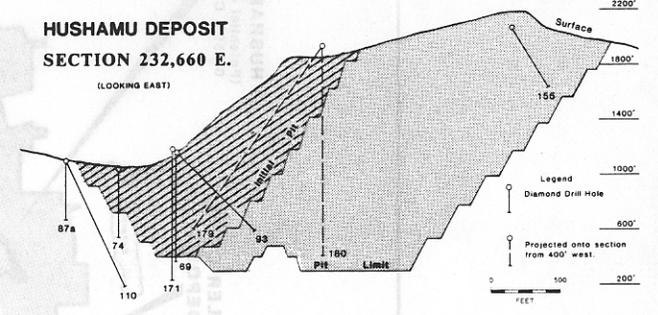
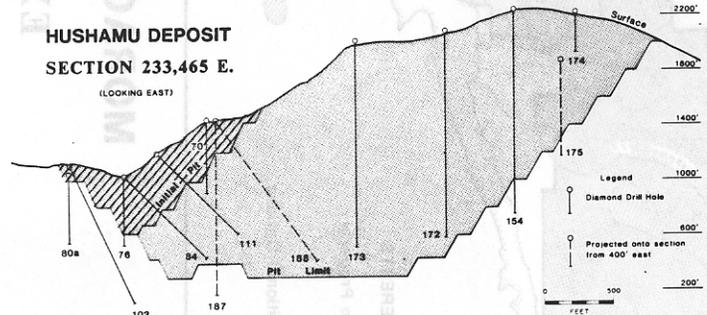
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NORTHERN VANCOUVER ISLAND, BRITISH COLUMBIA

DAIWAN ENGINEERING LTD.
 MORAGA RESOURCES LTD.
 EXPO PROJECT
 PORT HARDY AREA, VANCOUVER ISLAND, B.C.
HUSHAMU - McINTOSH MTN.
STARTER OPEN PIT
 STRIP: 0.7 : 1
 STEFFEN ROBERTSON KIRSTEN INC.
 DATE: JAN. 1991 FIGURE



- LEGEND**
- Propylitic Alteration/Pyrophyllite
 - Siliceous Breccia
 - Bonanza Volcanics
 - Diorite, Quartz-Diorite, Monzonite
 - Quartz Feldspar Porphyry



Section 233,465 E

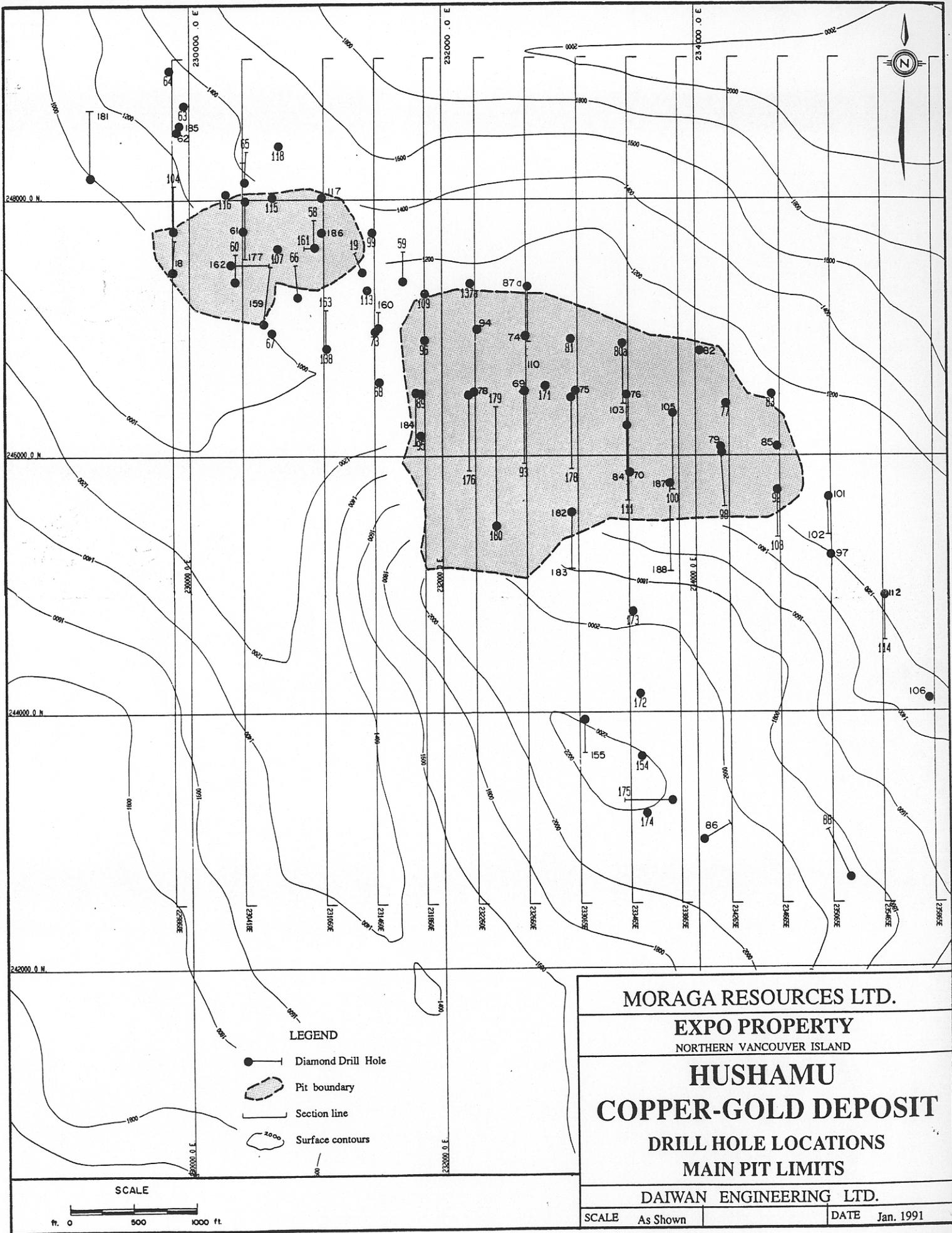
Drill Hole Number	Interval (ft)	Length (ft)	Cu%	Mo%	Au opt
EC-80a	240-500	260	0.169	0.004	n/a
EC-103	232-910	678	0.161	0.005	n/a
EC-76	66-420	354	0.316	0.005	0.012
EC-84	70-220	150	0.418	0.008	0.015
EC-84	45-842	797	0.268	0.008	0.011
EC-250	45-250	205	0.369	0.006	0.016
EC-111	310-630	320	0.109	0.014	0.004
EC-70	220-270	50	0.340	0.008	0.005
EC-70	280-330	50	0.366	0.030	0.003

Section 232,660 E

Drill Hole Number	Interval (ft)	Length (ft)	Cu%	Mo%	Au opt
EC-87a	200-370	170	0.170	n/a	n/a
EC-110	220-420	210	0.220	0.006	0.006
EC-74	70-370	300	0.311	0.009	0.011
EC-179	180-360	180	0.387	0.010	0.013
EC-171	61-794	733	0.387	0.008	0.019
EC-69	60-410	350	0.447	0.008	0.022
EC-69	40-740	700	0.363	0.010	0.010
EC-69	130-510	380	0.393	0.009	0.013

Drill Hole Number	Interval (ft)	Length (ft)	Cu%	Mo%	Au opt
EC-93	460-805	345	0.295	0.005	0.013
EC-155	510-660	150	0.361	0.006	0.017
EC-155	445-470	25	0.362	0.015	0.004
EC-179	807-1627	820	0.330	0.009	0.013
EC-180	955-1004	49	0.190	0.006	0.005
EC-180	1028-1476	394	0.200	0.008	0.007
EC-180	1082-1318	236	0.240	0.009	0.009

NORTHWEST BRITISH COLUMBIA
 EXPO PROJECT
 MORAGA RESOURCES LTD.
 STEFFEN ROBERTSON KIRSTEN INC.



MORAGA RESOURCES LTD.
EXPO PROPERTY
 NORTHERN VANCOUVER ISLAND
HUSHAMU
COPPER-GOLD DEPOSIT
 DRILL HOLE LOCATIONS
 MAIN PIT LIMITS

DAIWAN ENGINEERING LTD.

SCALE As Shown

DATE Jan. 1991

- LEGEND**
- | Diamond Drill Hole
 - ▭ Pit boundary
 - Section line
 - Surface contours

