ENVIRONMENTAL BASELINE SURVEY (SUBFILE 08) — 93L001(IW) SAM GOOSLY

PROPERTY FILE

Beak Consultants Limited

Montreal
Toronto
Calgary
Vancouver

385-A Shell Road
Richmond/British Columbia
Canada/V6X 2W2
Telephone (604) 273-1601
Telex 04-507893

24 October 1975

PROPERTY FILE
934 001-07

Equity Mining Capital Limited
908 - 1111 West Hastings Street
Vancouver, B.C.
V6B 3N5

Attention: Mr. E. Holt

Reference: J5058

Dear Mr. Holt:

In response to your recent request please find attached Beak's 1973 report entitled "An Environmental Baseline Survey - Sam Goosly Project". You will note that in addition to a presentation of Beak's field activities in 1973 the report includes as Appendices a reclamation report for mineral exploration prepared in August 1973 and a status report of environmental activities prepared in December 1973.

Considerations of the environmental aspects of the proposed development have continued since the preparation of the aforementioned documents and have been as follows:

1. Environment Canada - Summer 1974: Study of the watershed adjacent to Equity Mining Capital Limited proposed development near Goosly Lake to supplement water quality baselines established in 1973.

2. Beak Consultants - Spring 1975: Baseline levels of turbidity and suspended solids in the watercourses near the Sam Goosly project were monitored during periods of maximum flow.

3. B.C. Research - Summer 1975: The determination of acid production potential of tailing samples from pilot plant studies.

4. Beak Consultants - Summer 1975: Bench-scale testing program to quantitate observed pH decline in mill tailings supernatant.

The planning of all environmental work to date has been based on a phased program to allow environmental commitments to be in tandem with the overall development plan. Thus the status of future environmental programs will be determined concomitant with the feasibility decision of the development. It is anticipated that when the development proceeds, environmental programs will be formulated to conform with current standards.

/..... 2

Presently Beak has reviewed both the engineering activities and the environmental information available to date and placed these factors into a preliminary environmental impact matrix which is incorporated into Equity Mining Capital Limited's report entitled "Sam Goosly Project Information Summary". The matrix format suggested by the Department of Mines and Petroleum Resources is particularly useful in visually displaying areas of both positive and negative interaction and thereby allowing the proponent to direct their activities to reducing or enhancing the significant impact. It must at the same time be realized that impact analysis technology is evolving and that, as the Sam Goosly Project develops these more sophisticated techniques, designed to minimize the subjectivity while at the same time accommodating associated social factors, may have to be applied.

Thank you for the opportunity to be of service.

Yours truly,

BEAK CONSULTANTS LIMITED

J.E. Sager
Assistant Manager
Vancouver Environmental Services

JES/bm
Enc.

015364

AN ENVIRONMENTAL BASELINE SURVEY – 1973

SAM GOOSLY PROJECT

A REPORT FOR

EQUITY MINING CAPITAL LTD.

Beak Consultants Limited

PROPERTY FILE

Frontispiece - Westerly View From Existing Service Road with Goosly Lake in the Background

PROJECT J5058
MARCH 1974

EQUITY MINING CAPITAL LIMITED

AN ENVIRONMENTAL BASE LINE SURVEY - 1973

by

Beak Consultants Limited
Vancouver, B. C.

PROJECT J5058
AN ENVIRONMENTAL BASE-LINE SURVEY 1973

EQUITY MINING CAPITAL LTD.
VANCOUVER B.C.

DATE MARCH 1974

TABLE OF CONTENTS

		PAGE
I.	INTRODUCTION	1-2
II.	RESULTS	
	A. Chemical Analyses	2-3
	B. Biological Evaluation	3
III.	DISCUSSION	
	A. Chemical Analyses	3-6
	B. Biological Evaluation	6-9
IV.	RECOMMENDATIONS	9-10

APPENDICES

1. Sampling Locations - A Description
2. Reclamation Report - Mineral Exploration (August 1973)
3. Status Report of Environmental Activities (December 1973)

I. INTRODUCTION

BEAK CONSULTANTS LIMITED were retained by EQUITY MINING CAPITAL LIMITED in June, 1973 to act as environmental consultants for a proposed mining development on the Sam Goosly property near Houston, B.C. Development of the copper, silver, gold, and antimony deposit will include an open pit mine, milling facilities, antimony leaching facilities, and a tailings pond. Initial production capacity of the mill is planned to be 3,000 tons per day with ultimate expansion to 6,000 tons per day by the sixth year of operation.

The main objective of the BEAK study was to document the pre-operational physical, chemical and biological characteristics of the region that may be affected by the development. BEAK personnel conducted two pre-operational field surveys (July & October 1973) to provide baseline data of the area's water courses under both summer and fall conditions. This report presents the data gathered during those surveys and is intended to provide supplemental information for use during the Processing of pollution control applications.

For completeness, two related reports describing other complementary activities undertaken by BEAK, B.C. Research and Environment Canada have been included in Appendices 2 and 3 of this report. Appendix 2 contains a reclamation report prepared by BEAK in August, 1973 for submission to the Department of Mines and Petroluem Resources and Appendix 3 contains a status report of environmental activities prepared in December 1973 for

presentation to the Pollution Control Branch. The latter report summarizes the environmental activities undertaken by all interested parties.

II. RESULTS

During each survey eight stations, covering two watersheds, were sampled. The watersheds covered were Foxy Creek (2 stations), located northwest of the mining property and Buck Creek (6 stations), located south of the mining property. (Fig. 1: Appendix 3). At each station, water samples were collected and preserved for subsequent analysis at BEAK's Vancouver Laboratory.

A BEAK biologist conducted an on-site examination of the Foxy Creek and Buck Creek watersheds and collected benthic invertebrate samples using a Surber Sampler. The samples were examined on site, the predominant groups of the aquatic organisms identified and a general biological assessment made of the station. Detailed site descriptions are presented in Appendix 1.

A. Chemical

The results of the chemical analyses are presented in Table 1. Temperature and dissolved oxygen were measured in situ and the remainder of the parameters were measured in the BEAK Vancouver Laboratory. Stations 1 and 2 were chosen to represent the Foxy Creek watershed, Stations 3 to 8 represent the Buck Creek watershed. Station 4, Upper Buck Creek, was chosen as a

control station because it would not be affected by any activities associated with the mining development and lies within a different geological zone from that of the mine area. Stations 3, 6, and 7 are unnamed tributaries of the Buck Creek system and hence temporary names were applied to them to aid in data assimilation and discussion. It is for this reason that their names are given in quotation marks

B. Biological

Biological samples were collected from all stations except Goosly Lake and "Eagle" Creek. A preliminary field examination was made to identify the dominant invertebrate species. The results are contained in (Table 2). The samples have been preserved and are available should future analysis be required.

III. Discussion

A. Chemical

In general, all stations were very similar chemically during both surveys. The pH was close ($\pm$ 0.2) to neutrality in all cases and cyanide, silver arsenic, mercury, lead, antimony and zinc were not detected. Modest differences were detected in the total solids, turbidity, copper, fluoride and iron concentrations.

The Foxy Creek Stations (No. 1 & 2) were essentially identical chemically and all measured parameters were present in very low concentrations.

Solids, turbidity, fluoride and iron levels were generally lower than those found in the Buck Creek watershed. Copper levels were higher in comparison to Buck Creek Stations except for "Camp" Creek.

The Buck Creek sampling Stations (No. 3 to 8) did not exhibit major differences. Iron levels did fluctuate and indicate that concentrations in Upper Buck Creek and "Eagle" Creek already slightly exceed the level "A" standards for iron (0.3 ppm) set by the Pollution Control Branch for mine and mill effluents. All other parameters were well below level "A" effluent standards.

Within the Buck Creek watershed there are three points which merit discussion. First, "Eagle" Creek does not exhibit obviously different chemical characteristics in spite of its different geological source. Secondly, the July survey results for Lower Buck Creek were slightly different from those of Goosly Lake even though the former was close to the outlet of Goosly Lake. Total solids were found to be substantially higher at the Lower Buck Station, and iron was found to be much lower at Lower Buck Station. Examination of aerial photographs showed that the Lower Buck Station was below the confluence of Buck and Klo Creek. Thus the dissimilarities in certain chemical characteristics was most probably due to the inflow of Klo Creek water. Examination of the data obtained during the Fall survey, at which time the Lower Buck Station was relocated, shows that the chemical parameters are indeed very similar for Lower Buck Creek and Goosly Lake.

Table I: Chemical Analyses/Water Quality

	Station															
	1 Upper Foxy		2 Lower Foxy		3 "Camp" Creek		4 Upper Buck		5 Goosly Lake		6 "Burnt" Creek		7 "Eagle" Creek		8 Lower Buck	
	Summer[a]	Fall[b]	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall[d]
Temp. (°C)	7.8	0.0	13.0	3.8	11.0	2.8	10.5	2.2	16.0	7.2	9.5	3.0	8.8	1.6	12.5	4.5
Diss. Oxygen	10.2	11.9	9.2	11.1	10.2	12.1	9.4	10.7	8.3	7.8	10.4	10.8	9.2	11.1	9.0	10.4
Total Solids	64	108	65	97	111	221	66	116	59	100	96	104	86	121	95	94
Diss. Solids	56	106	57	92	104	189	60	110	48	90	92	98	80	115	88	90
Susp. Solids	8	2	8	5	7	32	6	6	11	10	4	6	6	6	7	4
pH	6.8	7.0	7.0	7.0	7.0	7.0	7.0	7.1	6.8	7.1	6.9	7.2	6.9	7.2	6.9	7.0
turbidity	1.0	1.0	2.0	1.0	4.0	3.4	3.0	3.0	2.0	1.0	2.0	1.0	3.0	4.5	1.0	1.0
cyanide	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver[c]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic[c]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper[c]	0.009	0.014	0.011	<0.005	0.009	0.014	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluoride[c]	<0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	<0.1	0.2
Iron[c]	0.08	0.10	0.08	0.10	0.09	0.06	0.49	0.54	0.18	0.22	0.18	0.02	0.22	0.34	0.09	0.22
Mercury[c]	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Lead[c]	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Antimony[c]	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Zinc[c]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Flow (cfs)	13	12	11	20	1.0	1.0	5.0	5.0	-	-	<0.2	<0.2	<0.2	<0.2	16	2.5

a July 25, 26, 1973
b October 10,11, 1973
c dissolved metals
d location changed in fall survey

Third, the one parameter which did change quite dramatically between the summer and fall surveys was the suspended solids and turbidity values for the "Camp" Creek Station. This increase might possibly be related to the increased activities in and around the proposed mine development.

The importance of the chemical and physical characteristics in Table 1 is the establishment of a pre-operational baseline. With such a data base it will now be possible to carefully and constructively monitor any changes which may occur in the water quality of these watersheds.

B. Biological

The biological sampling program involved the collection of one segment of the aquatic biological community, that is, the populations of bottom dwelling macro-invertebrate fauna (benthos). These animals, visible to the human eye and without a backbone, are common inhabitants in the bottom sediments of most natural water and are especially important to pollution monitoring because they are relatively immobile and exhibit varying degrees of sensitivity to changes in water quality.

Benthic populations are in constant contact with the water and therefore the numbers, density, and community composition reflect the quality of that water. Thus the benthic organisms will reflect the subtle effects of changes in water qualtiy over a period of time which physical or chemical measurements do not because of their time specificity.

Since benthic organisms exhibit varying degrees of sensitivity to changes in the conditions of the aquatic environment, BEAK (1965) has been able to categorize the benthos into three groups: those typical of clean water (pollution sensitive organisms - Group III), moderately polluted waters (moderately tolerant of polluted waters - Group II), or heavily polluted waters (pollution tolerant organisms - Group I). This biotic index is based not only on published scientific literature, but also on years of practical experience in baseline pollution studies. The Group III organisms contain the juvenile aquatic stages of insects which are sensitive to adverse changes in water quality and are the first to disappear if the condition of the streams or lakes deteriorate. Included in Group III are the mayflies (Ephemeroptera), stoneflies (Plecoptera), caddis flies (Trichoptera), and others. These organisms require clean water conditions such as high dissolved oxygen, swift currents, low turbidity and relatively low concentrations of toxic chemicals. The Group II organisms will consist of a number of organisms such as the leeches (Hirudinea) midges (Chironomidea), snails (Gastrotoda), and others. These can tolerate a moderate amount of biological degradation of the water to a varying degree according to individual tolerances. The Group I organisms are tolerant of some toxicity and low oxygen concentrations and will survive in an area where less tolerant organisms would be eliminated. The biological data enables evaluation of the community structure of benthic organisms and assessment of the environmental conditions of a particular water resource.

In this study, the preliminary examination of the biological samples indicated that all stations sampled supported a similar benthic community. Common to all biological samples were organisms characteristic

Table II - Benthic Invertebrate Evaluation

STATION	JULY 1973			OCTOBER 1973		
	Ephemeroptera	Plecoptera	Diptera	Ephemeroptera	Plecoptera	Diptera
1 Upper Foxy Creek	3	3	2	3	3	2
2 Lower Foxy Creek	3	2	1	3	3	3
3 "Camp" Creek	3	3	2	3	2	2
4 Upper Buck Creek	3	3	2	3	1	2
5 Goosly Lake	-	-	-	-	-	-
6 "Burnt" Creek	3	3	2		Absent	
7 "Eagle" Creek	-	-	-	-	-	-
8 Lower Buck Creek	(3	2	2)*	3	3	2

Index

3 = Abundant

2 = Moderately Abundant

1 = Few

- = Benthic Sample Not Taken

* = Location Change in Fall Survey

of Group III organisms or clean water forms, i.e. the Emphemeroptera (mayflies) and the Plecoptera (stoneflies). Although the numbers appeared to fluctuate between locations and time of year, fluctuations of this nature are characteristic of aquatic invertebrate populations. Other groups of organisms were noted with the Diptera being the most common. These are Group II forms and tolerate moderate pollution. Station 4, selected as a control, appears to be consistent with the other stations selected.

The preliminary results would suggest that the streams sampled are typical of undisturbed, clean, mountain-type streams found in northern British Columbia. From the estimates of numbers of invertebrates collected, it would appear that these streams may support adequate numbers of benthic organisms to provide an excellent fish food source. Although "Camp" Creek, "Burnt" Creek and "Eagle" Creek are probably poor fish habitat because of their size and physical characteristics, Foxy Creek and Buck Creek would appear to be excellent habitat for fish.

IV Recommendations

1. It is recommended that the following parameters be included in any future monitoring program; sulphate, sulphide, chemical oxygen demand, and oil and grease. The former two parameters are considered of importance because of the possibility of sulphur based compounds being present in the effluence due to the leaching plant.

The latter two are recommended on the basis of the ultimate use of various mill reagents during the flotation processes. In addition, it was noted during field surveys that natural foam was present at some sampling stations.

2. It is recommended that once final commitment for the development of the proposed project has been made, a more frequent and rigorous monitoring of the water flows in the Buck Creek Watershed be made since it is anticipated that this watershed shall be a principle source of water for the development and shall receive some effluent from the Tailings Pond area. In addition, it is recommended that a biological, chemical and physical survey of Goosly Lake be conducted prior to the full operation of the development.

3. It is recommended that Eagle Creek not be included in further surveys due to its apparent similarity to other Buck Creek water stations.

PREPARED BY: _____
J. E. Sager

_____
D. Krochak

APPROVED BY: _____
K. R. D. Mundy

APPENDIX 1

SAMPLING LOCATIONS - A DESCRIPTION

SAMPLING LOCATIONS - A DESCRIPTION

Eight stations, covering two watersheds, were selected and sampled during the survey. The watersheds covered were Foxy Creek (2 stations), located northwest of the mining property and Buck Creek (6 stations), located south of the mining property.

A. FOXY CREEK WATERSHED

STATION 1 - UPPER FOXY CREEK

The station is approximately 1.8 miles north of the camp. Access is by motor vehicle and foot. A forty-five minute hike along the poorer road sections and a blazed trail is necessary. The station area is noteworthy by its wilderness area. No logging activities are present in the region.

The sampling location is about 75 feet downstream from the junction of two Foxy Creek headwater tributaries, a west branch and a south-west branch. A water gauge has been installed on the west branch, just upstream from the junction. The creek bottom consisted of 5 - 8" boulders with gravel and sand.

STATION 1: UPPER FOXY CREEK

View of Confluence of West (left center) and south-west (lower right) branches.

STATION 2 - LOWER FOXY CREEK

The station is approximately ten miles downstream from Station 1 - Upper Foxy Creek. Road access is possible although the last 1 - 2 miles is unimproved and may prove impassable for a vehicle during unfavourable weather.

Location access is as follows:

Approximate Mileage	Description
0	Village of Topley east of Houston. Drive east to mile
6	where a closed Shell garage is seen on the left-hand side of the road, turn right and drive to mile
9	turn right at the T-junction and drive to mile
10	make a sharp left, cross the railway tracks and continue on to mile
13	the site of a small sawmill operation. Continue past the mill, bearing left at the junction immediately past the mill to mile
14.5	at which point a rough road joins the main road from the right, turn right and continue to approximately mile
17.5	bear right at the road junction just past the

meadow. The road condition deteriorates and by mile

18.5 it may be required to continue by foot to mile

19.5 the road ends at the steam as the bridge has been washed out.

The samples were taken about 75 feet upstream from the road. Visual stream and area conditions are similar to Station 1 with the exception that a wider stream bed, mainly gravel and sand is evident. The stream bed sampled is actually one of three branches of Foxy Creek which flow into Maxim Creek.

STATION 2: LOWER FOXY CREEK

Upstream view of sample location taken from the road.

B. BUCK CREEK WATERSHED

STATION 3 - "CAMP" CREEK

The station is approximately 2.4 miles south of the camp. Easy road access is available. About ¼ of a mile from the Buck Creek bridge, in the direction towards the camp, a road leads to the right. The station is about one-half mile up this road and is marked with orange flagging. The creek itself is unnamed. It provides drainage for the valley in which the Sam Goosly property is located.

The creek has a very wide gravel bed as evidence of large seasonal flows having occurred. During the reconnaisance of the station it was noted that "Camp" Creek has a number of beds available to its flow downstream from the station on Buck Flats. During low flow it enters Buck Creek about 100 feet upstream from the Buck Creek bridge but during high flow it appears that the creek floods sections of the flats and flows directly into Goosly Lake.

Logging operations are evident throughout the general area and log debris covers portions of the creek bed. The stream bed consists of sand and gravel with a few large rocks.

STATION 3 - "CAMP" CREEK

Upstream view of sampling location taken from road embankment.

STATION 4 - UPPER BUCK CREEK

The station is approximately 2.6 miles south of the camp and easy road access is available. Immediately before reaching the Buck Creek bridge, travelling towards camp, a road branches off the main road and follows the south side of Buck Creek. The station is reached from this road about 600 feet up from the junction and is approximately 500 feet upstream from the junction of "Camp" Creek and Buck Creek.

This station functions as a control since it will remain unaffected by any operations related to the development of the Sam Goosly property. Abundant vegetation grew close to the creek banks although extensive logging has taken place thoughout the immediate watershed area, particularly

on the moutain slopes to the south. Evidence of beaver activity both upstream and downstream from the station was present. The stream bed consisted of sand and gravel.

STATION 4 - UPPER BUCK CREEK

Downstream view of sampling location.

STATION 5 - GOOSLY LAKE

Road access is available to the lake's south shore from the main road about 1 1/2 miles from the Buck Creek bridge (travelling towards Houston).

Water samples are taken slightly offshore by wading as deep as possible with hip-boots. The bottom of the lake is firm and covered with fine

sediment of an organic nature. The sediment is possibly related to the use of the access clearing for certain logging operations.

STATION 5 - GOOSLY LAKE

View from south shore

STATION 6 - "BURNT" CREEK

The station represents an unnamed creek approximately 2.8 miles southwest of the camp. It enters Goosly Lake on its north-west shore. Access is difficult. From the main road, about 1/4 mile east of Station 5, a 3/4 mile hike through two marshy areas to the lake's north shore followed by about 1/2 mile through a previously burnt out area is required. The samples were taken about 600 feet upstream from the creek mouth. The

stream bed is sand and gravel and little evidence of large seasonal flow is present.

STATION 6 - "BURNT" CREEK

Upstream view of sampling location

STATION 7 - "EAGLE" CREEK

The station represents an unnamed creek approximately 3.6 miles southwest of the camp which enters Goosly Lake on its south-western shore. Access is easy from the main road at a bridge approximately 1/2 mile east of Station 5.

The exact sampling station is approximately 300 feet upstream from the bridge.

The creek is very small and little evidence of large seasonal flows is present. The stream bed is mostly sand, with some gravel. Vegetation was abundant in the small creek valley and no logging activities were noted in the immediate area.

As with Station 4 (Upper Buck Creek) this station serves as a control, since it will remain unaffected by a development associated with Sam Goosly property. It exhibits many physical similarities to "Burnt" Creek.

STATION 7 - "EAGLE" CREEK
Upstream view of sampling location.

STATION 8 - LOWER BUCK CREEK

The station as described herein was sampled for the first time during the fall survey. It is located approximately 75 yards upstream from the junction of Klo Creek and Buck Creek. The stream bed exhibits little evidence of high seasonal flows and consists mainly of 2 4' gravel.

Road access to the immediate area is not difficult although a short hike is required to reach the station itself.

General access to the area is as follows:

Mile	Description
0	main highway just west of Houston, where the Buck Creek access road begins
13.3	road junction, bear left
18.1	road junction, bear left
23.3	a large warning sign on right side of road, on left side is a clearing which begins a secondary unimproved road
app. 25	the unimproved road leads to an abandoned saw mill and farm on the valley floor. The road ends here.
app. 26	By foot, the sharp contour of the valley's south edge is followed for about 1/2 mile (trail flagged) at which point the trail is left. The valley floor is crossed until Buck Creek is reached.

STATION 8 - LOWER BUCK CREEK

Downstream view of relocated sampling station.

APPENDIX 2

RECLAMATION REPORT

PROJECT J5058
AUGUST 1973

GOOSLY PARTNERS LIMITED

HOUSTON, B.C.

RECLAMATION REPORT - MINERAL EXPLORATION

by

Beak Consultants Limited
Vancouver, B. C.

PROJECT J5058
RECLAMATION REPORT - MINERAL EXPLORATION

GOOSLY PARTNERS LIMITED
HOUSTON B.C.

DATE 20 AUGUST 1973

TABLE OF CONTENTS

	Page
INTRODUCTION	1
NATURE OF EXPLORATION	1
PRESENT LAND USE AND DESCRIPTION	2
ENVIRONMENTAL IMPACT OF EXPLORATION WORK	3
POTENTIAL LAND USE	5

PROJECT J5058
RECLAMATION REPORT - MINERAL EXPLORATION

GOOSLY PARTNERS LIMITED
HOUSTON B.C.

DATE 20 AUGUST 1973

INTRODUCTION

This report has been prepared in order to inform provincial authorities, as required under Section 11 of the Mines Regulation Act, of the intentions of Goosly Partners Ltd. to conduct mineral exploration work in a manner cognizant of relevant environmental reclamation procedures.

The exploration work described in this report is one phase of a continuing study of the mineral deposits on the property. It will complement previous work and should be regarded as part of the initial stages of the possible development of a major mining program in the area. Should results indicate the feasibility of putting into production a mine and mill complex, a more comprehensive reclamation report describing the environmental characteristics of the area in much greater detail would, of course, be provided.

NATURE OF EXPLORATION

During the period from August 1973 to April 1974 at the locations specified on the attached map, 40 test holes will be drilled and a nominal underground survey will commence. Associated activities to provide access and site location information will include approximately 1½ miles of road construction and approximately two miles of line cutting.

PRESENT LAND USE AND DESCRIPTION

The Sam Goosly property is located approximately thirty miles south-east of Houston, British Columbia. It is situated on gentle relief and at an elevation of 4,300 feet and is accessible by a logging road network which follows Buck Creek from Houston.

The climate can be described as northern temperate with an annual precipitation of 20 inches and temperature extremes of -50 to +90°F. Soils of the area are generally grey wooded with occasional rock outcropping present. Vegetation is second growth coniferous forest with White Spruce and Lodgepole Pine being the major species present, with Black Spruce in the wetter areas. Wildlife indigenous to the area include moose, muledeer, black bear, and ruffed and spruce grouse. The common furbears in the area are beaver, linx and fox.

The headwaters of an unnamed creek are located on the property. Flows of the creek are on the average low and appear to be insufficient to support major fish populations. This creek enters Buck Creek approximately four miles to the south, just upstream from Goosly Lake. An environmental survey was conducted by BEAK on the creek in July 1973 to determine biological and chemical parameters. An additional monitoring survey will be conducted in the fall of this year during a time in which the exploration activities will be underway. Environmental monitoring has been conducted not only for this creek, but also at seven other locations in the general area in order to

obtain baseline environmental information should a major mining development be built in the future. Environment Canada also conducted a biological and chemical survey in the immediate area during July 1973.

Land useage of the area has been primarily mining exploration in the recent past. In addition, recreational use by both resident and non-resident hunters has occurred. Extensive logging is evident in the adjoining region, primarily in the lower Buck Creek valley levels, but active logging near the Sam Goosly property itself has not occurred. Agricultural activities are non-existent in the immediate area as the soils and topography do not lend the area to such utilization.

ENVIRONMENTAL IMPACT OF EXPLORATION WORK

The area to be affected by the exploration activities is shown on the attached map. The actions which will have the greatest impact on the environment are road construction, line cutting, diamond drilling, underground exploration and the work-force's living accommodations. The environmental characteristics possibly affected by these activities will be very limited areas of vegetation and the watercourse which drains the area.

In order to minimize the environmental impact of road construction, existing access roads will be used whenever possible. Where additional roads are required, proper construction techniques will be employed to minimize the environmental impact. Primarily, this will involve the adequate provision of ditches and culverts to control erosion.

The removal of vegetation associated with line cutting and diamond drilling will be undertaken in such a manner as to minimize the actual area cleared, such action being commensurate with good mining practices and manpower allocation. Refuse associated with these activities will be collected, removed and disposed of by burial.

The underground exploration portal will provide a minimum of surface disturbance as it will be collared in an existing rock exposure, hence topsoil and overburden soil will not be disturbed. In addition, upon completion of the underground exploration, the portal will be sealed in order to abide by general safety considerations.

Storage and subsequent disposal of the ore removed during the underground exploration activities will take place in two discrete phases. Initially, approximately one hundred separate rounds of ore will be extracted and stored in discrete piles in a cleared area close to the portal for the duration of the data evaluation period following the exploration activities. After this evaluation, a decision will be made concerning the future of the property. Should full scale production be not feasible, the storage pile area would be levelled.

Living accommodations for the exploration crew have been constructed on the site of an existing exploration camp located near the mining property. The development included the additional clearing and levelling of approximately 10,000 square feet of land and the setting up of trailer units.

Appropriate sanitation facilities have been constructed and a small refuse disposal area cleared.

In summary, the impact of the exploration activities will be minimal. Refuse removal and burial and camp-site and drill site clean-up will help to provide positive aesthetic results. In addition, the areas cleared are small in comparison to the natural forests present in the region and to the previous logging operations nearby. Also, public access is very limited due to the property's remote location. Thus, aesthetic depreciation caused by vegetation removal in the area must be considered minor in magnitude and importance.

Road construction offers the greatest potential for deleterious impact on the environments through possible siltation of the existing watercourse in the valley. Proper techniques to minimize this impact will be followed and stream monitoring will occur at one point during the exploration activities. A potential benefit of road construction is the positive recreational impact of improving hunter's access to the area.

Competition with other public and private land-use activities do not exist at the present time, nor does such competition seem possible in the immediate future.

POTENTIAL LAND USE

The area detailed in the attached map has been surveyed and assessed as to its potential land capability by the Canada Land Inventory (ARDA). This

capability analysis assessed the area for its potential use for agriculture, big game, forestry, recreation, and waterfowl, then complexed the information to arrive at a "best use" of the land.

Based on the above mentioned categories, approximately 90% of the Sam Goosly property is classified as only moderate or limited (60:30 split respectively) yield forest. This relates to a productivity ranging from 31 to 70 cubic feet per acre. This lower rating for the property and its immediate surroundings was evident during site visitations as logging activity in the general area is extensive in the lower valley areas, where the capability has been classified as high yield. The remaining 10% of the property, a section on the mid-east side, is classified as limited big game range, that is: severe limitations for the production of wild ungulates and low to moderate capability for summer use exist.

In conclusion, the Sam Goosly property is located in an area of limited or moderate land use potential for those resources included in the ARDA study. The exploration and reclamation activities discussed in this report combine to yield an environmental impact of low magnitude and importance, yet offer the possibility of defining an area capable of supporting a high yield mineral extraction industry.

PREPARED BY: _____
J. E. Sager

APPROVED BY: _____
K. R. D. Mundy

APPENDIX 3

STATUS REPORT OF ENVIRONMENTAL ACTIVITIES

PROJECT J5058
DECEMBER 1973

EQUITY MINING CAPITAL LIMITED

HOUSTON, B.C.

STATUS REPORT OF ENVIRONMENTAL ACTIVITIES

1973

by

Beak Consultants Limited
Vancouver, B.C.

PROJECT J5058
STATUS REPORT - 1973

EQUITY MINING CAPITAL LIMITED
HOUSTON B.C.

DATE 17 DECEMBER 1973

TABLE OF CONTENTS

	Page
INTRODUCTION & SUMMARY	1
BEAK CONSULTANTS	
Pre-operational Field Surveys	1-2
Reclamation Report	2-3
Effluent, Emission and Refuse Applications	3
ENVIRONMENT CANADA	
Field Surveys	4
B.C. RESEARCH	
Acid Production Tests	4
ENVIRONMENTAL ACTIVITIES - 1974	4-5

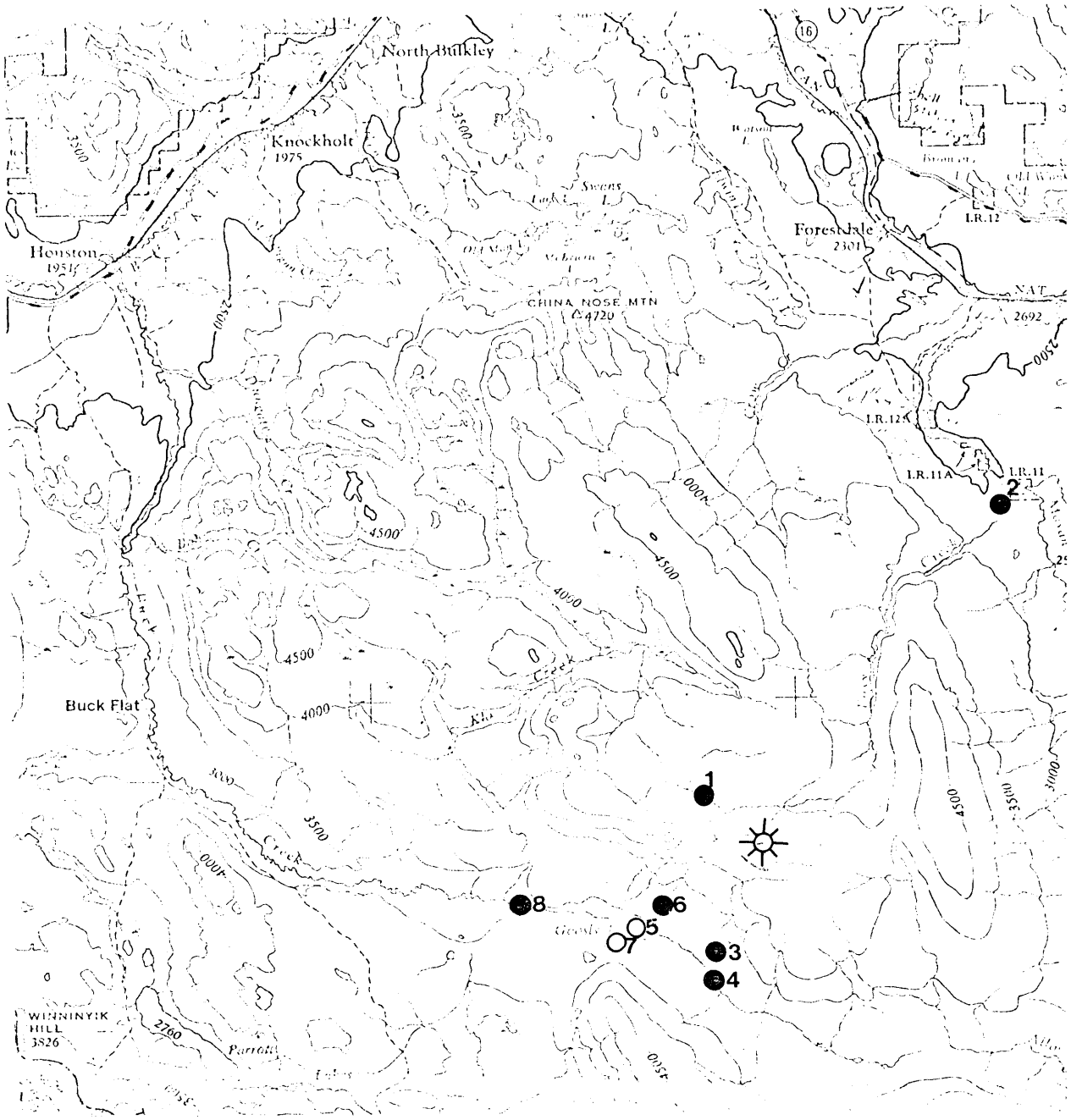
biological and chemical characterization of the area's watercourses. On-site examination of the area's aquatic habitats was performed by a Beak biologist who collected samples of benthic invertebrates which were preserved and stored for future detailed evaluation, should it be required. Water samples were collected and analysed for the following parameters:

temperature	copper
dissolved oxygen	flouride
total, suspended and dissolved solids	iron
pH	mercury
turbidity	lead
cyanide	antimony
silver	zinc
arsenic	

Eight stations, covering two watersheds, were selected and sampled during each survey. The watersheds covered were Foxy Creek (2 stations), located north-west of the mining property, and Buck Creek (6 stations), located south of the mining property (figure 1). Draft field notes have been prepared for each survey and preliminary assessments of the data have been made.

RECLAMATION REPORT

In August 1973 a reclamation report was prepared for submission to the Department of Mines and Petroleum Resources.



Reference:

Proposed Development Site

Benthos & Chemical Samples

Chemical Samples only

Legend:

Station 1 - Upper Foxy Creek
Station 2 - Lower Foxy Creek
Station 3 - "Camp" Creek
Station 4 - Upper Buck Creek
Station 5 - Goosly Lake
Station 6 - "Burnt" Creek
Station 7 - "Eagle" Creek
Station 8 - Lower Buck Creek

Figure 1: BEAK SAMPLE LOCATIONS

The report dealt with the environmental impact of exploration work planned for the fall of 1973. Activities associated with the exploration work were detailed in addition to the present and potential land use in the region.

It is recognized that should exploration results indicate the feasibility of putting a mine and mill complex into production, a comprehensive report describing the aquatic and terrestrial environmental characteristics of the area, development activities and the resultant interactions would be prepared.

EFFLUENT, EMISSION AND REFUSE APPLICATIONS

To date, hard technical data of the proposed mine and mill complex is not available. However, it is anticipated that two effluent flows, three emission points and one refuse dump will be associated with the complex. The effluent flow will include mill tailings, most likely to be in a recirculation system, and a leaching plant discharge. The former will be characterized by chemical analysis in early 1974 of the effluent from the process pilot plant which is currently being developed. Characteristics of the leaching plant discharge are not yet known. Emission points will probably include the primary crusher, secondary crusher and concentrate dryer. Refuse should consist mainly of packaging materials and industrial containers. Domestic refuse will most probably be at a minimum as initial plans are that mine and mill employees will not live on-site, but rather in the general Houston area.

ENVIRONMENT CANADA

Two pre-operational field surveys were also undertaken by the federal government during 1973 at selected sites on Foxy and Buck Creek. Emphasis of the surveys was on metals content in fish with general water chemistry and biological assessments also being made. A report of the two surveys is presently being prepared.

B.C. RESEARCH COUNCIL

In July 1973, three drill core samples representing the type of mineralization found on the mining property were subjected to acid production tests by the B.C.R.C. Both tests, initial (chemical) and confirmation (biological) were performed. It was determined that a potential for acidic drainage water exists when mineralized materials are mined and stockpiled.

ENVIRONMENTAL ACTIVITIES - 1974

The planning of all environmental work to date has been based on a phased program to allow environmental commitments to be in tandem with the overall development plan. Thus the status of future field programs will be determined in the new year concomitant with the feasibility decision of the development. It is anticipated that should the development proceed, approved environmental programs would be formulated to conform with the objectives detailed in the amended report "Pollution Control Objectives for the Mining, Mine-milling and Smelting Industries of British" and accepted by the Pollution Control Board in November 1973.

Consultation between the parties involved particularly Equity Mining Capital, Beak Consultants, the Pollution Control Branch and Wright Engineering, would be recommended during the formulation of future environmental programs.

PREPARED BY: _____
J.E. Sager

APPROVED BY: _____
K. R. D. Mundy

Addendum

February 1974 - At the time of preparation of the Status Report of Environmental Activities, the full extent of the field surveys conducted by Environment Canada (c.f. page 4) was not correctly known. The surveys were, in actual fact, quite comprehensive and included detailed benthic invertebrate analysis, algae analysis, and trace metals determinations in water at eleven sampling points as well as fish surveys of Foxy and Buck Creeks and the determination of pesticides, copper and zinc in fish tissues.

J. E. Sager

Beak Consultants Limited

Montreal
Ottawa
Toronto
Calgary
Vancouver
Atlanta
Portland