

DST

001563

Anvil Mining Corporation Limited

1973 Exploration Program

D. S. Jennings

S. K. Buziak

ANVIL MINING CORPORATION LIMITED

1973 EXPLORATION PROGRAM

Within Claims
{ Geophysical 126,000
{ Drilling 34,000
Off claim 48,000

D. S. Jennings

S. K. Buziak

TABLE OF CONTENTS

	<u>Page</u>
Summary	1
1973 Exploration Within Anvil Claim Groups	4
Background	4
Selection of Exploration Methods	5
Swim Lake Area	6
East Sea Area	6
Sea-Mor Area	7
Dea-Kay Area	7
Sink Claim Group	8
Vangorda Area	8
Dy-Gale Area	9
Sun Area	9
Tie Area	10
Rose Creek Area	10
Claim Status	11
Personnel	11
Timing of Geophysical and Drilling Programs	11
Equipment Requirements	12
Budget	12
1973 Exploration Program in Selected Areas of the Anvil Range	13
Background	13
Exploration Methods	17
Personnel and Program Timing	17
Budget	18

S U M M A R Y

The proposed 1973 exploration program is divided into two parts: a) exploration within Anvil claim holdings, and b) exploration in selected areas of the Anvil Range. An outline of both parts of the program follows.

Exploration within Anvil Claim Holdings:

1) Geophysical Programs

Turam and follow-up gravity surveys will be conducted in the East SEA and DY-GALE areas as well as over the entire SINK claim group to test for mass concentrations in conductive horizons within the phyllite unit. Gravity surveys will test for mass concentrations within known conductive graphitic phyllite or carbonaceous slate horizons in the SEA-MOR, DEA-KAY, SUN and TIE areas. Individual Turam lines will be run over weak (≤ 0.5 mgal), untested gravity anomalies on the East SEA, MOR and DY-RICH-BOB areas to test for coincident conductive zones. A small gravity survey will be completed over known conductors on the CROWN claims. Estimated cost for this program is \$127,230.

2) Diamond Drilling

Diamond drilling of specific targets defined by the above geophysical surveys will be performed where indicated. Areas of interest are detailed in the attached text. No defined drilling targets remain from the 1972 program. Estimated cost for this program is \$34,940.

3) Personnel

No additional personnel requirements above the present exploration staff are anticipated. Most field work in the Anvil claim groups will be carried out through geophysical and drilling contractors.

Exploration in Selected Areas of the Anvil Range:

1) Field Investigations

Sixteen airborne magnetic anomalies (Federal survey) in pelitic rocks of the Anvil Range will be investigated by geological, geochemical and ground magnetometer surveys. A detailed explanation of this program is attached. Transportation for this investigation is by helicopter. Estimated cost is \$48,000.

2) Personnel

This program will be implemented by the present exploration staff.

Budget:

The budget for 1973 exploration is as follows:

Source of Funds

Anvil Mining Corp. Ltd.	\$186,460
Pelly River Mines	<u>23,710</u>
Total	\$210,170

Cost of Programs

Claim Group Geophysics	\$127,230
Anvil Range AMAG	48,000
Drilling	<u>34,940</u>
Total	\$210,170

1973 EXPLORATION WITHIN ANVIL CLAIM HOLDINGS

Background:

Exploration for 1973 within the Anvil claim groups is based on two observations a) known massive sulfide deposits are spatially associated with graphitic pelitic rocks and b) these sulfide bodies contain sufficient ferromagnetic minerals (pyrrhotite and magnetite) to give anomalous responses on the 1000 foot altitude, federal aeromagnetic survey of the claim area. A brief review of these observations follows.

All known sulfide deposits in the Anvil metamorphic belt are closely associated with graphitic rocks as shown on Figure I. In particular, two graphitic pelite units host the bulk of known sulfide mineralization. Swim, Vangorda, Champ and the deposit reported under the northeast arm of Swim Lake all appear to occur within a single graphitic phyllite unit. The Faro orebodies occur within a horizon of graphitic schists about 200-400 feet below the overlying calc-silicate phyllite unit. Other occurrences of massive sulfides include the Firth deposit, sulfides intersected in SRH-4 and sulfides encountered in 66-S2 and 66-S4 (see Figure I). All these deposits occur in graphitic phyllites. In addition, the Firth deposit may occur in the same graphitic phyllite unit as Vangorda, Champ and Swim. Based on this observation, exploration in the Anvil district should concentrate on evaluating the base metal potential of known graphitic pelites as well as delimiting additional graphitic stratigraphic units.

Inspection of the federal government 1" = 4 mile aeromagnetic survey of the Tay River sheet shows a remarkable coincidence of AMAG anomalies with known sulfide deposits in pelitic rocks of the Anvil district. Details of this relationship are covered later in this proposal. For the present purposes, it is sufficient to note that most known sulfide occurrences, including Swim, Vangorda and Faro, are picked out by this survey.

Investigation of graphitic pelites and/or pelitic rock units with coinciding federal AMAG anomalies should yield the highest probability of base metal deposit discovery. This premise forms the basis of the 1973 exploration program on Anvil claim groups.

Selection of Exploration Methods:

Turam and gravity techniques appear to be most useful for exploration in the Anvil district. Turam electromagnetic methods are selected on the basis of their performance over Faro Zone 3 in the 1972 EM orientation study where the sulfide mass was detected to a maximum depth of 500 feet. On the SUN claim group, Turam was able to trace rock units of differing conductivities successfully. Comparison of the Turam results and geologic mapping over the same area showed the Turam survey capable of accurately "mapping" rock units. Thus, a combination of Turam and mapping should act as independent checks on each other and provide good geologic control of unit contacts in areas of deep overburden. This approach is proposed for location of unknown, graphitic, potential, sulfide-bearing pelites in covered areas. Gravity surveys

will be used to further test presently known, or Turam defined, graphitic units for mass concentrations. Selective diamond drilling of gravity anomalies in conductive units will be pursued as required.

Proposed line spacing for Turam and gravity surveys is 800 feet. This separation will permit effective data contouring which in turn should locate sulfide deposits under 1×10^6 tons.

Swim Lake Area¹:

Four grids (see Figures I and 2) will be evaluated by geophysical methods in this general area. The reasoning behind, priority and costs of each investigation are outlined.

1) East Sea Area: (Moderate to Low Priority)

A Turam and gravity follow-up survey will be completed to evaluate the presence of mass concentrations in conductive rock units. Anomalous Zn overburden geochemical values in RH 71-20 and RH 71-23 coupled with a moderate Lockwood AEM response over part of the area require investigation. Since bedrock was not intersected in the overburden drilling program in this area and geologic mapping has revealed little outcrop, the proposed survey is the best method of evaluating the base metal potential of the area. In addition, assessment work is required in this area by November-December 1973. Completion of the Turam gravity program and diamond drilling if required, should provide a final evaluation of these claims. This investigation plus existing gravity surveys on the remaining East SEA and MOR claims provides a final evaluation of the extreme southeast end of Anvil claim holdings. Tangential to this program, three Turam lines will be run over the sulfide showing at station 1437 (Figure I) to test its continuity. A single line of Turam will be run over two, undrilled, 0.5 mgal gravity anomalies on the 1969 MOR gravity grid to test for coincident conductors.

¹ Area refers to Anvil claims between Blind Creek and Orchay Lake

The cost of this program is as follows:

Linecutting (39 mi. @ \$150)	\$ 5,900
Turam (39 mi. @ \$185)	7,200
Gravity (8 mi. @ \$370)	3,000
Supervision/Interpretation	6,650
Transportation	<u>1,235</u>
	\$23,985

2) SEA-MOR Area: (High Priority)

A gravity survey will be run over the graphitic phyllite unit in this area (Figure I). The surface dimensions of this unit are determined from diamond drilling data and the Lockwood AEM survey. Coincident federal AMAG and bedrock Cu and Zn anomalies in RH 72-15 are to be investigated by this survey. Massive sulfides in the same rock unit are known to occur in nearby DDH 66-S2 and DDH 66-S4 (see Figure I). Anomalous gravity responses will be tested by diamond drilling.

Estimated costs for this program are:

Linecutting (19 mi. @ \$150)	\$ 2,800
Gravity (19 mi. @ \$370)	7,000
Supervision/Interpretation	4,075
Transportation	<u>760</u>
	\$14,635

3) DEA-KAY Area: (Low Priority)

Soil sampling in this area has established several Zn anomalies well in excess of 3X background. Individual values range from ≤ 140 to > 1000 ppm. Carbonaceous slates of presumed Proterozoic age underlie the area (Figure I). Overburden drilling results from RH 71-007 are anomalous with respect to Cu and Zn. A gravity survey is planned to cover these geochemical anomalies in an attempt to define mass concentrations in the slates. Follow-up diamond drilling will be pursued if warranted.

Cost estimates are as follows:

Linecutting (13 mi. @ \$150)	\$ 2,000
Gravity (13 mi. @ \$370)	4,800
Supervision/Interpretation	2,800
Transportation	<u>350</u>
	\$ 9,950

4) SINK Claim Group: (Moderate to High Priority)

Turam with follow-up gravity surveys on conductive zones are planned for the entire claim group. Nearly coincident federal AMAG and Lockwood AEM anomalies are to be investigated with this survey (Figure 2). No significant soil anomalies occur on the claim group. Gravity anomalies in conductive zones will be tested by drilling.

Projected costs for this program are:

Linecutting (35 mi. @ \$150)	\$ 5,200
Turam (35 mi. @ \$185)	6,500
Gravity (7 mi. @ \$370)	2,600
Supervision/Interpretation	5,950
Transportation	<u>1,105</u>
	\$21,355

Vangorda Area¹:

Two large grids (see Figure I) covering two areas of graphitic phyllite will be tested by Turam and gravity techniques. Details of these programs are outlined below.

¹ Area extending from Vangorda road turn-off to Blind Creek

Dy = 20.7 mi
Gale = 22.4

1) DY-GALE Area: (High Priority)

This area straddles the strike projections of both graphitic phyllite units found on Swim Ridge, one of which is host to the Swim deposit (Figure I). It also covers graphitic phyllite units on the GALE claims near Wedge Lake and the southeast extension of the Vangorda graphitic phyllite zone (same unit that hosts Swim deposit). Turam coverage will be used to more rigorously define the extent of these graphitic units into the Blind Creek valley. It should be pointed out that the contact pattern for graphitic phyllites near Blind Creek (Figure I) is inferred from the Lockwood AEM survey. Gravity surveys will be used to test conductive horizons defined by Turam for mass concentrations. A federal AMAG anomaly is centered on phyllitic rocks around Wedge Lake and will be tested in the course of this investigation. Follow-up diamond drilling of gravity anomalies will be pursued if required. Two lines of Turam will be run over low intensity, untested gravity anomalies on the 1968 DY gravity grid to test for coincident conductive zones. Such a coincidence might warrant diamond drilling.

Geophysical coverage of this area will cost:

Linecutting (48 mi. @ \$150)	\$ 7,200
Turam (28.8 mi. @ \$185)	5,330
Gravity (25 mi. @ \$370)	9,250
Supervision/Interpretation	9,400
Transportation	<u>1,795</u>
	\$32,975

2) SUN Area: (Moderate Priority)

The grid covering this area (Figure I) blankets two graphitic phyllite units. The unit to the northeast is host to one occurrence of massive sulfides, forty feet of massive pyrite in SRH-4. The other unit is rather poorly defined in terms of its outcrop dimensions because of nearly zero exposure on the northeast flank of Sheep Mountain. Scattered multi-station Pb and Zn soil anomalies are distributed over both units. Since both of these units are strongly conductive on the Lockwood AEM survey, a gravity survey will be undertaken to test these units for mass concentrations. Follow-up drilling of gravity targets will be implemented where necessary.

Approximate costs for this survey will be:

Linecutting (25 mi. @ \$150)	\$ 3,750
Gravity (25 mi. @ \$370)	9,300
Supervision/Interpretation	5,225
Transportation	<u>900</u>
	\$19,175

Rose Creek Area: (Low Priority)

A moderate conductive zone defined by the 1972 Turam survey underlies part of the CROWN claims. Costs to complete a gravity survey over this conductive zone follow:

Linecutting (2 mi. @ \$150)	\$ 300
Gravity (3 mi. @ \$370)	1,200
Supervision/Interpretation	700
Transportation	<u>555</u>
	\$ 2,755

Claim Status:

Upon application of all 1972 exploration expenditures to assessment work, all Anvil and Pelly River Mines claims are in good standing until 1975 or later with the following exceptions. The GALE (PRM) and part of the East SEA group (Anvil) will require work by September 1973 and November-December, 1973 respectively. The proposed 1973 geophysical surveys on these claim blocks will cover these requirements. Proposed 1973 work on the SINK claim group will extend its anniversary date well past April 1975.

Personnel:

No additional staff requirements are foreseen for 1973. Jansons will be responsible for implementing and overseeing the proposed geophysical and drilling programs on the claim groups. Buziak will attend to assessment filing, geometric analysis of structural data, and drafting until the beginning of the field season. Jennings will continue geologic and geochemical investigations within the Anvil claim groups up to the field season. The entire staff will collaborate on compilation and writing of a review of the 1972 program.

Timing of Geophysical and Drilling Programs:

Because of logistical problems caused by spring runoff, melting permafrost, gullywash through access roads and the like, linecutting and the proposed geophysical investigations will be completed prior to break-up. It is felt that a snowmobile supported program prior to

break-up will be substantially cheaper than mobilization involving road, bridge, culvert, 4 x 4 and flextrack vehicle rehabilitation. Drilling of geophysical targets can be accomplished with conventional bulldozer support at any time during the field season.

Equipment Requirements:

Equipment required to implement this program includes one 2-wheel drive pick-up truck, plus two snowmobiles and toboggans. The snowmobiles will be either leased or purchased, depending on cost.

Budget:

Source of Funds:

Anvil Mining Corp. Ltd.	\$186,460
Pelly River Mines	<u>23,710</u>
	\$210,170

Proposed Expenditures:

Geophysics	
Turam	\$ 19,030
Gravity	37,150
Linecutting	27,150
Transportation	6,700
Drilling	34,940
Salaries	
Exploration Geologist (+18% overhead)	20,000
Research Geologist (6 mo. +18% overhead)	10,000
Exploration Technologist (6 mo. + 18% overhead)	5,000
Exploration Draftsman (2.5 mo. +18% overhead)	<u>2,200</u>

Total:	<u>\$162,170</u>
--------	------------------

Balance:	\$ 48,000
----------	-----------

1973 EXPLORATION PROGRAM IN SELECTED AREAS OF THE ANVIL RANGE

Background:

Inspection of the 1" = 4 mile federal aeromagnetic map of the Tay River sheet shows a strong correlation between aeromagnetic (AMAG) anomalies and known sulfide deposits in Eocambrian pelitic rocks of the Anvil Range. AMAG anomalies from the federal survey have been superimposed on a generalized, geological map of parts of the Tay River and Glenlyon map areas published by the Geological Survey of Canada (Figure 3). This map covers known extensions of the Eocambrian stratigraphic package proximal to the mine, northeast of Tintina Trench. Perusal of Figure 3 shows that of a total of eleven investigated AMAG anomalies in pelitic rocks of the Faro-Swim area, seven can be related to sulfide deposits, three of which have economic or potential economic significance (Faro, Vangorda and Swim)¹. Three of the remaining four anomalies are related to ferromagnetic mineral concentrations in basic volcanic or intrusive rock types, the cause of the fourth is uncertain. Table I summarizes these relationships.

¹ It is emphasized that the "investigated" anomalies (with the exception of the GAL or Ski Hill anomaly) were not known per se during investigation of the areas covered by these anomalies since all exploration work was carried out before 1969 prior to publication of the AMAG survey.

TABLE I: Investigated AMAG Anomalies in Pelitic Rocks of Anvil Range

<u>Location of Anomaly</u>	<u>Cause of Anomaly</u>
1) Crown Claims	Magnetite-rich pyroxenite intrusion
2) Heck-Hill-Rust Claims	Magnetite-rich pyroxenite intrusion
3) Faro Claims	Magnetite and pyrrhotite in Faro deposit
4) Gal Claims (Ski Hill)	Pyrrhotite concentrations in amphibolite
5) Kerr Addison's Vangorda Claims	Pyrrhotite in Vangorda deposit
6) West Swim Claims	Pyrrhotite and magnetite in Swim deposit
7) BS Claims	Pyrrhotite in massive pyrite deposit under Swim Lake
8) East Sea Claims	Pyrrhotite in Sea deposit
9) Sea-Mor Claims	Pyrrhotite, pyrite, chalcopyrite in graphitic phyllites
10) Ace Claims (lapsed)	Disseminated pyrrhotite in graphitic phyllite
11) Cub Claims (lapsed)	Minor disseminated pyrrhotite in graphitic phyllite (uncertain)

It should be noted that the magnitude of the aeromagnetic response is not a function of deposit size. Both Swim (19×10^6 tons total sulfides) and Vangorda (22×10^6 tons total sulfides) give strong AMAG responses while Faro (estimated 63×10^6 tons total sulfides) gives a far weaker anomaly. The Firth and Champ deposits (0.5×10^6 tons total sulfides each) are not indicated by the federal survey. Magnitudes of aeromagnetic anomalies are determined by the following factors: 1) distribution and volumetric percentage of pyrrhotite/magnetite, 2) total volume of deposit, and 3) depth of burial of deposit.

Sixteen uninvestigated AMAG anomalies occur on open ground within the Eocambrian sequence between Earn River and Blind Creek (Figure 3). Historically, these anomalies have received little, if any, attention. Inspection of claim records from 1964 to present for this broad area in the Mining Recorder's office, Whitehorse Mining District, revealed only the anomalies in the Blind Creek valley have been staked. Since results of the federal AMAG survey over this area were made public in 1969, well after the staking rush in the Anvil area, it is doubtful that systematic exploration of these anomalies has taken place.

On the strength of the correlation between investigated AMAG anomalies and sulfide occurrences, it is proposed to test the sixteen anomalies outlined in Figure 3 for the presence of base metal sulfides. Other reasons to pursue this project at this time include:

1) Anvil has sufficient exploration personnel familiar with the geology and exploration within the Anvil district to complete a preliminary investigation of these anomalies in the 1973 field season.

2) Since most of the Anvil claim holdings will be adequately explored by the end of 1973, this project provides a logical transition to exploration outside the claim groups.

3) The sixteen AMAG anomalies are reasonably close to the minesite. Their evaluation provides a rapid and inexpensive method of testing large areas of "favourable" rocks in closest proximity to the mine outside of the claim groups.

4) Faro and the minesite afford the most logical base of operations for exploration in this area. For support reasons, Anvil is the logical organization to explore this area.

5) The area between Anvil Creek and Earn River has been considered for regional exploration by Cyprus. Canadian Reserve Oil and Gas and Glenlyon Mines hold small claim blocks in this general area. It is to Anvil's advantage to assess this and other areas relatively close to the mine as quickly as possible.

From discussions held with Dynasty and Cyprus personnel, it is apparent that they have not realized the potential of the federal AMAG survey. It is to Anvil's advantage to maintain the status quo.

Exploration Methods:

Each of the sixteen AMAG anomaly areas will be investigated by geologic mapping techniques in an attempt to explain the cause of each anomaly. Reconnaissance soil geochemistry and ground magnetometer surveys will be run over the anomalies to evaluate presence of near-surface base metal accumulations and to refine the anomaly locations. Anomalies that cannot be explained by ground investigations will be staked for geophysical evaluation at a later date. Transportation for this program will be by helicopter.

Personnel and Program Timing:

Jennings will be responsible for geologic investigations and supervision of this program. Buziak will be responsible for the soil geochemistry and ground magnetometer surveys. Approximately 40 square miles will be covered in detail by this program requiring approximately two months to complete. Field investigations will start in June and run to completion. The remaining portion of the field season will be spent "filling in" areas of sparse geologic coverage on the claim area maps.

Budget:

Source of Funds:

Anvil Mining Corp. Ltd. (balance of 1973 budget) \$48,000

Proposed Expenditures:

Helicopter Transportation

(40 days @ 3 hrs./day @ \$150/hr.) 18,000

Salaries

Research Geologist (6 mos. + 18% overhead) 10,000

Exploration Technologist (6 mos. + 18% overhead) 5,000

Maps

(Max. of 142 sq. mi. @ \$35/sq. mi.) 5,000

Air Photos

(Max. of 150 line mi. @ \$10/line mile) 1,500

Geochemical Analysis

(100 samples/anomaly @ \$1.50 ea.) 2,500

Magnetometer Rental

(2 mos. @ \$250/mo.) 500

Claim Staking Contingency

5,500

\$48,000

$$\begin{array}{r} 240 \\ 82 \\ \hline 126 \end{array}$$