

SUMMARY REPORT  
AND PROPOSED EXPLORATION  
ANVIL AREA  
YUKON

DYNASTY EXPLORATIONS LIMITED

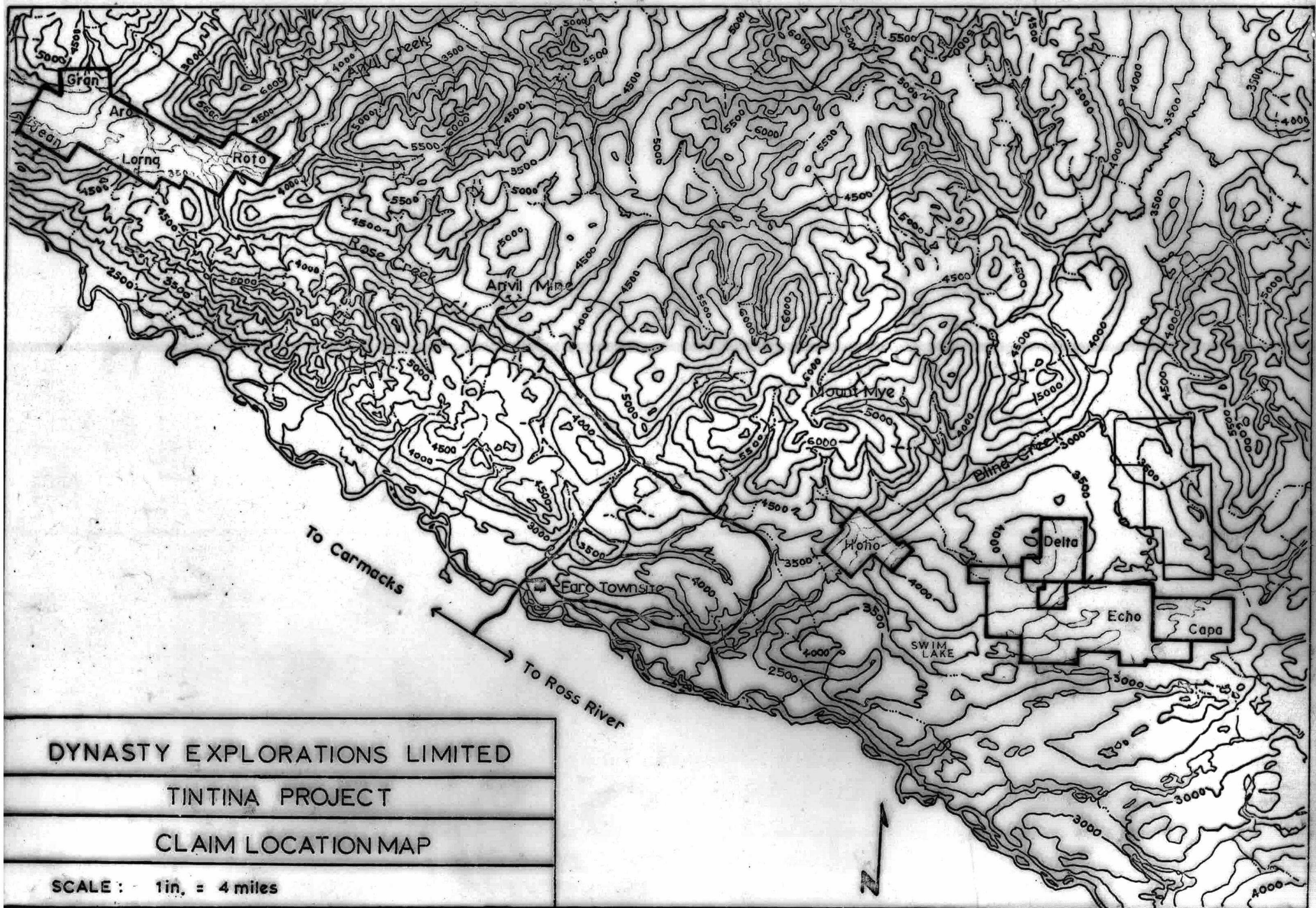
Vancouver, B.C.

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Submitted by  
DYNASTY EXPLORATIONS LIMITED  
Vancouver, B.C.

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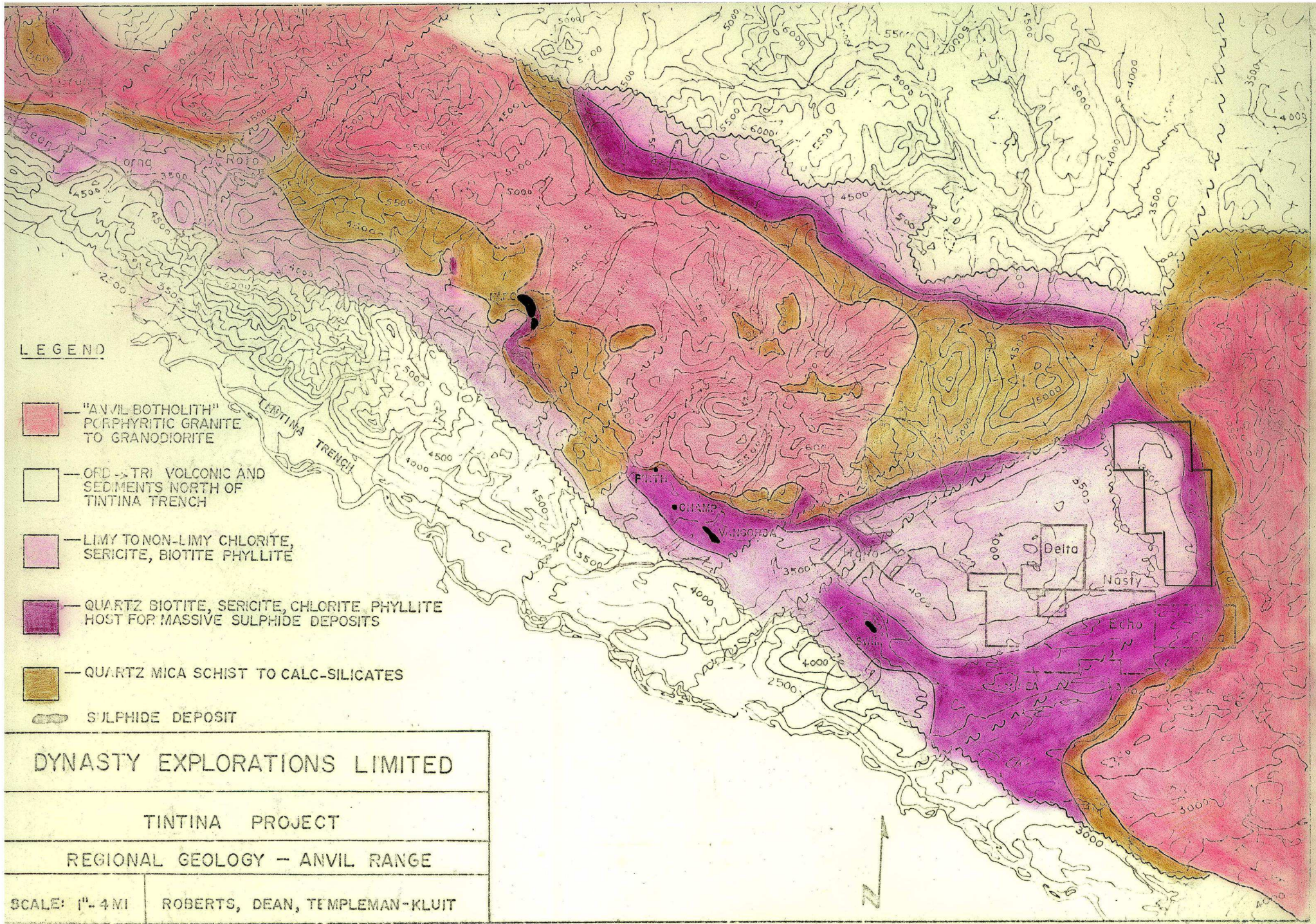


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TINTINA PROJECT

CLAIM LOCATION MAP

SCALE: 1in. = 4 miles



LEGEND

- "ANVIL BOTHOLITH" PORPHYRIC GRANITE TO GRANODIORITE
- ORD. VOLCANIC AND SEDIMENTS NORTH OF TINTINA TRENCH
- LIMY TO NON-LIMY CHLORITE, SERICITE, BIOTITE PHYLLITE
- QUARTZ BIOTITE, SERICITE, CHLORITE, PHYLLITE HOST FOR MASSIVE SULPHIDE DEPOSITS
- QUARTZ MICA SCHIST TO CALC-SILICATES
- SULPHIDE DEPOSIT

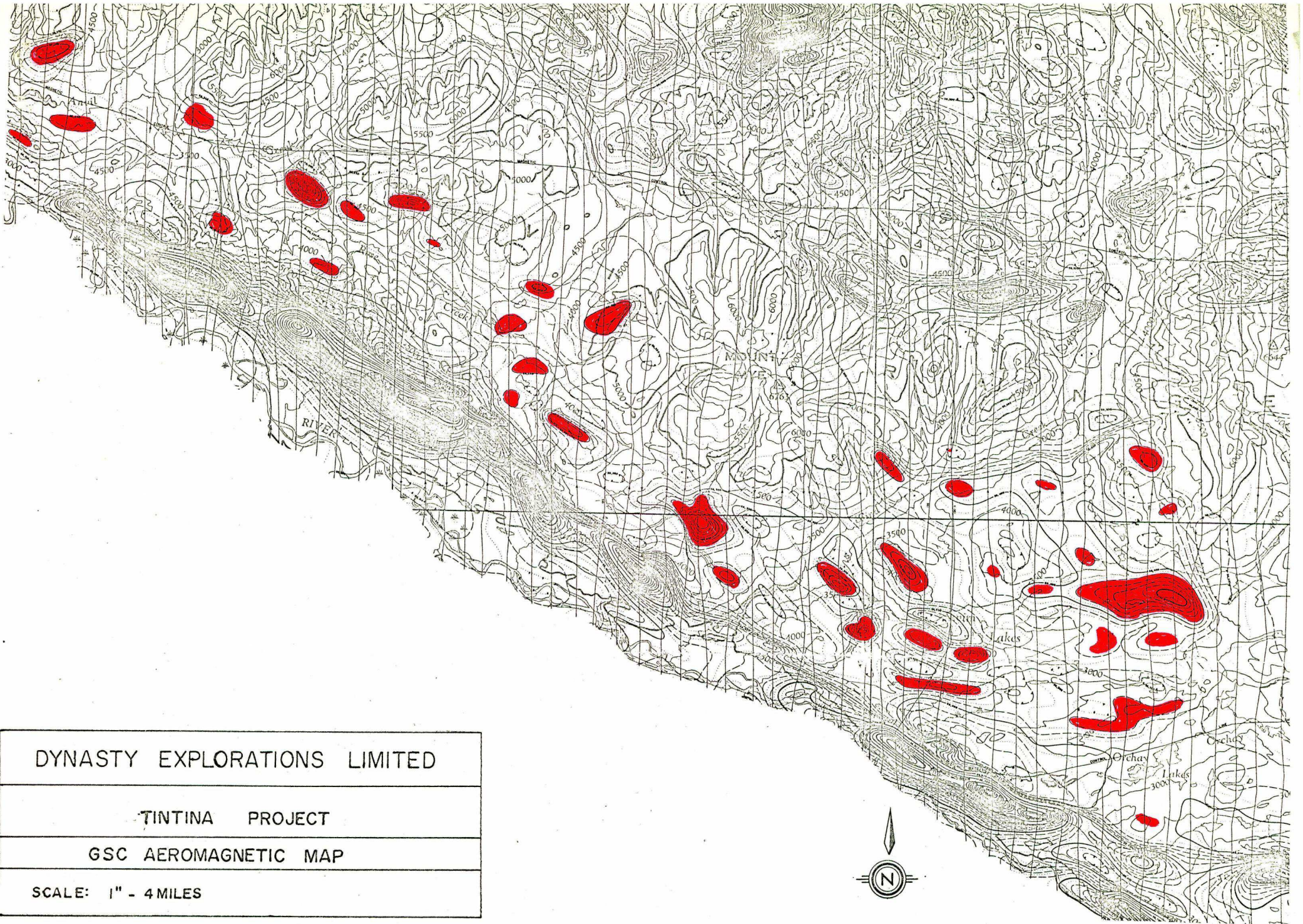
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TINTINA PROJECT

REGIONAL GEOLOGY — ANVIL RANGE

SCALE: 1" = 4 MI

ROBERTS, DEAN, TEMPLEMAN-KLUIT



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TINTINA PROJECT

GSC AEROMAGNETIC MAP

SCALE: 1" - 4 MILES

# DYNASTY EXPLORATIONS LIMITED

330 MARINE BUILDING  
355 BURRARD STREET  
VANCOUVER 1, B.C.

## SUMMARY REPORT AND PROPOSED EXPLORATION ANVIL AREA, YUKON

### INTRODUCTION

In 1964 Dynasty Explorations initiated the first comprehensive regional mineral exploration program in the Anvil area utilizing saturation geologic, geochemical and geophysical methods.

During 1964 and 1965 exploration was carried out over an area of approximately 250 square miles, located in the Anvil-Vangorda Creek area of east-central Yukon, 125 miles northwest of Whitehorse. The Vangorda deposit, a massive lead-zinc sulphide body discovered in 1953, was centred in the area proposed for exploration, a northwest trending belt located between the southwestern flank of the Anvil Range and Pelly River. To effectively explore this area, a combination of geophysical and geochemical methods were essential due to extensive overburden cover varying in depth from a few feet to over 300 feet.

After a total of 12 months of field work involving an expenditure of approximately \$450,000, massive sulphides of the Faro orebody were discovered. This orebody was put into production by Anvil Mining Corporation in early 1970 after a capital expenditure of \$65 million plus additional expenditures by the Federal Government and White Pass and Yukon Corporation in excess of \$70 million each.

With the Anvil Mine now in production, further mineral exploration is required to develop overall district reserves sufficient for a possible smelter. Based on the distribution of known

near-surface replacement-type lead-zinc ore deposits and the high probability of existence of additional such deposits at depth, or under overburden areas, intensive exploration of the Anvil area is well warranted. Continued exploration over the last two years has been based on an improved knowledge of the district gained from a re-evaluation of earlier exploration data, current exploration results available from Anvil Mining Corporation and development of better exploration techniques.

Approximately \$200,000 was spent in 1970 and 1971 on Dynasty's renewed program in the Anvil area involving large-scale property acquisition and ground follow-up. Dynasty holds two major groups of claims within the Anvil area:

East Sector (Hoho-Bram, Echo, Delta, Capa Claims) -278 claims

West Sector (Roto, Jean, Gran, Lorna Claims) - 207 claims

All claims have had considerable exploration carried out through geologic mapping, magnetic and electromagnetic surveys, gravity survey coverage and soil and silt sampling.

East Sector - This area is thought to be the most promising for new discoveries of lead-zinc sulphides. Geologic mapping of the region has indicated the presence of rock units similar to those which contain the Anvil, Vangorda and Swim deposits. The next phase of exploration will involve detailed deep drilling of EM conductors and favourable stratigraphy. A budget of \$250,000 will be required for this program.

West Sector - Rock types similar to the Anvil, Vangorda and Swim deposits are not exposed in this area, which is mainly covered by overburden, yet its proximity to the Faro deposit and other recent properties of merit make these holdings attractive for further work. Diamond drilling of geophysical targets is proposed for a cost of \$100,000.

Joint venture participation is now being sought for continuation of proposed exploration through 1972. This report describes the fundamental details of Dynasty's exploration activities in the Anvil area to date, as well as its plans for future exploration.

#### HISTORY OF MINERAL EXPLORATION - ANVIL AREA

Base metal sulphides were first discovered in the Anvil District when the Vangorda deposit, exposed in one outcrop on the bank of Vangorda Creek, was found by conventional prospecting in 1953. Between 1953 and 1955 this prospect was drilled by Prospectors Airways and was proven to be a flat-lying stratiform lead-zinc replacement deposit containing 9.4 million tons of 9 percent combined lead-zinc and 1.76 oz/ton silver. At the same time two smaller satellitic deposits, the Champ and Firth, were also discovered.

In 1962 Kerr Addison Mines resumed exploration in the Vangorda area and in 1963 an aeromagnetic survey was flown which led to the staking of several magnetic anomalies thought to be similar in expression to the magnetic anomaly over the Vangorda deposit. Kerr Addison followed up its aeromagnetic results with ground magnetic, electromagnetic and gravity surveys. One anomaly was diamond drilled, resulting in the discovery of the Swim deposit, reported to contain 5 million tons of 10 percent combined lead and zinc sulphides within a massive pyrite deposit of 20 million tons.

Dynasty Explorations began a comprehensive exploration program in the spring of 1964. Eight claim groups were staked and initially investigated with magnetometer and soil sampling surveys. Regional geologic mapping was carried out in an effort to outline structures and rock units thought to be favourable ore controls. A prospecting team was also engaged in reconnaissance geochemical silt and soil sampling, thus helping to

define a restricted area for flying of airborne magnetometer surveys in the fall of 1964. As a result of this work, five additional claim groups, including the Faro Group, were staked over geophysical-geological target areas. The Faro claims were staked over aeromagnetic and geochemical anomalies and a gossan zone, as well as a reported occurrence of mineralized float.

Early in 1965 Dynasty decided to finance further work by entering into a joint venture program with Cyprus Mines Corporation and began an extensive program of geophysical surveys coupled with follow-up rotary drill testing of anomalous target areas. By June of that year, the fifth geophysical target to be rotary drilled (a coincident ground electromagnetic, geochemical anomaly) resulted in intersection of massive sulphides of the No. 2 section of the Faro deposit. In late 1965 Anvil Mining Corporation was formed as the operating company of the Dynasty-Cyprus joint venture agreement.

Pre-production planning and development of the Faro deposits began in 1966 and, at the same time, exploration activity reached a peak in the Anvil Area. Over 12,000 mineral claims were staked in the district by at least 50 mining companies and individuals. It has been estimated that close to 2 million dollars was spent on mineral exploration in the Anvil district during 1966.

Other than a detailed geologic mapping program conducted by the Geological Survey of Canada, little exploration activity was carried out between 1967 and 1970. Anvil Mining Corporation continued a limited program of geologic mapping and diamond drilling during that period.

In early 1970 production commenced from the Faro deposits and during the summer of 1970 exploration was resumed in the Anvil district by at least five major companies, including Dynasty Explorations. By the end of 1970 Dynasty had acquired 205 mineral claims on the basis of geologic and airborne geophysical survey interpretations. Ground surveys were conducted on specific target areas and one hole was diamond drilled in the west sector. Drilling was halted short of its objective because of severe winter weather conditions.

Dynasty continued its program in 1971. At the same time, it participated in the management and financing of Anvil Mining's \$500,000 exploration program carried out over their own holdings. The Dynasty claim holdings were increased to 511 claims and by the end of 1971 linecutting, magnetometer and electromagnetic surveys and gravity surveys had been completed over most of the ground. In addition to completing ground follow-up on claims, Dynasty finished a detailed geological mapping program of the southwest flank of the Anvil Range to scale 1:1320. Orientation and research involving geochemistry and geophysics of the known sulphide deposits in the area was also done.

Dynasty has spent eight years exploring the Anvil Range both with Anvil Mining Corporation as well as on an independent basis. Recent exploration activities have now reached a stage whereby large capital expenditures will be required over the next few years for comprehensive drilling of specific areas of interest.

## EXPLORATION PROGRAM - RESEARCH

Exploration by Dynasty has been concentrated almost entirely on the southwest linear schist belt of the Anvil Range, in which all the known massive sulphide bodies have been found to date. During the past eight years Dynasty has had the opportunity to broaden its knowledge of the Anvil area through information gained from its own exploration activities as well as its relationship with Anvil Mining Corporation and close involvement with their exploration programs. A program of research and development of new exploration techniques has been the key to an effective search for new massive sulphide deposits in the Anvil area. Some of the research Dynasty has undertaken involved:

- (1) Participation in detailed structural and petrographic studies of the Faro orebodies to determine ore controls, oregogenesis and exploration parameters applicable to the immediate vicinity of known deposits that can be projected to other areas.
- (2) Geochemical orientation studies
  - Extensive trace element analysis of diamond drill cores from throughout the Anvil area are being carried out by the geochemical department at the University of British Columbia. The object of the study is to determine obvious 'geochemical markers' within the phyllite units that could aid in locating the 'host section' for sulphide deposits.
  - Multi-element analysis has also been carried out by Barringer Research on cores from and around the Faro deposits. These tests were done to locate the presence of a 'geochemical halo' around the deposits in the hopes that a geochemical aureole of particular elements would aid in future geochemical exploration.

- Correlation of soils geochemical data from various soil horizons with bedrock geochemical data. This data will be used to aid in mapping overburden-covered units through interpretation of overlying soils geochemistry.

- (3) Development of low-cost drilling techniques for overburden, bedrock sampling and coring. Drilling conditions in the Anvil area are variable with overburden varying in thickness from a few feet to over 300 feet. Dynasty has participated in a number of drill programs involving rotary, percussion, rotary-percussion and conventional coring techniques. From past experience a practical technique has been developed for efficient drilling of overburden and bedrock.
- (4) Low-cost drilling using both coring and rotary techniques is essential for overburden sampling for geochemical studies as well as penetration of deep overburden. Chip samples of all bedrock drilling are taken for rock geochemical studies and cores are taken where necessary for geologic interpretations. Drilling for geological and geochemical information is a necessary part of detailed exploration in the Anvil area.
- (5) Development and use of deep penetrating E.M. surveys has been done. The Crone C.E.M. has been found to be the most effective ground-operated electromagnetic instrumentation.
- (6) Continued review of previously collected exploration data is essential for re-interpretation of existing information as additional results are added to the file. Such compilation and review of data enables development of newer approaches to the search for massive sulphides in the Anvil area.

## EXPLORATION PROGRAM - CURRENT DETAILS

During 1970 and 1971 approximately \$200,000 was spent by Dynasty on regional exploration and property work in the Anvil Area. Considerable emphasis was placed on regional mapping as a guide to ground acquisition.

### Regional Geology

The Anvil Range, located in the eastern portion of the Selwyn Basin northeast of the Tintina Trench, consists of a 20-mile-wide by 50-mile-long belt of Proterozoic and Paleozoic strata. This succession of strata, dominated by Cambrian and Eocambrian quartz-mica schist and phyllite, forms the Anvil Arch, a northwest-trending antiform with an elongate intrusive, the Anvil Batholith, as its core. The quartz-mica schist and phyllite units, hosts for the Faro orebodies and the Swim and Vangorda massive sulphide deposits as well as other smaller sulphide occurrences, were mapped in detail during 1970 and 1971 in order to determine what structural or stratigraphic controls might be responsible for ore deposition.

These investigations indicate that the Anvil Arch is a large assymetric antiform with shallow dips to the southwest and moderate to steep dips to the northeast. A simplified geologic section consists of quartz-mica schist and calc-silicates overlain by phyllite, in turn unconformably overlain by late Paleozoic volcanics and sediments. There appears to be a definite stratigraphic control for ore deposition since all known massive sulphide deposits are confined within a zone at the phyllite-schist contact. Massive sulphides with a quartz gangue occur in the quartz-rich phyllite, which is often graphitic at the base of the phyllites, and in the top of the quartz biotite sericite schist.

Chloritic tuffaceous greenstone grading to massive meta-gabbro occurs as concordant to discordant lenses near all deposits but is nowhere immediately adjacent to ore.

Structurally, this area has had a complex history with a minimum of 5 periods of deformation during regional metamorphism, accompanied by faulting. Major faults are oriented parallel to the Tintina Trench, with possible strike slip and dip slip movement and also in a northeast-southwest direction with some vertical and left lateral displacement. The Tintina fault system, at least 600 miles long, is a zone of major trans-current faulting on which about 250 miles of right lateral displacement has been postulated by Templeman-Kluit.

Increasing metamorphic grade paralleled by an increase in sulphide grain size, increasing pyrrhotite content with metamorphism and elongation of deposits paralleling deformational fabrics, indicate that the sulphides were affected during regional metamorphism. The pre-metamorphic emplacement, coupled with similar average metal content, uniform lead-zinc ratios, and similar textures and mineralogy, and some stratigraphic control, may indicate a syngenetic origin. The highly bleached SiO<sub>2</sub>- and Al-rich envelope surrounding the deposits appears to be an alteration halo produced during hydrothermal replacement but could also be due to sulphidization during metamorphism.

### Ore Deposits

The Faro orebodies, owned and currently being mined by Anvil Mining Corporation, and the Vangorda and Swim deposits, owned by Kerr Addison Mines, contain over 80 million tons of reserves.

The Faro. No. 1 and 3 orebodies located on Faro Creek together form a regular and continuous southwest dipping tabular lens

roughly 4800 feet long, 1200 feet wide and averaging 120 feet thick. Proven tonnage is 58,300,000 tons at 9.23 percent combined lead and zinc with 1.2 ounces of silver per ton. Faro No. 2 orebody located about 500 feet south of the southeast extremity of the No. 3 orebody is about 1200 feet long and 1000 feet wide and may be a faulted continuation of the main deposit. It contains 5,150,000 tons of 8.0 percent combined lead and zinc with 1.5 ounces per ton of silver, apparently open to the southeast. Pyrite comprises from 25 to 50 percent of the sulphides and often occurs as segregated bands paralleling the penetrative  $S_2$  foliation of the enclosing schist. The massive sulphides occur in a quartzite host. Structurally the Faro orebodies occur in a  $F_4$  fold, possibly overturned to the north.

The Vangorda deposit, located on Vangorda Creek, consists of irregular lenses of massive sulphides in a quartzite host. It is surrounded by quartz-graphite phyllite and restricted bleached  $SiO_2$ - and Al-rich areas. The zone is tabular and flat-lying, approximately 2500 feet long, 500 feet wide and averaging 70 feet thick. Published tonnage and grade figures indicate roughly 10 million tons of 8 percent combined lead and zinc with 1.7 ounces of silver per ton. Massive sulphides constitute half of the deposit, of which pyrite is dominant. The Vangorda deposit occurs at the bedrock surface and a portion of it has likely been eroded away during glaciation.

The Swim deposit, located northwest of Swim Lake, consists of a discontinuous tabular sulphide body also in a quartzite host within the quartz-graphite phyllite unit. Irregular bleached areas occur peripheral to the main sulphide mass. The dimensions are roughly 1500 feet long, 500 feet wide and averaging 70 feet thick. Published figures indicate 5 million tons containing 9.5 percent combined lead and zinc with

1.5 ounces per ton of silver. In all deposits the grade is highest in the central thicker portions and diminishes towards the borders.

The Champ and Firth deposits, also owned by Kerr Addison Mines, occur northwest of the Vangorda. They occur within the quartz-rich phyllite and are thought to contain uneconomic tonnages.

### Future Potential

The Anvil district holds the highest potential for discovery of massive lead-zinc deposits. Although the genesis of mineralization is still unknown, a definite stratigraphic control has been recognized. Only through recent exploration has the extent and potential of the quartz-rich phyllite host been realized. Detailing of such areas with geophysics and follow-up drilling will be an integral part of continued exploration as based on previous success with similar programs.

### PROPERTY ACQUISITION AND EXPLORATION

Property acquisition has been based on locating of airborne geophysical targets within areas of favourable phyllite as defined by the regional mapping program. Follow-up exploration of the properties has been mainly through geophysical surveys for delineation of drill targets.

Completed Geophysical Surveys (1970-71)

<u>Property</u>	<u>No. Claims</u>	<u>Drill- ing</u>	<u>Line- cutting</u>	<u>Mag.</u>	<u>C.E.M.</u>	<u>E.M.16</u>	<u>Gravity</u>
Lorna	60	576 ft.	12	11	-	2	7
Roto	53		13	11	-	-	2½
Gran	24		5	4	-	-	3
Jean	28		2/3	-	-	-	2/3
Aro	42		-	-	-	-	-
Hoho-Bram	48		20 (abandoned)	(5)	18	-	-
Echo	147		52	20	43	-	-
Capa	44		33	-	30	-	-
Delta	39		26	-	23	-	-
Acme	24		<u>12</u>	<u>10</u>	<u>10</u>	<u>1</u>	<u>2</u>
			<u>174</u>	<u>61</u>	<u>124</u>	<u>3</u>	<u>15</u>

Lorna Group

Geologic, geochemical and geophysical surveys, as well as diamond drilling, so far have suggested that the existing geophysical anomalies are caused by a denser greenstone body. However, greenstone units have been mapped in close proximity to the Faro orebody as well as the Vangorda deposit. Further work is warranted to determine if the geophysical anomalies are caused by greenstone alone. An electromagnetic survey over the magnetic and gravity anomalies will indicate the conductiveness of the causative mass. Further gravity surveys will also detail the gravity anomaly and provide additional information for location of future drill holes.

Roto Group

Exploration work in 1970 on the Roto Group outlined a possible greenstone body within phyllitic rocks. Plans are to extend the present survey grid to the west over an airborne electromagnetic anomaly and to conduct electromagnetic and gravity surveys in that area.

Drilling of existing geophysical targets will be done in 1972. At the same time, selected deep drilling is planned to properly locate the stratigraphic position of the phyllite unit.

### Gran Group

The Gran mineral claims cover a quartz-mica schist unit contacting the Anvil Batholith. The geologic setting is similar to that of the Faro claims where quartz-mica schist is found above ore. Coincident airborne magnetic and electromagnetic responses have been defined on the property. Further ground follow-up surveys are required to better position drill targets.

### Jean Group

Two reconnaissance lines of gravimetric survey did not conclusively indicate a causative structure coincident with airborne geophysical targets on the Jean claims. In order to properly explore the potential of the Jean Group, a control picket-line grid must be established, deep penetrating electromagnetic surveys run, followed up by drill testing of conductors.

### Aro Group

The Aro Group was staked to cover airborne magnetic and electromagnetic anomalies to the west and north of the Lorna claims. The Aro claims are stratigraphically well located, covering a band of quartz-sericite schist, the host for the massive sulphide deposits in the Anvil Range. The proposed budget will provide funds for detailed ground geophysical, geochemical and geological surveys to assess the airborne anomalies.

During the course of Dynasty's 1971 exploration program in the Anvil Range, two more properties were acquired on the basis of favourable geologic environment and presence of known geophysical targets.

### Hoho-Bram Claims

This property is located over quartz-rich phyllite units as well as sections of sericite-chlorite phyllite. The claims are within close proximity to the Swim deposit and are on strike with the Vangorda deposit. Several electromagnetic conductors outlined on the property are also on strike with conductive units adjacent to the Swim deposit. Conductive bodies outlined on the Hoho-Bram claims are to be drill tested.

### Echo-Delta-Capa Claims

These properties are immediately adjacent to each other and are considered as being one claim group. The claims are situated at the southeast end of the Anvil Range and are staked over a large area of overburden-covered quartzose phyllites. All known massive sulphide occurrences in the Anvil area are found in such quartzose sections of the phyllite unit. Through geophysical interpretations, mapping of float occurrences and re-logging of existing borehole information, this unit has been projected under overburden-covered areas found in the southeast area of the district.

Dynasty carried out extensive ground E.M. surveys throughout this claim group area; earlier gravimetric and magnetic data has also been compiled. Numerous geophysical targets have been outlined for drill testing this season.

### PROPOSED EXPLORATION - 1972

Field exploration planned for the 1972 field season will include:

- (1) Drill testing of presently outlined geophysical targets on existing properties held within the Anvil area.
- (2) 'Fill in' drilling of specific sections of phyllitic rocks required for stratigraphic correlations and geologic mapping of areas masked by overburden.

- (3) Geochemical testing of all overburden profiles intersected and sampled during the drill program for locating of possible subsurface float trains.
- (4) Rock geochemical testing of all cores from the above-mentioned drill program to locate geochemical aureoles around sulphide deposits, as well as characteristic geochemical marker horizons within the phyllite unit.
- (5) A continuation of regional mapping throughout the northwest and northeast sectors of the Anvil district, coupled with detailed stream sediment and soil sampling surveys.

BUDGET OUTLINE - 1972

Drilling - estimated 10,000 feet @ overall cost of \$15/foot all inclusive	\$ 150,000
Geochemical Analysis	10,000
Regional Geologic Mapping	20,000
Regional Geochemical Surveys	20,000
Continued Geophysical Follow-up Surveys and linecutting	25,000
Transportation Costs	20,000
Camp Support Costs	<u>15,000</u>
	\$ 260,000
Plus Contingencies @ 20%	52,000
Plus Administration Charges @ 15%	<u>38,000</u>
TOTAL	\$ <u><u>350,000</u></u>

CONCLUSIONS

The success of the exploration leading to the discovery of the Faro orebodies was based on thorough prospecting of 'elephant country' for geophysical anomalies of a certain size and particular type. The choice and application of methods used in the search for massive sulphides was modified

and continually improved upon during the course of the exploration program. Anomalies most likely to be massive sulphides were tested by an inexpensive drilling method which continually provided additional geologic information that aided greatly in modification of the geophysical approach. Further exploration of the area is warranted. Numerous, more subtle geophysical targets, have not been investigated by more detailed interpretations and drilling. Refinements in geologic, geochemical and geophysical approach using previous methods as a base will undoubtedly reveal other deposits in the area. Modifications of the electromagnetic method both for airborne and ground surveys, to allow greater depth penetration and conductor discrimination coupled with gravimetric detailing of all conductors, is likely the best method of continued geophysical exploration in selected geologic environments of the Anvil area. All targets will have to be systematically drilled without exception since the most obvious massive sulphide targets would appear to have been found.

Dynasty's close involvement with the Anvil area over the past eight years has steadily increased our confidence in the potential of the district. It appears probable that in the order of 150-200 million tons of grade similar to the Faro and Vangorda sulphide bodies could exist as compared to Cominco's deposit at Kimberley (Trail) of approximately 150 million tons. The district's potential for new large lead-zinc deposits has not been tested. It would be very short-sighted indeed if intensive exploration of the proposed order of magnitude were not conducted, considering the opportunities that exist for new discoveries within an area that has received little detailed exploration to date.

Other major deposits can be discovered at depth in the district with recent better-developed and improved exploration techniques,

because the known discoveries all occur at the present fortuitous bedrock erosion surface, sizeable areas therefore remain relatively unexplored. Many major mineral districts have gone through the same cycle of initial activity, quiescence and then renewed discovery, and there is probably no better major potential in Western Canada. By comparison, the Anvil district is now in a stage similar to that of Highland Valley before discovery of Valley Copper.