

GEOLOGICAL REPORT

on the  
RECONNAISSANCE SURVEY OF THE  
INGS RIVER AREA

Yukon Territory, Canada

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Covering Mining Claims

JESS (Numbers 1 through 56)  
NORM (Numbers 1 through 48)

105 G/3

Lying Within

Latitude N 61°04' - 61°09'  
Longitude W 131°02' - 131°13'

Yukon Territory, Canada

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By

RALPH H. WILPOLT

and

JAMES D. SELL

Survey Conducted from June 28 through July 2, 1962

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GEOLOGICAL RECONNAISSANCE SURVEY OF THE  
INGS RIVER AREA, YUKON TERRITORY, CANADA

INTRODUCTION

An aircraft survey and ground-traversed geological reconnaissance into the Ings River area were made from June 27 through July 3, 1962, by Ralph H. Wilpolt and James D. Sell of The Superior Oil Company in behalf of the owners, principally Canberra Oil Company, Ltd. of Canada. The purpose of the trip was for preliminary examination and evaluation of the JESS and NORM groups of claims and the adjacent areas in regard to stratigraphy, structure, known ore deposits, and the projection and location of mineralized occurrences within the claim areas.

The JESS group (claims 1-56) and NORM group (claims 1-48) lie within latitude  $N61^{\circ}04' - 61^{\circ}09'$  and longitude  $W131^{\circ}02' - 131^{\circ}13'$ . The claims and their location in respect to topography and adjacent claims are well expressed on sheet 105G-3 issued by the Department of Northern Affairs and National Resources, Northern Administration and Lands Branch, Land Division, Canada. The area is covered by government-issued regional topographic and geological maps (Finlayson Lake quadrangle, Yukon Territory) and is located northwest of the junction between the Liard and Ings Rivers. The mountains are part of the St. Cyr Range, located some 120 miles northwest of Watson Lake, Southeastern Yukon Territory, Canada.

The claims are jointly held by various companies and individuals. Canberra Oil Company, Ltd. of Canada controls a fifty percent interest in the JESS and NORM groups of claims and the remaining fifty percent is controlled by the other parties. Canberra Oil Company is a wholly-owned subsidiary of The Superior Oil Company of California, a California corporation.

PRELIMINARY EVALUATION AND GEOLOGIC MAPPING

During the compiling of information of the Ings River area it was soon evident that the best available published geologic map of the area was the preliminary series Sheet 105-G showing the general topography and the geology of the Finlayson Lake quadrangle. Geologic map Number 8-1960, compiled and published under the auspices of the Geological Survey of Canada, at a scale of one inch to four miles, indicated the general geologic formations and structures and contained descriptive notes on the various formational units, their occurrence, distribution, and involved structural complications. Notes on the map indicating exploration by the Newmont Corporation and the favorability of the Lower Cambrian limestones as hosts for metallization assumed new significance when silver-lead finds were reported by Conwest Exploration Company in the area northwest of the Newmont exploration ground. The new interest necessitated the compiling of a more detailed geologic map of the area of interest.

The newly compiled preliminary geologic map of the Ings River area, Yukon Territory, Canada, was prepared in November 1961 by V. Zay Smith Associates Limited, consulting geologists of Calgary, Alberta, by means of stereoscopic examination of air photographs and incorporating data from the available published geologic literature and from personal observations of Mr. N. S. Edgar, a mining engineer from Edmonton, Alberta.

The preliminary map is submitted as Plate I of this report and is at the scale of one inch to one-half mile. The map is at the same scale and base as sheet 105G-3 released by the Canadian Department of Northern Affairs and National Resources.

Plate I has a contour base with an interval of five hundred feet and generally expresses the rugged mountainous terrain outlined by the marshy lower-lying areas cut by the Liard and Ings Rivers and their associated drainage systems.

Recognizable exposures and contacts of the Lower Cambrian limestones and/or quartzites, Middle Cambrian phyllite, and the Mesozoic intrusive granitic mass are clearly shown on Plate I. Mantled areas are also identified as reasonably as possible concerning the suspected source or underlying rock type. The Quaternary deposits, including alluvium and terrace deposits, are also shown on the map. Key beds within the formations have been traced where persistent.

The major fault structures visible on the air photographs have been traced, as well as numerous minor faults and continuous fracture systems. The relative displacement of the strata on opposite sides of the major faults has been determined and recorded. Relative values for the amount of dip of the formations are given wherever the outcrop evidence was sufficient for the determination of the value.

All recorded claim group boundaries, including those of the JESS and NORM groups, have been outlined on Plate I. The boundaries

were recorded on sheet 105G-3 of the Department of Northern Affairs and National Resources. The revision date of the map is 27 October 1961.

The cost verification of Plate I is recorded in Appendix B and is attached to this report.

GEOLOGICAL RECONNAISSANCE BY AIRCRAFT  
AND GROUND TRAVERSES

General

Mr. Ralph H. Wilpolt, manager, and James D. Sell, geologist, of the Minerals Division, The Superior Oil Company, Denver, Colorado, U.S.A., on behalf of the joint owners of the JESS and NORM groups of claims undertook a geological reconnaissance survey of a part of the Ings River Area, Yukon Territory, Canada. The party left Denver by air on June 27, 1962, and after an overnight layover in Edmonton, Alberta, arrived at Watson Lake, Yukon Territory, on June 28.

Mr. Wilpolt and Mr. Sell are not registered as engineers by the Yukon Territory and a statement of their qualifications as geologists is submitted in Appendix A.

Arrangements for continued transportation were finalized and in the afternoon of the 28th an air reconnaissance was made over the claim area in the Ings River area. The aircraft was a four-place Beaver Cessna piloted by Mr. Forsberg of the B.C.-Yukon Air Service Limited. During the reconnaissance the approximate claim boundaries were carefully noted and outcrop areas were checked for accessibility with a helicopter aircraft. Many of the structural features were identified and verified on the preliminary geological map (Plate I) with features visible in the silver-lead strike area of the Tintina Project of the Conwest Exploration Company being more closely studied. Regional investigation of the setting and

structure through the Newmont Corporation area was flown, as was the Tintina fault zone, during the flight patterns from Watson Lake to the claim area and return.

A reconnaissance was started on the 29th utilizing a three-place helicopter piloted by Mr. Miller of the Klondike Helicopter Limited. The reconnaissance included extensive flying over the JESS and NORM claims with selected set-downs at outcrop areas for closer examination of the formational units, dikes, faults, and gross structures. A visit was made to the camp of the Tintina Project and a general orientation discussion was given by personnel of the camp. Mr. Hainsworth, resident mine geologist, and Mr. Ashton, field manager, of the Tintina Project were most cordial and helpful in indicating numerous features of the area. The party returned to Watson Lake at nightfall.

On June 30 the helicopter party returned to the field and renewed the survey. Accommodations were arranged with the Tintina Camp and the party used the camp for a base of operations until the evening of July 1. During these two days four ground traverses were made in the JESS group area and one traverse in the NORM area. The traverses are noted on Plate I by the cross-hatched overlay. An underground and surface study and traverse were made in the Con-west strike area. Numerous helicopter sit-downs were again made, primarily in the zone of the Lower Cambrian limestone belt and fault systems extending from the Tintina camp to the north end of

the JESS group of claims. Study was also directed along the alteration zone adjacent to the granitic intrusive north of the claim area.

Mr. Forsberg flew the party from Watson Lake to Whitehorse, Yukon Territory, on July 2. In Whitehorse commercial airline transportation was secured for the return trip to Denver, Colorado, with an overnight layover in Calgary, Alberta, Canada.

Cost verification for expenses is given in Appendix C.

### Observation and Results of the Survey

Formational Units - The gross formational units are shown on Plate I accompanying this report. The age designations of these units were established by workers in the Geological Survey of Canada.

The Oldest group is the Lower Cambrian formation. It contains various units of massive gray and buff quartzite; gray and brownish-gray phyllite; and gray, buff, and orange-weathered gray limestone. Following the lower units is the Middle and Upper Cambrian (?) lustrous phyllite which is gray and orange-weathered and in part contains limy and dolomitic units.

Extensive graphitic schists or phyllite units are found in the Tintina area and elsewhere within the area of Plate I. In the Tintina Project area they are mapped as part of the Lower Cambrian units, but similar looking graphitic phyllites are also found in the central part of the JESS group where they are included with the Middle Cambrian units.

A granitic intrusive mass has been mapped on the north side of Plate I and is assigned a Jurassic and/or Cretaceous age. Numerous dikes of a light-colored lamprophyre are found to cut the various Cambrian units and are probably a late-stage phase of the intrusive activity.

Much of the claim area in the Ings River area is mantled by rock debris and is derived, for the most part, from the phyllite type units. Below the 5000-foot elevation the area is covered by dense northern forest growth and the low lands are covered by muskeg development.

Outcrop exposures are limited and are best found in the high cirques and along the stream beds of the mountainous drainage system. Exposures are also found along the overhangs of the ridges on the up-dip face of the slope. The overhang exposures are mostly on the north side of the east-trending ridges, and consequently are packed with snow long after the ridge crests have been cleared.

Structures- The major fault structures, as shown on Plate I, trend to the northwest with deviations to the east. Several east-west trending faults branch from or terminate the northwest trending faults. The major faults generally displace the formational units sufficiently to drop the Middle Cambrian phyllites into contact with the Lower Cambrian limestones and quartzites. The faulting thus repeats the stratigraphic sequence several times from north to south across the area shown on Plate I.

Minor faults, breaks, and persistent fractures tend to follow the trend of the major faults, although trends at an acute angle to the major faults are also found.

Cleavage fracturing and intense shearing parallel to the major northwest trending faults and to the strike of the bedding have greatly deformed the original features of the Cambrian formations within the area. Bedding has largely been destroyed during the intense cleavage development and has obliterated individual depositional features to the extent that rock types are difficult to identify in the Cambrian units.

The early cleavage development may not have originated at the same time and successive stages of development may be superimposed. In turn, the cleavage has been deformed and fractured by the later developments accompanying the major fault structures. The major faults are subparallel to the Tintina fault zone which is ten miles northeast of the area colored on Plate I and are probably the result of the same deformation interval.

Visual estimation of the strike and dip of the bedding indicate that the units flatten in dip from north to south within each structural block.

Alteration and Metallization - Alteration of the various rock units is very noticeable adjacent to the Mesozoic granitic intrusive. Much of the rock has been converted to a hornfels on the east side of the intrusive. The addition of iron, principally to the shaly units

rather than to the limestone units, is very strong on the south side of the intrusive mass. The intense iron alteration is localized within the Lower Cambrian limestone zone in the proximity of the northernmost fault shown on Plate I. The alteration feature is most intense in the Tintina Project area and becomes less recognizable toward the northern end of the JESS claim group. The iron alteration, coupled with the intense cleavage development, hinders the visual separation of the various sub-units within the formations.

Calcite veinlets and stringers fill all types of fracture systems. The cleavage fracture filling is most dominant and consists of thin-films and narrow fillings generally less than one-fourth inch in thickness. More persistent calcite veins, up to four inches in width, cut throughout the formational units, generally following the dominant northwest trend or the cross-cutting acute angle trend.

Later shear and fault zones, mapped as major northwest trending faults on Plate I, contain multiple fillings of varying proportions of quartz and calcite and/or carbonate. These masses, up to three feet in width, were especially noted along the trend and in the main northwest trending fault passing through the north end of the JESS group. A massive band of the quartz-calcite-carbonate was also found in the NORM group where it was mapped from the air photographs as a key bed in the Lower Cambrian limestones.

Ground Traverse Results - During the traverse along the ridge on the west boundary of the JESS group a lamprophyre dike was noted which had a two-inch calcite veinlet cutting through it. The veinlet and other smaller ones were devoid of other metallization.

During the ground traverse of the area, the northeastward trending dike noted on Plate I west of the central part of the JESS group was found to be a lamprophyre-filled structure. Outcrops throughout this traverse, across the JESS group and down to the Ings River, were sparse but they confirmed the Middle Cambrian phyllite designation as recorded on the map. Within the phyllite were several sub-units of graphitic schist or phyllite. Limestone boulders were abundant along the small stream drainage which was followed along part of the traverse and joins the Ings River outside the JESS claim boundary.

The ground traverse along a stream bed west of the northwest corner of the JESS group revealed highly sheared units with iron alteration and some graphitic zones. Quartz-carbonate veinlets and elongated replacement masses and pods were found cutting the sheared units and lying parallel to the major cleavage and fault structures. The pods dip steeply to the south and contain oxidized and weathered remnants of pyrite metallization. A two-and-one-half to three-foot vein of quartz carbonate was found in the stream bed where the northernmost fault is mapped. The occurrence is on the boundary between the ARCO and RAM groups. Several other small vein-like quartz-carbonate occurrences were noted in the same general area,

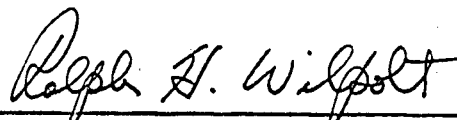
indicating close association with the major fault structure. Copper stain on the carbonate outcrop around the pyrite masses indicates minor copper values with the metallization. Further checking along the vein exposures revealed small unoxidized masses of pyrrhotite-chalcopyrite-pyrite. The metallized quartz-carbonate structures could not be traced into the JESS claim area because of heavy mantle cover and muskeg development. However, the zone was traced northwestward along the fault zone trend and at the crest of the ridge, at the ARCO-EAGLE boundary, a prominent quartz rib indicated the continuation of the structure.

During the mine trip underground and later the examination of the surface showings around the Tintina Project adit and strike area, it was noted that the mineralization appeared to be discontinuous in form and occurrence. Quartz-carbonate lenses and vein-like structures were contained in the highly sheared rock units and the silver-lead appeared to be replacement and filling of the quartz-carbonate structures. Pyrite was abundant in the lense metallization but was also found as small stringers throughout the rock units. One exposure underground exhibited a sharp cut-off of a mineralized vein zone by a non-mineralized lamprophyre dike.

SUMMARY


The extensive coverage of all the areas within the JESS and NORM claim boundaries by the helicopter flights and set-downs indicated that most of the two areas are covered by mantle, muskeg, or dense northern forest growth with much underbrush. The alteration and cleavage development in the various Cambrian formations have complexed the area and interpretation of the formational sequences is difficult in the separated outcrop areas.

The close proximity of the iron alteration, the major quartz-carbonate deposition, and the pyrite-pyrrhotite-chalcopyrite metallization with both the major fault structures and the Lower Cambrian limestone formations, suggest a strong structural-stratigraphic control on the metallization. In any further study the Lower Cambrian limestone belt and the major northwest trending fault structures from the granitic intrusive contact outward should be prospected in detail. The lenticular nature of the mineralization suggests that structural deviations in both strike and dip may exhibit a control on the deposition of the quartz-carbonate lenses and the later ore metallization pods.



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Ralph H. Wilpolt, Manager  
Minerals Division  
The Superior Oil Company



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James D. Sell, Geologist  
The Superior Oil Company

9/19/62

APPENDIX A

Ralph H. Wilpolt

Academical: Graduate, Lawrence College, Appleton, Wisconsin, June 1940; B.A. Geology

Graduate, Northwestern University, Evanston, Illinois, 1942; Master of Science.

Professional: U.S.G.S., Geologist; specialized in stratigraphy and ore deposits. Last position with U.S.G.S. - supervising geologist, Lexington, Kentucky, office.

New Mexico School of Mines: Associate professor of geology; taught mining geology, mineralogy, structural geology, petrography, etc.

Mina Tiro General, Charcas, S.L.P., Mexico, (American Smelting & Refining operation): chief, geological department.

Clinchfield Coal Operation, Dante, Virginia: chief geologist.

U.S. Atomic Energy Commission, Grand Junction, Colorado: Chief geologist in charge of Colorado Plateau uranium exploration.

The Superior Oil Company: Manager, minerals division for past six and one-half years. In charge of The Superior Oil Company minerals exploration program.

James D. Sell

Academical: Graduate, Colorado School of Mines, Golden, Colorado - June 1955. Degree in Geological Engineering (Mining-Geology option).

Graduate, University of Arizona, Tucson, Arizona. June 1961. Degree of Master of Science in Geology.

APPENDIX A - cont'd

Professional: Magma Copper Company, Superior, Arizona:  
Geologist, underground. Six years (including  
3/4 year leave of absence for graduate work).

The Superior Oil Company, Minerals Division:  
Geologist, exploration. One year.

APPENDIX B

Evidence of Expenditure Incurred:

Preliminary Geologic Map of the Ings River Area,  
Yukon Territory, Canada

V. Zay Smith Associates Ltd.

Professional fee for geologic research, air photo-  
mosaic and base map construction, and photogeologic  
evaluation leading to the preparation of the areal  
geology and structural interpretation map of the  
Ings River area ..... \$2,682.09

Air photography and reproduction charges ... \$ 70.31

\$2,753.00



*W. Jay Smith*

1143 SEVENTEENTH AVENUE S.W. • CALGARY, ALBERTA • PHONE CH 4-5551

Associated Companies

VEEZAY HELICOPTERS LTD  
1143 Seventeenth Avenue S.W., Calgary

W. JAY SMITH ASSOCIATES INC  
290 Lincoln St  
Denver 3, Colorado

VEEZAY HELICOPTERS LTD.  
1143 - 17th Ave. S.W.  
Calgary, Alberta.

February 7, 1962

Statement of fees re Jess and Norm group of claims in the  
Ings River area, Yukon Territory.

Professional fee for geologic research, air photo-mosaic  
and base map construction, and photogeologic evaluation  
leading to the preparation of the areal geology and struct-  
ural interpretation map of the Ings River area .. \$2,682.69

Air photography and reproduction charges ..... \$ 70.31

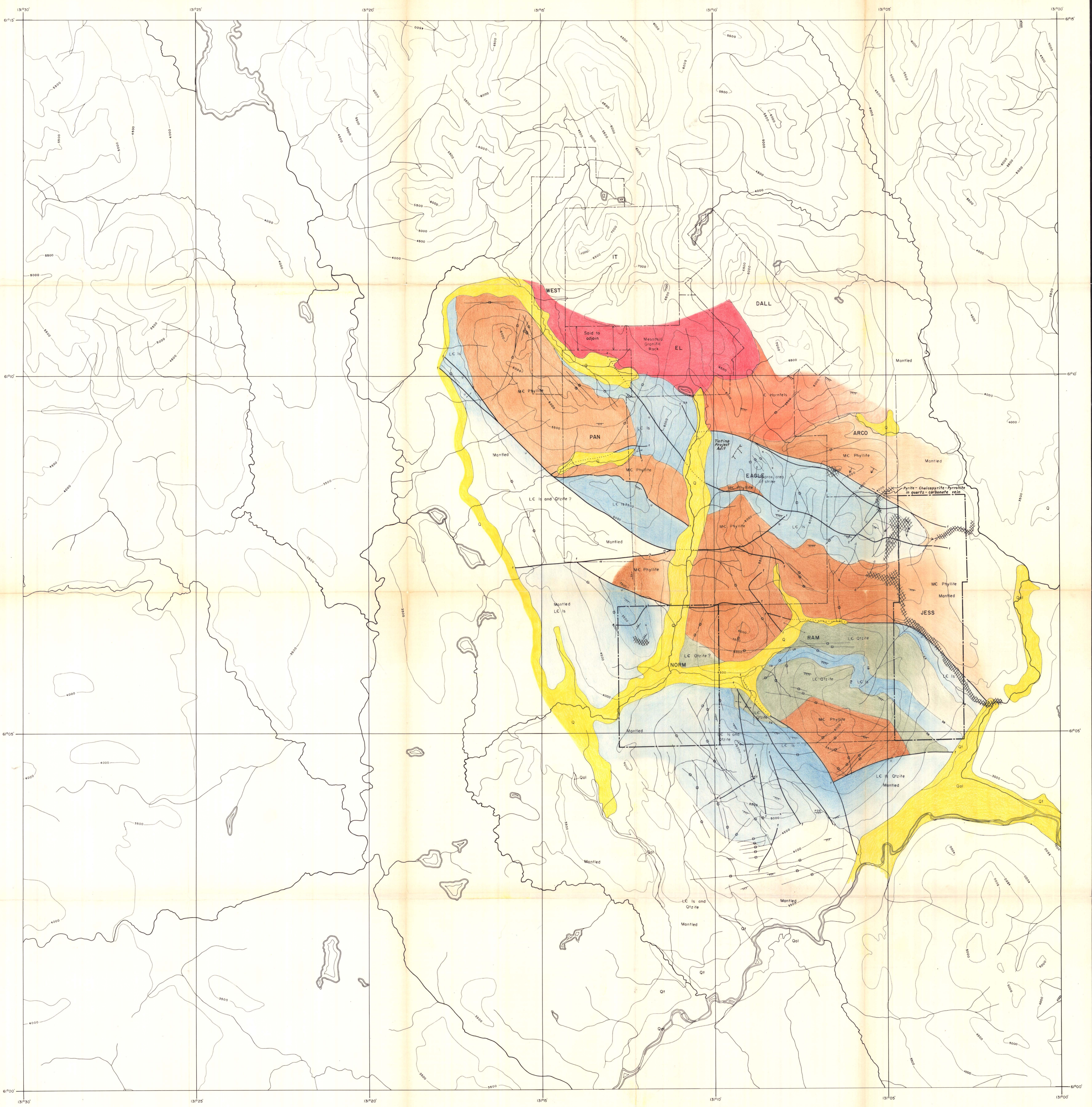
\$2,753.00

APPENDIX C

Evidence of Expenditure Incurred:

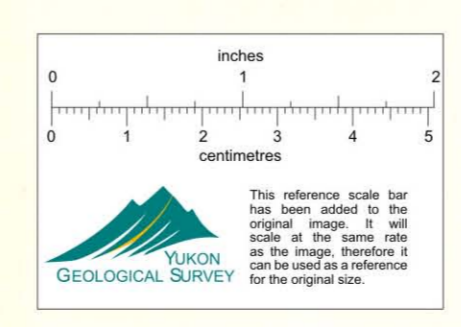
Examining Party in the Ings River Area,  
Yukon Territory, Canada

Plane Fare for R. H. Wilpolt and J. D. Sell			
From Edmonton to Watson Lake (\$65 each).....	\$130.00		
From White Horse to Edmonton (\$75 each).....	<u>150.00</u>		
			\$280.00
Expenses for R. H. Wilpolt (6/27/62-7/2/62)	\$65.55		
J. D. Sell (6/27/62-7/2/62)	<u>\$41.68</u>		\$ 107.23
Salary: R. H. Wilpolt (6/27/62-7/2/62)	\$452.61		
J. D. Sell (6/27/62-7/2/62)	<u>\$208.15</u>		\$ 660.76
B. C. Yukon - Charter			\$ 675.56
Klondike Helicopters			\$1246.00
			<hr/>
		TOTAL	\$2,969.55



PRELIMINARY GEOLOGIC MAP  
INGS RIVER AREA  
YUKON TERRITORY  
CANADA

- LEGEND
- Quaternary deposits
  - Quaternary alluvium
  - Quaternary terrace deposits
  - Mesozoic Granite rock
  - (Middle Cambrian) Phyllite
  - (Lower Cambrian) Limestone and/or Quartzite
  - (Cambrian) Hornfels (largely altered from the MC Phyllite)



- SYMBOLS
- Value indeterminate
  - 30° to 100°
  - 100° to 250°
  - Overturned
  - Fault
  - Fracture or minor fault
  - Dike
  - Contact
  - Stratigraphic break
  - Key bed
  - Claim block boundaries
  - Ground traverse