## FINAL REPORT

1983 GOLDORE PROJECT
(GOLDORE JOINT VENTURE)
Senora and Patricia Mining Divisions Northwestern Ontario

VOLUTE 1 of 5
83-3-C-144
by
R. E. Chisholm

GIL Minerals Consulting Ltd.
for
JALRA RESOURCES LIMITED
Suite All, Block A
6120-2nd Street SE
Calgary, Alberta
T2H 2L8
(403) 252-8846
(PROJECT OPERATOR)
and for

Fellow Joint Venture Participants
Pecos Resources Ltd., GLE Resources Ltd., Sutherland Resources Ltd., Austin Resources Inc.

February, 1984
Submitted to O.M.E.P. June, 1984
$0 M 83-3-c-144$
THIS SUBMITTAL CONSISTED OF VARIOUS REPORTS, SOME OF WHICH HAVE BEEN CULLED FROM THIS FILE. THE CULLED MATERIAL HAD BEEN PREVIOUSLY SUBMITTED UNDER THE FOLLOWING RECORD SERIES (THE DOCUMENTS CAN BE VIEWED IN THESE SERIES):
(1) FINAL REPORT, 1983 GOLD CREEK $\rightarrow$ SEE FILE 63.4394 PROJECT, VOL. I of 2 , by W. HANYCH, February, 1984
(2) REPORT ON INTERPRENTION, GROUND $\rightarrow$ SEE FILE 63.4394 Geophysics, Gout Creek Rotary, by
Misener, D.J., December 1983
PageSTORMI LAKE PROJECT AREA 5858
Location and Physiography ..... 58
Claims ..... 58
Geological Setting ..... 58
Exploration History ..... 59
Work Program ..... 59
Results ..... 60
Conclusions ..... 63
DRYDEN PROJECT AREA ..... 64
Location and Physiography ..... 64
Claims ..... 64
Geological Setting ..... 64
Exploration History ..... 66
Work Program ..... 67
Results ..... 67
Conclusions ..... 72
CERTIFICATE OF QUALIFICATION ..... 73FOR ROBIN E. CHISHOLM

## LIST OF FIGURES



## SUMMARY

CONCLUSIONS AND RECOEMENDATIONS
INTRODUCTION 7
GENERAL STATEMENTT
1983 HORK PROGRAM 10
CLATES
RATIONALE FOR CLATM ACQUISITION
COMPETITOR ACIIVITY
PROJECT MODEL 26
RESULTS OF DETAILED PROSPECTIITG AND FOLLOW-UP

SCHISTOSE LAKE PROJECT AREA
Location and Paysiography
Claims
Geological Setting
Exploration History
Work Program
Resules
MANITOU LAKES PROJECT AREA
Location and Physiography 39
Claims 39
Geological Setting 39
Exploration History 40
Work Program 40
Resules

1
5

7

23
24

SCHISTOSE LARE PROJECT AREA MAPS


MANITOU LAKES PROJECT AREA MAPS
FIGURE 12: Lower Manitou Lake Property: Regional Compilation Map
FIGURE 13a: Geological Map (1 inch $=1 / 4$ mile)
13b: Geochemical Map u
13c: Traverse Map "
13d: Summary Map "
FIGURE 14a: Geological Map (1 inch $=1 / 4$ mile)
14b: Geochemical Map "
14c: Traverse Map "
14d: Summary Map *
FIGURE 15a: Aronson Lake Grid: Geology
( 1 inch $=250$ feet)
15b: Aronson Lake Grid: Geochemistry
(1 inch $=250$ feet)
FIGURE 16a: Etta Lake Grid: Geology (4.5 inches $=1000$ feet)

16b: Etta Lake Grid: Geochemistry (4.5 inches $=1000$ feet)

FIGURE 17: Ten-Trench Area: Geology and Geochemistr (1 inch = 100 feet)

FIGURE 18: Surprise Lake Area: Geology and Geochemistry (1 inch $=500$ feet)

FIGURE 20: Washeibemaga Lake Property: Regional
Follows Page 58
Compilation Map
FIGURE 21a: Geological Map (1 inch $=1 / 4$ mile)
21b: Geochemical Map "
21c: Traverse Map "
21d: Summary Map "
FIGURE 22a: Geological Map ( 1 inch $=1 / 4$ mile)
22b: Geochemical Map "
22c: Traverse Map "
22d: Summary Map "
In Pocket (VOL. 5)
" (VOL. 5)
" (VOL. 5)
" (VOL. 5)
" (VOL. 5)
" (vOL. 5)
" (VOL. 5)
" (VOL. 5)

DRYDEN PROJECT AREA MAPS
FIGURE 23: Laval-Lola Lake Property/Beartrack Lak Property: Regional Geological Compilation

Map
FIGURE 24a: Geological Map (1 inch = $1 / 4$ mile)
$\begin{array}{lll}\text { 24b: } & \text { Geochemical Map } & \text { " } \\ \text { 24c: } & \text { Traverse Map } & \text { " } \\ \text { 24d: } & \text { Summary Map } & \text { " }\end{array}$
$\begin{array}{lll}\text { 24b: } & \text { Geochemical Map } & \text { " } \\ \text { 24c: } & \text { Traverse Map } & \text { " } \\ \text { 24d: } & \text { Summary Map } & \text { " }\end{array}$
$\begin{array}{lll}\text { 24b: } & \text { Geochemical Map } & \text { " } \\ \text { 24c: } & \text { Traverse Map } & \text { " } \\ \text { 24d: } & \text { Sumary Map } & \text { " }\end{array}$
FIGURE 25a: Geological Map (1 inch $=1 / 4$ mile)
25b: Geochemical Map "
25c: Traverse Map "
25d: Summary Map "
FIGURE 26a: Geological Map ( 1 inch $=1 / 4$ mile)
26b: Geochemical Map "
26c: Traverse Map "
26d: Summary Map "
FIGURE 27a: Geological Map ( 1 inch $=1 / 4$ mile)
27b: Geochemical Map "
27c: Traverse Map "
27d: Summary Map m
Follows Page 64

In Pocket (VOL. 5)
" (vol. 5)
" (vol. 5)
" (vOL. 5)
" (VOL. 6)
" (VOL. 6)
" (VOL. 6)
" (VOL. 6)
" (VOL. 6)
" (VOL. 6)
" (VOL. 6)
" (VOL. 6)
In Pocket (VOL. 6)
" (VOL. 6)
" (VOL. 6)
" (VOL. 6)

## LIST OF APPENDICES

## APPERDIX I HEMLO DISCUSSION <br> APPENDIX II ROCK CHIP GEOCHEAICAL ANALYSIS AND ASSAYS <br> Listing by Project Area

APPENDIX III BIBLIOGRAPHY

## MAP INDEX

Index to 1 inch = $1 / 4$ mile scale geology, geochemistry, traverse and summary maps with figure numbers.

SCHISTOSE LAKE PROJECT AREA (Single Map Sheet, Figure 11)

MANITOU LAKES PROJECT AREA (Figures 13, 14)

STORMI LARE PROJECT AREA (Figures 21, 22)


DRYDEN PROJECT AREA


## SUMMARY

The 1983 Goldore Project, managed by GML Minerals Consulting Ltd. for Jalna Resources Limited, involved a phased, detailed prospecting program within eleven selected project areas of northern Ontario. The project was designed to explore for Hemlo-Detour Lake type stratabound gold deposits. During the interval between May 22 and November 3, 1983, the program included ground acquisition, rock chip trace metal geochemical sampling, prospecting, reconnaissance geological mapping and gold prospect examination. Over the course of the season, 1163 claims were acquired by staking. During October, seven of the areas which had earlier produced positive gold values were subsequently mapped and sampled in detail. Objectives of the program were to identify targets warranting ground geophysical follow-up in the winter of 1984. The 1984 winter program is in turn designed to identify targets warranting drill testing in the winter of 1985.

From west to east, the four project areas are as follows:

Schistose Lake Area<br>Manitou Lakes Area

Stormy Lake Area
Dryden Area

Project planning, preparation, staff hiring and mobilization were completed by June 11, 1983. Field operations were carried out by two independent crews, each composed of a senior geologist, junior geologist and a prospector. Each crew was equipped for road or water
borne transportation and was supported by chartered fixed-wing and helicopter aircraft. The writer acted as project manager throughout the 1983 field season.

Regionally, the four project areas fall within the eastern two-thirds of the Wabigoon Greenstone Belt. Lithologically, project areas are composed of intercalated mafic volcanic/greywacke sequences which in most cases are located adjacent to felsic volcanic vent centres and/or sequences of their pyroclastic debris. Ultramafic flows and intrusions are found within the Schistose Lake Area. Chemical sediments including chert, oxide facies iron formation and sulphide facies iron formation have been identified in all project areas.

Areas with positive and anomalous gold values from rock chip samples were identified within all four project areas. Detailed follow-up sampling and mapping was carried out within all of the four project areas.

Two priority-1 targets were identified by this season's work, both of which are located within the Manitou Lakes Project Area. In brief, they are:

Manitou Lakes Area

1) Aronson Lake

A zone of auriferous, pyritic chert within clastic sediments is located on the north end of Aronson Lake. Anomalous gold values ranging from 85 to 350 ppb have been encountered.
within a northeast trending zone 625 feet long. The zone is located on a major northeast trending structure in close proximity to two strong parallel conductors.
2) Knowles Lake

An angular piece of float composed of pyritic crystal tuff was discovered 3000 feet south of Knowles Lake. The sample returned a very high gold value of .662 ounces per ton. The sample site is located down ice of two thin intermediate to felsic units at Knowles Lake.

In addition to the two priority-1 targets, a number of priority-2 targets requiring further investigation were defined within five of the project areas. The priority-2 targets include anomalous rock chip geochemical values in favourable geologic environments, electromagnetic conductors and anomalous rock chip sample sites not yet followed up in detail. They are listed as follows:

1) Manitou Lakes Project Area

Two geophysical targets in Mosher Bay, Upper Manitou Lake and Sunshine Lake areas and two geochemical targets in the Etta Lake and Ten-Trench areas. In addition, several single anomalous rock chip sample sites and a newly staked claim block at Knowles Lake have been defined as priority-2 targets.
2) Stormy Lake Project Area

A rock chip geochemical target within the Washeibemaga Lake Property located along strike of a significant find by Esso Minerals.
3) Dryden Project Area

Two rock chip geochemical targets in the Blackburn Creek and Swanson Lake areas. Of note is the fact that the Swanson Lake area is located along strike of a drill hole (Rio Tinto 1979) which encountered an intercept of 4.1 grams per ton gold over 1.2 metres (equivalent to .12 ounces gold per ton over 3.9 feet).

## CONCLUSIONS AND RECOMMENDATIONS

The 1983 Goldore Project has been successful in identifying a number of high-priority targets warranting further work in several environments assessed to be favourable for the occurrence of Hemlo-Detour type deposits.

Based upon the results of the program, the following proposals for the March-April, 1984 winter season and July-August, 1984 summer season are as follows:

PHASE I (March - April, 1984)

1) Grid construction of 48 line miles in 2 grids over priority- 1 targets in the Lower Manitou and Sturgeon Lake project areas. Ground geophysical surveying including 44 line miles of VLF-EM and magnetics, 36 line miles of induced polarization. Includes the Aronson Lake and Etta-Knowles Lakes targets in the Manitou Lakes Area.
2) Trenching with a small backhoe and bulldozer over four priority-1 targets within the Aronson Lake and Etta-Knowles Lakes grids in the Manitou Lake Area.

PBASE II (Winter - Spring, 1984)

Airborne surveying using the Aerodat EM and magnetic system (or comparable system) the priority-l Lower Manitou Lake and
the priority-two Washeibemaga Lake Property. A total of 345 line miles of surveying allocated to priority -1 properties and 30 line miles over priority-2 properties.

## PHASE III

1) Soil geochemical survey over the two priority-1 winter cut grids involving 2400 soil samples along 44 line miles.
2) Detailed grid geological mapping and sampling over the four winter cut grids involving 44 line miles of grid.
3) Detailed prospecting and sampling within five project areas in the vicinity of high-priority gridded areas, and within all priority-2 target areas. These areas include new claims, anomalous rock chip geochemical areas and anomalous sample sites identified in 1983 but not yet followed up (areas as identified in summary).

Based upon the results of the above work, a program of diamond drilling should be carried out over favourable targets during the winter of 1985.

Respectfully submitted, GL MINERALS CONSULTING LID.


Robin E. Chisholm, B.Sc. (Hons) Project Manager

## INTRODUCTION

## genteral statement

The 1983 Goldore Project involved the completion of the preliminary four phases of an eight-phase gold exploration program. Four areas of northern Ontario (Figure 1) were selected by detailed literature search and subsequently prospected and mapped in detail at a scale of one inch to one-quarter mile. Project areas were chosen on the basis of similarity to known gold deposits at Hemlo, Detour Lake and Cameron Island. The project was managed by Gll Minerals Consulting Ltd. of Calgary for Jalna Resources Limited, operator for joint venture participants Pecos Resources Limited, Sutherland Resources Limited, GLE Resources Ltd., Austin Resources Incorporated and Jalna Resources Limited.

Program phases accomplished to date include:
I) Data compilation and selection of target areas;
II) Acquisition of favourable ground by staking of $\mathbf{8 6 2}$ claims in five blocks;
III) Detailed prospecting and mapping of target areas with more detailed mapping, sampling and trenching of identified gold mineralization. Concomitant with prospecting, acquisition of 259 claims in four blocks by staking;
IV) Acquisition by staking of 42 claims over an area of gold mineralization identified by Phase III prospecting.


In total, 1163 mining claims were acquired by staking during the course of the field season.

Access to project areas was gained by a combination of road, water and air transportation utilizing four-wheel drive trucks, motorized boats, as well as chartered helicopter and fixed-wing aircraft.

A total of two self-contained three-man crews equipped for fly camping moved independently from project area to project area as work progressed. Camps consisted of a single $10^{\prime} X 12 '$ canvas prospector tent equipped with sleeping pallets and drafting table, as well as a separate open-air kitchen shelter. Each crew was equipped with a four wheel drive pickup truck and canopy, as well as a $14^{\prime}$ aluminum runabout boat propelled by a 20 HP outboard motor. In general, camps, boats and personnel could be moved in their entirety by three Beaver aircraft or by two A-Star helicopter flights. Over the course of the field season, each crew moved camp approximately ten times, with half of these moves being by truck and boat, and the other half by aircraft.

The writer, as project manager, was equipped with a four-wheel drive Jeep and traveled between project areas supervising and assisting field crews on an "as needed" basis.

This program was supported by the following personnel:

GML Minerals Consulting Ltd.:

Original project conception and data compilation by
George M. Leary President of GML
Walter Hanych Senior Geologist
Field exploration and data reduction by
Robin E. Chisholm Project Manager
Richard F. Skopik Senior Geologist
Marc W. Bowles Senior Geologist

Keith Spence
Stewart Nimmo

Frank J. Longpre
Carl B. Hansen

Geological Assistant
Geological Assistant

Prospector
Prospector

Claim staking was contracted to MIL Minerals Consulting Ltd. and all assays and geochemical analyses were carried out by Acme Analytical Laboratories Ltd. of Vancouver, B. C.

Physiographically, northwestern Ontario is typical boreal forest covered Canadian Shield, being composed of numerous lakes set in a rugged hilly terrain. In all cases, except for the Dryden area, outcrop is relatively abundant, with best exposures on lakeshores, inland outcrops being covered by a thin layer of lichen and moss.

The 1983 program involved the preliminary four phases of a planned eight-phase gold exploration project. Objectives accomplished during these phases include:

1) Acquisition by staking of favourable ground;
2) Identification of anomalous areas warranting further work and elimination of unfavourable areas;
3) Identification of targets warranting winter geophysical surveying and trenching prior to future drill testing.

Each phase of the program is described in detail as follows:

PHASE I

Research, data compilation and evaluation of all available information on six favourable areas was commenced on January 11 and finished May 13, 1983. Data was compiled onto overlays for Ontario Geological Survey geologic maps at the most detailed scale available (usually 1 inch to $\mathbf{1 / 2}$ mile). Two areas (Pukaskwa River and Missing Lake) proposed for detailed prospecting were subsequently staked by competitors leaving the following areas for further investigation:

Schistose Lake
Manitou Lakes
\(\left.\begin{array}{l}Washeibemaga Lake <br>

Stormy Lake\end{array}\right\}\)| Later amalgamated to |
| :--- |
| Storny Lake Area |

## Dryden


#### Abstract

Outlines of project areas (amended June 11, 1983) are shown in the Goldore Project Proposal (Appendix I) and Figure 2. Within these areas, four priority one targets were identified for subsequent land acquisition.


## PHASE II

Acquisition of priority one targets. Staking was begun May 22 and finished June 30th, 1983. In total five target areas, for a total of 862 claims, were acquired. They are:

| CLAIM BLOCK | AREA | NO. OF CLADMS |
| :--- | :--- | :---: |
| IN BLOCK |  |  |

TOTAL 862

A number of targets were staked by competitors prior to May 22, and so were unavailable.

## PHASE III

Planning and preparation for detailed prospecting and mapping was begun May 9, 1983 following approval of joint venture participants. Crews left Calgary June 3. An orientation tour of gold deposits for field personnel was carried out between June 6th and June 8th. The tour comprised examination of present and past gold producers near Kirkland Lake, examination of Detour Lake samples, discussions with Ministry officials in Timmins, examination of geologic setting and exposed ore body at Hemlo and discussions with Ministry officials in Thunder Bay regarding Hemlo gold deposits. Crews were dispatched to project areas commencing June 11 following detailed project orientation in Dryden.

Geological mapping, rock chip sampling and prospecting on lines spaced at one mile intervals were carried out over each selected area. In addition, smaller sub-areas deemed highly prospective were mapped on lines spaced at one half mile intervals.

Geological, geochemical and traverse data were plotted on mylar overlays at a scale of one inch to one quarter mile. Sumary maps at a scale of one inch to one quarter mile have been prepared for all map sheets and include geologic contacts, anomalous sample sites and geochemistry, and known gold occurrences. Geophysical and drill-hole data available in assessment files have also been included. Final maps were prepared by printing overlays onto base maps photographically enlarged from $1: 50,000$ scale government topographic sheets.

A total of 1102 rock chip, 7 silt and 14 soil samples were taken during the course of the field season. $1 / 3$ of these were taken during follow-up operations. Samples were sent to Acme Analytical

Laboratories Limited of Vancouver, B. C. for ICP geochemical analysis of 30 elements. Fire assay plus atomic absorption techniques vere used to geochemically analyze all samples for gold. A batch of 178 samples in series FL-1 to 3; FT-1 to 142; KO-1, 2, 32; KT-1 to 32; ST-1 to 12 was inadvertently ICP analyzed only for copper, lead, zinc, silver and arsenic, with gold being fire assayed. At the end of the field season, 13 geochemical samples in two batches (dated Nov. 10/83 and Feb. 2/84) which had returned highly anomalous gold values were subsequently re-assayed.

All geochemical data is listed in Appendix II by project area and then alphabetically by sampler.

First-pass mapping and prospecting of all areas was finished by October 10. Starting October 10th, the following areas were revisited for more detailed follow-up work:

## Schistose Lake

Manitou Lakes

Stormy Lake
Dryden

Follow-up work included fill-in quarter mile spaced mapping, very detailed prospecting and mapping in the immediate vicinity of anomalous sample sites, minor trenching (four areas trenched) of mineralized outcrops as well as detailed chip and channel sampling.

During Phase III operations, 259 mining claims in four blocks were staked by field personnel and GIL contractors. The three blocks cover ground that, after field examination, were felt to be highly prospective.

# Examinations including mapping, sampling and evaluation of fourteen known gold occurrences in the target areas were carried out by the writer and various field personnel. <br> After the close of Phase III field operations on October 31, all equipment was demobilized back to Calgary. 

PHASE IV

Following receipt of final geochemical results at the end of November, 1983, a block of 42 claims was staked in the Lower Hanitou area to cover an area of gold mineralization. Staking was completed by the middle of December.

Final map and report preparation has been worked on continuously by the writer and intermittently by Messrs. T. Bojczyszyn, M. Bowles and R. Skopik since the close of the field season.

The Goldore Project currently holds 1163 mining claims in six contiguous blocks. Project Summary Maps show the location and number of claims acquired in 1983. All claims have been transferred to Jalna Resources Limited.

Claims are in good standing up to June 13, 1984 when claim blocks in the Manitou Lakes and Dryden areas reach their anniversary dates. Assessment work sufficient to carry the claims forward must be completed by their anniversary dates and must be filed with the Mining Recorder within ten days thereafter. Geological work carried out in 1983 is not expected to carry claim standings forward beyond one month under present regulations.

A list of Jalna claims in good standing is as follows:

SCHISTOSE LAKE CLAIM BLOCX

| - | $\begin{aligned} & \text { MINING } \\ & \text { DIVISION } \end{aligned}$ | AREA OR TOWNSEIP | $\begin{gathered} \text { CLATM } \\ \text { NULBERS } \end{gathered}$ | $\begin{aligned} & \text { KO. OF } \\ & \text { CAIMS } \end{aligned}$ | RECORDED | $\begin{aligned} & \text { EXPPIRY } \\ & \text { DATE } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| - | Kenora, | Area of | 727507-727510 incl | 4 | Jui 6/83 | Ju1 6/84 |
|  | Ontario | Brooks Lake | 727513-727515 incl | 3 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727517-727536 incl | 20 | Ju1 6/83 | Jul 6/84 |
| - |  |  | 727538-727540 incl | 3 | Ju1 6/83 | Jul 6/84 |
|  |  |  | 727542-727556 incl | 15 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727557-727559 incl | 3 | Jul 6/83 | Jul 6/84 |
| - |  |  | 727561-727563 incl | 3 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727565-727567 incl | 3 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727569-727574 incl | 6 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727581-727592 incl | 12 | Ju1 6/83 | Jul 6/84 |
|  |  |  | .727597-727599 incl | 3 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727604-727606 incl | 3 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727610-727612 incl | 3 | Jul 6/83 | Jul 6/84 |
| - |  |  | 727615-727636 incl | 22 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727637-727666 incl | 30 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727668-727671 incl | 4 | Jul 6/83 | Jul 6/84 |
| - |  |  | 727673-727676 incl | 4 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727677-727694 incl | 18 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727696-727700 incl | 5 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727702-727706 incl | 5 | Ju1 6/83 | Jul 6/84 |
| - |  |  | 727711-727715 incl | 5 | Ju1 6/83 | Jul 6/84 |
|  |  |  | 727717-727745 incl | 29 | Ju1 6/83 | Jul 6/84 |
|  |  |  | 727767-727782 incl | 16 | Jul 6/83 | Jul 6/84 |
| - |  | Area of | 727511-727512 incl | 2 | Ju1 6/83 | Jul 6/84 |
|  |  | Dash Lake | 727516 | 1 | Jul 6/83 | Jul 6/84 |
| - |  |  | 727560 | 1 | Ju1 6/83 | Jul 6/84 |
|  |  |  | 727564 | 1 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727568 | 1 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727575-727580 incl | 6 | Ju1 6/83 | Jul 6/84 |
| - |  |  | 727600-727603 incl | 4 | Jul 6/83 | Jul 6/84 |
|  |  |  | 727607-727609 incl | 3 | Ju1 6/83 | Jul 6/84 |
|  |  |  | 727613-727614 incl | 2 | Jul 6/83 | Jul 6/84 |
| - |  |  |  |  |  |  |
|  |  |  | TOTAL | 240 |  |  |

## LONER MANITOU LAKE CLATM BLOCK

|  | MinImg <br> DIVISION | AREA OR TOWASEIP | CLATM NUTBERS | NO. OF CLATMS | RECORDED | $\begin{aligned} & \text { EXPIRI } \\ & \text { DATE } \\ & \hline \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Kenora, Oncario | Area of | 696601-696624 incl | 24 | Jun 13/83 | Jun 13/84 |
|  |  | Lower | 696625-696630 incl | 6 | Jun 13/83 | Jun 13/84 |
| - |  | Manitou | 696631-696655 incl | 25 | Jun 13/83 | Jun 13/84 |
|  |  | Lake | 696656-696661 incl | 6 | Jun 13/83 | Jun 13/84 |
|  |  |  | 730008-730017 incl | 10 | Jun 13/83 | Jun 13/84 |
| - |  |  | 730019-730052 incl | 34 | Jun 13/83 | Jun 13/84 |
|  |  |  | 730053-730065 incl | 13 | Jun 13/83 | Jun 13/84 |
|  |  |  | 730068-730094 incl | 27 | Jun 13/83 | Jun 13/84 |
|  |  |  | 762427-762445 incl | 19 | Jun 13/83 | Jun 13/84 |
| - |  |  | 762981-763000 incl | 20 | Jun 13/83 | Jun 13/84 |
|  |  |  | SUB-TOTAL | 184 |  |  |
|  |  | Area of | 649044-649046 incl | 3 | Jun 13/83 | Jun 13/84 |
| - |  | Heggisi | 649053-649068 incl | 16 | Jun 13/83 | Jun 13/84 |
|  |  | Lake | 649082-649086 incl | 5 | Jun 13/83 | Jun 13/84 |
|  |  |  | 649088-649090 incl | 3 | Jun 13/83 | Jun 13/84 |
|  |  |  | 773360-773375 incl | 16 | Jun 13/83 | Jun 13/84 |
|  |  |  | 773377-773396 incl | 20 | Jun 13/83 | Jun 13/84 |
|  |  |  | 773435-773436 incl | 2 | Jun 13/83 | Jun 13/84 |
|  |  |  | 773450-773455 incl | 6 | Jun 13/83 | Jun 13/84 |
| - |  |  | 773458-773485 incl | 28 | Jun 13/83 | Jun 13/84 |
|  |  | Area of | 649035 | 1 | Jun 13/83 | Jun 13/84 |
| - |  | Boyer | 649041-649043 incl | 3 | Jun 13/83 | Jun 13/84 |
|  |  | Lake | 649047-649052 incl | 6 | Jun 13/83 | Jun 13/84 |
|  |  |  | 649091-649094 incl | 4 | Jun 13/83 | Jun 13/84 |
|  |  |  | 649095 | 1 | Jun 13/83 | Jun 13/84 |
|  |  |  | 649097-649098 incl | 2 | Jun 13/83 | Jun 13/84 |
|  |  |  | 773347-773359 incl | 13 | Jun 13/83 | Jun 13/84 |
|  |  |  | 773376 | 1 | Jun 13/83 | Jun 13/84 |
| - |  |  | 773397-773434 incl | 38 | Jun 13/83 | Jun 13/84 |
|  |  |  | 773437-773449 incl | 13 | Jun 13/83 | Jun 13/84 |
|  |  |  | 773456-773457 incl | 2 | Jun 13/83 | Jun 13/84 |
|  |  |  |  |  |  |  |
|  |  | - | SUB-TOTAL | 183 |  |  |

LONER MANTTOU LAKE CLAIM BLOCK, continued

| MINING |
| :--- |
| DIVISION |

Kenora,

| AREA OR CLATM |
| :--- |
| TOWSSEIP |



| Area of | $746440-746466$ incl | 27 | Sep 22/83 | Sep 22/84 |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Lower | $746480-746505$ incl | -26 | Sep 22/83 | Sep 22/84 |
| Manitou Lake | $746530-746560$ incl | 31 | Sep 22/83 | Sep 22/84 |
| Area of | $746507-746512$ incl | 6 | Sep 22/83 | Sep 22/84 |
| Meggisi Lake | $746561-746566$ incl | 6 | Sep 22/83 | Sep 22/84 |


| Area of | 696665-696670 incl | 6 | Dec 16/83 | Dee 16/84 |
| :---: | :---: | :---: | :---: | :---: |
| Uang Lake | 728146-728160 incl | 15 | Dec 16/83 | Dee 16/84 |
| Area of |  |  |  |  |
| Lower | 696663-696664 incl | 2 | Dee 16/83 | Dec 16/84 |
| Manitou Lake | 744611-744629 incl | 19 | Dec 16/83 | Dee 16/84 |
|  | SUB-TOTAL | 42 |  |  |


| Sep | 23/83 |  | 34 |
| :---: | :---: | :---: | :---: |
| Sep | 23/83 | Sep | 23/84 |
| Sep | 23/83 | Sep | 23/84 |
| Sep | 23/83 | Sep | 23/84 |
| Sep | 23/83 | Sep | 23/84 |
| Oct | 7/83 | Oct | 7/84 |
| Sep | 23/83 | Sep | 23/84 |
| Oct | 7/83 | Oct | 7/84 |
| Sep | 23/83 | Sep | 23/84 |
| Oct | 12/83 | Oct | 12/84 |
| Oct | 12/83 | Oct | 12/84 |
| Sep | 23/83 | Sep | 23/84 |
| Sep | 23/83 | Sep | 23/84 |
| Sep | 23/83 | Sep | 23/84 |
| Sep | 23/83 | Sep | 23/84 |

Sep 22/83 Sep 22/84
Sep 22/83 Sep 22/84
Sep 22/83 Sep 22/84
Sep 22/83 Sep 22/84
Sep 22/83 Sep 22/84

Dee 16/83 Dec 16/84
Dec 16/83 Dec 16/84

Dec 16/83 Dec 16/84
Dec 16/83 Dec 16/84

## waseicibemaga lake ctaim block

|  | MINTLNG <br> DIVISION | area or TOWNSEIP | CLATM RIVMBERS | NO. OF CLATHS | RECORDED | $\begin{aligned} & \text { EXPIRI } \\ & \text { DATE } \\ & \hline \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Kenora, | Kawashegomuk | 729354-729368 incl | 15 | Aug 30/83 | Aug 30/84 |
|  | Ontario | Lake Area | 729371-729374 incl | 4 | Aug 30/83 | Aug 30/84 |
| - |  |  | 729378 | 1 | Ang 30/83 | Aug 30/84 |
|  |  |  | 729382 | 1 | Aug 30/83 | Aug 30/84 |
|  |  |  | 729386 | 1 | Aug 30/83 | Aug 30/84 |
| - |  |  | 729390 | 10 | Aug 30/83 | Aug 30/84 |
|  |  |  | 731133-731142 incl | 10 | Jul 26/83 | Jul 26/84 |
|  |  |  | total | 33 |  |  |

## Laval-LOLA Lake claim block

| - | MINING DIVISION | AREA OR TOWHSEIP | CLATM MUMBERS | NO. OF CLATMS | RECORDED | $\begin{aligned} & \text { EXPIRY } \\ & \text { DATE } \\ & \hline \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| - |  |  |  |  | - |  |
|  | Kenora, | Zealand | 705595-705598 incl | 4 | Jun 13/83 | Jun 13/84 |
|  | Ontario | Township | 705854-705869 incl | 16 | Jun 13/83 | Jun 13/84 |
| - |  | Brownridge | 649030-649034 incl | 5 | Jun 13/83 | Jun 13/84 |
|  |  | Township | 705841-705853 incl | 13 | Jun 13/83 | Jun 13/84 |
| - |  | Laval | 648985-649029 incl | 45 | Jun 13/83 | Jun 13/84 |
|  |  | Township | 705801-705840 incl | 40 | . Jun 13/83 | Jun 13/84 |
| - |  |  | TOTAL | 123 |  |  |

## beartrack lake claim block



## bluetr lake chank block

| $\begin{aligned} & \text { MINING } \\ & \text { DIVISIOX } \end{aligned}$ | $\begin{aligned} & \text { AREA OR } \\ & \text { TOWNSEIP } \end{aligned}$ | $\begin{aligned} & \text { CLATM } \\ & \text { EIUBEERS } \end{aligned}$ | $\begin{aligned} & \text { RO. OF } \\ & \text { CATMS } \end{aligned}$ | RECORDED | $\begin{aligned} & \text { EXPIRY } \\ & \text { DATE } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Kenora, Ontario | McIlraith and Webb Township | 649072-649080 incl | 9 | Ju1 27/83 | Jul 27/84 |

1983 was an exceptionally active year in terms of staking activity. The excitement generated by the recent Hemlo discoveries caused intense staking rushes in most greenstone belts in northern Ontario. Areas of interest such as Schistose Lake and the Manitou Lakes region closely fulfilled the criteria generated from the project model and represented exceptional exploration opporrunities. Within these areas, zones could be defined that exhibited favourable geologic settings adjacent to known gold occurrences and so represented priority targets warranting immediate staking. A decision was made to acquire those zones which showed the highest exploration potential.

## COMPETITOR ACTIVITY

Competitor activity in the Washeibemaga-Stormy Lake, Manitou Lakes, Schistose Lake and Longbay areas (southern half) has been very intense. Staking activity has been moderate in the Dryden area.

Widespread exploration activity and a number of staking rushes have been generated by new finds and old gold occurrences in three areas. They are:

## CAMIRRON LAKE

Drilling by the Nuinsco Resources/Lockwood Petroleum joint venture in the Cameron Lake area, 18 miles southeast of Sioux Narrows, has begun to outline a significant gold deposit related to the Pipestone-Cameron fault zone. No accurate tonnage figures have been published, but a longitudinal section showing grade $X$ thickness was published in the Northern Miner December 1, 1983. From this, a rough global estimate of reserves indicates an approximate tonnage of one million tons grading . 15 ounces per ton gold. Excitement generated by this play has encouraged a staking rush along the fault zone extending from the Lake of the Woods in the west to the Schistose Lake Project Area located southeast of Cameron Lake. Selco Inc. has carried out a large exploration program on the same structure within its property at Sioux Narrows. They are rumoured to have a significant gold showing.

## MANITOU LAKES REGION


#### Abstract

Staking within the Manitou Lakes Region has defined a belt of claims six miles wide extending thirty miles from Kabagukski Lake in the north to the south end of Lower Manitou Lake in the south. Interest has been spurred by the large number of old gold mines and occurrences present within the area. Teck Corporation and Noxe Petroleum (affiliated to M. Pezim) have formed a joint venture to explore a large block of land centered on Manitou Is land, Lower Manitou Lake. The block contains the old Gaffney and Beehive gold occurrences. In the $1940^{\prime \prime}$ s, Sylvanite Gold Mines Ltd. optioned the Gaffney prospect and drill-tested a reserve of 190,000 tons of .21 ounces per ton gold in pyrite felsic volcanics and porphyry dykes. Drilling by Teck in 1983 returned an intercept of . 367 ounces per ton gold over 12 feet within the known mineralized zone. The joint venture is expected to resume drilling at the end of January, 1984. Further to the north, Asamera Inc. carried out a drill program this summer adjacent to Kabagukski Lake. St. Joe Canada Inc. is expected to be drilling on its property just west of Upper Manitou Lake sometime this winter.


## STORMY LAKE AREA

Esso Minerals Canada staked a large block of claims adjacent to the Snake Bay Road in the Stormy Lake area. They have had a large crew working in the area all summer stripping overburden, trenching and drilling a number of pyrite felsic units. A single grab sample collected on the road returned a value of 3050 ppb gold.

## PROJECT MODEL

A project model for the Hemlo-Detour Lake-Cameron Island type of gold deposit was formulated by George M. Leary following a thorough review of all catalogued gold occurrences in northwestern Ontario, a study of known gold camps, and a synthesis of all available data on the three "type" deposits. The model, as formulated from the then available data, is of a large tonnage, concordant tabular deposit consisting of disseminations and laminations of sulphides (predominantly pyrite) in quartz-sericite schist and felsic tuffs or in chert units. Host lithologies are found as parts of mixed sequences comprising clastic sediments, ultramafic flows, mafic volcanics and satellitic felsic vent complexes with the sequence being positioned along the distal flank of a major felsic centre. Important to the model is the characteristic association of felsic horizons and ultramafics indicating the overlapping nature of temporally and spatially superimposed differentiated ultramafic to felsic volcanic cycles.

The type deposits show features indicative of many genetic processes including volcanogenic exhalative, volcanogenic hydrothermal, epigenetic plutonic hydrothermal and metamorphogenic. All processes may be applicable, however it appears that exhalative and subvolcanic hydrothermal processes are predominant. Combinations of the two predominant processes can be expected to generate a spectrum of different deposit types. Within this spectrum the Hemlo deposit, located proximal to a large satellitic felsic vent complex, may represent one deposit type while the Detour Lake deposit, located relatively more distal to its associated felsic centre, may represent a different deposit type.

Within this complex geologic setting the volcanic regime overlaps the plutonic regime and, as all these areas have experienced medium-grade metamorphism, it is not surprising that these deposits may have experienced significant remobilization and hence show evidence suggestive of these other genetic processes.

Any geologic model and postulated genetic process for a group of deposits must explain their geologic setting, host lithology, ore textures and mineralogical make-up. In the case of Hemlo (see Appendix II), Detour Lake and a number of similar smaller deposits, the characteristics of importance are as follows:

1) Gold is found free, interstitial to sulphide minerals.
2) There is very little nugget effect; gold values are very consistent over large sections of deposits. This is atypical of normal Archean Lode type deposits.
3) Sulphide contents (pyrite, pyrchotite) with which the gold is associated are found as disseminations and laminations in quantities up to $20 \%$.
4) Host cherts, cherty tuffs and quartz-sericite schists are laminated indicating the bedded nature of these rocks.
5) Deposits as a whole are concordant and stratabound.
6) Evidence of significant alteration. Potassium flooding and sodium depletion at Hemlo of host felsic and cherty tuffs, and intense carbonitization of footwall ultramafics at Detour Lake.
7) Geologic setting:
a) Proximity to felsic volcanic centres.
b) Location at the interface between sedimentary and volcanic sequences.
c) Proximity to ultramafic rocks, which are often subaqueous flows.
d) Association of chemical sediments such as chert, bedded barite and iron formation (sulphide, oxide, carbonate).
8) Mineralogy, low temperature arsenic minerals such as realgar and orpiment are typical of hydrothermal processes as well as volcanic exhalites. Metamorphic overprinting would be expected to eliminate these minerals. Indication is that hydrothermal processes have been active subsequent to metamorphism and hence the deposit may be epigenetic, or that the deposit may bear a hydrothermal overprint.

The concordant stratigraphic nature of the Hemlo-Detour Lake deposits, the bedded textures of their ores and the fact that gold is found free as a matrix to sulphides showing sedimentary textures, suggest that the gold was deposited syngenetic with host chemical sediments. It seems likely that the gold precipitated from auriferous volcanic exhalations at or near the ancient sea floor. Metal charged fluids of this type may have originated as a product of long term convective leaching of surrounding mafic volcanics, alteration of highly reactive ultramafic flows or as a late stage differentiate of felsic vulcanism.

Selection of target areas which contain geologic environments with significant exploration potential for the discovery of Hemlo-Detour Lake-Cameron Island type deposits must follow criteria generated by the project model. These criteria are as follaws:

1) Proximity to satellitic felsic vent complexes, specifically the interfaces between local volcanic and sedimentary lithologic sequences.
2) Frequency of gold occurrences in a variety of geological environments indicates that the region is a gold metallogenic province.
3) Presence of ultramafic flows in the immediate area.
4) Frequency of sulphide iron formation, chert and other chemical sediments demonstrating the presence of exhalite sequences.
5) Frequency of quartz sericite schist indicating the presence of altered felsic tuffs.

## RESULTS OF DETAILED PROSPECTING AND FOLLOW-UP

The four project areas are located within a single greenstone belt stretching over 220 miles across northwestern Ontario. All areas share some of the criteria required by the project model. However, there are many dissimilarities between areas such as regional geology and exploration history which necessitate a separate discussion for each area. Following this, each area will be treated as a separate entity.

SCHISTOSE LAKE PROJECT AREA

## LOCATION AND PHYSIOGRAPHY

The Schistose Lake Project Area is located 65 miles southeast of the town of Kenora and includes the area south of Schistose Lake bounded on the southeast by Pipestone Lake. Access is via float plane from the hamlet of Nestor Falls 18 miles to the west. Physiographically, the area is composed of low rolling hills and valleys which are covered by mature stands of red pine and spruce trees. Maximum change in elevation is 275 feet across the area with local variations of less than 150 feet. Outcrop is relatively abundant over the whole area and especially widespread on lakeshores. The area of interest is outlined on Figure 4h, Appendix I.

## CLATHS

Jalna Resources Limited currently hold a contiguous block of 240 claims bordering the south shore of Schistose Lake (Figure 10).

GEOLOGIC SETTING
Geological mapping of the Schistose Lake Project Area by the Ontario Geologic Survey is quite detailed, being compiled on two coloured geological maps at a one inch to one half mile scale (Edwards 1980, 1981, Kap 2421 and 2430).

On a regional scale the Schistose Lake Project Area is located within a western extension of the Archean aged Wabigoon Greenstone Belt.

Structurally the area is very complex, being located within the apex formed by the intersection of the southeast trending Pipestone-Cameron Lakes Fault and the northeast trending Helena-Pipestone Lakes Fauit. The major new gold deposit at Cameron Laike is related to silicic and carbonate

alteration within a splay off the major Pipestone-Cameron Lakes Fault. Located west of the intersection point of the two faults, south of Schistose Lake, is the small two-mile wide Phinney-Dash Lakes quartzfeldspar porphyry stock which likely represents a felsic volcanic vent centre. On a regional scale the Phinney-Dash Lake stock is a small volcanic centre which is probably satellitic to the major Kakagi Lake intermediate volcanic pile which pinches out north of Schistose Lake. Within the project area, the Phinney-Dash Lake stock is mantled to the south by intermediate to felsic pyroclastics and to the north by coarse volcanic derived greywacke and arkose. Ferruginous cherts are found as substantial units within both pyroclastic and epiclastic sequences. South of Dash Lake an irregular porphyritic trondhjemite intrudes mafic and felsic rocks on the east side of the Helena-Pipestone Lakes Fault. Mafic volcanic flows intruded by gabbro sills outcrop southwest of Bethume Lake (Edwards 1983) and east of the Helena-Pipestone Lakes Fault. Mafic flows outcrop north of the Pipestone-Cameron Lakes Fault.

## EXPLORATION HISTORY

Gold prospectors appear to have been active in the Schistose Lake Project Area since 1897 (Edwards 1980), but gold was not discovered until the gold rush of the early 1930's. At this time gold in quartz veins associated with porphyry dykes was discovered west of Bethune Lake, two miles south of the project area. Since that time, gold in trace amounts has been encountered in 1960 at Lun-Echo, west of Helena Lake and at the Roy Martin Occurrence at the east end of Kakagi Lake.

Major exploration programs (probably for base metals) have been carried out by a variety of companies including Kennco Exploration, 1956; Canadian Nickel Co. Ltd., 1967; Freeport Canadian Exploration Co., 1971; Beth Canada Mining Co., 1970; Amax, 1971; and H. B. O. G. Ltd, 1973.

## FORK PROGRAM

Phase III mapping, prospecting and sampling of the Schistose Lake area was carried out between September 19th and October 8th, 1983. Limited detailed follow-up work was carried out between October 25th and 28th, 1983. Traverses were completed cross strike at $1 / 2-$ mile intervals, except for a small area east of Kakagi Lake which was traversed at 1-mile intervals. A total of 146 rock chip, 3 silt and 2 soil samples were analysed from the Schistose Project Area. Data is plotted on Figures 11a, 11b, 11c and 11d located in the map pocket.

## RESULTS

Geologic mapping in the Schistose Lake Project Area by field crews has for the most part substantiated the geologic picture as shown on O.G.S. geologic maps.

Field crews noted the relative abundance of sulphides and pervasive ankeritic alteration within most lithologic units in the area. In addition to this, I.C.P. geochemical data indicate that the area has elevated background levels for copper, zinc, iron, arsenic, strontium, vanadium and calcium. Most strikingly different are backgrounds for arsenic, strontium and calcium in relation to backgrounds extablished for these elements in other project areas in Ontario. Backgrounds for the Schistose Lake area for these elements are respectively 15, 25 ppm and 1.5\%, i.e. higher than the 5, 15 ppm and . $4 \%$ backgrounds established in other project areas.

Within the area of interest there are two gold occurrences and an anomalous (gold) O.G.S. grab sample location. All three sites were located and evaluated in the field. They are described below.

## Kakagi Lake Gold Occurrence (Roy Martin Property)

The Kakagi Lake Gold Occurrence is located on a small island at the east end of Rakagi Lake. Edwards 1980 (O.G.S. Report 194) sampled and described this occurrence. The property is believed to be currenty held by Barrier Reef Resources Ltd., which completed a small drill program on the occurrence during the winter of 1983. Development consists of four trenches which have been driven cross stratigraphy spaced at 15-foot intervals over a strike length of sixty feet. The showing consists of a narrow ( 15 feet) gossanous shear zone which strikes $075^{\circ}$ azimuth parallel to stratigraphy and dips $80^{\circ}$ to the south. In detail the shear zone is composed of a pyritic quartz-feldspar-sericite schist within the main Kakagi Lake intermediate pyroclastic pile. Pyrite is found in 1 to 3 percent concentrations as medium-grained concordant laminations within cherty portions of the sericitic shear zone.

Geochemical data is as follows with trenches numbered from one to four, west to east.


Further Jalna investigations of this occurrence would involve examining drill core assays, if these are available. Should these not be available, no further Jalna investigations are warranted at this time.

## Lun-Echo Gold Mines Occurrence

The Lun-Echo Gold Mines occurrence is located a thousand feet west of the western shore of Helena Lake within claims registered (as of September 28, 1983) to S. Dallaire. Edwards (1983) described assessment data available in the assessment office in Toronto. Data from two diamond drill holes are available which show gold values over a 15-foot width in talc-carbonate schist with the best assay running 0.05 ounces per ton over five feet.

Jalna personnel attempted to find this occurrence on two different occasions, but no evidence of any drilling could be found. A sample (AT-167) of pyritic carbonated gabbro from this area returned a gold value below the level of detection.

## Millar Island

A grab sample taken by Edwards (1983) of a pyritic quartz vein located on Millar Island (within Jalna claims) north of the Gates Ajar Narrows assayed 0.04 ounces per ton gold. The sample site was followed up by Jalna personnel with four grab samples (CT-78, 79, 80, 81) being taken. Gold values for these samples are all below the limit of detection. Three of the samples came from separate white quartz veins and one from an adjacent pyritic quartz eye porphyry. The quartz eye porphyry, which carries finely disseminated pyrite (up to $1 / 2$ percent visible) gave an arsenic analysis of 179 ppm .

A total of six locations carrying anomalous gold values were encountered during Phase III mapping and sampling. They are described below by sample number.

AS-185. A single soil sample taken 2500 feet east of the northeast corner of Sandhill Lake returned a gold value of 95 ppb . The sample is one of several taken in a line which runs coincident with the trace of the favourable Pipestone-Cameron Lakes Fault. On Ministry claim maps, the sample site falls 200 feet outside the Jalna claim block boundary. However, the claim line position has not been confirmed in the field. No detailed follow-up work was carried out at this site.

BT-167. A single grab sample of gossanous felsic tuff taken from an outcrop located south of Phinney Lake, within claims registered to K. Bernier, returned gold and silver values of 32 ppb and 1.2 ppm respectively. No detailed follow-up work was carried out at this site.

BT-175. A single grab sample of pyritic, heavily chloritized basalt adjacent to a northeast trending shear zone located 4000 feet north of Cold Narrows, Pipestone Lake returned a gold value of 20 ppb and a very high arsenic analysis of 348 ppm. Pyrite is found in quantities up to 20\%, as coarse euhedral cubes forming lenses parallel to the adjacent shear. A single follow-up sample (BT-271) returned a gold value of 22 ppb and an arsenic analysis of 190 ppm.

AT-162. A single grab sample taken from a site on the east side of the Gates Ajar Narrows returned a gold value of 40 ppb and an arsenic analysis of 58 ppm. The sample was taken from a small two-foot wide pyritic interflow chert located 100 feet across a small graben from an ultramafic body. Two follow-up chip samples (BT-262B and BT-263B) assayed 55 ppb gold over two feet and 36 ppb gold over six inches. The sample location lies within Jalna's present clain block.

BT-170. A single grab sample of gossanous chert located on the west side of James Bay (Pipestone Lake) within claims registered to S . Dallaire returned a gold value of 70 ppb . The gossanous zone is exposed for 30 feet along strike, which parallels the adjacent shoreline. Locally,
the zone carries up to forty percent pyrite. A follow-up sample (BT-269) returned the following results: gold, 70 ppb ; arsenic, 141 ppm ; and silver, 1.1 ppm.

NT-149. A single grab sample from a small quartz vein located 1000 feet east of Cold Narrows (Pipestone Lake) within claims registered to J. N. Bouchard returned a gold value of 155 ppb and an arsenic analysis of 131 ppm. The quartz vein is one foot wide, and carries coarse cubic pyrite in patches with concentrations up to five percent. Follow-up samples BT-270, NT-266 and NT-267 returned gold values of 10 , 105 and 24 ppb respectively, with arsenic analyses of 492,163 and 75 ppm respectively.

## Dash Lake Trondhjemite

A group of eight rock chip samples taken over a 3000 foot by 3000 foot area of the Dash Lake Trondhjemite on the north shore of Dash Lake returned anomalous gold and silver values. The original eight samples and five subsequent follow-up samples are shown below with gold and silver analyses.

| SAMPLE NUMBER | GOLD (ppb) | SILVER (Ppm) | SAMPLE TYPE |
| :---: | :---: | :---: | :--- |
| NT-155 | 45 | 1.3 | Grab Sample |
| NT-156 | 2 | .1 | Grab Sample |
| NT-157 | 9 | .1 | Grab Sample |
| NT-158 | 58 | .4 | Grab Sample |
| NT-159 | 44 | 2.0 | Grab Sample |
| NT-160 | 30 | .6 | Grab Sample |
| NT-161 | 53 | 1.4 | Grab Sample |
| BT-162 | 31 | .8 | Chip over 60' |
| NT-268 | 6 | .6 | Grab Sample |
| NT-269 | 54 | .8 | Grab Sample |
| NT-270 | 120 | 1.1 | Grab Sample |
| NT-271 | 4 | .2 | Grab Sample |
| NT-272 | 9 | .1 | Grab Sample |

The samples come from the Dash Lâke porphyritic trondhjemite intrusive and carry one to five percent fine-grained pyrite in disseminations and bands. A majority of the land on which the trondajemite
outcrops is located within claims registered under the names of J. Moore and A. Aubuchon. A four claim sized area of favourable trondhjemite lies in open ground along the south shore of Dash Lake.

Outcrops of two ferruginous chert units, one within felsic pyroclastics southeast of Phinney Lake and the other within sediments south of Schistose Lake, were extensively sampled (AT-175, 176 and CT-82 to 89), but returned low gold values of 4 ppb or less.

From an exploration standpoint, the Schistose Lake area looks very favourable. It has a) the right mix of sulphidic felsic volcanics, ultramafics and chemical sediments; b) an abundance of fault and shear structures, some related to gold mineralization in other areas; and c) pervasive carbonate alteration suggesting extensive hydrothermal activity. Extensive rock chip sampling, however, did not reveal significant gold mineralization. Geochemically, the area appears more favourable from a base metal exploration standpoint. Thick sections of sulphides and graphite have been encountered south of Phinney Lake by Freeport Canadian Exploration (1972). Elevated copper and zinc levels cluster in the southeast quadrant of the project area within competitor claims. No further work is recommended in the Schistose Lake Project Area.

## MANITOU LAKES PROJECT AREA

## LOCATION AND PHYSIOGRAPHY

As shown on Figure 1, the area is located approximately 35 miles due south of the town of Dryden. Access is by float plane from Dryden or by boat via Cedars Narrows, Esox Lake, 18 miles south of the project area. Physiographically, the area is quite rugged, being composed of steep-sided hills and valleys. Maximum relief is approximately 250 feet. Outcrop is abundant on lakeshores and hills but is sparse in valleys, being covered by cedar swamp. The area of interest is outlined on Figure 4b, Appendix I.

## CLATMS

Jalna Resources Limited currently holds a single contiguous claim block of 626 claims within the region (Figure 12).

## REGIONAL GEOLOGIC SETTING

The Manitou Lakes region is located at the mid-point of the Wabigoon Greenstone Belt (O.G.S. 1979, G.C.S. Map 2443) . Similar to other greenstone belts in Ontario, the lithologic sequence is composed of Archean aged volcanics, volcanic derived sediments and related hypabyssal intrusions. The belt is pinched between younger granitic rocks of the Atikwa and Meggisi batholiths. In detail the region is composed of at least two thick sections of felsic volcanics separated by sediments of the Manitou Group and the major Manitou Straits shear zone (Blackburn 1982).

The project area is centred over the eastermmost felsic belt composed of the Cane Lake Formation pyroclastics and felsic intrusions as well as the Sunshine Lake subvolcanic intrusion. There appear to have been at least two major felsic subvolcanic vents in the immediate area, one at Sunshine Lake and one located 1 mile north of Glass Bay, Lower Manitou Lake. Reworked volcanics of the Mosher Bay, Uphill Lake, Sunshine Lake and Etta


Gaffney Prospect. The Gaffney Prospect (described by Blackburn 1976), located on the southern shore of Manitou Island, was briefly investigated during Phase III mapping and sampling. The prospect is the centre piece of the Teck-Noxe joint venture in the Lower Manitou area. Development consists of a number of small trenches, a small 25 -foot wide pit and forty-one diamond drill holes completed between 1933 and 1945.

All of the surface development but the main pit was overgrown at the time the property was investigated. Within the main pit, a twenty-foot wide unit of ankeritic quartz-feldspar-porphyry cuts a unit of quartz-sericite-feldspar schist. On a property map adapted by Blackburn (1976), the porphyry is shown as a crosscutting dyke. Both units contain between five and ten percent disseminated, medium-grained euhedral pyrite, and three to five percent disseminated ankerite on micro-shears. It can be seen from rubble located east of the pit that numerous white quartz veinlets cut the porphyry dyke. A single composite chip sample (AT-95) across 15 feet of schist gave a geochemical gold value of $10,900 \mathrm{ppb}$, equivalent to .32 ounces per ton. In addition to the high gold values, the sample carried 5.6 ppm silver and 108 ppm arsenic.

Ontario Geological Survey Map 2320 (Blackburn 1976) shows the host rocks to be "sericite-chlorite schist." In detail the surrounding rocks consist of sheared felsic crystal tuff with chert laminae, magnetite rich mafic crystal tuff, quartz-sericite-chlorite schist and sericite-chlorite-quartz-feldspar schist. The rocks then, represent a pyroclastic pile of variable composition interbedded with their sedimentary derivatives. Schistosity in the main pit strikes parallel to local stratigraphy and the adjacent Manitou Island Fault zone, which is a splay off the main Manitou Straits Fault.

From thin section work, Blackburn (1976) noted that the porphyry, originally mapped as "quartz monzonite" by Thompson (1933) i.e. the mafic quartz-sericite-chlorite schist, is probably of pyroclastic origin. The possibility is open that mineralization at Gaffney could be syngenetic in
origin, and perhaps similar to the Hemlo type. This point is crucial as the majority of gold occurrences in the Manitou Region are small tonnage quartz veins or quartz veining related to quartz-feldspar porphyry intrusives.

Reserves are reported at 190,000 tons of .21 ounces gold per ton in the probable category and a larger reserve in the possible category (N.M.I. $52 \mathrm{~F} / 7$, Au 16).

Recent drilling by the Noxe-Teck joint venture encountered a mineralized intercept of .37 ounces per ton gold over twelve feet within the shear zone. Drilling will likely resume in the third week of January, 1984. A contract has also been dram up to carry out 1200 kilometers of line cutting and geophysics.

The Beehive Mine. The Beehive Mine (described by Blackburn 1976, O.G.S. Report 142 ), located at the north end of Manitou Island, was briefly investigated during Phase III mapping and sampling. The property is located within the Noxe-Teck joint venture area. Development consists of a $37 \mathbf{1 / 2 - f o o t ~ v e r t i c a l ~ s h a f t ~ s u n k ~ o n ~ a ~} 2.5$-foot wide quartz vein in 1904 (R. Thompson, Summary of Notes, 1945). Sylvanite Gold Mines Limited in 1943 reported (Assessment Files) gold values over a strike length of twenty feet within which channel samples returned up to $\mathbf{1 . 8 1}$ ounces per ton (equivalent) over 2.2-foot widths. The vein averages $21 / 2$ feet in width over a reported strike length of at least 220 feet. Very little of the vein is now exposed, but investigation of the ore dump near the shaft shows that the vein material included both milky white and translucent grey massive quartz. Ankerite, tourmaline and chlorite are found as large (up to three inches) clots within the quartz. Pyrite is found in small amounts as one-inch blebs. The host rock consists of a pale grey-green sericite schist with schistosity parallel to local strike and the vein margins.

Sampling carried out by Sylvanite Gold Mines Limited in 1943 shows (Assessment Files) that similar to most quartz vein occurrences, the gold mineralization is very erratic, however probable reserves of 126,000 tons grading . 16 ounces gold per ton were reported (National Mineral Inventory 52 F/7, Au 16).

Royal Sovereign Mine. Located three quarters of a mile northeast along strike of the Beehive Mine, the Royal Sovereign Mine is a very similar type gold occurrence. The occurrence (described by Blackburn 1976, O.G.S. Report (142) is held under patent K1190, which appears to lie outside of the Noxe-Teck joint venture. Development consists of two small shafts and a small connecting adit opened in 1897. The occurrence consists of an anastamosing quartz vein one foot to seven feet in width that strikes $070^{\circ}$ parallel to stratigraphy. Mineralogy is entirely similar to the Beehive Mine, except that pyrite is only found in trace amounts. Gold mineralization is said to be weak, with the only reported reserves being 3600 tons of .28 ounces gold per ton below the one hundred foot level (National Mineral Inventory 52 F/7, Au 13).

Glass Reef Mine. The Glass Reef Mine is located one quarter mile east of Lower Manitou Lake south of Glass Bay, within claims held by Cochrane Oil and Gas Ltd. Originally opened in 1900, a shaft was sunk 200 feet and considerable drifting and crosscutting carried out. Two months of mill testing produced 22 ounces of gold before everything was closed down (Blackburn 1976).

The occurrence was found to be a network of narrow ( $<1$ foot) quartz veins within a thin (<100-foot wide) unit of sericite-chloritefeldspar schist. Vein material at the mine dump consists of massive light grey quartz containing clots of coarse-grained ankerite and chlorite with traces of fine-grained pyrite and fuchsite. A single composite grab sample (CT-63) of vein material returned only 3 ppb gold and 57 ppm arsenic. No published reserves for this occurrence could be found in available reiferences.

Of interest is the fact that a thin unit located several hundred feet to the west (originally mapped as argillite) appears to be felsic crystal tuff. An association of gold occurrences and felsic pyroclastic units appears to be strong in the Lower Manitou region. Cochrane Oil and Gas plans 5000 feet of diamond drilling on their claims in the region during January, 1984.

Prospecting and geologic mapping by Jalna crews this summer discovered the following showings and anomalous sample sites:

Aronson Lake Showing. A narrow northeast trending zone of sheared pyritic chert was discovered on the north shore of Aronson Lake located in the southern half of the area within Jalna claims (Figure 12). Grab samples returned geochemical gold values of up to 240 ppb at the lakeshore, as well as gradually decreasing values to the northeast. During follow-up, a 9000 -foot baseline trending $070^{\circ}$ azimuth and crosslines spaced at 1500-foot intervals were established north of Aronson Lake (Figure 15a in pocket). Rock chip or soil samples were taken every 500 feet along crosslines (Figure 15b in pocket). The anomalous outcrops and vicinity were mapped and sampled in detail as well as trenched in five different sites. A zone of pyritic (up to $25 \%$ pyrite) chert and cherty sediments was traced for 1100 feet in an $030^{\circ}$ direction from the lakeshore. Anomalous gold values have been encountered over the whole zone with a highly anomalous ( 885 ppb ) zone extending 625 feet from the lakeshore. A maximum of 350 ppb gold was obtained over a 2.5-foot chip sample taken from a trench blasted 45 feet north of the shore. Outcrops along the zone of interest are very small and scattered, so it is difficult to define both up-section and long strike limits of the pyritic chert.

The general Aronson Lake area is structurally complex on both macro and micro scales. Cherty sediments of the Etta Lake Formation strike regionally in an $040^{\circ}$ direction, dipping steeply to the southeast (Figure 13a). An Ontario Geologic Survey airborne electromagnetic and magnetic survey (O.G.S. 1980, Map 80477) shows a pronounced magnetic low
runs due north along the western shore of Aronson Lake, then arcs to the northeast where it finally intersects Meridian Bay (Lower Manitou Lake). North of Aronson Lake, the Etta Lake Formation appears to be stratigraphically disrupted where it intersects the magnetic low. Further south, Aronson Lake defines the contact between the Irene-Eltrut Lakes Granite Batholith and the Wabigoon Greenstone Belt. It seems likely that the axis of the magnetic low defines a major fault zone.

On a detailed scale, the Aronson Lake Showing is pervasively sheared on an $030^{\circ}$ trend dipping $75^{\circ}$ to the east-southeast. A variety of bedding trends have been identified with $180^{\circ}$ and $075^{\circ}$ being most common. A quarter mile further down the west side of Aronson Lake, the bedding strikes $190^{\circ}$. Very likely the sediments strike south into the lake. At this time it is difficult to tell whether we are dealing with syngeneticlithologic or epigenetic-shear related mineralization, or some combination thereof.

Two strong EM conductors run parallel to the magnetic low and units of the Etta Lake Formation just west of Aronson Lake. The conductive material does not outcrop, but studies of survey profiles and the strength of the conductors strongly indicate that they are bona fide bedrock conductors. It is important to note that the edge of the government survey falls just west of Aronson Lake and so we do not know the full extent of conductive material beyond 1,000 feet west of the lake.

Geochemically, those samples which returned high gold values came from sediments with greater than ten percent iron. Those samples with over 100 ppb gold contained greater than 15 percent iron. Obviously, high pyrite content is important. High gold samples return high silver values, and often high zinc and copper analyses as well (maximum 1724 ppm and 751 ppm respectively). A single high gold sample (BT-217, gold 85 ppb ) gave an anomalous antimony analysis of 16 ppm. Significant from an exploration point of view is the close relationship between gold and arsenic analyses. High gold values give arsenic analyses of up to 993 ppm (BT-239, gold 295
ppb). Arsenic shows broad dispersion over the area with good contrast at lower gold values. Clearly, arsenic in this area is a good pathfinder element, with values over 20 ppm being significant.

We have defined a zone of sheared pyritic cherty sediments carrying anomalous gold with an exposed length and width of 1100 and 80 feet respectively. The zone strikes into the lake and is open in all other directions. Clearly, an exploration target has been defined which is different from the small tonnage quartz vein type deposits common to the region. The Aronson Lake showing rates a detailed follow-up exploration program for the winter of 1984. A geophysical program including VLF, magnetic and I.P. surveys is recommended to accomplish the following:
a) Attempt to define the limit of the auriferous chert-sulphide unit;
b) Locate on the ground those conductors defined by the O.G.S. airborne survey;
c) Better define the local structure.

A trenching program is recommended to:
a) Strip overburden in areas of known gold mineralization;
b) Trench down to conductors defined by the proposed ground geophysical survey.

Meridian Bay. A group of three parallel conductors (O.G.S. 1980) trend northeast concordant to stratigraphy within Lower Manitou Lake in the vicinity of Meridian Bay. The central conductor of the group, as well as a 2500-foot section of another conductor, are located within a strip of 13 claims which is a part of Jalna's Lower Manitou claim block (Figure 13d). Associated with this conductor is a continuous weak magnetic high which appears to be an extension along strike of a very strong magnetic nigh located 1 1/2 miles to the northeast. Drilling in the early 1970's (C. E. Blackburn, personal communication) established that the magnetic high is an oxide iron formation. Although airborne geophysical coverage
is incomplete, it appears likely that the weak conductors of Meridian Bay are long strike extensions of the strong Aronson Lake conductors. Of note is the fact that the Meridian Bay conductors lie within 4500 feet of the major Gaffney gold occurrence. On the negative side, an unpublished bathymetric map of Lower Manitou obtained from the Ministry of Natural Resources shows that the conductor coincides with a lake bottom trench which is up to 81 metres deep.

The Meridian Bay conductors represent favourable well-defined exploration targets for the following reasons:

1) Favourable geologic setting in terms of associated stratigraphy, i.e. located up-section from the cherty felsic volcanics of Manitou Island and along strike of known chemical sediments;
2) Favourable proximity to a major known gold occurrence;
3) Favourable conductivity, neither too strong so as to be indicative of massive sulphides nor associated too closely with oxide iron formation.

A limited VLF, magnetic and I.P. survey is recommended to define local structure and locate accurately the conductor axis. The I.P. surveys would be limited to three cross lines and would be designed to discriminate between lake bottom sediments and bona fide bedrock conductors.

Etta Lake Sub-Area. A one-mile square area, within Jalna claims, centred over the west end of Etta Lake is defined by six sample sites carrying anomalous gold geochemistry (Figures 14b, 16b). Values range up to 670 ppb gold with two samples (BT-221 and BT-223) returning 640 ppb and 670 ppb gold respectively. BT-222 returned the next highest gold value of 80 ppb . In general, the anomalous values are associated with discontinuous wide (up to 250 feet) lightly pyritic chlorite-ankerite skear zones which strike parallel and sub-parallel to the local stratigraphy. Values tend to be erratic and do not occur over the length and width of the zone. In several instances, including the highest gold analyses, the
shears contain small (up to one foot wide) concordant white quartz veins and veinlets.

Chlorite observed in shear zones has an uncommon bright-green hue. Fuchsite was reported by Blackburn (1972, Map 2320) 1200 feet south of Etta Lake. I.C.P. geochemical data show anomalously high chrome values ranging up to 599 ppm. Field personnel have reported fuchsite in shear zones in the immediate area.

A single thin (<3 feet) interflow chert located on the north shore of Etta Lake gave a gold value of 34 ppb .

On a more regional scale, the Etta Lake sub-area is part of a north-northwest trending one-mile wide, $2.5-$ mile long zone of high gold values that cuts across the local stratigraphical strike.

Clearly, this sub-area is a favourable exploration target. Extensive detailed prospecting in the area, however, did not resolve the target down to any particular lithology or structure. A program of VLF, magnetic and I.P. geophysical surveys is recommended to resolve local structure and to define any conductors within the immediate area.

Four other anomalous gold values fall within Jalna's Lower Manitou claim block. They are from south to north:

BT-240. A single rock chip sample of pyritic crystal tuff float from $1 / 2$-mile south of Knowles Lake returned a gold value of $\mathbf{2 2 , 6 0 0}$ ppb (later assay of .662 ounces gold per ton). The sample contained 30 to 40 percent massive pyrite. Geochemically, the sample returned anomalous values of molybdenum, copper, silver, nickel and tungsten with analyses of 14, 537, 1.5, 245 and 10 ppm respectively. Follow-up was not attempted as the analysis was not received until after the end of the field program. Glacial striae in the area point to a source to the north-northeast near

Rnowles Lake. Experience in other project areas indicates that angular float such as BT- 240 usually travels less than 1000 feet from its source.

A geophysical program of VLF, magnetic and I.P. surveys is recommended to locate any conductors in the immediate area and to better define local structure. A mapping and prospecting program is recommended for the vicinity of BT-240 and within the newly acquired 42 claims southeast of Rnowles Lake.

NT-97. (Gold, 52 ppb ; arsenic, 46 ppm ) Strongly gossanous argillite and greywacke with 2 mm lenses of stratabound pyrite. Seven follow-up samples in the area returned a maximum of 4 ppb gold (NT-212 to NT-218 inclusive). No further work is recommended at this location.

AT-110. (Gold, 57 ppb ; arsenic, 14 ppm ) Felsic to intermediate crystal (?) tuff with $1 / 2$ percent disseminated pyrite located "near" a "large" tourmaline-quartz vein. During follow-up AT-221, 222 and 223 gave gold values of 1,120 and 48 ppb respectively. AT-222 and 223 are grab samples separated by 25 feet. Limited prospecting is recommended in the immediate area during the 1984 summer field seasor.

BT-105. (Gold, 28 ppb ; arsenic, 58 ppm ) Composite of three six-inch gossans within carbonate rich fine-grained basalt up to three percent pyrite locally. No follow-up was carried out. No further work is recommended at this location.

## Sunshine Lake-Mosher Bay

Phase III mapping and sampling in the Sunshine Lake-Mosher Bay area was begun September 1st, 1983 and finished September l6th. Follow-up detailed investigations were carried out between October 1lth and 18th. Approximately one-third of 396 Manitou samples were taken from this area.

Similar to the Lower Manitou area, a large number of samples returned anomalous gold values. Only the most anomalous sites will be described.

Two known gold occurrences were investigated and an undocumented old gold occurrence was re-discovered within the area. All three occurrences are described within.

Giant Prospect. The Giant Prospect (described by Blackburn 1981, O.G.S. Report ${ }^{(202)}$, located one thousand feet south of the south shore of Mosher Bay (Upper Manitou Lake), was investigated during Phase III mapping and sampling. The property is located within patented claim number 351463 registered to F. V. Reagan. Development consists of at least eleven trenches, a small shaft (reported depth 195 feet) and a small adit. The line of trenches runs for 570 feet at azimuth $260^{\circ}$ parallel to the local stratigraphy. Most of the trenches have collapsed and little outcrop is exposed. The main shaft is sunk on a two-foot wide quartz vein within sericitic chlorite schist which is part of a package of argillitic metasediments named the Mosher Bay Formation. In detail, the quartz vein trends $262^{\circ}$ dipping $82^{\circ}$ to the north and is composed of dark grey, translucent massive grey quartz which encloses fragments of chlorite schist and massive ankerite. Only a trace of pyrite was observed, although abundant pyrite and chalcopyrite is reported. A two-foot wide chip sample (CT-57) across the vein within the shaft gave a gold value of 170 ppb and an arsenic analysis of 88 ppm. BT-121, a similar sample, returned only 2 ppb gold.

Gold values within the vein are too low and erratic to warrant further interest in the prospect by Jalna Resources Limited.

Big Dick Occurrence. The Big Dick Occurrence (described by Thompson, J. E. 1934, O.G.S. Report Volume XLIII, Part IV, and Blackburn, C.E. 1981, O.G.S. Report 202), located on the north shore of Mosher Bay, was investigated and sampled during Phase III operations. The property is
located within patented claim HW66, registered to R. Nickel. Development consists of at least four trenches, the beginnings of an adit and a two stamp crushing will. The workings have been driven perpendicular to the contact of a large ( 40 feet wide) medium-grained quartz-feldspar porphyry sill and the host limonitic chlorite schist. Presently exposed over a four-foot width, the contact is obscured by a swarm of quartz veins (one inch to two feet thick) trending parallel to the sill boundary. It is reported by Thompson (1934) that the veined zone is up to 12 feet wide. In detail the contact zone is strongly gossanous and contains up to ten percent disseminated, medium-grained pyrite and abundant finely-disseminated ankerite. A four-foot chip sample of this zone returned a gold value of 330 ppb along with a high arsenic analysis of 5646 ppm . The porphyry dyke was grab sampled in two sites away from the contact zone, returning a gold value of 22 ppb and an arsenic analysis of 420 ppm. Clearly, the gold mineralization is associated with the quartz veining at the sill margin though it is likely that the sill as a whole is slightly auriferous. This relationship is a common one in many northwestern Ontario occurrences.

Gold values within the contact zone are too low to warrant any further interest in the occurrence by Jalna Resources Limited.

Ten Trench Sub-Area. A group of ten large trenches was located 3000 feet south of Mosher Bay (Upper Manitou Lake) within Jalna's Sunshine Lake claim block (Figure 12). The trenches are shown on the Boyer Lake Geology Map (O.G.S. Map 2437) as a pit, but no description could be found in any of the Ontario Geologic Survey published reports. It is likely that the trenches were developed at the turn of the century when the area first experienced a major gold rush.

During Phase III mapping and sampling, two composite chip samples (AT-155 and 156) returned geochemical gold values of 985 and 42 ppb over twenty and twelve feet respectively. Subsequent mapping shows ten eastwest trending trenches spaced over a distance of 475 feet. The line of trenches strikes approximately $020^{\circ}$ azimuth, while the local sedimentary
stratigraphy strikes $068^{\circ}$ azimuth. Most of the trenches are well preserved and all expose outcrop of pyritic polymictic conglomerate and sandstone of the Uphill Lake Formation. During follow-up investigations, the trench walls were chip sampled at intervals of ten inches or every foot over variable widths.

The geochemical results for all the trenches are shown below with trenches numbered 1 to 10 from south to north.

| TRENCH NUMBER | SAMPLE NUMBER | $\begin{gathered} \text { SAMPLE } \\ \text { INTERVAL } \end{gathered}$ | WIDTH OF SAMPLE (in feet) | $\qquad$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 10 | HT-252 | Grab of 0/C | - | 38 |  |
| 9 | NT-248 | One Foot | 15 | 23 |  |
| 8 | NT-249 | One Foot | 20 | 21 |  |
| 7 | NT-250 | One Foot | 12 | 200 |  |
| 6 | NT-251 | One Foot | 20 | 115 |  |
| 5 | BT-253 | Ten Inch | 20 | 410 | Strike <br> length |
| 4 | BT-264A | Ten Inch | 35 | 150 | of |
| 3 | BT-263A | Grab of Rubble | - | 215 | high |
| 2 | BT-262A | Ten Inch | 20 | 710 | at least |
| 1 | BT-261A | Ten Inch | 42 | 17 | 275 feet |

Anomalous gold values extend along strike for at least 275 feet while ranging in width from 12 to 35 feet. The trenches are shown on Figure 17.

In detail the rocks are composed of interbedded units of sandstone and conglomerate cut by a swarm of quartz veins and veinlets ( $1 / 8$ inch to 2 inches wide), the latter striking approximately $020^{\circ}$ azimuth. The veins are of two types: a) small ( $1 / 8$ inch to $1 / 4$ inch wide) translucent quartz with occasional euhedral pyrite; and b) larger ( $1 / 2$ inch to two inches wide) winte quartz veins, barren of sulphides. Sediments within the trenches exhibit ubiquitous fine-grained disseminated pyrite. Finer grained sediments are enriched in pyrite, averaging one percent while

| LEGEND <br> Clastic metasediments <br> 4b Polymictic conglomerate 4c Sandstone <br> GEOCBEMICAL LEGEND |  |
| :---: | :---: |
|  |  |
|  |  |
|  |  |
|  |  |




locally they may contain up to five percent. Field personnel feel that sulphide content and probably gold content are related to the injection of the quartz vein swarm. However, geochemically, gold content does not bear any relation to iron content. The ICP iron content for all samples averages 2.57 percent, while ranging from 2.30 to 2.96 percent, i.e. the gold content ranges widely while total iron content varies almost not at all. Outcrop within the immediate area of the trenches is limited, with swamp present on three sides. The fact that sampling was limited to pyrite rich areas and by the availability of outcrop suggests that the physical boundaries of gold mineralization have not yet been established.

A study of the local physiographic and magnetic relief suggests the Ten Trench mineralization is located on a northeast trending fault structure. A geophysical program including close space VLF, magnetic and I.P. surveys is recommended to define the local structure and resolve any conductive extensions of the Ten Trench occurrence.

Surprise Lake Sub-Area. Five grab samples from outcrop located south of Surprise Lake (Figures 12, 18, 14a and 14b) returned anomalous and positive values that ranged from 20 to 235 ppb gold (BT-132, gold 235 ppb ; BT-133, gold 18 ppb; BT-134, gold 20 ppb; NT-133, gold 32 ppb; NT-134, gold 23 ppb). During Phase III follow-up a total of 28 subsequent grab samples were taken from an area 4000 feet long by 700 feet wide (Figure 18). The BT-132 anomaly was confirmed and five anomalous and positive sample sites were encountered that returned values ranging from 23 to 90 ppb gold (BT-241, gold 90 ppb ; BT-242, gold 23 ppb ; BT-252, gold 43 ppb ; NT-231, gold 28 ppb ; NT-238, gold 38 ppb).

Similar to the rest of the Sunshine-Upper Manitou area, the background for geochemical gold is somewhat elevated, being approximately 4 ppb.

Rocks returning anomalous gold geochemistry fall inco two types: pyritic quarcz-feldspar-porphyries (NT-133, NT-134, BT-241 and



BT-252) and thin pyritic bands within siltstone and argillaceous sandstones (BT-132, BT-242, BT-250, NT-231 and NT-238).

The anomalous quartz feldspar porphyries do not outcrop extensively, so it is difficult to establish their origin. It seems likely however, from the scattered pattern of porphyry outcrops, that they are intrusive and form small sills or dykes. They are distinguished from the many porphyry intrusives in the region by the fact that they contain disseminated pyrite ( $1 / 2$ percent) and ankerite as well as biotite.

Sediments carrying anomalous gold values are found as sparsely distributed, thin ( 1 inch to 2 inches thick) pyritic (up to three percent) lenses of sandstone within a sequence of siltstone and dirty sandstones.

The Surprise Lake sub-area has proven to be geochemically anomalous in gold, however a clear exploration target could not be. defined. A program of limited mapping and prospecting is recommended to better resolve an exploration target for this area.

Seven other locations containing anomalous gold values were located in the Sunshine-Upper Manitou Lakes area. Of these seven locations, only one location is presently within Jalna's claims. The locations are listed below by original anomalous sample number.

NT-138. Located within Jalna claims on the south shore of Mosher Bay, this grab sample gave a value of 48 ppb gold and 126 ppm molybdenum from an eight-inch wide quartz vein within sericitic schist. Subsequent follow-up grab samples NT-253, 254, 255, 256 and BT- 254 gave gold values of $12,42,18,12$ and 135 ppb respectively. Best values came from narrow pyritic sericite-chlorite schist zones adjacent to the original quartz vein. Quartz vein material returned only 18 ppb gold.

At-138. Located within the Cochrane Oil and Gas Ltd. block of 14 ciaims souch of Mosher Bay, this chip sample taken over 15 feet returned
a gold value of 90 ppb from an 800 -foot wide sill of gossanous biotite-quartz-feldspar porphyry. Only a trace of pyrite was noted, so it appears likely that the gossan is due to the weathering of ankerite disseminated within the sill. No follow-up work was carried out in this area.

NT-144. Located at the boundary of patented mining claim HW267 and Jalna's Sunshine Lake claim block, this grab sample of gossanous intermediate crystal tuff returned a gold value of 36 ppb and 69 ppm arsenic. Three follow-up samples (BT-255, BT-256 and NT-257) returned gold values of 9,3 and 1 ppb respectively. The gossanous zone is reported to be at least 25 feet wide and strikes approximately $284^{\circ}$. No further work is recommended at this location.

BT-152. Located within Cochrane Oil \& Gas Ltd. claims west of the Manitou Straits, this grab sample of a one-foot wide gossanous band within sericite-chlorite schist returned a gold value of 41 ppb and 51 ppm arsenic. The chlorite schist strikes $044^{\circ}$ within the Manitou Straits Fault Zone, which passes through intermediate flows and tuffs. The schist contains four percent fine-grained pyrite. No follow-up work was carried out at this location.

BT-148. Located within Cochrane 0il \& Gas Ltd. claims on the west shore of Manitou Straits, this grab sample of sericite-chlorite schist returned a gold value of 80 ppb and $1.2 \mathrm{ppmsilver}$. 500 feet west of the main Manitou Straits Fault Zone. No follow-up work was carried out at this location.

NT-143. Located within Cochrane Oil \& Gas Ltd. claims on an island in Manitou Straits 3500 feet north of Watson's Narrows, this grab sample of sericite-chlorite schist gave a gold value of 140 ppb and 10 ppm arsenic. Subsequent follow-up work defined a zone at least twelve feet wide of sericite-chlorite schist containing small two-inch quartz veins striking $048^{\circ}$ parallel to schistosity. A subsequent three-foot chip sample (BT-257) of chlorite schist gave a gold value of 14 ppo , while a 12 -foot
chip sample (BT-258) of schist with quartz veins gave a value of 65 ppb . NT-258, a grab sample of gossanous sericite-chlorite schist, gave a gold value of 27 ppb and 40 ppm arsenic. No further work is recommended at this location.

NT-125. Located on the western shore of Watson's Narrows within Cochrane Oil Gas Ltd. claims, this grab sample of sericitechlorite schist gave a gold value of 270 ppb and 23 ppm arsenic. A follow-up sample of gossanous chert and argillite taken 200 feet to the southeast returned a gold value of 1 .ppb. Although the NT- 125 site is located very close to Jalna's claim block, it was verified in the field as being located within competitor holdings. No further work is recommended at this location.

Sunshine Lake. A series of three moderately strongly linear conductors running parallel to stratigraphy were located within Sunshine Lake by the 1980 O.G.S. airborne electromagnetic survey. The conductors are located north, and within a $1 / 2$-mile radius, of the Sunshine Lake Subvolcanic Intrusion. An association of moderately strong conductors to a felsic vent in an area containing many anomalous gold values must be considered a favourable exploration target. A limited geophysical program including VLF-EM, magnetic and I.P. surveys is recommended for the winter of 1984 to define local structure and accurately locate the conductors on the ground. Six test lines of I.P. surveying should be sufficient to discriminate between bona fide bedrock conductors and lake bottom sediments.

Mosher Bay. A series of three strong, linear conductors running parallel to stratigraphy were located within Mosher Bay, Upper Manitou Lake, by the 1980 O.G.S. airborne electromagnetic survey. The conductors appear disrupted by a northeast trending fault which may be an extension of the Ten Trench structure mentioned earlier. In addition to this, the conductors are located adjacent to the Big Dick Mine gold occurrence to
the north and near the Giant Prospect gold occurrence 2500 feet to the south. The proximity of these conductors to gold occurrences suggests that they must be considered as favourable exploration targets. A geophysical program including VLF-EM, magnetic and I.P. surveys is recommended for the winter of 1984 to define the local geologic structure and accurately locate the above mentioned conductors.

## STORMY LAKE PROJECT AREA

## LOCATION AND PGYSIOGRAPHY

The Stormy Lake Project Area is located 35 miles southeast of the town of Dryden, and includes the area surrounding Stormy and Washeibemaga Lakes. Access is via the Snake Bay gravel road from the Trans Canada Highway, and locally three gravel logging roads. Physiographically, the area is quite rugged, being composed of narrow steep-sided hills and valleys. Maxinum change in elevation is 280 feet across the area. Outcrop is relatively abundant on lakeshores and hills, but sparse in swampy valley bottoms. The area of interest is outlined on Figure 4b, Appendix I.

## CLATMS

Jalna Resources Limited currently holds a single contiguous claim block of 33 claims located one mile west of the Snake Bay road, 2 1/2 miles south of Snake Bay, Stormy Lake (Figure 20).

## GEOLOGIC SETTING

Geologic mapping of the Stormy Lake Project Area by the Ontario Geologic Survey is quite detailed, being compiled on three preliminary, 1 inch to one-quarter mile scale geological maps (Blackburn 1976, 1982, 1982, Maps P.1187, P.2569, and P.2570).

On a regional scale, the Stormy Lake Project Area is centrally located within the Wabigoon Greenstone Belt.

Structurally, the area consists of a north to northeast dipping homocline that youngs to the north-northeast. In general, the lithological sequence consists of intercalated pillow basalts and gabbro grading upwards

to coarse felsic tuffs that in turn grade into volcanic derived coarse epiclastic rocks. North of the major Mosher Bay-Washeibemaga Lake Fault, large gabbroic sills intrude basaltic pillow flows. The Thundercloud Lake quartz-feldspar porphyry intrusion south of Washeibemaga Lake and the Gawiewiagwa Lake quartz-feldspar porphyry at Gawiewiagwa Lake probably represent felsic subvolcanic vent centres. A small granodiorite pluton intrudes greywacke sediments on the north side of Stormy Lake. Numerous thin (<20 feet) bands of cherty sediments are found intercalated with pillow flows and mafic tuffs south of Snake Bay.

## EXPLORATION HISTORY

The Stormy Lake Project Area was located on the fringes of the 1897 gold rush centered around the Manitou Lake region. During this time, work was carried out at the Tabor Prospect, four miles north of Stormy Lake. A vertical shaft was sunk to 280 feet on a number of auriferous quartz veins within quartz porphyry. Reserves stand at 50,000 tons of 0.5 ounces gold per ton above the 410-foot level (N.M.I. 52 F/9, Au 2). Shortly afterward, the Sakoose Mine, located in the same area, produced 3,669 ounces of gold from blue auriferous quartz veins in quartz-feldspar porphyry. Reserves stand at $\mathbf{5 0 , 0 0 0}$ tons of unstated grade (N.M.I. 52 F/9, Aur 1).

The Washeibemaga Lake Occurrence southwest of Washeibemaga Lake was discovered in 1939. Diamond drilling has outlined a possible reserve of 52,250 tons of 0.37 ounces per ton gold within quartz veins related to a major shear emanating from the adjacent Thundercloud Porphyry (C. E. Blackburn 1981, O.G.S. Report 202, N.M.I. 52 F/7, Au 23).

Competitor activity was relatively intense in the area following Esso's gold discovery in felsic tuffs adjacent to the Snake Bay Road.

## WORK PROGRAM

Phase III mapping, prospecting and sampling was carried out between June 12 and July 16, 1983. Foilow-1p detailed work was carried
out between October 23 and October 30, 1983. A total of 198 rock chip and one silt sample were sent for analysis. of these, 34 were taken during detailed follow-up work. Traverses were carried out cross strike at one-mile intervals. Data is plotted on maps 21a, $b, c, d ; 22 a, b, c$, and d. A single known gold occurrence, Washeibemaga Occurrence, was mapped and sampled by field crews.

## RESULTS

Geochemically, the project area returned generally low values for most of the elements of interest, including molybdenum, copper, lead, zinc, silver, nickel, arsenic, antimony and tungsten. Barium and chrome levels tended to be high, with 13 and 23 samples higher than 200 ppm and 150 ppm respectively. Twenty-seven samples returned positive gold values of 20 ppb or greater; twelve of these came from known gold occurrences.

Pelham Gold Mines Ltd. (Washeibemaga Lake Occurrence). The Pelham occurrence described earlier was mapped and sampled by field crews. Development consists of a number of slumped in trenches and scattered diamond drill collars. A total of ten grab samples (NT-49 to 58) were taken from trenches and waste piles, returning gold values of 145,50 , $120,6,70,5,2,190,205$ and 28 ppb respectively. Gold values appear associated with pyritic quartz veins and silicified basalts related to east-west shear zones within basalt and mafic tuffs. Blackburn 1981 speculated that mineralization may be related to an east-west trending fault along which mineralizing fluids emanated from the adjacent ( 2000 feet) Thundercloud porphyry intrusion. Present reserves stand at 52,250 tons of 0.37 ounces gold per ton in the possible category and an equal amount of material in the speculative category.

Esso Snake Bay Occurrence. Esso Minerals Canada has been intensively trenching and drilling a new and unannounced gold occurrence on the Snake Bay Road, two miles south of Snake Bay, Stormy Laike. Detailed exarination of the Esso trenches reveals that they have been drilling a
number of thin (three feet to twenty feet wide) light coloured, finegrained felsic tuff and tuffaceous chert units. The units of interest are characterized by five to ten percent euhedral pyrite found at disseminations and stringers. In most cases the tuff beds are highly schistose, suggesting that they have been strongly sheared. A number of grab samples (AT-40, 41, 42,43 and VT-65) have been taken from the main Esso trench and from a smaller trench to the south (ST-161). All samples carry elevated but erratic gold values. They are respectively 50, 28, 3050, 170, 48 and 39 ppb . In addition to gold, arsenic levels tend to be anomalous, with analyses up to 212 ppm , calcium up to six percent, a silver analysis of 3.3 ppm and a single boron analysis of 38 ppm .

Washeibemaga Claims. Jalna's block of 33 claims adjoins the southeast corner of the Esso claim block and runs three miles parallel to stratigraphic strike. A total of 31 grab samples have been taken from the claim block, 16 of which were sampled during detailed follow-up. Mapping within Jalna's claims revealed a number of thin (3 feet to 4 feet on average, maximum 20 feet) argillaceous cherts containing up to $10 \%$ pyrite within mafic tuffs, flows and gabbro. Sulphide contents vary widely, being barren in some cases, but tend to average one to two percent. Individual chert units could not be mapped for more than one or two outcrops along strike. This may be a reflection of the erratic nature of the units themselves or the extreme structural complexity of the area.

Follow-up sampling of the many cherty interflow. sediment units did not reveal gold values greater than the 50 ppb encountered at sample site AT-28. For the most part, the chert units contain gold values only slightly above background. A small trench was blasted into a four-foot wide chert unit within basalt flows and mafic pyroclastics. A composite grab sample (CT-120) gave a gold value of 13 ppb .

A number of gold values were retursed from grab samples of angular limonitic float. Samples ST-167, 169 and AT-32 gave gold vaiues of 24,55 and 30 ppb respectively. The float consists of boulders of
basalt breccia with a fine-grained siliceous-ankeritic matrix. Gash veins filled with similar material have been reported throughout the local area.

A single sample (BT-40) of feldspar porphyry located south of Gawiewiagwa Lake, containing 12 coarse euhedral pyrite, returned a gold value of 36 ppb and an arsenic analysis of 2 ppm .

Highest values are found in narrow (less than one foot) strike limited pyritic-chloritic shears in mafic flows. Samples AT-23, 24, 26 and ST-172 and 179 returned gold values of $45,30,300,60$ and 36 ppb gold respectively. All but one (ST-179) of the sample sites are located within 5000 feet along strike of Esso's Snake Bay Road gold occurrence.

It appears that we may be looking at extensions of shears related to Esso's occurrence. Detailed mapping has failed to turn up felsic tuffs and tuffaceous cherts similar to those found on Esso's ground. To further upgrade the status of this property would require a program of geophysical surveys to outline any pyritic tuffs or shears which may presently not outcrop. An airborne EM survey over the property should be considered if Jalna carries out a survey in Lover Manitou.

AT-8. A piece of angular limonitic float located 3800 feet north of the Snake Bay Landing returned a gold value of 32 ppb with zinc and iron analyses of 1005 ppm and 27.507 respectively. Detailed follow-up in the area did not encounter the source of this float. No further work is recommended for this location.

AT-39. A single grab sample of pyritic quartz veining in basalt, located on the Snake Bay Road 4000 feet north of the Snake Bay Landing, returned a gold value of 22 ppb . The sample also returned anomalous copper and silver values of 3100 and 1.7 ppm respectively. No detailed follcw-up was attempted at this site. No further work is recommended at this location.

NT-35. A single grab sample from a six-foot wide biotitefeldspar porphyry dyke located on the north shore of Snake Bay returned a gold value of 65 ppb . No detailed follow-up was attempted at this site. No further work is recommended at this location.

## CONCLUSION

Geochemical results for the Stormy Lake area are relatively disappointing, with the exception of Jalna's Washeibemaga property. It is recommended that areas outside of Jalna's claims block be downgraded to a low priority status.

Jalne. GNL 1984

## DRIDEN PROJECT AREA

## LOCATION AND PHYSIOGRAPHY

The Dryden Project Area is located seven miles northeast of the town of Dryden and includes the area between Vermillion Lake in the north and Thunder Lake in the south. Access is via numerous paved and gravel roads from the towns of Dryden, Dinorwic and Hudson. Small areas around Beartrack and Rafter Lakes can only be reached by float plane from Dryden.

Physiographically, the area is composed mainly of a large central swampy lowland bounded by low rolling hills. Maximum change in elevation is 350 feet across the area with local variations being less than 50 feet. Outcrop distribution is quite varied, being very sparse in the central lowlands and relatively abundant in the surrounding hills. The area of interest is outlined on Figure 4c, Appendix I.

## CLATMS

Jalna Resources Limited currently holds three blocks of claims in the Dryden area. A block of 132 claims, the Beartrack Lake Property, extends west of Beartrack Lake, while the Laval-Lola Lake Property, a block of 123 claims, extends west of Laval Lake. The Bluett Lake Property, a single block of nine claims, is located one mile east of Bluett Lake (Figure 23).

GEOLOGIC SETTING

Geologic mapping of the Dryden Project Area by the Ontario Geologic Survey is very sketchy, with only one inch to one mile scale preliminary maps available (Breaks, et al. 1975, Map P.1204). Much of the data on Map P. 1204 was compiled from assessment files and many of the lithological units and contacts could not be verified in the field.


On a regional scale, the Dryden Project Area is centrally located within the Wabigoon Greenstone Belt. The geologic setting is quite complex, but the general structural picture is of a series of three mortheast trending tightly folded anticlines and synclines. In general, a lithologic sequence of mafic flows and tuffs is succeeded by a series of penecontemporaneous greywacke sediments and felsic pyroclastic rocks. Folding of this sequence has produced a pattern of linear northeast trending belts composed alternately by mafic volcanic rocks and greywacke sediments with subsidiary felsic volcanic rocks. Mafic volcanic rocks form anticlines while greywacke sediments and felsic volcanic rocks outcrop within synclines. A series of six small granodiorite and monzonite stocks intrude mafic volcanic rocks at anticline hinge lines.

For convenience sake, the Dryden area can be split across an east-west line into two sub-areas, North Dryden and South Dryden. The boundary line between the two sub-areas falls within greywacke sediments in the vicinity of Philcot and Kathyln Lakes.

## North Dryden Sub-Area

In detail, the North Dryden Sub-Area is composed lithologically of a $21 / 2$-mile wide belt of mafic volcanic rocks pierced at its centre by the Lateral Lake Granodiorite Stock. Two small felsic volcanic piles are found east of Bluett Lake and southeast of Gullwing Lake respectively. Contacts between felsic volcanic rocks and greywacke sediments are gradational, indicating that sedimentation and felsic volcanism were contemporaneous. North of Bluett Lake, greywacke sediments grade into mafic volcanics.

Thin units of sulphide iron formation are present within felsic volcanics adjacent to mafic volcanic contacts north of Needle Lake and south of Gullwing Lake. Thin units of oxide facies iron formation with minor sulphides are found within mafic tuffis northeast of Swanson Lake.

## South Dryden Sub-Area

In detail, the South Dryden Sub-Area is composed lithologically of a four-mile wide mafic volcanic belt pierced by five small granodiorite stocks. Greywacke sediments outcrop in wide belts to the north and south of mafic volcanics. A large felsic volcanic centre has been mapped northeast of Tom Chief Lake at the southern margin of the mafic volcanic belt. Thin units of felsic volcanic rocks have been mapped within mafic volcanic rocks between Beartrack and Troutfly Lakes. Thick (up to forty feet) units of sulphide facies iron formation within felsic volcanic rocks have been mapped on the northeast shore of Sandybeach Lake. Major units of oxide facies iron formation within sediments have been mapped south and east of Thunder Lake. Thin extensions of these units have been mapped as far north as Laval Lake.

Gold has been found in at least fourteen sites (O.G.S. 1981, Map ( 2443) between Crossecho and Vermillion Lakes within the mafic volcanic belt.

## EXPLORATION HISTORY

A total of 14 gold occurrences are shown on Map 2443 (0.G.S. 1981) within Echo and Pickeral townships. Existing documentation (O.G.S. 1971, Min. Res. Circ. F13) on six of the occurrences indicates that most were discovered between 1947 and 1952. All six occurrences including Conecho, Lun-Echo, Goldlund (Newlund), Villbona, Windward and Eaglelund Prospects are associated with quartz veins and breccia zones within granite and felsic porphyry dykes. Goldlund Mines is presently producing at a rate of 180 tons per day, and reserves are reported as 700,000 tons of .25 ounces gold per ton (National Mineral Inventory N.T.S. 52 F/16, Au 1). Plans are to upgrade mill capacity to 350 tons per day by the spring of 1984 (Northern Miner, December 1, 1983, Vol. 69 (39).

Assessment data indicates a large amount of geophysical surveys and diamond drilling have been carried out over iron formation during the 1970's in Zealand, Brownridge and Laval townhips. Companies were probably drilling electromagnetic conductors for base metals. Numerous scattered diamond drill holes have been drilled in most portions of the project area by Selco, Canadian Nickel and others.

WORK PROGRAM

Phase III mapping, prospecting and sampling of the North Dryden and South Dryden sub-areas was carried out from June 13 to July 5, and from September 2 to October 7, 1983 respectively. Detailed follow-up work was carried out between October 8 and October 22, 1983. Traverses were completed cross strike at one-mile intervals with $1 / 2-$ mile intervals over central high-priority areas. A total of 361 rock chip and three silt samples were collected for analysis over the course of the summer. Data is plotted on Figures 24a, b, c, d; 25a, b, c, d; 26a, b, c, d; and 27a, b, $c$ and $d$, located in the map pocket.

RESULTS

North Dryden Sub-Area
Four areas within the North Dryden Sub-Area returned positive gold values. They are:

Swanson Lake Showing. A sequence of interbedded pillow basalt flows and mafic tuffs located 1500 feet east of Swanson Lake returned gold
values up to 265 ppb (VT-44) and a single (FT-92) high value of . 024 ounces per ton (equivalent to 823 ppb ). Seventeen out of 51 samples returned positive ( 20 ppb ) gold values, thirteen of which are anomalous, being greater than 50 ppb or its equivalent. Positive gold values come from a zone of thin (maximum 8 feet thick) mafic tuff units 4000 feet long and approximately 300 feet wide. Best values come from slightly pyritic mafic tuffs. The zone has been mapped, sampled in detail and a favourable tuff unit has been trenched. The trench was blasted across the widest sulphidic tuff unit and a composite chip sample over eight feet returned a gold values of 85 ppb (ST-183). A three-foot chip sample (VT-44) over a six-inch wide pyritic quartz vein containing visible molybdenum returned a gold value of 265 ppb and a molybdenum analysis of 245 ppm. In general, samples taken from the zone returned anomalous copper values ranging up to 360 ppm (FT-103) and two very high values of 538 and 729 ppm (ST-183 and FT-95). The high gold values and large size of the Swanson Lake showing suggest that a source of gold exists within the area. Further exploration efforts should be focused on finding extensions in the area within a more favourable geologic setting.

FT-62. Two samples (FT-61 and FT-62) of gossanous, chloritic, mafic tuff located 11,500 feet east of Centre Fire Lake returned gold values of . 002 and . 004 ounces per ton (equivalent to 69 and 137 ppb gold, respectively). The two sites are located 150 feet apart within mafic volcanic rocks, 5000 feet north of the mafic volcanic/sediment interface. No detailed follow-up was carried out at this site. These sample sites must be considered low priority targets and should only be investigated in the summer of 1984 if a field crew is in the general area already.

Bluett Lake Claims. Nine claims were staked over two thin sulphide iron formations within quartz sericite schist located $1 / 2$-mile north of Needle Lake. Detailed mapping shows that the sulphidic schist forms two distinct lenses with a total strike length of 500 feet. A series of 13 grab samples (FT-145, 147, 148A, 148B, 153, 154, 155; ST-8, 143 , 144 and 145) returned a single positive gold value of 23 ppb (FT-148A). Follow-up work including the blasting of two small trenches shows that the westernmost zone contains up to 35 percent pyrite in laminations and disseminations over 12 feet, while the easternmost zone contains one to two percent disseminated pyrrhotite over thirteen feet. Of four composite chip samples (CT-113, 114, 115 and 116), the best gold value was 12 ppb (CT-116) over six feet. The analysis also showed an arsenic value of 64 ppw. No further work is recommended for this location.

Gullwing Lake Area. Detailed mapping and sampling was carried out in an area surrounding a sulphidic quartz sericite zone located 3000 feet south of Gullwing Lake. A total of seven samples (ST-147, 148, 149, 150; VT-50, 51 and 57) were taken which returned gold values of $17,10,4$, 26, 11, 6 and 2 ppb respectively. In detail, the zone is three feet wide and approximately one and a half miles long. Best values, however, came from medium- to coarse-grained amphibolite at the greywacke-mafic volcanic contact 500 feet to the north. No further work is recommended at this location.

## South Dryden Sub-Area

A known gold occurrence and four new areas containing positive gold values were investigated in the South Dryden Sub-Area.

Fairservice Showing Beartrack Lake. A known gold occurrence within a claim block owned by R. Fairservice was examined west of Beartrack Lake. Jalna's Beartrack Lake ciaim block surrounds Fairservice's four-claim block on all sides. The showing consists of several trenches located within
pyritic sericite schists and tuffs adjacent to a large diorite body. Gold and arsenic values from the four samples taken are as follows:

| SAMPLE NUMBER | GOLD (ppb) | ARSENIC (ppm) |
| :---: | :---: | :---: |
| LT-22 | 42 | 4 |
| LT-23 | 1540 | 317 |
| LT-24 | 18 | 4 |
| LT-25 | 26 | 34 |

The best value, 1540 ppb gold, represents a chip sample taken over 4 feet from an old pit sunk in pyritic sericite schist. Subsequently a broad quarter-mile wide pyritic zone was defined that strikes northeast for two miles from the main trench. The country rocks are dioritic with thin sparsely distributed felsic tuff horizons, all of which contain elevated levels of pyrite. Nine samples were taken from this zone, two of which returned positive gold values. They are VT-15 and VT-16 sampled in close proximity to each other over a felsic tuff unit three to ten feet wide, located 3700 feet north along strike of the main trenched showing. Gold values are 28 and 55 ppb respectively, with positive arsenic values of 53 and 15 ppm .

A drilling program of 12 diamond drill holes was carried out by Graham Bousquet Gold Mines in 1950 and 1951 (Northem Miner, April 12, 1951). Drill holes collared 80 feet from the surface showing encountered an intersection of .76 ounces gold per ton over 2.4 feet. The original surface showing was reported (Northern Miner, August 31, 1950) as . 31 ounces gold per ton over 2.4 feet.

Fairservice is willing to negotiate an option agreement for the four claims at $\$ 500.00$ the first year, $\$ 2,000.00$ for the second year, $\$ 5,000.00$ the third year, and a 37 net smelter return.

Limited detailed prospecting is recommended along the sedimentary/ volcanic interface northeast of Beartrack Lake.

Diamond Lake Road Samples. Two samples gave anomalous gold values in the Diamond Lake Road area. They are ST-84 and CT-50, with gold values of 34 and 20 ppb respectively. Both sample sites are found right at the greywacke/mafic volcanic interface. The first sample is of a locally derived, siliceous, graphite-sulphide breccia boulder and the second is of an outcropping pyrrhotitic garnet-amphibolite unit twenty feet thick. Detailed mapping in the area did not uncover further interesting geology, and all four subsequent samples returned gold values. below the level of detection. No further work is recommended for this area.

Trout-Fly Lake Sample. A single grab sample from a lightly gossanous outcrop of biotitic greywacke gave a gold value of 58 ppb. Subsequently, the area was mapped in detail and five samples taken from lightly gossanous outcrops of greywacke, quartz sweats and quartz feldspar porphyry. A maximum gold value of 2 ppb was obtained from the subsequent samples. No further work is recommended for this area.

## CONCLUSION

Sampling has returned few positive gold values within the Beartrack Lake and Laval-Lola Lakes claims. The lack of outcrop, however, prevented a thorough assessment of the properties' exploration merit. Field crews could not substantiate the presence of favourable sulphidic chemical sediments reported in assessment data. Owing to the lack of data, much of the two properties cannot be considered as having been fully assessed. Airborne electromagnetic surveying to outline conductive lithologies is required to upgrade the status of the Beartrack and LavalLola Lakes properties. Since the properties Lack felsic volcanic centers which are a major criteria dictated by the project model, they must be considered low-priority targets.

## CERTIFICATE OF QUALIFICATION

I, Robin E. Chisholm, of the city of Calgary, in the province of Alberta, hereby certify that:

1) I am a professional geologist, having received an Honours B.Sc. degree in geology in 1977 from Carleton University of Ottawa, Ontario.
2) I have been engaged in mineral exploration and property development work within the Northwest Territories, Ontario and to a limited extent, elsewhere in Canada. I have also engaged in mineral exploration in Niger, Africa and to a lesser extent, Algeria, Africa.
3) I have been involved in uranium, silver and molybdenum reconnaissance and property programs prior to my present involvement with reconnaissance exploration for gold. Programs have involved project conception, planning, field management and supervision.
4) Between 1975 and 1983 the writer has held responsible positions with Uranerz Exploration and Mining Ltd., Pan Ocean $0 i 1$ Ltd. (Canadian assets purchased by Aberford Resources Ltd.) and GML Minerals Consulting Ltd.
5) The present report is based on knowledge acquired in the field in 1983 while directly managing the Goldore Project, and on information available in government reports and other sources of information in the public domain.

Dated at Calgary
this 26 day of Tune , 1984


Robin E. Chisholm

APPERDIX I
HEMLO DISCUSSION

## HEMLO DISCUSSION

## INTRODUCTION

In 1981, International Corona Resources Limited announced that it had begun to prove up a significant gold deposit on the Trans-Canada Highway twenty miles east of Marathon, Ontario near Hemlo. Since that time a number of companies have announced similar adjacent finds which, taken together, define a world class gold deposit.

To date (January, 1984) the companies have announced a total reserve of 66.37 million tons of ore grading a weighted average of .253 ounces per ton gold (Northern Miner, October 13, December 15 and December 22, 1983). The contained gold content is 16.8 million ounces, which given a reasonable future gold price of $\$ 400 \mathrm{U} . \mathrm{S}$. per ounce, values the deposit at 6.7 billion U.S. dollars. A further ten million tons of ore at an unspecified grade has been announced by Lac Minerals. This is in addition to Lac's proven 32 million tons of ore grading .20 ounces per ton.

Overall, the deposit consists of a steeply dipping sheet which has a minimum length of 1.7 miles, a thickness of up to 100 feet and a down dip extension of 3000 feet (Plate One). The deposit is still open to the west and down dip. Gold mineralization is known to occur over a length of three miles and extends to a vertical depth of 5500 feet (Norther Miner December 22, 1983).

## GEOLOGIC SETTING

The ore deposit consists of a concordant, stratigraphic sheet of siliceous quartz sericite schist within the toe of a felsic volcanic pile which is a member of the Heron Bay Sequence (Muir 1982). The Beron Bay Sequence consists of a large thickness of felsic pyrociastics and their
epiclastic equivalents which form a north dipping homocline adjacent to the Pukaskwa Gneissic Complex. In more detail, the deposit is located at the interface between a 2000-foot thick felsic volcanic pile, the Moose Lake Formation, and a sequence of locally derived siliceous and pelitic clastic sediments, the Cedar Creek Formation (Figure 1). Immediately to the west, Muir (1982) has mapped a small feldspar porphyry plug which may represent a felsic volcanic center. No ultramafic flows outcrop in the immediate area but talc-carbonate schists thought to be ultramafic flows have been intersected in drill holes 12 miles to the west ( $J$. Dumouchel, personal commication). Goldie (1984 The Northern Miner, January 19) noted that a conformable sheared mafic to ultramafic intrusion is located in the general Hemlo area.

A major thrust and strikeslip fault over 16 kilometers long (Goldie 1984) strikes west-northwest through Botham Lake, cutting through the western tip of the main felsic volcanic pile. Noranda geologists speculate that the fault has been long lived controlling deposition of the Moose Lake felsic to intermediate volcanics (host to ore body) in a half graben which deepens to the west and south (Plate 2). Plate 3 shows a geological map as interpreted by Teck geologists and cross sections through the east and west zones (Plates 4 and 5). The area covered by Plate 3 is shown on Figure 1.

## DETAIL DESCRIPTION

Information within this section is derived from two geologic tours attended by the writer on June 8, 1983 and October 25 and 26, 1983 and information available in publications and news releases. The first was a day-long tour of roadcuts along the Trans Canada Highway where it intersects the Teck-Corona West zone deposit. And the second consisted of three company tours provided by geologists of Noranda Mines Limited, Teck Corporation and Lac Minerals Ltd. Information available to tour members included select drill logs, geologic maps and crossections and members were


The surface geology in the vicinity of the main Hemlo orebody. based on maps by Teck Corp. Lac Minerals and Noranda Exploration Co. The only inconsistency from one property map 10 another is in the thickness of the fragmensal unif (4) which runs from the TeckCoroma property acrass the Noranda-Cioliuth pmperty
to Lac's Williams property. Formational names and suggested stratigraphic correlations are thase of Noranda (the Moose Lake formation was originally Anown as the Goliath formation! The company maps were combined by Rupmond Guldie and Roger Walitis.
allowed to ask questions as they viewed outcrops, trenches and drill core. A complete set of rock chip samples were taken from roadcuts adjacent to Highway $\ddagger 17$ and the section exposed in Lac Minerals trench over their ore body. A series of 23 rock chip samples were sent for ICP geochemical analysis and gold analysis by Atomic Absorption and fire assay techniques (Appendix I).

A detailed discussion of the Hemlo Deposit is best facilitated by review of the Noranda-Goliath-Golden Sceptre Mine series as copied from Noranda cross-sections (Plate 6). The basic section as outlined by Noranda geologist Garth Pierce and amended by data from other sources is as follows:

## -Youngest

11) Greywacke
-pelitic sediments
12) Conglomerate (formerly Upper Volcaniclastic Member)
-two units containing felsic and mafic volcanic clasts
-said to contain volcaniclastic pebbles carrying significant gold and molybdenum values
-"sucker zone" composed of pyritic quartz sericite schist is located at base of upper conglomerate zone, carries geochemical gold values and rare green mica
13) Aluminous Sediments
-contains pelitic sediments containing staurolite, sillimanite and garnet
14) Greywacke
-undifferentiated sediments
15) Calcsilicate Member (Plate 7)
-thinly laminated unit containing biotitic sediments and calcareous bands containing green calc-silicate minerals (ex. Diopside)
-considered unique to mine series in local area
16) Siliceous Sedimentary Member
-siliceous fine-grained clastic (?) unit capped by chert, contains $3 \%$ pyrite in laminations in Noranda deposit and $20 \%$ pyrite in Lac Minerals trench
-contains geochemical gold, realgar and some arsenopyrite
17) Main Zone (Upper Mineralized Zone) (Plates 8 and 9)
-quartz-sericite schist host to ore, consists of $\mathbf{5 \%}$ to 207 pyrite in laminations and disseminations, crosscutting stringers of pyrite in Lac Minerals trench; very cherty in some sections and predominantly sericite in others
-lateral facies changes very rapid, changes from 10 feet to 80 feet over 150 feet lateral distance in Lac Minerals property
-contains four thin ( 1 foot) feldspar porphyry sills in Lac Minerals trench
-baritic sub-unit in footwall, average $14 \%$ barite, up to 50\%
-gold values vary with degree of sericitation i.e. less sericite lower gold values
-gold found free sometimes visible, values not related to pyrite content, sometimes found in quartz veins and sweats
-contains abundant apple green vanadium mica
-averages . 1 to . $18 \%$ molybdenum
-spotty realgar, orpiment and stibnite
18) Lower Mineralized Zone
-consists of sericite-quartz eye tuff, thin layers of massive sulphides and chert
-contains ore grade gold in part
-gold has no relation to pyrite content
-oíten contains visible molybdenum mineralization -contains a number of thin feldspar porphyry sills in Noranda section
19) Magnetic Zone
-thin garnet-hornblende schist unit containing 6-8z pyrrhotite, some pyrite and magnetite
20) Laminated Sediments
-interbedded, finely laminated siliceous and pelitic metasediments
21) Rule Lake Member
-thick section of hornblende schist probably basaltic flows
-01dest

Numerous thin (usually less than one foot thick) feldspar porphyry sills intrude the ore zone with the Long Lac trench. In proximity to these sills pyrite appears to have been remobilized into crosscutting veinlets (Plate 10).

Several large, late stage diabase dykes cross cut stratigraphy through the ore zone.

GEOCHEMISTRY

A study of seven rock chip samples from Lac Minerals trench and sixteen samples from roadcuts along the Trans Canada Highway shows:

1) That the Hemlo ore body contains anomalous concentrations of gold, molybdenum, iron, arsenic, antimony, barium and tungsten. In one case each, silver, zinc and vanadium approach anomalous levels.
2) Gold shows a generally wide dispersion being found up section in calc-silicates and the "sucker zone" as well as in the footwall.
3) That gold is likely found free as it does not seem to correlate with pyrite content.
4) That anomalous arsenic values show wide dispersion up section to the sucker zone.
5) That molybdenum, antimony and tungsten show no dispersion beyond the ore body.

Noranda geologists indicated that the ore body is depleted in sodium and contains up to 127 potassium.

The four samples taken from the low grade ore zone outcropping from the Long Lac trench and the Corona West zone show the following average values:

|  | Range | Average |
| :--- | :--- | :--- |
| Au | $.14-.16 \mathrm{oz} /$ ton | 4350 ppo |
| Mo | $1-2393 \mathrm{ppm}$ | 1047 ppm |
| Ag | $.1-1.1 \mathrm{ppm}$ | .55 ppm |
| Fe | $.64-10.26 \%$ | $4.54 \%$ |
| As | $24-1051 \mathrm{ppm}$ | 373 ppm |
| Sb | $18-2688 \mathrm{ppm}$ | 1000 ppm |
| Ba | $6-259 \mathrm{ppm}$ | 74 ppm |
| W | $13-1122 \mathrm{ppm}$ | 295 ppm |

HEMLO MODEL

A hypothetical picture of the sequence of formation of the Hemlo deposit is as follows:
A) A small pile of felsic pyroclastics forms above a small felsic porphyry intrusion.
B) On the margin of the felsic pile subaqueous pools of metal charged flueds derived from volcanic exhalations precipitate out laminations of pyrite in chert. Gold is precipitated as a fine matrix to pyrite.
C) Volcanic ejectamenta dilutes and buries pools forming interbedded chert and tuff pile saturated with hot auriferous brines.
D) Auriferous fluids percolate through volcanic pile sericitizing large portions, redistributing and concentrating gold.
E) As volcanic pile grows it is being actively eroded distributing auriferous pebbles in conglomerate beds off the eastern flank.
F) Local vulcanism diminishes and volcanic pile is buried by sediments composed of reworked volcanic material.
G) Low grade regional metamorphism forms schistosity, wipes out some volcanic textures redistributes gold into visible laminae and in quartz veins.
H) Continued low temperature hydrothermal activity perhaps from intrusion of Coldwell Alkalic Complex forms realgar and orpiment low temperature arsenic minerals.


PLATE 1. Plan in the Ore Horizon-Teck-Corona.


PLATE 2. Geological Map of Healo Camp--Voranda Exploration.


PLATE 3. Geological Map of Hemlo Camp--Teck-Corona. Map Coverage Shown on Figure 1 in Text.


PLATE 4. Geological Section, Corona East Zone--Teck-Corona. Section Line Siown on Plate 3.


PLATE 5. Geological Section, Corona West Zone-Teck-Corona. Section Line Shown on Plate 3.
plate 6.
Geological Section Goliath Deposit
Noranda Exploration



PLATE 7. Calc-silicate Member, Williams Zone-Long Lac Trench.


PLATE 8. Siliceous Ore Main Minezalized Zone, Corona West Zone near the Trans Canada Higaway. Note Green Vanadium Mica and Bluisi: Tinge from Moiybdenite.


PLATE 9. Siliceous Ore Zone, Goliath Deposit-Noranda Mines Ltd.


PLATE 10. Remobilized (?) Pyrite in Veinlets, Upper Portion of Siliceous Ore Zore adjacent to Eeldspar Porphyry Sills. Willians Zone-Lons LEc Trench.

## APPERDIX II

$-\infty$
$-\infty$


のッー～～ $=8$ a 0

ㄸ 토오호․
 －
＝～ㄲㅜㅎㅀㅎ


4
ge
$=$
$=$
$=$
$=$
＝
－
$\ldots$5쫄쿠롤










童妾 ニーーーー
－－－
ッロニニー
Fこ』ェロ
－ニニニー
$=$
かたのロ～

－- －－
－
$\qquad$
9
－－－
eneses

$\qquad$
$\qquad$
$\qquad$
EAB 두ํ
ธธฐºㄹ ฐ®®
콪ㅌㅗㅜ룸 ..... 쿵주렬
ェーニス～ 볻
토포푸토 토클
ッァニニッ ニュ～
ヘッチャッ ำニハエロェー ハール

－
 玉ぁぁぁ
플
をニミシー ..... عース
Nom
－－－ニワミNon－$\infty$ェーニエー53를5－ RA－$^{-1}$－${ }^{+\infty}$
 ..... シーニ
－
ミニニ
꼬코ํㅗいのーが－－
ミタェ゙アッ ..... ๗－－ー－－－－
E


줄

$01361-116$
츤


꿀


츨
高
흔





シミニーツのーい


## ＝









$=$
＝
－E
$=$


 $=5$


』まツmoーラ下




 28

ェスミニ亩

$-\infty-\infty$
$-\infty+\infty$
－Nex en

$23 \sin$


$\cdots=2=2$
－玉玉ฐニニ
－＝－ロー
－옹뭎플 －ニュニー
－ $\infty \pm=\infty-$
＝3
$\infty$

58：

## 

ํニロ
퉇
＊ロ플
토온 カnの $\infty+\infty$ 통․ 호ヲ\％ มェニ
 $\infty$ E－里 $\infty$

セㅗ～ B＝7 코클玉玉ニ

5＝ －こ゚








$\cdots$ 훙ㅎㅎ훙 호 후훙



- gm-nmmon-mかom



山䋰
























$$
\begin{aligned}
& \bar{\Xi} \mathrm{E} \\
& =2
\end{aligned}
$$

$$
-\infty+\infty
$$

$$
\cdots \geq \infty+\infty
$$ns-




[^0]

플
$=$ ㄹ․ - －

 요 훙웅훙

 $=\infty$ 훙․ㅇ으응







 $\operatorname{ce}^{\circ}$ s ${ }^{8}$
 ＝事

－$+\infty \rightarrow \infty=\infty$
＂${ }^{\infty}$
$-\infty$
$\infty$
$-\infty$
－－










| －$+\infty \rightarrow \infty$ <br>  |
| :---: |
|  |  |
|  |  |



\＆



』
 효렬



$$
\pm \pm
$$

$$
\begin{aligned}
& \text { ma } \\
& \text { 훙 }
\end{aligned}
$$ 2 ：＝気淢2412.18 ．18




三5855
 농크콩

$$
\begin{aligned}
& \$ 8 \cdot 9 \\
& 2=9
\end{aligned}
$$E

2.18

$\cdots$

$\qquad$ $\cdots$ 플



A85FE

58三雨
콩으웅

$$
\int_{0}^{R}
$$ y $5=-5$

 $x=-3$
 －－



웅훙홍
 P－\＃ER cosereser

－$-5=5-5 \pi=$

EAETE 5
$\infty \infty$
－ 0 ond
？
$\infty$
－
$\pm=8$
－
411
롱

| $=$ |
| :--- |
| $\approx$ |
| $\approx$ |
|  |















$$
=\infty
$$$\approx$58

0
క్రి
$=$Besen：コ量※こEェะ
点mon－mon momon0 e
＝三承禺： －mon－－－om－－coucos neveros
m





을 8
-8

2 $x=8385$





 It $8 \rightarrow \infty$ $5^{2}=\infty \rightarrow \operatorname{con}^{\infty}$


 28 $\infty \infty \infty+\infty$ －E Necemen aミ
 E $8+\infty$

 E E $3 \infty+\infty$ こー－

 まミニッシーース

 $\Leftrightarrow 8=8$ $28-\infty-\infty$
 $=8$


[^1]\section*{| 8 |
| :--- |
| $=$ |
|  |
|  |
|  |
|  |
|  |}

$\infty-\infty$
$\infty \infty \infty$
$\infty$ $+8$ $\qquad$ comencorect 88ㅗㅗㅇ％

 $\infty-\infty \rightarrow \infty$ $\underset{\sim}{6}=8=$
 geng

 옹홍영

 ensenemencoser nomen enceremer e
 －－－

$\infty \infty+\infty$

## $\infty$




上8か—mロ 똨ローー
$-\infty \infty+\infty$ －－$+\infty$－

 ＝－＝天


 －－－




8
$\therefore$ E
32 2 $3:$

亚
$=2$
틀
$0=$

E
8
－ 톨 $\therefore$ E

 톤충


 훙후ㅇㅜㅜㅇ 훟후ㅎㅜㅜ훌






ミ2 $=8$


＂en $8=8$
 ser ese 38

$-8$

$-8$
E＝ $\boldsymbol{x}^{\infty} \boldsymbol{x}$
E－


$+\frac{\circ}{2}$

$0 \infty \quad 8 \theta+8886$
$5^{-\infty}$


HE
$-\infty+\infty=\infty$
동
＊
틀
롤
$=8$
天豪
＝
$\pm \underline{E}$


を家 ッロッチーッー

2
$a$
횰
$32=\pi=88$ $\cdots \infty+\infty$

0000000
－- － $\boldsymbol{R}-\boldsymbol{R E}$



テッーッロ ニニエーか
ラッニニか＝スェー～
－

$-\infty=-\infty$



（ーロー・
ェニッー・
－－－－－－

产

출

空




$=8$
$=8$
$=5$


 －ミ
 $=2$

是 $3 ミ$ －－
 － $\mathrm{E}_{2}$ $=8$ $E$ ㄹ $\pm$ ： $\leqslant$ z $=\Sigma$ E － ェ s 틀玉
ミ $2 \Xi$ 3 ： $2 \dot{8}$


  쏭훙훌 훌풀 ..... $\stackrel{2}{2}$
 ..... 


$\overline{3}$
$=$ 8

| $\theta \infty$ | $5{ }^{-}$ | R＊－9m | $\cdots \infty$ | $\cdots \infty-$ |
| :---: | :---: | :---: | :---: | :---: |
| $\cdots \infty$ | － | Focteosede | T－ $0 \cdot 0$ | $\cdots$ |
| 옹ㅇ8응 |  | 통향․ | $\cdots 5$ |  |
| $\overline{6}$ | 옹ㅇㅇㅇ․ |  |  | $\pm 85$ |
|  | Ezex |  |  |  |
| $\cdots$－ | － | のーのか | $\cdots \rightarrow \infty$－ |  |
| \％ $\mathbf{F}_{6} \mathbf{8}$ |  | 종％ | 玉玉\＃゙す。 | 홍훙 |
|  | 으＝％ | 5\％5\％ | ํ゙ーツ | \％＝\％ |
| $5=5$ |  |  | 下=刃 =n |  |
| －以¢玉s | 옼킁 |  | =올뽈훙 |  |
| 2000cossor | $\cdots \infty$ | creersee | 上eremen | $\cdots=$ |
| ¢区E\％ |  | 훙훙 | \％${ }^{\text {\％}}$ |  |
|  |  | 홍크응 |  | 8580 |
| $=-3 \pi$ |  | 下気 |  | 로로ํ |
| $\cdots 00000000$ | $\infty$ | $\cdots$－ $0 \times 0 \times 0$ | $\cdots \infty<\infty$ | $\cdots \infty$ |
| $\infty+\infty$ | $\cdots \infty$ | $\cdots \infty$ | $\infty \times \infty$ | $\cdots \infty$ |
| やーのーー | $\cdots$－ | － 0 cocos | $\infty$ | － |
| F88 | 도조오 | 읔＊ | $\cdots \mathrm{E}$ ¢－2 | －8＊＊ |
| $\cdots \infty \times \infty$ | $\cdots \infty$ | $\cdots \infty<\infty$ | $\cdots \infty$ | $\cdots \infty<0000$ |
|  |  |  |  |  |
| $\infty \times \infty$ |  |  | $\cdots \infty-\infty$ | $\cdots \infty$ |
| 880 |  |  | ミニッ | $\pm \sec$ |
| ER=E | $\begin{aligned} & 85 \\ & 0 \end{aligned}$ | cicisp | 天下RE |  |
|  |  | 옹롳요흐쿡 | 출롤 | 돛초쿠 |
| 8로웅 | 큮 5 Fs | ※®\＃\％上 | ミッローツ | がmon |
| HESEP | 25988 | $8 \approx 8={ }^{8}$ | 츷ำ | ヒズッ |
| 9 | － | － | $\bigcirc$ | 9 |
|  | －5\％Fig | 2585＝ | 二玉ご兩 | B 5 － |
| － 3000 | － | －がこの |  | E0000 |
| －ํ゙5＊ |  |  | －n5 ${ }^{\text {ct }}$ | N－ロ－ |


PAGE 43

| \％ | $\square$ |
| :---: | :---: |
| $=2$ | $\cdots$ |
|  |  |
| \＃＂ |  |
| E－ |  |
| －E | － |
| ＝－ |  |
| ＝ | ェスッニ゙ |
| 50 |  |
| 」 ${ }^{\text {¢ }}$ |  |
| 98 |  |
|  | ※ฐำ\％\％\％¢ั\％ |
| E＊ |  |
| －$\ddagger$ |  |
| E | $\cdots$ |
| E | －～がミ0 |
| ＝ | $\cdots$ |
| $\pm$ ※ ${ }_{\text {a }}^{\square}$ | sxeol $=$ |
| E里号 | $\cdots$ |
| E |  |
| $=8$ |  |
| ¢ |  |
| ご |  |
| $\underline{5}$ |  |
| $8 \pm$ | ミョ\％＝ニー |
| － |  |
| E® | ¢ |
| $\pm$ ミ | ェミミニキ こ ミニー |
| 2E |  |
| 3 E | －ロロボミス ニッミ |
| $\underline{8}$ |  | 들



 NORTH DRYDEN GBOCIEMICAL SAMPLES


| 1 | 1 |
| :--- | :--- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| PAGE 47 |  |



PRYDEN GROCHBMICAL SAMPLES



 ＋寸MNMMホW•OONHN $\operatorname{OHNFH}$
OH

 gAMPLE


－
のonom～onom nomo．



－E－－－－－－－－－－








$=E$

$a!$


$\pm$ ミ
$E$
－ーロスニ ォニミダ
星

$=5$
$=8$ $\qquad$ 느N
ホNNが思



要咅

ミき シニスミミ ニニニミニ ェェ～ッ

글
MMngo

日3GFT－13日
日 $3 G F T-139$
日3GT－140
B3GFT－141
B3GFT－142



日3GKT-32


gavis 1  둔훌 
ACME ANALYTICNL LADDRNTORIEA LTD. AU**
OZ/TON
.001
.001
.001
.001
.002
.001
.001
.001
.001
.001
.001
.001
page 53

Es \# aova
nortil prydrn grocirmical samples



 DS2 E. IINATINGS, UANRGUUER D.C. Pll:253-3150



| a gece ban samit is diefsit <br>  <br>  |
| :---: |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |


|  |  |  |  |  |  |  |  |  |  |  |  |  | 110 | W-up |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| evelis | ${ }_{\sim}^{m}$ | $\underset{p p o}{\text { Bu }}$ | $\underset{p}{\mathbf{n}}$ | $\begin{aligned} & \text { in } \\ & \text { per } \end{aligned}$ | $\begin{aligned} & \text { M } \\ & \text { mpo } \end{aligned}$ | 111 | $\begin{aligned} & \text { co } \\ & \text { ppi } \end{aligned}$ | m | fi | $\underset{\sim}{\boldsymbol{f}}$ | $\underset{\text { NM }}{y}$ | ${ }^{m}$ | in 18 | $\begin{aligned} & \text { \% } \\ & \text { pron } \end{aligned}$ | $\begin{aligned} & \text { Cu } \\ & \text { pen } \end{aligned}$ | $\stackrel{\$ 1}{m m}$ | $\stackrel{81}{8 p}$ | $y$ | $\dot{i}$ | $\begin{aligned} & 8 \\ & 8 \end{aligned}$ |  | $\mathbf{8}$ | ! | $\begin{array}{ll} \mathrm{B} \\ \mathrm{ppa} \end{array}$ | $11$ | ${ }_{i m}^{1}$ | $\boldsymbol{H}_{1}$ | $m_{i}$ | $8$ | \# | $\begin{gathered} \text { Mull } \\ \text { int } \end{gathered}$ |
| 3007613 | 1 | 31 | 2 | 2 | d | 11 | 1 | 121 | 4.8 | 1 | 8 | m | 2 | 1 | 1 | 8 | 18 | 3 | 1.46 | .14 | 2 | 31 | * | b | . 11 |  |  | .41 | $\cdots$ | 108 | 4 |
| $33 \mathrm{CH}-14$ | 211 | 31 | 11 | 1 | .7 | 1 | 1 | 150 | . 31 | 2 | 11 | 3 | 1 | 2 | 1 | 1 | 131 | 8 | . 11 | .11 | 8 | 7 | . 11 | 1 | . 11 | 1 | . 28 | . 14 | . 01 | 1 | 21 |
| SxM1-15 | 1 | 16 | 1 | 2 | . 2 | 3 | 11 | 198 | 1, 1.1 | 5 | 1 | $\cdots$ | 2 | 2 | 1 | 8 | 3 | 48 | 1.16 | . 03 | 2 | 30 | . 11 | 1 | .818 |  | 1.18 | . 11 | 01 | g | 3 |
| $13 \mathrm{CWI}-14$ | 2 | 500 | 1 | $\boldsymbol{\pi}$ | .1 | 30 | 10 | 311 | 9.17 | , | 2 | 10 | 2 | 30 | 1 | 2 | 18 | 60 | 1.51 | . 13 | 2 | 3 | . 41 | 12 | .17 |  | 1.18 | . 17 | 11 | 2 | 48 |
| 139(1-4) | $J$ | 52 | 11 | 166 | 1.1 | 2 | 11 | (11 | b. 71 | 1 | 1 | $\cdots$ | 2 | 18 | 2 | 8 | 2 | 31 | 1.12 | . 01 | , | 11 | . 16 | 81 | .21 | 11 | 1.18 | . 03 | 10 | 2 | 2 |
| $3367-48$ $38 N 1-49$ | 1 | 24 | , | 4 | . 2 | 14 | 11 | ${ }_{580} 81$ | 9.02 0.31 | 1 | $!$ | m | 6 | 38 | 1 | 8 | 2 | 81 | . 11 | . 011 | 11 | ${ }^{13}$ | 1.21 | 178 | . 81 | $!$ | 1.19 1.58 | . 81 | . $\%$ | 2 | 3 |
| $83507-50$ $1367-51$ | 1 | 739 388 | 1 | ${ }^{131}$ | 1 | 100 | 81 | 198 | 8.117 4.02 | $\bigcirc$ | 10 | Nim | 2 | 5 | , 1 | - | 2 | 218 | . 19 | .03 | 2 | 116 | 1.81 .81 | 111 | . 18 | 1 | 2.77 6.03 | . 81 | . 10 | 8 | 11 |
| B30VT-51 | 1 | 209 | I | 16 | . 2 | H | 11 | 410 | 5.11 | 2 | 1 | W | 2 | 11 | 1 | 2 | 2 | 14 | 1.65 | . 01 | 2 | 6 | . 11 | 428 | . 19 | 1 | 2.01 | . 11 | . 6 | 2 | 2 |



$8 \frac{2}{2}$
$=E$

$$
\underset{=}{E}
$$

$E E$
玉
흥 를



| $\begin{aligned} & = \\ & 5 \\ & 5 \end{aligned}$ |
| :---: |









ェロ
～ー

$\underset{\sim}{6}=E$


봏․․․

$\Xi^{2}$－ －ーーーー－+ －ーー－
$\cdots-\infty-\infty$

́ㅡㄹ $=$



玉





※


－${ }^{2}$
－ッーーーーーー－ーーツー ーーーーー・ーー



## APPENDIX III <br> BIBLIOGRAPHY <br> (LISTED BY PROJECT AREA)

## Published Reports

and Maps

Beard, R. C., and Garratt, G.
1975: Pipestone Lake Area, District of Kenora; Ontario Div. Mines, Preliminary Map P.1025, Kenora Data Series, scale 1 inch to $1 / 4$ mile or $1: 15,840$. Data compiled 1974.

Blackburn, C. E.
1981: Kenora-Fort Frances, Kenora and Rainy River Districts; Ontario Geological Survey Map 2443, Geol. Comp. Series, scale 1 inch to 4 miles. Compiled 1973-78.

Edwards, G. R.
1975: Pipestone Lake Area (Northern Half), District of Kenora; Ontario Div. Mines, Preliminary Map P.1000, Geol. Ser., Scale 1 inch to $1 / 4$ mile or $1: 15,840$. Geology 1974.

1976: Pipestone Lake (Southern Half), Districts of Rainy River and Kenora; Ontario Div. Mines, Prelim. Map P.1103, Geol. Ser., scale $1: 15,840$ or 1 inch to $1 / 4$ mile. Geology 1975.

1980: Geology of the Schistose Lake Area, District of Kenora; Ontario Geological Survey Report 194, 67 p. Accompanied by Map 2421 , scale $1: 31,680$ or 1 inch to $1 / 2$ mile.

1983: Geology of the Bethune Lake Area, Districts of Renora and Rainy River; Ontario Geological Survey Report 201, 59 p. Accompanied by Map 2430, scale 1:31,680 or 1 inch to $1 / 2$ mile.

ODM-GSC
1962: Kakagi Lake Sheet, Kenora and Rainy River Districts; Ontario Dept. Mines - Geol. Surv. Canada, Aeromagnetic Series, Map 1168G, scale $1: 63,360$ or 1 inch to 1 mile. Survey flown May to October, 1961.

Springer, Janet
1978: Ontario Mineral Potential, Dryden Sheet, Districts of Renora and Rainy River; Ontario Geological Survey Prelim. Map P.1530, Mineral Deposits Ser., Scale 1:250,000. Compilation 1977, 1978.

## MANITOU LaRES AREA

Published Reports

## and Maps

Blackburn, C. E.
1973: Lower Manitou-Uphill Lakes Area, District of Kenora; Ontario Div. Mines, Preliminary Map P.816, Geol. Ser., scale 1 inch to $1 / 4$ mile. Geology 1972.

1974: Upper Manitou Lake Area, District of Kenora; Ontario Div. Mines, Preliminary Map P.961, scale 1 inch to $1 / 4$ mile ( $1: 15,840$ ). Geology 1973.

1976: Geology of the Lower. Manitou-Uphill Lake Area, District of Kenora; Ontario Div. Mines, Geoscience Report 142, 81p. Accompanied by Map 2320 , scale 1 inch to $1 / 2$ mile ( $1: 31,680$ ).

1979: Geology of the Upper Manitou Lake Area, District of Kenora; Ontario Geol. Surv. Report 189, 74p. Accompanied by Map 2409, scale 1 inch to $1 / 2$ mile ( $1: 31,680$ ).

1981: Geology of the Boyer Lake-Meggisi Lake Area, District of Kenora; Ontario Geol. Surv. Report 202, 107p. Accompanied by Maps 2437 and 2438 , scale 1 inch to $1 / 2$ mile ( $1: 31,680$ ).

1981: Kenora-Fort Frances, Kenora and Rainy River Districts; Ontario Geological Survey Map 2443, Geol. Comp. Series, scale 1 inch to 4 miles. Compiled 1973-78.

1982: Geology of the Manitou Lakes Area, District of Renora (Stratigraphy and Petrochemistry); Ontario Geological Suvery, Report 223, 61p. Accompanied by Map 2476, scale 1:50,000.

Davies, J. C.
1964: Manitou Lakes Sheet, Districts of Renora and Rainy River, Ontario Dept. Mines Map P.242, Geol. Comp. Series, scale 1 inch to 2 miles. Compiled 1963, 1964.

## ODM-GSC

1961: Upper Manitou Lake, Kenora District, Ontario; Ontario Dept. Mines, Geol. Surv. Canada, Aeromagnetic Map 1153G, scale 1 inch to 1 mile. Survey May to October 1961.

OGS
1980: Airborne Electromagnetic and Total Intensity Magnetic Survey, Manitou-Stormy Lakes Area, District of Kenora; by Kenting Earth Sciences Ltd. for the Ontario Geol. Survey, Geophysical/ Geochemical Series, Maps 80464, 80465A, 80465B, 80470, 80471, 80472A, 80472B, 80477, 80478, scale 1:20,000. Survey and compilation, November, December, 1979 and January, February, 1980.

Sage, R. P., Breaks, F. W., Stott, G. M., and McWilliams, G. M. and Ali, A. 1974: Operation Ignace-Armstrong, Mine Centre-Entwine Lake Sheet, Districts of Kenora and Rainy River; Ontario Div. Mines, Preliminary Map P. 965 Geol. Ser., scale 1 inch to 2 miles. Geology 1973.

Springer, Janet
1978: Ontario Mineral Potential, Dryden Sheet, Districts of Kenora and Rainy River; Ontario Geological Survey Preliminary Map P.1530, Mineral Deposits Ser., scale 1:250,000. Compilation 1977, 1978.

Thomson, J. E.
1934: Geology of the Straw-Manitou Lakes Area; Ontario Dept. Mines, Vol. 43, pt. 4, 32p. (published 1935). Accompanied by Map 43a, scale 1 inch to 1 mile.
and Maps

Blackburn, C. E.
1976: Boyer Lake Area, District of Kenora; Ontario Div. Mines, Map P.1187, Geological Series-Preliminary Map, scale 1:15,840 or 1 inch to $1 / 4$ mile. Geology 1975.

1981: Geology of the Boyer Lake-Meggisi Lake Area, District of Kenora; O.G.S. Report 202, 1981.

1981: Kenora-Fort Frances, Kenora and Rainy River Districts; Ontario Geological Survey, Map 2443, Geol. Comp. Series, scale 1 inch to 4 miles. Compiled 1973-78.

Kresz, D. U., Blackburn, C. E. and Fraser, F. B.
1982: Precambrian Geology of the Kawashegamuk Lake Area, Western and Eastern Parts, Kenora District; Ontario Geological Survey Maps P. 2569 and P.2570, Geological Series-Preliminary Map, scale $1: 15,840$ or 1 inch to $1 / 4$ mile. Geology 1980, 1981.

ODM - GSC
1961: Ontario Dept. Mines - Geol. Surv. Canada, Aeromagnetic Map 1144G, scale 1 inch to 1 mile.

OGS
1980: Airborne Electromagnetic and Total Intensity Magnetic Survey, Manitou-Stormy Lakes Area, District of Kenora; by Kenting Earth Sciences Limited for the Ontario Geological Survey, Geophysical/Geochemical Series, Map 80-467A, 80-474, 80-467B, scale 1:20,000. Survey and compilation, November and December, 1979, and January and February, 1980.

Rivett, Scott and MacTavish, A. D.
1980: Bending Lake Area, District of Kenora; Ontario Geological Survey Preliminary Map 2033, Kenora Data Series, scale 1:15,840 or 1 inch to $1 / 4$ mile. Compiled 1979.

1980: Kawashegamuk Lake Area, District of Kenora; Ontario Geological Survey Prelim. Map P.2051, Kenora Data Series, scale $1: 15,840$ or 1 inch to $1 / 4$ mile. Data compiled 1979.

1980: Wapageisi Lake Area, District of Kenora; Ontario Geological Survey Preliminary Map P.2034, Kenora Data Series, scale $1: 15,840$ or 1 inch to $1 / 4$ mile. Data compiled 1979.

Springer, Janet
1978: Ontario Mineral Potential, Dryden Sheets, District of Kenora and Rainy River; Ontario Geological Survey Preliminary Map P.1530, Mineral Deposits Ser., scale $1: 250,000$. Compilation 1977, 1978.

Thompson, J. E.
1934: Geology of the Manitou-Stormy Lakes Area; Ontario Dept. Mines, Annual Report for 1933, Vol. 42; pt. 4, p. 1-40. Accompanied by Map 42C, scale $1: 63,360$.

## DRYDEN AREA

## Published Reports

and Maps

Blackburn, C. E.
1981: Kenora-Fort Frances, Kenora and Rainy River Districts; Ontario Geological Survey Map 2443, Geol. Comp. Ser., scale 1 inch to 4 miles. Compiled 1973-78.

Breaks, F. W., Bond, W. D., Hesterman, C. J. and Harris, N.
1976: Operation Kenora-Ear Falls, Dryden-Vermillion Bay Sheet, District of Kenora; Ontario Div. Mines, Prelim. Map P.1203, Geol. Ser., scale $1: 63,360$ or 1 inch to 1 mile. Geology 1975.

Breaks, F. W., Bond, W. D., Harris, N., Westerman, C. J. and Desnoyers, D. W.
1976: Operation Kenora-Ear Falls, Sandybeach-Route Lake Sheets, District of Kenora; Ontario Div. Mines, Preliminary Map P.1204, Geol. Ser., scale $1: 63,360$ or 1 inch to 1 mile. Geology 1975.

Harding, W. D.
1951: Geology of the Gullwing Lake-Sunstrum Area, Renora District; Ontario Dept. Mines Annual Report 1950, Vol. 59, Part 4. Accompanied by Map 1950-2.

ODM - GSC Maps
1961: Dryden, Kenora Districts; Ontario Dept. Mines, Geol. Survey Canada, Aeromagnetic Series, Map 1155G, scale 1:63,360 or 1 inch to 1 mile. Survey flown May to October, 1961.

1961: Sandybeach Lake, Kenora District, Ontario Dept. Mines, Geol. Survey Canada, Aeromagnetic Series, Map 1155G, scale $1: 63,360$ or 1 inch to 1 mile. Survey flown from May to October, 1961.

Page, R. O. and Christie, B. J.
1980: Lateral Lake Area (West Half), District of Renora; Ontario Geological Survey Preliminary Map P.2371, Geol. Ser., scale 1 to 15:840 or 1 inch to $1 / 4$ mile. Geology 1979.

Rivett, A. S. and MacTavish, A. D.
1980: Thunder Lake-Mavis Lake Area, District of Kenora; Ontario Geological Survey Preliminary Map P.2058, Kenora Data Series, scale $1: 15,840$ or 1 inch to $1 / 4$ mile. Data compiled 1979.

Speed, A. A. and Maxwell, G. J.
1980: Echo Township Area, NTS 52F/16NW, Kenora District; Ontario Geol. Surv. Preliminary Map P.2332, Sioux Lookout Data Series, scale $1: 15,840$ or 1 inch to $1 / 4$ mile.

1980: Gullwing Lake Area, District of Renora (Patricia Portion); Ontario Geological Survey Preliminary Map P.2331, Sioux Lookout Data Series, scale $1: 15,840$ or 1 inch to $1 / 4$ mile. Data compiled 1979.

1980: Sandybeach Lake Area, NTS 52F/16SW, District of Kenora; Ontario Geological Surv. Preliminary Map P.2334, Sioux Lookout Data Series, scale 1:15,840 or 1 inch to $1 / 4$ mile.

Springer, Janet
1978: Ontario Mineral Potential, Dryden Sheet, Districts of Kenora and Rainy River; Ontario Geological Survey Preliminary Map P.1530, P.1538, Mineral Deposits Ser., scale 1:250,000. Compilation 1977, 1978.




|||||||||||||||||||||||





$\therefore$ -

-     - Tative
$+1$




















$$
\therefore
$$


mannill


















[^0]:    ehrite 1
    Jigis-180
    

    発
    
    
    
    
     추ㅊㅜㅜㄴ
    
    

[^1]:    

