

TECHNICAL REPORT
ON
PUFFY LAKE MINE.

LOCATED IN SHERRIDON AREA, MANITOBA

55° 01' 56" North latitude; 100° 58' 54" West longitude.

PREPARED FOR **AURIGA GOLD CORP.**
(formerly "Ursa Major International Inc")
IN ACCORDANCE WITH NI 43-101.

Prepared by
Karel R. Pieterse, P. Eng.

July 23, 2010.

TABLE OF CONTENTS

Cover Page

2.0	Table of Contents	i
	List of Figures	iii
	List of Tables	v
3.0	Summary	1
4.0	Introduction	7
5.0	Reliance on Other experts	12
6.0	Property Description and Location	14
7.0	Accessibilty, Climate, Local Resources, Infrastrucrure and Physiography	29
8.0	History	35
9.0	Geological Setting	43
10.0	Deposit Types	53
11.0	Mineralization	59
12.0	Exploration	65
13.0	Drilling	66
14.0	Sampling Method and Approach	67
15.0	Sampling Preparation, Analysis and Security	68
16.0	Data Verification	69
17.0	Adjacent Properties	71
18.0	Mineral Processing and Metallurgical Testing	74
19.0	Mineral Resources	86
20.0	Other Relevant Data and Information	93
21.0	Interpretations and Conclusions	113
22.0	Recommendations	116
23.0	References	118

Certificate of Author

Certificate of Consent

LIST OF FIGURES.

Figure 3-1	Photographs Illustrating Property	6
Figure 4-1	Author and Patrick McLaughlin	8
Figure 4-2	General View at Puffy Lake	9
Figure 4-3	Sub-Station	9
Figure 4-4	Stand-by Generator	10
Figure 4-5	Cover Over Portal	10
Figure 4-6	Collapsed Core Racks	11
Figure 4-7	Eckert Buhlman at Core Racks	11
Figure 4-8	Low-Grade Stockpile	11
Figure 6-1	Location of Puffy Lake	15
Figure 6-2	Property Outline	16
Figure 6-3	Claim Names and Numbers	17
Figure 6-4	Mineral Horizons	19
Figure 6-5	General Layout of the Puffy Lake Property	20
Figure 6-6	Puffy Lake – Underground Mine Workings	23
Figure 7-1	Access to Minesite	29
Figure 7-2	Plant-Site Layout	33
Figure 7-3	Photographs Illustrating Mill	34
Figure 9-1	Simplified Geology of Manitoba	44
Figure 9-2	Kisseynew Belt	49
Figure 9-3	Local and Mine Geology	51
Figure 10-1	Possible D1 Deformation	54
Figure 10-2	Possible D2 Deformation	55
Figure 10-3	Possible D3 Deformation	55
Figure 17-1	Properties Adjacent to Puffy Lake	72

Figure 18-1	Test Flowsheet	77
Figure 18-2	Mill Flowsheet	79
Figure 18-3	Mill Site Layout	80
Figure 18-4	Ragged Lake – Bathymetry	82
Figure 18-5	Photo Illustrating Deposited Tailing	83
Figure 19-1	Diamond Drill Hole Density	89
Figure 20-1	Typical Ramp Layout	107
Figure 20-2	Typical Stope Layout	107
Figure 20-3	Drift/Slash Plan	108
Figure 20-4	Drift/Slash Section	108
Figure 20-5	Ramp Section - 1993	109
Figure 20-6	Ramp Section - 1985	110
Figure 20-7	Down-Dip Longhole Stope	111
Figure 20-8	New Ramp Location and ‘Sweep’	112

LIST OF TABLES.

Table 6-1	Puffy Lake Claims – Details.	18
Table 6-2	Currently Valid Permits and Licenses	28
Table 8-1	Past Surface Diamond Drilling	37
Table 8-2	Resources- Calculated by Pioneer Checked by Piteau	42
Table 16-1	Independent Sampling Results	70
Table 19-1	Resources – Calculated by Kilborn	87
Table 20-1	Operating Numbers – Puffy Lake	102

3.0 SUMMARY

In May 2010, Auriga Gold Corp (formerly “Ursa Major International Inc”) (Auriga) retained Karel R. Pieterse, P. Eng. to prepare an independent NI 43-101 Technical Report (the “Report”) on the Puffy Lake Mine property in the Sherridon Area of Manitoba. During May and June, 2006, Pioneer Metals ULC (“Pioneer”) (formerly Pioneer Metals Corporation) retained the author to prepare an independent NI 43-101 Technical report on their Puffy Lake Mine property (the “2006 Report”). The 2006 Report was dated June 30, 2006. This Report is based in large part on the work done by the author in connection with the preparation 2006 Report. Author understands that this Report will be submitted by Auriga to the TSX Venture exchange in support of filings made by Auriga and will be filed by Auriga on SEDAR in compliance with Canadian securities legislation.

Neither Pioneer nor any of its affiliates has had any involvement with, and takes no responsibility for, the preparation of this Report and makes no representations or warranties whatsoever with respect to its completeness or accuracy.

Auriga Gold Corp. (formerly “Ursa Major International Inc.”) has an agreement to acquire the past-producing Puffy Lake Gold Mine and adjacent properties from Pioneer. The properties are located 50 km northeast of the town of Flin Flon, Manitoba.

Auriga Gold’s agreement is to acquire 100% of Pioneer’s interest in the Puffy Lake Gold Mine subject to a 3% net smelter royalty that reduces to 2.5% and 2% if gold is below US\$1,000/oz and US\$750/oz, respectively. The agreement also provides for the acquisition of Pioneer’s interest in the adjacent Nokomis Property where Pioneer has a 54% interest. In consideration of the acquisitions, Auriga Gold will make total payments of \$2.5 million and issue stock to Pioneer valued at \$1.0 million. Closing of the acquisition is subject to financing and regulatory approvals and is anticipated to occur on or before August 30, 2010.

Puffy Lake Mine is a past producer. The property was in production from January 1988 through April 1989, and delivered 28,430 ounces from approximately 350,000 tonnes milled.

A two phase exploration program is recommended. Phase 1 consists of confirmation drilling and shallow resource drilling combined with re-assay of selected intervals of drill core and pulps. This Phase has the objective of upgrading the historical resource to NI 43-101 compliance and defining an

open-pit mineable resource. Phase 1 is budgeted at \$1,260,000. Phase 2 involves deeper resource drilling and resource expansion and is conditional on certain results from phase 1 and is budgeted at \$5,050,000.

Wherever 'resources' or 'reserves' are mentioned in this report it must be understood that such are 'historical' in nature. The work necessary to confirm and classify these resources/reserves has not been completed and these estimates therefore cannot be treated as N.I.43-101 defined or verified by a 'Qualified Person'. These historical estimates should not be relied upon and there can be no assurance that any of the resources/reserves, in whole or in part, will ever become economically viable.

As of June 17, 1993 Puffy Lake is reported (Kilborn Engineering Pacific Ltd) to have historical 'proven and probable' resources of 1,346,177 tonnes @ 7.86 g/t as well as historical 'possible' resources of 883,718 tonnes @ 7.56 g/t. Tonto Mining, a Division of Dynatec Mining, analyzed and studied Kilborns' resources and concluded that 773,000 tonnes @ 8.9 g/t were 'mineable'. Allowing for dilution and mining losses it was estimated that 855,000 tonnes @ 6.7 g/t were 'recoverable'.

Geology - Puffy Lake is underlain by gneisses of the Kisseynew belt that is a high grade metamorphic belt consisting of various complexly deformed felsic and mafic gneisses metamorphosed to upper amphibolite facies. The 'package' containing the mineralization has a competent footwall gneiss and a hangingwall gneiss enveloping a less competent biotite schist that has been metamorphosed, folded and twisted. Regional 'events' opened up tension cracks (boudinage structures) into which the mineralized solutions and quartz were introduced.

Within the property, three main rock assemblages are distinguished. A lower homogeneous, light grey to white, lineated granite gneiss, that forms a distinctive footwall; a central well layered inhomogeneous, generally mafic schist and gneiss of the Nokomis group, that hosts the gold bearing quartz veins; and an upper unit of more competent felsic and intermediate gneisses of the Sherridon group. This upper unit, is bounded at the base by a stretched conglomerate that likely represents a regional unconformity and forms a distinctive marker throughout the area. The dominant rock type at the mine is a greywacke gneiss of the Nokomis group that is characterized by abundant biotite and garnet porphyroblasts.

The orebodies consist of five gold-bearing zones, designated from top to bottom, as the Sherridon, Upper, Main, Lower and Lower 2 zones. These zones are sub parallel to foliation and separated by between 15 metres and 80 metres of gneisses, are typically 1.5m wide and characterized by quartz veining. As well as being characterized by quartz veining, the gold bearing zones are strongly diopsidic. Pyrite, pyrrhotite, arsenopyrite, sphalerite and chalcopyrite are common constituent minerals.

Mineralogy. Mineralization exhibits different modes of occurrence in the Puffy Lake deposit. The immediate host rock is typically a schistose, biotite-rich quartzofeldspathic rock that appears to have been variably altered. Foliations, defined by arsenopyrite and pyrrhotite, and the schistosity developed in the biotite-rich host rock were both formed during regional deformation. Both simple and composite quartz veins up to 2 m thick, but more commonly less than 1 m thick, are invariably present and segment the sheets of mineralization parallel or subparallel to the schistosity.

The quartz appears to be late ore. Most of the quartz is barren and effectively dilutes the ore. The deposit was possibly quite high temperature and slow cooling that allowed the gold to be “annealed out”, freeing it from close association with the pyrite or arsenopyrite – effectively making it free-milling.

Exploration. Puffy Lake was discovered in the 1960's as an E.M. anomaly that was drilled by 14 holes – looking for sulphides. Later Granges Inc (Granges) acquired the property and drilled a further 50 holes. In 1980 Maverick (later incorporated into Pioneer) optioned the property and started seriously exploring the deposit. All exploration has been by diamond drilling from surface. The property has been explored by over 450 holes.

Development. By late 1986 Pioneer had gained sufficient confidence in the property to consider a production decision. A positive decision was reached early 1987 and mill construction was started in the early spring of that year. At the same time Pioneer aggressively delineated the property with infill diamond drilling from surface. In addition, a contract was let for the excavation of an underground ramp and the preliminary development of certain stoping areas.

Surface infrastructure development, construction and underground preparatory work continued at a hectic pace such that the mill was commissioned by December of that year and the first bar of gold was poured prior to December 31, 1987.

Operations. Puffy Lake was operated continuously from January 1988 through to March 1989.

Operations ceased as of the end of March 1989 and the mine was prepared to be placed on a care and maintenance basis during April and May 1989. During this fifteen month period, Puffy produced some 350,000 tonnes of 'ore' that delivered 28,430 troy ounces of gold.

The mill at Puffy was designed and constructed to treat 1,000 tonnes of ore per day at an average grade of 7.54 g/t. Mine personnel struggled to constantly deliver the requisite tons (averaged close to 80%) and were particularly challenged to meet grade (averaged at 38% of anticipated). In addition to normal dilution, it appears that, under the pressure to meet tonnage requirements, some of the low grade (or no grade) development material was delivered to the mill for processing.

During August 1989 devastating forest fires swept the area destroying pipelines and the onsite 24kV powerline (main power line not affected). No damage to the mill occurred.

Conclusions. Examination of the material available to author has led to the following conclusions (not necessarily in order of importance).

- A. Puffy Lake deposit has merit and deserves closer scrutiny.
- B. With respect to past production performance: - The deposit is not necessarily uneconomic but possibly just more challenging than originally anticipated.
- C. The deposit may have "a geometry" somewhat more complex than postulated.
- D. Previous layouts and actual excavations appear to have relied on an assumed conformably geometric orebody.
- E. A plunge of sub-structures within the deposit may exist and may have to be incorporated into future layouts and mining methods.
- F. Density of surface exploratory diamond drilling may not have been sufficient to adequately define the orebody.
- G. The resource component of the deposit may have been overestimated originally.
- H. Geological information and interpretation, as actually encountered, may not have been incorporated into on-going mine-planning.
- I. Adequate forward mine development and stope preparation may not have been available to the operating mine.
- J. Statistics to operate and mine a mine the size of Puffy Lake may not have been closely-enough examined.

K. Underground examination and definition drilling of the resource is warranted.

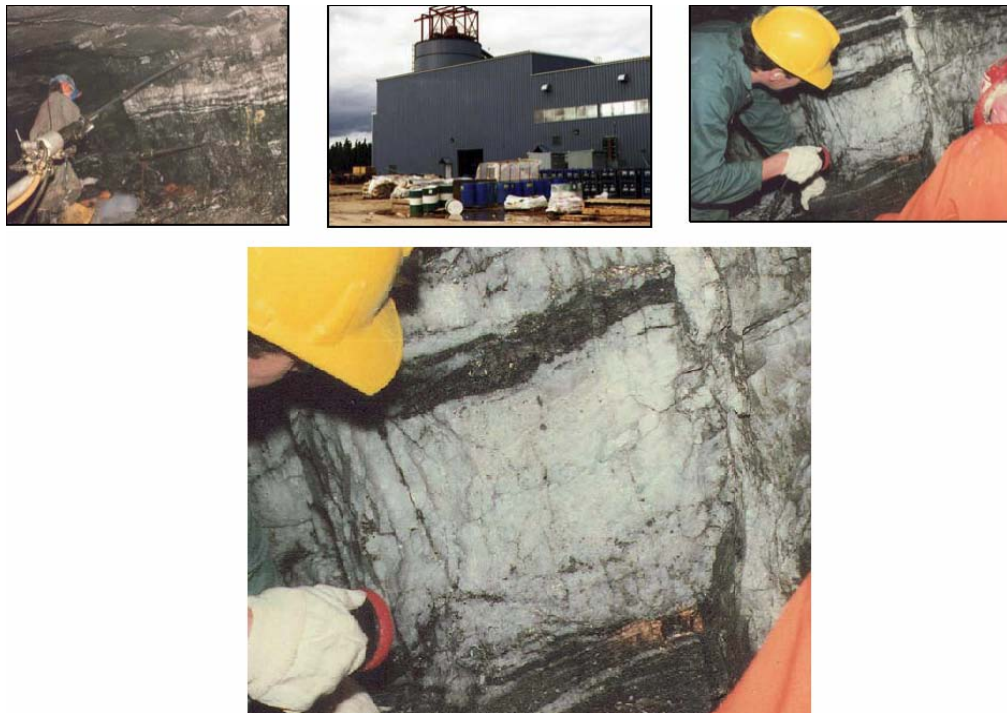
Recommendations. Recommendations centre around the interpretations and conclusions resulting from the examination of material utilized in preparing the technical report. Specifically these are: -

A two phase exploration program is recommended. Phase 1 consists of confirmation and shallow resource drill combined with a reassay of selected intervals of drill core and pulps. Data will also be compiled into a database and corporate model. This plan has the objective of upgrading the historical resource to NI 43-101 compliance and define an open pit mineable resource. Phase 1 is budgeted at \$1,260,000. Phase 2 involves deeper drilling and resource expansion and is conditional on positive results from phase 1 and is budgeted at \$5,050,000.

As general interest, following are several photographs illustrating the property as of May 2006.



As a contrast several historical photographs follow



4.0 INTRODUCTION

Report is prepared for; Auriga Gold Corp (formerly “Ursa major International Inc”).

Suite 1300, 8 King Street East,

Toronto, Ontario. M5C 1B5

Auriga has engaged the author to prepare an independent technical report compliant with NI 43-101 (the “Report”) regarding the Puffy Lake mine property, reflecting Auriga’s planned two-phase exploration program (described below).

1. Phase 1 – Confirmation drilling to define 43-101 resources and shallow resource definition drilling and re-assay of existing drill core and pulps, with objective of upgrading historical resource to NI 43-101. Shallow drilling (200 holes at average 25 meter depth - 5,000meters) with objective of completing scoping study to define open pit mineable resource (Complete Q1 2011).
2. Phase 2 – (dependent on results from Phase 1) Deeper U/G resource drilling from surface (20,000 meters, 140 holes to average depth of 150 m) with objective of improving quality and quantity of u/g mineable resource, plus resource expansion.

In 2006, the author prepared an independent technical report compliant with NI 43-101 (the “2006 Report”) on behalf of Pioneer regarding past mining activities and future prospects on the Puffy lake Mine property. This Report is based in large part on the work done by the author in connection with preparation of the 2006 Report. Neither Pioneer nor any of its affiliates had any involvement with, and takes no responsibility for, the preparation of this Report and makes no representations or warranties whatsoever with respect to its completeness or accuracy.

All the documents reviewed, quoted from, condensed and incorporated into this report were reviewed at, selected from or provided from Pioneer’s archives in connection with the author’s preparation of the 2006 Report. Minimal use was made of internet or other sources. A complete list of reference material is stated in Section 23 – References. In addition, several specific references are cited at the end of sections. Also, the sources of specific quotations, where used, are specified.

Author (Karel R. Pieterse, P. Eng) made an inspection of the property on May 11, 2006 accompanied by Mr Eckert Buhlman, P. Geo and Mr Patrick McLaughlin, P. Geo. No exploration or development

has been conducted on the property since the 2006 Report. Auriga management has visited the site several times in the past 12 months and the site remains secure with a locked access gate and regular site inspections by a watchman. As no exploration and development work has been performed on the property in the last 4 years, the May 2006 inspection by the author can be considered current. Since 2006, the property has not been the subject of active exploration and development but has remained under care and maintenance.

At the time of the May 2006 visit, the site was, generally, found to be in excellent shape though somewhat overgrown. Author has not made a more recent site visit.



Figure 4-1. Author & Patrick McLaughlin.

An attempt was made to examine water taking facilities at the fresh water site (thwarted by beaver dams and impassable water) and at the process-water reclaim site.



Figure 4-2. General View at Puffy Lake

The existing facilities were examined including coarse ore-dump, the crushing facilities, some of the milling facility and the assay lab (illustrated in Section 7.0). In addition the tailing depositional area was viewed (illustrated in Section 18.0).

Most of the facilities in place are in remarkable condition considering the fact that they have been in place for more than a decade, continuously exposed to the elements.



Figure 4-3. Substation General view of sub-station – remarkably good condition.

Standby Generator. Again – in remarkably good condition.



Figure 4-4. Standby Generator

A general tour of the site was made. The portal structure was examined and the ramp portal (flooded and iced-over) was viewed.



Figure 4-5. Cover over Portal.



A search for core storage was conducted. Several storage locations were found. In some instances the storage boxes and racks were completely destroyed by fire.

Figure 4-6. Collapsed Core Racks.

Others were found in a collapsed, but salvageable state.

A series of samples was collected from core as well as from other locations.

**Figure 4-7.
Eckert Buhlman
@ Core Racks**



The low-grade stockpile was inspected.



Figure4-8. Low-grade Stockpile.

5.0 RELIANCE ON OTHER EXPERTS.

Author has relied extensively on reports, production records and other documents that were made available at the offices of Pioneer in connection with the author's preparation of the 2006 Report. Although the documents are extensive they are not complete. The sheer volume of material available made it impractical to review and incorporate everything. Thus author has relied on selected documents. Furthermore, only a fraction of these are quoted.

It has been assumed that all the information and technical documents listed in the Sources of information section of this report are accurate and complete in all material aspects. While this material was carefully reviewed the accuracy and completeness cannot be guaranteed. Author reserves the right, but will not be obligated, to revise this report and conclusions if additional information becomes available subsequent to the date of this report.

Author has largely relied on the documents listed in Section 23.0 –References, for the information in this report. However, the conclusions and recommendations are exclusively that of the author. The results and opinions outlined in this report are dependent on the information relied upon, being current, accurate and complete as of the date of this report.

Auriga management have reviewed this report. Any changes made as a result of these review did not involve any alteration to the conclusions, and-or recommendations made. Hence, the statement and opinions expressed in this document are given in good faith and in the belief that such statements and opinions are not false and misleading at the date of this report.

This report is prepared in accordance with the Standards and Guidelines for Valuations of Mineral Properties as set out by the Special Committee of the Canadian Institute of Mining, Metallurgy and Petroleum (CIMVAL) and the requirements of National Instrument 43-101 (NI43-101) of the Ontario Securities Commission (OSC) and the Canadian Securities Administrators (CSA).

With respect to, 'title'. Author referred to Manitoba Energy & Mines' website data base on the properties, and has relied on technical data contained in reports of past exploration and title documents supplied by Pioneer in connection with the author's preparation of the 2006 Report. While it is believed that the information contained herein is reliable under the conditions and subject to the limitations set forth herein, this report is based in part on information not within the control of author and author does not guarantee the validity or accuracy of conclusions or

recommendations based upon that information that is outside the area of technical expertise of author. Auriga is in the process of conducting a title opinion on the property.

While author has taken all reasonable care in producing this report, it may still contain inaccuracies, omissions, or typographical errors. These, if and when identified, may be incorporated into subsequent reports, whether by author or others, provided such are clearly identified and validated.

6.0 PROPERTY DESCRIPTION AND LOCATION

Figure 6-1 illustrates the location of the Puffy Lake Property.

The Puffy Lake Gold Mine property is located in northwestern Manitoba approximately 60 kilometres northeast of Flin Flon and 12 kilometres, as the crow flies, southeast of the community of Sherridon.

Located on the Canadian National Railway (CNR), Sherridon is about 110 rail kilometers north of Flin Flon.

The property is situated at, 55° 01' 56" North latitude; 100° 58' 54" West longitude.

Figure 6-2 illustrates the outline of the property.

Pioneer Metals Corporation own two distinct blocks of claims in the area known respectively as 'Puffy Lake Property' and 'Nokomis Lake Property'. Auriga has an agreement to acquire an interest in two distinct blocks of claims respectively known as "Puffy Lake Property" and "Nokomis Lake Property".

This report is concerned with Puffy Lake Property only.

The total area of the 8 claims and one mineral lease, comprising Puffy Lake Property is 1,977 hectares.

Figure 6-3 illustrates the claims in detail.

The illustration also lists both the claim name and number for each of the constituent claims and mineral lease

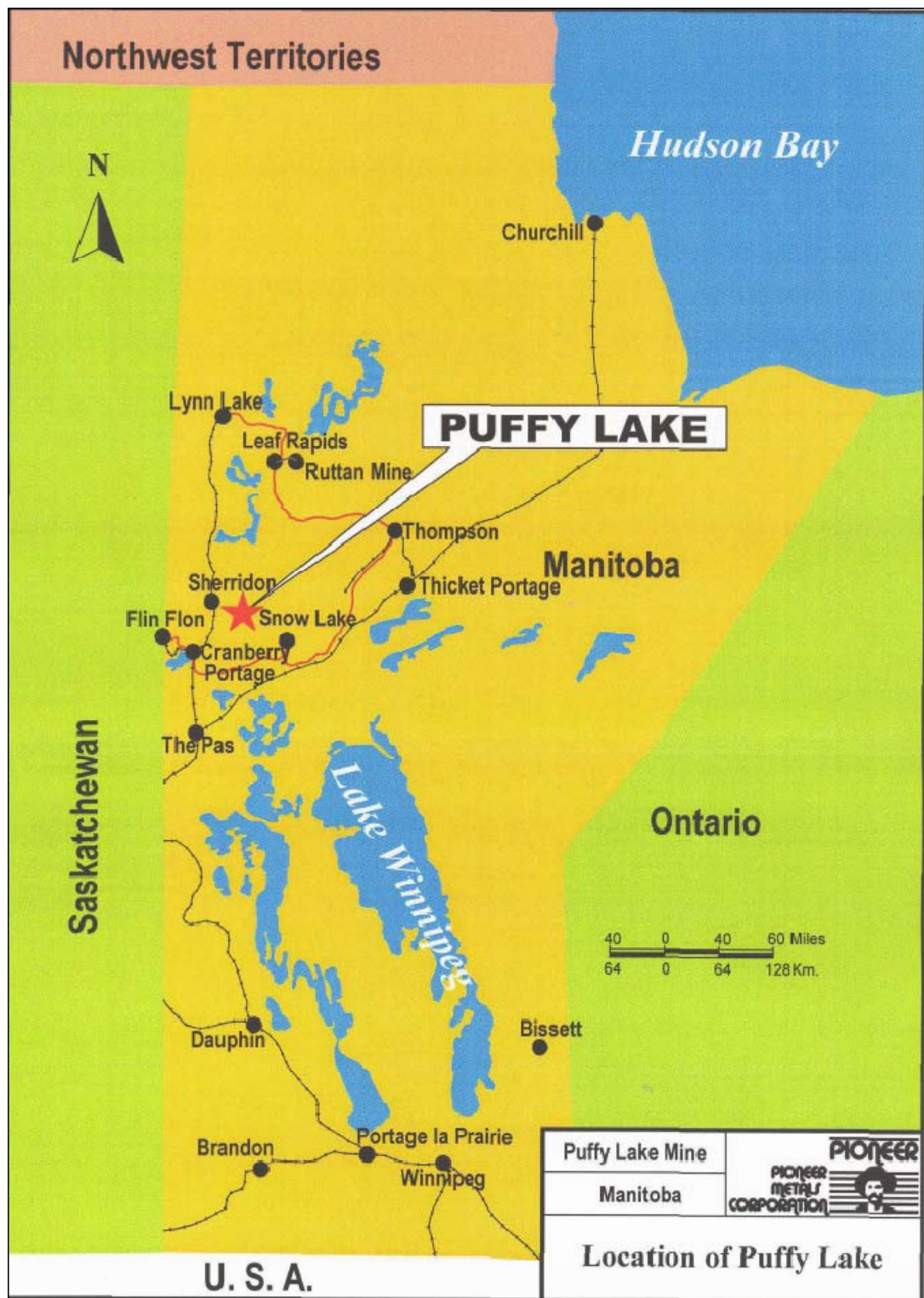


Figure 6-1. Location of Puffy Lake.

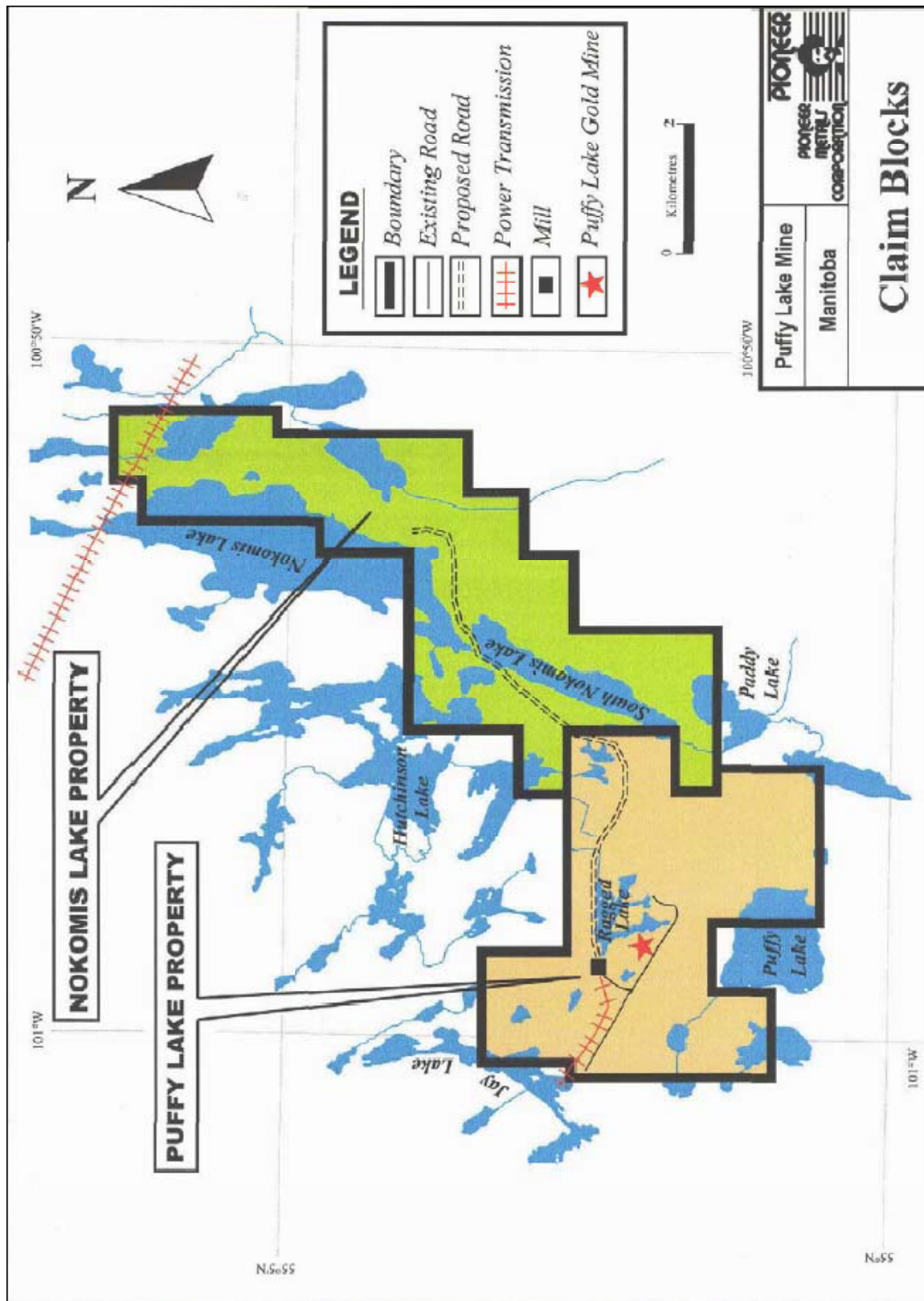


Figure 6-2. Property Outline.

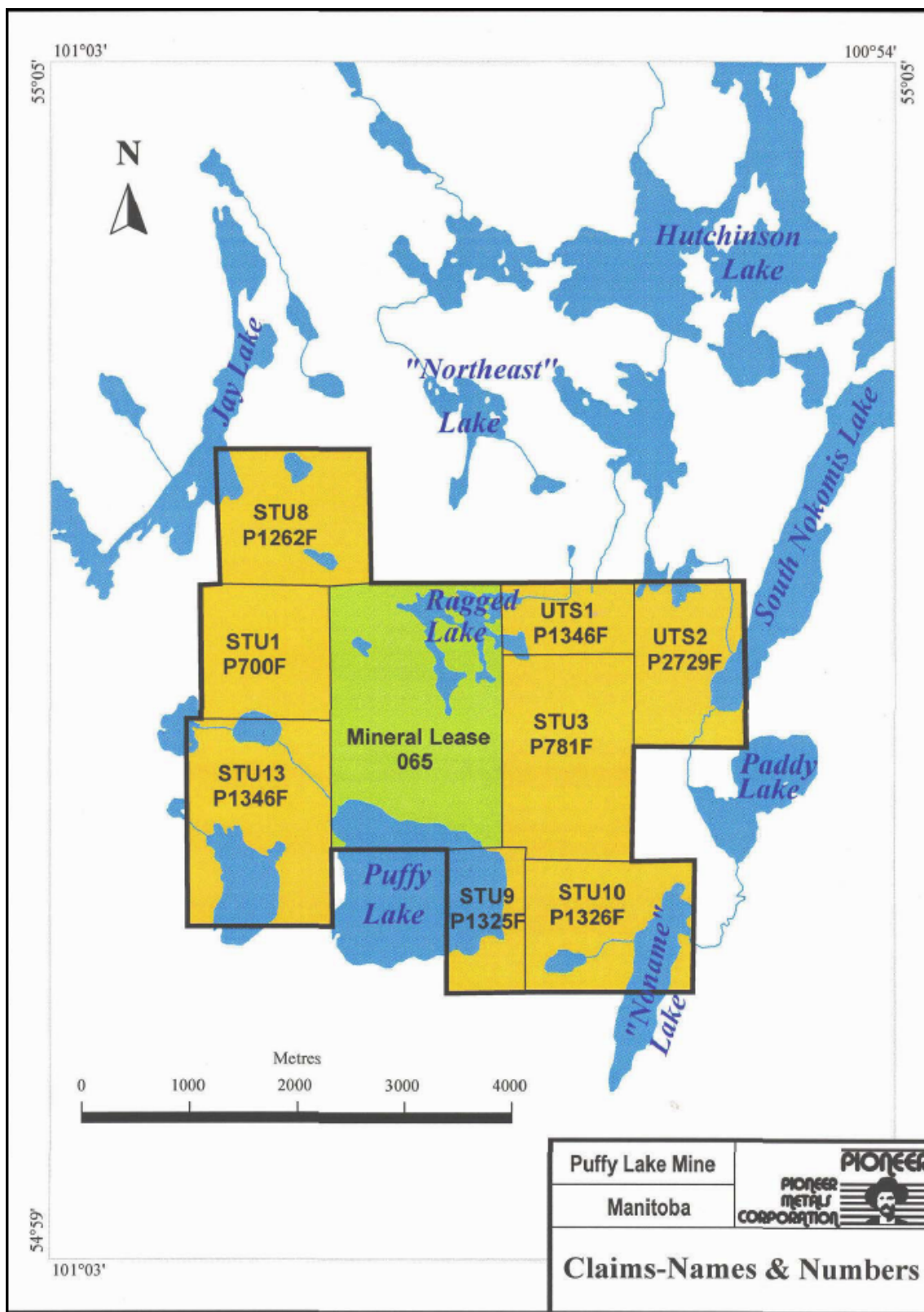


Figure 6-3. Claim Names and Numbers.

Table 6-1 lists the details of the claims.

Table 6-1. Puffy Lake Claims – Details

Rec	NAME	NUMBER	HOLDER	STAKED	RECORDED	EXPIRES	HECTARES	GROUPING
<u>1</u>	STU 8	P1262F	PIONEER METALS UNLIMITED LIABILITY COMPANY	1992/07/12 16:00	1992/07/15	2015/09/13	239	G11638
<u>2</u>	STU 1	P700F	PIONEER METALS UNLIMITED LIABILITY COMPANY	1992/01/16 15:30	1992/01/28	2015/03/29	232	G11638
<u>3</u>	UTS 1	P2728F	PIONEER METALS UNLIMITED LIABILITY COMPANY	1994/05/19 13:00	1994/06/17	2015/08/16	118	G11638
<u>4</u>	UTS 2	P2729F	PIONEER METALS UNLIMITED LIABILITY COMPANY	1994/05/20 14:15	1994/06/17	2015/08/16	152	G11638
<u>5</u>	STU 3	P781F	PIONEER METALS UNLIMITED LIABILITY COMPANY	1992/03/08 15:45	1992/03/16	2015/05/15	236	G10569
<u>6</u>	STU 10	P1326F	PIONEER METALS UNLIMITED LIABILITY COMPANY	1992/10/30 15:45	1992/11/04	2016/01/03	256	G10569
<u>7</u>	STU 9	P1325F	PIONEER METALS UNLIMITED LIABILITY COMPANY	1992/10/29 17:30	1992/11/04	2016/01/03	136	G11638
<u>8</u>	STU 13	P1346F	PIONEER METALS UNLIMITED LIABILITY COMPANY	1993/01/11 14:45	1993/01/14	2015/03/15	230	G11638
<u>9</u>	Lease	065	PIONEER METALS UNLIMITED LIABILITY COMPANY			2013/04/01	378	

Referring to Table 6-1. Pioneer control rights over 1,500 hectares of staked claims on which an annual expenditure of \$39,975 is required. In addition, Pioneer has leased an area of 378 hectares which requires an annual lease payment of \$3,969.

Leased claim No 065 was surveyed by Bastin & Shepherd, Manitoba Land Surveyors of Winnipeg, Manitoba. The survey took place between September 1 to 24, 1987.

Four plates illustrating the surveyed lease is available.

MINERALIZED ZONES. The Puffy Lake deposit has been explored by both surface diamond drilling and underground development and mining. The location of the mineralized area, generally, is outlined and placed in perspective with respect to other major infrastructure at the property – refer to figure 6-5.

Pioneer Metals Corporation described the deposit as consisting of four stacked concordant vein horizons with considerable lateral continuity. Step-out holes have been drilled more than 1.5 kilometres from the known deposits, and have intersected the four mineralized horizons in their same geometry". This is consistent with what is known about the geology of this area.

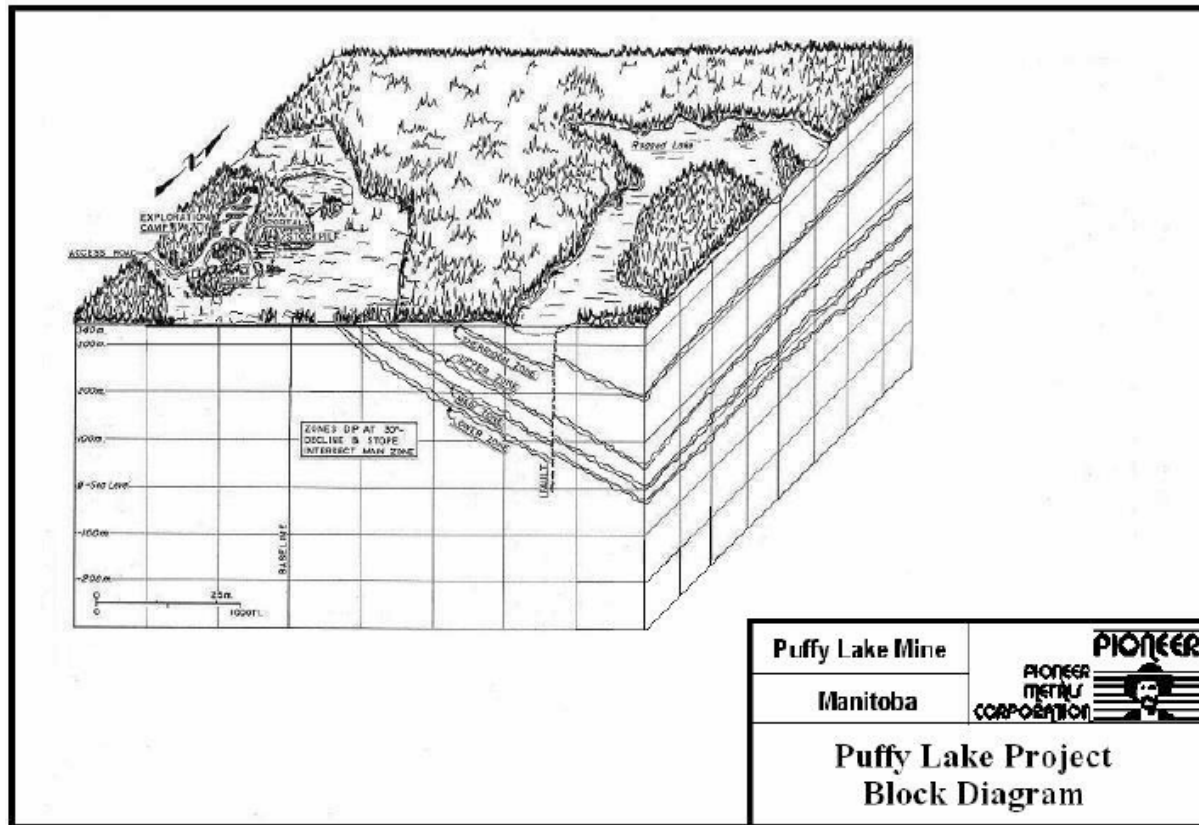


Figure 6-4. Mineral Horizons.

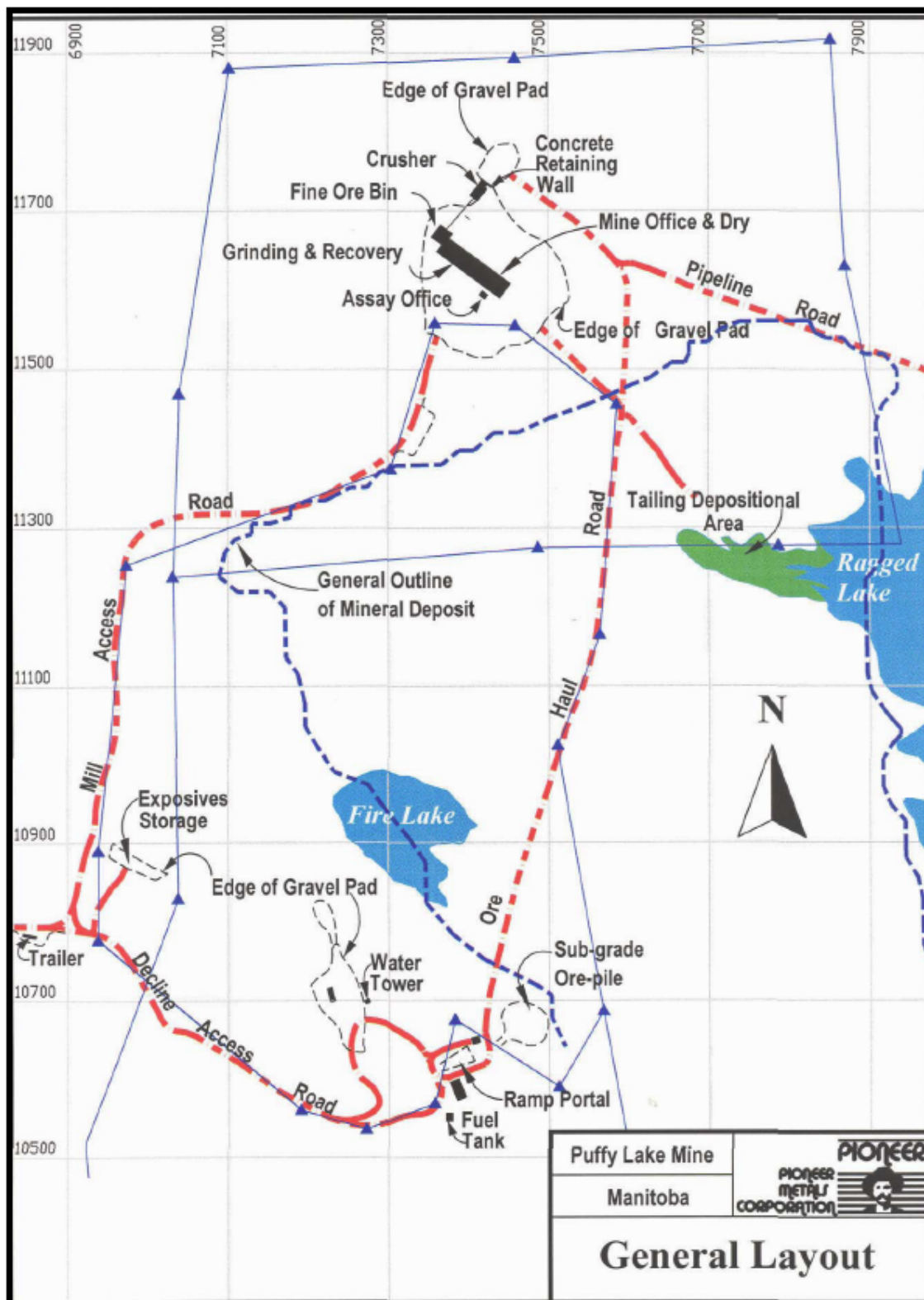


Figure 6-5. General Layout of the Puffy Lake Property

MINERALIZED RESOURCES. Two distinct resources estimates have been conducted on the Puffy Lake deposit. These are discussed in some detail under Section 19.0 Mineral Resources and Mineral Reserves Estimates. The original resource estimate by Pioneer staff was reviewed and authenticated by Piteau Associates – Geotechnical and Hydrogeological Consultants of Vancouver, B.C. Subsequent to this resource estimate, the mine was placed into production – for a period of approximately fifteen months. In the following paragraphs, reference to resources and reserves are historical in nature. As such, these are based on prior data and reports prepared by ‘other parties’. The work necessary to confirm and classify these resources and reserves has not been completed and the resource/reserve estimates therefore cannot be treated as NI 43-101 defined, verified by a ‘Qualified Person’. These historical estimates should not be relied upon and there can be no assurance that any of the resources/reserves, in whole or in part, will ever become economically viable.

On June 17, 1993 Kilborn Engineering Pacific Ltd (in their ‘final version’) summarized the re-estimate of resources (post-production) and reported as follows:-

The mineral resources on the property at a resource cutoff of 3.5 gram gold/tonne are:

Mineral Resource	Quantity (tonnes)	Gold Grade (gm/t)	Contained Gold (oz Troy)
West Side of Fault			
Proven and Probable	1,251,768	7.50	301,831
Possible	493,868	8.07	128,137
East Side of Fault			
Proven and Probable	94,409	12.63	38,356
Possible	389,850	5.99	75,078
Total Proven and Probable	1,346,177	8.57	340,187
Possible	883,718	7.15	203,165

In the same report, Kilborn stated: -

The mineable proven and probable ore reserves, based on Kilborn's estimate of the mineral inventory, calculated by Tonto for the area on the west side of the fault, are:

Quantity	855,000 tonnes
Gold grade	6.7 grams/tonne
Contained gold	184,200 ounces

These reserves were estimated based on: -

- An in-place cut-off of 3.5 g/t.
- A mining dilution above the design mine height of 15%.
- A loss in pillars and remnants of 20%.

Apart from reserves “on the west side of the fault”, no other reserves are referred to.

MINE WORKINGS. During the period May 1986 through April 1989, considerable underground excavation, in the form of ramps, drifts, raises and stopes were completed. These are illustrated in Figure 6-6.

As best as can be determined (monthly and other reports) some 350,000 tonnes of ore were mined from stopes. This aspect is more fully discussed in Section 20.0 – Other Relevant Data and Information.

EXISTING TAILINGS PONDS. The entire “Ragged Lake Area” has been approved as a tailing depositional and mine water treatment area. Refer to Figure 6-5. This aspect is more fully described in Section 18.0 – Mineral Processing and Metallurgical Testing. A very minor amount of the lake has been used to date.

WASTE DEPOSITS. Apart from a ‘built-up area’ in front of the ore grizzly dump (to allow ore-trucks to deposit their material over the grizzly in front of the primary crusher), there are no waste deposits at the site. As far as can be determined by this author, no specific location has been allocated for waste deposition. However, should there be a requirement in the future there is ample space for such.

IMPORTANT NATURAL FEATURES AND IMPROVEMENTS. Puffy Lake is fortunate in that the mine is located in a nondescript and remote part of the Province of Manitoba. There are no outstanding natural features other than the natural beauty of the area. The surrounding lakes are not likely to become tourist attractions for activities such as fishing.

The improvements (road access & hydro-line) are sufficient only to serve the requirements of a mining operation.

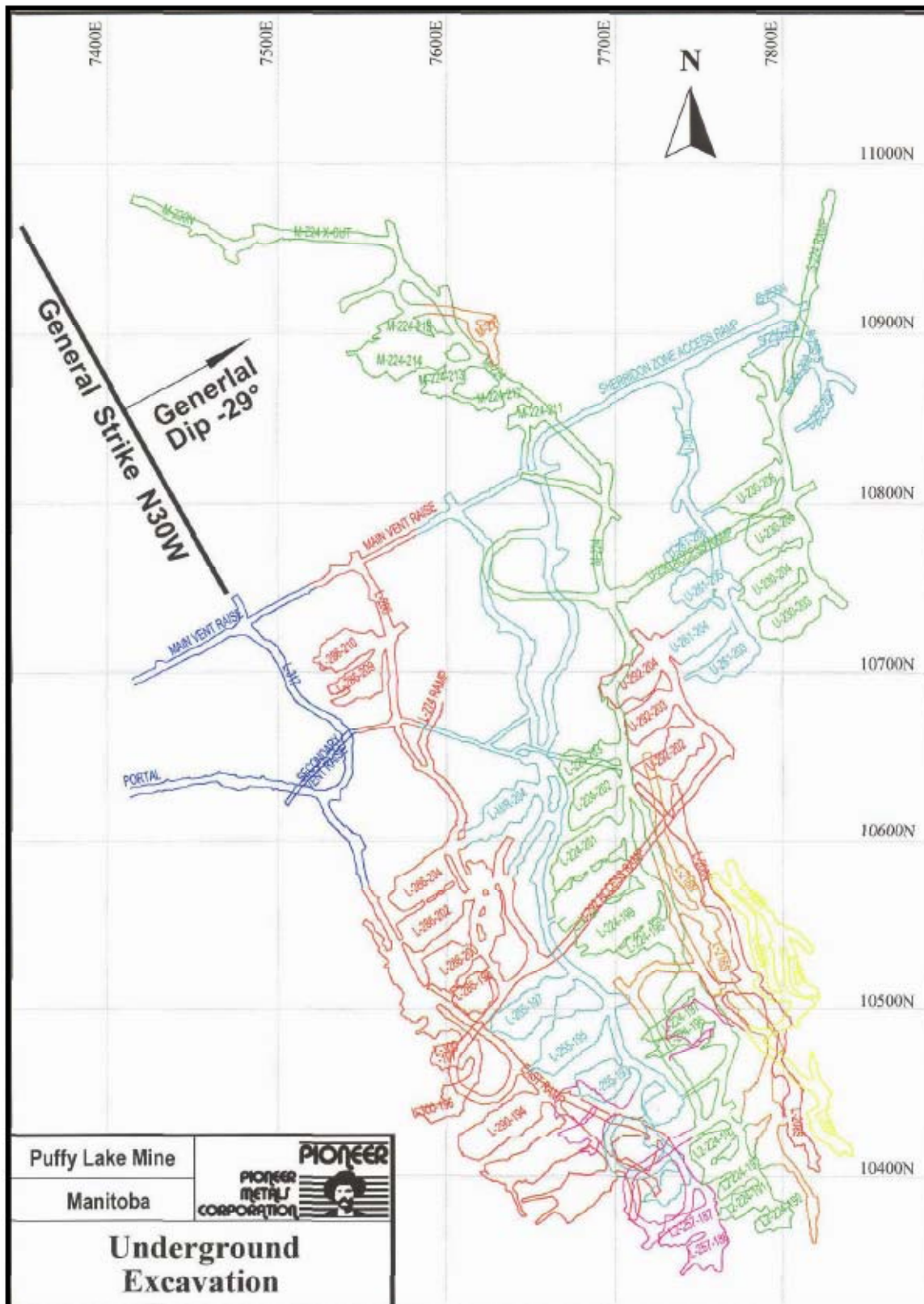


Figure 6-6. Puffy Lake – Underground Mine Workings.

Net Profits Interest. In December 1984 Granges transferred to Maverick Mountain a 100% interest in the property, retaining a 20% net profits interest (NPI). Since that time several changes have occurred. For one the property size has been reduced substantially. Secondly several corporate changes have taken place. At date of this report, because of the dissolution and sale of the assets of Granges, the status of the NPI is uncertain.

GILT Agreement. In Manitoba, under the Northern Affairs Act, the Department of Northern Affairs acts as the municipality for any unincorporated towns north of the 53rd parallel, including the town of Sherridon. As there is no basis for property tax assessment in these areas, companies are usually assessed a Grant-in-lieu of Taxes (GILT) in order to generate revenue for the maintenance and development of the surrounding communities.

Northern Affairs drafted a five-year agreement (with provision for a five-year extension), dated February 20, 1989, in the range of millions of dollars (Pioneer estimated the total as \$600,000 per annum). The mine closed prior to commencement of the payment schedule. As such funds spent by Pioneer were not a function of any agreement, but rather, goodwill.

Municipal Services and Housing. Pioneer was pressured by Northern Affairs to promote and utilize the town of Sherridon, and felt tremendous pressure to utilize existing accommodations. Pioneer became more and more involved in matters pertaining to development of infrastructure in the town. Pioneer invested \$2.0 million directly in the town for housing and infrastructure.

(Source. Intergroup Consultants Ltd. May 1981. "Impediments to Mining development in Manitoba – A Case Study of Pioneer Metals Corporation's Experience at the Puffy Lake Mine").

This agreement may no longer be valid but, no doubt, may impact on future production activities.

In August 1987, Pioneer submitted to Manitoba Environment and Workplace Safety & Health Environmental Control Programs, a project description and environmental impact assessment of the Puffy Lake project.

This document included reference to a permit (NoA14087, dated May 4, 1987) issued pursuant to Manitoba's Heritage Resources Act to allow Quaternary Consultants Ltd to carry out a heritage resource impact assessment of a proposed mine site, mineral extraction plant and campsite on the

north-west shores of Ragged Lake; the tailings deposition area at Puffy Lake; the access route between the two localities and the present access road from Fay Lake to the mine site.

The Heritage Resource Impact Assessment of the Puffy Lake Project by Quaternary Consultants Ltd was submitted in June 1987 and was acknowledged by Manitoba , Culture, Heritage and Recreation by June 18, 1987. This Branch, via its Impact Assessment Officer, stated – “As no archaeological resources were located during the assessment, the Branch has no further concerns about the mine site and its associated facilities”.

Based on the August 1987 report by Ilam Associates Ltd, an assessment of impacts on the environment which may result from Puffy Lake project, were summarized as follows;

AIR QUALITY. Impacts of the project on the air quality in the area are expected to be minimal. Dusty conditions on the access road may prevail from time to time in dry weather, but if these become persistently objectionable steps can be taken to treat the road surface.

Dust emissions from the tailings area are expected to be negligible. The major portion of the tailings will be submerged below water in Ragged Lake. Because the mill circuit will employ a relatively coarse grind, the tailings will tend to settle and compact into a dense mass, thus minimizing the potential for dust generation from those portions of the tailings above water.

The mill itself uses a wet process during the crushing, grinding and treatment of the ore and in-plant dust generation is avoided. Other emissions from the plant are expected to be minor. Once a week, the precious metal precipitate from the Merrill-Crowe precipitation unit will be mixed with flux and fed into the reverberatory furnace where it will be refined to bullion.

NOISE. The Puffy Lake site is approximately 12 kilometres from the nearest human habitation at Sherridon and is in any case well screened and buffered by the surrounding hilly terrain and forest cover. The mill will generate noise mostly from the crushing and grinding circuits, but noise levels from these sources outside the building will not be obtrusive.

WATER QUALITY. All liquid effluent from the mine and mill will be discharged, along with those mill tailings not required for backfill operations, to Ragged Lake.

Hydrogen peroxide treatment of the barren bleed from the cyanide leaching will destroy most of the cyanide such that total cyanide levels in the discharge to the Ragged Lake tailings basin will not exceed 0.5mg/L. Retention time of the liquid effluent in the tailings basin will vary, depending on the extent to which the basin has been filled, but decreasing progressively over the life of the mine. Nevertheless, retention in the tailings basin will allow further natural degradation of the cyanide to take place, resulting in even lower total cyanide levels prior to discharge. Recycling of up to 50 per cent of the water discharged from the mill will reduce total discharge to the environment.

Environmental testing by Coastech has shown that the tailings will be a net acid consumer and will not support biologically catalyzed sulphide oxidation. Furthermore, a large proportion of the tailings initially will be submerged below water. Release of heavy metals from the tailings sands is therefore not expected to occur.

Throughout the operation of the mill, the southernmost portion of the middle arm of Ragged Lake will be kept open as a final settling pond to permit clarification of the water prior to discharge.

The final discharge point from the tailings basin will be controlled by a weir. The location of the control structure will be in a small narrow 'canyon' south of the point where the stream exits from the lake. A road will be built to the control structure to provide easy access for monitoring purposes.

Between Ragged and Puffy Lakes and south of the 'canyon' noted above, the discharge route passes through a 750 metre wide swamp on the north side of Puffy Lake. This swamp can be expected to have some capacity to act as a filter and further purify the effluent prior to its discharge into the receiving waters of Puffy Lake.

FISHERIES. The gill net sampling program revealed a limited fish population in Ragged Lake.

Deposition of tailings will have a major impact on this fish population which over time will be killed off by increasing turbidity and loss of habitat.

However, the quality of the effluent discharged from the tailings basin, and its additional filtration during passage through the swamp north of Puffy Lake is not expected to cause any significant impact on fish stocks in Puffy Lake.

The natural flow rate out of Puffy Lake in May 1987 was measured at 432 cubic metres per hour which is approximately five times the projected flow into the lake from the Ragged Lake tailings basin under optimum recycling conditions.

Significant mixing will therefore occur in Puffy Lake prior to discharge to Noname Lake and the effluent quality will be further enhanced by passage through the extensive swampy area between Puffy and Noname Lakes.

No impact on fish stocks in Noname Lake or in any of the lakes downstream from this lake is expected. However, a regular water sampling program of Noname and Paddy Lakes will be undertaken to ensure that no degradation of water quality in these lakes is occurring as a result of the tailings discharge upstream.

Although not measured during the present program, there appears to be a substantial flow of water into Noname Lake from the chain of small lakes to the south. Additional mixing and dilution can therefore be expected to occur in this lake before discharge into Paddy Lake to the north and thence into South Nokomis Lake.

FORESTRY. The project will cause no further impact on forest resources in the area beyond that produced by the clearing of the right of way for the access road and the power line and clearing of the plant site itself. From a harvesting standpoint, the access road to the site provides access to the forest resources in the area, except that the hilly rocky terrain will make mechanized harvesting operations difficult.

WILDLIFE. Impacts on the wildlife resources of the project area are likely to be minimal. The mammal population of the area appears to be quite limited, especially the ungulates, probably because of a lack of suitable habitat and food supply. Fur-bearers also do not appear to be particularly numerous, nor do game birds and waterfowl. According to Kroker, the avian fauna of the Ragged Lake area appears impoverished compared with the variety of species observed further north in the Rat-Burntwood rivers area.

Efforts will be made, however, to control access along the road to the site (to deter increased hunting) and the security gate on the road will restrict access to the site itself. Good housekeeping practices will also be observed at all times at the plant site and at waste disposal sites in order to reduce nuisance visits by wildlife.

HERITAGE RESOURCES. The project will have no impact on heritage resources. The heritage resource impact assessment found no evidence of any archeological resources during intensive heritage resource investigations of the mill site, the mine site, the tailings deposition area at Ragged Lake, the water pipeline route from Northeast Lake and potential locations along the access road to the site. No other type of heritage resource was encountered during the assessment.

After approximately fifteen months of operation no adverse effects on the environment were noted nor were any restrictions to the ongoing operation of the Puffy Lake project contemplated.

As of date of this report Pioneer Metals Corporation hold the following valid permits and licences.

Table 6-2. Currently Valid Permits and Licences

<u>No</u>	<u>Name</u>	<u>Date</u>	<u>Term</u>
1207	Environmental Act License (Tailing)	July 15, 2010	Indefinite
PR20818	Railway Crossing Licence	as of June 2010 Not determined	Indefinite
87-24	Industrial Water Use	_____	_____
GP0004134	Crown Land (Tailing Dam)	Jan 01, 2011	1 year
GP0002799	Crown Land (Road to Puffy)	Jan 01, 2011	1 year
GP0003758	Crown Land (Water pipe ROW)	Jan 01, 2011	1 year
GP0004038	Crown Land (Access road)	Jan 01, 2011	1 year

Crown land permits are renewed on an annual basis. To date Pioneer has maintained these permits current – annually.

During operation Pioneer had a multitude of minor permits (Eg. Sand & Gravel; Septic effluent, etc). These will be identified and renewed prior to start of operations.

7.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The property is located in the Precambrian Shield on gently rolling terrain that is broken by swamps and marshy lakes in low lying areas. The plant site is located on a finger of high ground surrounded on three sides by swamps and has an average slope of 5 percent. Elevations on the site range from 350 metres above sea level at the camp site to 340 metres at Puffy Lake.

The area is typical of the Canadian Shield in Northern Manitoba with generally low relief. Shallow lakes and boggy ground occur over appreciable portions of the land surface. Vegetation is moderate to dense.



Figure 7-1 Access to Minesite

Capitalizing on provincial access road from highway 10 to the community of Sherridon, Pioneer Metals Corporation constructed a 10 kilometre mine-access road from 'mile 33' on the CNR. This access was used to mobilize the contractor's equipment to the underground development site in April 1986. Refer to Figure 7-1.

Town of Sherridon. Sherridon is the closest community to the property (about 20 km by road). The town originated as the service centre for the nearby Sherritt Gordon mine and grew to 1,500 people at its peak in the 1940's. The mine closed in 1951 after 20 years of operation; the company moved the equipment, many of the houses, the school, the bank, and many of the people to Lynn Lake over the period 1946 to 1953. The people who remained in Sherridon were left without a substantive economic base. The community was also left with ongoing environmental concerns resulting from the tailings of the Sherritt Gordon operation.

In order to assist residents with economic development, the community organized a Community Development Corporation in 1984.

Prior to 1985, access to Sherridon was by air or rail only. In 1985, Sherridon was connected by road to PTH 10 (between Flin Flon and Cranberry Portage).

The population of Sherridon is approximately 200. Present sources of employment include fishing, trapping, tourism and forestry.

Community of Flin Flon. Flin Flon is approximately 135 road kilometers and 110 rail kilometers south-southwest of the project

Transportation. The project is serviced by mine-access road from the provincial access road connecting Highway 10 to the town of Sherridon. Railroad service to the town of Sherridon is also available. The community of Flin Flon has regular commercial air service .

Due to the proximity of the mine-site to Flin Flon coupled with the fact that the elevation and local topography is similar, it is anticipated that the climatic conditions should not vary greatly from those of Flin Flon where detailed climatic records have been maintained for over 50 years.

Climate and Meteorology. The Mid-north area of Manitoba, including the Puffy Lake site has a continental subarctic climate characterized by short warm summers and long cold winters.

Environment Canada publishes temperature and precipitation detail for number of weather stations in the Mid North. The closest station to Puffy Lake is just outside Flin Flon, 65 kilometres to the southwest. Temperature and precipitation data for the Flin Flon station are based on a 30-year period (1951-1980) for temperature and 25-29 year period for precipitation. It is unlikely that the local climate at Puffy Lake is significantly different.

Temperatures show a wide range from daily average minimums in January of less than minus 26C to daily average maximums in July of plus 23.4C. The yearly mean daily temperature is minus 0.3⁰C.

Total precipitation amounts to 476mm, which is about 10 percent less than the 525mm received in Winnipeg. 30% of the precipitation falls as snow. More than half of the precipitation (55%) falls in the four summer months of June, July, August and September. The driest month is February with barely 4% of the precipitation.

Operations can be year-round provided provisions are made to accommodate the range of temperature applicable to the area. Snow precipitation is not excessive and can be accommodated with conventional cleaning and maintenance technology.

Sufficiency of Surface Rights for Project. The project has been more than adequately protected by the blocks of land either leased or claimed. Refer to Figure 6-2 and Figure 6-3 for the extent of the claims. Also refer to Figure 6-5 for the general disposition of the mineralized area relative to the claims.

Source of Power. A power transmission line was constructed from Sherridon to mine-site. This line followed the provincial access road south from Sherridon to a point close to the take-off point for the mine-access road. From there the power transmission line heads east to the minesite.

Source of Water Adequate supplies of fresh water (potable) are available from Jay Lake. A pipe-line (destroyed by the 1989 forest fire) and access road from the site to this lake was constructed and permitted. Process water is recycled from the tailing clarification pond (Ragged Lake) – again the reclaim water pipeline was destroyed by the 1989 forest fire.

Operating Personnel. During previous operations there was no appreciable problem in attracting suitable operating personnel. Although a workforce for future operations is not now readily available in the immediate area, it is assumed that a majority of the experienced personnel required could be recruited from the nearby mining communities of Lynn Lake, Leaf Rapids, Snow Lake and Flin Flon, where mining activity is in somewhat of a decline.

Tailing Storage Area. An approved tailing impoundment area at Ragged Lake exists. Approximately 350,000 tonnes of tailing material was discharged to this area previously.

Waste Disposal Area. During previous operations waste was utilized to construct roads and access ramps.

By and large underground access development at Puffy Lake was in near-ore grade material and very little, if any, waste rock was generated.

More than adequate waste disposal area is available south of Fire Lake.

Heap Leach Pad. There is nor current (or envisaged future) requirement for leaching.

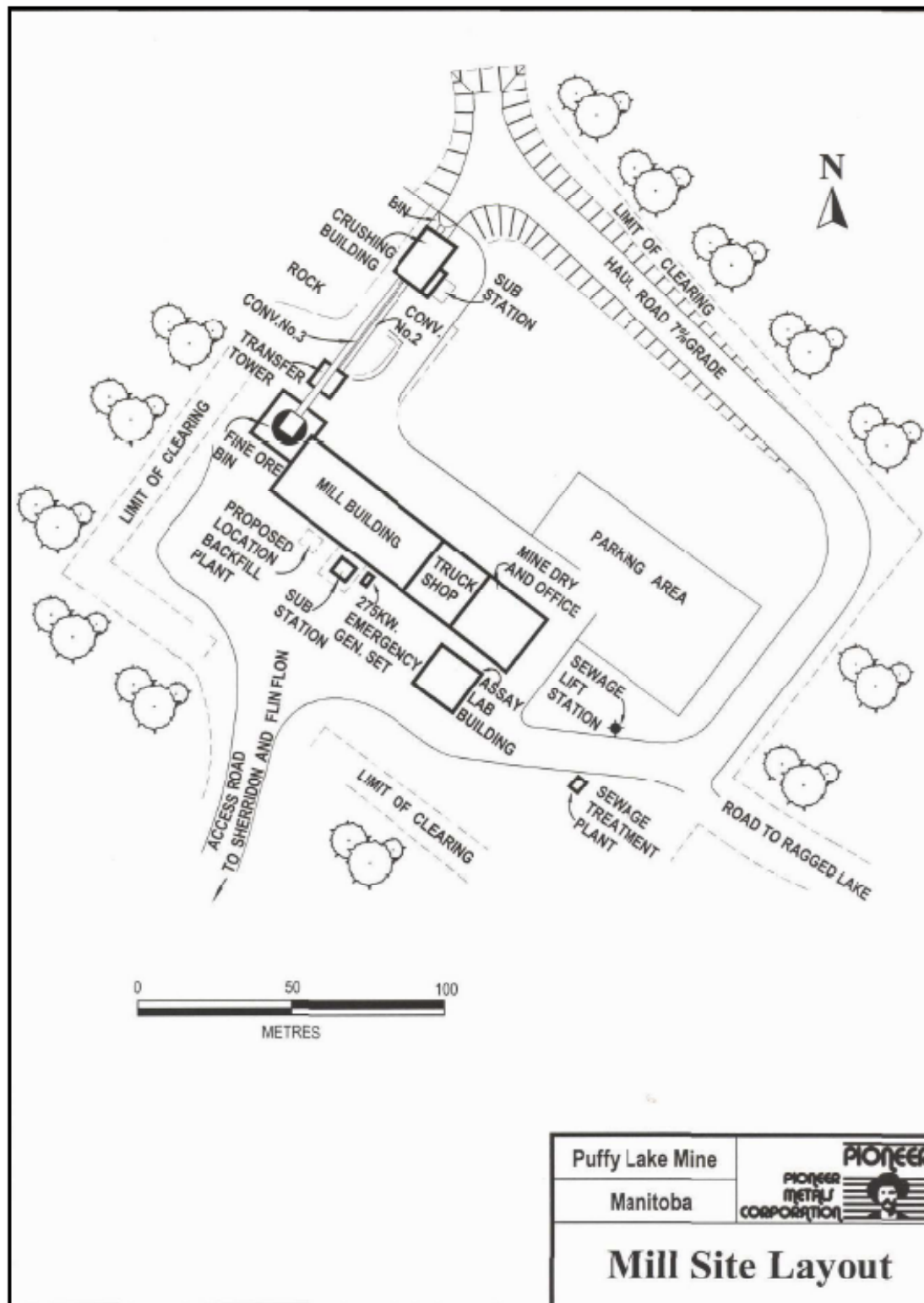


Figure 7-2. Plant-site Layout

Processing Plant. Refer to Figure 7-2. The site whereon the crushing complex, fine-ore bin, grinding complex and concentrator/recovery plant is located is compact and well-planned. The fire of 1989 did not affect the concentrator and associated structures.

As of May 11, 2006 the mill complex appears as in the photographs following – taken at the time of the site-visit.



This photo illustrates the coarse ore dump, the crushing complex, the conveyor gallery and a portion of the fine-ore bin.

This photo illustrates a portion of the fine-ore bin, the portion of the complex that houses the grinding and concentrating/recovery plant and, as well, the assay office.



This photo illustrates the mine-dry and office portion of the complex.



Vandalism at the property has been relatively minor (no doubt due to it's remote location). In the main some copper cables have been removed (neatly cut) and some windows have been broken.

Figure 7-3. Photographs illustrating mill

8.0 HISTORY

Auriga has an agreement to acquire, from Barrick Gold (Pioneer Metals), the Puffy lake Gold Mine formerly owned by Pioneer Metals Corporation of Vancouver, B.C.

The following series of agreements resulted in Pioneer's 100% interest in the Puffy Lake property.

Note: Prior to 1986, Maverick Mountain Resources controlled the property.

The following series of agreements resulted in Pioneer's current 100% interest in the Puffy Lake Project subject to a 20 percent net profits interest payable to Granges.

Granges Option Agreement. On June 4, 1980, Maverick entered into an option agreement with Granges to earn an undivided 60% interest in the Bed Claim CB 10186 Sherridon area, Manitoba, by expending a total of \$350,000 on exploration and development work by December 31, 1983. Subsequent program expenditures were to be 60% by Maverick and 40% by Granges. The agreement also provided for an area of interest around the Bed Claim; 3 miles to the north, west and east of the claim block.

Between August 1980 and September 1981, an additional 20 claim blocks, contiguous to the original Bed Claim, were staked and became part of the Puffy Lake Joint Venture. In 1985, a further 11 claim blocks were staked, contiguous to the previous group. In 1987 a third group of 19 claim blocks were staked and added to the property.

Exploration, Development and Mining Agreement. On June 29, 1984, an Exploration Development and Mining Agreement (ED & M) was made between Maverick and Granges to define the relationship of the parties, and to provide for the orderly exploration and development of the claims. On this date, Granges transferred a 60% interest to Maverick in the 21 claim blocks.

The joint venture operation was formed for the purposes of exploring the property, and, if warranted, bringing the property into production by establishing and operating a mine. Maverick was appointed the operator.

Homestake Option Agreement. On July 26, 1985, Homestake Mineral Development Company (Homestake) signed an option agreement with Maverick to acquire a 60% interest in the Puffy Lake claims. At that date, Maverick had earned a 71.8% ownership interest in the property and the right to acquire a 100% interest by expending an additional \$300,000 on exploration and development in 1985, under the terms of the 1984 ED & M agreement with Granges, except for the 20% non-assessable Granges interest in the proceeds from production from the property.

On January 30, 1986, Homestake terminated the option agreement.

Ownership Transfer to Maverick. On December 16, 1985, Granges transferred to Maverick 100% interest in the Puffy Lake Property, and Maverick assigned to Granges a royalty (carried) interest of 20 percent of the net profits, as defined in the ED & M agreement, dated June 4, 1980. This resulted from Granges election not to contribute its proportionate share of the cost of the operator's proposed Phase II underground exploration/development and diamond drilling program to be carried out in 1986.

1986 Agreements.

- A. Pioneer entered into an agreement with 301639 B.C. Ltd., a British Columbia corporation, whereby a 10% interest in the Puffy Lake Property was acquired by the expenditure on road building of \$300,000. Pioneer contributed \$165,000 towards these expenditures by way of the purchase of the beneficial right to the property interest.
- B. Maverick entered into an agreement with Societe en Comandite Miniere S & S No. 1, a Quebec Limited Partnership, whereby it agreed to sell a 7 percent working interest in the Puffy Lake Project in consideration of the expenditure of \$2,000,000 on the exploration of the property during 1986.

As at March 31, 1986, \$125,520 in exploration expenditures had been incurred. Maverick agreed to contribute \$1,060,000 towards these expenditures and the reacquisition of the working interest. Maverick further agreed to pay a commission up to the amount of \$132,500 to the General Partner as a financing fee.

- C. Pioneer entered into an agreement with a British Columbia Limited Partnership in which it is both a Limited Partner and General Partner. The Limited Partnership agreed to spend up to \$2,000,000 on further exploration of the Puffy Lake Project in part consideration of earning a 1 percent working interest in the property. The company agreed to advance up to \$1,100,000 toward these expenditures.
- D. Pioneer and Maverick amalgamated on a share exchange basis with Pioneer being the surviving entity.

Table 8-1. Past Surface Diamond Drilling.

<u>Year</u>	<u>Company</u>	<u>No of Holes</u>	<u>Metres</u>
1960	Hudson Bay E&D	14	
1981	Maverick Mountain Resources	30	
1984	Maverick Mountain Resources	29	
1985	Maverick Mountain Resources	29	
1986	Maverick Mountain Resources	75	9,145
1987	Pioneer Metals Corporation	225	
1994	Pioneer Metals Corporation	8	633

A. Oleson staked claims NIP 1-4 in February, 1953 over an area that presently includes the Puffy Lake Mine site, approximately 8 km southeast of Sherridon, Manitoba. All interests in the claims were assigned to Hudson Bay Exploration and Development (HBED) in March, 1960. From January to April, 1960, HBED conducted horizontal loop electromagnetic surveys of these claims and delineated an approximately 120 m long conductor. HBED drilled 14 diamond drill holes to test the conductor. These intersected quartz veins and auriferous arsenopyrite mineralization. The NIP claims lapsed in 1966.

An airborne EM and magnetometer survey performed during 1972 by Sherritt Gordon Mines Ltd. included the vicinity of the occurrence. J.J. Studer staked CB 10186 over the area in October 1979. In December, 1980 100% interest in the claims was transferred to Granges Exploration Aktiebolag (Granges).

In June, 1980, Maverick Mountain Resources Limited (Maverick) entered into an option agreement with Granges. Early in 1981 Maverick completed a 30-hole drill program and estimated reserves of 428,000 tonnes averaging 7.68 g/t gold (Canadian Mines Handbook, 1982).

During the winter of 1984-1985 a 29-hole drill program was performed. The strike length of the main zone was increased to 1037 m and a second zone of mineralization was discovered 275 m north of and parallel to the main zone. In 1985, 29 additional diamond drill holes were completed. This confirmed the down dip plunge extension of the Main Zone gold mineralization to a vertical depth of 183 metres. Four separate and distinct parallel gold-bearing lenses were identified – Sherridon, Upper Main, Main and Lower Main lenses, uppermost to lowest respectively. Upon completion of these programs, drill indicated reserves, in the four separate and distinct gold-bearing lenses, were calculated to be 603,000 tonnes averaging 6.86 g/t gold (Northern Miner, May 23, 1985).

During 1986, a total of 75 diamond drill holes totaling 9,145 metres was completed. A \$2 million underground development program was awarded to Canadian Mine Development that included a decline ramp to the 100 and 200 levels, drifting, trial stoping and bulk sampling (Northern Miner, April 7, 1986). Underground development began in May, 1986. A decline was collared and a crosscut was driven from the footwall to intersect the Main Zone. When the zone was encountered, the decline was turned and driven along strike and slightly down dip. This decline was driven to prove the continuity of the zone. The zone proved to be continuous and the decline was then spiraled down to intersect the zone at a lower elevation. Development totaled 650 metres of decline.

In September 1986, Maverick and Pioneer Metals Corporation (Pioneer) merged under the latter name.

In January 1987, Pioneer announced plans to place the Puffy Lake gold deposit into production at a rate of 500 tonnes per day at an estimated capital cost of \$18 million (Northern Miner, January 26, 1987). A feasibility study conducted by Kilborn Engineering Ltd. concluded that the reported resources of 1.3 million tons grading 7.88 g/t gold within four parallel mineralized zones could be mined using modified open stope methods (Northern Miner, January 26, 1987). A 93% rate of recovery was expected at an operating cost of \$175 US per ounce (Pioneer news release, January 19,

1987). Reserves were calculated using an average 2 m mining width, 3.43 g/t cutoff grade and a 10% dilution factor.

Mill site excavation began May 15, 1987 and pre-production underground development commenced near the month end. A raise was driven from the lower portion of the decline up dip to prove continuity in that direction and a test stope was mined. Additional diamond drilling from surface was undertaken.

After completion of 225 diamond drill holes, Pioneer updated ore reserves to 2.25 million tonnes grading 7.99 g/t gold and increased projected production to 900 tonnes per day (Northern Miner, May 11, 1987). The claim was converted to a mining lease October 30, 1987.

Milling began December 4, 1987 and the first dore bar was poured December 15, 1987 (Northern Miner, March 7, 1988). At this juncture, the deposit was estimated to contain probable and possible reserves of 3.54 million tonnes grading 7.88 g/t gold (Northern Miner, May 9, 1988).

In March, 1989, Pioneer announced suspension of mining operations due to a continuing operating loss and failure to reach commercial production levels (Globe and Mail, March 21, 1989).

In the period August 8th to 11th, 1989 a series of forest fires swept through the Sherridon – Puffy Lake area. These fires caused considerable damage to pipelines from the fresh water intake lake as well as discharge lines to the tailing pond. In addition, some damage was caused to power line poles and some outlying buildings.

The crusher/mill/office complex had an adequate firebreak surrounding it and escaped damage from these fires.

During February and March 1994, in anticipation of reactivating the Puffy Lake mine, a series of eight (8) holes for a total of 633 metres was drilled. The program was designed to better define reserves in the area to be mined – as infill drilling at 15 metre centres, over an area previously defined at 30 metre centres. The drilling confirmed the continuity of all four known zones and returned values similar to those received from past drilling in the area. (News Release dated March 17, 1994).

The following statements are derived from historical records and are historical in nature. Reference to 'reserves', 'resources', etc., do not conform to NI43-101 requirements thus are not NI43-101 compliant and should be read solely as an historical reference.

Disclosure – Historical Estimates. Piteau Associates Engineering Ltd reports as follows:- “Although the Puffy Lake deposit was known and tested by surface drillholes prior to 1980, none of the data obtained prior to 1980 was available thus the mineral inventory estimate was based on data obtained from 1980 to 1987.

In September 1980 diamond drilling began at Puffy Lake along cross sections spaced 100 feet apart and aligned N 70° E. Nominal drill spacing along the section lines is 100 feet, but varied considerably during various drill campaigns between 1980 and 1987.

The quartz veins containing gold mineralization strike northwards and dip towards the east at about 33°. As these veins are traced northwards from the Main Zone into what is called the Fire Zone, the strike of the veins swings around towards the northwest and the dip becomes 30° northeasterly.

Within the area tested by diamond drilling, four distinct horizons of quartz veining with gold values have been recognized. From the top downwards these horizons have been named Sherridon, Upper, Main, Lower. Although the thickness and gold content of these horizons are quite variable, the attitude and continuity of these horizons are remarkably consistent and uniform.

Most of the diamond drillholes at Puffy Lake were vertical, only a dozen or so being inclined at angles of 50° to 80° from the horizontal. Most of the drillholes were located by chain and compass, with only about 40 or so having had their collar locations precisely surveyed”.

Pioneer Metals’ mineral inventory calculation (Mr. Brian Simmons) used the polygon method to define an area of influence of each of the diamond drill holes on each of the four gold bearing horizons. The calculation procedure used by Pioneer (Brian Simmons) and reviewed by Piteau Associates Engineering Ltd in April 1987 is reported to have been as follows:

- (a) Geological logging of diamond drill core identified potential gold bearing quartz horizons and selected sample intervals for gold assays.
- (b) The drillholes and gold assays were plotted on cross sections drawn perpendicular to the strike of the quartz veins. Correlations of the quartz-gold intersections, with the four principal horizons (Sherridon, Upper, Main and Lower), were made on these cross sections.
- (c) All the drillhole and assay data were entered into the computer program together with the corresponding horizon identifier labels (Sherridon, Upper, Main, Lower). The computer program is specifically designed to handle vertical drillholes; consequently, the small number

of inclined drillholes were handled by inserting the coordinates of the vein intersections as if a vertical drillhole was intersecting the vein at that point.

- (d) The computer program calculated the area of influence of each drillhole on each quartz-gold horizon as a polygon. The computer program approximated true polygon construction by creating a block model and then assigning the drillhole grade outwards in ring increments, with early numbered holes having priority.
- (e) The memory capacity of the computer limits the size of the block model. Therefore, it was necessary to divide the property into three parts, the Main Zone to the south, the Fire Zone to the north, and the Ragged Lake Zone to the northeast.
- (f) The computer calculated the tonnage of each polygon using a specific gravity of 2.77 and calculated a total tonnage and weighted average grade for each of the gold bearing horizons. In each of the two halves of the deposit.
- (g) The results of the computation were output in the form of plans and tabulations of the individual polygons and a summary of the results.

Results of both Pioneer's and Piteau's calculations are illustrated in Table 8-2. Note; The following numbers were converted from rounded imperial units (estimates) to metric units thus were not further rounded, in order to avoid bias.

Table 8-2. Resources as calculated by Pioneer and checked by Piteau

	Pioneer		Piteau	
<u>Zone</u>	<u>Tonnes</u>	<u>Grade</u>	<u>Tonnes</u>	<u>Grade</u>
Sherridon	566,994	8.33	149,686	7.11
Upper	290,301	9.53	142,429	9.68
Main	783,812	7.06	707,608	5.73
Lower	963,436	6.86	192,324	5.19
Total	2,604,542	7.54	1,192,048	6.29

Specific Gravity of the Mineral Deposit. Two determinations of the specific gravity of the Puffy Lake mineral deposit were available. Both values were from the Main Horizon in the Main Zone. The first determination, by Britton Research in 1981 on a 20kg sample from diamond drill core, gave a value of 2.87 gm/cc. The second determination, by Lakefield Research on a 6.8 tonne bulk sample from surface trenches gave a value of 2.77 gm/cc. A value of 2.77 was selected for the mineral inventory estimation because it was based on a larger sample and was also the more conservative value.

In January, 1987, Pioneer announced the decision of its Board of Directors to place the Puffy Lake gold deposit into production.

Construction of a process plant, with a capacity of 1,000 tons per day, was completed within a year and production had begun by January of 1988. Annual gold production was targeted at 72,000 ounces. Actual production in 1988 was 21,000 ounces and 8,500 ounces in 1989. At peak, the Puffy Lake Gold Mine employed 170 people. The first major employee layoff occurred in March of 1989, and the mine was completely closed by June 1989. This aspect, production from the property, is much more fully discussed in Section 20 – Other Relevant Data and Information.

Data presented in this section are summarized from the following sources: -

1. Kilborn Engineering (BC) Ltd – 1986 “Valuation Report”
2. Piteau Associates Engineering Ltd – April 1987 “Updated Review of Polygonal Mineral Inventory Calculations”
3. Exploration Mining Geology, Vol 4, No 1, - “Geology of the Puffy Lake Au Deposit, Sherridon District, Manitoba by Gary Ostry & Norman H. Halden.

9.0 GEOLOGICAL SETTING

Regional Geology.

The regional geology of the Flin-Flon/Snow-Lake/Sherridon area has been described by Bailes, 1971 in Manitoba Mines Branch Paper 1/71. The following is a detailed summary of Bailes' discussion.

The Precambrian rocks of the Snow-Lake/Flin-Flon/Sherridon region comprise two broad, easterly-trending belts of rocks of differing lithology, degree of deformation and grade of metamorphism. These belts are referred to as the Flin-Flon/Snow-lake greenstone belt (south) and the Kisseynew metasedimentary belt (north).

The southern belt is composed of greenschist to lower amphibolite facies volcanic and sedimentary rocks. The northern belt comprises complexly deformed middle to upper amphibolite facies sedimentary gneisses and associated granite rocks. The two belts are separated by a fault zone from north of Flin Flon to a point east of File Lake.

The Flin-Flon/Snow-Lake belt comprises four main sequences (oldest to youngest): -

- The Amisk Group.
- The Post-Amisk Intrusive Group.
- The Missi Group.
- The Post-Missi Intrusive Group.

Amisk Group. This group is composed of a thick sequence of volcanic strata ranging from basal tuff to rhyolite, with intercalated volcanoclastic sediments. The Amisk volcanism began with widespread extrusion of thick sequences of mafic flows, commonly pillowed and includes agglomerates, tuffs and ash deposits. As the Amisk volcanism progressed it became more acidic, increasingly localized and more fragmental.

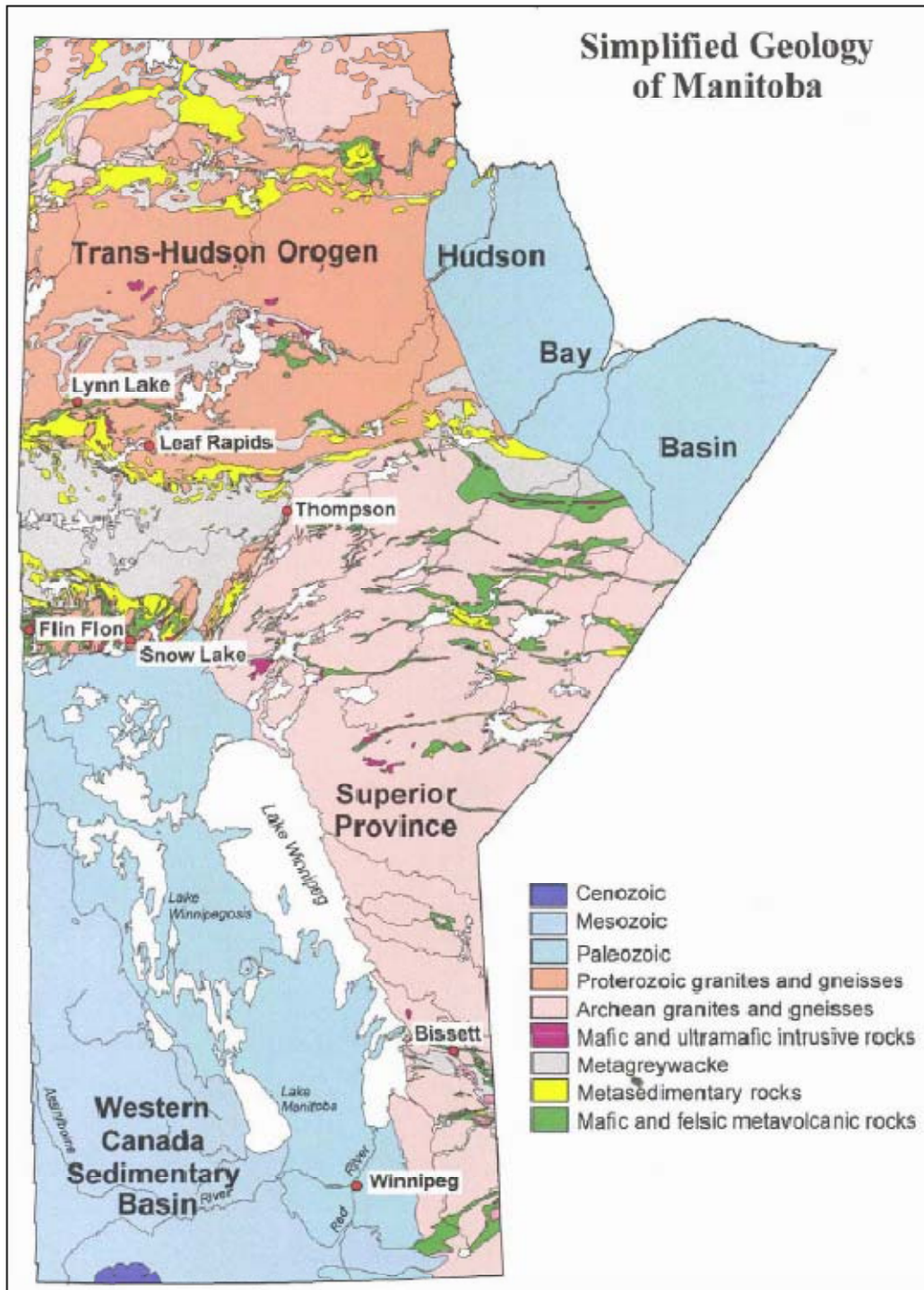


Figure 9-1. Simplified Geology of Manitoba.

Argillic and tuffaceous sediments were derived by erosion of pyroclastic deposits at various levels throughout the volcanic sequence. Sedimentary rocks can be subdivided into tuffaceous siltstones and greywacke and turbidite greywacke and siltstones.

Post-Amisk Intrusive Group. This group includes granites and mafic intrusive rocks. Intrusives range from small irregular masses to large stocks. Mafic intrusives are of diverse origin, many of them are differentiated.

Missi Group. The Amisk Group and Post-Amisk Intrusive Group are unconformably overlain by a clean detrital sequence of arkose, greywacke and quartzite known as the Missi Group. The contact of the Missi Group is disconformable with other units. The Missi is comprised largely of major granitic bodies, often of batholithic dimension.

The metasedimentary gneisses of the northern belt are termed the KISSEYNEW GNEISSES and have been derived mainly by regional metamorphism and granitization of sedimentary rocks.

The Kisseynew sedimentary gneiss belt has been subdivided into: -

- The Basement Group.
- The Nokomis Group.
- The Sherridon Group.
- The Post-Sherridon Intrusive Group.

The BASEMENT GROUP comprises a Sequence of layered granitoid gneisses. It is believed that the Basement Group are highly granitized gneisses of older 'basement gneisses'. These gneisses occupy the cores or large structural domes caused by large scale folding and/or diapiric intrusion of remobilized gneisses.

The NOKOMIS GROUP consists of two units. The first, a thick monotonous sequence of fine-grained plagioclase-quartz-biotite-(accessories) gneiss derived from a repetitive sequence of argillaceous sediments and greywacke. The second is a lithological rather than a strict rock-stratigraphic unit, and includes all basic

hornblende-plagioclase gneisses in the Kisseynew belt, regardless of stratigraphic position.

The SHERRIDON GROUP conformably overlies the Nokomis Group and is a monotonous sequence of fine to medium-grained quartz-plagioclase-potassium-feldspar-biotite gneisses derived from a sequence of akose and quartzite.

Large portions of the Sherridon gneiss have been subjected to potassium metasomatism and recrystallization to produce homogeneous granitoid phases which are transitional into granitic material.

The POST-SHERRIDON INTRUSIVE GROUP. This group was generated by a post-Sherridon metamorphic and tectonic event through metamorphic differentiation and mobilization of portions of the Nokomis and Sherridon sequences. The group are mainly comprised of white gneissic quartz monzonites and granodiorites with migmatic varieties.

Previous stratigraphic correlations between the Flin-Flon/Snow-Lake greenstone belt and the Kisseynew gneiss belt remain unclear. Bailes believes that the Kisseynew gneisses are a complex of different ages and include strata equivalent to both the Amisk and Missi Groups. Further, Bailes believes that the Nokomis Group is the stratigraphic equivalent of the Amisk Group sediments, while the Sherridon gneisses are equivalent to the Missi Group.

The intensity of deformation and grade of metamorphism is highest in the Kisseynew sedimentary gneiss belt and decreases southwards into the Flin-Flon/Snow-Lake greenstone belt. Within the Kisseynew gneisses, upper amphibolite facies was prevalent and accompanied by anatexis and granitization. The structures of the Kisseynew belt are dominated by tight, nearly isoclinal, eastern trending folds which are overturned to the south.

Ostry & Haldon also discuss this regional geology. They state: The Kisseynew gneisses form an east trending 240 km by 140 km belt of complexly folded, predominantly metasedimentary rocks. The gneiss belt is bounded by the Lynn Lake and Flin Flon greenstone belts to the north and south, respectively, to the east by Archean rocks of the Superior structural province, and by the Tabbemor fault and granitic rocks of the Glennie domain, Saskatchewan to the west. An attenuated slice of sedimentary gneisses occurring between the LaRonge - Lynn Lake greenstone belt and the Glennie Domain in Saskatchewan may represent a western extension of the Kisseynew gneiss belt. Zwanzig,

Lenton and Schledewitz proposed a stratigraphic nomenclature for these supracrustal components. They are: -

1. Amisk Group for fine-grained amphibolite and associated rocks that occur in proximity to the Kisseynew gneiss belt/Flin Flon green-stone belt margin.
2. Burntwood Metamorphic Suite (after Gilbert et al. 1980; Lenton, 1981) for greywacke derived gneiss and migmatite.
3. Missi Metamorphic Suite for fine-grained sedimentary (subgreywacke-arkose) derived and, locally, volcanic derived quartzofeldspathic gneiss and mig-matite, that had previously been mapped as granitized Nokomis gneisses by Robertson (1953).
4. Rocks of uncertain age that include fine to coarse-grained amphibolite and felsic gneisses, that are possible recrystallized equivalents of the Amisk Group.
5. Sherridon Metamorphic Suite quartz-rich rocks of uncertain age and genesis.

Kisseynew rocks have been metamorphosed to middle and upper amphibolite facies. The highest grades of metamorphism and most extensive migmatite development occur toward the central portion of the belt.

The structural history of the belt is uncertain due to local variations in the style of deformation, particularly within the rocks that outcrop along the south margin of the Kisseynew gneiss belt. Most investigators agree that the earliest deformation, which is common to the whole belt, produced large-scale recumbent isoclinal folds or nappe-like structures.

This style of deformation is inferred from regional inversions and repetitions of stratigraphy. Transposition of beds and development of the main regional schistosity/gneissosity (which is defined by biotite and/or hornblende alignment parallel to compositional layers) also occurred during this event.

Refolding of the early recumbent structures has produced dome and basin interference patterns that are prevalent throughout the Kisseynew gneiss belt. These early structures commonly exhibit shallow to moderate plunges and dips.

These structures include open flexural type folds, kinks and crenulations with north and south plunging axes; late high strain zones, which are also prominent along the south margin of the belt, may also be linked to these structures. A description of the tectonic evolution of the gneiss belt is presented in Zwanzig (1990).

The Puffy Lake deposit lies within a high grade metamorphic terrain on the south margin of the Kisseynew sedimentary gneiss belt. The area is underlain by a metasedimentary sequence consisting of the Amisk, Nokomis and Sherridon Groups and the intrusive granitoid gneisses of the Hutchinson Lake Dome. Figure 9-2.

It has been determined that the overlying Sherridon Group is of shallow-water, probably alluvial origin, while the Nokomis Group represents marine deposits. The gold-bearing ore zones at Puffy Lake occur within the metagreywacke gneisses of the Nokomis Group.

The regional structure is dominated by the Defender Lake and Hutchinson Lake Domes, which have tended to warp the foliation, and by a number of stages of folding in the Sherridon and Nokomis Group rocks.

Local geology.

The following are the findings of Ostry and Halden. Stratigraphy in the vicinity of the Puffy Lake deposit comprises fine-grained, intermediate to mafic biotite and amphibole-bearing gneiss of the Amisk Group, greywacke-derived gneiss of the Burntwood Metamorphic Suite and Missi Metamorphic Suite quartzofeldspathic gneiss. Large tonalitic-granitic bodies have intruded Amisk rocks. Most rock units are lineated and exhibit north to northwesterly strikes and moderate, 25° to 40° dips to the east or northeast.

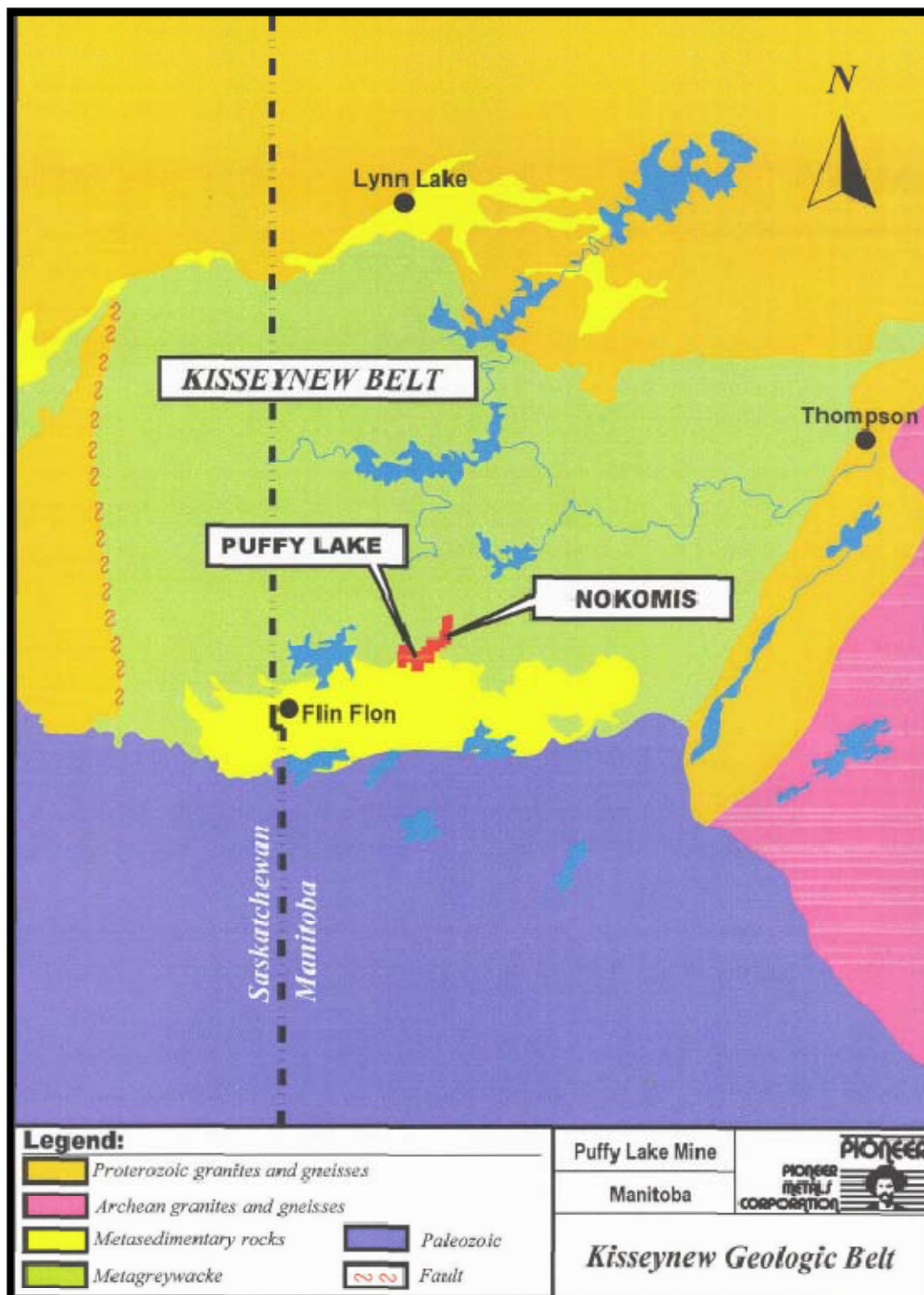


Figure 9-2. Kisseynew Belt.

Amisk Group rocks trend easterly along the south margin of the tonalite gneiss, occupy the core of a major overturned F_2 anticline in the east portion of the project area, and outcrop in the northeast. The Amisk Group rocks in this area are interpreted to be part of one continuous stratigraphic unit, but comprise different lithologies in different parts of the map area.

In the western portion of the map area, i.e., south of the tonalite intrusion, the Amisk rocks comprise a very fine to fine-grained, layered (tens of cms to meters in thickness) sequence that consists predominantly of amphibolite and garnetiferous amphibolite.

In the core of the fold structure that occurs southeast of the portal the Amisk rocks comprise a layered (one to tens of cms in thickness) sequence of predominantly fine to medium-grained biotite bearing, locally garnetiferous intermediate gneiss that is derived from volcanoclastic or greywacke rock. These rocks are interlayered with minor amounts of fine to medium-grained amphibolite, with or without garnet, felsic gneiss and ultramafic rock.

Amisk group rocks that outcrop in the northeast part of the map area comprise a sequence of layered (tens of cms to m in thickness) predominantly metavolcanic, variably garnetiferous and locally biotite bearing amphibolite with abundant calc-silicate segregations. Less common are volcanoclastic derived, massive, hornblende and biotite-bearing intermediate gneisses and a fine-grained felsic gneiss.

The granite is massive and apparently devoid of incorporated wall rock. U-Pb age determinations on zircons from the tonalite and granite intrusions yield probable Amisk age dates of 1892 Ma $\pm$ 66/-25 Ma and 1873 $\pm$ 4 Ma, respectively.

Missi rock sequences comprise a wide variety of finegrained, felsic, biotite and/or hornblende-bearing quartzofeldspathic gneisses, typically with a basal conglomeratic unit, that are interpreted to unconformably overly Amisk age rocks. These quartzofeldspathic rocks are fine to medium-grained, variably magnetic, banded to massive and weather buff white, pink, green or gray, and are principally derived from arkose, conglomerate quartzite and feldspathic greywacke. Layers are typically on the order of 1 m to 3 m in thickness.

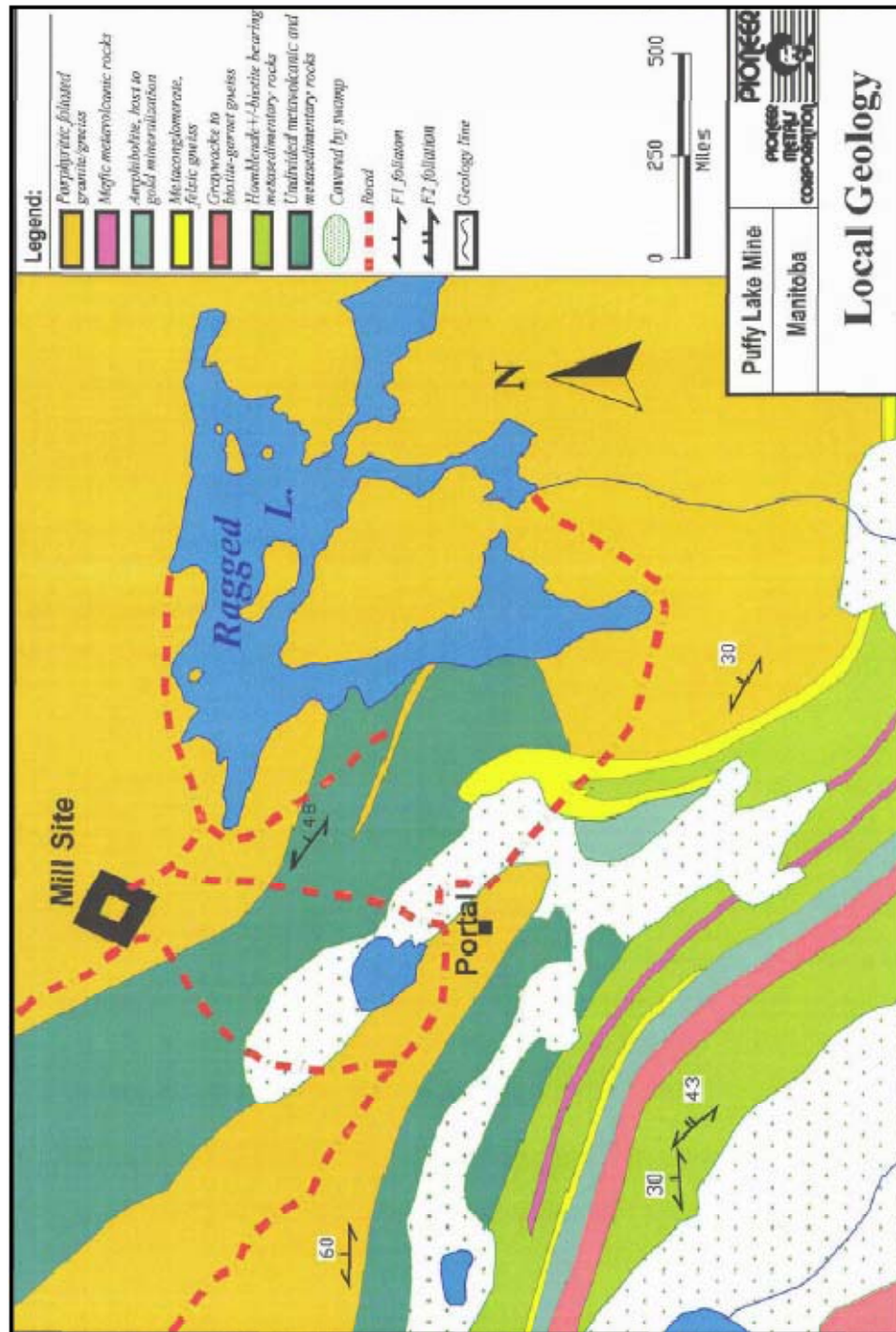


Figure 9-3. Local and Mine Geology

The Missi Group sequence that crops out immediately east of the mine portal consists of white-gray and pale green weathered biotite-bearing quartz-rich quartzofeldspathic gneiss that contains felsic polymictic conglomeratic layers and pebbly quartzfeldspar-biotite± magnetite gneiss (meta-arkose?). Locally, intermediate hornblende-feldspar quartz gneiss, amphibolite and calc-silicate layers form important constituents of this rock unit.

Property Geology.

Kilborn Engineering (1993) provide the following general geological description of the Puffy Lake property.

Within the property, three main rock assemblages are distinguished. A lower homogeneous, light grey to white, lineated granite gneiss, which forms a distinctive 'footwall' for frilling; a central well layered inhomogeneous, generally mafic schist and gneiss package of the Nokomis group, which hosts the gold bearing quartz veins; and an upper unit of more competent felsic and intermediate gneisses of the Sherridon group. This upper unit, is bounded at the base by a stretched conglomerate that likely represents a regional unconformity and forms a distinctive marker throughout the area.

The dominant rock type at the mine is a greywacke gneiss of the Nokomis group which is characterized by abundant biotite and garnet porphyroblasts.

Data presented in this section are summarized from the following sources: -

1. Exploration Mining Geology, Vol4, No 1, - "Geology of the Puffy Lake Au Deposit, Sherridon District, Manitoba by Gary Ostry & Norman H. Halden.
2. Manitoba Energy and Mines – Mineral Deposit Series No 19, "Mineral Deposits and Occurrences in the Batty Lake Area".
3. Kilborn Engineering Pacific Ltd – "Puffy Lake feasibility Study – 1993".

In the May 1989 'Monthly Report' Mr. Erik Anderson reports; "Manitoba Geological Services; George Gale and Gary Ostry spent 10 days on site mapping structures underground. A brief report was submitted to Pioneer. Ostry intends to return for a few days in early June".

Author placed a great deal of reliance on the "Ostry" document".

10.0 DEPOSIT TYPES

Classification.

The Puffy Lake deposit can be considered as a 'vein type deposit' with multiple veins or lenses. Auriferous sulphide-bearing quartz veins and zones of quartz free, gold-sulphide mineralization occur in a biotite-rich gneiss/schist. Gold-sulphide mineralization also occurs with or without quartz within fine to coarse-grained felsic quartzofeldspathic gneiss.

At the Puffy Lake deposit the recognition of an early mineralizing event and subsequent mobilizations of the sulphides and gold offers an alternate model for distribution of at least some of the gold-sulphide mineralization. The mobilization of arsenopyrite, sulphides and gold into structural traps that form high-grade 214-type shoots' would provide new exploration targets, in addition to the 201-type 'sheets'.

From a regional metallogenic perspective, known gold mineralization on the south flank of the Kiseeynew gneiss belt is associated with arsenopyrite and occurs within sequences of predominantly amphibolitic rocks at the major lithologic or structural break between Burntwood (Amisk?) and Missi age rocks, typically near the Missi basal conglomerate.

Structure.

In general, Puffy Lake deposit appears to strike N 30° W and dips 29° to the ENE.

Kilborn Engineering (1993) reported as follows. The engineering behaviour of the rock mass is dependent on the structural characteristics of the particular structural domain. In October 1987, Mr. A.F. Stewart, P.Eng., of Piteau Associates, investigated the structural considerations as evident in underground openings and drill core. Included in this work were investigations of foliation, joint sets and faulting.

Few faults have been mapped in the Puffy Lake area. From surface drilling, a post ore fault appears to have offset the lower portions of the various zones.

Three main joint sets, including foliation joints, were mapped. The foliation orientation is very consistent at N62°E dipping 29 degrees. There is some foliation

warping with dips ranging from 23 to 36 degrees. Where visible, it can be observed that foliation joints are continuous over considerable lengths (i.e. 10 to 15 metres). Spacing of foliation joints is typically 0.1 to 0.4 metres.

Two other joint sets other than foliation joints are evident. The second most prominent is N25°W dipping 67 degrees. This set is not as well defined as the foliation joint sets but is still relatively strong and present in all areas. Spacing of these joints is variable but generally in the range of 2 to 4 metres.

The third joint set has a vertical dip and is oriented S31°E. Spacing of these joints is variable at 5 to 8 metres, and they appear to be cut off by foliation joints.

Halden and Ostry discussed 'structure' in the following terms. Three periods of ductile deformation and at least one phase of late, possibly brittle faulting, have affected the rocks in the vicinity of the Puffy Lake deposit.

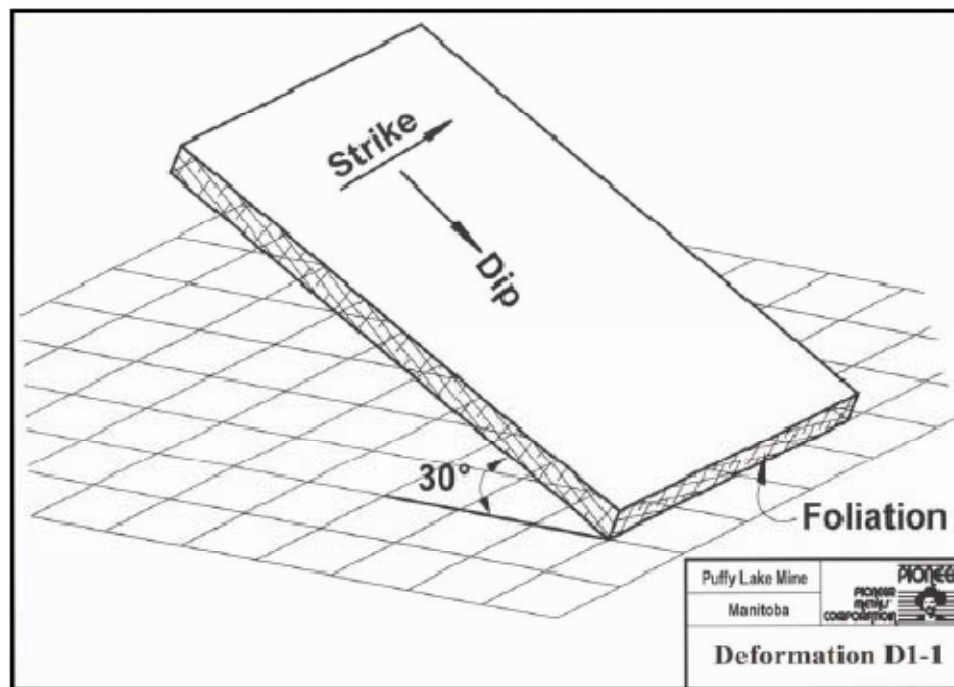


Figure 10-1. Possible D₁ Deformation.

The earliest deformation (D₁) identified in outcrop, and underground, produced the regional foliation which is a well-developed schistosity (S₁) defined by the parallel alignment of biotite and/or hornblende. Figure 10-1 illustrates this. In this majority

Of outcrop S_1 parallel to compositional layers (S_0), but crosscuts in the noses of small-scale F_1 intrafolial folds that were formed during D_1 .

The second deformation event, D_2 , produced the most conspicuous macroscopic structures observed in the area. These are larger-scale reclined flexural folds (F_2).

Possible D_2 deformation is illustrated in Figure 10-2.

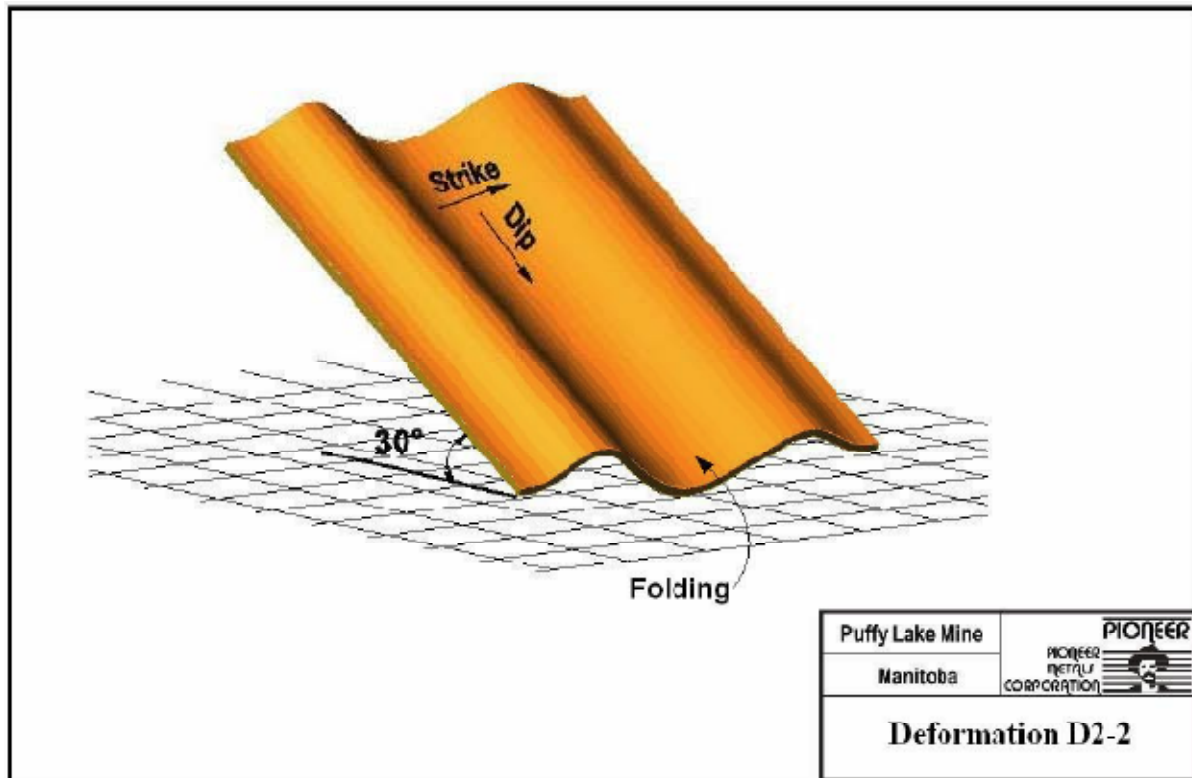
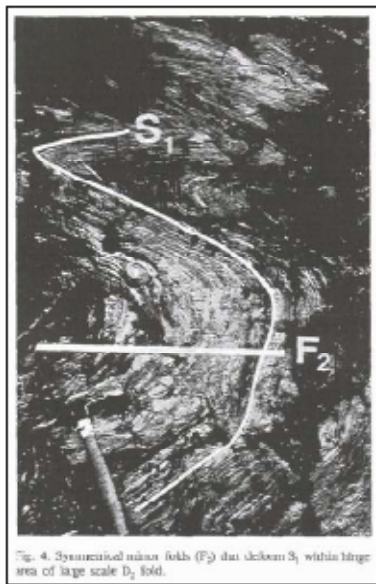


Figure 10-2. Possible D_2 Deformation.



Symmetrical small-scale folds are well developed within the hinges of these folds (Fig. 4). Small-scale folds with both 'S' and 'Z' asymmetry are particularly well developed on the limbs of the large F₂ fold that occupies the eastern portion of the map area. Locally S₂ is poorly developed; it is expressed as a weak biotite growth that cross cuts S₁ in the hinge zone of the large F₂ fold.

The most pronounced lineation (L₂) is defined by the preferred orientation of the long axes of biotite and hornblende crystals which plunge approximately 20° to 30° toward 030° to 060° and are parallel or close to parallel with the plunge of minor F₂ fold axes.

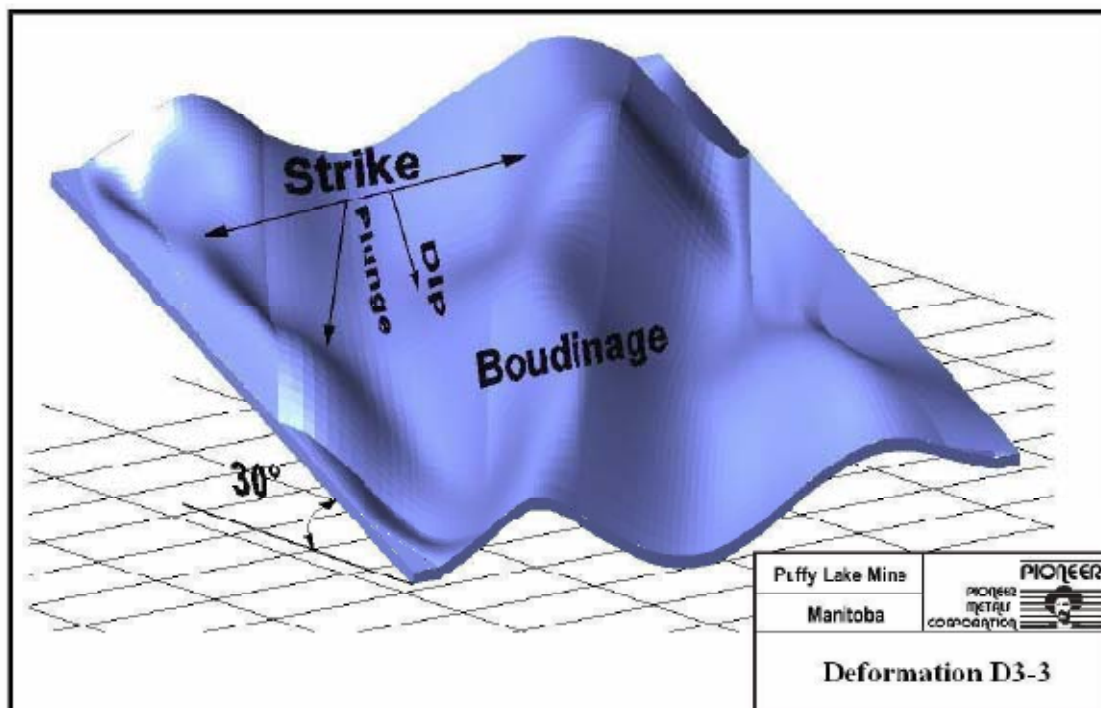
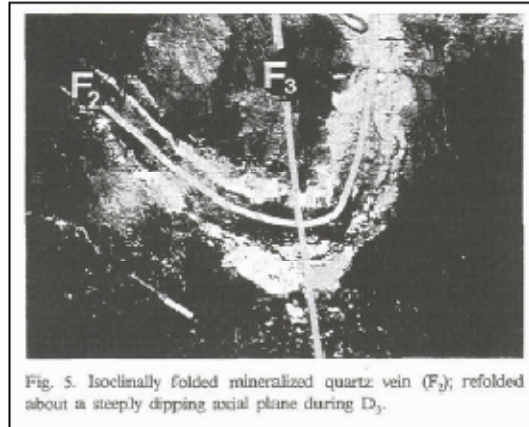


Figure 10-3. Possible D₃ Deformation.

A later deformation (D_3) produced large-scale open flexures and small-scale folds (F_3) that are coaxial with F_2 minor folds about shallow east plunging axes and steeply dipping axial planes. Figure 10-3 potential illustrates this phenomenon.

Fig 5. Both the F_3 fold axes and axial traces trend 070° to 080° . Small-scale open F_3 folds are also well exposed throughout the mine. A crenulation of S_1 by F_3 also produced mullion structures that parallel the F_3 fold axes.



The three illustrations accompanying the structural description of Ostry & Halden, do not portend to accurately reflect the sequence of events described by these gentlemen. These illustrations are included to graphically illustrate a phenomenon at Puffy Lake referred to by first-line supervisor, B. O'Beirn (Mine Captain) as well as mining consultants Norman Anderson and John D. Smith.

Mr. O'Beirn, in a report describing the various mining methods tried at Puffy Lake, makes the following comment with respect to mining the Puffy Lake structure: –

- “As this ore structure rolls on dip, as well as on strike, following it is very difficult”.

At another location of the report Mr O'Beirn talks about the designed ‘typical’ stope. Herein he refers to;

- “In some areas where ground conditions were a concern due to unforeseen rolling or plunging”.

With respect to positive aspects of the ‘typical’ method Mr. O'Beirn states;

- “Allowed for good control of ore extraction and adjustment to changes as the ore rolled on dip and on strike”.

In discussing a method developed at the mine described as “Combination of Drifting, Jumbo and Jackleg Slash”, Mr O'Beirn states;

- “Close adjustment to ore roll and dip could be better maintained”.

Finally, during Mr. O’Beirns’ discussion re possibly using longhole techniques, he states:

- “Because of the nature of the ore [and] it’s determination to roll on strike and dip as well as pinch and plunge, longhole”

John D. Smith M.Sc., P.Eng, in his January 25, 1989 report makes the following statements.

- “The ore zones contain conformable quartz veining that shows evidence of boudinge both on a large and small scale. These “pinches and swells” and related flow features are clearly seen in the shear zones that”.
- “.... Are the “pinches and swells” in the ore of a cyclical nature ...”.
- “Many stopes have shapes and sizes that clearly indicate the ore has been lost and is more discontinuous than the drilling indicated”.

Data presented in this section are summarized from the following sources: -

1. Exploration Mining Geology, Vol 4, No 1, - “Geology of the Puffy Lake Au Deposit, Sherridon District, Manitoba by Gary Ostry & Norman H. Halden.
2. Manitoba Energy and Mines – Mineral Deposit Series No 19, “Mineral Deposits and Occurrences in the Batty Lake Area”.
3. “Underground Mining at Pioneer Metals: Puffy Lake Project” by Bob o’Beirn.
4. “Review of mining Operations at Puffy Lake” by John D. Smith, M.Sc., P. Eng.

11.0 MINERALIZATION

Ostry and Gale (Refer to Section 9.0 – Geological Setting) undertook detailed mapping on the 224 level of the mine in the vicinity of the 201, 202, 203, 211, 212, 213, 214 stopes, and exploration drift. This area was selected for its ease of access, variable nature of the gold-arsenopyrite mineralization, and structural variation shown by steep and variably oriented foliations. Three styles of gold-sulfide mineralization were identified:

201-Type.

The 201-type of mineralization comprises of free gold and disseminated foliated arsenopyrite within laterally extensive, moderately dipping, parallel or close to parallel sheets that are conformable with layering and the regional S_1 schistosity.

These mineralized sheets form at least three narrow (1m to 2 m thick) zones within the intermediate quartzofeldspathic biotite-bearing gneiss (containing 20% disseminated arsenopyrite and locally, pyrrhotite) and are continuous from level to level within the mine.

201-type was the most widespread and significant ore-type in terms of production; it was exposed in the 201-203 and 211-213 stopes on the 224 level of the mine. The sulfide grains are typically flattened parallel to the S_1 biotite fabric in the 201-type mineralization; this distinguishes them from annealed sulfide grains in the 214-type mineralization (see later).

Elongation of the sulfide minerals is rare but lineated arsenopyrite crystals and crystal aggregates orientated parallel to L_2 are locally preserved; these were probably formed by flattening and extension at the same time as the hornblende and biotite mineral lineations (L_2) that were generated during development of F_2 folds. Both the upper and lower limits of mineralization are marked by a 2 cm to 4 cm transition from mineralized biotite-rich rock to biotite-bearing quartzofeldspathic gneiss. Ultramafic layers and calc-silicate veins are also present, but do not appear to display any spatial association to the gold and sulfide mineralization.

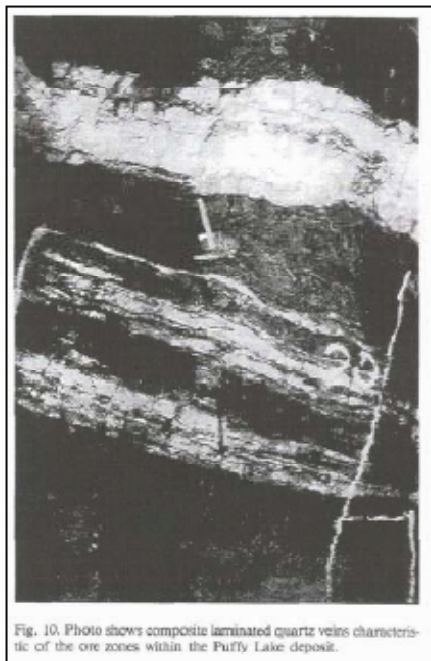


Fig. 10. Photo shows composite laminated quartz veins characteristic of the ore zones within the Puffy Lake deposit.

The mineralized sheets also contain several ages of white to smokey gray, simple quartz veins and/or composite laminated quartz veins (Fig. 10).

The simple veins exhibit relatively constant thicknesses of <1 cm to <1 m along strike. The thickness of some of the composite quartz veins range from a few cms or tens of cms to, locally, 1m to 3m along strike and have intruded and separated thin laminae of the mineralized rock parallel to the regional schistosity.

The veins also commonly contain rafts of mineralized wall rock; these rafts may display

ragged edges that locally crosscut the S_1 schistosity.

Most composite quartz veins contain schistose laminae that are parallel to vein walls, but in the thicker quartz masses the laminations or incorporated mineralized wall rock fragments are more commonly oriented oblique to the vein walls suggesting that they have been rotated. The contacts between the incorporated wall rock rafts and the quartz are sharp and invariably truncate the foliation (S_1) within the fragments, indicating the emplacement of the quartz is post- D_1 . The laminated nature of the composite veins and the variability in vein thickness are characteristic of vein growth by a crack-seal mechanism.

Distribution of gold and sulfide mineralization within the quartz veins is erratic; in general the quartz is not mineralized. The highest sulfide concentrations within the quartz veins are associated with incorporated rafts of the foliated and mineralized wall rock, or fine- to coarse-grained segregations and crystal clusters of arsenopyrite, pyrrhotite and pyrite $\pm$ chalcopyrite, sphalerite and galena. More rarely, gold nuggets occur in veins that occupy boudin necks which were most likely formed during D_2 deformation. Locally, vertical quartz veins that fill late fractures crosscut these zones, but do not contain visible mineralization.

The emplacement of the majority of quartz veins predates the D₃ deformation phase; minor F₃-folds, fold the early quartz veins and deform the foliated arsenopyrite and pyrrhotite layers. Some of the quartz veins appear to have been isoclinally folded by F₂ folds and are subsequently refolded by F₃.

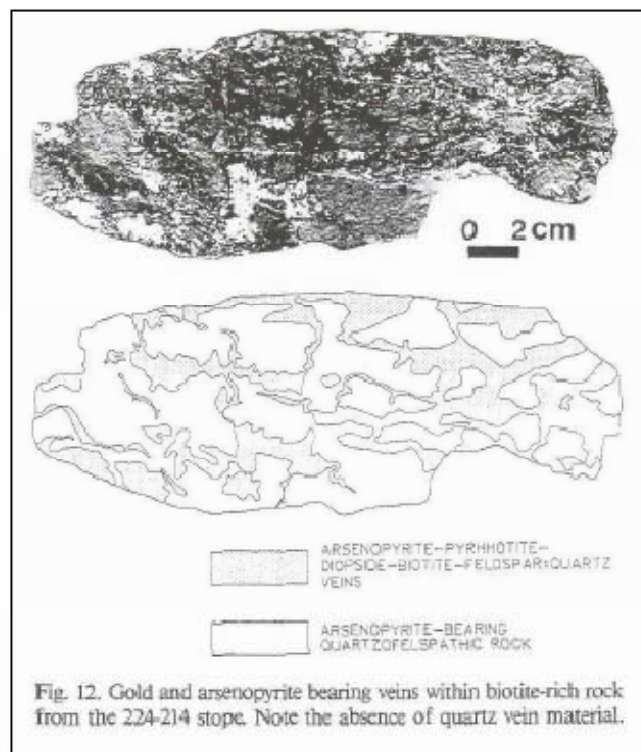
Boudinage and 'chocolate block' boudinage structures are locally developed within the quartz veins which is probably associated with the D₂ deformation event. Two episodes of mineralization are readily apparent:

1. A pre or syn-D₁ mineralization characterized by arsenopyrite and pyrrhotite either deformed during D₁ or found intimately associated with the S₁ biotite fabric.
2. A post-D₁ to syn-D₂ re-mobilization of arsenopyrite and pyrrhotite with subsidiary galena sphalerite, chalcopyrite and gold into irregular crosscutting fractures and boudin necks.

The sulfides may have been annealed during a post-D₃ high temperature metamorphic event; this is suggested by their association with a randomly-oriented, coarse-grained assemblage of diopside, Ca-amphibole and calcite within calc-silicate veins.

214-Type.

The 214-type mineralization is exposed within and in the vicinity of the 214 stope. This area, apparently, constituted the richest gold ore produced from the deposit. Host rock to the mineralization is similar in composition to that exposed in the 201-203 and 211-213 stopes, i.e., a fine-grained biotite-bearing quartzofeldspathic rock, but



in this case the matrix or gangue rock lacks a homogeneous planar fabric.

It is typically devoid of quartz veins and contains up to 40% arsenopyrite and accessory pyrrhotite. The sulfide minerals occur as randomly orientated blebs and crystals. These may be associated with accessory biotite, feldspar, quartz, and, locally, calc-silicate minerals. This assemblage is found within an anastomosing network of veins throughout the 214 slope (Fig. 12).

Other Types of Mineralization.

Erratically distributed sulfide minerals and gold also form veins that occupy brittle fractures within the quartz veins, and occur locally within felsic quartzofeldspathic gneiss of the Missi suite. The latter is informally referred to as the Sherridon Zone.

The veins (cm or less in width) of sulfides and gold crosscut the S_1 schistosity and are interpreted to have formed post- D_1 . They are erratically distributed throughout the compound quartz veins, previously described as part of the 201-type mineralization. These veins formed by mobilization of quartz, sulfides and gold from earlier formed mineralization.

The Sherridon zone of mineralization is hosted by Missi medium to coarse-grained quartzofeldspathic gneiss is up to 4 m thick, and contains erratically distributed sulfide minerals and gold plus discontinuous, white, simple quartz veins and lenses. The lateral extent of the Sherridon zone is not known but it is roughly parallel to the S_1 schistosity and layers and occurs within meters of the sill-like tonalite/granodiorite body.

Mineralization in these later veins and Sherridon zone comprises fine- to coarse-grained arsenopyrite, pyrrhotite and pyrite and, more rarely, sphalerite, galena and chalcopyrite which occur in randomly orientated concentraions but locally they may form euhedral-subhedral crystals or crystal aggregates. Visible gold, where present, commonly forms fine-grained nuggets.

The Sherridon zone has also been affected by a late shearing event that has broken and rotated quartz veins and lenses of quartzofeldspathic segregations. The Sherridon zone was accessed during underground development but gold contents were too erratic to sustain production.

Discussion – Principle Characteristics of the Puffy Lake Deposit.

Mineralization exhibits different modes of occurrence in the Puffy Lake deposit. The earliest and most extensive in mineralization, the 201 type, was introduced prior to the D₁ deformational event; it forms at least three 1 m to 2 m thick sheets of gold-arsenopyrite mineralization that are stratabound within intermediate biotite-bearing quartzofeldspathic gneiss.

The immediate host rock is typically a schistose, biotite-rich quartzofeldspathic rock that appears to have been variably altered. Foliations defined by arsenopyrite and pyrrhotite and the schistosity developed in the biotite-rich host rock were both formed during the D₁ regional deformation event. Both simple and composite quartz veins up to 2 m thick, but more commonly less than 1 m thick, are invariably present and segment the sheets of mineralization parallel or subparallel to the schistosity. Most of the quartz is barren and effectively dilutes the ore.

The 214-type mineralization, an anastomosing network of gold and arsenopyrite-bearing veins, crosscuts the S₁ schistosity and consequently postdates D₁. This mineralization does not appear to have been folded or lineated by D₂ and is interpreted to post-date D₂.

The steep dip of foliations in the vicinity of the 214 stope and the large open flexure, reflected by a deviation in the trend of stratigraphy near the 214 stope, are attributed to the D₃ deformation. This mineralization is considered to represent the mobilization of gold and arsenopyrite into a dilatant zone or structural trap that parallels F₃ fold axes.

An alternate explanation would be that the 214-type mineralization represents an early pre-D₃ feature with high arsenopyrite and low silicate content that recrystallized during a post D₃ metamorphism. Randomly oriented concentrations, blebs and euhedral crystals of arsenopyrite, pyrrhotite, with or without galena, sphalerite, chalcopyrite and gold, fill brittle fractures within the quartz veins. However, the distribution of this style of mineralization is erratic and interpreted to represent mobilization from contiguous 201-type mineralization. The erratically distributed mineralized fractures may be important locally, but are not systematically distributed and do not offer viable exploration targets.

Data presented in this section are summarized from the following sources: -

1. Exploration Mining Geology, Vol4, No 1, - "Geology of the Puffy Lake Au Deposit, Sherridon District, Manitoba by Gary Ostry & Norman H. Halden.
2. Manitoba Energy and Mines – Mineral Deposit Series No 19, "Mineral Deposits and Occurrences in the Batty Lake Area".

12.0 EXPLORATION

Historical exploration at the property is described in detail under section 8.0 – History. Since production ceased at the property (April 1987), and to the best knowledge of author, apart from the small 8-hole program in 1994, there has been no active field exploration at Puffy Lake.

13.0 DRILLING

Since production ceased in April 1987, Puffy Lake has been maintained on a care and maintenance basis. As such, and to the best knowledge of author, (apart from the 1994 8-hole program) no drilling has been carried out at the property. All drilling at Puffy Lake is considered historical in nature and is summarized in Table 8-1 – Past Surface Diamond Drilling.

14.0 SAMPLING METHOD AND APPROACH

All diamond drilling at Puffy Lake was in the relative recent past (1980 through 1994). Material sampled for resource estimate and grade control consisted of drill core. Piteau Associates Engineering Ltd (April 1987) report that, “The initial drillholes (Puf1 to Puf55) cut AQ core. This was increased to BQ core for drillholes Puf56 to Puf59 and then increased further to NQ core for drillholes Puf60 to Puf 192. As best as could be determined all subsequent drillholes were cut NQ. Drill core recovery at Puffy Lake was reported to be very good – verified, to an extent, by field observations of randomly selected trays of drill core.

Information related to core logging and sampling procedures during the drilling campaigns are not available to author. Nevertheless, based on visual inspection of diamond drill core stored at the site, author makes the following comments.

Mineralized drill core intervals that were sampled are identified and marked on the core boxes. Sample lengths vary from fractions of a metre to several metres. Sample intervals are marked by tags stapled to the core boxes and marked sample intervals were split in half using a core splitter.

In general, the drill hole sampling methods employed at Puffy Lake appear to, and no doubt did, conform to industry standards of the time.

The historical exploration approach and sample collection procedures, for the most part, appears to reflect thorough sampling methodology and documentation procedures. Exploration appears to have been carried out in a professional manner by, assumedly, experienced personnel utilizing methods, approaches and standards of the day.

15.0 SAMPLING PREPARATION, ANALYSIS AND SECURITY

Author has been unable to ascertain whether or not historical sampling and assay methodology were carried out utilizing appropriate Quality Control procedures. However, it is assumed that major corporations (HudBay, Granges, Homestake) who developed the Puffy Lake deposit, conducted their assaying in accordance with industry standards generally recommended and in place at the time of sampling.

16.0 DATA VERIFICATION

The preparatory work for this report included a visit to the site of Puffy Lake, in order to become familiar with the physical attributes of the site and, as well, to gather some representative samples of material and drill-holes at site. At that time, author, in the company of geologists Eckart Buhlmann and Patrick McLaughlin and with their assistance, collected a total of 10 samples identified as follows: -

<u>Sample.</u>	<u>Location</u>	<u>Description</u>
763358	At grizzly dump	White vein quartz, minor sulphide
763359	At grizzly dump	Vein quartz, minor sulphide
763360	At grizzly dump	Vein quartz, minor sulphide
763361	Main core rack	Light grey, coarse-grained, quartz-rich, 3% po, tr asp.
763362	DDH 337 Box 10	50m downhole, fine-grained light grey, siliceous tonalite gneiss, Tr to 0.5% po,py. Tr asp.
763363	NQ core, no I.D.	200m down-hole. Light grey, coarse vein quartz, 1% asp,po,py
763364	DDH 337, Box 8.	Grey, medium-fine grained feldspar-amphibolite-gneiss, 1% py.
763365	15 m NW of portal.	25cm boulder, rusty, 12% py, asp,po in chloritic to siliceous schist.
763366	Grey mine tailings	Grey mine tailings.
763367	Beige mine tailings	Grey to beige mine tailings.

These samples were forwarded to Swastika Laboratories, in Swastika, Ontario for independent analysis.

An attempt was made to sample intervals from a variety of low and high-grade material. The samples were documented and bagged and shipped to Swastika Laboratories - independently.

Although the samples are not representative of the Puffy Lake deposit, they confirm the presence of significant gold values. In addition some interesting and notable, associated metals were indicated. The results of the analysis are tabled below.

TABLE 16-1. INDEPENDENT SAMPLING RESULTS

Sample No.	763358	763359	763360	763361	763362	763363	763364	763365	763366	763367
Gold	4.39	0.26	18.93	0.40	0.44	3.61	4.80	10.77	0.71	0.33
Check-Au			16.59					11.45		
Silver	13.90	0.80	14.00	0.40	0.30	0.90	0.70	1.70	0.10	1.20
Arsenic	810.00	56.00	2,600.00	2,860.00	61.00	>10,000 2.92%	6,950.00	>10,000 6.61%	3,180.00	3,120.00
Copper	2,110.00	100.00	1,100.00	73.00	118.00	22.00	59.00	189.00	46.00	40.00
Zinc	3,030.00	162.00	853.00	164.00	31.00	88.00	65.00	133.00	307.00	220.00
Lead	4,870.00	105.00	2,450.00	32.00	17.00	85.00	2.00	21.00	47.00	120.00
Tungsten	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Platinum	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Palladium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	<0.005	<0.005

17.0 ADJACENT PROPERTIES.

A substantial number of mineral deposits are located in and around the Kiseynew Belt. Some of the better known past and current properties are shown on the accompanying illustration.

A number of these mineral deposits were economic and were mined in the past. Thus the entire belt is surrounded by a substantial number of past base metal and gold producers. In addition there are a number of current producers.

This report does not include discussion of any adjacent property. Notwithstanding, it must be noted that Puffy Lake is situated on a prolific mineral resource belt. In general, the major base metal deposits, the active gold producers and, as well, the gold resource deposits surrounding Puffy Lake are illustrated. Figure 17-1.

Other Gold Mineralization in the Area.

Mr. Gary Ostry of Manitoba Energy and Mines generally comments as follows; Copper-Zinc sulphide deposits are found within the Flin-Flon/Snow-Lake greenstone belt and the Kiseynew gneiss belt.

Base metal deposits in the Kiseynew tend to be coarse-grained, copper-rich and high grade and are generally smaller and more stratiform than those in the Flin-Flon/Snow-Lake regime. Sulphide mineralization is generally interpreted as syngenetic sedimentary and is preferentially localized in hornblende-plagioclase gneiss horizons. The presence of Cu-Zn sulphide deposits within the paragneiss and granitic rocks of Kiseynew belt disproves that Precambrian metamorphic sedimentary terrains are unfavourable for finding base metal deposits.

In the Kiseynew gold occurs within a thin volcano-sedimentary unit enclosed by Nokomis greywackes and a series of Sherridon quartzo-feldspathic rocks. At Puffy Lake and Nokomis Lake stratabound gold mineralization is localized within a quartz-rich gneiss with associated pyrite and pyrrhotite.

At least five localities of gold-arsenopyrite mineralization occur on the south flank of the Kiseynew gneiss belt within Manitoba in proximity to its southern boundary with Flin Flon metavolcanic and metasedimentary belt.

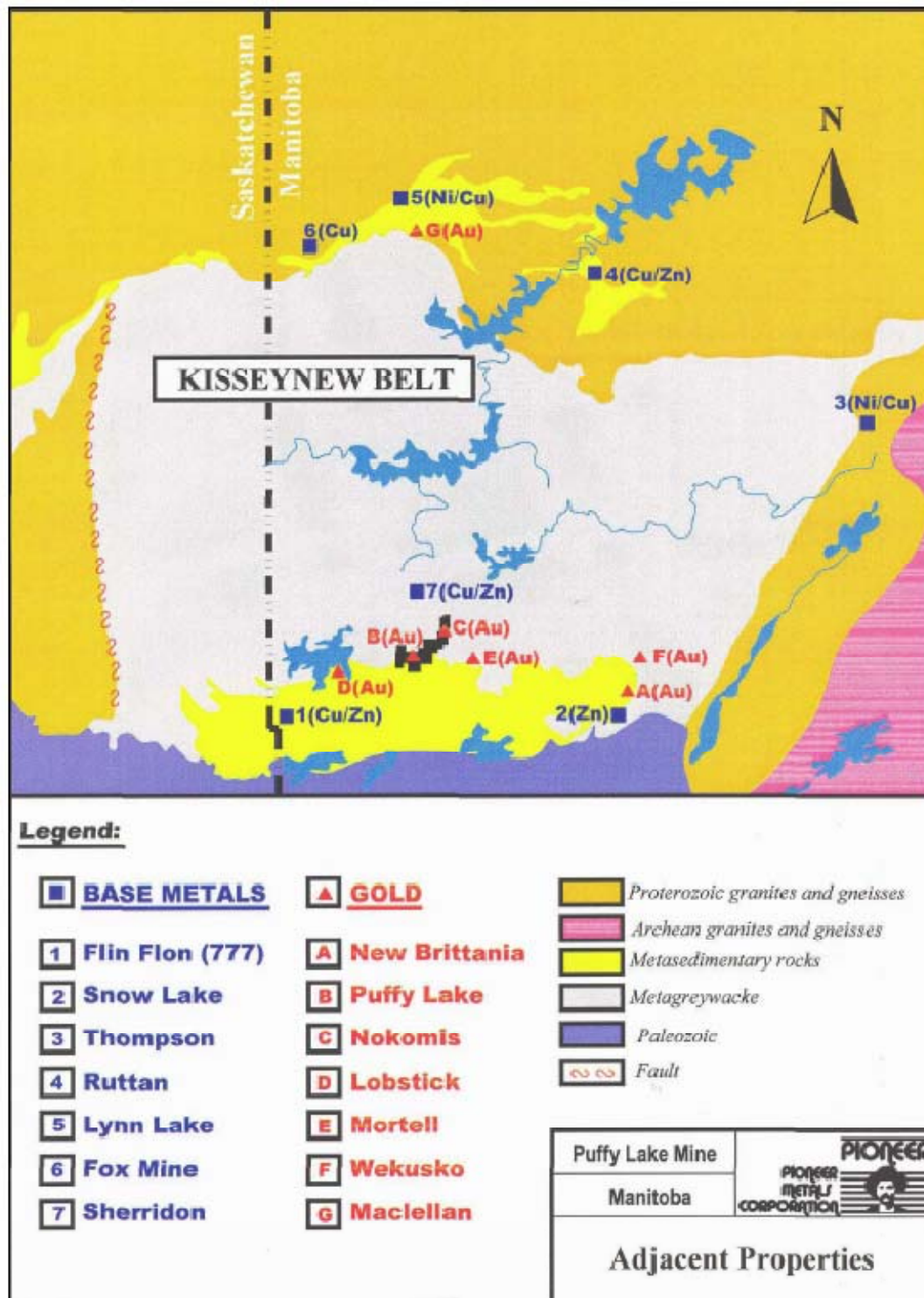


Figure 17-1. Properties Adjacent to Puffy Lake.

All mineralization occurs within predominantly amphibolitic rock sequences; these include the Puffy Lake and Nokomis Lake gold deposits, and the Evans, Lobstick Narrows and Martell lake gold occurrences.

At Nokomis and Evans Lakes (Gale and Ostry, 1984), and Lobstick Narrows (Parbety, 1990) stratigraphically controlled gold-arsenopyrite mineralization occurs within a regionally extensive, layered, predominantly mafic amphibolitic sequence. Gold-arsenopyrite mineralization has also been identified near the Kisseynew/Flin Flon belt contact just west of Martell Lake (Ostry, 1987).

For information of reader, it is noted that a technical report on the Sherridon VMS property, North-central Manitoba, was prepared for Halo Resources Ltd. This document, authored by K.J. Ferreira, M. Sc., P. Geo., is publicly available through SEDAR. Exploration of this property will be directed to the search for base metals rather than the search for gold-bearing minerals.

18.0 MINERAL PROCESSING AND METALLURGICAL TESTING

Data presented in this section are summarized from the following sources: -

1. April 13, 1981. Project B495. Britton Research Limited. Vancouver, B.C. Metallurgical tests on a Sample of Gold Ore
2. October 4, 1984. Project L.R.2873. Lakefield Research, Lakefield, On. An Investigation of The Recovery of Gold.
3. 25 November, 1986. Coastech Research Inc., Vancouver, B.C. Confirmatory Metallurgical Testwork.
4. Mine operating results from the mineral processing plant at Puffy Lake – operated from January 1987 through March 1988.
5. September 1988. Klohn Leonoff Consulting Engineers – Ragged lake tailings Dam.

METALLURGICAL TESTING

Britton Research Limited. On April 13, 1981, Britton reported on a series of metallurgical tests, including grinding, cyanidation and flotation. The test results were summarized as follows: -

1. The composite sample was made up from 103 diamond drill core assay rejects. It had an average gold assay of 7.1 grams per tonne. Due to the erratic distribution of coarse gold in the sample, individual assays, including calculated test heads, ranged from 4.4 to 12.3 grams per tonne.

Other assays included: -

→ Silver	- 4.0 grams/tonne.
→ Copper	- 0.04%.
→ Lead	- 0.03%.
→ Zinc	- 0.07%.
→ Sulphur	- 1.44%.
→ Arsenic	- 0.61% (equivalent to 1.35% arsenopyrite).

2. The sample had a Bond Work Index of 14.7 kw.hr per ton for grinding from 10 mesh to 63% minus 200 mesh.
3. The ore had a specific gravity of 2.87 g/cc.
4. Although an appreciable amount of arsenopyrite was present in the sample, it was not refractory to cyanidation.

Cyanidation for 72 hours, after grinding to 63% minus 200 mesh, followed by amalgamation of the coarse fraction of the residue to remove coarse gold, extracted 90.3% of the gold. Increasing the fineness to 87% minus 200 mesh raised the extraction to 92.7% and an extraction of 95.4% was obtained after grinding to 95% minus 200 mesh.

5. Three-stage rougher flotation, after grinding to 63% minus 200 mesh, followed by amalgamation of the tailing, recovered 93.1% of the gold in combined concentrates assaying 73.7 grams per tonne. Fine grinding (95% minus 200 mesh) increased the recovery to 94.8%.
6. Possible methods of treating the ore include: a Direct cyanidation after grinding. b Flotation, followed by shipment of the concentrate to a smelter. c Flotation followed by regrinding and cyanidation of the concentrate.

In each case, a jig would be installed in the grinding circuit to recover coarse gold.

7. Indications are that at least 90% of the gold could be recovered by any of these methods; the choice of the method to be used would depend on the results of additional metallurgical investigations, to be followed by a preliminary feasibility study, which would include estimates of capital and operating costs, as well as environmental studies. The possibility of shipping the ore direct to a smelter would also be investigated.

Lakefield Research. On October 4, 1984 Lakefield reported on an investigation of the recovery of gold on a bulk sample. The results are summarized as follows: -

1. Thirty (30) drums of material was received by Lakefield. Shipping weight was 6,818 kg (6.818 tonnes).
2. The overall 'calculated' grade of the 6.8 tonne bulk sample was 4.17 grams per tonne. Additional analyses on a representative head sample were: -

→ Silver	- 2.2 grams per tonne.
→ Lead	- 0.37%.
→ Sulphur	- 2.07%.
→ Arsenic	- 0.027%.

3. The flowsheet evaluated in the pilot plant is shown in Figure 18-1.
4. The circuit was operated for a period of 19 hours over 3 days and 6.8 tonnes of ore was processed.
5. Grinding Circuit. The average feed rate to the mill was 349 kg/hr and the net power consumption was 12.01 kW/t. The cyclone overflow was 71% passing 200 mesh. The calculated work index was 13.4.
6. Flotation & Gravity Circuits. Upon completion of the three days of tests the pilot plant was cleaned out and a mass balance was established. Gold recovered from tests together with that from clean-up (assumed to be recoverable during gravity concentration) an overall metallurgical balance was projected.

Gold recovery during concentration was 95.9% with 4.1% reporting to the tailing product.

Distribution of gold to various products was: -

Gravity concentrate	– 77.2%
Pyrite concentrate	– 11.8%
Arseno-pyrite concentrate	– 6.9%
Tailing product	– 4.1%

7. Gold Recovery. Concentrates were cyanided to extract gold from the gangue minerals and this gold was recovered by electrolysis. During this process some further gold losses were experienced. Final recoveries were stated as: -

Gravity concentrate	– 76.0%
Pyrite concentrate	– 11.5%
Arseno-pyrite concentrate	– 5.7%
Tailing product	– 4.8%

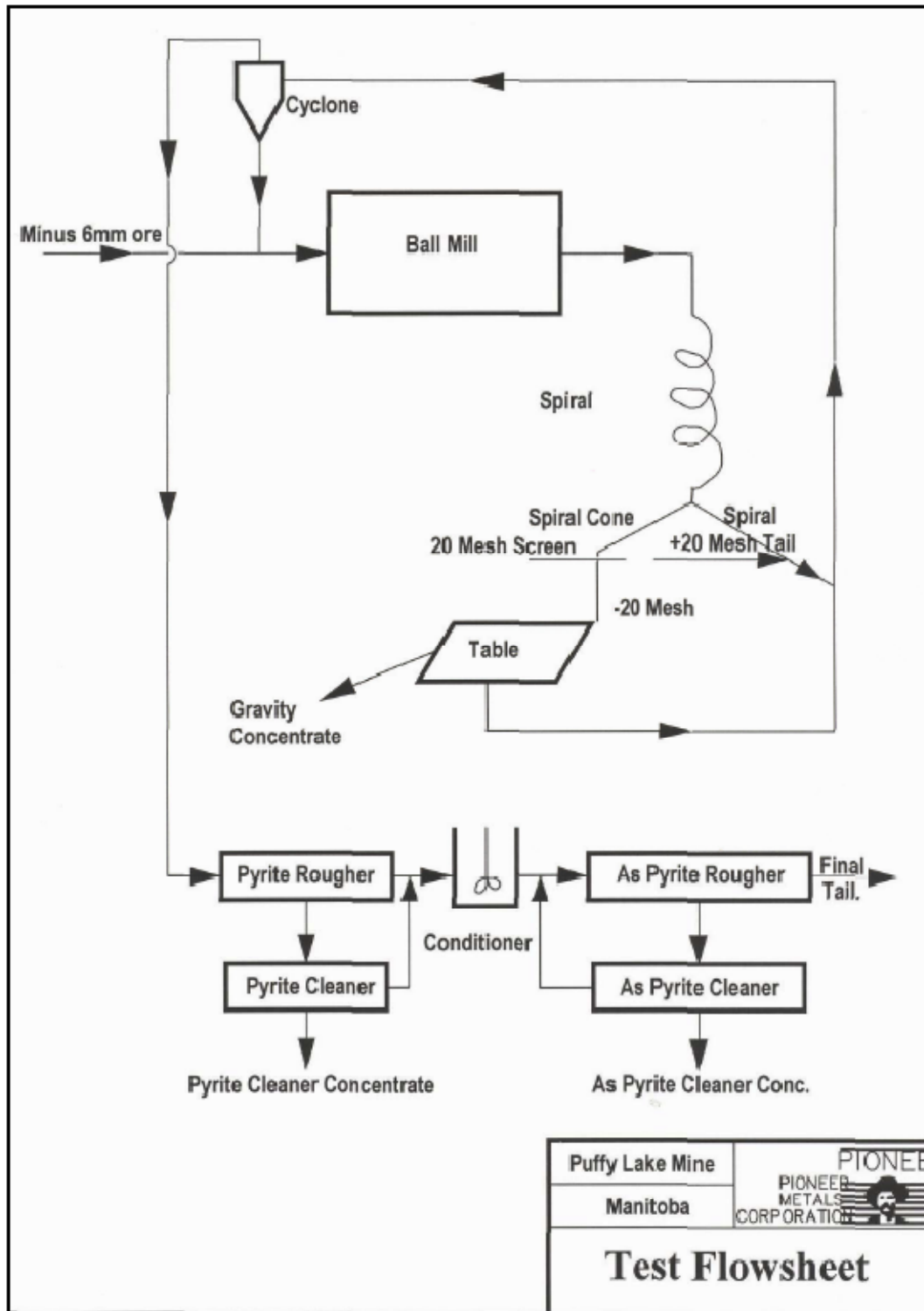


Figure 18-1. Test Flowsheet.

Coastech Research Inc. On November 25, 1986 Coastech reported on confirmatory metallurgical testwork. The essence of this work can be summarized as follows: -

1. The most significant estimate of head gold grade is by multiple sub-sample assay by fire/metallics. The mean gold grade for the twelve composite lots was 7.20 grams per tonne. Coarse, free gold was evident due to high variance of individual head assays. There was not economically significant copper, lead, or zinc values indicated. Silver is of minor economic and metallurgical significance.
2. All of the composite lots responded to direct cyanidation. It is estimated that following optimization of the cyanidation parameters gold extractions typically > 95% could be expected resulting in tailings grading 0.30 to 0.50 grams per tonne. Reagent consumptions < 0.2 kg NaCN per tonne and <1 kg CaO per tonne are expected with minor solution fouling by soluble coppers. High dissolved arsenic is expected in the pregnant solution.
3. Gravity concentration resulted in gold recoveries of 50 to 85% to a concentrate (uncleaned) grading >500 g Au/t and 30 to 40% As. Gravity and froth flotation combined bulk concentrate resulted in >95% gold recovery for all composite lots, except Lot 1. All flotation products contained high levels of arsenic. A separate base metal flotation concentrate for market is not viable. The most sensible processing route to pursue is a combined gravity flotation concentration followed by cyanidation of the combined or separate concentrates and conventional solution refining to bullion techniques.
4. Waste management should not present extraordinary processing measures.
5. All of the composite lots responded similarly to exploratory metallurgical testing.
6. Future detailed design testwork should be limited to two composites, a high grade and a low grade.

OPERATION OF CONCENTRATOR

In January 1987 Pioneer's Board of Directors made the decision to place Puffy Lake into production. The mill was constructed by Proton Systems Ltd of Vancouver, B.C. on a "Design, Procure, Construct & Manage" basis. The work was completed in about eight (8) months with the mill flowsheet generally following that suggested in the testwork and illustrated below (Figure 18-2).

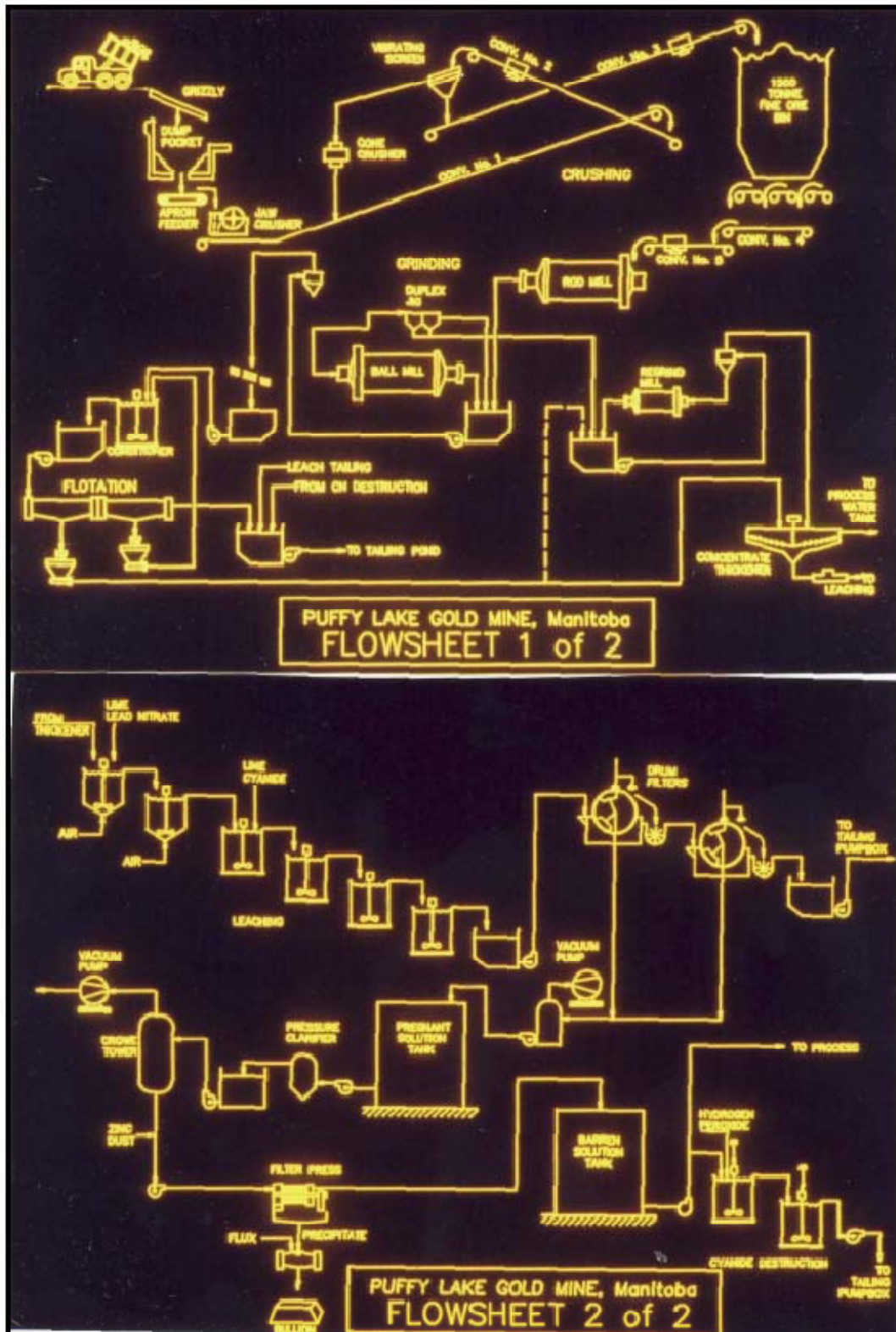


FIGURE 18-2. Mill Flowsheet.

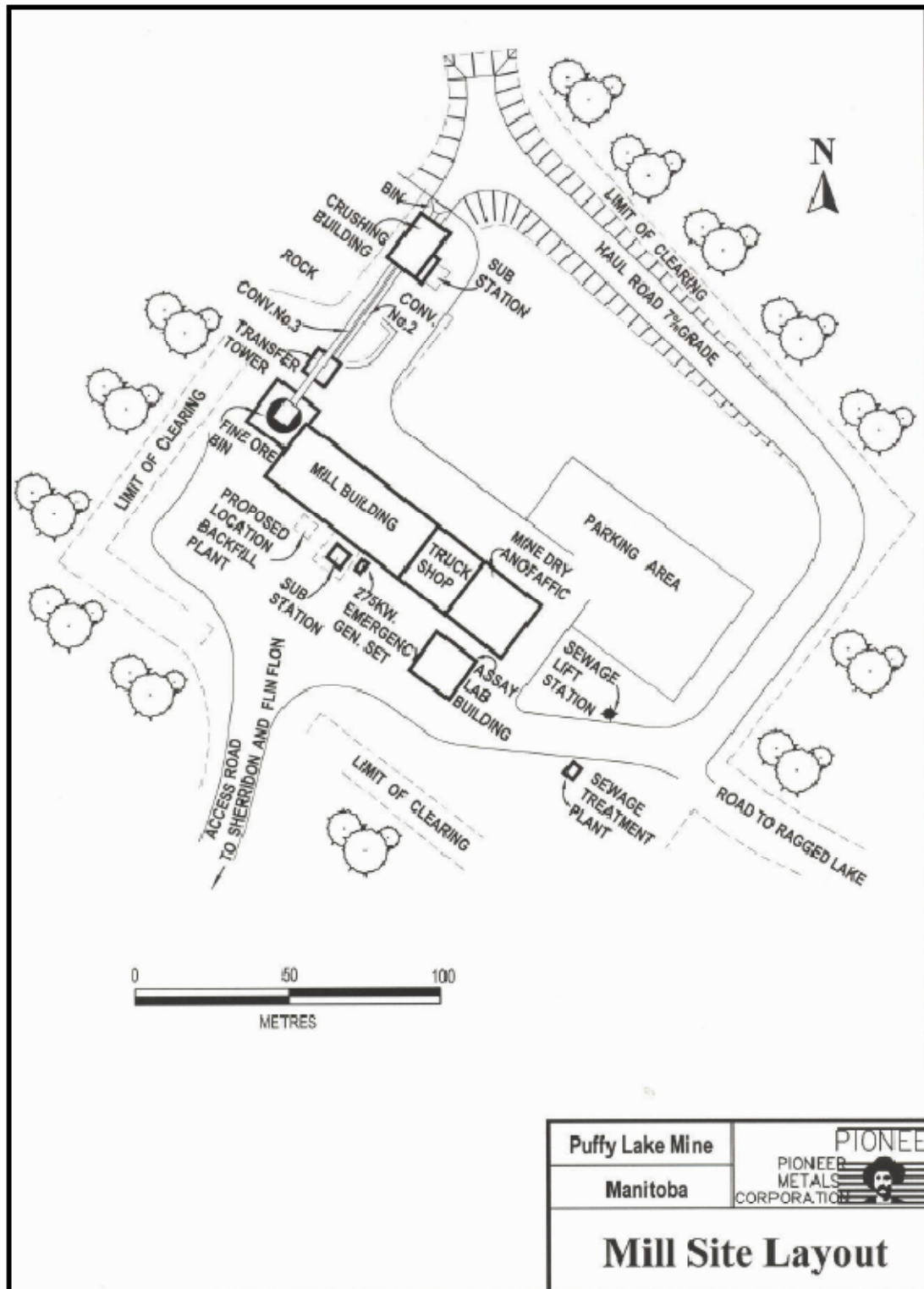


Figure 18-3. Mill Site Layout.

PROCESS DESCRIPTION.

Refer to Figure 18-3 for a general layout of the mill site and associated infrastructure.

Ore from the mine was delivered to a 100 ton capacity dump hopper located alongside the crusher building. A primary jaw crusher, that reduced the ore to a nominal 220 millimetres, was fed from the hopper. A cone crusher, in closed circuit with a double deck vibrating screen, further reduced the ore to 13 millimetres or less. Fine ore was transported by conveyor to a 1500 ton capacity fine ore bin adjacent to the mill building.

Fine ore was conveyed, as required, to a two-stage grinding layout. A rod mill and a ball mill, in closed-circuit, ground the ore to a design P_{30} size of 100 microns.

A duplex jig incorporated into the grinding circuit recovered coarse free gold that was then upgraded by spirals. The final high grade gravity concentrate was combined with the flotation concentrate for cyanidation.

Overflow from the ball mill was fed to a flotation circuit. Concentrate from the flotation cells, coupled with concentrate from the gravity circuit, was treated in a series of cyanide leach tanks. Flotation tailings was pumped directly to the tailings pond.

Residual solids from the leach cycle was filtered and washed using two drum filters in series and the repulped filter cake was pumped to the tailings pump box to join the flotation for pumping to the tailings pond.

The gold-bearing pregnant solution was mixed with the wash water from the drum filters and were treated by the Merrill-Crowe process to precipitate the gold from solution. The precipitate was removed by filter press, mixed into batches with flux, and charged to a reverberatory furnace. Gold bullion produced was remelted and cast into ingots. Slag from the furnace was returned to the mill.

The barren solution filtrate from the filter press flowed to a storage tank from which about two-thirds was recycled through the leaching circuit. The remaining barren solution was bled at about 3.6 cubic metres per hour and treated with hydrogen peroxide in a two-stage cyanide destruction plant before being discharged to the final tailings pump box.

The mill was designed to process 1,000 ton of ore per day for 355 days per year giving an annual mill throughput of 355,000 tons. Crushing, grinding and cyanidation circuitry was to operate continuously 24 hours per day, 7 days a week.

TAILING IMPOUNDMENT AND WATER SETTLING POND.

This aspect is critical to operating a concentrator and metallurgical extraction plant and will have considerable impact on decisions with respect to future operations. Consequently this aspect is herein discussed as follows;

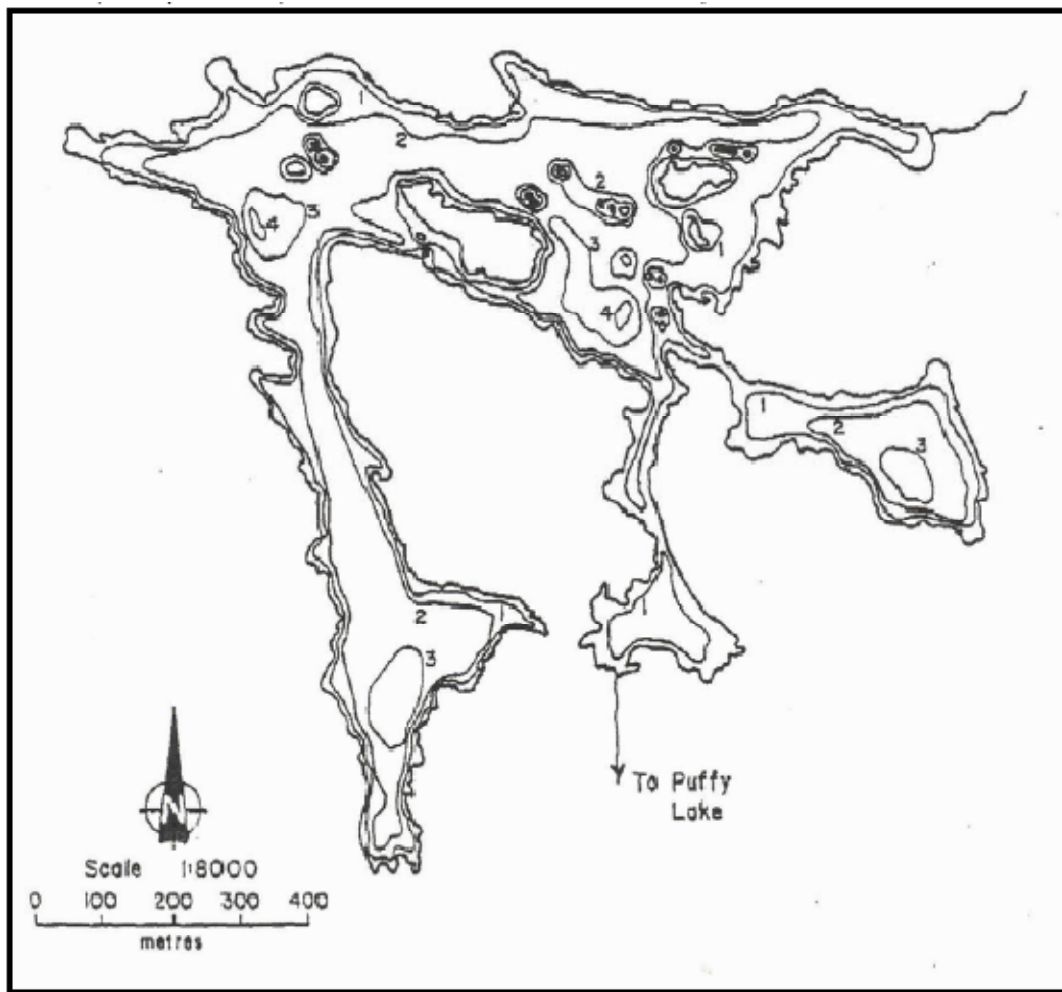


Figure 18-4. Ragged Lake – Bathymetry.

Ragged Lake, the tailing impoundment area at Puffy Lake, has a surface area of about 420,000 sq metres. The depth of the lake is typically up to 4 metres. The outlet to the lake is in a bedrock

channel about 20 m wide. The catchment area for the lake is about 2,700,000 sq m and the lake drains towards Puffy Lake which is about 1,300 metres south of ragged lake. Refer to Figure 18-4.



Tailings was discharged into the north-western corner of Ragged Lake and has formed a sand delta about 200 metres long.

Figure 18-5. Photo Illustrating Deposited Tailing.

Klohn Leonoff were requested to inspect the tailing disposal area and existing weir and to advise Puffy Lake Mines. Klohn Leonoff reported as follows: -

General. The tailings pond is intended to operate as a closed system, with no release of tailings water to the environment. The tailings pond operated between January 1888 and April 1889. During that period water was not released over the outlet weir. However, 1988 was an exceptionally dry year. Rainfall during the period of June to September 1988 was virtually nil, whereas in a typical year it is usually about 253 mm. Seepage did occur along the base of the weir and was estimated to be in the order of 0.5 L/s on August 18, 1988.

Permanent use of the tailings pond as a closed system does not appear feasible. The main limitations are: -

- Precipitation inflows are greater than evaporation.
- Winter ice cover results in poor reclaim water quality, necessitating the increased use of fresh water and lower reclaim rates.

Water balance. A tailings and water balance indicate that in an average year it will be necessary to discharge a total of approximately 1,324,000 cu. metres of excess water each year. This is approximately 3,600 cubic metres per day. The actual rate each year will vary according to rainfall and reclaim rates.

Water Balance Options. The excess water in the tailings pond will be contaminated with mine tailings and may not meet water quality standards for discharge to the environment.

The following options should be considered to evaluate the most feasible method of handling the excess water:

1. If water quality is good then discharge. This option may require a combination of storage during periods of low water quality and large discharges during periods of acceptable water quality.
2. Treatment of pond water as required to meet environmental requirements.
3. Construction of perimeter dykes and diversions to reduce the inflow into the lake.

Options 1 and 2 are dependent on the metallurgical properties of the tailings and the effects of dilution. A potential mining operation at Puffy Lake will need to assess these options. Option 3 is dependent on the topography and practicality/cost of building additional dykes and diversions. A detailed topographic survey around the pond is required along with a geotechnical assessment and cost/benefit assessment of any proposed works.

Tailings Storage. Tailings discharged into Ragged Lake will need to be arranged to maximize the storage capacity of the lake. The two objectives to controlling the discharge are:

1. To ensure tailings gets into the narrow reaches of the lake. The lack of reclaim at the ends of the reaches will inhibit tailings flow and reduce the actual storage capacity of the reaches.
2. To maximize tailings storage above the lake level by controlled discharge and formation of beaches.

The maximum storage volume beneath the existing lake level is reported to be about 1.2 million cu. metres. At a mine production rate of 1000 tpd and an average tailings density of 1.2 t/m³, this would represent about four years of tailings storage. To achieve this storage it will ultimately be necessary

to move the reclaim line to the existing outlet weir and to vary the tailings discharge points to include the end of the southwestern reach of the lake.

Additional storage capacity is available from storage of sands above the pond level. The estimated maximum storage available is greatly increased and is in the order of about an additional four to seven years of production. This will require some perimeter dykes in the order of 2 to 5 metres high and development of a beach with an estimated slope of 1.5%.

With respect to “Dam Design” Klohn Leonoff reported as follows: -

General. The existing dam on the Ragged Lake outlet consists of a 1.5 m high concrete weir. The structure leaks along the base and may have been damaged by ice loading or uplift. The structure was not ‘keyed’ into bedrock or the natural ground, and a layer of plastic was placed along the base. The space between the concrete base and the rock abutment was measured to be up to 20 mm.

Construction of a new dam has been considered. The new dam would be about 2 metres higher than the existing structure and would provide some flexibility for controlling discharge. The new dam will consist of a membrane faced rockfill structure with an open channel spillway and a low level outlet. The option of a concrete structure was rejected on the basis of cost. The higher cost of a concrete structure was mainly due to providing a resistance to ice loads. Control of the ice loads required either a massive concrete section or extensive anchor bolts. Construction of a new dam was estimated (1988 estimate) to be in the range of \$25,000 (1988).

19.0 MINERAL RESOURCES

This document will not report on mineral resources or mineral reserves. However, author will include a discussion of the historical findings and will state such.

In the following paragraphs, reference to resources and reserves are historical in nature. As such, these are based on prior data and reports prepared by 'other parties'. The work necessary to confirm and classify these resources and reserves has not been completed and the resource/reserve estimates therefore cannot be treated as NI 43-101 defined nor have these been verified by a 'Qualified Person'. These historical estimates should not be relied upon and there can be no assurance that any of the resources/reserves, in whole or in part, will ever become economically viable.

Notwithstanding the discussions of resources in Section 6.0 – Property description and section 8.0 – History the following is presented as a 'complete picture'.

Prior to implementing a production decision, several phases of resource estimates had been completed. Each of these built on the knowledge from the previous phase. Similarly, post production, the most recent resource estimate (Kilborn – June 1993) relied on information from previous diamond drill campaigns as well as information from actual production. These historical resource estimates can be summarized as follows: -

- May 31, 1986. Based on 154 DDH. 696,720 tonnes @ 7.99 g/t.
- February 15, 1988. Based on 473 DDH. 2,588,200 tonnes @ 7.54 g/t.
- April 1, 1987. Piteau review. 1,192,000 tonnes @ 6.23 g/t.

Subsequent to the estimates of these resources the mine was in production for approximately fifteen (15) months. The concentrating plant treated a total of 350,000 tonnes of mineral product producing 28,900 ounces of gold (actual production is discussed under Section 20.0 – Other Information. Currently, Puffy Lake mine is reported to contain a **historical** mineral resource as follows;

- "Indicated" resource of 1,346,177 tonnes @ 7.86 g/tonne – 339,652 ounces.
- "Inferred" resource of 883,718 tonnes @ 6.35 g/tonne – 203,146 ounces.

These resources are based on a cut-off of 3.5 grams/tonne. Refer to Table 19-1.

NOTE. In table 19-1, the resource classifications stated (in quotation marks) neither conforms, nor are compliant, with N.I. 43-101 requirements. These classifications refer to the differentiation used by Kilborn.

Table 19-1. Resources - Calculated by Kilborn Engineering Pacific Ltd.

NOTE: - ALL RESOURCES TABLED BELOW ARE BASED ON A 3.5 GRAM/TONNE CUT-OFF.

Zone	"Proven"			"Probable"			Sub-total			"Possible"			Total		
	Tonnes	Grade	Tonnes	Tonnes	Grade	Tonnes	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces
Sherridon (w)	30,359	9.12	105,492	135,851	7.65	137,543	135,851	7.99	34,882	78,394	8.09	20,390	214,245	8.02	55,272
Upper (W)	54,973	6.21	82,570	137,543	9.14	527,481	137,543	7.97	35,240	63,901	11.72	24,078	201,444	9.16	59,318
Lower (W)	373,587	6.82	153,894	527,481	7.33	118,183	527,481	6.97	118,183	149,485	7.18	34,508	676,966	7.02	152,691
Lower-2 (W)	69,919	5.75	63,542	133,461	6.28	25,755	133,461	6.00	25,755	101,055	6.72	21,833	234,516	6.31	47,589
Main (W)	158,520	9.42	148,912	317,432	7.68	87,807	317,432	8.60	87,807	101,033	8.43	27,383	418,465	8.56	115,190
Totals	697,358	7.39	554,410	1,251,768	7.64	301,867	1,251,768	7.50	128,193	493,868	8.07	128,193	1,745,636	7.66	430,060

Zone	"Proven"			"Probable"			Sub-total			"Possible"			Total			Contained		
	Tonnes	Grade	Tonnes	Tonnes	Grade	Tonnes	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces
Sherridon (E)	0.00	0.00	5,647	22,588	22.58	5,647	5,647	22.68	4,118	7,059	15.12	3,432	12,706	18.48	7,549			
Upper (E)	0.00	0.00	4,173	16.81	16.81	4,173	4,173	16.81	2,255	11,926	5.69	2,182	16,099	8.57	4,437			
Lower (E)	0.00	0.00	24,586	15.46	15.46	24,586	24,586	15.46	12,221	164,623	5.92	31,333	189,209	7.16	43,554			
Lower-2 (E)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Main (E)	436.00	5.48	59,567	10.27	10.27	60,003	60,003	10.24	19,745	206,242	5.58	37,000	266,245	6.63	56,745			
Totals	436	5.48	93,973	12.66	12.66	94,409	94,409	12.63	38,339	389,850	5.90	73,947	484,259	7.21	112,285			

TOTAL FOR BOTH EAST & WEST OF FAULT		1,346,177	7.86	340,206	7.11	202,139	2,229,895	7.56	542,345
--	--	------------------	-------------	----------------	-------------	----------------	------------------	-------------	----------------

This resource estimate was completed in June 1993 and is the most recent resource estimate. The estimate was completed by Kilborn Engineering Pacific Ltd (Kilborn) and appears to have been conducted using the standards appropriate to the industry at the time. However, the estimate does not meet current standards and definitions as required by NI43-101 Standards of Disclosure for Mineral Projects”.

Kilborn’s mandate was “To calculate the remaining reserves available for future mining”. This mandate was completed in three stages. During the first stage Kilborn calculated resources. Subsequently, Tonto Mining, a Division of Dynatec International Ltd (Tonto) completed the ‘mining portion of the work’ . The whole was then reported on by Kilborn as a feasibility study.

Kilborn, discussing the resource portion of the work, reports as follows with respect to: -

- Data provided.
- Method of calculation.
- Statistical analysis.

Data Provided. Kilborn reports as follows. “The basic data provided by Pioneer consisted of drill-hole information in the form of computer readable files. Additionally, sets of sections and plans, drill-hole logs and plans showing mined-out areas were available. It was assumed that the computer files that contained survey and assay information were accurate and no additional check was performed by Kilborn, as agreed. Kilborn takes no responsibility for errors resulting from errors contained in the data files”.

With respect to drill-holes (Refer to Figure 19-1), Kilborn reports – “Within the Puffy Lake area a total of 473 core holes were drilled of which 311 collars were surveyed at the surface. The coordinates of the remaining 162 holes were located by chain and compass. Most of the holes were drilled vertically with the exception of 72 holes in areas with difficult or impossible access, caused by swamps or lakes. Drill hole spacing is irregular and varies considerably because of various drilling campaigns between 1980 and 1989. There are areas of very dense drilling on the west side of the major fault. On the other hand, the East side of the fault is sparsely drilled with only 29 holes used to explore this area”.

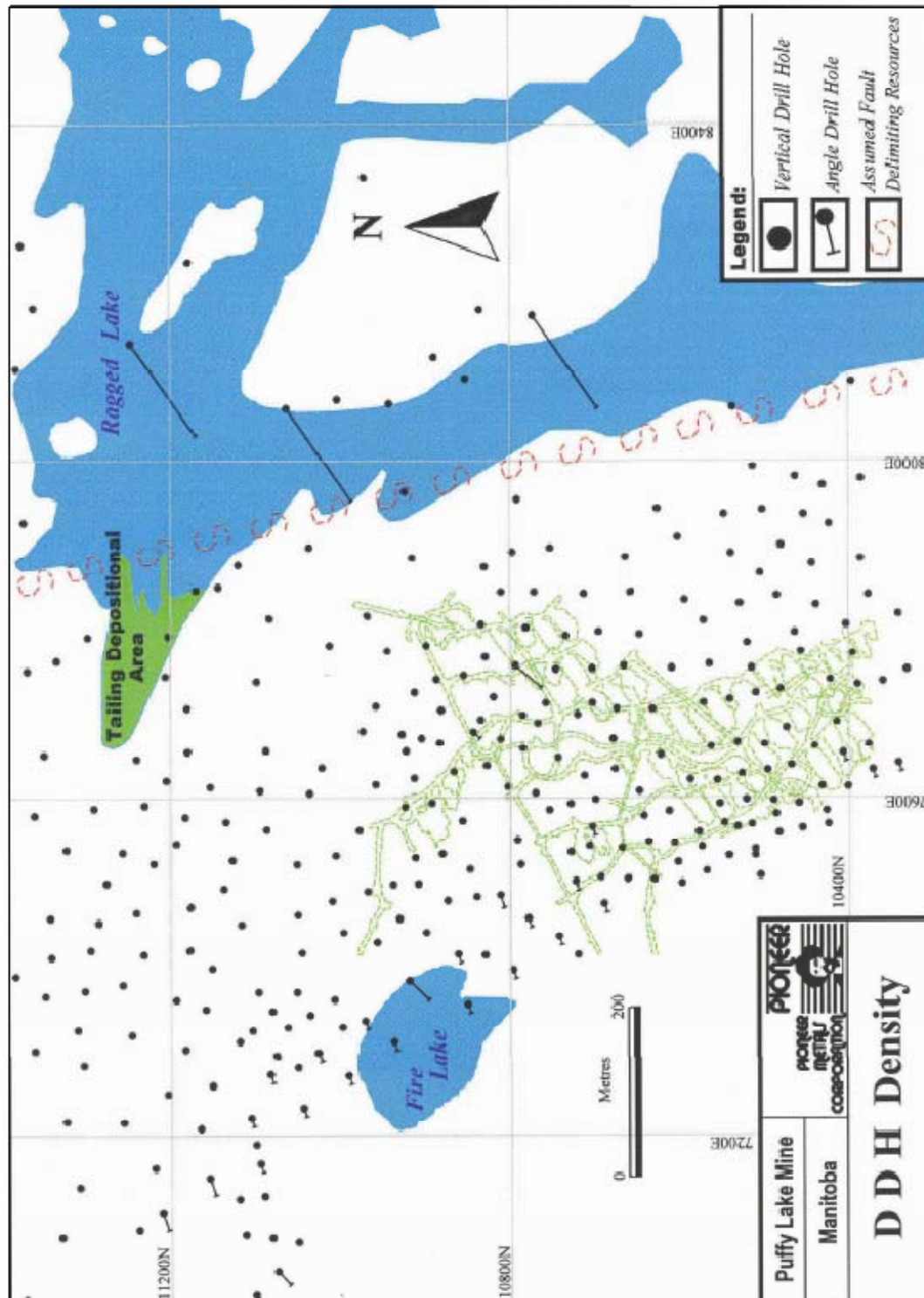


Figure 19-1. Diamond Drill Hole Density.

Author has not been able to definitively locate the “fault” referred to in the resource calculations thus has assumed that the “fault” generally follows the west-arm of Ragged Lake solely based on the density of drilling to the west and the east of this feature. Refer to figure 19-1.

Method of Calculation. Kilborn considered five zones in their study of Puffy Lake area. These include, from the top downwards, the Sherridon, Upper, Main and Lower zones. Kilborn reports that the southern part of the Lower zones splits into two distinct zones separated by a layer of rock of a minimum thickness of 10 metres. All five seams were modelled and their resources estimated. In addition, Kilborn reports that there is an indication of the presence of additional zones based on isolated drill holes, but these lack continuity; therefore, they were not included in the resource estimate.

In regard to method of calculation, Kilborn reports: - “The computer files were edited into Datamine software which was used for manipulation of the data and calculation of the resource model. The following information was programmed into the Datamine system: -

- All drill hole assay data,
- All drill hole survey data.
- Digitized outlines of the mined-out areas and openings.

The computer program was then used to calculate the resources while duly considering:-

- Topography. Modeled using-drill hole collar co-ordinates. The topography is relatively flat with an elevation of approximately 345 metres.
- Geological Models. Separate geological models were built for the area west of the main fault and the area east of the main fault. The hanging and footwalls of the Sheridan, Upper, Main, Lower and Lower Two zones were modeled by generating surfaces through the top and bottom of the drill hole intersections with the zones. The volumes contained between the hanging and foot-walls were filled with Datamine cells and subcells. The maximum horizontal dimensions were 25 metre by 25 metres, the minimum dimensions were one-eighth of the 25 metres in both X and Y directions. The vertical dimension of the cells were

controlled by the difference in elevation of the hanging wall and the footwall of the zone.

- **Minimum Mining Height.** The proposed mining method requires a minimum true thickness of 1.0 metre which is equivalent to a vertical thickness of 1.2 metres. The vertical thickness in some areas of the original geological models was less than required and was increased to the minimum thickness of 1.2 metres”.

Statistical Analysis. In relation to this aspect of the work Kilborn reports: - “Samples selected within mineralized zones were subjected to statistical tests. The interval length of the individual samples within the mineralized zones varies from 0.1 to 2.0 metres. These samples were composited over 1.0 metre lengths with a minimum composite length of 0.7 metres due to a minimum mining thickness of 1.2 metres. The results of the statistical analyses of these composites are as follows:

Zone	Number of Samples	Mean	Standard Deviation	Coefficient of Variation
Sherridon	531.0	1.89	4.52	2.4
Upper	423.0	1.60	5.02	3.1
Main	471.0	2.01	4.70	2.3
Lower	651.0	2.43	5.02	2.1
Lower-2	102.0	2.27	3.30	1.5

The coefficient of variation varies from 1.5 to 3.1 which indicates potential difficulties with interpolating grades when using traditional methods of grade interpolation. The coefficients of variation were calculated for the entire grade population of each zone. Scrutiny of grade distribution within each horizon indicates the existence of higher grade zones which, analyzed separately, will lower the coefficients of variation. Therefore, higher grade assays were not cut.

Experimental semi-variograms were computed for the composites within mineralized zones. The differential semi-variograms were difficult to define because of the erratic nature of the deposit and show very high nugget/sill ratios. Based on this fact, the Krigging method was rejected for grade interpolation and the more traditional method of inverse power of distance weighting method was selected.

The gold grades were interpolated into the cells and subcells using the inverse power of distance weighting method with a preferred direction of ellipsoid. In addition to distance weighting, the length of sample interval was used to weight gold grades in cells and subcells. The search radius was selected from the semi-variograms built for each zone. The parameters used in grade interpolation are as follows:

Power	2.0
Minimum number of samples	1
Radius of influence:	
Sherridon	30 metres
Upper	40 metres
Main	60 metres
Lower and Lower-2	60 metres".

Based on this work, Kilborn published a range of resources based on various cut-off grades. Those for a cut-off of 3.5 grams/tonne is stated in Table 19-1.

Subsequently, using Kilborn's resources, and consistent with the geometric interpretations therefrom, Tonto (in conjunction with Kilborn) devised a mining method primarily based on "Up-dip Longhole Slashing". In essence this method requires an up-dip and a down-dip sill drift (20 metres apart in the plane of the orebody). This aspect is more fully described in Section 20.0 – Other Information.

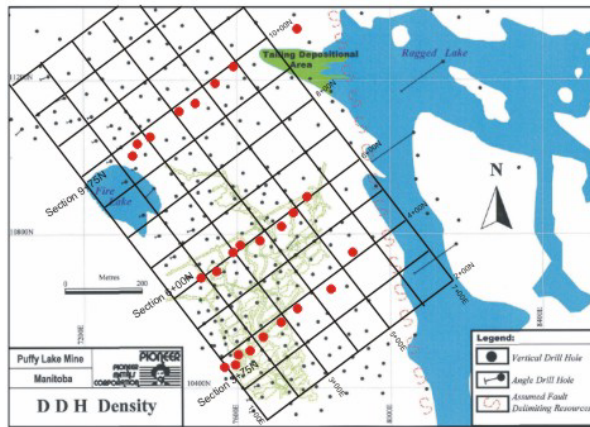
Pioneer Metals Corporation closed the mine for economic reasons, rather than for the lack of mineralization, and the Corporation believes that the remaining mineralization at Puffy Lake may potentially be economically viable to extract and process. Given this, and the significant increase in metal prices since the 1993 resource estimate was completed, Pioneer considers the historical estimate to still be relevant today and that it is reasonable for the Corporation to rely on it as justification for a program of compilation work, further exploration and, possibly, even a resumption of production.

20.0 OTHER RELEVANT DATA AND INFORMATION

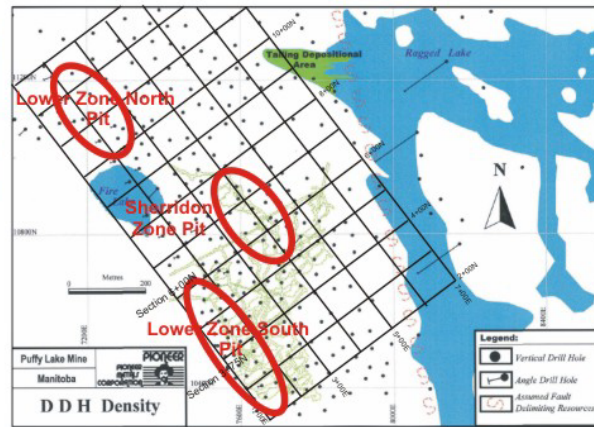
Auriga Gold Corp. (formerly "Ursa Major International Inc."), upon acquiring the property from Pioneer Metals intends to conduct a two-phase exploration program as follows;

Phase 1 – Confirmation drilling to define 43-101 resources and shallow resource definition drilling – 2,500 meters (20+ holes on 3 sections) and re-assay of existing drill core and pulps, with objective of upgrading historical resource to NI 43-101, plus 5,000 meters (200 holes average depth of 25 m, 3 areas, 100m x 200m, drilled at 25 m spacing) with objective of completing scoping study to define open pit mineable resource (Complete Q1 2011)

Phase 1 - Confirmation drilling



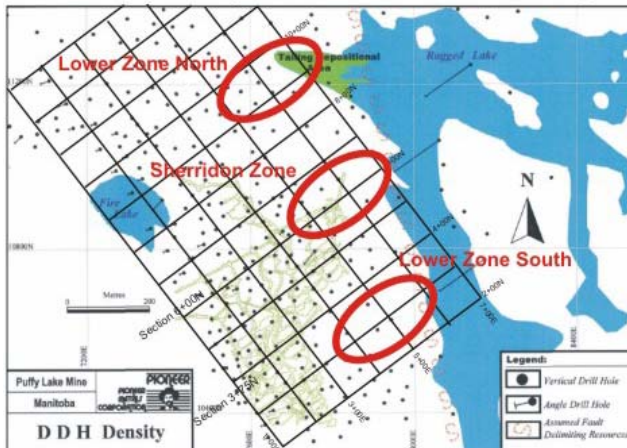
Phase 1 - Shallow resource drilling



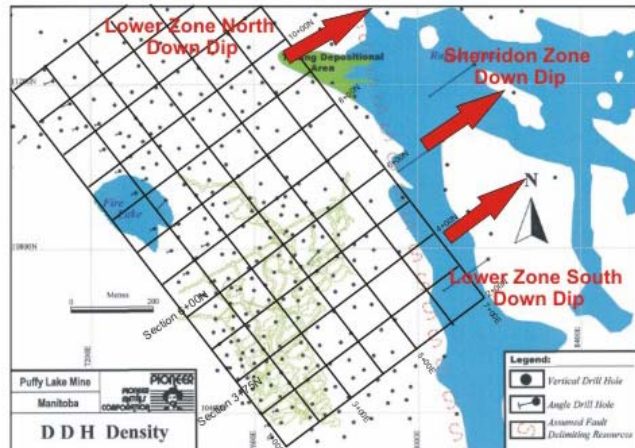
Phase 2 program will be contingent on results of phase 1 verifying pre NI 43-101 resources.

Phase 2 - Deeper U/G resource drilling from surface (20,000 meters, 140 holes to average depth of 150 m, 3 areas 100m x 200m, drilled at 25 m spacing) with objective of improving quality and quantity of u/g mineable resource, plus resource expansion (20,000 meters, 100 holes to average depth of 200 m) with objective of expanding resource and completion of updated NI 43-101 resource.

Phase 2 - Deeper U/G resource drilling



Phase 2 - Resource expansion



Additionally completion of feasibility study on 1,000 tpd operation (Complete Q4 2011)

Total program – 460 drill holes for a total 47,500 meters (Complete Q3 2011).

Completion of Feasibility Study on 1,000 tpd operation – (Complete Q4 2011).

PAST MINING ACTIVITIES.

For the 2006 report, Pioneer Metals Corporation had commissioned author to “provide an independent technical report compliant with NI43-101 **regarding past mining activities and future prospects** on the Puffy lake Mine property, in the Sherridan Area of Manitoba.

In the 2006 report, this section was used to report on the aspects of ‘past mining activities’ as well as ‘future prospects’ **Studies and Reports.** In order to provide reader with a comprehensive review, documents relating to the assessment of mining activities including ‘decision making matters’, are herein summarized – in chronological order.

October 1985. Kilborn Engineering (B.C.) Ltd completed a “Preliminary Review of Mining and Milling”. The terms of reference were; “..... Kilborn to prepare a preliminary report on mining and milling the gold-bearing material from the Puffy Lake deposit”. The scope of work undertaken by Kilborn was to “..... include a preliminary study of mine development, stoping method and a review of metallurgical test work. In the report, the proposed mining method was to be illustrated, the costs estimated, and similar mining operations referred to”.

Kilborn provided an illustrative type of flowsheet, and calculated the milling costs. For this study, the milling rate was set at 1,000 tonnes per day. Kilborn was not required to evaluate or calculate the mineral inventory, or to provide details on the infrastructure.

Kilborn summarized their report as follows; “A conventional mining method has been used in this study of the Puffy Lake deposit; although this conventional method is not used widely today. The method is not amenable to mechanization in the stope, but mechanized development and haulage have been applied. Assuming the rock is competent, production rate will be similar to a narrow vein shrinkage stope method – except for the additional step of slushing the broken mineral down the slope”. “The milling process as outlined is also conventional. Concentration by gravity, and by flotation, produces two products which are treated by cyanidation. This is followed by the ‘Merill-Crowe’ process to produce a precipitate for smelting into gold bullion”. “There are no apparent technical obstacles to the mining and milling of this deposit”.

February, 1986. Wright Engineers Limited (WEL), on behalf of Lion Metals Corporation of London, England, carried out an “Independent audit of performance and proposed work for the Puffy Lake Project”. This was a very ‘quick’ review (few days) and essentially zeroed in on the mineral deposit – “WEL felt that the ‘weight of the audit report rested on the ore deposit itself’, all other factors for project viability potential being reasonably predictable”. Wright Engineers concluded that “It is somewhat premature at this stage to predict economic viability conditions for the project”, however, made no recommendations apart from commenting that: “Pioneer’s 1986-87 exploration program appears to be logical”.

January 1987. Kilborn Engineering (B.C.) Ltd., “Feasibility Study”. The terms of reference were; “..... instructed Kilborn to carry out a Feasibility Study of Pioneer’s Puffy Lake Property”. In the Study, Kilborn was to perform the following:

- a Production Rate. Select a production rate in conjunction with Pioneer giving consideration to the mine life and practical production rates from the underground mine.
- b Mineral Reserves. Recalculate the mineral reserves from basic data provided by Pioneer using standards accepted in the industry.
- c Mining. Investigate and compare possible mining methods with regard to ground conditions, expected production rates, equipment requirements, and both capital and operating costs.
- d Ore Treatment. Examine all available metallurgical data and design a processing plant for the recovery of precious metals contained in the ore.
- e Infrastructure. Investigate all requirements to support the mining operation including tailings disposal, technical services, accounting, management, maintenance, and power and water supply.
- f Capital Costs. Estimate capital costs for the Project”.

Kilborn summarized their findings as follows: -

- Proposed to construct a 500 tonne per day underground mine and mill.
- Annual gold production to be 45,000 troy ounces.
- Mineral reserves were stated as;

• Measured and Indicated	451,600 tonnes	@ 8.6 g/t.
• Inferred	264,800 tonnes	@ 6.78 g/t.
• Potential	450,000 tonnes	@6.78 g/t.
- Capital costs were estimated at \$18,105,916 within plus or minus 20%.

- Operating costs were estimated at \$53.90 per tonne.
- Metallurgical recoveries of 92.78% were forecast.
- Direct operating costs of US\$152.25/oz were forecasted.
- The US\$ to Cdn\$ exchange rate was US\$1.00 = Cdn\$1.38.

October 1987. Piteau Associates Engineering Ltd, “Preliminary Engineering Geology and Rock Mechanics Assessment”. Prior to commencing mining operations Piteau carried out a comprehensive study on stope stability. The basic method outlined by Pioneer [actually Kilborn] was analyzed by Piteau. Piteau concluded and stated;

- Few faults appear to exist in the Puffy Lake area.
- Three joint sets were identified.
- All rocks examined in the field and point-load tested were hard and strong.
- Little is known concerning the shear strength of joints.
- Overall Rock Mass Quality (RQD) was considered “very good quality”.
- Near surface there is a “broken” zone that, in some areas, is up to 30m deep.
- No in-situ stress measurements were taken.
- Stope measurements were to be limited to 70m downdip – as planned, 20m wide – recommended by Piteau.
- Stope-backs to be supported by 2m bolts (mechanical, swellex or split-sets).
- Rib pillars to be 3m for 2m-high stopes and 4m for 3m-high stopes.
- Sill pillars would be required – to be determined in future.
- Backfilling was not within the mandate of the study – requires extensive geotechnical testing.
- Crown pillar. In general to be twice that of the sill pillar. Crown pillar could be located within the near-surface “broken” zone if artificial support (cemented backfill) was used.

Piteau recommended “... that a thorough optimization study be conducted to determine the most efficient and practical mining method”. “This optimization study will require consideration of the economic geology, rock mechanics and mining engineering aspects to develop an optimum mine plan”. Piteau also concluded that, “The optimization study will undoubtedly provide a clearer plan for the most feasible way to develop and operate the mine”.

September 1988. Mr. Norman Anderson of Andeson Genssler & Schwab Inc, made a thorough and detailed examination of operations at Puffy Lake. This report is more fully discussed in the section dealing with the physical implementation of operations.

December 1988. Piteau Associates Engineering Ltd, “Preliminary Geotechnical Assessments of Alternative Pillar Layouts”. Piteau describes the terms of reference as; “..... it is understood that three

alternative stope and pillar arrangements are being considered at the mine, and that the purpose of this study was to review the alternative arrangement with respect to feasibility and safety ...”

Piteau carried out analyses and studies on all three of the proposed mining layouts. A number of approaches to the determination of pillar strengths, stope and pillar dimensions were assessed. Piteau concluded that, “Based on the assessment, it is apparent that the Big Pillar and Small Pillar layouts are more suited to mechanization than the conventional layout. In addition, the Big and Small Pillar arrangements will likely be operationally easier to work from a position of safety”.

January 1989. John D. Smith Engineering Associates Limited, “Review of Mining Operations at Puffy Lake Mine”. This report is more fully discussed in the following chapter – Physical Implementation of Operations.

1989. B. O’Beirn, Mine captain, “Underground Mining at Pioneer Metals: Puffy Lake Project”. Descriptions of several mining methods experimented with together with discussion of ‘pros’ and ‘cons’.

- a Experimental Stope.
- b Typical Stope.
- c Mining at Reduced Heights.
- d Drift and Slash – Mechanized.
- e Combination Drift, Slash and Jack-leg Stopping.

This report is more fully discussed in the next chapter – Physical Implementation of Operations.

June 1993. Kilborn Engineering Pacific Ltd, “Feasibility Study 1993”. This study was reported on in three phases.

Phase I – June 26, 1992. The 1st phase of the work consisted of a review and analysis of existing data with the objectives of;

- Assessing the validity of previous ore reserves.
- Calculating the remaining reserves available for future mining.
- Determine future possible production rates and operating strategies.
- Investigate improvements in mining reasing efficiency and reducing dilution.
- Consider improvements to the handling of ore and waste from the working place to surface.

Kilborn concluded that;

- There is an estimated proven and probable mineable reserve of 1,306,000 tonnes with an average grade of 6.50 grams/tonne.
- An analysis of past mining activity indicate that the contained gold that reported to the mill and the gold estimated to be contained in the mined portion of the reserve were within 1%.
- The same analysis as indicate that dilution beyond the design mining thickness was 24%.
- The mining method recommended in this study is a combination of drift and slash stoping followed by longhole open stoping.
- The mining rate that should be considered is 500 tonnes per day.

Phase II – August 14, 1992. The 2nd phase of the work consisted of an inspection of surface facilities to determine reconstruction and refurbishing to place the mine back into production. The site was visited by two Kilborn employees accompanied by Pioneer’s Wayne Smith, director, on July 11, 1992.

Kilborn reported that;

- The plant has been shut-down in a workman-like manner.
- The structures are in good condition – heavy rains at the time of the visit indicated that there were no leaks.
- Although authorized removal of some plant and equipment has occurred, little malicious damage has been done to the property.
- The forest fire which passed through the area destroyed the freshwater pipeline, the reclaim water pipe and site 25kV overhead power lines.
- Kilborn estimated a cost to reactivate the surface facilities at \$1,600,000.

Phase III – Tonto Portion. The report of this portion of the work was dated January 22, 1993. The 3rd phase was divided into three parts, as follows;

1. Initially Kilborn re-estimated resources.
2. Kilborn’s resource calculations were then handed to Tonto Mining to;
 - a Review the “Geological reserves” and determine “Mineable reserves”.
 - b Assess the most appropriate access and mining methods.
 - c Evaluate the optimum sustainable mining rate and the operations required at that rate.
 - d Determine preproduction and operating costs.
3. Kilborn then brought all aspects together and produced a final feasibility to re-activate the Puffy Lake Mine.

Tonto concluded and reported that;

- Ore reserves that can economically mined amount to 60% of Kilborn's 'geological resources'.
- A total of 773,000 tonnes at a grade of 8.0 g/t can be mined.
- Allowing for dilution and mining losses the amount of material that will be delivered for treatment would be 855,000 tonnes @ 6.7 g/t.
- The reserves include both "Proven" and "Probable" and are considered the major risk for the project.
- The economics of several of several ore blocks are fairly sensitive to increased costs or decreased gold value.
- A new portal will be excavated closer to the mill to provide access to 60% of the reserves to be mined.
- The most appropriate mining method for this deposit is longhole slashing from parallel ore drifts.
- The initial operating plan will be based on 750 tonnes per day (264,000 tonnes/year).
- The main production equipment will consist of;
 - a The preproduction development program is estimated to cost \$3.3 million.
 - b Operating costs are estimated to be \$53.00/tonne.

Phase III – Kilborn Portion. This portion of the total study was the culmination of all of the aspects and was reported on as of June 17, 1993. In this final report on the

"Feasibility of Re-activating the Puffy Lake Mine" Kilborn concludes and recommends: -

- Preproduction mine development will be required to reactivate the mine.
- The mill was shut down in a proper manner but will require some remedial work prior to reactivation.
- Fire-damaged lines will have to be repaired or replaced.
- Accommodation for the workforce will have to be put into place.
- The deposit has the capability of sustaining a mining/milling rate of 750 tonnes per operating day.
- Production rate at Puffy has been assessed at 264,000 tonnes per year.
- The total mineral resources at the property are 2,229,895 tonnes @ 8.00 g/t.
- The mineable reserves at property are 855,000 tons @ 6.7 g/t.
- The mine could produce an average of 51,200 troy ounces per year.

- Preproduction expenditures are estimated at \$8,397,000.
- Required working capital was estimated at \$2,717,000.
- Average operating costs were estimated at \$61.52 per tonne of ore.

October 1993 – Tonto Mining. A synopsis of the Puffy Lake project summarized;

- Overview (location, access, claims, interest, history, etc).
- The reasons why the initial mining operation failed.
- The merits of the proposed mining operation (according to Kilborn/Tonto).
- The key attributes of the property.
- Financial projections.
- Operating projections.
- Capital cost summary.
- Operating cost summary.
- Proposed mining test program.
- Purpose of the test program.
- Schedule to production.
- Resources and reserves.
- Geology.
- Historical exploration.
- Reserve data and calculation methodology.
- Mine plan and mining.
- Mineral processing.

November 23, 1993 – Tonto Mining. Tonto reviewed the Kilborn feasibility study with respect to the proposed mining method. Since the economic viability of the operation was dependent on the success of the proposed mining method, Tonto proposed a test of the proposed method prior to undertaking a production decision.

The proposal, in essence, would create the portal and initial portion of the new ramp suggested by Tonto (accessing 60% of the ore zones). Tonto proposed using the Upper 315 zone for test purposes. On January 31, 1994, Tonto advised of modifications to their original suggestion for a test stope. There were concerns that the U-315 area was too close to the bottom of Fire Lake (within 16 metres). As a consequence the location of the portal was moved and the test-stope location was moved 20 metres vertically to the Lower-290 horizon.

Physical Implementation of Operations. The following generally describe the physical activity at the property. The bulk of the information for the following comments was derived from the monthly reports of operation at Puffy Lake.

February 1987. Production decision reached. Mill construction commenced in March 1987. Exploratory diamond drilling intensified and continued, contract awarded for excavation of access ramp and work commenced.

December 1987. Poured first brick of gold.

15-Month Operational Period. Table 20-1 summarizes the operating numbers as reported in available monthly reports from Puffy Lake. These reports, understandably and consistent with implementing new operations, vary considerably over the period. Some are complete and very detailed, while others lack even the most basic of operating information. Various styles and formats were used – by and large milling information was completely reported on, no doubt because, for a major part of the first year, mining operations were by contractor. One can sense the frustration and desperation to meet forecasts and operating parameters. Constantly new, and/or changed, parameters are being proposed and tested.

TABLE 20-1. Operating Numbers – Puffy Lake.

<u>Month</u>	<u>Tonnes Processed</u>	<u>Head Grade – g/t</u>	<u>Recovery – %</u>	<u>Grams Au Produced</u>	<u>Stopes in Operation</u>	<u>Total manpower</u>
Jan '88	27,306	3.329	57%	52,026		63
Feb '88	22,379	2.200	84%	41,314	5	
Mar '88	27,920	2.140	82%	48,770	8	74
Apl '88	29,370	2.660	81%	63,500		
May '88	31,773	2.210	73%	51,420		100
Jun '88	24,978	2.700	80%	53,934		
Jul '88	18,988	2.900	88%	48,347		
Aug '88	24,318	1.880	82%	37,294		
Sep '88	19,846	3.520	89%	62,216		
Oct '88	22,859	2.680	74%	45,372	13	153
Nov '88	21,845	4.045				159
Dec '88	20,219	3.050	83%	51,332		161
Jan '89	12,350	3.380	80%	75,022	11	157
Feb '89	22,168	3.493				
Mar '89	23,098	1.860	87%	37,449		

During this 15-month period a substantial volume of mine development and stopes were created (refer to figure 6-6). This development covered approximately 40% of the 'footprint' of the defined deposit area (Refer to Figure 19-1).

May 1989. Cessation of operations. In an activity report dated June 6, 1989, with respect to activities at the mine site during May 1989, a summary of gold bars poured at site is included. This summary reports the bar number, the date such bar was poured, the total weight of the bar (kgs), the assay of Au and Ag and the weight of Au and Ag respectively (both kg and ounces). 52 dore bars were poured at the mine-site for a total weight of 1,270.151 kg containing 884.255 kg Au (28,429.5 oz), 280.574 kg Ag (9,020.7 oz) and 105.322 kg of other metals (not identified).

August 1989. A forest fire devastated the area. The fire destroyed the water lines, damaged some power lines and poles, and, destroyed some of the ancillary facilities but the mill was not damaged.

Discussion of Operating Period. Actual operations did not meet forecasted numbers. This aspect was subject of concern to all involved, was examined, reviewed and reported on by a number of individuals and groups and formed the basis of discussion in a number of technical reports and site-visit reports. Two aspects haunted the operation;

1. Lack of feed to the mill (tonnes – 350,000 actual vs 440,000 budget).
2. Ore grade substantially below predictions (g/t – 2.84 actual vs 7.54 budget).

Attempts by operating personnel to control each aspect simply aggravated the other. When an attempt was made to selectively mine high-grade areas, feed tonnage dropped dramatically and when tonnes of feed became the priority, the grade dropped dramatically. It was not until more stopes were accessed and cut-out (latter part of year one) that both grade and feed improved somewhat. Operations were started with two active stopes and four under preparation – January 1988 month-end report.

Another factor that complicated and seriously impeded grade control was the geometry of the deposit. Rather than being sheet-like with consistent strike and dip it appears that there was rolling of the deposit with relatively low wave frequency and amplitude (refer to Figure 10-2). In addition it appears (from reports of behavior of ore in the stopes) that there was a further wave form oblique to the dip direction (again with low wave frequency and amplitude – Figure 10-3). Combined these rolls appear to give a plunge to a series of boudinaged higher-grade zones.

Reports of Norman Anderson and John D. Smith. These two reports (referred to earlier) appear to be the most complete and factual analysis of operations at Puffy Lake. The reports of Anderson and Smith are complimentary. Contextually they conform and they both report similarly on a number of aspects. The following compares their comments.

Definition of Ore Zones.

Norman Anderson

Drill spacing was reported as varying from a grid of 100 metres square to 100ft x 150ft in "well-drilled" areas.

John D. Smith

The ore-zones have not been well defined by diamond drilling.

Predicted Grade and Tonnes.

Norman Anderson

The contractor had probably mined "the vein" and no vast amounts of hanging-wall or foot-wall dilution was mined. Unfortunately much of "the vein" is low grade or no grade material and there is no apparent way to tell visually that this was the case.

John D. Smith

There has been difficulty in the past in obtaining both the tonnes and grades as predicted in the ore reserves.

Conformability of Ore-body.

Norman Anderson

Asked Norman Nendsa (Mine Geologist) why the stopes were not oriented on the plunge of the boudinage structures?

John D. Smith

The ore zones contain conformable quartz veining that shows evidence of boudinage both on a large and small scale.

Geological Interpretation

Norman Anderson

The distribution of the good gray quartz is not well understood. There appears to be a strong linear direction to the boudinage structures and it was suggested that the correlation would be useful to separate out better grade ore and direct stopes along this trend.

John D. Smith

There is a lack of structural mapping, recording of strike and dip variations, and ore-body thickness variations. Such work should provide useful insight into orebody controls. Eg. Are the "pinches and swells" of a cyclical nature.

An interesting comment by E. Anderson in the Activity Report for May 1989 when discussing the progress of the compilation of sections is – "A preliminary conclusion is that the hinges of large scale folds appears to concentrate gold mineralization within the zones. This pattern can be seen in detail in the quartz-rich Lower zone as reflected by thickening of quartz veining".

Comment on Resource Calculations

Norman Anderson

Kilborn's ID2 weighting and Pioneer's polygonal methods both appear to have over-estimated the grade to be mined because stoping of the Lower, Upper and Sherridon zones are coming out well below forecast grades. Our examination indicates that production grades will be lower than current ore reserve grades.

John D. Smith

The Sherridon and Upper zones are not working out as anticipated but the Lower zone is meeting expectations. There are many examples where stoping has taken place in an area of predicted higher grade and mining has subsequently been abandoned due to low grade.

Personnel

Norman Anderson

Puffy's senior people generally are a keen young bunch and they are working hard.

The place badly needs a mine manager.

John D. Smith

The management are all experienced people and appear to be well motivated. The morale of the workers appears to be good. A current drawback is that the mine manager has only been on-site for three months and the Chief Geologist for only one month.

With respect to the "ore" both Norman Anderson and John Smith gained valuable insight from their respective visits.

Norman Anderson reported on the mineral composition of the 'ore'. He was informed by Norman Nendsa, Mine Geologist, that gold deposition had the following characteristics;

1. Gold is directly proportional to sulphides.
2. The more variety of sulphides the more gold (generally).
3. Diopside is also a good indicator.
4. Arsenopyrite is the best gold indicator.
5. Gray quartz seems to be a better host for gold than white quartz.
6. K-Feldspar in the quartz or pegmatite dykes is bad news for gold.

John D. Smith reported on the ability of the 'miners' to identify and follow ore. "Geological staff claim that it is easy to follow ore since it is easily seen but there are many examples where stoping has taken place in an area of predicted higher grade and mining has subsequently been abandoned due to low grade. There also are many examples where both the floor and backs have had substantial slashes taken after initial mining. It would appear from underground observation that it is more difficult to follow the ore than first realized. The quartz veining is easily seen but

these do not define either the H/W or F/W contacts. The quartz veins vary significantly in width, and can break up and virtually disappear. One high grade stope in the main zone has no quartz veining evident (M224-214).

Evolution of Stope Layouts. The manner in which stopes have been laid out has gone through several phases of evolution, namely that devolved by;

1. Kilborn 1985
2. Puffy's Drift & Slash.
3. Kilborn 1992.
4. Tonto 1993.

General Discussion. The Puffy Lake mineralized foot-print, apparently, extends over an area of 1,200 metres on strike x 1,000 metres. To the south it is cut-off by granite but to the north it is uncertain what happens. Down-dip (explored to 365 vertical metres) the deposit is still open. Because this deposit extends over such a huge area ($\pm$ 120 hectares) and almost all of the diamond drill holes (+ 470) encountered the zone in a similar manner, apparently conformable, it was assumed that the deposit was stratigraphically conformable or near conformable (refer to Figure 10-1).

It also appeared that the deposit dipped consistently – at about 30° . In mining terms a dip of 30° is considered 'flat' in that it is below or near the natural angle of repose of broken rock. At a dip of 30° muck-handling is problematic and at dips lower than this muck-handling becomes inversely proportionally problematic. Stope planners thus (involuntarily) avoid low number stope-dips.

Kilborn 1985. At this stage of the examination of the Puffy Lake deposit (1985) 'conventional wisdom' dictated that the deposit was conformable, consequently the mining method and stope layouts were based on the information then available. The mining method was described as; "A conventional mining method has been used; although this conventional method is not widely used today". Figures 20-1 and 20-2 illustrate the systematic approach then envisaged and proposed.

Figure 20-1 illustrates a plan of the typical ramp development envisaged. Compare this to what actually occurred when the ramp was developed (Figure 6-6). Generally mine operating personnel followed the proposed layout. Logically, the approach to ramp layout for this type of orebody calls for a ramp zig-zagging in the footwall and it is merely its relative position to orezones that is in question.



Figure 20-1. Typical Ramp Layout

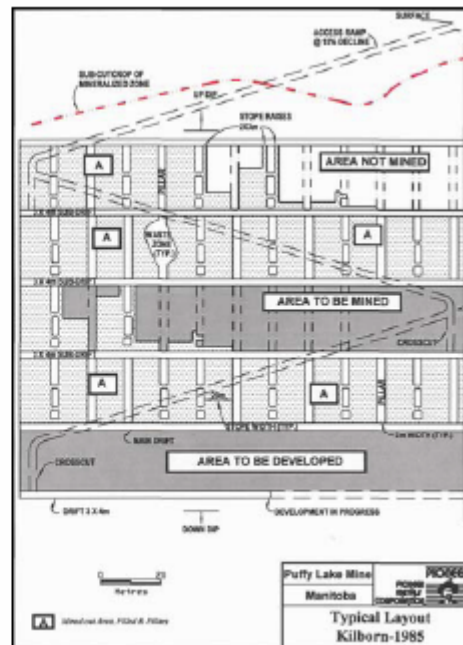


Figure 20-2. Typical Stope Layout

Figures 20-1 and 20-2 graphically illustrate the anticipated conformability of the ore-body. In practice it was found that the ore-body was not uniformly structured. In fact considerable rolling and boudinage structures were encountered – referred to constantly in a number of reports.

Bob O’Beirn – late 1988. Mr. O’Beirn was a mine captain at Puffy. He prepared an extensive report on the mining of the orebody. He states; “As this structure rolls on dip, as well as on strike, following it is very difficult”.

Another factor that severely influenced mining was stope height. This was planned at a maximum of 1.8 metres. Typical stope widths of 20m and down-dip extensions of 60m required bolting of the back. 2m bolts were specified (in a stope 1.8m high).

In addition, drilling holes for these bolts also was difficult. Typical long-leg stopers with a 2-ft starter steel approached or exceeded design stope height. Overbreak by miners, in order to provide 'working height' was endemic.

A serious attempt was made to mine stopes at reduced heights. Short-leg stopers were acquired and stope widths were reduced to eliminate bolting. Incentive bonus was structured to compensate for lower mine heights. This approach met with success. Mr. O'Beirn reports; "In the first bonus period, 4 stopes were excavated between 1m and 1.3m in average height. In these areas only the vein was mined therefore eliminating dilution entirely". However, increased grade of ore was offset by productivity decreases. In order to compensate a second system was devised to compliment the 'low-height' stopes. This method was termed "Drift and Slash".

During the final few months of operation the combination of these two methods dramatically improved grade, while at the same time delivering an acceptable amount of mill-feed (tonnes) – refer to Table 20-1.

Kilborn – 1992. In their evaluation of re-activating Puffy, Kilborn suggested that the 'Drift and Slash' method developed by Pioneer staff be modified somewhat to include some longholing. This approach maintained the 20m stope widths but reduced the down-dip lengths to about 24m. Refer to Figures 20-3 and 20-4.

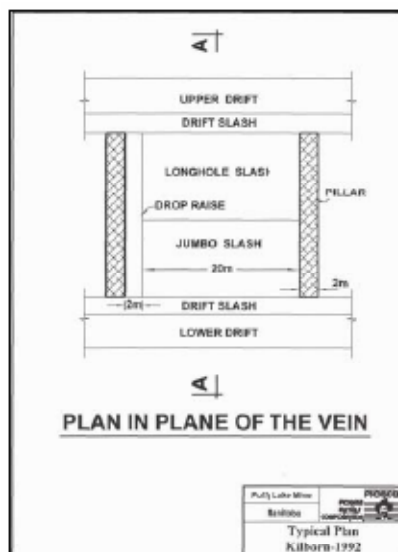


Figure 20-3. Drift/Slash Plan

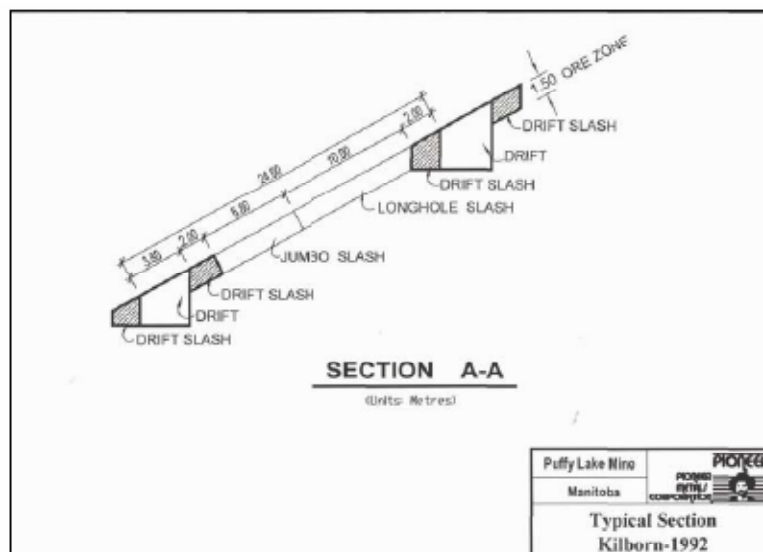


Figure 20-4. Drift/Slash Section.

Kilborn describes this approach as follows; “A drift and slash mining method was developed and used at Puffy Lake Mine. This method permitted higher mechanization as all drilling could be done with jumbo mounted drills”. “The method has advantages over the Initial Mining method which include:

- Mechanization of all drilling.
- Reduction in percent of ore requiring slushing.
- Reduction in rock bolting requirements.
- Narrower minimum mining height.

These advantages lead to a higher grade for the broken ore and higher productivity in stoping. The disadvantages in the method are primarily two:

1. Per tonne of ore there is a greater amount of waste development required.
2. The method is not as flexible where the ore zone is erratic.

Tonto – 1993. In addition to the method devised by Kilborn and discussed above, Tonto suggested a further refinement based solely on down-dip longholing. Ramp layout and stope dimensions were to remain constant (20m wide by 24m down-dip).

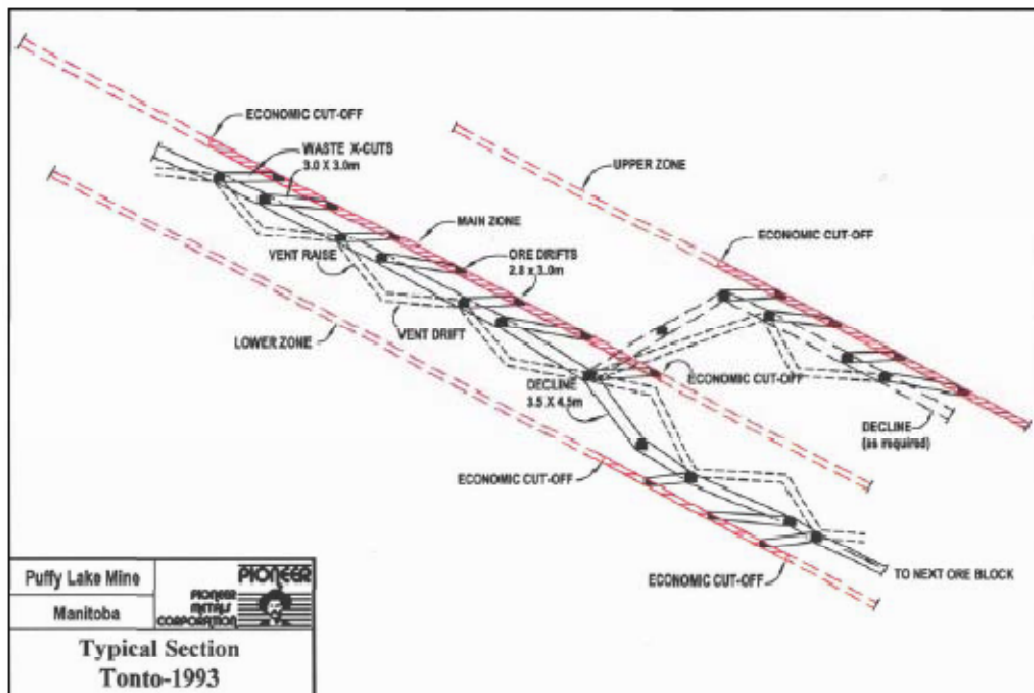


Figure 20-5. Ramp Section - 1993.

Figure 20-5 illustrates a typically anticipated section. Compare this section to that developed by Kilborn in 1985 (Figure 20-6).

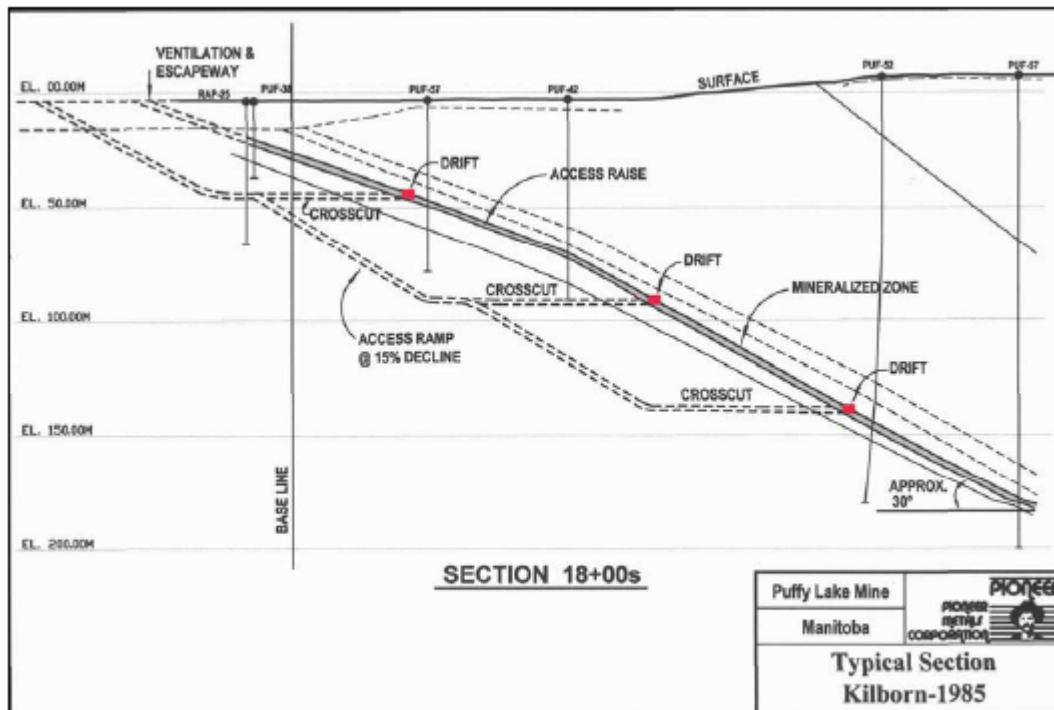


Figure 20-6. Ramp Section – 1985.

Tonto/Kilborn made the following comments regarding the Puffy deposit; “The ore veins have the following characteristics which must be taken into consideration when choosing the most appropriate mining method:

- The veins are shallow dipping (25° to 30°). Therefore, ore will not flow by gravity and will require mechanical assistance to be removed from the footwall over any length.
- The veins are fairly thin (average less than 2 metres vertically), requiring close control of dilution.
- Ore grades are erratic over fairly short distances, necessitating a flexible approach to pillar location and frequency. The grade and shape of the orebody contacts is more consistent along the dip than strike, but continuity must be verified as often as practical.
- The relatively low grade of the ore requires that the mining method be as productive and mechanized as possible, with any ore pockets left behind being of lesser concern than if it was higher Grade”

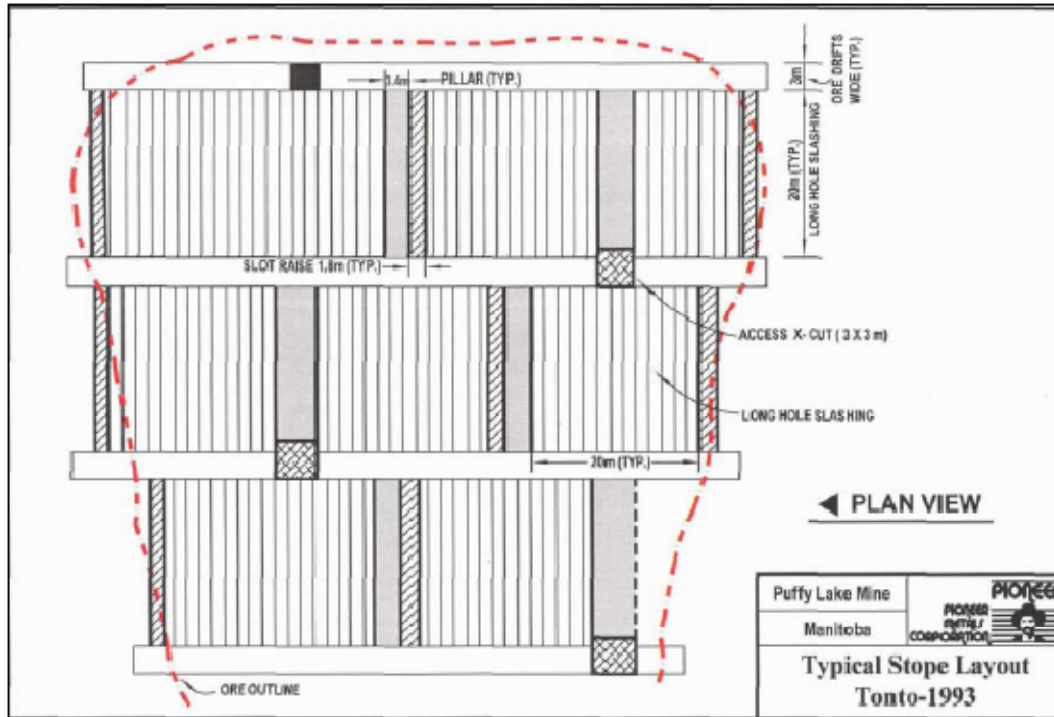


Figure 20-7. Down-dip Longhole Stope.

Tonto/Kilborn state; “The down-dip longhole slashing method will be used as the primary method for the following reasons:

- Use of specialized equipment and crews provides for greater productivity and lower costs.
- Accomodation of local variations along strike; stope dimensions can be readily modified for changing geological conditions to minimize dilution.
- Eliminates the requirement for manual slot raises”.

Tonto, in their January 22, 1993 report, presented a ramp layout to mine all of the reserves identified by themselves – Refer to figure 20-8. Tonto describe this layout as follows; “A new portal will be excavated closer to the mill to provide access to the majority (60%) of the reserves. The availability of two separate access declines located in the waste areas between the ore veins will allow flexibility in mining plans and provide for less congestion and greater productivities. A separate ventilation raise will be established for the second portal”.

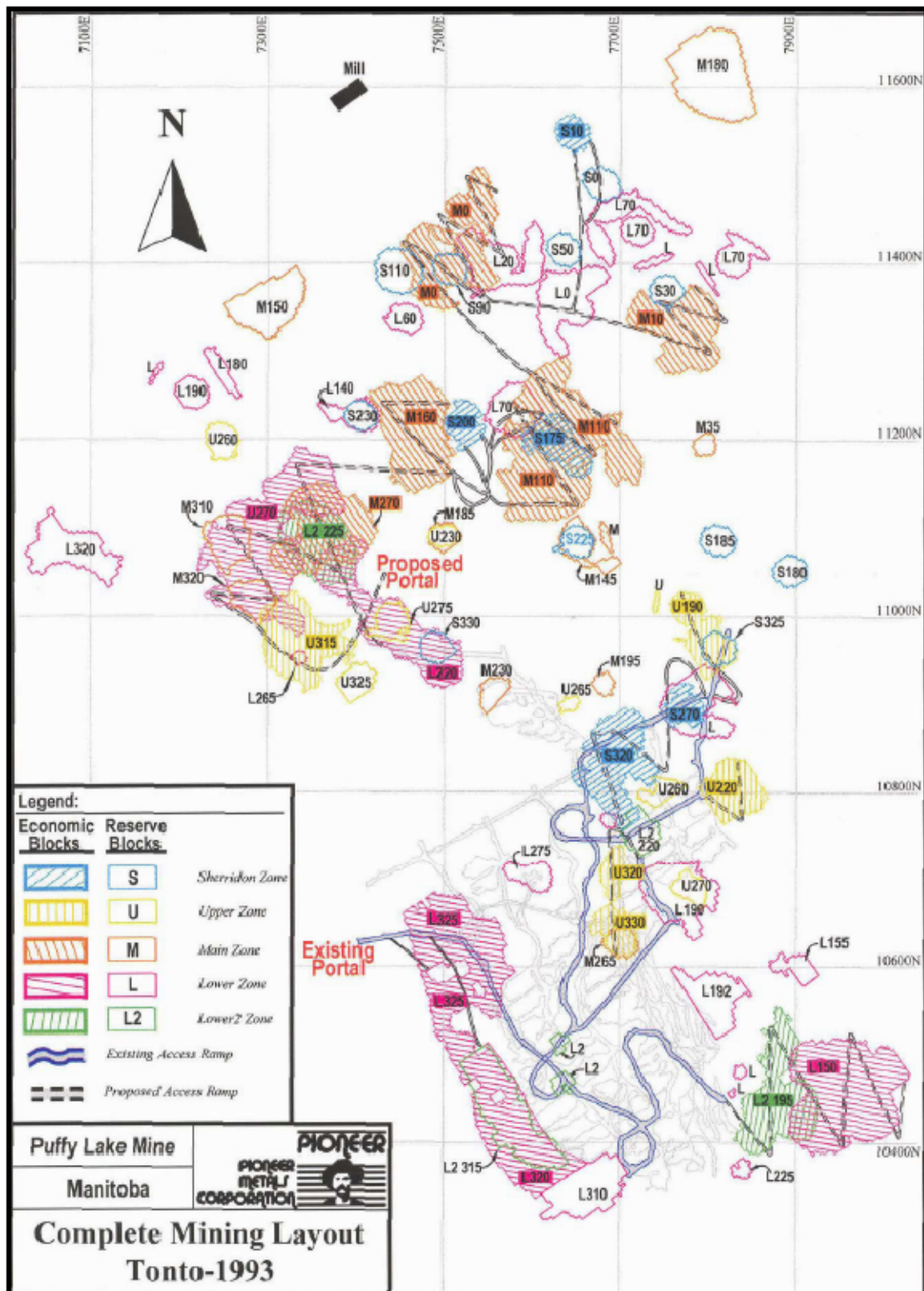


Figure 20-8. New Ramp Location and 'Sweep'.

21.0 INTERPRETATION AND CONCLUSIONS.

The original report was concerned neither, with resource estimation, nor, on-going exploration. Puffy lake had moved beyond initial exploratory stages to that of a producer.

Now that the property is being re-examined, and partially as a consequence of the original (June 2006 report) conclusions and recommendations, Auriga plan on doing an initial confirmatory and shallow resource definition drilling program.

However, the following can still be stated; **The mineral deposit at Puffy Lake has merit and deserve closer scrutiny.** The fact that, during the past production period, the mine did not meet forecasted parameters does not mean the deposit is uneconomic but merely that it is more challenging than originally anticipated.

This author is not convinced that a true understanding of the geometry of the structure has been explained. Several reports refer to difficulties with the structure rolling and yet all mining methods suggested, laid-out and physically tried assume a constant strike and dip. Stopes, in essence, were designed to systematically rely on the assumed strike and dip. Recognition of plunge, nor allowance to accommodate such, appears to have been factored into the equation of stope layout, design and method of operating.

An aspect that may have contributed is that it appears that the density of exploration drilling of the deposit was not sufficient. Drill-hole spacing appears to range between 50m-75 m generally to 30m-35m where infill-drilling was completed. Drill-holes at this density may be sufficient to define a conformable tabular sulphide deposit but may be lacking with respect to a gold deposit containing coarse free gold randomly distributed.

Drill-hole density affects the ability of an analyst to determine the resource component of a deposit (input = output). The search radius for inclusion may also have been somewhat liberal, in some cases. It may very well be that the resource component of the deposit was somewhat over-estimated.

Once underground, there appears to have been a lack of geological interpretation or incorporation of geological information into the ongoing planning. It may be that

production pressures did not leave sufficient time for this luxury. This aspect, production pressure, in turn, may have been precipitated by a lack of forward mine development and stope preparation.

The location and layout of the access ramp is adequate for this type of deposit (low-dipping and tabular). Any access in this type of deposit essentially has to wander to and fro underneath the deposit. Because of the extensive foot-print of the Puffy Lake deposit, a duplicate ramp paralleling the first may be warranted. . Such duplication will eliminate long access crosscuts or access drifts. In addition, the second system will greatly enhance flexibility (essentially creating a second mine), servicing the total mine workings and muck-transport to surface.

Although a fair amount of detail in prior studies is presented with respect to infrastructure, equipment, manpower and costs there is a decided lack of operating statistics and forecasts of anticipated performance levels. Specifically, forecast of stope productivity, stope miner productivity, trucking size and capacity, haul distances, numbers of stopes to operate at designed mine production requirements and advance development to sustain stope preparation and servicing (ventilation, supplies, muck removal, etc).

In order to detail a mine to this level at the feasibility stage requires a great deal of information about the size, shape and attitude of an orebody. Such information can only be gathered by intimate analysis of the deposit – probably requiring a close look from underground.

Underground geological mapping and infill, as well as exploratory, drilling may be warranted, if not justified.

There are a host of secondary as well as compelling factors that justify a re-examination of the Puffy Lake deposit. These include;

- Good access to the property.
- An established power line to Manitoba's electrical grid.
- Well designed and constructed (good equipment) crushing system.
- Ample fine ore storage.
- Adequate grinding facilities.

- Good flotation (secondary concentration) capability.
- Very good assay laboratory.
- A permitted tailing disposal area.
- Adequate maintenance, dry and office facilities.
- Extensive underground workings.
- Good relations with various governmental ministries and local communities.

These aspects all contribute immensely to the entry-threshold (numbers of ounces required to justify a production decision). With the infrastructure and facilities in place at Puffy lake the entry-threshold will be very much reduced – in fact may justify a production decision provided resource tonnage and grade are reasonable.

Finally, there is the matter of ‘history and a vast collection of data’. Pioneer Metals Corporation is in possession of a vast data base with respect to Puffy Lake. To go through this database and assimilate the information would challenge even the most industrious and knowledgeable of individuals, besides consuming substantial capital. At the end of such re-investment the information still will be with individuals who may, or may not, remain with Pioneer. This information requires inputting into a modern electronic format that can be readily accessed, by almost anyone – at any time.

22.0 RECOMMENDATIONS.

The recommendations in the original (June 2006) report are superseded. Auriga have proposed and author agrees with, and recommends, a two-phased exploratory drill program followed by scoping and feasibility study programs. The program is described as;

Proposed Puffy Lake Mine exploration program

Phase 1 – Confirmation drilling to define 43-101 resources and shallow resource definition drilling.

- 2,500 meters (20+ holes on 3 sections) and re-assay of existing drill core and pulps, with objective of upgrading historical resource to NI 43-10
- 5,000 meters (200 holes average depth of 25 m, 3 areas, 100m x 200m, drilled at 25 m spacing) with objective of completing scoping study to define open pit mineable resource.
- Anticipated completion - Q1 2011.

Phase 2 program will be contingent on results of phase 1 verifying pre NI 43-101 resources.

Phase 2 - Deeper U/G resource drilling from surface.

- 20,000 meters (140 holes to average depth of 150 m) over three areas (100m x 200m) drilled at 25 m spacing with objective of improving quality and quantity of u/g mineable resource, plus resource expansion.
- 20,000 meters (100 holes to average depth of 200 m) with objective of expanding resource and completion of updated NI 43-101 resource.
- Additionally completion of feasibility study on 1,000 tpd operation.
- Anticipated completion Q4 2011.

Total program – 460 drill holes for a total 47,500 meters (Complete Q3 2011)

Completion of Feasibility Study on 1,000 tpd operation – (Complete Q4 2011)

Puffy Lake Phase 1 Exploration Program

<i>Phase 1 -7,500 m @ \$130/m all inclusive</i>	<i>975,000</i>
<i>Update of resources to NI 43-101 compliance</i>	<i>100,000</i>
<i>Scoping study on o/pit development</i>	<i>25,000</i>
<i>Baseline Environmental Monitoring Program</i>	<u><i>160,000</i></u>
Phase 1 Total (Completed Q1 2011)	\$1,260,000

Puffy Lake Phase 2 Exploration Program

<i>Phase 2 drilling – 40,000 m @ \$110/m all inclusive</i>	<i>4,400,000</i>
<i>Update of NI 43-101 report</i>	<i>50,000</i>
<i>Environmental studies</i>	<i>100,000</i>
<i>Feasibility Study on mill restart</i>	<u><i>500,000</i></u>
Phase 2 Total (Completed Q4 2011)	\$5,050,000

23.0 REFERENCES

The following is a complete list of all references relied on in the preparation of this report. The documents (and other sources) are listed chronological order.

April 13, 1981. Britton Research Limited – “Metallurgical Tests on a Sample of Gold Ore.

October 4, 1984. Lakefield Research – “An Investigation of the Recovery of Gold”.

October 1985. Kilborn Engineering (B.C.) Ltd – “Preliminary Review of Mining and Milling”.

‘Early’ 1986. Pioneer Metals Corporation – “Puffy Lake Summary report”.

February 12, 1986. Wright Engineers Limited – “Independend Audit Report of Puffy Lake Project for Pioneer Metals Corporation and Lion Metals Corporation”.

October 1986. Canadian Mine development Ltd – “Preliminary feasibility for U’G Mining”.

November 25, 1986. Coastech Research Inc – “Confirmatory Metallurgical Testwork”.

‘Late’ 1986. T. Stubens, G. Silva, D. Grant supervised by A. Reed – “Geostatistical Study of Puffy Lake Deposit”.

January 1987. Kilborn Engineering (B.C.) Ltd – “Pioneer Metals Corporation, Puffy Lake Project, Feasibility Study”.

April 1987. Piteau Associates Engineering Ltd – “Updated Review of Polygonal Mineral Inventory Calculations”.

June 1987. Ilam Associates Ltd – “Heritage Resource Impact Assessment of the Puffy Lake Project”.

August 1987. Ilam Associates Ltd – “Project Description and Environmental Impact Assessment”.

October 1987. Piteau Associates Engineering Ltd – “Preliminary Engineering Geology and Rock Mechanics Assessment for the Proposed Underground Mine Development”.

‘Late’ 1987. Pioneer Metals Corporation – “Project Summary 1987”.

February 10, 1988. Puffy Lake Mine – “Janury Month-end Report”.

March 4, 1988. Puffy Lake Mine – “February Month-end Report”.

April 11, 1988. Puffy Lake Mine – “March Month-end Report”.

May 9, 1988. Puffy Lake Mine – “April Month-end Report”.

June 6, 1988. Puffy Lake Mine – “May Month-end Report”.

‘Mid’ 1988. Charles W. Pellet, P. Eng – “Report on a Site Visit to Puffy Lake Mine”.

July 1988. Puffy Lake Mine – “June Month-end Report”.

August 1988. Puffy Lake Mine – “July Month-end Report”.

September 2, 1988. Anderson, Gensler & Schwab Inc - “Report on Operations at Puffy Lake”.

September 1988. Puffy Lake Mine – “August Month-end Report”.

October 1988. Puffy Lake Mine – “September Month-end Report”.

October 21, 1988. M.J. Allan – “Memo to Jim Tompkins re Visit to Puffy Lake, Oct 17 to 19, 1988”.

November 2, 1988. Mike Allan – Memo to Erik Anderson re Metallurgical Balance Calculations”.

November 3, 1988. Mike Allan – Minutes of meeting”.

November 7, 1988. Puffy Lake Mine – “October Month-end Report”.

November 9, 1988. Mike Allan – Memo to Werner Koetter re Table Operation.

November 15, 1988. Mike Allan – Memo to Jim Tompkins re Puffy Lake Mill Operation”.

November 30, 1988. Mike Allan – “Review of Sampling in Mill”.

December 1988. Puffy Lake Mine – “November Month-end Report”.

December 1988. Piteau Associates engineering Ltd – “Preliminary Geotechnical Assessments of Alternative Pillar Layouts”.

January 4, 1989. Puffy Lake Mine – “December Month-end Report”.

January 20, 1989. Mike Allan – “Report on Site Visit. Jan 4 to 17, 1989.

January 30, 1989. Erik Anderson – “General memo re Mining Philosophy”.

January 30, 1989. J.G. Paterson Mining Engineering – “Report of assessment of Puffy Lake concentrator”.

February 3, 1989. J.R. Tompkins – “Comment re Review of Operations by John D. Smith”.

February 7, 1989. Mike Allan – “Memo to Werner Koetter re Rod Mill Feed Sampling”.

February 1989. Puffy Lake Mine – “January Month-end Report”.

February 21, 1989. Mike Allan – Memorandum to Jim Tompkins re Site Visit to Puffy Lake, Jan 29 to Feb 10, 1989”.

March 6, 1989. Puffy Lake Mine – “February Month-end Report”.

March 6, 1989. Mike Allan, Chief Metallurgist – “Memo to Jim Tompkins, Vice President Mining – Puffy Lake Visit, Feb 27 to Mar 3, 1988”.

June 6, 1989. Puffy Lake Mine – “May 1989 Activity Report “.

December 1988. Bob O’Beirn – “Underground Mining at Pioneer Metals’ Puffy Lake Mine”.

January 25, 1989. John D. Smith Engineering Associates Linmited – “Review of Mining Operations at Puffy Lake Mine”.

‘Late” 1989. Kilborn Engineering Pacific Ltd – Part 5.0 of Evaluation of Properties of Pioneer Metals Corporation”.

May 1991. Intergrout Consultants Ltd – “Impediments to Mining development in Manitoba – A Case Study of Pioneers Metals Corporation’s Experience at the Puffy Lake Mine”.

June 26, 1992. Kilborn Engineering Pacific Ltd – “Puffy Lake Reactivation Study, Phase I”.

August 14, 1992. Kilborn Engineering Pacific Ltd – “Puffy Lake Reactivation Study, Phase II”.

1992. Manitoba energy and Mines Geological Services – “Mineral Deposits and Occurrences in the Batty Lake area, NTS 63N/2”.

January 22, 1993. Tonto Mining, A Division of Dynatec Mining – “Puffy Lake Project, Mining Feasibility Study”.

June 17, 1993. Kilborn Engineering Pacific Ltd – “Puffy Lake Mine, Feasibility Study – 1993”.

October 1993. Tonto Mining – “Pioneer Metals Corporation, Puffy Lake Gold Project – Synopsis”.

November 23, 1993. Tonto Group of Companies – “Puffy Lake Underground Program to Test the Proposed Mining Method”.

January 1994. Tonto Mining – Underground Bulk Sampling Program”.

June 22, 1994. M. Ball, M.Sc., P. Geo – “Geological Report on the Test Mining Area, Puffy Lake Gold Property, Sherridon, Manitoba”.

April 23, 1996. Kilborn Engineering Pacific Ltd – “Economic Viability of Open Pit Mining at Puffy Lake”.

September 30, 1988. Kohn Leonoff Consulting Engineers – “Ragged Lake Tailings Dam”.

Website of Pioneer Metals Corporation @ www.pioneermetals.net

Karel R. Pieterse.

Tel 705-566-7549

E-mail: kpieterse@sympatico.ca

Fax 705-566-1902

61 Kingston Court, Sudbury, Ontario. P3A 1E1

CERTIFICATE OF AUTHOR

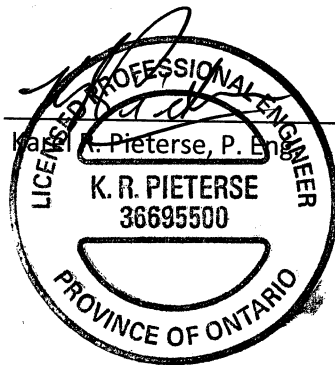
I, Karel R. Pieterse, P. Eng, do hereby certify that:

1. I graduated with an A.C.S.M. (First Class) from the Camborne School of Metalliferous Mining, Camborn, Cornwall, Great Britain in 1966.
2. I am a registered professional engineer with Professional Engineers Ontario (No 36695500 – expiry August 31, 2010).
3. I have worked as an engineer a total of 40 years since obtaining my A.C.S.M. and meet the requirements of a ‘qualified person’ by reason of education, professional affiliation and experience.
4. Specifically, I have operating and engineering experience with a variety of operations as follows; project engineer (nickel), (copper), (cobalt), (tungsten), mine superintendent (asbestos), general mine superintendent (copper/gold), project manager (gold), (nickel/copper), exploration manager (gold).
5. I am the author of this technical report titled “Technical Report on Puffy Lake Mine” dated June 30, 2006 and the updated report dated July 23, 2010.
6. I visited the mine-site on May 11, 2006, generally inspected the site and gathered samples for ‘verification’ purposes.
7. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report.
8. I am independent of the “issuer” applying all the tests in section 1.4 of National Instrument 43-101.
9. I have read National Instrument 43-101 and Form 43-101F, and the Technical Report has been prepared in compliance with that instrument and form

10. I consent to the publication and distribution of the Technical Report with any stock exchange and other regulatory authority and publication of the report, for regulatory purposes as well as electronic publication, in public company files and on issuer's website, all accessible by the public.
11. As of the date of the certificate dated July 23, 2010, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated at Sudbury, Ontario this 23 day of July, 2010.

Signed and Sealed:



Karel R. Pieterse.

Tel 705-566-7549

E-mail: kpieterse@sympatico.ca

Fax 705-566-1902

61 Kingston Court, Sudbury, Ontario. P3A 1E1

CERTIFICATE OF CONSENT

TO; TSX Venture Exchange,

And Other Regulatory Agencies, as concerned.

I, Karel R. Pieterse, P. Eng, with a business address as noted above, hereby Consent to the public filing on SEDAR of the Technical Report titled "Technical report on Puffy Lake Mine" dated July 23, 2010, (the "Technical Report") and any extracts from or a summary of the Technical Report which I prepared for Auriga Gold Corp.

Dated at Sudbury, Ontario this 23rd day of July, 2010.

Signed and Sealed:

