

**DRAFT**

**PolyMet Land Exchange Proposal  
Feasibility Analysis  
Mineral Characterization  
Determination Related to Exchange of  
Lands Between Polymet Mining and  
USFS - 2009**

**July 2009**

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This Mineral Characterization Determination Report was prepared in July 2009 for a Forest Service Feasibility Analysis of the PolyMet Land Exchange Proposal. The purpose of the Mineral Characterization Determination Report was to help identify whether there were any obvious minerals concerns or problems associated with pursuing the proposed land exchange. The purpose of the *Feasibility Analysis* was to take a preliminary look at whether the proposed land exchange was feasible enough to consider investing additional time, energy, and effort associated with case management and environmental analysis. This information will serve as the starting point for the minerals portion of the environmental analysis.

The Feasibility Analysis was approved in 2010 by the Regional Forester of the Eastern Region. That means the Forest Service will study the proposal in an Environmental Impact Statement (EIS) and determine whether it is in the interest of the people of the United States to exchange these lands.

The proposed land exchange is a connected action with the mining and operations proposal. These projects are being analyzed together under the co-leadership of the Forest Service, the US Army Corps of Engineers, and the Minnesota Department of Natural Resources.

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**Update: Fall 2010**

The following table shows the mineral potential and ownership of the tracts proposed for potential land exchange between PolyMet and US Forest Service. Note that Tracts 2-4 are undergoing a land title deed review to determine status and ownership of minerals.

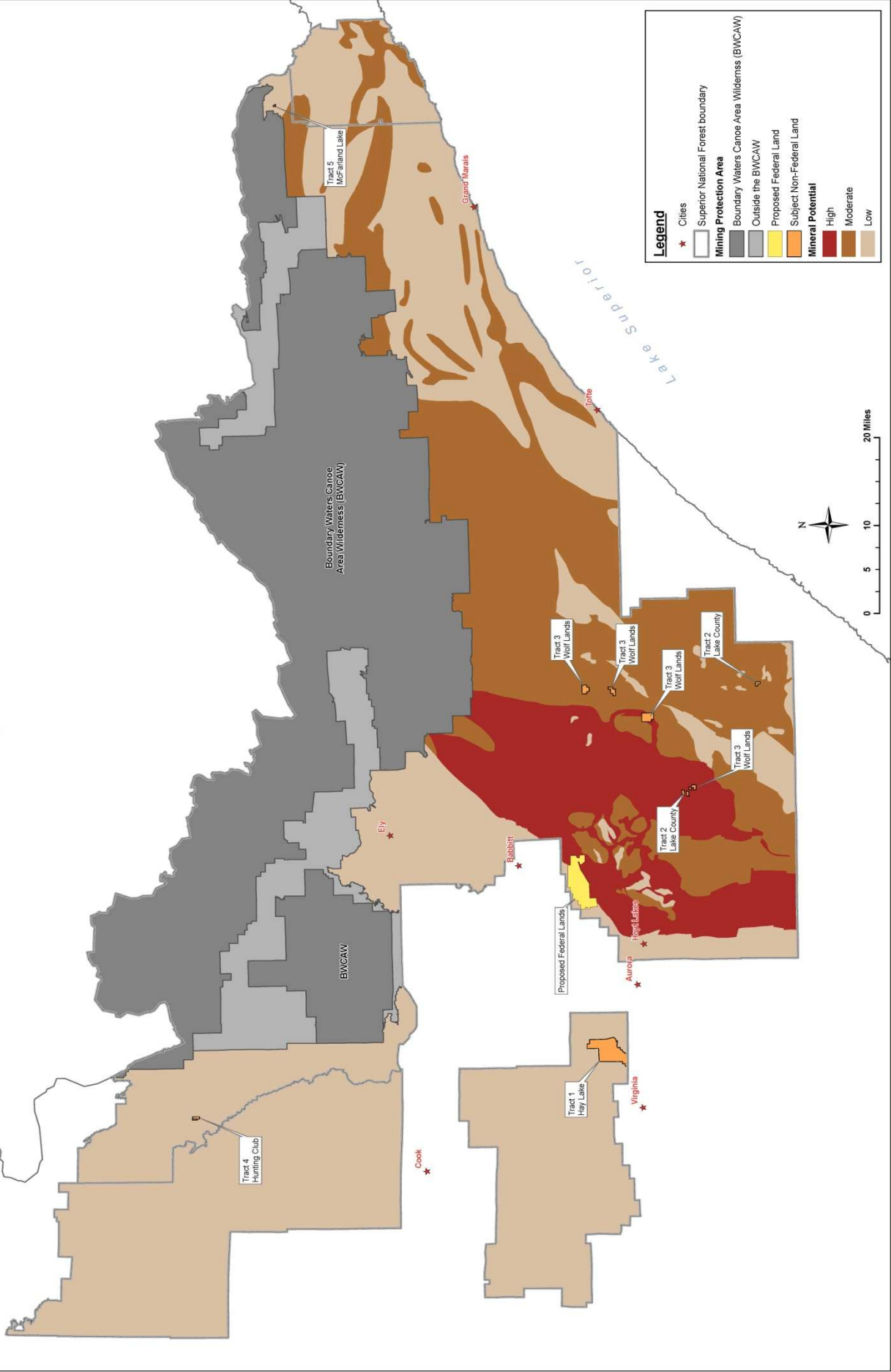
<b>MINERAL POTENTIAL AND OWNERSHIP</b>			
<b>Tracts</b>	<b>Mineral Potential</b>	<b>Mineral Ownership (approximate acres)</b>	<b>Acres</b>
Federal Lands	High, Low, and Unknown	Federal (140 acres) Private – Reserved (5,441 acres) Private – Outstanding (1,069 acres)	6,650
Tract #1 Hay Lake	Low	Private – Outstanding (4,590 acres) Private - Reserved (60 acres)	4,650
Tract #2 Lake County lands	High and Moderate	Title Deed Review in Progress	320
Tract #3 Wolf lands	High and Moderate	Title Deed Review in Progress	1,560
Track #4 Hunting Club lands	Low	Title Deed Review in Progress	160
Tract #5 McFarland Lake	Low	Title Deed Review in Progress	32

The map on the following page shows where mineral potential falls within northeastern Minnesota. This is followed by initial brief or summary descriptions of mineral potential for each of the tracts.



# Proposed PolyMet Land Exchange

## Mineral Potential of Subject Federal & Non-Federal Lands



## **Mineral Ownership and Potential**

### **Federal Land**

The federal land includes three types of mineral ownership: federal, private reserved, and private outstanding. There are approximately 140 acres of federal, 5,441 acres of reserved, and 1,069 acres of outstanding mineral ownership for a total of 6,650 acres. The lands are situated within the Biwabik Iron Formation in the north portion, Virginia Formation in the central portion, and the Duluth Complex in the southern portion. The Biwabik Iron Formation in this particular location has unknown mineral potential. However, this formation is being mined for iron ore by the Northshore Mining Company on the northern edge of the project area. The Virginia Formation has low mineral potential except for the possible “footwall/contact” mineralization associated with the Duluth Complex. The Duluth Complex generally has high mineral potential; however, at this time the areas outside of the defined NorthMet mineral deposit have not been identified sufficient for mining. The minerals associated with the Duluth Complex in the area are copper, nickel, platinum group metals (PGMs), cobalt, silver and gold.

### **Tract 1 – Hay Lake Tract**

The Hay Lake tract includes two types of mineral ownership: private reserved and private outstanding. There are approximately 60 acres of private reserved and 4,591 acres of private outstanding mineral ownership for a total of 4,650 acres. The lands are situated mainly within Archean aged granitic rocks. The southern edge of the tract is within greenstone belt rocks and schists within metavolcanic rocks. The Laurentian fault cuts between these two rock types. Mineral potential of the granitic, greenstone and schist rocks is low.

### **Tract 2 – Lake County Lands**

The title deed review is in progress and the mineral ownership for the Lake County Lands tract will be available in the near future. It covers 320 acres. It is composed of two separate locations with differing geology. The northern segment in T57N, R11W is situated within troctolitic rocks of the Duluth Complex. Mineral potential is high for these rocks. The southern track in T56N, R9W is situated within mafic rocks of the Beaver Bay Complex. Mineral potential is moderate for these rocks. Further geologic investigation would be necessary to validate these ratings.

### **Tract 3 – Wolf Lands**

The title deed review is in progress and the mineral ownership for the Wolf Lands tract will be available in the near future. It covers 1,560 acres. It is composed of four separate locations with differing geology. The segment in T57N, R11W is situated within troctolitic rocks of the Duluth Complex. The segment in T58N, R10W is situated within troctolitic, anorthositic, and felsic rocks of the Duluth Complex. The segment in T59N, R9W is situated within felsic rock of the Duluth Complex. The segment in T59N, R9W is situated in felsic and anorthositic rocks of the Duluth Complex. The mineral potential is high for all four track segments, however further geologic investigation would be necessary to validate this rating.

**Tract 4 – Hunting Club Lands**

The title deed review is in progress and the mineral ownership information for the Hunting club Lands tract will be available in the near future. It covers 160 acres. The track is situated within the Vermilion Granitic Complex that is composed of granitic rich migmatite rocks. The mineral potential for these rocks is low.

**Tract 5 – McFarland Lake**

The title deed review is in progress and the mineral ownership information for the McFarland Lake track will be available in the near future. It covers 32 acres. The lands are situated within the Animikie Group Rove Formation that is composed of argillite interbedded with siltstone and sandstone. The mineral potential for these rocks is low.



## **POLYMET MINING INC.**

### **NorthMet Project**

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## **MINERAL CHARACTER DETERMINATION RELATED TO EXCHANGE OF LANDS BETWEEN POLYMET MINING AND USFS-2009**

**July 17, 2009**

### **INTRODUCTION**

Following is a review of the bedrock and surficial mineral potential underlying surface rights to be exchanged between PolyMet Mining (PolyMet) and the United States Forest Service (USFS). This is intended for surface rights informational and administrative purposes as there is no request on the part of PolyMet to acquire any federal mineral rights. No new field work was conducted for this review. This review assumes all maps and lists generated by all parties are correct at time of writing.

See Figure 1 for general site locations.

The mineral character determination is based on extensive research of geological literature and maps published by state government and universities. Much of the research was done for previous projects in these areas and only a review of the most pertinent literature was required. For the parcels suggested by USFS for investigation a variety of public Minnesota Geological Survey maps were used, as well as 1:24,000 USGS topographic maps and background information from reports by Minnesota Department of Natural Resources and the Natural Resources Research Institute of the University of Minnesota Duluth. These maps and publications are referenced below. This document is for surface administration purposes only and was not done in the sufficient detail required when determining the extent and value of minerals.

This work is presented in two parts: 1) those private lands to be acquired by PolyMet for the USFS; 2) those USFS lands to be acquired from USFS by PolyMet.

Detailed ownership and possible encumbrances are covered elsewhere.

## **PART 1, SITES TO BE ACQUIRED BY POLYMET FOR TRADE WITH USFS:**

### **Hay Lake Site**

#### **Location**

The Hay Lake site is in St. Louis County and includes all or parts of: T59N, R16W, sections 9, 16, 19, 20, 21, 27, 28, 29, 30, 31, and 32. Total area is about 7.7 square miles. See Figure 2.

#### **Land and mineral ownership and encumbrances**

Surface rights at the Hay Lake site are currently owned by Leonard Land Company and under option to PolyMet. Mineral rights were not investigated for this study. There are no known encumbrances.

#### **Subject Mineral Resource Geology**

The “Hay Lake Site” north of McKinley and Biwabik in St. Louis County is entirely on Archean aged rocks (Figure 3). Mostly these are granitic rocks. The southwestern-most part of the area is underlain by metamorphosed basalts, gabbros, and sedimentary rocks (Jirsa, et. al., 2005). The mineral potential of these rocks has not been investigated in detail, but is limited as granitic rocks in the area are not hosts for known mineral deposits.

#### **Subject Mineral Resource potential**

There is little mineral potential at the Hay Lake site. The Minnesota DNR core library index (August 2001 database) shows no drilling in or near the land exchange area. Biwabik Iron Formation is about two miles south of the site.

#### **Surficial Geology**

MGS Map-164 (Figure 4, from Jennings and Reynolds, 2005) shows the area to be predominantly glacial till with lesser peat and exposed bedrock.

#### **Surficial Mineral Material Potential**

There are no nearby gravel operations on 1:24,000 USGS maps that would indicate any potential for extracting surficial materials.

#### **Conclusions**

There is a powerline across sections 19, 20, and 21, and a portion of section 16; the area is bounded on the east by County Highway 715; otherwise there is no development on these parcels based on USGS 1:24,000 topographic map (McKinley and Biwabik quads, Figure 5).

## **Wheaton College Site**

### **Location**

Site is in Cook County Minnesota, T64N, R3E, section 9.

### **Land and mineral ownership and encumbrances**

The site is currently owned by Wheaton College and under option to PolyMet. Mineral rights ownership is unknown. There are no known encumbrances.

### **Subject Mineral Resource Geology**

The "Wheaton College Site" in Cook County (Figure 6) is underlain by gabbroic rocks of Keweenawan age (Logan Sills) and Proterozoic sedimentary rocks (Rove Formation) (Miller, et. al., 2001). Studies of mineral potential in the area are rare because of the proximity to the wilderness. However, this is not a rock package than has shown potential elsewhere in Cook County.

The Minnesota DNR core library index (August 2001 database) shows no drilling in or near the land exchange area.

### **Subject Mineral Resource potential**

There is little or no mineral potential in the Wheaton College Site area.

### **Surficial Geology**

Surficial geology does not seem to have been mapped in detail, though the expectation would be thin tills, outwash, and peat over bedrock, as is common in northeast Minnesota.

### **Surficial Mineral Material Potential**

There are no nearby gravel operations on 1:24,000 maps that would indicate any potential for extracting surficial materials. The USGS quadrangle map shows road access near, but not to, the site, this is a limiting factor for aggregate development.

### **Conclusions**

There is no development on this parcel based on USGS 1:24,000 topographic map (Pine Lake East quadrangle, Figure 7).

## **PART 2, FEDERAL SURFACE RIGHTS TO BE ACQUIRED BY POLYMET MINING:**

For the PolyMet land exchange area (Figures 8 and 9), geologic information is based on company drilling data, as well as regional data from publications and maps by the Natural Resources Research Institute of University of Minnesota Duluth, and the Minnesota Geological Survey (MGS), a branch of the University of Minnesota Twin Cities (Severson and Miller, 1999, 2005, Miller and Severson, 2005).

Mineral rights are not a part of the land exchange being negotiated, information is presented here only for completeness. Lands in the PolyMet area are underlain by Biwabik Iron Formation, Virginia Formation, and the Duluth Complex.

Any drilling information on the Biwabik Iron Formation is private, hence no specific comment can be made about the mineral potential.

The Virginia Formation is not known to have any mineral potential.

Duluth Complex lands can be divided into three broad categories for mineral potential: 1) in the area of a defined mineral deposit (i.e., NorthMet); 2) lands that have been explored (i.e., drilled) but where information is insufficient to evaluate the potential (e.g., Wetlegs area to west of Northmet); 3) lands where no drilling has been done as to the south of the NorthMet deposit.

Within the area outside of the current NorthMet minerals lease and over the Duluth Complex there is moderate mineral potential in the lands being exchanged. Previous drilling has shown mineralization, but its continuity has not been evaluated by PolyMet. Mineral potential is high in the areas PolyMet intends to mine.

Overall, surface resource potential, i.e., aggregate, is limited as drilling in area has shown glacial overburden to be thin, generally less than 20 feet thick and not well sorted.

Table 1, attached, shows location, gross bedrock geology for each parcel, basis for evaluation, and minerals ownership.

### **SIGNATURE AND DATE:**

Report prepared by Richard Patelke, P.G., for PolyMet Mining, July 17, 2009.



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Richard Patelke  
(Signed copy on file)

## GENERAL AND SPECIFIC REFERENCES:

- Jennings, C.E., and Reynolds, W.K., 2005, Surficial Geology of the Mesabi Iron Range, Minnesota, Minnesota Geological Survey Miscellaneous Map 164, scale 1:100,000
- Jirsa, M. A., and Miller, J.D., 2004, Bedrock Geology of the Ely and Basswood Lake 30' X 60' Quadrangles, Northeast Minnesota, Minnesota Geological Survey Miscellaneous Map 148, scale 1:100,000
- Jirsa, M.A., Chandler, V.W., and Lively, R.S., 2005, Bedrock Geology of the Mesabi Iron Range, Minnesota, Minnesota Geological Survey Miscellaneous Map 163, scale 1:100,000
- Miller, J.D., Jr., Green, J.C., Severson, M.J., Chandler, V.W., and Peterson, D.M., 2001, Geologic Map of the Duluth Complex and related rocks, northeastern Minnesota: Minnesota Geological Survey Miscellaneous Map 119, Scale 1:200,000
- Miller, J.D., Jr., Green, J.C., Severson, M.J., Chandler, V.W., Hauck, S.A., Peterson, D.M., and Wahl, T.E., 2002, Geology and Mineral Potential of the Duluth Complex and related rocks of northeastern Minnesota: Minnesota Geological Survey Report of Investigations 58, 207 p., one CD-ROM.
- Miller, J.D. Jr., and Severson, M.J., 2005, Bedrock Geologic Map of Babbitt SW Quadrangle: Minnesota Geologic Survey, Miscellaneous Map - 161, 1:24,000.
- Minnesota Department of Natural Resources, digital copy of exploration drill hole database, from 2001. Contact Rick Ruhanen at MDNR Lands and Minerals, Hibbing, for further information.
- Patelke, R.L., 2003, Exploration drill hole lithology, geologic unit, copper-nickel assay, and location database for the Keweenawan Duluth Complex, northeastern Minnesota: Natural Resources Research Institute, University of Minnesota, Duluth, Technical Report, NRRI/TR-2003/21, 96 p. one CD-ROM.
- Patelke, R.L., and Severson, M.J., 2007, A history of copper-nickel and titanium oxide test pits, bulk samples, and related metallurgical testing in the Keweenawan Duluth Complex, northeastern Minnesota, Natural Resources Research Institute, University of Minnesota, Duluth, Technical Report, NRRI/TR-2005, one CD-ROM.
- Severson, M.J., 1988, Geology and structure of a portion of the Partridge River Intrusion, northeastern Minnesota: Natural Resources Research Institute, Univ. Minn., Duluth, Tech. Rept., NRRI/GMIN-TR-88-08, 78 p.
- Severson, M.J., and Hauck, S.A., 1990, Geology, geochemistry, and stratigraphy of a portion of the Partridge River Intrusion, northeastern Minnesota: Natural Resources Research Institute,

Univ. Minn., Duluth, Tech. Rept., NRRI/GMIN-TR-89-11, 79 p.

Severson, M.J., and Miller, J.D. Jr., 1999, Bedrock Geologic Map of Allen Quadrangle: Minnesota Geologic Survey, Miscellaneous Map - 91, 1:24,000.

Severson, M.J., and Miller, J.D. Jr., 2005, Bedrock Geologic Map of Babbitt Quadrangle: Minnesota Geologic Survey, Miscellaneous Map - 159, 1:24,000.

# Superior National Forest

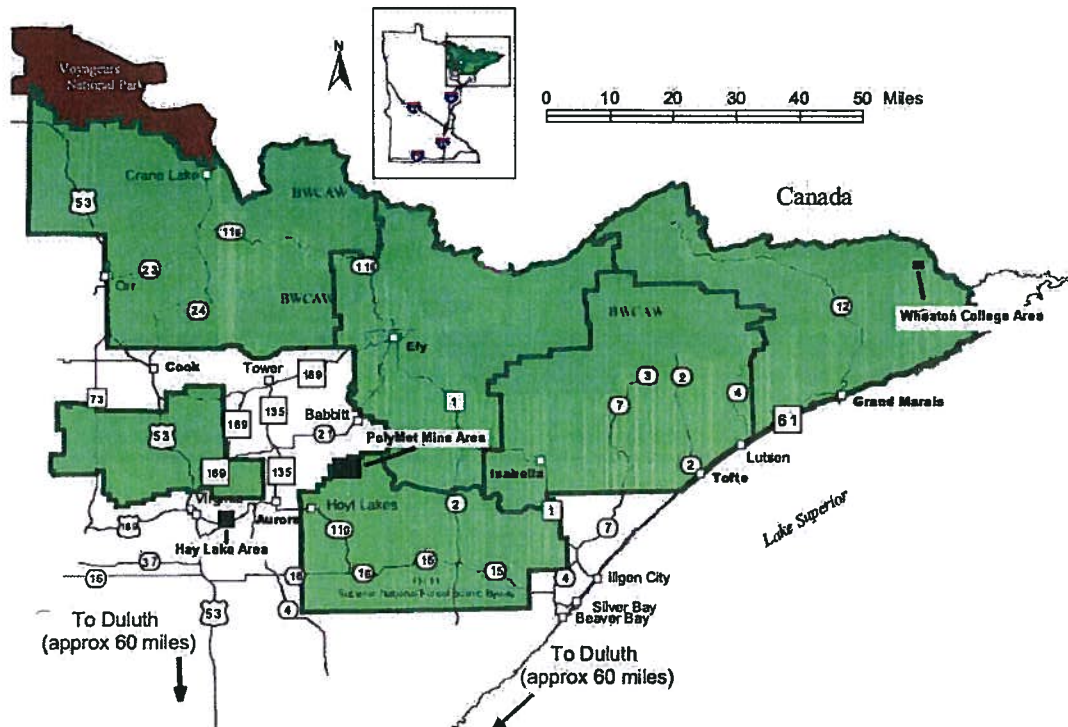


Figure 1. Generalized location map of PolyMet site and three sites under consideration for land exchange (solid black rectangles). Modified from USFS map.

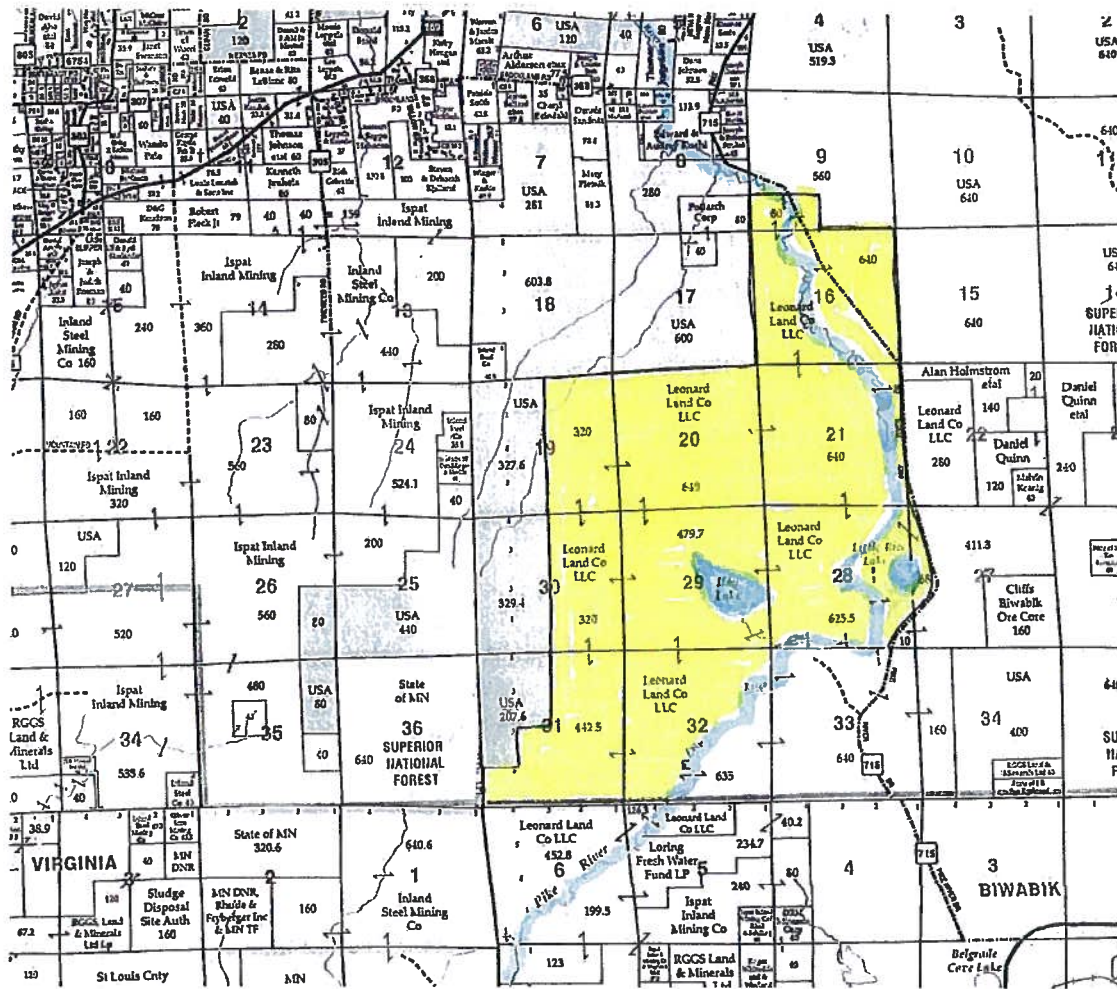
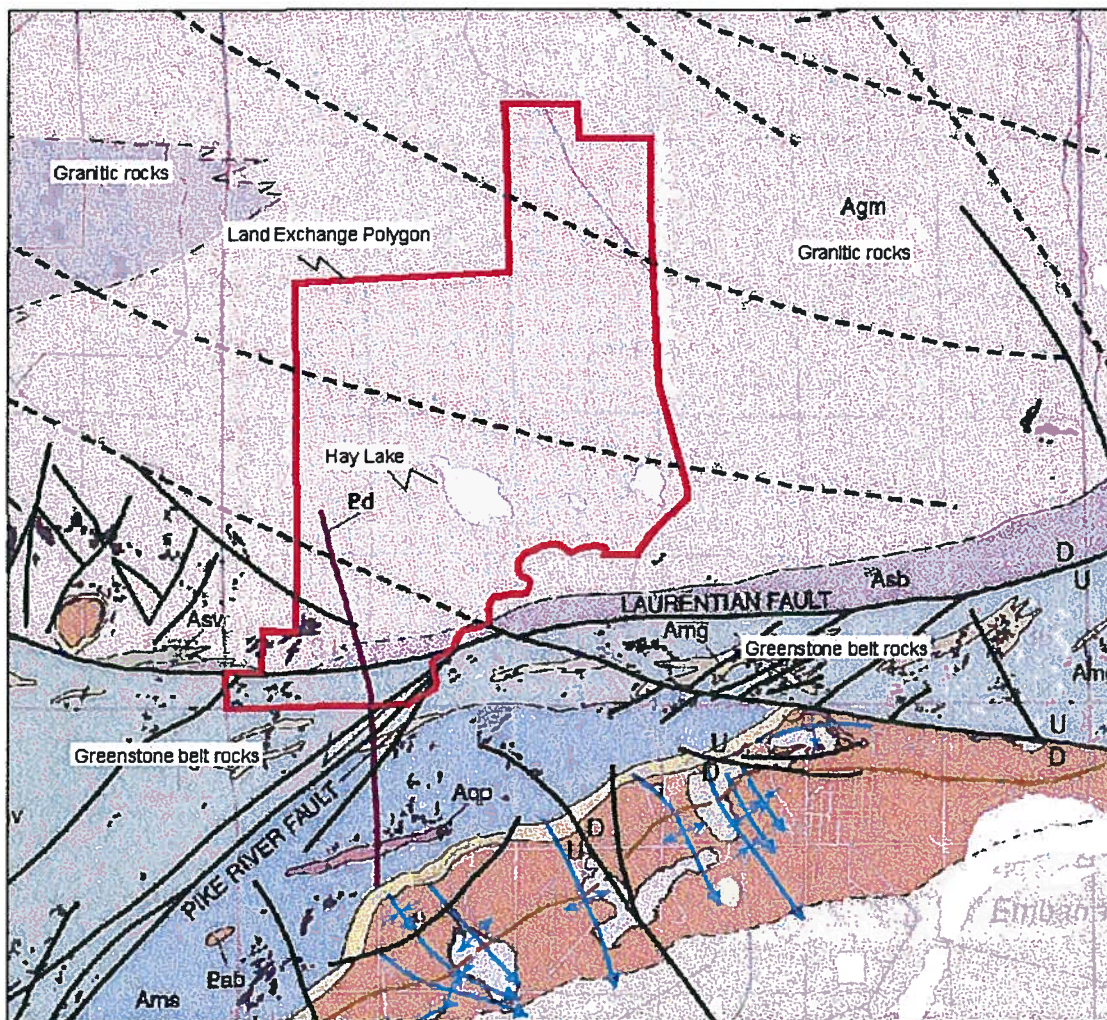


Figure 2. Hay Lake exchange area on plat map. T59N, R16W, St. Louis County.



**Figure 3. Geologic map of area around Hay Lake lands. One grid square equals approximately one mile. Agm is largely granite, Asb are schists, and Amg are gabbros in the Amv volcanic rocks. From MGS map 163, Jirsa et al., 2005.**

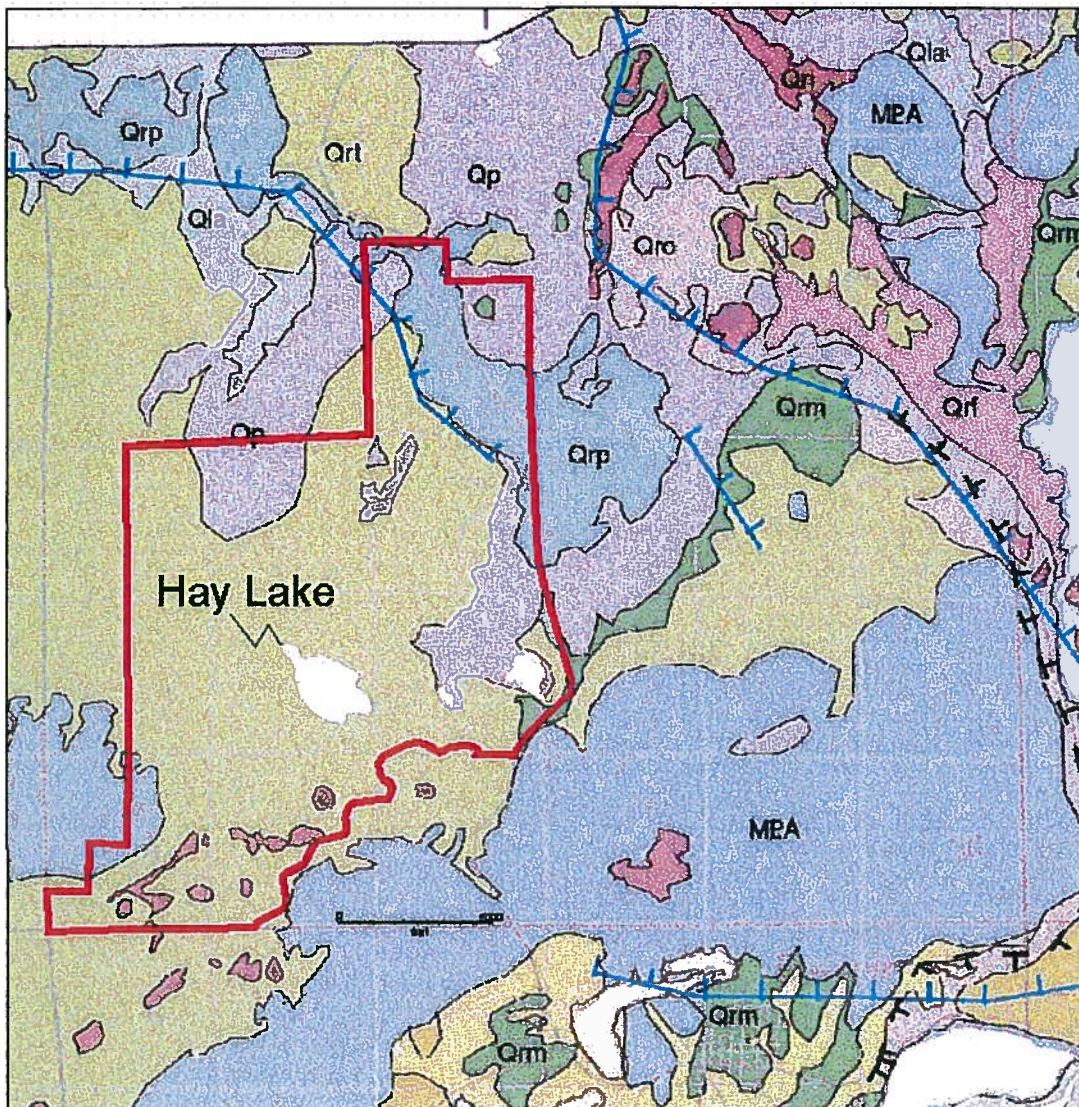


Figure 4. Hay Lake area boundary on Minnesota Geological Survey map M-164, Jennings and Reynolds, 2005. Qrt, Qrp, and Qrm are various glacial till units. Qp is areas of peat. MPA denotes areas of thin till over bedrock.

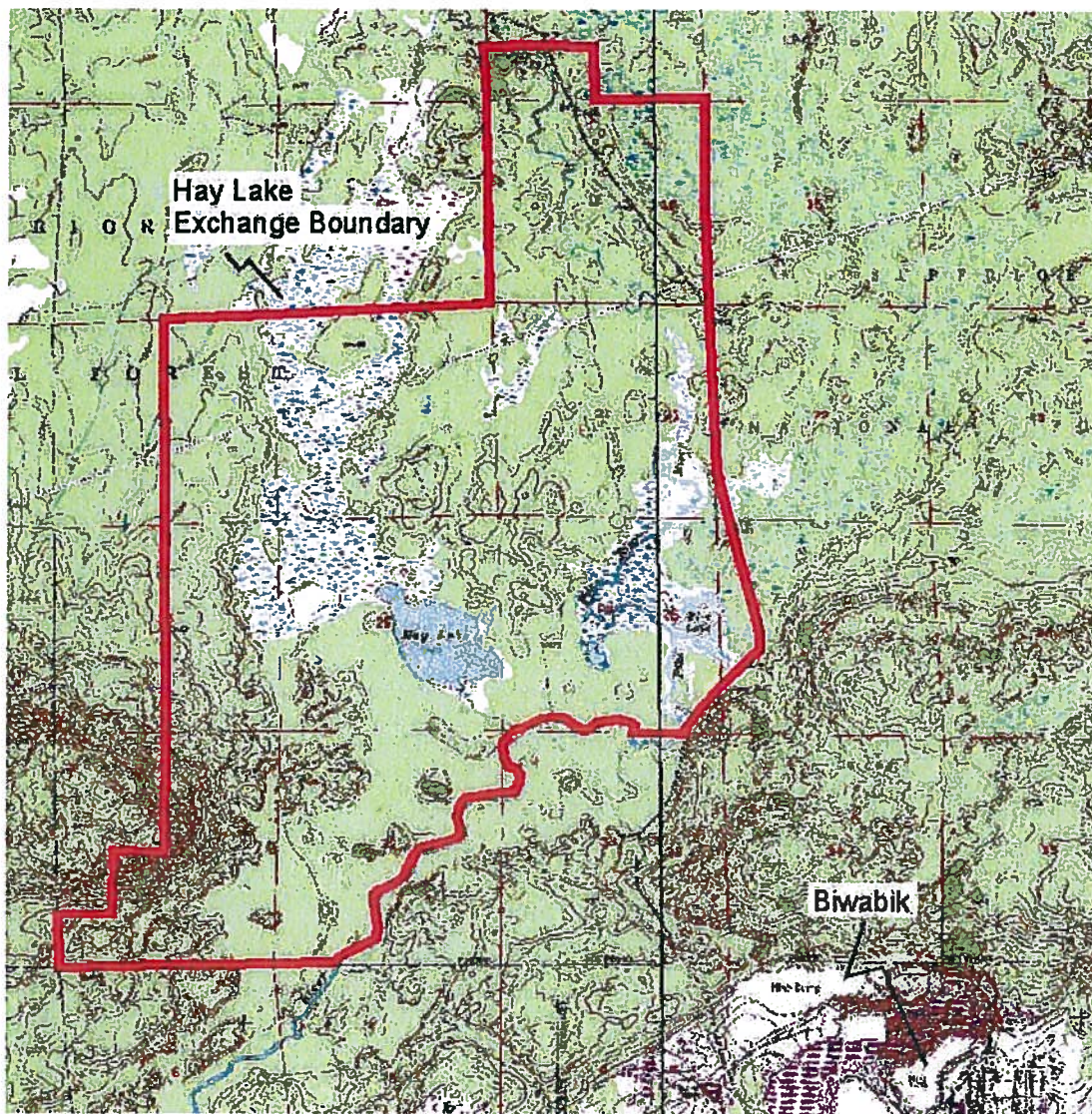


Figure 5. Hay Lake land exchange boundary on USGS topographic base. USGS McKinley and Biwabik quads.

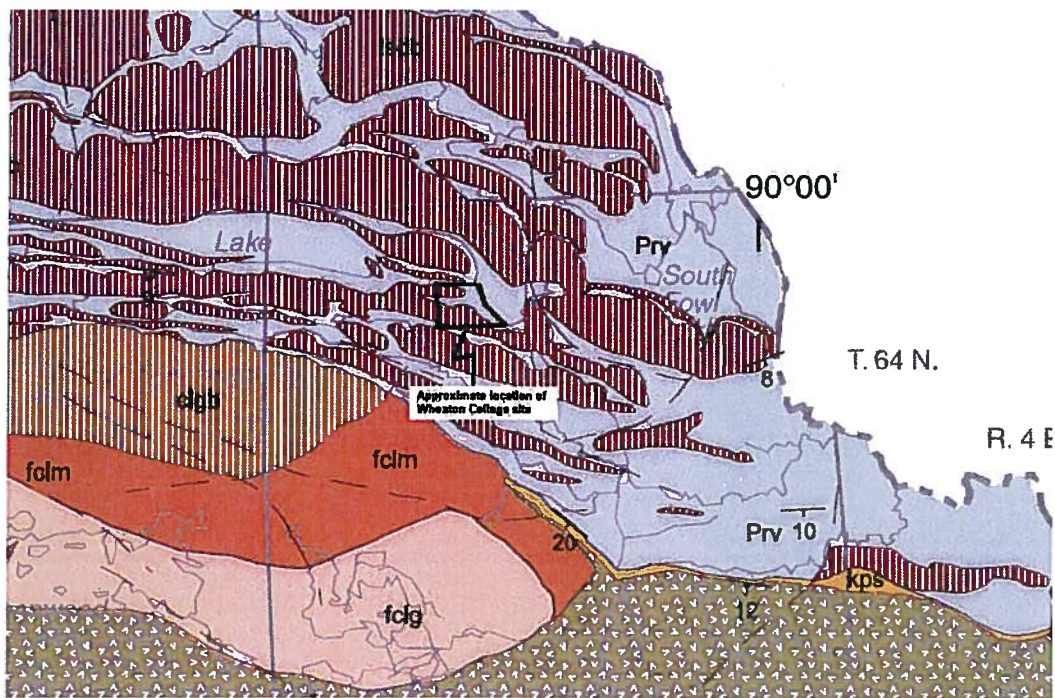


Figure 6. Wheaton College site on MGS Map 119 (Miller, et al., 2001). Site is approximately 0.25 miles X 0.25 miles.

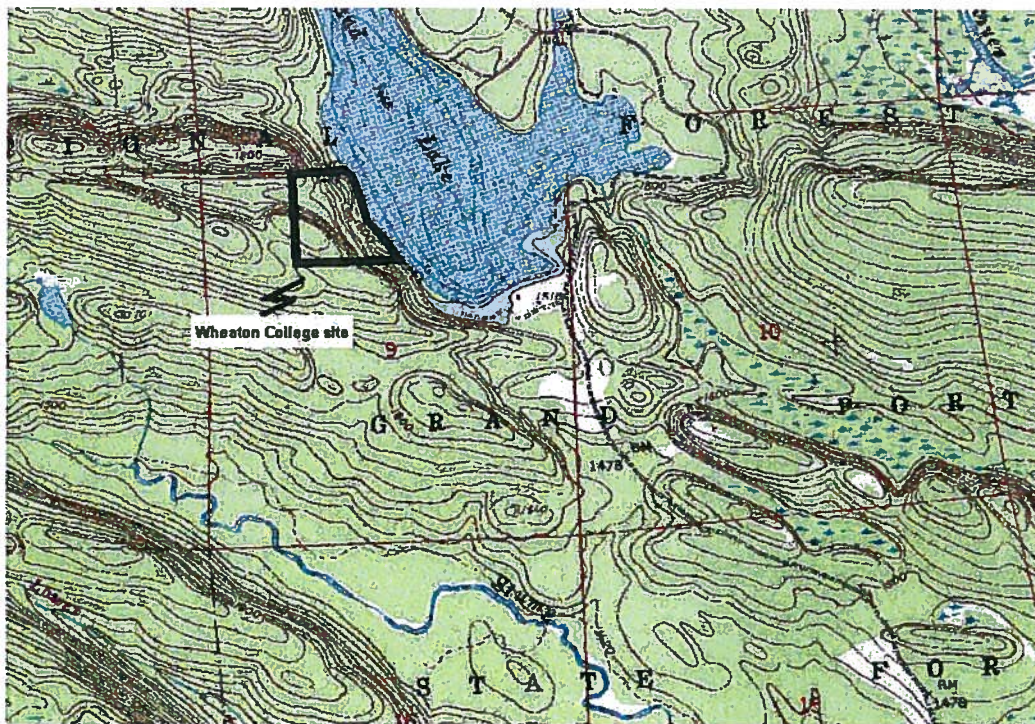


Figure 7. Wheaton College site on USGS topographic base, Pine Lake East quad.

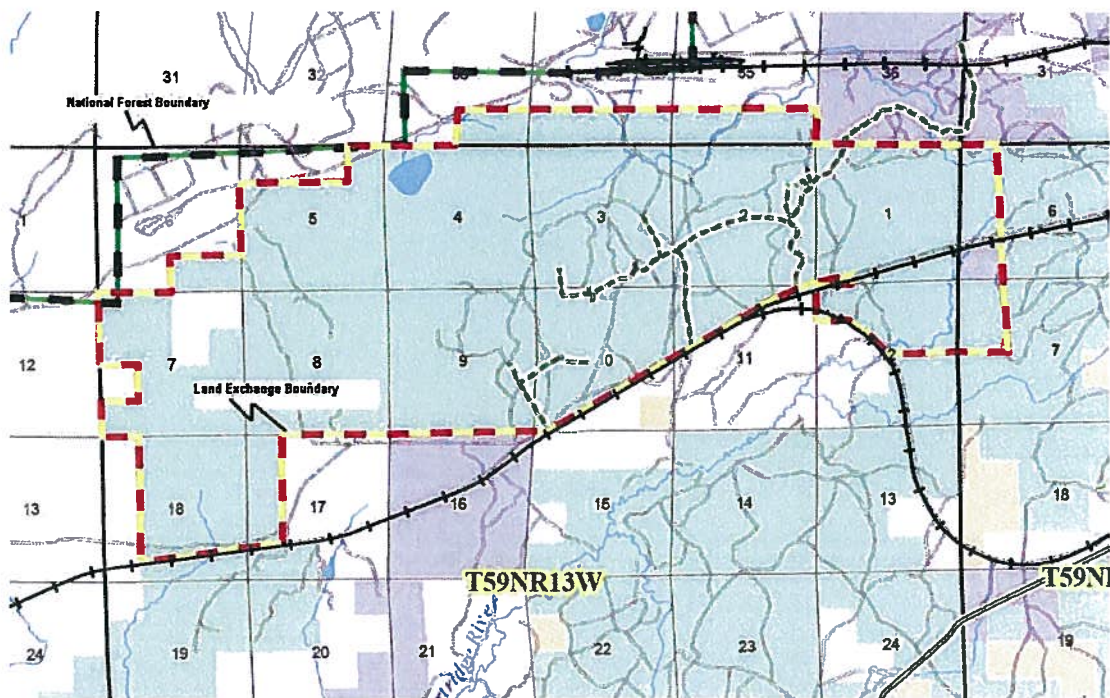


Figure 8. Land exchange area. Map by USFS.

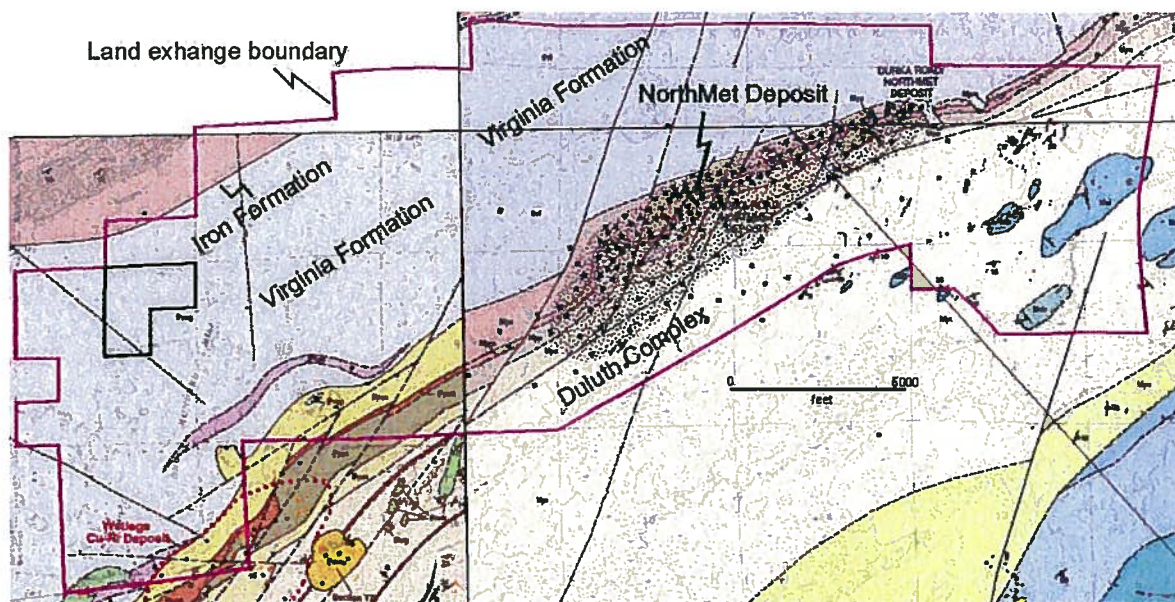


Figure 9. Land exchange boundary at NorthMet site over MGS maps, M91, M-159, and M-161, Severson and Miller, 1999 and 2005, Miller and Severson 2005.

Table 1, Lands at PolyMet Mine Site to be purchased / exchanged									
Note: List from USFS, total acres for some sections with parcels less than 40 acres are incorrect here. For Instance T59N, R13W, Section 10.									
Minerals right ownership is based on best available existing information, no specific review was done for this report									
R. Patette, PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	13	1	GL 1	NE-NE	34.63		Duluth Complex, no drill holes	RGGS	
59	13	1	GL 2	NW-NE	34.86		Duluth Complex, no drill holes	RGGS	
59	13	1	SWNE	SW-NE	40		Duluth Complex, no drill holes	RGGS	
59	13	1	SENE	SE-NE	40		Duluth Complex, no drill holes	RGGS	
59	13	1	GL 3	NE-NW	35.09		Duluth Complex and Virginia Formation, 2 drill holes	RGGS	
59	13	1	GL 4	NW-NW	35.32		Virginia Formation, no drill holes	RGGS	
59	13	1	SWNW	SW-NW	40		Duluth Complex and Virginia Formation, 2 drill holes	RGGS	
59	13	1	SENW	SE-NW	40		Duluth Complex, 1 drill hole	RGGS	
59	13	1	NESW	NE-SW	40		Duluth Complex, no drill holes	RGGS	
59	13	1	NWSW	NW-SW	40		Duluth Complex, 1 drill hole	RGGS	
59	13	1	SWSW	SW-SW	35.64	GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes in area being purchased	RGGS	
59	13	1	SESW	SE-SW	25.89	GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes in area being purchased	RGGS	
59	13	1	NESE	NE-SE	39.89	GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes	RGGS	
59	13	1	NWSE	NW-SE	40		Duluth Complex, no drill holes	RGGS	
59	13	1	SWSE	SW-SE	27.22	GLO acreage lying N & S of RR r-o-w	Duluth Complex, no drill holes	RGGS	
59	13	1	SESE	SE-SE	27.77	GLO acreage lying N & S of RR r-o-w	Duluth Complex, 1 drill hole	FEDERAL	
TOTAL FOR SECTION		1			576.31				

Note: List from USFS, total acres for some sections with parcels less than 40 acres are incorrect here. For instance T59N, R13W, Section 10.									
Minerals right ownership is based on best available existing information, no specific review was done for this report									
R. Patelke, PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	13	2	GL 1	NE-NE	37.48		Duluth Complex and Virginia Formation, 13 drill holes	RGGS	
59	13	2	GL 2	NW-NE	37.57		Duluth Complex, 1 drill hole	RGGS	
59	13	2	SWNE	SW-NE	40		Duluth Complex, 35 drill holes	RGGS	
59	13	2	SENE	SE-NE	40		Duluth Complex, 19 drill holes	RGGS	
59	13	2	GL 3	NE-NW	37.66		Virginia Formation, no drill holes	RGGS	
59	13	2	GL 4	NW-NW	37.75		Virginia Formation, no drill holes	RGGS	
59	13	2	SWNW	SW-NW	40		Duluth Complex and Virginia Formation, 2 drill holes	RGGS	
59	13	2	SENW	SE-NW	40		Duluth Complex and Virginia Formation, 18 drill holes	RGGS	
59	13	2	NESW	NE-SW	40		Duluth Complex, 13 drill holes	RGGS	
59	13	2	NWSW	NW-SW	40		Duluth Complex, 14 drill holes	RGGS	
59	13	2	SWSW	SW-SW	40		Duluth Complex, 4 drill holes	RGGS	
59	13	2	SESW	SE-SW	40		Duluth Complex, 2 drill holes	RGGS	
59	13	2	NESE	NE-SE	40		Duluth Complex, 3 drill holes	RGGS	
59	13	2	NWSE	NW-SE	40		Duluth Complex, 9 drill holes	RGGS	
59	13	2	SWSE	SW-SE	40		Duluth Complex, 1 drill hole	RGGS	
59	13	2	SESE	SE-SE	40		Duluth Complex, no drill holes	RGGS	
TOTAL FOR SECTION					530.46				

Note: List from USFS, total acres for some sections with parcels less than 40 acres are incorrect here. For Instance T59N, R13W, Section 10.									
Minerals right ownership is based on best available existing information, no specific review was done for this report									
R. Patelke, PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	13	3	GL 1	NE-NE	37.85		Virginia Formation, no drill holes	RGGGS	
59	13	3	GL 2	NW-NE	37.96		Virginia Formation, no drill holes	RGGGS	
59	13	3	SWNE	SW-NE	40		Virginia Formation, 1 drill hole	RGGGS	
59	13	3	SENE	SE-NE	40		Virginia Formation, no drill holes	RGGGS	
59	13	3	GL 3	NE-NW	38.07		Virginia Formation, no drill holes	RGGGS	
59	13	3	GL 4	NW-NW	38.18		Virginia Formation, no drill holes	RGGGS	
59	13	3	SWNW	SW-NW	40		Virginia Formation, no drill holes	RGGGS	
59	13	3	SENW	SE-NW	40		Virginia Formation, no drill holes	RGGGS	
59	13	3	NESW	NE-SW	40		Duluth Complex and Virginia Formation, no drill holes	RGGGS	
59	13	3	NWSW	NW-SW	40		Virginia Formation, no drill holes	RGGGS	
59	13	3	SWSW	SW-SW	40		Duluth Complex and Virginia Formation, 4 drill holes	RGGGS	
59	13	3	SESW	SE-SW	40		Duluth Complex and Virginia Formation, 18 drill holes	RGGGS	
59	13	3	NESE	NE-SE	40		Duluth Complex and Virginia Formation, 20 drill holes	RGGGS	
59	13	3	NWSE	NW-SE	40		Duluth Complex and Virginia Formation, 13 drill holes	RGGGS	
59	13	3	SWSE	SW-SE	40		Duluth Complex, 21 drill holes	RGGGS	
59	13	3	SESE	SE-SE	40		Duluth Complex, 6 drill holes	RGGGS	
TOTAL FOR SECTION		3			632.06				

Note: List from USFS, total acres for some sections with parcels less than 40 acres are incorrect here. For instance T59N, R13W, Section 10.									
Minerals right ownership is based on best available existing information, no specific review was done for this report									
R. Pateke, PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	13	4	GL 1	NE-NE	38.43		Virginia Formation, no drill holes	RGGS	
59	13	4	GL 2	NW-NE	38.82		Virginia Formation, no drill holes	RGGS	
59	13	4	SWNE	SW-NE	40		Virginia Formation, no drill holes	RGGS	
59	13	4	SENE	SE-NE	40		Virginia Formation, no drill holes	RGGS	
59	13	4	GL 3	NE-NW	39.21		Virginia Formation, no drill holes	RGGS	
59	13	4	GL 4	NW-NW	30.15		Virginia Formation, no drill holes	RGGS	
59	13	4	GL 5	SW-NW	29.45		Virginia Formation, no drill holes	RGGS	
59	13	4	SENW	SE-NW	40		Virginia Formation, no drill holes	RGGS	
59	13	4	NESW	NE-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	4	NWSW	NW-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	4	SWSW	SW-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	4	SESW	SE-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	4	NESE	NE-SE	40		Virginia Formation, no drill holes	RGGS	
59	13	4	NWSE	NW-SE	40		Virginia Formation, no drill holes	RGGS	
59	13	4	SWSE	SW-SE	40		Virginia Formation, 1 drill hole	RGGS	
59	13	4	SESE	SE-SE	40		Virginia Formation, no drill holes	RGGS	
TOTAL FOR SECTION		4			616.06				

Note: List from USFS, total acres for some sections with parcels less than 40 acres are incorrect here. For instance T59N, R13W, Section 10.									
Minerals right ownership is based on best available existing information, no specific review was done for this report									
R. Patelke, PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	13	5	GL 1	NE-NE	33.19		Virginia Formation and Biwabik Iron Formation, no drill holes	LONGYEAR-MESABA	
59	13	5	SWNE	SW-NE	40		Virginia Formation, no drill holes	RGGS	
59	13	5	GL 5	SE-NE	23.7		Virginia Formation, no drill holes	RGGS	
59	13	5	SWNW	SW-NW	40		Virginia Formation and Biwabik Iron Formation, no drill holes	RGGS	
59	13	5	SESW	SE-NW	40		Virginia Formation and Biwabik Iron Formation, 1 drill hole	RGGS	
59	13	5	NESW	NE-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	5	NWSW	NW-SW	40		Virginia Formation and Biwabik Iron Formation, no drill holes	RGGS	
59	13	5	SWSW	SW-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	5	SESW	SE-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	5	NESE	NE-SE	40		Virginia Formation, no drill holes	RGGS	
59	13	5	NWSE	NW-SE	40		Virginia Formation, no drill holes	RGGS	
59	13	5	SWSE	SW-SE	40		Virginia Formation, no drill holes	RGGS	
59	13	5	SESE	SE-SE	40		Virginia Formation, no drill holes	RGGS	
TOTAL FOR SECTION					496.89				
59	13	6	SWSE	SW-SE	40		Virginia Formation and Biwabik Iron Formation, no drill holes	RGGS	
59	13	6	SESE	SE-SE	40		Virginia Formation, no drill holes	RGGS	
TOTAL FOR SECTION					80				

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Minerals right ownership is based on best available existing information, no specific review was done for this report									
R. Patelke, PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	13	7	SENE	SE-NE	40		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	7	NENW	NE-NW	40		Virginia Formation, no drill holes	RGGS	
59	13	7	GL 1	NW-NW	41.08		Virginia Formation, no drill holes	RGGS	
59	13	7	GL 2	SW-NW	41		Virginia Formation, no drill holes	RGGS	
59	13	7	SENE	SE-NW	40		Virginia Formation, no drill holes	RGGS	
59	13	7	NESW	NE-SW	40		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	7	GL 4	SW-SW	40.84		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	7	SESW	SE-SW	40		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	7	NESE	NE-SE	40		Virginia Formation, no drill holes	RGGS	
59	13	7	NWSE	NW-SE	40		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	7	SWSE	SW-SE	40		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	7	SESE	SE-SE	40		Virginia Formation, no drill holes	RGGS	
TOTAL FOR SECTION		7			482.92				

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R. Patel/ke. PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	13	8	NENE	NE-NE	40		Virginia Formation, no drill holes	RGGS	
59	13	8	NWNE	NW-NE	40		Virginia Formation, no drill holes	RGGS	
59	13	8	SWNE	SW-NE	40		Virginia Formation, no drill holes	RGGS	
59	13	8	SENE	SE-NE	40		Virginia Formation, no drill holes	RGGS	
59	13	8	NENW	NE-NW	40		Virginia Formation, no drill holes	RGGS	
59	13	8	NWNW	NW-NW	40		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	8	SWNW	SW-NW	40		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	8	SENW	SE-NW	40		Virginia Formation, no drill holes	RGGS	
59	13	8	NESW	NE-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	8	NWSW	NW-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	8	SWSW	SW-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	8	SESW	SE-SW	40		Duluth Complex and Virginia Formation, no drill holes	RGGS	
59	13	8	NESE	NE-SE	40		Duluth Complex and Virginia Formation, 2 drill holes	RGGS	
59	13	8	NWSE	NW-SE	40		Duluth Complex and Virginia Formation, no drill holes	RGGS	
59	13	8	SWSE	SW-SE	40		Duluth Complex and Virginia Formation, 2 drill holes	RGGS	
59	13	8	SESE	SE-SE	40		Duluth Complex, 2 drill holes	RGGS	
TOTAL FOR SECTION		8			640				

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R. Patelke, PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	13	9	NENE	NE-NE	40		Duluth Complex and Virginia Formation, no drill holes	RGGS	
59	13	9	NWNE	NW-NE	40		Virginia Formation, no drill holes	RGGS	
59	13	9	SWNE	SW-NE	40		Duluth Complex and Virginia Formation, 2 drill holes	RGGS	
59	13	9	SENE	SE-NE	40		Duluth Complex and Virginia Formation, 12 drill holes	RGGS	
59	13	9	NENW	NE-NW	40		Virginia Formation, no drill holes	RGGS	
59	13	9	NWNW	NW-NW	40		Virginia Formation, no drill holes	RGGS	
59	13	9	SWNW	SW-NW	40		Duluth Complex and Virginia Formation, no drill holes	RGGS	
59	13	9	SENW	SE-NW	40		Duluth Complex and Virginia Formation, no drill holes	RGGS	
59	13	9	NESW	NE-SW	40		Duluth Complex, 1 drill hole	RGGS	
59	13	9	NWSW	NW-SW	40		Duluth Complex and Virginia Formation, 1 drill hole	RGGS	
59	13	9	SWSW	SW-SW	40		Duluth Complex, no drill holes	RGGS	
59	13	9	SESW	SE-SW	40		Duluth Complex, no drill holes	RGGS	
59	13	9	NESE	NE-SE	40		Duluth Complex, 11 drill holes	RGGS	
59	13	9	NWSE	NW-SE	40		Duluth Complex, 3 drill holes	RGGS	
59	13	9	SWSE	SW-SE	40		Duluth Complex, no drill holes	LONGYEAR-MESABA	
59	13	9	SESE(part)	SE-SE(part)	37.5 all SESE except SE1/4SE1/4SE1/4		Duluth Complex, 2 drill holes	RGGS	
TOTAL FOR SECTION		9			537.5				

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R. Patelke, PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	13	10	NENE	NE-NE	40		Duluth Complex, 3 drill holes	RGGS	
59	13	10	NWNE	NW-NE	40		Duluth Complex, 6 drill holes	RGGS	
59	13	10	SWNE	SW-NE	40		Duluth Complex, 3 drill holes	RGGS	
59	13	10	SENE (part)	SE-NE (part)	35	All SENE except S1/2SE1/4SE1/4NE1/4	Duluth Complex, 3 drill holes	RGGS	
59	13	10	NENW	NE-NW	40		Duluth Complex, 14 drill holes	RGGS	
59	13	10	NWNW	NW-NW	40		Duluth Complex and Virginia Formation, 12 drill holes	RGGS	
59	13	10	SWNW	SW-NW	40		Duluth Complex, 19 drill holes	RGGS	
59	13	10	SENW	SE-NW	40		Duluth Complex, 16 drill holes	RGGS	
59	13	10	NESW (part)	NE-SW (part)	35	All NESW except S1/2SE1/4NE1/4SW1/4	Duluth Complex, 3 drill holes	RGGS	
59	13	10	NWSW	NW-SW	40		Duluth Complex, 14 drill holes	LONGYEAR-MESABA	
59	13	10	SWSW (part)	SW-SW (part)	18.42	GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes	LONGYEAR-MESABA	
59	13	10	SESW (part)	SE-SW (part)		GLO acreage lying North of RR r-o-w	Duluth Complex, 1 drill hole	RGGS	
59	13	10	NESE (part)	NE-SE (part)		GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes	RGGS	
59	13	10	NWSE (part)	NW-SE (part)	15.41	GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes	RGGS	
TOTAL FOR SECTION		10			423.83				
59	13	11	NENE (part)	NE-NE (part)		GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes	RGGS	
59	13	11	NWNE (part)	NW-NE (part)	33.75	GLO acreage lying North of RR r-o-w	Duluth Complex, 1 drill hole	RGGS	
59	13	11	NENW (part)	NE-NW (part)	36.56	GLO acreage lying North of RR r-o-w	Duluth Complex, 1 drill hole	RGGS	
59	13	11	NWNW	NW-NW	40		Duluth Complex, 5 drill holes	RGGS	
59	13	11	SWNW (part)	SW-NW (part)	21.64	GLO acreage lying North of RR r-o-w	Duluth Complex, 1 drill hole	RGGS	
59	13	11	SENW (part)	SE-NW (part)		GLO acreage lying North of RR r-o-w	Duluth Complex, 1 drill hole	RGGS	
TOTAL FOR SECTION		11			131.95				

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Minerals right ownership is based on best available existing information, no specific review was done for this report									
R. Patelke, PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	13	12	NENE	NE-NE	40		Duluth Complex, no drill holes	RGGS	
59	13	12	NWNE	NW-NE	40		Duluth Complex, no drill holes	FEDERAL	
59	13	12	SWNE (part)	SW-NE (part)	39.31	GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes	RGGS	
59	13	12	SENE	SE-NE	40		Duluth Complex, no drill holes	RGGS	
59	13	12	NENW	NE-NW	39.08	GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes	RGGS	
59	13	12	NWNW (part)	NW-NW (part)		GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes	RGGS	
59	13	12	SENW (part)	SE-NW (part)	12.2	GLO acreage lying North of RR r-o-w	Duluth Complex, no drill holes	RGGS	
TOTAL FOR SECTION		12			210.59				
59	13	17	NWNW	NW-NW	40		Duluth Complex and Virginia Formation, 3 drill holes	LONGYEAR-MESABA	
59	13	17	SWNW	SW-NW	40		Duluth Complex and Virginia Formation, 1 drill hole	LONGYEAR-MESABA	
59	13	17	NESW (part)	NE-SW (part)	5.79	GLO acreage lying North of RR r-o-w	Duluth Complex, 3 drill holes	LONGYEAR-MESABA	
59	13	17	NWSW (part)	NW-SW (part)	30.13	GLO acreage lying North of RR r-o-w	Duluth Complex and Virginia Formation, 5 drill holes	LONGYEAR-MESABA	
TOTAL FOR SECTION		17			115.92				
59	13	18	NENE	NE-NE	40		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	18	NWNE	NW-NE	40		Virginia Formation, no drill holes	RGGS	
59	13	18	SWNE	SW-NE	40		Virginia Formation, no drill holes	RGGS	
59	13	18	SENE	SE-NE	40		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	18	NENW	NE-NW	40		Virginia Formation, no drill holes	LONGYEAR-MESABA	
59	13	18	SENW	SE-NW	40		Virginia Formation, no drill holes	RGGS	
59	13	18	NESW	NE-SW	40		Virginia Formation, no drill holes	RGGS	
59	13	18	NESE (part)	NE-SE (part)	37.71	GLO acreage lying North of RR r-o-w	Duluth Complex and Virginia Formation, 1 drill hole	LONGYEAR-MESABA	
59	13	18	NWSE	NW-SE	40		Virginia Formation, 1 drill hole	LONGYEAR-MESABA	
TOTAL FOR SECTION		18			357.71				

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R. Patelke, PolyMet, July 2009									
TOWNSHIP (NORTH)	RANGE (WEST)	SECTION	LEGAL	ALTERNATE LEGAL	GLO ACRES	COMMENTS	MINERAL COMMENTS	MINERALS OWNERSHIP	
59	12	6	GL 3	GL-3	30.09		Duluth Complex, no drill holes	FEDERAL?	
59	12	6	GL 4	GL-4	43.75		Duluth Complex, no drill holes	FEDERAL?	
59	12	6	GL 9 (part)	GL-9 (part)	39.11	GLO 46.25 less RR 7.14	Duluth Complex, no drill holes	FEDERAL?	
TOTAL FOR SECTION		6			112.95				
59	12	7	GL 3	GL-3	51.25		Duluth Complex, no drill holes	FEDERAL?	
59	12	7	GL 4	GL-4	53.75		Duluth Complex, no drill holes	FEDERAL?	
TOTAL FOR SECTION		7			105				
60	13	33	SWSE	SW-SE	40		Virginia Formation, no drill holes	RGGS	
60	13	33	SESE	SE-SE	40		Virginia Formation, no drill holes	RGGS	
TOTAL FOR SECTION		33			80				
60	13	34	SWSW	SW-SW	40		Virginia Formation, no drill holes	RGGS	
60	13	34	SESW	SE-SW	40		Virginia Formation, no drill holes	RGGS	
60	13	34	SWSE	SW-SE	40		Virginia Formation, no drill holes	RGGS	
60	13	34	SESE	SE-SE	40		Virginia Formation, no drill holes	RGGS	
TOTAL FOR SECTION		34			160				
60	13	35	SWSW	SW-SW	40		Virginia Formation, no drill holes	RGGS	
60	13	35	SESW	SE-SW	40		Virginia Formation, no drill holes	RGGS	
60	13	35	SWSE	SW-SE	40		Virginia Formation, no drill holes	RGGS	
60	13	35	SESE	SE-SE	40		Virginia Formation, no drill holes	RGGS	
TOTAL FOR SECTION		35			160				
GRAND TOTAL		ACREAGE			6650.15				