

On the Rocks



A Newsletter of the Michigan Basin Geological Society

2006-2007 Number 5

www.mbgs.org

January 2007

EVENTS

January 10, 2007: **Andrew Ware**, will discuss Kennecott's plans for nickel and copper exploration at their 'Eagle Project' in Marquette County. Kennecott has applied for permits to construct an underground mine at this site. Andrew will discuss the configuration of the ore body and how Kennecott proposes to mine this resource.

February 13, 2007: (Tuesday) **Keith Johnson**, Manager of Geophysics with Wolverine Gas and Oil Company will discuss Wolverine's discovery in the Federal Unit, located in the Central Utah Thrust Belt.

March 14, 2007: **Dr. Taggart** will discuss the K-T Boundary at MSU, more information to follow.

Tentative upcoming field trips:

Salt mine trip – April 2007

Baraboo – with Robb Gillespie, Possibly 3rd weekend in Sept. 2007, Friday – Sunday

Wanted: MBGS Newsletter Editor

Tom Wellman is retiring as MBGS Newsletter Editor after several years of service helping to keep us informed of MBGS news and meetings.

We need to find a replacement by July 2007. If you might be interested in this position, please let a MBGS officer know. It is not a difficult job and we provide on the job training. If you have questions on what the job involves, please contact Tom at wellmant@michigan.gov or 517-373-7666.

2006-2007 MBGS Officers

The Executive Committee meeting minutes are available on our website at www.mbgs.org

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MEETING CANCELLATION POLICY

Monthly meetings will be automatically cancelled whenever the National Weather Service issues a "Storm Warning" for the Lansing area. If driving conditions are poor but a "Warning" has not been issued please contact any member of the Executive Committee for the status of the meeting.

MICHIGAN BASIN GEOLOGICAL SOCIETY PUBLICATIONS

Historical CD #1: Nine out-of-print publications from 1949 through 1965 and 1998, Devonian to Silurian Rock Fieldtrips to MI, WI, IL and Ontario, 2000, \$15

Historical CD #2: Four out-of-print publications from 1947, 1959, 1983 and 1991, Northern Devonian and UP Fieldtrips in MI, 2001, \$15

Historical CD #3: Six out-of-print publications from 1948, 1952, 1990 - 1995, Northern Devonian and UP Fieldtrips in MI, 2001, \$15

Historical CD #4: Six out-of-print publications from 1957, 1958, 1961, 1967, 1968 and 1970, Northern LP and UP Fieldtrips in MI, 2004, \$15

Historical CD #5: Five out-of-print publications from 1971, 1989, 2001, Southern LP, MI and Ohio Fieldtrips and **Oil & Gas Fields Vol. 1 & 2, 1969 & 1992**, 2006, \$50

Special Price - Historical CDs #1, #2, #3, #4, & #5 for \$75

NE Lower Peninsula Geological Field Conference, 2004, T. Black, M. Wollensak, 133 pp., illus., maps. On CD \$10

Stratigraphic Lexicon for Michigan, 2001, prepared by MBGS and published by DEQ, 56 pp., chart, \$2.65 picked up or \$4 mailed, Can be ordered from MBGS or Office of Geological Survey of the DEQ

Price Includes postage, handling and any applicable sales tax. Orders for publications should be prepaid in U.S. Funds and addressed to: MBGS - Publications, P O Box 18074, Lansing MI 48901-8074

MBGS Meeting

Wednesday January 10, 2007

Location: Coyote Creek
6951 Lansing Road,
Diamondale, MI 48821

5:30 to 6:15 PM – Social Hour

6:15 PM – Dinner

Presentation after Dinner

Cost (includes dinner) \$25.00 (Students \$15.00)

Topic: **“Geology Of The Eagle Nickel-Copper Deposit”**

by

Andrew Ware

Dinner Meeting Reservation

Name: _____

Number Attending: _____

Please notify Thomas Godbold by **December 9, 2007**.

Members are welcome to attend the presentation after dinner for no charge.

Please contact Thomas Godbold to ensure adequate seating. Send reservations to:

Thomas Godbold

P.O. Box 30256

Lansing, MI 48909-7756

Ph: Bus Ph: 517-241-1545, Fax 517-241-1595

E-mail: godboldt@michigan.gov

Abstract
The Geology Of The Eagle Nickel-Copper Deposit
Marquette County, Michigan

Kennecott's discovery of the Eagle nickel-copper deposit in 2002 marked the culmination of more than a decade of exploration work by Kennecott in the Baraga Paleoproterozoic sedimentary basin. The discovery hole, YD02-02 completed in July 2002, intersected 84.2m of massive sulfide mineralization averaging 6.3% Ni and 4.0% Cu. The resource estimate for the Eagle deposit at start of 2005 was 4.1 million tonnes at 3.57% Ni, 2.91%Cu and 0.1% Co with minor Au and PGE credits.

The Eagle deposit is hosted in the westernmost of two small peridotite bodies historically referred to as the Yellow Dog Peridotite. The Yellow Dog intrusions, which lack penetrative foliations and truncate Penokean tectonic fabrics in the surrounding meta-sediments, are believed to be Keweenawan in age (Klasner, et. al., 1979). The intrusions are mainly comprised of coarse-grained, variably serpentized peridotite and feldspathic peridotite. A fine-grained, olivine poor phase is found along the margins of the intrusions and as xenoliths within the peridotite.

Three principal types of sulfide mineralization are recognized in the Eagle deposit: disseminated (blebby), semi-massive (matrix) and massive. Although the nickel contents of massive sulfides are relatively uniform through out the deposit, copper contents vary significantly. Platinum group metals (PGM) and gold values are significantly higher in the copper rich massive sulfides. Copper rich veins and disseminations, with significant PGM and gold, in the surrounding meta-sediments may constitute a fourth type of ore.

Massive and semi-massive sulfide ore types in the Eagle deposit are irregularly distributed. The contacts between different ore types are sharp and show little evidence of the gradation that might be expected if gravity driven accumulation of sulfides from an overlying, sulfide saturated, silicate magma was the principle mechanism of ore formation. Sequential emplacement of various mixtures of silicate and sulfide magma and cumulus minerals, derived from a lower stratified magma chamber, may provide a better model. Calcite-quartz xenoliths are probably derived from the assimilation of the Chert Carbonate and Goodrich Quartzite units, are observed in several intrusive phases. The xenoliths support a model of a lower chamber located at or near the base of the Palaeoproterozoic sedimentary sequence.

Klasner, J.S., Snider, D.W., Cannon, W.F., and Slack, J.F., 1979. The Yellow Dog Peridotite and a possible buried igneous complex of lower Keweenawan age in the northern peninsula of Michigan. Geologic Survey of Michigan DNR report of investigation 24, 31 pp.

Biography for Andrew Ware

Andrew Ware has been the Operations Manager of the Eagle Project in Michigan for Kennecott Minerals Company since 2003. He has served in a number of positions for Kennecott including Mexico Prophyry Search, Manager of Operations in Guadalajara, Project Geologist exploring for gold and running a Reconnaissance Team in Papua New Guinea. In addition, he worked for Rio Tinto in Australia from 1987 to 1988.

He received a Bachelor of Science Degree with Honors in Applied Economic Geology in 1986 from the University of New South Wales, Sydney Australia.

We have not received a great response, so far, regarding updating the MBGS Membership Directory. Please take some time to review and respond to the questionnaire below:

Member Information for 2007 Membership Directory

MBGS is embarking on an update of its Membership Directory for 2007. Please fill in whatever information you wish to have published in the 2007 MBGS Membership Directory. This information will not be sold or given out to any known solicitors, but will be distributed solely to members of the MBGS. If no information is received, we will list your name and the mailing address information that we have on file. If you wish not to be included in the membership directory, please specify below.

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Business Phone _____ Fax _____
Company e-mail _____
Home Address _____
State _____ Country _____ Zip _____
Home Phone _____ Fax _____
Home e-mail _____
College Degrees (BS, MS, PhD, etc.)
_____ Field _____ School
_____ Field _____ School
_____ Field _____ School
Membership in Other Organizations

[] I do not wish to be included in the 2007 MBGS Directory (place an "X" in the box)