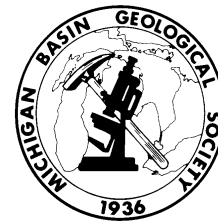




ON THE ROCKS

A Newsletter of the Michigan Basin Geological Society
Founded in 1936 as an affiliated non-profit organization of the American Association of Petroleum Geologists



2015-2016 Edition 6

www.mbgs.org

February 2016

MEETINGS

MBGS-AIPG Joint Membership Meeting, February 11th, 2016

The February meeting will be held at Johnson Center, Cleary College, Howell Michigan. The speaker is Bob Mahin, CPG, Lundin Mining Corporation presenting "Exploration at Eagle/Eagle East: A Model-Driven Discovery". Additional details are included in the newsletter.

ANNOUNCEMENTS

MBGS FIELD EXCURSIONS

- Alabastine Gypsum Mine, Michigan Natural Storage Company, Grand Rapids, Michigan, April 2, 2016. Limited space (10 MBGS members), announcement included in newsletter
- Detroit Salt Company Underground Salt Mine Tour, Detroit, Michigan – Planned for late April 2016
- Douglas Houghton Michigan Historical Marker Dedication, Eagle Harbor, Michigan – Planned for late Summer 2016
- Yellowstone National Park Geological Expedition, Yellowstone, Wyoming – Planned for late Summer 2017
- Grand Canyon Geological Rafting Expedition, Lees Ferry to Whitmore Landing, Arizona – Planned for May 2020



MBGS Field Excursion August 2014
Eastern Upper Peninsula

MBGS ONLINE STORE

The Michigan Basin Geological Society now has an on-line store. Shop for shirts, hats, bags and other items at <http://www.cafepress.com/mbgs>.





**Michigan Section American Institute of Professional Geologists
and
Michigan Basin Geological Society**



MEETING ANNOUNCEMENT

February 11, 2016

EXPLORATION AT EAGLE/EAGLE EAST: A MODEL-DRIVEN DISCOVERY

Featured Speaker

Bob Mahin, CPG, Lundin Mining Corporation

Location: Johnson Center, Cleary College, Howell, MI (Map attached)

Cost: Students Free, AIPG/MBGS Members \$30.00, Non-members \$50.00. **Registration is payable electronically via Eventbrite (see link below). Please note: No refunds will be given for cancellations made within 48 hours of the meeting and/or "No Shows".**

Dinner: Taste of Italy Buffet; Manicotti with Meat Sauce, Grilled Vegetable Lasagna, Chicken Alfredo, Anti-Pasta Salad, Garlic Bread Sticks, Dessert.

Time: Cash Bar 5:30-6:30 PM, Dinner 6:30 PM, and Speaker 7:30-9:00 PM

RSVP: On the Eventbrite website no later than February 8th at:

<https://www.eventbrite.com/e/aipgmbgs-joint-section-meeting-tickets-20014135819>.

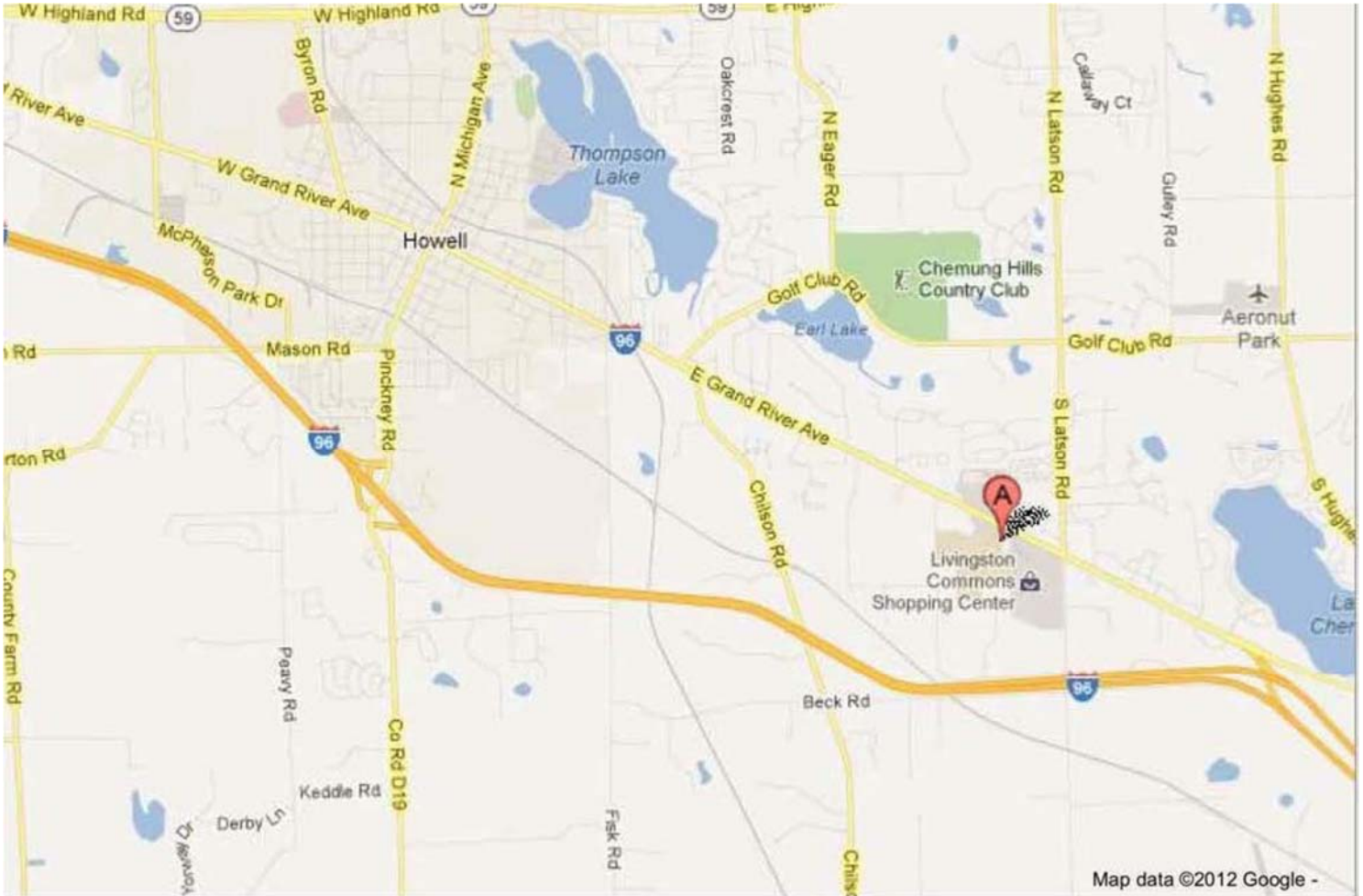
Abstract: In June 2015, Lundin Mining Corporation announced the discovery of very high grade magmatic nickel-copper mineralization similar in style to the Eagle deposit (5.2 MT reserves @ 3.12% Ni, 2.56% Cu) approximately two kilometers east of Eagle. The best intercepts from the new zone included 23.9 meters of 5.3% Ni and 4.4% Cu and 30.9 meters of 5.2% Ni and 8.7% Cu. The latter included 16.4 meters of massive sulfide grading 6.7% Ni, 13.6% Cu, 6.7 gram/tonne Pt, and 6.9 gram/tonne Pt. The new zone is approximately 960 meters deep and as such, would not have been detected by airborne geophysics. In addition, it is in an undrilled area, so borehole geophysical data was absent. In short, the target had no geophysical support and the discovery was the result of exploration based purely on the open-system chonolith model of magmatic sulfide deposits. The Eagle deposit was likely formed by a series of magma pulses that employed a single magma conduit, or chonolith, allowing sulfides to settle out more or less continually while the conduit remained dynamic. (This differs from a closed, differentiated intrusion system.) Eagle East is a separate intrusion from the Eagle deposit that was known to contain uneconomic levels of nickel and copper in the upper portions.

Previous drilling at Eagle East determined that at depth, the intrusion necks down to a narrow, barren dike. Eagle geologists postulated that the narrow dike should be sourced in a larger magma chamber and used directional drilling to trace the dike, eventually resulting in the discovery.

Speaker Bio: Bob Mahin is currently the Exploration Manager and Mineral Resource Qualified Person for the Eagle Mine. He is an AIPG Certified Professional Geologist and has 25 years' experience in the exploration and mining industry, mostly in Michigan and Minnesota. He has been at Eagle for four years, starting with Rio Tinto, remaining with the project after Lundin Mining acquired it in July of 2013. He spent the previous 9 years with the Aquila Resource's Back Forty project. Prior to that, has worked with Western Mining Corporation, Kennecott Exploration, Cliffs Natural Resources, and Minerals Processing Corporation. He has a BS in Geology and a BA in Technical Communications from Purdue and an MS in Economic Geology from the University of Utah.

Joint AIPG/MBGS Meeting February 11, 2016

Johnson Center, Cleary College, Howell



From I-96 West: I-96 West to Exit #141 (Grand River), west onto Grand River. Go through the light at Latson Road, then through the next light at the Meijer entrance. Turn left onto Cleary Drive (immediately past the Meijer entrance) and follow the drive back to campus.

From I-96 East: I-96 East to Exit #137 (Michigan Avenue/D-19), north onto Michigan Avenue. Turn right on Grand River. Follow Grand River through town to Grand Oaks Drive. Turn right onto Grand Oaks, then left onto Cleary Drive; OR, go through the lights at Grand Oaks and in front of the Speedway station, and turn right onto Cleary Drive.

From M-59: (east- or westbound) South onto Latson Road; follow Latson to Grand River Avenue (2nd traffic light). Turn right onto Grand River, go through the next light (at the Meijer entrance) and make an immediate left onto Cleary Drive. Follow the drive back to the campus.

UPCOMING EVENTS



February 11, 2016: Michigan Basin Geological Society (MBGS) and American Institute of Professional Geologist (AIPG) host a joint meeting at Johnson Center, Cleary College, Howell Michigan. Speaker is Bob Mahin, Lundin Mining Corporation presenting “Exploration at Eagle/Eagle East: A Model-Driven Discovery”.

February 18, 2016: Ohio Geological Survey Meeting, Colm Murphy - Bell Geospace, Holiday Inn Columbus-Worthington, Worthington, OH, <https://ohiogeosoc.org>

February 18, 2016: Ohio AIPG Meeting, Boulders, Bedrock, and Brewing Water: How Geology has Influenced the History of Dayton, David Alan Schmidt, Ph.D., Director of Environmental Sciences Undergraduate Program Earth and Environmental Sciences, Dayton Ohio <https://www.aipg-ohio.org/payment.php>

February 24, 2016: SPE Midwest Gas Storage Section Meeting, Pontiac, Illinois, Michael Choi, LNG Basics for Petroleum Engineers, <http://michigan.spe.org/home>

February 25, 2016: SPE Northern Michigan Section Meeting, Traverse City, Michigan, Michael Choi, LNG Basics for Petroleum Engineers, <http://michigan.spe.org/home>

March 16, 2016: Ohio Geological Survey Meeting, Hilton Easton, Columbus, OH, Determination of Wellbore Orientation in the Utica Shale of Southeast Ohio, Joseph P. Smith - PDC Energy, Inc., www.ohiogeosoc.org

April 2, 2016: MBGS Field Excursion, Alabastine Gypsum Mine, Michigan Natural Storage Company, email Mark Wollansak at wollensak@voyager.net to get your name on the attendees list. Limited space.

April 12, 2016: SPE Michigan Section Meeting, Lansing, Michigan, Daniel Tormey, First-Ever Comprehensive Environmental Characterization of Hydraulic Fracturing for Shale Oil and Gas Production, <http://michigan.spe.org/home>

April 13, 2016: SPE Northern Michigan Section Meeting, Traverse City, Daniel Tormey, First-Ever Comprehensive Environmental Characterization of Hydraulic Fracturing for Shale Oil and Gas Production, <http://michigan.spe.org/home>

April 18–19, 2016: The Geological Society of America, North-Central Section, Champaign, Illinois, Call for papers until January 26, <http://www.geosociety.org/Sections/nc/2016mtg/index.htm>

May 5-6, 2016: Institute on Lake Superior Geology - Annual Meeting 2016, Duluth, MN, <http://lakesuperiorgeology.org/Duluth2016/index.html>

May 19, 2016: SPE Midwest Gas Storage Section Meeting, Pontiac, Illinois, Duane McVay, The Value of Assessing Uncertainty (What You Don’t Know Can Hurt You), <http://michigan.spe.org/home>

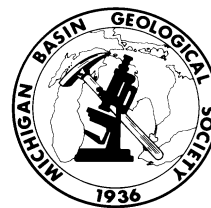
June 1-4, 2016: Canadian Society of Civil Engineers – Annual Conference, London, Ontario, <http://www.csce2016.ca/technical-program/>

June 13-15, 2016: MI AIPG Michigan Section Summer Workshop, Topic TBD <http://mi.aipg.org/default.htm>

September 9-13, 2016: 53rd Annual AIPG Meeting to be held in Santa Fe, New Mexico. Details available on the National AIPG website www.aipg.org

MICHIGAN BASIN GEOLOGICAL SOCIETY OFFICERS

2015-2016



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Historical CD #1: Nine out-of-print publications from 1949 through 1965 and 1998, 2000, \$15

- The Stratigraphy of Manitoulin Island, Ontario, Canada, June 19-20, 1954
- The Devonian and Silurian Rocks of Parts of Ontario, Canada and Western New York, June 22-23, 1951
- The Traverse Group of the Northern Part of the Southern Peninsula of Michigan, June 16-17, 1949
- The Devonian Strata of the London-Sarnia Area, Southwestern Ontario, Compiled by Erwin C. Stumm, Lewis B. Kellum and Jean Davies Wright, June 9-10, 1956
- The Ordovician Rocks of the Escanaba-Stonington Area, Led by R. C. Hussey, June 2-3, 1950
- The Niagara Escarpment of Peninsular Ontario, Canada, June 18-19, 1955
- Lower Paleozoic and Pleistocene Stratigraphy Across Central Wisconsin, Compiled by C. E. Prouty, Led by L. M. Cline, J. L. Hough and R. F. Black, 1960
- Classic Silurian Reefs of the Chicago Area, by Donald G. Mikulic and Joanne Kluessendorf, June 27, 1998
- Geology of Central Ontario, Canada, 1965

Historical CD #2: Four out-of-print publications from 1947, 1959, 1983 and 1991, 2001, \$15

- Copper Country Field Trip, Michigan, June 20-22, 1947
- Geology of Mackinac Island and Lower and Middle Devonian, South of the Straits of Mackinac, June 12-14, 1959
- Tectonics, Structure and Karst in Northern Lower Michigan, August 1983
- Geology of the Pictured Rocks, Upper Peninsula, Michigan, July 11-13, 1991

Historical CD #3: Six out-of-print publications from 1948, 1952, 1990 - 1995, 2001, \$15

- Pleistocene and Early Paleozoic of the Eastern Part of the Northern Peninsula of Michigan, June 18-21, 1948
- Stratigraphy and Structure of the Devonian Rocks in Southeastern MI and Northwestern OH, June 20-21, 1952
- Lower Ordovician and Upper Cambrian of Wisconsin, May 10-12, 1990
- Guidebook to the Precambrian Geology and Metallogeny of the Central Upper Peninsula of Michigan September 12-13, 1991

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

- Silurian Rocks of the Northern Peninsula of Michigan, 1957
- Cambrian Geology of Parts of Dickinson and Iron Counties, Michigan, June 1958
- Geologic Features of Parts of Houghton, Keweenaw, Baraga and Ontonagon Counties, Michigan, May 19-21, 1961
- Correlation Problems of the Cambrian and Ordovician Outcrops Areas, Northern Peninsula of Michigan 1967
- The Geology of Manitoulin Island, June 1968
- Devonian Strata of Alpena and Presque Isle Counties, Michigan 1970

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

- Oil & Gas Fields Symposium, Volume 1, April 1969, 200 pp., maps, illus., second printing with updates
- Oil & Gas Fields Manual of the Michigan Basin, Volume 2, 1992, 520 pp., maps, illus.
- Glacial Geology of Southwestern Michigan, 1989, 53 pp. by A. Kehew, L. J. Schmaltz, and W. T. Straw
- Geology of the Lake Erie Islands and Adjacent Shores, 1971, 65pp., maps, illus. by Jane L. Forsyth
- Glacial Geology of Southwestern Michigan, Landforms of the Lake Michigan Lobe, Southwestern Michigan, 2001, AAPG Eastern Section Meeting Field Trip, 32 pp., maps, illus. by A Kehew and A. Kozlowski

Historical CD #6: Six out-of-print publications from 1946, 1953, 1963, 1966, 1978 & 1987 plus the Richfield Challenge, 1952 & Tom Knapp's MS Thesis, 2007 \$15.

- Guidebook for Ordovician Stratigraphy of the Cincinnati, Ohio and Richmond, Indiana Areas, June 12, 13, 1953 by W. H. Shideler and B. T. Sandefur
- Guidebook for Ontario Geological Excursion to Kettle Point – Owen Sound- Waubesaushene, June 21, 22, 23 1946 by W. A. Roliff, C.S. Evans and J.F. Caley
- Guidebook for the Stratigraphy of the Silurian Rocks in Western Ohio, May 31-June 2, 1963 by C. H. Summerson, Jane L. Forsyth, Karl V. Hoover and J. R. Ulteig
- Guidebook for Cambrian Stratigraphy in Western Wisconsin, May 21, 22, 1966 by Merideth E. Ostrom
- Geology of the Manitoulin Area, Special Papers #3, September 29, 30 and October 1, 1978 by J. T. Sanford and R. E. Mosher
- Middle Devonian Cratonic Carbonates and Shales in Southwestern Ontario, November 14, 1987 by Bruce Wilkinson
- The Richfield Challenge, A Review of the Richfield Developments in Michigan, 1952 by Gordon H. Hautan
- A Theory of Rogers City and Dundee Relationships in Central Michigan, Masters Thesis, 1947 by Tom Knapp

(NEW) Historical CD #7: Six out-of-print

Field Guidebooks from 1962, 1969, 1977, 1980, 1985 & 1988, \$15

- Silurian Rocks of the Southern Lake Michigan Area, 1962, James H. Fisher, Chairman, MBGS Annual Field Conference
- Studies of the Precambrian of the Michigan Basin, by Harold B. Stonehouse, 1969
- The Geology of the Marquette District: a Field Guide By F. W. Cambray, 1977
- Ordovician and Silurian Geology of the N. Peninsula of Michigan, 1980, R.B. Votaw, 40 pp., illus., maps
- Special Paper #4: Ordovician and Silurian Rocks of the Michigan Basin and its Margins, 1985 K.R. Cercone and J.M. Budai (eds.), 96 pp., illus.
- Upper Keweenawan Rift-Fill Sequence, Mid-Continent Rift System, Michigan, 1988, P.A. Daniels and R.D. Elmore, M.S. Wollensak, ed., 150 pp., illus., maps

OTHER SPECIAL OFFERS

- **Historical CD Set - # 1 – 7 (detailed above) for a special purchase price of \$95**
- **NE Lower Peninsula Geological Field Conf., 2004, T. Black, M. Wollensak, On CD \$10**
- **Stratigraphic Lexicon for Michigan, 2001, prepared by MBGS and published by DEQ, \$4**
- **Robert E. Mosher Geological Studies** A lifetime of geological research on Silurian Rocks with John T. Sanford. The disks are organized chronologically and include field work in North America and Europe. 2007, 2 CDs \$35.



MICHIGAN BASIN GEOLOGICAL SOCIETY FIELD EXCURSION SPRING 2016

ALABASTINE GYPSUM MINE MICHIGAN NATURAL STORAGE COMPANY

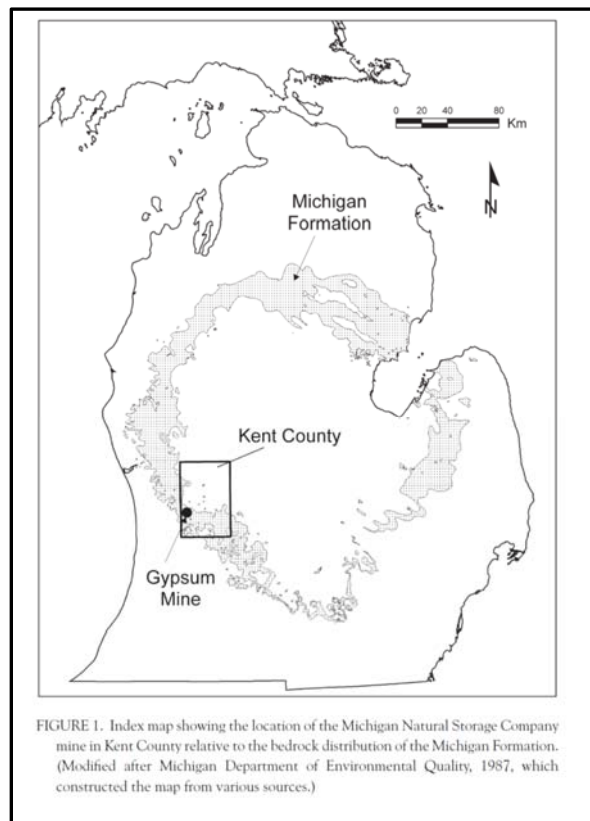
DATE: Saturday, April 2nd, 2016

FEE: \$15 for MBGS Members; \$40 Adult Non-Members;
\$25 Student Non-Members.

LOCATION: Michigan Natural Storage Company, 1200
Judd Ave SW, Wyoming, MI 49509

REGISTRATION: Email Mark Wollensak at
wollensak@voyager.net to get your name on the attendees
list. Must be 18 years of age. Limited spacing available.

LEADER: Dr. Kevin Cole, Grand Valley State University



The ground was broken for the first shaft in 1907, and by mid 1908 the hand dug shaft had reached the twelve foot thick gypsum seam with a floor about 85 feet underground. Most of the output of the mine was used to produce plaster for stucco, and as a sparkly filler for alabastine paint. In later years the mine output was used to make gypsum wallboard. The Alabastine Company went bankrupt 40 years later due to poor management. When the mine went bankrupt the Michigan Natural Storage Company was formed to take advantage of this natural refrigerator. Many Michigan crops are stored in the mine and released throughout the year for sale. Some of the 'rooms' are refrigerated to lower temperatures, and only rise two degrees a month. Some rooms are rented to companies for records storage, and today there is a data center located in the mine.