



May 25, 2016

Minnesota Environmental Quality Board (EQB)
520 Lafayette Road
St Paul, MN 55155

RE: Petition for Rulemaking under Minn. R. 1400.2040 and 1400.2500

Dear Environmental Quality Board (EQB) members,

The Minnesota Academy of Family Physicians (MAFP) is the largest medical specialty organization in Minnesota, representing over 3,100 members. The MAFP House of Delegates (HOD) meets annually and considers resolutions brought forth by its members designed to improve patient and public health. The HOD passed the following resolution at its April 13, 2016 meeting in Minneapolis.

“BE IT RESOLVED, that the MAFP supports the preparation of a comprehensive, independently produced Health Impact Assessment (HIA) for all sulfide mining projects requiring the completion of an environmental assessment worksheet (EAW) or an environmental impact statement (EIS), and

BE IT FURTHER RESOLVED, that the MAFP also supports changing Minnesota Administrative Rules in Chapter 4410 to include the requirement that a comprehensive and independent HIA be prepared for all sulfide mining projects requiring an EAW or EIS.”

The impetus for the resolution came from discussions with MPCA Commissioner John Linc Stine and DNR Assistant Commissioner Barb Naramore at a September 25, 2015 meeting held at the DNR Offices in St. Paul. They recommended that we pursue changing Chapter 4410 to require an HIA. DNR Commissioner Tom Landwehr, MDH Commissioner Dr. Ed Ehlinger, and Joanna Dornfeld Assistant Chief of Staff from Governor Dayton’s office, were also present.

At this meeting Dr. M. Tariq Fareed, then MAFP President, and several Duluth doctors requested that a comprehensive, independently produced HIA be completed for the PolyMet NorthMet Project proposal. The Minnesota Medical Association (MMA), the Minnesota Nurses Association (MNA) and Minnesota Public Health Association (MPHA) had also requested that an HIA be completed for this project. Ultimately, the Minnesota DNR as the responsible governmental unit (RGU) under Chapter 4410, denied their requests.

The Minnesota Department of Health , the Minnesota Department of Natural Resources, and the Minnesota Pollution Control Agency officially espouse a “health in all policies” approach to governance. To make this a reality and resolve any potential conflicts, we need to put these words into action. We petition under Minnesota Statutes 14.09 and Minnesota Rule 1400.2040 that Chapter 4410 be amended to require that human health impacts be specifically analyzed in an independently produced HIA. This step would ensure that human health impacts are rigorously analyzed, along with environmental, economic, employment and sociological impacts.

A petition for rulemaking under Minnesota Rules 1400.2500 and supporting documents, including proposed language for the rule change, the July 2015 letter from MAFP requesting a health impact assessment for the PolyMet NorthMet proposed sulfide mine and the meeting bullet points reflecting the substance of issues raised by Duluth physicians at the above-described September 2015 meeting with State Commissioners are also attached.

Please let us know when the EQB plans to discuss and consider our request for rulemaking and whether there is additional information that would be helpful to you in this process.

Thank you for your consideration of our petition,

A handwritten signature in black ink that reads "Dania Kamp" followed by a long horizontal flourish.

Dania Kamp, MD, MAFP President

Enclosures

Petition for rulemaking using the form in Minn. R. 1400.2500

Specific proposed rule changes to Minn. R. 4410.1200 and 4410.2300

July 2015 MAFP letter requesting PolyMet HIA

September 2015 bullet points from physicians' meeting with commissioners

1400.2500 PETITION FOR RULEMAKING.

PETITION FOR RULEMAKING TO THE MINNESOTA DEPARTMENT OF
EQB

Name: Dania Kamp, MD

Group Represented or Title: Minnesota Academy of Family Physicians

Address: Suite 1680, 600 Highway 169

St. Louis Park, MN 55426

I request that the agency named above (check one):

Adopt a new rule governing _____

Amend Minnesota Rules, part(s) 4410.1200, 4410.2300

Repeal Minnesota Rules, part(s) _____

1. Explain the need or reason for the rulemaking you request. The agency will consider your reasons in making its decision, so your explanation must be detailed. You can use additional pages.

2. For a new rule, state the proposed new language of the rule. For rule amendments, repeat the text of the rule, striking through deletions and underlining new language. If you cannot provide new rule language, then write a detailed description of the rule that you are requesting. You can use additional pages.

You must file this petition with the executive director or head of the agency in person or by United States mail. The agency must reply in writing to your petition within 60 days after receiving it.

DATE: _____

Signature of Petitioner

Statutory Authority: *MS s 14.386; 14.388; 14.51*

History: *20 SR 2058*

Published Electronically: *August 6, 2013*

1400.2500 PETITION FOR RULEMAKING
Submitted by Minnesota Academy of Family Physicians
May 20, 2016

The Minnesota Academy of Family Physicians (MAFP) requests amendment of Minnesota Rules 4410.1200 and 4410.2300 as follows:

4410.1200 EAW CONTENT

E. major issues sections identifying potential environmental impacts and issues that may require further investigation before the project is commenced, including identification of cumulative potential effects;

F. if the project involves a permit to mine, mining operation, storage pile, tailings facility, waste facility, hydrometallurgical process or beneficiation plant for nonferrous metallic minerals as defined in part 6132.0100, the EAW must also contain a major issues section identifying human health impacts that may require further investigation before the project is commenced, including identification of cumulative potential effects.

[change lettering for subsequent items]

4410.2300 CONTENT OF EIS

H. Environmental, economic, employment, and sociological impacts: for the proposed project and each major alternative there shall be a thorough but succinct discussion of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative. For any permit to mine, mining operation, storage pile, tailings facility, mine waste facility, hydrometallurgical process or beneficiation plant for nonferrous metallic minerals as defined in part 6132.0100, an EIS must contain a thorough health risk and health impact assessment of potentially significant adverse or beneficial effects generated, be they direct, indirect, or cumulative. Data and analyses shall be commensurate with the importance of the impact and the relevance of the information to a reasoned choice among alternatives and to the consideration of the need for mitigation measures. . .



July 22, 2015

Governor Mark Dayton
Office of the Governor and Lt. Governor
116 Veterans Service Building
20 W 12th Street
St. Paul, MN 55155

RE: Request for Human Health Risk and Human Health Impact Assessments

Dear Governor Dayton, Commissioners:

We appreciate the opportunity to convey our concerns about the potential health effects of copper-nickel sulfide mining in Northeastern Minnesota.

The Minnesota Academy of Family Physicians (MAFP) is the largest medical specialty organization in Minnesota, representing over 3000 family physicians, family medicine residents, and medical students. The House of Delegates is the elected representative body of the MAFP and holds its annual meeting in the spring. Physician delegates, representing every corner of Minnesota, bring forth resolutions promoting patient and public health. These resolutions are discussed, debated and voted upon by the entire House.

On April 15, 2015, The House of Delegates unanimously approved the following resolution:

BE IT RESOLVED, that the MAFP request that a Human Health Risk Assessment be performed using the most current scientific modeling methods to evaluate the health effects of the by-products of proposed mining projects, and

BE IT FURTHER RESOLVED, that the MAFP supports the subsequent completion of a Human Health Impact Assessment for mining projects so that both health professionals and the public can make informed decisions.

With the adoption of this resolution, the MAFP joins its voice to those of the Minnesota Medical Association (MMA), Minnesota Nurses Association (MNA), Minnesota Public Health Association (MPHA) and Dr. Edward Ehlinger and the Minnesota Department of Health (MDH) in requesting that the health impacts of sulfide mining be analyzed and addressed.

Human Health Risk and Health Impact Assessments have not been completed for the PolyMet NorthMet Project. As physicians, our priorities are the health of our patients and the communities we serve. We must be proactive in asking, "How will PolyMet's NorthMet Project affect the long-term health of our patients and communities?" Health Risk and Health Impact Assessments are needed to answer these questions.

Dr. Ehlinger stated in the comments he submitted on behalf of the MDH, "Health starts where we live, learn, work and play. To create and maintain healthy Minnesota communities, we have to think in terms of health in all policies." We urge you to consider completing health risk and health impact assessments for the PolyMet NorthMet Project and those to follow.

Thank you for your consideration.

Sincerely,

A handwritten signature in cursive script that reads "M. Tariq Fareed". The signature is written in dark ink and is positioned above the typed name and title.

M. Tariq Fareed
President, MAFP

CC: Commissioner Tom Landwehr, Minnesota Department of Natural Resources
Commissioner Dr. Edward Ehlinger, Minnesota Department of Health
Commissioner John Linc Stine, Minnesota Pollution Control Agency

Sept. 25th Meeting at DNR

Review of issues presented by physicians attending

To Commissioners Landwehr, Linc Stine, Ehlinger , Assistant Commissioner Naramore, and Assistant Chief of Staff Dornfeld

Introduction: Jennifer Pearson, M.D., Family Medicine, Duluth

- Review of important letters voicing health concerns of SDEIS: *(copy of each of these of these letters attached)*
 - MPHA (October 2014): representing over 400 public health professionals
 - MN Nurses Association (March, 2014) representing over 20,000 nurses
 - Health Providers Letter (March, 2014) 46 doctors and nurses expanded to:
 - Individual Health Professionals letter (Oct. 2014): 94 individuals plus Healthy Food Action and Food and Water Watch for a total of 153 health professionals (October 2014)
 - MMA (Sept. 25th, 2014) Dr. Don Jacobs, representing over 10,000 physician members
 - Lake Superior Chapter Minnesota Academy of Family Physicians (March 2015 letter), followed in April 2015 by unanimous resolution of statewide MAFP, representing more than 3000 family physicians and residents (largest specialty organization in MN).
- Collective ASK: Comprehensive Health Risk Assessment of the NorthMet Project and Health Impact Assessment. Critical that these analyses not be just a desktop exercise, but scrutiny of underlying assumptions and use of independent science to provide objective assessments of risks and impacts.
- Quotes from PFEIS: response to concerns regarding human health:
 - “Completing an HIA between the SDEIS and FEIS would require significant time and effort, and would represent a considerable delay to the FEIS”
 - “The SDEIS did include extensive public health information relative to air and water quality”
 - “The additional information from and HIA would not significantly inform regulatory permits required for the project”
- Physician’s opinion: We do not believe that the conclusions of the Co-Lead agencies to the many comments requesting health analysis are sufficiently rigorous or protective of human health.

Closer look at Bullet Point Quotes:

- Bullet Point number 1:

- Physicians' concerns are for the health and wellness of region
- At least 5 of 10 Toxins of major public health concern to the World Health Organization (mercury, lead, arsenic, asbestos, particulate air pollution) are released from copper-nickel mining as well as sulfates released that increase mercury methylation and accumulation in the food chain
- If this door is opened, may never be able to close it
- Must take whatever time is needed assess the affects to human health, regardless of time needed. Health of future generations in our hands.
- Bullet Point #2: Covered by others- concerns about the extent and quality of information pertinent to public health remaining with the PFEIS
- Bullet Point #3:
 - Risk/Benefit of potential health effects needed to be better understood to make informed decisions
 - FDA regulations for any medication we prescribe; allow us to understand Risk/Benefit Ratio and discuss with patients
 - More and more medical literature about environmental toxins and the deleterious affects to human health
 - State of Minnesota must set a precedent that independent analysis, Health Risk Assessment and public Health Impact Assessment ARE necessary information to include in an FEIS before new industry that can potentially affect human health (sulfide mining and processing) is allowed to seek regulatory permits
 - Hippocratic Oath- first do no harm. Our duty as physicians.

Water Modeling/Containment: Areas of Concern that Support the Need for Human Health Impact Assessment Emily Onello, M.D., Family Medicine, Duluth

- Models used in PFEIS assert that there will be no off-site discharge of drainage water during operations. Current expert opinions in the literature dispute the feasibility of this assertion. Given the toxicity of this aqueous drainage, alternative models that include various rates of off-site discharge should be provided. (For example, what if only 80% or 60% of water seepage is captured for treatment?) **What would be the human health effects, if any, using these lower capture rates?**
- The PFEIS also asserts that after the mine closes, a greensand filter, pre-filters and a reverse osmosis system would be required to treat water to meet water quality standards well into the foreseeable future. **The document does not model what could happen to human health if this post-closure treatment were to end (due to unanticipated scenarios of malfunction, natural disaster or inadequate funding). How many people could get sick? And how sick could they become?**

- Analysis of the two scenarios described above should include modeling for methylmercury contamination as a result of sulfate releases, as well as releases of toxins including mercury, lead, arsenic and manganese. Potential *indirect* health effects of loss of water quality should be considered in the health impact analyses.
- Table 6.2.7-5 in the PFEIS estimates that NorthMet's direct GHG emission constitutes just over 1/1000th of the total GHG release of the state of Minnesota. Though a small fraction at first glance, when adding in indirect emissions, **could these GHG emissions have health significance?** Health-directed analyses could investigate this possibility.
- Current PFEIS models greenhouse gas (GHG) release but is not required to address how additional fossil fuel combustion related to the PolyMet project could affect human health. This connection is critical because links between increased air pollution and adverse health outcomes (for example, heart attacks and strokes) are well established in the medical literature. **Could the added air pollution from power generation affect human health in our region? More asthma attacks? Acute coronary events? Strokes? Higher prevalence of heart failure?**
- Estimates of direct and indirect GHG emissions only extend for 30 years in the PFEIS, yet the energy-demanding processes of water treatment will continue well beyond that time. Figure 5.2.7-9 gives an emission lifetime total of 15,790,752 metric tons of carbon dioxide-equivalent (CO₂e). **What would GHG emission projections look like beyond 30 years, say the 200 to 500 years where pollution from tailings and mine site may require active water quality treatment? Could the long-term electricity demand for wastewater treatment have significant direct and/or indirect effects on human health? If effects are identified, how might they differ under different models of power generation?**

Water Modeling/Containment Continued: Sue Nordin, M.D., Family Medicine, Duluth

- We question the statement that the area under the tailings basin will be impermeable. Independent review by JD Lehr and Don Lee (available on line at <http://www.waterlegacy.org/PolyMet-SDEIS-Comments>) points out that this claim is not substantiated.
- No evidence has been provided that in real field experience situations 90-99% capture of wastewater has been achieved. We would like to see modeling of pollutant outputs for lower levels of capture, along with evaluation of health consequences of less perfect capture.

Health Impacts Associated with Catastrophic Failure: Debbie Allert, M.D., Family Medicine, Duluth and President of Minnesota Academy of Family Physicians, Lake Superior Chapter

- We respectfully request that an in-depth, independent, rigorous, and adequately funded Health Impact Assessment and Health Risk Analysis be done for the proposed NorthMet project. This presentation centers on the likelihood and impact of catastrophic events on human health. Catastrophic events may involve dam failure, waste rock storage, tailings storage, or the transportation and storage of contaminated process water, concentrates, and sludge.
- Why is a Health Impact Assessment needed?
 - The current PFEIS does not adequately address the issues of either a catastrophic dam failure or multiple small breaches of the PolyMet tailings dam or of containment of PolyMet's highly toxic hydrometallurgical residue at the Hydrometallurgical Residue Facility (HRF). These events could have significant impacts on human health.
- What are the primary health concerns?
 - In the event of dam failures or breaches, highly toxic substances will be released into nearby watersheds, these include:
 - Heavy metals, such as manganese and lead, mercury that are known human neurotoxins.
 - Arsenic, a known carcinogen.
 - Mercury and sulfates, which are especially concerning because bacteria in the relatively acidic environment of bogs and wetlands produce methylmercury. Methylmercury is highly toxic to humans. Even small amounts bio accumulate in the food chain to toxic levels.
- How likely is it that catastrophic failures will occur?
 - Catastrophic events resulting in the introduction of contaminated water into surrounding watersheds have occurred recently in similar operations
 - In 2014 the Mount Polley, British Columbia copper and gold mine tailings pond breach spilled over 6 billion gallons of mine waste and polluted water into the surrounding lakes and watershed causing a major environmental disaster.
 - A 2015 study of tailings storage facility failures centering on those categorized as "serious" or "very serious" determined that such failures have increased not decreased over the last 20 years. The study also concluded that small mining companies have the highest failure rates partially because of financial constraints that can restrict them from implementing the best available technology. (Reference: The Risk, Public Liability, & Economics of Tailings Storage Facility Failures, Bowker and Chambers, July 21, 2015)
- Catastrophic events may occur in NE Minnesota in the future.
 - In June, 2012 parts of Northeast Minnesota experienced a 10 inch rainfall in 24 hours.

- The current PFEIS does not address how the tailings dams or HRF will be able to withstand rainfall in excess of 5.69 inches in a 24 hour period and fails to analyze more extreme weather events that may occur over the 200+ year life expectancy of the tailings dam.
- Whose health is at risk?
 - There are 34 homes that could be immediately affected by a PolyMet dam failure. Contaminated seepage could reach the first home in an hour.
 - Contamination of the watershed could affect thousands of people downstream. Flowage from the PolyMet site empties into both the Partridge and the Embarrass rivers which empty into the St. Louis River which is the largest tributary of Lake Superior, which is the largest source of clean water in world and serves heavily populated areas.
- How do these concerns relate to PolyMet?
 - PolyMet has no history with copper sulfide mining.
 - PolyMet has few assets and may not be able to invest in the best available technology in regard to contaminated water containment.
 - PolyMet's environmental documents fail even to consider the best available technology known as filtered dry tailings stacking, a technique recommended to reduce tailings dam failures as well as to reduce contaminated seepage from tailings.
 - As stated above, PolyMet environmental documents do not include any assessment of health risks of catastrophic dam failure or multiple small breaches.
- Conclusion
 - As physicians, we believe there is overwhelming potential for significant, far-reaching harm to the health of our community. We believe that there does not exist at this time adequate information regarding the human health impacts of the proposed NorthMet project. We believe that citizens and their health providers need to know what will happen if the sulfides mine engineering (especially the long-term containment of contaminants) works perfectly . . . and what will happen to our health if it doesn't. The current information is grossly inadequate to predict the human health impact of this project.
 - It is imperative those who will ultimately make final decision understand the true cost both in loss of health and in healthcare dollars that will result as a consequence of the NorthMet proposed project. Therefore we are requesting an independent and adequately funded rigorously scientific Health Risk Assessment and Health Impact Assessment prior to the completion the FEIS.

Mercury- Steve Bauer M.D., Medical Director of Community Mental Health Center which serves the Arrowhead of MN

- Industrial exposure to high levels of mercury is known to lead to mercury poisoning. “Mad Hatters Disease” was a common name reflecting consequences of high levels of ingestion when hat-makers used mercury to treat fur to make felt hats.
- Mercury exposures resulting from ingestion of fish contaminated with methylmercury can result neuropsychiatric issues including problems with brain development and sensory issues that can include paranoia and hallucinations.
- Mercury ingestion can also cause other adverse medical outcomes, including neurological, heart, kidney, immune system and problems with reproduction.
- As medical director my role is to not only treat but to minimize possible problems when possible.
- The adage “an ounce of prevention is worth a pound of cure” is applicable only when there is a cure.
- Unfortunately with mercury poisoning there is no way to “fix” the damage that results from exposure. Treatment may only lessen the severity. Prevention cannot be traded for “cure”.
- The assumptions made within the most recent EIS about potential mercury and methylmercury risks are not good science.
- The current modeling uses a “best case scenario” guesstimate and doesn't allow for many possible problems that may arise.
- After reviewing other information from experts that study how mercury and other heavy metals are available in the environment and what factors lead to changes, there are several points that need better consideration.
- Specifically the proposed reverse osmosis treatment of the wastewater does not address either reduction of mercury or the potential for production of methylmercury downstream, which is the version that becomes incorporated in our food chain.
- The amounts calculated for mercury increases in downstream waters express a false precision and don't include an important factor of the production of additional methylmercury downstream as a consequence of the increased sulfates being added to the watershed combining with other mercury that has accumulated in the bogs and rivers from atmospheric deposition and other discharge sources.
- Most experts who have read the environmental review documents conclude that PolyMet and its consultants have underestimated the increase in mercury methylation.
- Other examples of poor science include the laboratory test of absorption of mercury onto tailings, which only tested mercury samples for short periods of time. This test showed an initial drop in mercury levels, but then showed increasing levels in a period of just hours. This test is clearly insufficient to tell us how the long-term mixing of the waste rock in the tailings pond will

change with respect to mercury concentrations over the years of mining, reclamation and beyond.

- Science on the issue of mercury contamination should be objective to provide a more complete analysis of the future consequences of sulfide mining.
- We ask you to address this clear hazard to public health with independent analysis of health risks and a more broad and considered assessment of impacts to the community. An independent academic expert like Dr. Brian Branfireun has the needed perspective. Thank you.

Methyl Mercury – Margaret Saracino M.D., Child and Adolescent Psychiatry, Duluth

- Represent the patients with no voice- infants and children.
- This project's negative impact could be profound and have devastating consequences for infants and children due to the potential to increase heavy metals into the environment, including methylmercury, lead, arsenic, manganese, all of which cause neurodevelopmental disorders in infants and children.
- Neurodevelopmental disorders include ADHD, dyslexia, other learning disorders, autistic spectrum disorders, cerebral palsy, and intellectual disabilities.
- Neurodevelopmental disorders are one of the new pediatric morbidities-chronic conditions with no cure.
- Neurodevelopmental disorders can set the stage for neurodegenerative diseases later in life.
- Neurodevelopmental disorders occur in 3-8% of the approximately 4 million infants born each year.
- The National Academy of Sciences (NAS) estimated in 2000 that 3% of neurobehavioral disorders in American children are caused directly by toxic environmental exposures.
- Methylmercury exposure occurs due to ingestion of pregnant women and young children of fish with high methylmercury content. The placenta is not protective and the blood brain barrier of the infant is not well formed until after 2 years, leaving the developing brain vulnerable to injury. Permanent brain damage can occur, with loss of IQ points. Exposures to levels of methylmercury below what is considered toxic for adults are dangerous to the developing brain.
- Sulfide mining is known to release other neurotoxins and their negative affects can be synergistic.
- Treatment is actually management, as there are no cures. Children may need multiple supportive services including:
 - Educational assistance in the form of an IEP (Individualized Education Program) or 504 (disability accommodation) plan
 - Individual and family therapy
 - Occupational therapy, physical therapy, speech and language services

- Partial hospitalization, inpatient psychiatric hospitalization, residential placement, group home
- Juvenile detention (potential for incarceration as adults)
- SSDI (Social Security Disability Insurance)
- Possible group homes or supportive living environments as adults.
- Economic costs:
 - Each decrement in IQ is associated with lower wages, diminished lifetime earning power.
 - The loss of intelligence from methylmercury exposure has exacted a significant economic cost to American society amounting to at least hundreds of millions of dollars per year.
 - Lost wages for parents, loss of work due to meetings with care providers
 - Loss of economic growth for the community
 - Evidence from worldwide sources cite that the average national IQ scores are associated with GDP (gross domestic product)
 - Estimated costs of neurobehavioral disorders of environmental origin, US, 1997 is \$9.2 billion
- Lack of resources for management:
 - CDC (Center for Disease Control) reported in 2013 that only 20% of emotionally disturbed children and adolescents receive some kind of mental health services and only a fraction of them receive an evaluation by a child/adolescent psychiatrist
 - Children and adolescents with developmental disabilities have 3-4 times higher rates of mental, emotional and behavioral disorders than the general population (National Institute of Health 2001)
- First do no harm-Hippocratic Oath. This should apply to government agencies before allowing new industry with risks to human health.
- Issue of data/research- needs to be NON-biased. We do not accept studies that are supported financially by the drug industry as the research study has inherent bias.
- Risk/benefit ratio- if the risks outweigh the benefits, then need to look at alternatives.
- Potential risks of this project are profound. It is imperative that, before going forward, that we have an independent study, with realistic models, and accurate numbers, in order to decipher the true human health risks. Too much is at stake- costs to human health, the environment and economic costs to the community and the State.

Polymet Mine Workers: Douglas Wendland, M.D., Occupational and Environmental Health, Duluth

- Mine workers at PolyMet will have exposure to respirable crystalline silica which causes the disease silicosis.
- Mine workers will also have exposure to diesel particulates, nickel and other potentially toxic substances.
- The current Mine Safety and Health Administration (MSHA) exposure guidelines (30 C.F.R. 56.5001) are mainly based on the 1973 American Conference of Governmental Industrial Hygienists (ACGIH) guidelines and are therefore outdated and inadequate for mine worker protection.
- The current MSHA allowance for respirable crystalline silica is 4 times that recommended in current ACGIH TLV-BEI guidelines: 25 micrograms/cubic meter. (2014 ACGIH-BEI Guidelines)
- The National Institute for Occupational Health & Safety (NIOSH) has recommended and both MSHA and OSHA have proposed rule changes to reduce the exposure allowance for respirable silica to 50 mcg/m³. (See 30 C.F.R. 58, 29 C.F.R. Parts 1910, 1915, 1926)
- MSHA and the current PolyMet proposal do not mandate the medical surveillance of mine workers in order to evaluate the effectiveness of measures to limit the exposures to crystalline silica and other workplace exposure hazards.
- OSHA has published models for medical surveillance of workers exposed to a variety of chemical hazards including respirable crystalline silica. (29 C.F.R. Appendix A to 1926.1053)
- **Recommendations:**
 - Require that exposure levels of miners to respirable crystalline silica not exceed the level required in the current MSHA and OSHA proposals for rule change.
 - Require that for other exposures the 2015 ACGIH TLV-BEI Guidelines be used to define the permitted exposure.
 - Require a medical surveillance program for miners exposed to dusts, minerals and chemicals identified as significant health hazards at mine site and processing facilities with use of OSHA recommended model to guide creation of such monitoring programs.
 - The Final Environmental Impact Statement (FEIS) should include an assessment of the health impact on the community and health care resources that may result from workplace exposure both at mining sites and at related offsite workplaces. This assessment should include both cancer and non-cancer health risks.

Particulate Pollution Health Concerns- John Ipsen M.D., Family Medicine, Duluth

- Discharges of fine particulates including amphibole elongated mineral particles - pose a health risk to the mine workers and to the surrounding communities.
- The rock to be mined contains amphibole fibers: crystals with similarities to asbestos found in ore formations in the Duluth Complex where the mine would be located. Mining the ore will produce EMPs (elongated mineral particles, including amphibole mineral fibers) and other harmful particulates.
- The MN Department of Health and the PFEIS state that amphibole mineral fibers pose “an uncertain risk to human health”, an undetermined toxicity and potency. This is not reassuring. Without a thorough evaluation of the potential for exposures and the risks involved, we will be relegating the miners and the people in the surrounding communities who breathe the air to participate in an experiment they did not agree to be part of.
- Mesothelioma is a rare cancer directly linked to amphibole mineral fibers. Other identified risks of exposure include coronary artery disease (which is of course far more common than mesothelioma), and cancers of the larynx, stomach, and bladder. The personal and financial burden of these illnesses would be significant.
- The PFEIS evaluates airborne discharges in relation to PM10 and PM2.5 standards. However particulates 4 microns and below are likely to become lodged in the alveoli and so the PFEIS most likely underestimates the risk of PolyMet’s particulate releases.
- In addition there is recent research by Liuhua Shi et al. (referenced below) that has brought into question the EPA thresholds for PM2.5, and indicates human health is adversely affected by significantly lower levels of fine dust than was previously thought.
- The discussion of particulate air pollution control in the PFEIS does not provide adequate assurance of human safety.
- HEPA filters will be used downstream from bag filters, but only in some applications and only for part of the year (apparently due to energy costs). Where the trapped fines from the filters will go is not addressed.
- The tailings basin beaches will be a source of dust and the claim that capillary action will keep the surface moist and prevent the wind from blowing particulates aloft has not been substantiated and may represent wishful thinking.
- Water will be used in some operations to reduce dust, but wherever the particulate-laden water goes, once it evaporates, the dust will be exposed.
- The contribution to air pollution from what’s termed “fugitive dust” has not been not been rigorously analyzed. The control measures identified at the plant site are only theorized to provide adequate suppression of dust.
- The rail transport of ore from the mine site to the plant site is claimed to have minimal contributions to airborne particulates but there is concern that 6 miles of railbed could accumulate and release a significant quantity of dust

from the 32 thousand tons of ore transported daily and that the dust will be carried off by the wind.

- The particulates can travel far. We know that the airborne concentrations of amphibole fibers measured 12-15 miles away at sites near Ely are highest when the wind blows from the direction of the eastern Iron Range - due to activity at taconite operations that are about a mile from the proposed PolyMet site. Conversely the lowest amphibole particulate levels on record occurred during a taconite miners' strike. If these fibers are detectable in the air around Ely it is virtually certain higher levels are present at the mine site and surrounding area.
- Another significant omission in the EIS documents is the pollution that will be produced by remote power generation supporting the energy needs of the project. Much of this is likely to be supplied by coal combustion. In addition to its contribution to greenhouse gases, fossil fuel combustion to meet power needs of the PolyMet project will have deleterious health effects due to release of SO_x, NO_x, Mercury, and Particulates.
- In summation, the PFEIS incompletely addresses particulate air pollution. The analysis provided in the PFEIS is inadequate to reasonably address the health risks of the proposed mine – risks to the mine workers and to people living in the surrounding communities. A more comprehensive Health Risk Assessment as well as a Health Impact Assessment from a qualified independent evaluator is necessary to clarify the risks of this proposal.

HIA and the regulatory process – Dr. Kris Wegerson; Family Medicine, Duluth

- NEPA (1969) directs all agencies of the Federal government to take health impacts into account for all Federal actions “significantly affecting the quality of the human environment”. MEPA (1973) directs “all department and agencies of the state government to ...undertake, contract for or fund such research as is needed in order to determine and clarify effects by known or suspected pollutants which may be detrimental to human health or to the environment, as well as to evaluate the feasibility, safety and environmental effects of various methods of dealing with pollutants”.
- The National Research Council (NRC) has published a book which details health impact assessments, their roles and uses in: “Improving Health in the United States: The Role of Health Impact Assessments”. The NRC states that “the appropriate assessments of direct, indirect, and cumulative health effects under NEPA is a matter of law and not discretion”. (p. 12)
- The PFEIS doesn't adequately address cancer, brain damage or lung disease. It neither provides a baseline health status of the affected populations, nor analyzes in an objective way the potential adverse effects of the PolyMet Project.
- The PFEIS does not specifically address the potential health impacts to vulnerable populations, such as infants, children, the elderly, and persons

- who rely for subsistence on fish, wild rice or game species, where pollutants may bio-accumulate. Executive Order 13045 (1997) directs “each Federal agency: (a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children, and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks”. Executive Order 12898 directs “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States”.
- HIA is considered to be a “best practices” approach to responsible review of large-scale natural resource development projects in Alaska. Independent scientific analysis of issues such as seepage of contaminated water, capture and spills of contaminated seepage, and mercury methylation potential as well as independent HIA contracting are needed to objectively evaluate health risks and public health impacts of the PolyMet NorthMet project.
 - We do not believe that the health effects of the proposed NorthMet Project have been adequately addressed in the PFEIS. Comprehensive and independently produced health risk and health impact assessments must be completed for the NorthMet Project prior to completion of the FEIS.

Conclusion: Jennifer Pearson, M.D.

- PolyMet preliminary final EIS is insufficient in addressing our concerns for human health. What we are requesting is as follows:
 - That the statements about what will be released would be based on real experience, with realistic range for seepage, collection, as well as impacts of potential failures
 - Independent science rather than overly optimistic models by the mining company. Would our state want us as physicians to prescribe medications that had only been studied and regulated by the companies that made a profit on them?
 - That state agencies have analyzed the health risks of all chemicals released and have looked at human cancer, respiratory illness, brain damage, neurodevelopmental disorders.
 - That independent scientists have provided quantitative and qualitative analysis of what would happen to the vulnerable individuals in our population: infants, children, the elderly and people who have greater exposure or sensitivity as well as on-site workers
 - That the costs of illness, health care, and disability have all been evaluated and calculated. There is much less cost in preventing than in treating disease.

- We've been asking agencies for 18 months to provide an independent Health Risk Assessment and Health Impact Assessment. Hundreds of individual physicians and allied health professionals have been loudly voicing our concerns and our request for further science and analysis.
- We are disappointed in the response made by the agencies in PFEIS
- Mission of organizations
 - MN Dept of Health: "Protecting, maintaining, and improving the health of all Minnesotans"
 - MN Pollution Control Agency: "To protect and improve the environment and enhance human health"
 - MN Dept of Natural Resources: "To work with citizens to conserve and manage the state's natural resources, to provide outdoor recreational opportunities, and to provide for commercial uses of natural resources in a way that creates a SUSTAINABLE QUALITY of life"
- Hippocratic Oath: first, do no harm.
 - Our job to assure the health of our region.
 - We need to clearly understand the risk/benefits.... In an industry where there appears to be many risks
 - Comprehensive Health Risk Assessment of the NorthMet Project and Health Impact Assessment. Critical that these analyses not be just a desktop exercise, but scrutiny of underlying assumptions and use of independent science to provide objective assessments of risks and impacts.

Selected References:

Letters voicing concern about Health Risk (attached)

PolyMet NorthMet Preliminary Final EIS, Appendix A, Responses to Comments and selected PolyMet documents cited in the PFEIS.

The Risk, Public Liability, & Economics of Tailings Storage Facility Failures, Bowker and Chambers, July 21, 2015

Synopsis of Psychiatry by Kaplan and Sadock, 9th addition, page 367

Neurobehavioral effects of developmental toxicity, Philippe Grandjean, Philip Landrigan, *Lancet Neurol* 2014;13:330-38 (attached)

Public Health and Economic Consequences of Methyl Mercury Toxicity to the Developing Brain, Leonardo Trasande, Philip Landrigan, Clyde Schechter, volume 113, May 2005

Environmental Pollutants and Disease in American Children: Estimates of Morbidity, Mortality and Costs for Lead Poisoning, Asthma, Cancer, and Developmental

Disabilities, Philip Landrigan, Clyde Schechter, Jeffrey Lipton, Marianne Fahs, Joel Schwartz, Volume 110, July 2002.

AACAP Workforce Fact Sheet

Expert Opinion of JD Lehr; Don Lee, PhD, PE; and Brian A. Branfireun, PhD, Concerning the NorthMet Mining Project and Land Exchange Supplemental Draft Environmental Impact Statement available on line at <waterlegacy.org/PolyMet-SDEIS>

Low-Concentration PM_{2.5} and Mortality: Estimating Acute and Chronic Effects in a Population-Based Study, Liuhua Shi, Antonella Zanobetti, Itai Kloog, Brent A.

Improving Health in the United States: The Role of Health Impact Assessments, The National Academies Press, Washington, D.C., 2001