



Natural Resources Group

Thursday, February 2nd, 2017

3:00 p.m. – 5:00 p.m.

Mining & Reclamation Building

1003 Discovery Drive, Chisholm, MN 55719

AGENDA

1. **Welcome, Introductions and Safety Share**
2. **Further define sector goals and participants' role**
 - Explanation of IRRRB senior leadership direction
3. **Review recent progress on Session #1 identified strategies**
4. **Jim Glowacki to describe progress made in the area of potential sale of concentrate for non-blast furnace customers**
 - Jim offers a great example of how the participants may advance sector ideas
5. **Open discussion of potential new opportunities**
6. **Planning for future session**

Natural Resources
Mineland Reclamation
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In Attendance: Rolf Weberg, Mike Mlinar, Julie Lucas, Kent Jacobson, Sara Ferkul, Brian Hiti, Doug Learmont, Jordan Metsa, Bill Whiteside and Dan Jordan

Mike gave a quick overview of the agenda.

Julie gave a safety share of the day: Taking the time to examine new equipment prior to driving it to be aware of where everything is.

Discussion on what this group will be doing. What we can or can't do as a group? Discussing ideas within the group to possibly pass on to other entities. Entities that may be able to make things happen, NRRI, IRRRB, DNR etc. Also discussing opportunities where industries may be able to cross.

Mike Mlinar told us about an opportunity that Jim Glowacki came across. Shows that someone from this group can further the ideas that are generated. Jim spoke with a company about the possible sale of concentrate to non-blast furnace customers.

There was also a discussion and update on the spreadsheet that was created at our last meeting which included active programs and projects and gaps and opportunities. When looking at the spreadsheet, items that are now in yellow are items that there has been significant progress. Any items that are highlighted in green are ideas that we believe the natural resources group can help to progress further. And finally any bold items are a new items that came about at the February meeting. All of the changes are listed below:

There was progress in the active programs by NRRI.

Ferrous Mining: Construct a high value iron product process simulator to aid industry in optimization of processes to match various ore bodies and various high value product processes (DRI, Nuggets, Pig Iron etc.)

Non-Ferrous Mining: Ilmenite processing demonstration project – demonstrate utility of emerging technologies to isolate high purity titanium dioxide, iron oxide, manganese and vanadium from low-sulfur Minnesota ilmenite deposits.

Forestry and Land Management: Develop approaches utilizing LIDAR data to model timber location, quality, quantity and availability. Characterize the “true wood basket” and availability.

Forest Products and Bio Economy: Material characterization of Minnesota wood species to identify compositional makeup; match with industry desires and requirements for biomass feedstock processes; clarify industry opportunities,

Energy: Biomass based energy laboratory to demonstrate torrefied biomass solid fuels in high volumes for industry testing.

Social License: Develop “Map of Opportunity” overlaying characterized mining resources and material challenges with water resources, municipalities, utilities, parks, protected areas, forests, industry, etc. to help identify challenges and define mining districts.

We then discussed the gaps and opportunities. There was some additions as well as some areas that were assigned to members of the group to give an update at the next meeting.

Ferrous Mining: Consider iron ore concentrates as independent market; high value additives to other materials/media/processes; consider as a small business opportunities with high value. Need to know market size/value. (Jim Glowacki)

Cooperative Minerals Research Fund; need to leverage vs. new opportunities. Consider partial application of fund to innovation vs. reinvestment into current operations. (Mineral Coordinating Committee)

Drive the Mineral Coordinating Committee’s focus (Brian Hiti and Rolf Weberg)

Secondary Mining Products: Develop and identify waste stream opportunities (Future Topic to discuss)

Forest and Land Management: Join/support efforts for beneficial reuse of minelands for biomass generation; how to better leverage: include tailings basins, buffer lands, etc. How can these opportunities support emerging bio economy opportunities? (Kent Jacobsen)

Forest Products and Bio Economy: Periodic update regarding attraction of bio economy investment/partners. (Kent Jacobsen)

Energy: Understanding the true cost of energy to support industries; educate public on cost of “green.” Consider existing data and potential speakers. Include tax policy. (Bill Whiteside)

Periodic updates on School Trust Land Project. (Dan Jordan)

Social License: Drive pride in MN mining industry; doing it right is a differentiator, “Mined in Minnesota” as a brand. Consider creation of a Center of Excellence for Mining via consortium approach with Midwest/Canadian collaborators. (All)

Other: Consider external speakers and/or seminars/forums for discussion. (All)

New items added at this meeting:

Forest Products and Bio-Economy: Identify opportunities for Minnesota's wood to be more competitive vs. regional partners. Access to markets, labor, energy etc. Consider engagement with an industry group to define.

Water: Survey industries for their needs. And all survey available technology for water reuse and recycling.

Energy: Fully characterize torrefaction. Support with redirect of forest fire control funding.

There was discussion about hosting a forum about Green Energy for the public. What is green energy and where does it come from? What are the benefits and what are the downfalls? Bringing speakers in that would have environmentally based information.

Next Meeting:

May 18th, 2017

3:00 p.m. – 5:00 p.m.

Mineland Reclamation

****Make sure to allocate enough time to discuss the spreadsheet in depth – agenda****

Natural Resources Focus Statement

Support natural resource initiatives to address strategies and challenges

GOAL: HELP NATURAL RESOURCE INDUSTRIES EVOLVE

Identified Strategies	Active Programs & Projects				
FERROUS MINING	(NRRRI) Construct high-value iron product process simulator to aid industry in optimization of processes to match various ore bodies and various high value product processes (DRI, nuggets, pig, etc.)	(NRRRI, others) Optimize and implement high yield flotation technologies for separating all iron from Minnesota ores.	High Value Iron Coalition report (4Q, 2016)		
NON-FERROUS MINING	(NRRRI) Collaborative development of reduced-impact hydrometallurgical techniques to isolate copper and nickel concentrates.	(NRRRI) Kinetic leaching studies of finely ground copper/nickel ores to characterize process timescale-relevant relationships between contact time, acid generation, flotation additives, leaching rates, etc.	(NRRRI) Evaluate manganese deposits and approaches to development of value-added products.	(NRRRI) Ilmenite processing demonstration project - demonstrate utility of emerging technologies to isolate high purity titanium dioxide, iron oxide, manganese and vanadium from low-sulfur Minnesota Ilmenite deposits.	
SECONDARY MINING PRODUCTS	(NRRRI) Deliver road patch compound technology utilizing taconite mining waste materials	Use of taconite waste as roadbed base (St. Louis County)			
FORESTRY AND LAND MANAGEMENT	(NRRRI) Deliver red pine thinning study data to deploy new practices to optimize yield.	(NRRRI) Develop approaches utilizing LIDAR data to model timber location, quality, quantity and availability. Characterize the "true wood-basket" and availability.	(NRRRI) Wildlife & ecosystem characterization to inform sustainable forestry practices (bats, moose, water, etc.)	EAB tree harvest; how to access, quarantine, treat, market.	Private forest education effort currently under way on Range
FOREST PRODUCTS AND BIOECONOMY	(NRRRI) Material characterization of Minnesota wood species to identify compositional makeup; match with industry desires and requirements for biomass feedstock processes; clarify industry opportunities.	(NRRRI) Pursue funding for biofuel gasification and production of liquid biofuels (jet fuel, diesel fuel, chemicals)			
WATER	(NRRRI) Development of peat-based absorbents to remove heavy metal contaminants from Minnesota waters.	(NRRRI) Collaborate with industrial partners to pilot and demonstrate high volume physical/chemical processes to remove sulfate from Minnesota waters.			
ENERGY	(NRRRI) Demonstration of compressed air energy storage as means for onboarding renewable energy for industry utilization.	(NRRRI) Biomass-based energy laboratory to demonstrate torrefied biomass solid fuels in high volumes for industrial testing.	(NRRRI) Develop hydrothermal carbonization processes to convert wet woody biomass to fuels.		
SOCIAL LICENSE	(MCC, IMA, MM) Development of "Social License" approach to mine management.	(NRRRI) Develop "Map of Opportunity" overlaying characterized mineral resources and material challenges with water resources, municipalities, utilities, parks, protected areas, forests, industry, etc. to help identify challenges and define mining districts.	RAMS - leading discussions among community leaders; may be a good medium for these conversations.		
OTHER					

Summary of Strategic Activities - Pi

Natural Resources Focus Statement

Support natural resource initiatives to address

GOAL: HELP NATURAL RESOURCES

Identified Strategies	Gaps & Opportunities							
FERROUS MINING	Consider iron ore concentrates as independent market; high value additives to other materials/media/processes; consider as small business opportunities with high value. Need to know market size/value. (Jim Glowacki)	Consider iron ore (concentrate) as additive to materials/concrete as heat sink for construction. Horizontal heat storage/passive heat storage.	Cooperative Minerals Research Fund; need to leverage vs. new opportunities. Consider partial application of funds to innovation vs. reinvestment into current operations. (Minerals Coordinating Committee)	LVP: look at land use planning to preserve ore body access for future.	Educate public/stakeholders on energy impact on industry; targeted marketing effort.	Pursue use of Magnetite as passive solar material	Drive MCC external focus. (Brian Hiti/Rolf Weberg)	
NON-FERROUS MINING	Wastestream issue solutions. Communicate UofM and other activities and progress in bioremediation, absorption, chemical processes, UF.	LVP: look at land use planning to preserve ore body access for future.	Continue to support exploration to define opportunity					
SECONDARY MINING PRODUCTS	Use slag as concrete aggregate.	Develop/identify wastestream opportunities (future topic)						
FORESTRY AND LAND MANAGEMENT	Regional forest product alliance - provide support for logging industry; financing/business planning/workforce planning	Join/support efforts for beneficial reuse of minelands for biomass generation; how to better leverage: include tailings basins, buffer lands, etc. How can these opportunities support emerging bioeconomy opportunities? (Kent Jacobsen)	Offer free forest planning to smaller private landowners; need to communicate available programs. How to leverage scarce resources (DNR).	MN Forest Industries (MFI) needs to have a presence in these conversations; MFRC as well. Include American Forestry and Paper Association.	Mining & Forestry have challenges regarding transportation (rail). Note Regional Rail Initiative.	Include Duluth Superior Port Authority in NR discussions		
FOREST PRODUCTS AND BIOECONOMY	Is furniture mfg a possibility in MN? How does MN utilize substandard (structural) wood?	Periodic update regarding attraction of bioeconomy investment/partners. (Kent Jacobsen)	Identify opportunities for MN wood to be more competitive vs. regional partners; access to markets/labor/energy/etc. Consider industry group engagement to define.					
WATER	How to consider water as an opportunity itself rather than just an enabler for mining, timber, energy, etc. How do we monetize water? Prevention/remediation technologies or other?	How to maintain local control of MN waters in terms of water resources? Not applicable to Great Lakes.	Survey best available technology for water reuse/recycle; survey industry needs.					
ENERGY	Understand true cost of energy to support industries; educate public on cost of "green". Consider existing data and potential speakers. Include tax policy. (Bill Whiteside)	Periodic updates on School Trust Land project (Dan Jordan)	Fully characterize torrefaction; support with redirect of forest fire control funding					
SOCIAL LICENSE	Harness interest in maintaining MN jobs towards solving the non-ferrous mining impacts on water.	Non-ferrous communication is difficult. Need to lead discussion on state-wide basis; need comprehensive statewide strategy. Need to engage stakeholders proactively.	Need to carefully identify who delivers the message; makes difference to the reception. Also can look for opportunities to leverage communications proactively.	Drive pride in MN mining industry; doing it right is a differentiator; "Mined in Minnesota" as a brand. Consider creation of a Center of Excellence for Mining via consortium approach with midwest/Canadian collaborators. (All)	Need to be able to tell story of how the industry operates today vs. yesterday; can be a powerful message; address perceptions proactively.	Must develop ambassadors for natural resource industries and target with key messages. Mobilize education approaches.		
OTHER	Demographic shortcoming: where are the young engineers who will be carrying out these long-term actions? May also want to include operator demographic as well. Engage scam mining participants. Need the collective, entrepreneurial voice. Need the hands-on voice.	Changing workforce dynamics in NR industries. More automation/fewer direct jobs; need for technicians.	Promote sharing of investment in environmental protection for new natural resource development by recipients of royalties, payments, etc.	Consider external speakers and/or seminars/forums for discussion (All)				