Frac Sand Mining:
Frac Sand 101 and DNR Regulations

2012 APA-WI ANNUAL
CONFERENCE
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SAND MINING IN WISCONSIN IS NOT NEW

- Mining sand and nonmetallic minerals in Wisconsin for over 100 years
- All frac sand is quartz sand
- Foundry
- Glass
- Water Filtration
- Construction
- Sandblasting
- Road sand
Nonmetallic mining – a widespread activity in WI

- Variety of geologic environments provides for a diverse industry. Currently there’s an estimated 2,500+ mines in the state. We have nonmetallic mines in every Wisconsin county.
WHAT’S NEW AND DIFFERENT?

- Footprint of the new mines and plants
- Geographical concentration of the new mines
- Rate of mineral withdrawal
- Number of new mining and processing plant proposals
WHY HERE?

Wisconsin has sandstone deposits that are:

- Clean, crystalline, almost pure silica sand
- Spheroid shape
- Desirable size gradations and consistency
- High crush resistance
- Usually close to the surface and easy to mine
THE GEOLOGIC STORY BEHIND THE WI SANDSTONE FORMATIONS
WHERE THE BEST FRAC SAND IS (RED)
THE BEST FRAC SAND IS WELL ROUNDED AND NEARLY PURE QUARTZ

Many younger sands are too angular or contain other minerals or rock fragments.
FRAC SAND “BOOM”
WHY NOW?

- Technological advances
- Maximizes oil and gas yields
- Increasing worldwide demand for petroleum products and gas
HYDROFRACKING A WELL

Fluid pressure fractures the rock, sand grains keep the fractures open
WHERE THE GAS IS
SAND MINING PROCESS

- Removal of sand (possible blasting or dredging)
- Rough screening
- Washing sand to remove fines
- Sand then goes to drying or a stock pile
- Further screening
- Possible resin coating
- Transport
- Processing facilities (physical processes incl. washing &

- Resin coating

Resin plant—coating of sand to add strength
WISCONSIN DNR REGULATIONS

- Air permits
- Stormwater permits
- High capacity well permits
- Wetland and waterway permits
- Endangered and threatened species and archeological review
AIR PERMITS

- REQUIRE APPLICANT TO QUANTIFY ALL AIR EMISSION SOURCES AT THE FACILITY
- DNR WILL REVIEW APPLICATION AND DETERMINE IF AMBIENT AIR QUALITY STANDARDS WILL BE MET.
- AIR PERMIT WILL CONTAIN OPERATIONAL AND TESTING REQUIREMENTS TO ASSURE COMPLIANCE WITH THE PERMIT.
- AMBIENT PARTICULATE MONITORS WILL BE REQUIRED UNLESS A WAIVER IS GRANTED.
- A FUGITIVE DUST PLAN IS REQUIRED BY THE AIR PERMIT.
WPDES GENERAL NON METALLIC STORMWATER PERMIT

- REGULATES DISCHARGE OF STORMWATER AND PROCESS WASTEWATERS TO THE GROUND WATER OR SURFACE WATERS OF THE STATE.

- WASTEWATER INCLUDES PROCESS WASH WATERS, NON CONTACT COOLING WATERS, VEHICLE WASH WATERS AND MINE DEWATERING.
HIGH CAPACITY WELL PERMITS OR DEWATERING

- A HIGH CAPACITY WELL OR DEWATERING PERMIT IS REQUIRED IF TOTAL GROUNDWATER WITHDRAWAL CAPACITY EXCEEDS 70 GALLONS PER MINUTE.
- DNR REVIEW INCLUDES ANALYSIS OF THE WITHDRAWAL IMPACTS ON SPRINGS, TROUT STREAMS, OUTSTANDING AND EXCEPTIONAL RESOURCE WATERS AND PUBLIC WATER SUPPLY WELLS.
- ALSO HAVE BEGUN ANALYZING POTENTIAL IMPACTS ON NEARBY PRIVATE WELLS.
WETLAND REGULATIONS

- Ponds with 500 feet or connected to navigable water
- Grading within 300 feet of a navigable water
- Dredging from streams and lakes
- The construction of culverts or bridges on navigable waterways
- Permit applicants will need to demonstrate that they cannot avoid or reduce wetland impacts, and that the project will not have significant adverse impacts on wetland functions and values including secondary impacts.
The Department of Natural Resources shares joint responsibility with Federal Fish and Wildlife Service through a formal cooperative agreement to administer the Federal Endangered and Threatened Species Act of 1973.

The DNR also works cooperatively with the State Archeological Survey to protect archeological sites.

All mine and processing sites as well as areas disturbed by supporting infrastructure undergo a screening process to determine if the project will impact threatened or endangered species or archeological sites.

If identified the developer must take steps to avoid or minimize impact on these resources. In some cases mitigation is a possibility.
Karner Blue Documented Range in Wisconsin
Karner blue butterfly

*Lycaeides melissa samuelis*
Wild lupine
Karner blue’s host plant
Jack pine barrens

oak savanna
COUNTY REGULATIONS

- DNR Oversight
- Shoreland zoning and floodplain regulations
- Mine reclamation
FLOODPLAIN AND SHORELAND REGULATIONS ADMINISTERED BY COUNTIES

- FLOODPLAIN AND SHORELAND ZONES 500 FEET FROM A NAVIGABLE STREAM AND 1,000 FEET FROM A LAKE
- 75 FOOT SETBACK FOR STRUCTURES AND BUILDINGS FROM THE ORDINARY HIGH WATER MARK OF A NAVIGABLE STREAM
- PRESERVATION OF VEGETATIVE CORRIDOR ON THE SHORELAND
NR 135 NON METALLIC MINE RECLAMATION ADMINISTERED BY THE COUNTIES – DNR OVERSIGHT

- ALL NON METALLIC MINES ARE REQUIRED TO HAVE A RECLAMATION PLAN APPROVED BY THE COUNTY
- THAT PLAN MUST MEET THE MINIMUM RECLAMATION STANDARDS OF NR 135
- MUST PROVIDE FINANCIAL ASSURANCE TO ENSURE RECLAMATION IN THE EVENT OF AN OPERATOR DEFAULT
POTENTIAL RECLAMATION USES

- AGRICULTURAL
- PRAIRIE
- WILDLIFE HABITAT/HUNTING AND RECREATIONAL LAND
- COMMERCIAL OR RESIDENTIAL DEVELOPMENT
- PARKS
Restored Wetland – FMC, Ladysmith
ISSUES

- Citizen concern with potential crystalline silica and acrylamide exposure.
- Management of fugitive dust and stormwater runoff.
- Abandonment of exploratory boreholes.
- Moratoriums at the county and township level.
- Locating mines adjacent to existing contamination sites.
- Impact of high capacity wells on municipal water supplies.
- Lack of a trade association or similar organized group to work with.
6-2011 -- The Fairmount Mine in Menomonie has two high-capacity wells for spraying down sand to keep it from blowing around.
ECONOMIC IMPACT

- 40-50 Jobs per processing plant
- 10-20 Jobs per mine
- 90% of new jobs are local hires
- $18-$20 per hour for equipment operators
- $20 per hour + for electricians, engineers, geologists, managers, etc.
- Secondary economic impacts
SECONDARY ECONOMIC IMPACTS

- JOBS ASSOCIATED WITH CONSTRUCTION OF PROCESSING PLANTS ($20M-$40M) AND PROCESSING PLANTS WITH RESIN COATING ($100M)
- JOBS ASSOCIATED WITH INFRASTRUCTURE CONSTRUCTION (ELECTRICAL LINES, GAS PIPELINES, RAIL SPURS AND WATER LINES)
- LOCAL TRUCKING JOBS
- SECONDARY SERVICE JOBS TO SUPPORT THE MINING ACTIVITY.
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