



*Protecting, maintaining and improving the health of all Minnesotans*

February 6, 2013

Jason Gilman, AICP  
Planning and Environmental Services Director  
Winona County  
177 Main Street  
Winona, MN 55987

Dear Mr. Gilman,

Thank you for providing the Minnesota Department of Health (MDH) with the opportunity to comment on the Environmental Assessment Worksheets (EAW) for the Dabelstein Quarry and Yoder Mine projects. MDH joins the Minnesota Pollution Control Agency (MPCA) in recommending that Winona County make a positive declaration on the need for an Environmental Impact Statement (EIS) for both projects in order to fully assess the potential impacts of these projects.

#### *Well Construction*

The Yoder project site has two wells, one of which will be relocated as part of the project. New wells that are constructed in Minnesota must be constructed according to the requirements of [Minnesota Statutes, Chapter 103I](#), and [Minnesota Rules, Chapter 4725](#). Abandoned wells will need to be properly sealed. Additional information is available at [Well Construction](#) and [Well Sealing](#). MDH staff are also available to provide information and resources.

#### *Groundwater Quality*

The proposed quarries are located in an area of Minnesota prone to the formation of karst, particularly in the Prairie du Chien Group, where groundwater is highly susceptible to the infiltration of contaminants. Mining there will remove the natural cover material above the Prairie du Chien Group, which is used as a drinking water aquifer by many of the residential and business wells in the area (see attached figure). In parts of the Yoder quarry only 5 feet of St. Peter Sandstone will remain above the Prairie du Chien, while the Dabelstein quarry will excavate approximately 6 feet into the Prairie du Chien. During mining operations, portions of the quarry will have little or no cover above the Prairie du Chien, making it even more vulnerable to infiltrating contaminants. This will be somewhat mitigated by the fact that as mining proceeds, this cover will be partially replaced by backfilling the excavated areas with the unmarketable portions of the excavated materials. However, after final reclamation, the fill level generally will be at or below the elevation of the surrounding ground surface and the bedrock beneath both quarries will have approximately 30 to 70 less feet of cover material than before mining activities began. Moreover, both quarries will leave behind deep depressions (up to 100 feet) in the bedrock. [Note: it is difficult to evaluate the Dabelstein excavation plans in any detail as no map was provided to show the location of the cross-sections in the Operations and Reclamation Plan report.]

Buried depressions on the bedrock surface can channelize flow and result in focused infiltration which may accelerate karst formation. There are no mapped karst features on either of the quarry properties, but as shown in the attached figure there are many nearby. Five sinkholes (and a possible sixth), have been mapped by the Minnesota Geologic Survey (MGS) within 2 miles of the Dablestein quarry (the four nearest are less than one-half mile from the quarry). The nearest MGS mapped sinkholes to the Yoder quarry are over 1.5 miles from the property. Karst features tend to align along large bedrock joints; these joints sometimes may also be reflected in surface drainage features. In southeast Minnesota, subparallel groups of these joints are oriented roughly northeast-southwest (NE-SW) and northwest-southeast (SW-NE). Sinkholes are particularly apt to form where two joints intersect. In Saratoga Township, the location of MGS mapped sinkholes appears to indicate the presence of a number of joints in these orientations. As shown on the attached figure, near the Dabelstein quarry sinkholes 5 and 6 may be located on a NW-SE joint parallel to others in the township and sinkholes 1-4 and the intermittent stream valley in which they are located may indicate the presence of a NE-SW joint. These two possible joint sets intersect near the proposed mine location. Given the potential for focused infiltration and accelerated karst development at both sites, MDH recommends that, as part of an EIS process, a more careful evaluation of the bedrock geology, karst features, and hydrogeology be completed. The reclamation plan for the sites should include more detailed plans for how the backfill and cover above the quarries will be engineered to prevent focused infiltration in these areas. MDH also recommends that the reclamation plan assess impacts to groundwater quality from row crop production, with its attendant use of fertilizers and pesticides, on the sites following mining.

The potential to create pathways for contaminants to enter the groundwater is important, given the proximity of drinking water wells to the two quarries. Maps in the EAWs show the location of only some of the wells recorded in the County Well Index (CWI). Although the text states that "additional water wells may exist" in the area, as there is no rural or municipal water supply available in Saratoga Township, it should be assumed that every residential property has at least one drinking water supply well. As part of the recommended EIS, a thorough well survey should be completed to locate all drinking water wells in the area.

As shown on the attached figure, many of the wells near the quarry sites are completed in the Prairie du Chien and would be more at risk from surface contaminants if a sinkhole were to form nearby. Both EAWs indicate that nearby wells will be tested for nitrate and bacteria before mining begins and then annually until the mine is restored. MDH recommends that the specific wells to be monitored be identified as part of the recommended EIS and that monitoring continue beyond the reclamation and closure of the mines, as development of karst and the related additional risk to groundwater may occur years after the mine is closed.

The EAWs also indicate that Diesel Range and Gasoline Range Organics (DRO and GRO) may be monitored in wells located downgradient of the quarries and completed in the Shakopee Formation member of the Prairie du Chien Group, based on the assumption that DRO and GRO are "lighter than water" and would be present only near the top of the water table. This is true only for non-aqueous phase liquid DRO and GRO; dissolved phase DRO and GRO will travel with the groundwater in which it is dissolved and may move vertically as well as horizontally. Moreover, in the case of the Yoder quarry, the nearest well likely to be completed in the Shakopee Formation (UN85W0000027) is located more than 1 mile from the quarry and would not provide a reasonable monitoring point. MDH recommends that any private drinking water well within 1 mile downgradient of the quarries be tested for DRO and GRO.

### *Air Quality*

Silica exists in two forms: amorphous and crystalline. The toxicity of crystalline silica to humans has been well characterized. In occupational settings where exposures tend to be higher than ambient exposures, silica is capable of causing a number of diseases. The best known disease is silicosis (silicotic nodules and fibrotic scarring of the lung), but exposure to crystalline silica is associated with other health concerns. Silica exposure contributes to other diseases of the lung including emphysema, chronic obstructive pulmonary disease, tuberculosis, and lung cancer. Silica exposure has also been associated with several diseases of the renal and immune systems.

When discussing the toxicity of silica, the real concern is with respirable crystalline silica particles with a diameter of 4 micrometers (4  $\mu\text{m}$  or 4 microns) or smaller. Particulate matter 4 microns or smaller is referred to as PM<sub>4</sub>. Particles this small are invisible to the naked eye. PM<sub>10</sub> (particulate matter 10 microns or smaller) is respirable but the fraction of PM<sub>10</sub> larger than 4 microns only reaches upper levels of the respiratory system. Particles 4 microns or smaller can travel much deeper in the lungs and reach the lower respiratory surfaces (alveoli) where the changes that produce silicosis take place. Disease risk is related to both the levels and duration of silica exposure and the onset of disease may occur long after the exposure has ceased.

The California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) has used information from occupational studies to develop a chronic reference exposure limit for silica in ambient air of 3  $\mu\text{g}/\text{m}^3$ . The MPCA has requested that MDH develop an exposure limit for respirable crystalline silica in air. MDH staff are currently developing this exposure limit, which should be available mid-2013. In the interim MDH has suggested that the MPCA use the OEHHA value of 3 $\mu\text{g}/\text{m}^3$  for screening purposes.

MDH has little to no information on the levels of respirable silica generated by frac sand mining or processing. MDH has not been provided with any information on the ambient levels of silica that result from frac sand mining operations. MDH is aware of air monitoring plans for ambient crystalline silica associated with several frac sand mining facilities in Wisconsin and these results could be applicable to assessing potential risks posed by proposed facilities in Minnesota.

### *Truck traffic*

Trucking from both mines, estimated to be 1,200 trips per day, will put significant burden on the streets used for hauling the silica sand and the surrounding community. Increased truck traffic has potential to increase vehicular and pedestrian injuries. Additionally, trucks emit PM and chemicals that with acute or long-term exposure can exacerbate respiratory and cardiovascular disease, and can increase the risk of asthma, allergic diseases, bronchitis, impaired respiratory function, pneumonia, cardiopulmonary diseases and cancer. Reviewing truck routes to prevent exposure of sensitive populations to pollutants, such as schools or assisted living facilities, is recommended. Truck routes can be changed to alleviate the risk of exposing sensitive populations to these risks. Emergency routes also should be reviewed to ensure that increased truck traffic does not interfere with timely responses of emergency vehicles such as ambulances and fire trucks.

### *Connected/Phased Actions*

As stated in Minnesota Rule 4410.4400, Subpart 1, an EIS must be prepared for projects that meet or exceed the threshold of any of subparts 2 to 25. Multiple projects and multiple stages of a single project that are connected actions or phased actions must be considered in total when

comparing the project or projects to the thresholds of this part. Minnesota Rule 4410.4400, Subpart 9, item B states that any EIS is required for sand mining or extraction that will excavate 160 or more acres of land to a mean depth of ten feet or more during the mine's existence. Additionally, Minnesota Rule 4410.2000 states that two or more projects to be undertaken by the same proposer that will have environmental effects on the same geographic area and are substantially certain to be undertaken sequentially over a limited period of time are considered phased actions. It has come to MDH's attention that there are a number of mines in the area that will be operated by Minnesota Sands LLC (aka Minnesota Sand, LLC and Minnesota Proppant, LLC). The proposed Campbell Quarry in Saratoga Township and the proposed Alice Dabelstein Quarry, Boyum Quarry and the Kessler Quarry in Fillmore County are all within 5 miles of the Yoder and Dabelstein mines and have a combined project size of over 160 acres. In addition, Minnesota Proppant, LLC, began work in 2012 on a draft EAW for a sand processing facility in St. Charles and an associated sand slurry pipeline that would transport sand from several, if not all, of the quarries listed above, as described in the Yoder and Dabelstein EAWs. All of these projects are connected/phased actions that require a thorough analysis in an EIS. Analysis of these projects as connected actions will result in a more comprehensive, and accurate, assessment of the potential health impacts associated with increased truck trips, air quality, and groundwater use.

#### *Health Impact Assessment*

A Health Impact Assessment (HIA) is a research and community engagement process that can be used to help ensure that people's health and concerns are being considered when decisions on infrastructure and land use projects are being made. The National Research Council defines HIA as "a structured process that uses scientific data, professional expertise, and stakeholder input to identify and evaluate public-health consequences of proposals and suggests actions that could be taken to minimize adverse health impacts and optimize beneficial ones." HIAs have been used to provide important health information to decision makers on a wide range of projects outside the typical health arena, including comprehensive plans, brownfield redevelopment, transportation projects, energy policies, and housing projects. Over 100 HIAs have been performed in the US to help improve public health. Ten HIAs have been completed in Minnesota, mostly on comprehensive plans and transportation projects.

In Colorado, an HIA was undertaken to assess health impacts associated with a hydraulic fracturing project proposed in that state. However, to date, no HIA has been used to evaluate frac sand mining in the US, but HIAs have been used to inform decision makers about additional health effects in projects that have some similarities, including oil and gas leasing, coal mine proposals, and copper, zinc and gold mining. These HIAs may review health issues that are typically included in an EIS, such as water and air quality, but they also review additional health effects that are related to the specific site and community. Some health effects considered in these HIAs include reviewing the health effects of newly built infrastructure and traffic to support mining, the influx of migrant workers, and the disturbance of food sources relied upon by subsistence cultures.

An HIA on silica sand mining could provide additional health information for policy makers in determining how to balance health and citizens' concerns with the economic benefits of silica sand mining. Ideally, the HIA would include an air monitoring study, but this requires significant time and resources. An HIA could be scaled according to available resources and still answer some of the health questions posed by the community. An HIA could provide recommendations

to policy makers to support possible positive health outcomes and to mitigate or prevent possible negative health outcomes to improve the public's health and to inform zoning, permitting, monitoring, and reclamation policies. Since February 2013, MDH screens all EAW to determine whether they would benefit from an HIA. Using a standardized, pilot screening tool, MDH found that the Dabelstein Quarry and the Yoder Mine Projects could benefit from a HIA.

*Summary of Recommendations:*

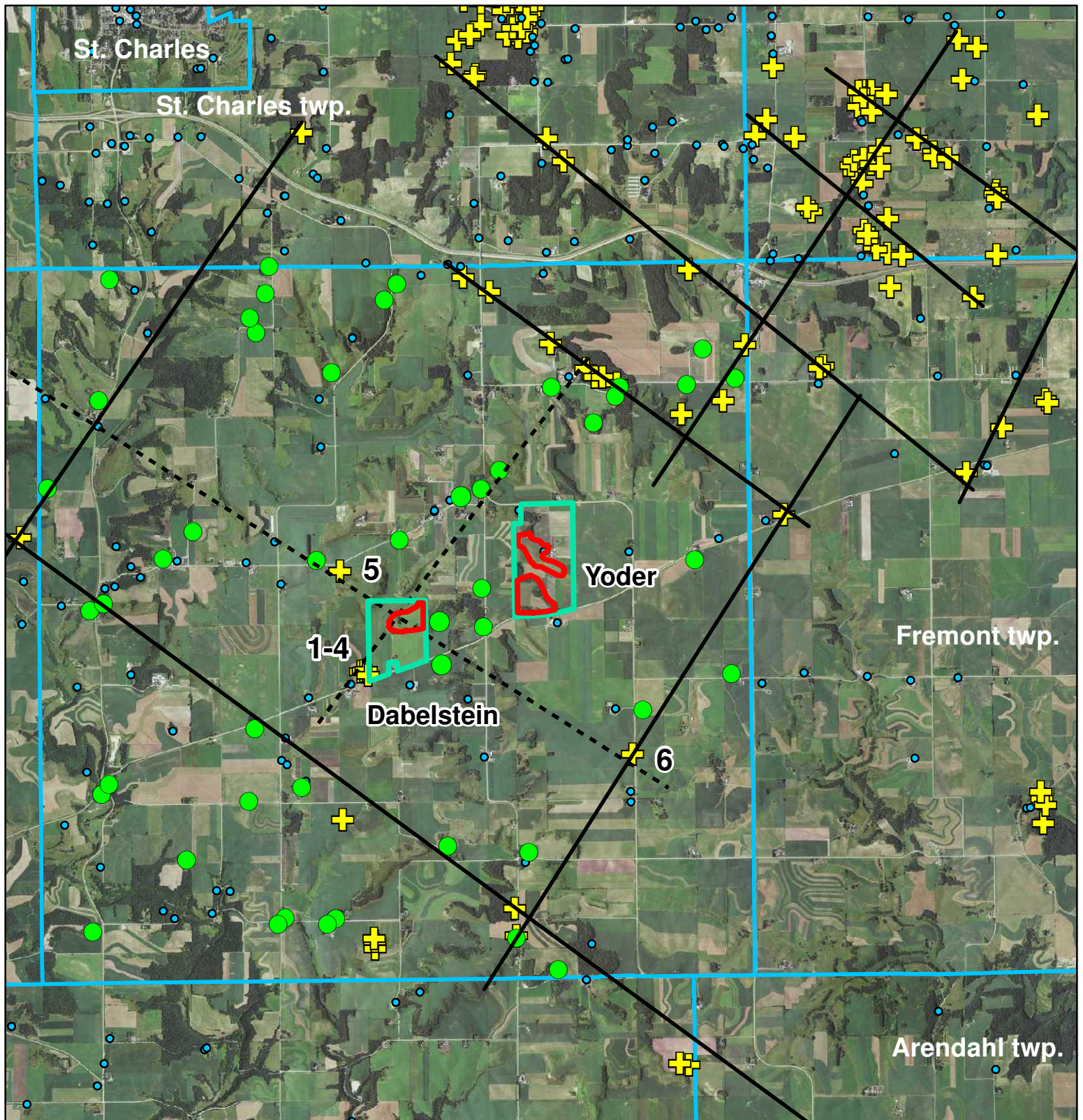
- Winona County should make a positive declaration on the need for an EIS for both projects. As noted in MPCA's letter to Winona County date February 4, 2013, it may be appropriate for Winona County to prepare a Related Actions EIS, a single EIS for independent projects with potential cumulative environmental impacts on the same geographic area.
- As part of the recommended EIS process, a more careful evaluation of the bedrock geology, karst features, and hydrogeology should be completed.
- The reclamation plan for the sites should include more detailed plans for how the backfill and cover above the quarries will be engineered to prevent focused infiltration in these areas and should take into account information that may indicate particular risk for karst development (for example, intersecting bedrock joint sets).
- As part of the recommended EIS, a thorough well survey should be completed to locate all drinking water wells in the area.
- As part of the recommended EIS process, the specific drinking water wells to be monitored be identified and monitoring should continue beyond the reclamation and closure of the mines.
- Private drinking water wells within 1 mile downgradient of the quarries should be tested for DRO and GRO, regardless of the aquifer in which they are completed.
- A map showing the location of the cross-sections should be provided in the Operation and Reclamation Plan report for the Dabelstein quarry.
- Project operation should include a plan to monitor for respirable crystalline silica on a regular basis.

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. Thank you again for the opportunity to provide comments on these EAWs. Please feel free to contact Michele Ross at (651) 201-4927 or [michele.ross@state.mn.us](mailto:michele.ross@state.mn.us) if you have any questions regarding this letter.

Sincerely,



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# Location of Wells, Sinkholes, and Possible Joint Sets

## LEGEND

- Quarry property
- Proposed quarry location
- + MGS mapped sinkhole
- Prairie du Chien well
- Non-Prairie du Chien well
- Possible joint based on mapped karst features
- Possible intersecting joints near proposed Dabelstein mine

