



## MEMORANDUM

TO: Mr. Andy Albarado  
Rusk County Economic Development  
311 Miner Ave. E. #L337  
Ladysmith, WI 54848-1862

FROM: Darrell Reed, Senior Scientist  
SEH  
421 Frenette Drive  
Chippewa Falls, WI 54729

DATE: April 4, 2011

RE: Frac Sand Potential – Rusk County  
SEH No. RUSKC 114478

Introduction: SEH has performed a review of available published geologic data for the potential of frac sand mine development in Rusk County, Wisconsin. Frac sand exploration in Barron and Chippewa counties has focused on the Cambrian-age, Wonewoc and Jordan Formations. Sands in both formations are favorable for the frac sand industry as they possess the correct grain size, roundness, crush testing values, composition and occur near ground surface. No field work was performed as part of this assessment.

Background: Rusk County is characterized by large areas of thick glacial deposits that are underlain by PreCambrian igneous and metamorphic bedrock as shown on Figure 1, “Bedrock Geology Map”. Favorable bedrock areas are identified as two areas of Wonewoc sand and one undifferentiated Cambrian sandstone formation area. The reviewed areas include: an area north of Bruce; the southwest area of the county near Fish Lake, and an area of undifferentiated Cambrian formations in the south county area. The areas are shown on Figure 1.

Thick glacial deposits and shallow water table conditions are present across most areas of the county. Frac sand mine development is favorable in Chippewa and Barron county where sandstone-cored ridges are found near surface and above the water table. Glacial deposit thicknesses across Rusk County are shown on Figure 2, “Depth of Glacial Deposits”. Over most of the county, the overlying glacial deposits are too thick for mine development. However, areas with thin areas of glacial deposits (50 feet or less) that are underlain by sandstone bedrock were evaluated in this study.

Evaluation of potential areas: The Wonewoc and undifferentiated Cambrian sandstone areas overlain by glacial deposits were evaluated as part of this study.

Bruce Area - Wonewoc Area 1: An area of Wonewoc sandstone occurs north of Bruce along STH 40 and approximately 1 mile to the west as shown on Figure 1. Review of area Well Constructor’s Reports (WCRs) indicate several private wells that encountered white colored sandstone at depths ranging from 55 to 77 feet below surface. This sandstone interval may belong to the Wonewoc Formation. Further review of the WCRs indicates glacial sands, gravels and clays overlying bedrock, and a shallow groundwater table occurring at depths less than 50 feet at most well locations. The overburden thicknesses and shallow water table in this area suggest a low potential for frac sand mine development.

SW County Area – Wonewoc Area 2: A north to south, elongate area of Wonewoc Formation is shown as the first bedrock unit encountered in the Fish Lake area of southwestern Rusk County. Wonewoc Area 2 is identified on Figure 1. Review of area WCRs indicate several private wells that encountered possible Wonewoc Formation with depth. Depth to the Wonewoc sandstone varies from 36 to 89 feet in several wells in the vicinity of Fish Lake. Glacial deposits consisting of sand, gravel and clay overlie the bedrock unit and the area water table occurs generally above the bedrock. The near surface water table conditions, glacial deposit thicknesses and the absence of near surface exposure of the Wonewoc suggest a low potential for frac sand mine development in this area.

Undifferentiated Cambrian Sandstone Area: An area of undifferentiated sandstone occurs in southern Rusk County as shown on Figure 1. The area shown on Figure 1 and 2 shows a considerable glacial deposit thickness overlying the undifferentiated Cambrian sandstone bedrock unit. No bedrock exposures or near surface sandstone bedrock occurrences were identified in this area based on this limited review. It is interpreted that a low probability of frac sand mine development exists in this area.

Summary: Based on available published information and geologic interpretation, there appears to be low potential for frac sand mine development in Rusk County.

If you have any questions regarding this report or request additional study, please contact me at 1.800.472.5881.

Darrell Reed, PG

Enc.

DRR/drr/DC

c: David Carlson, SEH

p:\ko\m\wv\ec\common\entrance road work plan for additional activities\work plan memo summary 3 21 11.doc

