Attachment D

Preapplication Notification Information
Pursuant to s. 295.465(2), Wis. Stats.

March 10, 2014

Additional Water Monitoring Information

A monitoring strategy is required to document existing baseline conditions, as well as quantifying resource change during mine construction and operation and after mining ceases to assess potential changes in the environment. The applicant must develop a monitoring strategy that complies with subch. III of ch. 295 requirements. While it is applicant's responsibility to develop this monitoring strategy, the department offers the following additional recommendations on water-related monitoring for consideration. The department's monitoring recommendations may change as the mining project is further developed. Consultation with department staff as monitoring plans are developed will help to ensure data is appropriate and meets the department's needs for preparation of the Environmental Impact Statement (EIS).

When choosing specific monitoring locations, the department recommends the following criteria be considered:

- Zones of groundwater influence
- Discharge points
- General water budget for mining operation
- Air emission models to determine footprint of atmospheric deposition
- Roads and other infrastructure
- Other unforeseen factors

Data collection and analysis should be consistent with the department's methods for physiochemical and biological assessments. For example: Hilsenhoff biotic index, fish and macroinvertebrate indexes of biotic integrity, diversity indices etc.

A water quality monitoring program for the proposed mine should establish baseline conditions in the streams, lakes, and wetlands on the mine site, within the mine vicinity, and within reference watersheds. Baseline data will be needed to complete an EIS and baseline monitoring site locations and data will be used to determine baseline conditions to monitor and assess changes in condition of the resource over the life of the project.

Baseline monitoring should include measures of physical, chemical and biological condition, including the water column, sediments, fisheries, macroinvertebrates, periphyton, macrophytes, wetlands, and riparian components of the ecosystem. These measures must include the quality and quantity of these resources including a spatial and temporal extent and be able to detect acute and chronic impacts.

Streams closer in proximity to the mine site have a greater potential for acute changes in stream condition, while streams farther from the mine are more likely to experience chronic changes. The monitoring plan must be rigorous enough to detect changes caused by point sources, land use, and landscape modifications from natural variation.

Lakes near the mining site are vulnerable to local impacts such as groundwater withdrawal, surface runoff (via disturbed land in the watershed), and aerial contamination. Lakes further from the mine are vulnerable to atmospheric deposition of contaminants. A strong monitoring design for lakes would include lakes within the immediate vicinity of the mine and lakes at greater distances along transects to the East, South, and West of the mine.

The biological data collected should use the methods and metrics found in Attachment C, and include fish IBIs, CPE, RSD and Macroinvertebrate IBIs, species diversity etc.

A representative range of naturally occurring baseline conditions will identify acute and chronic changes in condition over time. Monthly water chemistry sampling and biologic assemblage surveys should be conducted over a time period adequate to understand variability. (In general, the department conducts this monitoring over a period of two years). Baseline data collection needs to be conducted over a long enough time period to account for environmental variability (drought, heat, etc.). In some cases more frequent samples may be necessary. This sampling should occur before mine construction.

A reference watershed is recommended. The selected watershed should be similar in physical, chemical and biological condition as the watershed near the mine site, but outside the influence of the mine. Reference sites within the watershed should be monitored to establish appropriate benchmarks of an undisturbed watershed. The Potato River, Montreal River and Marengo River watersheds have the potential to be used as reference watersheds.

The monitoring plan should be based on a statistical design in order to detect changes from mining activity on the environment. Before, After, Control, Impact (BACI) monitoring designs or similar study designs are applicable. The BACI design is particularity useful for evaluating responses that potentially have high natural year to year variation. These monitoring designs are employed on flow connected streams upstream and downstream of potential impacts to streams. The BACI design is specifically created to statistically determine if the impact reach changed after a particular activity relative to the control reach.

Wetland Monitoring

Wetland monitoring information should be collected in order to characterize the wetland resource for the EIR and as part of the long term monitoring plan. This section focuses on the spatial aspects of the information needed for these purposes. Set forth below is one way the wetland studies could be organized based on proximity and type of impact expected from the project.

Zone 1 – Mine site Discharge of fill or excavation is expected to result in a loss of wetlands within this zone. For regulatory purposes the extent of the direct loss of wetland acres and wetland functional values must be determined. The wetlands must be mapped and functional assessments conducted prior to disturbance.

No ongoing monitoring would take place in this zone, however there may be inadvertent wetland formation during mine construction and operation, especially in areas of “red clay” soils north of the pit, and changes between the plan and actual operations may result in some wetlands that were permitted to be lost persisting on the landscape. Periodic (every 5 years) scouting for new wetlands over the life of the mine may need to be conducted and wetland boundaries delineated in this zone.

Zone 2 – Indirect and Secondary Potential Impact Zone is a buffer area around limits of construction/operation where direct + indirect and secondary impacts are expected from construction and operation, including access roads and routes in areas outside, but adjacent to operations. This area can be defined when more information on site design and construction plans are known. The purpose of monitoring in this zone is primarily to assess the actual extent of construction and operation impacts in adjacent wetlands, and also to assess the extent of groundwater withdrawal. Possible impacts can be evaluated through inspections conducted at periodic intervals and after significant runoff events or other significant (blasting, major excavation, etc.). Zone 2 wetlands would be searched for signs of sediment input, rutting, erosion and vegetation destruction, invasive plant growth or similar impacts.

Monitoring stations consisting of monitoring wells, nests of piezometers and/or surface water sampling points could be installed in this zone to provide a spatially representative network to characterize baseline pre-construction surface and subsurface flow conditions. The purpose of the monitoring network is to detect changes in wetlands compared to baseline conditions and as compared to reference conditions measured in zone 4. Monitoring wells installed in wetlands for the purpose of developing the groundwater model could be adapted for use in this zone and zone 3 if they are appropriately located. Sampling density should be sufficient to characterize the range of wetland plant communities and Floristic quality surveys should be conducted annually during the appropriate sampling period.

Zone 3 – Groundwater Withdrawal Potential Impact Zone – This zone would be defined as the area beyond zone 2 in which impacts to wetlands may be expected from loss/reduction of groundwater support to wetland hydrology. This zone would be mapped based on the results of the groundwater model, including a defined margin of error based on model uncertainty. The sampling network should be designed to allow comparison with wetlands of similar hydrogeomorphic and plant community type, while also being linked to the stream and lake sampling networks. Sampling methods and parameters should be consistent with zones 2 and 4 and Floristic Quality Assessment should be used to measure changes in plant community over time and in comparison to reference conditions as measured in zone 4.

Zone 4 - Reference Zone – This zone would be well outside the area where groundwater hydrology is predicted to be unaffected by the groundwater model. It would be efficient to develop a water sampling network closely related to the streams sampling network, using wetlands within the chosen reference watershed. The network should allow analysis of the sampled wetland's hydrologic relationship to stream hydrology. As in zones 2 and 3 monitoring stations consisting of monitoring wells and/or piezometer nests and/or surface water sampling points within major wetland complexes and community types should be established. Sampling frequency should be consistent with the stream sampling. Sampling methods and parameters should be consistent with zones 2 and 3 and Floristic Quality Assessment should be used to measure changes in plant community over time and in comparison to conditions measured in zones 2 and 3.

Additional Considerations

Additional monitoring for specific parameters may be necessary depending on the geological and waste characterization studies and to determine baseline and future conditions related to the Bad River Tribe's water quality standards. These will be determined as more information becomes available.

A long term monitoring program will be needed. Gaging stations on streams immediately adjacent to the mining site should be established and could include: Devils Creek, Ballou Creek, Bull Gus Creek, Javorsky Creek, Tyler Forks River up and downstream of mine site, and other unnamed streams. Stations should be systematically located to identify the cause of changes and subsequent intervention as appropriate. A long term event monitoring program should be established and associated with these gaging stations.