

7.0 ADDITIONAL IMPACTS ANALYSIS

An additional impact analysis is required for major new sources pursuant to 40 CFR Part 52.21(o) and Michigan Rule 1815 (R 336.2815). Therefore, an analysis is necessary to evaluate the impacts from the proposed project for:

- Soils, vegetation, and visibility
- Associated growth and secondary emissions

The permit applicant is currently working with the Michigan Department of Natural Resources-Wildlife Division and the U.S. Fish and Wildlife Service to secure their written concurrence that this project will not have a detrimental impact on any known threatened and endangered species. As soon as written approval has been received from these government entities, it will be forwarded to the MDEQ–AQD for informational purposes.

7.1 ANALYSIS ON SOILS AND VEGETATION

Potential impacts to soils and vegetation with commercial or recreational value in the vicinity of the proposed facility were evaluated through review of existing published information including review of Michigan Resource Information System (MIRIS) data, and review of the United States Department of Agriculture Soil Survey for Presque Isle County, Michigan. The dispersion modeling demonstrated that the farthest distance for any significant ambient impact of any air pollutant from the proposed facility was approximately 8 km. A buffer area of an additional 22 km was included to create a 30-km diameter study area that was examined for cover type and land use.

Within this 30-km study area, the primary land cover types included approximately 50% broadleaf forests comprised of common species such as aspen, ash, birch, and maple. The second highest cover type, approximately 30%, included agricultural use: cropland and permanent pasture. Typical farm crops include potatoes, corn, beans, and hay. Less common cover types included lowland conifer swamps, streams, and open water areas. The balance of cover types included minor components of residential/commercial, extractive, herbaceous, and shrub rangeland.

A mix of public and private lands was found in the 30-km study area. Notable existing natural areas included portions of the Mackinaw State Forest, located in a patchwork across the study area, and P.H. Hoefft State Park, located 10 km northwest of Rogers City.

To evaluate the impacts on soils and vegetation, Wolverine compared the predicted air quality impacts from the project against screening concentrations developed by the EPA. These concentrations are listed

in Table 3-1 of *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils and Animals* (EPA 1981). Table 7-1 presents a comparison of the maximum predicted impacts of the WCEV project to the screening concentrations. As shown in the table, the maximum predicted impacts from the WCEV project are well below the screening concentrations.

Table 7-1 – Maximum Predicted Impacts on Vegetation

Pollutant	Averaging Period	Sensitive Screening Concentration ($\mu\text{g}/\text{m}^3$)	Maximum Predicted Project Impact ($\mu\text{g}/\text{m}^3$)
NO _x	Annual	94	1.3
SO ₂	Annual	18	1.3
	3-hour	786	86.8
	1-hour ¹	917	33.0

¹ The 1-hour SO₂ concentration was determined by converting the 3-hour concentration using the factors on page 4-16 of *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources* (EPA-454/R92019, Revised October 1992)

In addition to the above analysis, the maximum predicted impacts from the proposed WCEV project are well below all of the secondary NAAQS. Secondary NAAQS are set to be protective of soils and vegetation. Therefore, it is not anticipated that the proposed WCEV project will have any adverse impacts on soils or vegetation.

7.2 VISIBILITY

A detailed visibility analysis is included in Section 6 of this application.

7.3 ASSOCIATED GROWTH AND SECONDARY EMISSIONS

During construction of this facility, approximately 800 to 1,000 workers will be onsite at various stages of the project. The total number of construction workers onsite at any time is dependent upon each specific construction phase. These temporary construction workers will generate significant revenue for the community of Rogers City and nearby supporting facilities such as lodging, grocery, and general merchandise sales; restaurants; and other local businesses for approximately four consecutive years. Once the facility is completed, Wolverine will employ approximately 100 permanent staff.

Secondary emissions associated with the construction of the facility will be minimized with the use of fugitive dust suppressants and good housekeeping practices as identified in an FDCP to be developed and submitted to district MDEQ staff prior to commencement of onsite construction activities. The plan will

be re-visited, as necessary, and modifications will be made upon agreement by WCEV and district MDEQ staff.

No new localized industrial/institutional growth is anticipated in the immediate area directly as a result of this project, aside from temporary support businesses during the construction of this facility. There will be no significant degradation to the existing air quality in the Rogers City area as a result of secondary emissions.

7.4 MERCURY RISK ANALYSIS

7.4.1 RISK ESTIMATION PROTOCOL

A Rule 228 analysis for mercury emissions was conducted for this project. A copy of the entire *Rule 228 Analysis for Mercury Emissions in Support of an Air Use Permit for a Proposed New Circulating Fluidized Bed Power Plant – Wolverine Clean Energy Venture* (FTC&H, September 2007) is presented in Appendix 30.

7.4.2 INCREMENTAL RISK FROM PROJECT

The MMREM was used as a screening tool to evaluate whether a lower emission rate than a rate compliant with T-BACT and health-based screening levels needed to be considered pursuant to Rule 228. The mercury emission factor used was based on the limit in Draft Rule 336.2503.

The MMREM was conducted under the assumption that all the potentially emitted mercury was present as divalent mercury with a deposition velocity of 1.10 cm/sec. Hg⁰ has an indicated deposition velocity of 0.005 cm/sec, and particulate mercury has an indicated velocity of 0.01 cm/sec. By assuming all of the potentially emitted mercury is divalent mercury, with a settling rate more than an order of magnitude greater than the other forms, the estimated deposition is considered a maximum estimate and will be more conservative than actual emissions.

The MMREM addresses mercury discharges in the form of methyl mercury as it accumulates in the biota. Driscoll et al., 2007⁷, in the journal *BioScience*, summarized the mercury deposition issues very succinctly as, "Human and wildlife exposure to mercury occurs largely through the consumption of contaminated fish." This is the reason for using mercury concentration data in fish generally as the basis for both human

⁷ Driscoll, Charles T., Young-Ji Han, Celia Y. Chen, David C. Evers, Kathleen Fallon Lambert, Thomas M. Holsen, Neil C. Kamman, and Ronald K. Munson. "Mercury Contamination in Forest and Freshwater Ecosystems in the Northeastern United States." *BioScience*, January 2007 Volume 57 No. 1, page 17.

health advisories and evaluating the wildlife or ecological impact of mercury released into the environment. While no wildlife criteria for methyl mercury have been developed in Michigan, the MDEQ has been using the same 0.35 mg/kg that they use to model human health risk. The MMREM indicated the methyl mercury fish fillet concentration after the project is in operation will not cause mercury to exceed the risk-based standards in use by the MDEQ.

The MMREM results conservatively indicate that the mercury concentrations in fish fillets from mature fish could increase from 0.83% to 1.25% in the target lakes. The possible increase in fish fillet mercury concentrations due to plant operations will not increase the mercury levels to or above current state health-based criteria or the HQ derived using EPA risk assessment methodology and the reference dose (RFD) for methyl mercury of 1E-04 microgram per kilogram per day.

The MMREM results indicate that further permit requirements for a lower emission rate than that which is compliant with T-BACT and health-based screening levels, as identified in Rule 228, are not necessary.

7.5 LEAD RISK ANALYSIS

7.5.1 RISK ESTIMATION PROTOCOL

Lead emissions from the proposed WCEV facility were discussed with the MDEQ during a pre-permitting conference call. The agency stated that the permitting process included the evaluation of lead based on emission data and that they would compare the emission data to a threshold level, below which they would not be concerned. The MDEQ did not specify the threshold level they would use; however, they indicated that if the WCEV application included modeled lead information, they would use the data themselves with the EPA's Integrated Exposure Uptake Biokinetic Model (IEUBK) if they thought that lead needed further evaluation. The AERMOD lead modeling results are presented in Appendix 31. The model was run to define the location of maximum impact and also a maximum annual concentration in $\mu\text{g}/\text{m}^3$ for Rogers City.

7.5.2 INCREMENTAL RISK FROM PROJECT

The EPA's *Utility Hazardous Air Pollutant Report* submitted to Congress on February 24, 1998, was prepared to summarize the hazards to public health reasonably anticipated to occur as a result of emissions by electric utility generating units as a result of emissions of HAPs after imposition of the requirements of the Clean Air Act. The study collected data from 52 utility units and reference test data regarding HAP emissions from 684 utility plants in the United States. The study included conducting inhalation and multi-pathway exposure risk assessments. Paragraph ES.12.1 of the Executive Summary stated that the highest modeled air concentration of lead was 200 times below the national ambient air

quality standard. Because the emission quantities and inhalation risks are relatively low, the EPA did not plan to conduct future evaluations of multi-pathway exposures to lead. These overall study results also prioritized contaminant significance in utility emissions, and lead was low.

Lead is emitted as solid particulate from coal-fired boilers, which is effectively captured by technology used to meet PM emission requirements. Therefore, lead emission control is already considered as part of the PM and PM₁₀ emission limit. Control technology for lead emissions from the proposed CFB boilers will be the control of PM emissions using fabric filtration (baghouse). The WCEV proposes a lead emission limit of 0.000013 lb/MMBtu, with compliance demonstrated by meeting the proposed PM₁₀ limits as a surrogate.