United States Department of the Interior

National Park Service

Midwest Region
601 Riverfront Drive
Omaha Nebraska 68102-4226

12 NOV 2008

D18(MWRO-PCL/PC)

RECEIVED
NOV 14 2008
AIR QUALITY
PROGRAM

Mr. Kyrik Rombough
Natural Resources Engineering Director
Department of Environment and Natural Resources
Division of Environmental Services
523 East Capitol Street
Pierre, South Dakota 57501

Dear Mr. Rombough:

The National Park Service (NPS) has reviewed the draft Prevention of Significant Deterioration pre-construction permit prepared by the South Dakota Department of Environment and Natural Resources (DENR) for the proposed Hyperion Energy Center (HEC), by Hyperion Refining, LLC (Hyperion), in Union County, South Dakota. We offer the following comments for your consideration.

The proposed HEC consists of a combined oil refinery and 532 megawatt Integrated Gasification Combined Cycle (IGCC) facility. The IGCC power plant will produce hydrogen and power for the refinery. The proposed facility is within 300 kilometers (km) of 5 sensitive Class II areas administered by the NPS. These include the Missouri National Recreational River (River) (13 km), the Lewis and Clark National Historic Trail (Trail) (13 km), Niobrara National Scenic River (108 km), Pipestone National Monument (129 km), and Homestead National Monument of America (274 km).

While we appreciate the efforts to control the emission rates from the HEC, we are concerned that the emissions may impact the River and the Trail. This concern is based on our review of the Class II area "Additional Impacts Analyses" modeling results that Hyperion included in the permit application.

The modeling files and Modeling Addendum Report provided on DENR's website contained insufficient information on the assumptions used and methodologies followed. We had some difficulty locating the modeling information on DENR's website (it is somewhat buried in the list of links) and suggest placing the summary write-up of the modeling results and the methodologies used in a more obvious and easy to find location. Additionally, it appears that the modeling files available for download (as zip) have been replaced by more recent modeling runs reported in the modeling addendum. If this is the case, the fact that the models have been

updated should be made clear on the website and visitors informed where to find the most recent modeling information.

The applicant has completed a VISCREEN analysis for all the Class II parks identified above, and a refined PLUVUE II analysis for the River. The River is identified as the closest NPS administered area in the application. However, the location of the Trail is incorrectly identified as being 106 km from the proposed HEC. The Trail follows the historic route of the 1804-1806 Corps of Discovery Expedition from Wood River, Illinois, to the mouth of the Columbia River in Oregon. The Trail runs closest to the HEC along the Missouri River border between Nebraska and South Dakota. This segment of the Trail is more or less congruent with the River and so the level-1 VISCREEN analysis run for the River should be considered applicable to the Trail. While the Statement of Basis reports these modeling results and concludes that there will be no visibility impacts from a "perceptible plume" in the Class II parks, we have several concerns with the conclusions reported in the Statement of Basis and the methodologies utilized in the modeling analyses, as outlined below.

First, the VISCREEN model, which was used to assess visibility impacts in all these areas, is not recommended[1] for analyses beyond 50 km. In order to adequately assess visibility impacts in parks greater than 50 km, the current Environmental Protection Agency (EPA) recommended long range transport model is CALPUFF. Since a CALPUFF modeling analysis was not conducted, the visibility impacts to the more distant areas are unknown. It is misleading to report in the Statement of Basis that there are no visibility impacts in these areas when relying on results from a model that is not the appropriate or recommended analysis tool for assessments beyond 50 km.

Second, while we agree that the near-field plume models are acceptable to analyze the effects on River and Trail sites within 50 km, after reviewing the PLUVUE modeling files, we have found that the Statement of Basis does not report the full range of impacts predicted by the model. The addendum modeling report and the Statement of Basis conclude that the PLUVUE modeling results are below threshold values and, therefore, the plume is not "perceptible." This conclusion is inaccurate, as the applicant only reported results for site paths at ground level (i.e., assuming the observer is looking at a site path along the ground and not looking up at the sky). If the applicant had reported the values for the site paths through the plume center (i.e., assuming the observer is looking into the sky), it would have shown an exceedance of the threshold values and what would, therefore, be considered a perceptible plume. For instance, the PLUVUE output files in the applicant's modeling addendum for sight paths through the plume center show plume perceptibility (delta E) values as high as 4.758, well in excess of the Federal Land Manager (FLM) threshold of 1.0. Additionally, this comparison was made using something other than natural background conditions, which are recommended by FLMs for visibility analyses (outlined in detail below). If natural background conditions were used, it is expected that the predicted near-field impacts would be much greater.

---

[1] Appendix B of Appendix W; EPA Guideline on Air Quality Models.

Further, we found that the applicant employed several modeling methodologies that do not follow EPA or FLM recommendations for PLUVUE analyses. As already stated, more detail on the methodology for visual impacts analyses in these areas is necessary. However, based on the information that is available, we have the following comments and concerns regarding the visibility modeling:

- It appears that the modeling analyses did not apply all EPA recommendations for application of PLUVUE. In Appendix W (the Guideline on Air Quality Models), the EPA provides the following recommendations for regulatory use of PLUVUE: 1) treat the optical effects of nitrous oxide (NO) and particles separately as well as together to avoid cancellation of NO absorption with particle scattering; 2) examine the visual impact of the plume in 0.1 (or 0), 0.5, and 1.0 times the expected level of particulate matter in the background air; and 3) examine the visual impact of the plume over the full range of observer-plume sun angles. It appears that the PLUVUE modeling did not utilize these EPA guidelines. If the DENR chooses to require the applicant to rerun the PLUVUE model, we recommend that the applicant follow this guidance before the modeling results are relied upon to make conclusions regarding impacts in sensitive Class II areas.

- The applicant did not use natural background conditions in the assessment. Instead, it appears they used background visual ranges around 64 km; the source of the background visual range is unclear in the modeling addendum report. The FLMs' Air Quality Related Values Work Group (FLAG) report requests that applicants use natural background estimates for visibility impairment assessments. The FLAG report states:

  > Until better modeling tools are available, FLAG recommends using the present EPA techniques for plume visual impact screening analyses (USEPA 1992a). However, unlike those procedures, which suggest the use of current average annual visibility conditions, FLAG recommends that for Class I areas the visual range corresponding to natural conditions be used to generate the hourly estimates of ΔE and plume contrast. FLAG recommends this change in order for the analysis technique to be consistent with the national visibility goal. For plume analyses, FLAG recommends using the monthly average natural visual range conditions provided for each area in Table V.1-6.

  Table V.1.6 lists natural background estimates for these nearest Class I area(s): Badlands National Park at approximately 233 km and Hercules Glades at approximately 178-180 km. Our expectation is that that natural background at Hyperion's project site would be closer to these values.

- The project emissions summary states that the facility will emit 80 tons per year of sulfuric acid mist. However, the applicant did not model primary sulfate emissions in

either VISCREEN or PLUVUE. Generally, sulfuric acid is considered as a surrogate for primary sulfate emissions, and should be included in the visibility analysis.

- It is unclear what observation points were selected for analysis in the visibility modeling, or whether these are the observation points of concern to the NPS for evaluating perceptible plume impacts. Generally, the NPS requests coordination with the applicant to ensure that the observation points modeled are those of concern to the particular NPS administered areas. However, our review of the PLUVUE modeling indicates that the applicant modeled an early morning condition with an observer generally looking toward the east. The model generally produces a worst-case result when the observer is looking into the sun.

Given the NPS's concerns with the Class II analyses, we request that the DENR revise their current Statement of Basis to reflect the correct PLUVUE results using a site path through the plume center against the sky, which will show that the visibility threshold values have been exceeded and that a visible plume at the River and the Trail may occur under some conditions. Additionally, we request that the applicant rerun the PLUVUE model to address our concerns since these modeling results are relied upon to make conclusions regarding impacts in sensitive Class II areas yet did not follow the EPA or FLM guidance for PLUVUE analyses. Further, the methods used to run PLUVUE did not produce results that allow the NPS to assess the frequency or duration of perceptible plume impacts at the River and the Trail. While we are very concerned about the magnitude of the impacts to visibility in these sensitive Class II areas and would be interested in working on potential mitigation proposals with the applicant, we would first need a better understanding of when and how frequently these impacts are expected to occur. This additional information would allow us to assess whether the predicted impacts would be considered adverse.

Any new Class II visibility results should be included in a revised Statement of Basis that is made available for public comment. The "additional impacts" predicted in the River and the Trail should be disclosed in the Statement of Basis and the public given an opportunity to review and comment on the draft permit in light of this significant new information.

If the applicant agrees to rerun the visibility model, we request that they complete the analysis in consultation with the NPS staff in order to coordinate on accepted methodologies. For instance, the NPS recognizes that many conservative assumptions were utilized in the PLUVUE analysis, such as using worst-case meteorological conditions and the assumption that all the emissions for the entire facility are coming out of a single 160-foot stack. The applicant may want to address some of these assumptions in a subsequent round of modeling. We would recommend several methodologies that have been utilized in the past, which the applicant may want to employ. In the first circumstance, the applicant may want to run several scenarios in PLUVUE using a range of meteorological conditions. By evaluating these results in conjunction with the frequency under which each condition is expected to occur, one can assess the frequency of the projected plume impacts and, thus, the acceptability or unacceptability of those impacts. Additionally, there are ways to address the conservative assumption that all emissions are coming from a

single stack. If the applicant wishes to address these or other modeling assumptions, the NPS Air Resources Division staff offer to assist in completing an analysis using modeling assumptions that are acceptable to the FLMs. We recommend that the applicant provide a detailed modeling protocol for NPS review prior to conducting any additional modeling and that any additional analyses follow procedures documented in the FLAG guidance or developed in coordination with the NPS staff.

The NPS also reviewed the modeling results for the National Ambient Air Quality Standard (NAAQS) and increment analyses provided in the Statement of Basis. We would like to point out that the modeled concentrations for the short-term averaging periods for particulate matter of 10 micrometers or less (PM_{10}) are very close to both the NAAQS and increment ceilings for this pollutant. While the DENR has concluded that neither the increment nor the NAAQS will be exceeded by the HEC, it appears that there would be very little room left for additional development in the area if this project is constructed. Additionally, there was very little information provided in the Statement of Basis on how these analyses were completed. For instance, the document does not specify what emission rates were modeled and whether they were the appropriate rates for the averaging period of concern. To demonstrate compliance with both the short-term NAAQS and increments, the modeling analyses should use the maximum short-term emission rates consistent with the averaging period of concern. The determination of the impact area itself, and thus the realm of sources included in the various analyses, should also be consistent with the averaging period of concern. After reviewing the modeling addendum, it appears the applicant may have only relied on the impact area determined using the annual Significant Impact Level of 1 microgram per cubic meter of air. Further, the document does not discuss how the emission inventories within the impact area were developed. In particular, we request the DENR provide information on determinations regarding what sources should be included in the increment analysis. Finally, if the River and the Trail fall within the impact area for the NAAQS and increment analyses, it would be informative for the NPS if the DENR reported the maximum modeled concentrations at receptors within the River and the Trail. This is consistent with EPA guidance for evaluating ambient air quality under the additional impacts analyses section found in the New Source Review Workshop Manual.

We are aware that Hyperion has requested a contested case hearing on the draft air permit stating that doing so is in the public interest and would advance the purposes of the administrative proceedings for this matter. We are also aware that the Board of Minerals and Environment will hear oral public comments at a "public comment meeting" on the permit application before the contested case hearing. We would like to point out that these opportunities for public comment will not satisfy the requirement for public participation under the National Environmental Policy Act (NEPA) should future federal involvement in this project necessitate compliance with the NEPA.

In conclusion, the NPS has questions and concerns regarding the modeling analyses conducted for the proposed Hyperion air permit and the potential effects this facility may have on visibility in the River and the Trail. The NPS recommends the DENR provide more information in their Statement of Basis on how the various analyses were completed, disclose potential impacts to the

River and the Trail in the Statement of Basis, and give the public an opportunity to review and comment on the draft permit in light of this significant new information. We also recommend that the applicant rerun PLUVUE to determine the range of conditions under which the visibility impacts could be anticipated to occur, and thus the predicted frequency of when a plume would be perceptible. The NPS requests the opportunity to provide input on the methods used in that modeling analysis and offers to work with the applicant on appropriate methods to address conservative assumptions in the model. However, we would like to point out that since the proposed HEC would be located only 13 km from these sensitive Class II areas, it seems likely that modeled plume impacts will exceed the FLM threshold criteria even if conservative assumptions are addressed. The NPS staff from the affected parks is willing to explore options to mitigate or otherwise address the potential impacts to these Class II areas. We would like the opportunity to discuss any mitigation options with the DENR and the applicant.

Please direct any general questions regarding our comments to Michael Madell, Superintendent, Missouri National Recreational River, at 605-214-3389 or at Michael_Madell@nps.gov. For technical questions, please contact Andrea Stacy, Environmental Protection Specialist, Air Resources Division, at 303-969-2816 or at Andrea_Stacy@nps.gov.

Thank you for the opportunity to provide these comments. We look forward to working cooperatively with the DENR and Hyperion to ensure the protection of the River and the Trail for the enjoyment of future generations.

Sincerely,

Ernest Quintana

Ernest Quintana
Regional Director