

**Project:** HiTest Smelter PSD Dispersion Modeling Protocol  
**Attention:** Ranil Dhammapala, WA Dept. Ecology  
**Reviewer:** Jay McAlpine, Regional Modeler, EPA Region 10  
**Date:** 20 Nov 2017  
**Version:** Draft

**Summary and Actions Recommended:**

The Washington State Department of Ecology (“Ecology”) asked EPA Region 10 (“Region 10”) to review and comment on the HiTest Sand LLC, Newport, WA (“HiTest”) PSD modeling protocol (“the protocol”) and provide technical assistance as needed with the review of the associated air quality analyses. This document provides a list of our comments and recommendations. This review was conducted in accordance with the 2017 Guideline on Air Quality Models, 40 CFR Part 51, Appendix W (“Appendix W”).

#	Section	Topic	Comment
1	1.1.1	Criteria Pollutant Emissions	<p>The annual TPY of emissions are lower than initially estimated based on review of similar facilities. Using ratios based on throughput and emissions reported in the Mississippi Silicon, LLC 2014 air permit application, Region 10 was expecting higher annual emissions based on an initial HiTest estimate of 55,000 tpy Silicon production.</p> <p>It is understood Ecology engineers will conduct a thorough evaluation of emissions. Based on the discussion at the protocol meeting with the applicant, it is inferred some modern engineering developments may result in lower emission rates than estimated for older silicon smelter facilities.</p>
2	2.2.2	Meteorology	<p>The ID41 tower is not an official NWS ASOS station nor PSD-quality onsite tower. It was originally assumed the tower could possibly qualify as an ASOS-equivalent tower and therefore appropriate for PSD, as allowed under Appendix W. It is understood Ecology conducted a review of this station, with the help of the State of Idaho. The review concluded the tower is neither an ASOS-equivalent quality station nor is maintained under a consistent quality assurance program. Based on Ecology’s findings, we agree with Ecology’s decision that the ID41 meteorological dataset is not appropriate for major New Source Review air permitting.</p>
3	2.2.2	Meteorology alternatives	<p>The protocol does not offer an alternative meteorological dataset or methodology for Class II modeling. Region 10 has confirmed there is no appropriate representative NWS or ASOS-equivalent meteorological monitoring station in the vicinity of the proposed source site. The nearest ASOS station, KDEW, is over 35 km southwest of the site. Due to the complex terrain and known heterogeneous wind climatology in the region, we recommend KDEW not be used for this project. We recommend the following alternatives be considered:</p> <ol style="list-style-type: none"> <li>I. Use of the University of Washington 3-year 4km WRF or 1.3km dataset to provide AERMOD meteorological inputs via MMIF, in accordance with the methodologies specified in Appendix W. We recommend use of AERMET-derived mixing heights instead of WRF-derived mixing heights. It must be shown, through a thorough modeling performance analysis, the WRF dataset is appropriate for use in NSR in the region of the proposed source. Section 3.2.6 does not offer a sufficiently detailed explanation of how the model performance analysis will be conducted. It would be best if model performance analysis was included in the modeling protocol.</li> </ol>

			<p>II. If option I is not feasible or the model performance analysis reveals poor WRF performance, we recommend the applicant produce a 3-year WRF dataset up to 1 km resolution, using archived meteorological reanalysis data to drive WRF. The applicant should append the protocol to outline all WRF settings and methods used in this case. The NSR application should include a thorough model performance of the WRF modeling. We recommend use of AERMET-calculated mixing heights instead of WRF-calculated mixing heights.</p> <p>III. If options I or II are not feasible or the model performance analyses show poor WRF performance, we recommend a 1-year PSD-quality site-specific meteorological dataset be collected at or near to the site of the proposed source. Ecology must approve a Quality Assurance Performance Plan that conforms with current PSD-monitoring guidance.</p>
4	2.2.6	Tier 2 NO <sub>2</sub> models	Note ARM2 is now the regulatory Tier 2 model for NO <sub>2</sub> modeling. The ARM method is now considered a non-regulatory modeling method. However, the 1-year transition period allows for flexibility in the application of these models if Ecology has technical reasons to believe ARM is the more appropriate model in this case. Region 10 would highly recommend ARM2 be used for Tier 2 modeling. If Tier 3 modeling is requested, please consult with EPA Region 10, as required under Appendix W for application of Tier 3 NO <sub>2</sub> models.
5	2.3	SILs	<p>Region 10 would recommend the State allow the use of the interim SILs, as proposed, if the State concludes the SILs are appropriate given the nature of the proposed source and climatology of the region. The EPA will be releasing final ozone and PM<sub>2.5</sub> SILs guidance by early 2018 (draft guidance is currently available). This guidance will contain documentation providing strong regulatory and legal justification for use of SILs.</p> <p>Region 10 would recommend the applicant include a review of all background design concentrations to assure sufficient “head room” for use of the SILs to comply with current guidance (EPA-454/B-14-001).</p>
6	2.3	Use of MERPs for secondary PM <sub>2.5</sub> and ozone	<p>Use of the draft MERP guidance is proposed for Class II receptors only. The MERPs guidance provides example calculations of emission thresholds based on Class II SILs. The applicant is assuming MERPs guidance is not applicable to Class I areas.</p> <p>The modeling results used in the draft MERPs guidance is not specific to Class II or Class I areas. However, the example calculations used to define MERP thresholds are based on Class II SILs. The modeling results reported in the guidance could be used to determine MERPs thresholds for Class I areas or be used to estimate conservative air quality impacts for NAAQS evaluations. However, Region 10 would recommend the MERPs guidance only be used for cumulative analysis purposes in the case where the background design concentrations are significantly below the NAAQS and where the facility emissions do not significantly exceed the emission rates used in the MERPs guidance (for example, a 3000 TPY source would significant exceed the 1000 TPY hypothetical sources used in the MERPs guidance).</p>
7	2.3, last paragraph	Reference to Mar. 4 2013 PM <sub>2.5</sub>	Just to note: the March 4, 2013 draft guidance referred to here was finalized on May 20, 2014 (document EPA-454/B-14-001). The draft MERPs guidance does not supersede the EPA-454/B-14-001, but offers methods to comply with Appendix W

		modeling guidance	parts 5.3.2 and 5.4.2. The recommendations in the May 20 <sup>th</sup> 2014 guidance do not necessarily conflict with the requirements of part 5.4.2. The MERPs approach offers a preferred method to conduct the preliminary Source Impact Analysis outlined in the May 20 <sup>th</sup> 2014 guidance.
8	2.6	Class II increment	Region 10 recommendation: The modeling protocol should be amended to identify major and minor source baseline dates and identify for which pollutants increment consumption analysis will be needed.
9	2.7	Nearby source emissions	If emissions from nearby sources are needed for the NAAQS analysis (if a source can cause a significant concentration gradient in the vicinity of receptors where the SIL is exceeded), then Region 10 recommends the nearby source emissions comply with Appendix W Table 8-2 guidance. Note: guidance recommends emission factors be based on actual operating conditions, not “actual emissions” as defined in 40 CFR 52.21(b)(21)(i).
10	2.7	Background values – hour-of-day	If hour-of-day backgrounds are proposed for use, the applicant should work closely with Ecology to confirm the situation justifies use of this approach.
11	2.9	MERPs for ozone	Some discussion should be added to note Source 18 from the MERPS guidance (EPA-454/R-16-006) is also representative of the area in question given its proximity and similar climate and background chemical and emissions loading. The applicant plans to conduct a Tier 2 analysis using Ecology-provided modeling files. Region 10 recommends the methodology for the Tier 2 ozone analysis be outlined in the modeling protocol.
12	3.1	Kalispel and Spokane tribes have not requested AQRV protections. However, visibility analysis is warranted under the additional impact requirements.	<p>Although the Kalispel and Spokane Tribes do not have any specific AQRV protection requirements, the Kalispel Tribe has requested Ecology require an evaluation of local visibility impacts in the Class II areas and Kalispel Tribal land areas in the region of the proposed facility (request was given verbally and discussed during the modeling protocol meeting). This evaluation would fulfill the requirements under 52.21(o), “additional impact analyses.” This requires the applicant to assess visibility impacts that may result due to project emissions in the vicinity of the source. However, the requirement does not state how an analysis should be performed or what level of degradation qualifies as a significant impairment.</p> <p>For near-field visibility impairment analysis, we recommend the applicant prepare a multi-faceted qualitative analysis based on the results from a visibility screening model such as PLUVUE II, the primary PM impacts from the AERMOD modeling, and possibly visibility impacts as determined from the CALPUFF AQRV analysis (receptors can be placed in the Kalispel Reservation boundaries and necessary inputs adopted from the nearest or most representative nearby Class I areas). The qualitative analysis should predict how impacts from the proposed source might affect visibility in the region, guided by the results of the modeling. The modeling protocol should be expanded to outline the method, as required by Ecology.</p>
13	3.1	PM <sub>2.5</sub> Class I increment analysis	The applicant insists the draft MERPs guidance is not applicable to Class I areas. Although we disagree with this assumption (the modeling results used in the draft guidance could be applied to Class I areas also), we do agree the impact determined using MERPs guidance could be excessively conservative for evaluation of secondary pollutant impacts far downwind of the facility. As shown in the draft MERPs guidance, the maximum ozone impacts rarely occur more than 30 km from

			<p>the source. Maximum PM<sub>2.5</sub> impacts from SO<sub>2</sub> and NO<sub>x</sub> emissions rarely occur more than 50 km and 100 km from the source, respectively. However, the Kalispel Reservation is located 22 km from the proposed source. The median maximum secondary impact is generally in the range of 20-30 km, according to the evaluation contained in the draft MERPS guidance. Therefore, we would recommend the secondary PM<sub>2.5</sub> impacts determined using the draft MERPs guidance be considered for use in a SIL or cumulative analysis of Class I increment consumption of the near-field (&lt; 50 km) Class I areas.</p>
14	3.1	Class I >50km screening technique for increment analysis	<p>A 3-tier system for Class I increment analysis is proposed:</p> <ul style="list-style-type: none"> <li>a) AERMOD 50km arc</li> <li>b) CALPUFF screening</li> <li>c) Design value lookup tool approach</li> </ul> <p>The first two tiers follow current guidance in Appendix W. The proposed methodology for Tier A is sound and in line with previous EPA recommendations. For Tier B, the applicant could use the older EPA-approved version or more modern versions of CALPUFF, but chemistry must be turned off. The Tier C approach is unorthodox: if a Tier C approach is necessary, we advise requesting guidance from EPA's Model Clearinghouse.</p>
15	3.2	AQRV analysis	<p>Region 10 did not evaluate the AQRV methodology because the responsibility is under the purview of the Federal Land Managers.</p>