From: John Kessler
To: Docket Optical System
Date: 1/18/2008 2:56 PM
Subject: Fwd: VV2 Project - Vegetation Impacts of Nitrogen Deposition and Cooling Tower Drift
Attachments: Vegetation Impacts of Nitrogen Deposition.doc; Vegetation Impacts of Mist f rom Project Cooling Tower.doc

Dear Dockets Staff:

Please docket this email and the attachments to Victorville 2 (07-AFC-1).

Thank you,

John

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>>> "Bachrach, Arrie" <ABachrach@ensr.aecom.com> 1/16/2008 6:42 PM >>>
Misa -

As we discussed, here are the writeups for Victorville 2 on vegetation impacts of nitrogen deposition and vegetation impacts of cooling tower drift. I trust they provide the information you need to address these issues for the FSA. Let me know if you have any questions.

We will send these writeups to the rest of the attendees at the meeting together with the revised BiOp, but wanted to get this to you earlier because of your need to complete the FSA.

Thanks.

Arrie

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Vegetation Impacts of Nitrogen Deposition from Victorville 2 Project Emissions

Project emissions are expected to contain minute amounts of nitrogen. A small degree of nitrogen deposition on proximal soils is expected to occur over time as a result of Project operations. While nitrogen deposition may benefit non-native annual grasses occurring in the immediate vicinity of the Project to a trace degree, this deposition is not expected to substantially benefit non-native growth to the detriment of native plant species occurring in the area.

Project emissions will contain nitrogen, mostly in the form of nitric oxide (NO). The NO will react in the air to form other compounds such as nitrogen dioxide (NO_2), and nitrate (NO_3) compounds. Similar to the cooling tower drift discussion above, the Project was assessed for its potential nitrogen deposition impacts in the area. Project nitrogen oxides (NO_X) emissions were modeled with CALPUFF to estimate the potential nitrogen deposition in the vicinity of the Project. The CALPUFF model, which was used for the Project to assess potential Class I area impacts, incorporates the required atmospheric chemistry and chemical transformations necessary to compute nitrogen deposition. The total modeled nitrogen deposition rates are based on the sum of wet and dry fluxes of NO_3^- (as NH_4NO_3) and HNO_3 in addition to dry deposition of NO_X (assumed to be NO_2).

The CALPUFF model provides results in units of kilograms per hectare per year (kg/ha/yr). Nitrogen deposition rates were modeled at receptor grids which included the Project fenceline and three nearby habitat areas of concern: Riparian vegetative communities along the Mojave River, Southwestern Willow Flycatcher critical habitat, and Desert Tortoise critical habitat. The maximum annual deposition rate of 0.083 kg/ha/yr was modeled to occur along the fenceline to the northeast of the facility, consistent with the predominant winds which blow most frequently from the south and south-southwest. The maximum concentrations at the three habitat areas were 0.033, 0.002, and 0.003 kg/ha/yr, respectively.

In general, nitrogen deposition acts as a plant nutrient, which can be beneficial but can also be detrimental if it selectively favors non-native plants. In order to put some perspective on the results, the modeled nitrogen deposition can be compared to the annual amount of nitrogen applied to a lawn in a fertilization application. As recommended by lawn fertilizer manufacturers, the amount applied to a lawn ranges from 10-60 pounds (lbs) of nitrogen per 10,000 square feet (ft^2). The estimated nitrogen amount corresponding to the annual modeled deposition rates for each area are as follows:

- Fenceline Maximum = 0.017 lbs / 10,000 ft^2
- Riparian habitat along the Mojave River = 0.007 lbs / 10,000 ft^2
- Southwestern Willow Flycatcher critical habitat = 0.0004 lbs / 10,000 ft^2
- Desert Tortoise critical habitat = 0.0006 lbs / 10,000 ft^2

The maximum of 0.017 lbs per 10,000 ft^2 is also equivalent to 1.2 ounces per acre. These nitrogen deposition rates are negligible as compared to the amount of fertilizer typically applied to a lawn. Based on these results, nitrogen deposition associated with Project emissions is expected to have a negligible impact on any plant species and hence would not affect the habitat quality in the Project vicinity.

Vegetation Impacts of Mist from VV2 Project Cooling Tower

In order to assess the impact of salts that will be present in the mist or drift that is released from the cooling tower, the air quality impact assessment that was performed for the VV2 Project was reviewed. This VV2 impact assessment included dispersion modeling of the emission sources, including modeling of the total dissolved solids (TDS) from the cooling tower. The Project is proposing to use reclaimed water in the cooling tower, and a portion of the dissolved solids in this water will include salts. Based on a review of the 2004 and 2005 data from the Victor Valley Wastewater Reclamation Authority (VVWRA), salts (sodium, chloride, sulfate and nitrate) may be on the order of 70 percent of the total dissolved solids.

The Project's maximum 24-hour total particulate impact was 6 $\mu g/m^3$, of which approximately 5 $\mu g/m^3$ was due to combustion equipment (no salts emissions) and approximately 1 $\mu g/m^3$ was due to the cooling tower. As stated above, approximately 70 percent of the TDS emissions from the cooling tower could be salts, and thus the maximum concentration of salts from the Project would be 0.7 $\mu g/m^3$. This maximum impact occurred at the Project fenceline very close to the power block, and the impacts drop off very quickly such that they would be negligible (0.09 $\mu g/m^3$) at the riparian vegetative communities near the Mojave River about 0.7 mile to the east and undetectable (<0.01 $\mu g/m^3$) at the Southwestern Flycatcher critical habitat over 3.5 miles to the southeast and at the Desert Tortoise critical habitat 4 miles to the northwest. On an annual average basis, the cooling tower was found to contribute less than 0.1 $\mu g/m^3$ of the total dissolved solids, or 0.07 $\mu g/m^3$ of salts, at the maximum impact (fenceline) receptor, which drops to a tenth as much (<0.01 $\mu g/m^3$) along the Mojave River.

There is no specific air quality standard for salt emissions, but the EPA has set "secondary" ambient air quality standards that are meant to protect public welfare, including impacts to crops and plants. The 24-hour PM10 secondary standard is 150 $\mu g/m^3$ and there is no national ambient annual average PM10 standard. Therefore, the Project will contribute a negligible amount of salts that are well below the established secondary air quality standard at the maximum impact location on the fenceline and near the River.

Additionally, based on the "wind rose" (a graphical frequency distribution of wind speed and direction) for Victorville, the winds in this area are predominantly (>30% of the time) from the south or SSW and seldom (<8%) from the west. The windiest seasons in the immediate Project vicinity generally occur prior to deciduous plant species leaf production in the early spring of the year or concurrent with leaf-drop in the late fall of the year. Further, occasional salt buildup on both upland and riparian vegetation is a fairly common and natural occurrence in arid environments such as Project location.

Due to the above factors and because much of the limited riparian vegetation occurring in proximity to the Project is either deciduous in habit or adapted to salt deposition/buildup, essentially no adverse impact upon riparian vegetation occurring in that portion of the Mojave River located adjacent to the Project area is anticipated to occur due to cooling tower drift. This minimal effect would be the case on both a seasonal and long-term basis.