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December 21, 2007

Ms. Nancy Norem
Public Service Company of New Mexico
2401 Aztec Road NE
MS-Z110
Albuquerque, New Mexico 87107

Subject: Additional Information Request for San Juan Generating Station BART Analysis

Dear Nancy,

As we are continuing our review of the BART analysis submitted by PNM, we have developed the attached list of questions and additional information needs.

If you have questions regarding the modeling analysis request, please contact Gi-Dong Kim at (505) 476-4326. For questions regarding the cost evaluation and ROFA technology review, please contact Liz Bisbey-Kuehn at (505) 476-4338. Gi-Dong's email address is gi-dong.kim@state.nm.us; Liz's is elizabeth.kuehn@state.nm.us. My new telephone number is (505) 476-4304.

Thank you for your assistance with this request.

Sincerely,

Rita Trujillo
Planning & Policy Section Chief

Attachment

**PNM San Juan Generating Station BART Analysis**

**Modeling Analysis**

Black & Veatch performed the initial and refined modeling analyses using EPA's default average annual natural visibility conditions. NMED needs an additional modeling analysis reflecting the 20 percent best and worst days visibility conditions. To support the additional study, NMED calculated the scaling factors (shown in Table 1). The scaling factors were calculated by solving the species components in the following light extinction equation:

$b_{ext}$ = (3) f (RH) [ammonium sulfate] + (3) f (RH) [ammonium nitrate] + (0.6) [coarse mass] + (4) [organic carbon] + (1) [soil] + (10) [elemental carbon] + $b_{ray}$

where

bracketed quantities represent background concentrations in ug/m$^3$,
values in parenthesis represent scattering efficiencies,
f (RH) is the relative humidity adjustment factor (applied to hygroscopic species only),
$b_{ray}$ is light extinction due to Rayleigh scattering (10 Mm$^{-1}$ used for all Class I areas).

The levels of aerosol components at each Class I areas for the 20 percent best and worst days visibility conditions are then scaled using the scaling factor. The species' concentrations calculated using the scaling factors are provided in Tables 2 and 3. All data used in the calculation is available in Table A-3 and Appendix B of EPA's Guidance for Estimating Natural Visibility Conditions under the Regional Haze Rule (EPA, 2003). For the additional modeling analysis, use 1 ppb background ammonia concentration because of excluding VOC and ammonia emissions from surrounding sources as well as the BART process. Ammonia Limiting Method (ALM) is not acceptable because EPA does not approve it for BART modeling.

Please provide modeling results focusing on the impact of each individual unit as well as combined visibility impacts for the SJGS BART sources at each Class I area reflecting the best and worst days visibility conditions. Please use the attached Excel spreadsheet for the results.

Table 1. Scaling Factors for Calculating Species' Concentrations for the 20% Best & Worst Days Natural Visibility Condition in Each Class I Area

| Scaling Factors (unitless) | | |
|---|---|---|
| Class I Area | 20% Best Days | 20% Worst Days |
| Arches | 0.37 | 1.82 |
| Bandelier | 0.37 | 1.82 |
| Black Canyon of the Gunnison | 0.38 | 1.80 |
| Canyonlands | 0.38 | 1.83 |
| Capitol Reef | 0.37 | 1.81 |
| Grand Canyon | 0.36 | 1.81 |
| Great Sand Dune | 0.38 | 1.79 |
| La Garite | 0.38 | 1.80 |
| Maroon Bells Snowmass | 0.38 | 1.80 |
| Mesa Verde | 0.39 | 1.84 |
| Pecos | 0.38 | 1.81 |
| Petrified Forest | 0.37 | 1.82 |
| San Pedro Parks | 0.38 | 1.82 |
| Weminuche | 0.38 | 1.82 |
| West Elk | 0.38 | 1.81 |
| Wheeler Peak | 0.38 | 1.80 |

Table 2. Species' Concentrations for the 20% Best Days Natural Visibility Condition in Each Class I Area

| | Species' Concentration (µg/m$^3$) | | | | | |
|---|---|---|---|---|---|---|
| Class I Area | Ammonium sulfate | Ammonium nitrate | Organic carbon mass | Elemental carbon | Soil | Coarse Mass |
| Arches | 0.044 | 0.037 | 0.174 | 0.007 | 0.185 | 1.108 |
| Bandelier | 0.045 | 0.037 | 0.175 | 0.007 | 0.187 | 1.120 |
| Black Canyon of the Gunnison | 0.045 | 0.038 | 0.177 | 0.008 | 0.188 | 1.130 |
| Canyonlands | 0.045 | 0.038 | 0.176 | 0.008 | 0.188 | 1.125 |
| Capitol Reef | 0.045 | 0.037 | 0.176 | 0.007 | 0.187 | 1.122 |
| Grand Canyon | 0.043 | 0.036 | 0.170 | 0.007 | 0.181 | 1.086 |
| Great Sand Dune | 0.045 | 0.038 | 0.178 | 0.008 | 0.190 | 1.137 |
| La Garite | 0.045 | 0.038 | 0.177 | 0.008 | 0.188 | 1.130 |
| Maroon Bells Snowmass | 0.045 | 0.038 | 0.177 | 0.008 | 0.188 | 1.130 |
| Mesa Verde | 0.046 | 0.039 | 0.182 | 0.008 | 0.194 | 1.162 |
| Pecos | 0.045 | 0.038 | 0.176 | 0.008 | 0.188 | 1.126 |
| Petrified Forest | 0.044 | 0.037 | 0.173 | 0.007 | 0.184 | 1.101 |
| San Pedro Parks | 0.045 | 0.038 | 0.176 | 0.008 | 0.188 | 1.125 |
| Weminuche | 0.046 | 0.038 | 0.178 | 0.008 | 0.190 | 1.138 |
| West Elk | 0.045 | 0.038 | 0.178 | 0.008 | 0.189 | 1.134 |
| Wheeler Peak | 0.045 | 0.038 | 0.178 | 0.008 | 0.189 | 1.133 |

Table 3. Species' Concentrations for the 20% Worst Days Natural Visibility Condition in Each Class I Area

| | Species' Concentration (µg/m$^3$) | | | | | |
|---|---|---|---|---|---|---|
| Class I Area | Ammonium sulfate | Ammonium nitrate | Organic carbon mass | Elemental carbon | Soil | Coarse Mass |
| Arches | 0.218 | 0.182 | 0.854 | 0.036 | 0.909 | 5.451 |
| Bandelier | 0.218 | 0.182 | 0.853 | 0.036 | 0.908 | 5.446 |
| Black Canyon of the Gunnison | 0.217 | 0.180 | 0.848 | 0.036 | 0.902 | 5.415 |
| Canyonlands | 0.220 | 0.183 | 0.861 | 0.037 | 0.916 | 5.495 |
| Capitol Reef | 0.217 | 0.181 | 0.852 | 0.036 | 0.906 | 5.436 |
| Grand Canyon | 0.217 | 0.181 | 0.851 | 0.036 | 0.905 | 5.429 |
| Great Sand Dune | 0.215 | 0.179 | 0.841 | 0.036 | 0.895 | 5.370 |
| La Garite | 0.217 | 0.180 | 0.848 | 0.036 | 0.902 | 5.415 |
| Maroon Bells Snowmass | 0.216 | 0.180 | 0.845 | 0.036 | 0.899 | 5.394 |
| Mesa Verde | 0.220 | 0.184 | 0.863 | 0.037 | 0.918 | 5.506 |
| Pecos | 0.217 | 0.181 | 0.852 | 0.036 | 0.906 | 5.436 |
| Petrified Forest | 0.218 | 0.182 | 0.856 | 0.036 | 0.910 | 5.462 |
| San Pedro Parks | 0.218 | 0.182 | 0.854 | 0.036 | 0.909 | 5.452 |
| Weminuche | 0.218 | 0.182 | 0.854 | 0.036 | 0.909 | 5.452 |
| West Elk | 0.217 | 0.181 | 0.848 | 0.036 | 0.903 | 5.415 |
| Wheeler Peak | 0.216 | 0.180 | 0.848 | 0.036 | 0.902 | 5.410 |

**Request for Additional Cost Evaluation and Additional Review of ROFA Technology**

In Appendix Y of 40 CFR 51, Guidelines for BART Determinations under the Regional Haze Rule, EPA recommends methods for determining whether the options identified in Step 1 are technically feasible (Step 2), and evaluating impacts analyses (Step 4).

EPA Guidelines offer the following guidance on determining whether a control technology should be considered technically feasible: *"Control technologies are technically feasible if either (1) they have been installed and operated successfully for the type of source under review under similar conditions, or (2) the technology could be applied to the source under review. Two key concepts are important in determining whether a technology could be applied: "availability" and "applicability." As explained in more detail below, a technology is considered "available" if the source owner may obtain it through commercial channels, or it is otherwise available within the common sense meaning of the term. An available technology is "applicable" if it can reasonably be installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible."* The analysis of the Mobotec ROFA and ROTAMIX technology did not include a demonstration that this technology is technically infeasible. EPA guidance directs this demonstration to conclude that the control *"option is either commercially unavailable, or that specific circumstances preclude its application to a particular emission unit*." Absent an analysis prescribed in the EPA guidelines, NMED considers this technology both commercially available and applicable, and NMED requests that the analysis include this technology throughout the BART determination process.

Sections 4. and 5. of Part a. of Step 4: Methods of Estimating Costs of Control, provides two options for documenting equipment cost estimates. The Part requires that "*The basis for equipment cost estimates should be documented, either with data supplied by the equipment vendor"* or *"by a referenced source (such as the OAQPS Control Cost Manual, Fifth Edition, February 1996, EPA 453/B-96-001)"*. This Part further states, *"In order to maintain and improve consistency, cost estimates should be based on the OAQPS* <u>*Control Cost Manual*</u>*, where possible."*

In its BART analysis, PNM has provided its cost estimate using a third method, an engineering analysis based on Black &Veatch's past experiences with the technologies reviewed. Supporting data for the cost estimates was provided on a single sheet, one for each of the four boiler units listing major cost headings with their associated line item costs from "similar projects", multiplied by a scaling factor to provide a cost estimate. No documentation was provided for the individual line item costs or supporting the scaling factors. When told by NMED that the data provided was insufficient to allow for proper regulatory oversight, PNM's response was to resubmit the same four single page spreadsheets with modest increases in detail.

After its review of PNM's second submittal and upon reviewing the Appendix Y procedures outlined above, NMED is requiring that an OAQPS <u>Control Cost Manual</u>, Fifth Edition, February 1996, EPA 453/B-96-001 cost estimate be performed. Optionally, with prior approval of NMED to include a proposed submittal deadline, NMED may approve a submittal of the vendor-based estimate method.