

BEFORE THE  
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION VI

In the Matter of:	)	
	)	
Approval and Promulgation of	)	
Implementation Plans; New Mexico;	)	
Federal Implementation Plan for	)	Docket No. EPA-R06-OAR-2010-0846
Interstate Transport of Pollution	)	
Affecting Visibility and Best Available	)	
Retrofit Technology Determination;	)	
76 Fed. Reg. 491 (Jan. 5, 2011)	)	
	)	
	)	

**COMMENTS PREPARED BY PUBLIC SERVICE COMPANY OF NEW MEXICO  
EPA REGION 6 DRAFT INTERSTATE TRANSPORT FIP AND  
NO<sub>x</sub> BART DETERMINATION FOR THE SAN JUAN GENERATING STATION**

Public Service Company of New Mexico (PNM) appreciates the opportunity to comment on the proposal issued by the U.S. Environmental Protection Agency (EPA) Region 6 (Region 6 or the Region) to adopt a Federal Implementation Plan (FIP) to impose additional nitrogen oxide (NO<sub>x</sub>) emission control requirements on the San Juan Generating Station (San Juan).<sup>1</sup> As part owner and operator of the facility, PNM has a vested interest in new regulatory requirements that may apply to San Juan, particularly with regard to requirements such as those proposed by Region 6 that would impose exorbitant costs on the plant to achieve an imperceptible change in visibility in the region. These comments express the following concerns with the proposed FIP:

- The draft FIP attempts to combine the regional haze and interstate transport requirements under the Clean Air Act. Unfortunately, the result is a draft FIP that is not legally well-founded and that could lead to confusing and contradictory actions among EPA regions nationwide.
- The proposal to require the installation of selective catalytic reduction (SCR) technology on all four units at San Juan in three years is based on a BART analysis that is fundamentally flawed in three primary respects:
  1. Cost: The cost to build SCR's at San Juan is approximately four times higher than the cost estimate relied upon by Region 6 in the proposed FIP.

<sup>1</sup> 76 Fed. Reg. 491 (Jan. 5, 2011).

2. Timing: The analysis does not demonstrate how a three-year compliance period would be feasible and the cost estimate used in the analysis does not reflect cost increases that would be required in an attempt to meet a three-year deadline.
  3. Analysis: The visibility analysis is based on outdated and incompatible computer models and overstates the impact of SCRs on visibility at nearby Class I areas.
- The State of New Mexico is engaged in an ongoing rulemaking process to adopt a regional haze state implementation plan (SIP). Region 6’s proposal to adopt a FIP before the state rulemaking process is complete is premature and deprives the state of its significant discretion to establish and administer its own regional haze program.

Due to the legal and analytical flaws to the approach used to develop the proposed FIP, Region 6 should extend the deadline for the regional haze BART determination at San Juan to allow time for the State of New Mexico to issue a final regional haze SIP.

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**Comments Prepared by Public Service Company of New Mexico  
EPA Region 6 Draft Interstate Transport FIP and  
NO<sub>x</sub> BART Determination for the San Juan Generating Station  
Docket No. EPA-R06-OAR-2010-0846**

April 4, 2011

**I. INTRODUCTION**

**A. The San Juan Generating Station**

San Juan is a four-unit, coal-fired generating station with a capacity of 1,800 gross megawatts located in Waterflow, New Mexico. The ownership of San Juan is made up of a diverse group of entities. PNM is the operator for San Juan and holds an approximate 46% ownership interest. Two New Mexico municipalities, the County of Los Alamos and the City of Farmington, also own an interest in San Juan. Other governmental entities owning an interest in San Juan include the City of Anaheim, California, M-S-R Public Power Agency, Utah Associated Municipal Power Systems, and the Southern California Public Power Authority. Tri-State Generation and Transmission Association, Inc. is a part owner of San Juan and provides electric generation to New Mexico's rural electric cooperatives. Tucson Electric Power, an investor owned utility, also has an interest in San Juan.

For nearly 40 years, San Juan has provided reliable and affordable energy to electricity consumers in the Southwest. San Juan supplies electricity to over two million consumers in New Mexico and other western states. The plant also serves as critical base load generation for PNM's 500,000 electric customers and 450,000 additional customers served through New Mexico's rural electric cooperative associations. The City of Farmington has 44,000 electric utility customers, and the County of Los Alamos has 8,500 electric utility customers. San Juan is a critical source of electricity in New Mexico as there are no readily available base load generation alternatives for PNM's customers.

San Juan is a major contributor to the employment and economies of the Four Corners region and New Mexico. It employs approximately 400 local residents with an annual payroll of \$40.5 million and additional payroll benefits of \$16.3 million. San Juan Coal Company (SJCC) operates the San Juan Coal Mine, the coal supplier for San Juan. SJCC employs approximately 500 local residents with an annual payroll of \$45 million. The San Juan and SJCC workforce is diverse and includes very significant representation from the local Native-American community – in fact, 22 percent of the San Juan employees and 46 percent of the SJCC employees are Native American. These operations are especially important to the nearby Navajo Nation where unemployment has fluctuated between 40 percent and 45 percent in recent years. San Juan and SJCC are also important to the New Mexico and local tax bases. Coal royalties paid to governments and tribes total \$54.8 million per year and San Juan alone accounts for \$6.4 million in annual local property taxes.

San Juan has recently completed significant upgrades of its emission control equipment during a four-year project lasting from 2006 through 2009. In that time period alone, PNM and

the other owners of San Juan invested more than \$320 million in state-of-the-art environmental control equipment, including newly installed fabric filter baghouses, low-NO<sub>x</sub> combustion controls, and upgrades to the flue gas desulfurization scrubbers for each unit. This additional equipment has greatly reduced the emissions of nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), and particulate matter (PM) from the plant, and San Juan is currently achieving high removal efficiencies for all of these pollutants. San Juan is also an industry leader in the installation and operation of new mercury control technology. Based on testing that EPA required the industry to complete in 2010, San Juan is now achieving as high as 99 percent removal of mercury, making it one of the best performing power plants in the nation with regard to mercury emissions.<sup>2</sup>

## **B. The New Mexico Regional Haze SIP Development Process**

To date, New Mexico has submitted only one regional haze state implementation plan (SIP) revision to EPA for review and approval. That SIP revision, submitted in 2003, was only designed to address SO<sub>2</sub> emissions under Section 309 of EPA's regional haze regulations. After New Mexico submitted its 2003 SIP, however, a decision issued by the U.S. Circuit Court of Appeals for the D.C. Circuit invalidated several aspects of EPA's regulations.<sup>3</sup>

After EPA revised its regulations in light of the D.C. Circuit decision, the New Mexico Environment Department (NMED) began efforts to revise its Section 309 SIP by continuing its participation in the Western Regional Air Partnership (WRAP), which assisted Western states by conducting modeling and assisting with the development of coordinated Section 309 regional haze plans. NMED also began development of a regional haze SIP for PM and NO<sub>x</sub> as well, in accordance with Section 308 of EPA's regional haze regulations.

As part of its effort to address NO<sub>x</sub>, NMED contacted PNM on November 9, 2006 and asked for a BART analysis for San Juan. PNM hired Black & Veatch to assist with the BART determination and provided a BART determination for San Juan to NMED on June 6, 2007. PNM also submitted numerous follow-up responses as well.<sup>4</sup> NMED prepared a draft SIP revision dated June 23, 2010 containing a proposed BART determination for San Juan that would have required the installation of SCR with sorbent injection to reach a NO<sub>x</sub> emission rate of between 0.03 and 0.07 pounds per million British thermal units of heat input (lb/mmBtu). NMED's draft SIP determined that these controls would be "cost effective" even though PNM estimated a cost of \$5,946 and \$7,398 per ton of NO<sub>x</sub> removed. In addition, NMED approved the modeling prepared by PNM's consultant, which determined that the maximum visibility improvement at any one Class I area would be a 1.34 deciview (dv) improvement at the Mesa Verde Class I area, with less than 1 dv of improvement in all other nearby Class I areas.

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<sup>2</sup> The 99 percent removal calculation is based on the testing completed in April – June 2010, as required by EPA's Information Collection Request for the Electric Utility Maximum Achievable Control Technology Standard.

<sup>3</sup> See *Center for Energy and Economic Development v. EPA*, 398 F.3d 653 (D.C. Cir. 2005).

<sup>4</sup> As noted in NMED's 2010 draft SIP revision, NMED received additional information from PNM on November 6, 2007, March 29, 2008, March 31, 2008, May 30, 2008, August 29, 2008, and March 16, 2009, which provided additional modeling analyses and analyses of additional NO<sub>x</sub> and PM controls.

NMED's June 23, 2010 draft SIP revision was withdrawn in December 2010. Thus, the 2010 SIP was never subject to a hearing, never adopted as a state rule, and never submitted to EPA for approval. Even so, the FIP proposed by Region 6 purports to rely heavily on NMED's 2010 draft. However, the conclusions in Region 6's proposed FIP differ drastically from those reached by NMED – although it also proposed to require the installation of SCR, Region 6 did not account for sorbent injection, determined that SCRs would only cost between \$1,579 – \$1,920 per ton of NO<sub>x</sub> removed, and concluded that the maximum visibility improvement associated with installing SCRs at San Juan would be 3.11 dv at the Canyonlands Class I area.

On February 28, 2011 the NMED filed two petitions with the New Mexico Environmental Improvement Board (EIB). The first petition is entitled "Revision to the New Mexico State Implementation Plan for Regional Haze" and is intended to meet the requirements of 40 CFR § 51.309 (the "309 SIP"). The second petition is entitled "New Mexico State Implementation Plan – Regional Haze Pursuant to 40 CFR § 51.309(g)" (the "309(g) SIP"). At its meeting on March 15, 2011, the EIB set both of these matters for hearing beginning June 1, 2011. The EIB's procedural orders provide that the EIB will deliberate on the NMED petitions immediately following the close of the cases. Thus, it is likely that the EPA will receive the state-adopted regional haze SIPs before the end of June 2011.

The new draft BART determination for San Juan concludes that the installation of Selective Non-Catalytic Reduction (SNCR) controls meet EPA's presumptive BART limit of 0.23 lb/mmBtu for sub-bituminous coal combustion at a dry-bottom, wall-fired utility unit. The draft SIP also addresses the other components of the regional haze program, including a determination of natural visibility conditions, reasonable progress goals, and a long-term strategy.

## **II. LEGAL FLAWS IN THE PROPOSED FIP**

The FIP proposed by Region 6 contains several legal flaws. The FIP improperly blends the requirements of two separate and distinct Clean Air Act provisions and, in doing so, cannot properly implement either one. Although certainly the same control requirements can be used to satisfy two different programs at once, the manner in which Region 6 has proposed to implement the two programs addressed in the FIP has resulted in a proposal that exceeds the authority of Section 110 of the Clean Air Act and improperly isolates the requirement for a BART determination for one facility from the rest of the regional haze program.

### **A. Partial Implementation of the Section 169A BART Requirement Under a Section 110 "Good Neighbor" FIP Is Inappropriate and Conflicts With the Structure and Purpose of the Clean Air Act.**

Region 6 initially describes its proposed FIP as follows:

EPA is proposing to disapprove a portion of the State Implementation Plan (SIP) revision submitted by the State of New Mexico for the purpose of addressing the "good neighbor" requirements of section 110(a)(2)(D)(i) of the Clean Air Act (CAA or Act) for the 1997 8-hour ozone National Ambient Air Quality Standards (NAAQS or standards) and the

1997 fine particulate matter (PM<sub>2.5</sub>) NAAQS. The SIP revision addresses the requirement that New Mexico's SIP must have adequate provisions to prohibit emissions from adversely affecting another state's air quality through interstate transport.<sup>5</sup>

After explaining the "good neighbor" provision in Section 110, Region 6 adds this: "Furthermore, EPA is proposing the FIP to address the requirement for best available retrofit technology (BART) for NO[X] for this source," citing simply to "part C of the CAA."

Although Region 6 purports to be acting pursuant to "good neighbor" provision in Section 110 of the Clean Air Act, the FIP appears to selectively borrow one part of the regional haze program established under Section 169A (without the other core elements of that section), to do what neither section could do alone – namely, to single out one facility to require the installation of immensely expensive controls for a single pollutant on an accelerated schedule, even though the plant recently installed all the control equipment necessary to comply with, and in many cases exceed, all existing health-based standards. The result is also inefficient and unnecessarily complicated.

#### **1. Section 110 and Section 169A of the Clean Air Act Each Have Different Purposes and Impose Different Requirements.**

As noted in the Region 6 proposal, Section 110(a)(2)(D)(i)(II) of the Clean Air Act requires that states submit a SIP revision containing provisions "prohibiting any source or other type of emission activity within the state from emitting any air pollutant in amounts which will ... interfere with measures required to be included in the applicable implementation plan for any other State under part C [of the CAA] to protect visibility."<sup>6</sup> In other words, Section 110 of the Clean Air Act is designed to prevent one state from "interfering" with the visibility plans of another.

Region 6 does not quote its second source of authority – Section 169A – which resides within part C of the Clean Air Act.<sup>7</sup> However, a review of that provision is instructive. In subsection (a) of Section 169A, Congress espoused an overarching goal: the "prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution."<sup>8</sup> To achieve that goal, other provisions of Section 169A require that states submit a SIP revision containing:

... emission limits, schedules of compliance and other **measures as may be necessary to make reasonable progress toward meeting the national goal** specified in subsection (a), **including--**

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<sup>5</sup> 76 Fed. Reg. 491.

<sup>6</sup> 76 Fed. Reg. at 493.

<sup>7</sup> Region 6 does cite to Section 169A on one occasion in the preamble to its proposed FIP, but only to point out that the BART controls required by that section must be installed no later than 5 years following the rule imposing them. 76 Fed. Reg. at 495.

<sup>8</sup> 42 U.S.C. § 7491(a) (CAA § 169A(a)).

(A) except as otherwise provided pursuant to subsection (c), a requirement that each major stationary source which is in existence on [Aug. 7, 1977], but which has not been in operation for more than fifteen years as of such date, and which ... emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any such area, shall procure, install, and operate, as expeditiously as practicable (and maintain thereafter) the **best available retrofit technology** ... for controlling emissions from such source for the purpose of eliminating or reducing any such impairment, **and**

(B) **a long-term (ten to fifteen years) strategy for making reasonable progress toward meeting the national goal** specified in subsection (a).<sup>9</sup>

Thus, in the words of Congress, BART is one of several tools available for achieving the national goal of eliminating visibility impairment at all Class I areas.

EPA Region 6 has re-purposed the BART requirement in the context of its proposed Interstate Transport FIP. Rather than using BART as part of the comprehensive, long-term strategy for addressing regional haze in Class I areas, as intended by Congress, Region 6 has applied that visibility requirement out of context to satisfy the much more limited purpose of Section 110, which only authorizes EPA to ensure one state does not interfere with another states' air quality plans.

The resulting proposal would overburden San Juan with an enormously expensive control requirement that is far more stringent than Congress intended. It is more stringent than Section 110 requires because, as recognized in the FIP, more cost-effective measures are available to ensure New Mexico will not interfere with its neighboring states' visibility goals because those goals only rely on a NO<sub>x</sub> emission rate of 0.27 or 0.28 lb/mmBtu (depending on the unit), as described further below. It is also more stringent than Section 169A requires because Region 6 did not take into account other available measures for addressing visibility or engage in the comprehensive decision-making process designed to guide states' efforts to achieve the long-term visibility goal.<sup>10</sup>

## **2. The Proposed FIP Improperly Combines the Interstate Transport and Regional Haze Provisions of the Clean Air Act.**

The proposed FIP suggests that the use of Section 169A BART authority to address a Section 110 requirement will provide "efficiency" and "certainty" to the rulemaking process by avoiding the need for future rulemakings. However, the FIP concedes that "[a]ny BART determinations for other pollutants that may be warranted under the [regional haze regulations] will be addressed in future rulemakings."<sup>11</sup> The FIP also notes that "[i]n this action, we are not

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<sup>9</sup> 42 U.S.C. § 7491(b) (CAA § 169A(b)) (emphasis added).

<sup>10</sup> See *Center for Energy & Economic Development v. EPA*, 398 F.3d 653, 660 (D.C. Cir. 2005) ("Congress's addition of § 169B, however, clarified that the focus of the Clean Air Act was to achieve 'actual progress and improvement in visibility,' 42 U.S.C. § 7492(b), not to anoint BART the mandatory vehicle of choice.")

<sup>11</sup> *Id.*

addressing whether the state has met other requirements of the [regional haze] program and will address those requirements in later actions.”<sup>12</sup> As such, the FIP is not efficient and does not provide any greater certainty because several additional rulemakings will be needed in the future in any event.

If EPA were to address the rest of the country in the same manner that Region 6 has chosen for New Mexico – one pollutant and one facility at a time – the number of individual rulemakings required to implement the regional haze program nationwide would be unmanageable. PNM believes EPA, state permitting authorities, and the regulated community would all be better served by a more integrated approach to implementation of the regional haze program in each state. Doing so would not only be more efficient, it is also the process Congress required in the Clean Air Act.

The better approach, which will provide greater certainty and require fewer rulemakings, would be to follow the structure of the Clean Air Act – by addressing Section 110 in one action, and then addressing the entire regional haze program for New Mexico in a separate action under Section 169A. That strategy would allow Region 6 an opportunity to fully consider all of the interconnected elements of the regional haze program together, as Congress intended, and avoid the unintended consequences of the piecemeal approach proposed in the FIP.

### **3. The Proposed FIP, Though Intended to Meet Two Deadlines, Fails to Properly Satisfy Either One.**

The FIP appears to be an attempt to satisfy two different deadlines. The first deadline was established by a Consent Decree that EPA signed with WildEarth Guardians regarding EPA’s failure to address Section 110 interstate transport requirements associated with EPA’s new ground-level ozone and fine particulate matter standards. That deadline originally required EPA to propose an Interstate Transport FIP on November 10, 2010 but was extended until December 21, 2010, and Region 6 issued its proposed FIP just before that deadline.

The second deadline is EPA’s self-imposed deadline of January 15, 2011 to issue a FIP for the 37 states that failed to submit regional haze SIPs in accordance with EPA’s 2005 regional haze regulations.<sup>13</sup> EPA has already failed to meet this deadline for every other state in the nation. Several environmental groups have now expressed an intent to sue EPA for its failure to meet that deadline.<sup>14</sup>

Thus, in developing its proposed FIP for New Mexico, Region 6 faced a court-imposed Interstate Transport deadline of December 21, 2010 and a self-imposed Regional Haze deadline of January 15, 2011. Region 6 should have properly addressed the requirements of Section 110 without a BART determination for NO<sub>x</sub> emissions from San Juan because Section 110 does not require BART. However, presented with these two deadlines, it appears Region 6 is attempting

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<sup>12</sup> 76 Fed. Reg. at 493.

<sup>13</sup> 74 Fed. Reg. 2,392 (Jan. 15, 2009).

<sup>14</sup> See Letters from EarthJustice and Reed Zars to EPA Administrator Jackson, dated January 19, 2011.

to satisfy the Interstate Transport deadline through a partial implementation of the regional haze program. In doing so, the Region 6 proposal fails to properly implement either Section 110 or Section 169A, for the reasons described further below.

**B. The Region Exceeded its Authority under Section 110 by Imposing More Stringent Controls Than Needed to Avoid Interference With Other States' Plans.**

There are two ways in which Region 6 could satisfy Section 110 and the WildEarth Guardians Consent Decree without the need to resort to an overly burdensome BART FIP, each one of which is recommended below in turn.

**1. Region 6 Should Approve New Mexico's 2007 Section 110 Interstate Transport SIP Because it Complies with EPA Policy and Satisfies the WildEarth Guardians Consent Decree.**

As noted in the proposed FIP, New Mexico submitted an Interstate Transport SIP in September 2007. Now, nearly three and a half years later, Region 6 is taking action on that submittal, two years later than the Clean Air Act requires.<sup>15</sup> The Region 6 proposal would disapprove that SIP based on the assertion that New Mexico has not submitted a regional haze SIP revision. However, New Mexico's SIP was proper when initially submitted and, in any event, NMED is currently nearing completion of a regional haze SIP that will address the Region's concern.

If Region 6 had acted in a timely manner, it could have approved New Mexico's 2007 SIP because it was consistent with EPA guidance. As noted in the proposed FIP, EPA's "2006 Guidance stated that states may make a simple SIP submission confirming that it was not possible at that time to assess whether there is any interference with measures in the applicable SIP for another state designed to 'protect visibility' for the 8-hour ozone and PM[2.5] NAAQS until RH SIPs are submitted and approved."<sup>16</sup> The guidance was issued by EPA because it was impossible to determine whether the actions of one state would interfere with another state's plan because the plans did not yet exist. Unfortunately, EPA has not approved a single state regional haze SIP. Without plans in place, determining interference with those plans remains impossible. Therefore, Region 6 is in no different position today than it was in 2007, when it first received New Mexico's interstate transport SIP. As such, the first method Region 6 could use to satisfy the interstate transport requirements for New Mexico is to approve New Mexico's 2007 interstate transport SIP.

This alternative was presented to Region 6 by NMED in a letter to Mr. Guy Donaldson on May 6, 2010. In that letter, NMED expressed its "fundamental concerns regarding the

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<sup>15</sup> Section 110(k)(1)(B) of the CAA requires EPA to either approve or disapprove the SIP revision within 12 months of determining that the submittal is "complete." Since a SIP revision is deemed "complete" if EPA fails to take action in six months, the CAA essentially requires EPA to act on a SIP revision within a total of 18 months. The decision of Region 6 to delay action on New Mexico's interstate transport SIP for 41 months is thus clearly in violation of Section 110 of the CAA.

<sup>16</sup> 76 Fed. Reg. at 494.

workability of the SIP review process,” based on the failure of Region 6 to take action on the 2007 SIP for almost two and a half years. The letter asked Region 6 to approve the 2007 SIP and notes Section 110 required Region 6 to act upon the SIP by March 17, 2009.<sup>17</sup> The letter also explained the difficulties associated with the Region’s failure to act on SIPs, which simply results in “a never ending cycle of SIP submissions without approvals.” NMED also noted, and PNM agrees, that the actions taken (and not taken) by Region 6 in this instance have “unnecessarily confounded the issues.”

The other western EPA Regions fulfilled their nondiscretionary duty to act on other states’ interstate transport SIPs. Specifically, Regions 5, 7, 8, 9, and 10 acted on SIPs submitted by Arizona, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, Nevada, South Dakota, Utah, Washington, and Wyoming. For example, Region 9’s approval of the Interstate Transport SIP for Arizona, similar to New Mexico’s SIP, includes the following remarks:

We also find that the Arizona Interstate Transport SIP adequately provides for non-interference with CAA PSD and visibility (not including regional haze) measures in other states with respect to 8-hour ozone and PM[2.5] and reasonably concludes that a determination of whether or not the Arizona SIP for 8-hour ozone or PM[2.5] contains adequate provisions to prohibit emissions that interfere with measures in other States’ SIPs designed to address regional visibility impairment caused by regional haze must wait for the submittal of regional haze SIPs. Based on these findings, we are approving the Arizona Interstate Transport SIP as meeting the requirements of CAA section 110(a)(2)(D)(i), and as a result of our approval of this SIP, we are no longer obligated to promulgate a FIP for Arizona addressing the CAA section 110(a)(2)(D)(i) requirement.<sup>18</sup>

New Mexico’s 2007 SIP addressed the visibility component of the interstate transport requirements using the same approach as Arizona and the other states listed above. Given the absence of approved regional haze SIPs, the policy behind EPA’s 2006 guidance still applies, and Region 6’s previous failure to comply with the Clean Air Act and act in a timely manner should not alter that analysis. As such, the proposal by Region 6 to disapprove New Mexico’s 2007 Interstate Transport SIP is unfounded. Thus, PNM requests that Region 6 approve the 2007 Interstate Transport SIP for New Mexico in lieu of its proposed FIP.

## **2. Region 6 Can Ensure No Interference with Other States’ Plans By Establishing NO<sub>x</sub> Limits of 0.27 and 0.28 lb/mmBtu for San Juan.**

Alternatively, the FIP should only impose sufficient emission limits to “prohibit emissions that would interfere with the reasonable progress goals set to protect Class I areas in

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<sup>17</sup> Section 110(k)(1)(B) requires EPA to determine, within 60 days of receipt of a SIP or SIP revision, whether the SIP is “complete.” 42 U.S.C. § 7410(k)(1)(B). If, at the end of 60 days, EPA has taken no action, the submission is deemed to be “complete.” Once deemed (or determined to be) complete, Section 110 imposes a nondiscretionary duty on EPA to approve or disapprove the submission within 12 months. 42 U.S.C. § 7410(k)(2), (3). Thus, at most, Region 6 had a nondiscretionary duty to take final action on New Mexico’s SIP within 18 months of receiving the submission on September 17, 2007.

<sup>18</sup> 72 Fed. Reg. 41,629 (July 31, 2007).

other states,” as Section 110 requires.<sup>19</sup> Although EPA has not approved any regional haze SIPs, many of New Mexico’s neighboring states have adopted the “reasonable progress goals” developed by WRAP.<sup>20</sup> WRAP developed those goals using modeling that relied upon certain assumptions about emissions from stationary sources in the region. For San Juan, WRAP assumed a SO<sub>2</sub> emission rate of 0.15 lb/mmBtu and a NO<sub>x</sub> emission rate of 0.27 lbs/mmBtu, for Units 1 and 3, and 0.28 lbs/mmBtu, for Units 2 and 4.<sup>21</sup> The proposed FIP proposal recognizes the relevance of these WRAP modeling assumptions to the implementation of interstate transport requirements, as follows:

[I]n developing their respective reasonable progress goals, WRAP states consulted with each other through the WRAP’s work groups. As a result of this process, the common understanding was that each State would take action to achieve the emissions reductions relied upon by other states in their reasonable progress demonstrations ....

We believe that the analysis conducted by the WRAP provides an appropriate means for designing a FIP that will ensure that emissions from sources in New Mexico are not interfering with the visibility programs of other states, as contemplated in section 110(a)(2)(D)(i)(II). In developing their visibility projections using photochemical grid modeling, the WRAP states assumed a certain level of emissions from sources within New Mexico. Although we have not yet received all RH SIPs, we understand that the WRAP states used the visibility projection modeling to establish their own respective reasonable progress goals. **Thus, we believe that an implementation plan that provides for emissions reductions consistent with the assumptions used in the WRAP modeling will ensure that emissions from New Mexico sources do not interfere with the measures designed to protect visibility in other states.**<sup>22</sup>

The proposed FIP relies on this reasoning to conclude that “all of the sources in New Mexico are achieving the emission levels assumed by the WRAP in its modeling except for the SJGS.” The proposed FIP also relies on this reasoning to conclude that an SO<sub>2</sub> limit at San Juan consistent with the WRAP modeling assumptions (0.15 lb/mmBtu) will eliminate interstate interference associated with SO<sub>2</sub> emissions from San Juan. Inexplicably, the proposed FIP takes an entirely different approach for NO<sub>x</sub> emissions from San Juan and proposes a much more onerous BART determination.

If emissions consistent with the WRAP modeling assumptions will eliminate interference from other sources and from SO<sub>2</sub> emissions from San Juan, that reasoning will also suffice for NO<sub>x</sub> emissions from San Juan. Nothing in the preamble to the FIP suggests a justifiable basis

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<sup>19</sup> 76 Fed. Reg. at 493

<sup>20</sup> As noted in the proposed FIP, “The Western Regional Air Partnership (WRAP) is a voluntary partnership of state, tribal, federal, and local air agencies dealing with regional air quality issues in the West. ... The WRAP evaluates air quality impacts, including RH impacts, associated with regionally significant emission sources. In so doing, the WRAP has conducted air quality modeling. The states in the West have used this modeling to establish their reasonable progress goals for RH.” 76 Fed. Reg. at 495-496

<sup>21</sup> 76 Fed. Reg. at 497.

<sup>22</sup> 76 Fed. Reg. at 496-497.

upon which to treat NO<sub>x</sub> emissions from San Juan any differently from SO<sub>2</sub>. The only attempt made in the FIP to distinguish the two pollutants is a reference to New Mexico's intention to participate in the SO<sub>2</sub> trading program under 40 C.F.R. Section 51.309. Not only does that reference again confuse interstate transport requirements with the regional haze program, it also fails to address the point. If New Mexico's participation in the trading program was sufficient to satisfy its interstate transport obligations, no additional SO<sub>2</sub> emission limits would be needed. However, to ensure SO<sub>2</sub> emissions from San Juan do not interfere with other states' reasonable progress goals, the FIP proposes a new SO<sub>2</sub> emission limit of 0.15 lb/mmBtu, equal to the WRAP modeling assumption. In doing so, the FIP is careful to note that it is not finding that the limit satisfies BART, explaining that SO<sub>2</sub> BART will be addressed separately once New Mexico submits its Section 309 regional haze SIP.

The FIP should follow the same approach with NO<sub>x</sub> as it does with SO<sub>2</sub>. By imposing a new NO<sub>x</sub> emission limit of 0.27 lb/mmBtu on San Juan Units 1 and 3 and a limit of 0.28 lb/mmBtu on San Juan Units 2 and 4, Region 6 could, in its own words, "provide[] for emissions reductions consistent with the assumptions used in the WRAP modeling [to] ensure that emissions from New Mexico sources do not interfere with the measures designed to protect visibility in other states," thus satisfying the requirements of Section 110. Like the proposal for SO<sub>2</sub>, the FIP could allow time for New Mexico to complete its SIP revision for NO<sub>x</sub>. Those efforts are ongoing and a new SIP revision to address NO<sub>x</sub> BART at San Juan is expected in a matter of weeks.

### **3. The Proposed FIP Exceeds the Authority of Section 110 of the Clean Air Act.**

Given the alternatives to addressing interstate transport described above, the Region 6 proposal to impose a NO<sub>x</sub> limit of 0.05 lb/mmBtu clearly exceeds EPA's authority under Section 110 because it will demand more stringent control requirements than necessary to avoid interfering with other states' visibility plans. Instead, based on Region 6's own reasoning, a limit of 0.27 lb/mmBtu (Units 1 & 3) and 0.28 lb/mmBtu (Units 2 & 4) will satisfy New Mexico's obligation to ensure emission from its sources do not interfere with other states' visibility plans. The difference between these two emission limits is significant, of course, because the limit proposed by Region 6 would require hundreds of millions of dollars to install SCR, whereas that equipment would not be needed to meet the limit actually required by Section 110. In addition, Region 6's decision to propose ammonia and sulfuric acid limits also exceeds its authority under Section 110 because Region 6 only proposed those limits as a means of ensuring proper operation of an SCR, which is not necessary to reach limits of 0.27 and 0.28 lb/mmBtu. As addressed in more detail below, the proposed 0.05 lb/mmBtu is also inappropriate under the regional haze program as well.

### **C. Isolating the BART Determination From the Rest of the Regional Haze Program Conflicts With the Structure and Purpose of Section 169A.**

In addition to exceeding its authority under Section 110 of the Clean Air Act, the FIP proposed by Region 6 is an improper implementation of the regional haze program for two reasons – it not only fails to address the core elements of the regional haze program, it also fails to take those elements into account in its analysis. In doing so, Region 6 has taken an inefficient,

piecemeal approach to implementing the regional haze program that fails to properly consider and balance, as Congress intended, the costs and benefits of all available control alternatives.

**1. The Proposed FIP Fails to Consider Other Key Elements of the Regional Haze Program, as Required by the Clean Air Act and EPA Regulations.**

In its proposal, Region 6 concedes that it is “not addressing whether [New Mexico] has met other requirements of the RH program” and notes that it “will address those requirements in later actions.”<sup>23</sup> This approach is clearly inefficient and, more significantly, violates the structure of the Clean Air Act visibility provisions because it fails to consider its proposed BART determination in context with the rest of the regional haze requirements for New Mexico.

As noted above, the Clean Air Act visibility provisions establish an overarching goal of natural visibility conditions in all Class I areas and require states to develop comprehensive plans for achieving “reasonable progress” towards that goal. The EPA regulations implementing those provisions recognize the enormity of that task, and thus establish the year 2064 as the target date for achieving natural visibility.<sup>24</sup> Those regulations also set forth the “core elements” for regional haze implementation plans, which include “reasonable progress goals,” “calculations of baseline and natural visibility conditions,” “long-term strategies,” “monitoring strategies,” and “other implementation plan requirements.”<sup>25</sup> Each of these elements is important in that they are all designed to work together as a comprehensive strategy. However, the most critical component, based on the language of the Clean Air Act, is the “reasonable progress goals” for Class I areas, since the other elements are essentially tools for achieving the “reasonable progress” required by the statute. EPA’s own regulations confirm the importance of the reasonable progress goals by explaining that they “will be considered by the Administrator in evaluating the adequacy of the measures in the implementation plan to achieve the progress goal adopted by the State.”<sup>26</sup>

Despite the importance of “reasonable progress goals” as the foundation of any regional haze implementation plan, the FIP proposes NO<sub>x</sub> BART controls on a single source, without any analysis of the goal such controls must be designed to achieve. As such, the proposed FIP entirely lacks the context needed to determine whether additional NO<sub>x</sub> controls at San Juan are reasonable in light of the reasonable progress goals for nearby Class I areas. EPA’s regulations also require states whose reasonable progress goals establish a rate of improvement that is less than what would achieve natural visibility conditions by 2064 to conduct additional analysis to confirm the reasonableness of those goals. Without any reasonable progress goals to consider, Region 6 cannot even attempt such an analysis, even though EPA would require it of all states as an essential component of any regional haze implementation plan. In addition, because it does not propose a “long-term strategy,” another “core element” of EPA’s regional haze rules, the

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<sup>23</sup> 76 Fed. Reg. at 493.

<sup>24</sup> 40 C.F.R. 51.308(d)(1)(i)(B).

<sup>25</sup> 40 C.F.R. 51.308(d)(1)-(4).

<sup>26</sup> 40 C.F.R. 51.308(d)(1)(v).

proposed FIP ignores the reasonable progress already achieved by New Mexico sources due to the emission reductions required by other federal and state air quality programs. Region 6 should accurately quantify the progress in each affected Class I area being made by other programs before considering whether any other control requirements at San Juan are necessary to achieve reasonable progress.

By omitting any consideration of reasonable progress goals and the other elements of the regional haze program, Region 6 fails to conduct the proper analysis that would be required for any regional haze implementation plan by the Clean Air Act and EPA regulations. Thus, the proposed FIP represents a flawed and likely illegal effort to impose new control requirements under Section 169A.

**2. The Proposal Fails to Consider Other BART-Eligible Sources or Other Emission Control Strategies.**

The proposed FIP fails to fully implement the BART requirements. The regional haze regulations clearly require each implementation plan to:

contain[] emission limitations representing BART and schedules for compliance with BART for each BART-eligible source that may reasonably be anticipated to cause or contribute to any impairment of visibility in any mandatory Class I Federal area, unless the State demonstrates that an emissions trading program or other alternative will achieve greater reasonable progress toward natural visibility conditions.<sup>27</sup>

The proposed FIP fails to comply with these regulations because it does not address any other BART-eligible sources. The only reference in the proposal to other potentially BART-eligible sources is a note that all other sources are considered “sufficiently controlled to eliminate interference with the visibility programs of other states.” However, that statement again confuses the interstate transport and regional haze requirements. Taken at face value, that statement would suggest that sources in compliance with Section 110 need not comply with the BART requirements in Section 169A, when of course that is not the case.

The proposed FIP also falls short of the Clean Air Act and EPA’s own regional haze regulations because it does not provide sufficient justification for failing to consider possible emission control strategies for other sources of visibility impairing pollutants in the state.

**3. The Proposed FIP Should Have Considered the Presumptive BART Limits for NO<sub>x</sub> Provided in EPA’s BART Guidelines.**

EPA’s BART Guidelines, codified at 40 C.F.R. Part 51 Appendix Y, establish certain “presumptive limits,” and specifically describe the NO<sub>x</sub> presumptive limits as follows:

For coal-fired EGUs greater than 200 MW located at greater than 750 MW power plants and operating without post-combustion controls (i.e. SCR or SNCR), we have provided

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<sup>27</sup> 40 C.F.R. § 51.308(e) (emphasis added).

presumptive NO[X] limits, differentiated by boiler design and type of coal burned. You may determine that an alternative control level is appropriate based on a careful consideration of the statutory factors. For coal-fired EGUs greater than 200 MW located at power plants 750 MW or less in size and operating without post-combustion controls, you should likewise presume that these same levels are cost-effective. You should require such utility boilers to meet the following NO[X] emission limits, unless you determine that an alternative control level is justified based on consideration of the statutory factors.

EPA's 2005 preamble to those Guidelines further explains the reasoning behind those presumptive NO<sub>x</sub> limits:

For all types of boilers other than cyclone units, **the limits in Table 2 [the presumptive NO<sub>x</sub> limits] are based on the use of current combustion control technology.** Current combustion control technology is generally, but not always, more cost-effective than post-combustion controls such as SCRs. ... **We are establishing presumptive NO[X] limits in the guidelines that we have determined are cost-effective for most units** for the different categories of units below, based on our analysis of the expected costs and performance of controls on BART-eligible units greater than 200 MW. ... We also analyzed the installation of SCRs at BART-eligible EGUs, applying SCR to each unit and fuel type. The cost-effectiveness was generally higher than for current combustion control technology except for one unit type, cyclone units. ... For other units, we are not establishing presumptive limits based on the installation of SCR. Although States may in specific cases find that the use of SCR is appropriate, **we have not determined that SCR is generally cost-effective for BART across unit types.**<sup>28</sup>

Region 6 should have at least considered whether the presumptive NO<sub>x</sub> emission limits would constitute BART for San Juan. Despite failing to address the presumptive limits in the proposed FIP for San Juan, Region 6 has recently proposed to approve the presumptive NO<sub>x</sub> limits as BART for six different coal-fired units in the neighboring state of Oklahoma.<sup>29</sup>

According to Table 1 of EPA's BART Guidelines, the presumptive limit for a dry-bottom wall-fired boiler is 0.23 lb/mmBtu for sub-bituminous coal and 0.39 lb/mmBtu for bituminous coal. San Juan is a dry-bottom, wall-fired boiler, but the coal it burns does not fall neatly into either the bituminous or sub-bituminous categories. EPA seemed to agree, based on a March 20, 2008 email from EPA to NMED recognizing that the San Juan coal "appears to fall in a gray area, where it can be classified as either sub-bituminous or high-volatile bituminous coal" and requesting additional information to help define the quality of the coal. On May 30, 2008, PNM provided additional information to NMED to demonstrate that, although the coal falls in between bituminous and sub-bituminous in many respects, it behaves more like bituminous coal with respect to its NO<sub>x</sub> emission characteristics.

Specifically, PNM explained in its correspondence that, as compared to San Juan coal:

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<sup>28</sup> 70 Fed. Reg. 39,104, 39134-36 (July 6, 2005) (emphasis added).

<sup>29</sup> 76 Fed. Reg. 16,168 (March 22, 2011). The inconsistencies in the approach Region 6 has taken in New Mexico and Oklahoma are addressed in more detail below.

- Sub-bituminous coals have higher oxygen content. As a result, less combustion air is needed to combust sub-bituminous coals. Because the combustion air contains most of the nitrogen that forms NO<sub>x</sub>, the ability of sub-bituminous coals to utilize lower combustion air results in lower NO<sub>x</sub> emissions as compared to the San Juan coal.
- Sub-bituminous coals have higher moisture content. As a result, sub-bituminous coals burn at a lower temperature, which leads to lower NO<sub>x</sub> formation than the San Juan coal, which burns at a hotter temperature.
- Sub-bituminous coals have lower nitrogen content. As a result, sub-bituminous coals contribute less nitrogen to the combustion process than the San Juan coal.

In addition to these fuel-related factors, the San Juan boilers are also smaller than most boilers designed to combust sub-bituminous coal. As a result, the boiler operates at higher temperatures, which result in greater NO<sub>x</sub> emissions as compared to larger, cooler boilers.

To account for these characteristics, which make it extremely difficult for San Juan to achieve NO<sub>x</sub> emission levels normally associated with sub-bituminous coals, the most appropriate presumptive BART limit for NO<sub>x</sub> for San Juan should be the 0.39 lb/mmBtu limit for bituminous coals.

**4. Region 6 Has Not Properly Justified Its Decision to Propose Emission Limits for Other Pollutants as Part of the San Juan BART Determination.**

In addition to NO<sub>x</sub> and SO<sub>2</sub> emission limits, the Region 6 FIP would impose sulfuric acid and ammonia emission limits on San Juan as well. The justification for such emission limits revolves around the Region's reliance on estimates of the emission rates for those pollutants which, according to Region 6, depend on "proper design and operation of the SCR unit." These proposed emission limits are unnecessary and inconsistent with EPA regulations and guidance, which state the following:

What pollutants should I address?

Visibility-impairing pollutants include the following:

- (1) Sulfur dioxide (SO<sub>2</sub>),
- (2) Nitrogen oxides (NO<sub>x</sub>), and
- (3) Particulate matter . . .

You should exercise judgment in deciding whether the following pollutants impair visibility in an area:

- (4) Volatile organic compounds (VOC), and
- (5) Ammonia and ammonia compounds.

You should use your best judgment in deciding whether VOC or ammonia emissions from a source are likely to have an impact on visibility in an area. . . . You should fully document the basis for judging that a VOC or ammonia source merits BART review, including your assessment of the source's contribution to visibility impairment.<sup>30</sup>

The FIP, however, includes neither a showing that ammonia limits are necessary nor an analysis of the visibility impacts of ammonia emissions from SCRs proposed for San Juan. In fact, as noted in the modeling discussion below, Region 6 utilized constant ammonia background concentrations in its modeling, thus assuming that ammonia emissions from San Juan were essentially irrelevant to the analysis. In addition, sulfuric acid is not one of the pollutants listed in EPA's Guidelines as a pollutant subject to the regional haze program. In any event, the sulfuric acid and ammonia limits proposed are unachievable at the NO<sub>x</sub> limit the Region would require San Juan to meet. Moreover, the ammonia monitors Region 6 has proposed raise significant technical questions as well, because Region 6 has not identified any similar unit currently employing such monitors. Although both these pollutants can have an impact on visibility, Region 6 should not impose limits on these pollutants without the proper justification and analysis.

#### **5. Practical Experience is Essential in Developing a Realistic Cost Estimate.**

On September 28, 2010, PNM met with Region 6 to discuss the Region's plans to prepare a BART determination for San Juan. At that time, Region 6 introduced its recently-hired consultant, Dr. Phyllis Fox, who indicated that she was very new to the project. Although Region 6 was still in the early stages of understanding the BART analysis that PNM and NMED spent three years developing, Region 6 issued its proposed FIP just three months after that initial meeting.

PNM questions whether Region 6 truly had sufficient time to fully analyze all of the technical issues involved in its proposed FIP. In addition, its consultant appears to have no practical experience with the actual design and implementation of retrofit emission control equipment or the visibility provisions in the Clean Air Act. Dr. Fox's qualifications were recently drawn into question in the context of a challenge to the permit limits for a coal-fired facility in Georgia:

Dr. Fox is not a regulator, a design engineer, or an expert in the design of pollution control devices. She has never worked for a permitting agency reviewing permit applications. Nor has Dr. Fox ever drafted an air quality permit, made a BACT [Best Available Control Technology] determination for a permitting agency, or assisted an applicant in submitting an air quality permit application for a pulverized coal-fired power plant.<sup>31</sup>

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<sup>30</sup> 40 C.F.R. Part 51, Appendix Y II.A.3.

<sup>31</sup> *Friends of the Chattahoochee, Inc. and Sierra Club v. EPD*, OSAH-BNR-AQ-0732139-60-HOWELLS, 2008 Ga. ENV LEXIS 1 \*24 (January 11, 2008) ("*Friends of the Chattahoochee*"). Although this decision was vacated on other grounds by a Georgia Superior Court, that court did not take issue with the conclusions reached by the administrative law judge with respect to Dr. Fox's qualifications and, in any event, the Superior Court's decision

In contrast, PNM has employed consultants from Black & Veatch since 2007. Black & Veatch is one of the world's leading engineering firms specializing in the design and implementation of new and retrofit emission control projects for large coal-fired power plants. Black & Veatch has actively participated in the development of dozens of SCR projects at existing coal-fired power plants over the past several decades. The SCR projects that Black & Veatch has designed and built include the following:

<b>Client</b>	<b>Unit</b>	<b>Capacity (MW)</b>	<b>Combustion Process / Fuel<sup>32</sup></b>	<b>Year In Service</b>
NIPSCO	Bailly Unit 7	175	Cyclone / Coal	2008
SJRPP	St. John River Power Park	670 each	PC / Coal & Pet Coke	2008
Alabama Electric Cooperative, Inc.	Lowman Units 2 & 3	250 each	PC / Coal	2007
IPL	Harding Street Station Unit 7	460	PC / Coal	2005
Vectren	A. B. Brown Units 1 & 2	265 each	PC / Coal	2004 / 2005
NIPSCO	Bailly Unit 8	360	Cyclone / Coal	2004
ALCOA	Warrick Unit 4	320	PC / Coal	2004
Dayton Power & Light	J. M. Stuart Station Units 1-4	600 each	PC / Coal	2003 – 2004
Dayton Power & Light	Killen Station Unit 2	600	PC / Coal	2003
NIPSCO	Schahfer Unit 14	431	Cyclone / Coal	2003
Vectren	Culley Unit 3	255	PC / Coal	2003
City of Springfield, IL	Dallman Units 21 & 32	80 each	Cyclone / Coal	2003
City of Springfield, IL	Dallman Unit 33	190	PC / Coal	2003
NIPSCO	Michigan City Unit 12	470	Cyclone / Coal	2002
Associated Electric Cooperative, Inc.	New Madrid Station Unit 1 & 2	638 each	Cyclone / Coal	2000 / 2001

was later reversed by the Georgia Court of Appeals. *EPD v. Friends of the Chattahoochee, Inc. and Sierra Club*, 298 Ga. App. 753, 681 S.E.2d 203 (Ga. App. 2009).

<sup>32</sup> The abbreviation "PC" refers to pulverized coal.

Black & Veatch used the knowledge gained by designing and building these SCR projects over the last ten years to guide and direct the SCR cost analysis for San Juan. Where possible, Black & Veatch scaled the costs from actual vendor quotations from another representative project, accounting for differences in unit size, baseline emissions, regional labor costs, and production rates and provided detailed documentation to explain how each item of the cost estimate was developed. PNM provided that analysis to Region 6.

Region 6 chose to rely exclusively on Dr. Fox's conclusions and chose to disregard the information provided by Black & Veatch. PNM believes that Region 6's decision to rely solely on Dr. Fox resulted in numerous fatal flaws in the analysis underlying Region 6's proposed FIP that render it legally untenable. PNM requests that Region 6 reconsider its decision to disregard the information and analysis provided by Black & Veatch. The sections below describe many of the flaws in the analysis prepared by Dr. Fox and relied upon by Region 6 in proposing the FIP for San Juan.<sup>33</sup>

**D. The Proposed FIP Deprives the New Mexico of its Discretion to Implement an Appropriate Regional Haze Program.**

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The regional haze provisions of the Clean Air Act are designed to be implemented by the states, and the states are granted wide discretion in implementing the program.<sup>34</sup> Congress expressly designed the program to allow the states the widest latitude possible to develop narrowly-tailored solutions to visibility degradation in Class I areas. EPA has accepted that construct, and its BART "Guidelines" are not only aptly named, but appropriately speak in terms of recommendations, allowing sufficient flexibility for the adoption of a wide range of appropriate measures. In light of this design, EPA should only seize control of a state's authority as a last resort.

Simply put, imposing a BART determination on San Juan as proposed in the FIP is not Region 6's last resort for addressing visibility in New Mexico. As noted above, there are several options by which Region 6 could satisfy its consent decree requirements to adopt (or approve) an interstate transport SIP for New Mexico and still allow New Mexico time to complete its regional haze SIP, as envisioned by the Clean Air Act. However, it does not appear that Region 6 is affording the proper deference to state authority. In fact, Region 6 has proposed to take over portions of the air quality programs in three of its five states – New Mexico, Oklahoma, and Texas – all within the last year. PNM asks Region 6 to reconsider its decision to step in front of New Mexico's efforts to adopt and implement its own regional haze program as Congress intended, for the reasons explained further below.

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<sup>33</sup> Revised BART Cost Effectiveness Analysis for Selective Catalytic Reduction at the Public Service Company of New Mexico San Juan Generating Station, Final Report, prepared by Dr. Phyllis Fox (consultant) Ph.D., P.E. (November 2010).

<sup>34</sup> 42 U.S.C. § 7491 (requiring states to implement BART by revising their SIPs and suggesting that EPA's role in the BART process is to establish "guidelines" for the states ).

**1. Region 6's Heavy Reliance on an Unofficial Draft SIP prepared by NMED, Which Has Now Been Withdrawn, Was Improper.**

To explain how it obtained the facts supporting the analysis underlying its proposed BART determination, Region 6 notes the following:

Although not officially submitted to us, NMED completed a NO[X] and PM BART determination for the SJGS (referred to herein as the "NMED BART evaluation"), which we have found to be thorough and comprehensive. In making our NO[X] BART determination for the SJGS, we drew heavily upon the NO[X] BART portion of that document, and used it to help inform our NO[X] BART determination for the SJGS. We have incorporated it into our Technical Support Document (TSD) found in the electronic docket for this action.<sup>35</sup>

Not only was the NMED BART withdrawn, as noted above, NMED has refined its analysis and reached an entirely new determination on BART for San Juan. Under these circumstances, Region 6's reliance on a preliminary, unofficial, and now withdrawn draft SIP is inappropriate. Moreover, while Region 6 indicates that it agreed with the conclusions reached in NMED's draft 2010 BART determination, it takes exception to the cost estimates for SCR at San Juan, the visibility benefits associated with SCR at San Juan, and the ancillary emission increases that SCR might cause.<sup>36</sup> With such all-encompassing exceptions, it is difficult to understand what remains to form the factual basis for the conclusions in the proposed FIP.

The justifications underlying Region 6's conflicting conclusions are not compelling. For example, Region 6's decision to consider San Juan capable of achieving 0.05 lb/mmBtu with a retrofit SCR, simply because three newly constructed facilities may be capable of doing so, is incorrect. Moreover, the technical support documents provided by Region 6 seem to indicate that the 0.05 lb/mmBtu limit was actually assumed from the beginning, rather than developed through an objective analysis.<sup>37</sup> The reliance on assumptions rather than facts led to many specific factual errors in the proposed FIP, which are addressed separately below.

**2. The Proposed FIP Fundamentally Differs From The Manner In Which Every Other State Has Determined BART.**

Specific technical errors aside, the ultimate conclusions reached by Region 6 are far different than those that have been made in other states in determining NO<sub>x</sub> BART for other electric generating units. Enclosed as Attachment A is a table of the other NO<sub>x</sub> BART determinations that have been made by 13 different states as they have developed the proposed

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<sup>35</sup> 76 Fed. Reg. at 498.

<sup>36</sup> 76 Fed. Reg. at 499.

<sup>37</sup> See Revised BART Cost Effectiveness Analysis for Selective Catalytic Reduction at the Public Service Company of New Mexico San Juan Generating Station, Final Report, prepared by Dr. Phyllis Fox (consultant) Ph.D., P.E. (November 2010) ("The EPA requested that I estimate the cost of SCR, **assuming** an outlet NO<sub>x</sub> of 0.05 lb/MMBtu.") (emphasis added).

regional haze SIPs that are awaiting EPA approval. In comparison to the determinations made by every other state, the Region 6 proposal concludes that San Juan must be required to install, (i) the most effective SCR in the nation, (ii) at the cheapest price, and (iii) in the shortest amount of time. These unrealistic expectations do not reflect the significant site-specific challenges San Juan must face to install SCR, particularly within the proposed 3-year deadline.

First, the FIP is overly optimistic about the effectiveness of SCR retrofit technology – although newly constructed units may be capable of achieving 0.05 lb/mmBtu with SCR, an emission limit that stringent has never been imposed on a unit with a retrofit SCR by any state, as illustrated by the attached table. Second, San Juan will not be able to install SCR on all four units for the price calculated by Region 6 and its consultant, based on the cost estimates developed by other states.<sup>38</sup> Third, San Juan will not be able to install all four SCRs in three years without significant additional costs, engineering, and construction feasibility challenges, and much more significant interruptions in operation of the plant. Taken together, these assumptions are unrealistic and undermine the Region’s cost-effectiveness calculation, particularly when compared to the results of the other BART determinations that have been made by the states for other electric generating units. The FIP proposed by Region 6 also includes a variety of measures never before considered relevant to a NO<sub>x</sub> BART determination in any other state, including the ammonia and sulfuric acid emission limits and the requirement to install a continuous emissions monitoring system for ammonia.

The proposed FIP offers no explanation of how or why its conclusions appear to represent such a strident departure from the determinations reached by every other state. If the analysis undertaken by Region 6 with regard to San Juan is a true indication of EPA’s interpretation of the regional haze program, EPA will be faced with disapproving every other state regional haze implementation plan in the country and replacing those plans with FIPs. That approach would directly contradict the design of the visibility provisions of the Clean Air Act, which grants to the states significant discretion in choosing their own means of meeting the national visibility goal. As part of these comments, PNM has provided a list of the other NO<sub>x</sub> BART determinations for electric generating units to demonstrate the stark contrast between Region 6’s approach and other states. PNM requests Region 6 take a more realistic look at its conclusions in light of this additional information and the additional technical information provided in the remainder of these comments.

### **3. The Proposed FIP for San Juan Is Inconsistent with Other BART Determinations Proposed by Region 6 and Other EPA Regions.**

EPA has recently proposed five rulemaking actions to address regional haze in addition to the proposed FIP for San Juan. Three of those proposals are to approve the regional haze SIPs submitted by California (Region 9), Idaho (Region 10), and Oregon (Region 10). Another proposal by Region 6 would approve the Oklahoma regional haze SIP in part and disapprove it in

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<sup>38</sup> A few BART determinations prepared by other states suggest that SCRs may be cost-effective, but those examples do not present an appropriate comparison to San Juan, either because they involve different boiler types or sizes or are already required to install (or already have installed) SCRs to meet other federal or state laws.

part. In addition, Region 9 has also proposed a FIP for the Four Corners Power Plant to require SCRs as NO<sub>x</sub> BART.

Three of those actions are not directly relevant to the proposed FIP for San Juan – the California regional haze SIP relies primarily on existing California state law to satisfy BART, Idaho has no BART-eligible coal-fired electric utility units, and the regional haze SIP for Oregon relies upon a strategy that requires the only coal-fired unit subject to BART in that state to retire from coal combustion by 2020.<sup>39</sup> The other two proposals for the Four Corners Power Plant and Oklahoma would impose control requirements on a total of eleven individual coal-fired electric generating units.

Because BART must be determined on a “unit-by-unit” basis, BART determinations naturally vary from unit to unit based on site-specific factors. Even so, EPA has indicated that a consistent method of analysis is important to ensure consistency in the application of BART.<sup>40</sup> However, the approach Region 6 has taken in proposing BART for San Juan appears to be entirely inconsistent with the approach it has taken in proposing to approve NO<sub>x</sub> BART for six units in Oklahoma. In addition, PNM is concerned that the Region 6 FIP for San Juan may have been inappropriately influenced by the FIP proposed for Four Corners Power Plant by Region 9. Although the overall analytical approach must be consistent, the final determinations should be different to reflect the differences between those two facilities.

**a. The Proposed FIP for San Juan is Entirely Inconsistent With FIP Proposed for Six Units in Oklahoma by Region 6.**

Oklahoma submitted its regional haze SIP to Region 6 on February 19, 2010, which included BART determinations for six coal-fired power plants – Units 4 and 5 of Oklahoma Gas and Electric’s (OG&E) Muskogee plant, Units 1 and 2 of the OG&E’s Sooner plant, and Units 3 and 4 of the American Electric Power / Public Service Company of Oklahoma (AEP / PSC) Northeastern plant.<sup>41</sup> The BART determinations for the those plants concluded that low NO<sub>x</sub> burners with over-fire air, existing electrostatic precipitators, and the continued use of low-sulfur coal satisfied BART because scrubbers and SCRs were not cost-effective.

On March 4, 2011, Region 6 proposed to disapprove the Oklahoma SO<sub>2</sub> BART determination for its six coal-fired facilities and proposed a FIP to require dry flue-gas desulfurization as BART.<sup>42</sup> However, Region 6 proposed to approve the determination that NO<sub>x</sub> BART for all six units only requires installation and operation of NO<sub>x</sub> combustion controls in

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<sup>39</sup> The Oregon strategy essentially re-calculates the cost-effectiveness of SCR for the Boardman Power Plant by assuming a shorter lifespan of the plant, which increases the annualized cost of SCR to well beyond cost-effective levels.

<sup>40</sup> See EPA’s BART Guidelines, 40 C.F.R. Part 51, Appendix Y (encouraging the use of EPA’s Cost Control Manual to estimate control costs, where possible, to provide for a consistent analysis).

<sup>41</sup> [http://www.deq.state.ok.us/aqdnew/RulesAndPlanning/Regional\\_Haze/SIP/index.htm](http://www.deq.state.ok.us/aqdnew/RulesAndPlanning/Regional_Haze/SIP/index.htm)

<sup>42</sup> 76 Fed. Reg. 16,168 (March 22, 2011).

five years to meet the presumptive BART limits.<sup>43</sup> Strangely, the proposed FIP does not expressly address SCRs at all, other than to recognize that Oklahoma properly considered SCRs (and other available controls) in its NO<sub>x</sub> BART analysis. The analysis submitted by Oklahoma indicated a cost-effectiveness for SCRs at the six units under consideration to be between \$4,044 and \$7,676 per ton of NO<sub>x</sub> removed and that, as such, SCRs were not cost-effective. By proposing to approve the BART determinations in Oklahoma, Region 6 appears to implicitly agree that (i) SCRs can cost as much as \$7,676 per ton of NO<sub>x</sub>, (ii) SCRs are not cost-effective if they cost more than \$4,044 per ton of NO<sub>x</sub>, and (iii) NO<sub>x</sub> BART for a large coal-fired power plant can be based on the use of combustion controls to achieve the presumptive limits.

The proposal to approve the NO<sub>x</sub> BART determinations for the six Oklahoma plants appears inconsistent with the proposed FIP for San Juan. For example, even though Region 6 estimated the cost of SCRs at San Juan to range between \$52 and \$63 million per unit, Region 6 has proposed to approve the conclusion made by Oklahoma that SCRs will require a capital investment of \$145 – \$193 million per unit, which is much more similar to PNM’s estimate of \$194 – \$261 million per unit.<sup>44</sup> Likewise, even though Region 6 estimates that the cost-effectiveness of the San Juan SCRs are \$1,579 – \$1,920 per ton, Region 6 has proposed to approve the Oklahoma conclusion that the cost-effectiveness of SCRs ranges between \$4,044 – \$7,676 per ton, which again is much closer to PNM’s estimate of \$5,946 – \$7,398 per ton. Region 6 has also been inconsistent with respect to the emission rate used in the analysis. Although it rejected the 0.07 lb/mmBtu NO<sub>x</sub> emission rate used in the analysis for San Juan, Region 6 has proposed to approve the analyses in Oklahoma that rely on that same rate. That inconsistency is particularly inappropriate, given that the Oklahoma units under consideration are tangentially-fired and burn sub-bituminous coal, and therefore should be expected to have lower NO<sub>x</sub> emission rates than San Juan, according to EPA’s presumptive NO<sub>x</sub> BART emission limits.

Because BART is a unit-specific analysis, the BART determination for San Juan should vary somewhat from the BART determinations made in Oklahoma. However, the failure of Region 6 to explain how its conclusions in Oklahoma can vary so significantly from its proposed FIP for San Juan suggests an inconsistent method of analysis. If nothing else, allowing Oklahoma sources five years to install combustion controls while requiring San Juan to install four SCRs in three years is inexplicable. Perhaps Region 6 is simply affording deference to the state of Oklahoma’s NO<sub>x</sub> BART determination, as envisioned by the Clean Air Act. If that is the case, PNM asks Region 6 to consider affording that same deference to New Mexico by allowing the state’s ongoing efforts to address regional haze to continue, since a final regional haze SIP is expected within a matter of weeks.

Given the similarity of the BART determinations made by the state of Oklahoma and the BART determination prepared for San Juan by PNM’s consultant, and the significant difference between those determinations and Region 6’s proposed FIP, PNM asks Region 6 to reconsider its BART analysis for San Juan using the method of analysis applied in Oklahoma.

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<sup>43</sup> 76 Fed. Reg. 16,168. The presumptive limits for the six Oklahoma units is 0.15 lb/mmBtu because they are tangentially-fired units burning sub-bituminous coal.

<sup>44</sup> PNM’s analysis is appropriately somewhat higher than the analyses prepared by Oklahoma, given the specific site-specific challenges at San Juan, which are addressed in detail below.

**b. Although A Similar Analytical Approach is Appropriate, the Outcome of the BART Analysis for San Juan Should Differ from the Proposed BART Determination for the Four Corners Power Plant.**

After publishing an advanced notice of proposed rulemaking on August 28, 2009 in the Federal Register, Region 9 proposed a FIP for the Four Corners Power Plant on October 6, 2010 because the plant is located on Indian lands that are not subject to an approved state, tribal, or local air quality program. The FIP proposed in 2010 concluded that BART for the Four Corners Power Plant would be SCRs and sorbent injection on all five units, to be installed within five years and operated to achieve an emission limit of 0.11 lb/mmBtu. In response to a proposal from one of the owners of Four Corners, Region 9 has since proposed an alternative to its initial BART determination that involves the retirement of three of the five Four Corners units.<sup>45</sup> Accordingly, there has been no final determination that SCR is required for Four Corners and it does not appear that the initially proposed FIP will be adopted.

Regardless of the final outcome of the Four Corners FIP, the fact that SCR was initially proposed as BART for all five units at Four Corners does not suggest that Region 6 must require SCRs for the four units San Juan. Based on conversations with Region 6 personnel, however, PNM understands that Region 6 is concerned about inconsistent BART determinations for San Juan and Four Corners because of the proximity of the two plants.

PNM agrees that a consistent method of analysis should apply. However, PNM disagrees that the outcomes of the analyses must be the same, given the meaningful differences between the two facilities. For example, the site congestion is a much greater concern at San Juan than at Four Corners. In addition, Four Corners does not have the same environmental upgrades that San Juan recently installed – specifically, Four Corners lacks the low-NO<sub>x</sub> burners and over-fired air systems that are already achieving significant NO<sub>x</sub> reductions at San Juan. As a result, Four Corners currently emits NO<sub>x</sub> at higher levels than San Juan, and therefore has the opportunity to achieve greater emission reductions at a lower cost. Thus, SCRs are less cost-effective at San Juan than at Four Corners.

With respect to conducting a proper BART analysis, however, the Four Corners FIP does provide a helpful point of comparison. First, Region 9 allowed much more time for review of its proposed action with its advanced notice of proposed rulemaking, which was published more than a year before the FIP was proposed. Region 9 has also allowed more time for comment on its proposed FIP than Region 6 has allowed for its proposed FIP. To be consistent, Region 6 should allow a similar amount of time for review of the proposed San Juan BART determination. Also, the FIP proposed by Region 9 would have allowed five years for construction of the SCRs, as authorized by the Clean Air Act. As noted above, San Juan is a more congested site, and therefore would need at least the same amount of time to install SCRs as Four Corners, not less, and Region 6 failed to account for the extra costs that would associated with a shorter deadline. In addition, the emission limit utilized by Region 9 in its analysis (0.11 lb/mmBtu) took into

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<sup>45</sup> The alternative proposal for Four Corners would require Units 4 and 5 to achieve 0.098 lb/mmBtu (with SCR) and require the retirement of Units 1, 2, and 3.

account the limitations of the units and the retrofit nature of the SCR installations required, and also would have allowed compliance on a plant-wide basis. Region 6, on the other hand, relied on an inaccurate assumption that a retrofit installation of SCRs at San Juan would be capable of achieving the same level of performance as a brand new unit designed with SCRs from inception, and applied that limit on a unit-by-unit basis. Region 6 should reconsider the emission limit it assumed for San Juan in the site-specific, plant-wide manner employed by Region 9.

**4. Region 6 Should Defer Action on the Proposed BART Determination for San Juan Until New Mexico Can Adopt its Own Regional Haze Program.**

The two regional haze SIP revisions recently submitted by NMED to the EIB are intended to satisfy New Mexico's obligations with respect to visibility protection pursuant to the regional haze regulations under Section 169A of the Clean Air Act. Together, the two SIP revisions represent an integrated and comprehensive approach to addressing regional haze impacts from sources in New Mexico.

**a. Summary of the Section 309 SIP**

The initial 309 SIP was submitted to the Region 6 in December 2003. It was intended to address the first phase of the regional haze requirements with an emphasis on stationary source SO<sub>2</sub> reductions intended to improve visibility on the Colorado Plateau. The current revision to the 309 SIP maintains the essential purpose of the original 2003 filing but incorporates updated air modeling results. Section 309 of the regional haze regulations provides an optional method of compliance with the Clean Air Act regional haze requirements that is only available to New Mexico and eight other western states that comprised the Grand Canyon Visibility Transport Commission (GCVTC). In 1996, the GCVTC submitted a report to EPA addressing visibility protection in Class I areas on the Colorado Plateau. The recommendations from this report were incorporated into Section 309. New Mexico has opted to address the requirements of the regional haze under Section 309 of EPA's regulations.

WRAP is the successor organization to the GCVTC and is comprised of western states, tribes, federal agencies, and other stakeholders. WRAP has developed many technical and policy tools to aid in implementation of the requirements under Section 309. It has also conducted air modeling that New Mexico and its neighboring states have used to establish their "reasonable progress" goals for regional haze.

The 309 SIP addresses visibility impacts from SO<sub>2</sub> emissions and proposes that New Mexico meet its obligations for SO<sub>2</sub> reductions to protect visibility through participation in the Western Backstop SO<sub>2</sub> Trading Program (WEB Trading Program). The WEB Trading Program is an alternative to individual BART assessments for covered stationary sources. The 309 SIP establishes the requisite regional milestones, the SO<sub>2</sub> emissions tracking requirements, and if the WEB Trading Program is triggered, the 309 SIP describes how NMED will determine allocations and manage the allowance tracking system needed to implement the program. The 309 SIP also demonstrates that it will provide for greater "reasonable progress" than would be achieved by application of BART pursuant to 40 CFR § 51.308(e)(2).<sup>46</sup>

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<sup>46</sup> See "Demonstration that the SO<sub>2</sub> Milestones Provide Greater Reasonable Progress than BART."

The WRAP modeling presumes that SO<sub>2</sub> emissions from San Juan will be limited to 0.15 lbs/mmBtu on a thirty-day rolling average for all four units which is the presumptive emission rate under 40 C.F.R. Part 51, Appendix Y. To that end, the 309 SIP would impose the 0.15 lbs/mmBtu SO<sub>2</sub> emission limitation on San Juan in order to satisfy the “reasonable progress” goals for to SO<sub>2</sub> emissions in the region. San Juan’s present SO<sub>2</sub> emissions are in the range of 0.10 to 0.18 lbs/mmBtu. PNM is in the process of filing an application to amend the San Juan air permit with an enforceable limit of 0.15 lbs/mmBtu for SO<sub>2</sub>.

**b. Summary of the Section 309(g) SIP**

The 309(g) SIP serves as a supplement to the 309 SIP and addresses visibility impacts from NO<sub>x</sub> and PM sources in New Mexico. Significantly, the WRAP modeling concluded that for the vast majority of Class I areas in the WRAP region that stationary source NO<sub>x</sub> and PM emissions are not a major contributor to visibility impairment. The 309(g) SIP includes the elements required under the Clean Air Act and EPA’s regional haze regulations, including a demonstration of expected visibility conditions for the most impaired and least impaired days at the mandatory Class I areas; provisions for establishing reasonable progress goals for Class I areas in New Mexico in compliance with 40 C.F.R. § 308(d)(1)-(4); long-term strategies for emissions reductions that compliment the strategies in the 309 SIP; and provisions to address long-term strategies and BART requirements for stationary source NO<sub>x</sub> and PM emissions pursuant to 40 C.F.R. § 51.308(e).

Under 40 C.F.R. § 51.308(d)(1) states are required to establish goals that provide for “reasonable progress” toward achieving natural visibility conditions for each Class I area in the state. The reasonable progress goals are interim goals that represent incremental visibility improvements over time. The 309(g) SIP includes specific reasonable progress goals for seven Class I areas in New Mexico. Based on its analysis, NMED determined that the 309(g) SIP will ensure “reasonable progress” towards achieving “natural visibility conditions” for 2018, the first planning period for the regional haze long-term planning effort.

The regional haze regulations also require states to submit a 10- to 15-year long-term strategy to address regional haze visibility impairment in each Class I area in the state, and for each Class I area outside of the state which may be affected by emissions from the state. The 309(g) SIP includes the requisite analysis to comply with the long-term strategy requirements under 40 C.F.R. § 50.308(d)(3)(v). The BART determination for San Juan, which includes emission limits and schedules for compliance, is one of the elements of New Mexico’s long-term strategy under the regional haze regulations. Because of the significance of the San Juan BART determination in the 309(g) SIP, it is addressed in detail below.

**c. Summary of NMED San Juan BART Determination**

On November 9, 2006, NMED informed PNM that the WRAP modeling indicated that San Juan was subject to a BART analysis. PNM retained Black & Veatch to prepare a BART analysis for San Juan. PNM submitted its BART analysis to NMED on June 6, 2007 and submitted several amendments and supplements to its initial June 2007 BART analysis. These

supplements and amendments addressed a variety of topics including costs estimations for emission control technology and air technology after receiving information that confirmed that SNCR can achieve NO<sub>x</sub> reductions sufficient to meet the presumptive limit for NO<sub>x</sub> emissions. PNM also submitted to NMED a comparative analysis of the cost impacts to residential electric customers resulting from the installation of SCR and SNCR technology. Additional modeling analysis was provided that addressed plant-wide and unit specific regional haze visibility impacts at 16 Class I areas assuming the use of SNCR control technology on all four San Juan units.

Following receipt of the information above, NMED undertook the five-step BART analysis as described in the 309(g) SIP. Pursuant to the BART Guidelines, as a first step, NMED identified all available retrofit emission control technologies for NO<sub>x</sub> and PM control for San Juan. In the second step, NMED eliminated the technically infeasible control technologies. NMED noted that in PNM's original BART analysis, SNCR was deemed technically infeasible because it was unable to meet the presumptive limit for NO<sub>x</sub> of 0.23 lb/mmBtu. However, PNM's February 2011 submittal confirmed that, based on recent advances in SNCR technology, the presumptive limit can be achieved.

In Step 3 of the BART analysis, NMED evaluated the control effectiveness of the feasible emission control technologies. The analysis for SNCR showed emission reductions of 966 tpy (Unit 1), 961 tpy (Unit 2), 1,500 tpy (Unit 3), and 1,472 tpy (Unit 4). In Step 4 of the BART analysis, NMED performed an "impact analysis" for the feasible control technologies. The four impacts considered in this analysis included the cost of compliance, energy impacts, non-air quality environmental impacts, and the remaining useful life of the facility. These four impacts are used to determine the cost effectiveness of each control technology which allows comparisons to be made between the various emission control technologies for the facility. NMED estimated the cost effectiveness of SCR as follows: \$3,708 per ton for Unit 1; \$3,727 per ton for Unit 2; \$3,238 per ton for Unit 3; and \$3,301 per ton for Unit 4. Notably, NMED agreed with PNM's cost estimates for the various control technologies considered, including SCR. The estimated costs effectiveness of SCR, plus sorbent injection, for NO<sub>x</sub> removal was \$6,931 per ton for Unit 1; \$7,398 per ton for Unit 2; \$6,191 per ton for Unit 3; and \$5,946 per ton for Unit 4.

In the fifth step of the BART analysis NMED assessed the visibility impacts of the feasible control technologies. The modeling followed the requirements of the WRAP's BART modeling protocol "*CALMET/CALPUFF Protocol for BART Exemption Screening Analysis for Class I Areas in the Western United States*" dated August 15, 2006. The modeling showed an improvement in all sixteen Class I areas through the use of SNCR compared to current emission levels utilizing combustion control technologies consisting of over-fire air and low NO<sub>x</sub> burners.

In the 309(g) SIP, NMED confirms that PNM followed the five-step process under the BART Guidelines in Appendix Y 40 C.F.R. Part 51 and concludes that SNCR constitutes BART for NO<sub>x</sub> controls with an emission rate of 0.23 lbs/mmBtu on a 30-day rolling average.<sup>47</sup> This determination was based on the following factors:

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<sup>47</sup> NMED also concludes that the existing pulse jet fabric filters constitute BART controls for PM at San Juan.

- SNCR technology is considered cost effective at an average cost of \$3,494 per ton of NO<sub>x</sub> removed. SNCR technology will reduce the facility annual NO<sub>x</sub> emissions by 4,900 tons.
- SNCR technology will result in additional energy impacts and non-air impacts. SNCR will require a new reagent system and a reagent storage system. NMED considered these additional costs in determining the overall cost effectiveness of SNCR and found these costs to be reasonable.
- NMED reviewed the visibility improvements that resulted from the installation of SNCR technology. NMED determined that on a facility-wide basis, the visibility improved by 0.25 dv at San Pedro, 0.22 dv at Mesa Verde, and 0.21 at Bandelier.
- An emission limit of 0.23 lbs/mmBtu of NO<sub>x</sub> at each of the San Juan units meet the EPA's established presumptive limit for dry bottom, wall-fired boilers burning sub-bituminous coal.
- NMED reviewed the additional economic information provided by PNM that analyzed the economic impact of SCR and SNCR to ratepayers in New Mexico. NMED determined that the cost of control technology beyond SNCR would be financially burdensome and cause economic hardship to low income New Mexico residents. NMED noted that, according to the U.S. Census Bureau, as of 2009, 18% of New Mexicans were living below the poverty line as defined by federal poverty standards. PNM estimates that installation of SNCR will result in a rate increase to residential customers of \$11.50, versus an estimated rate increase of \$82.00 per year for installation of SCR.
- NMED determined that in light of the unreasonable cost of SCR, requiring controls to achieve reductions beyond the most stringent presumptive standard prescribed by the EPA is not justified.<sup>48</sup>

The draft regional haze SIPs fully address the required elements under the regional haze regulations. Taken together, the SIPs provide a comprehensive and integrated approach to visibility protection in the Class I areas, in contrast to the FIP proposed by Region 6 which only partially addresses EPA's own regional haze requirements. Although the SIPs are still in draft form, and will need approval of the EIB to become final, the regional haze SIPs warrant careful consideration by the EPA in the present rulemaking proceeding.

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<sup>48</sup> Although the NMED assumed that San Juan burns sub-bituminous coal, PNM maintains that the coal actually falls between the sub-bituminous and bituminous classifications, for the reasons indicated above. For bituminous coal burned the same boilers, the presumptive limit is 0.39 lb/mmBtu. PNM currently meets that limit with the NO<sub>x</sub> combustion controls upon which EPA's presumptive limits are based. *See* 70 Fed. Reg. at 39134-36 ("For all types of boilers other than cyclone units, the limits in Table 2 [the presumptive NO<sub>x</sub> limits] are based on the use of current combustion control technology.").

**5. Region 6 Should Allow New Mexico the Opportunity to Finalize and Submit its Complete Regional Haze Plan.**

**a. The Clean Air Act Grants Discretion to States in Implementing the Regional Haze Program.**

The Clean Air Act contemplates that the states are to have the primary role in developing plans to protect visibility in Class I areas. States are specifically empowered to determine those stationary sources within their borders that emit “any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility.”<sup>49</sup> States are also specifically empowered to make determinations about what constitutes “best available retrofit technology” for these sources.<sup>50</sup> In contrast, the EPA is tasked with developing certain “guidelines” for implementation of the Act.<sup>51</sup> The primacy of the states in implementing the regional haze program was confirmed in *American Corn Growers Association v. EPA*, 291 F.3d 1, 2 (D.C. Cir. 2002) (“The Regional Haze Rule calls for states to play the lead role in designing and implementing regional haze programs to clear the air in national parks and wilderness areas that have been classified as ‘mandatory class I federal areas’ ....”) In meetings between representatives of PNM, Region 6, and the U.S. EPA, EPA confirmed that it preferred states pursue state implementation plans over EPA-issued federal implementation plans.

While New Mexico, along with most other states, missed the initial December 17, 2007 deadline to submit its regional haze SIP to the EPA, the state is stepping forward with a full regional haze program designed to address visibility impacts in Class I area. PNM supports the draft regional haze SIPs prepared by NMED, including the BART determination for San Juan, and will support NMED’s efforts to obtain EIB approval of its SIPs. It is now incumbent upon the EPA Region 6 to afford New Mexico an opportunity to present its regional haze SIP and for the EPA to properly evaluate the state program.

**b. It Is Not Necessary For Region 6 to Make a BART Determination for San Juan in Its Proposed FIP.**

As noted above, one of the stated bases for the Region 6’s haste in the present FIP proceeding is a consent decree in the case of *WildEarth Guardians v. Jackson*, No. 4:09-CV-02453 (N.D.Cal. Nov. 10, 2009) entered in federal district court in California. Under the terms of this consent decree and a related motion to extend certain deadlines, the EPA is required to issue a final interstate transport FIP or approve a final interstate transport SIP, including provisions to protect visibility, by June 21, 2010. Despite numerous requests from various interested parties for 60 to 90 day extensions of the public comment period, EPA has maintained that its ability to afford additional time for comment is constrained by the consent decree. In addition, during meetings between representatives of EPA Region 6 and PNM, the Region has

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<sup>49</sup> 42 U.S.C. § 7941(b)(2)(A).

<sup>50</sup> *Id.*

<sup>51</sup> 42 U.S.C. § 7941(b)(2)(A).

expressed concern about its ability to consider the regional haze SIPs within the deadline under the consent decree.

Again, it is important to note that the consent decree does not directly implicate the regional haze program or require a BART determination for San Juan. Rather, the consent decree only requires that any final FIP or SIP address visibility for purposes of Section 110 of the Clean Air Act. The WRAP modeling used by states to develop their regional progress goals relied on specific assumptions concerning emissions from stationary sources in the region. For San Juan, the WRAP modeling assumed a 0.15 lb/mmBtu emission rate for SO<sub>2</sub>, a 0.27 lb/mmBtu emission rate for NO<sub>x</sub> for Units 1 and 3, and a 0.28 lb/mmBtu emission rate for NO<sub>x</sub> for Units 2 and 4. The proposed FIP itself acknowledges that “an implementation plan that provides emissions reductions consistent with the assumptions used in the WRAP modeling will ensure that emissions for New Mexico sources do not interfere with the measures designed to protect visibility in other states.”<sup>52</sup>

Because the visibility requirements under the Interstate Transport Rule can be met without a Regional Haze BART determination for San Juan, Region 6 should only require San Juan to implement emission control measures necessary to meet the NO<sub>x</sub> limitations under the WRAP modeling. The EPA should defer any action on a BART determination for San Juan until it is presented with the final New Mexico regional haze SIPs. At a minimum, PNM specifically asks EPA to request a further extension of the deadline for a FIP under the WildEarth Guardians consent decree to allow time to properly consider the NMED SIPs.

## **6. Region 6 Failed to Comply with the Unfunded Mandates Reform Act.**

As noted in the proposed FIP, the Unfunded Mandates Reform Act of 1995 (UMRA), requires EPA and all federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and on the private sector. Under section 202 of UMRA, EPA must prepare a written statement, including a cost-benefit analysis, for all “federal mandates” that may result in expenditures of \$100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of UMRA also requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule.

In its proposal, Region 6 asserted that the proposed FIP would not require expenditures that exceed the UMRA threshold of \$100 million by state, local, or tribal governments or the private sector in any one year. However, that assertion is based on a unrealistically low estimate of the costs associated with the proposal to require San Juan to install SCRs. The Region’s cost estimate would be unrealistic even if it allowed for a five-year compliance date, as authorized under the Clean Air Act, but it is even more unrealistic in the three-year deadline proposed in the FIP. Based on PNM’s more realistic cost estimates, developed with the assistance of leading engineers with significant expertise in the field, the proposal to require SCRs at San Juan will cost at least \$908 million, not accounting for the additional costs associated with an accelerated implementation schedule. Even if spread over five years, such costs would easily exceed the

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<sup>52</sup> 76 Fed. Reg. at 496-497.

UMRA threshold of \$100 million in one year by either governmental or private sector entities. As such, Region 6's proposal is procedurally deficient in that it does not comply with UMRA.

### III. TECHNICAL FLAWS IN THE PROPOSED FIP

The technical and factual flaws in Region 6's BART analysis for San Juan are many. Grouped into general categories, PNM disagrees with:

- (A) the estimates of the capital and annual costs associated with installing and operating SCRs at all four units at San Juan;
- (B) the proposed 3-year implementation schedule;
- (C) the belief that retrofit SCRs at San Juan will be capable of achieving 0.05 lb/mmBtu NO<sub>x</sub> emission on a continuous, rolling average basis;
- (D) the visibility improvements projected with SCRs at San Juan; and
- (E) the total cost-effectiveness calculation and metric.

#### A. **Region 6's SCR Cost Analysis is Unrealistically Low and Fails to Properly Account for Site-Specific Challenges Associated with Installing SCR at San Juan.**

PNM and its consultants estimated the cost of retrofitting San Juan with SCRs to be between \$194 million and \$261 million per unit (depending on the unit) with a total cost of \$908 million for all four units.<sup>53</sup> Region 6 claims that SCRs can be purchased and installed for much less – between \$52 million and \$63 million per unit for a total of about \$229 million. Region 6's estimate of annual operating costs for the SCRs are also much lower than PNM's estimate. PNM's analysis indicates annual operating costs for all four SCRs would be approximately \$114 million per year, whereas Region 6 expects PNM to be capable of operating the SCRs for only about \$28 million per year.

In short, Region 6 believes that SCRs cost \$679 million less, or **one quarter** of the amount estimated by PNM. The breadth of the disparity between these two estimates alone draws the Region 6's estimate into question. The cost analysis failed, among other things, to properly consider site-specific challenges at San Juan, as explained further below.

#### 1. **Region 6 Failed to Account for Costs Associated with a Wide Variety of Equipment That Will Be Needed to Install and Operate SCR at San Juan, Which Underestimates the Cost of the SCRs.**

The Clean Air Act visibility provisions, EPA's own regional haze regulations, and the preambles to those rules all envision a "source-by-source" approach to BART, which by its

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<sup>53</sup> Although PNM's initial estimates were made in 2007 dollars, PNM updated these figures to 2011 dollars at EPA's request prior to issuance of the proposed FIP.

nature must account for site-specific challenges at each facility.<sup>54</sup> However, despite the significant amount of information provided by PNM in its original BART analysis, in subsequent exchanges with NMED and Region 6, and in the September 2011 meeting between Region 6 and PNM specifically to discuss the site-specific challenges at San Juan, Region 6 did not take into account many of the most significant costs that are essential in calculating an accurate cost estimate of installing SCR at San Juan.

**a. Region 6 Failed to Account for the Costs Associated with Ensuring Sufficient Auxiliary Power to Operate SCR at San Juan.**

The Region 6 cost analysis recognizes that the installation of SCR at San Juan will require additional auxiliary power that is currently unavailable with the existing auxiliary power sources. That additional auxiliary power would be needed to operate the larger fans that the SCR would require, and to operate other existing fans at a higher operating levels to overcome the additional differential pressure resistance that an SCR would add to the flue gas path for each unit. Without upgrades to the auxiliary power system, the San Juan units would be unable to achieve rated capacity and overall efficiency of the units would decrease. Accordingly, PNM's estimate includes the costs associated with upgrades that would be needed to ensure sufficient auxiliary power is available for SCR operation and allow the units to achieve rated output capacity.

Region 6 discounted by nearly 80 percent the estimated cost of the auxiliary power upgrades needed to power the SCR. The theory behind this sharply discounted cost estimate is that the SCR will only be responsible for approximately 20 percent of the total draft pressure of the units and that therefore the cost of the auxiliary power upgrades should be allocated in similar fashion. Region 6's approach complicates an otherwise simple issue. Without SCR, no additional auxiliary power would be needed; with SCR, auxiliary power upgrades would be critical to the continued safe and reliable operation of the units. As such, those costs must be included in the cost of the SCR, as they represent one of the site-specific concerns that could make the installation of SCR at San Juan more difficult than other units. The decision by Region 6 to exclude these costs underestimates the cost of SCR for San Juan by **\$73,175,000**.

**b. Region 6 Failed to Account for Additional Costs Associated with Protecting the Air Preheater Following an SCR Installation.**

Retrofit SCR are designed to convert NO<sub>x</sub> into nitrogen gas and water through the injection of ammonia into the flue gas in the presence of a catalyst. However, that same

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<sup>54</sup> See, e.g., 42 U.S.C. § 7491(b)(2)(A) (requiring specific sources to install and operate BART "for controlling emissions from such source.") (emphasis added), 42 U.S.C. § 7491(g) (defining BART in terms of five site-specific factors), 40 C.F.R. § 51.308(e) (requiring regional haze implementation plans to contain "emission limitations representing BART and schedules for compliance with BART for each BART-eligible source . . .") (emphasis added), 40 C.F.R. Part 51 Appendix Y (providing "a process for making BART determinations that States can use in implementing the regional haze BART requirements on a source-by-source basis, as provided in 40 C.F.R. § 51.308(e)(1)," and referring to that analysis as a "Case-by-Case BART Analysis") (emphasis added), and 70 Fed. Reg. 39,104, 39,134 (July 6, 2005) (noting as one example that "certain boilers may lack adequate space between the burners and before the furnace exit to allow for the installation of over-fire air controls.").

ammonia also reacts with sulfur in the flue gas downstream of the SCR forming ammonium bisulfate (ABS), which condenses in the air preheater where flue gas temperatures drops to the dew point of ABS. ABS is an acidic substance that forms a sticky deposit on heat transfer surfaces, resulting in both corrosion of the equipment and the collection of fly ash that plug passages, which ultimately impairs the efficiency and reliability of the unit. As such, the installation of a retrofit SCR generally requires a modification to the air preheater to allow for easier cleaning of the basket surfaces in order to protect the heat transfer elements against the potential damage that might otherwise result from ABS.

Region 6 deleted the costs of protecting the air preheater in its SCR cost analysis, “pending compelling justification that they are required for the SCR.” Region 6’s cost analysis recognizes that modifications to the air preheater are generally required for “units that burn high sulfur coal,” but Region 6 assumes that such modifications are not necessary “for a properly designed SCR on a boiler that burns low sulfur coal.” Without further defining the difference between “high” and “low” sulfur coal, Region 6 assumes that San Juan would not experience significant ABS formation using a low oxidation SCR catalyst and an ammonia slip of 2 ppm. As justification for deleting the air preheater costs, Region 6 cites to a BART determination recently prepared for the Navajo Generating Station, which did not recommend modification of the air preheater if SCR were required for that facility. Region 6 also cites an article from an air preheater vendor for support as well.

The two materials cited by Region 6 do not support its conclusion that ABS “is not an issue” for units combusting low-sulfur coals. First of all, the Navajo Generating Station does not actually have an SCR, so the assumptions and recommendations made in the BART determination report prepared for that source are not based on actual operating experience. Perhaps more importantly, however, the Region’s characterization of the report as suggesting that ABS is not a concern is inaccurate. On the contrary, the BART determination prepared for the Navajo Generating Station includes the following discussion of the dangers of ABS formation in the air preheater following installation of an SCR:

The application of SCR technology to coal fired power plants creates a potential problem with the deposition of ammonia-sulfur salts in the air preheater. The vanadium/titanium-based catalyst will oxidize a portion of the sulfur dioxide in the flue gas to sulfur trioxide. Under certain temperature and concentration conditions, the sulfur trioxide will react with ammonia slip from the SCR reactor to form ammonium bisulfate (ABS) which will tend to deposit in the air preheater. If favorable conditions for this reaction persist and ammonia concentrations reach higher than the designed value of 2 ppmvd, frequent washings of the air preheater may be required.

ABS will condense from the gas stream and form a sticky deposit on the heat transfer surface of the air heater at a temperature of 380 – 450 °F. Fly ash particles will tend to stick to the ABS resulting in the gradual pluggage of the APH. Depending on the degree of formation, this could result in an increase in APH pressure drop (impacting ID fan capacity) as well as a loss in thermal efficiency for the plant.

ABS is also corrosive (acidic in nature) and will corrode the mild steel or low alloy steel surfaces of the APH. The rough surface of corroded material further enhances the deposition of ammonium bisulfate and accelerates the plugging mechanism.

The ABS dew point while burning bituminous fuel will be in the temperature range of 590 °F to 615 °F. The melting point of this compound is 300 °F and the boiling point is 914 °F. Once this compound is formed, it will be in liquid phase above 300 °F and the solid phase below 300 °F. Therefore, all metal surfaces of the APH from 300 °F to 615 °F will be subjected to ammonium bisulfate deposition.

Since the air heater outlet temperatures of both Navajo Generating Station and SJGS are below the 300° F threshold, both projects units would be at risk for ammonium bisulfate deposition upon installation of an SCR.

Region 6 is correct that, in spite of the quoted discussion above, Sargent & Lundy did not recommend air preheater modifications in the SCR cost analysis for the Navajo Generating Station. However, that recommendation was based on the specific emission characteristics at Navajo Generating Station, which differ significantly from those at San Juan. For instance, although San Juan does burn relatively low sulfur coal, the sulfur content is still typically higher than that of the coal burned at the Navajo Generation Station. In addition, the higher heating value (HHV) of the San Juan coal is 1000 Btu/lb lower than coal burned at Navajo Generating Station and the ash content is one-hundred-eight percent (108%) higher. The higher ash content increases the risk of pluggage associated with ABS if SCRs are installed at San Juan. The difference between San Juan and the Navajo Generating Station seem to have been completely ignored in the effort to rely on the BART determination for the Navajo Generating Station to delete the air preheater costs from the San Juan estimate prepared by Black & Veatch.

The article cited by Region 6 to suggest that air preheater modifications are only required for units that burn high sulfur coal also does not support Region 6's position. To the contrary, rather than focusing on the level of sulfur in the flue gas the article simply states that "[b]ased upon the sulfur content of most American coals, predominantly ammonium bisulfate will form." Since ammonia would be absent from the flue gas stream without SCRs, any formation of ABS at San Juan would be entirely attributable to the installation of the SCRs. The article cited by Region 6 also notes that, even in "low ammonia slip designs, fouling has often been observed due to increases of slip during transient load conditions." In other words, even if ammonia slip is generally kept below 2 ppm, changes in load will likely result in higher slip that will form ABS in the air preheater. Region 6 ignores this fact in its analysis.

Given the likelihood that the installation of retrofit SCRs at San Juan will result in the formation of ABS in the air preheater, Black & Veatch's cost estimate included modifications to the air preheaters to improve basket longevity by making it easier for the air heater sootblower to remove ABS deposits that would otherwise lead to the corrosion and pluggage that could impact unit reliability. The modifications recommended by Black & Veatch are a cost-effective approach that would still be capable of addressing the ABS concerns. Those modifications result in significant costs that are not only essential, but also fully attributable to the SCR. The

Region's failure to account for the costs associated with protecting the air preheater underestimates the cost of the SCR retrofits at San Juan by **\$16,698,000**.

**c. Region 6 Failed to Account for Code Required Boiler Stiffening.**

The installation of SCR at San Juan would increase the resistance in the flue gas path for the units. To overcome that additional resistance, PNM would need to install new higher capacity fan rotors and motors because the SCRs will add an additional pressure drop in the system of 10 inches of water. This change in pressure and higher fan pressure ratings would increase the potential risk of a boiler implosion during transient (upset or malfunction) conditions. The analysis prepared by Black & Veatch of the expected cost of an SCR retrofit includes the costs to mitigate the implosion risk by converting to balanced draft and stiffening the boiler and associated flue gas path. The specific recommendation made by Black & Veatch ensures that the San Juan boilers would remain in compliance with the National Fire Protection Association (NFPA) Code 85. NFPA 85 governs fire and implosion protection for Boilers and Combustion Systems and establishes structural and controls design requirements that must be incorporated. Throughout the industry, state inspection authorities and insurers routinely use NFPA 85 as a minimum standard to determine when a boiler requires stiffening for implosion and explosion protection. San Juan is currently in compliance with the NFPA 85 and therefore would not need to stiffen the boiler in the absence of the proposed FIP requiring SCRs.

Region 6 recognizes in its cost analysis that larger ID fans will be needed and that an SCR would increase the flue gas pressure drop through the units by 10 inches of water. Region 6's conclusions with regard to the size of the fans needed, however, are unsupported, and fail to take into account the need to add additional operating margin to the fan capacity. Region 6 also concludes that additional boiler stiffening would not be required, stating simply that "a balance draft conversion with the proposed stiffening is not part of an SCR project." Based on the analysis performed so far, boiler stiffening would be a necessary part of any SCR project at San Juan to maintain a safe and reliable facility that also meets code requirements. Costs associated with code compliance must be taken into account in making a site-specific BART determination for San Juan. Region 6 improperly focuses on other pollution control equipment that already exists at the site in an effort to argue that those controls, not the SCR, trigger the need for additional boiler and duct stiffening. In fact, partial boiler stiffening was already performed during the installation of the existing controls to bring the unit into compliance with NFPA 85. However, an SCR would present additional draft system pressure concerns beyond that presented during the installation of the existing control equipment.

Region 6's consultant, Dr. Fox, states in her analysis of boiler stiffening costs that "[m]y review of the 2004 and 2007 revisions of NFPA 85 indicates that the 2004 revision of the [relevant code provisions] applied to the Consent Decree projects."<sup>55</sup> Dr. Fox makes that assertion to support her opinion that "stiffening was triggered by the Consent Decree projects, based on the plain language of NFPA 85" and that "[t]hus, none of the stiffening costs should be attributed after the fact to the SCR." Dr. Fox further suggests that, because of an "ambiguity" in

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<sup>55</sup> The "Consent Decree" projects referenced in the Region's cost analysis include the demisters, low NO<sub>x</sub> burners, baghouses, and activated carbon injection systems that PNM installed in compliance with a 2005 Consent Decree.

the 2007 version of the code, it may not apply to the San Juan boilers at all, although she does eventually apportion some of the boiler stiffening cost to the SCR.

Dr. Fox's interpretations and conclusions about the code and the boiler stiffening are incorrect in several ways and likely the result of her inexperience with the code. In contrast, Black & Veatch's boiler and draft system expert, Mr. Kris Gamble, has over 30 years of boiler and draft system design experience. Mr. Gamble also serves on the Technical Committee on Multiple Burner Boilers that help write the NFPA 85 code.

Dr. Fox's belief that the 2004 version of the Code applied to the Consent Decree projects is incorrect. The 2004 version was superseded by the 2007 version during the Consent Decree work, and the 2007 version was utilized in that work.<sup>56</sup> In addition, the Code is not ambiguous in the manner suggested by Dr. Fox. Rather, it allows boiler owners to either (i) meet a generally-applicable pressure standard of +/- 35 inches w.g., or (ii) conducting "a more complete and rigorous analysis" to develop a design that utilizes other safety precautions, so long as the designer can demonstrate that those other safety precautions will sufficiently protect the boiler from implosion and explosion risks.<sup>57</sup> PNM complied with NFPA 85 during construction of the Consent Decree projects by demonstrating, through "a more complete and rigorous analysis," that the San Juan boilers would be adequately protected from implosion during upset or transient conditions. Additional duct and boiler stiffening was completed at that time to meet code.<sup>58</sup>

Installation of SCR's at San Juan Generating Station will again increase boiler and duct implosion potential due to increased draft system requirements and fan pressure ratings. SCR's will trigger the need to once again choose between either designing to the general standard of +/- 35 inches w.g. (which is typical for a newly designed power plant) or performing a "more complete and rigorous analysis" to determine whether PNM will qualify for an exception from the generally-applicable implosion protection standard through the use of alternative methods. To date, neither PNM nor its consultants have fully determined whether an alternative to the +/- 35 inches w.g. standard would suffice following installation of an SCR, due to the significant

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<sup>56</sup> The 2007 version of NFPA 85 has recently been superseded by a 2011 version, but that version does not make any material changes to the provisions discussed above.

<sup>57</sup> National Fire Protection Association Code 85, "Boiler and Combustion Systems Hazards Code (2007 Edition), Sections 1.2.3.1 & 6.5.1.3.1 (requiring that "[t]he furnace and flue gas removal system shall be designed so that the maximum head capability of the induced draft fan system with ambient air does not exceed the continuous design pressure of furnace, ducts, and associated equipment," but indicating that "[a] designer capable of applying more complete and rigorous analysis to special or unusual problems shall have latitude in the development of such designs.").

<sup>58</sup> The analysis completed by PNM's consultants indicated that the boilers would be sufficiently protected if stiffened to withstand negative pressure differentials of 15 inches w.g. (for Units 3 and 4) and 12 inches w.g. (for Units 1 and 2), instead of the generally applicable NFPA 85 standard of +/- 35 w.g. Although PNM's engineers were able to demonstrate that the units would be sufficiently protected, as then configured, at negative pressure differentials of 12 and 15 inches w.g., FM Global, PNM's insurer, asked PNM to be more conservative and stiffen the boilers further so that all four units would be able to withstand a negative pressure differential of up to 18 inches w.g. PNM complied with that request and stiffened the boilers to that specification.

amount of time and expense that would be associated with that analysis. For example, the analysis conducted for the Consent Decree control projects cost more than \$300,000 to complete, and clearly exceeds the level of detailed engineering required for a BART determination. Based on the information that is currently available, and the acknowledged increase in differential pressures associated with an SCR, Black & Veatch concluded that including the cost for stiffening the boilers to +/- 35 inches w.g. is the only way to ensure full compliance with the NFPA 85 standard. Therefore, Black & Veatch included the cost of stiffening the boilers to +/- 35 inches w.g. in its analysis.

This explanation was previously provided to Region 6 and to Dr. Fox, but it appears to have been entirely ignored in Region 6's cost analysis of SCRs for San Juan. In addition, Region 6 has no regulatory authority to determine whether the proposed design meets the requirements of NFPA 85. According to the code, that authority lies with the entity defined as the "Authority Having Jurisdiction," which for San Juan is PNM's insurance carrier, FM Global. PNM's experts currently believe significant boiler stiffening will likely be required to protect the boilers from implosion following installation of an SCR and, without a successful demonstration that the boilers could be adequately protected without stiffening to the NFPA 85 standard, PNM must assume that stiffening will be required. The mere existence of a possible exception from the generally applicable NFPA 85 standard, even if successfully obtained in the past, does not suggest that it will be possible to do so again. Region 6's failure to properly account for the boiler stiffening costs underestimates the cost of the SCR retrofits for San Juan by **\$55,718,000** in capital costs for boiler stiffening and properly sized fans and motors.

In addition, the Region 6 cost estimate also underestimates the cost of lost generation and associated replacement power costs by **\$78,682,000** because it did not consider the outage time needed to complete the boiler stiffening. Lost power generation is a real cost that PNM will incur as a result of the SCR retrofit. Also, while the San Juan units are offline, PNM and the other owners of San Juan will have to purchase power to satisfy their customers' needs. This "replacement power" will cost more than the cost to produce power at San Juan, and thus will result in additional costs to the San Juan owners. These costs must be taken into account in the cost estimate for the SCRs.

**d. Region 6 Failed to Account for the Cost of Installing the Initial Catalyst Layers in the SCR.**

SCRs must have several initial layers of catalyst to begin operating. Those initial layers of catalyst become deactivated over a period of time due to various factors and lose the ability to reduce NO<sub>x</sub> emissions. The catalyst layers must be replaced periodically to optimize catalyst life and maintain emissions performance. There are two ways to accurately account for the cost of both the initial catalyst layers and the replacement catalyst layers. The first method is to include the initial catalyst layers in the capital cost calculation for the SCR and account for each of the replacement layers in the annual operating cost calculation. The second method is to include all of the catalyst layers, both the initial layers and the replacement layers, in the annual cost calculation. Either way, the cost analysis must take into account both the initial catalyst layer and all of the replacement layers that will be needed over time operate the SCR.

The cost analysis prepared by Black & Veatch followed the first method described above by including the cost of the initial layers of catalyst in the capital cost and including the replacement layers in the annual operating cost calculation. Region 6's consultant, however, appears to have misunderstood the analysis and assumed that the initial catalyst layers were double-counted. As a result, she subtracted the initial catalyst cost from the capital cost calculation, without adding it to the annual cost calculation. In doing so, the Region's analysis entirely eliminates the cost of the initial catalyst layers. As such, Region 6's failure to include the cost of the initial layers of catalyst in its analysis underestimates the cost of installing SCRs at San Juan by **\$33,556,000**.

**e. Sorbent Injection Will Be Needed if PNM Must Install SCRs at San Juan and the Region 6 Cost Analysis Should Reflect Those Costs.**

In order to reduce the cost-effectiveness calculations, Region 6 eliminated from the analysis costs associated with the installation and operation of a sorbent injection system. Sorbent injection systems are often used at coal-fired power plants equipped with SCRs to help reduce emissions of sulfuric acid mist that are an unavoidable byproduct of the chemical reactions that occur in an SCR. PNM included the cost of the sorbent injection system in its cost analysis of the SCRs for San Juan for several reasons. First, sulfuric acid mist resulting from SCR operation has been known to cause a visible plume at some units in the industry. Although the installation of SCRs may not result in such a plume at San Juan, the sorbent injection system would be needed to ensure a visible plume does not materialize. The second reason PNM included the cost of sorbent injection in its cost estimate is that the failure to address the sulfuric acid mist created by the SCR can reduce any visibility benefits associated with an SCR. Incurring the significant costs to install SCRs without addressing the inherent increases in sulfuric acid mist that would also result would simply be counter-productive, as recognized in the analysis conducted by PNM and both the 2010 and 2011 draft BART determinations developed by NMED.

Region 6 assumed that emissions of sulfuric acid following the installation of SCRs at San Juan would be minimal, but EPA's calculation of sulfuric acid emissions is incorrect. Region 6 estimated sulfuric acid mist emission levels based on a document prepared by the Electric Power Research Institute (EPRI), which describes a formula used by many utilities to estimate sulfuric acid emissions. However, in applying that formula, Region 6 assumed an ammonia slip value of 2.0 ppm, even though actual ammonia slip varies over the life of a catalyst layer from very low values up to 2.0 ppm as the catalyst ages. A more appropriate assumption for ammonia slip is the 0.75 ppm value recommended by the EPRI formula, which better represents the expected ammonia slip over the life of a catalyst. Using that assumption, the sulfuric acid emissions from San Juan are calculated to be twice that assumed by Region 6. As a result, Region 6's attempt to justify its decision to delete the costs of sorbent injection based on minimal sulfuric acid mist emissions is incorrect.

The EPA also cites to the results of a stack test performed at the Navajo Generating Station in November 2009 to conclude that actual sulfuric acid mist emissions are lower than would be estimated using the EPRI Method. However, there are two major concerns with the Region's conclusion. First, the air quality control industry generally considers sulfuric acid

testing to be very prone to inaccuracy because the test methods used are susceptible to bias.<sup>59</sup> Second, sulfuric acid emissions vary significantly from unit to unit because emissions removal is dependent on many variables including temperature, moisture, process operation, air quality control equipment, ambient conditions, and the quality of the testing. As mentioned above, San Juan and the Navajo Generating Station differ significantly in many of these respects. Therefore, it is not appropriate to use test results from Navajo Generating Station to make assumptions about San Juan.

Finally, it is appropriate to include sorbent injection costs in the SCR cost analysis because sorbent injection may be required by law. The Prevention of Significant Deterioration (PSD) program under the Clean Air Act requires major sources to install additional controls to address any significant net emissions increases resulting from a physical change to an emissions unit. Because the SCR will constitute a physical change to the San Juan emission units, and could have the potential to result in a significant net emissions increase in sulfuric acid mist, additional controls could be required by the PSD program. If triggered, the PSD program would require the installation of “best available control technology,” which for sulfuric acid mist emission increases would likely include a sorbent injection system. Although there remains some uncertainty as to whether the SCR would trigger PSD permitting requirements, PNM believes it is appropriate to include the cost of the system in the SCR cost analysis, and the failure to include those costs underestimates the cost of the SCRs by **\$12,118,000**.

**f. Region 6 Failed to Account for the Additional Steel That Will Be Needed Due to Site Congestion at San Juan.**

Region 6 assumed that the “complexity factor” applied to the structural steel cost in PNM’s cost analysis was a “contingency factor.” As such, Region 6 assumed that PNM had double-counted contingency costs by using both the “complexity factor” for structural steel and a more general “contingency factor” overall. Region 6 misunderstood PNM’s analysis because a “complexity factor” is not a “contingency factor.” “Contingency factors” are designed to address unforeseeable costs. “Complexity factors” are used to reflect expected additional costs related to site congestion identified during the analysis.

Region 6 relies on Dr. Fox’s opinion that San Juan is no more congested than other sites, including the St. John River Power Park (SJRPP), which was used as a comparison point in developing the SCR cost analysis for San Juan. According to her report, Dr. Fox’s opinion is based on a review of the San Juan and SJRPP using Google Earth, a web site that includes a database of satellite photographs.

Google Earth is not a valid means of ascertaining site-specific engineering challenges at a complex industrial facility. PNM asks Region 6 to reconsider the analysis provided by Black & Veatch, given that the engineers at Black & Veatch made several site visits to San Juan and

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<sup>59</sup> Such bias may result from (i) measurement interferences by PM, fluorides, free ammonia, and dimethylaniline, (ii) impacts of unit and AQCS equipment operation during sampling, (iii) impacts of testing crew in handling sampling equipment, and (iv) accuracy of barium-thorin titration to determine sulfuric acid in the sample.

designed the SCR's for SJRPP. The pictures of SJRPP and San Juan provided by Black & Veatch in Attachment B illustrate the differences in site congestion:

The extreme site congestion at San Juan is caused by several factors that do not exist at SJRPP. First, San Juan has "hot side" ESPs that are ahead of the air preheater in the flue gas path, whereas most coal plants have "cold side" ESPs that are downstream of the air preheater. Because the ESPs for San Juan are located in front of the air heaters they are right in the middle of the boiler outlet duct area, which severely restricts the area in which SCR's would need to be installed, particularly given the fact that the stacks are also located right next to the air heaters.

The second primary cause of site congestion at San Juan is the arrangement of the four units in a row, which leaves two units (Units 2 and 3) on the interior of the row. There is very little space between units – in fact, as shown in the pictures in Attachment B, the only space available between units are small maintenance roads to go into the boiler building. As a result, there is very little room between units for the cranes that will be needed to hoist the SCR's into place.

To account for the site congestion at San Juan, Black & Veatch added a "complexity" factor to the amount that would normally be associated with a typical retrofit SCR installation – 20 percent for Units 1 and 4 and 50 percent for Units 2 and 3. A higher retrofit factor was used for Units 2 and 3 because they are "interior units" (located in between the exterior units 1 and 4) and crane access is especially limited on those units. The factor applied to the normal structural steel cost was not a "contingency factor," but rather an expected cost of installing SCR's at the complex and congested San Juan site. Region 6 underestimated the cost of its BART proposal by **\$35,087,000** by failing to accurately account for site congestion.

**g. Region 6 Failed to Account for the SCR Bypass That Will Be Necessary to Protect the SCR During Startup on Oil.**

Region 6 assumed that San Juan could initiate startup of its units on oil without fouling the catalyst in the SCR. The Region's justification for the removal of this cost line item was that fuel oil is efficiently burned in modern low NO<sub>x</sub> burners with oil ignitors, citing two coal-fired units that have shown the ability to startup on oil without a bypass and two oil-fired boilers with SCR's that do not have a bypass. Based on these references, the Region's consultant concluded that San Juan will be able to startup on oil without risking catalyst fouling resulting from a coating of incompletely combusted fuel oil.

Although some new units have shown the ability to startup on oil without bypassing the SCR, as the risk of catalyst fouling due to incompletely combusted fuel oil is much greater with a retrofit SCR at an existing unit. Even with new burners, greater uncertainties exist during startup of older units with retrofit burners and retrofit SCR's. Black & Veatch determined that a bypass would be necessary at San Juan to avoid fouling of the SCR catalyst, based on their wealth of experience in installing and supporting operational retrofit SCR's across the nation. Since the BART analysis requires a site-specific analysis, Region 6 should defer to the opinions of experts who have practical experience with the site-specific questions involved, rather than rely on

anecdotal references to other units. The failure to account for the needed SCR bypass system underestimates the cost of installing SCR at San Juan by **\$126,484,000**.

**h. Region 6 Failed to Properly Estimate Annual Operating Costs.**

The Region 6 cost estimate also does not properly estimate annual operating costs for auxiliary power consumption and catalyst replacement rate. Black & Veatch estimated the amount of auxiliary power needed to run the SCR to be 16,297 kW (for all four units) at a cost of \$0.06095 per kWh, based on a site-specific analysis. Specifically, B&V's calculation was based on the calculation of the additional fan energy (based on flue gas flow rate and estimated pressure drop from the SCR) and the power consumption for the auxiliary equipment (such as the ammonia system). Region 6, on the other hand, simply assumed a cost of 5,400 kW at \$0.05 per kWh based on a percentage estimate for "typical" SCR installations. This error underestimates the cost of auxiliary power consumption when operating SCRs by **\$5,388,000**. Because of the Region 6's underestimation of the capital cost of the project, the capital recovery (which represents the annual impact of the initial capital expenditure) for the project is also underestimated by **\$50,407,000**.

Each of these errors illustrates the failure to take into account the site-specific characteristics of San Juan, as directed by the Clean Air Act and EPA's own regulations and guidance.

**2. By Focusing Too Heavily on an Outdated, Generic Manual, the FIP Cost Analysis Fails to Represent a Realistic Estimate of SCR Costs for San Juan.**

The cost estimate also fails to take into account the realistic estimating factors utilized in PNM's cost estimate, as recommended by its consultants, Black & Veatch. Black & Veatch has a wealth of experience in designing and installing SCRs at large coal-fired power plants. Black & Veatch drew upon that experience in estimating the costs for SCR at San Juan. In contrast, Region 6 and its consultant relied almost exclusively on a general guide prepared in 2002 by the EPA Office of Air Quality Planning and Standards named the "Control Cost Manual."<sup>60</sup> Region 6's heavy reliance on the Cost Control Manual resulted in an unrealistic and inaccurate SCR cost estimate.

The Cost Control Manual is described in the preamble to EPA's BART regulations as "a good reference tool," and the BART Guidelines likewise recommend EPA's Control Cost Manual as one of several sources of information states should consider as they determine BART for specific sources.<sup>61</sup> However, neither the rule preamble nor the BART Guidelines suggest that the Control Cost Manual is the only possible source of information that should be used to determine BART. For instance, taken in full context, the reference to the Cost Control Manual in the BART Guidelines clearly recognizes the potential limitations of the manual and the need to consider additional information sources:

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<sup>60</sup> 70 Fed. Reg. at 39,127.

<sup>61</sup> 40 C.F.R. Part 51, Appendix Y.IV.D.4.

The basis for equipment cost estimates also should be documented, either with data supplied by an equipment vendor (i.e., budget estimates or bids) **or by a referenced source (such as the OAQPS Control Cost Manual, Fifth Edition, February 1996, EPA 453/B-96-001).**<sup>62</sup> In order to maintain and improve consistency, cost estimates should be based on the OAQPS Control Cost Manual, where possible. The Control Cost Manual addresses most control technologies in sufficient detail for a BART analysis. **The cost analysis should also take into account any site-specific design or other conditions identified above that affect the cost of a particular BART technology option.**<sup>63</sup>

Despite the recognition by EPA regulations and guidance that its Control Cost Manual may be inadequate in some cases, Region 6 refers to the Cost Control Manual as “the standard procedure developed by EPA” that is “stipulated in the BART Guidelines,” and cites to it more than thirty times in its analysis.<sup>64</sup> Although Region 6’s analysis acknowledges the requirement that BART analyses must take “unusual circumstances” into account,<sup>65</sup> the Region’s analysis fails to properly do so. Region 6 criticizes PNM and Black & Veatch for “deviating” from that “standard procedure.” However, those “deviations” in fact represent either estimates of costs associated with the “unusual circumstances” that would significantly complicate the installation of SCRs at San Juan or adjustments to the assumptions in the manual to appropriately reflect the real costs that will be associated with installing SCRs at San Juan.

Region 6’s justification for relying so heavily on the Control Cost Manual is that use of the manual will lend consistency to the BART cost analysis. That is the same reason EPA provided in its Guidelines for recommending the manual as one possible source of information, but the Guidelines continue to support the use of other sources of information in spite of that policy, and only recommend use of the Control Cost Manual “where possible,” recognizing the limits to which the BART determination process may be standardized.

Furthermore, perfect consistency in the cost analysis would entirely eliminate the case-by-case nature of the analysis envisioned by Congress. In a recent telephone conference on March 21, 2011, EPA’s Office of Air and Radiation agreed that consistency among various EPA Regions is important but recognized that site-specific considerations must be addressed because “plants are not all alike.” As such, Region 6’s failure to properly consider costs for site-specific

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<sup>62</sup> In footnote 14 of the Guidelines, EPA explains that the 1996 version of the Control Cost Manual was the latest version available at the time the Guidelines were developed (originally proposed in 2001), even though the latest version to date is the 2002 version that was relied upon by the Region’s consultant.

<sup>63</sup> 40 C.F.R. Part 51, Appendix Y IV.D.4. Moreover, with regard to design specifications for the various control options, the BART Guidelines only recommend consulting cost manuals developed by EPA as one of a wide variety of possible information sources, which include “equipment vendors, background information documents used to support NSPS development, control technique guidelines documents, cost manuals developed by EPA, control data in trade publications, and engineering and performance test data.”

<sup>64</sup> See Revised BART Cost Effectiveness Analysis for Selective Catalytic Reduction at the Public Service Company of New Mexico San Juan Generating Station, Final Report, prepared by Dr. Phyllis Fox (consultant) Ph.D., P.E. (November 2010).

<sup>65</sup> *Id.* at p. 2.

challenges beyond those identified in the manual is inappropriate and inconsistent with the regional haze program.

Region 6 also justifies its refusal to consider additional line items outside the scope of the Cost Control Manual on the grounds that “PNM had provided no documentation regarding unique circumstances related to the BART determinations.” That claim is incorrect. Region 6’s own analysis cites the documentation PNM submitted to demonstrate the unique circumstances at San Juan, referred to by Region 6 as Black & Veatch’s “Cost Analysis Manual Commentary.”<sup>66</sup> That document was a response to the cost analysis that was initially prepared by NMED in March 2008 as a response to follow-up questions from NMED regarding the BART determination for San Juan. The “Cost Analysis Manual Commentary” demonstrates two critical points. First, the document demonstrates that the Cost Control Manual method of estimating cost would omit the significant line item expenditures noted above that will be real costs associated with installing SCRs at San Juan. Second, the document demonstrates that, but for those line items, the Black & Veatch estimates would be comparable to NMED’s cost estimate.

In addition to the “Cost Analysis Manual Commentary,” PNM also provided significant evidence of the site-specific challenges directly to Region 6 in response to its questions over the several months during which Region 6 prepared its BART determination for San Juan. PNM also discussed those questions with Region 6 and its consultant in a lengthy, detailed telephone conference on October 14, 2010. The significant amount of information provided previously to NMED regarding site-specific challenges was also provided to Region 6. Thus, the assertion by Region 6 that PNM has failed to sufficiently document the site-specific challenges at San Juan is incorrect.

The exclusive use of the Control Cost Manual underestimates the expected costs for SCRs at San Juan for several reasons. First, the manual was last updated in 2002 and Section 4.2, Chapter 2, Selective Catalytic Reduction, was written actually written in October 2000. In addition, on page 2-40 of the SCR section, the Manual indicates that the costs presented are based on 1998 dollars. Therefore, the Manual does not reflect more recent experience with SCR installations, the cost of which has skyrocketed. Second, the 2002 version of the manual was the very first version to specifically address NO<sub>x</sub> controls at all. According to the introduction to the manual, EPA was at that time “entering new and uncharted territory for part of the Manual” because “previous editions did not discuss NO<sub>x</sub> or SO<sub>2</sub> controls, and [the 2002] edition starts the process of correcting that oversight.”<sup>67</sup> Finally, EPA also admits in the manual that it had difficulty obtaining information on control costs because most of the information is proprietary – the very type of information to which Black & Veatch has ready access.<sup>68</sup>

<sup>66</sup> See Black & Veatch, Discussion of OAQPS Cost Manual Method for AQCS Estimation, available at <http://www.nmenv.state.nm.us/aqb/reghaz/documents/DiscussionofOAQPSCostManualMethodRev080329.pdf>.

<sup>67</sup> Available at <http://www.epa.gov/ttncaatcl/products.html#cccinfo>.

<sup>68</sup> One of the BART determinations cited by Region 6 in the technical support documents for the proposed FIP also noted the insufficiency of the cost manual to properly estimate the real cost of installing SCRs. See Sargent & Lundy, Salt River Project Navajo Generating Station – Units 1, 2, 3, SCR and Baghouse Capital Cost Estimate Report, Revision D (August 17, 2010) (“When using the PCCM [Pollution Control Cost Manual] and adjusting the cost developed by a composite BLS price index, the PCCM predicts that the cost of an SCR on NGS Unit 1 in 2010 would be \$47,844,624 or \$64/kW (see Appendix P). Recent Surveys (data provided by NPS and public sources) of

Region 6 made several important errors by failing to look beyond the generic Cost Control Manual, each of which is described below.

**a. The Rejection of PNM's Escalation Factors Is Unrealistic.**

By relying too heavily on the Cost Control Manual, Region 6's analysis not only omits the specific line items noted above, it also omits or alters various estimating factors utilized by Black & Veatch in PNM's analysis. For example, Region 6 relied on the Chemical Engineering Plant Cost Index (CEPCI) to escalate costs from the Control Cost Manual. However, although that index may be a reasonable tool for a chemical plant, it does not properly account for escalation of costs at power plants. In contrast, Black & Veatch developed an appropriate escalation factor with the help of an outside consulting firm specializing in financial analysis and forecasting, which incorporates the complete Black & Veatch database of "as-built" costs, the Bureau of Labor Statistics indices, and the consulting firm's database of costs and indices, all tailored specifically to the power generation industry.

**b. The Rejection of Direct Installation Costs Is Unrealistic.**

Region 6's estimate of Direct Installation Costs provides another example of how reliance on the Cost Control Manual underestimated the real cost of SCRs at San Juan. In its analysis, Region 6 recognized that the Cost Manual does provide factors to estimate certain "direct installation costs," namely foundation/supports, handling/erection, electrical, piping, insulation, painting, demolition, and relocation. The Region's analysis also recognizes that these are real costs that will be associated with installation of an SCR. **However, the Control Cost Manual fails to provide factors to estimate these costs for SCR**, as recognized in Region 6's analysis.

Faced with a gap in the Control Cost Manual methodology, Region 6's consultant could have developed SCR-specific factors to estimate direct installation costs or relied upon the factors developed by Black & Veatch, which the consultant listed in her analysis. Instead, she indiscriminately took the median of the factors for other control technologies, which vary significantly from SCRs. As a result, Region 6's analysis slashes in half the direct installation costs estimated by Black & Veatch. For example, the direct costs assumed by Dr. Fox for Unit 1 are \$8,799,917, but that amount would only cover 159,998 man-hours, or 21 weeks of construction.<sup>69</sup> The Region's own schedule, even though insufficient itself, assumes 38 weeks of construction,<sup>70</sup> nearly double of the amount that Dr. Fox's analysis could afford. Thus, EPA's estimate is insufficient for its own estimated construction timeline, much less the 64 to 72 weeks of construction that PNM's experienced consultants predict.

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actual SCR installations show that costs for SCRs vary from \$100/kW to \$300/kW. The cost developed in this study falls inside the reported range at \$228/kW while the cost predicted by using the PCCM is outside the range.").

<sup>69</sup> The 21 week figure assumes a 150 man crew, based on the 2009 average labor cost for environmental upgrades of \$55 per hour and a 50-hour work week (needed to attract labor).

<sup>70</sup> See EPA-600/R-02/076 (Oct. 2002).

To justify the approach based entirely on the median of different control technologies, Region 6's consultant downplays the complicated process of designing and constructing an SCR, thereby ignoring not only the technology itself but the site specific-factors that must be considered at San Juan. SCRs at San Juan would have to be constructed so that each SCR can be positioned at the proper point in the flue gas stream, which will significantly complicate the foundation and supports that will be needed, resulting in additional costs of **\$35,630,000** that Region 6 failed to recognize or consider.

**c. The Rejection of "Contingency" Costs Is Inappropriate Because the Region Eliminated Costs that Are Not a "Contingency."**

Region 6 asserts that "[t]he contingencies included in the Black & Veatch cost estimates are double-counted and excessive," based on the misimpression that there are three contingencies "imbedded" in the analysis. However, two of the three are allowances for known costs, and therefore are not "contingencies." Specifically, the complexity factor for structural steel costs of 1.2 (for Units 1 and 2) and 1.5 (for Units 3 and 4) are known, expected costs, and therefore do not constitute a contingency factor, as noted previously. Also, the \$2 million estimated for underground obstructions and the \$500,000 estimated for on-site buildings are also known, and therefore do not represent a duplicative contingency factor. Thus, Region 6's claim that PNM double-counted its contingency costs is incorrect and underestimates the cost of SCRs at San Juan by **\$61,978,000**.

**d. Excluding Interest During Construction Costs Is Unrealistic.**

Region 6 also claims that the Interest During Construction included in the Black & Veatch cost estimates are not allowed by the Cost Manual. Therefore, this cost was eliminated from the cost analysis underlying the proposed FIP. However, this cost item is a real project cost, which will be incurred by PNM to finance the project and must be recovered from the San Juan customers. The rejection of costs associated with Interest During Construction underestimates the cost of the project by **\$78,300,000**.

**e. Region 6 Only Accepted Information from Outside the Cost Control Manual Where It Served to Reduce the Cost Estimate Even Further.**

The Region 6 cost estimate rarely differs from the Cost Control Manual, and only does so where the information from outside the Cost Control Manual would serve to reduce the amount of the cost estimate. Region 6 provides no justification for straying from the manual in those instances, despite focusing so heavily on it in others. For example, Region 6's consultant applied an SCR life span of 30 years instead of the 20 year life span provided in the Cost Control Manual. The justification for choosing a different life span than provided for in the manual is that other facilities have requested 30 year life spans in requests for proposal and some unidentified SCRs in Europe have lasted that long. If such general, anecdotal information were sufficient to convince Region 6 to stray from the Cost Control Manual, the Region 6 analysis should be replete with variations from the outdated Cost Control Manual. However, the Region 6 analysis only varies from the manual where it serves to further reduce costs. In contrast,

because PNM did not perform a specific life span analysis of an SCR at San Juan, PNM's analysis accepts the Cost Control Manual's recommendation of a 20-year SCR life span. The use of a 30-year lifespan underestimates the cost estimate of SCR by **\$15,268,000**.

### 3. Summary of Errors in the Region 6 SCR Cost Estimate.

Taken together, the errors described above result underestimate the capital cost associated with installing SCRs at San Juan by a total at least **\$625,409,000**, and underestimates the annual costs of SCRs by at least **\$71,191,000**, as illustrated in Table 1 below:

**TABLE 1: Incorrectly Excluded Costs in Region 6 SCR Cost Analysis**

<b>Incorrectly Excluded Annual Cost</b>	<b>Unit 1</b>	<b>Unit 2</b>	<b>Unit 3</b>	<b>Unit 4</b>
Unjustified decrease in auxiliary power consumption rate and cost (§1.h.)	\$1,094,000	\$1,101,000	\$1,586,000	\$1,607,000
Impact of underestimated capital costs on annual cost (§1.h.)	\$10,733,000	\$11,515,000	\$14,571,000	\$13,588,000
Unjustified increase in SCR life-span from 20 to 30 years (§2.e.)	\$3,263,000	\$3,525,000	\$4,404,000	\$4,076,000
<b>Unit Total</b>	<b>\$15,118,000</b>	<b>\$16,169,000</b>	<b>\$20,597,000</b>	<b>\$19,307,000</b>
<b>Grand Total of Incorrectly Excluded Annual Costs</b>	<b>\$71,191,000</b>			

<b>Incorrectly Excluded Capital Cost</b>	<b>Unit 1</b>	<b>Unit 2</b>	<b>Unit 3</b>	<b>Unit 4</b>
Failure to include cost of additional auxiliary power equipment (§1.a.)	\$15,053,000	\$15,943,000	\$21,668,000	\$20,511,000
Failure to include cost of protecting the air preheater from ABS (§1.b.)	\$1,451,000	\$1,451,000	\$6,898,000	\$6,898,000
Failure to include cost of boiler stiffening and balanced draft (§1.c.)	\$11,950,000	\$11,950,000	\$15,909,000	\$15,909,000
Lost generation cost associated with retrofit extended outage (§1.c.)	\$15,667,000	\$15,667,000	\$23,674,000	\$23,674,000
Failure to include cost of 3 initial catalyst layers in SCR (§1.d.)	\$7,233,000	\$7,576,000	\$9,570,000	\$9,177,000
Failure to include costs of sorbent injection system (§1.e.)	\$2,900,000	\$2,900,000	\$3,159,000	\$3,159,000
Failure to include additional steel needed due to site congestion (§1.f.)	\$5,482,000	\$10,086,000	\$12,499,000	\$7,020,000
Failure to include cost of SCR bypass to protect SCR during startup (§1.g.)	\$30,660,000	\$32,166,000	\$32,997,000	\$30,661,000
Improper rejection of appropriate escalation factors (§2.a.)	\$4,197,000	\$4,165,000	\$4,687,000	\$4,934,000
Improper rejection of Direct Installation Cost estimates (§2.b.)	\$8,408,000	\$8,348,000	\$9,437,000	\$9,437,000
Improper rejection of "contingency" costs and (§2.c.)	\$13,315,000	\$14,302,000	\$17,801,000	\$16,560,000

Improper rejection of Interest During Construction costs (¶2.d.)	\$16,853,000	\$18,318,000	\$22,481,000	\$20,648,000
<b>Unit Total</b>	<b>\$133,169,000</b>	<b>\$142,872,000</b>	<b>\$180,780,000</b>	<b>\$168,588,000</b>
<b>Grand Total of Incorrectly Excluded Capital Costs</b>	<b>\$625,409,000</b>			

The cost figures provided above are costs that were incorrectly excluded from Region 6's analysis that must be added to the cost estimate prepared by Region 6's consultant in order to accurately estimate the cost of installing SCRs at the four San Juan units.<sup>71</sup> The absence of these costs from the analysis underlying the FIP significantly impacts the fundamental conclusions upon which the FIP is based. Therefore, the proposed FIP should be rejected.

**B. A Compliance Deadline of Three Years Is Unrealistic and Is Not Reflected in Region 6's Cost Analysis.**

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The decision to propose a compliance deadline of three years will result in significant additional costs that Region 6 did not account for in its analysis, compounding the errors made in its unrealistic cost analysis. The proposed FIP attempts to justify a three-year compliance deadline by citing two studies, but those studies do not reflect a realistic schedule for installing SCRs at San Juan. First, Region 6 cites to the installation timelines provided in a whitepaper prepared in 2002 by the Institute of Clean Air Companies (ICAC) entitled “**Typical** Installation Timelines for NOx Emissions Control Technologies on Industrial Sources.” As stated in the paper's introduction, “[t]he information below can be used as a general guide for the **typical** time required to complete a **typical** NOx control project....” However, as explained throughout these comments, the installation of SCRs at San Juan would be anything but typical. In addition, the ICAC study cited by Region 6 only addresses SCR installations for industrial applications, not electric utility coal-fired boilers, which are much larger, and therefore, require significantly more time to build.

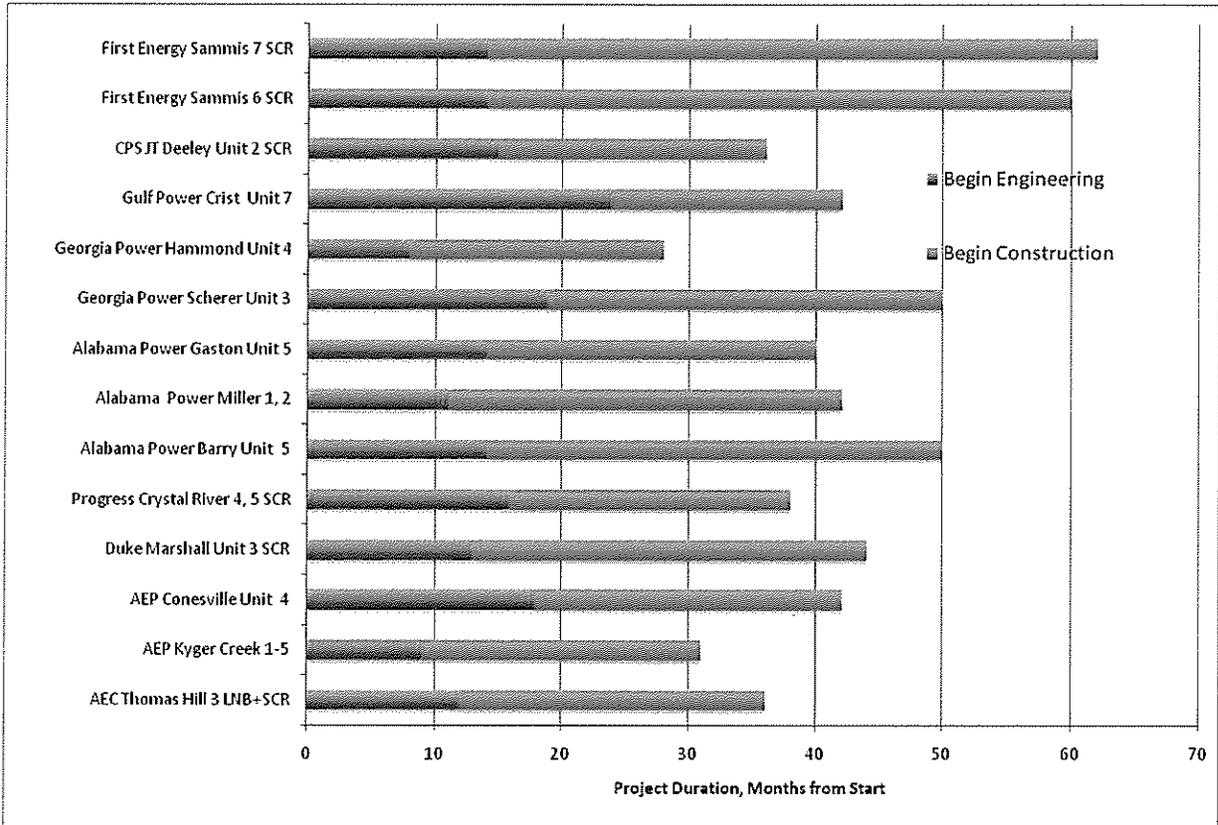
The second reference is a document prepared for the U.S. EPA Office of Research and Development in October 2002, titled “Engineering and Economic Factors Affecting the Installation of Control Technologies for Multipollutant Strategies.” The introduction notes that “projections beyond 2010 are of limited value as market conditions could change significantly between now and 2010....” Thus, by its own terms, the 2002 document should be considered to be of “limited value” at this point in time, particularly given the tumultuous market conditions in recent years.

A far more contemporaneous report, which Region 6 neglected to consider, is the recently published “Implementation Schedule for Selective Catalytic Reduction (SCR) and Flue Gas Desulfurization (FGD) Process Equipment” October 1, 2010, prepared by J. Edward Cichanowicz for the Utility Air Regulatory Group. The report is based on a review of numerous

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<sup>71</sup> The remaining difference between the Region's estimate and PNM's estimate results from more minor differences in methodology or other factors that perhaps represent two different, but both acceptable, methods for estimating costs.

FGD, SCR, and LNB retrofits actually completed at coal-fired power plants during the last ten years. Particularly relevant is Section 4.1.2 of that report, which discusses several examples of multiple SCRs installed at a single location. As shown in the chart below, the multiple SCR system installations took between 31 and 62 months, depending upon site-specific factors.



As discussed further below, the site congestion and other site-specific challenges at San Juan will demand an implementation schedule that is similar to SCR installations at Units 6 and 7 of First Energy’s Sammis facility, which required 60 and 62 months to complete, respectively.<sup>72</sup>

**1. The Proposed FIP Fails to Account for Time Needed to Obtain a Permit to Construct and Public Regulation Commission Approval for the SCRs.**

SCR installations often trigger PSD permitting requirements because they constitute physical changes to an existing emission unit that may result in increased emissions of sulfuric acid mist. Obtaining a PSD permit for an SCR can take a significant amount of time, up to or exceeding 18 months in some cases. Even if the SCRs do not trigger PSD permitting

<sup>72</sup> The 31-month timeline indicated for the AEP Kyger Creek facility is not an appropriate comparison for determining a realistic timeline for installing SCRs at San Juan for two reasons. First, only one of the five units at Kyger Creek was able to begin operating in the 31-month timeframe indicated above. Second, the Kyger Creek units are all identical and much smaller than the units at San Juan. As such, the engineering for one Kyger Creek unit could be more readily applied to the other units and the construction could still be completed in a serial manner.

requirements, the projects could trigger state permitting requirements, which can require several months to satisfy. In addition to possible air quality permitting requirements, the installation of an SCR will involve a significant capital expenditure that will require approval from the New Mexico Public Regulation Commission. All told, such permitting and regulatory approvals could take as long as two years, and must be completed prior to the commencement of any construction on the SCRs. Failure to take these requirements into account results in an unachievable deadline for compliance.

**2. The Proposed FIP Fails to Account for Time Needed to Obtain Competitive Bids for Design and Installation of the SCRs at San Juan.**

The Region 6 analysis also allows no time for competitive bidding. In the normal course of a significant capital project, time would be needed to pre-qualify potential bidders, allow the bidders time to perform a full review of the design specifications for the SCRs, and allow PNM time to review the bids returned to ensure selection of the most competitive and appropriate offer. To meet a three-year schedule, PNM would have to simply offer the work to a single vendor, eliminating the opportunity to identify other qualified vendors or provide any incentive to encourage competitive pricing. The failure to account for this important process in minimizing the costs of significant capital projects not only renders the three-year compliance date unrealistic, it also draws into question the underlying cost estimates, which of course are based on contracts entered into by other utilities that most likely were allowed sufficient time to complete a proper competitive bidding process.

**3. The Proposed FIP Incorrectly Assumes that PNM Can Save Time and Money By Performing Engineering for All Four SCRs at the Same Time.**

Region 6 suggests that the engineering needed to design four SCRs can be completed all at the same time, thus saving time and money. While some economies may arise with a multiple SCR installation, as lessons learned in designing and installing one SCR are applied to the next, a three-year deadline would require PNM to design all four SCRs at the same time. Designing all four SCRs at once would require four separate design and construction teams, which would eliminate the opportunity to apply any experience gained. As a result, the costs associated with designing the SCRs will be much higher on a shorter timeframe, not lower as Region 6 appears to suggest. The short, three-year deadline also allows no time for additional design work that may be needed to address unforeseen engineering challenges that are likely to arise at each unit. Like the failure to account for the time needed to conduct a competitive bidding process, Region 6's failure to allow sufficient engineering design time is unrealistic and will result in significant additional costs that are not reflected in Region 6's analysis.

**4. The Proposed FIP Failed to Account for Significant Additional Construction Costs That Would Be Required to Meet a Three Year Deadline.**

To meet a three-year deadline, PNM would have to prefabricate as much of the SCRs as possible, which would require extremely large pre-fabrication yards and pre-fabrication crews. Due to the physical layout of the site and units, independent, simultaneous fabrication and installation activities would also be required. In addition, a three-year deadline would also

require significant overtime hours, expedited material costs, double “heavy long-lift” crane costs, and a larger construction workforce overall. Because these costs would never be incurred in the normal course of installing SCRs, PNM did not include these costs in its analysis, but they would be unavoidable in the event a three-year deadline is required.

Such a short construction deadline would also exacerbate the shortage of skilled labor caused by the significant number of similar projects that are either ongoing or planned for the near future in the region. PNM already experienced the impacts of a tight labor force during the recent efforts to install low NO<sub>x</sub> burners, baghouses, and mercury controls at San Juan, and those pressures are expected to continue to worsen in the coming years. The tight labor force will only worsen as utilities around the country begin to prepare for the implementation of EPA’s new Maximum Achievable Control Technology standard for electric utilities, which EPA estimates will require “roughly 31,000 job-years” to implement.<sup>73</sup> The failure to account for the additional labor costs associated with such a short timeframe, particularly given other factors affecting the market for skilled labor, renders both the three-year deadline and the cost estimate prepared by Region 6 unrealistic.

**5. A Three-Year Compliance Deadline Would Require Two Units to Be Offline at Once, Significantly Increasing Replacement Power Costs.**

The cost estimate prepared by Region 6 does not account for the need to have two units offline at the same time to install the SCRs, but PNM would not be able to meet a three-year deadline for compliance without taking two units offline at once. In addition, a three-year deadline would likely eliminate the ability of PNM to plan the outages for off-peak seasons, when the demand for power and the cost for replacement power are lower. The failure to accurately reflect additional replacement power cost associated with a three-year compliance period is unrealistic and will result in significant additional costs that are not reflected in Region 6’s cost analysis.

**C. Region 6 Erred in Assuming That the Installation of SCRs Would Enable San Juan to Achieve a NO<sub>x</sub> Emission Rate of 0.05 lb/mmBtu.**

Region 6 instructed its consultant, Dr. Fox, to estimate the cost-effectiveness of SCR at San Juan “**assuming** an outlet NO<sub>x</sub> of 0.05 lb/mmBtu.”<sup>74</sup> Region 6 then proposed that assumed rate as the BART emission limit for San Juan. Region 6’s assumption is unfounded – the installation of SCRs at San Juan will not enable the units to achieve 0.05 lb/mmBtu on a continuous basis. As such, the proposed 0.05 lb/mmBtu limit cannot be BART for San Juan.

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<sup>73</sup> See National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units, Proposed Rule, pre-release copy available at <http://www.epa.gov/airtoxics/utility/utilitypg.html>.

<sup>74</sup> See Revised BART Cost Effectiveness Analysis for Selective Catalytic Reduction at the Public Service Company of New Mexico San Juan Generating Station, Final Report, prepared by Dr. Phyllis Fox (consultant) Ph.D., P.E. (November 2010).

Although instructed to assume a NO<sub>x</sub> rate of 0.05 lb/mmBtu, it appears Dr. Fox nevertheless attempted to justify that assumption in Section IV of her report in several ways. First, Dr. Fox asserts that “SCRs are routinely designed to achieve 90% NO<sub>x</sub> control,” claiming that 90 percent reduction at San Juan would result in NO<sub>x</sub> emissions of 0.05 lb/mmBtu or even lower. In contrast, Black & Veatch, who has extensive practical experience in actually designing and installing retrofit SCRs determined that a retrofit SCR would only be capable of achieving 0.07 lb/mmBtu on a continuous basis, particularly if required to use the low-oxidation catalyst assumed by Region 6 to minimize ancillary emission increases associated with SCR.

Dr. Fox claims that many facilities are using SCR to actually achieve lower emission rates than 0.07 lb/mmBtu, including the following units – “Havana Unit 9, Amos Units 1 and 2, Chesterfield Unit 6, Cardinal Units 2 and 3, Colbert Unit 5, Ghent Units 3 and 4, and Mill Creek Unit 3.” While these units have shown the ability to reach 0.05 lb/mmBtu or lower at times, those units are unable to do so on a continuous basis. Black & Veatch investigated the units cited by Dr. Fox to determine whether the units were continuously meeting 0.05 lb/mmBtu and found that they were not – all of the units exceeded 0.05 lb/mmBtu on numerous occasions. Thus, if the units cited by Dr. Fox were in fact subject to a 0.05 lb/mmBtu emission limit, those limits would have been violated many times at each unit, as illustrated by Attachment C.

In addition to the units Dr. Fox erroneously claims to be capable of achieving 0.05 lb/mmBtu, Dr. Fox also cites seven units that have accepted 0.05 lb/mmBtu or lower as an enforceable NO<sub>x</sub> emission limit. Readily apparent from her report, however, is the fact that all of the units cited are brand new units – none of the units are more than five years old and all of them were designed to accommodate SCR from inception. In addition, five of the seven units are not yet operational, and thus have not yet demonstrated the ability to meet the NO<sub>x</sub> limit cited by Dr. Fox.

In any event, even it would be possible to comply with a 0.05 lb/mmBtu limit at a new unit, where the unit can be designed from the ground up with SCR technology in mind, retrofit controls are not capable of meeting the same emission limits. The Clean Air Act programs applicable to stationary sources recognize the difference between the potential effectiveness of retrofit controls at existing units and controls that can be installed during the initial construction of a new unit.<sup>75</sup> The visibility provisions of the Clean Air Act are no different. They clearly recognize that retrofitting existing units with new controls will often entail unique and difficult challenges that could result in lower control efficiencies than might be possible for new units and require permitting authorities to take those concerns into account. Region 6 fails to make that important distinction in its proposal to require San Juan to meet a 0.05 lb/mmBtu that has only been achieved on a continuous basis by two new units that are less than five years old and that were designed from inception to accommodate SCRs. The emission limit proposed by Region 6

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<sup>75</sup> See, e.g., 42 U.S.C. § 7411 (requiring EPA to adopt emission limits that only apply to new sources, and establishing separate procedures for requiring states to impose similar limits on existing sources by taking into account other factors); 42 U.S.C. § 7412(d)(3) (establishing different hazardous air pollutant emission limits for new and existing sources).

is unachievable at San Juan and therefore violates the Clean Air Act and EPA regulations, which require BART emission limits to be achievable.<sup>76</sup>

PNM asks Region 6 to reconsider its assumption that SCRs would enable San Juan to achieve an emission rate of 0.05 lb/mmBtu because that emission limit would be unachievable on a continuous basis. PNM also asks Region 6 to reevaluate the cost effectiveness of SCRs at San Juan. By incorporating the incorrect assumption that SCRs at San Juan would achieve 0.05 lb/mmBtu into her cost effectiveness calculations, Region 6's consultant overestimated the emission reductions that the SCRs would achieve, thus underestimating the cost per ton of pollutant removed. In addition, since Region 6's analysis overestimates the emission reductions associated with installing SCRs at San Juan, PNM also asks Region 6 to reevaluate the visibility improvement that it assumed the SCRs would provide. At an emission limit more appropriate for the retrofit context under consideration, the SCRs would not achieve nearly the level of visibility improvement that Region 6 expects. In short, Region 6's incorrect assumption that San Juan could achieve 0.05 lb/mmBtu with SCRs skewed its entire cost-effective and visibility analysis. As a result, the Region's proposed FIP is unachievable and it should be rejected.

PNM also questions Region 6's proposed compliance method because it would be inconsistent with the compliance demonstration required by other air quality standards that EPA's BART Guidelines specifically encourage states to follow in setting BART limits. Regardless of the NO<sub>x</sub> limit chosen (whether 0.05 lb/mmBtu with SCRs, as EPA has proposed, or 0.23 lb/mmBtu with SNCRs, based on NMED's 2011 draft SIP revision), the BART limit should not be based on daily averages of thirty (30) **calendar** days, as EPA has proposed. If calendar days are used, the average could include as little as one hour of operation if the unit is offline for an outage that lasts longer than thirty days because the first hour of operation would be the only data recorded in the last thirty calendar days. To avoid this approach, PNM asks Region 6 to consider changing "calendar days" to "boiler operating days" (*i.e.*, days in which the unit ran for at least one hour). That approach would be consistent with EPA's own BART Guidelines, which include the following advice to states:

For EGUS, specify an averaging time of a 30-day rolling average, and contain a definition of "boiler operating day" that is consistent with the definition in the proposed revisions to the NSPS for utility boilers in 40 CFR Part 60, subpart Da.<sup>77</sup>

The "boiler operating day" would ensure that, when an outage occurs, the emissions following startup will be averaged with the emissions data from before the outage, rather than with the period of time during which the unit did not have any emissions at all because it was offline.

In addition, Region 6 should exclude emissions occurring during startup, shutdown, and malfunctions events because post-combustion controls equipment such as SCRs cannot operate effectively during those events. Alternatively PNM asks Region 6 to consider setting a different standard that is more representative of the emission characteristics of the units during those

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<sup>76</sup> See, e.g., 40 C.F.R. Part 51, Appendix Y IV.D.4.a.4. (directing states to "ensure that the control option will achieve the level of emission control being evaluated.").

<sup>77</sup> 40 C.F.R. Part 51 Appendix Y.