

## CHAPTER 10: BEST AVAILABLE RETROFIT TECHNOLOGY (BART) EVALUATION

### 10.1 Introduction

In 1999, the EPA published a final rule to address a type of visibility impairment known as regional haze. See 64 Fed. Reg. 35714, July 1, 1999. The regional haze rule requires States to submit state implementation plans (SIPs) to address regional haze visibility impairment in 156 Federally-protected parks and wilderness areas. The 1999 rule was issued to fulfill a long-standing EPA commitment to address regional haze under the authority and requirements of sections 169A and 169B of the Clean Air Act (CAA).<sup>1</sup>

As required by the CAA, the EPA included in the final regional haze rule a requirement for Best Available Retrofit Technology (BART) for certain large stationary sources. The regulatory requirements for BART were codified at 40 CFR § 51.308(e) and in definitions that appear in 40 CFR § 51.301.

The BART-eligible sources are those sources which have the potential to emit 250 tons per year or more of a visibility impairing air pollutant, were put in place between August 7, 1962 and August 7, 1977, and whose operations fall within one or more of 26 specifically listed source categories. Under the CAA, BART is required for any BART-eligible source which a State determines “emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any such area.” Accordingly, for stationary sources meeting these criteria, States must address the BART requirement when they develop their regional haze SIPs.

The EPA published a second rulemaking on June 6, 2005 that made changes to the Final Rule published July 1, 1999. The second rulemaking was in response to a U.S. Court of Appeals for the D.C. Circuit ruling that vacated part of the regional haze rule, *American Corn Growers v. EPA*, 291 F.3d 1 (D.C. Cir. 2002). The June 6, 2005 Final Rule required the BART analysis to include an analysis of the degree of visibility improvement resulting from the use of control technology at BART-subject sources; included new BART Guidelines contained in a new Appendix Y to Part 51; and added the requirement that States use Appendix Y for determining BART at certain large electrical generating units (EGUs).

The Guidelines also contained specific presumptive limits for SO<sub>2</sub> and NO<sub>x</sub> for certain large EGUs based on fuel type, unit size, cost effectiveness, and presence or absence of pre-existing controls. The Guidelines directs states to generally require owners and operators to meet the presumptive limits at coal-fired EGUs greater than 200 MW at power plants with a total generating capacity greater than 750 MW. The presumptive limits for NO<sub>x</sub> are based on coal type, boiler type and whether post-combustion controls are already installed at the source.

As originally adopted by the Board on June 3, 2011, this Chapter 10 of New Mexico’s 309(g) SIP contained the Department’s determinations of BART for the San Juan Generating Station (“San Juan”) with respect to sulfur dioxide (“SO<sub>2</sub>”), particulate matter (“PM”), and nitrogen oxides (“NO<sub>x</sub>”). In November 2012, the EPA promulgated final approval of these BART determinations with respect to SO<sub>2</sub> and PM, but took no action on New Mexico’s NO<sub>x</sub> BART determination for San Juan. 77 Fed. Reg. 36,044 (Nov. 27, 2012). EPA had previously issued a federal implementation plan (“FIP”) containing a different NO<sub>x</sub> BART determination for San Juan. 76 Fed. Reg. 52,388 (Aug. 22, 2011).

To resolve litigation arising from New Mexico’s and EPA’s incompatible San Juan NO<sub>x</sub> BART determinations, New Mexico, the U.S. EPA, and PNM reached a tentative agreement on an alternative plan to address pollution control requirements for the San Juan Generating Station under the Clean Air

Act's requirements for regional haze and interstate transport for visibility. *See* Appendix G, Term Sheet Between the U.S. Environmental Protection Agency, Public Service Company of New Mexico and the State of New Mexico ("Term Sheet"). This plan, referred to hereinafter as the "State Alternative" calls for the complete shutdown of Units 2 and 3 by the end of 2017, and the installation of selective non-catalytic reduction ("SNCR") on Units 1 and 4.

In order to maintain New Mexico's BART analyses together in one location within the SIP, this revised Chapter 10 continues to contain a description of the statewide BART determination process, reviews the 2011 BART determinations for San Juan, and adopts the State Alternative as New Mexico's NOx BART determination for San Juan.

## 10.2 SO<sub>2</sub>: Regional SO<sub>2</sub> Milestone and Backstop Trading Program

New Mexico is a "§309" (40 CFR § 51.309) state participating in the Regional SO<sub>2</sub> Milestone and Backstop Trading Program. §308(e)(2) provides states with the option to implement or require participation in an emissions trading program or other alternative measure rather than to require sources subject to BART to install, operate, and maintain additional control technology to meet an established emission limit on a continuous basis. However, the alternate program must achieve greater reasonable progress than would be accomplished by installing BART at each source subject to BART. A demonstration that the alternate program can achieve greater reasonable progress is prescribed by §308(e)(2)(i). Section 309(d)(4)(i) requires that the SO<sub>2</sub> milestones established under the Plan "...must be shown to provide for greater reasonable progress than would be achieved by application of BART pursuant to §51.308(e)(2)."

New Mexico participated in creating a detailed report entitled "Demonstration that the SO<sub>2</sub> Milestones Provide Greater Reasonable Progress than BART" covering SO<sub>2</sub> emissions from all states participating in the Regional SO<sub>2</sub> Milestone and Backstop Trading Program. The document is included in New Mexico's §309 Regional Haze SIP submittal to EPA.

As part of the §309 program, participating states, including New Mexico, must submit an annual Regional Sulfur Dioxide Emissions and Milestone Report that compares actual emissions to pre-established milestones. Participating states have been filing these reports since 2003. Each year, states have been able to demonstrate that actual SO<sub>2</sub> emissions are well below the milestones. The actual emissions and their respective milestones are shown in Table 10-1 below:

**Table 10-1 Regional Sulfur Dioxide Emissions and Milestone Report Summary**

<b>Year</b>	<b>Reported SO<sub>2</sub> Emissions (tons)</b>	<b>3-year Milestone Average (tons)</b>
2003	330,679	447,383
2004	337,970	448,259
2005	304,591	446,903
2006	279,134	420,194
2007	273,663	420,637
2008	244,189	378,398

On November 27, 2012, the EPA approved New Mexico's SO<sub>2</sub> backstop trading program under 40 CFR §§ 51.309 and 51.308(e)(2) as achieving greater reasonable progress than BART. 77 Fed. Reg. 36,044. Notwithstanding the fact that the BART requirement has thus been satisfied statewide with respect to SO<sub>2</sub>, additional SO<sub>2</sub> reductions will be made at the San Juan Generating Station under the "State Alternative" described below.

### **10.3 Determination of Sources Subject to BART**

Under the BART Guidelines, a state is required to take the following steps in its BART analysis: (a) identify all “BART eligible” sources, (b) identify sources “subject to BART,” (c) determine what BART is for each source subject to BART, and (d) establish emission limits consistent with the BART determination for each source subject to BART. *See* 70 Fed. Reg. at 39,158. In New Mexico, the result of steps (a) and (b) was the determination that only one source is subject to BART, the San Juan Generating Station, as discussed below. Steps (c) and (d) as applied to San Juan are discussed in section 10.4 below.

#### **10.3.1 BART Eligible Sources**

Under the CAA and the BART Guidelines, states are required to identify each source that satisfies all of the following criteria: it falls within the 26 listed source categories as listed in the CAA, it was “in existence” on August 7, 1977 but was not “in operation” before August 7, 1962, and it has a current potential to emit that is greater than 250 tons per year of any single visibility impairing pollutant.

In May 2006, the Department conducted a review of sources potentially subject to the BART rule. New Mexico identified 11 sources as BART-eligible sources as part of this review. The 11 BART eligible sources identified in New Mexico are Giant Refining, Ciniza Refinery (now Western Refining Southwest, Gallup Refinery); Public Service Company of New Mexico, San Juan Generating Station Boilers 1 through 4; Giant Refining San Juan Refinery (now Western Refining Southwest, Bloomfield Refinery) Unit #1 fluid catalytic cracking unit electrostatic precipitator; DEFS Artesia Gas Plant (now DCP Midstream Artesia Gas Plant) sulfur recovery unit; Amoco Empire Abo (now Frontier Field Services Empire Abo Gas Plant) sulfur recovery unit; Marathon Indian Basin Gas Plant (now Oxy USA WTP Indian Basin Gas Plant) sulfur recovery unit; DEFS Linam Ranch Gas Plant (now DCP Midstream Linam Ranch Gas Plant) sulfur recovery unit, Dynegey Saunders (now Versado Gas Processors Saunders Gas Plant) sulfur recovery unit; Southwestern Public Service Cunningham Station; Southwestern Public Service Maddox Station; El Paso Rio Grande Generating Station.

#### **10.3.2 Sources Subject to BART**

After determining BART-eligibility, the State must then determine whether the source is potentially-subject-to-BART. EPA finalized several options that allowed States flexibility when making the determination of whether a source "emits any pollutants which may reasonably be anticipated to cause or contribute to any visibility impairment."

Option 1: All BART-eligible sources are Subject to BART

EPA provided the States with the discretion to consider all BART-eligible sources within the State to be "reasonably anticipated to cause or contribute" to some degree of visibility impairment in a Class I area. EPA held that this option is consistent with the American Corn Growers court's decision, as it would be an impermissible constraint of State authority for the EPA to force States to conduct individualized analyses in order to determine that a BART-eligible source "emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any [Class I] area."

Option 2: All BART-Eligible Sources Do Not Cause or Contribute to Regional Haze

EPA also provided States with the option of performing an analysis to show that the full group of BART-eligible sources in a State may not, as a whole, be reasonably anticipated to cause or contribute to any

visibility impairment in Class I areas. Although the option was provided, EPA did also state that it anticipated that in most, if not all States, BART eligible-sources are likely to cause or contribute to some level of visibility impairment in at least one Class I area.

### Option 3: Case-by-Case BART Analysis

The final option provided to the States was to consider the individual contributions of a BART-eligible source to determine whether the facility is subject-to-BART. Specifically, EPA allowed States to choose to undertake an analysis of each BART-eligible source in the State in considering whether each such source "emit[s] any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any [Class I] area." The Guidelines provide that a source with a visibility impact of 1.0 dv should be considered to *cause* visibility impairment, and a source with a visibility impact of 0.5 dv should be considered to *contribute* to visibility impairment. Alternatively, States may choose to presume that all BART-eligible sources within the State meet this applicability test, but provide sources with the ability to demonstrate on a case-by-case basis that this is not the case.

The Department determined that the third option is the most consistent with the *American Corn Growers* case, as this option provides a rebuttable method for the evaluation of the visibility impact from a single source. If the air dispersion modeling analysis shows that a facility causes or contributes to Regional Haze, then it is required to address BART. A State is also provided with flexibility under this option, as it may exempt from BART any source that is not reasonably anticipated to cause or contribute to visibility degradation in a Class I area.

The Western Regional Air Partnership (WRAP) performed the initial BART modeling for the state of New Mexico. The procedures used are outlined in the WRAP Regional Modeling Center (RMC) BART Modeling Protocol that is available at:

[http://pah.cert.ucr.edu/aqm/308/bart/WRAP\\_RMC\\_BART\\_Protocol\\_Aug15\\_2006.pdf](http://pah.cert.ucr.edu/aqm/308/bart/WRAP_RMC_BART_Protocol_Aug15_2006.pdf)

The basic assumptions in the WRAP BART CALMET/CALPUFF modeling used for New Mexico are as follows:

- Use of three years of modeling of 2001, 2002, and 2003.
- Visibility impacts due to emissions of SO<sub>2</sub>, NO<sub>x</sub> and primary PM emissions were calculated. PM emissions were modeled as PM<sub>2.5</sub>.
- Visibility was calculated using the Original IMPROVE equation and Annual Average Natural Conditions.

Initial modeling was performed for the 11 source complexes in New Mexico with visibility estimated from the sources' SO<sub>2</sub>, NO<sub>x</sub>, and PM emissions. Then for those sources whose 98<sup>th</sup> percentile visibility impacts at any Class I area due to their combined SO<sub>2</sub>, NO<sub>x</sub>, and PM emissions exceeded the 0.5 dv significance threshold, the separate contribution to visibility at Class I areas was assessed for SO<sub>2</sub> alone (SO<sub>4</sub>), NO<sub>x</sub> alone (NO<sub>3</sub>), PM alone (PMF) and combined NO<sub>x</sub> plus PM emissions (NO<sub>3</sub> + PMF).

Of the 11 source complexes analyzed, only one source complex's visibility impacts at any Class I area due to combined SO<sub>2</sub>, NO<sub>x</sub>, and PM emissions exceeded the 0.5 dv threshold (PNM San Juan Generating Station Boilers #1-4). Of the 10 other source complexes, none exceed a 0.33 dv impact. See Appendix C. Consequently, only the PNM San Juan Boilers #1-4 were subjected to a BART determination.

On November 9, 2006, the New Mexico Environment Department informed PNM that the modeling performed by the WRAP indicated the visibility impairment from the San Juan Generating Station (SJGS)

was over the 0.5 dv threshold, and was therefore subject to a BART determination. In response, Black & Veatch (B&V), on behalf of PNM, submitted the BART Modeling Protocol document which described the CALPUFF modeling methodology to be used as part of the BART engineering evaluation for Units 1-4 at the SJGS. The results are presented in Table 10-2 below.

**Table 10-2: Visibility Impact Analysis of PNM's San Juan Generating Station  
 NM SRC02 Unit # 350450902, PNM SJ #1-4: SO<sub>2</sub> = 35,735 TPY; NO<sub>x</sub> = 38,763 TPY; PM = 3,884 TPY**

**Annual Average Natural Conditions**

**Class I Area with at least 1 receptor within 300 km of source**

Class I Area	Minimum Distance	98th Percentile for Each Year			98th
	(km)	2001	2002	2003	3 year AVG
Mesa Verde NP	40	5.54	5.34	5.30	5.40
Weminuche Wilderness	98	2.24	2.99	2.41	2.55
San Pedro Parks Wilderness	155	3.80	4.07	4.14	4.01
La Garita Wilderness	169	1.63	1.82	1.77	1.74
Canyonlands NP	170	6.21	4.33	4.44	4.99
Black Canyon Gunnison NM	203	2.38	2.27	2.43	2.36
Bandelier NM	210	2.47	2.90	3.08	2.82
Petrified Forest NP	213	1.62	1.27	1.03	1.31
West Elk Wilderness	216	2.14	1.90	2.20	2.08
Arches NP	222	4.06	3.71	3.59	3.79
Capitol Reef NP	232	4.00	2.02	2.35	2.79
Pecos Wilderness	248	2.17	2.63	2.81	2.53
Wheeler Peak Wilderness	258	1.94	1.73	1.97	1.88
Great Sand Dunes NM	269	1.47	1.59	1.74	1.60
Maroon Bells-Snowmass WA	271	1.19	1.27	1.15	1.21
Grand Canyon NP	285	2.12	1.50	1.18	1.60

**NM SRC02 Unit # 350450902, PNM SJ #1-4: PM Only (PM = 3,884 TPY)  
Annual Average Natural Conditions  
Class I Area with at least 1 receptor within 300 km of source**

Class I Area	Minimum Distance	98th Percentile for Each Year			98th
	(km)	2001	2002	2003	3 year AVG
Mesa Verde NP	40	0.86	0.96	1.13	0.98
Weminuche Wilderness	98	0.15	0.24	0.25	0.21
San Pedro Parks Wilderness	155	0.25	0.28	0.22	0.25
La Garita Wilderness	169	0.06	0.08	0.09	0.08
Canyonlands NP	170	0.28	0.20	0.22	0.23
Black Canyon Gunnison NM	203	0.09	0.11	0.07	0.09
Bandelier NM	210	0.13	0.19	0.17	0.16
Petrified Forest NP	213	0.05	0.03	0.05	0.05
West Elk Wilderness	216	0.07	0.09	0.07	0.08
Arches NP	222	0.19	0.19	0.15	0.17
Capitol Reef NP	232	0.12	0.07	0.09	0.09
Pecos Wilderness	248	0.08	0.10	0.10	0.09
Wheeler Peak Wilderness	258	0.07	0.06	0.07	0.06
Great Sand Dunes NM	269	0.07	0.05	0.06	0.06
Maroon Bells-Snowmass WA	271	0.04	0.04	0.03	0.04
Grand Canyon NP	285	0.08	0.04	0.05	0.05

**NM SRC02 Unit # 350450902, PNM SJ #1-4: NOx Only (NOx = 38,763 TPY)  
Annual Average Natural Conditions  
Class I Area with at least 1 receptor within 300 km of source**

Class I Area	Minimum Distance	98th Percentile for Each Year			98th
	(km)	2001	2002	2003	3 year AVG
Mesa Verde NP	40	3.59	3.73	3.24	3.52
Weminuche Wilderness	98	1.66	2.15	1.71	1.84
San Pedro Parks Wilderness	155	2.70	2.74	2.89	2.78
La Garita Wilderness	169	1.09	1.30	1.22	1.20
Canyonlands NP	170	4.28	3.22	2.79	3.43
Black Canyon Gunnison NM	203	1.67	1.72	1.86	1.75
Bandelier NM	210	1.69	2.13	2.23	2.02
Petrified Forest NP	213	0.80	0.70	0.30	0.60
West Elk Wilderness	216	1.22	1.44	1.60	1.42
Arches NP	222	3.22	2.50	2.40	2.71
Capitol Reef NP	232	2.89	0.92	1.45	1.75
Pecos Wilderness	248	1.49	1.72	1.94	1.72
Wheeler Peak Wilderness	258	1.15	1.09	1.36	1.20
Great Sand Dunes NM	269	1.09	1.00	1.10	1.07
Maroon Bells-Snowmass WA	271	0.76	0.88	0.88	0.84
Grand Canyon NP	285	1.56	0.80	0.44	0.93

**NM SRC02 Unit # 350450902, PNM SJ #1-4: SO<sub>2</sub> Only (SO<sub>2</sub> = 35,735 TPY)  
Annual Average Natural Conditions  
Class I Area with at least 1 receptor within 300 km of source**

Class I Area	Minimum Distance	98th Percentile for Each Year			98th
	(km)	2001	2002	2003	3 year AVG
Mesa Verde NP	40	2.78	3.17	3.14	3.03
Weminuche Wilderness	98	1.28	1.23	0.89	1.13
San Pedro Parks Wilderness	155	1.77	2.13	1.72	1.87
La Garita Wilderness	169	0.81	0.89	0.70	0.80
Canyonlands NP	170	2.65	1.79	2.06	2.17
Black Canyon Gunnison NM	203	0.92	1.03	0.89	0.95
Bandelier NM	210	1.17	1.62	1.24	1.34
Petrified Forest NP	213	0.94	0.83	0.94	0.91
West Elk Wilderness	216	0.75	0.79	0.59	0.71
Arches NP	222	1.74	1.22	1.33	1.43
Capitol Reef NP	232	1.68	1.47	1.32	1.49
Pecos Wilderness	248	1.09	1.16	1.24	1.16
Wheeler Peak Wilderness	258	1.00	0.86	1.06	0.97
Great Sand Dunes NM	269	0.64	0.69	0.68	0.67
Maroon Bells-Snowmass WA	271	0.54	0.62	0.36	0.51
Grand Canyon NP	285	1.18	0.78	0.73	0.90

**NM SRC02 Unit # 350450902, PNM SJ #1-4: PM plus NO<sub>x</sub> (NO<sub>x</sub> = 38,763 TPY; PM = 3,884 TPY)**

**Annual Average Natural Conditions  
Class I Area with at least 1 receptor within 300 km of source**

Class I Area	Minimum Distance	98th Percentile for Each Year			98th
	(km)	2001	2002	2003	3 year AVG
Mesa Verde NP	40	4.27	4.06	3.46	3.93
Weminuche Wilderness	98	1.74	2.28	1.76	1.93
San Pedro Parks Wilderness	155	2.85	2.87	3.07	2.93
La Garita Wilderness	169	1.15	1.36	1.30	1.27
Canyonlands NP	170	4.39	3.33	2.91	3.54
Black Canyon Gunnison NM	203	1.73	1.84	1.90	1.82
Bandelier NM	210	1.77	2.29	2.31	2.12
Petrified Forest NP	213	0.83	0.72	0.31	0.62
West Elk Wilderness	216	1.26	1.50	1.64	1.47
Arches NP	222	3.30	2.65	2.50	2.82
Capitol Reef NP	232	3.06	0.95	1.50	1.83
Pecos Wilderness	248	1.55	1.77	2.04	1.79
Wheeler Peak Wilderness	258	1.20	1.12	1.40	1.24
Great Sand Dunes NM	269	1.14	1.05	1.15	1.11
Maroon Bells-Snowmass WA	271	0.78	0.91	0.91	0.87
Grand Canyon NP	285	1.60	0.82	0.45	0.96

## 10.4 Summary of BART Determinations for San Juan

Clean Air Act § 169A(g)(7) directs States to consider five factors in making BART determinations. The regional haze rule codified these factors in 40 CFR § 51.308(e)(1)(ii)(B), which directs States to identify the "best system of continuous emissions control technology" taking into account "the technology available, the costs of compliance, the energy and non-air quality environmental impacts of compliance, any pollution control equipment in use at the source, and the remaining useful life of the source."

The BART regulations define BART as meaning "...an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by ... [a BART-eligible source]. In its guidance, EPA was clear that each State must determine the appropriate level of BART control for each source that is determined to be subject-to-BART. In making a BART determination, a State must consider the following factors:

- (1) The costs of compliance;
- (2) The energy and non-air quality environmental impacts of compliance;
- (3) Any existing pollution control technology in use at the source;
- (4) The remaining useful life of the source; and
- (5) The degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology.

To consider these factors, New Mexico applied the following 5 step process as specified in the BART Guidelines at Appendix Y to 40 CFR Part 51:

Step 1 – Identify All Available Retrofit Control Technologies

Step 2 – Eliminate Technically Infeasible Options

Step 3 – Evaluate Control Effectiveness of Remaining Control Technologies

Step 4 – Evaluate Impacts and Document the Results

- a) Costs of Compliance
- b) Energy Impacts
- c) Air quality environmental impacts
- d) Non-air environmental impacts
- e) Remaining useful life

Step 5 – Evaluate Visibility Impacts

The Department applied the 5 step process to San Juan, as described in detail in Appendix D. The results are summarized below.

### 10.4.1 Particulate Matter

Based on the five factor analysis, the Department determined in 2011 that BART for Units 1-4 for particulate matter ("PM") is the existing pulse jet fabric filter control technology and an existing emission rate of 0.015 lb/MMBtu. The Department's determination of BART was based on the following results of the full five factor analysis:

1. Each of Units 1-4 is equipped with a pulse jet fabric filter (PJFF) and is subject to a federally-enforceable emission limit of 0.015 lb PM/MMBtu.

2. The Department reviewed both the cost-effectiveness and incremental cost-effectiveness of additional control technology (WESP) and found these costs to be excessive.
3. There are no non-air impacts associated with the WESP technology.
4. There are additional energy impacts associated with the WESP technology and the Department considers these costs to be reasonable.
5. The Department reviewed the visibility improvement that resulted from the installation of the consent decree technology (PJFF and LNB/OFA) and that would result from the addition of WESP technology. The Department determined that on a facility-wide basis the visibility improved by 1.06 deciviews (dv) from the installation of the consent decree technology at Mesa Verde National Park (Mesa Verde). The installation of WESP would result in a facility-wide improvement of 0.62 dv at Mesa Verde.

On November 27, 2012, the EPA approved New Mexico's determination that PJFF is BART for PM at San Juan. 77 Fed. Reg. 36,044. Notwithstanding the fact that the BART requirement has thus been satisfied with respect to PM, additional PM reductions will be made at the San Juan Generating Station under the "State Alternative" described below.

#### **10.4.2 Nitrogen Oxides**

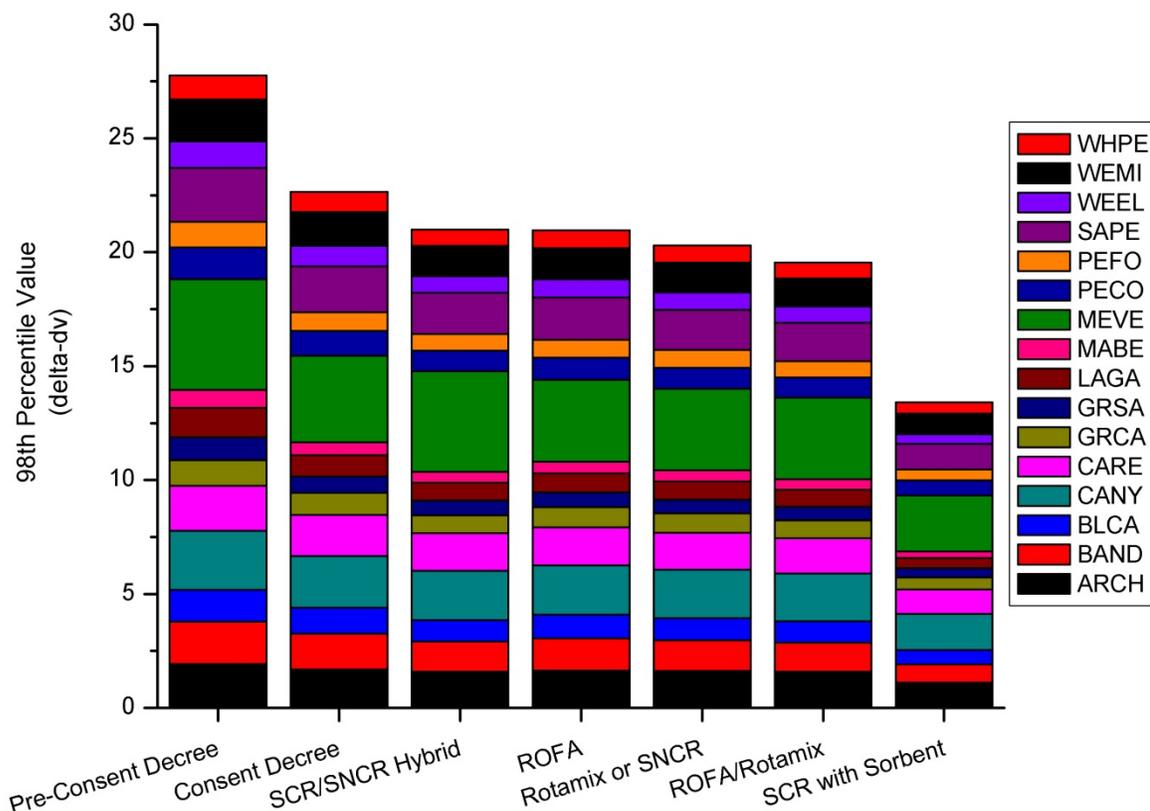
Based on the five factor analysis, the Department determined in 2011 that BART for Units 1-4 for NO<sub>x</sub> is SNCR technology and an emission rate of 0.23 lb/MMBtu on a 30-day rolling average. The Department's determination of BART was based on the following results of the five factor analysis:

1. SNCR technology is considered cost-effective at an average cost of \$3,494 dollars per ton of NO<sub>x</sub> removed. SNCR technology will reduce the facility annual NO<sub>x</sub> emissions by 4,900 tons.
2. The SNCR technology will result in additional energy impacts and non-air impacts. The SNCR technology will require a new reagent system and a reagent storage system. The Department considered these additional costs in the review of the overall cost-effectiveness of SNCR and found these costs to be reasonable.
3. The Department reviewed the visibility improvement that resulted from the installation of the SNCR technology. The Department determined that on a facility-wide basis the visibility improved by 0.25 dv at San Pedro Parks, 0.22 dv at Mesa Verde, and 0.21 at Bandelier.
4. An emission limit of 0.23 lb NO<sub>x</sub>/MMBtu at each of Units 1-4 equals the EPA's established presumptive limit for dry-bottom, wall-fired boilers burning sub-bituminous coal.
5. The Department reviewed additional economic information provided by PNM that analyzed the economic impact to ratepayers in New Mexico. PNM estimates indicate the cost of control technology beyond SNCR would be financially burdensome and cause economic hardship to low-income New Mexicans. According to the U.S. Census Bureau, as of 2009, 18 percent of New Mexicans were living below the poverty line, as defined by the federal poverty standards. PNM estimates a rate increase of \$11.50 per year per residential ratepayer from the installation of SNCR versus an estimated rate increase of \$82.00 per year from the installation of SCR.

The visibility improvement projected for each Class I area from the installation of various NOx control technologies is shown in

Figure 10-1.

**Figure 10-1: Visibility Improvement from NOx BART Controls at San Juan Generating Station**



Notwithstanding this 2011 NOx BART determination applicable to all four units, which the Department believes would satisfy all applicable requirements, the Department has determined that the State Alternative would result in additional visibility improvements and other air and non-air benefits, as described below, and therefore is preferable to the 2011 NOx BART determination.

### 10.4.3 State Alternative

As noted in the Introduction above, on February 15, 2013, New Mexico, EPA, and PNM signed a tentative agreement (Term Sheet) to address the CAA requirements for regional haze and interstate transport for visibility at the San Juan Generating Station. Although the agreement arose from a dispute over the NOx BART determination, its terms will also result in reduction of PM, SO2, and other pollutants including greenhouse gases.

In accordance with the Term Sheet, PNM submitted to the Department in March 2013 a revised 5-factor BART analysis that includes consideration of the State Alternative. As documented in Appendix D of

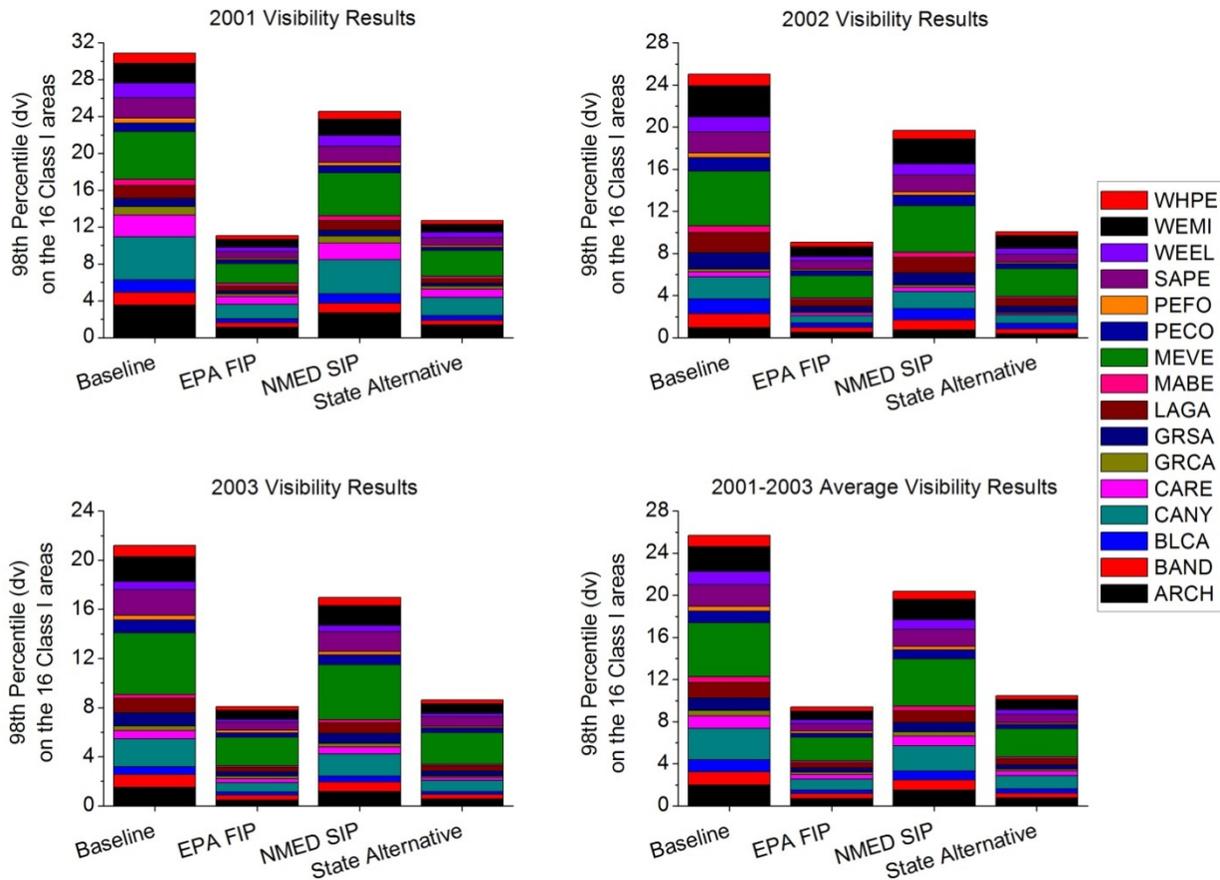
this SIP, the Department has reviewed the revised BART analysis, and has determined that the State Alternative satisfies the BART requirements of the CAA and 40 C.F.R Part 51 Appendix Y. The comparison of the State Alternative to the Department's BART determination of SNCR on all four units and the installation of SCR on all four units (EPA's Federal Implementation Plan decision; 76 FR 52388, August 22, 2011) is summarized in Table 10-3.

**Table 10-3: Facility-Wide Pollutant Emissions from State Alternative, FIP and NMED SIP**

<b><u>Scenario</u></b>	<b><u>NOx</u></b>	<b><u>SO<sub>2</sub></u></b>	<b><u>PM</u></b>	<b><u>CO</u></b>	<b><u>CO<sub>2</sub></u></b>	<b><u>VOC</u></b>	<b><u>Mercury</u></b>	<b><u>Non-Hg</u></b>	<b><u>Acid Gases</u></b>
Current	21,000	10,500	2,380	33,507	14,669,968	210	0.0842	5.4	1,488
State Alternative	8,011	3,483	1,184	18,615	7,314,801	104	0.042	2.7	744
State Alternative % Reduction	62%	67%	50%	44%	50%	50%	50%	50%	50%
NMED SIP	16,100	10,500	2,380	33,507	14,699,968	210	0.0842	5.4	1,488
NMED SIP % Reduction	23%	0%	0%	0%	0%	0%	0%	0%	0%
EPA FIP	3,502	10,500	2,380	33,507	14,699,968	210	0.0842	5.4	1,488
EPA FIP % Reduction	83%	0%	0%	0%	0%	0%	0%	0%	0%

Visibility improvements were compared for the current configuration (Baseline), NMED SIP assessment (SNCR on all four units), the EPA FIP final determination (SCR on all four units), and the State Alternative Plan. Figure 10-2 shows the differences in visibility between the alternatives at the 16 Class I areas within 300 kilometers of SJGS. The State Alternative Plan provides similar visibility improvement as the EPA FIP plan. See Appendix D for additional details.

**Figure 10-2: Comparison of Visibility Improvement of Alternatives at San Juan Generating Station**



Note: WHPE – Wheeler Peak Wilderness Area, NM; WEMI – Weminuche Wilderness Area, CO; WEEL – West Elk Wilderness Area, CO; San Pedro Parks Wilderness Area – NM; PEFO – Petrified Forest National Park, AZ; PECO – Pecos Wilderness Area, NM; MEVE – Mesa Verde National Park, CO; MABE – Maroon Bells Wilderness Area, CO; LAGA – La Garita Wilderness Area, CO; GRSA – Great Sand Dunes National Monument, CO; GRCA – Grand Canyon National Park, AZ; CARE – Capitol Reef National Park, UT; CANY – Canyonlands National Park, UT; BLCA – Black Canyon of the Gunnison National Park, CO; BAND – Bandelier Wilderness Area, NM; ARCH – Arches National Park, UT

Based on this analysis, the Department determines that the State Alternative is superior to the 2011 NOx BART SIP and EPA’s NOx BART FIP for the following reasons:

- 1) PNM will obtain the necessary construction permit modification to limit the SO<sub>2</sub> emission rates at Units 1 and 4 to 0.10 lb/MMBtu on a daily rolling 30-day average basis.
- 2) The retirement of Units 2 and 3 will reduce the facility annual NOx emissions by an additional 10,550 tons. When added to the controlled emission rate of Units 1 and 4, total annual NOx emission will be reduced by 12,989 tons. Additionally, PNM will conduct performance testing to determine if the SNCRs installed on Units 1 and 4 can achieve significantly less than 0.23 lb/MMBtu.
- 3) The retirement of Units 2 and 3 will reduce raw material usage at the facility, including limestone, activated carbon, coal and No. 2 diesel oil. See Table below.

Raw Material	State Alternative Plan (TPY)	Baseline, FIP, and FIP
Limestone <sup>(1)</sup>	86,052	172,104
Activated Carbon <sup>(1)</sup>	130	261
Coal <sup>(2)</sup>	2,667,364	5,334,729
No. 2 Diesel Oil <sup>(2)</sup>	1,007,336	2,014,671

- 4) The two-unit retirement scenario will result in a substantial decrease in particulate matter emissions from coal processing, handling and transportation, as well as a substantial reduction in greenhouse gas emissions, mercury and non-mercury emissions, and acid gas emissions as detailed in Table 22.
- 5) Water usage is expected to drop by up to approximately 53% to 10,161 acre-feet/year.
- 6) The visibility improvement from the State Alternative scenario achieves significant visibility improvements as compared to the baseline and the SNCR installation on Units 1-4. The visibility improvements from the two-unit retirement and 2 SNCR installation scenario compared very closely with the SCR installation scenario as proposed in the FIP (less than 0.5 dv impact).
- 7) The total capital investment of the proposed FIP is estimated at nearly \$861,871,000, as compared to \$34,556,000 for the installation of SNCR at Units 1 and 4. This additional and significant capital expenditure that would be required to comply with the FIP is not justified given the slight and undetectable improvement in visibility.

Accordingly, the State Alternative is hereby adopted in lieu of the 2011 NOx BART determination, to be implemented as provided in section 10.5 below.

#### 10.5 Implementation of the State Alternative

In accordance with the Term Sheet, the following requirements apply to the San Juan Generating Station

- a. Fifteen (15) months after EPA final approval of this revised SIP, no earlier than January 31, 2016, Public Service Company of New Mexico (PNM) will complete installation of selective non-catalytic reduction (SNCR) technology on SJGS Unit 1 and 4 of no greater than 0.23 lb/MMBtu on a daily rolling 30-day average basis.
- b. Testing Program. PNM shall comply with the following. Dates that follow with an asterisk(\*) in items (i) – (iv) shall be revised accordingly if the installation date extends past January 31, 2016 due to delay in EPA’s SIP approval:
  - i. PNM will commence a program of testing and evaluation, after the installation of the SNCRs. The Testing Program consisting of SNCR Performance Testing, Fuel Performance Testing, and Long-Term Performance Evaluation is to be completed no later than January 31, 2017,\* unless the Long-Term Performance Evaluation is delayed per the language in paragraph b.iv below.

- ii. SNCR Performance Testing will be conducted to develop a targeted ammonia/urea injection rate range at various load levels without exceeding a to-be-agreed-upon preliminary slip limit of between 5 and 10 ppm, with the goal of minimizing NOx emissions. PNM shall provide the results of the performance tests, recommended final slip limit, and target ammonia/urea injection rates to NMED and EPA by April 1, 2016.\* PNM will allow up to April 30, 2016\* for the agencies to either concur with PNM's slip limit recommendation or to concur on a different slip limit that PNM will comply with for Units 1 and 4.
- iii. PNM will conduct Fuel Performance Testing (in conjunction with the SNCR Performance Testing) of its pre-treated coal technology, so long as it has not been previously determined to result in any detrimental effect to SJGS Units 1 and 4 or their operation, with the objective of further reducing NOx emissions. If the Fuel Performance Testing demonstrates that it does not: (i) measurably increase NOx emissions, or (ii) adversely impact overall unit operations, PNM shall also use such pre-treated coal for the 9-month Long-Term Performance Evaluation Period described below. PNM will also use pre-treated coal on units 2 and 3 when used on units 1 and 4.
- iv. Long-Term Performance Evaluation Period. PNM will begin collecting NOx emission and ammonia/urea injection rate data from Units 1 and 4 on a daily rolling 30-day average basis for nine continuous months beginning on May 1, 2016\* and provide such data and any recommendations on the NOx emission limit to NMED and EPA by February 28, 2017\* or no later than 28 days after completing the Long-Term Performance Evaluation Period. PNM may request more time if a slip limit is not agreed upon by April 30, 2016.\* The Long-Term Performance Evaluation Period must include 60 days between June 1<sup>st</sup> and August 30<sup>th</sup> and 60 days between December 1<sup>st</sup> and February 28<sup>th</sup>. The Demonstrated Emission Rate will be the highest daily rolling 30-day average emission rate during the 9-month Long-Term Performance Evaluation Period (not including periods of malfunction or abnormal operating conditions) adjusted to three significant digits. If the Demonstrated Emission Rate is greater than or equal to 0.200 lb/MMBtu on a daily rolling 30-day average basis no adjustment to the NOx emission rate for units 1 and 4 will be made. If the Demonstrated Emission Rate is less than 0.200 lb/MMBtu on a daily rolling 30-day average basis PNM will apply for a permit modification by March 31, 2017\* (or no later than 60 days after completing the Long-Term Performance Evaluation Period) to reduce the permitted emission rate by 60% of the difference between 0.23 lb/MMBtu and the Demonstrated Emission Rate, provided the revised emission rate does not adversely impact overall unit operations. The permit modification will include the agreed upon ammonia slip limit.

- c. No later than six months from the Board's adoption this SIP revision, PNM will comply with a sulfur dioxide ("SO<sub>2</sub>") emission rates at Units 1 and 4 of 0.10 lb/MMBtu on a daily rolling 30-day average basis.
- d. PNM shall diligently seek all necessary regulatory approvals to allow for retirement of SJGS Units 2 and 3 by December 31, 2017, and if such approvals are granted, shall retire SJGS Units 2 and 3 by December 31, 2017.
- e. Nothing in this SIP shall relieve the SJGS from its obligations to comply with all applicable federal, state, and local laws and regulations, including laws, regulations, and compliance deadlines that become applicable after the date that this SIP revision is approved by EPA.