[9/15/98 - 4:45pm]

Attachment IV

AES Puerto Rico Cogeneration Project
Responsiveness Summary

Introduction

The Region 2 Office of the U.S. Environmental Protection Agency (EPA) held a public comment period from April 11, 1997 until May 21, 1997 with respect to the Prevention of Significant Deterioration of Air Quality (PSD) permit application submitted by AES Puerto Rico, L.P. (AES-PRLP) for the construction and operation of the AES Puerto Rico Cogeneration Project (AES-PRCP) in Guayama, Puerto Rico. This public comment period was subsequently extended until June 20, 1997. A public hearing was held May 21, 1997. The purpose of the public comment period was to solicit comments from the public on EPA's preliminary determination to approve AES-PRCP's PSD permit.

EPA received numerous comments during the public comment period, carefully reviewed each relevant comment on this project and developed this Responsiveness Summary. In addition, the reader may wish to refer to Addendum A at the end of this Responsiveness Summary for a primer on Air Quality Analysis Requirements under the PSD regulations. Because of the wide variety of comments received, EPA has segregated the comments and responses into 10 sections (subjects). EPA also consolidated various comments according to relevance and edited others for reasons of space and clarity. For reasons of simplicity, EPA addressed each comment as if it was made by a single commenter, although in many cases, a number of commenters raised the same issue. Only relevant comments were included in this summary. The 10 sections have been identified as:

Section 1.0 - Sulfur Dioxide (SO_2) Emissions - Page 2
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Addendum A - Air Quality Analysis Requirements Under the Prevention of Significant Deterioration (PSD) of Air Quality Regulations - Page 96

Section 1.0 - Sulfur Dioxide (SO_2) Emissions

Comment 1.1

In order to produce 4,922.7 MMBTU/hr [the maximum design heat input rate of AES-PRCP] one would need, for example, 241.3 tons/hr of coal from the coal mine of San Jorge in Colombia. With a coal sulfur content of 0.80%, it means that the boilers will have 3,861 lb/hr of SO_2. AES-PRCP's assertion that the maximum SO_2 removal efficiency is 95% (a more reasonable value should be a typical 90%), which means that 5% of the sulfur will not be collected. This quantity is equivalent to 193 lb/hr. Assuming that all sulfur is converted into SO_2 this means an emission rate of 386 lb/hr of SO_2. AES-PRCP's PSD permit indicates 108.3 lb/hr of SO_2. In other words, AES-PRCP's calculations are underestimated by a factor of 3.5 (possibly a factor of 7 if we use 90% removal efficiency instead of 95%).

Response 1.1

Commenter takes the coal data for the San Jorge mine located in Colombia from Table 2-3 of AES-PRLP's December 1995 permit application. This table lists possible sources of coal for the proposed AES-PRCP as of 1994. The table lists nine possible sources of coal from Colombia and Venezuela with sulfur contents ranging from 0.50 % sulfur to 0.80% with the majority in the 0.60% range. The BTU content range in the list is from 10,200 to 13,000 Btu/lb with the majority near the 12,000 BTU/lb range. The coal from the San Jorge mine has an energy content of 10,200 Btu/lb (the lowest in the table) and a sulfur content of 0.80% (the highest in the table). A more representative coal from that list is something like the coal from La Jagua in Colombia which has an energy content of 12,000 BTU/lb and a 0.60% sulfur.

In any event, assuming that AES-PRCP decides to burn, as the commenter states, coal with a sulfur content of 0.80% sulfur and with a 10,200 BTU/lb coal then:

$$\frac{0.008 \text{ lb Sulfur}}{\text{lb coal}} \times \frac{1 \text{ lb coal}}{10{,}200 \text{ BTU}} \times \frac{64 \text{ lb } SO_2}{32 \text{ lb Sulfur}} \times \frac{10^6 \text{ BTU}}{1 \text{ MMBTU}} = 1.569 \text{ lb } SO_2/\text{MMBTU of uncontrolled emissions}$$

The PSD permit requires an SO_2 emission rate of 0.022 lb SO_2/MMBTU which means that, at that particular sulfur and BTU content, AES-PRCP would have to achieve an SO_2 removal rate of 98.6%. (The AES-PRCP application does not, as the commenter states, assert that the maximum SO_2 removal efficiency will be 95%.) We believe that this emission rate is technically feasible because three methods of emission controls are used, all of which have been proven. The first is a fluidized bed with limestone injection, the second is an add-on dry scrubber, and the third is low sulfur coal. All working in tandem can be adjusted to ensure compliance. Also see Response 1.2.

Comment 1.2

AES-PRCP acknowledges that none of the 46 facilities listed with fluidized bed-boilers and

limestone injection achieve 0.022 lb/MMBTU emission rate for sulfur dioxide. Moreover, none of the non-fluidized bed boilers achieve this emission rate. Where has this combination of technology ever been used, and how is it verifiable?

Response 1.2

Fluidized bed boilers combined with low sulfur coals can achieve very low emission rates. For example, under the listing for coal-fired fluidized bed boilers in Appendix B of the AES-PRCP permit application, the facility of Mount Poso Cogeneration Co. in California is listed as having an SO_2 emission rate of 0.04 lb/MMBTU utilizing limestone injection and low sulfur coal alone. Others examples include BMCP in California with an SO_2 emission rate of 0.039 lb/MMBTU also utilizing limestone injection and low sulfur coal alone (96% SO_2 removal efficiency) and Rio Bravo Refining Co. with an SO_2 emission rate of 0.036 lb/MMBTU. These facilities are representative because they are fluidized bed boilers that burn low sulfur coal ($\leq$1% sulfur) and utilize limestone injection as proposed by AES-PRCP. Given the permitted emission rates for SO_2 found in California without a dry scrubber and assuming a very conservative estimate of the removal efficiency of a dry scrubber, the 0.022 lb/MMBTU is technologically feasible. We see no reason why a dry scrubber would be technologically inconsistent with low sulfur fuel.

Although Appendix B does not include facilities with dry scrubbers, dry scrubbers are recognized SO_2 pollution control equipment with a proven track record. These three types of SO_2 control: limestone injection, dry scrubber, and low sulfur coal were not included in Appendix B because they have not been combined simultaneously in the past due to the cost involved.

Considering all these factors, AES-PRCP's SO_2 emission rate of 0.022 lb/MMBTU is technologically feasible. While we do not know of any existing fluidized bed boiler that has these three levels of controls, we are aware that this combination of controls has been applied successfully to non-fluidized bed boilers. Furthermore, application of one control technology from one type of facility can be successfully applied to other types of facilities (technology transfer).

Comment 1.3

Besides sulfur content in the coal, what are the specific changes in AES-PRCP's pollution control technology between 1994 and 1995? What verifiable operational and technical changes resulted in the notable reductions in SO_2 emissions between 1994 and 1995 at the AES-PR facility?

Response 1.3

No changes were made other than lowering the sulfur content of the coal and improving data

quality.

It should be noted that AES-PRCP submitted a formal PSD application in December 1995. Prior to that in 1994, they had submitted a draft permit application. This is normal practice for major permit applicants. In the interest of time, applicants normally submit draft applications that are not quite ready for a formal review by permitting authorities. This is done prior to submitting the formal application so that major omissions can be identified earlier on and timely guidance can be given to the applicant. Any communications with the applicant are contained in the administrative record. In general, from the time a draft permit application was prepared to the time it was submitted, many things can change. Events that may change an applicant's submittal include: an applicant could identify new coal suppliers and get a better quote on coal prices; they can also get more accurate vendor data, calculations are re-checked for errors, etc. Therefore, permitting authorities need only to look at the formal permit application submitted or the latest revision.

Comment 1.4

What are the economic factors of the BACT chosen with respect to SO_2? What are the economic factors for each individual control method (dry scrubber, limestone injector, 1% coal, etc.)?

Response 1.4

Under the "top-down" approach of determining BACT, the applicant need not submit an economic analysis if the top control method is selected by the applicant, as was in this case. (Note that commenter in Comment 1.2 does not dispute the fact that the SO_2 control option proposed by AES-PRCP would be "the top control" in a "top-down" BACT analysis.)

However, assuming that an applicant determines that this top control method is inappropriate, this determination should be based on energy, environmental, or economic impacts, and then the next most effective alternative in the "top-down" listing becomes the new control candidate and is similarly evaluated. Therefore, an economic analysis is required if the applicant selects a control option that is not the top. This is needed to justify why a permit applicant cannot afford the top control. Since AES-PRCP proposed "the top" control level, no economic data for SO_2 control was required of the applicant.

Comment 1.5

How is the BACT for the emission rate of SO_2 been verified as achievable? How many of the non-fluidized bed boilers achieve this emission rate?

Response 1.5

Coal-fired fluidized bed boilers have been in operation for a number of years. They have been

demonstrated to achieve a high level of SO_2 reduction. Dry scrubbers have also been demonstrated to achieve reductions of SO_2. To our knowledge, no one has yet constructed a fluidized bed together with a dry scrubber because of the costs involved. Also, the design of the fluidized bed boiler already includes a control for SO_2 emissions. Because of their individual proven track records, the combination of these two control technologies can work. All things being equal, non-fluidized bed boilers do not achieve this level of SO_2 control since they have only one control technology (scrubber). See also Response 1.2.

Comment 1.6

What are the Method 9 visible emissions readings for other facilities using CFB?

Response 1.6

We do not have that information. However, it is our experience that opacity is not normally a problem with these types of facilities. In addition, opacity standards are different for each state, ranging in the 10-20% range. In any event, this facility is required to install and operate an opacity monitor to ensure that visible emissions are within the 20% permitted level.

Comment 1.7

What technical assessment, including physical, chemical, engineering principles and empirical data were used in addition to information about vendor guarantees?

Response 1.7

See Responses 1.1, 1.2 and 1.5 above for EPA's analysis.

Comment 1.8

What are the calculations for each individual pollution control technology that was used to achieve 0.022 lb/MMBTU? Where has the combination of these types of technologies been used and how is it verifiable?

Response 1.8

While it is possible to calculate the SO_2 emission rate after it comes out of each individual pollution control technology, we looked at all the SO_2 controls as a whole with one final emission rate. This would give more flexibility to the facility in meeting this emission rate. Response 1.1 explains how we determined that this emission rate can be achieved. Also see Responses 1.2 and 1.5.

Comment 1.9

What is the reference material used by EPA to calculate the Best Available Control Technology that combines limestone injection, a circulating dry scrubber and coal with a 1% sulfur content?

Response 1.9

See Responses 1.2, 1.4 and 1.5 above.

Comment 1.10

The draft permit emissions for SO_2 of 108.3 lb/hr are specified for 105% maximum continuous rating (MCR). How is this achieved when the SO_2 emissions for maximum load (100%) in Table 7.3-1b for two boilers is also 108.3 lb/hr? (AES-PRCP Application revised May 1996.)

Response 1.10

105% maximum continuous rating (MCR) refers to the highest guaranteed heat rate that the boiler can achieve at any given moment. However, it is unlikely that the unit will operate at this level at all times. The MCR value is a good number to use to determine a conservative value for the emissions in the air quality modeling. The term 100% in the context of Table 7.3-1b of the permit application refers to the full load capability of the boilers and is defined as 105% MCR. The important thing is that whether it is 105% MCR or 100% load, the two boilers combined will not exceed 108.3 lb/hr of SO_2 during any three-hour period.

Comment 1.11

How does AES calculate the same emissions for 100% and 105% ratings?

Response 1.11

See Response 1.10 above.

Comment 1.12

Would AES emit half of the permissible SO_2 pollutants if there was only one boiler?

Response 1.12

BACT emission rates are unit-specific. The 108.3 lb/hour of SO_2 corresponds to the two boilers combined. Each single boiler is allowed to emit the maximum amount of 54.1 lb/hr. The final permit has been amended to clarify this.

Section 2.0 - Particulate Matter and Particulate Matter Under 10 Microns (PM_{10}) Emissions

Comment 2.1

As the worst case, take the coal that will come from the Tachira coal mine in Venezuela. To generate 4,922.7 MMBTU/hr [the maximum design heat input rate of AES-PRCP] one would need 197 tons of coal per hour. This coal has 9.5% ash. Assuming this amount to be increased three times during combustion one would get 28.5% ash (in fact, we estimate that the percent ash can reach up to 30%). So the ash produced will reach a total of 112,237 lb/hr. To this quantity one must add the particulates from CaSO4 that will be produced during the sulfur removal. For the Tachira coal, with a sulfur content of 0.70% and a sulfur removal efficiency of 95% we obtain a total of 2,620 lb/hr of sulfur which converted to CaSO4 adds another 11,299 lb/hr of particulates. Evidently, to reduce the sulfur content in the boilers, they would have to add excess limestone for which the total particulate would be greater than the simple addition of the ash and the CaSO4. However, this simple addition would give us an idea of the lower limit of particulates produced in the boilers. This lower limit would be 123,536 lb/hr. According to AES, the particulate removal efficiency is 99.9%. If we use this number, the total particulate that escapes through the stack is 124 lb/hr or 0.02518 lb/MMBTU. This value is 1.68 higher than the value proposed by AES of 0.015 lb/MMBTU.

Response 2.1

Commenter does not indicate all the assumptions made in deriving his calculations. It should be noted that potentially everything that goes into the circulating fluidized bed (CFB) boiler such as limestone, ash, coal, etc., can be a particulate emission. So a percent ash content of the coal is not the main factor in determining whether the facility will meet its particulate emission rate. Particulate matter composition and emission levels are a complex function of firing configuration, boiler operation, and coal properties. After the coal is combusted in the furnace side of the CFB, unburned coal, $CaSO_4$, ash, etc., go through the cyclone side of the CFB. This cyclone sends all these materials back into the furnace side for additional combustion. The bottom ash settles and is then separated from the furnace through an ash conveyor system. It is not clear what assumptions commenter made with respect to what gets out with the bottom ash. The 99.9% particulate removal efficiency refers to the particulate loading of the flue gas that leaves the CFB furnace from the top. Since we do not know what assumptions were made as to what amount of ash leaves through the bottom ash, we cannot comment specifically on commenter's particular example. As a side statement, Panther Creek Cogen in Pennsylvania is permitted to burn anthracite refuse (a.k.a. culm, another type of coal), which has much higher levels of ash than the 30% assumed by the commenter (35.6% ash) and has a permitted particulate emission rate of 0.014 lb/MMBTU. Furthermore, this facility is in compliance with all its permitted emission rates.

Comment 2.2

Commenter states that because the permit allows the burning of 4,000 tons of coal per day, if AES-PRCP were to operate the controls slightly below the 99.9% removal efficiency such as 99.7%, the total particulate emission would increase by a factor of three. In other words, the particulate emission rate would increase from 124 lb to 372 lb. Appendix B of the AES-PRCP application show a list of facilities that operate below this level of removal efficiency. This situation is particularly dangerous in Puerto Rico because of the fiscal fragility of the local government, the regulatory agencies do not have the staff nor the necessary equipment to monitor the compliance with the permitted levels.

Response 2.2

It is not clear how the commenter came up with the assumption that the emission rate will increase from 124 lb to 372 lb. The PSD permit allows the AES-PRCP to emit 0.015 lb/MMBTU of particulate matter. Since the maximum heat input rate is 4,922.7 MMBTU/hr, then the maximum particulate emission rate at any given hour is 73.84 lb not 124 lb. With respect to the level of removal efficiencies, the list of sources located in Appendix B of the AES-PRCP PSD permit application lists facilities that were mostly permitted in the 1980s. These contain particulate removal efficiencies less than 99.9%. Facilities permitted more recently, for example, Archer Daniels Midland in Cedar Rapids, Iowa have a particulate control efficiency of 99.9%. The important thing here is not the exact actual percent removal efficiency but the worst case federally-enforceable emission rate for particulate matter that will be emitted from the proposed facility. This worst-case emission rate has been modeled and it meets all applicable air quality standards.

With respect to the issue of local resources to monitor this facility, EPA has the lead role in ensuring that this facility meets all the applicable requirements listed in this permit.

Comment 2.3

EPA should consider the mass of the particulate matter such as PM_{10} not just the total quantity of the particulate matter emitted.

Response 2.3

EPA has, in fact, considered the small particulate matter (PM_{10}) . The control technology review and the air quality analysis all have covered PM_{10}.

Comment 2.4

The emission limits contained in the draft PSD permit cannot be verified or confirmed as BACT.

For PM_{10}, we have compared the AES Puerto Rico draft PSD permit with other facilities listed in the RACT/BACT/LAER Clearinghouse listing. The AES Warrior Run Plant in Maryland is the only other facility in the clearinghouse listings which claims an emission rate of PM_{10} of 0.015 lb/MMBTU for coal-fired fluidized bed boilers. Warrior Run is a much smaller plant. Only one other facility in the forty listed facilities claims a lower PM_{10} emission rate. Therefore, we request that the lowest BACT listing for PM_{10} for a facility using ESP be reanalyzed.

Response 2.4

The EPA is confident that a particulate emission rate of 0.015 lb/MMBTU is technologically feasible. The listing provided by AES-PRCP from the RACT/BACT/LAER clearinghouse in Appendix B of the permit application shows more than one source with a lower or similar emission rate. That listing shows two sources controlling particulate matter to a comparable range with respect to AES-PRCP utilizing an ESP. These are: the William Zimmer Generating Station in Moscow, Ohio with a PM limit of 0.025 lb/MMBTU; and the Wisconsin Electric Power Plant in Port Washington, Wisconsin with a PM limit of 0.02 lb/MMBTU. These facilities were permitted in the mid to late 1980s. The listing also includes numerous other facilities which have baghouses with emission rates like 0.015, 0.018, and 0.022 lb/MMBTU. Newer ESPs have improved collection efficiencies than those built earlier and when they are compared with baghouses they are considered equivalent in the control of particulate matter. EPA does not consider a PM emission rate of 0.015 lb/MMBTU to be unreasonably low. Therefore, upon review of commenter's concern, we are still confident that 0.015 lb/MMBTU is achievable. In addition, the commenter has not provided any technical data nor proposed any emission rate that would demonstrate that a higher PM_{10} emission rate is required. Also see Response 2.6 for a discussion on condensible and non-condensible PM_{10}.

Comment 2.5

AES Puerto Rico states that the technology for either electrostatic precipitators or fabric filters would result in the same efficiency. If this is so, why is it that the same permit conditions for PM_{10} emissions at the [AES] Warrior Run facility emit higher ratio of tons per year of PM_{10} per megawatt or hour of electric energy produced?

Response 2.5

We were not the lead permitting authority for the Warrior Run facility. Consequently, we do not have all the information/data with respect to that facility to fully explain the differences between the two projects. However, based on information supplied by AES-PRLP:

	AES Warrior Run (180 MW)	AES-PRCP (454 MW)
PM	31.1 lb/hr	73.8 lb/hr

0.17 lb/MW	0.16 lb/MW
0.015 lb/MMBTU	0.015 lb/MMBTU
Baghouse	Electrostatic Precipitator

This shows that the Warrior Run facility has a particulate matter emission rate identical to AES-PRCP in terms of lb/MMBTU. In terms of lb/MW produced, a difference of 0.01 lb/MW produced is not that significant and could be due to a variety of reasons. Although there have been considerations to set emission rates based on units of electric energy produced, the current practice is to write limits based on pounds per MMBTU heat input.

Comment 2.6

EPA Method 202 should not be required because the BACT limit for PM_{10} for this facility was developed on the basis of prior BACT determinations which did not include the condensible particulate matter measured by Method 202. Further, there are insufficient data at this time on the condensible PM_{10} emissions from coal-fired CFB facilities to establish an emission limit that includes them.

EPA discussed the setting of PM_{10} BACT emission limits and test methods when the PM_{10} standard was promulgated. In apparent recognition of limited data, EPA indicated that the setting of BACT emission limitations for PM_{10} would be "contingent upon the availability of emission factors and control efficiency information for the source under review." It further indicated that the feasibility of establishing a PM_{10} emission limitation and an acceptable test method would be determined on a case-by-case basis. See 52 Fed.Reg. 24684 (July 1, 1987).

The BACT limit for this facility was developed on the basis of the BACT determinations listed in Appendix B of the Application. None of those BACT determinations included condensible emissions. When the BACT analysis was submitted to EPA for review, no other information was requested from AES-PRLP. The very strict 0.015 lb/MMBtu standard in the AES-PRCP draft permit is premised on the performance of comparable facilities measuring in-stack emissions only. Thus, the appropriate test method for demonstrating compliance with that permit limit is an in-stack method.

In its Summary of Responses for Method 202 associated with the rulemaking, EPA confirmed this analysis. To a commenter who requested that the agency "clearly state that Method 202 should not be used for assessing compliance with emission limits set on the basis of data derived from a different measurement approach," EPA responded:

> The EPA agrees that the technique for determining compliance should be consistent with

Consequently, it is inappropriate to require that EPA Method 202 be used to determine compliance with the 0.015 lb/MMBtu emission limit that was established on the basis of performance data developed using EPA Methods 5 and 17.

EPA should maintain the 0.015 lb/MMBtu limit in the permit, to be tested using an in-stack method, and not require a limit at this time for the condensible fraction of PM_{10}. Because data on predicted emissions of condensible particulate from a coal-fired CFB facility are virtually unavailable, we believe EPA should conclude that it is inappropriate to impose a permit limit for the condensible fraction of PM_{10} on the AES-PRCP facility at this time. AES-PRLP contacted 15 state environmental agencies to determine whether or not they include condensible particulate matter (determined by EPA Method 202) when evaluating PSD applicability or in setting new source emission limits under the PSD program for coal-fired plants. Among them, the only states that include condensible particulate matter are New Jersey and New York, both at the direction of EPA Region 2. We also verified that the Puerto Rico SIP does not require the use of Method 202.

AES-PRLP compiled the data in Table 1 from contacts with environmental consultants and review of test reports at the offices of the New Jersey Department of Environmental Protection. Despite these efforts, test data for only five boilers at four facilities were obtained. For three of the facilities, the condensible particulate matter emission rates are based on EPA Method 202 but the results for Portland General's Boardman plant in Oregon are based on an Oregon state method.

The available data, based on 3-run averages, show a range of condensible particulate matter emission rates from 0.0017 lb/MMBtu to 0.0531 lb/MMBtu. Even at a single facility, Portland General's Boardman plant, condensible particulate matter emissions range from 0.0017 lb/MMBtu to 0.0344 lb/MMBtu. All of the tested facilities differ from the proposed AES-PRCP in one or more aspects that may be important. The Keystone Logan Township particulate control device operates at a temperature of 181°F which is close to the planned AES-PRCP control device temperature of 170°F. However, the Keystone plant is a pulverized coal fired boiler, not a circulating fluidized bed; uses a spray dryer adsorber/fabric filter, not a circulating dry scrubber/electrostatic precipitator for SO_2/particulate control; and uses ammonia injection with selective catalytic reduction for NOx control not urea injection with selective noncatalytic reduction. The Portland General plant is a circulating fluidized bed but it does not use a circulating dry scrubber. Other Portland General details are not available. The two PSEG Mercer units use an electrostatic precipitators for particulate control but the electrostatic precipitators operate at a high temperatures relative to the planned AES-PRCP and they are pulverized coal fired units with no SO_2 control. The Westvaco Luke units are similar to the PSEG units but smaller.

Condensible particulate matter emissions are known to consist of inorganic and organic materials. A number of factors including the type and efficiency of the combustion system, the type and temperature of the particulate control device, the sulfur content of the fuel, the type of SO_2 control device and its efficiency, the NOx control system, and ammonia slip might reasonably be expected to affect condensible particulate matter emissions. However, no information is available on the relative importance of these factors. The variability of the available results, differences between the tested facilities, and the lack of information on the important factors affecting condensible particulate matter emissions make it difficult to predict

condensible particulate matter emissions with precision for the proposed AES-PRCP facility.

Alternatively, EPA could maintain the 0.015 lb/MMBtu limit for the in-stack PM_{10} and set a limit for the condensible fraction PM_{10} emissions at the upper end of the test data, which would be subject to review based on data generated from the facility after commencement of operation. To assure that this approach would comply with the National Ambient Air Quality Standards (NAAQS) and increment, AES-PRLP performed dispersion modeling for the facility assuming total PM_{10} emissions from the CB stack of 0.065 lb/MMBtu. This emission rate is based upon the 0.015 lb/MMBtu guaranteed filterable particulate emission rate plus a conservative estimate of 0.050 lb/MMBtu condensible PM_{10} fraction based upon available measurement data from coal-fired power plants. All PM_{10} sources at the proposed facility were modeled using the same models and methodologies described in the PSD permit application. Multisource modeling of major sources of PM_{10} was also conducted to determine total PSD increment consumption and NAAQS compliance.

Maximum impacts from the facility alone are predicted to be identical to those presented in Application Table 7.4-3 (Revised May, 1996). In other words, the increase in CFB stack emissions has no effect upon the maximum predicted concentrations. This is because the maximum PM_{10} concentrations are predicted to occur close-in to the facility where the CFB stack has essentially no impact. Modeling results for the proposed facility combined with other PSD increment consuming sources are identical to concentrations presented in Application Table 7.5-1 (Revised May, 1996) for the same reason given above. Finally, multi-source modeling results are identical to those presented in Application Table 7.5-2. Therefore, there will be no change in maximum PM_{10} impacts from the proposed facility and no change in PSD increment and NAAQS compliance assuming the CFB boiler stack's PM_{10} emissions are 0.065 lb/MMBtu.

For the above reasons, AES-PRLP requests that EPA maintain its 0.015 lb/MMBtu limit for PM_{10}, to be tested by an in-stack test method. Alternatively, AES-PRLP requests that the 0.015 lb/MMBtu limit be maintained for in-stack PM_{10} and a new limit for the condensible fraction be added at 0.050 lb/MMBtu and tested using Method 202. The new limit would be subject to adjustment based on actual operating data from AES-PRCP.

Response 2.6

The definition of PM_{10} includes condensible particulate matter (CPM). CPM is of potential importance to attainment of the PM_{10} National Ambient Air Quality Standards because it usually is quite fine and thus falls primarily within the PM_{10} fraction (see e.g., "PM-10 Development Guideline," June 1987, USEPA, EPA-450/2-86-001 at p. 5-32 and 56 FR 65432, December 17, 1991). However, upon further review of the issue, EPA agrees that there is currently insufficient information to determine the condensible portion of particulate matter on fluidized bed boilers. Therefore, EPA has decided to include in the final PSD permit two PM_{10} limits that include both condensible and non-condensible particulates. The first limit is the original value included in the draft permit, 0.015 lb/MMBTU. In the event that AES-PRCP cannot achieve this level due to the actual PM_{10} condensibles, EPA will adjust the final permit limit

administratively to a level not to exceed 0.05 lb/MMBTU. This latter limit has been modeled and meets the applicable NAAQS and increment standard. See Permit Conditions VIII.1-CFB.a1, a.2, and a.3.

Comment 2.7

The proposed BACT for PM_{10} cannot be verified and should not be accepted for the AES-PRCP permit conditions. How were the emission limits for PM_{10} verified and confirmed as the Best Available Control Technology?

Response 2.7

Appendix B of the PSD application shows a list of facilities which have comparable PM_{10} emission rates. For example, AES Warrior Run has a 0.015 lb/MMBTU rate of PM_{10}; Wisconsin Electric Power has a 0.02 lb/MMBTU rate and East Providence Cogeneration has a 0.015 lb/MMBTU rate. Although the listing includes a larger mix of facilities with baghouses rather than electrostatic precipitators, both types of control equipment have a proven track record. So EPA considers 0.015 lb/MMBTU BACT for this facility.

Commenter does not provide any alternative emission rate, technical factor or demonstration of technological infeasibility.

Comment 2.8

How many of the 40 facilities listed in the RACT/BACT//LAER Clearinghouse [report in Appendix B of the AES-PRCP permit application] claim a PM_{10} emission rate of 0.015 lb/MMBTU?

Response 2.8

Appendix B of AES-PRCP's PSD permit application contains a report from the RACT/BACT/LAER Clearinghouse retrieved sometime before the application submittal date of December 1995. So this list contains dated information. It should be noted that the majority of the facilities listed in Appendix B were permitted in the 1980s. Design advances in the control equipment have improved the percent control efficiencies of these units. Facilities in Appendix B with permit limits that meet or exceed AES-PRCP's PM_{10} emission rate of 0.015 lb/MMBTU include: Warrior Run (0.015 lb/MMBTU); East Providence Cogeneration (0.015 lb/MMBTU); City of Wyandotte (0.011 lb/MMBTU). Other comparable units include: Taunton Energy Center (0.018 lb/MMBTU) and Energy New Bedford (0.018 lb/MMBTU).

A more recent report (2/98) from the RACT/BACT/LAER Clearinghouse include the following coal-fired facilities and PM_{10} emission rates: Cogentrix of Dinwiddie in Virginia (0.018 lb/MMBTU); Energy New Bedford Cogeneration in Massachusetts (0.018 lb/MMBTU); Keystone Cogeneration (0.018 lb/MMBTU); and Chambers Cogeneration (0.018 lb/MMBTU)

The last two facilities (Keystone and Chambers) were permitted in New Jersey. We have been notified by our counterparts in New Jersey that these two pulverized-coal boiler facilities have been in operation for the past three years and have been consistently achieving an actual emission rate of 0.008 lb/MMBTU.

Comment 2.9

What is the operating capacity of the other RACT/BACT/LAER facilities that claims a lower PM_{10} emission rate?

Response 2.9

The sizes of the boiler units are included in Appendix B of the application. As to the operating capacity, we do not know that information. However, most PSD permits are permitted for a 95%-100% capacity.

Comment 2.10

What are the actual emission rates for PM_{10} at these facilities during the past two years?

Response 2.10

The Warrior Run facility is still under construction so no actual emissions data exist. With respect to the other facilities, we do not have any information on the actual emission rates for PM_{10} of the 40 facilities listed in the RACT/BACT/LAER Clearinghouse report of the application. However, see Response 2.8 regarding the actual emission rates for PM_{10} on the Keystone Cogeneration and Chambers Cogeneration, both located in New Jersey.

Comment 2.11

Do any of these facilities use an Electrostatic Precipitator (ESP) for the control of PM_{10} in the boilers?

Response 2.11

The listing shows Southeast Paper, Wm. H. Zimmer Generating Station, and Wisconsin Power as using ESPs.

Comment 2.12

What is the lowest RACT/BACT/LAER listing for PM_{10} for a facility using an ESP?

Response 2.12

The listing shows Wisconsin Electric Power Co with a PM_{10} emission rate of 0.02 lb/MMBTU.

Comment 2.13

What is the emission rate for other facilities using an ESP in comparison with the proposed AES facility? What is the experience in terms of actual emissions data for the past three years at other facilities using an ESP?

Response 2.13

See Response 2.7.

Comment 2.14

Have facilities that use ESPs had problems with breakdowns and maintenance when there are fluctuations and drop in electrical voltage?

Response 2.14

Since electrical power is produced and controlled on-site, we see no reason why there should be fluctuations and drop in electrical voltage that could affect the ESP. In other words, since the facility is a net producer of electricity, voltage will be dropped to outside sources first thereby minimizing breakdowns.

Comment 2.15

Would mass emissions testing be required for compliance with permit conditions?

Response 2.15

Mass emissions testing for PM_{10} and other pollutants are part of the PSD permit. See Permit Condition XV., "Performance Test Requirements" for details.

Comment 2.16

What verifiable operational and technical changes resulted in the potential reductions in PM_{10} emissions between 1994 and 1995 at the AES-PRCP facility? AES Warrior Run, a 180 MW facility in Maryland, is the only other facility in the Clearinghouse Listings which claims an emission rate of PM_{10} of 0.015 lb/MMBTU for coal-fired fluidized bed boilers.

Response 2.16

No operational or technical changes that we know of were made. Also, see Response 1.3.

Comment 2.17

With the same permit conditions for PM_{10} emissions, why does the Warrior Run facility in Maryland emit a higher ratio of tons per year (TPY) of PM_{10} per MW of electric energy produced than the proposed AES-PRCP facility? Why does the Warrior Run facility emit a higher ratio of tons per year (TPY) of PM_{10} per MMBTU than the proposed AES-PRCP facility? Why does AES-PRCP require a lower ratio of MMBTU needed to produce 1 MW than the Warrior Run facility?

Response 2.17

See Response 2.5 above.

Section 3.0 - Nitrogen Oxide (NOx) Emissions

Comment 3.1

Commenter states that when a RACT/BACT/LAER Clearinghouse listing shows a lower BACT than what AES Puerto Rico can claim to achieve, such as emission levels for nitrogen oxides, AES-PRCP claims that the emission limit cannot be considered representative of BACT since it has never been verified as achievable. That is, a lower BACT in the Clearinghouse for some emissions does not count because AES-PRCP vendors will not guarantee an emission that low.

Response 3.1

In order to make valid comparisons between various emission rates, one must include their respective averaging periods. For example, Appendix B of AES-PRCP's PSD permit application list three sources with NOx emissions lower than AES-PRCP's. One is Archer Daniels Midland in Cedar Rapids, Iowa with a NOx emission rate of 0.07 lb/MMBTU on a 30-day rolling average. AES-PRCP's NOx emission rate of 0.10 lb/MMBTU is on a 24-hr rolling average basis. Two other listed sources with emission rates of 0.074 and 0.039 lb/MMBTU do not state the averaging period and, therefore, it is impossible to compare them with AES-PRCP. Based on the different averaging periods, it is not clear that the Cedar Rapids rate is more stringent than the one required of AES-PRCP.

Comment 3.2

We object that EPA bases permit limits on operating characteristics that include "pushing the technology of the boilers to their apparent bounds" in order to achieve the 24-hour average

permit condition of 0.10 lb/MMBTU of NOx.

Response 3.2

The "top-down" BACT process provides that all available control technologies be ranked in descending order of control effectiveness. Under this process, the PSD applicant first examines the most stringent or "top" control alternative. That alternative is established as BACT unless the applicant demonstrates, and the permitting authority in its informed judgement agrees, that technical considerations, or energy, environmental, or economic impacts justify a conclusion that the most stringent technology is not "achievable" in that case. If the most stringent technology is eliminated in this fashion, then the next most stringent alternative is considered, and so on. We believe that the 0.10 lb/MMBTU emission rate for NOx is technically feasible. For example, New Jersey permitted two pulverized coal-fired powerplants (Chambers Cogeneration and Keystone Cogeneration) that have been in operation for the last three years. Pulverized coal-fired boilers operate at a higher combustion temperature and create more NOx emissions (thermal NOx) than circulating fluidized bed boilers. The NOx permitted rate for both of these facilities is 0.17 lb/MMBTU using selective catalytic reduction (SCR) technology. However, the permits require these facilities to conduct a 5-year optimization program to achieve a target of 0.10 lb/MMBTU. Currently, the actual emission rates are in the neighborhood of 0.13 lb/MMBTU. Taking into account that circulating fluidized bed boilers operate at a lower temperature than pulverized coal-fired boilers and thus create lower NOx emission, an emission rate of 0.10 lb/MMBTU is therefore, technically feasible. Also, although SCR technology is different from selective non-catalytic reduction (SNCR) technology (the one proposed by AES-PRCP), both can achieve similar levels of NOx control.

Comment 3.3

Is the emission rate of 0.10 lb/MMBTU the lowest level or the worst-case scenario?

Response 3.3

The 0.10 lb/MMBTU emission rate for NOx is the worst-case emission rate that the facility will be allowed to emit on any 24-hour averaging period.

Comment 3.4

Which has lower capital and operating costs, SNCR or SCR? Permit application p.6-14 is contradictory. "SNCR...will result in increased capital and operating costs." "SNCR is preferred over SCR...and has lower capital costs."

Response 3.4

The two sentences referred to by the commenter on Page 6-14 of the permit application are as

follows:

1) "SNCR is preferred over SCR for CFB boilers since SNCR has been demonstrated, is operating on existing units, and has lower capital costs."

2) "Pushing the technology of CFB boilers in conjunction with SNCR to its apparent bounds to achieve an emission rate of 0.10 lb/MMBTU on a 24-hour average basis, will result in increased capital and operating costs to the project."

The first sentence clearly indicates that SNCR has lower capital costs than SCR. The second sentence indicates that the CFB/SNCR/0.10 lb of NOx per MMBTU combination will result in higher capital cost and operating cost as opposed to any other combination such as no SNCR or a higher NOx limit. (Note that CFBs are inherently low NOx emitters.) No comparison is made here in this sentence with respect to SCR. Therefore, while these two sentences may look contradictory, they are not.

Comment 3.5

What are the hourly emissions for NOx for the proposed AES-PRCP facility? (While EPA only has NOx criteria for annual averages, a set data should be provided to determine spikes.) AES's experience at Barber's Point indicates that 3-hour averages have been exceeded on a number of occasions.

Response 3.5

The maximum permitted NOx emission rate for the two boilers combined is 492.3 lb/hr based on a 24-hour rolling average. On a single hour, AES-PRCP can have spikes higher than this level as long as it subsequently compensates so that the 24-hour average achieves the permitted level. At this emission rate, AES-PRCP meets the annual national ambient air quality standard for NOx. Since there is no federal 3-hour standard for NOx, we did not require an averaging period less than 24 hours.

Comment 3.6

What specific and verifiable technological and operational changes resulted in lower potential NOx emissions at AES-PRCP from 1994 to 1995?

Response 3.6

See Response 1.3.

Comment 3.7

What is the content of nitrogen in the limestone that would be used at the proposed facility? Are there any other comparable coal-fired plants that have had problems complying with permit nitrogen oxide emissions due to the nitrogen content of the limestone?

Response 3.7

The nitrogen content of the limestone is not an issue in this review. Any nitrogen in limestone would be in an inorganic state (unlike an organic state in coal) and thus, it would not combust like the nitrogen in coal to produce NOx emissions.

Section 4.0 - Ambient Monitoring

[* Before reading Section 4.0, the reader may wish to refer to Addendum A at the end of this Responsiveness Summary for a primer on air quality analysis requirements under the PSD regulations.]

Comment 4.1

The ambient monitoring that is actually established by the PREQB in the region has been abandoned. The PREQB has been negligent in its duties and EPA should withdraw its endorsement of PREQB's maintenance of the ambient monitoring because EPA should delegate work, not responsibility. The PREQB is just as responsible as the EPA is for what is happening in the Jobos sector of Guayama.

Response 4.1

The PREQB has not abandoned the monitoring responsibilities in Jobos or Guayama. PREQB continues to properly operate and maintain monitors and provide reports to EPA, industry and the public. A summary of the monitoring data necessary to estimate background concentrations (see Response 4.2) was available from PREQB and is contained in the Administrative Record.

Comment 4.2

Average maximum ambient concentrations from other parts of the island were compared with Guayama using monitoring data supposedly approved by EPA as representative air quality data in Guayama. AES-PRCP reported that for SO_2, the representative data used for Guayama was PREPA data at Cerro Modesto, 17 km northwest of the proposed site. According to PREQB, the PREPA Cerro Modesto station is not intended to reflect the SO_2 levels in the community of Jobos or in Guayama. Only one of the four Island-wide sites used for comparison (Bayamón) had available data for SO_2, where there are PREQB stations. AES-PRCP stated that there is an SO_2 station operated by PREQB in Guaynabo, but the data is also missing. Does the PREPA

monitoring facility in Cerro Modesto have a quality assurance/quality control [QA/QC] plan available to EPA?

Response 4.2

AES-PRCP was actually not required to collect ambient air quality concentrations for SO_2 prior to receiving a draft PSD permit from EPA. AES-PRCP was exempt from installing ambient monitors since the modeled air impacts were below the monitoring de minimis levels defined in 40 CFR 52.21. However, since some monitoring data exists on the island of Puerto Rico that could be used to estimate a background concentration, EPA accepted this data in order to estimate a background concentration. While Cerro Modesto might not be identical to Guayama, it is exposed to similar industrialization. Therefore, it can act as an estimate of background concentration. In order to ensure that the emissions from the AES-PRCP, when combined with the original levels without the plant are at safe levels, monitored background concentrations from existing facilities were examined and added to the modeled impacts from the proposed facility. In this case, the existing measured monitored concentrations were well below the National Ambient Air Quality Standards. The PREPA Cerro Modesto ambient monitor QA/QC plan was made available to EPA and is part of the Administrative Record. Even as we added the projected future concentrations from AES-PRCP, the total concentration is below the National Ambient Air Quality Standards (NAAQS).

Comment 4.3

The ozone ambient concentration in the Guayama area should be measured prior to issuing the permit to AES-PRCP.

Response 4.3

There is no requirement to measure ozone ambient concentrations for this project. 40 CFR Part 52.21 specifies de minimis levels for preconstruction ambient monitoring. For ozone, the de minimis level is defined as an emission limit of 100 tons per year of VOCs (an ozone precursor). AES-PRCP was below the de minimis level for VOCs. Nevertheless, an ozone monitor was operated in Levitown up to 1993. In addition, an ozone monitor was recently placed in Cataño. The values from these monitors were examined and found to be within the NAAQS levels in recent years.

Further, it should be noted that the impacts from ozone are more regional in nature rather than local. It is a secondarily formed pollutant. That is, ozone is not directly emitted by a stationary source but rather it is formed downwind when its precursors (primarily NOx and VOCs) react with sunlight and specific atmospheric conditions. Therefore, an ozone monitor located in Levitown or Cataño is representative of conditions in Guayama.

Comment 4.4

Have the ambient concentrations for ozone been verified?

Response 4.4

Yes, the ozone ambient monitor and its data are both subject to EPA and PREQB quality assurance/quality control audits.

Comment 4.5

How much sulfuric acid mist is present in the area?

Response 4.5

At present, there is no satisfactory monitoring technique available to measure sulfuric acid mist in ambient air. However, the sulfuric acid mist would be a component of sulfur dioxide or particulate matter which are measured in Puerto Rico. Guayama is in attainment for these pollutants.

Comment 4.6

We understand that the PREQB is finally considering putting a PM_{10} [ambient] monitor in Guayanilla, as a result of significant public indignance of similar shenanigans for another recently-approved Region 2 PSD permit. However, one monitor is not sufficient to measure tropical winds and variations in Puerto Rico. The communities will continue to demand that ANY new major polluting source in Puerto Rico be required to present more than one year of air quality monitoring data for all major pollutants, especially NOx, SO_2, PM_{10} and ozone with more than one monitor.

Response 4.6

This question does not relate to any of the permit conditions in AES-PRCP's draft PSD permit. However, it should be noted that if PREQB decides to install a new monitor in Guayanilla, that is acceptable although it was not required by EPA as a result of a recent PSD permit action in the area. The length of time under which ambient monitoring is required is determined by EPA regulation and guidance and is also dependent on the reason for installing the monitor. EPA would like to clarify that there are different purposes for which ambient monitoring is required. One is for the requirements under the PSD regulations. Another is for assessing whether the current State Implementation Plan needs to be reviewed. Under the PSD regulations, if preconstruction monitoring is required by a particular facility, one year is the minimum requirement. However, the regulation also allows for less than one year under certain

circumstances. The number of monitors would not necessarily be limited to one nor would the duration of the measurement be limited to one year. (Also see Response 5.7.)

Section 5.0 - Dispersion Modeling Analysis

[* Before reading Section 5.0, the reader may wish to refer to Addendum A at the end of this Responsiveness Summary for a primer on air quality analysis requirements under the PSD regulations.]

Comment 5.1

To determine the impacts from PM and NOx, the company has used lower emission rates than those guaranteed by the suppliers of the control equipment. In the evaluation of the ambient impacts, these lower emission rates should not be used since these will only be achieved on occasions when everything is working optimally. The ambient impacts should be determined using the worst case scenario for emission rates. This has not been done here.

Response 5.1

The application submitted by AES-PRCP does not state that the emissions for PM and NOx are below those guaranteed by the suppliers of the control equipment. Based on recently permitted facilities, EPA believes that the emission rates for AES-PRCP are realistic and technically feasible. A facility may need to reduce its emission rate in order to meet BACT or other regulatory constraints. To ensure that the facility operates at the lower rate, the PSD permit restricts the emissions to the lower emission rate. To be more specific regarding the pollutants PM and NOx mentioned by the commenter, AES-PRCP will install a properly-sized electrostatic precipitator which will adequately help control particulates. With respect to NOx, the inherent design of the fluidized bed boiler, which lowers combustion temperature, and the installation of selective non-catalytic reduction (SNCR) will help reduce NOx emissions. Also, see Responses 2.8 and 3.2.

The modeling analysis is done at this “allowable” permitted rate or “worst-case scenario” to ensure that air quality standards are protected. An exceedance of the “allowable” emission limit would be a violation of the PSD permit and subject to enforcement action.

Comment 5.2

It is known that the area of impact has severe health problems. Much of them created by the high emissions from the existing facilities in the area. Given this situation, I do not understand why the agencies do not undertake actual field measurements of pollutants emitted by AES-PRCP such as particulate matter, SO_2, NOx, CO, lead and other organic pollutants. Modeling

and calculations are useful and convenient to estimate future impacts of proposed projects. In Guayama there are no proposed projects, there is a reality that it is better to measure than to model. Once these field actual measurements are taken, then you can add the impacts from the proposed facility. It would be a crime to allow new facilities into the area without the certain knowledge of what the real ambient situation is in the area.

Response 5.2

EPA allows new sources to construct without an area wide ambient monitoring analysis if they can demonstrate that their pollutant-specific individual impacts are below the applicable de minimis monitoring levels. Actual field measurements or monitoring was not conducted by AES-PRCP since the projected impacts due to modeling are below the levels which would require this. The exception is PM_{10}. For PM_{10} actual field measurements of PM_{10} were collected near the Jobos Wards Secondary School approximately 1.8 kilometers to the northwest of the proposed AES-PRCP site. This monitor meets the three conditions which should be assessed when considering the use of an existing monitor as "representative" of a particular location. These conditions are specified in section 2.4 of the EPA, Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD). In this document, it specifies that a representative monitor must be located in an area that is similar to the proposed source, the quality of data must meet the various quality control/quality assurance criteria, and the data should be current (i.e., "generally, this would mean for the preconstruction phase that the data must have been collected in the 3-year period preceding the permit application.") The PM_{10} monitor in Jobos Ward meets these three criteria with respect to the location of the proposed facility.

Although not required by regulation, AES-PRLP provided some information regarding background concentrations of the other pollutants. This information was obtained from other existing monitors in Puerto Rico that are exposed to similar industrialization as Guayama. This information was used as the commenter suggested. The measured values were added to the modeled impact from AES-PRLP in order to assess whether the air quality standards are protected. Furthermore, to add more assurance, AES-PRLP offered to perform a multi-source modeling analysis and measure the SO_2 air concentrations for one year. This was not required by EPA regulations since AES-PRCP's impacts are below the de minimis limits. However, since AES-PRLP volunteered to do the additional studies, EPA chose to make this a legal requirement of the PSD permit, particularly in light of environmental justice concerns raised by the community (also see Response 7.1). As an aside, it should be noted, that air quality analysis performed by modeling have certain advantages over obtaining monitored values. The monitors only measure "actual conditions" and only when the wind blows in its direction. Dispersion models may simulate maximum "allowable conditions" and provide a better spacial and temporal distribution of the pollutant. Therefore, in many cases, making air quality assessment decisions based on modeling techniques is more conservative.

Comment 5.3

According to AES-PRCP's Environmental Impact Statement, Volume I, the permissible increment for the Class II areas for PM_{10} will be 17 micrograms per cubic meter and in 24 hours, 30 lb. This impact in our sector will be disastrous because it is already highly polluted by petrochemical and pharmaceutical facilities nearby in our area in Jobos, even when the EPA has not established increments for CO, lead and ozone.

Response 5.3

It should be clarified that the PSD increments are set air quality standards specified in 40 CFR Part 52.21. They are "increments" of the NAAQS. The PSD increments were developed by Congress and incorporated into the Clean Air Act in order to "maintain" the NAAQS so that areas that already meet the NAAQS do not "significantly deteriorate." In other words, there are three types of PSD Classes (determined by EPA) which differ by the amount of economic growth permitted before "significant air quality deterioration" would be deemed to occur. Class I areas, for example, have the smallest increments and thus allow only a small degree of air quality deterioration. Class I areas usually pertain to the National Parks or National Wilderness Areas. Class II areas can accommodate normal well-managed industrial growth. Class III areas have the largest increments and thereby provide for a larger amount of industrial development than either Class I or II area. The majority of the U.S. is classified as a Class II area. This includes all of Puerto Rico. In Class II areas, such as Guayama, the PM_{10} increment is 30 ug/m^3 on a 24-hour average basis and 17 ug/m^3 on an annual average basis. AES-PRCP did perform a PSD increment analysis for PM_{10} and it was found to be within the increment standards. AES-PRCP also performed a NAAQS analysis of PM_{10} and found that these impacts are also with in the standards. Both of these analyses included emissions from other nearby industries in the area of AES-PRCP' proposed site.

In order to address the remaining statement regarding CO, lead and Ozone, the commenter is correct that the EPA has not established PSD increments for these pollutants. However, AES-PRCP is not PSD-affected for lead. With respect to CO, AES-PRCP's impact is below the applicable de minimis significant impact level; therefore, the facility does not adversely affect the NAAQS for CO. Ozone is a secondarily-formed pollutant and is not emitted directly by a single source. Its de minimis monitoring threshold is defined by the tons per year of VOCs a facility emits. AES-PRCP emits below the 100 tons per year of VOC threshold. Therefore, it was exempt from the preconstruction monitoring. However, this was addressed by examining monitoring data in Puerto Rico which shows that ozone concentrations in Puerto Rico are in attainment (see Responses 4.3 and 4.4 for more details regarding ozone air quality).

With respect to the comment that the area is "already highly polluted," EPA performed a modeling analysis as part of the State Implementation Plan for Puerto Rico and found the air quality to be in compliance. The commenter should also note that in order to have further assurance, a cumulative SO_2 impact analysis will be performed by AES-PRCP as per its permit requirement. This analysis will identify adverse impacts (if any) from the existing sources in the area. An ambient monitor will also be installed in order to ensure that the air quality is within acceptable limits. If either of these methods identifies adverse air quality levels, EPA and

PREQB are committed to correct the problem expeditiously.

Comment 5.4

Commenter states that somewhere between 1993 and 1995, AES-PRCP figured out how to get their SO_2 emission levels down significantly so that they were below the significant impact levels. In 1993, AES-PRCP requested a waiver from PSD pre-construction ambient air quality monitoring because predicted impacts of all pollutants were below EPA's significant impact levels. Their levels at that time for three-hour averages were 61.0 micrograms per cubic meter, and 8.3 micrograms per cubic meter for a 24-hr average. Are not these levels over EPA's significant impact? If so, would this mean that AES-PRCP provided false and misleading information to a Federal Agency? Would EPA's preconstruction monitoring exemption granted to AES-PRCP be considered a perpetuation of false information provided by AES-PRCP regarding their impacts being less than significant for all pollutants?

Response 5.4

The SO_2 Significant Impact Levels are 1, 5, and 25 ug/m^3 on an annual, 24, and 3-hour average basis, respectively. The values stated by the comment would have been above the significant impact levels and would have resulted in AES-PRCP being required to conduct a multisource modeling analysis which would have included other nearby existing sources. However, the AES-PRCP offered more stringent control measures in order to reduce emissions. When that occurred the impacts decrease to below the Significant Impact Levels. The reduced emission limits were incorporated into the PSD permit and AES-PRCP will need to meet these limits in order to stay in compliance with the federal permit. AES-PRCP's decision to use more stringent control measures will result in a real decrease in impacts and does not represent any falsification of the manner in which the facility will operate.

Comment 5.5

AES-PRCP achieved an SO_2 impact of 4.97 microgram per cubic meter. Why was such a level of 0.03 micrograms per cubic meter below the significant impact level accepted without further analysis of the air quality in Guayama when the combinations of technologies used to achieve such low levels of sulfur dioxide have never been accomplished or verified anywhere in the United States? Did AES-PRCP and their consultants use the desired significant level for SO_2 emissions and work the equation backwards ?

Response 5.5

BACT is, by definition, the "Best Available Control Technology." It is a moving target and it is technology driven to achieve the maximum level of control considering cost. This type of

control strategy forces improved and better control technology. AES-PRCP proposed, and EPA accepted, the most strict emission limit for SO_2 which would result in insignificant impacts. However, this is acceptable because it results in more stringent control measures. In this case, three methods of emission controls are used, all of which have been proven. The first is a fluidized bed with limestone injection, the second is an add-on dry scrubber, and the third is low sulfur coal. All working in tandem can be adjusted to ensure compliance.

The SO_2 emission rate in AES-PRCP's PSD permit is a federally enforceable emission rate. In order to add assurance that the impact will be protective of the air quality, AES-PRCP voluntarily offered to model the cumulative impact from the other sources in the nearby area. Further, AES-PRCP will install an SO_2 ambient monitor in the area. Therefore, based on the three levels of SO_2 controls mentioned before and AES-PRCP's SO_2 impacts that will be below the significance limit the limit was accepted. In addition, AES-PRCP's offer for the additional analyses provides further assurance regarding impact levels.

Another reason that the 4.97 ug/m^3 was accepted is that AES used state-of-the-art meteorological data and collected these data right on their site. It was quality assured and controlled. These data were applied to CTDMPLUS, the most refined complex terrain model approved by the EPA Guideline on Air Quality Models. This models incorporates the latest understanding by EPA of the physics of the planetary boundary layer. Therefore, given the data and the model, the impacts are representative of the atmospheric transport conditions of the location.

Comment 5.6

Commenter believes that the EPA must take into account and exercise their discretion the fact that there is already been testimony, and there are studies that you have before you, showing that we have a health problem in these communities. This is an element that the EPA must take into account to demand a multi-source analysis, not after but before the permit has been issued.

Response 5.6

A multi-source analysis is not required under the PSD regulations when the impacts from a new facility are below the significant impact levels. As stated in the comment, a multi-source analysis will be performed after the permit is issued. This analysis will be based upon worst case allowable emissions of existing sources. This analysis will be completed within 3 to 6 months after the effective date of this permit. This would allow sufficient time to finish the multi-source analysis before the construction phase is over. (See Response 5.41 for more details regarding the regulatory rationale for conducting a post-permit modeling analysis). In addition, the modeling analyses conducted for the existing SIP show that impacts in the area are well within the NAAQS, which are designed to protect human health.

Comment 5.7

The meteorological data was only for a year, and in this proposed project two methods were

used: a tower 50 and 100 meters apart, and a Doppler to measure wind profiles. And we know that in the Caribbean there might be hurricanes during this season and no hurricanes during the next three seasons. So, we know that the Caribbean has a climate with a cycle larger than a year, and it can vary tremendously and significantly. Therefore, it is difficult to see that for a project of this nature only one year was used when in fact the plant plans to operate for 30 years.

Response 5.7

The EPA Guideline on Air Quality Models, 40 CFR Part 51, Appendix W, specifies that modeling analysis should either use 1 year of on-site data or 5 years of offsite data such as that collected at National Weather Service Stations. In this case, the applicant was required to collect one year of on-site data in order to have representative atmospheric conditions around the complex terrain nearby. EPA even rejected the use of meteorological data collected at the PREPA plant nearby since this was not site specific enough to AES-PRCP. Therefore, by collecting the one year of on-site data AES-PRCP met the requirements for the proper implementation of the CTDMPLUS model and obtained atmospheric flow characteristics very specific to the proposed location of its stack. It should be noted that the one year of on-site data is also required in the continental United States where there is a larger variability between winter and summer climates than the Caribbean. There is also a larger year to year variability in the continental United States. Actually, the climate in the Caribbean experiences fairly persistent conditions due to the trade winds.

Comment 5.8

Commenter believes that the EPA should require reliable meteorological data of the surroundings; a calibration process of the model to show that the model is reliable for the region before it is used for regulatory purposes and use historical data as well as new data.

Response 5.8

The meteorological data is very representative of the surroundings since it was collected at the proposed site. The data was quality assured and the capture statistics were adequate according to EPA guidelines. Since the meteorological data was collected on-site, it would contain any characteristics that are unique to the Guayama area. Use of historical meteorological data would be useful if it was representative of the site. Since this data did not exist, the site specific data is preferable. With respect to the adequacy of the models, both models, ISC3 and CTDMPLUS underwent several evaluation procedures to show that they perform well in a variety of terrain similar to Guayama. After these evaluations and review processes, the models are incorporated into the Guideline on Air Quality Models as preferred models.

Comment 5.9

If AES-PRCP has to push the limits to achieve their permit conditions, what does this leave the community of Guayama on a less-than-perfect day? What are the health effects of spikes in

these emissions on an hourly basis for a community that is already severely impacted by adverse environmental effects?

Response 5.9

The models work in a manner to determine the worst-case impacts by simulating the worst case combination of emission parameters (such as emission rate, gas exit temperature, and exit velocity), meteorological parameters (such as wind speed, direction and stability) and terrain configuration. For those pollutant that have an hourly average health-based NAAQS, the model assessed the impacts. For other pollutants, short-term averages exist also which were evaluated (i.e., PM_{10} has a 24-hour as well as an annual standard). Since all impacts were below the "Significant Impact Levels" (except PM_{10}), the health-based NAAQS are protected both on a short-term and long-term basis. For PM_{10}, further analyses were required and the results also show that the short- and long-term NAAQS will be protected. (See also Response 5.5).

Comment 5.10

To require that an SO_2 multi-source analysis be submitted after the PSD permit is effective is futile. By proceeding in this manner, EPA is not meeting the requirements that govern this agency.

Response 5.10

EPA incorporated the requirement of the post-permit air quality modeling and monitoring for SO_2 because it was volunteered by AES-PRCP and EPA believed it would help to address environmental justice concerns raised by the community. (See Response 7.1 for more information on this.) However, this requirement is not otherwise required by EPA. The reason it is not required is because the impacts from the proposed new source (AES-PRCP) are below the "Significant Impact Levels" as define by EPA in 40 CFR Part 51. Sources that have impacts below these levels are not required to perform further multi-source analyses of the PSD increment and NAAQS. (However, these analyses were performed for PM_{10}.) By being below these levels, EPA does not consider the source to be "significantly causing or contributing" to an air quality exceedance if one exists. Even if a multi-source analysis was performed and an exceedance was found, EPA and PREQB would have to take action to remedy the modeled exceedance outside the AES-PRCP's permit through the SIP process. This is because the exceedance would be due to an existing source(s). EPA would then take action to remedy the modeled exceedance outside AES-PRCP's permit through the SIP process. (See July 5, 1988 memorandum from Emison, Director of The Office of Air Quality Planning and Standards to Maslany, Director of Air Management Division Region 3.)

In this case, EPA incorporated the modeling requirement into AES-PRCP's permit thereby ensuring that the modeling would be performed. If an exceedance is determined to exist, EPA and PREQB are committed to take corrective action on an expedited basis to remedy the exceedance **(**also see Response 5.41).

Comment 5.11

According to a report (TMC, Farmacol), the pollutant most critical in the southern portion of the island is SO_2, not particulate matter, since it is emitted in excess of 275,000 tons/year vs. 82,000 tons/year in the northern portion of the island (1990 data). There is an average SO_2 concentration of 11.5 ug/m^3 over Guayanilla and an average of 9.3 ug/m^3 around the San Juan Bay. The most contaminated SO_2 region in the island is located toward the west of the Jobos Bay in Guayama where there are 150,000 tons of SO_2 emitted annually (the proposed location of AES-PRCP). It is easy to see that the 1,260 tons/year of SO_2 emissions from the AES-PRCP facility is not small matter for an area that is highly contaminated. [Commenter estimated the 1,260 tons of SO_2 based on a 1% sulfur coal and a 97% removal efficiency.]

Response 5.11

The PSD permit allows AES-PRCP to emit the maximum amount of 453 tons of SO_2 per year, not 1,260 tons/year. See PSD permit, Attachment I, Page 3 of 4.

The NAAQS and increment are based upon air quality concentrations, which are expressed in terms of impacts, rather than upon emissions. In this case, the air quality impacts were greater for PM_{10} than for SO_2. Any adverse impacts from SO_2 from the combined existing facilities will be corrected by EPA and PREQB on an expedited basis. This decision will be based both on the multi-source modeling analysis and the monitoring data that will be collected as required by AES-PRCP's PSD permit. The commenter states that SO_2 is a greater problem for the area than PM_{10}. However, EPA must first consider the individual impacts of the proposed source which in this case are more significant for PM_{10}.

Comment 5.12

It is unreasonable that in the vertical air dispersion model analysis, ambient data from the Luis Muñoz Marin Airport in San Juan was used. For North American standards, the distance between San Juan and Guayama is a short one. However, we all know that the San Juan climate is not representative of Guayama. The amount of precipitation is not the same, the wind and especially, the close location of the mountains (in Guayama) affect the vertical dispersion of the air. So the results of the modeling analysis is erroneous.

Response 5.12

AES-PRCP used meteorological data collected at its proposed site in Guayama for the air quality dispersion modeling. The only parameter that was used with the San Juan Airport data was upper air soundings to calculate mixing heights. At these upper levels (several hundred meters above ground), the mixing heights should be similar at these two separate locations since at the

higher altitudes the local ground level influences on atmospheric parameters become less pronounced. Therefore, it is appropriate to use San Juan data in Guayama only for the mixing height purposes. Precipitation is not a factor in the modeling analyses to determine the air quality concentrations from this facility. Wind information is very important especially near mountainous areas. However, AES-PRCP obtained this information not from San Juan but from the meteorological tower sited at their proposed property in Guayama.

Comment 5.13

AES-PRCP, in analyzing the SO_2 contribution from existing major sources, used the SO_2 emissions allowable in the permits for Phillips and PREPA Aguirre instead of the actual emissions. What the permit says or what it is allowed in the permit is not real data when we take into account the high concentrations of SO_2 in the area. The modeling must be conducted taking into account the worst possible case. This has not been done here since the multi-source analysis for SO_2 was not required.

Response 5.13

AES-PRCP has not yet provided EPA with a multi-source SO_2 modeling analysis which shows the contribution from Phillips or PREPA Aguirre. When this analysis is done, the worst case emission rates will be used. This involves modeling the sources at their maximum allowable emissions rates for 8760 hours per year (unless otherwise restricted by the permit). The model also assumes all the sources operate at this mode simultaneously which is also unlikely but adds a degree of conservatism to the final impacts. If a source operated in exceedance of its permit, this would need to be modeled as well. Therefore, the modeling will be a worst case analysis. Finally, we have no information to suggest that the Phillips and PREPA Aguirre facilities are in violation of their sulfur in fuel limits.

Comment 5.14

Has EPA evaluated the capacity of the Guayama Air Basin to absorb more air pollution based on scientific data?

Response 5.14

In 1983, EPA performed an Island-wide study to determine the air quality status of the various locations throughout Puerto Rico. It was determined at the time that Guayama was in attainment for all the criteria pollutants. Since that time there has been little or no major new source growth. Furthermore, PREQB does maintain an ambient air monitor for PM_{10} in the area and provides EPA with status reports which confirm that the area is in attainment.

Comment 5.15

How did EPA evaluate the cumulative or synergistic effects of the major pollutants from this

proposed project and the other pollutants in the Guayama Air Basin, given that there is a documented environmental problem due to many pollutants in the area?

Response 5.15

A cumulative or synergistic effect due to the exposure of several pollutants simultaneously is not required under the PSD regulations. Pollutants are examined individually and compared to health-based standards such as the NAAQS. In that respect, a PM_{10} multi-source analysis was performed (i.e., modeling which includes AES-PRCP and existing background sources). In addition, a multi-source analysis for SO_2 will be performed as per the PSD permit requirement.

Comment 5.16

What effect will an increase in PM_{10}, SO_2, NOx and CO have on the air basin that is negatively affected by other classified toxic substances?

Response 5.16

See Response 5.15 above on the synergistic effects of pollutants.

Comment 5.17

Why do the values for Modeled Sources change for the annual and the 24-hour analysis from 1995 to 1996?

Response 5.17

One year of meteorological data was collected at the proposed site. The data was collected from April 18, 1994 to April 18, 1995. There was no meteorological data collected in 1996. Since there was only one year of data, only one annual average concentration was calculated. On a 24- hour basis, there were approximately 365 values calculated. Each 24-hour calculation is subject to different atmospheric parameters that influence the plume. The worst case days were used in determining compliance with the air quality standards.

Comment 5.18

Are the emissions from the water-recycling unit included in the VOC calculations?

Response 5.18

We are not sure what water-recycling unit the commenter is referring to (there is no water-recycling unit proposed to be constructed in the AES-PRCP facility). AES-PRCP plans to obtain some of its process water needs from a nearby PRASA facility. If that is the “water-recycling

unit" that the commenter is referring to, then the answer is that VOC emissions from that other separate facility was not included in AES-PRC's VOC calculations since these would be considered secondary emissions. Secondary emissions are not included in a facility's potential to emit.

Comment 5.19

AES-PRCP modeled potential impact and the result are questionable receptor points for the highest significant impacts. The winds in this area are predominantly easterly and southeasterly. The actual wind patterns do not substantiate the location of the highest impact for modeled impact points nor the extent of the impact.

Response 5.19

The grid was designed as follows: a course rectangular grid with receptors spaced 1 km apart which extends 18 km to the west, 10 km to the east, 2 km to the south, and 10 km to the north from the proposed site. A fine grid with denser resolution was placed surrounding the site which extends 3.75 km in the north-south and east-west direction. This grid had receptors spaced 250 meters apart. Fence line receptors were placed every 100 meters. There was also a dense grid receptor field around 14 hills in the nearby area. EPA believes this is an adequate receptor field.

The model calculates an impact at each of these points and then the maximum impact is used for compliance demonstration. Appendix J of the PSD permit application contains graphic depictions for the concentrations. Annual impacts tend to mimic the predominate longer term climate. As can be seen, most of the annual impacts are predominately to the west or northwest of the proposed site. This is what would be expected in a wind regime that is predominately from the east or southeast.

Comment 5.20

In order to facilitate this analysis, we will not refer to individual receptor points. We do not accept the value for the highest modeled impact, but clarify that the Jobos Ward is within the Significant Impact Area [SIA] for all major pollutants. AES-PRCP states that the SIA for PM_{10} is 1.3 km from the CFB stack. We maintain that the Jobos Ward, Puerto de Jobos and communities further northwest and west in the municipalities of Guayama and Salinas will also be impacted by all major pollutants due to their proximity to the facility and the variability of the winds. This analysis should be completed especially for particulate matter smaller than 10 microns.

Response 5.20

The Significant Impact Area (SIA) is the circular area with a radius extending from the source to (1) the most distant point where approved dispersion modeling predicts a significant ambient impact will occur, or (2) a modeling receptor distance of 50 km, whichever is less. This definition was applied to PM_{10}, the only pollutant which resulted in a significant impact. The

SIA is determined by modeling the impacts from AES-PRCP. This modeling analysis was performed using the meteorological data collected at the site which accounts for any variability of the winds. The other criteria pollutants did not have impacts above the Significant Impact Levels. The PM_{10} SIA extended to 1.3 km from the CFB stack. Therefore, a multi-source PSD increment and NAAQS was performed in this area for PM_{10}. The modeled impacts did not extend to Salinas on a significant level.

Comment 5.21

What were the emission limits used for Phillips? What were the emissions limits used for PREPA's Aguirre Plant? Are both of these facilities operating within their federally enforceable limitations?

Response 5.21

The emission limits used in the PM_{10} multi-source modeling analyses are found in Table 4-3 of the PSD permit application. This includes the emission limits modeled for Phillips and PREPA Aguirre. Because only a multi-source analysis for PM_{10} was required, only PM_{10} emissions from PREPA Aguirre and Phillips were used.

Except for opacity problems, EPA has no information to suggest that this facility is currently not operating within its federally enforceable limitations. With respect to PREPA Aguirre, it is currently subject to a federal consent decree due to opacity problems.

The following are the actual emissions from these two facilities in the last few years. 1997 emissions data from PREPA Aguirre are not yet available. These emissions are within these facilities' allowable limits.

Phillips PR CORE								
Year	**Fuel usage (m gals) #6**	**%S**	**Tons per year (AP-42)**					
			PM	**PM_{10}**	**SO_2**	**NOx**	**CO**	**VOC**
1993	**39,618**	**0.81**	**211**	**137**	**2,519**	**1090**	**99**	**6**
1994	**29,655**	**0.64**	**135**	**88**	**1,490**	**816**	**74**	**4**

1995	**38,873**	**0.70**	**188**	**122**	**2,137**	**1,069**	**97**	**5**
1996	**45,838**	**0.67**	**215**	**140**	**2,411**	**1,261**	**115**	**6**
1997	**49,523**	**0.70**	**240**	**155**	**2,721**	**1,362**	**124**	**7**

PREPA Aguirre								
Pollutant	**1993**		**1994**		**1995**		**1996**	
	FO#6/FO#2		**FO#6/FO#2**		**FO#6/FO#2**		**FO#6/FO#2**	
Mgals/yr	**286647**	**166726**	**272183**	**157578**	**284814**	**163772**	**298990**	**147900**
% S	**1.74**	**0.41**	**1.41**	**0.42**	**1.35**	**0.45**	**1.43**	**0.45**
PM	**2753**	**167**	**2252**	**158**	**2225**	**164**	**2446**	**148**
PM_{10}	**1790**	**108**	**1463**	**102**	**1447**	**106**	**1590**	**96**
SO_2	**39153**	**4853**	**30126**	**4699**	**30183**	**5232**	**33563**	**4725**
NOx	**7883**	**1667**	**7485**	**1576**	**7883**	**1638**	**8222**	**1479**
CO	**716**	**417**	**680**	**394**	**711**	**409**	**747**	**370**
VOC	**40**	**63**	**38**	**60**	**40**	**62**	**42**	**56**

FO#6, FO#2: Fuel oil No. 6, Fuel Oil No. 2, respectively.
Pollutants are in tons/year.

Comment 5.22

Does the operating level exceed the design capacity (considering any federally enforceable limits) for any of the facilities included in the NAAQS demonstration? Should the actual operating level be used to calculate the emission rates in these cases?

Response 5.22

EPA does not have information to suggest that a facility was operating at levels which exceeded its design capacity or federally enforceable limits. AES-PRCP modeled the allowable emission limit in the PM_{10} NAAQS demonstration. The actual operating levels would have been used if they exceeded the design capacity (or federally enforceable limit).

Comment 5.23

Were the following sources of emissions included in the modeled source analysis: Puerto Rico Aqueducts and Sewer Authority Wastewater Treatment Plant, Alco Asphalt, Anaquest, Alpha Caribe, Reynolds Metals and Medisearch?

Response 5.23

Table 4.3 of the PSD application contains the list of sources modeled in the PM_{10} multi-source analysis. The sources named by the commenter were not included in the analysis since their impacts (if any) could be accounted for through the ambient monitoring portion of the NAAQS analysis. Further, some of these sources may not be PSD-affected for PM_{10} or may not be within or near the Significant Impact Area. However, if they impact the area, their emission contribution would be accounted for by the addition of the monitoring data at Jobos Ward to the modeled impact. The background concentrations at Jobos Ward monitor (1.8 km form AES-PRCP) are representative of background concentrations in the Significant Impact Area (1.3 km from AES-PRCP). The assessment to the NAAQS was a summation of the modeled plus monitored data (which also measures the sources that were modeled thereby double counting some impacts). Section 9.2 of the Guideline on Air Quality Models, states that minor or more distant background sources may be accounted for by ambient monitoring data.

Comment 5.24

What are the health effects of spikes in NOx emissions on an hourly basis for a community that is severely impacted by adverse environmental effects?

Response 5.24

For NOx, the health-based standard established by the U.S. Congress in the Clean Air Act is 100 ug/m^3 on an annual basis. There is no short-term health-based NAAQS for NOx. Therefore, this was not addressed under the PSD provisions.

Comment 5.25

What are the synergistic effects of NOx and other chemicals in the area registered in the TRI?

Response 5.25

See Response 5.15 above.

Comment 5.26

Did the pre-application emission level for NOx, which was higher than the Significant Impact Level (SIL), trigger a multi-source analysis, especially when representative background data was not available?

Response 5.26

At the preliminary stages of the project the proposed NOx emission levels were greater. This may have triggered a multi-source analysis for NOx if the impacts would have been greater than the significant impact levels when the permit application was submitted. However, when AES-PRCP submitted their PSD permit application, they reduced the emissions and the net result were lower ambient impacts. These emissions are incorporated into the PSD permit and AES-PRCP will be legally bound to those emission limits.

Comment 5.27

Was a full impact analysis triggered in 1993 and 1994 for SO_2 and NOx? When did EPA find out that AES-PRCP was not going to carry out multi-source refined modeling or a full impact analysis for SO_2 and NOx? Did the 1994 modeling protocol include multi-source refined modeling for SO_2 and NOx?

Response 5.27

The 1994 modeling protocol contained only a proposed procedure for performing a multi-source modeling analysis if one would be required for any of the criteria pollutants. The actual analysis was submitted to EPA in December 1995 when they submitted the PSD permit application. In the application the air impacts were below the impact thresholds that require the multi-source analysis. This is largely due to the fact that AES-PRCP added further emission controls in order to reduce the pollution emitted than originally proposed.

Comment 5.28

With respect to PREQB's PM_{10} monitor in Barrio Jobos and PREPA's monitors for SO_2 and NOx at Cerro Modesto, why did Mr. Kenneth Eng accept that representative data was available? Are the QA/QC for PREPA's Cerro Modesto SO_2 and NOx stations part of this Administrative Record?

Why was Cerro Modesto data accepted as representative data when it is 17 km away from the AES-PRCP site? Does the PREQB consider the Cerro Modesto data representative of Guayama and Barrio Jobos? Why did EPA Region 2 accept data from a monitor 17 km away from the site as representative SO_2 for which QA/QC data has not been provided, for a community close to

the site with documented disproportionate environmental impacts.

Response 5.28

The only pollutant for which monitoring data was required was PM_{10}. The PM_{10} monitor is located only 1.8 km away from the proposed site. This monitor measures all the sources in the vicinity of AES-PRCP. AES-PRCP was not required to monitor for the other pollutants since the impacts are modeled to be below the Monitoring de Minimis levels as specified in 40 CFR 52.21. The monitoring data from the Cerro Modesto site was used only to estimate a background concentration. Even though not required, the data from Cerro Modesto was used to represent the background concentrations since Cerro Modesto and Guayama are of similar industrialization. The QA/QC plans are part of the Administrative Record.

Comment 5.29

What are the monitoring reports for Phillips Petroleum for the past five years? What are Phillips's levels of opacity, SO_2 and other inspection reports for the past five years? What are the percentages of SO_2 in the combustion emissions at Phillips?

Response 5.29

The monitoring reports and other information from Phillips are not the subject of this PSD permit process. In any event, monitoring reports have not shown any violations of the sulfur content of the fuel burned at Phillips. In addition, Phillips was subject to an EPA enforcement action in 1993 for its failure to conduct the required monitoring and reporting requirements with respect to benzene. However, these problems have already been addressed. Also see Response 5.21.

Comment 5.30

What are the levels of sulfur in fuel used at Phillips?

Response 5.30

See Response 5.29

Comment 5.31

Would measuring actual air quality for SO_2 in Guayama have jeopardized the AES-PRCP project?

Response 5.31

The decision to issue a draft permit to AES-PRCP is based on dispersion modeling. Dispersion

modeling is considered a valid tool for regulatory decision making especially for proposed sources that do not exist. If preconstruction monitoring was used and it showed an exceedance of the NAAQS, AES-PRCP's contribution would need to be determined. Since monitoring was not required, the critical question is whether AES-PRCP's modeled contribution was below the significant impact level. In fact, it was not considered to "significantly cause or contribute" to any potential exceedance. Also see Response 5.10.

Comment 5.32

According to Ambient Monitoring Guidelines for Prevention of Significant Deterioration (EP-450/4-87-007), "In determining whether the [air quality] data are representative, three major items which needs to be considered are monitor location, quality of data, and currentness of data."

Section 2.4.1

> The existing monitoring data should be representative of three types of areas (1) the location(s) of maximum concentration increase from the proposed source, (2) the location(s) of the maximum air pollutant concentration from the existing sources, and (3) the location(s) of the maximum impact area.

Was a dispersion model used to verify the representativeness of this data?

Response 5.32

The results of the dispersion modeling analysis verifies that the location of the PM_{10} monitor is representative of the all three criteria listed above. It is representative of the general location of the maximum impact, and is representative of the location of the combined impact. To be precise, AES's Significant Impact Area extends 1.3 km. The PM_{10} monitor is located 1.8 km to the northwest. At this location the monitor is able to measure the background concentration from existing sources. Also, it should be noted that the monitor is located downwind of the general prevailing wind direction where sources in the vicinity of AES-PRCP would most likely be impacting.

With respect to the quality of data and the currentness of data, the PM_{10} monitor is operated by PREQB and is systematically audited. It is current information to date and has been in operation for several years prior to the submission of the PSD permit application.

Comment 5.33

The Monitoring Guidelines also indicates that monitors outside these three types of areas may or may not be used, and that determinations are made on a case-by-case basis. EPA's intent regarding the use of existing data is described through various examples.

Case II is an example for proposed construction in an area with multi-source emission and

basically flat terrain. Guayama was considered a complex terrain, but the criteria in this example are illustrative:

1. The existing monitor is within 10 km of the points of proposed emissions, or

2. The existing monitor is within or not farther than 1 km away from either the area of the maximum air pollutant concentration from the existing sources or the area of the combined maximum impact from the existing and proposed sources.

Case III is an example for proposed construction for an area of multi-source emissions and complex terrain, aerodynamic downwash complications, or land/water situations.

Does the Cerro Modesto station [which measures NO_2 and SO_2 ambient air concentrations] meet the criteria [assumptions made] in Case II or Case III?

Response 5.33

AES-PRCP was exempt from preconstruction monitoring requirements as allowed in 40 CFR Part 52.21(i)(8) for all pollutants except PM_{10} which used data near AES-PRCP's proposed site. The Cerro Modesto Monitoring data was submitted to EPA and used only to obtain a general sense of the potential air quality in the area. The Cerro Modesto station does not meet the criteria (assumptions made) in the hypothetical Case II or III examples and there was no requirement for AES-PRCP to do pre-construction ambient monitoring. Moreover, the hypothetical Case II and III examples are cited in the monitoring guideline referenced by the commenter only as examples for those sources that are required to do pre-construction ambient monitoring.

Comment 5.34

According to AES-PRCP, the emission levels in the draft permit represent "substantial additional expense to the company" to achieve these 1996 BACT levels for SO_2. AES-PRCP worked on their numbers for three years and finally reached an emissions level in the draft permit for SO_2 of 4.97 ug/m^3, which is microscopically below the SIL. The community will not accept that requiring representative data for SO_2 is now a "moot point." EPA Region 2's lack of interest in the air quality in Guayama makes the current emissions level even more questionable.

Did emissions of 4.97 ug/m^3, after so many variations, cause any concerns at EPA Region 2?

Response 5.34

This level is below the de minimis impact levels. It was attained by adding further emission controls to the CFB stack. These emission controls are enforceable requirements of the PSD permit. They will improve air quality since impacts would have been greater had AES-PRCP submitted a PSD application with larger emission limits. AES-PRCP added further assurance by

volunteering additional modeling and post-operation monitoring in order to assess the existing conditions.

Comment 5.35

Did EPA consider an informal policy to monitor SO_2 emissions [SO_2 ambient concentrations] in Puerto Rico in 1996?

Response 5.35

Maintaining ambient air monitors is not a matter of policy. It is required as part of the Puerto Rico SIP and necessary to assure compliance with air quality standards. As such, PREQB has maintained several ambient SO_2 monitors in Puerto Rico for many years including 1996 through present. EPA has oversight of PREQB's monitoring program and ensures that they are properly operated.

Comment 5.36

Can EPA use its discretion to insist that an applicant perform multi-source modeling as part of its demonstration of PSD compliance?

Response 5.36

EPA was not required to compel AES-PRCP to perform the multi-source modeling analyses because the impacts were below the significant impact levels (except for PM_{10}) and EPA acted accordingly. However, SO_2 multi-source modeling will be performed (see Response 7.1).

Comment 5.37

Does EPA consider the lack of adequate monitoring in the area to be PREQB's problem?

Response 5.37

EPA does not believe that this is solely PREQB's problem. EPA works with PREQB to maintain and assess the need for monitoring throughout Puerto Rico. The only monitoring data that were necessary for this permit was PM_{10} monitoring data. We determined that the monitoring data used were adequate and of good quality.

Comment 5.38

Why was a significant level of 0.03 ug/m^3 below the SIL accepted for SO_2 without requiring a multi-source analysis when the technologies proposed to achieve such low levels of SO_2 have never been accomplished or verified anywhere as BACT?

Response 5.38

AES-PRCP has prepared an approvable BACT analysis. They will now be legally bound to those emission limits through the PSD permit. The 0.03 ug/m^3 difference between the significance level and the modeled level is acceptable. To add further assurance, AES-PRCP will maintain an ambient monitor and perform the additional multi-source modeling. This is acceptable to perform after the permit is issued as discussed in Response 5.5. Also, see Response 1.2.

Comment 5.39

Why didn't EPA Region 2 require on-site monitoring or a multi-source analysis when the significant impact for SO_2 was 0.03 ug/m^3 lower than the SIL in a poor community that has documented health problems relating to environmental pollution, including uncontrollable chemical emissions from the neighboring industrial park?

Response 5.39

On-site monitoring or multi-source modeling was not required as described in Response 5.41 since the modeled impacts from AES-PRCP are below the monitoring de minimis levels and the significant impact levels, respectively. With respect to impact on poor communities, EPA performed several assessments to determine if there was a disproportionate impact on the nearby communities. EPA looked at impacts in the area both from a pollutant perspective and a siting of industrial facilities perspective. The details and conclusion of these assessments are found in Sections 7.0 and 8.0 of this Responsiveness Summary.

Comment 5.40

Was the 0.022 lb/MMBTU BACT determined in function of achieving 4.97 ug/m^3 significant impact level? Could it be that AES-PRCP and their consultants used the desired significance level for SO_2 emissions and work the equation backwards?

Response 5.40

See Response 5.5

Comment 5.41

The draft permit states that <u>modeling analysis</u> for SO_2 would be conducted within 3 to 6 months of AES-PRCP's effective PSD permit, before construction. It is important to clarify that only a modeling analysis for SO_2 would be required during the pre-construction phase. Since no data

for SO_2 is available for Guayama, EPA has again accepted PREPA's Cerro Modesto Station as representative data for air dispersion modeling analyses.

According to EPA, Guayama was in compliance for attainment in 1983, and no new emissions were added to the area. No monitoring has been done, even though the facilities are some 14 years older than the attainment determination in 1983. Moreover, new industry has located in the area since 1983. AES-PRCP would not be held accountable for any ambient air quality violations, nor does ambient air monitoring fingerprint the source of violations.

According to Steven Riva, Chief of EPA's Air permitting section, "if a problem is uncovered [through modeling], it will be corrected prior to the operation of AES-PRCP through the State Implementation Plan (SIP) process."

How can a problem with the actual emissions and air quality be addressed through modeling, when there is no representative data for SO_2? There has been a problem with the ambient air quality in Guayama for many, many years, and it has never been addressed in the SIP.

As a point of clarification, page 14 of the draft permit includes references to 4 letters between AES-PRCP and EPA, and these letters include references to 5 previous letters between EPA and AES-PRCP. We find this description of the approved modeling protocol in a PSD permit completely inappropriate and unacceptable for the public comment process, as well as unsuitable for compliance oversight.

Response 5.41

Ambient air monitoring data is not an input of the dispersion model. It is used in order to determine a background concentration. Dispersion modeling is an acceptable tool used by regulatory agencies in order to determine air quality concentrations. It has advantages over measured ambient air monitoring data in that ambient impacts from existing sources can be assessed by creating a computer representation of the existing facilities. The computer representation, or dispersion model, takes into account the maximum emissions allowed by the permit, and the stack flow characteristics. In that regard, modeling is more protective than monitoring since actual emissions detected by the monitor is typically lower than the allowable emission input to the model. The meteorological data is another input which determines the atmospheric transport of the emissions. In this case, it was collected at the proposed site and therefore is very representative of the transport in the area. Measured ambient monitoring data is valuable to determine a background concentration (e.g., concentrations from minor or distant sources). In this post-permit issuance modeling analysis, AES-PRCP will model the most important industrial sources. The ambient concentrations from existing sources of SO_2 in the Guayama area will be assessed with an EPA dispersion model.

The 1983 SIP demonstration was an island-wide air quality evaluation to determine if the areas were in attainment with air quality standards. Since that time there has been little new source growth. In order to address any potential problems, AES-PRLP has agreed to the requirement in

the draft permit to perform a multi-source modeling and monitoring analysis. EPA and PREQB are committed to correct any exceedances on an expedited basis should it be determined by the analyses that there is a problem in the area.

See Response 5.33 for a discussion of the Cerro Modesto Station monitor.

With respect to the letters referenced in Permit Condition XVI(4), the letters cited in the condition represent an enforceable component of the permit. In addition, these letters were made available to the public as part of the Administrative Record.

Comment 5.42

Meteorological data was gathered for one year using ground-based instrumentation, specifically a Central Met Tower and a Doppler instrument to measure vertical wind profiles. Although tropical climates present, in general, low thermal seasonal variability, Caribbean islands are heavily influenced by the easterly wind trends which are present in the summer and fall. Furthermore, it has been demonstrated that Atlantic and Caribbean waters show cyclic warming and cooling trends with duration of several years. These oceanic variability are one of the major causes for high hurricane seasons in the eastern Caribbean. Therefore, more than a year's worth of meteorological data should be used to fairly represent the Caribbean climate.

Response 5.42

See Response 5.7.

Comment 5.43

Given the proximity of AES-PRCP reported values for SO_2 to those considered by EPA to cause significant impact in the air quality, EPA should have required of AES to conduct a sensitivity analysis for those sources near the minimum established. A good sensitivity analysis should consider worst case scenarios. These worst case scenarios can be a combination of increases in production of SO_2 and variability in weather patterns.

I undertook the initiative of conducting simple sensitivity analysis for SO_2 for the exact same operating conditions as those reported by AES-PRCP. The analysis was conducted using the ISC Version 3 code assuming a single source equivalent to AES-PRCP's proposed production. The source was treated as a point with stack parameters as described in Table 1. Other model options used in ISC3 executions included complex terrain and buoyancy induced dispersion.

Table 1: Stack Parameters for SO_2 Simulation

Parameter	Value
Stack Height (m)	135.00
Equivalent Stack Diameter (m)	6.90
Exit Gas Temperature (K)	350.0
Exit Velocities (m/s)	17.13, 34.3, 51.4, 172.0
Mass Flow Rate of SO_2 (g/s)	7.0, 14.0, 21.0, 70.0

The base exit mass flow rate of SO_2 was obtained from the maximum power production of 4,922.7 MMBTU/hour using a coal with a high heating value of 10,000 BTU/lb and a 1% maximum sulfur content. A technology capable of removing 98% of this sulfur was also assumed to be installed in the boilers. The 98% value was originally proposed by AES-PRCP in their initial PSD solicitation and eventually changed to 99%. This base value resulted in a mass flow rate of SO_2 approximately equal to 14.0 g/s. Two worst case scenarios were considered: weather variability and variations in the effectiveness of the technology used to removed SO_2.

Weather Worst Case: The worst-case weather pattern considered was based on a one-day prediction using data as shown in Table 2. This weather scenario was first proposed by AES-PRCP under their PSD permit and it includes strong winds in one direction and various atmospheric stability conditions. This scenario is highly possible in Puerto Rico due to the well defined easterly wind trends.

Table 2: Assumed Worst Case Weather Data

Year	Month	Date	Hour	WD (^{o})	WS (m/s)	Temp (K)	Stabi.	MH (m)	MH (m)
95	1	1	1	360	1	293	1	5000	5000
95	1	1	2	360	3	293	1	5000	5000
95	1	1	3	360	1	293	2	5000	5000
95	1	1	4	“	3	“	2	“	“
95	1	1	5	“	5	“	2	“	“

95	1	1	6	“	1	“	3	“	“
95	1	1	7	“	3	“	3	“	“
95	1	1	8	“	5	“	3	“	“
95	1	1	9	“	10	“	3	“	“
95	1	1	10	“	1	“	4	“	“
95	1	1	11	“	3	“	4	“	“
95	1	1	12	“	5	“	4	“	“
95	1	1	13	“	10	“	4	“	“
95	1	1	14	“	15	“	4	“	“
95	1	1	15	“	1	“	5	“	“
95	1	1	16	“	3	“	5	“	“
95	1	1	17	“	5	“	5	“	“
95	1	1	18	“	1	“	6	“	“
95	1	1	19	“	3	“	6	“	“
95	1	1	20	“	5	“	6	“	“
95	1	1	21	“	3	“	4	“	“
95	1	1	22	“	5	“	4	“	“
95	1	1	23	“	10	“	4	“	“
95	1	1	24	“	15	“	4	“	“

Several scenarios were investigated under this assumed weather pattern which included effectiveness of the SO_2 removal technology at 99, 98, 97 and 90%. Table 3 shows results for 3-hour and 24-hour for these simulated cases.

Table 3: Maximum Concentrations of SO_2 for the Weather-Based Worst Case Scenario (ug/m3)

Effectiveness of Technology	Flow Rate (g/s)	3-Hour	24-Hour
99	7.0	7.91	2.72
98	14.0	15.83	5.44
97	21.0	23.74	8.16
90	70.0	79.16	27.21

The array of receptors used in these particular simulations was a discrete one with X axis fixed to zero value and Y axis facing north at intervals ranging 100 m in the first 2 Km and 500 m in the remaining 10 Km. It is evident from these results that minimum significant levels are exceeded for all cases except when the limestone based technology is capable of removing 99% of all sulfur present in the coal. This requirement of 99% effectiveness will be extremely difficult to meet by any power plant on a continuous basis and therefore minimum significant levels should be expected to be exceeded under the conditions considered in this first worst case scenario.

Worst Case with Existing Data: in the second worst case scenario considered, the weather data gathered by AES-PRCP were used and annual simulations were performed for SO_2 removal technology effectiveness of 99, 98, 97, and 90%. The weather data used was obtained from compressed files provided by AES-PRCP to EPA Region 2. The particular weather file used was AESISC.MET. The receptors array used in these simulations was similar to the first case considered but shifted towards the west of the proposed plant. Table 4 shows results for maximum 3-hour and 24-hour average concentrations for these simulated cases.

Table 4: Maximum Concentrations of SO_2 for the Worst Case Scenario with AES-Annual Weather Data (ug/m^3)

Effectiveness of Technology	Flow Rate (g/s)	3-Hour	24-Hour
99	7.0	24.65	6.15
98	14.0	49.30	12.30
97	21.0	73.96	18.45
90	70.0	240.71	60.05

Maximum encountered values of SO_2 occurred at heights between 100 and 150 m and about 4

Km north-west of the proposed power plant. These heights may seem far from ground. However, for the Guayama area they may represent realistic scenarios since terrain is complex and populated mountains are present in the north-west bound. Furthermore, the results shown in Table 4 far exceed the minimum significant levels of 5.0 and 20.0 (ug/m^3) for the 24-hr and 3-hr average, respectively, for all assumed operating cases including the proposed by AES-PRCP of 99% effectiveness for SO_2 absorption. These significant minimums were also found to be exceeded in several lower locations during simulations. Thus, it should be expected that a large geographic area will be exposed to levels higher than significant levels even under the proposed conditions.

Conclusions on Sensitivity Analysis: The objective of the analysis presented above was to demonstrate that due to the proximity of AES-PRCP's values to EPA established minimum significant figures, minimum variations in the operation of the system will lead to reach significant numbers. The case for SO_2 was taken as basis for the analysis and simulations were conducted for two worst case conditions, weather variability and departure of the effectiveness of the SO_2 absorption technology from the proposed design conditions of 99%. Simulated results indicate that minimum significant levels are exceeded when strong and defined winds are present for all effectiveness except the 99% proposed condition. Any deviation from this restrictive condition will lead to minimum air quality impacts. Results also show that minimum impacts can be expected under normal weather conditions prevailing in the area even when the system is operating at 99% of SO_2 removal effectiveness for height above 100 m. It is therefore concluded that SO_2 emissions from AES-PRCP will have a minimum impact in the air quality of the Jobos area of Guayama, Puerto Rico.

Response 5.43

Commenter erroneously assumes that the facility will be permitted to have SO_2 removal efficiencies of 99%, 98%, 97% and 90%, and for each decreasing removal efficiency, the facility will be allowed to emit incrementally higher emissions. That is not the case. The permit actually requires an SO_2 emission rate of 0.022 lb/MMBTU at any 3-hour average. Removal efficiencies for SO_2 will vary according to the types of coal burned. Taking commenter's example of 1.0 % sulfur coal with 10,000 BTU/lb, in order to achieve the 0.022 lb/MMBTU emission rate, the facility would need to achieve a 98.9% removal rate. However, if the facility were to burn 0.5% sulfur coal with 10,000 BTU/lb, in order to achieve a 0.022 lb/MMBTU, it would need to achieve a lower 97.8% removal efficiency. That is, removal efficiencies will vary according to sulfur content of the coal. Lower sulfur coals require a lower removal efficiency to achieve the stated emission rate. Commenter assumed 1.0% sulfur coal in all his operating scenarios. As demonstrated above, a 1.0% sulfur coal (with 10,000 BTU/lb) and 98% , 97% or 90% SO_2 removal efficiency would not meet the emission rate of 0.022 lb/MMBTU and the continuous emission monitors would detect that.

The operating scenarios that were described by the commenter are therefore not correct. In the commenter's scenario, the significant impact levels were exceeded at the lower removal efficiencies (i.e., 98%, 97%, and 90%). However, these lower removal efficiencies would not be

allowed by the PSD permit since these would not meet the 0.022 lb/MMBTU limit using the 1.0% sulfur coal and 10,000 BTU/lb. The modeled scenarios using the one-day worst-case meteorological data (Table 3) exceeded the significant impact levels for the 3 and 24-hour only at removal efficiencies at 98% and lower. Otherwise, the impacts were still within the appropriate Significant Impact Levels.

The only valid operating scenario would be the 99% since this one would meet the stated 0.022 lb/MMBTU limit required by the permit. From Table 4 in Comment 5.43, at this 99% removal efficiency scenario, the 24-hour average significant impact level was exceeded. The 3-hour was still within the de minimis significant levels of 25 ug/m^3 (the text in the comment misquoted this level to be 20 ug/m^3). Although there was a modeled exceedance at the 24-hour at 99%, the commenter used a different air quality model than the one used by AES-PRCP. EPA's normal procedure to review the model inputs and outputs for technical and regulatory adequacy was not performed in the commenter's case since the actual modeling analysis performed by the commenter was not submitted to EPA. While EPA conducted such a review of the air model submitted by AES-PRCP, it was not possible in the commenter's case. Nevertheless, assuming that was done correctly, EPA notes the following: The model used by the commenter was ISC3. This model is really two models linked together. That is, it comprises of the ISC model which calculates impacts at locations below the stack top (or simple terrain) and Complex I for calculating impacts above stack top (or complex terrain), which is at 135 meters. ISC3 was used by AES-PRCP but only for simple terrain level impacts that are located below stack top. AES-PRCP did not use the Complex I algorithm above stack height. Therefore, commenter and AES-PRCP used two different models in the complex terrain area. Both models are EPA-approved models in complex terrain. However, the commenter used a more simplistic conservative "screening" model Complex I, while AES-PRCP used a "refined" model CTDMPLUS that required more detailed data.

The nature of "screening" models is that they are designed to be simple but conservative. The EPA Guideline on Air Quality Models, found in 40 CFR Part 51, Appendix W states in section 2.3, "...there are two levels of sophistication [or model type]. The first level consists of general, relatively simple estimation techniques that provide conservative estimates of the air quality impact of a specific source, or source category. These are screening techniques or screening models. The purpose of such techniques is to eliminate the need of further more detailed modeling for those sources that clearly will not cause or contribute to ambient concentration in excess of either the National Ambient Air Quality Standards (NAAQS) or the allowable Prevention of Significant Deterioration (PSD) concentration increments.[...] The second level of sophistication consists of those analytical techniques that provide more detailed treatment of physical and chemical atmospheric processes, and provide more specialized concentration estimates. As a result, they provide a more refined and, at least theoretically, more accurate estimate of source impact and effectiveness of control strategies. These are referred to as "refined models."

The commenter used Complex I in his modeling. This is listed in the Guideline on Air Quality

Models as a screening model (see Section 5.2.1 of the guideline). AES-PRCP used CTDMPLUS to calculate its impacts in complex terrain. This air model is considered a refined model (see Section 5.2.2 of the guideline). Therefore, the impact calculated by the commenter are expected to be greater than those calculated by AES-PRCP since a screening model was used.

Terrain that exceeds stack top is considered "complex terrain." Although ISC3 contains a complex terrain algorithm, Complex I, it was not used by AES-PRCP. AES-PRCP opted to use the "refined" complex terrain model, CTDMPLUS for this area. CTDMPLUS is an EPA refined complex terrain model. Complex I is a "screening" model designed to be conservative. The two models are different in their simulation of impacts. Complex I is more simplistic and the data requirements are also less intensive. CTDMPLUS calculates a more refined impact by more accurately characterizing the terrain configuration and meteorological dispersion parameters. The enhanced meteorological database and terrain details makes CTDMPLUS a more refined complex dispersion model. Any source seeking to calculate impacts in complex terrain may use CTDMPLUS provided it follows the proper protocol.

Therefore, the impacts calculated by the commenter and those calculated by AES-PRCP cannot be directly compared since both used different dispersion models to arrive at their conclusions. However, one is simply more refined. AES-PRCP followed appropriate regulatory procedures and the impacts under all scenarios modeled for the PSD permit application resulted in the SO_2 impacts below the significant impact levels.

Comment 5.44

EPA should require the use of an external meteorological data set which can include information from near monitoring stations in any simulation exercise which apply to the proposed AES-PRCP project in Guayama.

Response 5.44

With some models, the meteorological data can be obtained from an off-site location. However, in complex terrain assessments where the air flow may be different from one location to the next, it is more technically sound to obtain data at the actual site where the source will construct. This way the atmospheric dispersive conditions can be more accurately quantified. For this reason, the EPA Guideline on Air Quality Models recommends that the meteorological data be collected at the site of the source. This was done for AES-PRCP.

Comment 5.45

A calibration procedure should be implemented to demonstrate that the proposed simulation tools are indeed appropriate to this particular application. The procedure should include the use of historical records of emitting gases as well as new data from sensitive points.
Response 5.45

See Response 5.8

Comment 5.46

EPA should require AES-PRCP to conduct multiple source analysis for SO_2 and any other emitting gas whose resulting concentration has the potential of exceeding established minimums. The multiple source analysis should consider actual emissions from near sources and not only those reported when installed. Therefore, an inventory of emitting sources should be generated based on recent actual profiles to conduct the multiple source analysis.

Response 5.46

EPA requires a multi-source analysis for any criteria pollutant when the proposed impacts are above the Significant Impact Levels. Even though this is not the case for AES-PRCP for SO_2, AES-PRCP will conduct the SO_2 multi-source NAAQS analysis. However, in the NAAQS analysis, the permitted emission levels will be modeled rather than the actuals since this is more conservative. This scenario gives the potential air quality concentrations. Usually, actual emission are less than the allowable as is the case in this area since the nearby facilities are complying with their sulfur in fuel limits. Therefore, this analysis is more conservative than the one suggested by the commenter. The ambient monitor which will also be installed by AES-PRCP will measure "actual" concentrations in the air.

Comment 5.47

The multiple source analysis should be accompanied by a good estimate of the background air which can only be accomplished by a monitoring program of the area prior to granting permission and not after.

Response 5.47

AES-PRCP modeled its predicted impact using approved modeling techniques. The impacts from this modeling analysis indicated that the impacts would be below the Monitoring De Minimis Levels (except PM_{10}). Therefore, EPA did not require AES-PRCP to conduct ambient monitoring.

Section 6.0 - Choice of Fuels

Comment 6.1

Of all the fossil fuels, coal is the dirtiest fuel. It contains the largest amount of contaminants and generates the largest amount of carbon dioxide per unit of energy produced. It is also a major contributor of global warming. Coal generates 30% more CO_2 than oil and 80% more CO_2 than natural gas. If Puerto Rico has never burned coal to produce electricity, to start now would be an

unforgiving anachronism.

Response 6.1

Currently, there are no regulations prohibiting the burning of coal. If fact, coal is the most common fuel used in the United States (and in the whole world for that matter) in large industrial boilers and for power generation. Coal-fired power plants produce 57 percent of the electricity in the United States (the second is nuclear power with approximately 20%). In addition, advances in the design of combustion boilers, i.e., fluidized combustion technology, and the burning of low sulfur coal have made coal burning less polluting.

Comment 6.2

Commenter states that the EPA should not endorse this plant without first asking what country will the coal be brought in from, and certify that, and conduct a direct study about that.

Response 6.2

Coal is a fuel that is widely used in the United States and worldwide. Therefore, there is no need to conduct a study on the use of such fuel or from what country the coal will be brought in. Since the most critical characteristic of coal, for environmental purposes, is the percent sulfur in coal, this is regulated in the AES-PRCP permit (maximum 1% sulfur content in coal). In addition, there is a maximum SO_2 emission rate which will be monitored through an SO_2 continuous emission monitor (CEM). Other important characteristics of coal include: heat content, ash content, etc. These are all listed in Table 2-3 of the PSD permit application submitted by AES-PRCP for the various countries that AES-PRCP is looking into.

Section 7.0 - Environmental Justice Issues

Comment 7.1

We want to emphasize that our sector is comprised of 17,000 people according to the 1990 census, comprised of low middle-class and poor people with scarce economic resources, and with an area that is already highly polluted, with 90% of inhabitants that are dark-skinned and disadvantaged and a 20% unemployment in the Guayama area, and 25% in the town as such. Seeing it from this point of view, we appeal the Executive Order from the President of the United States, William Clinton, signed February 11, 1994, in which he orders all Federal Agencies, including the EPA, to protect this type of population as mentioned earlier, concerning its disadvantages in relation to other social classes.

Response 7.1

EPA has performed an environmental justice analysis that addresses the concerns that the commenter has raised. Our analysis was performed in accordance with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." The Executive Order is designed to focus Federal attention on the environmental and human health conditions in minority communities and low-income communities with the goal of achieving environmental justice. Its provisions are to be implemented consistent with, and to the extent permitted by, existing law. The Executive Order 12898 directs each Federal agency involved with programs affecting the public's health and the environment to incorporate environmental justice as part of the Agency's mission "by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." In general, this means that in carrying out the Agency's programs, EPA will examine whether there are environmental justice issues for minority and low-income populations.

The goal of environmental justice is not to shift risks among populations, but to identify potentially disproportionately high and adverse effects and mitigate such impacts. Region 2 does consider demographical information with respect to the percentage of minority populations and low-income populations when it seeks to evaluate whether a community may be disproportionately and adversely impacted by environmental problems and whether those problems may be exacerbated by the Agency's carrying out its programs, policies, and activities.

This Executive Order is distinct from Title VI of the Civil Rights Act of 1964. Title VI, another important tool for addressing environmental justice concerns, applies to recipients of federal funds, for example, EPA-funded state agencies issuing state environmental permits. Title VI does not apply to a federal permit issued by an agency of the United States Government and therefore is not applicable to the AES-PRCP PSD permit. However, Section 2-2 of the Executive Order is designed to ensure that Federal actions substantially affecting human health or the environment do not have discriminatory effects based on race, color, or national origin. Accordingly, EPA is committed to a policy of nondiscrimination in its own permitting actions.

In evaluating AES-PRCP's permit application, EPA Region 2 derived median household income data and population density data from the 1990 Census. This information was incorporated into the Region 2 Geographical Information System (GIS) which allows the Agency to plot such information on maps. EPA also plotted information about sources of pollution in the Guayama area of Puerto Rico on these maps. Pollution source information was compiled using data from the EPA's 1995 Toxics Release Inventory (TRI), an annual inventory of emissions from all major sources of pollution. In addition, EPA Region 2's Permit Compliance System Database was used to plot sources of pollution on the maps. Using this information, EPA made both island-wide maps and maps for the municipalities of Guayama and Salinas. EPA calculated the locations where the maximum impacts from AES-PRCP for all modeled pollutants will occur and the locations most likely to be impacted by PM_{10} cumulative emissions from area industries. These impacted locations were overlayed onto the maps which are part of the Administrative Record.

Environmental Justice (EJ) Analysis Process

EPA Region 2 first analyzed whether a minority or low-income population exists in the potentially-affected area. EPA could not document a potentially-affected population based on minority status (see Responses 7.14 and 7.16). However, EPA did conclude that the potentially-impacted population is a low-income community. The Agency proceeded to analyze whether there would be a disproportionately high and adverse human health or environmental effect on this community due to the issuance of the AES-PRCP PSD permit. EPA concluded that there will not be such an effect. Our income level and disproportionately high and adverse impact analyses are described below.

A) Income Level Analysis

The above-referenced GIS maps are helpful in analyzing the income levels of the potentially-affected communities. The maps show that much of the municipality of Guayama, based on census blocks, is below the median household income for the Island of Puerto Rico. EPA further analyzed the specific areas of maximum impact and found that these areas are also below the average income for the Island. AES-PRCP's maximum impacts for most of the criteria pollutants fall within Guayama. Specifically, maximum short-term impacts for sulfur dioxide (SO_2) and carbon monoxide (CO) occur in census blocks within Barrio Pozo Hondo in Guayama where the average income is between $3,897 and $8,362 per year. The maximum annual SO_2 impacts and the maximum short-term and annual impacts for particulate matter under 10 microns (PM_{10}) occur in census blocks in the vicinity of the Barrio Jobos also within Guayama, where the average income is between $8,363 to $10,701 per year. The maximum impacts from nitrogen dioxide (NO_2) occur in the vicinity of Barrio Aguirre in the municipality of Salinas where the average income is $3,897 to $8,362 per year. These areas are all lower when compared with the average income of between $14,672 and $17,790 Island-wide.

It should be noted that in terms of percentage of families below the poverty level, Guayama's level is 64.8% compared to an Island-wide average of 55.3%. In addition, the 1990 Census data ranks the 78 municipalities in Puerto Rico in terms of percentage of families below the poverty level. The municipalities ranking low on the list have a higher percentage of such families than the municipalities ranking high on the list. While Salinas ranks 23rd out of the 78 municipalities, Guayama ranks 31st out of the 78 municipalities in Puerto Rico for percentages of families under the poverty level, which suggests that Guayama falls fairly close to the Island-wide median.

However, when EPA further looked at the census income data on a Barrio-specific basis, the data revealed that Jobos, Pozo Hondo and Aguirre all have significantly higher percentages of families below the poverty level, 80.9%, 90.9%, and 69.4%, respectively. Since the GIS maps enabled us to determine the specific Barrios where the maximum impacts occur, we found that the Barrio-based income data was very pertinent to our decision on whether a low-income area exists. Based upon the above, EPA has determined that the best reading of all the income data

derived from the various methodologies is that the Barrios of Jobos, Pozo Hondo, and Aguirre are low-income areas.

In its application, the applicant provided a different method of analyzing income levels. The applicant prepared a comparative income analysis that examined other sites where the facility could feasibly be located. AES-PRCP's analysis concluded that, based on per capita income, Guayama's income was slightly higher than other municipalities selected by the applicant for potential alternate sites for the facility. Specifically, in Guayama, the per capita income was $3,207 compared with a range of $2,575-$3,045 in the alternate municipalities. The applicant's analysis leads to the conclusion that Guayama is not a low-income area when compared to the applicant's alternate sites. This conclusion does not change EPA's conclusion that the areas potentially-impacted by the AES-PRCP are low-income.

B) Disproportionately High and Adverse Effect Analysis

Since EPA concluded that the areas potentially-impacted by AES-PRCP are low-income communities the Agency proceeded to determine whether there is a disproportionately high and adverse effect on human health or the environment. The GIS maps developed by EPA were also helpful in making this determination. As noted previously, EPA plotted the areas of AES-PRCP's maximum impact and found that they are located in the Barrios of Jobos, Pozo Hondo and Aguirre. However, it is necessary to look in a more detailed fashion at what the maximum impacts represent in this case and whether they are disproportionately high and adverse.

[* Before continuing reading the following sections, the reader may wish to refer to Addendum A at the end of this Responsiveness Summary for a primer on air quality analysis requirements under the PSD regulations.]

1) Barrio Pozo Hondo - Maximum Impacts of Short-Term SO_2 and CO

The maximum impacts of short-term SO_2 and CO are in Pozo Hondo. These maximum impacts, however, are very small and are below the thresholds of concern, called "Significant Impact Levels." The Significant Impact Levels are fractions of the NAAQS and are used by EPA to determine whether further detailed analyses are warranted or whether the source has such a low impact that its additional impacts of pollutants are negligible. It should be noted that the National Ambient Air Quality Standards (NAAQS) are the levels established to protect public health, not the Significant Impact Levels. Significant Impact Levels could better be described as de minimis impact levels. To give a perspective, the Significant Impact Levels of SO_2 are 5, and 25 ug/m^3 on the 24-hour and 3-hour averaging periods, respectively. This is compared to the NAAQS of 365, and 1300 ug/m^3 for the same averaging times, respectively. The Significant Impact Levels are also used by the EPA when there is a violation of an air quality standard in order to decipher which sources are "significantly" causing or contributing to the violation and therefore must reduce their impacts. An exceedance to the Significant Impact Levels does not constitute a health threat but is merely used to assess whether further cumulative analyses are required.

Because Significant Impact Levels were not exceeded for any pollutant, AES-PRCP's levels of emissions are so small that even if there were an existing exceedance of the health-based NAAQS or PSD increment, EPA would not consider AES-PRCP alone to be significantly causing or contributing to the exceedance. Therefore, EPA would need to address the violation by acting against the other existing source(s) that are significantly causing or contributing to the violation (see July 1988 EPA policy memorandum from Calcagni to Emison).

i) Frequency of Short-Term Maximum Impact Levels for SO_2 and CO

Not only are AES-PRCP's maximum short-term impacts for SO_2 and CO below the Significant Impact Levels, but these maximum impacts also occur infrequently. A short-term impact is calculated by determining a "worst-case" day. The "worst-case" day will not occur every day, but the computer model found at least one day in which this scenario could occur and this is considered the maximum short-term impact. On most days, the impact would be less than the maximum impact. In order to ascertain the frequency of this scenario, one may only need to examine the wind rose which plots the frequency of the wind directions. The wind rose in this case was developed from the meteorological data collected at the proposed AES-PRCP site. As can be seen from the wind rose there is a strong persistence of the winds blowing from the easterly components. This is very common in subtropical areas such as Puerto Rico. Therefore, most of the time, the impacts will usually be off-land, southwest of the facility, at a lower concentration than the maximum identified. The projected maximum short-term impacts for SO_2 and CO occur in Pozo Hondo which is located north of the proposed AES-PRCP facility. The wind barb that records a wind blowing from the south is very small indicating that the wind did not blow very often from the south to the north which would carry the pollutants into Pozo Hondo. Notwithstanding this low frequency, this impact was still used by EPA in the permit decision.

2) Barrio Aguirre - Maximum Impacts for NO_2

With respect to NO_2, the modeling analysis projects that the maximum impact from AES-PRCP would occur in Salinas, but more specifically, in Aguirre at an annual average concentration of 0.81 ug/m^3. Again, this impact is below the Significant Impact Level for NO_2 which is defined as 1 ug/m^3. The NAAQS for NO_2 is 100 ug/m^3. AES-PRCP was not required to conduct an ambient monitoring study of this pollutant since its impacts are also projected to be below the monitoring de minimis levels. However, as added assurance, information from an existing NO_2 ambient monitor in Salinas were provided in the application. In the application, the maximum measured background concentration was 4 ug/m^3. Therefore, if the new impact is added to the existing measured monitored concentration the total concentration is 4.81 ug/m^3, well below the NAAQS of 100 ug/m^3.

3) Barrio Jobos - Maximum Impacts of PM_{10} and Annual SO_2

The maximum impacts of PM_{10} are in Jobos. Unlike the SO_2, CO and NO_2 maximum impacts, the PM_{10} impacts are above the Significant Impact Levels. As a result, AES-PRCP was required

to perform a multi-source impact analysis to determine the combined PM_{10} impacts from AES-PRCP and all existing sources in the area. The multi-source impact analysis revealed that there was no exceedance of the PM_{10} NAAQS or PSD increment. This analysis, which is also part of the Administrative Record, also revealed that the maximum multi-source impact level identified was within the health-based PM_{10} NAAQS. For example, the health-based NAAQS for PM_{10} on an annual and 24-hour bases are 50 ug/m^3 and 150 ug/m^3, respectively. The maximum combined PM_{10} impacts from AES-PRCP and all existing sources in the area are projected to be 44.5 ug/m^3 on an annual basis and 112.1 ug/m^3 on a 24-hour basis. Similar results are obtained with respect to the PM_{10} PSD increments. PM_{10} PSD increment standards on an annual and 24-hour bases are 17 ug/m^3 and 30 ug/m^3, respectively. Projected PM_{10} PSD increment impacts from AES-PRCP and existing sources on an annual and 24-hour bases are 3.3 ug/m^3 and 16.6 ug/m^3, respectively (see Attachment III of this PSD permit for additional information).

With respect to the annual SO_2 impact, AES-PRCP's annual SO_2 impact is 0.55 ug/m^3 which is below the Significant Impact Level of 1 ug/m^3. The annual SO_2 NAAQS is 80 ug/m^3.

4) NAAQS are Health-Based Standards

That air quality, even with the proposed source, will stay far below the levels of the NAAQS and PSD increments is of great significance to EPA's analysis because the NAAQS are health-based standards and the PSD increments help to prevent significant deterioration (preserve those health-based standards). Since Congress passed the Clean Air Act in 1970, EPA has been required to set the NAAQS at a level that will protect public health with an adequate margin of safety. The NAAQS may be based only upon a consideration of public health without consideration of costs. Congress made an explicit choice to separate the setting of public health standards in establishing the NAAQS from consideration of costs in implementing the NAAQS.

In accordance with the Clean Air Act, EPA developed "criteria" documents that represent a compilation and scientific assessment of all the health and environmental effects information available and consulted with the Clean Air Scientific Advisory Committee (CASAC) in setting the standards. CASAC is a Congressionally mandated group of independent scientific and technical experts. With CASAC, EPA develops a criteria document that provides an analysis of sensitive populations such as children, the elderly and asthmatics. The health-based NAAQS therefore take into account such sensitive populations.

5) Existing Attainment Designations of Guayama and Salinas for All Criteria Pollutants

With respect to the entire area, EPA has no data to suggest that there is an existing exceedance of any of the NAAQS or PSD increments. The last SO_2 multi-source modeling that was done in the area for the State Implementation Plan (SIP) demonstration indicates that the area is far below the SO_2 NAAQS (see 48 FR 41409, Sep 15, 1983). Although this analysis was performed in 1983, the lack of growth in new or modified major stationary sources of air pollution in Guayama leads EPA to conclude that the health-based NAAQS, which take into account

sensitive populations such as children, the elderly and asthmatics, are still being met. However, in order to address environmental justice concerns, EPA has taken additional steps to verify this condition (see "Measures to Re-Confirm NAAQS Attainment Status" section of this response). With respect to the other criteria pollutants, such as PM_{10}, CO, NO_2, and Ozone, there are no nonattainment areas in Guayama or Salinas (see 44 FR 5131, Jan 25, 1979, as amended at 47 FR 31878, Jul 23, 1982; 48 FR 41409, Sep 15, 1983; 52FR 7866, Mar 13, 1987; 56 FR 56855, Nov 6, 1991; 57 FR 56779, Nov 30, 1992). Therefore, the health-based NAAQS are being met for these pollutants as well.

6) Community Concerns About Adverse Health Impacts on Schools in Jobos

i) PREQB Air Studies

In response to community concerns about past adverse health impacts at two local schools from existing facilities, EPA looked at air studies conducted by PREQB in 1991. The studies, conducted for one week each in two schools in Jobos, were designed to find the cause of the reported odors at these schools. The studies utilized Tenax Cartridges that are capable of detecting 19 compounds. These compounds are carbon tetrachloride, benzene, chlorobenzene, ethyl benzene, toluene, xylene, 1,2-dichloropropane, 1,3-dichloropropane, 1,2-dichloroethane, 1,1,1-trichloroethane, tetrachloroethylene, trichloroethylene, cumene, n-heptane, 1-heptene, bromoform, ethylene dibromide, bromobenzene and chloroform. The cartridges were analyzed using sophisticated scientific methods called gas chromatography and mass spectrometry. The results of the studies showed no chemical concentrations of these 19 compounds above 1 ppm in the air at either school. The detection limit for the Tenax Cartridges is 1 ppm. The Occupational Safety and Health Administration (OSHA) and/or National Institute for Occupational Safety and Health (NIOSH) have set maximum permissible/recommended exposure limits greater than or equal to 1 ppm for 16 of the 19 compounds. Two of the remaining compounds, bromobenzene and 1-Heptene, do not have set maximum exposure limits. For the last chemical compound, bromoform, the maximum exposure limit is 0.5 ppm on a time-weighted average of up to 10 hours. Although it appears that these chemicals were not present at harmful levels, the PREQB studies recommend that additional studies be performed in the area regarding odors.

ii) Hermes International Corp. Study

EPA also considered two other studies. The first was conducted in September 1995 by the Puerto Rico Energy Affairs Commission, which retained a contractor named Hermes International Corp. to conduct a preliminary health study on the environmental problems occurring in the Ramona Mendoza Secondary School and the José M. Vázquez Elementary School in Barrio Puente Jobos in Guayama. Hermes International Corp. reviewed emergency hospital logs that contained data on the age of the students and teachers who received treatment at the hospital after an odor episode, the symptoms these patients experienced, the hospital diagnosis given to the patients, and the medical treatment provided to the patients. In addition,

information was compiled on how frequent students and teachers experienced physical symptoms such as headaches, vomiting, coughs, fatigue, eye irritation, and throat irritation. The study concluded that the two schools were experiencing a series of environmental incidences where students and teachers were exposed to nauseous odors. The study was not able to determine the cause of these physical symptoms. The study recommended that further studies be conducted. Furthermore, it also provided a preliminary recommendation that a monetary fund be created by the industrial facilities in Barrio Jobos to fund the creation of a "forest belt" built on the west and northwest of the facilities to protect the communities from pollution and to trap carbon dioxide emissions. The fund would also be used to pay for additional health and environmental studies in the area.

iii) Servicios Científicos y Técnicos Study

The other report we considered was prepared by Servicios Científicos y Técnicos in June 1995 entitled "El Problema Ambiental de la Escuela Ramona Mendoza Santos de Guayama" for the Department of Education. The report lists the industrial facilities that are located in Guayama with a listing of possible chemicals emitted from those facilities. The study compared the physical characteristics and possible health-related effects of some of the chemicals such as benzene, methylamine, xylenes, kerosene, methyl mercaptan, diesel, and toluene. It also contains the results of a survey of a number of students/teachers as to what physical symptoms they have experienced during an odor episode. The recommendations this report makes include: conduct additional studies on the causes of the odor and the existing facilities; conduct a more complete health study of the schools and community; inspect the control equipment of the existing facilities; propose alternative emissions controls for the facilities which are more efficient and will reduce the odor episodes; install air conditioners in the classrooms to help reduce the incidents of odors; contract out the services of a nurse who will give first aid in the school in case of another odor episode, etc.

iv) Reported Possible Causes of Odors at Other Schools

PREQB has not been able to identify the problem in the air sampling studies that they have conducted (see earlier discussion on this). It should be noted, though, that these odor incidences might not be isolated cases to this area since reportedly, a February 13, 1995 San Juan Star article by Douglas Zehr stated that 30 schools on the island were found to be affected by bad odors since 1993 (it was also reported that, according to PREQB officials, in the majority of these cases the odors may have originated from school facilities such as poorly stored chemicals in science labs, poorly maintained bathrooms, propane gas leaks, etc.).

While we understand that there seems to be a susceptibility to odors in some members of the local population, the chemicals that are suspected as potential causes of these odors are not emitted by a coal-fired powerplant.

v) The Number of TRI Facilities in the Area

In response to concerns raised about the number of TRI facilities, EPA also examined the GIS maps island-wide with 1995 TRI facilities to determine whether Guayama and Salinas have substantially more facilities in their communities than most other locations in Puerto Rico. The data reveal that the municipality of Guayama has 8 TRI facilities and the municipality of Salinas has 4 TRI facilities. Of the 66 municipalities with at least one TRI facility, there are 14 municipalities with the same number or more of TRI facilities than Guayama's and 29 municipalities with the same number or more of TRI facilities than Salina's. In fact, the municipalities of San Juan, Bayamón and Ponce alone have a total of 22, 20, and 17 TRI facilities, respectively.

Furthermore, we examined the 1996 TRI database (the most recently available) for the total amount of toxic chemical releases into the air and water reported by the facilities on an annual basis. We compiled the following on a municipality basis: Barceloneta (>2.6 million lb/year); Arecibo (>2.5 million lb/year); Manatí (1.3 million lb/year); Bayamón (>1.0 million lb/year); Guayama (835,000 lb/year); and Salinas (55,000 lb/year). Guayama is number eleven in terms of the number of TRI facilities sited in the municipality and the top fifth in terms of total amount of toxic chemical releases per year. However, we have no data on where the impacts from these facilities occur. While no data currently exist on the cumulative toxic ambient impacts and cumulative health impacts from these facilities, the data that we have show that Guayama and Salinas meet all National Ambient Air Quality Standards for all criteria pollutants.

EJ Analysis Conclusion

Based upon all the above, EPA Region 2 has determined that while there are low-income communities in the relevant area, all the information we have leads us to the conclusion that there are no disproportionately high and adverse impacts in those communities with or without AES-PRCP with respect to air impacts. Nonetheless, as discussed below, we have exercised our full legal flexibility in setting conditions in the permit that are protective of the communities and in ensuring that additional steps, such as continued ambient monitoring for PM_{10} and NO_2, will be taken independent of the permit to protect the health of the residents.

C) Measures to Re-Confirm NAAQS Attainment Status

1) Post- Permit SO_2 Modeling and Ambient Monitoring

AES-PRLP orally expressed to EPA a concern based on their preliminary review of existing source permits that there may currently exist some uncertainty about a potential exceedance of the SO_2 PSD increment and/or NAAQS. There were no data provided to EPA by the company to support this concern and since no multi-source modeling is required of AES-PRCP for SO_2 because their impacts are below significance levels, EPA has no reason to believe that there is a violation of the SO_2 air quality standards. Our assessment, based upon the 1983 SIP demonstration and our evaluation of subsequent growth, continues to be that there is no SO_2 NAAQS violation. However, in order to address environmental justice concerns in the

community and to re-confirm that there are no potential NAAQS or PSD increment-related health concerns in the area, EPA has included permit conditions, to which AES-PRLP has agreed, that address post-permit issuance SO_2 modeling and ambient monitoring.

AES-PRLP's multi-source modeling analyses will determine whether there may be a potential exceedance of the SO_2 PSD increment or NAAQS in the area surrounding the facility. The analyses would be submitted within 3 to 6 months of the effective date of AES-PRCP's PSD permit. AES-PRCP will also perform SO_2 post-operation monitoring to ensure that the air quality standards are maintained. EPA has exercised its discretion under the PSD regulations to require such monitoring and in order to address environmental justice concerns and to avoid potential adverse impacts from existing sources. As such, a condition has been included in AES-PRCP's permit requiring that an SO_2 ambient monitor be installed and operational for one year subject to extension by EPA if the monitor records any exceedances in that one-year period. AES-PRLP has indicated its intention to fully comply with this condition.

EPA believes that even if there is a potential NAAQS violation found, the violation would be based on modeling analysis and not on actual emissions of SO_2. This might occur because the analysis is performed on the basis of the maximum allowable emissions from each existing source. The model assumes that these sources are simultaneously operating at their maximum allowable emissions throughout the year. Since many sources in the area are actually emitting less than what they are allowed to emit, it is unlikely that there is any actual existing violation of the SO_2 health standard. However, if a violation is found through either actual monitoring or analysis, EPA and PREQB will take corrective action in an expeditious manner.

2) Expedited Resolution by Regulatory Agencies, if Needed

PREQB specifically informed EPA in a February 21, 1997 letter that if the SO_2 multi-source NAAQS analysis reveals a potential violation, within six months PREQB will take necessary steps to attain the NAAQS. If such a State Implementation Plan (SIP) revision is necessary, PREQB will have to impose conditions on those existing sources that contribute to the NAAQS exceedance. Such conditions could include limiting the hours of operation, requiring the burning of cleaner fuels or decreasing the allowable emissions. If PREQB does not take these steps, EPA has authority under Section 110 of the Clean Air Act to find that the Puerto Rico SIP is substantially inadequate and to "call in" the SIP, meaning that the Commonwealth will be required to submit a SIP revision. If Puerto Rico does not thereafter submit the SIP, the Clean Air Act provides for sanctions to be imposed and for EPA itself to revise the applicable implementation plan. All of these remedies are available regardless of whether a potential NAAQS violation is detected through modeling or ambient monitoring.

3) Continued Ambient Monitoring for PM_{10} and NO_2 for Additional Assurance

With respect to PM_{10}, although both the multi-source modeling analysis performed by AES-PRCP and the ambient PM_{10} monitor in Jobos revealed that there is no threat to the PM_{10} NAAQS or PSD increment, residents can be assured of continued monitoring of the air quality

because a PM_{10} monitor is maintained by PREQB in the residential section of Jobos. In fact, on June 30, 1998, EPA received a letter from PREQB informing us that the PM_{10} ambient monitor in Jobos will continue to operate indefinitely. In addition, PREQB has proposed to locate a new $PM_{2.5}$ at the same site.

With respect to NO_2, the monitor located in Cerro Modesto, which recorded very low readings of NO_2, can continue to provide assurance to area residents that in the unlikely event of a threat to the NO_2 NAAQS, it will be discovered. While this ambient monitor is maintained by PREPA, EPA has no reason to believe that its operation will be discontinued.

In the unlikely event that there is an exceedance of the PM_{10} or NO_2 NAAQS, PREQB will be required to correct the violation in the same manner previously discussed for SO_2 and EPA has the same remedies previously referenced should PREQB fail to correct the violation.

Comment 7.2

I think that as a disadvantaged community, we should be protected, protect our environment and the air that we breathe. It is unfair for us day after day to have to pay for the carelessness of our industrial neighbors. And on top of this, you want to bring another industry now to aggravate our situation. As a resident of the sector, I live in my own flesh with this situation because three of my children have asthma. There are many parents that go through this same situation as I do. Increase in diseases like cancer, heart diseases, skin diseases are additional prices we have had to pay for this industrialization, this un-planned industrialization.

Response 7.2

EPA is very concerned about the health of residents in the potentially-affected communities. This is why we sought to ensure that the health-based NAAQS, which take into account sensitive populations such as children, the elderly and asthmatics, would be met for all criteria pollutants of concern. Furthermore, as stated in Response 7.1, EPA has added permit conditions, to which AES-PRCP has agreed, that require AES-PRCP to conduct SO_2 PSD Increment and NAAQS analyses to ensure that there is no potential National Ambient Air Quality exceedance. In addition, in order to be certain that the quality of the air in the community remains safe, we are also committed to ensuring that PM_{10}, NO_2, and SO_2 ambient monitors are maintained in the potentially affected areas and that a multi-source SO_2 modeling is conducted within 3-6 months. If potential violations are uncovered, EPA and PREQB are committed to take corrective action in an expeditious manner. Finally, most air toxic emissions (in particular VOCs), which are not regulatorily addressed through the PSD process, will be controlled through combustion controls that the permit requires.

Comment 7.3

AES Puerto Rico has created an innovative training program for the people in the Guayama area. That is why AES Puerto Rico deserves our support. This project will increase by about 25% the

municipal budget, creating work, employment, and improving the welfare of our town. Commenter supports this project if it meets all the established standards.

Response 7.3

While EPA supports training and job opportunities for the residents of the communities that host such facilities, our granting of the PSD permit to AES-PRCP is based on it meeting all applicable PSD requirements. PSD requirements include the proper pollution control technology and analysis of its impact on the applicable ambient air quality standards and PSD increments.

Comment 7.4

This project is to make some people rich that have nothing to do with us, and the local people will suffer the consequences because of the indifference of ambitious people.

Response 7.4

EPA's mandate is to protect public health and the environment. In carrying out this mandate, we evaluate environmental consequences and the appropriateness of environmental controls and monitoring systems and also monitor compliance with permit requirements. This ensures that health-based standards under the Clean Air Act are protected.

Comment 7.5

Commenter questions whether the draft PSD permit decision reflects EPA Region 2's official guidelines on identifying environmental justice communities in Puerto Rico.

A draft of requirements for the analysis of environmental justice issues was prepared by the Air Compliance Branch of the Air and Waste Management Division of EPA Region 2. It states that the analysis should include the identification of low-income communities that will be affected by the source. The same draft indicates that there should be an investigation as to whether there are abnormal levels of cancer, asthma, birth defects, or other illnesses. It is commonly accepted knowledge that pockets of low-income communities may be masked by aggregated data. In its review of the PSD application, did EPA Region 2 simply accept industry provided aggregated data?

Response 7.5

It is unclear which document the commenter was referring to. EPA made several recent attempts to get a copy of that document from the commenter. Commenter indicated she would be looking for it. However, EPA did not receive a copy of that document. In any event, EPA Region 2 did not only accept data provided by industry. Rather, as indicated in Response 7.1, we did our own independent analysis. Indeed, our own analysis resulted in a different conclusion from AES-PRCP with respect to the low-income determination, was far more detailed than AES-PRCP's

analysis, and provides for measures to re-confirm NAAQS attainment status.

Comment 7.6

The municipality of Guayama is comprised of ten barrios or wards. In Puerto Rico, the political and administrative divisions correspond to both municipalities and barrios. The census data is available for both municipalities and barrios. A ward is a politically, economically, and statistically definable sector of the community. If Region 2 New York Office did not have this information, it was the responsibility of the EPA San Juan Office to provide this.

Response 7.6

EPA agrees that in this case, where we were able to pinpoint the specific Barrios in which the maximum ambient impacts will occur, it makes sense to examine census data on a Barrio basis. As indicated in Response 7.1, the Barrio data we examined was very pertinent to our decision-making that there are low-income areas affected by this facility.

Comment 7.7

The Community that will be most affected is Jobos because that is where the wind blows. The per-capita income in the Ward of Jobos is $2,364. This is 73% of the $3,207 per-capita income for the Municipality of Guayama. Per capita income island-wide in Puerto Rico is $4,177, approximately 45% higher than Barrio of Jobos. 80.9% of the families are considered living below the poverty level. Jobos is the largest barrio after the Town of Guayama with a population of 6,993. Has EPA insured that there was a full analysis of the environmental effects of low-income communities, including human health, social, and economic effects in accordance with the Executive Order?

Response 7.7

Jobos is one of three Barrios where maximum impacts will occur for one or more pollutants. EPA has done an Environmental Justice analysis (see Response 7.1) to determine whether Jobos and other potentially-affected Barrios are low-income and whether there is a disproportionately high and adverse impact. We have determined that Jobos is a low-income area but that there is no disproportionately high and adverse impact. Nonetheless, we have provided for measures to re-confirm NAAQS attainment status, such as additional modeling and monitoring, that will ensure protection of the residents in Jobos as well as two other Barrios. These measures are discussed in detail in Response 7.1.

Comment 7.8

If Puerto Rican communities are going to be compared to Puerto Rican communities, it makes sense to compare Barrio Jobos in Guayama with say the San Francisco Urbanization in Rio Piedras [a well-to-do area]. Only then can EPA make a comprehensive analysis of the economic

structure of Puerto Rico. Only then can EPA determine if Barrio Jobos, Puerto de Jobos, Pozo Hondo, or the communities of Central Aguirre, San Felipe de Coquí in Salinas are not low-income communities. The great number of poor communities in Puerto Rico should not be further discriminated against because they do not meet statistically skewed criteria, such as sufficient deviations from the median income in Puerto Rico.

Response 7.8

EPA's low-income analysis did conclude that there are low-income communities in some of the locations referenced by the commenter, particularly in Jobos, Pozo Hondo and Aguirre. EPA concentrated its EJ review on these Barrios because AES-PRCP's projected maximum air impacts would fall on these locations (see Response 7.1 for a more detail discussion). However, we note that San Francisco Urbanization in Rio Piedras would not have been a good choice for comparison because it was not a site where AES-PRCP could have located due to technical/physical limitations. Specifically, the area cited by the commenter does not have the necessary infrastructure such as a port, electric stations, etc., needed to support a cogeneration plant. Therefore, this is not a technically viable site for comparison.

Comment 7.9

What outreach to certain community groups has EPA completed to assure the most reliable data-collection method to determine low-population income? What are the requirements for the identification of low-income communities that will be affected by the source?

Response 7.9

EPA used population income data from the most recent U.S. Census (1990). In addition to the public hearing, EPA conducted a public availability session, not otherwise required in the PSD regulations, and extended the public comment period for an additional 30 days to allow for maximum input from the community. In addition, during and after the public comment period, we maintained an ongoing dialogue with members of the public who were seeking documents and explanations of technical materials in the Administrative Record. See also Response 7.1 for a discussion of EPA's analysis with respect to low-income communities.

Comment 7.10

What attempts were made by EPA to determine the affected community and the disproportionate high and adverse human-health environmental effects?

Response 7.10

See Response 7.1.

Comment 7.11

How did EPA identify pockets of low-income communities?

Response 7.11

See Response 7.1.

Comment 7.12

Has EPA Region 2 considered other criteria besides the median income of Puerto Rico for statistical purposes of comparison for low-income communities?

Response 7.12

See Response 7.1.

Comment 7.13

What socioeconomic analysis was done on other communities that will be affected by the proposed project, including wards, barrios and sectors in Guayama, Pozo Hondo, Jobos, Puerto de Jobos, Miramar, Lapa, Cimarrona, Villados, Chun Chin, Santa Ana and Central Aguirre, San Felipe, Mosquito and Coquí in Salinas?

Response 7.13

The barrios and sectors mentioned by the commenter are all located in the municipalities of Guayama and Salinas. However, EPA's EJ analysis was concentrated in Barrio Jobos and Pozo Hondo in Guayama and Barrio Aguirre in Salinas because the projected maximum air impacts from the AES-PRCP facility would be in those areas. While the maximum air impacts from AES-PRCP would be in those areas, these air impacts are meeting the health-based National Ambient Air Quality Standards (see Response 7.1 for a more detailed discussion).

Comment 7.14

Has the absence of official ethnic statistics resulted in EPA Region 2's abstention from classifying Puerto Rico as a minority in its development of environmental justice criteria in Puerto Rico? Are race and minority issues incorporated in the development of guidelines for Puerto Rico?

Response 7.14

The Executive Order (E.O.) concerns itself with addressing environmental justice in low-income populations and minority populations. EPA Region 2 realizes that Puerto Rico presents unique demographical concerns when attempting to do an EJ analysis, because the entire Island or

Commonwealth is predominantly minority (as used in the E.O.). Therefore, it would be difficult to ascertain whether one area or community or barrio was disproportionately more minority than the other. In addition, as the commenter accurately stated, Puerto Rico does not consider race in the Census population data it collects. Nevertheless, the Region can still do an EJ analysis of Puerto Rico utilizing income information.

Comment 7.15

Did EPA Region 2 carry out an analysis of the ethnic and cultural composition of the communities that will be affected by the proposed AES project? Given that official ethnic statistics do not exist in Puerto Rico, has EPA Region 2 decided not to address this issue in this PSD determination? What other criteria were considered to evaluate the impact of the AES-PRCP project on minority groups?

Response 7.15

See Response 7.14.

Comment 7.16

We understand that ethnic discrimination is very different in Puerto Rico than in the U.S., and that EPA Region 2 does not have adequate methodology or instruments available to make the traditional determinations regarding ethnicity and discrimination. Nevertheless, the fact that Puerto Rico does not fit into the U.S. framework for determining ethnic discrimination does not make the issue any less real, or substantiate that discrimination on the basis of color does not exist in Puerto Rico. Cultural and ethnic discrimination are well documented in Puerto Rico. There is a plethora of writing on this topic from highly respected authors (Fernando Pico, Halid Sued Badillo, José Luis González, Isabel Xenón). That the EPA does not have the tools or elements to define ethnic discrimination in Puerto Rico and that EPA therefore chooses to ignore ethnic issues because of the Island's "inability" to conform to established criteria is, unfortunately, another form of discrimination.

Response 7.16

While we are aware that certain forms of ethnic discriminations may exist in Puerto Rican society, EPA Region 2 has not yet determined how to identify Puerto Rican populations based upon color but we can utilize income data to do an effective analysis for EJ purposes. If the commenter wants to submit the literature mentioned, EPA Region 2 will submit it to the Office of Environmental Justice in EPA Headquarters to be considered with respect to the development of a national EPA EJ policy to Identify EJ Areas, and the Region, through our Environmental Justice Coordinator will also consider it.

Comment 7.17

Another obvious issue in the question of environmental justice is language. EPA has developed the following strategies to overcome the language barrier in Puerto Rico: notices and fact sheets in Spanish are published for EPA actions 30 days prior to hearings. The public hearing is simultaneously translated into English and Spanish. However, all of the other technical documents and administrative records relative to EPA decisions are in English. EPA argues that the translation of all documents would not be economically viable. (The proponent of a project must, however, translate all documents submitted to Puerto Rican agencies into Spanish.). Why has EPA determined that Puerto Rico does not warrant minority status on the basis of being non-English speakers?

Again, EPA Region 2 must meet the challenge of the uniqueness of Puerto Rico. The cultural, linguistic, economic, ethnic and political realities of Puerto Rico cannot be ignored and cannot be equitably addressed by consolidating Puerto Rico with other States.

Response 7.17

The Inter-Agency working group established by Executive Order 12898 developed definitions on key terms such as "minority." They defined minority as "individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic." There is no reference in the definition to language as a basis for conferring minority status. However, we recognize, as indicated in Response 7.14, that Puerto Rico presents unique demographical concerns. We hope to address those concerns more directly in future guidance.

EPA is sensitive to overcoming language barriers in communicating with local citizens about permit actions. This is why EPA translated documents that were intended primarily for communication with members of the community such as the public notice and a fact sheet on the project. In addition, EPA provided for simultaneous translation at the public hearing to ensure that all members of the public could fully participate and be heard. Furthermore, EPA extended the public comment period for an additional 30 days to allow for additional public submitted comments in their preferred language (Spanish or English). However, it is the policy of EPA Region 2 (Region 2 Policy on Translations & Interpretations, Order No. R-1500.1) not to provide for translation of legally binding documents or detailed and lengthy technical documents because of the potential for introducing ambiguity or confusion about the intended meaning of the document.

Comment 7.18

What did EPA do to consider the information that was presented in Spanish in the Administrative Record?

Response 7.18

EPA gave equal consideration to comments/documents submitted in Spanish and English. The

complete public hearing transcript was provided to us in both Spanish and English by our contractor. EPA does have technical staff who know Spanish fluently and who have read the Spanish documents submitted and summarized them in this Responsiveness Summary.

Comment 7.19

We live in an era of high technology and we must evolve and participate in it so that we can have a better future for our town in Guayama. We cannot negate to our children a better future with new and better sources of income. If the regulatory agencies determine that the project meets all the regulatory requirements, then I will be the first in defending and promoting such project for the enjoyment of all the people in Guayama and Puerto Rico.

Response 7.19

EPA has found that the project, as proposed, meets all applicable requirements of the Clean Air Act.

Comment 7.20

This project will help increase the municipal budget by approximately 25%. This will help in creating new local projects, new employment and improve the well being of our town.

Response 7.20

EPA does not have information as to the amount of the local taxes that this project will provide. In any event, this was not a factor in our approval of this project. Our approval of this project was based on it meeting all applicable requirements of the Clean Air Act.

Comment 7.21

I support this project and I support even more the company that it represents. This company knows how to respect my people. It has provided us with orientation and trained more than 200 local people [on various construction skills]. It has taken the time to show us its intentions by taking approximately 100 people, the majority from the Guayama area, to visit and witness its existing facilities [in the United States].

Response 7.21

While some local residents may benefit from the training provided, our approval of this project is based on it meeting all applicable Clean Air Act requirements.

Comment 7.22

This project will contribute positively to the economy of Guayama and Puerto Rico. It is estimated that a maximum of 1200 jobs will be created during construction with an average of 680 in its duration. During the operation of the plant, 110 full-time employees will be needed.

Response 7.22

Our approval of this project is based solely on it meeting all applicable Clean Air Act requirements.

Section 8.0 - Health and Other Impacts

Comment 8.1

More than 70% of Puerto Rico's electric energy production comes from the south coast of Puerto Rico, resulting in a disproportionate amount of contamination from the thermoelectric plants. Guayama is second on the island of Puerto Rico for emissions from the Toxics Release Inventory. According to the AES-PRCP site selection criteria, the current status of health of the area residents, and the environmental health impacts of existing facilities did not play any role in the site analysis.

The public schools in the Jobos Ward have been the focus of investigations regarding the disproportionately high effects of these industries and their adverse human health effects, which have been occurring ever since the secondary school opened in 1986. The academic life of the school community has been interrupted on hundreds of occasions due to environmental contamination and several individuals have required medical treatment as a result of the pollution.

The proposed coal plant in Barrio Jobos is not a political issue. It is about children's and people's health. It is about poor people's struggles for a decent environment and a future without pollution. EPA Region 2 has scorned a fundamental issue: people are sick, and pollution plays a major role in their illnesses.

Response 8.1

EPA is very concerned about the health of residents in the potentially-affected communities. This is why we sought to ensure that the health-based NAAQS, which take into account sensitive populations such as children, the elderly and asthmatics, would be met for all criteria pollutants of concern. Furthermore, as stated in Response 7.1, EPA has added permit conditions that require AES-PRCP to conduct SO_2 PSD Increment and NAAQS analyses to re-confirm that there is no existing air quality concern. In addition, in order to be certain that the quality of the air in the community remains safe, we are also committed to ensuring that PM_{10}, NOx and SO_2 monitors are maintained in the potentially-affected areas and that multi-source modeling for SO_2 is conducted within 3-6 months. If any problem is uncovered, EPA and PREQB are committed

to take corrective action in an expeditious manner. Moreover, if the Commonwealth fails to take action, EPA will exercise its authority to require the Commonwealth to do so, as discussed in Response 7.1. Finally, most air toxic emissions (in particular VOCs) which are not regulatorily addressed through the PSD process, will be controlled through combustion controls that the permit requires of AES-PRCP.

Comment 8.2

A health study commissioned by the Puerto Rico Department of Education to continue to investigate the environmental health problems in the Ramona Mendoza Secondary School was carried out by Scientific and Technical Services in 1995. 66% of the students interviewed reported that they did not have health problems before coming to the school. 55% of the sample reported that they had required medical attention after an episode of chemical emissions; of that group, 28% reported that they had been hospitalized. The health symptoms related to the episodes of chemical emissions that were most frequently identified by students were headaches, nausea, sore throat, chest pain, and dizziness. Other symptoms were related to the digestive and nervous system, eyes and skin. The students most frequently described the odors as chemicals, mercaptan, a combination of odors, sewer waters (hydrogen sulfide and ammonia), liquified petroleum gases, diesel and rotten eggs (hydrogen sulfide). School employees were also administered questionnaires. This study recommended an extensive investigation of the different equipment, production processes, generation of waste and combustion of gases at the various facilities in the area.

Does the EPA Region 2 require an investigation as to whether there are abnormal levels of diseases in the affected community associated with environmental factors?

Response 8.2

The PSD regulations address regulated air pollutants other than hazardous air pollutants. The pollutants mentioned by the commenter such as mercaptans, diesel, hydrogen sulfide, etc. are not PSD (criteria) pollutants and are not emitted by a powerplant.

The Ramona Mendoza Secondary School is located 2 km NW of AES-PRCP's site. There is also the José M. Vázquez Elementary School located 1 km from the AES-PRCP site. These two sites are not where the maximum AES-PRCP's ambient impacts will occur. The maximum impacts for PM_{10} will occur near the industrial zone and even in those areas, the maximum impacts will be below the health-based standards.

In response to community concerns about past adverse health impacts at these two local schools from existing facilities, EPA looked at air studies conducted by PREQB in 1991. The studies, conducted for one week each in two schools in Jobos, were designed to find the cause of the reported odors at these schools. The studies utilized Tenax Cartridges that are capable of detecting 19 compounds. These compounds are carbon tetrachloride, benzene, chlorobenzene, ethyl benzene, toluene, xylene, 1,2-dichloropropane, 1,3-dichloropropane, 1,2-dichloroethane,

1,1,1-trichloroethane, tetrachloroethylene, trichloroethylene, cumene, n-heptane, 1-heptene, bromoform, ethylene dibromide, bromobenzene and chloroform. The cartridges were analyzed using sophisticated scientific methods called gas chromatography and mass spectrometry. The results of the studies showed no chemical concentrations of these 19 compounds above 1 ppm in the air at either school. The detection limit for the Tenax Cartridges is 1 ppm. The Occupational Safety and Health Administration (OSHA) and/or National Institute for Occupational Safety and Health (NIOSH) have set maximum permissible/recommended exposure limits greater than or equal to 1 ppm for 16 of the 19 compounds. Two of the remaining compounds, bromobenzene and 1-Heptene, do not have set maximum exposure limits. For the last chemical compound, bromoform, the maximum exposure limit is 0.5 ppm on a time-weighted average of up to 10 hours. Although it appears that these chemicals were not present at harmful levels, the PREQB studies recommend that additional studies be performed in the area regarding odors.

Comment 8.3

Two health studies, one commissioned by the Puerto Rico Energy Affairs Commission (done by Hermes International) and one by the Puerto Rico Department of Education (done by Scientific and Technical Services) apparently form part of the administrative record. Did EPA consider this data about the health status of these residents? How did EPA consider the data from these studies, that are written in Spanish, as part of its determination that this community does not have disproportionately high and adverse human health and environmental effects?

Response 8.3

EPA, in this permit decision, did consider these two studies and the recommendations made. The first study was done in September 1995 by the Puerto Rico Energy Affairs Commission which retained a contractor named Hermes International Corp. to conduct a preliminary health study on the environmental problems occurring in the Ramona Mendoza Secondary School and the José M. Vázquez Elementary School in Barrio Puente Jobos in Guayama. The health study consisted of, among other things, the gathering of emergency hospital logs which contained data on the age of the student/teacher who received treatment at the hospital after an odor episode, what symptoms the patients experienced, the hospital diagnosis and the treatment provided to the patient each time an odor episode occurred. In addition, the study also compiles the frequency of the physical symptoms experienced such as headaches, vomiting, coughs, fatigue, eye irritation, throat irritation and other, etc. The study concludes that these two schools were experiencing a series of environmental incidences where students and teachers were exposed to nauseous odors and that in spite of the numerous studies conducted, it has not been possible to determine the cause of these physical symptoms. It recommends that further studies be conducted. Furthermore, it also provides a preliminary recommendation that a monetary fund be created by the industrial facilities in Barrio Jobos to fund the creation of a “forest belt” built on the west and northwest of the facilities to protect the communities from pollution and to trap carbon dioxide emissions. The fund would also be used to pay for additional health and environmental studies in the area.

The other report we considered was prepared by Servicios Científicos y Técnicos in June 1995 entitled "El Problema Ambiental de la Escuela Ramona Mendoza Santos de Guayama" for the Department of Education. The report lists the industrial facilities that are located in Guayama with a listing of possible chemicals emitted from those facilities. It also includes the physical characteristics and the health-related effects of some of the chemicals such as benzene, methylamine, xylenes, kerosene, methyl mercaptan, diesel, and toluene. It also contains the results of a survey of a number of students/teachers as to what physical symptoms they have experienced during an odor episode. Among the recommendations this report makes include: conduct additional studies on the causes of the odor and the existing facilities; conduct a more complete health study of the schools and community; inspect the control equipment of the existing facilities; propose alternative emissions controls for the facilities which are more efficient and will reduce the odor episodes; install air conditioners in the classrooms to help reduce the incidents of odors; contract out the services of a nurse who will give first aid in the school in case of another odor episode, etc.

PREQB has not been able to identify the problem in the air sampling studies that they have conducted (see Response 8.2 for more information on this). It should be noted, though, that these odor incidences might not be isolated cases in the area since reportedly, a February 13, 1995 San Juan Star article by Douglas Zehr stated that 30 schools on the island were found to be affected by bad odors since 1993 (it was also reported that, according to PREQB officials, in the majority of these cases the odors may have originated from school facilities such as poorly stored chemicals in science labs, poorly maintained bathrooms, propane gas leaks, etc.). However, EPA's plan to address the concerns raised by the commenter are detailed in the Measures to Re-Confirm NAAQS Attainment Status section of Response 7.1.

Comment 8.4

Guayama is second on the island of Puerto Rico for emissions from the toxic release inventory. Does EPA know about the health problems relating to environmental factors in Guayama, particularly in Jobos? Particularly at the local public schools?

Response 8.4

With respect to the number of TRI facilities, out of the 78 municipalities in Puerto Rico, Guayama is in the top dozen or so municipalities on the Island with the largest number of TRI facilities and it is the fifth municipality in terms of the total amount of toxic releases into the air and water. EPA is aware of complaints and studies done in Guayama by the Puerto Rico Department of Education, Servicios Científicos y Técnicos, and PREQB. However, EPA is not aware of any conclusive data from these studies as to the origin of these odor episodes. These reports do not blame criteria pollutants for these episodes. The PSD permit being issued today regulates only criteria air pollutants. Nevertheless, EPA has provided measures to re-confirm the NAAQS attainment status (see Response 7.1).

Comment 8.5

Are the documented events of emergency evacuations from the schools as a result of environmental factors part of the AES-PRCP Administrative Record for a PSD permit?

Response 8.5

They are part of the AES-PRCP PSD Administrative Record. However, there are no indications that the evacuations were due to exceedances of the National Ambient Air Quality Standards. The students, most frequently, described the odors as chemicals, mercaptan, a combination of odors, sewer waters (hydrogen sulfide and ammonia), liquified petroleum gases, diesel and rotten eggs (hydrogen sulfide). These pollutants are not emitted by a coal-fired powerplant.

Comment 8.6

The analysis presented by AES-PRLP is not complete because it does not consider synergistic aspects that are necessary for EPA and the PREQB to keep in mind, such as the increased in the cancer rate directly related to environmental pollution.
Response 8.6

See Response 5.15.

Comment 8.7

Our sector is one that is highly contaminated already by the various industries that surround us. I think that if we were to add another industry, the situation will be worsened.

Response 8.7

EPA is concerned with protecting the health of residents in the potentially-affected communities. EPA looked at the maximum impacts of all criteria pollutants of concern and determined that AES-PRCP's maximum impacts were below thresholds of concern, called significant impact levels, for all pollutants except particulate matter under 10 microns (PM_{10}). With respect to PM_{10}, AES-PRLP conducted a multi-source modeling to determine AES-PRCP's combined effects with other industrials facilities in the area. The modeling analysis demonstrated that PM_{10} levels were well within the health-based NAAQS and PSD increment. EPA looked at other data as well, including the Island-wide distribution of industrial facilities. We concluded that while Guayama is in the top 12 municipalities or so with the largest number of TRI facilities sited and it is the top fifth municipality in terms of the total amount of toxic chemical releases into the air and water, there is no data on toxicological impacts from these facilities. See Response 7.1 for more details.

Comment 8.8

AES-PRCP's source of water must be made clear in the application. We believe that the source

of water will be Patillas Lake. This lake provides water to Guayama. Since millions of gallons of water will be extracted from this lake, the towns of Patillas, Arroyo and Guayama as well as the local agriculture will be affected.

Response 8.8

The PSD permit is an air permit that does not regulate the source of water for the facility. However, AES-PRCP's air permit application includes a bulletin in Spanish that addresses this issue. According to the bulletin, AES-PRCP proposes to use 6 million gallons of water per day. The source of this water will be supplied by the waste water treatment plant in Guayama, Phillips Core, the Fibers Superfund site and/or the Patillas Lake. Water from the Patillas Lake will be extracted only during emergency situations and should not even exceed 2 million gallons per day.

Comment 8.9

Section IV.D.3 of the New Source Review Workshop Manual requires an analysis of the BACT in terms of other environmental impacts, including solid or hazardous waste generation. Site-specific circumstances must be considered. The permit application in question does not address the ash to be generated in terms of BACT.

Response 8.9

Coal ash generated from circulating fluidized bed boilers is not considered to be a hazardous waste. In fact, because of its non-reactive physical and chemical properties this ash can be used in the manufacturing of cement. The PSD permit for AES-PRCP addresses ash handling as a potential source of fugitive emissions. Therefore, work practices requirements were included in the permit under Condition XIII.4.

Comment 8.10

If the Prevention of Significant Deterioration (PSD) permit is issued to the AES project, EPA will be making a mockery of the Declaration of the Environment Leaders of the Eight on Children's Environmental Health that was signed by the U.S. Government in Miami, Florida on May 6, 1997. Among other things, it stipulates:

> - Childhood asthma and other pediatric respiratory ailments are increasing dramatically in our countries and are substantially exacerbated by environmental pollutants in the air, including emissions from fossil fuel combustion and other sources.
>
> - We undertake to reduce air pollution in our respective countries, which will alleviate both domestic and transboundary impacts of air quality and, particularly, children's

health.

Response 8.10

Consistent with President Clinton's April 21, 1997 Executive Order 13045, Protection of Children From Environmental Health Risks and Safety Risks, EPA considers it a "high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children." EPA believes that issuing this PSD permit to AES-PRCP is not inconsistent with the Executive Order or with the Declaration of the Environmental Leaders of the Eight on Children Environmental Health cited, as submitted by the commenter. While the Clean Air Act allows for new source growth, it ensures that human health is protected by requiring that new major facilities be controlled utilizing best available control technology level (BACT) and that the air quality analysis submitted by the permit applicant demonstrates that the facility will meet all applicable Clean Air Act requirements.

Furthermore, the area currently meets all applicable NAAQS. With the Clean Air Scientific Advisory Committee (CASAC), a Congressionally-mandated group of independent scientific and technical experts, EPA develops a criteria document that provides an analysis of sensitive populations such as children, the elderly and asthmatics. The health-based NAAQS take into account such sensitive populations. See also Responses 7.1 and 10.10.

Comment 8.11

In the document titled," Inventory of Puerto Rico Greenhouse Gas Emissions and Sinks": 1990-1994, pages 16-20, identifies that the activity of generating electric power is over half the carbon dioxide contributor in Puerto Rico.

Response 8.11

While it is true that electric generating powerplants do generate carbon dioxide, a cogeneration plant has a greater thermal efficiency and thus, it generates less carbon dioxide per usable energy than older powerplants.

Moreover, in response to mounting concern over the potential risk posed by global warming, the Framework Convention on Climate Change was opened for signature at the Rio Summit on Environment and Development in June 1992. The U.S. was the fourth nation overall, and the first industrialized nation, to ratify this landmark accord. Under this treaty, the world's industrialized nations pledged to establish policies and measures that reduce emissions of the greenhouse gases that are changing the Earth's climate. At this time, there are no specific requirements that would impact the PSD permit review process.

Comment 8.12

Commenter opposes the AES-PRCP. Commenter quotes various science books regarding

damages to the environment and to the human body caused by the pollutants being emitted in a coal-fired power plant. Commenter also asks that the public be educated in conserving electric energy and that renewable sources of energy, such as sunlight, be used to produce electricity.

Response 8.12

EPA is aware of the adverse effects that the various criteria pollutants can have on the environment and the human body. In fact, Congress has required that EPA establish National Ambient Air Quality Standards in order to protect the health and welfare of the public especially sensitive populations such as children, the elderly and asthmatics. The PSD regulations require us not to issue the PSD permit if this facility causes a violation of the National Ambient Air Quality Standards. Also, see Response 7.1 to see what additional steps EPA has taken to protect the residents in the affected communities.

With respect to conserving electric energy, EPA conducts public outreach in the dissemination of ideas that will conserve energy usage and will promote the use of renewable sources of energy under EPA's Green Lights program. See Response 10.17 for more information on the Green Lights program.

Comment 8.13

There is reason for concern in Guayama regarding poor air quality with possible health effects due to air contamination. If another potentially contaminating industry is allowed into the area, the reaction products of various sources of contamination could have noxious effects on health even though threshold levels for individual contaminants are within EPA and local standards. As you know, it is very difficult to study the interaction of various sources of contamination. The experimental studies performed to date are with exposure to ambient levels of one contaminant such as ozone or sulfur dioxide and its effect on a healthy young subject. What is the effect on exposure to multiple contaminants and what may be the effect on subpopulations such as infants, young children or asthmatics? What is the risk of synergistic effects of multiple contaminants causing an increased incidence of cancer, congenital defects, respiratory disorders, etc. in individuals living in an area where there is exposure to multiple contaminants akin to the documented increased risk of lung cancer and mesothelioma seen in workers exposed to asbestos and cigarette smoke?

Response 8.13

See Responses 7.1, 8.12 and 10.10.

Comment 8.14

The technology proposed by AES-PRCP is a by-product of the "Clean Coal Technology Program" of the Department of Energy. The proposed AES plant in Guayama will produce three times the energy of other AES plants in the United States (454 MW compared to 180 MW). Will

the pollution control devices work as efficiently such as a large capacity plant? Will Guayama be the trial location for this large scale project whose long term health effect will be known in the next generation? This reminds me of the experiments performed by Nazi Germany on prison populations without consent at the cost of many lives and which resulted in the Nuremberg Principles on Ethics in Human Experimentation or the recent apology of President Clinton to black WWII veterans who were involved in an experiment at an Alabama VA Hospital in which they were denied treatment from syphilis without their consent to evaluate the natural history of the disease. Barrio Jobos of Guayama like the above examples is a poor, vulnerable, mostly black community which has been neglected by the government for years and a victim of environmental contamination.

Response 8.14

Pollution control devices are sized according to the unit's capacity. That is, a larger facility will have a relatively larger pollution control device than a smaller facility. In the United States, there are powerplants with much larger electrical generating capacity than the one proposed by AES-PRCP (e.g., >850 MW) with properly working pollution control devices. This is not a "trial location" as the commenter states. EPA evaluates permit applications as we receive them and there is no agenda to test new or established technologies in any particular community. Any violations of the permitted emission rates will be detected through the continuous emission monitors (CEMs) and will be addressed by the enforcement agencies. See also Response 1.2.

Comment 8.15

We need to find a way to prevent the electric energy crisis forecast for the year 2000. In 1990, the electrical power interruptions reached approximately 250 hours. In 1994, the shortage in power generation required power interruptions for 56 hours during an 8-month period. The largest power interruptions amounted to 200 and 300 MW (10% of the maximum power demand experienced by PREPA). In order to achieve the objective of long-term power reliability, PREPA needs a reserve margin of approximately 75% of the power demand or 2,100 MW. This is because Puerto Rico is an island and cannot rely on a grid [like in the mainland United States] to provide electric power in case of an emergency. Therefore, I support this project. Also, we must consider new ways to produce electricity since the price of a barrel of oil [the main fuel used to produce electricity in Puerto Rico] has increased.

Response 8.15

Electrical power needs and fuel diversification were not criteria used by EPA in approving this project. Approval of this project was based on it meeting all applicable requirements of the Clean Air Act and policies on matters such as environmental justice.

Section 9.0 - Attachments I and II of the Draft PSD Permit

Comment 9.1

The third and fourth sentences of the section entitled "General Project Description", should be revised to read, "This cogeneration facility will consist of two bituminous coal-fired circulating fluidized bed (CFB) boilers which together will have a maximum heat input rate of 4,922.7 million British Thermal Units per hour (MMBTU/hr) at 105% maximum continuous rating (MCR). In addition, each CFB will be capable of generating approximately 1.8 million lb/hr of steam at 2,400 psig and 1,000°F at the superheater outlet."

Response 9.1

These changes are typographical corrections/clarifications to the description of the project. The changes have been made.

Comment 9.2

The third sentence of the third paragraph of the section entitled "General Project Description," should be revised to read, "The applicant also proposes to include a diesel generator, a diesel-engine driven feed water pump and a diesel-engine driven fire water pump to ensure the safe operation and shutdown of the cogeneration facility in the unlikely event of a complete loss of offsite power."

Response 9.2

The word "fired" was replaced with the word "feed." EPA agrees with the change.

Comment 9.3

The second sentence of the section entitled "Coal and Limestone Receiving and Handling Systems" should be revised to read, "The coal will be transported by overland conveyor approximately 3,800 feet to the site and stored in on-site stockpiles."

Response 9.3

These changes are typographical corrections/clarifications to the description of the project. The changes have been made.

Comment 9.4

The heading of the section entitled "Limes Receiving and Handling System" should be revised to read "Lime Receiving and Handling System."

Response 9.4

This typographical error has been corrected.

Comment 9.5

The first sentence of the section entitled "Limestone Storage" should be revised to read, "A 20-day inactive supply of limestone will be stored in a roofed storage area. The inactive supply is intended for use in the event of a limestone delivery interruption. In addition, a 1.75 acre active storage pile will be used to store limestone as it is reclaimed for transfer to the limestone crusher."

Response 9.5

These changes are typographical corrections/clarifications to the description of the project. The changes have been made.

Comment 9.6

The first bullet point of description of fugitive dust emissions in the section entitled "PSD-Affected Pollutants Emitted at the AES Puerto Rico Cogeneration Project and Their Potential to Emit" should be revised to read, "unloading or loading of ships or trucks." AES-PRLP does not intend to transport materials by rail during the operation of the facility.

Response 9.6

These changes are typographical corrections/clarifications to the description of the project. The changes have been made.

Comment 9.7

Item 2 of Section VI should be revised to read, "Distillate oil with a maximum sulfur content of 0.05% sulfur by weight (startup and emergency equipment fuel)."

Response 9.7

These changes are typographical corrections/clarifications to the description of the project. The changes have been made.

Comment 9.8

The heading of Section VIII should be revised to read, "Best Available Control Technology (BACT) and Emission Limitations for Circulating Fluidized Boilers (CFBs). AES-PRLP

recommends the words “each of the two” be deleted because certain of the limits provided in this section apply to each boiler, such as lb/MMBTU, opacity, and ppmvd limits, while the lb/hr limits apply to total emissions from both boilers. The text of this section should be clarified to reflect this distinction.

Response 9.8

Commenter is correct in that some of the limits apply to a single boiler while the lb/hr limits apply to the total emissions from both boilers. To avoid confusion, the lb/hr limit will be halved so that the emission rates only apply to a single boiler.

Comment 9.9

Section VIII provides CFB boiler emission limits for nitrogen oxides, carbon monoxide, sulfur dioxide, sulfuric acid mist, and volatile organic compounds in ppmvd (corrected to 7% oxygen), lb/hour, and lb/MMBTU. Applicable new source performance standards are expressed in lb/MMBTU, not ppmvd. In addition, EPA’s RACT/BACT/LAER clearinghouse, which serves as a starting point for determining the required level of emissions, reports emissions data for coal-fired sources in primary units of lb/MMBTU. A ppmvd emission limit, corrected to 7% oxygen is equivalent to a lb/MMBTU emission limit and, thus, redundant. AES-PRLP was unable to find any regulatory basis for including ppmvd emission limit when a lb/MMBTU limit is already required. For these reasons, AES-PRLP would propose the ppmvd emission limits in Items 2-CFB, 3-CFB, 4-CFB, 5-CFB, and 7-CFB be deleted.

Response 9.9

It has been EPA practice that more than one expression of emission rates or enforceable limits are included in PSD permits. Since continuous emission monitors, which will be installed in each of the circulating fluidized bed boilers, measure concentration (ppmdv), EPA does not see a reason why this limit should be deleted from the final permit.

Comment 9.10

Section IX provides emission limits for the limestone dryer in ppmdv (corrected to 7% oxygen), lb/hour, and lb/MMBTU. For the same reasons discussed in Comment 9.9 above, AES-PRLP proposes the emission limits expressed in ppmvd be deleted. Alternatively, if the emission limits expressed in ppmvd remain in the permit, they should be changed to the following values:

5-LD	nitrogen oxides	96 ppmdv
6-LD	carbon monoxide	21 ppmdv
8-LD	volatile organic compounds	18.4 ppmdv

Although AES-PRLP did provide EPA with the values included in the draft permit in a letter dated February 13, 1997, these values had not been corrected to 7% O_2. Please note these

changes do not affect the lb/MMBTU values originally provided in the permit application, which are equivalent to ppmvd emission levels when corrected to 7% oxygen, and were used in all analysis provided in the application.

Response 9.10

After reviewing the comment on this issue, EPA agrees to remove the ppmdv values for the limestone dryer but not for the reasons stated in Comment 9.9. EPA has made this decision because of the fact that the limestone dryer burns propane (a clean fuel) and the permit does not require AES-PRCP to install continuous emission monitors on the limestone dryer; so ppmdv limits would not serve a useful purpose in this case. Please note that EPA is still requiring the ppmdv limits for the fluidized bed boiler, where there are continuous emission monitors (CEMs).

Comment 9.11

Item 1-LD of Section IX indicates the limestone dryer operation will be limited to 12 hours of operation per day. Although Table 5-1 of the PSD permit application indicates that the limestone dryer will be operated a maximum of 4,380 hours per year, dispersion modeling was based upon 24 hours per day of operation for short term impacts and a 50% annual capacity factor for annual impacts. Therefore, operation of the limestone dryer should not be limited to 12 hours per day. Instead, AES-PRLP would like to propose the limestone be limited to a 50% capacity factor, calculated on an annual basis, which is equivalent to 4,380 hours of operation per year.

Response 9.11

EPA sees no problem with this proposal since it complies with the operating data included in the modeling analysis. The requested change has been made.

Comment 9.12

Item 2-CT.a of Section X should be revised to read. “Emissions of PM shall not exceed 15 lb/hour. Emissions of PM_{10} shall not exceed 0.37 lb/hour.” These limits were derived using the following methodology. Cooling tower drift consists of water droplets, containing dissolved solids, which are entrained in the air flow through the tower and carried out to the atmosphere. These droplets are produced within the tower by mechanical forces such as impaction with the tower fill material and air sheering. These mechanisms tend to produce large water droplets. The water droplets will contain up to 12,000 ppm of total dissolved solids (TDS) based control of cooling tower operation.

The PM emission rate of 15 lb/hr includes all dissolved solids in the cooling tower drift even though many of these large particles (greater than 100 um diameter) will fallout on the AES-PRCP site. The calculation for PM emissions is shown below:

PM = 250,000 gpm x 500 lb/hr per gpm x 12,000 particle of PM/1,000,000 particles of water (total dissolved solids,TDS) x 0.00001(0.001% drift, design specification) = 15 lb/hr

(500 lb/hr per gpm = 8.33 lb/gal x 60 min/hr.)

The PM_{10} emission rate is conservatively based on the assumption that each droplet smaller than 100um diameter will form a PM_{10} particle. Vendor data shows that 2.47% of the droplets will be smaller than 100um diameter. Therefore, PM_{10} emissions are calculated as shown below:

PM_{10} = 15 lb/hr x 0.0247 = 0.37 lb/hr

Response 9.12

EPA agrees with the proposed changes. However, this PM_{10} value was subsequently changed to 0.33 lb/hr. See EPA Item 9.26 for additional information.

Comment 9.13

Item 2-ST of Section XI indicates there will be a limit placed on the number of turnovers per year allowed for the startup fuel tank. Since PREPA has the right to dispatch the facility at its discretion, AES-PRLP has no control over how many startups will be performed in any given year. Therefore, due to its inability to control the number of startups and the relatively small amount of VOC emissions associated with each turnover, AES-PRLP proposes this maximum limit be deleted from the permit.

Response 9.13

Since VOC is a PSD-affected pollutant, a best available control technology (BACT) limit must be imposed on all units that emit VOCs within the facility. Given the fact that the commenter did not provide an alternate number of turnovers together with a rationale, EPA has decided to maintain the same number of turnovers as required in the PSD permit.

Comment 9.14

Item 1.b of Section XIV indicates that a monitoring system to measure stack gas volumetric flow rate should be installed. The purpose of this monitor is to provide data that can be used to calculate mass emission rates on a lb/hour basis from monitored SO_2 and NOx concentrations. However, compliance with the mass emission rate limits in the permit application can be verified by using monitored data for emission rates on a lb/MMBTU basis and calculated plant heat input data on a MMBTU/hr basis. Therefore, AES-PRLP requests that Item 1.b of Section XIV be replaced by a requirement to calculate plant heat input.

Response 9.14

In principle, EPA has no objection in allowing an alternative monitoring system than the one required in Item 1.b of Section XIV, provided we can get representative data. However, before EPA would agree to the alternative methodology of calculating the plant heat input, EPA would like to review the specific measurements and procedures that will be used to calculate the heat input.

AES-PRCP provided additional information stating that the energy output from the plant will be determined by monitoring electrical output (MW) and steam output (lb/hr). These will be converted to MMBTU/hr using standard factors and knowing the steam temperature and pressure. Plant efficiency (MMBTU out per MMBTU in) will be based on vendor guarantees, initial acceptance test and periodic verification using ASME Power Test Code 4.1. While this seems acceptable, EPA will still need additional information regarding the QA/QC and other aspects of the procedure. However, EPA believes that these issues can be addressed when the company submits the stack test protocol. Therefore, EPA has decided to revise the final permit to indicate that EPA may accept an alternative method provided that EPA is satisfied that the data that will be obtained will be representative.

Comment 9.15

Item 1.c of Section XIV indicates a continuous monitoring system should be installed to measure oxygen. The purpose of the oxygen monitor is to allow calculation of emission rates on a lb/MMBTU basis from monitored SO_2 and NOx concentrations. Emissions can be calculated on a lb/MMBTU basis by monitoring either CO_2 or O_2 as specified in 40 CFR Part 60 Appendix A Method 19. Therefore, AES-PRLP requests that the permit be revised to state "...measure carbon dioxide or oxygen."

Response 9.15

EPA agrees with the proposed change. The change has been made in the final permit.

Comment 9.16

Item 1-CFB d. of Section VIII provides that control efficiency of particulate matter emissions shall be established during all particulate performance testing. In this regard, AES-PRLP proposes that Item 4.d of Section XV be clarified to read, "Performance tests for the emissions and control efficiency [add these words] of PM shall be conducted using 40 CFR Part 60, Appendix A, Method 5." The test method listed in 4.g of Section XV is not correct. The method should be "25" not 25A."

Response 9.16

EPA agrees with first part of the comment and agrees with the proposed changes. (See also Response 2.6 for additional information regarding PM_{10}.) However, with respect to the use of Method 25, this method is not sensitive enough at concentrations below 50 ppm. Therefore, we

cannot accept this method. Unless the sensitivity of Method 25 improves so that it can be used by the time the facility is proposing to actually stack test, we have amended the PSD permit to require that both Method 25A (which measures VOCs and methane) and Method 18 (measures methane only) be used. To determine the VOC concentration, we will subtract the results of the second test from the results of the first test.

Comment 9.17

Item 4.j of Section XV contains a performance test method for verifying lead emissions from the CFB boilers. AES-PRLP would like to propose the subsequently promulgated EPA Reference Method to replace the method currently written in the draft permit. The revised section would read as follows, "Performance tests for the emissions of lead shall be conducted using EPA's 40 CFR Part 60, Appendix A, Method 29."

Response 9.17

EPA agrees with the proposed change. The changes have been made.

Comment 9.18

Item 4.k of Section XV should be clarified to indicate AES-PRLP will conduct performance tests for the drift rate on two of the cooling tower cells.

Response 9.18

EPA agrees with the proposed changes. There is no need to conduct the test on all the identical cells. The changes have been made.

Comment 9.19

Item 4 of Section XVI contains requirements for Preconstruction PSD Increment and NAAQS Modeling Analyses. Since this activity will be occurring simultaneously with the commencement of construction of the facility, AES-PRLP would like to propose the word "preconstruction" be replaced with preoperational throughout this subsection.

Response 9.19

EPA agrees that the word "preconstruction" in the heading is misleading in Item 4 of Section XVI. The operative requirement of this section is in Condition 4.d. which states that AES-PRCP must submit the modeling analyses to EPA within 3-6 months of the effective date of this permit. Therefore, to avoid any confusion, EPA has decided to remove the word "preconstruction" from the heading. The revised heading for this section will now be: PSD Increment and NAAQS Modeling Analyses.

Comment 9.20

Attachment III of the draft PSD permit consists of a table which provides the projected maximum air quality impacts of the AES-PRCP. The heading of the sixth column should be revised to read, "AES-PRCP + Background Sources." In the sixth column of table on the CO line, the numbers 140.3 and 200.5 should be deleted and be replaced by "Not Calculated."

Response 9.20

EPA agrees that this was a typographical error. The change has been made.

Comment 9.21

AES-PRLP proposed an annual capacity factor limitation of 95% for the AES-PRCP facility. "Annual capacity factor" means the ratio between the actual heat input to the steam generating units from fuel use during a period of 12 consecutive calendar months and the potential heat input to the steam generating units from fuels had the steam generating units been operated for 8,760 hours during that 12-month period at the maximum design heat input capacity of 4,922.7 MMBtu/hr. Therefore, a maximum annual capacity factor of 95% means fuel use will not exceed 40,966,709 MMBtu during a period of 12 consecutive calendar months. Considering this definition of annual capacity factor, AES-PRLP proposes the following language be included as a permit condition; "The facility shall not exceed a maximum annual capacity factor of 95% during any period of 12 consecutive months. Compliance will be demonstrated by limiting facility fuel use to a maximum of 40,966,709 MMBtu during any period of 12 consecutive months."

Response 9.21

EPA agrees with the proposed restriction since AES-PRCP's modeling was based on a 95% annual operating capacity factor. This new condition has been incorporated into Condition XVI. 6 "Maximum Annual Capacity Factor." Additional requirements for recordkeeping have also been included.

Comment 9.22

In May 1996, AES remodeled the ambient air quality analysis at an increased heat input rate. They proposed a 95% annual operating capacity factor as the new permit limitation. In response to inquiries regarding operational limitations at the Availability Session held in Guayama, Permitting Chief Steven Riva confirmed that all modeling analyses were performed based on a 95% capacity factor, that this limit was accepted but was inadvertently omitted in the draft permit.

We tried on more than five separate occasions to confirm the exact number of hours that should have been included in the permit, but EPA has failed to respond to any of these queries during

the public comment period. The New Source Review Manual states that "the permit conditions must be clear, concise and independent of one another such that enforceability in never questionable" (Appendix c.5). Operational limits should include all restrictions that are limits on a source's capacity utilization. EPA Region 2's unresponsiveness during the public comment period has hindered public access to pertinent information.

Response 9.22

Since the air quality modeling performed by AES-PRCP was based on a 95% annual operating capacity factor, the final PSD permit must include this restriction. This permit condition was inadvertently omitted from the draft permit. At the end of the public comment period, AES-PRCP proposed such a condition, which we agreed to after we reviewed it. This new condition has been incorporated in the final PSD permit under Section XVI, Item 6. See Response 9.21 for additional information.

Comment 9.23

Would mass emissions testing be required for compliance with permit conditions?

Response 9.23

Yes. All mass emission testings requirements are included in Section XV. of Attachment II of the final PSD permit under "Performance Test Requirements."

EPA Item 9.24

Under Condition XVI.4 "Preoperational PSD Increment and NAAQS Modeling Analyses," EPA has made the following change to the first paragraph: AES-PRCP shall conduct air dispersion modeling analyses of the Prevention of Significant Deterioration of Air Quality (PSD) Increments and National Ambient Air Quality Standards (NAAQS) for SO_2 which involves the combined impacts from other nearby existing sources impacting AES-PRCP's Significant Impact Area. The underlined words have been deleted due to the fact that AES-PRCP does not have a significant impact area for SO_2.

EPA Item 9.25

Permit Conditions VIII.1-CFB.a.1, a.2, and a.3 have been modified. See Comment 2.6 for more details.

EPA Item 9.26

As a result of a November 26, 1997 letter from AES-PRLP informing EPA of several design changes in the project, changes were made to the final PSD permit. The project changes include: 1) retaining a new CFB boiler manufacturer; 2) installation of two additional material handling

transfer towers in the port unloading area along with an additional 500 feet of conveyor; and selection of a different cooling tower. The changes to the PSD permit are as follows:

1) The new cooling tower will have a lower water circulation rate (225,000 gallons/minute) than the tower in the PSD application (250,000 gallons/minute) and thus, a lower PM_{10} emission rate (0.33 lb/hour compared to 0.37 lb/hour). Consequently, Attachment I, Cooling System circulating water flow is reduced from 250,000 gallons/minute to 225,000 gallons/minute. In addition, Section X, 2-CT, a: the PM_{10} emissions are reduced from 0.37 lb/hr to 0.33 lb/hr.

Section 10.0 - Administrative and Other Miscellaneous Issues

Comment 10.1

We object that the commenters have only ten minutes per person to give an oral presentation at the public hearing. These people have the rest of their lives in Guayama possibly to continue with this contamination. Ten minutes is not sufficient time to give a presentation.

Response 10.1

The purpose of the public hearing is for the agency to gather new information from members of the public. We believe that a 10-minute limit for each oral presentation was adequate. Moreover, commenters had the opportunity to follow up with written comments. Finally, there was a separate public availability session held on May 21, 1997 that gave the public an additional opportunity to address EPA.

Comment 10.2

Commenter claims that the Supreme Court of Puerto Rico has been paralyzed debating the issues of this project for over a year, and now, the EPA issues a draft permit that is not necessary or urgent so as to send a message of pressure to the Supreme Court of Puerto Rico.

Response 10.2

The PSD proceedings are independent of any other proceedings that might be taking place with respect to this project. EPA's decision on this project is based solely on the applicable Clean Air Act requirements and is not intended to send any form of message regarding other legal requirements or actions. [On June 29, 1998, the Supreme Court of the Commonwealth of Puerto Rico issued a decision on the AES case.]

Comment 10.3

Given that the validity of the siting permit for this facility has been challenged by heterogeneous

groups and scientists, this section of the application cannot be considered complete or valid until a final section from the Puerto Rico judicial system is returned. The draft permit was therefore issued using an application with incomplete data.

Response 10.3

EPA deemed the PSD permit application complete as of September 18, 1996. That is, the application has enough information so that the permitting authority can make a determination to approve or disapprove the permit with respect to the Clean Air Act requirements. Therefore, there is no reason to wait for the Puerto Rico Supreme Court decision. In addition, there is a statutory requirement to make a final determination within one year of permit application completeness.

Comment 10.4

Commenter fears that the EPA and the PREQB have been very lax in enforcing current air and water quality standards. For example, the relatively small fines assessed by the EPA against PREPA for repeated violations over the years of air quality standards.

Response 10.4

EPA and PREQB have very active enforcement programs in Puerto Rico and have available a number of enforcement options in the event of violations at the facility.

Comment 10.5

The public policy established in the National Energy Conservation Policy Act (codified, as amended, in 15, 42 and 49 U.S.C.) provides for limits in the establishment of cogenerations and also provide for discretionary judgement in establishing cogeneration projects in areas where there are schools and hospitals 42 U.S.C. 6371(k) and 6371(e) (1982).

Response 10.5

While it is true that Title III of the National Energy Conservation Policy Act (NECP) addresses energy efficiency in schools and hospitals, it is not clear from commenter's citations how NECP in any way limits construction of cogeneration plants near schools and hospitals. Moreover, commenter has not presented any information to suggest that the PSD permitting requirements of the Clean Air Act, as implemented in AES-PRCP's permit, are in any way inconsistent with the NECP.

Comment 10.6

How will the fluorine content of the fuel be measured?

Response 10.6

Fluoride emissions will be stack tested once the facility starts operation. Subsequently, the fluorine content of the coal will be monitored on a monthly basis so that total fluoride emissions from the facility do not exceed 9.8 tons/year. The fluorine content of the coal will be measured using the most current applicable ASTM method. See Permit Condition XVI.2.b.

Comment 10.7

Is the dust collection at the transfer sites for active coal piles defined as BACT?

Response 10.7

Yes. It is a work practice/control intended to minimize particulate emissions.

Comment 10.8

Will Method 9 visual emissions readings be included in the compliance schedule?

Response 10.8

EPA Reference Method 9 has always been an acceptable alternate method to determine a facility's compliance with the opacity standard whether or not it is listed in a permit. In any event, the draft permit contained such condition and has been kept in the final PSD permit. See Permit Condition XV.4.m. of Attachment II.

Comment 10.9

Were the emissions from connecting and transporting the steam to the host included in the calculations?

Response 10.9

There are no air emissions associated with the connection and transportation of steam to the host facility.

Comment 10.10

At what point would the proposed facility have to comply with newly proposed ozone and $PM_{2.5}$ standards?

Response 10.10

There are no areas in Puerto Rico which are in nonattainment of the existing 1-hour ozone standard. Compliance with the newly adopted 8-hour standard will be determined by measurements during the 1997 to 1999 period. In 2000-2001, the Administrator will make determinations of whether the new 8-hour ozone standard is being attained. In the interim, the existing designation of attainment for ozone will apply throughout Puerto Rico for PSD, new source review purposes.

With respect to $PM_{2.5}$, ambient monitoring data must be collected from appropriately designed $PM_{2.5}$ monitors. Monitoring will begin for $PM_{2.5}$ during 1998 and 1999, after which three years of data will be collected. Starting in 2002, the Administrator will begin to designate areas based on the measured air quality data collected over 3 years. A high priority has been placed on the establishment of the necessary $PM_{2.5}$ monitoring sites nationwide. Until this information is collected, EPA believes that sources should continue to meet PSD and new source review program requirements for controlling PM_{10} emissions (and, in the case of PM_{10} nonattainment areas, offsetting emissions) and for analyzing impacts on PM_{10} air quality. Meeting these measures in the interim will serve as a surrogate approach for reducing $PM_{2.5}$ emissions and protecting air quality. However, if an area is designated as nonattainment for $PM_{2.5}$ after 2002, States will be required to submit within 3 years of designation a State plan which will address the measures necessary to attain the $PM_{2.5}$ standards.

Comment 10.11

Would any further reductions in MMBTU still allow the applicant to meet its contractual agreement for supplying electric energy?

Response 10.11

We do not know the answer to this question since we are not familiar with the specifics terms of the facility steam contract.

Comment 10.12

Does EPA consider that the construction of the proposed facility would reduce air pollution in the area?

Response 10.12

While there have been some references made that the existing facilities that will be purchasing the steam from the AES-PRCP will not be using their own (more inefficient and higher pollutant emitting) boilers, and therefore, air quality will improve, EPA's granting of this PSD permit is not predicated upon the reduction of air emissions in the area. Our approval of this PSD permit is predicated upon it meeting all the applicable PSD and applicable Clean Air Act requirements with all existing facilities operating.

Comment 10.13

Does EPA have any data to quantify the alleged reduction in air pollution from the Aguirre or Phillips facility?

Response 10.13

We do not have that information nor does the PSD process require such quantification. Also see Response 10.12.

Comment 10.14

What are the emissions from the vessels at berth ("dockside") that would transport coal to the proposed facility? (NRDC v. EPA, 75 F.2d 761, D.C. Circuit 1984 determined that these vessels are considered for applicability purposes.)

Response 10.14

We do not know the vessel emissions for all criteria pollutants. However, including the vessel emissions into the potential to emit for the AES-PRCP would not change the review of this project since PSD review has already been triggered for all major criteria pollutants with the exception of lead. AES-PRCP estimates that 50 ships per year of coal, 50 ships per year of limestone, and 50 ships per year of ash are docked in port loading/unloading with the ships burning No. 6 fuel oil. For lead, we estimate an increase in 0.00027 ton/year of lead from this activity. If this is added to AES-PRCP's potential to emit of lead of 0.24 tpy, the lead emissions from the ship would still not trigger PSD (0.6 tpy for lead) for that pollutant.

Comment 10.15

I am convinced from reading extensive technical literature that there are more economical and non-polluting energy alternatives to provide Puerto Rico with 3 billion kilowatts of electricity annually than by using a 454 megawatt coal-fired electric power plant that will produce enormous amounts of pollutants to the air, water and soil of our 3,435 square mile island. Commenter states that there are appropriate technologies presently available to develop renewable energy resources. If EPA issues the PSD permit to AES-PRCP, EPA will be closing the door of Puerto Rico, incarcerating its 3.8 million population, from developing and using renewable energy sources and energy conservation measure for the next 10 years.

Response 10.15

See Response 10.17.

Comment 10.16

If the EPA grants the PSD permit to AES-PRCP, it will interfere and block again the establishment of small-scale cogeneration power plants in Puerto Rico that will reduce large amounts of pollution from the atmosphere of the island.

Response 10.16

It is certainly not EPA's intention to block the future development of small scale cogenerations. Rather, we are required to address those permit applications that are before us.

Comment 10.17

With the implementation of compact fluorescent lighting in each Puerto Rican home and other energy conservation measures in the commercial sector, under a clearly defined renewable energy technology development and implementation program by PREPA, represents the application of the best available control technology (BACT) on the market, and provides a much better energy alternative to the coal-fired power plant project proposed by AES-PRCP.

Response 10.17

Green Lights is an important EPA initiative to encourage businesses, public schools, and government agencies to reduce their lighting electricity while maintaining lighting quality. Thus, commenter is correct in noting that this is a form of energy conservation, and an important one. However, EPA's Green Lights Initiative is voluntary. It is implemented through education and outreach, not imposed on entities.

EPA is not institutionally situated to engage in regional or Commonwealth-wide energy planning in Puerto Rico via the federal PSD permit process. In short, Region 2's function here is to issue a federal permit decision, not to determine what Puerto Rico's short- and long-term energy needs are, the importance of diversifying energy supply with coal, or to require implementation of demand side management and other energy conservation measures in Puerto Rico. The Commonwealth planning agencies are better situated to make these judgements. However, we recognize commenter's concern and we would like to indicate that EPA has encouraged Puerto Rico's government and energy planning agencies to implement the EPA Green Lights program in Puerto Rico.

EPA's voluntary programs such as Green Lights Energy Star Buildings and Climate Wise have an important continuing long-term role in addressing Puerto Rico's need for reliable and less polluting forms of electrical energy. Several companies and government agencies in Puerto Rico are members of these programs. It is important to note that these progams are based on a cost-effectiveness test and as a result particpants take five to seven years to complete their program obligations and the pollution prevention occurs in the future.

Comment 10.18

Since 1976, the economic development of Puerto Rico has been mainly driven by Section 936 of the U.S. Internal Revenue Code, a tax credit provided to U.S. companies that operate in Puerto Rico. The U.S. Congress has recently eliminated Section 936. The opinion of highly recognized experts in the economic development of Puerto Rico is that the economy of Puerto Rico will be significantly constrained and the present level in the use and consumption of electricity on the Island will be reduced, eliminating much of the need for additional generating capacity.

Response 10.18

EPA's approval of this project is not based on the current need for generating capacity or opinions of future electrical needs of the area. Rather, it is based on the facility meeting all applicable requirements of the Clean Air Act. Determining the electrical needs of a specific area is best left to the local government officials.

Comment 10.19

We must point out that our Mayor Honorable Héctor Luis Colón Mendoza gave his endorsement to this project to the Executive Director of PREPA Engineer Miguel Cordero in a letter dated April 13, 1993. This was done without any consultation with the Municipal Assembly or the town. The Municipal Assembly voted against this project; the vote was unanimous. The Assembly understood that the proposed facility's intention was a clear attempt of taking our economic resources and let a sick town behind them forever. We must point out that we know the Mayor for more than 40 years since he lives in our neighborhood and we also know that he does not have the knowledge or expertise to make this kind of decision.

Response 10.19

EPA's approval of this project is not based on positive or negative endorsements from local officials or legislative bodies. Rather, it is based on the project meeting all applicable requirements of the Clean Air Act.

Comment 10.20

Did EPA consider that the Municipal Assembly of Patillas was opposed to the use of the water from the Patillas Lake for the construction of the coal-fired plant?

Response 10.20

The Municipal Assembly of Patillas did not at any time inform us that it was opposed to AES-PRLP's proposed use of the water from the Patillas Lake. See also Response 10.19.

**********The End**********

Addendum A

Air Quality Analysis Requirements Under the Prevention of Significant Deterioration (PSD) of Air Quality Regulations

The purpose of this addendum is to provide the reader with a summary of the general air quality analysis requirements in PSD in order to facilitate the discussions in the Responsiveness Summary. Also, for greater ease, EPA attached a table summarizing AES-PRCP's air quality impact analysis which the reader may refer to as needed. However, this addendum is only intended to be general so for further details the reader should consult 40 CFR 52.21, 40 CFR 51. EPA also recommends the EPA New Source Review Workshop Manual, dated October 1990 which, although in draft form, is able to explain many of the requirements in simpler language than the CFRs.

Prevention of Significant Deterioration (PSD) of Air Quality:

The U.S. Congress established National Ambient Air Quality Standards (NAAQS) which are ambient concentration levels which were deemed to protect the public health and welfare, specifically that of the sensitive population. Areas whose air quality concentrations were within these levels were considered to be in attainment of the NAAQS for those pollutants. However, in order to maintain these ambient concentration levels while allowing some economic growth, Congress established a second air quality standard, namely the PSD increment. This allows only an incremental increase in ambient concentrations over the levels which existed at the time the regulation was triggered. New sources that are considered major (or major modifications to existing sources) that wish to construct after the PSD regulations were promulgated are required to obtain a PSD permit.

PSD Applicability:

In order to be subject to the PSD regulations, a new source must be considered "major." This is defined as either a source which is classified as one of 28 source categories listed in 40 CFR 52.21 and has the potential to emit 100 tons per year of a criteria pollutant, or any other source which has the potential to emit 250 tons per year of a criteria pollutant. Once a new source is determined to be major, it must obtain a PSD permit for that pollutant and any other criteria pollutants that it has the potential to emit at levels greater than the "Significant Emission Levels" (defined in 40 CFR 52.21).

A source that is PSD-affected for a particular pollutant must submit a PSD application which addresses the Best Available Control Technology (BACT) for each pollutant and an air quality analysis which addresses the ambient air impacts.

AES-PRCP is classified as one of the 28 source categories listed in 40 CFR 52.21. It is a fossil

fuel-fired steam electric plant of more than 250 million British thermal units per hour of heat input. Therefore, it needs to emit at least 100 tons of one of the criteria pollutants to be considered major. In this case, it emits more than 100 tons per year of NOx, SO_2, PM_{10}, and CO. Since it is major, it is PSD-affected for these pollutants and any other pollutant that it emits above the significant emission level. This adds VOCs, fluorides and sulfuric acid mist to the list of pollutants that AES-PRCP is PSD-affected. (See PSD permit Attachment I for the maximum tons/year allowed for these pollutants.)

Preconstruction Ambient Monitoring:

Prior to submitting a PSD application, the source must address the need for pre-application monitoring in order to obtain existing ambient background concentrations. This means that the source would need to collect one year's worth of ambient background data prior to submitting the PSD application. If there is an existing ambient monitor which is representative of the location of the proposed new source, it may also be considered subject to the approval of EPA. However, a proposed source may request a waiver to be exempt from this requirement if its single source impact (determined by dispersion modeling) is below the monitoring de minimis levels. These levels are defined in 40 CFR 52.21.

AES-PRCP's single source impacts were above the monitoring de minimis level for PM_{10} and below the monitoring de minimis level for the other pollutants. (See attached Table A). Puerto Rico EQB operates an ambient PM_{10} monitor at the Jobos Ward School which is located 1.8 kilometers to the northwest of AES-PRCP's proposed site. This monitor is in close proximity to the proposed site and the existing nearby sources. Therefore, it is considered representative of the background concentrations of the proposed site for AES-PRCP. Since this monitor and its data have undergone proper quality assurance/quality control (QA/QC) measures by PREQB, the data from this monitor are acceptable for use as background concentrations for the AES-PRCP project. (As an aside, it should also be noted that EPA received confirmation from Puerto Rico EQB that they plan to continue operating this monitor at this site indefinitely. Puerto Rico EQB also plans to augment this monitor with a $PM_{2.5}$ monitor in the near future.)

AES-PRCP was not required to obtain background concentrations of other pollutants since its single source impacts of the other pollutants were below the monitoring de minimis levels. AES-PRCP, however, did provide some ambient monitoring data for informational purposes just for the record from the monitoring station in Cerro Modesto for SO_2, NOx, and ozone even though this was not required. Also, while not required by the PSD regulations, EPA examined the concentrations of a carbon monoxide monitor located in downtown San Juan in order to estimate a background. This CO monitor was actually sited in order to measure ambient concentrations from automobiles. Since it is located in a more traffic-congested area than Jobos it provides a conservative estimate of background concentrations which were found to be within the NAAQS.

Single Source Modeling Analysis:

A separate air quality analysis must be performed for each pollutant which will be emitted above the "Significant Emission Levels." This modeling analysis is initially performed by examining the impacts from the proposed new source alone. These single source impacts are then compared to the monitoring de minimis levels to determine the need for preconstruction monitoring (as discussed above), and to another significance level, namely, the "Significant Impact Level." The significant impact levels may be found in 40 CFR 51.165 or in the EPA New Source Review Workshop Manual dated October 1990. The significant impact levels are not ambient air quality standards but rather are used as minimum threshold levels which trigger further multi-source analyses, if exceeded. If the proposed source impacts are above the Significant Impact Levels the proposed source must then perform a multi-source impact analyses which includes the cumulative impacts from other nearby sources and then determine if the PSD increment and NAAQS standards are protected. The cumulative multi-source analyses consist of examining two air quality standards which must be met. These are the PSD increment and NAAQS. If the proposed source impact is below the Significant Impact Level, the source is not required to perform these cumulative multi-source impact analyses.

The Significant Impact Levels are considered by EPA to be de minimis levels. These are also used as benchmarks to see whether a source "significantly causes or contributes" to an air quality standards violation if one is measured or modeled. If a violation is found, then sources that significantly cause or contribute to the violation must alleviate their impacts to correct the violation. In other words, if the impacts in the cumulative multi-source analysis violate either the PSD increment or NAAQS, the sources that significantly contribute to the violation must reduce their impacts.

In the case of AES-PRCP, they exceeded the significant impact levels only for PM_{10}. Therefore, they proceeded to determine the ambient impacts from existing sources of PM_{10} in order to demonstrate that the PSD increment and NAAQS are protected. As can be seen in the attached Table A, both the PM_{10} PSD increment and NAAQS are protected. AES-PRCP was not required to perform the same cumulative multi-source analysis for the other PSD-affected pollutants since its impacts were small enough and do not trigger the further analysis.

NAAQS/NAAQS Analysis:

The NAAQS analysis is an analysis that takes into account all emissions sources regardless of when they were constructed. It is the sum total concentration from all sources. The NAAQS is the air quality standard determined to protect public health and welfare. A NAAQS was established for 6 pollutants which became known as the criteria pollutants (SO_2, NO_2, CO, Pb, O_3, and PM_{10}).

In the case of AES-PRCP, a cumulative multi-source analysis was performed for PM_{10}. The analysis showed that the ambient concentration from all sources (including AES-PRCP) is 44.5 ug/m^3 for PM_{10} on an annual average basis. The NAAQS standard on an annual basis for PM_{10} is 50 ug/m^3. On the 24-hour average basis the concentration from all sources (including AES-PRCP) is shown to be 112.1 ug/m^3. The NAAQS standard is 150 ug/m^3 on the 24-hour average

basis. The analysis of all sources is a summation of the modeled impacts from all nearby sources, AES-PRCP modeled impact and the measured monitored concentration. The monitored concentration is added in order to account for concentration from small sources and distant sources which are not modeled. It should be noted that adding the monitored concentration to the modeled impact is conservative since the monitor also measures the concentration from the larger existing source which are also modeled. Therefore, there is some double counting of the concentrations from the larger existing sources. In addition, all the sources that are modeled are modeled at their maximum allowable emission rate which is often greater than the actual emission rates. Nonetheless, for the AES-PRCP project, the total PM_{10} concentration is within the NAAQS standard.

PSD Increment Analysis:

After the Clean Air Act established the NAAQS, which were designed to protect public health, Congress wanted to establish a second air quality standard to maintain those areas that were in attainment. Therefore, Congress incorporated another air quality standard which allowed only incremental increase in air pollution from the point in time that the regulation was triggered. For PM_{10} this was January 6, 1975. This allowed areas to maintain good air quality while allowing some economic growth. This was accomplished by establishing only an incremental degradation of air quality or "PSD increment." The PSD increment analysis is a modeling analysis which includes the new proposed source plus other nearby sources which constructed after the baseline date of this regulation. There are currently PSD increment standards for 3 of the 6 criteria pollutants: SO_2, NO_2, and PM_{10}. AES-PRCP was required to perform a PSD increment analysis for PM_{10}. By examining Table A, it can be seen that 19% of the 24-hour average increment is consumed. That is, the model calculated that the incremental increase in concentration from new sources since 1975 is 3.3 ug/m^3 on a 24-hour basis. The PSD increment standard is 17 ug/m^3. On the annual average basis, 55% of the increment is consumed. That is, the model calculated that the incremental increase in concentration from new sources since 1975 is 16.6 ug/m^3 on an annual average basis. The PSD increment standard is 30 ug/m^3. Therefore, the PSD increment standard is protected.

Meteorological Monitoring:

An important input to the modeling analysis is the meteorological data which describes how the pollution will travel and where it will impact. The EPA Guideline on Air Quality Models specifies that the analysis should be done with either 5 years of recent, representative and readily available data from an offsite location such as a National Weather Service Station or 1 year of site-specific data. In some cases, an applicant may be required to collect meteorological data for input to the model. The meteorological requirements depends on the complexity of the atmospheric flow, and the availability of existing representative data. In addition, it depends on the type of dispersion model used in the application. In this case, AES-PRCP was required to collect one year of site-specific data due to the complex terrain nearby.

A windrose may be developed for a particular meteorological site. It is a graphical depiction

which summarizes the frequency of the wind speed and wind direction at a location for a given period of time (usually one-year period). It looks like a center point with various spokes emanating outward in any potential radial direction. By examining the windrose one may obtain the percent frequency that the wind blew from a particular direction at a particular speed. Each spoke, or wind barb, points toward the direction where the wind was blowing from. Its length corresponds to the frequency. Each spoke is then divided into various sectors each corresponding to a particular speed. On a windrose, north is at the 12 o'clock position and referred to the zero degree radial. A windbarb that points in the 90 degree direction means that the wind was blowing from the east.

Table A - AES-PRCP's Air Quality Analyses (ug/m^3)								
Pollutant	Averaging Time	AES-PRCP Single Source impact	**Significant Impact Level** **(if AES impact is >SIL then need to do PSD Increment & NAAQS) (cite 40 Part 51)**	**Monitoring de minimis Level** **(if AES impact is >this level then need preconstruct ambient mon.data)**	PSD Increment Impact (modeled impacts of AES and other PSD increment consuming background sources)	**PSD Increment Standard** **(cite 40 CFR Part 52.21)**	NAAQS Impact (modeled impacts of AES, other background sources, and monitored concentration)	**NAAQS Standard** **(cite 40 CFR Part 50)**
NO_2	Annual	0.81	**1**	**14**	not required	**25**	not required	**100**
SO_2	Annual	0.55	**1**	**not applicable**	not required	**20**	not required	**80**
	24-hour	4.97	**5**	**13**	not required	**91**	not required	**365**
	3-hour	20.0	**25**	**not applicable**	not required	**512**	not required	**1300**
PM_{10}	Annual	2.95	**1**	**not applicable**	3.3	**17**	44.5	**50**
	24-hour	20.4	**5**	**10**	16.6	**30**	112.1	**150**
CO	8-hour	140.3	**500**	**575**	not required	**not applicable**	not required	**10,000**
	1-hour	200.5	**2000**	**not applicable**	not required	**not applicable**	not required	**40,000**

The bold-type columns refer to regulatory air quality levels which are EPA air quality standards or thresholds.

Notes:

1. PSD Increment and NAAQS are not calculated for NO_2, SO_2, and CO since AES-PRCP's modeled impact is less than the de

minimis Significant Impact Level. When the single source impact is below Significant Impact Level, it is not required to perform the multi-source PSD increment or NAAQS analyses.

2. Not applicable means that there is no federal standard established for this pollutant and/or averaging time.

3. AES-PRCP single source impact column is based on the maximum modeled impact.
4. The PM_{10} increment and NAAQS 24-hour average concentrations are based on the highest of the second-highest impact modeled. The PM_{10} increment and NAAQS annual average is based on the highest annual average.

5. The PM_{10} monitor is operated by PREQB and is located at the Jobos' Ward Elementary School, 1.8 km northwest of AES.

6. The CO monitor is a traffic monitor and is operated by PREQB. It is located in San Juan.

7. The other monitors are operated by PREPA and are located in Cerro Modesto, 17 km northwest of AES.

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