

## **Excerpt 3**

Responses to Comments, dated June 2013 ("RTC"), AR V.3



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 2**

**290 Broadway  
New York, NY 10007-1866**

**RESPONSES TO PUBLIC COMMENTS**

**On the Clean Air Act  
Prevention of Significant Deterioration of Air Quality Draft Permit  
For**

**ENERGY ANSWERS ARECIBO, LLC  
ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT**

**June 2013**

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## I. INTRODUCTION

On May 9, 2012, the U.S. Environmental Protection Agency Region 2 Office (EPA) proposed to approve, subject to public review, a Prevention of Significant Deterioration (PSD) permit for Energy Answers Arecibo, LLC ("EA") that would authorize construction, and operation of a new 77 Megawatt (MW) resource recovery facility known as the Arecibo Puerto Rico Renewable Energy Project. The public comment period for the proposed permit was originally scheduled to last approximately 30 days. However, the public comment was subsequently extended, and it was officially closed on August 31, 2012. EPA announced the public comment period(s) through public notices published in the *El Vocero* and *El Norte* (both in Spanish) and on the Interamerican University-Arecibo Campus website (in English and Spanish). EPA also distributed the Spanish and English public notices and Fact Sheet to a significant number of interested parties in accordance with 40 CFR Part 124, including notices sent by mail, and e-mail.

The Administrative Record for the proposed permit was made available at the Interamerican University-Arecibo Campus website, and at the EPA Region 2's offices in Guaynabo, Puerto Rico (PR), and New York City.

In addition, EPA held six public hearings on the following dates: June 25, 2012, August 25, 2012 (two sessions), August 26, 2012 (two sessions), and August 27, 2012 in Arecibo, PR. The hearings were held in Spanish with simultaneous English translation. All oral comments (i.e., statements) made were recorded, and the transcripts were subsequently translated in English.

EPA also held a public availability session earlier on May 25, 2012, in Arecibo, PR. The purpose of the public availability session was to answer questions about the project so that the public could provide meaningful comments during the comment period. EPA made it clear at the outset that public availability session was not the forum to provide comments, and anyone with comments on the permit conditions should submit them in writing or provide oral comments at the public hearing. A Spanish language interpreter was present for oral translation. EPA responded to questions at this meeting, but did not formally record remarks from those in attendance.

During the public comment period, EPA received 1,100 written comments ("comment letters") by mail, e-mail, fax, in person at the hearings, and written statements submitted at the public hearings, and 90 comments given by oral testimony at the six public hearings. Out of 1,100 commenter letters, 648 were identical comment letters (that means more than one person ("commenter") submitting an identical commenter letter), while 56 comment letters were signed by more than one person. About 90% of the comment letters were submitted in Spanish, and these letters were subsequently translated into English. Multiple people signed many of the comment letters so that, all together, there were several thousand signatures on the written comments. The total number of commenters who submitted comment letters (identical letters and comment letters signed by multiple people) is 3,280. In some cases, a single person commented multiple times, e.g., filed multiple sets of written comments, and spoke at one or more public hearings. All comments received equal weight, regardless of the method used to submit them, or whether they were provided at the public hearing or in writing.

After a careful review of the comments received, EPA has made a final decision to issue this PSD permit. As required by 40 CFR 124 "Procedures for Decisionmaking" EPA has prepared this document known as the "Responses to Comments" that describes and addresses the significant issues raised during the comment period and describes the provisions of the draft permit that have been changed and the reasons for the changes. Since the Fact Sheet is a final document at the time of the draft permit, no changes were made to it. Instead, comments on the Fact Sheet were noted, and responses to them are included in this document in the relevant subject matter category.

The Final Permit is substantially the same as the Draft Permit (or "draft PSD permit") that was available for public comment. Although EPA's decision making process has benefited from various comments, the information and arguments presented did not raise any substantial new issues that required major changes to the permit. However, EPA revised some permit conditions in the response to comments. These changes are detailed in this document and reflected in the Final Permit. The analyses underlying these changes are explained in the responses to individual comments that follow.

This document summarizes or recites the public comments described in the introduction to this document and provides EPA's response. Because of the wide variety of comments received, EPA has segregated the comments and responses into sections, or subject areas as identified in the Table of Contents.

In many cases, EPA has included a brief summary of each comment to remind the reader of the topics being discussed. In some cases, EPA has included original comments nearly verbatim for the reader's convenience. In some instances, for reasons of space and clarity, EPA has provided a synthesized summary comment that distills the essence of several individual comments, and then provided a response to that summary comment. The particular language used in the summary comment may derive primarily from one comment or set of comments, and is the product of EPA's careful review of each comment related to the subject matter of the summary comment. While many of the details presented in the original comments were not repeated in the comment summaries, EPA has reviewed each comment in its entirety. This outline of EPA's response to comments is simply designed to structure EPA's response and make them more accessible to the interested public; no significance should be attached to the form in which EPA cited or summarized the original comment in this response document. The complete text of each comment as submitted, and a complete copy of the transcripts from the public hearings, is in the administrative record and available by request by contacting EPA at the address provided in this document

The Final Permit and the Responses to Comments are available on the EPA Region 2 website at <http://www.epa.gov/region02/air/permit/energyanswers>. Additionally, EPA is providing notice of the final permit decision to those who commented on the draft permit and provided adequate contact information. Copies of the Final Permit and Responses to Public Comments may be also obtained by writing or calling EPA between the hours of 9:00 a.m. and 4:00 p.m., Monday through Friday, excluding holidays:

U.S. Environmental Protection Agency  
Region II  
Permitting Section  
Air Programs Branch  
290 Broadway  
New York, New York 10007  
Attention: Mr. Steven C. Riva  
(212) 637-4074  
riva.steven@epa.gov

U.S. Environmental Protection Agency  
Region II  
Caribbean Environmental Protection Division  
City View Plaza III-Suite 7000  
#48 Rd. 165 km 1.2  
Guaynabo, PR 00968-8069  
Attention: Mr. Jose Font  
(787) 977-5870  
font.jose@epa.gov



## II. COMMENTS ON SPECIFIC PROVISIONS OF THE DRAFT PERMIT

Please note that for the readers' convenience, the revisions, and additions to the draft PSD permit conditions (Items) are included in *italics and underlined*, while the deletions proposed to the draft PSD permit conditions are ~~strikethrough~~. The “PSD permit” means “draft PSD permit and final PSD permit”.

### A. Comments from Public Referencing Specific Draft Permit Conditions

**Comment 1:** The Table of Contents of the draft PSD permit does not specify the page number for the draft's sections.

**Response to Comment 1:** EPA agrees with the commenter and the final permit Table of Contents now includes page numbers for the sections.

**Comment 2:** While, in the Table of Contents, Chapter VIII contains four Sections (A through D), in the draft Permit, Chapter VIII contains only three sections (A through C).

**Response to Comment 2:** EPA agrees with the commenter and the draft permit has been modified accordingly.

**Comment 3:** While, in the Table of Contents, Chapter IX, Section C reads "Cooling Tower", on page 28 of the draft permit, Section C reads "Cooling Tower System".

**Response to Comment 3:** EPA agrees with the commenter and the draft permit has been modified to incorporate the comment. The final permit Table of Contents, Chapter IX, and Section C read now “Cooling Tower System.”

**Comment 4:** The definitions in the draft permit are not provided entirely. Therefore, the draft permit should be revised to include complete definitions of 40 CFR 52.21, and 40 CFR 60.

**Response to Comment 4:** There are no provisions in the PSD regulations or EPA policy, requiring including complete definitions of PSD or 40 CFR Part 60. The draft permit and the final permit (or “PSD permit”) reference the relevant regulatory sections. No change to the draft permit was made based on this comment.

**Comment 5:** The number of audio, olfactory, and visual checks for ammonia emissions from the aqueous ammonia solution storage tank should be increased from once per day, as required by the draft permit (Condition **VII. E. 1. D**), to two (2) times in the morning and in the afternoon, and four times during night.

**Response to Comment 5:** First, it is important to note that EPA was not provided information supporting the request for increasing the number of audio, olfactory, and visual checks from once per day (as required by the draft PSD permit) to eight (8) times per day. In addition, EPA was not provided with any demonstration that the requested number of checks would contribute to minimizing the ammonia emissions from the storage tank.

In order to mitigate the risk associated with storage of 19% aqueous ammonia, the PSD permit requires that the storage tank will be comprised of a double walled, unpressurized tank. As a result, very low ammonia emissions are expected to result from the storage of ammonia solution. Furthermore, the PSD permit requires that the storage tank be equipped with a vapor recovery and return system. Thus, any vapors displaced during transfer (i.e., unloading) will be routed back to the tanker truck (which will transport the ammonia solution to the site), and consequently very low (if at all) ammonia emissions are expected from the transfer operations.

However, EPA agrees with the commenter that the draft permit could be improved by increasing the number of audio, olfactory, and visual checks. Consequently, we will increase the number of audio, olfactory, and visual checks from at least once per day to at least three times a day, with one mandatory check during night time, and therefore, the increased number of checks will ensure that any ammonia emissions that may occur during any 24 hours period are promptly detected. However, as we will discuss below, EPA does not believe further checks would be warranted for determining ammonia emissions from the storage tank.

It should be noted that ammonia is not a regulated PSD pollutant, and, in general, EPA-issued PSD permits do not include requirements for the ammonia storage tanks (which are part of a project). However, EPA can include conditions that relate to the operation and safety of control equipment required for BACT. EPA is particularly aware of safety concerns that may arise from storing ammonia at a facility, and has decided to include permit conditions for the ammonia storage tank.

Additionally, the proposed ammonia storage tank is not subject to the 40 CFR Part 68 "Chemical Accident Prevention Provisions", because Part 68 applies only if the concentration of ammonia is 20% or greater, and the storage tank is not subject to any other federal regulations.

The purpose of the audio, olfactory, and visual checks is to detect any ammonia emissions that may occur due to the storage tank leaks, and these checks are in addition to other requirements and measures (i.e., type of storage tank, ammonia concentration, and vapor recovery and return system) in the draft permit, that are designed to prevent leaks and respectively, ammonia emissions. While we believe that increasing the number of audio, olfactory and visual checks to three times per day will ensure that long periods of time will not transpire without a check, there is no basis in the record, nor has commenter provided information to establish, a demonstrable benefit from increasing the number to eight.

In conclusion, EPA, believes that the permit conditions established in the PSD permit for preventing the ammonia leaks, in combination with increased audio, olfactory, and visual checks to three times per day (i.e., during any 24-hours period) with one mandatory check during night time, are adequate measures for preventing and detecting any ammonia emissions, and these measures are consistent with good engineering practices. Further, we do not believe that number of checks suggested by the commenter, would contribute to minimizing the ammonia emissions from the storage tank.

Condition **VII. E. 1. d** has been modified to include three checks per day, and it reads as follows:

"Audio, olfactory, and visual checks for ammonia emissions shall be made ~~once~~ at least three times per day (i.e., 24 hours period), within the operating area; one check shall be made during night time, and regardless of whether the facility is operating during night time."

**Comment 6:** The draft PSD permit includes a 12,000 gallon tank designed to store aqueous ammonia solution containing 19% ammonia. How would EPA ensure that EA would only use aqueous ammonia solution with 19% ammonia by volume?

**Response to Comment 6:** EPA considered this comment and the following requirement has been added to Condition **VII. E.1.a.** of the draft permit:

"The Permittee is authorized to install and operate a 12,000 gallons tank (Tank 1) to store aqueous ammonia solution containing 19% ammonia by volume that is used as reagent for the Regenerative Selective Catalytic Reduction (RSCR) units – Selective Catalytic Reduction (SCR) modules. Compliance with the 19% ammonia by volume requirement of this permit shall be demonstrated by ammonia supplier certification for each ammonia delivery."

Additionally, EPA added the following recordkeeping requirement:

Condition **XIV.1.n** "Logs shall be kept and updated daily to record, for each ammonia delivery, documents from the ammonia supplier certifying compliance with the 19 % ammonia by volume specified in this permit."

**Comment 7:** From the draft PSD permit (Condition **VIII. A.4**), it is unclear whether the supplementary fuels (ASR, PUWW, and TDF) combustion demonstration period would be required only once, or each time EA plans on combusting supplementary fuels. Given the fact that the composition of these fuels is not homogeneous, a combustion demonstration period should be required every time any of these supplemental fuels are combusted.

**Response to Comment 7:** The supplementary fuels combustion demonstration period is required only once, at the outset. The PSD permit does not allow EA to combust any of the supplementary fuels (ASR, PUWW, and TDF) before conducting the combustion demonstration period and demonstrating that the emissions resulting from these fuels are less than or equal to the permitted emission limits. Furthermore, the PSD permit contains conditions regarding the permitted composition of the supplementary fuels, as well as monitoring requirements for demonstrating compliance with the composition of these fuels. EPA believes that the initial combustion demonstration period and compliance with the supplementary fuels' composition are adequate measures for ensuring compliance with the permitted emission limits, while combusting supplementary fuels. In particular, the permit conditions that restrict the composition of the supplementary fuels should adequately address concerns about variability in the fuel composition. In addition, EPA believes, that requiring a combustion demonstration period every time the facility plans to combust supplementary fuels is neither necessary, nor practicable. No change to the draft permit was made based of this comment.

**Comment 8:** The number of inspections required to be performed for the roadways and parking areas must be increased from daily, as required by the draft PSD permit (Condition **VII. G. 1.c**), to at least six (times) a day as follows: morning, noon, afternoon, evening, and when the winds

are of a higher than normal speed. Furthermore, the number of checks for any visible fugitive emissions from the processing buildings must be increased, from daily as required by the draft PSD permit (Condition **VII.G.8.a**), to at least six (6) times a day. Additionally, the number of inspections of all processing buildings must be increased, from weekly, as required by the draft PSD permit (Condition **VII.G.8.b**), to twelve (12) times a day.

**Response to Comment 8:** EPA was not provided information or rationale to support the request for increasing the number of roadway/parking inspections processing building inspections from daily and weekly to, respectively, six (6) times and twelve (12) times per day, and the number of visible fugitive emissions checks from daily to six (6) times per day. Moreover, EPA was not provided any demonstration that the requested number of inspections and checks would contribute to minimizing the fugitive particulate emissions.

The purpose of the roadways/parking areas daily inspections (Condition **VII.G.1.c**) is to assess whether the areas require treatment (e.g., sweeping, vacuuming, watering) that particular day. We do not anticipate changes occurring, regularly throughout the day, which would require inspection, and respectively treatment of the facility's paved roadways/parking areas, more than once per day.

The purpose of the daily checks for visible emissions of the processing buildings (Condition **VII.G.8.a**) is to assess whether there is a need for repairs of the buildings, windows, doors, roof monitors, etc. , so that any occurrence of fugitive emissions will be immediately addressed. The purpose of the weekly inspections of the processing buildings (Condition **VII.G.8.b**) is to verify the proper functionality of the processing buildings access doors, and buildings draft flow-monitoring devices, which prevent fugitive emissions from escaping the buildings.

In addition to the daily inspections of the roadways, and parking areas (Condition **VII.G.1.c**), the daily checks for any fugitive emissions from processing buildings (Condition **VII.G.8.a**), and weekly inspections of all processing buildings (Condition **VII.G.8.b**), the PSD permit, requires the following fugitive emissions control measures: 1) the facility roadways and parking areas will be paved, or landscaped; the permit does not allow outdoor unloading and storage for any of the fuels or materials at the facility; 2) all delivery vehicles will be enclosed or covered, when entering or leaving the facility; 3) all processing buildings will be enclosed, and these buildings will be equipped with fabric filters or the exhaust air will be drawn to the combustors as combustor air, which will keep the buildings under negative pressure; 4) the conveyors will be fully enclosed, and controlled by the fabric filters.; and 5) the storage silos will be equipped with fabric filters.

EPA believes that the above-described control measures in combination with the inspections, and checks specified in the PSD permit are consistent with good engineering practices, and are adequate measures for both minimizing the fugitive particulate emissions at the facility, and ensuring that the fugitive particulate emission limits established in the PSD permit are not exceeded. Further, EPA notes, the combination of control measures, inspections, and checks, contained in the EA's PSD permit is more stringent than the control measures, inspections, and checks established by EPA for other permits. No change to the draft permit was made based on this comment.

**Comment 9:** The number of inspections for detecting damages to the drift eliminator and cooling tower must be increased, from at least once per shift, as required by the draft PSD permit (Condition **VII. F.9**), to at least three (3) times per shift. Additionally, the number of complete inspections of the drift eliminator and cooling tower must be increased, from at least once per calendar year, as required by the draft PSD permit (Condition **VII. F.10**), to at least once per month.

**Response to Comment 9:** EPA was not provided information or facts demonstrating the need or rationale for the proposed increase in the number of inspections. Moreover, EPA was not provided any demonstration that the requested number of inspections would contribute to minimizing the particulate emissions from the cooling tower.

The purpose of the cooling tower and the drift eliminator once per shift inspections (Condition **VII. F.9**) is to detect any damage that may occur, and ensure that the damages are promptly corrected, so that the cooling tower's particulate emissions are immediately minimized. The purpose of the cooling tower and drift eliminator calendar year inspection (Condition **VII.F.10**) is to verify the integrity of the cooling tower and drift eliminator components, which would provide that the particulate emissions would be continuously minimized.

In addition, to the inspections required for the cooling tower and drift eliminator, the PSD permit also requires continuously monitoring of the flow rate of the circulating water and monthly measurements of the total dissolved solids. (Condition **VII.F.5**). These two permit conditions are an indicator of proper operation of the cooling tower and drift eliminator, and of the fact that the particulate emissions are continuously minimized.

EPA considers that the combination of control measures, inspections, and checks is consistent with good engineering practices. Further, EPA notes, the combination of control measures, inspections, and checks, contained in the EA's PSD permit are adequate. Moreover, EPA was not provided information establishing demonstrable benefit from increasing the number of inspections. No change to the draft permit was made based on this comment.

**Comment 10:** How would EPA ensure that EA will comply with the sulfur content in fuel limit, which is established in the draft permit (Condition **VIII. C.1**), on a continuous basis?

**Response to Comment 10:** As specified at Condition **VIII. C.1** of the PSD permit, compliance (i.e., continuous compliance) with the sulfur in fuel limit shall be demonstrated based on the supplier certification for each fuel oil or propane delivery. Further, Condition **XIV.1.k** requires EA to keep and update, daily, the supplier documentation certifying compliance with the sulfur content in fuel.

**Comment 11:** The commenter states that the draft PSD permit should include Standard Operating Procedures (SOP) and or Quality Assurance Project Plan (QAPP) for: 1) each emission unit, and air pollution control equipment; 2) each monitoring, performance test (including protocols and test methods), and recordkeeping requirement; and 3) all inspections tasks.

The draft permit conditions the commenter requests should be revised by adding SOP or QAPP are as follows: III. "Plant Operations", IV. "Right to Entry", VII. "Operating Requirements/Work Practices and Stack Parameters", VIII. "Fuel Requirements", IX. "Air Pollution Control Equipment", X. "Air Pollutants Emissions, Opacity, and Visible Emissions", X. "Performance Test Requirements", XII. "Continuous Emission Monitoring/ Continuous Opacity Monitoring", XIII. "Other Monitoring Requirements", IX. "Recordkeeping Requirements" and XV. "Reporting Requirements".

**Response to Comment 11:** EPA was not provided information that would demonstrate that by including SOP and QAPPS, beyond what is already in the draft permit, it would improve the monitoring, recordkeeping, and reporting requirements of the PSD permit, or that it is necessary to ensure compliance with the BACT limits established in the PSD permit.

All performance tests required in the PSD permit must be conducted using EPA approved or recognized performance test methods, which include Quality Assurance (QA) and Quality Control measures. The PSD permit (Condition **XI.A.2**) requires EA to submit to EPA for approval, prior to conducting the performance tests, a QAPP that would detail the methods and procedures used during the performance tests.

The continuous emissions monitoring systems (CEMS) and continuous opacity monitoring system (COMS) required in the PSD permit must meet the EPA performance specifications, which include QA and QC measures. The PSD permit (Condition **XII.3**) requires EA to submit to EPA for approval, prior to startup, a QAPP for the certifications of the CEMS and COMS.

The PSD permit (Condition **XII.4** and **5**) requires EA to conduct, in accordance with the EPA specifications, including but not limited to 40 CFR Part 60 Appendix B, performance evaluations for the CEMS, COMS, and all other continuous monitoring systems required by the PSD permit, and to submit the results of the evaluations to EPA, for certification.

Additionally, the recordkeeping and reporting requirements established in the PSD permit must comply with the provisions of different Subparts of 40 CFR Part 60. To that effect, EPA has amended Conditions **XIV.3**, and **XV** to better clarify that the recordkeeping and reporting requirements shall comply with the provisions of 40 CFR Part 60, Subpart A, Subpart Eb, and other Subparts as applicable.

The amended Condition **XIV. 3** reads as follows:

**XIV.3** All recordkeeping requirements required by this permit shall comply with the provisions of 40 CFR Part 60, Subpart A, Eb, and other Subparts as applicable. All records and logs required by this permit must be maintained for a period of five years after the date of the record, and make available upon request.

The amended Condition **XV. 7** reads as follows:

**XV.7** All reporting requirements required by this permit shall comply with the provisions of 40 CFR Part 60, Subpart A, Eb, and other Subparts as applicable. All emission reports, testing

reports and start-up notifications required under this permit shall be submitted to the Director, Caribbean Environmental Protection Division, U.S. EPA, Region 2 at the address listed above.

Based on the above considerations, EPA believes that the permit conditions identified by the commenter as requiring including SOPs, and QAPPs, are adequate, consistent with the EPA's regulations and with the PSD permits issued by EPA. Therefore, no change was made to the draft permit to add additional QAPPs or SOPs. Nevertheless, in recognition to the commenter's concern, EPA amended two permit conditions by adding the reference to the recordkeeping and reporting requirements of the 40 CFR Part 60.

## B. Comments from Energy Answers Arecibo, LLC on Draft Permit Conditions

Energy Answers Arecibo, LLC (“EA” or “Commenter”) submitted the following comments.

**Comment 1:** Condition **VII.A.5.a.i** and **ii** of the draft permit indicates the steam condition commensurate with 400 MMBtu/hr and 550 MMBtu/hr heat input rate, respectively, based on design parameters furnished in the air permit application. The design information for temperature (i.e., 830<sup>0</sup>F) and pressure (i.e., 850.3 psig) represent the average condition commensurate with 400 MMBtu/hr and 550 MMBtu/hr. In practice, there is a range of temperatures and pressures equivalent to the design information for these heat input rates. For example, 400 MMBtu/hr can also be represented by 292,000 lb of steam per hour (“lb steam/hr”) at 780<sup>0</sup>F and 850 psig.

For these reasons, EA requests that Condition **VII.A.5.a. i** and **ii** to be revised to include the phrase "or equivalent enthalpy per standard engineering references" next to the temperature (830<sup>0</sup>F) and pressure (850.3 psig).

**Response to Comment 1:** EPA has considered this comment but has determined that no revisions are needed to the referenced condition. Conditions **VII.A.8.a, b** and **c** of the PSD permit require that the actual steam flow rate (i.e., lb steam/hr), and the steam's temperature and pressure be monitored on a continuous basis. So that, the actual steam flow rate, and steam's temperature and pressure data supplied by the continuous monitoring systems combined with engineering references and calculations will enable EA to correct the actual steam flow rate to the temperature and pressure conditions of 830<sup>0</sup> F and 850.3 psig, respectively, that are specified by both the EA's application and Condition **VII.A.5.a**.

**Comment 2:** As it reads, Condition **VII.A.5.b** of the draft permit appears to prohibit EA from operating at an average heat input rate of less than 500 MMBtu/hr on a 12-month rolling average. Such an inflexible stipulation would be impractical and overly prohibitive and we do not believe this to be the intent. Therefore, for clarity, EA proposes that the phrase "shall only be allowed to operate" be replaced with "shall not to exceed".

**Response to Comment 2:** EPA has reviewed Condition **VII.A.5.b** and determined that it was not our intent to say that the combustors' heat input rate shall not be less than 500 MMBTU/hr (based on a 12-month rolling average). The commenter's requested change is consistent with the application and the assumptions used in the EPA's review. Therefore, EPA concurs with this comment, and has revised Condition **VII.A.5.b** to read as follows:

“Except for warmup and shutdown, each municipal waste combustor unit shall ~~only be allowed to operate~~ not exceed at 500 MMBtu/hr, based on a 12-month rolling average. Compliance ...”

**Comment 3:** Condition **VII.A. 5** of the draft permit specifies the heat input limitations and the monitoring methodology that EA shall use for ensuring continuous compliance with the heat input limits on an hourly basis. In order to determine compliance with the permitted hourly heat input limits, EA is required to use: 1) the actual steam production rate as an indicator of actual boiler hourly heat input rate; and 2) the ratio of each combustor's design heat input rate to its design steam output rate (“design steam ratio”), expressed as MMBTU/ lb of steam . However,



EA estimates that the combustor units will experience a degradation rate in their efficiency of approximately 2% over 8 years. That means that the actual steam output will be less over time for the same heat (BTU) input. Furthermore, since the amount of actual steam produced will be reduced as the efficiency degrades, the design steam ratio used to calculate compliance with the heat input limit would also change. Therefore, EA believes that it would be appropriate that instead of adjusting the steam production rate, as it is required by the draft permit, EA should measure and adjust, as necessary, on ongoing basis, the steam ratio.

**Response to Comment 3:** EPA has reviewed the comment and the Condition **VII.A. 5** of the draft permit, and determined that by requesting EA to measure and adjust (as necessary) the design steam ratio, instead of adjusting the steam production rate, would contribute to the effectiveness and enforceability of the permit. However, it is important to note that, EA will still be required to continuously measure each combustor's actual steam production rate. The revised Condition **VII.A.5** reads as follows:

### **VII.A.5 Heat Input and Steam Production Rate Limitations**

- a. Except for warmup and shutdown, for each 1-hour period, each municipal waste combustor unit (Boiler 1 and Boiler 2), shall only operate between the following two heat input rate limits:
  - i. 400 MMBtu/hr; Compliance with this heat input rate limit shall be demonstrated by ~~complying with a steam production rate limit of no lower than 290,014 pounds (lb) of steam/hr at 830 degrees Fahrenheit (<sup>0</sup>F) and 850.3 pounds per square inch gauge (psig)~~ complying with a steam production rate limit of no lower than 398,840 lb of steam/hr at 830<sup>0</sup>F and 850.3 psig *multiplying the design steam ratio or the actual steam ratio (expressed as MMBTU/ lb of steam) by the measured steam production rate ( lb of steam /hr) at 830 degrees Fahrenheit (<sup>0</sup>F) and 850.3 pounds per square inch gauge (psig); and*
  - ii. 550 MMBtu/hr; Compliance with this heat input rate limit shall be demonstrated by ~~complying with a steam production rate limit of no lower than 398,840 lb of steam/hr at 830<sup>0</sup>F and 850.3 psig~~ *multiplying the design steam ratio or the actual steam ratio (expressed as MMBTU/ lb of steam) by the measured steam production rate ( lb of steam /hr) at 830<sup>0</sup>F and 850.3 psig.*
- b. Except for warmup and shutdown, each municipal waste combustor unit shall not ~~only be allowed to operate at 500 MMBTU/hr~~ exceed 500 MMBtu/hr, based on a 12-month rolling average. ~~Compliance with this heat input rate limit shall be demonstrated by complying with a steam production rate limit of 362,582 lb of steam/hr (based on a 12-month rolling average) at 830<sup>0</sup>F and 850.3 psig.~~ See section XIII. E. of this draft permit for a detailed explanation on determination of the heat input rate based on 12-month rolling average limit.

- e. ~~The steam production rate limits specified in 4(a) and (b), above, are based on a ratio of each municipal waste combustor unit's maximum rated heat input capacity (MMBtu/hr) to its design rated steam output (lb of steam/hr) of 0.001379 or 1.379E-03 MMBtu/ lb of steam.~~
- c. For the purposes of this permit the design steam ratio (MMBTU/ lb of steam) specified in 5.a.i and 5.a.ii above shall be defined as the ratio of each combustor's design heat input rate ( MMBTU/hr) to its design steam production rate output ( lb of steam /hr). The design steam ratio used for demonstrating compliance with the heat input rate limits specified in this permit shall be 0.001379 MMBtu/ lb of steam or 1.379E-03 MMBtu/ lb of steam.
- d. The steam ratio( MMBTU/lb of steam) of each combustor shall be measured quarterly, to determine the actual steam ratio (MMBTU/lb of steam) of each combustor, as follows:
- i. Actual heat input rate (MMBtu/hr) shall be determined as the product of the actual (weighted) amount of waste (tons per hr of RDF and WDF) charged to each municipal waste combustor, and the actual heating value (i.e., heat content) of the waste expressed as MMBtu/ton of RDF and WDF;
  - ii. Heating value (MMBtu/ton) of RDF and WDF shall be determined by the procedures contained in the American Society of Mechanical Engineers (ASME) Performance Test Code 34-2007 "Waste Combustors with Energy Recovery", or the most current ASME version, or other procedures upon EPA's approval.
  - iii. Actual steam production rate (lb of steam/hr) shall be supplied by the steam monitoring device;
  - iv. Actual MMBtu/lb of steam ratio shall be calculated by dividing the actual heat input rate (MMBtu/hr) by the actual steam production rate (lb of steam/hr).
- e. ~~If it is determined that the actual MMBtu/ lb of steam ratio is greater than the permitted ratio of 1.379E-03 MMBtu/lb of steam, the Permittee shall not combust any fuel in that municipal waste combustor unit(s) until it has completed one of the following actions:~~
- i. ~~Shall remedy the municipal waste combustor unit(s) failure to meet the design MMBtu/lb steam ratio; or~~
  - ii. ~~Shall submit an application for a modification to the PSD permit to revise the steam production rates limits specified in this permit and receive final approval from EPA; any revised steam production rates limits shall be equivalent to the heat input levels specified in this permit of 400, 500, and 550 MMBtu/hr, respectively.~~

- e. The results of each combustor quarterly steam ratio measurements must be submitted to EPA within 15 days after completion of the measurements.
- f. If, during a quarterly measurement it is determined that the actual steam ratio (MMBtu/ lb of steam) is greater than the design steam ratio of 1.379E-03 (MMBtu/lb of steam), the Permittee, for the next quarter compliance demonstration with the heat input rate limits, may use the actual steam ratio.
- g. The Permittee shall calculate and record, on an hourly basis, for each municipal waste combustor unit, the actual heat input (MMBtu/hr) during normal operation. The actual heat input shall be calculated based steam production rate (lb of steam/hr) supplied by the steam monitoring device and the ~~1.379E-03 MMBtu/lb of steam or another amended ratio, approved by EPA,~~ design steam ratio or the actual steam ratio.
- h. The Permittee shall submit a written report of the heat input rates recordings, including the data and calculations used to derive them, to EPA for every calendar quarter. All quarterly reports shall be postmarked by the 30<sup>th</sup> day following the end of each quarter.

**Comment 4:** Condition VII.A.7.f of the draft permit specifies a minimum operating temperature during warmup periods for when the RSCR shall begin to be used, including ammonia injection. Since the critical temperature is that of the inlet gas, the above Item should be revised to read as follows:

“During warmup periods, the Regenerative Selective Catalytic Reduction (RSCR) units, including ammonia injection, shall be operated no later than when the inlet gas temperature to the RSCR unit reaches 290<sup>0</sup>F.”

**Response to Comment 4:** EPA agrees with EA's comment, and the requested change is consistent with the application and RSCR's technical documents used in the EPA's review. The final permit includes Condition VII.A.7.f, which was revised as described above in **Comment 4**.

**Comment 5:** Comment VII.G.6 of the draft permit specifies that the municipal solid waste (MSW) and supplementary fuels unloading, storage, processing, and blending buildings must be kept under negative pressure at all times by venting air from these areas to the boilers as combustion air. However, EA states that this provision should include the qualifier that a boiler is running under normal operating conditions. Furthermore, EA proposes that during times when both boilers are shutdown, EA would remove fuel from the tipping floor and maintain best management practices in other areas of the MSW and supplementary fuels buildings as measures for preventing fugitive particulate emissions from these buildings. In addition, EA adds that they expect that the times when both boilers are shut down will be very infrequent. Consequently, EA requests that Comment VII.G.6 be changed to read as follows:

“In order to prevent the fugitive particulate emissions from the MSW and supplementary fuels unloading, storage, processing, and blending buildings, the Permittee shall maintain these

buildings under negative pressure when either one or both boilers are operating. The negative pressure shall be maintained by continuously drawing the exhaust air from these buildings into the municipal waste combustors as combustion air. During times when both boilers are shut down, Energy Answers will remove fuel from the tipping floor and maintain best management practices in other areas to prevent unwanted fugitive particulate emissions from these areas.”

**Response to Comment 5:** EPA agrees with the first part of the EA’s comment which states that in order for the exhaust air from the MSW and supplementary fuels unloading, storage, processing, and blending buildings to be drawn and supplied as combustion air to the municipal waste combustors (Boiler 1 and Boiler 2), at least one combustor should be operational, at any time. Condition **VII.G.6** has been modified in response to this comment.

However, while EPA understands that there may be situations when both boilers are shut down, while MSW and supplementary fuels are still present inside the buildings, EPA does not find the EA's proposed fugitive emissions' control measures, for times when both boilers are shut down, to be adequate because the PSD permit does not authorize outdoors fuels storage, and EA does not indicate where they plan to store the removed fuel from the tipping floor. Nevertheless, even if there would be an appropriate storage for the removed fuel, EPA considers that removing the fuel from the tipping floor is neither practical nor enforceable because it would be difficult to monitor compliance with the fuel removal each time the boilers are shut down for any period of time. Thus, Condition **VII.G.6** has not been revised as requested by EA.

However, EPA believes that when both boilers are shut down, the exhaust air from the MSW and supplementary fuels buildings shall be vented to dust collectors and odor control equipment (e.g., odor scrubbers, or equivalent odor control equipment). Since the requirements for the control of odors must be addressed in the State permit issued by PREQB and not in the PSD permit, Condition **VII.G.6** does not contain any reference to the odor control equipment. EPA has revised Condition **VII.G.6** to reflect the addition of the fugitive emissions’ air pollution control equipment (i.e., dust collectors) to be employed by EA when both boilers are shutdown. The revised Condition **VII.G.6** reads as follows:

“In order to prevent the fugitive particulate emissions from the MSW and supplementary fuels unloading, storage, processing, and blending buildings, the Permittee shall maintain these buildings under negative pressure ~~at all times~~ when either one or both boilers are operating. The negative pressure shall be maintained by continuously drawing the exhaust air from these buildings into the municipal waste combustors as combustion air. During times when both boilers are shut down, in order to prevent the fugitive emissions from the MSW and supplementary fuels unloading, storage, processing, and buildings, the exhaust air from these buildings shall be vented to dust collectors.”

**Comment 6:** EA requests that Condition **VIII.A.1.d** of the draft permit should be clarified by removing the expression “when fired alone”.

**Response to Comment 6:** EPA has reviewed the comment and Condition **VIII.A.1.d** of the draft permit and determined that by removing the expression “when fired alone” it would make the permit clearer, and more effective.

Further, it should be noted that, the existing permit Condition **VIII.A.1.e** that reads, “If any amount of the supplementary fuels is combusted, the RDF consumption rate shall be prorated so that the heat input rates limitations specified by this permit for each municipal waste combustor unit are not exceeded.”, provides additional assurance that the RDF consumption rate limit of 2,106 TPD is not exceeded when EA combusts supplementary fuels.

Consequently, EPA agrees with this comment, and the revised Condition **VIII.A.1.d** reads as follows:

“The total combined RDF consumption rate for the two municipal waste combustors units, ~~when fired alone~~, shall not exceed 2,106 tons per day (TPD) based on 12-month rolling average. See section XIII. E. of this permit for detailed explanation on determination of the 12-month rolling average limit.”

**Comment 7:** Condition **IX.D.2** of the draft permit specifies that the RSCR’s “optimal ammonia injection rate”, that is required for achieving the permitted NO<sub>x</sub> and ammonia slip emission limits, to be determined by EA during the municipal combustors’ NO<sub>x</sub> performance tests.

EA states that because of variations in NO<sub>x</sub> loading levels per fuel type, catalyst degradation over time, and other variations in operations from the date of the NO<sub>x</sub> performance test, EA expects that, over time, the required ammonia injection rate will vary from the maximum ammonia injection rate established during the NO<sub>x</sub> performance tests. Therefore, for clarity, EA requests that the word “optimal” in Condition **IX.D.2** to be replaced with “maximum”.

**Response to Comment 7:** EPA concurs with EA's statement that there may be various operation modes (including those mentioned by EA in **Comment 7**) of the municipal waste combustors, which inherently would require varying amounts of ammonia to be injected into the flue gas stream prior to the SCR module(s) of the RSCR unit(s).

EPA has reviewed the comment and Condition **IX.D.2** and determined that using the word “maximum” instead of “optimal” would contribute to the effectiveness of the permit.

EPA agrees with EA’s request to replace the word "optimal" with "*maximum*". Additionally, EPA has added a provision to Condition **IX.D.2** that states that “*once, the maximum ammonia injection rate becomes a permit condition, it shall not be exceeded*”.

However, EPA notes that under the PSD permit conditions, EA, is also required to: 1) monitor on a continuous basis the ammonia injection rate (Condition **IX.D.1.b**); and 2) demonstrate continuous compliance with the ammonia injection rate determined as specified at Condition **IX.D.2**.

The revised Condition **IX. D.2** reads as follows:

"The *maximum* ammonia injection rate required to achieve the NO<sub>x</sub> emissions and ammonia slip limits specified in this permit shall be determined during the NO<sub>x</sub> performance test and shall be submitted to EPA and, if approved, become a condition of this permit; once, the maximum ammonia injection rate becomes a permit condition, it shall not be exceeded".

**Comment 8:** Condition **XIII.E** Steam production rate, and refuse-derived fuel consumption rate "12-month rolling average", describes the calculation method for deriving the "12-month rolling average" limits for the steam production and refuse-derived fuel (RDF) consumption rates. However, in light of changes to the draft permit in response to **Comment 3**, the item should be revised to read: Heat input rate, and refuse - derived fuel consumption rate "12-month rolling average".

The way Condition **XIII.E** is written, there is confusion about how to derive the average limits during times when one boiler is not operating. As an example, while the consumption rate of 2,106 TPD of RDF represents a combined limit for both boilers, Condition **XIII.E.1** specifies that the "Calendar months during which the unit(s) does not operate shall not be included in the 12-month rolling average." Since shutdown of one boiler would be the more prevalent scenario for any shutdown event, and since these events are most likely to last for less than a month, the described method would appear to exclude from the calculation quantities of RDF, which are combusted during normal operating periods in the months when a shutdown occurred. EA believes that the above-described method is an arbitrary exclusion, which could be viewed as potentially skewing the calculation. EA requests the following:

- a. To simplify the calculation methodology for demonstrating compliance with the heat input rate and, RDF consumption rate limits by proposing a revised language for Condition **XIII.E.2** and **3**; and
- b. To remove Condition **XIII. E.1** provision that excludes the boiler "non-operating" calendar months from the calculation of the "12-month rolling average" limit;

**Response to Comment 8:** EPA agrees that the permit should be clarified regarding the calculation methodology that should be used for demonstrating compliance with the "12-month rolling average" heat input rate and RDF consumption rate limits. Therefore, EPA has revised Condition **XIII.E.2** and **3** by including the language proposed by EA. This revision (i.e., clarification), however, does not change the substance of the permit's monitoring requirements.

Furthermore, in order to address EA's concerns regarding the exclusion of the calendar months in which the boilers do not operate from the calculation of the "12-month rolling average", EPA has removed the reference to the exclusion of the boilers' non-operating months from Condition **XIII.E.1** However, EPA believes that based on the Condition **XIII.E.1** revised language, it is clear that boilers' operating calendar months with zero boiler operating hours are not included in the "12-month rolling average" calculation. The revised Condition **XIII. E.1** reads as follows:

- E. ~~Steam production rate~~ *Heat input rate*, and refuse-derived fuel consumption rate “12-month rolling average” limit.
1. The “12-month rolling average” limit as used in this permit shall mean the *average* of the 12 successive *calendar* months of the municipal waste combustors units' operation. ~~Calendar months in which the unit(s) does not operate shall not be included in the 12-month rolling average.~~
  2. The “12-month rolling average” of *heat input rate (MMBTU/hr)* shall mean the average *MMBTU/hr* determined at the conclusion of each *calendar* month, by calculating:
    - a. For each municipal waste combustor unit, the *sum of the hourly heat input rate during the calendar month (while the boiler is operating on RDF or WDF) divided by the number of hours of operation within the month* to obtain a monthly *heat input (MMBTU/hr)* average; and
    - b. The average *heat input rate (MMBTU/hr)* of the current month and the previous 11 successive months to obtain the 12-month rolling average *heat input rate (MMBTU/hr)*.
  3. The “12-month rolling average” RDF consumption rate (TPD) shall mean an average consumption rate determined at the conclusion of each calendar month by calculating:
    - a. For each ~~hour~~ the municipal waste combustor unit(s) *the sum of tons of RDF is operating on the arithmetic average of all hourly consumption rates for each operating day combusted during the calendar month, divided by the number of days within the month* to obtain a monthly ~~of a given calendar month~~ RDF consumption rate (TPD) average; and
    - b. The average RDF consumption rate(s) of the current month and the previous 11 ~~consecutive~~ *successive* months to obtain the 12-month rolling average RDF consumption rate (TPD).

### **C. Comments from Puerto Rico Environmental Quality Board on Draft Permit Conditions**

Puerto Rico Environmental Quality Board ("PR EQB" or "Commenter") submitted the following comments.

**Comment 1:** Condition **VII.A. 5.b** of the draft permit specifies that, "except for warm-up and shutdown, each municipal waste combustor unit shall only be allowed to operate at 500 MMBtu/hr based on a 12- month rolling average". However, the 500 MMBtu/hr heat input rate should be a minimum or maximum value; as written, it is a fixed value, which does not consider variations in the process.

**Response to Comment 1:** EPA agrees with the commenter's suggestion. It should be noted that a similar comment was also made by EA. See Section **II. B Response to Comment 2**, of this document. EPA has revised Condition **VII.A.5.b** to read as follows:

"Except for warmup and shutdown, each municipal waste combustor unit shall ~~only be allowed to operate~~ not exceed at 500 MMBtu/hr, based on a 12-month rolling average. Compliance ..."

**Comment 2:** The last sentence segments in Conditions **X.D.1.a** and **b**. should read "based on 12-month rolling total."

**Response to Comment 2:** EPA considered the commenter's request. However, since Condition **X.D.1.a** and **b** already contained the "based on 12-month rolling total" language, no change was necessary in response to this comment.

**Comment 3:** Condition **XV. 4** should read that "All malfunctions of any emission unit must be reported within 24 hours by telephone or e-mail to the Chief of Inspection and Compliance Division of the PREQB office listed below."

**Response to Comment 3:** EPA agrees with the commenter and will revise Condition **XV. 4** accordingly.

**Comment 4:** Condition **XV. 6** and **8**, should list the following PR EQB personnel contact information:

Chief, Compliance and Inspection Division Air Quality Area  
Puerto Rico Environmental Quality Board  
P.O. Box. 11488  
San Juan, PR 00910  
(787)767-8181  
e-mail: [complianceAQA@jca.pr.gov](mailto:complianceAQA@jca.pr.gov)

**Response to Comment 4:** EPA concurs with the commenter and will revise the permit's Condition **XV.6** and **8** accordingly.



### III. REVISIONS TO DRAFT PERMIT INITIATED BY EPA

**Revision 1:** EPA increased the frequency of performance testing for the municipal solid waste combustor organics (measured as dioxin and furans) ("dioxin and furans" or "D/F) emissions from once per calendar year, as it is required in the draft permit, to once per calendar quarter.

A significant number of commenters have expressed concerns regarding the possible health effects of D/F emissions and the commenters have requested that EA should demonstrate compliance with D/F emissions limit with continuous monitoring system. However, as explained in **IV.D.1 Response to Comment 1**, of this document, currently, there are no EPA performance specifications for continuous automated sampling system or continuous emissions monitoring system to measure D/F emissions discharged to the atmosphere from the stationary sources such as the EA's project.

It should be noted, that the D/F emissions monitoring requirements contained by the EA's PSD permit are consistent with EPA's regulations and guidance and have been successfully employed by other PSD municipal solid waste combustion facilities. However, EPA has increased the frequency of the D/F performance testing, because more frequent testing will provide more assurance that EA is operating within the D/F permitted emission limit. The final permit contains the following new requirement:

Condition **XI. 11.** Following the date of the initial performance test, the Permittee shall conduct performance tests as follows:

c. On a calendar quarter basis:

iii. For D/F emissions( Boiler 1 and Boiler 2);

iv. The D/F performance test shall be performed quarterly on each combustor for the first three (3) years of operation. The reduction of the frequency of the performance tests for D/F, from once per calendar quarter to once per calendar year, may be authorized by EPA in its discretion, provided that each one of the twelve (12) quarterly performance test over the first 3-year period indicate that D/F emissions are less than or equal to 7 nanograms (ng)/dscm @7% O<sub>2</sub>. In the event that any subsequent calendar year performance tests (if authorized by EPA) indicates that the D/F emissions exceed 7 ng/dscm@7% O<sub>2</sub>, the Permittee shall return to the quarterly performance test requirement.

**Revision 2:** EPA added the requirement to use continuous emissions monitoring system (CEMS) to measure hydrogen chloride (HCL) instead of conducting the annual performance test for HCL, as was required by the draft PSD permit.

EPA notes that, currently, there are no EPA performance specifications for CEMS to measure HCL emissions resulting from municipal solid waste combustors, and therefore no HCL CEMS are required in draft permit. However, EPA estimates promulgating HCL CEMS performance

specification, by the end of calendar year 2014. Consequently, EPA has determined that it would be appropriate to include the use of HCL CEMS in the PSD permit, at this time.

The final permit contains the following new requirement:

**Condition XII. 1.f. Continuous Emissions Monitoring/Continuous Opacity Monitoring**

*In the event EPA promulgates HCL CEMS performance specification before the end of calendar year 2014, the Permittee shall install, calibrate, maintain, and operate CEMS to measure stack gas HCL. Before using CEMS for HCL, the Permittee shall comply with all notifications requirements of 40 CFR Part 60. 58 b (n). In the event that no EPA HCL CEMS performance specifications are promulgated before the end of calendar year 2014, the Permittee shall conduct HCL annual performance test, as it is required at Section XI. A.11.b.i of this permit.*

**Revision 3:** EPA added a footnote (i.e., footnote 1) for the municipal waste combustor organics (measured as dioxins and furans) listed in the table that shows the annual facility emissions limits, which is contained on page 7 of the final permit. The purpose of the footnote is to include the complete definition of municipal waste combustor organics as contained in 40 CFR 52.21(b) (23) (i). The final permit contains the following footnote:

Municipal waste combustors organics (measured as dioxin<sup>1</sup> and furans<sup>1</sup>)

<sup>1</sup> *Based on the definition of municipal waste combustors organics at 40 CFR-52.21 (b)(23)(i) the, "dioxin" shall mean total tetra-through octa-chlorinated dibenzo-p-dioxin, and "furans" shall mean total-tetra-through-octa-chlorinated dibenzofurans.*

**Revision 4:** EPA revised the existing permit condition VIII.A (1) (b) "Fuel Requirements/Municipal Waste Combustors/Primary Fuel: Refuse Derived Fuel", by adding language that would clarify that Puerto Rico requires municipalities to establish a recycling plan under 12 L.P.R.A. Section 1320b, and to specify conditions under which EA can accept municipal solid waste in a manner consistent with 12 L.P.R.A Section 1320b. This language is, therefore, consistent with the Puerto Rico's recycling goals and the intent of condition VIII (A) (1) (b) on source separation. The final permit contains the following requirement:

**Condition VIII.A. (1)(b):** The Permittee shall use exclusively municipal solid waste that includes items and materials that fit within the definition of municipal solid waste contained in 40 CFR Part 60.51b. *With respect to municipal solid wastes supplied from municipalities, the Permittee shall accept municipal solid waste only from municipalities that: (i) have established a Recycling Plan under 12 L.P.R.A Section 1320b that has been approved by the Puerto Rico Solid Waste Authority ("SWA") or are participating in a municipal consortium with a Recycling Plan approved by the SWA; or (ii) do not have such an SWA-approved Recycling Plan, but are covered by an order or other resolution issued by the SWA pursuant to 12 L.P.R.A Chapters 127 or 127A directing such municipality to submit its Recycling Plan to the SWA for its evaluation and approval and the time allotted for the submittal of such Recycling Plan has not expired.*

#### **IV. COMMENTS FROM PUBLIC THAT DO NOT REFERENCE SPECIFIC PERMIT CONDITIONS**

##### **A. Municipal Solid Waste and Supplementary Fuels**

**Comment 1:** The commenters state that the draft PSD permit allows for the use of 1,514 TPD (330 TPD of TDF + 286 TPD of ASR + 898 TPD of PUWW) of supplementary fuels or 72 % of the 2,106 TPD combustors' capacity, and therefore, the primary fuel is not the MSW (or RDF), but the supplementary fuels.

**Response to Comment 1:** Condition **VIII.A.3.c** of the PSD permit allows for the combustion of supplementary fuels, only in combination (mixture) with the RDF. Further, Condition **VIII.A.3.e** of the draft permit allows that only one type of supplementary fuel be present in the mixture with RDF at any give time. Additionally, Condition **VII.A.5.a** of the PSD permit restricts the heat input rate of each combustor to 550 MMBTU/hr and to 500 MMBTU/hr based on 12-month rolling average. Thus, given the higher heating value of the supplementary fuels, the hourly, as well as daily, amount the supplementary fuel present in the mixture must be adjusted, so that the combustors comply with the heat input rate limits.

In conclusion given the permitted amount of each supplementary fuel (Condition **VIII.A.2.a, b, and c**), and the restrictions imposed by the PSD permit Conditions **VIII.A.3.c, VIII.A.3.e** and **VII.A.5.a**, described above, the MSW (RDF) will be the primary fuel and the amount of supplementary fuel used will be far less than 1,514 TPD.

**Comment 2:** The commenter requests clarification if during the permitting process, EPA has taken into consideration the metal emissions generated in the area where the hammers (i.e., shredders) shred the incoming trash.

**Response to Comment 2:** EPA has considered the emissions from the shredders. The shredding activities of the municipal solid waste will take place in enclosed buildings, and maintained under negative pressure. The exhaust air from these buildings, including any particulate emissions that may result from the shredders, would be continuously drawn into the combustors as combustion air. In the unusual event that both combustors are shutdown, the exhaust air from these buildings will be vented to dust collectors. The commenter is referred to Condition **VII.G.6** of the PSD permit.

**Comment 3:** Several commenters provide comments related to supplementary fuels. Some commenters inquire regarding the composition of ASR, PUWW, and TDF, which will be combusted by the project. One commenter states that the amount of ASR that could be mixed with RDF must be established, precisely. Other commenter alleges that, while, combusting ASR, the EA's combustors would generate less than 52 MW of electrical power. One commenter claims that EA cannot combust rubber because the municipal waste combustors are not suitable for fuels of higher heating value such as rubber.

**Response to Comment 3:** EPA notes that the commenters do not challenge the EA's MSW combustors' proposed emission limits or object to any draft permit conditions.

The permit conditions specifying the composition of each supplementary fuel are included in the PSD permit at **VII.A.2** and **3**. The permit condition specifying the amount of ASR that can be blended with RDF is included in the PSD permit at **VII.A.2.a.ii**.

With respect to the comment on the electrical power generated from combustion of ASR, it is unclear, whether the commenter assumes that ASR will be combusted alone. However, for clarification, EPA notes that based on the PSD permit conditions, the ASR (and other supplementary fuels) could only be combusted mixed with RDF, and not alone. Additionally, since the draft permit does not establish limits in terms of electrical power generated (MW), it is unclear to us, how the comment concerning the 52 MW of electrical power relates to the PSD permit conditions.

Since, the comment on the rubber's heating value, does not include any specific information, it is unclear to us what fuels containing rubber is the commenter referring to. However, for the purposes of this response, we assume that the comment was intended to refer to TDF and ASR. The PSD permit establishes heat input rate limits (See Condition **VII.A. 5**) that apply at all times, including during combustion of the mixture RDF and TDF or ASR, and these heat input rate limits account for the higher heating value of the supplementary fuels such as ASR and TDF. Therefore, in order to comply with the heat input rate limits, the permit also establishes limits for ASR or TDF that could be mixed with the RDF.

**Comment 4:** Several commenters express concern about the potential health effects associated with the emissions resulting from supplementary fuels. One commenter expresses concern regarding the effectiveness of the project's control technologies in reducing the pollutants resulting from the combustion of supplementary fuels.

**Response to Comment 4:** EPA notes that the commenters do not identify which pollutants resulting from the supplementary fuels are of concern to them, and therefore, we cannot determine whether those pollutants would be regulated under the PSD permit.

The PSD permit does only allow for the combustion of the supplementary fuels in combination with the MSW, and not separately, and only one supplementary fuel is allowed to be in the mixture with MSW, at any given time. Consequently, the PSD permit does not establish separate emissions limits for the combustion of supplementary fuels. EA will be required to comply with the same limits, regardless of whether EA will combust a mixture of MSW with supplementary fuel (s), or MSW alone.

Furthermore, the PSD permit establishes BACT limits only for those pollutants resulting from the mixture of MSW and supplementary fuel(s) or MSW alone, which are PSD pollutants. Other pollutants, although, resulting from the mixture of MSW and supplementary fuel (s) or MSW alone cannot be regulated through the PSD process, because they are not PSD pollutants. These non-PSD pollutants, however, will be addressed by the State permit issued by PR EQB, and they will be controlled through air pollution control equipment that the PSD permit requires of EA.

With regard to the health effects associated with all pollutants resulting from the EA's combustors, the commenters are referred to Section **IV.K Response to Comment 1**, Section

**V.A. Response to Comment 1**, and Section **IX. A** and **F**, and Section **X.E.1** and **2**, of this document.

With respect to the comment on the effectiveness of the control equipment in reducing pollutants from supplementary fuels, EPA notes that the PSD permit (Condition **VIII.A.4**) does not allow EA to combust any of the supplementary fuels until EA verifies the effectiveness of the control technologies in reducing the pollutants resulting from supplementary fuels, so that the emissions limits established in the PSD permit will be met, while combusting the mixture of MSW and supplementary fuel(s). The PSD permit does not allow for less stringent emissions limits when EA combusts supplementary fuels.

## **B. Warmup and Shutdown**

**Comment 1:** Several commenters address comments regarding warmup (i.e., startup) and shutdown events. The commenters state that the number of warmup (or startup) and shutdown events included in the draft PSD permit is greater than the number of these events included in the PSD application. Some commenters, inquire whether the warmup and shutdown periods include unexpected (i.e., unplanned) events or accidental interruptions, and if EA would be exempt from compliance with the emissions limits established in the draft PSD permit during the warmup, shutdown, and unexpected events. Furthermore, some commenters request information as to whether the air pollution control equipment will be operated during the warmup and shutdown periods.

Some commenters state that the draft PSD permit does not require EA to measure emissions resulting during the warmup and shutdown periods, and the warmup and shutdown emissions represent an unjustifiable risk to health and the environment. The commenters add also, that, recent studies show that emissions resulting during warmup and shutdown could be three times higher than the emissions resulting during normal operation.

**Response to Comment 1:** There is no increase in the total number of warmup and shutdown events proposed in the PSD permit, for the two combustors, combined, beyond the number of these events in the PSD application. The application proposes 16 warmup and shutdown events for each combustor per year; since there are two combustors, the total number of warmup and shutdown events proposed in the application is 32 events for the two combustors, combined, per year. Condition **VII.A.7.a** of the PSD permit limits the total number of warmup and shutdown events per year for the two combustors, combined, to 32 events.

The warmup and shutdown periods do not include unexpected events or accidental interruptions and there is no provision in the permit that allows EA to avoid compliance with emissions limits during unexpected events or accidental interruptions. As required in the PSD permit, the duration of a warmup event is limited to 7 hours, and the duration of a shutdown event is limited to 6 hours. Condition **VII. A.7.e** of the PSD permit requires EA to record the time, date, and duration (in hours and minutes) of each warmup and shutdown event. No municipal solid waste (RDF) or supplementary fuels will be combusted during warmup and shutdown. During warmup and shutdown, the two combustors' auxiliary burners will be fueled, exclusively, by ultra low sulfur distillate fuel oil No.2 (with sulfur content in fuel of 15 ppm).

The PSD permit provides no exemption from complying with the BACT emissions limits established in the PSD permit for the warmup and shutdown periods. The PSD permit does not establish less stringent emission limits for unexpected events or accidental interruptions (See Section **IV. C Response to Comment 1** of this document) and the PSD permit is clear that any exceedances of the permit emission limits shall be considered violations of the applicable emissions limits. (See Condition **XV.1** of the draft permit). The BACT emissions limits for the two combustors are specified at Condition **X.A.1** through **14** of the draft permit. Furthermore, for almost all PSD-regulated pollutants, the emissions limits and their averaging periods, established in the PSD permit for warmup and shutdown periods, are identical with the normal operation emission limits. The only exceptions are for warmup emissions of NO<sub>x</sub> and CO, where the PSD permit does not require compliance with the NO<sub>x</sub> and CO ppmvd @7% O<sub>2</sub>, and with the NO<sub>x</sub> and CO lb/hr limits, which are required during normal operation. For warmup events, the PSD permit establishes separate NO<sub>x</sub> and CO BACT limits expressed as lb of NO<sub>x</sub> per 7-hour warmup event, and respectively lb of CO per 7-hour warmup event (lb/7 hr). Nevertheless, EPA notes, that, the BACT warmup CO emission limit, although expressed as lb/7 hr, if the limit is converted on an hourly basis, it is more stringent than the lb/hr CO limit during normal operations.

The reasons EPA proposed separate emission limits, that would apply during warmup events, are as follows: 1) the temperature in the SCR module of the RSCR, at least for the first 5-6 hours of the warmup event, is not high enough to fully atomize the aqueous ammonia, and therefore to effectively control NO<sub>x</sub> emissions; 2) the temperature in the Oxidation Catalyst module of the RSCR, during the early phase of the warmup event, may not be sufficient to effectively control CO emission; and 3) there may be variability in the exhaust flow rates during warmup.

In addition, since the boilers will only combust ultra low sulfur distillate fuel oil, EPA does not expect that the emissions during warmup and shutdown would be higher than during normal operation except that, as explained above, the lb/hr of NO<sub>x</sub> emissions during warmup could potentially be higher than the NO<sub>x</sub> lb/hr during operation. Also, EPA notes, that, given the use of fuel oil, EPA expects no D/F emissions and very low metals emissions (even lower than the already low emissions rates expected during normal operation) resulting from warmup and shutdown.

EA will be required to operate all air pollution control equipment, on a continuous basis, including during warmup and shutdown periods. During warmup periods, however, in order to ensure that RSCR will work optimally and the ammonia solution will be fully atomized to prevent the formation of the ammonia slip emissions, Condition **VII. A. 7.f** of the PSD permit specifies that, "RSCR and ammonia injection shall be operated no later than when the inlet gas temperature to the RSCR unit reaches 290<sup>0</sup>F."

In regard to the commenters' assertion that the draft permit does not require measurement of the warmup and shutdown emissions, EPA notes that Condition **VII. A. 7.d** specifies, "during warmup and shutdown EA shall operate the continuous emissions monitoring systems (CEMS), continuous opacity monitoring system (COM), and other continuous monitoring systems and devices required by the permit."

With respect to the commenters' assertion that the warmup and shutdown emissions would be higher than the normal operation emissions, it is important to note, that, EPA was not provided information to demonstrate that, for this project, the warmup and shutdown emission would be higher than the normal operation's emissions. Based on EPA's review, and explained above in this response, the project's warmup and shutdown emissions, while using fuel oil and operating the control equipment, will not be higher than the normal operation emissions, except possibly for NO<sub>x</sub>.

EPA notes, however, that the project's warmup and shutdown emissions were modeled and it was determined that these emissions would not pose any risk to the health and the environment. The model demonstrated that there would be no threat to the NAAQS and PSD increment.

**Comment 2:** First, the commenter asks if EPA knows the reason why EA has requested an increased number of startup (i.e., warmup) and shutdown events. Further, the commenter states that Unit 3 of the SEMASS plant (Massachusetts) has experienced the greatest number of shutdowns out of the three-combustor units operating at the plant. The commenter questions, if, the reason for the higher number of shutdown events is because of the catalyst (which controls Unit 3's emissions) contamination caused by exhaust gases resulting from the MSW combustion. Additionally, the commenter asks if: 1) the proposed EA catalytic control is similar to the one used at the SEMASS plant; 2) EPA examined, as part of the permitting process, the SEMASS plant operational records related to the Unit 3's shutdown events, and estimated whether the EA's proposed project would encounter similar shutdown issues as Unit 3 at SEMASS; and 3) the SEMASS' catalytic control is similar to the one at Power Plant in Cambalache, PR.

**Response to Comment 2:** The commenter poses questions rather than a comment. With respect to the first question about the number of warmup and shutdown events, the commenter is referred to Section **IV.B. Response to Comment 1** of this document.

EPA was not provided information to support the statement made regarding the Unit 3 shutdowns. Regardless, EA's proposed NO<sub>x</sub> control equipment is not similar to the control equipment used by Unit 3 at SEMASS. While the control equipment employed by the Unit 3 of the SEMASS plant is identified as a selective non-catalytic reduction ("SNCR") system, the control proposed by EA is a regenerative selective catalytic reduction (RSCR) system. Therefore, the SEMASS plant operational records related to the Unit 3 shutdown events would not be particularly helpful to examine in this case. Moreover, EPA notes that any exceedance of the number of warmup and shutdown events specified in the EA's PSD permit will be considered violation of the permit condition. Additionally, we note that EPA's BACT decision for NO<sub>x</sub> and other pollutants was not simply based on SEMASS plant, but rather on a careful review of all recent BACT decision for other municipal waste combustors, that EPA was aware of.

With respect to the last question posed by the commenter, Unit 3 catalytic control is not similar to the catalytic control at the Power Plant in Cambalache. See Section **IV.H.13 Response to Comment 1** of this document for more details on the PREPA Cambalache plant.

## C. Upset Events

**Comment 1:** The commenter requests clarification regarding the number (per year) and duration (hours and minutes per event) of the combustors' major upset events, and the major events' air pollutants emissions limits as proposed in the draft PSD permit. The commenter asserts that the combustors' actual emissions will exceed the permitted emissions limits because: 1) the permitted limits do not account for the emissions resulting during the major upset events; and 2) the performance tests are not representative for all combustors' operating conditions, such as combustors' major upset events.

**Response to Comment 1:** The PSD permit does not include specific exemption from the permitted emissions limits (including opacity) during malfunction or upset events (i.e., periods). Based on the PSD permit conditions, all emissions in excess of the permitted limits, regardless of whether these emissions are potentially due to malfunctions or other events are considered violations of the permit. The PSD permit (Condition **XV**) requires EA to report promptly all malfunctions, and to submit written reports of all excess emissions events that should include detailed information regarding the nature of these events, their duration, and the amount of emissions. Thus, EPA has not placed a limit on the number and duration of malfunctions/upsets because there is no exemption from the BACT emission limit during those events.

While the PSD permit does not grant any exemption from compliance with the permit BACT limits during malfunction or upset periods, EPA recognizes that such events, when the air pollution controls do not effectively control the emissions, could occur infrequently. Nevertheless, since under the PSD permit, any emission excursion can be considered a violation, the potential for enforcement provides a strong incentive for maintaining the pollution control equipment and avoiding malfunctions or upset periods, and minimizing emissions.

EPA notes that, new MWC facilities, such as the EA's project, are regulated by NSPS Subpart Eb of 40 CFR 60 (Subpart Eb), which requires the use of good combustion practices (combustion efficiency), and imposes requirements for operating training and certification of the facilities' operators, and the development of a site-specific operating manual (40 CFR 60.54b). All these requirements are designed to ensure that: 1) the municipal waste combustors are properly operated (i.e., within the standards), thereby avoiding the occurrence of the upset events; and 2) any upset events are properly handled, thereby reducing the duration of these events, if they were to occur. The Subpart Eb requirements will be included in the State permit issued by PR EQB.

Further, the EPA regulations<sup>1</sup>, and guidance<sup>2</sup>, recommend that performance tests should be performed under representative conditions, but without creating an unsafe condition. EPA believes that it would not possible to conduct tests during malfunction, without creating an unsafe condition for those conducting the test and for the source (e.g., combustors). Condition **XI.A.5** of the PSD permit requires representative conditions as well. Moreover, EPA does not require sources to intentionally operate in a manner for testing purposes that would cause violations of permit limits.

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<sup>1</sup> See 40 CFR 60.8 (c)

<sup>2</sup> US EPA Office of Enforcement and Compliance, "Issuance of the Clean Air Act National Stack testing Guidance", April 27, 2009, Memorandum, from Lisa C. Lund, Director, Office of Compliance.



## D. Air Pollutants

### 1. Dioxins and Furans Emissions

**Comment 1:** Several commenters inquire regarding the monitoring requirements for the dioxin and furans (D/F) emissions. One commenter states that the PSD permit should require the use of a continuous sampling and analysis system for monitoring of dioxin/furans emissions (D/F), because technologies used to continuously measure D/F emissions have been employed at the European MSW combustors since 1990. Another commenter asserts that, even though there are technologies for measuring D/F emissions, which were verified by the EPA's Environmental Technologies Verification (ETV) Program, the draft permit does not contain continuous emissions monitoring requirements for the D/F emissions. One commenter requires clarification regarding the D/F emissions pollution control equipment required by the draft PSD permit.

**Response to Comment 1:** The PSD permit establishes monitoring requirements, which have been successfully used as reliable indicators of the compliance with the D/F permitted limits at US municipal waste combustors. Specifically, the permit requires: 1) quarterly D/F performance tests (See Condition **XI. A. 11.c.iii** and **iv** of the permit, and Section **III. Revisions to Draft Permit Initiated by EPA, Revision 1**, of this document); and 2) continuous monitoring of the activated carbon and lime injection rate, and fabric filters' inlet flue gas temperature. EPA believes that the above monitoring requirements, along with the recordkeeping and reporting requirements represent the most reliable measures, which are currently recognized by EPA, for ensuring continuous compliance with the D/F emission limit.

It is not clear whether the commenter requesting a “continuous sampling and analysis system” is requesting a continuous automated sampling system (CASS) or a continuous emissions monitoring system (CEMS). Therefore, for the purposes of this response, EPA will assume that the commenter is requesting either a CEMS or a CASS.

The EPA's ETV Program verifies the performance of innovative technologies (e.g., monitoring technologies, pollution control products) having the potential to improve protection of human health and the environment. However, the EPA's ETV program does not endorse, certify, or approve technologies, nor does the existence of the ETV's verification (of innovative technology), means that EPA has a performance specification for a particular CEMS or CASS.

The EPA's performance specifications are used for "evaluating the acceptability of the CEMS or CASS at the time of or soon after the installation, or whenever specified in the regulations"<sup>3</sup>.

While there are EPA ETV verified D/F emissions monitoring technologies, and there may be technologies measuring continuously D/F emissions employed at some European facilities, EPA does not currently have a performance specification for CEMS or CASS to measure D/F from combustion sources such as EA's project. EPA could use the CEMS or CASS results to determine compliance with the BACT emission limits established in EA's PSD permit on a continuous basis. However, because compliance determinations are based on the CEMS and/or

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<sup>3</sup> See “Performance Specifications and Other Monitoring Information” available at <http://www.epa.gov/ttn/emc/monitor.html>.

CASS results, using data produced by any CEMS or CASS not evaluated and accepted by EPA (i.e., without performance specifications) may not be indicative of the actual emissions generated by a source, such as EA's project.

The commenter references some form of continuous sampling and analysis system, which was used in Europe, but does not reference specific equipment, nor is any reference to specific facilities using such systems.

EPA notes that based on the DIRECTIVE 2000/76/European Commission of the European Parliament and of the Council<sup>4</sup>, dated 12/4/2000 on the incineration of waste, which establishes measurements requirements for the air pollutants resulting from the waste incineration plant, the CEMS and CASS for D/F emissions are not among the type of monitoring requirements required for D/F emissions.

The air pollution controls for D/F proposed by the PSD permit include a Turbosorp circulating dry scrubber with lime injection, activated carbon injection system, and fabric filter system. There are also reporting requirements any time the emissions limits are exceeded or when any of the measured control equipment parameters are outside the required range. Additionally, EPA notes that both the selective catalytic reduction and oxidation catalyst module of the RSCR proposed by EA are expected to reduce the D/F emissions.

**Comment 2:** The commenter asserts that while the draft PSD permit allows 18 grams of D/F per year for each combustor, the SEMASS plant limits the dioxin/furans emissions of each combustor to 9 grams per year.

**Response to Comment 2:** The commenter does not identify the source of the D/F limit for SEMMAS' combustors D/F annual emission, and therefore EPA was not able to verify the commenter's assertion. The commenter implies that the limit is in the SEMMAS permit. However, EPA has reviewed the SEMASS plant Title V Permit, which is posted on the Massachusetts Department of Environmental Protection's website, and determined that there are no annual D/F emissions limits established in the permit for any of SEMASS' combustors. According to its Title V Permit, two of the SEMMAS' combustors have a D/F limit of 60 ng/dscm @ 7% O<sub>2</sub> per combustor, and one combustor is permitted at 30 ng of D/F /dscm @ 7% O<sub>2</sub>. Each one of the three SEMMAS' combustors is rated at 375 MMBTU/hr.

The EA's annual D/F emission limit of 18 grams per combustor was determined based on a permitted concentration of dioxin/furans emissions of 10 ng /dscm @ 7% O<sub>2</sub>, a heat input rate limit of 500 MMBTU/hr, and 8,760 operating hours per year. Based on EPA's estimation, the SEMASS' annual D/F emission limit calculated based on the 30 ng, and assuming no restrictions in the annual operating hours, it would be about 34 grams per combustor. Further, the annual D/F emission limit calculated based on the 60 ng, and assuming no restrictions in the annual operating hours, it would be about 68 grams per combustor. Therefore, we disagree with the commenter that SEMMAS' D/F annual limit is lower than the EA's D/F annual limit per combustor.

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<sup>4</sup> [http://europa.eu/legislation\\_summaries/environment/waste\\_management/128072\\_en.htm#amendingact](http://europa.eu/legislation_summaries/environment/waste_management/128072_en.htm#amendingact)

## 2. PM<sub>2.5</sub> Emissions

**Comment 1:** The commenter questions why the draft PSD permit does not require continuous emission monitoring system (CEMS) to measure the municipal waste combustors PM<sub>2.5</sub> emissions.

**Response to Comment 1:** Currently, EPA does not have a performance specification for CEMS to measure PM<sub>2.5</sub> emissions from a stationary source, such as EA, and the commenter did not provide information to suggest that CEMS are available for PM<sub>2.5</sub> emissions. For the PSD permit requirements designed to ensure the municipal waste combustors' continuous compliance with the PM<sub>2.5</sub> emission limits (and other particulate emission limits) the commenter is referred to Section IV. G.1 Response to Comment 1, of this document.

**Comment 2:** The commenter inquires concerning the reasons of the PM<sub>2.5</sub> emissions provisional limit included in the draft PSD permit.

**Response to Comment 2:** As stated in both the draft PSD permit and the Fact Sheet, the reason EPA agreed to adjust the PM<sub>2.5</sub> emission limit is that there is very limited data available regarding the condensable PM<sub>2.5</sub> emissions from municipal waste combustors. Condensable PM means materials that are in a vapor phase at stack conditions, but condenses and /or reacts upon cooling and dilution in the ambient air to form solid or liquid PM immediately after discharge from the stack. The combustors' PM<sub>2.5</sub> emission limit is comprised of both filterable and condensable particulate matter. The PSD permit states that EPA would adjust the PM<sub>2.5</sub> limit, only if EA cannot meet the permit PM<sub>2.5</sub> limit because of the condensable PM<sub>2.5</sub>. A similar approach was taken by EPA in the past in the context of condensable fraction of PM<sub>10</sub> emissions and has been supported by the Environmental Appeals Board (See *In Re AES Puerto Rico L.P.*, 8 E.A.D. 324 (May 27, 1999)). In addition, as EPA explained in the Fact Sheet, the upper limit of the adjustable PM<sub>2.5</sub> limit(s) was modeled and found to comply with the air quality standards.

## 3. Acid Gas Emissions

**Comment 1:** The commenter notes that the draft PSD permit does not require CEMS for H<sub>2</sub>SO<sub>4</sub>, HCL, and HF. Further, the commenter asserts that it is unacceptable that the draft permit does not include requirements for demonstrating continuous compliance with the acid gases permitted limits.

**Response to Comment 1:** The PSD permit establishes monitoring requirements, which have been successfully used, as reliable indicators of the compliance with the H<sub>2</sub>SO<sub>4</sub>, HCL, and HF permitted limits at US municipal waste combustors. Specifically, the permit requires a regimen of annual stack testing for H<sub>2</sub>SO<sub>4</sub>, HCL, and HF, in conjunction with SO<sub>2</sub> CEMS, and continuous monitoring of the operational parameters of the control equipment (i.e., pressure drop, flue gas exit temperature, lime injection rate). Compliance with the SO<sub>2</sub> limit, which as mentioned above is measured by CEMS, is an indicator that the acid gas treatment systems are functioning properly, and it thus serves as good indicator that H<sub>2</sub>SO<sub>4</sub>, HCL, and HF emissions are kept below their permitted levels. There are also reporting requirements any time the emissions limits

are exceeded or when any of the measured control equipment parameters are outside the required range.

EPA does not currently have a performance specification for CEMS to measure H<sub>2</sub>SO<sub>4</sub>, HCL and HF emissions. However, as discussed above, the PSD permit establishes monitoring, and reporting requirements, which we believe represent the most reliable measures, which are currently recognized by EPA, for ensuring continuous compliance with the H<sub>2</sub>SO<sub>4</sub>, HCL, and HF emission limits.

Additionally, EPA notes, that the final permit contains a requirement for the use of CEMS to measure HCL emissions, if EPA's CEMS HCL performance specifications are promulgated by the end of calendar year 2014. For a detailed explanation of the CEMS HCL requirement added to the final permit, see Section **III. Revisions to Draft Permit Initiated by EPA, Revision 2** of this document.

#### **4. Fugitive Particulate Emissions Sources**

**Comment 1:** The commenter states that sweeping of the facility roads and using covered trucks (as proposed in the draft permit), are not sufficient measures for controlling the fugitive particulate emissions. Further, the commenter notes that, while the Fact Sheet states that "all the control measures, monitoring requirements and the BACT emissions limits for PM, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions resulting from the sources of fugitive emissions are included in the draft PSD permit", no such information is included in the draft Permit.

**Response to Comment 1:** EPA was not provided information demonstrating why the draft permit proposed measures are not adequate for the control of fugitive particulate emissions and does not suggest any additional measure.

Condition **VII. G** of the PSD permit contains a comprehensive list of control measures and monitoring requirements for the facility's fugitive emissions; sweeping of the facility roads and using covered trucks are only two of the several measures required by the PSD permit for minimizing the fugitive particulate emissions from the facility's roadways and parking areas. Based on the EPA's determination, the control measures established in the permit represent BACT for the project's sources of fugitive particulate emissions. The BACT emissions limits for fugitive PM, PM<sub>10</sub>, and PM<sub>2.5</sub> could be found at Condition **X. F** of the PSD permit.

## 5. Greenhouse Gases (GHG) emissions

**Comment 1:** Several commenters expressed general concerns with the combustion of MSW as a waste disposal method, due to the GHG emissions resulting from combustion. They state that it does not help addressing the global warming issues.

One commenter criticizes EPA for not including the biogenic CO<sub>2</sub> emissions in EA's annual GHG emissions limit, and asserts that the CO<sub>2</sub> emissions, once released into the atmosphere, have the same effect on global warming, regardless of being biogenic or non-biogenic CO<sub>2</sub>. Additionally, the same commenter questions how EA would measure only the non-biogenic CO<sub>2</sub> emissions, since the facility would emit both biogenic and non-biogenic CO<sub>2</sub> from the same emission point.

Another commenter asserts that the MSW combustors emit more CO<sub>2</sub> per MW-hr than any other source combusting fossil fuels, including coal. Another commenter states that, although burning landfill waste has fewer methane emissions than depositing it in a landfill, methane is not as abundant as CO<sub>2</sub> and is therefore not as responsible for global warming as CO<sub>2</sub>.

**Response to Comment 1:** Combustion of MSW, as well as combustion of fossil fuels, produces CO<sub>2</sub> and other GHGs. However, when combusting MSW (and other organic materials), the portion of the CO<sub>2</sub> generated from the combustion of the biological fraction of the MSW (biogenic CO<sub>2</sub>) may be viewed in certain circumstances as not adding additional carbon to the atmosphere. This is based on the argument that the plants and trees that make up the biogenic portion of the waste removed CO<sub>2</sub> from the air while they were growing, and that CO<sub>2</sub> would otherwise have been emitted to the air as part of the natural carbon cycle upon the death and decomposition of the trees and plants if it had not been combusted earlier as MSW.

In contrast, when fossil fuels are combusted, they release CO<sub>2</sub> that has not been part of the Earth's atmosphere for a very long time (i.e., within a human time scale) and which would have remained sequestered from the atmosphere in the absence of the fossil fuel combustion. EPA is in the process of evaluating the distinction between the combustion of fossil fuel and various types of biogenic materials and whether that distinction justifies treating biogenic CO<sub>2</sub> emissions differently under the PSD program. Pending the outcome of this technical and scientific evaluation, EPA issued a rule entitled "Deferral for CO<sub>2</sub> Emissions from Bioenergy and Other Biogenic Sources under the Prevention of Significant Deterioration (PSD) and Title V Programs" (76FR 43490; July 20, 2011). This rule provides that, for a period of 3 years, the biogenic fraction of a source's CO<sub>2</sub> emissions are not required to be counted or regulated under the PSD and Title V permitting programs. The deferral rule was effective upon publication for permit programs that are implemented by EPA, such as in Puerto Rico. However, since EA's non-biogenic CO<sub>2</sub> emissions are over the "subject to regulation" and PSD major source thresholds, EA is subject to PSD for its GHG emissions. Therefore, the PSD permit requires EA to: (1) continuously monitor the total combustor CO<sub>2</sub> emissions (both biogenic and non-biogenic CO<sub>2</sub>) by using CEMS; (2) measure on a calendar quarter basis the combustors' biogenic CO<sub>2</sub> emissions by using the American Society for Testing and Materials (ASTM) Standard Test

Methods Procedures and Practices<sup>5</sup>; and (3) determine the non-biogenic CO<sub>2</sub> emissions as the difference between (1) and (2). For detailed information regarding the GHG emission limits, and monitoring requirements established by the PSD permit, see Conditions **X.A. 14**, **XI.A.10.a**, **XI.A.11.c**, **XII.1.c**, and **XIII.A** and **F** of the PSD permit.

If EPA considered both the biogenic and non-biogenic fractions of EA's MSW combustor exhaust, the CO<sub>2</sub> emissions would be higher than CO<sub>2</sub> emissions from fossil fuel burning combustion sources. However, as explained above, based on EPA's current regulations, the biogenic fraction of the CO<sub>2</sub> emissions is not included in the GHG emission calculations. EPA estimates of the GHG emissions from the US MSW combustion facilities reveals that when considering only the non-biogenic CO<sub>2</sub> fraction, the MSW combustors generate 1,016 lb CO<sub>2</sub>/MW-hr which is less than coal or oil combustion sources<sup>6</sup>. For comparison, based on EA's PSD Application, the EA's combustors (while combusting, exclusively, MSW) would generate 857.25 lb CO<sub>2</sub>/MW-hr which is less than the EPA's estimates for the US MSW combustion facilities.

Both the combustion of MSW and the decomposition of MSW in landfills produce methane. However, the amount of methane emissions resulting from landfill decomposition is, by far, greater than the amount of methane emissions from MSW combustion. While the methane is not as prevalent as CO<sub>2</sub>, methane's Global Warming Potential (GWP) is 21, while CO<sub>2</sub>'s GWP is 1 (see 40 CFR 98 Table A-1). The GWP reflects the total energy that a gas absorbs over a particular period of time, relative to CO<sub>2</sub>. Gases with a higher GWP absorb more energy per pound than gases with lower GWP and, thus, these gases contribute more to climate change. According to the current GWP values in 40 CFR Part 98, the pound-to-pound comparative impact of methane on climate change is 21 times greater than the impact of CO<sub>2</sub> over a 100-year period. Therefore, avoiding methane emissions from landfills—through waste combustion, recovery techniques, and other methods that reduce methane emissions—would help to reduce the impact of GHG emissions on global climate.

**Comment 2:** The commenter proposes three ways for reducing the world's CO<sub>2</sub> emissions: (1) reducing the working days to four days a week; (2) starting an international no drive day for 52 days per year; and (3) reducing the plastic consumption. Additionally, the commenter inquires when EPA would start implementing a national reforestation project as a measure for balancing the CO<sub>2</sub> pollution.

**Response to Comment 2:** EPA agrees with the commenter about the importance of identifying global solutions to address global warming. However, the commenter has not indicated how these proposals would figure into the PSD permit conditions for Energy Answers. While the commenter's suggestions are not the kind of measures that EPA can include in the PSD permit,

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<sup>5</sup> ASTM D6866-08“Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis”, and ASTM D7459-08“Standard Practice for Collection of Integrated Samples for the Speciation of Biomass(Biogenic) and Fossil-Derived Carbon Dioxide Emitted from Stationary Emissions Sources”, or the most current ASTM version, and following the procedures described at 40 CFR Part 98.34

<sup>6</sup> "Air Emissions from MSW Combustion Facilities" available at <http://www.epa.gov/epawaste/nonhaz/municipal/wte/airem.htm#7>

EPA recognizes the connection between vehicle emissions and climate change, and so the Agency has issued several rules to reduce GHG emissions from motor vehicles (40 CFR Parts 85, 86, and 600). EPA also recognizes the connection between waste and GHG emissions, and the Agency supports a solid waste management strategy that prioritizes source reduction, recycling and composting. With respect to the comment regarding the reforestation project as a measure for balancing the CO<sub>2</sub> emissions, EPA recognizes reforestation as one of the strategy solutions to reduce CO<sub>2</sub> pollution.

**Comment 3:** The commenter states that EA would not know for sure what pollutants would result from the proposed MSW combustors, and the effect of these pollutants on climate change.

**Response to Comment 3:** EPA, has identified the types of air pollutants, both non-GHG and GHG, that a MSW combustor would likely emit.<sup>7</sup> As a result, EPA understands the types of non-GHG and GHG emissions that are included in the EA's PSD permit. While EPA is not able to measure the specific climate change impacts from GHG emissions at a particular source, knowing the Global Warming Potential for the GHG pollutants and EA's GHG emissions information would reflect the relevant impact of GHG's from the proposed EA facility. See also "Inventory of US Greenhouse Gas Emissions and Sinks, 1990-2010", April 15, 2012<sup>8</sup>.

**Comment 4:** The commenter asserts that by granting an air permit to EA would be against the President Obama's policy designed to reduce GHG emissions.

**Response to Comment 4:** President Obama and EPA have initiated many measures to reduce GHG emissions in the United States. Among the measures taken by the Administration is issuance of regulations to address GHG emissions from mobile sources, which had the effect of making GHGs emissions increases from construction and modification of stationary sources subject to regulation under the PSD permitting program. Thus, the EA's PSD permit includes emissions limits for GHGs based on application of the Best Available Control Technology. The GHG emission limits in the EA's PSD permit are consistent with EPA's PSD program regulations and policies. EPA was not provided information to explain which policy of President Obama that the EA draft permit conditions are inconsistent with. Therefore, EPA does not have any basis for altering EA's PSD permit based on this comment.

## 6. Project Emissions Unrealistic

**Comment 1:** The proposed emissions rates for the pollutants from the EA incinerator (i.e., combustors) are meaningless and exist only on paper, because no incinerator in the USA has ever been able to meet the emissions rates listed in the permits. Incinerators have so many problems

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<sup>7</sup> AP 42 Emissions Factors, Fifth Edition, Chapter 2, "Solid Waste Disposal", 40 CFR Part 98, Subpart C, " General Stationary Fuel Combustion Sources"

<sup>8</sup> "Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2010", April 15, 2012, available at: <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2012-Main-Text.pdf>. and <http://epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2012-Chapter-3-Energy.pdf>

that this application by EA and the EPA review completely ignore the real world problems frequently experienced by large municipal waste incinerators.

**Response to Comment 1:** EPA was not provided with information supporting the claim that no US combustor has ever complied with their permitted emissions limits. In any event, EPA disagrees with the commenter's claim, as based on our review, the US combustors largely do comply with their permitted emissions limits. With respect to EA's PSD permit, the PSD permit's limits are achievable through the application of the air pollution controls proposed in the PSD permit.

Furthermore, with regard to the comment about the "the real world problems" it is unclear to us what are the real world problems experienced by the large combustors that EPA allegedly ignored and how these problems relate to the EA's PSD permit conditions. EPA is unable to conjecture about the nature of the commenter's assertion of "real world problems" at large municipal waste combustors. EPA reviewed actual tests from MWC facilities throughout the country, and the data we reviewed indicates that compliance with the permitted limits was achieved.

However, EPA is aware that prior generations of the MWC were frequently perceived as high polluting because they did not have emission control equipment. As we discuss at Section V.A. **Response to Comment 1**, of this document, because of technical innovation in response to EPA's promulgation of Maximum Achievable Control Technology (MACT) standards pursuant to the 1990 CAA amendments, the emissions from the US MWC facilities have decreased dramatically. Because of EPA's actions, the newer generation of large MWC facilities in the US, such as EA's project, can be controlled with significantly better equipment.

## **E. Continuous Compliance with the Emission Limits**

**Comment 1:** The commenters express general concerns as to whether EA would meet its emissions limits on a continuous basis. Further, the commenters inquire whether EPA will perform unannounced inspections, and whether the members of the community will be allowed to participate, along with EPA, during the inspections. One commenter requests the use of a video monitoring of the combustors' stacks to be included as a condition of the PSD permit, and video recordings and the combustors' operational and air pollutants monitoring data to be posted on publicly accessible web sites.

**Response to Comment 1:** The PSD permit, requires a comprehensive set of continuous emissions monitoring systems (CEMS) (for several pollutants), continuous opacity monitoring system (COMS), performance tests (for all pollutants, opacity, and visible emissions), continuous monitoring of the air pollution controls' operating parameters, continuous monitoring of the operating parameters of the combustors, and other emission units, and monitoring requirements of the fuels' composition. These monitoring provisions will help ensure that EA meets the PSD permit emissions limits on an ongoing basis.

In addition, the PSD permit requires EA to record, among other things, the emissions data, the emissions units and air pollution control operating parameters, fuels composition data, and all



instances when EA did not comply with the permitted limits. The PSD permit requires EA to submit to EPA all emissions measurements, and to report any exceedances of the permit limits. While EPA does not typically post data submitted pursuant to PSD permit monitoring and reporting requirements, the public has the right to request it pursuant to the Freedom of Information Act (FOIA), and much of the information is generally within the scope of what the Agency can release under FOIA. The permit limits will apply for the life of the facility, so that the air pollution control equipment will not be allowed to deteriorate over time. EPA trusts that the above-described PSD permit conditions will ensure continuous compliance with the permit limits.

EPA will enforce the PSD permit conditions, and the EPA's inspectors will have the right to visit the facility to inspect it, to take samples, to review EA's actual emissions and other operational records. It is EPA's policy to conduct unannounced inspections. The Clean Air Act, Section 114(a)(2), 42 U.S.C. §7414(a)(2), gives a right of entry at facilities only for authorized representatives of the Administrator of EPA, and only upon presentation of credentials, so EPA cannot invite citizens to come along with EPA personnel to inspections. In addition, there are safety concerns with inspections; for example, EPA inspectors must undergo safety training before conducting inspections.

Video monitoring is not required by EPA regulations and it would not provide us with meaningful data on compliance with emission limits for the specific pollutants addressed in the PSD permit. While a video camera might detect smoke or steam, it would not tell us much about the content of the emissions or lead to information that is practically enforceable. The monitoring and testing requirements in the draft permit are far more accurate, specific, and enforceable.

## **F. Ammonia Storage Tank**

**Comment 1:** Two commenters inquire whether the draft PSD permit establishes requirements addressing the leak prevention, detection, and mitigation measures for the 12,000 gallons ammonia storage tank, including the protections measures for preventing accidental ammonia spills during major floods, earthquakes, and land settlement.

**Response to Comment 1:** These commenters appear to be asking questions rather than recommending changes to the permit. However, EPA notes that the PSD permit requirements addressing the leak prevention, detection, and mitigation measures for the 12,000 gallon ammonia storage tank are found at Condition **VII. E.1. b** through **f** of the PSD permit. In addition, while the PSD regulations do not contemplate a plan for emergency response, under the PR EQB regulations EA is required to submit an Emergency Response Plan, which would identify how EA would respond to fires, catastrophic events such as fires, explosions, etc. Anyone concerned with the EA's plans in case of an emergency should consult the EA's proposed PREQB air permit.

**Comment 2:** Who will be the supplier of the ammonia solution? How many trucks per day or month will be used for the transportation of the ammonia solution to the facility?

**Response to Comment 2:** The commenter appears to be asking questions rather than recommending changes to the permit. However, EPA is not aware of any PSD provisions that would require obtaining information regarding the ammonia solution's suppliers, or regarding the number of trucks needed for the transportation of ammonia solution; transportation details are beyond the scope of the PSD permitting requirements.

## **G. Air Pollution Control Equipment**

### **1. Fabric Filters**

**Comment 1:** The commenters request clarification regarding the: 1) efficiency of the MSW combustors fabric filters in collecting particulates, Pb, Hg, Zn, Cd emissions; and 2) permit requirements designated to ensure continuous operation of the fabric filters, and continuous compliance with the emissions limits. One commenter demands a certification for the fabric filters collection efficiency, by an independent source, other than the fabric filters' manufacturer.

**Response to Comment 1:** The efficiency of the control equipment, including the fabric filters, is an important factor in a PSD permit reviewing process, and EPA considered control equipment efficiency in its review of the EA permit. Consequently, the combustors' particulate BACT emissions limits (expressed as mg/dscm) established in the permit are representative of the expected control efficiency of the filters.

Based on our review of the available technical reports and the fabric filters manufacturer's information provided by EA, the combustors' fabric filters expected efficiency in removing PM, and PM<sub>10</sub>, is better than 99.9%, and for PM<sub>2.5</sub> is 99.99%.

The commenter refers to metals resulting from the combustors such as Pb, Hg, Zn, and Cd, which are not PSD regulated pollutants. Under the PSD regulations, the municipal waste combustors metals are measured by using particulate matter (PM) as a surrogate. Consequently, the draft PSD permit proposes a BACT limit for the municipal waste combustors metals (measured as PM emissions) rather than individual metals. The proposed fabric filters' expected efficiency in removing municipal waste combustors metals, measured as PM, equals the filters expected efficiency in removing PM, of better than 99.9%, as specified above.

Furthermore, EPA notes that the individual metals Pb, Hg, Zn, and Cd will be addressed in the State permit issued by EQB. However, these metals will be controlled through the combustion controls that the PSD permit requires. Anyone concerned with the filters' efficiency in removing individual metals, should consult the EA's proposed PREQB air permit.

In order for EA to comply with the particulate emissions limits, the fabric filters must operate at the expected efficiency. Compliance with the PM, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions limits resulting from the combustors will be verified annually, by using established EPA test methods. Additionally, the PSD permit requires the use of continuous opacity monitoring system (COMS) for measuring the opacity of emissions resulting from the combustors. EPA notes that opacity<sup>9</sup> is

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<sup>9</sup> See EPA's " Basic Information/ Continuous Monitoring System", available at [http://cfpub.epa.gov/oarweb/mkb/Basic\\_Information.cfm#Ambient Air Quality Monitoring](http://cfpub.epa.gov/oarweb/mkb/Basic_Information.cfm#Ambient Air Quality Monitoring)

used as an indicator for the particulate matter emissions limits. Additionally, in order to ensure continuous compliance with the particulate emission limits, and continuous operation of the fabric filters, the PSD permit requires continuous monitoring of the following filters' operating parameters (i.e., variables or parameters) that work as reliable indicators of the filters' efficiency: pressure drop and bag leak detection systems with an audible alarm; flue gas temperature at the inlet of the filters. There are also conditions in the PSD permit, which requires EA to report any events when the emissions limits are exceeded or any of the measured filters' parameters are outside the required range.

With regard to the comment requesting certification of the fabric filters' collection efficiency by an independent source, other than the filters' manufacturer, EPA notes that the EA's PSD permit requires compliance with the numerical emissions limits (mg/dscm) of particulates, rather than compliance with the collection efficiency of the fabric filters. EPA believes that measuring compliance with the numerical emission limits is more appropriate and reliable compliance method, for type of emitting source such as EA, than the filters' efficiency, because testing and monitoring of collection efficiency would have to occur both before and after the fabric filters. Thus, EPA does not see any benefit derived from independent source certification, and the commenter has not provided a justification for needing such certification.

## **2. Turbosorp Dry Scrubber**

**Comment 1:** The commenter asserts that the EPA's Environmental Technologies Verification (ETV) Program has never verified the EA's proposed Turbosorp, and therefore the commenter expresses concerns regarding the Turbosorp effectiveness in controlling the proposed project pollutants.

**Response to Comment 1:** The EPA's ETV Program verifies the performance of innovative technologies (e.g., monitoring technologies, pollution control products) having the potential to improve protection of human health and the environment. The EPA's ETV does not endorse, certify, or approve technologies.

The Turbosorp Dry Scrubber proposed by EA operates similarly to a spray dryer/dry scrubber technology, which has been used by EPA for establishing the maximum achievable control technology (MACT) for the acid gas emissions from various sources, including municipal waste combustors.

EPA notes that the PSD permit requires EA to demonstrate continuous compliance with the permitted emissions limits for the pollutants controlled by the Turbosorp Dry Scrubber. Given the similarity between the Turbosorp Dry Scrubber and the spray dryer/dry scrubber used by EPA to establish MACT, and the permit requirement to demonstrate continuous compliance, EPA has confidence that the emissions will be well controlled.

### 3. Regenerative Selective Catalytic Reduction

**Comment 1:** The commenter asserts that only 60% of the nitric oxide (NO) resulting from the combustors, is removed.

**Response to Comment 1:** EPA was not provided information to support the assertion regarding the 60% NO removal. Further, it is unclear whether the commenter refers to the air pollution control equipment as being only 60% efficient in removing NO emissions, so EPA is uncertain about whether this comment concerns RSCR conditions.

In general, EPA, while characterizing pollutants produced by fuel combustion, refers to NO<sub>x</sub>, which is the generic term to describe the sum of NO, nitrogen dioxide (NO<sub>2</sub>) and other oxides of nitrogen. As provided in the PSD application, the NO<sub>x</sub> air pollution control equipment (Regenerative Selective Catalytic Reduction System or RSCR) control efficiency is about 77%. Consequently, since NO is a component of the NO<sub>x</sub>, EPA has reason to believe that the RSCR would provide the same control efficiency for NO emissions as for NO<sub>x</sub> emissions. Thus, to the extent that the commenter refers to the RSCR removal efficiency, EPA disagrees with the commenter's assertion regarding the 60% NO emissions removal efficiency.

**Comment 2:** The Regenerative Selective Catalytic Reduction (RSCR) has been used since 1970's, and RSCR's operational problems (i.e., catalyst deactivation and failure) are well documented.

Regardless of the activated carbon injection, lime injection, and fabric filter systems located upstream to the RSCR, the pollutants resulting from the combustion of RDF and supplementary fuels will poison or plug the RSCR's pores, which will cause deactivation of the RSCR.

The alkali metals present in the flue gas resulting from the combustion of PUWW (that is a supplementary fuel), and heavy metals present in the flue gas resulting from the combustion of RDF and supplementary fuels will poison the RSCR. The ammonia (NH<sub>3</sub>) slip can react with the sulfur trioxide (SO<sub>3</sub>) forming ammonium sulfates, and with halogens: chlorine (Cl) and bromine (Br) forming ammonium chloride (NH<sub>4</sub> Cl) and ammonium bromide (NH<sub>4</sub> Br) that will plug the RSCR's pores. In addition, the fabric filters are easily clogged and breakdown and, therefore, the uncontrolled PM<sub>2.5</sub> emissions will reach and plug the RSCR's pores.

**Response to Comment 2:** Although the commenter states that the RSCR operational failures are well documented, EPA was not provided examples of facilities that employed RSCR and experienced any of the operational problems mentioned in the comment. Also the commenter does not indicate what control technology would be preferable.

The NO<sub>x</sub> air pollution control equipment included in the EA's PSD permit is identified as RSCR system. While, the RSCR uses the same reagents or reactants (e.g., ammonia, or urea injection) and reaction chemistry to convert NO<sub>x</sub> into N<sub>2</sub> and H<sub>2</sub>O in the presence of a catalyst, as the selective catalytic reduction system (SCR), the RSCR, incorporates a regenerative ceramic bed heat exchanger. While the SCR has been applied to different combustion sources since the early

1970's, based on EPA's information, thus far, the RSCR systems have been developed recently (i.e., much later than 1970's).

EPA acknowledges that over time the SCR and RSCR (or "catalyst") activity<sup>10</sup> decreases causing catalyst deactivation<sup>11</sup>, and, therefore, in order to comply with the NO<sub>x</sub> emission limits (and other emissions limits, as applicable) the catalyst (either the entire catalyst or portions of the catalyst) must be replaced periodically. However, as we will discuss below, several measures can be taken to decrease the rate of the catalysts deactivation.

In a "tail-end" catalyst (either SCR or RSCR) configuration, such as the "tail-end" RSCR configuration proposed by EA, all other air pollution control equipment are located upstream of the RSCR. Consistent with the technical documents we reviewed, the air pollution controls located upstream of the catalysts, remove most of the flue gas constituents that are damaging to the SCR or RSCR before the flue gas enters the catalyst, and therefore, this tail-end RSCR or SCR configuration reduces considerably the catalyst deactivation rate.

The "tail-end" SCR configuration has been employed for the coal-fired boilers. In Europe, tail-end SCR is employed for the municipal solid waste combustion facilities. Additionally, tail-end SCR configuration was recently included in the PSD permit issued on 12/23/2010 for the Solid Waste Authority of Palm Beach, Florida, that authorizes the construction of a 3,000 tons per day municipal waste combustor(s). Furthermore, the tail-end RSCR configuration was employed at several biomass boilers in the US.

The draft PSD permit requires upstream control equipment, such as Turbosorp dry scrubber, activated carbon injection, and fabric filter systems, which will remove alkali and heavy metals resulting from combustion of the supplementary and RDF fuels and from the flue gas before entering the RSCR. Consequently, the possibility of catalyst deactivation caused by alkali and heavy metals poisoning will be greatly reduced.

Furthermore, the PSD permit includes the following conditions for preventing the formation of NH<sub>3</sub> slip: 1) continuous compliance with the permitted ammonia solution injection rate; and 2) injection of ammonia solution into the flue gas only when the inlet gas to the RSCR reaches the minimum temperature, as recommended by the manufacturer. In addition, EPA has informed PR EQB that the EA's State permit should include CEMS to measure NH<sub>3</sub> slip emissions. The Turbosorp dry scrubber and fabric filters will remove the acid gases (e.g., SO<sub>2</sub>, SO<sub>3</sub>, HCl, and HBr) from the flue gas before entering the RSCR. Consequently, by treating the flue gas before entering the RSCR to remove the acid gases, and by preventing the formation of NH<sub>3</sub> slip, as proposed by EA, the formation of ammonium sulfates, ammonium chloride (NH<sub>4</sub> Cl) and ammonium bromide (NH<sub>4</sub> Br), and, therefore, the possibility of catalyst deactivation rate will be greatly reduced.

The commenter assertion that the fabric filters are easily clogged and break down, and thus, the PM<sub>2.5</sub> emissions will plug the RSCR pores, is unsupported by any specific example or technical

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<sup>10</sup> RSCR and or SCR (or "catalyst") activity is defined as a measure of how much the catalyst accelerates the NO<sub>x</sub> reduction reaction rate.

<sup>11</sup> The process of catalysts losing their activity is called catalyst deactivation.

information. Furthermore, the commenter does not indicate what PM<sub>2.5</sub> removal technology would be preferable.

Furthermore, the commenter does not indicate what fabric filters or equivalent control equipment for PM<sub>2.5</sub> removal technology would be preferable.

Nevertheless, EPA has no reason to believe that the fabric filters proposed by EA for controlling the combustors will experience the issues mentioned by the commenter. Moreover, EPA notes that the PSD permit requires continuous monitoring of the filters' operating parameters (pressure drop and bag leak detection systems with an audible alarm; flue gas temperature at the inlet of the filters) so that, any clogging, or breakdown of the filters will be instantly detected.

As shown above, based on EPA's analysis, the tail-end location of the RSCR, in combination with the permit conditions designed to prevent the formation of NH<sub>3</sub> slip, the formation of the constituents damaging to the catalyst will be minimized, and thus, the catalyst deactivation rate will be greatly reduced. As a result, the catalyst will work efficiently, for a longer period of time, without the need for catalyst replacement.

In conclusion, while EPA is aware, that the catalyst deactivation could not be, completely, prevented, the PSD permit establishes requirements that would ensure a decreased rate for the catalyst deactivation. Moreover, the PSD permit requires CEMS for NO<sub>x</sub>, pollutant controlled by the RSCR, and therefore, any potential non compliance issues with the NO<sub>x</sub> emission limit, will be instantly detected.

## **H. Other Comments**

### **1. Disposal of Materials Collected by Air Pollution Controls**

**Comment 1:** There is no information provided in the PSD application materials, Fact Sheet, or draft PSD permit, regarding the disposal method of the: 1) particulates collected by the fabric filters; and 2) solvents used to wash the pollutants trapped on the combustors' equipment.

**Response to Comment 1:** Disposal of the particulate matter or of the cleaning solvents is not regulated under the PSD regulations. However, the disposal of any materials collected from the pollution control equipment will be regulated by the EA's air permit issued by the PR EQB.

### **2. Bypass Vent Stack**

**Comment 2:** The commenter requests clarification whether the design of the EA's municipal waste combustors includes a bypass vent stack, an emergency release pressure valve, or some other bypass mechanism.

**Response to Comment 2:** Based on the EPA's review of the EA's PSD application, the municipal waste combustors' design does not include a bypass vent stack, emergency valve or other bypass mechanism. The PSD permit does not contain any provision that allows EA to bypass the pollution controls.

### **3. Emergency Response Plan**

**Comment 1:** Would EPA require EA to prepare an Emergency Response Plan?

**Response to Comment 1:** See Section IV.F .**Response to Comment 1** of this document.

### **4. Fugitive Ash Emissions**

**Comment 1:** The commenters state that about 25% of the amount of MSW (RDF) combusted is converted to ash, and 10% of the ash generated from the EA's project becomes fugitive ash and goes into the air.

**Response to Comment 1:** EPA was not provided information supporting the statement that 10% of the ash generated from the MSW combustion becomes fugitive ash and goes into the air. Therefore, EPA cannot adequately respond to this comment.

The commenters do not argue that the fugitive ash emissions resulting from the project would impair EA's ability to meet the visible emissions established in the PSD permit for the fugitive ash emissions. Further, the commenter do not challenge the opacity and emission limits established in the PSD permit for the ash emissions resulting from the ash handling, conveying, processing, and storage activities.

However, the permit contains conditions that will minimize the fugitive ash. The ash (bottom and fly ash) generated by the combustors will be collected, handled, and transported, through enclosed conveyors, sealed, and kept under negative pressure. The bottom ash handling, conveying, storage, and processing activities will take place within enclosed buildings. The fly ash will be conditioned (i.e., hydrated) prior to transfer for disposal. To further minimize the particulate emissions, the bottom ash conveyors system, bottom ash processing and storage buildings, and the fly ash silo will be continuously controlled by fabric filters. In addition, the draft permit establishes BACT emission limits for the particulate emission from the exhaust of each fabric filter controlling the ash conveyors, processing buildings, and silo. Moreover, the draft permit establishes opacity limits for the emissions from the fabric filters' exhaust, and for the visible emissions from the ash conveyors systems, and ash processing and storage buildings.

The PSD permit also establishes continuous compliance demonstration requirements with the BACT particulate emissions, opacity of emissions, and visible emissions limits. EPA believes that the requirements established in the draft permit would ensure that the particulate emissions associate with the ash generated by the combustors, are minimized, to the extent possible.

### **5. SEMASS ASR and TDF Actual Data**

**Comment 1:** Several commenters state that EPA has not made available to the public the results from the stack tests conducted by EA at the SEMASS Plant (Massachusetts), while combusting Auto Shredder Residue (ASR), and Tire Derived Fuel (TDF).

**Response to Comment 1:** The actual stack tests data collected while combusting ASR and MSW at SEMASS were provided by EA with a submittal titled " Supplemental to Application: responses to EPA Comments to the PSD Air permit Application (6/2/2011)". The EA's 6/2/ 2011 submittal has been included in the administrative record for the draft PSD permit, and therefore, it was available to the public since May 2011. Other clarifications related to the supplementary fuels, provided by EA, could be found in a document titled " Supplemental to Application: Additional Information for the PSD Air permit Application (9/2/2011)", which was also included in the administrative record prior to the release of the draft permit. EPA notes that no test data was provided by EA for the combustion of TDF, as it appears that no such test was available.

## **6. NSPS Subpart Eb, and Non PSD Pollutants**

**Comment 1:** The commenters inquire regarding the project's pollutants, which are not included in the PSD permit.

**Response to Comment 1:** As explained in the Fact Sheet, the air pollutants resulting from the project that are not subject to PSD will be addressed in the State permit which will be issued by PR EQB. However, these pollutants will be controlled through the same combustion controls that the PSD permit requires. For information related to the emissions limits, monitoring and other requirements for the pollutants, which are not included in the PSD permit, the commenters should consult with the PR EQB Air Quality Department.

**Comment 2:** The commenters inquire regarding the pollutants, which are regulated under the 40 CFR 60 Subpart Eb "New Source Performance Standards for Large Municipal Waste Combustors" ("Subpart Eb").

**Response to Comment 2:** EPA encourages the commenters to consult the Fact Sheet, which explains which pollutants are regulated under Subpart Eb. Additionally, more details can be found in NSPS Subpart Eb, which is available through e-CFR (electronic code of federal regulations).<sup>12</sup>

## **7. Zero Emissions, BACT, and State-of-the-Art Facilities**

**Comment 1:** One commenter states that, "state-of-the art" means zero emissions, and the project emissions are far too high, to be considered "state-of-the art" municipal waste combustors. Other commenters state that, while, EA proposes to install BACT, these technologies are not capable to guarantee zero emissions, and these emissions are a threat for health and the environment.

**Response to Comment 1:** In setting emission limits for a PSD permit, EPA uses the regulatory standard of Best Available Control Technology (BACT). The PSD regulations do not create a presumption that zero emissions is BACT. Rather, BACT is a site-specific determination that

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<sup>12</sup> See Subpart Eb available at <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=87f8848f0eb993990cd758911cece846&rgn=div6&view=text&node=40:7.0.1.1.1.15&idno=40>



results in the selection of an emission limitation representing application of control technology or methods appropriate for the particular facility. The site-specific determination is made in the context of a “top-down” BACT analysis, which EA used in its PSD permit application. The top-down BACT analysis was reviewed by EPA and found to be sound. A review of the EPA's RACT/BACT/LAER Clearinghouse and other MWC facilities' PSD permits issued which are not included yet in the EPA's Clearinghouse reveals that the EA facility is one of the best controlled MWCs in the US, and among the MWCs in the US with the most stringent emission limits. The air pollutants emissions from EA's MWC facility will be well controlled with the use of BACT, and based on EPA's analysis the EA's emissions do not pose a concern for human health. See Section IV. K, Section V.A. **Response to Comment 1**, Section IX. A and B, and Section X.E.1 and 2, of this document.

## **8. MWC Facilities and Renewable Energy**

**Comment 1:** One commenter contends that waste-to-energy facilities, such as the proposed project are not renewable energy source. Further, the commenter asks what the EPA's definition of renewable energy is.

**Response to Comment 1:** It does not appear that the commenter is seeking any change to the draft PSD permit. Nevertheless, EPA notes that MSW is considered a renewable energy source. The Energy Policy Act of 2005 (Section 203) has included MSW-derived electricity as a renewable energy source. Further, the American Recovery and Reinvestment Act of 2009 included a production tax credit for renewable energy, including the energy from MSW. In any event, EA's status (or the status of any other facility for that matter) as a renewable energy source, has no effect of how EPA sets emission limits or establishes permit conditions in a PSD permit.

## **9. Energy Generated by EA MWC Facility**

**Comment 1:** Several commenters assert that EA's project will combust recyclable materials, and the energy generated by combustion will be far less than the energy that would be saved if the materials would be recycled, instead of being combusted.

**Response to Comment 1:** EPA recognizes the energy benefits inherent in EPA's Waste Management Hierarchy. (See Section IV.J.3. **Response to Comment 1** of this document)

## **10. Heating Value**

**Comment 1:** The commenters state that by removing recyclable materials from the waste stream, such as paper, cardboard, plastic, the heating value of the remaining waste, fed to the combustors, it will not be sufficient to ensure an efficient operation for the combustors.

**Response to Comment 1:** EPA recognizes that the heat input rate can be used as an indicator of the combustors' efficiency. EPA acknowledges that the combustor's heat rate input is a function of the heating value of the waste, and the amount of waste fed to the combustor. Further, unlike

fossil fuels, where the fuel's heating value, generally, does not experience variations, the MSW's heating value is rather variable due to the heterogeneous nature of MSW.

In order to ensure an efficient operation for the combustors, the PSD permit requires that each combustor operates, on a continuous basis, between a minimum and maximum heat input rate limit. In order to demonstrate compliance with the combustors' heat input rate limits, the draft permit requires, among other measures, that EA determine on a quarterly basis, using American Society of Mechanical Engineers (ASME) procedures, the heating value of the MSW and the mixture of the MSW with supplementary fuels. Condition **VII.5** of the PSD permit contains the EA's compliance demonstration requirements with the heat input rates limits.

EPA believes that the conditions established in the PSD permit for demonstrating compliance with the combustors' heat input rate limits, on an continuous basis, are adequate, and therefore, compliance with the heat rate limits would guarantee an efficient operation of the combustors.

## **11. Material Balance of MSW Combustion**

**Comment 1:** Several commenters inquire regarding the type and amount of the products of combustion of MSW resulting from the EA's project. One commenter provides a material balance of MSW combustion and states that there are 321, 411 tons per year (TPY) or 42% of the total products of combustion, which resulting from the combustion of 768, 690 TPY of MSW, and which are not included in the draft PSD permit and therefore not regulated by the draft PSD permit .

**Response to Comment 1:** EPA agrees with the commenter's statement that not all of the products of combustion of MSW are included in the PSD permit, as these products of combustion are not required to be part of the PSD permit. Also, we concur with the commenter's assertion that the products of combustion, respectively, water vapors resulting from hydrogen, and from moisture, and the non-biogenic CO<sub>2</sub>, which are not included in the EA's PSD permit, represent around 42% of the total products of combustion resulting from the combustion of 768, 690 TPY of MSW.

## **12. Authenticity of Information**

**Comment 1:** During the permit process with the PR government, EA stated that they will only combust municipal solid waste, however, from the draft PSD permit, it is clear that EA will also use non-MSW, such as TDF, ASR, and PUWW. This is a clear indication that EA could be providing false information. What actions has EPA taken to corroborate the authenticity of the information provided by EA?

**Response to Comment 1:** As specified in the PSD application and all subsequent information provided, the fuels proposed by EA have consistently been MSW and supplementary fuels (ASR, TDF, and PUWW). However, in the case of EA, as in all PSD permit applications, EPA did not take at face value information provided by the applicant. Rather, we conducted a thorough review of the documents and data submitted by EA. After the thorough review of the application documents, we established permit conditions. Ultimately, the permit conditions control the

manner in which the source will be operated and EA must comply with those conditions or face a potential enforcement action.

### **13. Prior Region 2 Permit Modification**

**Comment 1:** The commenter provides a copy of the PSD permit modification issued by EPA to PREPA Cambalache, PR, in 2006, approving the removal of the SCR system because of the concerns related to the elevated ammonia slip emissions. The commenter demands EPA to evaluate how the PSD permit issued to PREPA Cambalache would relate to the proposed project.

**Response to Comment 1:** The PREPA Cambalache situation is different from the EA proposed project, because SCR technology had never been used before at a facility like PREPA Cambalache, and EPA viewed the SCR technology at that time as a technology transfer from another source category. PREPA Cambalache SCR's situation was therefore unique, and Region 2 has never had to remove a NO<sub>x</sub> control technology from a permit due to ammonia slip since then. Meanwhile, SCR technology has been used, for years, at MWC facilities in Europe.

**Comment 2:** The commenters provide several articles on lead health effects.

**Response to Comment 2:** As explained in the Fact Sheet, and elsewhere in this document, lead is not a pollutant regulated under this PSD permit.

## **I. BACT Analysis Process and Questions on PSD Regulations Provisions**

### **1. BACT Analysis Process**

**Comment 1:** One commenter requests clarification as to whether the emissions limitations established in the draft PSD permit represent only Best Available Control Technology (BACT) or both BACT and Lowest Achievable Emission Rate (LAER).

**Response to Comment 1:** As stated in the Fact Sheet, the EA's project emission limits included in the draft PSD permit represent BACT<sup>13</sup>.

**Comment 2:** The commenter first asserts that there is an EPA office in charge of analyzing the technology available, and then the commenter inquires regarding the process that EPA follows in identifying the BACT.

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<sup>13</sup> BACT is defined as, "an emission limitation (including visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Clean Air Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems and techniques including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60 and 61..." (40 CFR Part 52.21(b) (12); CAA, Section 169 (3)).

**Response to Comment 2:** EPA notes that it is unclear to us, which EPA office the commenter is referring to, but EPA's Office of Air Quality Planning and Standards maintains the RACT/BACT LAER Clearinghouse. Regarding the process for identifying BACT, the commenter is referred to the Fact Sheet which includes a summary of the five steps involved in the "top-down"<sup>14</sup> BACT evaluation. For a general overview regarding the process followed by EPA while conducting BACT analysis the commenter may consult: "Draft New Source Review Workshop Manual", October 1990, available at <http://www.epa.gov/region07/air/nsr/nsrmemos/1990wman.pdf>, and the "Guidance for Determining Best Available Control Technology for Reducing Carbon Dioxide Emissions from Bioenergy Production", March, 2011, available at <http://www.epa.gov/nsr/ghgdocs/bioenergyguidance.pdf>.

## 2. Questions on PSD regulations Provisions

**Comment 1:** The commenter refers to several requirements of 40 CFR 52.21 "Prevention of Significant deterioration of air quality" ("PSD") that, as commenter alleges, are applicable to the EA's project, but these requirements are not addressed in the EPA's PSD air permitting review of the project.

**Response to Comment 1:** With the exception of one requirement related to including the fugitive emissions in the potential to emit, all other PSD requirements that the commenter is referring to are related to PSD requirements applicable to existing emission units, and respectively to modifications to existing major stationary sources ( 52.21(b) (3) (ii) (a), 52.21 (b) (3) (iii) (a), 52.21(b) (48) (i) (b), and 52.21(b) (48) (ii) (e)), and not to new major stationary sources. However, as explained in the Fact Sheet, under the PSD regulations, the EA's proposed project is a new major stationary source<sup>15</sup>, and therefore, contrary to the commenter's claim, these requirements do not have to be included in the PSD permitting review. Further, for clarification, the fugitive emissions associated with the EA's project are included in the potential to emit.

## 3. Questions on Air Toxics and LAER

**Comment 1:** The commenter states that the "14 toxics of a toxic substances list " which was provided by EPA as a response to a FOIA request titled "TRI Arcibo 1988-2010" should be

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<sup>14</sup> In brief, the top-down process requires that all available control technologies be ranked in descending order of control effectiveness. The PSD applicant, first examines the most stringent (i.e., or top) technology. That technology is established as BACT unless it is demonstrated by the applicant and agreed upon by the permitting authority (e.g., EPA) that technical considerations, or energy, environmental, or economic impacts justify a conclusion that the most stringent technology is not achievable in that particular case ( e.g. emission unit of a proposed project). If the most stringent technology is eliminated following the step described above, then the next most stringent option (i.e., technology) is evaluated in the same manner as described above, until BACT is determined. (Draft New Source Review Workshop Manual", October 1990)

<sup>15</sup> See 40 CFR 52.21. (b)(1) "Major stationary source" available at <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=5f2b25d1de7e11a0da1dbelbd0ce9a1&rgn=div8&view=text&node=40:3.0.1.1.1.1.19&idno=40>

included in the EA draft PSD permit, and EPA should establish lowest achievable emissions rates (LAER) for these toxic substances, and not only BACT.

**Response to Comment 1:** EPA was not provided the list of the 14 toxics, and therefore it is unclear to us whether the list contains any of the air toxics estimated to result from the EA's project. However, PSD, in general, address air pollutants, other than air toxics.

The commenter is referred to Section **V.A Response to Comment 1** of this document for explanation about the air toxic pollutants estimated to result from the EA's project, and which are included in the PSD permit and in the permit that will be issued by PR EQB permit. However, in order to avoid any confusion, EPA notes that there are no provisions in the PSD regulations that would enable establishing emissions limits for pollutants that are not emitted by the proposed project, which is subject to the PSD review. The limits established in a PSD permit represent BACT. LAER limits are required for criteria air pollutants (such as CO, Pb, NO<sub>x</sub>, Ozone, Particles, SO<sub>2</sub>) emitted by sources located in areas which do not meet the NAAQ for the respective criteria pollutants.

## **J. Municipal Solid Waste, Supplementary Fuels, Recycling, and Materials Separation Plan**

### **1. Composition of MSW**

**Comment 1:** Although the composition of the MSW being combusted influences the type and amount of air pollutants generated, there is no information provided in the Fact Sheet regarding the MSW's composition.

**Response to Comment 1:** EPA notes that the EA's Fact Sheet prepared by EPA follows the requirements set forth at 40 CFR 124 "Procedures for Decision Making". In summary, based on these requirements, a Fact Sheet must contain a description of the proposed facility, the applicable PSD regulations, and an analysis demonstrating how the applicant complied with the requirements, and not all the information supplied by the PSD applicant. Consequently, the information related to the MSW composition was not included in the Fact Sheet. However, this information could be found in the PSD application documents (See "PSD Application 2/4/2011", pages 2-6 and 2-7), which were part of the Administrative Record.

### **2. MWC Facilities (with energy recovery) in the US and worldwide**

**Comment 1:** Several commenters state that they oppose the proposed MWC because waste combustion is no longer practiced or considered a waste disposal method, at the worldwide level, and no construction of a MWC facility has been approved in the US since 1995.

**Response to Comment 1:** There are currently 86 facilities<sup>16</sup>, in the US, that combust waste with energy recovery.

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<sup>16</sup> "Energy Recovery from Waste" available at <http://www.epa.gov/epawaste/nonhaz/municipal/wte/index.htm>

Additionally, based on the EPA's information, thus far, since 1995, in the US, the following MWC facilities have been expanded to handle additional waste and create more energy: Lee County Resource Recovery Facility (FL), added a new 660 TPD combustor (10/13/2003), Hillsborough County Resource Recovery Facility (FL) added a new 600 TPD combustor (10/03/2006), Honolulu Resource Recovery Facility (HI) added a new 900 TPD combustor (12/23/2009), and Palm Beach Renewable Energy Facility (FL) added three new identical combustors rated at 1,000 TPD each (12/23/2010). Additionally, a final air permit to install was issued on 4/3/2009 for Mahoning Renewable Energy, LLC (OH), which is a new MWC facility comprised of two identical combustors rated at 1,000 TPD each.<sup>17</sup>

Furthermore, in the European Union Countries, over the past decade, there has been a drive towards waste-to-energy facilities. The reports<sup>18</sup> show that a large number of facilities commenced operation between 2002 and 2010, with the prediction that a significant number of new facilities will open by 2020.<sup>19</sup>

Consequently, based on the above considerations, EPA disagrees with the commenters' assertion that waste combustion (with energy recovery) is no longer used as a waste disposal method.

### **3. Combustion of Municipal Solid Waste and MSW Recycling**

**Comment 1:** The commenters state that they oppose the proposed MWC facility, because there are better solutions for waste management disposal than waste combustion.

Several commenters state that they are aware of the existing landfills' pollution issues and the fact that the majority of the landfills have reached their useful life and there is not enough space for new landfills on the Island, but they state that waste combustion is neither the better nor the only alternative MSW disposal method.

The commenters assert that the solution for addressing the PR's waste management disposal issues, is through reducing, recycling, reusing, and composting of the waste. Several commenters, state that the path forward in dealing with the PR waste should be through the implementation of the "zero waste"<sup>20</sup> policy.

Some commenters criticize PR government for being irresponsible in management of the solid waste, especially in the sector of implementation of an effective recycling program. Other commenters express their satisfaction regarding the recycling rates achieved in PR, at least by some municipalities.

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<sup>17</sup> The final air permit lists only the maximum rated heat input of the combustors. The 1,000 TPD was calculated by EPA, based on the maximum rated heat input.

<sup>18</sup>Confederation of European Waste-to-energy(CEWEP), Map of European Waste- To-Energy Plants available at <http://www.cewep.eu/information/data/studies/index.html>

<sup>19</sup> Science for Environment Policy, DG Environment News Alert Service, European Commission available at <http://ec.europa.eu/environment/integration/research/newsalert/pdf/275na5.pdf>

<sup>20</sup> As provided by the commenters, "Zero Waste is the design and management of products and processes to reduce the volume and toxicity of waste and materials conserve and recover all resources and not burn or bury them."

Several commenters state that the MWC facilities, such as the proposed project, and recycling activities, are not compatible waste-to-energy management solutions. One commenter states that studies show that municipalities across the US where there are MWC facilities do not recycle well. The commenters conclude that the EA's proposed MWC facility will threaten the recycling efforts in PR, by taking away the raw waste that otherwise could be recycled.

**Response to Comment 1:** EPA encourages, and supports the recycling programs. In the EPA's Waste Management Hierarchy (WMH)<sup>21</sup>, the most environmentally preferable options for waste management are reducing, reusing, recycling, and composting of the majority of wastes. The next option is combustion of the mixed solid waste (not recyclable or compostable) with energy recovery (i.e., waste-to-energy). The least preferred options are landfilling, and incineration (without energy recovery).

Furthermore, on a regional basis, EPA, in an effort to promote recycling and composting, has established a Puerto Rico Recycling Partnership, that brings together all parties interested in creating effective recycling programs in PR.

While EPA's policy promotes recycling and waste reduction, we want to make clear that we believe that the development, and implementation of the waste management plans, including recycling programs, and the decisions of what would constitute the best waste management disposal options (including waste-to-energy facilities) for a community (e.g., municipality, state, etc.) are best made by local and state government(s) ( i.e., PR Solid Waste Management Authority, and local municipalities), and not by the EPA through this PSD permitting action. For instance, the EA project is part of the PR Solid Waste Management Authority, and local municipalities' waste diversion strategy from disposal in landfills. However, we did consider materials separation in the BACT analysis for this permit (see **V.J.5 Response to Comment 1**). EPA's role, through this PSD permitting action, is to review the EA's PSD application and determine whether it meets the CAA requirements of the Clean Air Act and implementing regulations pursuant to 40 C.F.R. §52.21. With respect to the comment that MWC facilities and recycling cannot coexist, and communities using MWC facilities, do not recycle well, EPA was not provided information, or evidence supporting their statements. Nevertheless, based on EPA's information (from the US and Europe), recycling and waste-to-energy are compatible wastes to energy management strategies<sup>22</sup>, and areas where waste-to-energy (MWC) facilities are located achieve higher recycling and composting rates<sup>23</sup> than other areas, without MWC facilities.

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<sup>21</sup>Waste Management Hierarchy available at <http://www.epa.gov/waste/nonhaz/municipal/wte/nonhaz.htm>

<sup>22</sup> "A Compatibility Study: Recycling and Waste-to-Energy Work in Concert", Eileen Brettler Berenyi, available at [http://www.energyrecoverycouncil.org/userfiles/file/2008\\_Berenyi\\_compatibility\\_study.pdf](http://www.energyrecoverycouncil.org/userfiles/file/2008_Berenyi_compatibility_study.pdf) Environment Agency, UK Government, " Position Statement", available at [http://www.environment-agency.gov.uk/static/documents/Leisure/position\\_statement.pdf](http://www.environment-agency.gov.uk/static/documents/Leisure/position_statement.pdf)

Confederation of European Waste-to-Energy Plants, " Recycling and Waste-to-Energy in combination for sustainable waste management", available at <http://www.cewep.eu/information/recycling/index.html>

<sup>23</sup> US EPA, "Standards of Performance for New Stationary Sources and Emissions Guidelines for Existing Sources: Large Municipal Waste Combustors/Summary of Public Comments and Responses for December 19, 2005 Proposed Rule."

For clarification, there are no provisions in the PSD permit that would prevent PR communities from implementing strong recycling programs. Moreover, EPA added a new requirement to the PSD permit (Condition **VIII.A. (1) (b)**), to clarify that Puerto Rico requires municipalities to establish a recycling plan under 12 L.P.R.A. Section 1320b, and to specify the conditions under which EA can accept municipal solid waste in a manner consistent with 12 L.P.R.A Section 1320b. The commenters are referred to Section **III. Revisions to Draft Permit Initiated by EPA, Revision 4** of this document.

As indicated by EA's Materials Separation Plan (MSP), EA's facility will be designed to accept MSW that remains after recycling and composting programs reduce the overall quantity of waste generated by the communities. Also, additional recyclable materials (e.g., metals) will be recovered from the waste stream after it enters the facility. In conclusion, we believe that the success of reaching higher recycling rates would greatly depend on the regulations and policies of the PR's local and Commonwealth government, and, thus, EPA disagrees with the assertion that the project will prevent PR communities from implementing strong recycling programs.

#### **4. Materials Separation Plan and MSW Generation Rate**

**Comment 1:** Some commenters state that EA's MSP estimates of the municipal solid waste (MSW) generation rate relied completely on the information and assumptions included in the Dynamic Itinerary for Infrastructure Projects (DI) developed by the Puerto Rico Government Solid Waste Management Authority (SWMA), which, as the commenters claim, are dated and incorrect. Several commenters provide comments stating that there is not enough MSW generated in the service area to sustain or justify EA's MWC proposed facility. One commenter states that the waste generation rate per person per day used by EA in the MSP of 5.51 lb per person per day is not correct and a rate of 3.91 lb per person per day should have been used, instead. Some commenters assert that the methods proposed by EA for materials separation are not adequate as these methods will not make it possible to avoid combustion of recyclable materials or toxic or hazardous waste items. One commenter states that the 10% recycling rate used by EA in the MSP is dated, as "today's PR recycling rate is close to 25% and rising fast..."

**Response to Comment 1:** For clarification, the MSP is a NSPS Subpart Eb requirement and not a PSD regulation requirement. Specifically, the MSP is part of the "Siting requirements" included in NSPS Eb at 40 CFR 60.57b.

EPA has reviewed the MSP and Siting Analysis provided by EA, and has determined that the proposed project satisfies the requirements set forth in 40 CFR 60.57 b. EPA notes that its review of EA's MSP and Siting Analysis has taken place outside the EPA's PSD permitting review of EA's PSD application. Thus, EPA does not provide responses to comments related to the MSP in the context of this PSD permitting action. However, while MSP is a function of the NSPS Eb

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NAWTEC 19-5439, May 16-18, 2011, "Changes in Public Perception of Role of Waste-to-Energy for Sustainable Waste Management of MSW", Prof. Nicholas Themelis, Director, Columbia University, Earth Engineering Center, available at [http://www.seas.columbia.edu/earth/wtert/sofos/nawtec/nawtec19\(new\)/NAWTEC19-5439.pdf](http://www.seas.columbia.edu/earth/wtert/sofos/nawtec/nawtec19(new)/NAWTEC19-5439.pdf)



requirements, EPA did consider materials separation for the BACT analysis for this permit. See **Section IV.J.5 Response to Comment 1**, of this document for more details on BACT.

With respect to the MSW estimated generation rate, EPA notes that based on the EA's MSP, EA plans on receiving waste from the two service areas: core service<sup>24</sup> and the broader service area<sup>25</sup>; these two areas would satisfy the MSW needs of the proposed project. EPA notes that was provided no information to demonstrate that it will be insufficient waste stream in the service areas mentioned above.

Furthermore, with regard to EA's proposed materials separation methods, EPA was not provided with information about more adequate separation methods than the ones proposed by EA. EPA notes that the materials separation requirements included in the PSD permit, (See **Section IV.J.5. Response to Comment 1**) will address, at least in part, the removal of toxic and hazardous items from the waste stream. Additionally, please see **Section IV.J.5. Response to Comment 1** of this document, regarding the PR regulations which are expected to further restrict the types of wastes that can be accepted by EA.

## **5. Materials Separation and BACT analysis**

**Comment 1:** The commenters express concern that the combustion of certain items or constituents (e.g., household hazardous waste materials, other toxic materials), which may be present in the waste stream, could cause air toxic emissions.

One commenter states that the technology proposed by EA for the removal of a portion of the heavy metals has not advanced sufficiently to guarantee a substantial removal of certain heavy metals such as lead (Pb) and mercury (Hg) from the waste prior to combustion. The commenter asserts that, while recycling mechanisms and associated requirements should be taken into account more stringently under PSD permitting review in order to avoid the combustion of items that could result in toxic emissions, the EA BACT analysis has not considered recycling and its effects on reduction of constituents in the waste stream, prior to combustion. Additionally, the commenter adds that proper recycling along with add-on controls would assist in reducing the Pb air emissions resulting from the combustors.

Another commenter states that, in the 1989 Proposed NSPS Eb rule, "EPA observed that recycling is an appropriate technology, in and of itself, for the reduction of air pollution generated by waste incinerators." The commenter states that reducing (certain) constituents from the waste stream prior to combustion can reduce emissions of both regulated (i.e., PSD pollutants) and non-regulated pollutants (e.g., air toxics pollutants). Additionally, the commenter references a 1989 PSD permit issued to MWC Spokane Regional Waste-to-Energy Project,

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<sup>24</sup> In the MSP, a **core service area** refers to seven municipalities located nearby the proposed MWC facility: Arecibo, Camuy, Hatillo, Lares, Florida, Manati, and Utuado.

<sup>25</sup> In the MSP, a **broader service area** refers to the following municipalities: Toa Baja, Cataño, Guaynabo, Aguas Buenas, Comerío, Barranquitas, Naranjito, Bayamón, Dorado, Vega Alta, Vega Baja, Morovis, Orocovis, Ciales, Barceloneta, Adjuntas, Las Marias, Añasco, Rincón, Aguada, Aguadilla, Moca, Isabela, Quebradillas, San Sebastián and Corozal.

where, as stated by the commenter, EPA considered waste separation and recycling, as part of the BACT analysis. The commenter, states that the materials separation should not be a separate requirement from PSD regulations, and, therefore, EPA should require EA to provide, as part of its PSD application, a detailed waste separation plan, that should include substantial recycling mechanism, as part of the BACT analysis.

**Response to Comment 1:** EPA recognizes that reducing certain constituents in the waste stream can reduce some pollutants emissions. This is why EPA has included Condition **VIII (A) (1) (c)**, which requires EA to use best engineering and work practices to (1) remove all identifiable wastes from the municipal waste stream, prior to shredding, that do not qualify as municipal solid waste as defined in 40 CFR Part 60.51b; (2) remove metals from the waste stream; and (2) prevent large quantities of easily discernible yard waste from being charged to the MWCs. EPA expects that these conditions, in particular, removing metals and yard waste from the municipal waste stream, will reduce emissions of particulate matter (including municipal waste combustors metals, measured as metals, and individual metals), and NO<sub>x</sub>.

While EPA included these conditions, we note that EA's BACT analyses only reflected a limited review of source separation as a potential control option. As such, EPA has revisited the BACT analysis by conducting a Supplemental BACT Analysis, and considered the broader source separation option. Our source-specific BACT evaluation concluded that reductions associated with source separation were small, and the variable and heterogeneous nature of municipal solid waste makes reliable quantification of such emission reductions associated with removal of various materials technically infeasible. This conclusion is consistent with EPA's final NSPS Eb rule, which differed from the 1989 proposal cited by the commenter. In the 1991 final rule, 56 Fed. Reg. 5507 (February 11, 1991), EPA decided not to include the materials separation requirements.<sup>26</sup>

Since we could not accurately quantify the control effectiveness, expected emission rate, expected emission reduction, energy impacts, etc., in Step 3 of the BACT analysis for this option, we eliminated source separation as a stand-alone control option. Nonetheless, EPA's conclusion is that there will be some qualitative emissions benefit from source separation, albeit not quantifiable, and so EPA has maintained these conditions in EA's permit in order to enhance the selected BACT. Our analysis is somewhat different for Greenhouse Gases (GHGs) with respect to separation of paper/paperboard and plastics because we removed source separation from the list of potential control technologies for GHG under BACT Step 1. Employing the materials separation programs at the facility would not lower the project's GHG emissions. In order to comply with the permit's required thermal efficiency, EA would have to substitute other

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<sup>26</sup> "In proposing the materials separation requirements the Agency believed that there would be both direct air emissions reduction from the standard and that considering net costs, energy, and nonair quality environmental impacts, the overall nonair quality benefits from a source separation requirement would be positive on a national basis. However, while EPA projected certain reductions in air emissions from MWCs attributable to this requirement these reductions were small, and the variable and heterogeneous nature of municipal solid waste makes reliable quantification of such emissions reductions associated with removal of various materials technically infeasible." (56 Federal Register at 5496)

types of fuel for the paper/paperboard and plastics. The replacement fuels have the potential to generate equal or greater amount of GHG emissions.

EPA is not aware of, nor has commenter provided information on, other MWCs using source separation in a more effective manner to achieve better emissions reductions. In addition, the control efficiency of the technologies to be used at EA surpass earlier generations of MWCs and so source separation is not expected to produce as much emissions benefits as we might have seen at lesser controlled facilities. EPA was not provided with comments specific to the source separation in the draft permit, Condition **VIII (A) (1) (c)**, or discussion of a preferred approach.

We also note that the types of post-recycled and post-composted MSW that can be accepted by EA are further limited by the PR EQB Solid Waste Rules. Furthermore, the Commonwealth permit is also expected to restrict the types of wastes that can be accepted by EA. Additionally, EA's New Source Performance Standards (NSPS) Materials Separation Plan (MSP) reuse and reduction strategies include implementation of a pay-as-you-throw (PAYT) pricing system, which means that the residents pay based on the amount thrown away. Implementing the PAYT pricing system will encourage communities to recycle more and to generate less waste.

The comments assert that source separation should be used to reduce metals (i.e., Pb, Hg) and other air toxics emissions. First, EPA notes that lead is one of the criteria pollutants to which PSD applies in attainment areas. However, Arecibo is in a nonattainment area for lead, so EPA does not have authority to regulate it under the PSD program. Lead would normally be regulated via Puerto Rico's nonattainment permit program; however, our understanding is that the emissions of lead fall below the de minimis thresholds for nonattainment regulation.

While EPA recognizes the importance of minimizing all potential detrimental pollutants resulting from the project, listed hazardous air pollutants are excluded from the pollutants regulated under the PSD permitting program(42 U.S.C. 7412(b) (6); 40 C.F.R. 52.21(b) (50) (v)). Thus, metals such as Hg are not pollutants regulated under the PSD regulations. EPA recognizes that there are other toxic pollutants that could result from the project that are not subject to PSD permit requirements. Although we expect that the source separation conditions in the permit will reduce emissions of these non-regulated pollutants, EPA does not have specific authority to address them in the PSD permit. Moreover, with respect to EA's technology for removing metals from the waste stream, the commenter does not provide any information about a better metal separation control option than the one proposed by EA nor does the commenter provide information about what level of control the commenter believes is achievable.

## **6. Suppliers of MSW, and Supplementary Fuels**

**Comment 1:** Several commenters state that EPA should prohibit EA from combusting MSW and supplementary fuels imported from other places than PR. The rationale provided by some commenters for preventing EA from using combustion fuels from outside PR, is that the commenters do not want to suffer the consequences of pollution generated by combusting other people's garbage. Some commenters inquire concerning the EA's suppliers for the supplementary fuels. Additionally, one commenter alleges that US regulations prohibit combustion of ASR, whereas PR lacks such regulations.

**Response to Comment 1:** The PSD permit allows for the combustion of MSW (RDF) and supplementary fuels in the two MSW combustors. EA is required to comply with the BACT emissions limits established in the permit at all times, regardless of the fuel being burned or the source of that fuel. There are no provisions in the PSD regulations under which EPA could dictate the supplier or the geographic origin of the MSW or supplementary fuels. For EPA's analysis of the project's health effects, see Section **IV.K. Response to Comment 1**, Section **V.A. Response to Comment 1**, Section **IX. A and F, Section X. E.1 and 2** of this document. The comment concerning the assertion that US regulations prohibit the combustion of ASR, does not include any specific information or evidence for EPA to respond. However, based on our review, thus far, we are not aware of any federal regulations prohibiting the combustion of ASR in the US.

## **7. Type of Contract with the MSW Suppliers**

**Comment 1:** Several commenters provide comments related to the contract signed between the Solid Waste Management Authority of PR (SWMA) and Energy Answers (EA). Specifically, the commenters state that 30 years contract agreement for the municipal solid waste supply, between SWMA, EA, was signed without having the residents approval, and the contract is a deviation from the PR Government rules governing competition. Further, the commenters assert that the contract will force closure of most existing landfills, and will increase the cost of waste disposal in PR.

**Response to Comment 1:** These comments are beyond the scope of consideration for the PSD permit, which focuses on the project's air emissions.

## **K. Particulate Emissions**

**Comment 1:** The commenters express concern about the particulates emission resulting from EA's project, especially PM<sub>10</sub>, PM<sub>2.5</sub>, and ultrafine particles (UFP)<sup>27</sup>, and their associated health effects, such as asthma, impaired lung function, cardiovascular disease, stroke, birth defects. Some commenters assert that the most vulnerable populations would be children, elderly, and people living with lung or cardiovascular diseases. Some commenters specifically identified the particulate emissions associated with the ash generated by the project as posing a health risk. The commenters state that asthma is the most common respiratory illnesses in PR, and the prevalence asthma of child population is the greatest in PR.

Several commenters assert that the project's UFP will affect large areas of the PR population, since UFP can travel long distance from the source of emissions.

**Response to Comment 1:** We are very sensitive to the health of the residents, and we understand that people are concerned about the health risks from the exposure to particulate

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<sup>27</sup> "Ultrafine particles, generally including particles with a mobility diameter less than or equal to 0.1um, are emitted directly to the atmosphere or are formed by nucleation of gaseous constituents in the atmosphere". See EPA- National Ambient Air Quality Standards for Particulate Matter, December 14, 2012 available at <http://www.epa.gov/pm/2012/finalrule.pdf>

emissions resulting from combustion sources, including the EA project. Therefore, EPA, through this PSD permitting action, sought to ensure that health based NAAQS would be met for all criteria pollutants, including PM<sub>10</sub> and PM<sub>2.5</sub>. EPA notes that the air quality impact analysis for PM<sub>10</sub> and PM<sub>2.5</sub> included the particulate emissions associated with the ash generated by EA's project (at EA's location). With respect to UFP as discussed at Section **VIII. A.1. Response to Comment 1**, no separate NAAQS exist for UFP, and therefore, under EPA's regulations, PM<sub>2.5</sub> is an indicator for UFP.

For a PSD permit, compliance with the NAAQS<sup>28</sup> is sufficient to demonstrate that emissions from a proposed facility will not have adverse health or environmental effects.

A rigorous process has been established to set health based criteria for permissible levels nationwide, based on the requirements of CAA Section 109 (b)(1), which requires that the NAAQS ensure an "adequate margin of safety to protect the public health." EPA must review each NAAQS standard every 5 years to ensure that the latest scientific findings are taken into account so that the limits adequately protect the public health, including sensitive populations such as elderly, children, and asthmatics.

The draft PSD permit analysis demonstrated that the BACT emissions limits established for EA's project will not cause an exceedance of NAAQS for PM<sub>10</sub>, PM<sub>2.5</sub>, and other criteria pollutants resulting from the project for which NAAQS exist. The draft PSD permit air quality analysis also demonstrated that the permit limits would not cause an exceedance of the increment, which is an additional level of protection to ensure that the air quality does not approach the health based NAAQS levels. Furthermore, the PSD permit establishes monitoring requirements to ensure that the particulate matter BACT limits will be continuously met.

Additionally, since PM<sub>2.5</sub> is the indicator for fine particles (including UFP matter), and EA has demonstrated that the project's PM<sub>2.5</sub> emissions will not cause or contribute to a violation of the NAAQS and increment, EPA is confident that the project's UFP emissions (which are a component of PM<sub>2.5</sub>) will not pose a concern for health and the environment.

With regard to the comment that UFP can travel long distances, EPA notes that the commenters do not provide any supporting information supporting the assertion made. However, as stated in the EPA's Particulate Matter Final Rule, December 14, 2012, "...the number of ultrafine particles generally decrease sharply downwind from sources, as ultrafine particles may grow into the accumulation mode by coagulation or condensation"<sup>29</sup> ..., thus, we disagree with the commenters' assertion.

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<sup>28</sup> National Ambient Air Quality Standards (NAAQS)" available at <http://www.epa.gov/air/criteria.html> ; The NAAQS are based on health studies, with large safety margins, in order to protect: 1) public health, "including protecting the health of "sensitive" populations such as asthmatics, children, and elderly"<sup>28</sup>; and 2) public welfare, "including protection against decreased visibility and damage to animals, crops, vegetation, and buildings."

<sup>29</sup> See EPA- National Ambient Air Quality Standards for Particulate Matter, December 14, 2012 available at <http://www.epa.gov/pm/2012/finalrule.pdf>

**Comment 2:** The commenter refers to a study published in a medical journal, which, as stated by the commenter, indicates that there is an association between exposure to contaminants (i.e., PM<sub>10</sub>, and PM<sub>2.5</sub>) emitted by vehicular traffic and increase asthma incidences, and aggravated heart conditions. Further, the commenter alleges that if the vehicular contaminants, to which people are exposed daily, can cause lung and heart conditions, then the harm caused by the EA facility particulate emissions would be much greater in both short and long-term.

**Response to Comment 2:** EPA agrees with the commenter that at some emission levels of PM<sub>10</sub> and PM<sub>2.5</sub> can produce a range of health effects. However, EA's modeling analysis demonstrates that those levels will not be reached with the operation of EA. In fact, EA's analysis took into account background sources, which includes vehicles, and the results demonstrate that there will be no exceedance of the NAAQS or increment. Therefore, as discussed above in **Response to Comment 1**, based on EPA's analysis, air quality in the area with respect to PM<sub>10</sub>, and PM<sub>2.5</sub>, and all other PSD pollutants, are not expected to pose a concern for human health and the environment.

## **V. OPPOSING/SUPPORTING THE PROJECT**

### **A. Comments Opposing the Project**

**Comment 1:** The commenters provide comments expressing opposition to the EA project, and state that the EPA should not issue the PSD permit.

The commenters state that they oppose the EA's MWC facility because of the potential adverse health and environmental effects associated with exposure to emissions from the facility. Several commenters allege that they oppose to MWC facilities, in general, and not only to the EA's project, because they believe that these types of facilities pose a threat to human health and the environment.

The commenters assert that EPA's function is to protect the human health and the environment, and the commenters add that granting an air permit to EA, it would be against the CAA provisions, and therefore EPA would fail meeting its mission. The commenters state that the project is a clear disregard for the quality of life.

Some commenters emphasize that Arecibo is fighting against the construction of the MWC facilities in PR for more than 30 years; EA's project is the third MWC facility proposal in PR, and the previous two were rejected. One commenter alleges that this is the first time when a draft PSD permit is proposed for a MWC facility in PR. The commenters declare, "We warn EPA that regardless of granting an air permit to EA, the proposed MWC facility will not be built in Arecibo, or any other place in PR."

**Response to Comment 1:** EPA understands the concerns expressed regarding the adverse effect of pollutants on human health and the environment.

EPA's goal in this PSD permitting action is to ensure that EA's MWC facility is constructed and operated in accordance with EPA requirements such that, the human health and the environment remain protected from harmful pollutants.

Even before explaining the human health and environment protections in EA's PSD permit, it is important to note that EA must comply with other Clean Air Act requirements that will ensure far greater protection than was the case for earlier generations of MWC facilities. MWCs must comply with Section 111 of the Clean Air Act, 42 U.S.C. § 7411 (New Source Performance Standards) and Section 129 of the Clean Air Act, 42 U.S.C. § 7429 (Solid Waste Combustion). Section 129 was added to the Clean Air Act in the 1990 Amendments and requires MWCs to comply with the Clean Air Act's (CAA's) Maximum Achievable Control Technology (MACT)<sup>30</sup> standards. These standards, which are codified in the New Source Performance Standards (NSPS) Part 60, Subpart Eb, make the operation of today's US MWC facilities much safer, as these facilities are required to be well controlled, and meet tight emissions standards. Because of the MACT standard in NSPS Subpart Eb, most of the existing MWC facilities were retrofitted with air pollution control systems or shut down, and new facilities were required to install controls up front. The additional impact of EPA's promulgation of MACT standards has been substantial; the emissions from the MWCs decreased dramatically.

Because of EPA's MACT standard, the emissions from MWC facilities decreased by a factor of twenty.<sup>31</sup> For instance, a comparison between 1990 US MWC facilities' emissions and 2005 US MWC facilities' emissions indicates a reduction of D/F emissions by 99%, Lead emissions by 97%, and Hg, Cd, and PM emissions by 96%, HCL by 94%, SO<sub>2</sub> by 88%, and NO<sub>x</sub> by 24%<sup>32</sup>.

In addition to establishing a MACT standard, Subpart Eb requires monitoring requirements (CEMS, continuous opacity monitoring system or "COMS", annual performance test, continuous monitoring of the pollution controls' operating parameters) to ensure that the emission standards are met on a continuous basis. The overall objective of Subpart Eb is to ensure that emissions from MWC facilities do not occur at levels that could pose a public health threat.

Based on case-specific data for the Maryland Solid Waste Resource Recovery Facility, a MWC facility in Montgomery County, Maryland, which was constructed to meet the requirements of MACT and NSPS Eb, "the overall cancer and non-cancer risk to human health has been always below EPA benchmarks and in many cases have actually decreased over time despite incorporating new risk methods and more exposure pathways."<sup>33</sup>

The designated air pollutants from MWC facilities, regulated under Subpart Eb, and therefore subject to the MACT standard, are as follows: PM, NO<sub>x</sub>, CO, SO<sub>2</sub>, HCL, Pb, Hg, Cd, and D/F.

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<sup>30</sup> In the CAA, MACT is defined as the maximum degree of reduction in emissions of designated air pollutants taking into consideration, while taking into consideration various factors.

<sup>31</sup> Air Emissions from MSW Combustion Facilities available at <http://www.epa.gov/osw/nonhaz/municipal/wte/airem.htm#5>

<sup>32</sup> "Emissions from Large and Small MWC Units at MACT Compliance" available at [http://energyrecoverycouncil.org/userfiles/file/070810\\_Stevenson\\_MWC\\_memo.pdf](http://energyrecoverycouncil.org/userfiles/file/070810_Stevenson_MWC_memo.pdf)

<sup>33</sup> Air Emissions from MSW Combustion Facilities available at <http://www.epa.gov/osw/nonhaz/municipal/wte/airem.htm#5>

Consequently, since EA's MWC facility is subject to Subpart Eb, it must ensure that the PM, NO<sub>x</sub>, CO, SO<sub>2</sub>, HCL, Pb, Hg, Cd, and D/F emissions will be below the levels that could pose public health threat.

Currently, the US MWC facilities are either new or have been significantly modified to meet the much tighter air toxics ( D/F, Hg, Pb, Cd, HCL) and criteria pollutants emissions standards established by EPA through the MACT standards. Therefore, MWC compliance with MACT standards provides assurance that the public health is protected.

The pollutants resulting from EA's project, that are subject to PSD regulations and therefore included in the draft permit, belong to two categories. One category is criteria pollutants (NO<sub>x</sub>, Ozone (as VOC), CO, SO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub>) for which there are NAAQS. The second category is pollutants for which no NAAQS exists. (D/F, HCL, H<sub>2</sub>SO<sub>4</sub>, Fluorides (measured as HF) and MWC metals (measured as PM), PM, and GHG).<sup>34</sup> In order to comply with PSD requirements, EA must install BACT, to minimize the above listed PSD pollutant emissions.

EPA notes that many of the same pollutants that are subject to the MACT standards in NSPS Subpart Eb are also PSD regulated pollutants, and are therefore subject to BACT. It is significant from a human health perspective that BACT for EA's project is more stringent than MACT. As a result, the PSD permit establishes much tighter limits for these pollutants than MACT standards requires.

In addition to the pollutants included in the PSD permit, the project is estimated to result in Pb, Hg, Cd, Zn, Cr, As, Ni, Be, Polychlorinated biphenyls (PCBs) and Polyaromatic hydrocarbons (PAH) emissions, which are not subject to PSD regulations, and are therefore not included in the PSD permit. However, the control equipment, that the PSD permit requires, will limit emissions of these pollutants as a co-benefit, and the State permit issued by PREQB is expected to specifically address these pollutants through PREQB authorities. EPA notes that these pollutants are considered air toxics under the CAA.

Based on EPA's air quality impact analysis of the criteria pollutants, the anticipated air quality impacts associated with EA's project for those pollutants will not cause or contribute to an exceedance of any NAAQS or increment. The NAAQS are based on health studies, with large safety margins, in order to protect public health,<sup>35</sup> and public welfare<sup>36</sup>. See Section **IX** of this document, for information about the air quality analysis.

Accordingly, since the BACT limits for criteria pollutants comply with NAAQS, they are adequate to protect public health and public welfare. Furthermore, we believe that it is likely that actual emission rates will be less than the BACT limits for criteria pollutants. In conclusion, the

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<sup>34</sup> The PSD permit includes also NH<sub>3</sub> emissions, which is not a PSD pollutant. NH<sub>3</sub> emissions will result primarily from the RSCR that uses ammonia solution to reduce NO<sub>x</sub> emissions.

<sup>35</sup> "Including protecting the health of "sensitive" populations such as asthmatics, children, and elderly", National Ambient Air Quality Standards (NAAQS) available at <http://www.epa.gov/air/criteria.html>

<sup>36</sup> "Including protection against decreased visibility and damage to animals, crops, vegetation, and buildings", National Ambient Air Quality Standards (NAAQS)" available at <http://www.epa.gov/air/criteria.html>



project's emissions for which NAAQS exist are not expected to pose a concern for human health or the environment.

In order to evaluate the health and ecological (i.e., environmental) effects of air toxic emissions (both air toxics included in the PSD permit, and air toxics expected to be included in the PR EQB permit), estimated to result from the two municipal waste combustors, EPA has reviewed the Human Health Risk Assessment (HHRA)<sup>37</sup> and Screening Level Ecological Risk Assessment (SLERA)<sup>38</sup> prepared by EA<sup>39</sup>.

Based on the HHRA results, the air toxics emissions estimated to result from the EA's project are not expected to pose a concern for human health and the environment (i.e., ecological receptors). (See Section **X.E.1** of this document). Furthermore, based on the SLERA results no adverse effects in ecological receptors are expected from the air toxic emissions estimated to result from the EA's project. (See Section **X. E. 2** of this document).

## **B. Comments Supporting the Project**

**Comment 1:** A significant number of commenters submit comments expressing support for the EA project, and demand EPA to grant a permit to EA as soon as possible. The commenters note the following considerations as basis for their support:

- The project is the best thing that has happened to Arecibo in a very long time; the project will establish a new quality of life in Arecibo.
- The project will contribute to mitigate the continuous contamination of the Cano Tiburones, and other areas caused by the landfills.
- The project will contribute to addressing the waste disposal problem of PR, which is a small island, with dense populations, and where there is limited space available for new landfills.
- The project will bring progress and economic opportunities such as jobs, and other investments, to the Arecibo area and better environmental health for ailing people.
- The EA proposed project technology, is widely, used around the world, and it will use modern pollution control technologies, and therefore will provide a safe and clean process to treat waste.

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<sup>37</sup> The HHRA evaluated the potential for adverse health effects in human receptors from exposure to combined air toxic emissions estimated to result from the from the EA's combustors.

<sup>38</sup> The SLERA evaluated the potential for adverse effects in ecological receptors from exposure to combined air toxic emissions estimated to result from the from EA's Combustors. The ecological receptors identified in SLERA are plants and animals of the habitat areas (e.g., open water, estuarine areas, wetlands, upland forested habitat in the karst region beyond the agricultural areas, conservation areas or natural areas, etc.) included in SLERA.

<sup>39</sup> The HHRA, SLERA conducted by EA, and a Summary of both HHRA and SLERA prepared by EPA are available in the administrative record.

- The project will combust the MSW that cannot be recycled, and therefore, instead of burning thousands of tons of waste in the landfill, and polluting the environment, the waste will be used to generate electricity.
- The project will contribute to reducing the cost of electricity.
- The MWC facilities are a good value and approvable in other states across the US such as Maryland, Florida, Massachusetts, and Hawaii, and in the European countries such as Denmark or Germany, without impairing the quality of life of their communities.
- The waste-to-energy facilities, does not compete against recycling.
- The project represents a modern waste disposal method, and the use of waste-to-energy, such as EA's project, as a waste disposal method is part of the EPA's waste management hierarchy.
- The MWC are most regulated and monitored facilities in the US and the emissions from MWC have dropped dramatically in the past 20 years, especially D/F, and heavy metals.
- The draft PSD permit meets all the regulatory requirements and will not cause any harm to the human health or the environment.

Another commenter submits a comment stating that, “It is not a good public policy to rely on just one solution, and therefore PR is concurrently working to promote the development of alternate sources of energy. Consistent, with the EPA's waste management hierarchy, PR is working to develop various initiatives that include source reduction, reuse, recycling, and recycling, waste-to-energy recovery, and lastly disposal to landfills. Waste-to-energy recovery facilities, such as EA's project, represent an additional solution to PR's energy emergency and waste management problem”.

**Response to Comment 1:** EPA acknowledges receipt of these comments and notes that a response is not necessary, as the comments do not seek any changes to the permit.

## **VI. PUBLIC COMMENT PROCESS**

### **A. Comments about June, 2012 Public Hearing**

**Comment 1:** The commenter express disappointment regarding the events that happened during the June 25, 2012 public hearing, which lead to EPA's suspension of the hearing. Additionally, the commenter poses some questions and makes suggestions concerning the additional public hearings that EPA plans to schedule.

**Response to Comment 1:** EPA has already responded to the substance of this comment through a letter dated 8/7/2012 from Judith Enck, Regional Administrator, EPA, Region 2, to Mark Green, Project Director, Energy Answers International, which can be found in the administrative record, and EPA has conducted additional five public hearings.

## **B. June 2012, Public Hearing, and Request for Additional Hearings**

**Comment 1:** Several commenters provide comments stating that reducing the speaker's time allotment to 3 minutes, at the June 25, 2012 public hearing, was not adequate, and express dissatisfaction for not allowing the speakers to donate their time to other speakers. Further, the commenters request EPA to reschedule the hearing, and demand the following: 1) each more than 10 minutes for each speaker; 2) to allow the speakers to voluntarily yield their time to other speakers; 3) to allow speakers to use audiovisual equipment during oral testimonies; 4) to hold the hearing(s) during a weekend; 5) to extend the public comment until beyond the date the next public hearing ; and 6) for EPA to organize and offer trainings/workshops in Spanish, before the August hearings.

**Response to Comment 1:** EPA has already responded to these comments through letters dated 7/12/2012, and 8/22/2012, has already taken the actions requested in these comments, and also has already met the majority of the demands made in these comments.

At the June 25, 2012, public hearing, some of the attendees became contentious upon learning of the three-minute restriction on each speaker's time allotment. EPA announced the three-minute time limit, after seeing the significant turnout, to ensure that all attendees had an equal opportunity to speak. Further, EPA had to suspend the hearing, as the disturbance and interruption caused by some of the attendees made it impossible to provide the intended productive opportunity for people to comment on the proposed draft PSD permit.

When EPA rescheduled the hearing, it sought to ensure an orderly and safe hearing environment where all views could be presented. EPA listened to commenters' request and demands and scheduled five public hearing sessions, over three days, on Saturday ( two sessions) August 25, Sunday ( two sessions) August 26, and Monday ( one session) August 27, 2012. EPA also extended the public comment period to August 31, 2012 to allow hearing participants some time following the hearings to submit comments in writing, if they chose to do so. EPA increased the allotment for each speaker from three to ten minutes and provided additional time at the end of the sessions for people to speak a second time, if they wished. These public hearings were especially designed to give interested parties ample time and flexibility to deliver their oral statements. However, as EPA explained in the public notices, public hearings are only one approach that EPA uses to solicit comments on proposed permits, and the commenters had the opportunity to follow up with written comments.

While EPA could not accommodate the use of audio-visual equipment during oral testimonies, the public was encouraged to include, within their written statements, any technical presentations, graphs, charts, etc.

With respect to the request for holding trainings and workshops prior to the August public hearings, we believe that EPA conducted an extensive public outreach process for the proposed draft PSD permit to enable interested persons to comment. Although not required by 40 CFR Part 124, which sets forth the requirements for public review, EPA held a public availability session on May 23, 2012 and a public meeting session, on February 15, 2012. These sessions

were informal opportunities for the public to learn about the proposed project, and both sessions were simultaneously translated into English and Spanish.

In addition, about one month prior to the public hearings, EPA published public notices and a fact sheet in Spanish. Both the public notice and the fact sheet included appropriate information as required by 40 CFR Part 124. While, the public notices included a short summary of the proposed project, the fact sheet incorporated a detailed summary of the proposed project, the emissions limits, air pollution control technologies, monitoring requirements, and the air quality impacts of the project. Additionally, EPA allowed the written comments to be submitted in either Spanish or English. The comments in Spanish, and the hearing transcript, were then translated into English.

The adequacy of EPA's public outreach on the proposed EA's draft PSD permit is demonstrated by the 1,100 written comments we received during the 105 days of public comment period that EPA provided, and by 90 people who offered oral testimonies during the five additional public hearings, organized by EPA. About 90% of the written comments received by EPA were submitted in Spanish, and these comments were subsequently translated into English. The six public hearings sessions were held in Spanish with simultaneous English translation. All oral testimonies made at the hearings were recorded and the transcripts were translated in English.

Consequently, in addition to the public availability session and public meeting, which educated the public about the project, we believe that EPA's public outreach and public comment process goes substantially beyond the requirements for public notice and public hearings at 40 CFR Part 124. Furthermore, we believe that the public availability and public meeting sessions, the information contained in the public notices and fact sheet, which were provided in Spanish, have provided adequate opportunity for the public to learn about the project.

### **C. Public Participation Process**

**Comment 1:** Several commenters submitted comments stating that EPA does not provide a full and transparent public review of the proposed EA's PSD permit, and adequate opportunities for public to participate in the permitting process.

One commenter alleges that, as shown in past examples, the public hearings are only held to fulfill the regulatory requirements, and these hearings are undemocratic, and the hearings are not taken into account (by the permitting authorities) in making final permit decisions.

Some commenters asserts that it is unfair that EA's draft PSD permit was developed over 18-month period, and the public was given a short period to understand and comment on rather complex draft PSD permit and related documents, and the public was limited to 3 minutes, respectively to 10 minutes for delivering the oral testimonies during the public hearings.

One commenter questions why the public is not given access to the PSD application documents prior to the EPA's determination of a complete application and respectively proposal of a draft PSD permit. The same commenters inquires why EPA's decision on granting the PSD permit, is

based only on the EA's PSD application, and why EPA is not appointing an attorney to assist the public in reviewing and commenting on a proposed draft PSD permit.

**Response to Comment 1:** As we discussed in **VI.B. Response to Comment 1**, EPA believes that the public outreach and public comment process provided by EPA on the proposed EA's permit went beyond the regulatory requirements set forth in 40 CFR 124 for PSD permit proceedings. Moreover, as part of the public comment process, the project administrative record comprised of all documents relevant to the EPA's PSD permitting review, were made available to the public via internet and also at the EPA's offices. Thus, we consider that this demonstrates that EPA made every effort to seek out and facilitate the involvement of the public in the decision making process.

With respect to the comment that the hearings do not count in the decision making process (by the permitting authorities), EPA has listened carefully to the people's concerns, and has reviewed every written and oral comment received. This "Responses to comments" document addresses all significant issues raised by the commenters during the public comment period, including comments made at the public hearing, and describes the changes made to the draft PSD permit because of the comments received. Moreover, EPA stated in its announcement of the August public hearing sessions that oral and written comments receive equal weight.

In response to the question about granting public access to the PSD application documents, before EPA makes a completeness determination, we note that there are no provisions in the 40 CFR Part 124 "Procedures for Decision Making" that EPA follows, which provides for public access to the PSD application documents before EPA makes a completeness determination. The Freedom of Information Act does provide access to many documents earlier than the Part 124 public review process. However, EPA received no FOIA requests on this permit matter.

EPA disagrees with the comment that the decision on granting a PSD permit is based only on the PSD application. First, EPA performed an extensive technical analysis, to determine whether EA's proposed application meets all the regulatory requirements and to formulate the draft permit conditions. Second, EPA values public comment and did not render a final decision on the permit application until after reviewing all the comments. Indeed, the final EA permit has been improved by changes that EPA made to the permit based on public comments.

With respect to the comment on appointing an attorney, we are not aware of any provision in the regulations, which would enable EPA, via the federal PSD permitting process, to appoint an attorney who would assist in the context of the PSD public comment process. In addition, no specific requests for legal assistance were made to our legal office during the public review process.

**Comment 2:** The public has encountered difficulties reviewing the draft PSD permit, and the PSD application documents, because these documents are in English, and the information in this document is very technical and complex.

**Response to Comment 2:** EPA has a strong interest in ensuring that the public has an opportunity to participate in the public review process. This interest caused EPA in this permit

matter to go well beyond the regulatory permit requirements, including arranging for Spanish/English translation of some of the permit documents and at the public hearing (see **VI.B. Response to Comment 1**). 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, such as the draft PSD permit and PSD application, because of the potential for introducing ambiguity or confusion about the intended meaning of the document.

As we explained at **VI.B. Response to Comment 1**, EPA translated documents that were intended primarily for communication with members of the community such as the public notice (s) and a fact sheet on the project. EPA recognizes that many of the permit documents are technically complex, and so EPA presented the information in the public notices(s) and fact sheet summarizing the project, including the emissions, control technologies, and EPA's analysis, in lay persons terms.

**Comment 3:** The commenter states that the process of educating Arecibo residents and the extent of the public review and outreach conducted in conjunction with the proposed project has been the most extensive, comprehensive process that has ever taken place in Puerto Rico.

**Response to Comment 3:** EPA acknowledges the comment.

#### **D. Workshops**

**Comment 1:** The commenter express disappointment that EPA does not organize workshops regarding the EA's proposed project.

**Response to Comment 1:** Please see Section **VI.B Response to Comment 1** and Section **VI. C Response to Comment 1** of this document.

#### **E. Comments about the August Public Hearings**

**Comment 1:** One commenter provides comment to thank EPA for organizing the additional five hearing sessions over 3 days in August. Another commenter provide comments to expresses satisfaction and thank EPA for the way we organized and conducted the five public hearings sessions held on August 25, 26 and 27, 2012.

**Response to Comment 1:** EPA acknowledges the importance of our responsibility in providing adequate conditions for public to participate at the public hearings.

#### **F. EA's Supporters did not attend the August Public Hearings**

**Comment 1:** The people supporting the EA project did not attend the August hearings, because EA did not want the project's supporters to hear the truth regarding the project's harmful effects on the human health.

**Response to Comment 1:** EPA's approval of EA project is not based on who attends the hearings; rather, it is based on the project meeting all applicable requirements of the Clean Air Act's PSD program. In addition, our decision is based on a thorough review and consideration of information provided by all commenters regardless of whether they presented their comments orally at the public hearings or in writing.

### **G. Public Hearing - Security**

**Comment 1:** The presence of security at the August public hearings was unnecessary, and inappropriate. It is obvious that the purpose of the security was to intimidate people from expressing their opposition against the project. It is true that at the June 25, 2012 hearing an incident has occurred. However, the full responsibility for that incident lies with EPA, because EPA has not offered people enough time to speak.

**Response to Comment 1:** While EPA is recognizing that the June 25, 2012 hearing did not enable a productive opportunity for the public to provide comments, EPA, notes that the orderly conduct of the hearing was hindered by the audience members' disturbance and interruptions. We regret that some people may have felt intimidated by the presence of security at the hearings, but EPA has a responsibility to ensure that members of the public can feel that they are in a safe environment when they attend an EPA public hearing. The security was necessary following the cancellation of the June 25, 2012 hearing because that session devolved into unruly disturbances and chaos. EPA provided security so that all participants at the August sessions would feel free to speak their views. EPA recognizes that the disorder at the June 25 hearing was at least in part due to frustration by some attendees with the three minute limit. That frustration was a major factor in EPA's decision to schedule five additional hearing sessions, over three days, on August 25, 26, and 27; 86 people delivered testimonies during the five hearing sessions. We believe that providing security at the public hearing sessions was conducive to public participation.

**Comment 2:** The commenter expresses disappointment about the events that led to the suspension of the June 25, 2012 public hearing and suggests EPA adding security for the next EA's public hearings.

**Response to Comment 2:** EPA acknowledges the comment. In response to concerns articulated after the June 25, 2012 public hearing, EPA added security at the August sessions. See **Response to Comment 1** above.

### **H. Comments about May, 2012 Public Availability Session**

**Comment 1:** Several commenters provide comments related to the public availability session. The commenters allege that, the EPA's evaluation of the EA's project, as presented by the EPA's representative during the public availability session, is not an objective analysis. Further, the commenters demand that a new PSD permitting reviewing process should be initiated, and under a different project review team.

**Response to Comment 1:** EPA has already responded to the substance of these comments through letters dated 7/12/2012, from Judith Enck, Regional Administrator, EPA, Region 2 to

Angel Gonzalez, Aleida Centeno, Orlando Negron, Martha Quinones Dominguez, and Teresa Sanchez, and 8/22/2012, from Judith Enck, Regional Administrator, EPA, Region 2 to Angel Gonzalez, Aleida Centeno, Orlando Negron, Teresa Sanchez, Javier Biaggi, Juan Rosario, Fernando Marquez, and Ivan Federico Elias Rodriguez. These letters can be found in the administrative record. As noted in the 7/12/2012 letter, EPA takes very seriously the importance of an impartial process in EPA decision-making, and EPA has maintained an impartial process throughout the proceedings on the EA PSD permit application.

## **VII. CRITICISM OF THE EPA PERMITTING REVIEW AND PR EQB AND PR GOVERNMENT**

### **A. Criticism of the EPA Permitting Review**

**Comment 1:** The commenters express criticism regarding the EA permitting review conducted by EPA.

Some commenters allege that EPA has acted subjectively in reviewing the PSD application. One commenter states that EPA has directed EA to amend their PSD application so that EPA could justify granting a PSD permit. The commenter alleges that EPA accepted EA's information without validating it, and EPA has allowed exemptions to EA without justification.

**Response to Comment 1:** EPA was not provided with any specific examples to illustrate the commenters' assertion, and therefore it is difficult for EPA to provide a more detailed response.

EPA's permitting review process of EA's application has been consistent with the PSD permitting process<sup>40</sup> used across Regional Offices under the applicable procedures in 40 CFR Part 124. EPA notes that EA's PSD application proposed a complex project, which required an extensive technical review. After receiving the application, in accordance with EPA's PSD permitting process, EPA's focus was to make sure that we have all the information needed for processing the application and proposing a permit decision. Therefore, in order to achieve those goals, we requested that EA submit, on several occasions, additional or clarifying information. However, once again, to avoid any misunderstanding, the request for information during a PSD application review, is an integral part of the EPA's permitting review process. Our primary purpose in requesting additional information is to ensure that the air quality will be protected and that applicant has proposed the most stringent control technology appropriate under EPA's top-down BACT approach.

EPA examined all the information supplied by EA, and our permit decision was based on EPA's own analysis of EA's information and EPA's own technical expertise. EPA's permit decision is in accordance with all applicable regulations, and guidance. All information EPA received and on which we based our PSD permitting decision, was made available in the administrative record for the draft PSD permit. The PSD permit conditions are consistent with the other PSD permits

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<sup>40</sup> See, for example, "Timely Processing of Prevention of Significant Deterioration (PSD) permit when EPA or a PSD-Delegated Air Agency Issues the Permit." available at <http://www.epa.gov/region07/air/nsr/nsrmemos/timely.pdf>



issued by EPA. Specifically, the BACT emissions limits, monitoring requirements, and other permit conditions are consistent with the PSD permits issued for other US MWC facilities and do not provide for exemptions, as claimed by the commenter

## **B. Criticism of PR State and Local Government**

**Comment 1:** The commenters provide comments criticizing the local and Commonwealth government. Several commenters criticize the representatives of Arecibo Municipality endorsed the EA's MWC facility, without consulting with the Arecibo residents. Further, the commenter states that the representatives are responsible for the harm the project will cause to human health and the environment. Other commenter asserts that the PR Government has an absurd policy of waste to energy before recycling.

**Response to Comment 1:** EPA notes that any endorsement of EA's project or the adoption of the PR Waste Management Policy are decisions made by the Municipality of Arecibo and the government of PR, and not by EPA. EPA, through this PSD permitting action, has no authority to oversee or, otherwise, engage in the local or state government decisions. We believe that the local and state governments are better situated to make these judgments. Nevertheless, as mentioned at Response to Comment of this document, EPA encourages PR's government to implement effective recycling programs on the Island. With respect to the commenters' concern on the project impacts on human health and the environment; we encourage the commenters to consult Section **IV. K**, Section **V.A**, Section **IX**, and Section **X.E.1** and **2** of this document.

## **C. Criticism of PR EQB**

**Comment 1:** The commenters express concerns and skepticism regarding PR EQB's abilities to handle its responsibilities to enforcing the regulations designated to protect human health and environment in general and in particular regarding enforcing the EA's permit.

**Response to Comment 1:** EPA is the primary authority for PSD permits in Puerto Rico and will enforce EA's PSD permit conditions. Any concerns regarding PR EQB's ability to protect public health and the environment is beyond the scope of this permit action. However, we note that EPA and PR EQB have joint enforcement authority on many of the environmental regulations based in federal law and, as such, EPA can often take action against sources violating those regulations.

## VIII. NON PSD REGULATED POLLUTANTS/NON PSD DRAFT PERMIT RELATED ISSUES

### A. Non PSD Regulated Pollutants

#### 1. Ultrafine Particles

**Comment 1:** Several commenters address comments regarding the project's ultrafine particles (UFP) emissions. The commenters note that there are no EPA regulations addressing the UFP emissions. Further, while some commenters assert that the fabric filters, as the ones proposed by EA, cannot collect UFP, other commenters state that the UFP collection efficiency of the fabric filters is low. One commenter includes (along with a comment letter) an article (technical paper or paper)<sup>41</sup> to support the assertion regarding the fabric filters' poor UFP collection efficiency.

**Response to Comment 1:** As noted by the commenters, no separate national ambient air quality standards (NAAQS) exist for UFP<sup>42</sup> matter beyond the NAAQS for particulate matter with aerodynamic diameter less than or equal to 10 micrometers (PM<sub>10</sub>) and 2.5 micrometers (PM<sub>2.5</sub>).

Consequently, an UFP analysis is not a current PSD regulation requirement, and, therefore, under EPA's regulations, PM<sub>2.5</sub>, which is addressed in the EA permit, is the indicator for fine particles<sup>43</sup> (including UFP matter).

EPA's review of the technical paper provided by the commenter, shows that, in fact, the section of the paper which we assume that the commenter has relied upon to support its position on the collection efficiency of fabric filters, does not specifically provide information regarding the collection efficiency for UFP. The paper offers, instead, information about some fabric filters' (which were in operation before 1999) collection efficiency of particulate matter below 2.5 micrometers (PM<sub>2.5</sub>), and which the paper alleges to fall, "between 5% and 30%, before the filters become coated with lime and activated carbon." The paper does not seem to provide any explanation whether the fabric filters' lime and activated carbon coatings play any role in the filters' efficiency, or provide the information about the filters' PM<sub>2.5</sub> collection efficiency after the filters become coated with lime and activated carbon.

Nevertheless, based on the information supplied by EA's PSD application and additional supporting materials, and based on EPA's review of technical documents, the filters' coating (known as "filter cake") plays an important role in the filters' particulate collection efficiency.

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<sup>41</sup> Howard, C.Vyvyan, Statement of Evidence, Particulate Emissions, and Health, Proposed RingaskiddyWaste- to Energy Facility, June 2009.

<sup>42</sup> "Ultrafine particles, generally including particles with a mobility diameter less than or equal to 0.1um, are emitted directly to the atmosphere or are formed by nucleation of gaseous constituents in the atmosphere". See EPA- National Ambient Air Quality Standards for Particulate Matter, December 14, 2012 available at <http://www.epa.gov/pm/2012/finalrule.pdf>

<sup>43</sup> See EPA- National Ambient Air Quality Standards for Particulate Matter, December 14, 2012 available at <http://www.epa.gov/pm/2012/finalrule.pdf>

Further, the paper states that, “though there have been an improvement since 1999, the bag filter technology used at municipal waste incinerators is not efficient at filtering very fine particles. For particles of less than 1 um down to about 0.2 um the abatement efficiency is low. Although very high capture rates, based on gravimetric indices, are generally claimed, the majority by number of ultrafine particles will pass through, and current standards do not take into consideration the sizes of the particles emitted by an incinerator.”

Based on EPA’s review of the paper it is unclear whether the paper considers that the filters’ UFP efficiency is similar to the filters’ PM<sub>2.5</sub> efficiency of 5% to 30%. In addition, the PM<sub>2.5</sub> collection efficiency shown in the paper is dated and it is not consistent with today's fabric filters PM<sub>2.5</sub> collection efficiency, which is routinely better than 99.9%. Further, while the paper notes the improvements to the efficiency of the newer fabric filters, the paper does not provide any data about the collection efficiency of the fabric filters newer than 1999. Additionally, no information is provided in the paper about the type or number of fabric filters tested, which raises questions about the reliability of the efficiency data provided in the paper.

Moreover, the paper does not explain how the collection efficiency was determined (i.e., performance test, etc.). EPA notes that in order for us to use the actual collection efficiency of pollution control technologies, or actual emission rates in making PSD permitting decisions, the test methods (performance test or other type of test) used to obtain that data must be identified and must have a scientifically sound basis; however, as we noted above, no test methods are mentioned in the paper.

In conclusion, while an UFP analysis is not a current PSD regulation requirement, and the indicator for UFP is the PM<sub>2.5</sub>, based on EPA’s review of UFP related technical information , thus far, the fabric filters, including the fabric filters’ proposed by EA, are effective in removing UFP emissions.

## **2. Clarification on Lead Emissions Description in the Fact Sheet**

**Comment 1:** The commenter requests clarification on a footnote included in the Fact Sheet explaining why lead (Pb) is not included in the draft PSD permit.

**Response to Comment 1:** The PSD regulations apply to new major stationary sources<sup>44</sup> or major modifications at existing stationary sources for regulated New Source Review (NSR) pollutants<sup>45</sup> where the area the source is (or will) be located is designated as “attainment” or “unclassifiable” with respect to the National Ambient Air Quality Standards (NAAQS). The EPA administers the PSD program in Puerto Rico, and therefore is responsible for issuing PSD permits for sources subject to PSD regulations.

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<sup>44</sup> See 40 CFR 52.21. (b) (1) “Major stationary source” available at <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=5f2b25d1de7e11a0da1dbe1ebd0ce9a1&rgn=div8&view=text&node=40:3.0.1.1.1.1.19&idno=40>

<sup>45</sup> See 40 CFR 52.21. (b) (50) “Regulated NSR pollutant” available at <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=5f2b25d1de7e11a0da1dbe1ebd0ce9a1&rgn=div8&view=text&node=40:3.0.1.1.1.1.19&idno=40>

While EA proposes to emit Pb, which is a regulated NSR pollutant, the existing ambient air quality in the region (i.e., a section of Arecibo) where EA will be located is not in attainment with the NAAQS for Pb. Consequently, as explained above in this response, based on PSD regulations, Pb cannot be included in the PSD permit, but Pb will be included in the Commonwealth permit issued by PR EQB.

PR EQB issues permits for major stationary sources, and major modifications to existing major stationary sources, for regulated NSR pollutants where the area the source is (or will be) located is not in attainment with the NAAQS (i.e. nonattainment areas). Thus, for information related to the EA's project Pb emissions requirements, the commenters should consult with the PR EQB Air Quality Department.

### **3. Polycyclic Aromatic Hydrocarbons**

**Comment 1:** The commenter inquires regarding the Polycyclic Aromatic Hydrocarbons (PAH) emissions that would result from the project.

**Response to Comment 1:** The PAH is not a PSD regulated pollutant, and therefore PAH emissions are not addressed by the PSD permit, but PAH will be controlled through the combustion controls that the PSD permit requires for other pollutants. The PAH will be addressed by the permit issued by PREQB.

## **B. Non-PSD Draft Permit Related Issues**

### **1. Location**

**Comment 1:** The commenters provide comments related to the location of the project. Some commenters stated more generally that the project would have a negative impact on the health of the residents living in the proximity of the project's location. Several commenters stated that the Arecibo municipality does not generate enough MSW to sustain the project, but since the project will be located in Arecibo, the Arecibo residents would be the most affected by the negative health impacts of the project. Several commenters stated that the project location is a flooding zone. One commenter includes several photographs showing flooding events, which occurred in Arecibo area over the years.

One commenter expresses concern that the project would have a negative impact on the tourism in the area of the project's location. One commenter expresses concerns regarding the devaluation of properties adjacent to project. One commenter questions whether the project would affect the Arecibo residents (e.g., Arecibo Municipality is the project's location) who are using federal subsidized housing.

**Response to Comment 1:** EPA defers to state and local authorities on the selection of the location of the project and so non-air quality siting issues are not addressed in the federal PSD permitting process. We understand that people are concerned, for various reasons, about the project location. However, consideration of the economic benefits from tourism, property value, housing, and other economic and social issues are the role of the local and state government.

With respect to the amount of waste generated in the service areas (core and broader area), the commenters are referred to Section **IV.J.4** of this document).

With respect to the concern about flooding, there is a separate permit process, outside the scope of the Clean Air Act, to address possible flooding and filling of the wetlands. This other permit process falls under the authority of the Army Corp of Engineers (ACOE). EPA serves as a resource agency and commenter on ACOE wetland permit action. EPA has considered flooding in the ACOE process, but the ACOE permit will be resolved on a separate track.

The air quality and environmental justice analysis conducted by EPA show that the project meets all applicable requirements and is protective for human health and the environment. (See Section **IV.K**, Section **V.A**, Section **IX**, and Section **X. E. 1** and **2** of this document).

**Comment 2:** The commenters assert that the site proposed for the EA's project is a contaminated site.

**Response to Comment 2:** Based on our information the location of the EA's project does not qualify as a contaminated site. See **Response to Comment 1** above.

## **2. Water Resource Use/ Water Discharge**

**Comment 1:** Several commenters state their concern that EA will use valuable water resource as cooling water for the project's cooling tower system. Further, the commenters express concern that EA's project will contaminate water resources by discharging the cooling water.

**Response to Comment 1:** EPA recognizes the importance of protecting the water resources. However, the PSD permit is an air permit that does not regulate the water resource use and water discharge for the proposed project. The cooling water for the cooling tower system and discharge of cooling water is unrelated to the emissions limits and BACT in the PSD permit. Other federal and Commonwealth permits will address the water resource and discharge issues relate to the EA's project.

**Comment 2:** The commenter questions what regulations would EPA impose on EA in order to protect and preserve the aquifers.

**Response to Comment 2:** It is unclear to us whether the comment is intended to refer to protecting the aquifers from contamination with discharge waters. Thus, EPA cannot adequately respond to this comment. Nevertheless, discharges that affect drinking water quality are not regulated under the Clean Air Act's PSD program. Also, see **Response to Comment 1** above.

### **3. History of Energy Answers**

**Comment 1:** The commenters provide comments related to EA's history as a MWC facility operator. While some commenters inquire whether EPA has conducted a comprehensive review of EA's compliance with the regulations at the sites previously owned or operated by EA, other commenters demand that EPA should conduct such a review. Other commenters allege that EA has a long history of violations with various regulations. Other commenters assert that EA's experience as a MWC facility operator does not qualify EA to operate the proposed project.

One commenter asserts that, once constructed, EA's project will be operated by Covanta Energy. Further, the commenter includes a list of several MWC facilities operated by Covanta Energy in the US and worldwide and examples of these projects non-compliance events with the air regulations and other regulations.

**Response to Comment 1:** There are no provisions in the PSD regulations that provide for consideration of an applicant's compliance history in the permit decision. However, EPA believes that the comprehensive set of monitoring, recordkeeping, and reporting requirements which we established in the EA's PSD permit will help us identify violations expeditiously in the event they do occur.

**Comment 2:** The commenters question why the PSD permit application does not include any information regarding the fire, which took place in 2007 at the SEMASS facility. Additionally, the commenters inquire regarding the EA's emergency plan.

**Response to Comment 2:** The commenters do not specify how the comment relates to the draft PSD permit conditions. See Section **VIII.B.3. Response to Comment 1** and Section **IV.F. Response to Comment 1** of this document.

**Comment 3:** The commenter describes a fire that occurred in 2008, at Integrated Waste Management Company (IWMC), PR, a facility that was engaged in processing and recycling tires. Additionally, the commenter lists the PR EQB and EPA actions taken against the IWMC, and includes copies of the EPA Administrative Order on Consent issued to IWMC.

**Response to Comment 3:** See Section **VIII.B.3. Response to Comment 2** of this document.

### **4. Potential to Emit of Future MWC Facilities**

**Comment 1:** The commenters assert that, based on their information, there are seven other municipal waste combustors facilities that are planned to be constructed in PR, in the future. Further, the commenters state that EPA, through the proposed EA's PSD permitting action, should evaluate the impact of the air emissions, collectively, from the EA project and the seven planned facilities.

**Response to Comment 1:** EPA has not received any PSD permit applications for additional MWC facilities. While there may be plans for additional MWCs at the Commonwealth and local level, the commenter did not provide any documentation in support of their contention that there are other facilities that EPA was required to consider when reviewing EA's analysis. We would like to further note that emissions from proposed sources would have been considered if they had a complete application at the time of Energy Answers' completeness date and if they are in the vicinity of the Energy Answers facility. There are no other proposed MWC facilities in the vicinity of Energy Answers with complete applications.

## **5. Workers Exposure**

**Comment 1:** The commenters provide comments related to workers health exposure in conjunction with the proposed project.

**Response to Comment 1:** The Occupation Safety and Health related issues are not addressed through the PSD permitting process. However, EPA did consider the health impacts of the source more broadly (see Section V.A, Section IX, and Section X. E.1 of this document).

## **6. Environmental Impact Statement and Materials Separation Plan**

**Comment 1:** One commenter provides a copy of a comment letter sent to EA in conjunction with EA's Materials Separation Plan.

**Response to Comment 1:** EPA acknowledges the comment. However, no response is provided since the comment is not related to the draft PSD permit. See IV.J.4 of this document for a discussion of the materials separation plan.

**Comment 2:** Several commenters provide comments related to the EA's Environmental Impact Statement that was approved by PR EQB in November 2010. One commenter states that the Environmental Impact Statement's conclusion that there are no adverse health impacts caused by the PCBs emissions is an evident underestimation.

Another commenter states that the EIS was approved by PREQB using a "Fast Track" mechanism, which made impossible for the public to evaluate the EIS. One commenter criticizes PR EQB for not questioning any parts of the EIS prepared by EA.

One commenter includes a copy of letter sent to the Industrial Development Company (IDC) of PR by the Municipality of Arecibo on October 29, 2010, which contains comments on the preliminary EIS that the IDC proposed for public comment. The commenter states that since the community is an environmentally discriminated community, under the Environmental Justice, EPA to evaluate the letter.

**Response to Comment 2:** EPA acknowledges these comments but they are outside the scope of the PSD permit as they involve environmental impact statements.

**Comment 3:** The commenter asserts that EPA did not carry out its obligation to prepare an EIS in conjunction with the EA project. Another commenter states that although EPA may not be obligated to prepare an EIS, EPA should request other federal agencies such as US Fish and Wildlife, US Corp of Engineers, US Department of Health, or Department of Energy to prepare an EIS.

**Response to Comment 3:** EPA reiterates that under the 40 CFR Part 124 "Procedures for Decision Making", an EIS is not required for PSD permits (See 40 CFR 124.9(a) (6)). Additionally, we are not aware of any provisions in the PSD regulations that require EPA to make requests to other federal agencies to conduct and EIS.

## **7. Request of a Copy of the EQB Permit**

**Comment 1:** One commenter requests a copy of the EA's permit issued by PR EQB.

**Response to Comment 1:** Based on our information, to date, no air permit was issued by PR EQB to EA. However, we advise the commenter to contact PR EQB for any updates on the status of the EA air permit.

## **8. Jobs, and Economic Benefits**

**Comment 1:** EPA is supposed to serve the best interest of the people and ensure quality of life and human health and not to look out for the facilities' economic benefits.

**Response to Comment 1:** EPA's mandate is to protect public health and the environment. We note that the potential for economic benefits does not affect the standards for issuing this PSD permit. EPA's analysis in deciding whether to approve the project is based on evaluating the following factors that ensure that the health-based standards are protected: the project's environmental consequences, the appropriateness of air pollution control technologies and monitoring systems, and the requirements for demonstrating continuous compliance with the permit requirements. EPA does consider cost-effectiveness in the top-down BACT analysis, but this is not a measure of economic benefit to the facility. Rather, EPA examines the average and incremental cost-effectiveness of the control technologies being considered in Step 4 of the top-down BACT analysis.

**Comment 2:** Several commenters state that the number of jobs that the project will create is not significant.

**Response to Comment 2:** EPA notes that the approval of this project is based on whether the project meets all applicable Clean Air Act requirements. See **Response to Comment 1** above.

## **9. Ash Disposal**

**Comment 1:** The commenters express concerns regarding the health effects associated with the ash disposal, and with the use of the bottom ash as construction material. Further, the commenters state that the use of the Toxicity Characteristic Leaching Procedures, which is



included in the EPA's "Guidance for the Sampling and Analysis of Municipal Waste Combustion Ash for Toxicity Characteristics, 1995", is not an adequate method for the characterization of the ash' composition.

**Response to Comment 1:** The ash disposal, ash beneficial use, ash sampling are not implemented through a PSD permit. As stated in the draft PSD permit, these requirements should be addressed by appropriate permits issued under the authority of PR EQB.

The PSD permit concerns the air emissions resulting from the proposed project, and health effects of these emissions. The EA PSD permit addresses ash (bottom and fly ash) handling and conveying system, ash processing, and storage as potential sources of particulate emissions. EA's PSD permit requires the installation of fabric filters for the control of the particulate emissions resulting from the above listed potential sources. The PSD permit includes BACT limits for the particulate emission rates, opacity of emissions, and visible emissions associated with the ash generated by the combustors. Additionally, the permit requires continuous monitoring of the filters' operating parameters, which would ensure the BACT limits are met on a continuous basis.

## IX. AIR QUALITY ANALYSIS

### A. Comments related to the National Ambient Air Quality Standards

**Comment 1:** Some commenters question the adequacy of the National Ambient Air Quality Standards (NAAQS). One questioned what are the allowed PM, PM<sub>10</sub> and PM<sub>2.5</sub> emission levels that do not cause damage?

**Response to Comment 1:** The Clean Air Act (CAA) requires EPA to set National Ambient Air Quality Standard (NAAQS). These are found in 40 CFR Part 50 and apply to pollutants considered harmful to public health and the environment. The Clean Air Act identifies two types of national ambient air quality standards. *Primary standards* provide protection of public health. These are designed to protect the health of all Americans, including "sensitive" populations such as asthmatics, children, and the elderly, with an adequate margin of safety. *Secondary standards* provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Sections 108 and 109 of the CAA govern the establishment, review, and revision, as appropriate, of the NAAQS to provide protection for the nation's public health and the environment. The CAA requires periodic review of the science upon which the standards are based and the standards themselves. Reviewing the NAAQS is a lengthy undertaking which has very robust involvement of non-EPA experts and other outside stakeholders, and includes the following major phases: Gathering information from the scientific community, assessment and evaluation, studies of risk to human health or the environment, policy assessments, and rulemaking. EPA has set NAAQS for six principal pollutants, which are called "criteria" pollutants. The levels, which are set with an adequate margin of safety, are considered protective and may be found in the following EPA website: <http://epa.gov/air/criteria.html>.

EPA found that the smaller particles had more adverse health effects than the larger sized particles. Therefore, in 1987 EPA replaced the larger sized particles (referred to as Total Suspended Particulates, or PM) NAAQS with the PM<sub>10</sub> NAAQS (where PM<sub>10</sub> are particulates with a diameter of 10 micrometers or smaller). In 1997, EPA further refined the NAAQS by supplementing the PM<sub>10</sub> NAAQS with an additional NAAQS for PM<sub>2.5</sub> (where PM<sub>2.5</sub> are particulates with a diameter of 2.5 micrometers or smaller.) The NAAQS for PM<sub>10</sub> is based on a 24 hour average concentration of 150 ug/m<sup>3</sup>. For PM<sub>2.5</sub>, there are 2 NAAQS. There is a short term 24 hour average NAAQS of 35 ug/m<sup>3</sup> and the new annual average NAAQS of 12 ug/m<sup>3</sup>. The secondary NAAQS are the same as the primary for each of these with the addition that EPA retained the former PM<sub>2.5</sub> annual NAAQS of 15 ug/m<sup>3</sup> as the secondary NAAQS for this pollutant. Energy Answers is required to meet all of these NAAQS.

**Comment 2:** Some commenters asked whether Energy Answers will comply with the PM<sub>2.5</sub> annual NAAQS which was revised on December 14, 2012.

**Response to Comment 2:** EPA recently revised the PM<sub>2.5</sub> annual average NAAQS on December 14, 2012 from 15ug/m<sup>3</sup> to 12ug/m<sup>3</sup>. EA's modeling demonstrates that the maximum

annual PM<sub>2.5</sub> impact from all the modeled facilities plus background concentrations is 7.5ug/m<sup>3</sup>. This concentration is below the revised NAAQS of 12ug/m<sup>3</sup>. Therefore, the facility shows compliance with the revised PM<sub>2.5</sub> annual average NAAQS.

**Comment 3:** A commenter said that the PM 2.5 standard should be focused on the number of particles emitted per year rather than the weight of the particles.

**Response to Comment 3:** EPA promulgated the PM<sub>2.5</sub> NAAQS as a mass based standard expressed in micrograms per cubic meter. EPA's promulgation was subject to public review and is not reviewable in this action.

## **B. Comments Related to Quality Assurance Project Plans**

**Comment 1:** A commenter stated that a Quality Assurance Project Plan (QAPP) was not prepared for this project in particular, for the AERMOD model, the meteorological data, and the ambient air monitored data. The commenter provided a reference to the document, *Guidance for QAPP for Modeling*, EPA QA/G-5M December 2002, EP A/240/R-02/007 and some excerpts.

**Response to Comment 1:** The model, methods, and associated data did indeed meet all Quality Assurance Project Plans set forth by the EPA. The commenter stated that EPA failed to apply *Guidance for QAPP for Modeling*, EPA QA/G-5M December 2002, EPA/240/R-02/007 to this permit decision but did not provide information that demonstrated that elements of the *Guidance for QAPP for Modeling* were not applied.

EPA has several guidance documents and regulations that specify how modeling is to be carried out for PSD permitting decisions. These guidance documents ensure that the modeling analyses for PSD are performed on a technically sound basis and are in accordance with the agency's policies. These documents cover the processes that are required for acceptable quality assurance and performance from the initial pre-application stages such as preconstruction ambient monitoring, or site specific meteorological monitoring to the final stages such as criteria that are required for ultimately approving the information provided by the air quality analyses. The air quality modeling field, particularly as it applies to PSD permitting, is well established by regulation to meet quality assessments for decision making. As explained in more detail in the subsequent response to comments, the EPA guidance documents, regulations, and models provide EPA with the best state of the science for sound, transparent and objective environmental decision making. Many of these documents were in existence even before the *2002 Guidance for QAPP for Modeling* and have the necessary elements to meet the recommendations of the 2002 Guidance document.

In order to respond further to this comment, EPA would like to provide clarifications regarding the QAPP process for EPA's model development and acceptance, and the application of the model and the associated data in this case in the subsequent responses that follow. First as background, we note that in 2002, the EPA'S Office of Environmental Information issued the *Guidance for Quality Assurance Project Plans for Modeling (EPA QA/G-5)* as a tool for project managers and planners to document the type and quality of data and information needed for making environmental decisions. This document contains generic advice and

recommendations on how to develop a QAPP for projects involving model development or application using data acquired from other sources. This document was designed for internal use and provides guidance to EPA program managers and planning teams. The document even states that it does not impose legally binding requirements and might not apply to a particular situation based on the circumstances. The PSD modeling program meets these recommendations through other guidance documents and the procedures outlined in the EPA *Guideline on Air Quality Models*, codified under Appendix W of 40 CFR Part 51, and the processes discussed in the subsequent responses. The process that EPA has in place for ensuring that air quality modeling is technically correct already meets the goals of the generic 2002 document.

It should be noted that this 2002 document is not specific to air quality modeling but to any type of environmental modeling, such as water or soil quality modeling. It is also not specific to modeling but also to environmental monitoring or decision making. However, one important distinction that is not clear even from the QAPP document is that models analyze data; they do not produce data. It is important that the methods that are employed in order to properly analyze the data follow established and approved federal procedures. These procedures were followed in the case of the Energy Answers permit as further discussed in the subsequent response to comments below.

A principle reviewer of the 2002 document was the Council on Regulatory Environmental Modeling (CREM). Air quality modelers from the EPA's Office of Air Quality Planning and Standards (OAQPS) and EPA Regional Offices (including EPA Region 2) have been participants on this council. As a matter of fact, the document benefited greatly from the experience gained in the dispersion modeling field used in PSD permitting. As discussed in more detail below regarding the AERMOD model development, EPA has had a very rigorous and structured process in place since the 1970's that ensures the very goals that the commenter's reference document suggests. With the creation of the Model Clearinghouse and the promulgation of the *Guideline on Air Quality Models*, the air quality models and the respective data acquisition and guidelines meet the QAPP requirements. This applies to the AERMOD model development, the application in this case, the data inputs such as meteorological information and ambient air monitoring information.

**Comment 2:** Some commenters questioned the integrity of the AERMOD Air Quality Dispersion Model. A commenter claims that a QAPP for the AERMOD model was not prepared and reference portions of an EPA Document *Guidance for QAPP for Modeling*, (EPA QA/G-5 M December 2002) which the commenter believes was not relied upon. Some commenters further questioned the appropriateness of the AERMOD Air Quality Dispersion Model in Puerto Rico.

**Response to Comment 2:** The comment questioned the integrity of AERMOD but did not show where the development or evaluation of AERMOD as an EPA preferred model under 40 CFR Part 51, Appendix W failed. In addition, challenges to the AERMOD should have been made when EPA proposed the model, and not via a specific permit action. Regarding the decision to rely on AERMOD for EA's permit, EPA would like to offer the following clarification. AERMOD is the EPA preferred regulatory model for assessing air quality impacts related to PSD permit applications. AERMOD is part of the EPA *Guideline on Air Quality Models*

(GAQM), which is codified into regulation under 40 CFR Part 51, Appendix W. AERMOD was developed jointly by the American Meteorological Society and EPA as a Regulatory MODEL (AERMOD) starting in 1991 and received final promulgation in December 2005. It represents the best state of the science for assessing air quality in the planetary boundary layer. In order to receive preferred regulatory status in the EPA *Guideline on Air Quality Models* AERMOD had to undergo rigorous performance tests including statistical tests, field experiments, evaluations, scientific peer reviews and a public review process. The results of these tests and other relevant information are publicly available under the dispersion modeling section of the EPA modeling website called SCRAM <http://www.epa.gov/scram001/>. In particular, the *AERMOD Formulation Document*, the *AERMOD: Latest Features and Evaluation Results* (EPA-454/R-03-003), June 2003, and *Comparison of Regulatory Design Concentration* (EPA-454/R-03-002), June 2003 are useful documents for understanding this model's development and evaluation. The *AERMOD User's Guides* and the *AERMOD Implementation Guide* provides guidance on the dispersion model's proper application.

In order to maintain technical integrity and achieve consistency in model applications, Congress mandated through the Clean Air Act that EPA hold periodic Modeling Conferences approximately every 3 years. During these conferences experts in the field participate in technical and policy model developments. These experts include people from academia, Regional, State and Local regulators, environmental groups, and professional organizations. Further, EPA established a Model Clearinghouse in the Office of Air Quality Planning and Standards (OAQPS) where new modeling issues are brought forward for consistency and proper resolution. The Model Clearinghouse developed the EPA *Guideline on Air Quality Models*. This document provides guidance for applying the models consistently in a manner that is technically sound, and meet the regulatory requirements. EPA is continually looking to improve upon the science and policy thus, model updates are occasionally released, and bug fixes such as minor code changes are made. Model Clearinghouse letters are publically released when clarifications are necessary.

In the case of the Energy Answers, the AERMOD dispersion model was used. The latest versions of this model and its preprocessors, including any updates that were issued by EPA during the permit application review process, were used.

AERMOD is the dispersion core. It is appropriate to use in Puerto Rico since the meteorological, topographic, land cover and other information that is specific not only to Puerto Rico but to Cambalache in particular are used as the inputs.

**Comment 3:** A commenter suggested that AERMOD should be calibrated for use in Puerto Rico.

**Response to Comment 3:** Calibration of the EPA models is not accepted and is specifically prohibited in the *Guideline on Air Quality Models*. The EPA preferred models have already undergone extensive evaluations. The *Guideline on Air Quality Modeling*, section 7.2.9, states that "Calibration is subject to much error and misunderstanding". There is too much uncertainty in calibrations that may result in a different outcome for the wrong reason. This is especially

true for short term concentrations that depend on so many variables. Therefore, calibration is not recommended.

**Comment 4:** A commenter noted that there have been 140 bug fixes since AERMOD's promulgation in 2005.

**Response to Comment 4:** EPA is constantly looking to improve upon the model and will correct bug fixes or enhance the model whenever it finds the opportunity to do so. These types of changes are not uncommon in any technical field and do not suggest that the model is not sound. In fact the model performance comparisons show dramatically improved performance and less over-estimation with each update. With the updates and bug fixes to the model, EPA performed a reevaluation of the model which showed either no impact or improved performance from the updates. EPA has processes in place to ensure that the improvements are both appropriate and transparent with the underlying credibility of the model in place. The processes include the model evaluations that accompany the change, the documentation, the vetting of the changes in the modeling community through public announcements, and opportunity for comment during the modeling conferences.

**Comment 5:** A commenter mentioned that the model is over 10 years old.

**Response to Comment 5:** AERMOD was first promulgated in 2005. The age of the model is inconsequential since model experts constantly maintain the model and make changes when appropriate. The *Guideline on Air Quality Models* states, "EPA does not make changes to the guidance on a predetermined schedule, but rather on an as-needed basis. EPA believes that the revisions should be timely and responsive to user needs and should involve public participation to the greatest possible extent."

**Comment 6:** Some commenters believe that a QAPP was not prepared for the site specific meteorological monitor in Cambalache so the data is unreliable.

**Response to Comment 6:** Some commenters questioned the integrity of the meteorological monitor that was used for measuring the meteorological data that was input into the dispersion model. EPA agrees that a meteorological monitor must have an approved QAPP before data is used for dispersion modeling. EPA Region 2 did indeed have this information available during the permit applicant review process. A Monitoring Plan and Quality Assurance Project Plan (MP/QAPP) and Standard Operating Procedures (SOP) manual was developed and approved by EPA Region 2 for this site specific area on November 24, 1992 by trained monitoring experts in the EPA Region 2 office in Edison and with EPA Region 2 meteorological staff. A diligent review of the MP/QAPP and SOP was performed and found to be acceptable for PSD applications. The procedures met EPA guideline methods including those specified in the "*On-Site Meteorological Program Guidance for Regulatory Modeling Applications*", the "*Ambient Monitoring Guidelines for the Prevention of Significant Deterioration (PSD)*", and other applicable guidelines such as the "*Quality Assurance Handbook for Air Pollution Measurement Systems - Volume IV: Meteorological Measurements (EPA-454/B-08-002)*".

**Comment 7:** A commenter claims that a modeling protocol was provided rather than a QAPP.

**Response to Comment 7:** A modeling protocol is different than a QAPP. A modeling protocol describes the methods that will be used by the model to analyze the data. A QAPP deals with the quality of the data that is input into the model. A modeling protocol is a proposal prepared by the applicant and approved by the regulatory agency prior to the undertaking the modeling analysis. The intent of the modeling protocol is to come to an agreement on how to conduct the analysis whereas a QAPP deals with the data itself. A modeling protocol describes how the modeling analysis will be done, what data bases will be used and any assumptions that are made. The reviewing agency in turn looks to ensure that the proposed procedures described in the protocol are based on sound technical science and follows the agency's regulatory guidance and policies for the proper application of the model. An example of information that is contained in the modeling protocol which is not relevant to a QAPP is the determination of which NAAQS applies, which averaging times should be used, and in what form the standard should be presented.

Energy Answers submitted the first draft modeling protocol in February 2010. EPA provided comment on that protocol and on each revision that followed. The final protocol was submitted in September 2011 in response to revisions to the PM10 and PM2.5 emission rates and approved by EPA on October 11, 2011. As may be seen from the correspondence, protocols are not simply accepted by EPA but reviewed and commented upon so that the modeling analysis that is ultimately performed and submitted represents the latest science, guidance and policies.

**Comment 8:** Does data from the National Weather Service, NWS, for its acronym in English, meet requirements of QS? Where is the evidence?

**Response to Comment 8:** The comment refers to QS, which we assume is "Quality Specification." In response to this comment regarding the QS for the meteorological data measured in San Juan, we note that this meteorological data is collected and maintained by the National Weather Service offices under the National Oceanic and Atmospheric Administration (NOAA) and not by a private entity. There are personnel in the local NWS offices that do precisely this on a continuous basis. The primary user of this information is the aviation industry which constantly relies on this information. We agree that the data must meet the QS criteria even for dispersion modeling. That criterion was met at the San Juan NWS site. See <http://www.nws.noaa.gov/directives/>.

**Comment 9:** A commenter stated that the ambient monitors operated by the PREQB do not meet the proper Quality Assurance/Quality Control requirements.

**Response to Comment 9:** The Catano, Barceloneta and San Juan monitors are regulated by PREQB and EPA. They comply with EPA/State Quality Assurance/Quality Control procedures and are audited for quality specifications. PREQB, like all states, have a Quality Management Plan, which ensures that the monitors meet Quality Assurance/Quality Control procedures. In addition, they comply with 40 CFR Part 58 which specifies how the state must run their air monitoring network. EPA performs audits on the monitors and the lab every year and PR has been meeting the acceptance criteria which ensure that the monitors are well maintained.

### C. Comments Related to the Representativeness of the Meteorological Data

**Comment 1:** Some commenters question the spatial and temporal representativeness of the meteorological data measured in Cambalache. Another commented that the atmospheric conditions were not taken into consideration.

**Response to Comment 1:** EPA *Guideline on Air Quality Models*, (GAQM) (40 CFR Part 51, Appendix W), specifies that either 5 years of National Weather Service or 1 year of site specific meteorological data is required as input for dispersion modeling (see section 8.3.1.2 of the GAQM). It further states that site specific data is preferred (8.3.3.1) since spatial representativeness is best achieved by collection of all the needed model input in close proximity to the actual site of the source.

In this case, meteorological data that was measured in Cambalache between August 1992 and August 1993 was found to be more spatially representative than 5 years measured by the National Weather Service in San Juan. During the modeling protocol stage for the Energy Answers project, both the Cambalache and the San Juan airport data were examined. EPA concluded that the surface meteorology in San Juan is much different than Cambalache. San Juan is influenced much more by urban conditions while Cambalache is more rural. A comparison of the winds and the land cover lead to the conclusion that the meteorology at the lower atmospheric levels is not similar. The different land cover show differences in parameters that are used to calculate the surface roughness, albedo and Bowen ratios which are parameters used by the AERMOD model to build profiles of convective and mechanical turbulence.

Further, spatial representativeness must consider the geographic differences between the facility's site and the site of the meteorological monitor. If there are mountains or a river valley nearby they may cause local effects that are specific to that area. For this reason it is best to obtain data that is site specific to the source of emissions, in this case in Cambalache. As may be seen from the wind rose, the site specific data in Cambalache show that there are times that the winds come from the south. The mountains to the south of Cambalache cause drainage to flow down the mountains towards Cambalache. This flow is specific to the area and would not be picked up by the data measured in San Juan.

Some commenters noted that the data was old since it was measured between August 1992 and August 1993. While the data was measured over 20 years ago we have found that the Caribbean is subject to little variability from one year to the next. The Caribbean is noted for its persistent weather patterns over time. Puerto Rico is located in the trade winds which blow predominately from the north easterly/easterly direction. The trade winds affect Puerto Rico in general. The *Guideline on Air Quality Models* allows for the use of older data provided that it is temporally representative as may be seen in Section 8.3 where it states that temporal representativeness is a function of year-to-year variations in weather conditions. EA and EPA reviewed the year to year variation in Puerto Rico. It was found that by examining the weather patterns at a location over time, the patterns are not different enough to lead to a different conclusion. This may be seen in the wind roses that were developed for San Juan between 2005 and 2009 (see figures in April 2010 Modeling Protocol.) The five years are similar to each other which show that there is little temporal variability in Puerto Rico. Examination of meteorological data at other Caribbean sites



including data measured at the Aguadilla airport and the US Virgin Islands show little variability over a year and over time as well. It may also be noted that while 1 year may not seem adequate it is also allowed as the length of time for site specific data measured in the continental US where there is greater seasonal variability. Therefore, it was concluded that the 1 year of site specific surface data at Cambalache while measured 20 years ago is still temporally representative to the project and preferable over the surface data in San Juan which was not spatially representative of Cambalache.

**Comment 2:** It is unacceptable that the data is complete, which could not be obtained from Cambalache, with the remaining data NWS Airport in Isla Verde.

**Response to Comment 2:** The discussion above (response C.1) pertains to the surface meteorological data measured in Cambalache. San Juan surface data was not found to be representative of Cambalache. However, AERMOD also requires upper air data for information that the model needs for the upper atmosphere, not for surface conditions. San Juan is appropriate for this purpose. This is because the upper atmosphere is more homogeneous from one location to another since it is removed from local surface influences. In the US the National Weather Service operates approximately 1 upper air station per State. Puerto Rico only collects this information at the San Juan Airport since the primary users of this information is the aviation industry. Information such as cloud cover was obtained from San Juan. After evaluation it was found that 1 year of upper air data from San Juan used concurrently with the surface data measured in Cambalache was approvable for this modeling analysis.

The surface data measured in Cambalache met the minimum 90% data capture requirements and in many cases the data capture was 99% or 100%. In order to obtain a full data set for all parameters, a small number of hours of surface data in San Juan were substituted so that the model could calculate a concentration for that hour. Otherwise, there would not be sufficient data to calculate a concentration for the hour where the data was missing. (For guidance on appropriate data substitution and representativeness, see *Guideline on Air Quality Models section 8.3.3.2c* and *Meteorological Monitoring Guidance for Regulatory Modeling Applications*, available at <http://www.epa.gov/ttn/scram/guidance/met/mmgrma.pdf>.)

**Comment 3:** A commenter noted that the data in San Juan measured more calm wind conditions than in Cambalache.

**Response to Comment 3:** The response to this deals with the difference in the instrument threshold used at NWS sites (such as San Juan airport) and ones that are installed for site specific PSD purposes (see EPA guidance “*Meteorological Monitoring Guideline for Regulatory Modeling Applications*”). A wind is defined as calm when the wind speed is below the starting threshold of the anemometer. The instruments used at airports are generally more robust and less sensitive than the instruments recommended for site specific purposes. The thresholds for measuring wind direction and wind speed are higher at airports. This results in a greater incidence of reported calms in airport data. (See section 6.7 of the *Meteorological Monitoring Guidance for Regulatory Modeling Application*).

In addition, it is important to note differences in reporting requirements between NWS airport sites and site specific measurements particularly when it comes to comparing the reporting of

calms. NWS airport sites around the US underwent a transition around the 1990's that led to the reporting of a larger number of calms. That is, the wind information at NWS sites was no longer recorded by a human observer but rather recorded by an automated system called the Automated Surface Observing Station (ASOS). At ASOS stations, such as the San Juan NWS station, wind information is archived on a minute basis but reported only once per hour. This method of reporting once an hour is not a true hourly average wind but rather a single 2 minute average reading that is supposed to represent that hour. If the reading happens to be calm at that instant it is reported as calm regardless of the wind information over all the other minutes that made up that hour. In addition, the wind speed was truncated to the nearest integer rather than rounded. This led to a larger number of hours reported as calm at NWS sites. EPA became aware of this issue as it effects dispersion modeling and developed a program, called AERMINUTE that is able to resolve the wind back to true hourly averages using the archived data. The model also adjusts for the truncation. This not only allows for better data resolution but reduces the number of hourly averages that are reported as calm. This is not an issue for site specific data (as used by Energy Answers) since site specific data uses the minute data to begin with.

See [http://www.epa.gov/ttn/scram/guidance/clarification/20130308\\_Met\\_Data\\_Clarification.pdf](http://www.epa.gov/ttn/scram/guidance/clarification/20130308_Met_Data_Clarification.pdf).

However, it should be noted that too many calms are not desirable in selecting data for modeling analyses since these hours are not used in the modeling analysis. This reduces the number of iterations that the model uses to calculate an ambient concentration (Section 8.3.4.2 a. of the *Guideline on Air Quality Models* states that hourly concentrations calculated with steady-state Gaussian plume models using calms should not be considered valid. The wind and concentration estimates for these hours should be disregarded and considered to be missing.)

**Comment 4:** Of the 8,760 hours a year (between August 12, 1992 and August 11 1993), it is said that for only one (1) hour the wind was calm. This is contrary to the experience that we the residents live in the Coastal Zone of Arecibo live.

**Response to Comment 4:** While EPA agrees that there are many occurrences of low wind speeds in Arecibo, these may not necessarily be a calm wind by definition. The NWS classifies an observation as calm if the wind speed is less than 3 knots (or 1.5 meters/second). When site specific data is collected using EPA guidance, a calm wind is considered to be 1.0 meters/sec. Winds that are less than the calm but greater than the instrument threshold of 0.5 meters/second are still processed. Winds less than the instrument threshold are disregarded. This is done in order to avoid unrealistically high concentrations while still allowing most of the data to be used. In this case, there were no hours disregarded due to calms for determining where there was a modeled exceedance.

**Comment 5:** A commenter questioned why EPA corrected the information reported in a wind rose.

**Response to Comment 5:** During EPA's technical review of the initial modeling protocol, it was noted that the wind rose data reported winds with respect to where the winds are blowing to. This is not incorrect but is contrary to the more common convention which is to report winds with respect to where they are blowing from. It displays the information as a mirror image to

what is common practice. EPA noted this and requested that the wind rose use the more common convention.

**Comment 6:** If the winds rose shows that the prevailing winds are from the north why are the runways at the Aguadilla airport oriented east-north-east?

**Response to Comment 6:** The prevailing and strong winds measured in the Cambalache data are indeed from the east-north-east. First, we should clarify that the wind barb that the commenter refers to was corrected to be from the south and not the north. In any case, this wind barb may occur often but when they do they are low wind speeds. The airport is interested in higher wind speeds. As may be seen from the wind roses, winds with easterly components (i.e., those encompassing directions spanning from the north- east to south-east) account for approximately 52% of the total winds. These winds are also stronger. The wind blows from the south approximately 22% of the total time but these are the lower wind speeds.

**Comment 7:** Data are Cambalache August 1992-August 1993. What happened before and after August 1992 August 1993?

**Response to Comment 7:** The 1 year of data is used for diagnostic purposes in the model. It is not meant to be a forecast. The EPA dispersion models are tools for decision making and provide information on potential worst case impacts based on a particular averaging time. EPA developed a policy that 1 year of site specific data is adequate to make this diagnostic decision. See Response to Comment C.1, above, for more details.

**Comment 8:** Start with the territory to be impacted. This is the first data that the EPA does not describe. Certainly it is anticipated that the area of impact not only includes the 2 km. around where the chimneys are to be located, but will spread to hundreds of miles of distance of these chimneys.

**Response to Comment 8:** The description of the area is contained in the PSD application and the modeling protocol. The modeling domain was not limited to 2 km but rather out to 24 km radius from the facility. The maximum impacts were close in to the facility (within Cambalache). The impacts decreased outward where impacts fall below de minimis level (significant impact levels) after 3 or 4 km depending on the pollutant. (For additional information on the terrain data, see section D)

**Comment 9:** The area of impact is not defined. It is not clear what meteorological, topographic, or terrain data is necessary to use in the modeling process to be able to predict where the pollutants will deposit and in what concentrations.

**Response to Comment 9:** The area of impact was indeed defined for each pollutant and for each averaging time of the NAAQS and for various operating loads. For most pollutants, the impacts are less than the significant impact levels so the area is defined simply as the maximum impact since the other impacts of that pollutant are less than de minimis. For pollutants with impacts exceeding the significant impact levels, the impact area was specified.

The air dispersion model requires meteorological, topographical, and terrain data (and other data) that is representative of the location of the proposed source to be inputted into the model. The air dispersion model uses mathematical equations to calculate where the pollutants would deposit and their concentrations. It does this for every hour of meteorological data used in order to determine the worst case or design concentration.

**Comment 10:** In the ALNM (San Juan) data from 2005-2009, states that wind blows west 27% of the time. This data has a closer behavior to the reality that the residents of Arecibo experience.

**Response to Comment 10:** EPA agrees that the wind in San Juan and the Caribbean in general blows primarily towards the west (from the east). However, the San Juan airport was not found to be representative of the conditions in Cambalache. There are local geographic features in Cambalache that influence the weather on a local scale which sometimes cause the winds to blow from the south.

**Comment 11:** The terrain data used was based on terrain from Alaska.

**Response to Comment 11:** By terrain, we mean ground or topographic elevation. The terrain that was used for this modeling analysis was ground elevation information from Arecibo, not Alaska. The terrain was obtained from the US Geological Survey and extended out to 24 km. The mountains, rolling hills and flat area in Arecibo are simulated by the AERMAP model which is the terrain preprocessor to AERMOD. In the event that the comment in Spanish was translated to the word “terrain” in English but the commenter meant “surface roughness”, we refer to the response on land use (see response to comment 13).

**Comment 12:** Some commenters claim that AERMOD uses a constant wind speed, constant concentration and constant terrain.

**Response to Comment 12:** AERMOD is a “steady-state model”. This means that it simulates a straight line flow for each hour and calculates an ambient concentration at each grid point (or receptor point) for each averaging time. This is actually a conservative assumption since the plume truly does meander with distance and, therefore, impacts are more likely to be overstated than understated. In any event, a steady state model does not mean that there is a constant wind speed, concentration or terrain. The wind speed and direction change each hour (which in a one year data base includes nearly 8760 hours). The wind speed also changes with height. Therefore, the wind speed in AERMOD is not constant and, as a result, is more realistic.

The concentrations in AERMOD are characterized as “Gaussian” in general and further refined into “Bi-Gaussian” under convective conditions. EPA recognizes that the Gaussian assumptions are valid out to a distance of approximately 10 to 50 km. The concentration of the pollutant in a plume varies by distance with the highest concentration in the centerline. The concentration decreases as the distance from the centerline increases. This decrease depends on many meteorological factors for each hour such as the atmospheric stability (or turbulence), and the depth of the mixing layer.

While the model uses a single emission rate, it uses the maximum allowable emission rate. In reality, the actual emission rate does vary but is always less than the worst case maximum allowable emission rate. This represents one of the conservative assumptions in the model. A flat, uniform terrain was also not assumed. AERMAP was used in order to integrate terrain into the model. AERMAP is a preprocessor to the AERMOD Model. In this case, terrain elevation data was extracted from the USGS National Elevation Dataset in order to obtain the topographical information of the surrounding area extending out to a 24 km radius distance. Thousands of receptor grids were placed throughout Cambalache and the surrounding towns including on terrain that is flat, or mountainous. (A receptor is a location where an air quality concentration is calculated by AERMOD.) It should be noted, that in some locations discrete receptors were also used in order to specifically calculate concentrations on sensitive populations such as hospitals, schools, parks, ecologically sensitive areas. A plume that travels towards the terrain can either impact it directly, travel over it, or around it depending on the plume's kinetic energy, and the atmospheric stability. Since the meteorological data was site specific, the effects of the terrain on the air flow was captured.

**Comment 13:** Some commenters questioned the appropriateness of applying a procedure developed by the State of Alaska for calculating surface characteristics in Puerto Rico since the meteorology of the two areas is different.

**Response to Comment 13:** The surface characteristic are those of Arecibo not Alaska. Land cover is used in the modeling analysis in order to obtain some surface features or characteristics that AERMOD uses to calculate the amount of boundary layer energy that is available. The growth of the boundary layer is driven by changes in the heat and momentum which depends on the type surface where the air travels over. For example a rough surface affects the air flow because of the friction it causes. In other words it affects the mechanical turbulence. Moisture affects the convective turbulence in the air due to the latent or sensible heat. Albedo represents a degree of reflectivity of atmospheric energy. There are 3 surface characteristics that are used by AERMOD for this part of the calculation. These are the surface roughness length, the albedo, and the Bowen ratio.

EPA guidance specifies that these should be measured around the meteorological monitor (which is representative of the facility site.) Model sensitivity studies show that the model tends to be most sensitive to changes in the surface roughness. Surface roughness becomes important to dispersion mostly at night time due to mechanical or shear turbulence. EPA experience shows that the effects of surface roughness on a 10 meter tall meteorological measurement site can be felt out to about 1 kilometer. The surface roughness feature closest to the meteorological monitor has the greatest influence and diminishes as the distance from the meteorological monitor increases outward. EPA finds the importance diminishes by inverse distance square relationship. Therefore, geometric mean of an area that contains a surface roughness feature must be weighted by the distance. For example, a forest close to the meteorological monitor has a greater influence than one further away. Therefore, the influence a geographical area such as a forest is weighed by the inverse distance squared.

The albedo and Bowen ratio are additional boundary layer parameters where the influence may be felt further. Therefore, EPA guidance specifies that the area of a particular land cover for these features should be based on a 10 km grid.

In order to assist with these calculations, EPA developed a tool called AERSURFACE. This is an optional tool and not a regulatory component of AERMOD. AERSURFACE requires land cover information from the 1992 US Geological Survey (USGS). However, the 1992 land cover data in the U.S. Geological Survey does not include Puerto Rico. This only means that the AERSURFACE tool may not be used and that the calculation must be done manually using satellite or photographs. Prior to the release of the AERSURFACE tool in January 2008, this phase of all AERMOD applications had to be done manually. So this is not new. The 1992 land cover data in the USGS also does not include other parts of the United States such as Alaska. Therefore, the State of Alaska documented the equations for ease in use of the manual procedure. The equations are simply mathematical equations (such as calculating the geometric mean weighted by an inverse distance) and are not particular to Alaska. The equations may be used anywhere. These are the same mathematical equations used by AERSURFACE. Energy Answers used the manual procedures using land cover information from Cambalache and Arecibo obtained from satellite images.

#### **D. Comments Related to the Topographic Features**

**Comment 1:** Some commenters stated that the terrain information from Arecibo was not considered.

**Response to Comment 1:** Terrain elevation data for Arecibo was indeed considered. The data was extracted from the USGS National Elevation Dataset. The AERMOD is an all terrain model. This means that all terrain heights in the modeling areas may be taken into account. This includes flat, intermediate, and complex or mountainous terrain that exceeds the height of a stack within the domain. The topographic information is entered into AERMOD using a preprocessor called AERMAP. AERMAP simulates the terrain so that plumes from the stacks can either impact them directly or travel around them depending on the kinetic energy of the plume.

**Comment 2:** The base elevations of the modeled sources are not uniform.

**Response to Comment 2:** The base elevations are not uniform in this modeling analysis. The base elevations of each source is obtained from the emission inventory and are based either the topographic information, or the blue prints of the facilities.

#### **E. Comments Related to Ambient Monitoring**

**Comment 1:** A commenter is not in agreement with the decision to grant Energy Answers a waiver from the preconstruction ambient monitoring requirements and would like to know the basis for this decision.

**Response to Comment 1:** EA provided EPA with monitoring data for all criteria pollutants subject to PSD even though those pollutants were less than the Significant Monitoring

Concentrations in 40 C.F.R. 52.21(i)(5)(i). The data provided by EA was in accordance with the EPA *Ambient Monitoring Guidelines for Prevention of Significant Deterioration*. Since Energy Answers' potential to emit exceeds 100 tons per year of NO<sub>x</sub> (an ozone precursor), EPA required that EA obtain preconstruction monitoring data for ozone. Therefore, 3 years of ozone data was obtained and examined for compliance with the ozone NAAQS. This monitor is located in Catano where the 3 year average design value is 0.037 ppm which is below the ozone NAAQS of 0.75 ppm. Energy Answers requested approval to use existing data for all of the criteria pollutants instead of obtaining new, site-specific monitoring data in May and September 2011. EPA approved this request based on the fact that representative existing ambient monitoring data was provided. The existing data that is available was collected at sites that have higher concentrations than Arecibo since they are located in more industrial areas, such as Catano, Barceloneta, and San Juan (see Response to Comment 3 in this section for further details).

**Comment 2:** Why are dioxin monitors not required to be installed in the Arecibo Area as part of terms and conditions of the permit.

**Response to Comment 2:** The PSD regulations do not require ambient air monitoring for a pollutant that is not listed in section 52.21(i) (5) (i) (40 CFR Part 52.21(i) (5) (iii)). In any event, since there is no NAAQS for dioxins, post construction ambient monitoring is of questionable value since EPA's regulations do not provide an air quality benchmark. We note, however, that EA performed health and ecological risk assessments which included dioxin, and those assessments established that there are no adverse health risks from EA.

**Comment 3:** Some commenters questioned the appropriateness and representativeness of the ambient monitors.

**Response to Comment 3:** The modeling analysis assesses air impacts from the proposed and existing sources in the area. The analysis takes into consideration several conservative factors in order to add degrees of safety. For example, the facilities that are included in a NAAQS analysis are assumed to operate simultaneously, and continuously all at their maximum allowable limits. In reality, the actual emissions are lower and facilities do not always operate simultaneously and continuously. However, in order to account for small, natural, or distant sources, the EPA *Guideline on Air Quality Models* recommends that concentrations from ambient air monitors be added to the modeled components. This added concentration is the background concentration in an area. In this case, Energy Answers used concentrations from Catano, Barceloneta, and San Juan. The EPA *Ambient Monitoring Guidelines for Prevention of Significant Deterioration*, EP-450/4-87-007 allows the use of monitors in other geographical areas provided they are representative. In this case, the monitors are located in more industrialized area so they represent a conservative estimate. EPA allowed the use of these monitors for background in this case since these monitors measure more than the "natural, minor or major distant sources" in Arecibo (*Guideline on Air Quality Models* section 8.) They also measure concentrations from other large sources. In addition, the monitors are upwind of Arecibo. It should be noted that the monitored concentration was simply added to the modeled concentration without refining the background to match the time of day or season of the modeled concentration, so the background concentration produced is more conservative than if the background were refined. In this case, 3 years of recent data was obtained by Energy Answers.

This was needed for the cumulative modeling analyses of the 1 hour NO<sub>2</sub>, 1 hour SO<sub>2</sub> and the 24 hour and annual average PM<sub>2.5</sub> concentrations. The 1 hour average NO<sub>2</sub> background concentration was obtained from the monitor in Catano during 2005-2007. It was based on the 3 year average maximum. Energy Answers could have used the 3 year average 98<sup>th</sup> percentile which would be a smaller number (a 98<sup>th</sup> percentile is equivalent to the 8<sup>th</sup> highest value measured in year.) Therefore, while the NAAQS is based on the 3 year average of the 98<sup>th</sup> percentile (or 8<sup>th</sup> highest concentration), Energy Answers used the 3 year average maximum or 1<sup>st</sup> highest concentration to represent the 1 hour NO<sub>2</sub> background. The use of the maximum measured concentration along with the conservative location of the background concentration, lead EPA to accept this background value of 65.2ug/m<sup>3</sup>.

Regarding the 1 hour SO<sub>2</sub> background concentration, this was obtained from a PREQB monitor in Barceloneta between the years 2003 and 2005. This value is 66.4ug/m<sup>3</sup>. In the case of the 1 hour SO<sub>2</sub>, Energy Answers calculated the background based on the form of the design value of the 1 hour SO<sub>2</sub> NAAQS. That is, the 3 year average of the 99<sup>th</sup> percentile concentrations measured at this monitor was used as the background value that was added to the modeled concentration.

PM<sub>2.5</sub> background concentrations also come from the PREQB monitor in Barceloneta between 2007 and 2009. The background is based on the form of the NAAQS which is the 3 year average of 98<sup>th</sup> percentile of the daily concentrations which is 16ug/m<sup>3</sup>. The annual PM<sub>2.5</sub> background concentration is the 3 year annual average which is 5.5ug/m<sup>3</sup>. Background ambient air data was also provided for carbon monoxide and PM<sub>10</sub> from the PREQB monitor located in San Juan.

**Comment 4:** A commenter mentioned the impacts due to sea salt.

**Response to Comment 4:** It should be noted that sea salt is more likely to be in the size range of coarse particulate rather than fine particulate (i.e., sea salt is at least as large as PM<sub>10</sub> if not larger). In 1987, EPA replaced the larger sized particle air quality standards (such as Total Suspended Particulates) with the PM<sub>10</sub> standards. This is because the smaller particles had larger adverse health effects than the larger particles. To the degree that any sea salt is smaller size, its concentration would be measured by the ambient monitor.

## **F. Comments Related to National Ambient Air Quality Standards Compliance**

**Comment 1:** With what projects did Energy Answers make the comparisons for significant levels (SIL)?

**Response to Comment 1:** The SIL analysis is done with the primary source. In this case, the SILs analysis was done with the combined impacts from all of the emission units at the Energy Answers facility. This includes the 2 boilers, emergency generator, fire water pump, cooling towers, 3 storage silos, and the ash transfer equipment.

The Significant Impact Levels are small de minimis levels (or screening levels) that EPA considers negligible concentrations when compared to the NAAQS or PSD increment. EPA uses these levels and information from ambient monitors in order to determine whether a cumulative source modeling analysis is required for that pollutant to show compliance with the NAAQS and



increment. A cumulative source modeling analysis takes into account the combined impacts of the new source plus the impacts of other existing sources in the area including ambient background. EPA allows a new source to forgo the cumulative source modeling analysis if the impacts from the new source alone are less than the SIL and the ambient data does not indicate a potential to exceed the NAAQS. This is because under these conditions the NAAQS would continue to be protected.

**Comment 2:** A commenter claimed that existing contaminates were not considered and that only the emissions of the proposed facility was considered.

**Response to Comment 2:** Emissions from existing facilities were considered in the multi-source modeling analysis, which was performed for the 1 hour NO<sub>2</sub>, 1 hour SO<sub>2</sub>, and the 24 hour and annual average PM<sub>2.5</sub> NAAQS. The list and figure of existing sources that was included in the multisource modeling analysis are found in Appendix D of the October 2011 PSD Air Quality Modeling Analysis (revised). The *Guideline on Air Quality Models*, section 8, contains recommended procedures for determining the air quality concentrations of a pollutant during a PSD permit review process. Table 8-2 of this section summarizes the model emission input data for NAAQS compliance demonstrations and breaks the air quality components down to the proposed source, emissions from “nearby” existing sources, and “other” background sources (such as the natural, minor and major distant sources.)

Nearby sources are those that are expected to have a significant concentration gradient in the vicinity of the proposed source. These sources should be explicitly modeled since their maximum concentration may not necessarily be accounted for in the monitored background. In this case, Energy Answers included sources both in the vicinity and further away in the multisource modeling analysis. The most important existing sources to include in a multisource analysis are those with impacts that may potentially overlap with the proposed source’s maximum impact or the ones where the combined impact of all proposed and existing sources overlap. Energy Answers opted to include all the major sources rather than eliminate any that do not overlap. They also included sources that were possibly not necessary since their impacts could be accounted for in the background ambient monitor. This leads to double counting of those impacts and, as a result, a more conservative maximum impact. Also, as mentioned earlier, it is assumed that all these sources operate at their maximum potential emission rate, continuously and simultaneously which add degrees of assurances since in reality this is not the case.

“Other sources” could be accounted for in the monitored concentrations that are simply added to the modeled concentration without consideration to the time or location of the maximum impacts. Given the conservative assumption in the development of the modeled emission inventory, and the selection of ambient monitored background, the NAAQS analysis is demonstrated with an adequate margin of safety.

Regarding the other criteria pollutants that are PSD affected, the modeled impacts are less than the SILs. As stated earlier, this means that the impacts are de minimis. Furthermore, monitored ambient data of existing ambient conditions was provided that shows that the NAAQS would continue to be protected since the additional impacts from EA are small enough to not cause or

contribute to an exceedance over existing conditions. The monitored data provide a conservative estimate of air quality in the Arecibo area because the monitors are located in more industrialized areas than Arecibo. Given that the impacts from EA are less than the de minimis levels and that the ambient data are from more industrialize areas, the NAAQS and increment are conservatively demonstrated for these pollutants as well.

**Comment 3:** A commenter requested whether the project considered an ambient air quality analysis of the number of startup and shutdown periods allowed by the draft permit and whether these events would contribute to violations of the NAAQS. Another asked whether there were preventative measures to assess the air quality due to start up and shut down.

**Response to Comment 3:** Preventative measures to reduce the impacts due to startup were incorporated into the permit. The permit restricts the facility to the startup only one boiler at a time (simultaneous startups are not allowed.) In order to minimize impacts further, the startup must commence and finish only during the day time when dispersion conditions are more favorable. Energy Answers accepted a Time of Day permit limit for startup in order to meet this requirement. Each boiler will be started up using auxiliary burners firing No. 2 ultra low sulfur content fuel oil. Each startup is limited to 7 hours and each shutdown is limited to 6 hours. The 2 boilers combined are limited to 32 startups per year.

Emissions were modeled for all short term air quality standards except for the 1 hour SO<sub>2</sub> since EPA guidance allows for exemptions to this standard if the scenario does not occur often enough and reaches normal operation in a short time. See the linked guidance memo dated March 1, 2011 signed by Steven Page, Director of EPA's Office of Air Quality Planning and Standards: [http://www.epa.gov/ttn/scram/guidance/clarification/ClarificationMemo\\_AppendixW\\_Hourly-NO2-NAAQS\\_FINAL\\_06-28-2010.pdf](http://www.epa.gov/ttn/scram/guidance/clarification/ClarificationMemo_AppendixW_Hourly-NO2-NAAQS_FINAL_06-28-2010.pdf). EPA determined that the infrequency of startups and the short time allowed for completing startup and shutdown warranted use of the exemption. Furthermore, the SO<sub>2</sub> emissions during startup and shutdown are less than those during normal operation. The March 1, 2011 memo applies to the 1 hour NO<sub>2</sub> modeling as well.

However, since NO<sub>x</sub> emissions increase in this case during startup, EPA opted to require an analysis of these impacts. It was found that air quality impacts due to startup are greater than the de minimis impact levels (SILs) for the 24 hour PM<sub>2.5</sub> and 1 hour NO<sub>2</sub>. However, the impacts of PM<sub>2.5</sub> were less than those under normal source operation.

The worst case operating scenario which included 1 boiler starting up at a time while the second boiler operated under various operating loads showed an increase in the 1 hour NO<sub>2</sub> impacts (87.0ug/m<sup>3</sup>) which is above the current EPA interim SIL of 7.5ug/m<sup>3</sup>. For NO<sub>2</sub>, a more detailed modeling analysis which assessed the combined impacts of Energy Answers under this scenario and other existing sources including background was undertaken. Exceedances of the 1 hour NO<sub>2</sub> NAAQS were indentified. However, upon further review it was concluded that Energy Answers did not significantly cause or contribute to any of the exceedances at the times they occurred. The largest contribution from Energy Answers was 0.23ug/m<sup>3</sup>. This is less than the SIL of 7.5 ug/m<sup>3</sup> and less than the health based NAAQS of 188 ug/m<sup>3</sup>.

It should be noted that the exceedances themselves are overestimated. A more refined analysis would reduce the modeled impacts. The Guideline on Air Quality Models, section 5.2.4 specifies a 3 tiered approach for modeling NO<sub>2</sub>. This guidance was supplemented by the March 1, 2011 guidance memo provided above in order to address the 1 hour NO<sub>2</sub> NAAQS. All 3 tiers are “screening” (which means conservative) since EPA recognizes that chemical transformation in the atmosphere of NO<sub>x</sub> emissions to NO<sub>2</sub> is more complex. The first tier is the most conservative. Energy Answers opted to use the second tier. A third or more refined technique would reduce the modeled impacts further. Energy Answers was able to meet the requirements using the second tier. Therefore, it was not necessary to conduct the more refined analysis. In addition to the screening technique used, it should be noted that even the inputs could have been refined. As mentioned earlier in Section E of this response to comments (related to Ambient Monitoring), the conservative nature of the background concentration measured in Catano and the inclusion of all major sources operating at their maximum allowable emissions simultaneously and continuously even if the impacts would not overlap leads to over estimation of impacts. Existing ambient NO<sub>2</sub> monitors in the even more industrial areas of Puerto Rico do not show exceedances of the NAAQS.

Regarding CO, the impact also increased slightly to 126.5ug/m<sup>3</sup> on a 1 hour basis which is still well below the de minimis SIL level of 2000 ug/m<sup>3</sup> and below the NAAQS for the CO which is 40,000 ug/m<sup>3</sup>. On an 8 hour basis, the worst case CO impact is 28.3 ug/m<sup>3</sup>. This impact is less than the SIL of 500 ug/m<sup>3</sup> and less than the NAAQS of 10,000ug/m<sup>3</sup>. Ambient monitors continue to show compliance with the CO NAAQS (measured in San Juan) even with the additional impact from EA under startup/shutdown scenario.

The PM<sub>10</sub> impact is also less than the SIL and NAAQS under startup. The worst case PM<sub>10</sub> 24 hour impact is 2.65 ug/m<sup>3</sup> where as the SIL is 5 ug/m<sup>3</sup> and the NAAQS is 150 ug/m<sup>3</sup>. As is the case with the other pollutants in this response, compliance with the NAAQS would continue to be shown if this additional impact is added to the conservatively obtain background concentration from San Juan.

Regarding shutdown, emissions are not expected to increase during this scenario. There is no separate emission limit. Energy Answers will need to comply with the same permitted emission limits during shut down as during normal source operation.

**Comment 4:** A commenter noted that the impacts of different pollutants occur at the same location even though the pollutants have a different molecular weight. The commenter says that pollutants with different molecular weights should fall in different locations.

**Response to Comment 4:** The molecular weight of a pollutant is factored into the emission rate which is inputted into the model. The emission rate expressed as grams per second is specific to each pollutant. No settling or removal of the pollutant was considered when assessing compliance with the NAAQS. This is conservative since this assumes that all of the emissions stay in the plume while it travels. The result is that the maximum modeled ground level concentration which is used to show compliance with the NAAQS is maximized.

Depending on the modeling scenario, the maximum impact location could be the same for different pollutants. For example, if a terrain feature is nearby and the plume impacts it directly, it could be the location of all the maximum impacts. However, the numerical impact itself would likely be different since the emission rates (which take molecular weight into account) are not the same for all pollutants.

In any case, the commenter provided an example which is excerpted in the following paragraph: “For example, 100% of CO, where the concentration is highest is in meters 742658.29 in the north and 2042987.81 on the east. That is 110, in 100% less load, less mass, is what we are saying, and the coordinates are the same, that's for CO. But if we look at the 80% coordinates remain the same. These same coordinates in the case, for example, in the case of PM 10 for 100% of the average coordinates are 24 hours for 100% 742402.13 2042601.0 and those seen in the same coordinates the PM2.5 different mass, which says 742452.13 20425260.”

In this example, the commenter first questions that the carbon monoxide impacts due to different mass emission rates under different operating loads fall in the same location. This could happen. However, what would be found is that the magnitude of the impact would be different. The commenter states that the PM10 and PM2.5 impacts occur at the same location and provides the coordinates of these impacts. However, these coordinates are not the same.

**Comment 5:** Was the designation of non-attainment for the Arecibo Area with the NAAQS for lead considered in developing the proposed draft permit?

**Response to Comment 5:** The PSD program does not apply in nonattainment areas. Therefore, lead is not a pollutant regulated in EA’s PSD permit. However, we note that the lead emission rate of the Energy Answers facility is 0.31 tons per year which is below the significant emission rate that would trigger review if lead were a PSD pollutant. A “significant emission rate” at a major source of lead is defined as 0.6 tons per year. If lead were a PSD regulated pollutant, EA’s lead emissions rate of 0.31 TPY would fall below this threshold.

In addition, Energy Answers is not subject to the nonattainment permit regulations since it would have to emit 100 tons per year of lead. Since the facility will emit less than this major source threshold it is also not subject to nonattainment permit requirements.

**Comment 6:** Some commenters are concerned about the impacts from the facility on their soils and vegetation.

**Response to Comment 6:** Generally, if the air quality impacts are less than the secondary NAAQS, the impacts to soils and vegetation are not considered adverse. In this case, the impacts to soils and vegetation were addressed as part of 40 CFR 52.21(o) and found to be less than the secondary NAAQS. EPA further specifies screening levels in order to assess the impacts on soils and vegetation. These levels are found in the EPA document, “A Screening Procedure for the Impacts of Air Pollution Source on Plants, Soils and Animals”, December 1980. The impacts in this case are below the screening levels. In order to expand upon the analysis of this guidance document, Energy Answers performed a health and ecological risk assessment on soils and vegetation which looked at particulates, fluorides and lead in addition to other pollutants. The results reveal that the impacts are within acceptable health and ecological risk levels.

**Comment 7:** A commenter stated that the existing conditions in Puerto Rico are already adverse due to Sahara dust.

**Response to Comment 7:** Sahara dust is a known phenomena impacting in the Caribbean. EPA and PREQB monitor for Sahara dust, and consider its impacts in decision making on State Implementation Plans. It is a natural event that cannot be regulated. EPA does look for exceptional events. EPA recently addressed Sahara Dust in the Virgin Islands Regional Haze Plan (a Regional Haze Plan is not required for Puerto Rico). The particle distribution peaks in the 2 to 5 micron range, so much of the Sahara dust is in the coarse particle portion. As part of their natural events plan, PREQB posts air quality index results for PM-10 on their website and issues alerts if concentrations approach 150ug/m<sup>3</sup> of PM10.

**Comment 8:** Concerning the new SO<sub>2</sub> standard approved by EPA, PREQB notified EPA in writing in July of 2011 that the area extending from Manati to Arecibo would be classified as Non-Attainment pursuant to the Clean Air Act (CAA). Recently PREQB issued a letter to EPA requesting that it be revised to unclassifiable. In contrast, the PSD permit application submitted by Energy Answers and the Agency's determination is based on this same area being classified as an Attainment area for the NAAQS. These discrepancies should have been addressed during the permit application review process and prior to EPA's "completeness" determination.

**Response to Comment 8:** EPA promulgated a new NAAQS for SO<sub>2</sub> based on a 1 hour average in June 2010. An area is considered to meet the NAAQS if the 3 year average 99<sup>th</sup> percentile of the annual distribution of the daily 1 hour maximum concentrations is less than 75 parts per billion. On June 3, 2011, Puerto Rico EQB initially considered some locations in Puerto Rico to be classified as nonattainment due to a combination of modeling and monitoring information (the letter is dated June 3, 2011 rather than July 2011 as stated in the comment). The information was preliminary. Upon further review, on March 26, 2012 PREQB determined that all of Puerto Rico should be classified as "unclassifiable" until more accurate information is obtain. It should be noted that the PSD regulations apply equally in unclassified areas as it does in attainment areas. In any event, EPA has not yet finalized approval of any redesignation of the area where EA will be located so the PSD rules are in effect.

**Comment 9:** Arecibo must be declared a NOT COMPLIANCE area for continuing violations to EPA regulations due to the following facilities: The power plant of Cambalache Arecibo, Battery Recycling (Lead), Treatment plant wastewater, and Arecibo Landfill.

**Response to Comment 9:** A section of Arecibo is already classified as nonattainment for lead. EPA does not have data to suggest that the Arecibo area should be reclassified for other pollutants, and the commenter has not provided any such data.

**Comment 10:** The commenter stated that PREPA Cambalache failed and they used AERMOD so Energy Answers may fail.

**Response to Comment 10:** It is not clear what the commenter is referring to by stating that PREPA "failed," but it may relate to PREPA's need to change the control technology at that plant. This is discussed in section IV.H.13 under Response to Comment 1 in more detail.

However, In order to respond to the air quality concerns about PREPA Cambalache, EPA would like to clarify that the need to change the emission controls at PREPA Cambalache were not caused by anything related to the air quality assessment. Moreover, the EPA dispersion model used by PREPA Cambalache for their original application was the ISC and Complex I model to assess compliance with the NAAQS and increments at the time. The ISC and Complex I models preceded the promulgation by EPA of the AERMOD dispersion as the preferred model in the *Guideline on Air Quality Models*. Nevertheless, compliance with the applicable NAAQS and Increments at PREPA Cambalache was indeed shown with these earlier models, and even after the change in control equipment using AERMOD.

**Comment 11:** A commenter inquired about impacts in Guaynabo.

**Response to Comment 11:** Guaynabo is over 40 miles east of Arecibo. Air currents predominately flow in the opposite direction. There are no significant air quality impacts that extend to this distance and in this direction from this facility.

**Comment 12:** A commenter request isopleths of the air quality impacts.

**Response to Comment 12:** Isopleths may be produced by the model output. Isopleths are graphical depictions of lines of equal air quality concentrations. The multi-source modeling isopleths are found in the tabbed figure section of the October 2011 PSD Air Quality Modeling Analysis. As can be seen, it includes isopleths concentration of the 1 hour NO<sub>2</sub>, 1 hour SO<sub>2</sub> and PM<sub>2.5</sub>. These isopleths of concentrations may also be found in October 2011 Environmental Justice Evaluation. In this latter submittal the isopleths are overlaid on aerial photographs. Separate isopleths of concentrations were developed with Energy Answers operating under 80%, 100% and 110% load. As may be seen, the maximum concentration occurs close in to the Energy Answers facility. The isopleths continue to decrease outward until the concentrations fall to less than the EPA de minimis impact levels also known as significant impact levels.

**Comment 13:** A commenter expressed concern over the age of the trucks that will be used for transporting the garbage and the fact that older trucks are exempt from complying with new pollution control regulations. The commenter asked, “Why doesn’t Energy Answers include the pollution from these trucks in calculation of emissions of the plant?” One commenter asked about the health effects due to exposure to diesel emissions.

**Response to Comment 13:** Vehicle emissions are accounted for in the NAAQS analysis since they are part of the measured ambient monitored background concentrations that are added to the modeled concentration due to the stationary sources (facilities). The background concentration is obtained from the ambient monitors that are located in areas that are more industrialized and contain more truck traffic than Arecibo. Therefore, while the background component does not account for expected increased truck traffic in a particular neighborhood due to EA, it represents a conservative concentration.

In this permit action, while the effects of tailpipe emissions on air quality are considered in the NAAQS analysis through the measured ambient monitored background concentrations, the direct emissions from the truck tailpipes are not included in calculating emissions from the plant

because they are mobile sources which are regulated under Title II of the Clean Air Act. The PSD regulations are implemented under Title I of the Clean Air Act. However, the particulate emissions (PM, PM<sub>10</sub>, and PM<sub>2.5</sub>) that occur as a result of the vehicles (including trucks) that entrain dust into the air as the trucks travel over the paved surfaces (i.e., roads and parking areas)<sup>46</sup> within the boundaries of Energy Answers property are indeed included in the fugitive particulate emissions resulting from the project. In fact, the numbers of Vehicles Miles Traveled (VMT) on the Energy Answers' property are factored in the calculations of the fugitive particulate emissions limits established in the PSD permit. These fugitive emissions are part of the annual PM, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions limits of the facility.

The total fugitive emission limit in the PSD permit will, in effect, restrict the amount of traffic that is allowed in the area. In order to minimize dust and particulates, trucks that will deliver waste to Energy Answers or will transport ash or other materials will be required to be covered. The roads (including parking areas) on the property will be required to be paved and wetted in order to reduce dust.

As previously noted, EPA regulates emissions from motor vehicles through Title II of the Clean Air Act. While Title II actions are not part of the stationary source permit processes, we would like to note that mobile source emissions from trucks in Puerto Rico are being addressed by EPA and PREQB in a number of ways. For example, Region 2 is working toward granting DERA (Diesel Emission Reduction Act) funding to assist in the reduction of heavy duty diesel truck emissions. In response to this effort, a grant was awarded in 2012 to the Puerto Rico Polytechnic University which is actually providing funds for the purchase and installation of 75 Diesel Oxidation catalytic converters on diesel trucks to members of the Puerto Rico Truck Association. In addition, the funds will help by partially funding the replacement of 10 heavy duty diesel trucks.

EPA does not regulate the age of the trucks in the PSD permit used by municipalities hauling waste to EA. However, Region 2 has been encouraging PREQB to enforce Rule 403 of the RCAP on mobile sources including a meeting with the Public Service Commission (PSC) to agree on a strategy to reduce diesel opacity emissions from heavy duty trucks. Region 2 expects to have meetings in CY2013 with PREQB and PSC, once the agencies heads are defined, to set goals that will help to control high opacity emissions from diesel trucks. However, this is unrelated to the PSD permit.

**Comment 14:** It is believed that in letter dated August 2011, EPA asked Energy Answers to perform a model about tire derived fuels and automotive shredded residues in the plant they own in Massachusetts. It is not clear if EPA received such information or if the information was indeed provided whether or not was taken in consideration in the proposed permit.

**Response to Comment 14:** The modeling analysis of the Energy Answers facility in Arecibo did include emissions from the all the fuels including the tire derived fuels and automotive

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<sup>46</sup> As of EPA's AP 42, Fifth Edition, Volume I, Section 13.2.1 Paved Roads, "Particulate emissions occur whenever vehicles travel over a paved surface such as a road or parking lot. Particulate emissions from paved roads are due to direct emissions from vehicles in the form of exhaust, brake wear and tire wear emissions and re-suspension of loose material on the road surface."

shredded residues. A request of a modeling analysis of the Massachusetts plant was not necessary for this permit decision. Any modeling that was performed for the Massachusetts plant would be relevant only for that plant and have no bearing on an air quality analysis in Puerto Rico.

**Comment 15:** Some commenters asked if the modeling analysis considered the impacts due to catastrophic events such as explosions or fires, and impacts due to upset conditions.

**Response to Comment 15:** In assessing air quality impacts for permitting, efforts are taken in the modeling analysis to determine the worst case impacts. This includes impacts not only due to the source's normal operation or design capacity, but also due to intermediate operating loads and impacts due to start up/shut down. In this case, Energy Answers modeled 3 operating loads, i.e., 80%, 100% and 110%. Permit conditions restricting the facility to these loads are incorporated into the PSD permit. Note that there is no provision in the PSD permit that allows EA to emit beyond the emissions limits during upset conditions. Exceedances of the emissions limits constitute violations of the permit. The *Guideline on Air Quality Models* states that malfunctions (or upset conditions) which may result in excess emissions are not considered normal operating conditions. These emissions generally are not considered in determining allowable emissions for the purpose of permitting.

Regarding impacts due to catastrophic events such as explosions, there is no requirement under the PSD regulations to assess hypothetical scenarios. Actions needed in the event of a catastrophic event would be addressed by local ordinances. Local ordinances such as PREQB's require facilities to submit an Emergency Plan.

**Comment 16:** A commenter asked if the modeling analysis took into consideration the impacts of pollutants that are vented through a bypass stack.

**Response to Comment 16:** There is no bypass stack therefore, this scenario was not modeled.

## **G. Requirements under Other Federal Acts**

**Comment 1:** A commenter asked whether the Endangered Species Act was considered.

**Response to Comment 1:** Under Section 7(a) (2) of the Endangered Species Act, 16 U.S.C. § 1536(a)(2), the EPA must ensure that any action that is authorized, funded, or carried out by the EPA is not likely to jeopardize the continued existence of any federally listed endangered species or threatened species or result in the destruction or adverse modification of such species' designated critical habitat. If the EPA's action(i.e., permit issuance) may affect a federally listed species or designated critical habitat, Section 7(a)(2) of the ESA and relevant implementing regulations at 50 CFR Part 402 require consultation with the US Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service, (NMFS ) depending on the species at issue. The U. S. Fish and Wildlife Service were consulted. They reviewed the information regarding the project and concluded on May 4, 2011, that based on the nature of the project and the site characteristics, that a suitable habitat for federally listed species is not present within the project site. Thus, adverse effects are not anticipated for species within the US FWS's jurisdiction.



**Comment 2:** Comment asked whether the Coral Reef Conservation Act was considered.

**Response to Comment 2:** The Coral Reef Conservation Act does not apply to PSD permits. It is administered by NOAA. The purposes of this Act are: (1) to preserve, sustain, and restore the condition of coral reef ecosystems; (2) to promote the wise management and sustainable use of coral reef ecosystems to benefit local communities and the Nation; (3) to develop sound scientific information on the condition of coral reef ecosystems and the threats to such ecosystems; (4) to assist in the preservation of coral reefs by supporting conservation programs, including projects that involve affected local communities and nongovernmental organizations; (5) to provide financial resources for those programs and projects; and (6) to establish a formal mechanism for collecting and allocating monetary donations from the private sector to be used for coral reef conservation projects. EPA Region 2 is fully committed to the purposes of this Act and has recently established a Caribbean Coral Reef Protection Group to address the protection of coral reefs including Puerto Rico.

## **X. ENVIRONMENTAL JUSTICE**

### **A. Introduction**

Several commenters made statements that the area of the proposed facility is already disproportionately burdened and that they are concerned over adverse health or ecological effects. Some commenters questioned whether there was sufficient public outreach in this case. Since these comments relate to issues of disproportionately high and adverse effects due to the permitting of this facility, they are being addressed under the authority of Environmental Justice (EJ) Executive Order 12898.

Region 2 is committed to addressing environmental justice in all permits and has been especially attentive to environmental justice concerns in Puerto Rico. Energy Answers was informed that it should respond to issues regarding environmental justice early on in the permit process so that all concerns may be addressed to the best degree possible throughout the permit process. They were given the EPA Region 2 Interim EJ Policy and the associated demographic GIS tool prior to the submittal of the PSD application. The EPA Region 2 Interim EJ Policy is designed to address EJ in permitting, and since 2000 has been used by many PSD applicants throughout Puerto Rico and elsewhere in other Region 2 States. It may be found on our website under <http://www.epa.gov/region02/ej/poltoc.htm>. EPA has reviewed EA's EJ analysis in accordance with the Region 2 Interim EJ Policy and the Executive Order and has determined that issuing the PSD permit to EA will not result in disproportionately high and adverse human health or environmental effects on minority and low-income populations.

Region 2 is also an active participant in an ongoing national workgroup called the Plan EJ 2014 Permitting workgroup that was tasked by the Administrator Jackson to meet the needs of the Environment Justice Executive Order 12898. The EJ analysis undertaken in this case adheres to the goals of the Plan EJ 2014 Permitting workgroup and EPA has determined that issuing the PSD permit to EA will not result in disproportionately high and adverse human health or environmental effects on minority and low-income populations. The EPA Region 2 Interim EJ Policy, Executive Order 12898 and the national EJ in Permitting workgroup recognize that

public participation is of the utmost importance in the permitting process. Region 2 agrees and undertook two enhanced public outreach sessions. The first was upon receipt of the permit application. The second was prior to the formal public hearing. As a result of the first session, Region 2 learned that the community was largely agricultural and was concerned about impacts on their agricultural industry. The community also voiced concern over the large lead impacts due to the battery recycling facility nearby. In response to these concerns, Energy Answers undertook additional analyses that are not otherwise required in PSD permitting. Health and ecological risk assessments were done on various aspects of the agriculture, ecology, and human health for both PSD affected pollutants and non-PSD effected pollutants. Energy Answers also addressed lead impacts due to the nearby battery recycling facility and volunteered to install an ambient lead monitor in the community. The results of these analyses including more details on the enhanced public outreach follow below.

## **B. Comments Related to Enhanced Public Participation**

**Comment 1:** Some commenters expressed concern that the public participation process was not guaranteed for all affected persons.

**Response to Comment 1:** EPA recognizes that public participation is an important component of the E.O. 12898. That recognition is a major reason why EPA went above and beyond the requirements of the procedures in 40 CFR Part 124 with respect to EA's permit, including, among other things, early outreach to the community, translation of permit documents into Spanish, conducting the public hearing in Spanish, extending the public comment period and holding multiple public hearings. Not only did EPA's additional efforts provide the public with ample opportunity to participate in the permit process, but it made it possible for EA and EPA to address substantive environmental justice concerns. The extent of the enhanced public outreach undertaken in this case to reach out to all members of the affected community may be seen in section VI.C under Response to Comment 1.

In order to enhance the public outreach, EPA Region 2 held two informal public availability sessions. These are not required by law but were held in order to provide a forum to hear the public's concerns, and allow informal conversations in order to better inform people and in some case alleviate concerns. The first public availability session was held shortly after the submittal of the initial PSD permit application. The meeting was held early in the permit process upon receipt of the first submittal regarding the PSD application. This allowed EPA to hear the concerns of the public at the outset so that they may be addressed to the extent possible in the application. For example, we heard early on that the area is largely an agricultural area.

Therefore, in response to this information, the application contains health and ecological risk assessments that examined impacts on soils and vegetation, milk and other intakes on various sensitive populations. These studies were not required by EPA's PSD regulations. They were additional steps taken to ensure the protection of agriculture and the people's health. In addition we heard many concerns regarding high lead levels in the area. The permit application took additional measures to address these concerns. The second public availability session was held shortly after the issuance of the draft PSD permit and prior to the first formal public hearing. A goal at this stage is to respond to questions or clarify issues so that if a citizen would like to

formally submit a comment, they may do so in a more informed manner. The EPA regulations require a public comment period which typically is open for 30 days. In this case the comment period was open for several months (105 days). Typically, there is only one public hearing if any. In this case there were 6 hearings with sessions in the day, evening and the weekend in order to accommodate the various schedules of citizens.

Enhanced public outreach may also be seen by the multiple public notices, emails and letters that notified the public of the draft permit and announced the public availability sessions and hearings. The letters and emails were sent to all interested parties including a solicitation of others who might be interested. All the meetings were announced in several newspapers both in English and in Spanish well in advance of the meetings to allow proper planning. The PSD permit application and the associated correspondence was uploaded to a website at the local university in Arecibo for ease in obtaining information from any location. The website is: <http://www.arecibo.inter.edu/reserva/epa/epa.htm>. The information was also available at the EPA Region 2 offices in San Juan and New York.

Translators procured by Region 2 were present at the public availability sessions and public hearings so that comments could be made both verbally or in writing and in English or in Spanish. Transcripts and fact sheets were prepared in both Spanish and English. Energy Answers also held their own set of public outreach with more than 40 public presentations, radio interviews, and trips for community leaders to the similar SEMASS facility in Boston.

### **C. Comments related to Disproportionate or Adverse Impacts of Criteria Pollutants**

**Comment 1:** Several commenters made comments that there are already disproportionate or adverse burdens in their neighborhoods due to criteria pollutants:

**Response to Comment 1:** An air quality analysis was undertaken for all the criteria pollutants for which the facility is subject to PSD. This included SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, O<sub>3</sub> and CO. The air quality impacts from the proposed facility alone were less than the "Significant Impact Levels" which EPA considers to be de minimis impact levels except for the 1 hour average NO<sub>2</sub>, 1 hour average SO<sub>2</sub> and the 24 hour average PM<sub>2.5</sub>. Therefore a cumulative source modeling analysis was required for these three pollutants at these averaging times to show compliance with the NAAQS and increment (increment applies to PM<sub>2.5</sub> only). Three modeling analyses were done for each pollutant in order to account for worst case impacts due to the various operating loads. This included Energy Answers operating at 80%, 100% and 110% loads (plus startup and shutdown.) Permit conditions are included that restrict Energy Answers to these operating load ranges in order to minimize impacts due to lower loads (except for startup and shutdown which also has its own permit conditions designed to minimize air quality impacts under this scenario.) The cumulative source modeling analysis that included other existing sources and background concentrations showed that the maximum impacts occurred close in to the facility in the barrio of Cambalache and were below the NAAQS and increment. The impacts decreased with distance out to about 4 km to the northwest of the facility where the concentrations then fall below the de minimis impact levels. This would normally be sufficient

information to move forward with a draft PSD permit<sup>47</sup>, but in furtherance of the goals of E.O. 12898, EA went beyond the requirements and provided additional analysis.

Energy Answers conducted a socio-economic study to see if there were any disadvantaged communities in the vicinity of the maximum impacts in the barrio of Cambalache. The demographics examined parameters such as age, gender, income, population density, occupations, percent unemployment, level of education, and housing cost. The socio-economic study did not reveal that the barrio of Cambalache was disadvantaged. However, the population according to the 2000 census is only about 65 people so a broader area was examined for further information.

The socio-economic study was expanded to other neighboring barrios within Arecibo. It was found that there are some barrios with low income areas. To define a low income area, EPA Region 2 uses a statistical reference number of 52% of the population at or below the poverty level as a screening level which merits further environmental justice review. There were several barrios in the surrounding areas outside the area of Energy Answer's impacts with populations greater than 52% below the poverty level. Thus, additional analyses that take a closer look at the environmental impacts were undertaken. As discussed in the subsequent response to comments, Energy Answers submitted health and ecological risk assessments for the pollutants it emits in significant amounts and even some that it does not such as lead. Energy Answers as well as EPA took additional measures to enhance its outreach to the community in order to better inform the people, listen to their concerns and consider the concerns in this permit review process to the greatest extent practicable.

The area of maximum impact due to the facility is within the NAAQS and PM2.5 increment are even less than the de minimis impact levels for the other PSD affected pollutants. This area is not economically disadvantaged according to EPA Region 2's Interim Environmental Justice Policy. In conclusion, there is no adverse or disproportionately high impact from criteria pollutants to an environmental justice community due to the proposed source. Since there are some low income areas nearby additional evaluations were undertaken that would not otherwise be required under PSD regulation. The results of these evaluations (health and ecological assessments as well as the additional assessments of lead) did not indicate that the environmental impacts due to Energy Answers were disproportionately high and adverse.

**Comment 2:** Some commenters refer to the lead issues caused in the area by the Battery Recycling facility as an example of disproportionate impact. Some further ask what did EPA do to resolve the issue and why did the EPA grant them permission to operate in the first place?

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<sup>47</sup> The EPA Environmental Appeals Board has often deferred to the judgment of EPA Regional offices that the NAAQS provide a useful benchmark in environmental justice analyses. *See generally In re Knauf Fiber Glass, GmbH*, 9 E.A.D 1, 15-17 (EAB 2000) (upholding Agency finding that facility "will not have disproportionately high and adverse human health or environmental effects on a minority or low-income population" based on finding of attainment of relevant NAAQS, citing 40 C.F.R. § 50.2(b) (NAAQS set at level to protect the public health and welfare)); *AES Puerto Rico, L.P.*, 8 E.A.D. at 351 (affirming environmental justice analysis based on reasoning that NAAQS are health-based and protect sensitive populations).

**Response to Comment 2:** First EPA would like to clarify that there was no federal air permit issued to the Battery Recycling facility. EPA is aware that the facility has caused high lead levels. The issue is currently being addressed by Puerto Rico EQB and Region 2 independent of this PSD permit action. To resolve the high lead concentrations, EPA designated the area to nonattainment with respect to lead. This means that the Commonwealth must take action to lower the ambient lead concentrations and show attainment of the lead NAAQS. Although EA is not subject to the PSD regulations for nonattainment pollutants, specifically, for lead, there are more stringent nonattainment permitting requirements for sources in this area that meet certain thresholds. For example, new major sources of lead emissions must install emission controls which meet the “Lowest Achievable Emission Rate” (LAER). A new major source is considered to be one that emits 100 tons per year. Energy Answers is projected to emit 0.31 tons per year which is even lower than a Significant Emission Rate of 0.6 tons per year. Therefore, Energy Answers is not subject to the lead nonattainment permit requirements.

Nevertheless, given the public concern regarding lead in the area, Energy Answers took additional steps under the environmental justice authority that are not otherwise required by PSD regulations. First, Energy Answers modeled its own impacts from lead. As stated earlier, pursuant to the nonattainment rules, the Energy Answers facility is allowed to emit up to 0.31 tons per year of lead although experience with other facilities is that it will emit substantially less than allowed. The modeled impact of the maximum allowed emissions of lead impact was so small it did not show up in two decimal places of the model results, that is, it was less than 0.00 micrograms per cubic meter where the health standard is 0.15ug/m<sup>3</sup>. Emissions of lead would have to be 1000 times greater than projected in order to show a number in two decimal places. The maximum impact from lead was close to the Energy Answers fence line and was 200 times less than the NAAQS. Near the battery recycling facility, where the worst impacts from that facility occur, the lead impact from Energy Answers was 3000 times less than the NAAQS. Therefore, while the battery recycling facility caused high lead concentrations, Energy Answers could not be said to pose a disproportionate or adverse impact even if EPA had authority to regulate it under the PSD permit. Meanwhile, EPA and PREQB have already begun taking corrective actions to reduce the lead impacts from the battery recycling facility.

While Energy Answers is not required under PSD and is not a significant emitter of lead, Energy Answers volunteered to install a lead ambient monitor in the community. This will be located in the community in order to obtain further information on the lead levels in the area. Health risk assessments are not a requirement under PSD or Nonattainment permit reviews. However, due to concerns regarding impacts of lead, Energy Answers did health and ecological risk assessments including assessments from lead.

#### **D. Comments Related to Disproportionate or Adverse Impacts Due to Air Toxics**

**Comment 1:** Several commenters asked whether certain air toxics were evaluated. Further question included whether information contained in EPA's 2010 Toxic Release Inventory (TRI) were considered and integrated in the proposed draft permit, based on concerns about the cumulative effects of air toxics reported in the Arecibo area?

**Response to Comment 1:** Air toxics are not regulated under PSD. However, a qualitative assessment of the number of facilities that emit air toxics in the area was made. This included obtaining information from EPA's Toxic Release Inventory (TRI) and mapping it in the vicinity of Cambalache. It was found that the number of TRI facilities, including ones that emit dioxin and furans is not greater than the number in other parts of Puerto Rico. Therefore, there are not a disproportionate number of TRI facilities.

EPA also evaluated the National Scale Air Toxics Assessment (NATA) data which is used to identify and prioritize air toxics, emission source types and locations that are of greatest potential concern in terms of contributing to population risk. Communities have used NATA to guide their exploration of risk where they live. Energy Answers provided a facility-specific risk assessment that estimated potential excess lifetime cancer risk and noncancer hazard associated with emissions potentially released from the proposed facility. The following 2005 NATA-based view of air toxics risk in the area is offered as a pre-start-up perspective.

NATA is EPA's most comprehensive estimate of human health risk nationwide resulting from inhalation of air pollutants identified in the Clean Air Act as "hazardous air pollutants" and often referred to as "air toxics." It is a model-based, screening-level risk assessment. It includes impacts from emissions to outdoor air from all types and sizes of sources. The 2005 NATA was published in 2011 and based on a year 2005 emission inventory. EPA's web page for 2005 NATA, <http://www.epa.gov/ttn/atw/nata2005>, provides links to an overview of NATA, limitations of the assessment, Frequently Asked Questions, and EPA Region 2's companion web site. Notable among the limitations are that it does not calculate the contribution of diesel particulate matter to cancer risk and does not include exposures via ingestion and absorption through the skin resulting from contact with water, food, and soil that are important exposure pathways for some of the air toxics.

The 2005 NATA results show that the census tract in which the prospective Energy Answers site is located is estimated to have a relatively low risk with respect to exposure to air toxics. The cancer risk is 25 in a million, the respiratory hazard index (HI) is 0.36, and the neurological HI is 0.026. The effects on other systems of the body included in NATA were lower. The emissions contributing most to risk in this tract are "background"-- air toxics that are persistent in the environment (i.e., they remain in the air for a long time after they are emitted or formed), are transported to the impact location from areas more than 50 km (31 miles) away, or are emitted by natural (not man-made) sources--and "secondary"--emissions that form air toxics after release to the environment. Point sources, which tend to be larger facilities that emit higher amounts of air toxics and are associated with a particular location, contributed little to the risk in the subject census tract—2% to the cancer risk and 4% to the respiratory HI. EPA's framework for an acceptable level of cancer risk provides a goal of the greatest number of people at no more than a 1 in a million cancer risk, with 100 in a million being the upper limit of acceptable risk to the most-exposed individual. For noncancer health effects, EPA regards an aggregate exposure resulting in a target organ-specific hazard index lower than 1 as a safe level of risk, where a hazard index greater than 1.0 does not necessarily suggest a likelihood of adverse effects nor does it imply an unsafe level of effect. While NATA was not designed to estimate the risks to the most-exposed individual, it does lead us to believe that both the cancer and noncancer risks in the subject area, as of the 2005 emissions inventory, were in all likelihood lower than the

“acceptable” criteria levels noted above. Viewing the 2005 NATA results from a relative risk perspective, the cancer risk for the people living in the subject census tract is lower than that for 92% of the population nationwide, 49% of the population in Puerto Rico, and 60% of the population in Arecibo. For respiratory HI, these values are, respectively, 97%, 68%, and 59%. For neurological HI, these values are, respectively, 88%, 53%, and 68%. From a national perspective, we view the risk in the subject tract as relatively low.

## **E. Health and Ecological Risk Assessments**

### **1. Dioxins and Furans, Metals Emissions, and Human Health**

**Comment 1:** The commenters state that they are concerned about the potential adverse health effects caused by dioxins and furans (D/F), and metals (e.g., Pb, Hg, Cd, Cr, Ni, As, Be, Zn) contamination which may occur through food chain (dairy products, meat, poultry, eggs, fish, home-grown produce, etc.), drinking water, and inhalation. Some commenters provide comments expressing concerns about the potential impact of the project's D/F, and metals emissions on the North Coast Aqueduct System, which provides the potable water for Arecibo.

Several commenters express concern about the potential negative impact that the D/F contamination could have on the milk and meat industry in PR. One commenter questions whether EPA evaluated the impacts of the project's emissions, especially D/F, on livestock and milk produced in the areas surrounding the project, including Hatillo. Several commenters state that the D/F and metals are persistent and bioaccumulative, and therefore these pollutants will have a potential long-term health effects. Some commenters emphasize that the D/F and other emissions are known as causing cancer and the most vulnerable to the project's pollutants impact would be children.

**Response to Comment 1:** The commenters raise health concerns regarding both PSD regulated pollutants and non-PSD pollutants. EPA does not have authority to impose PSD permit limits for non-regulated pollutants. Moreover, there is no health based standard in the PSD program for the non-NAAQS PSD pollutants. However, EA went beyond the regulatory requirements of PSD, and performed a Human Health Risk Screening Assessment (HHRA) to determine if there are any human health risks associated with exposure to combined air toxics emissions resulting from the two municipal waste combustors, including D/F and metals, for which no NAAQS exist.

The HHRA was performed following the current EPA guidance, including but not limited to EPA's 2005 Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (HHRAP). Although this guidance was originally developed for hazardous waste combustors, its risk assessment methodology is generally applicable to other types of waste combustors, including municipal waste combustors, such as EA's MWC facility. No health risk assessment guidance specifically focused on MWC facilities has been developed by EPA.

The project's emissions (e.g., chemicals or chemical classes) evaluated by the EA's HHRA are as follows: polycyclic aromatic hydrocarbons (PAH), dioxins, furans, and metals (antimony, arsenic, beryllium, cadmium, chromium VI, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, tin, vanadium, and zinc), polychlorinated biphenyls (PCBs),

hydrochloric acid and hydrofluoric acid gases. In the context of HHRA, these chemicals are called constituents of potential concern (COPCs).

First, the HHRA calculated the COPCs concentrations in air, the COPCs deposition rates onto the earth's surface, and the COPCs concentrations in a variety of environmental media (e.g., soil, surface water, sediment) and food items (e.g., milk, beef, pork, poultry, home-grown produce, eggs, fish, etc.) through which humans may be indirectly (i.e., ingestion) exposed.

The HHRA calculated the potential exposures to the COPCs for several different types of individuals or "receptors" living within 10-km radius (e.g., 10-km<sup>2</sup> receptor grid) from the project that could be exposed to the project's COPCs. The receptors used in the HHRA are as follows: suburban resident (adult and children), urban resident (adult and children), farmer (adult and children), fisher (adult and children), and nursing infants. Each adult and children receptor was assumed to be simultaneously exposed to COPCs through one or more of the following exposure pathways: via inhalation (COPCs in air), soil ingestion, drinking water from surface water sources, and food ingestion (locally grown produce (e.g., lettuce, other leafy produce, corn, peas, fruits, etc.) milk from local dairies, beef, poultry from locally-raised animals, fish from local surface water bodies, eggs, etc. Each adult receptor was assumed to be the mother of a breast-fed infant, and therefore the nursing infant was assumed to be exposed to D/F via breast milk.

Specifically, exposure to COPCs was calculated using a "reasonable maximum exposure" scenario, with the intent to overestimate the potential for exposure and associated health hazards to provide a conservative (health protective) evaluation.

The exposure duration parameter used in the HHRA is 70 years for evaluating cancer risks. For evaluating non-cancer health effects, the exposure durations are as follows: 40 years for farmer receptor, 30 years for other adult receptors, and 6 years for child receptors.

For assessing the human exposure through food ingestion, it was assumed that 100% of a particular type of food consumed was grown or raised within the 10-km radius of the proposed facility.

Another example of a reasonable maximum exposure used in this HHRA is assuming that a farmer drinks 1.4 liters of untreated drinking water from a local surface water source (North Coast Aqueduct System known as Superacueducto or reservoir), and eats locally-raised beef, poultry, produce, eggs, pork, and milk, and 100% of the food is affected by COPCs from the proposed facility, for 350 days per year, and for 40 years out of a lifetime.

The drinking water ingestion pathway considered exposure to COPCs potentially associated with combustion emissions from the proposed facility that are deposited onto a surface water body used as a drinking water source (e.g., a reservoir). The main water system in the region, the Superacueducto, was modeled as a water body receptor and conservatively assumed that the potable water from it is untreated.



Exposure to milk from dairy cows was evaluated by estimating COPCs concentrations in the cow's diet and through incidental ingestion of soil. It was assumed that the cow's diet consisted of forage (pasture grass and hay), grain, and silage (grain that has been stored and fermented). It was conservatively assumed that 100% of the animal's diet is grown locally on soil that receives COPCs deposition and COPCs in soil are 100% bioavailable<sup>48</sup>, and metabolism does not decrease the COPCs concentration in fat and muscle tissue. The milk ingestion pathway was modeled at the farmer receptor location and the pathway cancer risks and non-cancer hazards were added to each receptor evaluated.

The fish ingestion pathway considered exposure to COPCs that are deposited onto fishable water bodies. Three fishable water bodies were selected for the fish ingestion pathway: estuary where the Rio Grande de Arecibo meets Puerto Arecibo, Cienega Tiburones, and Puerto Arecibo.

The HHRA calculated the chronic (long-term) cancer risks and non-cancer hazards, for each receptor, by combining all the exposure estimates for all COPCs and all exposure pathways (including untreated drinking water (e.g., from the Superacueducto), milk, beef, and other locally raised animal products).

For example, in order to calculate the cancer risks and non cancer hazard index (HI) values for the farmer receptor all the following farmer's exposure pathways are added up: air inhalation, soil ingestion, ingestion of locally-grown produce, ingestion of drinking water from surface source (reservoir), ingestion of beef, milk from dairy cows, poultry, eggs, and pork.

The HHRA also calculated the acute (short-term) non-cancer risks caused by exposure to COPCs through inhalation. Additionally, the HHRA calculated the potential for non-cancer health effects from oral (ingestion) exposure to D/F expressed as toxic equivalent (TEQ) 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (TCDD) for nursing infants and adults.

Based on the HHRA, the calculated Excess Lifetime Cancer Risks, and Non-cancer Hazard Indices for all COPCs combined and across all exposure pathways, fall within, or are less than the acceptable EPA range and benchmark. Furthermore, the HHRA indicated that the potential for acute (i.e., short-term) exposure is less than the EPA benchmark, and the estimated D/F, expressed as toxic equivalent (TEQ) 2, 3, 7, 8-TCDD, intakes from ingestion, are less than the national average background exposure level for nursing infants and adults.

In conclusion, the analysis completed in the HHRA showed that potential risks associated with the combined emissions estimated to result from the two proposed combustors were below the EPA cancer risk range and benchmark levels for human health. Consequently, the EA's project is not expected to have an adverse impact on human health even when considering pollutants that are not regulated by PSD and PSD-regulated pollutants for which there is no health based standard in the PSD program.

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<sup>48</sup> The term bioavailable (or bioavailability) refers to the fraction of the total amount of compound in contact with a body portal of entry (e.g., gut, skin, and lung) that enters the blood stream, from which it may exert a toxic response.

**Comment 2:** The commenter inquires about the body weight assumptions used to evaluate the dioxin and furans health effects. Specifically the commenter notes that using the assumption that all people weigh 70 kilograms (kg) is not a correct approach, since newborn and children who weigh a lot less than 70 kg are the most vulnerable to dioxin and furans exposure.

**Response to Comment 2:** The potential for human exposure, in EA's HHRA, was evaluated using 70 kg as the average adult body weight and 15 kg as the average child body weight. The newborn or infant exposure to dioxin and furans was assumed to be due to breast-milk ingestion.

**Comment 3:** The commenter states, "For each of more than 100,000 people in the region that will be exposed to the project's emissions, the 37 grams of dioxin and furans are equivalent to 528 doses with the potential to induce carcinogenic effects". Further, the commenter states that the "37 grams of dioxin and furans is equivalent to 4 million doses for each of the 30 thousand children living in the region with the potential to produce negative effects in the reproductive system".

**Response to Comment 3:** It is unclear to us: 1) what the commenter means by the term "doses"; and 2) how the commenter derived the number of doses mentioned above. Thus, EPA cannot provide a response to this comment. However, EPA's conclusion based on EA's HHRA which was performed following the assessment methods of the EPA's 2005 HHRAP is that the combined effect of dioxins and furans with other pollutants is not expected to have an adverse effect on human health (See **Response to Comment 1**, above for details).

**Comment 4:** The commenter states that the information regarding the evaluation of the project's impact on health should be available in an "understandable manner", and the commenter adds that such information is missing from the record.

Further, the commenter states that, in order to understand and assess the impact of the project's emissions on the health and the environment, it is important to know the: 1) number of acceptable daily intake doses of dioxin and furans and other toxic pollutant that the residents of Arecibo, and nearby municipalities will receive; 2) number of acceptable daily intake doses of dioxin and furans other living species in the region will receive; and 3) the equivalent doses of each toxic pollutant that will be emitted through the project's stacks.

**Response to Comment 4:** EPA acknowledges that risk assessments are complicated technical documents. The Environmental Justice Analysis prepared by EA, which includes a summary of the EA's HHRA and SLERA, was part of the administrative record for the draft PSD permit, since May 2012. The EA's HHRA and SLERA summary is easier to understand than the complete HHRA and SLERA. However, EPA decided to supplement the permit record, by including the complete HHRA and SLERA conducted by EA for the proposed project.

EPA notes that it is unclear to us, what the commenter means by "acceptable daily intake doses" and "equivalent doses", and therefore we cannot adequately respond to this comment. However, EA did consider toxicity values of each toxic pollutant (i.e., COPC) used in the HHRA. These values (i.e., cancer slope factors (CSFs:  $\text{mg/kg-day}^{-1}$ ), unit risk factor (URF:  $\text{g/m}^3)^{-1}$ , reference dose (RfD:  $\text{mg/kg-day}$ ) and reference concentration (RfC:  $\text{mg/m}^3$ ) are in Table 15 of the HHRA and were used for evaluating the potential for cancer risks and non-cancer health effects

See **X.E.2** below, for information responsive to the commenter's question on impacts on other species.

**Comment 5:** The commenter states that, the World Health Organization (WHO) dioxin toxic dose for a person is about 1-4 picograms of dioxin per kilogram of body weight, whereas EPA indicates that the safe level is about 7 picograms per kilogram of body weight per day (pg/kg/day) (1 gram = 1, 000,000,000,000 pg and 1 kg = 1.0 E+15 pg). Further, the commenter states that 7 picograms/kg/day is, "too high of a dose for a facility" which is located within 2 miles from schools, nursing homes, etc.

**Response to Comment 5:** EPA is aware of a 1998 WHO guidance establishing a tolerable daily intake (TDI) of total dioxin (PCDDs) and furans (PCDFs) for lifetime exposure (i.e., chronic), through ingestion, that would have no health consequences (i.e., noncancerogenic health effects). The TDI is expressed as a range of 1-4 pg of 2,3,7,8-TCDD toxic equivalents (TEQ) /kg/day.

While we are not aware of any EPA safe level for dioxin expressed as "7 pg/kg/day", the EPA's Integrated Risk Information System Program in 2012<sup>49</sup> did establish a Reference dose (RfD) of 7E-10 mg/kg/day for the exposure, through ingestion only, to 2, 3, 7, 8-TCDD. This RfD is intended for use in risk assessments for evaluating noncancerogenic health effects caused by 2, 3, 7, 8-TCDD. EPA notes that the RfD of 7E-10 mg of 2, 3, 7, 8-TCDD /kg/day equals 0.7 pg of 2, 3, 7, 8-TCDD /kg/day, and not 7 pg/kg/day. Thus, it appears that the EPA's RfD of 0.7 pg of 2, 3, 7, 8-TCDD/kg/day is lower than the WHO's TDI of 1-4 pg of 2, 3, 7, 8-TCDD TEQ/kg/day.

Additionally, it is important to note that the WHO's TDI of 1-4 pg of 2, 3, 7, 8-TCDD TEQ/kg/day, accounts not only for the 2, 3, 7, 8-TCDD, but also for other dioxin and furans congeners. Thus, a comparison between the EPA's RfD of 0.7 pg of 2,3,7,8 TCDD/kg/day and the WHO's TDI of 1-4 pg of 2,3,7,8 -TCDD TEQ/kg-day, is highly conservative (i.e., health protective).

**Comment 6:** The commenter asks EPA what is the "minimum lethal dose of dioxin know to cause a human disease". Further, the commenter inquires what would EPA do in case such a dose is exceeded.

**Response to Comment 6:** We are not aware of a "lethal dose of dioxin" established by EPA, or other US government agencies. However, the HHRA establishes that the combined impacts of dioxin and other toxic pollutants, even those that are not regulated by PSD, are not expected to have an adverse impact on human health.

**Comment 7:** The EPA is authorizing the incinerator of Arecibo to emit 4.07 E-05 tons of dioxins and furans yearly into the air. Given the uncertainty on the dose of dioxins that can precipitate human disease, how can EPA talk about RfD or maximum acceptable oral dose of 7E-10 mg/kg/day?

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<sup>49</sup> See Integrated Risk Information System (IRIS)/2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) available at <http://www.epa.gov/iris/subst/1024.htm#oralrfd>

**Response to Comment 7:** The 4.07 E-05 tons of dioxins and furans (D/F) per year (for two combustors combined) corresponds to the short-term limit of 10 ng/dscm @ 7% O<sub>2</sub> of dioxins and furans which represents the BACT emission limit. Both, the annual and short-term limits mentioned above, represent the maximum amount of dioxin and furans, which can be present in the volume of the exhaust gases released, through the combustors' stacks, into the atmosphere.

The commenter questions the reference dose (RfD) of 7E-10 mg /kg/day for the exposure, through ingestion, to 2, 3, 7, 8-TCDD. As we mentioned at Section **X.E.1 Response to Comment 5**, this RfD was established by EPA's Integrated Risk Information System Program (IRIS) in 2012<sup>50</sup>, unrelated to the Clean Air Act and PSD program. In this PSD permitting action, we are not revisiting reference doses, which were established by a different EPA program.

This RfD (mg of 2,3,7,8-TCDD/kg of body weight/day), is a daily oral intake rate intended for the use in risk assessments for evaluation of the potential for noncancer health effects caused by 2,3,7,8-TCDD, and based on the IRIS' definition, "... is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime." Consequently, while it is unclear to us, whether the commenter attempted to make a comparison between the D/F potential to emit and the RfD of 7E-10 mg/kg/day, we do not believe that a direct correlation can be established between the potential to emit and the RfD.

The EA's HHRA evaluated the potential for noncancer health effects in adults and infants from oral exposures (e.g., soil, water, sediment, food, ingestion of breast milk for infants) to dioxins and furans stack emissions estimated to result from the two combustors. The average daily doses of dioxins and furans, expressed as picograms (pg) of 2, 3, 7, 8-TCDD toxic equivalents (TEQ)/kg of body weight/day, for each receptor (see Section **X.E.1 Response to Comment 1** for details regarding the types of receptors evaluated by the EA's HHRA) evaluated in the HHRA are presented in Table 19 of the EA's HHRA.

EPA notes that the infant's average daily doses of 2, 3, 7, 8-TCDD TEQ in Table 19 are at least 12 times lower than the EPA's RfD, and the adult's average daily doses of 2,3,7,8-TCDD TEQ in Table 19 are at least 350 times lower than the EPA's RfD. It is important to note that the average daily doses of 2, 3, 7, 8-TCDD TEQ in Table 19, account not only for the 2, 3, 7, 8-TCDD, but also for the other 17 dioxins and furans congeners. Thus, a comparison between the EPA's RfD of 7E-10 mg of 2,3,7,8-TCDD/kg-day (which is equivalent to 0.7 pg of 2, 3, 7, 8-TCDD/kg/day) and the average daily doses expressed as pg of 2, 3, 7, 8-TCDD TEQ, is highly conservative (i.e., health protective).

Furthermore, we note that the EA's HHRA, which goes beyond the PSD regulatory requirements, evaluated the health risks associated with exposure to the dioxins and furans, as

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<sup>50</sup> See Integrated Risk Information System (IRIS)/2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) available at <http://www.epa.gov/iris/subst/1024.htm#oralrfd>

well as other toxic pollutants emissions estimated to result from the EA's combustors, and found that the project is not expected to have an adverse impact on human health.

**Comment 8:** The commenter states that the residents of the US living in places with MWC suffers from cancer, diabetes, and asthma more than in places without MWC facilities.

**Response to Comment 8:** EPA was not provided with any documentation to support the statement made.

The results of health risk assessments conducted to address concerns about the health effects potentially associated with two US MWC existing facilities, which EPA has reviewed, showed that the cancer and non-cancer risk to human health is below EPA benchmarks, and no significant elevation in any type of cancer was observed. As stated elsewhere in this document, EPA believes that US MWC facilities that are operating in compliance with the US regulations, including NSPS Eb, and PSD regulations are not associated with adverse impacts to human health or the environment. More importantly, the HHRA for this facility establishes that adverse impacts on human health are not expected.

**Comment 9:** The commenter states, in addition to the known pollutants, the project's emissions would contain "unidentified compounds", and asks if EPA will fund investigations to identifying such compounds.

**Response to Comment 9:** EPA was not provided with any documentation that would indicate the circumstances that would lead to the formation of unidentified compounds, and what class (e.g., non-toxics or toxics) of chemicals would the unidentified compounds potentially belong to. EPA's PSD regulations do not include any provisions for funding of any studies or investigations through this permitting action.

## **2. Dioxins and Furans, Metals Emissions, and Ecological Impact**

**Comment 1:** The commenters express concern about the dioxins and furans (D/F) and MWC metals (e.g., Pb, Hg, Cd, Cr, Ni, As, Be, Zn) emissions resulting from the EA's project, and their associated impacts on :1) ecological receptors such as Puerto Rican Parrot, Puerto Rican Boa, coastline marine turtle nesting, various ecological receptors, including birds, found in Cano Tiburones, and on other habitat areas surrounding the project; 2) various wildlife species (including plants) found in the area; and 3) aquifer, sediments, soil, and beaches.

**Response to Comment 1:** In order to determine if there are any risks to the environment (i.e., ecological risks) associated with exposure to combined emissions (i.e., air toxics emissions, including D/F and metals, for which no NAAQS exist) estimated to result from the two proposed municipal waste combustors, the facility has prepared a Screening Level Ecological Risk Assessment (SLERA).

The SLERA focused on evaluating potential adverse effects to ecological receptors (e.g., mammals, birds, plants, etc.) which potentially could be found in habitat areas (i.e., open water, estuarine area, wetlands (tidal wetlands, freshwater wetlands), and upland forested habitat in the

karst region, conservation areas, and natural areas), located within 10 km radius of the project. In the SLERA, the habitat areas are referred to as ecologically sensitive areas (ESAs)<sup>51</sup>

The SLERA estimated the concentration of chemicals (i.e., emissions or chemicals of potential ecological concern or "COPEC", estimated to result from the combustors) in soil, surface water, and sediment. The COPEC are predicted to be transported via stack emissions and deposited on ecological habitats. The chemicals evaluated by SLERA are similar to the chemicals evaluated by HHRA, and they are as follows: polycyclic aromatic hydrocarbons (PAH), dioxins, furans, and metals (antimony, arsenic, beryllium, cadmium, chromium VI, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, tin, vanadium, and zinc), polychlorinated biphenyls (PCBs), hydrochloric acid and hydrofluoric acid gases.

The COPEC concentrations in soil, surface water, and sediment were compared to ecological-based screening level (EBSLs) for different classes of receptor organisms and plants. The EBSLs are meant to be protective of animals and plants. These comparisons provide information on potential impacts to ecological receptors and form the basis for the assessment of ecological risk.

The estimated concentration of all COPECs (for soil, surface water, and sediment), in the ESAs are much lower than their appropriate EBSLs screening values (i.e., more than 3 orders of magnitude less for soil and sediment, and more than one order of magnitude for surface water), and therefore, adverse effects in the ecological receptors are not expected. In conclusion, ecological species (i.e., ecological receptors) such as birds (e.g., parrots), mammals, reptiles (e.g., snakes), aquatic species (e.g., turtles, fish, amphibians), and other organisms, as well as plants may be present in the above ESAs analyzed by this SLERA. As discussed above, the estimated concentration of all COPECs (for soil, surface water, and sediment) in the ESAs are much lower than their corresponding EBSLs screening values. Thus, since the EBSLs are meant to be protective of these species of animals and plants, the ecological species mentioned above will be protected from adverse effects caused by exposure to the estimated combustors' emissions.

### **3. Dioxin Emissions and Distance from the Source**

**Comment 1:** Several commenters state that since the dioxin emissions can travel long distances, they would affect not only people living nearby the facility, but also large areas of PR. One commenter states that dioxin emissions are transported for thousands of km from the source of emissions, while another commenter states that the dioxin emissions could reach 50 km, or more from the source.

Several commenters state that there is evidence that people living within 100 miles around incinerators suffer up to two times more than the general population of different illnesses,

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<sup>51</sup> Within 10 km radius, the SLERA identified the following ESAs: Rio Grande de Arecibo adjacent to the proposed facility, Rio Grande de Arecibo Estuary/Priority Conservation Area, Forested Wetlands 3 km west of the proposed facility, Woodlands 5 km west of the proposed facility, Woodlands at Rio Abajo State Forest 6 km southwest of the proposed facility, Forested and Emergent Wetlands 5 km south of the proposed facility, Woodlands at Cambalache State Forest 7 km south of the proposed facility, Reserva Natural Cano Tiburones 2 km northeast of the proposed facility, and Puerto Arecibo

including cancer. One commenter states that it is known that the MWC cause adverse health effects on 20 miles (32 km) radius of the source; the commenter refers to the Fourth Report of the British Society of Ecological Medicine.

**Response to Comment 1:** EPA was not provided with any documentation to support the statements that elevated risks of cancer or other diseases were associated with the emissions from municipal waste combustors and the information we have suggests otherwise (see Section **X.E.1. Response to Comment 8**). The commenter referencing the Fourth Report of the British Society of Ecological Medicine does not specify which section of the report contains the information pertaining to the health effects on 20 miles radius and our review of the report does not support the commenter's conclusion.

EPA is aware that, dioxin emissions from the stacks, along with the other exhaust gases, are dispersed into the atmosphere, and are deposited in various environmental media (e.g., soil, surface water, sediments, etc). It is well understood that once dispersed into the atmosphere the dioxin emissions can travel long distances from the stacks before deposition occur. The dioxin deposition plays an important role in the evaluation of the potential for adverse health and environmental effects caused by dioxin emissions, since the most dioxin exposure occurs through ingestion (i.e., food chain), with small amounts of exposure coming from breathing air containing trace amounts of dioxin.

As mentioned earlier in this document, the EA's HHRA analysis generally followed US EPA's 2005 Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (HHRAP). The HHRAP states that the "experience has shown that the most significant deposition occurs within a 10 km radius from the facility". The HHRAP adds, "Most recommended exposure scenarios appropriate for the assessment will likely be located within this area."

The air modeling conducted by EA for the HHRA (for determining the dioxin concentration in air and dioxin deposition rates or fluxes in environmental media), predicted also that the highest concentration and deposition fluxes would occur within 10 km radius of the proposed project. Actually, initially, EA had conducted the air modeling on a 20 km radius, but then the area was reduced to a 10 km radius based on model results. Consequently, the HHRA analysis was focused to evaluate potential health risk for people (receptors) identified within a 10-km radius.

Based on the highest air concentration and deposition fluxes, which occur within the 10 km radius (e.g., 10 km<sup>2</sup> receptor grid), the HHRA analysis shows that the potential risks associated with the exposure to the project's emissions, including dioxin emissions, are below the USEPA cancer risk range and benchmark levels (for non-cancer hazard). Thus, based on the above considerations, EPA has no reason to believe that the amount of dioxin emissions estimated to result from the project, and which potentially may reach beyond the 10 and respectively 20 km radius, would pose concerns for human health.

#### 4. Synergistic Effects

**Comment 1:** The commenters assert that the EPA's PSD permitting review does not account for the interaction of pollutants resulting from the project. The commenters state that combined exposure to multiple pollutants may produce synergistic<sup>52</sup> effect, which is more detrimental than the exposure to each pollutant individually.

One commenter inquires why EPA is not funding studies that would identify the effects associated with synergistic interactions, and therefore preventing the associated adverse health effects.

**Response to Comment 1:** EPA notes that it is unclear which pollutants the commenters consider as having potentially a synergistic effect. In addition, there is no documentation provided to support the statement made about the occurrence of synergistic interactions among the emissions from MWC facilities, or any example of synergistic effect.

Nonetheless, EPA recognizes that, the combined exposures to multiple pollutants may produce synergistic or antagonistic effects<sup>53</sup>. However, additional research is needed to understand possible synergistic or antagonistic effects between pollutants. EPA, at the national level and independent of the PSD program, conducts studies to identify and quantify the effects associated with exposures to mixtures of pollutants.

A cumulative or synergistic effect due to exposure to several pollutants simultaneously is not required under the PSD regulations nor is any form of exposure analysis for that matter. EA went beyond the regulatory requirements by performing a HHRA. The PSD regulations protect the public health by requiring sources to ensure no exceedance of the health-based NAAQS and increment for criteria pollutants. These criteria pollutants are examined individually, and compared to the health-based NAAQS.

As noted previously in this document (see Section V.A), there are no health based standards in the PSD program for the non-NAAQS pollutants therefore no requirements to measure impacts on air quality for these pollutants. However, EA went beyond the regulatory requirements for the non-NAAQS pollutants. EA's HHRA generally followed the EPA's HHRAP. Based on the "Risk Characterization Equation" of the EPA's HHRAP, Volume 2, Appendix C<sup>54</sup>, while calculating the cancer risk, and non-cancer health effects for all chemicals, and all exposure pathways, it is assumed that no potential antagonistic or synergistic effects occur and that all chemicals produce the same effect. However, as stated in the HHRAP, "this approach of ignoring the antagonistic and synergistic effects may overestimate the total cancer risk and total hazard index (for non-cancer health effects)".

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<sup>52</sup> Synergistic or synergetic effect of multiple pollutants is an effect, which is more detrimental than exposure to each pollutant individually.

<sup>53</sup> Antagonistic effect means that the combined exposures to multiple pollutants may be less detrimental than exposure to each pollutant separately.

<sup>54</sup> Risk Characterization Equations, Volume 2, Appendix C, of the HHRAP is available at <http://www.epa.gov/osw/hazard/tsd/td/combust/finalmact/ssra/05hhrapapc.pdf>



## 5. Studies Related to Dioxin Emissions

**Comment 1:** The commenter states that EPA has recently published a study of the effects of dioxin, and inquires why the study was published with such a delay, and why the study excludes the relation of dioxin and cancer.

**Response to Comment 1:** It appears that the commenter is asking a question rather than commenting on the permit, and it is unclear what study the commenter is referring to, and how that particular study is relevant to the draft permit conditions. Thus, EPA cannot respond to this comment.

**Comment 2:** The commenter requests EPA to publish the second part of the study on dioxin prepared by the National Academy of Sciences 27 years ago.

**Response to Comment 2:** This request involves actions that are outside the scope of the PSD permit.

**Comment 3:** The commenter states that before granting a permit to EA, EPA should conduct a Hydrological Study about dioxin percolation through karst. Additionally, the commenter recommends that before granting a permit, EPA should have a "complete Environmental Impact Analysis that would address air, water, land, underground water, and long distance farm impact".

**Response to Comment 3:** EPA is not aware of any PSD regulatory provisions that would require us to conduct a Hydrological Study in the context of this PSD permitting action.

Additionally, assuming that the comment was intended to refer to an Environmental Impact Statement (EIS), instead of an Environmental Impact Analysis, EPA wants to emphasize that under the 40 CFR Part 124 "Procedures for Decision Making", an EIS is not required for PSD permits ( See 40 CFR 124.9(a)(6)).

From the comment letter, we understand that the commenter request for a Hydrological Study is based on the commenter's concern about the dioxin contamination of the ground water in aquifers located in the karst region.

While beyond the scope of the PSD permit, we note that in a 1998 Public Health Statement for Chlorinated Dibenzo-P-Dioxin (CDDs) of the Department of Health and Human Services, Public Health Service Agency for Toxic Substances and Disease Registry (ASTDR), "the CDDs (i.e., dioxin), which are deposited on land, from combustion sources, or from herbicide or pesticide applications, bind strongly to the soil, and therefore, the CDDs are not likely to contaminate groundwater by moving deeper into the soil". Thus, although the ASTDR study refers to the soil in general and not specifically to karstic rocks, it seems that conducting a Hydrological Study to evaluate the ground water contamination, may not be relevant in this case.

The commenter is encouraged to consult the HHRA and SLERA prepared by EA, which address the commenter's concerns regarding the impact of the project's emissions (including dioxin) on the environmental media located within 10-km radius from the project. The environmental media

evaluated in the HHRA and SLERA include air, water [e.g. surface water (including sources of potable water), land (including upland forested habitats in the karst region)], sediments, and farm impact.

## **6. Commenters' examples of Dioxins and Metals contamination nearby incinerators**

**Comment 1:** One commenter states that some studies published in the 1990s (most of them in the early 1990s) showed elevated metals or dioxin in soil samples collected from sites close to chemical, medical, and MSW incinerators located overseas (e.g., Europe, Japan). Further, the commenter states that overseas studies (e.g., Spain, Austria, UK, and Switzerland) indicating D/F cow milk contaminations in the 1990s, were linked to the chemical, or municipal incinerators operating in those areas. Also, the commenter states that a 1994 study indicated high levels of mercury in vegetation samples collected from sites around of MWC in New Jersey, and a 1992 study that indicated high Cd, and Pb levels in foliage samples collected from sites nearby a MSW incinerator in the US.

**Response to Comment 1:** The comment refers to studies showing soil or vegetation contamination around the overseas and US incinerators, and D/F milk contamination. However, since EPA has no information regarding those facilities' control technologies, and actual emissions, EPA cannot respond to this comment.

Nevertheless, considering the year(s) the studies were published, as indicated by the commenters, it appears that those incinerators were old and were required to comply with less stringent emission standards than the emissions standard required for the modern US, and European MWC facilities. As discussed in Section V.A of this document, emissions from the newer generation MWC facilities are much lower than in the past. Moreover, the HHRA and SLERA performed for EA demonstrate that adverse effects on human health and ecological receptors are not expected.

**Comment 2:** One commenter mentions a 2010 incident of milk contamination that took place at a farm in Iceland, which was linked to the dioxin emissions emitted by a small waste incinerator.

**Response to Comment 2:** EPA was able to find some information related to the 2010 incident of milk contamination with dioxin in Iceland. Based on our brief review, the incinerator that was linked to the milk contamination incident is 3,000 tons of waste per year community incinerator, which started operation in 1995. The incinerator was exempt from complying with the regulatory limits for dioxin emissions, because of the high costs associated with installing controls for such a small incinerator. The first inspection made by the authorities, since starting operation in 1995, was conducted in 2007, when the measurement of D/F emissions showed that the incinerators' D/F emissions were 20 times higher than the regulatory standards. Thus, EPA believes that this contamination case cannot be directly extrapolated with any reliability to controlled and monitored MWC facilities, such as EA's project.

## **7. Health Care Expenses, and Health Studies**

**Comment 1:** The commenter expresses concern that because of the project's adverse health effects the residents will experience additional medical expenses, which will not be covered by the current health insurance plan.

Another commenter states that because of the project's adverse health effects such as asthma, the emergency room visits, and the cost of hospitalization will increase, and the residents will experience loss of working days, wage loss, and loss of productivity, etc.

One commenter request EA to commit to paying any medical expenses that Arecibo and neighboring municipalities may encounter because of the emissions impacts on residents health.

**Response to Comment 1:** See Section **IV.K**, Section **V.A.**, Section **IX**, and Section **X.E. 1** of this document for a detailed discussion of why EPA does not expect health impacts from the EA facility. We also note that there are no provisions in the PSD regulations that would allow us to impose a requirement on PSD applicants to pay for the medical expenses.

**Comment 2:** Another commenter states that the Puerto Ricans need a Public policy agenda to protect the health of PR, for preventing diseases, such as cancer.

**Response to Comment 2:** We acknowledge this comment but it is beyond the scope of the EA PSD permit.

**Comment 3:** The commenter asks what health studies were conducted by EA to prove that their project would not affect the health of the community. One commenter inquires whether EA will be required to conduct a study prior to startup to assess the people's health. Another commenter states that there is a need for a health study for the people living closest to the EA project, to establish a health database. The commenter suggests that the School of Public Health should conduct such a study.

**Response to Comment 3:** With regard to the analyses performed in the context of this PSD permitting action for evaluating the potential adverse health effects associated with the project emissions, the commenters are referred to Section **V.A. Response to Comment 1**, and Section **IX** and Section **X.E.1** and **2** of this document. EPA acknowledges the benefits of performing health studies but does not have authority to require such studies in the PSD permit.

## **8. Dioxins Emissions from Domestic Sources / Grilling Activities**

**Comment 1:** EA has informed the Arecibo residents that their home barbecues produce more dioxin emissions, while preparing a steak, than the dioxin emissions that would result from the proposed project in a given year. We request that EPA clarify EA's statement regarding the dioxin emissions.

**Response to Comment 1:** EPA notes that we received numerous comments expressing concerns regarding the harmful effect of the dioxin emissions on human health. (See Section **X.E.1**

**Response to Comment 1.)** EPA recognizes the public concern regarding dioxin and, is therefore, providing a brief analysis of the amount of dioxin emissions from MWC facilities and from the uncontrolled sources of dioxin.

Dioxin can be formed in the emissions of many types of combustion, both natural and anthropogenic (i.e., man-made). The anthropogenic combustion sources, include but are not limited to, diesel fuel combustion in trucks, vehicles and other equipment, industrial wood combustion, coal fired boilers, medical waste and municipal wastewater treatment sludge incineration, municipal waste incineration, backyard barrel burning of trash, and domestic (residential) heating using distillate oil, or wood combustion.

EPA does not have any (historical or current) information concerning the amount of the dioxin emissions resulting from grilling or cooking activities using charcoal or any other type of fuel, in the US or elsewhere or how these emissions would compare with the dioxin emissions from the municipal waste combustors.

However, it should be noted, that in contrast to the municipal waste combustors (and other sources), which operate under highly controlled conditions that are designed to reduce formation and emissions of air pollutants, including dioxin emissions, other sources, such as domestic fuels burning (e.g., residential heating, grilling or cooking activities), backyard trash burning, are uncontrolled, and or have poor combustion characteristics.

According to the EPA 2006 inventory (2006 inventory)<sup>55</sup> of sources and environmental releases of dioxin-like compounds in the US for the years 1987, 1995, and 2000, the dioxin emissions from controlled sources, especially MWC, dropped considerably from 1987 to 2000. Additionally, as shown in the EPA's 2007 "Emissions from Large and Small MWC Units at MACT Compliance", as result of the strict dioxin controls ensured by EPA through the implementation of the federal Maximum Achievable Control Technology (MACT) regulations, since 1990 ( pre-MACT conditions) the D/F emissions from MSWC have been reduced by more than 99%.

For instance, as shown in the 2006 inventory, in 2000, the backyard barrel trash burning activities ranked as the first source of dioxin emissions in the US, while MWC facilities (from the entire US) ranked the fourth source of dioxin emissions. Further, the 2006 inventory indicates an increase in the percent of dioxin emissions resulting from the combustion of wood and oil from residential heating, as compared to the total dioxin emissions from the sources in the inventory.

In conclusion, based on the above analysis, the contribution of the dioxin emissions from uncontrolled sources (e.g., backyard barrel burning trash, residential heating) to the total dioxin emissions, in the US, has increased, while the contribution of controlled (in particular MWC) dioxin emissions sources to the total dioxin emissions, has decreased.

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<sup>55</sup> 2006 inventory, available at <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=159286>

However, in order to make a comparison between the EA project dioxin emissions and the dioxin emissions produced by the grilling (e.g. home barbecues) activities in PR or Arecibo area, one would need to know specific information related to the type of fuel used for grilling, type of grilling appliances, and the extent of the grilling activities. As noted above by EPA, the comment does not include any specific information, and therefore EPA cannot provide the clarification that the commenter request.

## **F. Other Comments**

**Comment 1:** The commenter submits numerous articles, reports, technical papers (as electronic copies), and web links to the same type of documents, regarding the damage to human health, caused by the pollutants being emitted by MWC combustors and hazardous waste incinerators, and the opinion of environmental groups concerning the use of MWC as a waste disposal method. The commenter adds, "Since our community is an environmentally discriminated community, under the Environmental Justice tenants and due to the fact that we cannot raise money to defend ourselves with paid consultants, we request and demand EPA to evaluate such reports. All information submitted will most likely be use in any and in all forms, in all legal actions that the community may take to defend our air, land, and water, if EPA gives the trash incinerator the permit to operate."

**Response to Comment 1:** The commenter sent multiple reports and studies, primarily on the health effects of MWCs. The commenters did not indicate which positions of theirs are supported by these documents, and so it is unclear what information in the reports they are relying on, and for what purpose. It is also unclear what conditions in the permit these documents would form the basis for an objection. However, what is common to the information provided is that the documents broadly address health impacts from MWCs. EA performed a human health risk assessment (HHRA) using EPA guidance. The risk assessment is specific to the EA facility and considers impacts within a 10 km radius. Therefore, the EA's HHRA is much more specific to the EA facility and surrounding areas than the reports provided by the commenters. EPA reviewed EA's HHRA and found that it comports with EPA guidance. (See Section **X.E.1 Response to Comment 1** of this document).

Included with the set of reports provided by the commenters are pictures of flooding in the area where EA will be located. See Section **VIII.B.1. Response to Comment 1** of this document, for more details on flooding.

**Comment 2:** The commenter provides comments related to the EPA's public statements following the collapse of the World Trade Center Towers in September 11, 2001, when EPA reassured the public regarding that air was safe to breath.

**Response to Comment 2:** The commenter has not made clear to us whether there are any specific conditions in the draft EA permit that relate to commenter's concerns about alleged health impacts from EPA's actions in response to the World Trade Center tragedy. EPA takes very seriously the obligation under the PSD program to address regulatory requirements related to health impacts and has done so in this permit. (See Section **IV. K**, Section **V.A**, Section **IX**, and Section **X.E.1. Response to Comment 1**).