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ATTACHMENT J: Ash Beneficial Use Plan

ATTACHMENT J – ASH BENEFICIAL USE PLAN

1. **Purpose:** This Ash Beneficial Use (ABU) Plan outlines the procedures to be utilized by the Solid Waste Authority of Palm Beach County (Licensee) for the beneficial use of ash residue, as defined in Section 62-701.200(7), F.A.C. Subject to the requirements in this ABU Plan, the Licensee is authorized to blend its bottom ash with aggregate and use the blended materials in concrete and asphalt pavement, pursuant to Section 403.7045(5), F.S. This ABU Plan also describes how the Licensee may obtain authorization to blend the bottom ash with aggregate and use the blended materials in covered (paved) base courses (identified as Specific Use 2 below), if the Licensee satisfies the requirements herein.

2. **Baseline Report:** This ABU Plan is based on a report entitled “Assessment of Proposed Recycling Activities for Waste-to-Energy Bottom Ashes Produced by the Solid Waste Authority of Palm Beach County” dated March 2018 (Baseline Report), which was prepared for the Licensee by the Engineering School of Sustainable Infrastructure and the Environment, Department of Environmental Engineering Sciences, at the University of Florida.

3. **Specified Materials:** The following materials (Specified Materials) are generated by the Licensee’s REF #1 and REF #2 facilities and are allowed for beneficial use by recycling and reuse, subject to the conditions in this ABU Plan:

a. Bottom ash residue that will be blended in specific percentages with aggregate in concrete and asphalt pavement (Specified Use 1, as defined below).

b. Pursuant to the Conditions in Paragraph 7 below, bottom ash residue that will be blended in specific percentages with aggregate in covered (paved) base courses (Specified Use 2, as defined below).

4. **Required Aging:** Once approved for use by the Department, the Specified Materials used for Specified Use 2, Blended Base Course Aggregate (as defined below), shall be aged by the Licensee in accordance with the following procedure:

Bottom ash used for Specified Use 2, Blended Base Course Aggregate (as defined below) will be aged for a minimum period of 90 days. Aging will be conducted on top of or in a lined Class I or Class III landfill cell, inside permitted ash-processing buildings, or at other locations approved by the Department. The ash piles shall be no greater than 20 feet in height during the entire treatment period.

5. **Specified Uses:** The beneficial use by recycling and reuse of the Specified Materials is limited to the following specified uses and subject to the conditions herein:

a. **Specified Use 1, Aggregate in Concrete and Asphalt Pavement:** Bottom ash will be blended with other aggregates in concrete and asphalt pavement at replacement percentages up to a maximum of 30% by mass of total aggregate.

b. **Specified Use 2, Blended Base Course Aggregate:** Aged bottom ash will be blended with other aggregates for use in covered (paved) base courses at replacement percentages up to a maximum of 15% by mass of total aggregate. The aggregates that the Specified Use 2 ash-derived aggregate will be blended with may include limerock, coquina, and recycled concrete aggregate.

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6. Conditions for Specified Use 1, Aggregate in Concrete and Asphalt Pavement:

- a. Bottom ash used by the Licensee pursuant to this ABU Plan shall be obtained from REF #1, REF #2, or a mixture from both facilities.
- b. Ash-derived aggregates for Specified Use 1 shall be processed with a screen designed to remove particles smaller than 1/4-inch and larger than 3/4-inch.
- c. Ash screening will occur on top of or within a permitted Class I or Class III landfill, inside permitted ash-processing buildings, or at another location approved by the Department.
- d. The amount of ash-derived aggregates for Specified Use 1 in the concrete or asphalt product will not exceed 30% by mass of the total aggregate.
- e. Fugitive dust emissions from the storage, processing, and transport of bottom ash will be controlled by wetting the ash, or covering the ash with a tarp, or covering the ash with other similar protective material.
- f. Appropriate management at the aggregate yard or batch plant shall consist of controlling fugitive dust emissions.
- g. Ash-derived aggregates for Specified Use 1 may be stored at a batch plant or an aggregate supplier's yard for a period of no more than two weeks before integration into a concrete or asphalt pavement mix. After two weeks, any unused Specified Use 1 ash-derived aggregate will be returned to the Licensee's Class I landfill or the designated ash processing facility.
- h. Blended ash-derived aggregate products for Specified Use 1 that are removed from service shall be considered construction and demolition waste and should be managed in compliance with applicable state and local regulations.

7. Conditions for Specified Use 2, Blended Base Course Aggregate:

- a. Bottom ash used by the Licensee pursuant to this ABU Plan shall be obtained from REF #1, REF #2, or a mixture from both facilities.
- b. The Licensee shall not use bottom ash for Specified Use 2 until the Licensee conducts a demonstration project in compliance with the requirements in Section 9, below. Based on the results of the demonstration project, the Licensee may submit a request to modify the ABU Plan to include conditions for Specified Use 2 to ensure the protection of human health and the environment. If Specified Use 2 is approved by the Department, the following minimum conditions will be applicable to such use:
 - 1) Bottom ash utilized for Specified Use 2 shall be aged, prior to recycling and reuse, in accordance with the requirements in Section 4, above.
 - 2) Prior to blending, bottom ash for Specified Use 2 shall be processed with a screen designed to remove particles larger than 1.5 inches.
 - 3) Ash screening will occur on top of or within a permitted Class I or Class III landfill, inside permitted ash-processing buildings, or at another location approved by the Department.

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4) The amount of ash-derived aggregate for Specified Use 2 in any blend used for road base will not exceed 15% by mass of total aggregate.

5) Fugitive dust emissions from the storage, processing, and transport of bottom ash will be controlled by wetting the ash, or covering the ash with a tarp, or covering the ash with other similar protective material.

6) Appropriate management at the aggregate yard shall consist of controlling fugitive dust emissions.

7) After the ash is aged, ash-derived aggregate for Specified Use 2 may be stored at an aggregate supplier's yard for a period of no more than two weeks prior to blending. Any ash-derived aggregate not blended with other aggregates within two weeks will be returned to the Licensee's Class I landfill or the designated ash processing facility.

8) Blended ash-derived aggregate for Specified Use 2 will not be placed at a project site within 3 feet of the groundwater table, within 15 feet of existing wetland areas, or within 100 feet of an existing potable well that is being used to provide water for consumption by humans or livestock.

9) A base layer constructed with Specified Use 2 blended ash-derived aggregate will be covered by a pavement layer (e.g., a road, parking lot, or sidewalk).

10) Blended ash-derived aggregate for Specified Use 2 that is not used at a project site shall be removed and returned to the aggregate yard.

11) Blended ash-derived aggregates for Specified Use 2 that are removed from service shall be considered construction and demolition waste and should be managed in compliance with applicable state and local regulations.

8. Conditions for Recordkeeping, Testing, and Reporting:

a. The Licensee shall comply with the following record keeping requirements:

1) The Licensee shall prepare and maintain records that identify each Person that receives bottom ash for Specified Use 1. For each Person, the Licensee's records also shall identify (a) each date when bottom ash was provided to that Person, (b) the approximate quantity of bottom ash that was provided to the Person on each date, and (c) the street address of each batch plant or aggregate yard where the bottom ash was taken.

2) The Licensee shall maintain the records required pursuant to Section 8.a.(1), above, for not less than 10 years after the Licensee provides bottom ash to a Person for Specified Use 1.

3) By March 1st of each year after the Licensee begins to use Specified Materials pursuant to this ABU Plan, the Licensee shall submit an annual report to the Department. The annual report shall contain the information required pursuant to Sections 8.a.(1), (2), and (3), above, for the prior calendar year, and the results of the routine monitoring conducted during the prior calendar year pursuant to Section 8.b, below. Upon request, the Licensee also shall provide the Department with copies of the contracts and interlocal agreements executed by the Licensee pursuant to Section 11, below.

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b. The Licensee shall conduct routine monitoring of the bottom ash on a quarterly basis for one year after the Licensee begins to use Specified Material pursuant to this ABU Plan. After one year, the routine monitoring shall be conducted semi-annually. The purpose of the routine monitoring is to confirm that the chemical characteristics of the bottom ash generated by the Licensee's Facilities in the future are consistent with the chemical characteristics of the bottom ash evaluated during the Licensee's baseline testing.

1) The routine monitoring shall be conducted with bottom ash that has not been aged pursuant to Section 4, above. Bottom ash samples will be collected from an ash conveyor, an ash bunker, or designated stockpiles in an area at the landfill that is downstream of the Facility's metals recovery system. The ash sampling methodology will be similar to the methodology described in the Baseline Report and will be conducted at the frequencies described in Section 8.b.2, below.

2) During the routine monitoring for each Facility, one Daily Composite Sample (as defined in Section 12.c, below) of bottom ash will be collected for three consecutive days. Each Daily Composite Sample will be collected by taking a grab sample at hourly intervals over an 8-hour shift as described in 8.b.1 above. In this manner, three Daily Composite Samples will be collected at REF #1 and three Daily Composite Samples will be collected at REF #2. Samples collected from REF#1 will not be combined with the samples from REF #2.

3) For each Facility, the three Daily Composite Samples from that Facility will be tested to determine the total concentrations of aluminum, arsenic, lead and antimony in the bottom ash generated by that Facility. For each Facility, the three Daily Composite Samples from that Facility also will be tested using the Synthetic Precipitation Leaching Procedure (SPLP) to determine the leachable concentrations of aluminum, arsenic, lead, and antimony in the bottom ash generated by that Facility. Consequently, the routine monitoring will produce three sets of test results for total concentrations and three sets of test results for SPLP concentrations at each Facility.

4) The Licensee will calculate the average of the three test results (Average Value) for each parameter at each Facility. For example, the Licensee will calculate the Average Value for the total concentration of aluminum in the bottom ash collected from REF #1, based on the three Daily Composite Samples of bottom ash collected at REF #1 during the routine monitoring.

5) When evaluating bottom ash that will be used for Specified Use 1 or Specified Use 2, the Licensee will compare: (i) the Average Value calculated from the test results for routine monitoring of total concentrations at a Facility; and (ii) the baseline values described in Section 10, below, for total concentrations in the bottom ash generated at the same Facility.

6) When evaluating bottom ash that will be used for Specified Use 2, the Licensee also will compare: (i) the Average Value calculated from the test results for routine monitoring of SPLP concentrations at a Facility; and (ii) the baseline values described in Section 10, below, for SPLP concentrations from bottom ash generated at the same Facility.

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7) The Licensee shall notify the Department in writing within 5 business days if these comparisons show that there has been a significant increase (as defined in Section 10, below) in the concentrations of one or more of these parameters.

c. The Licensee shall notify the Department in writing within 5 business days if the Licensee concludes that recycling or reuse of the Specified Materials in accordance with this ABU Plan will cause or contribute to violations of state water quality standards.

d. Upon reasonable notice to the Licensee, the Department's staff or agents with proper identification may enter the Licensee's premises and inspect, sample, and test the Specified Materials as the Department deems necessary to verify the Licensee's compliance with the requirements of Chapter 403, F.S., and this ABU Plan.

9. Conditions for Demonstration Projects with Specified Use 2 Material:

a. Subject to the requirements in this Section 9, the Licensee may conduct demonstration projects with Specified Use 2 Material.

b. Before the Licensee uses bottom ash for Specified Use 2, the Licensee shall establish the baseline values for SPLP concentrations in compliance with the requirements in Section 10.b, below, and then the Licensee shall conduct a demonstration project with the bottom ash, subject to the requirements herein. The Licensee shall provide the Department with a post-certification submittal that describes the key features of, and scope of work for, the demonstration project. The Licensee's submittal shall include the following information: (1) the proposed use of the material (e.g., as an engineered base under a sidewalk); (2) the proposed location for the use of the Specified Use 2 Material; (3) the type of material (e.g., concrete; asphalt) that will cover the Specified Use 2 Material; (4) the groundwater monitoring, if any, that will be conducted; (5) the testing and reporting that will be conducted by the Licensee; and (6) the other safeguards that will be used by the Licensee to ensure the protection of human health and the environment.

c. The Department's Solid Waste Division shall review all post-certification submittals for demonstration projects based on Specified Use 2. The Department's Solid Waste Division may impose reasonable conditions on the demonstration project. The Licensee shall not use bottom ash for Specified Use 2 in a demonstration project until the Department confirms in writing that the Licensee may proceed with that project.

d. The requirements in this ABU Plan, including the requirements in this Section 9, do not apply to or otherwise restrict the laboratory or bench scale testing of any Specified Material or product made with Specified Material.

10. Conditions for Determining Significant Increases in Test Results:

a. Pursuant to Section 8.b.5, above, for each Facility, the Licensee shall compare the Average Values from the routine monitoring for total and SPLP values to the baseline values for the bottom ash. The baseline values for total concentrations at each Facility are presented in the Baseline Report. These values were established by separately collecting and testing 14 Daily Composite Samples from each Facility. The samples were obtained by collecting bottom ash at hourly intervals over two 8-hour shifts each day for 7 days. The baseline values for SPLP concentrations will be established in the same manner, as described in Section 10.b, below.

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b. The Baseline Report only provided SPLP results for aged bottom ash. The Licensee shall conduct SPLP tests on bottom ash to establish an appropriate baseline. Fourteen Daily Composite Samples will be separately collected and tested for each Facility. More specifically, over a 7-day period, grab samples will be collected at hourly intervals over two 8-hour shifts, and the grab samples from one 8-hour shift will comprise one Daily Composite Sample. Each Daily Composite Sample will be tested using SPLP to determine the leachable concentrations of aluminum, arsenic, lead, and antimony from the bottom ash generated by each Facility. The Licensee shall calculate the 95th percentile of the SPLP data for each of these parameters. The Licensee shall submit the SPLP data and the 95th percentile values to the Department in a post-certification submittal. The Licensee shall not use bottom ash or ash-derived aggregates for Specified Use 2 until the Department confirms in writing that the baseline values and the 95th percentile values for the SPLP tests have been established in compliance with the procedures described herein.

c. For the purposes of this ABU Plan, a significant increase in total concentrations shall be deemed to have occurred if an Average Value from the routine monitoring at a Facility is greater than one of the following values for the same Facility:

	Total Concentrations (mg/kg)			
	Aluminum	Arsenic	Lead	Antimony
Bottom Ash from REF #1	40,714	6.30	1,174	14.0
Bottom Ash from REF #2	21,606	19.7	1,300	9.5

The total concentrations presented above are equal to the 95th percentile of the baseline values for the total concentrations in the bottom ash. The Average Values for total concentrations shall be compared to the baseline values when the Licensee is evaluating bottom ash that will be used for Specified Use 1 or Specified Use 2, pursuant to Section 8.b.5, above.

d. For the purposes of this ABU Plan, a significant increase in SPLP concentrations for Specified Use 2 shall be deemed to have occurred if an Average Value from the routine monitoring at a Facility is greater than the 95th percentile of the corresponding baseline value for the SPLP concentration at the same Facility.

	SPLP Concentrations (mg/l)			
	Aluminum	Arsenic	Lead	Antimony
Bottom Ash from REF #1	TBD	TBD	TBD	TBD
Bottom Ash from REF #2	TBD	TBD	TBD	TBD

The Average Values for SPLP concentrations shall be compared to the baseline values when the Licensee is evaluating bottom ash that will be used for Specified Use 2, pursuant to Section 8.b.6, above.

11. Conditions for Contracts to Receive Bottom Ash or Ash-Derived Aggregate:

a. The Licensee shall not provide bottom ash or ash-derived aggregate (collectively, SWA Aggregate) to any Person for a beneficial use project until the Licensee and that Person (Recipient) execute a contract or interlocal agreement requiring the Recipient to comply with the conditions in this ABU Plan that are applicable to the Recipient's proposed use

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of the SWA Aggregate. More specifically, before the Licensee provides SWA Aggregate to a Recipient, the Licensee and Recipient shall execute a contract or interlocal agreement that contains the provisions in Section 11.b if the SWA Aggregate will be used for Specified Use 1.

b. The following provisions shall be included in any contract or interlocal agreement authorizing the use of SWA Aggregate for Specified Use 1 (Aggregate in Concrete or Asphalt Pavement):

1) The SWA Aggregate may be used in a concrete or asphalt product, but the SWA Aggregate shall not comprise more than thirty percent (30%) by mass of the total aggregate used in the product. The SWA Aggregate shall not be used for any other purpose or in any other manner.

2) Fugitive emissions (dust) generated by storing, processing, or transporting the SWA Aggregate must be controlled by wetting the SWA Aggregate, or covering the SWA Aggregate with a tarp, or covering the SWA Aggregate with other similar material.

3) The SWA Aggregate shall not be stored at the Recipient's batch plant, supply yard, or other location for more than 14 days before it is used in a concrete or asphalt mix. If the SWA Aggregate is not used in a concrete or asphalt mix within 14 days after it is received from the SWA, the SWA Aggregate shall be returned to a location on the SWA's property (e.g., the SWA's Class I landfill) that is designated by the SWA. In such cases, the Recipient must contact the SWA's Director of WTE Operations by calling (561) 640-4000 and must request specific instructions concerning the return of the SWA Aggregate.

4) The Recipient shall provide a quarterly written report to the SWA concerning the Recipient's use of the SWA Aggregate. At a minimum, the Recipient's report shall provide the following information for each location where the SWA Aggregate was used: (i) the amount (tonnage) of SWA Aggregate that was used in a concrete or asphalt product; (ii) the percent of SWA Aggregate in the product; (iii) the project information for the use of the concrete or asphalt product, indicating the type of end use of the concrete or asphalt created with the SWA aggregate (e.g., roadway; parking lot; sidewalk); and (iv) the date when the SWA aggregate was used. In each report the Recipient shall provide a statement confirming that the Recipient used all of the SWA Aggregate in compliance with the requirements contained herein and returned any unused SWA Aggregate to the SWA.

5) Each of the requirements in Sections 1 through 4, above, is a material component of this agreement between the SWA and the Recipient. If the Recipient fails to comply with any of these requirements: (i) the SWA may seek damages, specific performance, or any other remedies available at law or in equity for the Recipient's breach of this contract or interlocal agreement; and (ii) the SWA may terminate this contract or interlocal agreement.

12. **Definitions:** For the purposes of this ABU Plan, the following definitions shall be used:

a. **Average Value** means, with regard to a parameter (i.e., aluminum, arsenic, lead, and antimony), the average of the test results for three Daily Composite Samples of bottom ash generated at each Facility. The average is calculated by summing the three test results for that parameter and then dividing by three.

b. **Baseline Report** means the report described in Section 2, above.

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- c. **Daily Composite Sample** means a composite sample of bottom ash that has been collected by taking a grab sample at hourly intervals over an 8-hour shift from a Facility.
- d. **Facility** means one of the Licensee's renewable energy facilities – REF #1 or REF #2.
- e. **Licensee** means the Solid Waste Authority of Palm Beach County or "SWA."
- f. **Person** means any and all persons, including any individual, firm, or association; any municipal entity or private corporation organized or existing under the laws of this state or any other state; any county of the state of Florida; and any governmental agency of the state of Florida or the Federal Government.
- g. **Recipient** means any Person that receives SWA Aggregate from the SWA for a beneficial use project.
- h. **REF** means a renewable energy facility.
- i. **SPLP** means the Synthetic Precipitation Leaching Procedure.
- j. **SWA Aggregate** means the bottom ash and ash-derived aggregate generated by one or both of the waste-to-energy facilities owned by the SWA.