TECHNICAL EVALUATION
AND
PRELIMINARY DETERMINATION

Orlando Utilities Commission
Curtis H. Stanton Energy Center Units 1 & 2

Improvements to Ash Loadout Silos

Orange County

DEP File No. 0950137-016-AC

Florida Department of Environmental Protection
Division of Air Resource Management
Bureau of Air Regulation
Permitting South

November 26, 2007

1. GENERAL FACILITY DESCRIPTION

Facility Description and Location

The OUC Curtis H. Stanton Energy Center is located in Orange County, Southeast of Orlando and North of Highway 528 at 5100 South Alafaya Trail. The site is located 144 km southeast from the Chassahowitzka National Wildlife Area; the nearest Federal Prevention of Significant Deterioration (PSD) Class I Area. The UTM coordinates for this site are 483.6 km East and 3151.1 North. The location of the OUC Stanton Energy Center is shown in Figure 1.

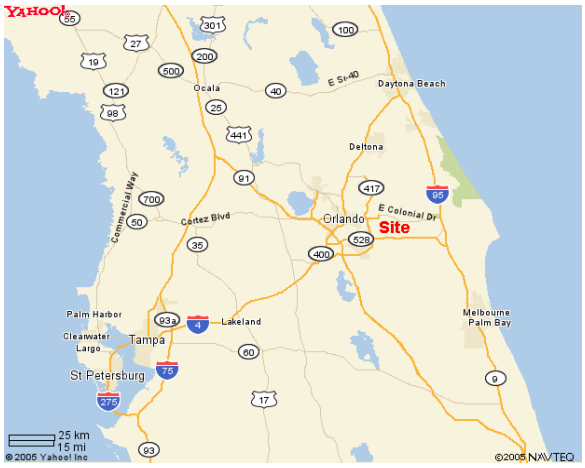

Figure 1. OUC Curtis H. Stanton Energy Center Location and Stanton Units 1 and 2.

The OUC Stanton Energy Center presently consists of two fossil fuel-fired steam electrical generating units and a combined cycle unit. Fossil fuel-fired steam electric generating Units 1 and 2 (468 megawatts-MW each) began operation in 1987 and 1996 while Combined Cycle Unit A (640 MW) began operation in 2003. A PSD permit was recently issued for the construction of a nominal 285 MW integrated gasification combined cycle unit (Unit B) planned to be operational by 2012.

Table 1. OUC Curtis H. Stanton Energy Center SIC Codes

STANDARD INDUSTRIAL CLASSIFICATION CODES (SIC)		
Industry Group No.	49	Electric, Gas, and Sanitary Services
Industry No.	4911	Electric Services

Key Regulatory Categories

The key regulatory provisions applicable to Stanton Units 1 and 2 are:

Title I, Part C, Clean Air Act (CAA): The facility is located in an area that is designated as "attainment", "maintenance", or "unclassifiable" for each pollutant subject to a National Ambient Air Quality Standard. It is classified as a "fossil fuel-fired steam electric plant of more than 250 million BTU per hour of heat input", which is one of the 28 Prevention of Significant Deterioration (PSD) Major Facility Categories with the lower PSD applicability threshold of 100 tons per year. Potential emissions of at least one regulated pollutant exceed 100 tons per year, therefore the facility is classified as a "major stationary source" of air pollution with respect to Rule 62-212.400 F.A.C., Prevention of Significant Deterioration of Air Quality.

Title I, Section 111, CAA: Units 1 and 2 are subject to Subpart Da (Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978) of the New Source Performance Standards in 40 CFR 60.

Title I, Section 112, CAA: The facility is a "Major Source" of hazardous air pollutants (HAP).

Title IV, CAA: The facility operates units subject to the Acid Rain provisions of the Clean Air Act.

Title V, CAA: The facility is a Title V or "Major Source of Air Pollution" in accordance with Chapter 62-213, F.A.C. because the potential emissions of at least one regulated pollutant exceed 100 tons per year (TPY). Regulated pollutants include pollutants such as carbon monoxide (CO), nitrogen oxides (NO_X), particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

CAIR: The facility is subject to the Clean Air Interstate Rule (CAIR) set forth in Rule 62-296.470, Florida Administrative Code (F.A.C.).

CAMR: The facility is subject to the Clean Air Mercury Rule (CAMR) set forth in Rule 62-296.480, F.A.C.

Siting: The facility was originally certified pursuant to the power plant siting provisions of Chapter 62-17, F.A.C.

Application Processing Schedule

02/05/07: Received application to construct, install or improve low NO_X burners (LNB), overfire air (OFA), forced oxidation, ash loadout system and scrubber on Units 1 and 2.

03/07/07: Application determined incomplete. Sent request for additional information (RAI).

08/09/07: Received partial responses to RAI.

09/04/07: Received additional responses to RAI including Best Available Control Technology (BACT) proposal for carbon monoxide (CO), revised application pages, air dispersion modeling, etc.

09/06/07: Separated out requests into three different projects including the present project for the improvements to ash loadout silos.

11/26/07: Distributed public notice package including the draft PSD permit for the improvement to ash loadout silos project.

Current Ash Loadout System

Stanton Energy Center currently has two fly ash (ash) loadout silos designated as Silo No. 1 and Silo No. 2. These silos receive ash pneumatically from power Units 1 and 2, respectively. Each silo is equipped with an individual load-out spout that allows the ash stored in the silos to drop from each silo to a truck for delivery to the landfill or sale for beneficial use depending on ash quality and market conditions. For control of PM each silo is equipped with a baghouse (EU ID 015 and EU ID 029).

2. PROJECT DESCRIPTION

The following descriptions are based on information provided by Black and Veatch (BV) for OUC, Headwater Resources, Inc, and from AP-42 Section 11.12, *Concrete Batching*, Table 11.12-2.

The proposed project is for the installation of equipment needed to allow ash blending at the Stanton Energy Center. These improvements to the current ash handling arrangement may best be described as three phased construction activities that will ultimately allow maximum flexibility to mix ashes from onsite and offsite to produce an increased amount of marketable pozzolan grade ash for use in concrete (See Figure 2 below for a Process Flow Diagram).

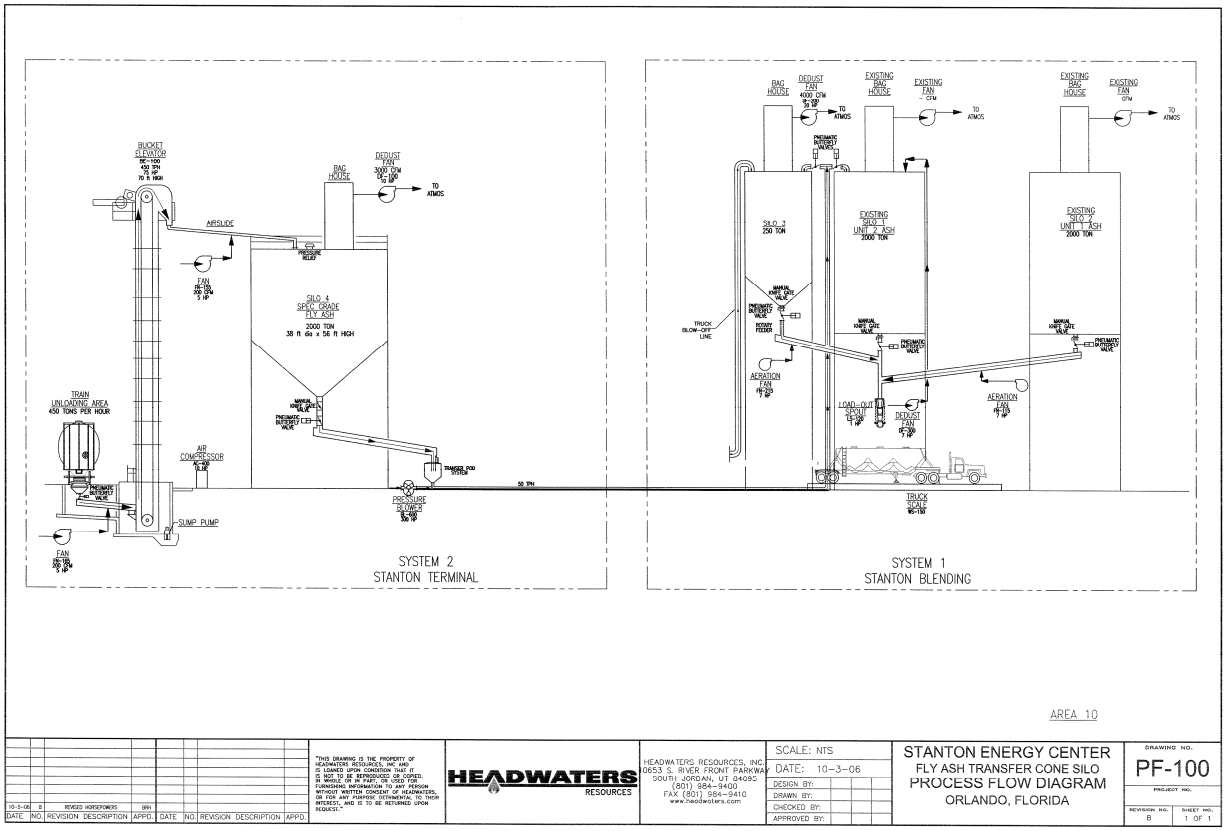

Figure 2. Process Flow Diagram (PFD) of Ash Loadout Improvements.

Purpose of Project

These ash loadout improvements are proposed to allow the blending of Unit 1 & 2 ashes with imported ashes to produce larger quantities of high quality, marketable, pozzolan grade fly ash (a non-cementitious additive to concrete that partially replaces cement and improves concrete durability and workability), and reduce quantities of fly ash going to the onsite landfill.

Technical Description of Project

The three phases of the proposed construction project are:

Phase-1. Installation of common piping between existing Silos No. 1 and No. 2 that will allow mixing of ashes from those silos during load-out to trucks. A truck scale will also be installed under these silos during this phase of construction (see Silos No. 1 and No. 2 and truck scale in System 1 on Figure 2).

Phase-2. Installation of a rail unloading system that will allow rail cars to import ash to the Stanton silo facilities (see System 2 on Figure 2). This operation will consist of a bucket elevator that will unload incoming railed ash to a new 2,000-ton Silo No. 4 (equipped with an individual baghouse), which will store ash prior to conveying to one of two silos in the truck load-out area (Silo No. 1 or new Silo No. 3 of System 1, see Figure 2).

Phase-3. Installation of a new 250-ton Silo No. 3 equipped with a baghouse. Silo No. 3 will be located adjacent to Silo No. 1. This silo will accept imported ash from the rail unloading system. Silo No. 3 will also accept imported ash from pneumatic trucks via a single truck port hook-up. Ash from Silo No. 3 can be loaded on to trucks directly through the same common load-out spout used for Silo Nos. 1 and 2.

The major pieces of new equipment required to accomplish these improvements are:

- 450-tons-per-hour (TPH) bucket elevator;
- Five air slides;
- 2,000-ton Silo No. 4 with baghouse (EU ID 031) at rail unloading;
- 250-ton Silo No. 3 with baghouse (EU ID 030) at truck load-out;
- Pneumatic transfer equipment with pressure pod; and
- Various blowers, compressors, and piping.

Existing Silo Nos. 1 and 2 will continue to receive ash generated by the plant, each receiving approximately 100,000 tons per year. These two silos will combine their individual load-out spouts into a single common spout. The common spout will be an extendable double walled, hatch fitted spout that blows vented air from the trucks back to Silo No. 1. Appropriate conveyance piping, air slides, vent piping, valving, etc. will be installed to accomplish combining the load-out spouts. In addition, a truck scale will be installed under the common spout.

Railcar imported ash (see System 2 on Figure 2) will be received at the railcar unloading facility located on the Stanton site approximately 500 feet south-southwest from the truck scale. Ash will unload by gravity from covered hopper bottom dump railcars to an air slide (see Figure 2). The air slide / railcar connection is fitted with an airtight boot. The air slide operates up to a maximum 450 TPH. Ash will be moved by the air slide to a load-in bucket elevator (450 TPH) and raised to a second air slide. The air slide will load the pozzolan (ash) into a 2,000-ton silo (new Silo No. 4).

The pozzolan is removed from Silo No. 4 by gravity load-out to a pressure pod, which will pneumatically convey the ash to either the new 250-ton Silo No.3 or existing Silo No. 1, depending on valve settings, at a rate of 50 TPH. This transfer is anticipated to operate for 8 to10 hours per day and transfer about 100,000 tons per year. Silo No. 3 essentially serves as a surge silo for imported ashes that will normally be used in mixing with Units 1 & 2 ashes to augment quality. Silo No. 3 can also accept ash pneumatically from trucks equipped with blowers; this transfer rate will be approximately 25 tons per hour. Silo No. 3 will load-out through the same

common spout as Silo Nos. 1 and 2, directly above the truck scale. As much as 30,000 tons of ash per year may be imported by truck.

Mixing of ash is accomplished by loading ash from Silo Nos. 1, 2, and 3 at separate intervals; the mixing actually occurs in the truck, not in the pipe. Intervals of a silo's unloading are dictated by desired ash mixing ratios and are tracked by tonnages monitored on the truck scale. The instantaneous load-out rate is expected to be 250 TPH but will be very discontinuous because of the mixing method described.

Applicants Emissions Analysis

Silo No. 1 emissions will increase slightly because of the additional emissions from loadout to trucks from Silo Nos. 2 and 3, due to all three silos sharing a common load-out spout. This is a relatively small emissions increase and may be considered insignificant. The existing baghouse on Silo No. 2 will have emissions reduced by the amount of emissions caused by load-out to trucks since such emissions will now be vented to Silo No. 1. Silo No. 3 emissions will be the result of pneumatic load-in of 130,000 tons per year (average). Silo No. 4 emissions will be the result of pneumatic load-in of 100,000 tons per year (average).

Controlled PM and PM_{10} emission factors for cement supplement unloading to elevated storage silo (pneumatic) from AP-42 Section 11.12, *Concrete Batching*, Table 11.12-2 are used to estimate emissions from the new silos. These emission factors are 0.0089 lbs/ton for PM and 0.0049 lbs/ton for PM_{10}. Using these emission factors and an estimated load-in of 130,000 tons per year, estimated emissions for Silo 3 are 0.58 tpy and 0.32 tpy for PM and PM_{10}, respectively. Similarly, with an estimated load-in of 100,000 tons per year for Silo 4, estimated emissions from Silo 4 are 0.45 tpy and 0.25 tpy of PM and PM_{10}, respectively. Silo No. 1 emissions will increase slightly because of the additional emissions from load-out to trucks from Silo Nos. 2 and 3, due to all three silos sharing a common load-out spout; this is certainly a relatively small emissions increase and may be considered insignificant. Emissions associated with the additional loadout of the 130,000 tons per year of imported ash can be conservatively estimated using an emissions factor of one tenth of that of pneumatic transfer. As such, additional emissions associated with loadout of the imported ash are estimated at 0.06 tpy and 0.03 tpy of PM and PM_{10}, respectively. The existing baghouse on Silo No. 2 will have emissions reduced by the amount of emissions caused by load-out to trucks since such emissions will now be vented to Silo 1.

Consequently, due to the installation of two new ash storage silos and bringing ash in from other sites as part of the improvements to the ash loadout system, there will be a slight increase in PM/PM_{10} emissions from additional ash handling. As discussed in the preceding paragraph an estimate of the increased emissions from the new fly ash silos associated with the fly ash blending operation are 1.09 tpy PM and 0.60 tpy PM_{10}.

Currently, Units 1 and 2 produce a coal fly ash that is either marginally marketable or nonmarketable for use as an ASTM-approved pozzolan in concrete. Unit 1 usually meets pozzolan specifications required by the concrete industry; Unit 2 rarely meets such specifications. Each unit produces about 100,000 tons per year. Non-marketable ash is presently landfilled. This landfilling is viewed as a negative value activity for this material and has a net negative impact on the environment.

Importation and mixing of a high quality pozzolan ash with the onsite ashes will allow for the production of a blended ash product, resulting in more and higher quality marketable pozzolan ash for use in concrete.

Limitation on Product Fly Ash Use

Based on information available to the Department, a substantial amount of mercury (Hg) contained in flue gas from bituminous coal-fueled power plants with low NO_X burners (LNB) and/or selective catalytic reduction (SCR) systems tends to be captured in the fly ash collected in cold-side particulate collection devices.

The blended fly ash will be used directly in concrete and concrete-like products and not as fuel or raw material in cement pyroprocessing where the possibility exists that Hg collected by the power plant fly ash can then be re-emitted from a cement plant.

The Department will include a prohibition on use of the OUC fly ash (whether or not it has been blended) as a fuel or raw material in pyroprocessing unless OUC and the user of such fly ash can show that Hg emitted from the cement facility will not increase compared with use of native raw materials and fuels. Such use will require submittal of a permit application by OUC along with supporting technical details before the prohibition is removed.

3. CONCLUSION

The estimated increases in PM and PM_{10} emissions resulting from this project are 1.09 and 0.60 tpy, respectively. These increases are much less than the PSD significant emission rates (SER) of 25 tpy for PM and 15 tpy for PM_{10}. Because there are no expected SER increases of any regulated pollutant, the project is not a major source modification as described in 62-210.200(191), F.A.C. and therefore not subject to PSD review. However, the improvements to the ash loadout silos will result in an emission increase of a regulated pollutant (PM) and thus constitutes a modification requiring a permit as described in 62-204.200(204), F.A.C.

The Department will issue a permit authorizing the construction of the improvements to the ash loadout system for Stanton Units 1 and 2.

The Department's determination is strictly limited to this specific case and should not be used as a precedent for other cases, or lead to unintended consequences construed from the language contained in this determination. Ultimately, it is the Department that interprets its own regulations and opinions.