

Notes from Site Visit at Duke Energy's Edwardsport IGCC Station on March 15, 2011

EPA conducted a site visit at Duke Energy's Edwardsport Integrated Gasification Combined Cycle (IGCC) Station (Edwardsport) located in Edwardsport, IN on Tuesday, March 15, 2011 to learn about the operations at the plant, specifically the IGCC unit. Table 3, located at the end of these notes, identifies the site visit participants. The presentation that the Edwardsport personnel gave during the site visit is provided as Attachment 1 to these notes.

These notes describe the information collected during the site visit.

Plant Overview

These notes focus on operations at the Edwardsport IGCC Station. Attachment 1 contains process flow diagrams for the gasification process, including the syngas cleaning operations and the slag handling operations, overall water balance diagram for the IGCC plant, and process flow diagrams for the grey water treatment system. Attachment 2 contains more detailed process flow diagrams for the grey water treatment system.

- Edwardsport retired the three coal-fired generating units located on the plant site on March 1, 2011. These units had a capacity of approximately 160 MW.
- Edwardsport is in the process of constructing the IGCC unit which will use Illinois Basin coal as the fuel source. The unit will have a gross capacity of approximately 780 MW and a net capacity of 618 MW. The unit will have two combustion turbines with gross capacity of 230 MW each and one steam turbine with a gross capacity of 320 MW.
- The table below contains some general information for the IGCC generating unit.

Table 1. Summary of IGCC Generating Unit Operations

Unit	Installation Date	Gross Capacity (MW)	Unit Type	Fuel Type
GT1	2012. Projected Commercial Date: Mid 2013	236.5 (MW net)	Integrated Gasification Combined Cycle (IGCC) – base load	Syngas generated from coal or natural gas
GT2	2012. Projected Commercial Date: Mid 2013	236.5 (MW net)	Integrated Gasification Combined Cycle (IGCC) – base load	Syngas generated from coal or natural gas
Steam Turbine	2012. Projected Commercial Date: Mid 2013	331.5 (MW Net)		Heat Recovery from GT1 and GT2

- The Edwardsport plant comprises over 118 acres and is expected to employ approximately 130 people once commercial operations begin.

- The Edwardsport plant currently has approximately 2,500 construction workers on site to install the IGCC unit.
- [Confidential Business Information has been removed from this section.]
- Cooling water for the plant will be supplied by both the White River and groundwater. Plant personnel estimate that approximately 70% of the water will be pulled from the White River, while the other 30% will be pulled from groundwater.
- The raw intake water consisting of both river water and groundwater, approximately 10,000 gpm, will be softened and filtered prior to use. Additionally, 2,000 of the 10,000 gpm will be further treated using demineralizers for use in the steam/water cycle.

Gasification Process Operations

- The gasification technology used at Edwardsport was designed by General Electric (GE).
- Edwardsport plans to use Illinois Basin coal as the fuel source for the gasifier. Plant personnel stated that the plant could use a blend of coal and petroleum coke or only petroleum coke; however, they plan to use coal for at least ten years because of tax incentives.
- Plant personnel noted that the unit can operate on natural gas, but would not be able to reach the full 618 MW capacity because there is no steam generated from the gasification process, via the radiant syngas cooler (RSC).
- Edwardsport is building a grey water treatment system to handle the grey water generated by the plant. Plant personnel noted that the treatment system was designed based on estimated characteristics of the grey water and they do not yet know the actual characteristics. Plant personnel also stated that they do not know if the grey water characteristics would be different depending on whether coal or petroleum coke is used, but they do not believe that it would impact the grey water treatment system or cause any permit limit exceedances.
- Edwardsport will receive Illinois Basin coal from a mine approximately 50 miles away. The coal will be delivered via rail, but the plant will also have the capability to receive coal via truck.
- The coal will be stored on the coal pile, where Edwardsport plans to store approximately 30 to 45 days worth of coal. During the operation of the unit, Edwardsport plans to process approximately 6,000 tons of coal per day.

- Edwardsport will transfer the coal from the coal pile to the two coal bunkers, each with a capacity of 3,000 tons, which then feed to the grinding mill. Treated intake water is added to the grinding mill to create the coal slurry that is fed to the gasifier, which is approximately 60% solids.
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Gasification Wastewater Treatment

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Table 2: Grey Water Treatment System Equipment Cost

Equipment	Percent of Total Equipment Cost (%)
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Edwardsport Water Treatment

- As described above, the treated grey water will be transferred to the Southeast Pond, along with cooling tower blowdown, site storm water, water treatment concentrates, and treated sanitary effluent.
- The overflow from the Southeast Pond will be transferred to the Final Settling Pond, which will also receive coal pile runoff pond effluent, runoff from the intermediate slag storage area, and legacy station coal pile drainage. The overflow from the Final Settling Pond will be discharged to the White River via Outfall 002.

Table 3. Site Visit Attendees

Name	Organization (Representing)	Telephone	E-mail
Jon Arbo	Duke Energy	812-735-8579	jon.arbo@duke-energy.com
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