

**Program:** Tour of the Hoosier Energy Merom Electric Power Generating Station

**Coordinator:** Jim Bettner

**Attendance:** 50

**Guests:** Dave Poole

**Scribe:** Benny Ko

**Editor:** Jim Willson

Jim Bettner and the bus were waiting for us at the Northside K of C parking lot before 9:00 am, with Starbuck coffee and donuts if I may add.

There were 50 participants on this field trip and the bus departed promptly at 9:35 am.

Before arriving at the power generating station at Merom, Indiana, we stopped at Oaktown and enjoyed a delicious lunch at the McKinley's Farm & Restaurant.

At the power plant, we were welcomed by the plant manager and several of his engineers. They gave us an excellent introduction to the business as well as the technical details of the facility and how it is operated. Then they took many questions from the audience before the actual guided tour began. And here is a summary of some of the salient points:

**Hoosier Energy** is a non-profit generation and transmission cooperative (of electricity) that serves an 18 member system in southern and central Indiana and southeastern Illinois.

The Merom power plant is one of the cooperative's assets. Beside coal-powered electricity generation like the Merom plant, there are other generating facilities within the cooperative that utilize natural gas and renewable resources such as solar, hydro and wind power.

### **MISO (Midcontinent Independent System Operator)**

The Merom power plant is tied in with MISO which operates the transmission system and a centrally dispatched market in portions of 15 states in the Midwest and the South, extending from Michigan and Indiana to Montana and from the Canadian border to the southern extremes of Louisiana and Mississippi. With marketing data made available electronically in real-time, MISO helps the management of a subscribing power plant to determine at what capacity its generators should run at in order to sell its power profitably in accordance with market demand.

The Merom facility is a steam power turbine plant with two independent boiler/turbine systems. Coal, mainly sourced from southwestern Indiana mines for its relative purity and proximity, is first pulverized in a mill. The coal powder is then burned in a furnace and the hot gas is used to convert water in a boiler into super-heated steam. The hot steam is sent through controlling valves to a turbine. As the steam expands and cools, its energy is transferred to the turbine blades which turn the generator. The spent steam becomes water vapor and is fed through a condenser and the condensed water is then pumped into the boiler to repeat the cycle.

Emissions from the boiler include carbon dioxide, nitrogen oxide, sulfur oxides, fly-ash, and bottom-ash. 99% of the nitrogen oxide is catalytically removed and used to manufacture fertilizer. Sulfur oxides can be converted into gypsum, a form of calcium sulfate that can be used to make drywall. Waste heat from the condenser is transferred to the air as well as to a man-made lake. The ashes removed from the air are used mainly for landfill and also an additive in cement.

We were then divided into several groups, each person was given a helmet, protective glasses, and headphone. Each group was guided by a plant engineer very familiar with the operation and the machinery. Even though all the equipment is highly computerized and runs on automatic mode 80-85% of the time, regular human input is absolutely crucial to avoid very costly shut-downs and re-starts, not to mention accidents. Therefore, the judgment and experience of the plant engineers and crew are as much an asset to the facility as is the machinery. For example, feeding the power generated into a wider power grid, the engineer must make sure the power flow is efficient and uni-directional; an unexpected 'back-surge' could potentially cause great damage to the generators and poses a safety hazard to the workers. Yet another example lies in the moisture and purity of the coal. If the coal is too wet, its dust would burn unevenly in the furnace and again could damage equipment and impair generator efficiency. Coal impurities result in slag formation, a headache to equipment maintenance.

The visit ran just a little longer than planned but no one registered any complaints. Despite climbing up to some fairly high and exposed locations, everyone handled the challenge beautifully. We thank the facility for their time and hospitality and boarded the bus for home. It was 6:30 pm when we arrived at Northside K of C. Thank you Jim Bettner for arranging this wonderful excursion.



