

# D.C. Cook PWR Nuclear Generating Station

## Ice Condenser Ice Machine System Replacement Project Profile



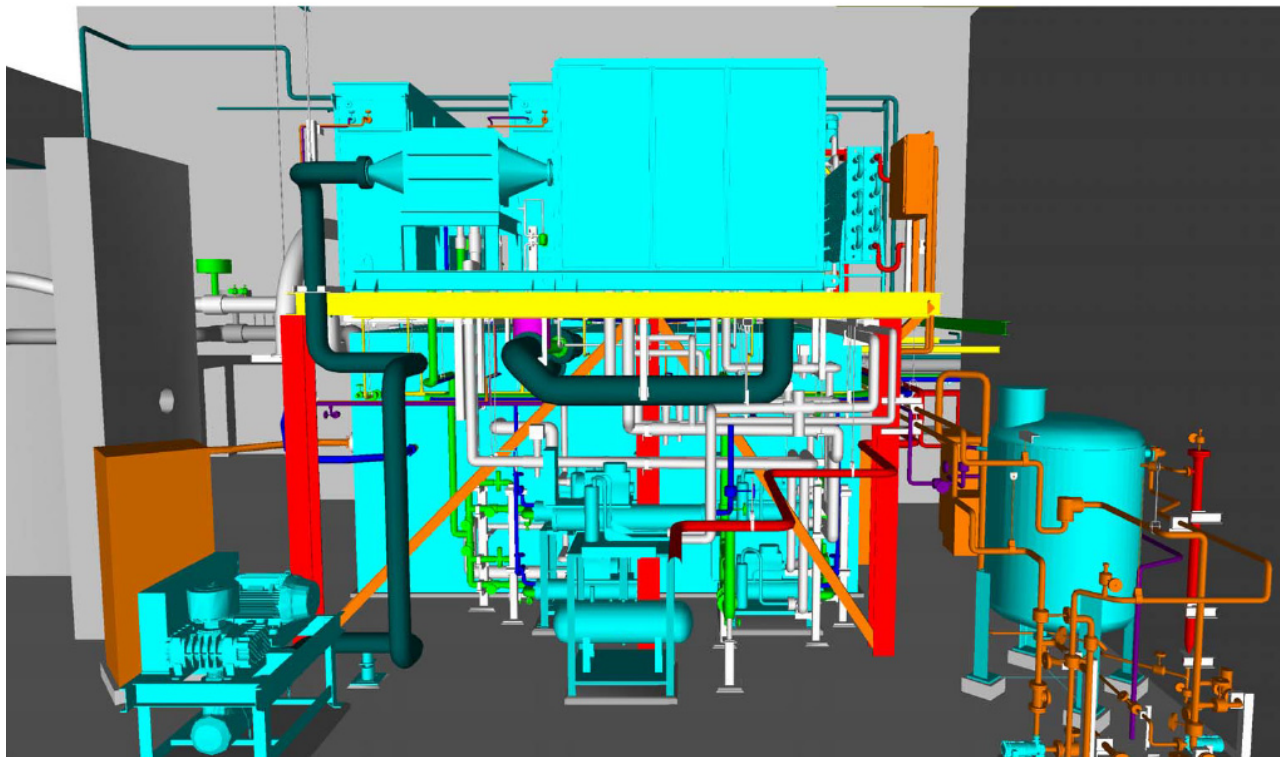
**Client:** American Electric Power – D.C. Cook Nuclear Generating Station

**Project Name:** D.C. Cook Ice Condenser Ice Machine System Replacement

**Location:** Bridgman, Michigan

**Unit Size:** Unit 1 – 1,048 MW      Unit 2 – 1,107 MW

**Schedule:** 2012 - 2015



*View facing east*

### **Description:**

Units 1 and 2 of the D.C. Cook nuclear generating station are pressurized water reactors (PWR) with ice condenser containment systems. The purpose of the ice condenser is to absorb rapidly the thermal energy released to the containment and to remove iodine radioactivity in the event of a loss-of-coolant accident or steam line break. The borated ice has special technical specification requirements to meet pH levels and borate concentration percentages, enabling the ice to perform its safety-related function.

In order to produce the borated ice, the station employs ice production, storage, and distribution systems located in the auxiliary building. The ice making and delivery systems were designed to produce and store borated ice and to precool the air used in conveying the ice from the ice manufacturing/storage area to the ice condenser for the purposes of establishing initial inventory and subsequent ice makeup necessitated by sublimation losses.

D.C. Cook's original three flake ice machines and automated ice storage and pneumatic delivery systems to Units 1 and 2 were designed based on 1960s-era technology, which resulted in the problems of aged and

obsolete equipment relative to system reliability and availability of replacement parts. As such, the station initiated this project to replace the existing ice making infrastructure with state-of-the-art ice machines and supporting system components to provide improved and more reliable ice making capabilities.

**Scope of Services:**

Sargent &Lundy's scope consisted of providing the detailed design services required for the removal of the existing ice machines and delivery system and for the installation of the new, larger and heavier ice machines and delivery system. We performed all the design work to locate 25 major equipment items for the ice machine system; route and support over 1,300 feet of small-bore piping for eight different systems; route and support over 500 feet of conduit and cable tray for two 3-1/C 500-kcmil power cables within the auxiliary building; design and qualify a new seismic platform; and route all the associated power and signal cables between the new ice machine equipment.

The detailed design for the project involved the preparation of a modification package, detailed design drawings, and detailed vendor document reviews. Our services included detailed walkdowns, utilization of 3-D laser scans, and 3-D modeling to route and install the new, larger ice machines and delivery system in a very congested area located within the auxiliary building. In addition to these design services, Sargent &Lundy provided onsite support throughout the installation phase of the project. The new ice machine system was successfully returned to operations (RTO) in May 2015.

Sargent & Lundy deliverables included the modification package for replacement of the ice machines and delivery system, drawings, 3-D model, and reports related to the above-cited activities.

**Highlights:**

- Utilization of the 3-D tools allowed for the prefabrication of 90% of the piping.
- In addition, the 3-D model and laser scans enabled Sargent &Lundy to place the seismic platform columns in specific locations, which resulted in no additional support requirements to the auxiliary building steel columns, concrete floor, or steel beams.

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