

# Big Rock Point Nuclear Power Plant

## BWR Decommissioning and ISFSI Implementation Project Profile



### Client:

Consumers Energy

### Project Name:

Big Rock Point  
Restoration Project

### Location:

Charlevoix, Michigan

### Schedule:

1997 - 2007



### Project Description:

Big Rock Point, an early-vintage boiling water reactor (BWR) facility, was shut down in 1997. Consumers Energy was interested in immediate dismantlement of the plant, removing the spent fuel to an independent spent fuel storage installation (ISFSI), and returning the site to greenfield, or unrestricted, status.

From mid-November 2002 to early May 2003, all spent fuel from the site was removed from the spent fuel pool, where it had been stored after shutdown, and transported to Big Rock Point's onsite ISFSI. Fuel loading and transfer were completed on May 2, 2003, with 441 fuel bundles loaded into storage casks. The ISFSI is located approximately one-quarter mile from the plant.

The Big Rock reactor vessel was shipped to Barnwell for burial in 2004, and the NRC approved the release of 435 acres of the Big Rock Point site for unrestricted use on January 8, 2007.

Approximately 107 acres remain under license for spent fuel storage and maintenance until the U.S. federal government removes the spent nuclear fuel from the site.

### Scope of Services:

Sargent & Lundy's scope consisted of providing the design services required for an independent decommissioning power system, the preparation of specifications for primary system decontamination, and preparation of demolition work packages for selected systems and components. A zircaloy oxidation fuel analysis was performed, as were various other analyses to demonstrate the adequacy of the spent fuel pool for use to store the reactor pressure vessel (RPV) internals and fuel handling components. Sargent & Lundy prepared methods for major equipment dismantlement and disposal, and was involved with major component removal planning and scheduling.

In addition, Sargent & Lundy performed all of the design work associated with the ISFSI. Being completely independent from the plant, the island ISFSI required all necessary support facilities. Sargent & Lundy's electrical and security system design for the ISFSI included a central alarm station, perimeter intrusion and detection system (PIDS), closed-circuit TV system, illumination system, and grounding system. Radiological dose analyses were performed, including berm design for shielding. Site civil design, geotechnical engineering, and electrical power distribution design were also provided.



The scope included determination of decommissioning power loads, specification of new system transformer and switchgear, plant distribution, and raceway design for an independent, color-coded power distribution system designed to provide safety for workers dismantling plant components and structures by allowing for complete de-energizing of the existing plant power.

Sargent & Lundy performed structural engineering for the design of the containment shell opening reinforcement and for the load handling systems, including floor shoring and crane upgrade for the removal of large plant components and loading of fuel storage casks.

Other tasks included preparation of design and supporting safety analyses for the reactor vessel package and transportation system. Analyses were performed to demonstrate compliance with Normal Condition of Transport (NCT) and Hypothetical Accident Conditions (HAC), including non-linear structural analysis to evaluate the consequences of the HAC 30-foot load drop.

**Project Highlights:**

- The Sargent & Lundy-designed decommissioning power system was recognized as a *Power Engineering* Project of the Year, a significant industrial safety project.
- The Sargent & Lundy-designed reactor transportation system included the first NRC-certified fully compliant Type B reactor vessel container.

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