Ameren MISSOURI | Callaway Energy Center

DRY CASK STORAGE PROJECT

PROJECT TIMELINE

Fall 2013
Project field work began

August 6, 2014
Construction of the UMAX ISFSI pad began

January 23, 2015
Construction of the UMAX ISFSI pad completed

Spring 2015
Project field work completed

May—August 2015
Completed Nuclear Regulatory Commission trial (dry) runs

August 2015
Load first dry cask with fuel

PROJECT OVERVIEW

The purpose of the dry cask storage project is to design, build and place into operation an Independent Spent Fuel Storage system at the Callaway Energy Center. In accordance with the amended Nuclear Waste Policy Act of 1982, long-term spent fuel storage is the responsibility of the United States Department of Energy (DOE). To date, the DOE has not fulfilled its contractual obligation to provide such storage, prompting Callaway to develop a Nuclear Regulatory Commission (NRC) approved interim storage facility. All fuel used since Callaway came online in 1984 is currently stored onsite in the spent fuel pool. The dry cask storage project is necessary to provide sufficient spent fuel storage capacity in support of continued plant operations through the end of Callaway's license extension.

PROJECT LICENSING

Holtec International, the general contractor for the project, submitted the project design to the NRC for approval. After successful review of the design, the NRC issued a Certificate of Compliance (CoC) to document its approval and any additional requirements for construction. Callaway then used a general license permissible by 10CFR Part 72 to start fabrication and construction on the dry cask storage area—the first of its kind in the world. The Callaway dry cask storage area's groundbreaking subterranean design includes additional safety and shielding features in addition to above ground dry cask storage designs.

UNDERGROUND DESIGN

Callaway chose the Underground Maximum (UMAX) storage system based on its robust design and ability to withstand severe weather. By placing the casks underground the concrete and soil provide additional radiation shielding as compared to an above ground design. With a low-profile concrete and steel closure lid, security of the storage system is also improved.

The 17,100-square-foot concrete pads on top and bottom are approximately 33 inches thick with about 17 feet of non-reinforced concrete between them (about 13,000 total cubic

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yards of concrete).

TESTING PROCESS

The Nuclear Regulatory Commission observed demonstrations of Callaway's dry cask storage processes with five trial runs focused on weld integrity, water flow control and the center's ability to safely move mock fuel assemblies from the spent fuel pool into the cask and in place on the pad. This process was to verify that Callaway is ready to move fuel assemblies into the casks. All five trial runs have been successfully completed.

LOADING CAMPAIGNS

Moving fuel from the spent fuel pool and into the storage canisters is called a loading campaign. During these campaigns, expected to occur every three years, a mix of both newer and older spent fuel assemblies will be loaded into the casks based on specific loading guidelines. Other nuclear facilities across the country are also using similar dry cask storage facilities as an interim measure. Callaway will continue to use this method until the federal government implements a permanent solution.

TECHNICAL DETAILS

- Each storage canister can hold up to 37 spent fuel assemblies.
- Loading campaigns are expected to occur every three years.
- Six loaded canisters will be moved to storage for a total of 222 fuel assemblies moved from the spent fuel pool.
- The Underground Maximum (UMAX) storage pad can handle 48 canisters for a total storage capacity of 1776 spent fuel assemblies.
- Approximately 153,345 tons of rock was sourced from local mid-Missouri quarries throughout the project.
- Approximately 13,000 cubic yards of concrete from mid-Missouri suppliers went into the UMAX storage pad.
- The vertical cask transporter (VCT) weighs approximately 209,550 pounds and is load rated at 415,000 pounds.
- The HI-PORT transport machine weighs approximately 60,000 pounds and is load