

Client:

AmerenUE

Project Name:

Callaway Buried ESW
Piping Replacement

Location:

Portland, Missouri

Schedule:

2007 - 2009



Project Description:

The Callaway Nuclear Plant Essential Service Water (ESW) system was originally designed and constructed using carbon steel piping. In the early 2000s, numerous instances of pinhole leaks, pitting, and other localized degradation of the ESW system piping due to erosion, corrosion, and microbiologically induced corrosion (MIC) were identified.

In early 2007, Callaway initiated a project to replace the existing buried carbon steel ESW system piping. Due to its resistance to erosion, corrosion, and MIC, it was decided that the replacement buried ESW piping would be made of high-density polyethylene (HDPE). While HDPE piping had been previously used in several nuclear plants (Callaway included), this project was the first use of HDPE piping in a safety-related application at a nuclear power plant in the United States. This required the project to obtain regulatory approval from the NRC by means of a 10 CFR 50.55a Relief Request. The replacement piping was designed and the majority of the replacement piping was installed with the plant on line in parallel with obtaining final regulatory approval. Following receipt of NRC approval in late 2008, the final replacement piping tie-ins to the existing ESW piping system were made in two separate ESW train outages in late 2008 and early 2009 with the plant on line.

This project was recognized with a 2009 Nuclear Energy Institute (NEI) Top Industry Practice (TIP) award.

Scope of Services:

Sargent & Lundy's scope consisted of developing the design, providing procurement and installation specifications, assisting with obtaining regulatory approval, and providing support during the installation of the replacement ESW piping. In addition, Sargent & Lundy developed several other temporary and permanent modifications to facilitate the installation of the replacement piping by relocating interferences and providing an alternative source of emergency power to allow online tie-in to the existing ESW piping system.



As with any first-of-a-kind project, the use of HDPE piping in the Callaway ESW system presented challenges in all phases of the project, including design, procurement, licensing, and installation. Sargent & Lundy team members worked closely with AmerenUE team members to overcome these challenges and deliver to the Callaway Nuclear Plant a permanent solution to the MIC problems that were adversely affecting the existing buried carbon steel piping.

Sargent & Lundy deliverables included modification packages, design, installation and procurement specifications, design drawings, design calculations, licensing submittal inputs, and responses to requests for additional information (RAIs) from the NRC.

Project Highlights:

The overall project achievements included:

- First-of-a-kind project successfully completed from inception to completion in less than two years, including design, procurement, regulatory approval, installation, and return to service.
- Life-of-the-plant solution to MIC problems in the existing buried piping that was replaced and improved system hydraulic performance.
- Industry-recognized innovative project that earned the NEI Top Industry Practice (TIP) award.

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