

TUV Rheinland Industrial Solutions Leads ASME N-5 Documentation Regeneration Effort to Benefit Bellefonte Nuclear Power Plant

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BACKGROUND

The Bellefonte Nuclear Power Generating Station (BLN) dates back to January 1974, when the Tennessee Valley Authority (TVA) was granted a construction permit to build two Babcock & Wilcox (B&W) Type 205, 1,256 MWe reactors at the Bellefonte site on the Tennessee River in Jackson County, Ala. This type of reactor is the same as the Mülheim-Kärlich reactor in Germany that operated for three years and proved the B&W design. TVA began construction on two B&W units but work was halted in 1985 when TVA determined it had no immediate need for the power that could be generated from the twin reactors. Over time, TVA made several attempts to re-start construction: First, from 1989-1993, and then as recent as 2011, when AREVA came on-board as a prime contractor to revive and complete the effort.

BUSINESS CHALLENGE

AREVA NP was tasked with performing engineering and related support work for the reactor's nuclear steam supply system (NSSS) in anticipation of Bellefonte Unit One completion. The recovery effort was largely based on the AREVA Digital Control Center and the critical ASME work elements for regeneration of the ASME N-5 Code Data Reports and system documents. The ASME N-5 Code Data Reports are necessary for obtaining the Authorized Nuclear Inspector (ANI) approval, ASME certificate renewal and restarting construction. That is where TUV Rheinland was able to help.

SOLUTIONS AND RESULTS

TUV Rheinland's proposal included the scope, technical details, methods of performance and schedule and staffing levels needed to regenerate the ASME N-5 Code Data Reports for the 48 primary ASME systems. The company also proposed to complete estimating, identify the necessary repairs and replacements of components and achieve the ASME Code Certificate needed to re-start construction on Unit One. The proposal was created by the nuclear power plant (NPP) industry experience of TUV's team leader John Cason, Project Manager, and his legacy knowledge of the 1989 re-start effort and similar US NPP projects over the past 30+ years, including his ASME Section III and XI assessment for the US-NRC after the accident at the Three Mile Island NPP. Using the assessment and project execution plan contained in the proposal, AREVA conducted an internal review of the N-5 regeneration process and ASME materials issues and awarded TRIS the managed task contract to begin work at Bellefonte.

TUV Rheinland worked with AREVA to organize a group dubbed "N5U," with John Cason as the project manager of a team with nine handpicked personnel. They included five TUV employees, two retired TVA individuals and two AREVA contractors. The N5U team underwent on-site training on all the data retrieval methods using TVA QA legacy document archives, database systems, and a vault retaining 30+ year-old hard-copy records.

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SOLUTIONS AND RESULTS CONTINUED

The team began working on the Bellefonte site in November 2012, re-visiting all of the construction “open items.” Open items is a term for ASME Code and quality or regulatory variances that must be remedied prior to the acceptance of the final N-5 Code Data reports by the TVA Authorized Nuclear Inspectors.

Specifically, N5U provided the review and technical assessment of all open items and defined the technical/engineering closure process with man hour estimate for the disposition of each and every item and the item-related sub-condition. The root causes of the open items were paraphrased under several nuclear construction processes, including ASME material qualification and traceability, correct ASME class boundaries and classifications, component testing and validation, and construction QC, including visual and NDT inspections and tests. A critical element of the process was estimating the man power requirements in resolving the 6,000+ open items as part of the final estimate for construction cost. TUV Rheinland completed the project on time, within budget and delivered the final report in June of 2013.

AREVA had budgeted for additional work for the balance of the year; however, TVA announced that work for all contractors on site would be temporarily suspended pending the completion of TVA Watts Bar Unit One, ending the immediate site work for AREVA, TUV and over 300+ other site contractors from TVA prime suppliers.

Fortunately, TUV was able to provide a turnkey service to AREVA and demonstrate to TVA and its other contractors the full range of TUV services, which go far beyond NDT and inspection. The services include regulator and licensing interface, equipment risk and qualification assessments, reviews of available advanced NDT methods, providing QA and QC process control methods and instructions, and defining the IT data integration options and pathways for interfacing with the AREVA/URS 3-D modeling software process for construction configuration management and work control. When the TUV team finished the N-5 task, they offered to extend their support to the closure process. AREVA granted the request to prepare the re-activation plan and lay-up of work activities, thus leaving the path for re-activation precisely marked by TUV for AREVA and TVA.

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