

**ASME**

**125<sup>th</sup> C+S Anniversary Case Study**

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### **One Code to Save Millions:**

#### **ASME codes and standards guide Dominion in efficiency, cost savings and safety**

Efficiency, production costs and safety are priorities for any business, with many following specific guidelines to help increase overall production. In engineering, these guidelines are communicated in the form of codes and standards, which are developed to support consistency of production and operations, while helping to prevent accidents, thus saving companies millions of dollars. ASME (the American Society of Mechanical Engineers) has developed codes, standards and conformity assessment programs for over 125 years to guide engineers and regulators in creating more efficient and safer production and work environments. One code in particular, the ASME Boiler and Pressure Vessel (BPV) Code, is often utilized at nuclear power plants and contributes to safer, cleaner and more profitable energy production. By following the ASME BPV Code, many companies, including Dominion Resources, have saved millions of dollars by enhancing safety protocols and keeping their equipment running at high efficiencies.

#### **Overview**

Dominion is one of the nation's largest producers and transporters of energy, with a portfolio of more than 27,500 megawatts of generation, 12,000 miles of natural gas transmission, gathering and storage pipeline and 6,000 miles of electric transmission lines. Dominion operates the nation's largest natural gas storage system with 942 billion cubic feet of storage capacity and serves retail energy customers in 12 states.

Dominion's resources include gas and electric facilities, wind farms, fossil-fueled power stations, hydro power stations and nuclear power plants. Nuclear energy is the core of Dominion's business, with four plants in Virginia, one in Wisconsin, and two in Connecticut. For Dominion, it is a top priority to run at the highest of efficiencies and operate with the most current production and safety procedures available.

#### **The Challenge**

As an energy provider and distributor, Dominion has a unique set of challenges concerning safety and efficiencies. New technologies and programs, including Risk Informed Inservice Inspection (ISI) and updated weld overlay applications, that contribute to overall plant efficiency and the output of energy production are being introduced into the industry at a rapid pace, making it a challenge for some energy providers to stay current on their own. This is another area where the ASME codes and standards become an important resource. Codes and standards help engineers by providing accurate, reliable, and

leading edge guidelines for the design, manufacture, inspection, testing, operation, maintenance, and certification of a myriad of power plant equipment. In many cases, the resulting codes and standards are the basis for regulatory enforcement.

Keeping up with new technology isn't the only challenge for an energy provider. The mix of old and new equipment creates logistical issues for any manager concerned with equipment efficiency and regulatory compliance. Each piece of equipment requires specific efficiency and safety tests scheduled at particular intervals, depending on age and model. With over 3,000 items that need to be tracked and tested at each of Dominion's plants, this can become overwhelming.

### **The Solution**

In order to stay on track with technology and provide the safest and most efficient working environment at their nuclear power plants, Dominion follows the codes and standards developed by ASME. ASME has been developing codes and standards for over 125 years; the mission of its Standards & Certification organization is "to develop the preeminent, universally applicable codes, standards, conformity assessment programs, and related products and services for the benefit of humanity." These codes and standards have a significant impact on the industry and save companies millions of dollars per year as well as assist in accident prevention and the development of more efficient production and operational practices. Key technical staff from Dominion are among the over 4,000 volunteers from around the world who contribute to this important effort.

To help interpret and apply the codes and standards and keep the company updated on any changes, Dominion supports the Code by sending several employees to the quarterly meeting. One of these employees is Viki Armentrout, an engineer at the corporate office in Richmond, Virginia. Viki is the Chair of the Task Group Alloy 600, Secretary of the Working Group on Inspections of Systems and Components, and member of Subgroup Industry Experience for New Plants (BPV III/XI), Subgroup Water Cooled Systems, and Subcommittee XI.

One of the codes that Armentrout focuses on is Section XI of the ASME BPV Code, In-service Inspection of Nuclear Power Plant Components. This section of the code includes rules for repairs, replacement of equipment, activities for evaluations and in-service inspection requirements. Implementation of this code alone has saved Dominion tens of millions of dollars in avoiding unwanted repairs, time delays, outages, and lost revenue.

For example, every ten years Dominion saves \$2.6 million from a nuclear safety innovation called Risk-Informed ISI that was generated for the code specific to piping welds. Section XI has changed the way inspections are performed on piping welds, making the process more efficient and less time consuming. This has not only saved Dominion millions of dollars, but has enhanced productivity and safety throughout the nuclear industry.

In addition to establishing rules and guidelines, many of ASME's codes and standards are under continuous review, which facilitates the incorporation of technical revisions based on advances in technology and changes in the industry. "ASME codes are designed to allow engineers to evaluate new concepts, new techniques and new ways to do things through code cases," says Armentrout. "They are living documents."

Code cases provide a particularly expeditious means of addressing new technologies, materials, and processes and allow ASME to make amendments to the code without changing the code itself. This process enables engineers to keep current with new technologies and to develop new techniques without being limited by prescriptive code requirements. Without the flexibility of code cases, the industry would fall behind, and use of new techniques as well as possible safety issues would take longer to address.

Nuclear Code Cases N-498 and N-416-1 and their revisions for example, helped to eliminate the practice of hydrostatic testing when it was discovered that the value of this test was no better than a leakage test conducted at normal operating pressure and temperature. These BPV Section XI code cases have created at least \$10 million in savings for Dominion.

Dominion has seen significant cost savings, increased efficiencies and improved safety measures through its use of the ASME BPV code. By following these requirements and guidelines, Dominion is able to help keep their employees safe and provide a more efficient work environment.

Through their codes and standards, ASME has increased the quality of life and safety for millions of people around the world. Celebrating 125 years of codes and standards, ASME now has over 4,000 volunteers who create and oversee the development of more than 500 codes and standards, which are in use in over 100 countries around the world. Public safety is a top priority for ASME and, through the development of codes and standards, a reality worldwide.