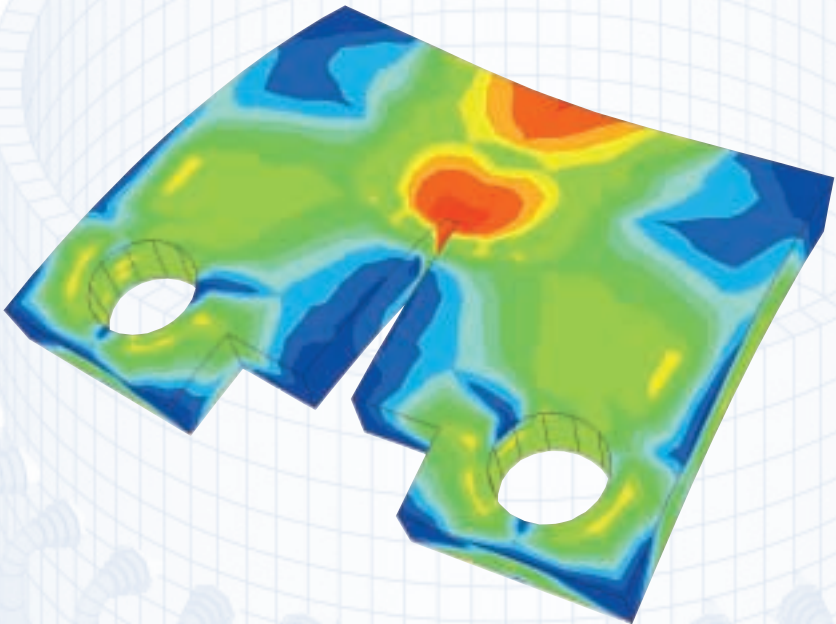




**Babcock & Wilcox Canada**

# Engineering Services

**Your source for complete  
engineering solutions**



# Performance

## Proven Performance

When searching for a company with an established record in providing comprehensive engineering services for nuclear equipment and systems applications, look no further than Babcock & Wilcox Canada (B&W).

From research and development to design and fabrication, B&W is known worldwide as a total solutions source. As the originator and supplier of over 260 steam generators and more than 100 heat exchangers and process vessels, B&W has decades of experience designing top quality products.

This success can be attributed to our highly skilled engineers and staff who have a well-earned reputation for providing clients with flexible, innovative engineering services that solve challenges on time and within budget.

B&W has the proven experience and resources to play a key role in your organization's success today, and into the future.



## Extensive Research & Development

It is important to note that an extensive research and development program is the backbone of all our projects. Our R&D focuses on materials and corrosion research, critical materials manufacturing, thermal and structural design, field service and repair work, as well as advanced materials development.

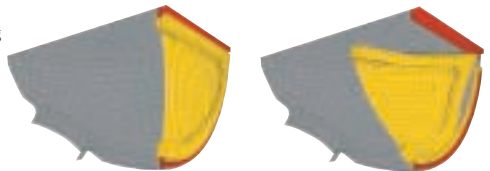


## Comprehensive Services

B&W has the multi-disciplinary capabilities to help you optimize your business performance—and ultimately your profitability. We can help you troubleshoot, assess and resolve problems, plan for emergency outages, and increase the capacity, efficiency and operating life of your plant.

Our ability to provide a wide range of integrated engineering solutions is one of the main reasons we are a leader in the nuclear industry. B&W's engineering expertise includes complete project engineering/project management, thermal hydraulic design and analysis as well as structural design and analysis. We offer all-inclusive service in:

- Structural Engineering
- Performance Engineering
- Material Engineering
- Manufacturing Engineering
- Welding Technology
- NDE Technology
- Nuclear Services Site Experience



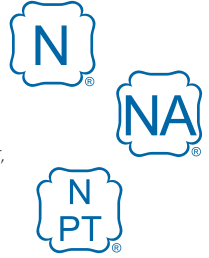
3-D Divider Plate Elastic-plastic LOCA Analysis

# Integrity

## High Standards

Every project is required to pass the high standards of our quality assurance program which meets or exceeds 10CFR50 Appendix B, ASME NQA-1 and CSA N285 quality program requirements.

As well, B&W is accredited with the following ASME stamps: N, NPT, NA, TP, U, S, PP. We also participate in various ASME and CSA committees on design, materials and inspection.



## Superior Solutions

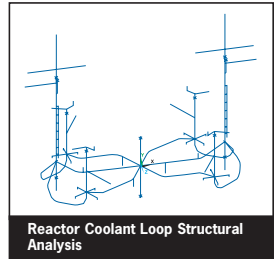
In today's competitive environment, you need a supplier who understands your engineering needs and your operations. For over 125 years, this has been B&W's strength. When it comes to solving problems, making improvements, and effectively managing projects of all sizes, we lead the industry.

### Engineering Reviews

- new designs and plant modification reviews, vendor surveillance and QA audits
- design specification preparation and/or certification, including review of design reports on behalf of the owner
- procurement specifications for components and material
- transportation logistics, planning and design support

### Structural Analysis

- experienced in ASME Section III, Section VIII Divisions 1 and 3 and piping code requirements
- expertise in finite element analysis to support linear elastic, elastic-plastic, seismic dynamic (response spectrum and time history) and vibration analysis
- skilled in classical vessel analysis



# Innovation

## Steam Generator and Heat Exchanger Performance Analysis

- maintain and support ongoing development of engineering computational codes for 3-D thermal hydraulic analysis of steam generators, design codes for heat exchangers and flow induced vibration (FIV) codes

## Thermal Hydraulics Analysis

- support a set of general purpose thermal hydraulic codes
- skilled at solving problems involving transient (accident) response of a 1-D flow network or steady state/transient response of a general 3-D geometry

## Materials Engineering and R&D Capabilities

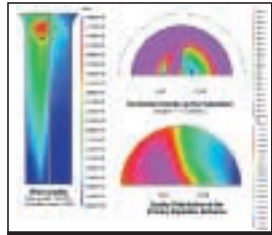
- experienced materials engineers supported by an extensive materials R&D program
- maintain a world class R&D centre in Alliance, Ohio
- recognized as a leader in Alloy 690 steam generator tubing development—setting the standard for heat treatment optimization to maximize SCC resistance
- actively developing corrosion and wear resistant alloys at our Integran Technologies, Inc. joint venture, through the application of GBE™ and Nanocrystalline Technologies

## Material Supply and Component Fabrication

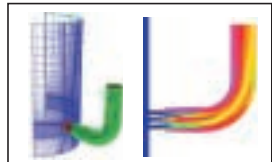
- our fully integrated engineering and manufacturing facility provides high quality repair parts, plant improvement components, retrofit parts and new equipment
- maintain an extensive worldwide supplier network for nuclear grade material and a substantial in-house stock of nuclear material and in-house capability to upgrade commercial material to respond to plant outage needs for components or material

## Component Reliability Modifications

- provide analytical qualification and field modification solutions to pressure boundary components and troubled bolted closures from the smallest inspection port right up to large bolted tubesheet closures
- offer pressure vessel bolted closure design services that include gasket design, specification and procurement, join redesign and modification to solve leakage problems, and stuck stud removal and repair justification



ATHOS 3-D Steam Generator Hydraulics Analysis



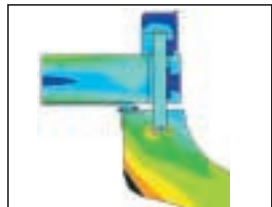
3-D CFD Analysis of a Steam Nozzle Flow Restrictor



Grain Boundary Characterization



Section III Class 1 Repair/Replacement Parts



Bolted Closure Analytical Qualification

# Experience

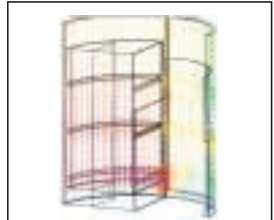
## Engineering Services At-a-Glance

We offer flexible service solutions which means you don't have to choose from a limited list of standard options. Instead, B&W tailors our services to fit your needs precisely. Services include:

- project engineering (task management from concept to completion)
- engineering design for analysis, field repair and modification of pressure vessels, piping and supports
- third party reviews, design specification and design report preparation and certification
- structural engineering analysis (piping analysis, linear FE thermal and stress analysis, dynamic elastic-plastic analysis, seismic and vibration analysis)
- 3-D thermal-hydraulics engineering analysis
- time dependent thermal hydraulics engineering analysis
- materials R&D, material selection, qualification and procurement
- component design, fabrication
- life assessment and/or life extension evaluation
- custom tooling design
- engineering support for construction and installation
- cleaning process development and qualification
- outage, inspection and maintenance pre-planning
- development of inspection procedures



**Experienced and well trained engineers**



**3-D CFD Analysis of flows within Heat Exchangers**



**Extensive lab capabilities for mechanical tests and R&D**



**Elastic-plastic Large Deflection Failure Analysis of a Divider Plate under LOCA loading**

# The B&W Advantage

## Qualified People Extensive Resources On-site Service

Utilities worldwide have relied on B&W for proven technology, custom engineering capabilities, strict quality control, an ongoing commitment to research and development, and an unmatched level of service and support.

B&W's team of qualified technicians, engineers and other experts boast industry-leading credentials, years of field experience, and comprehensive services and programs to help you manage all areas of your plant more efficiently.

We provide you with a complete package of engineering services. Insist on the best. Insist on B&W.

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