

# BOILER CYCLING AND LOW LOAD ASSESSMENTS



**RileyPower**  
a Babcock Power Inc. company

## OVERVIEW

Your US-based power plant was likely designed for—and operated for decades—at full, base-load operation. However, with opportunistic energy sources like solar and wind being fed to the electric grid at both variable and inopportune times, your dispatchable assets are now required to change loads quickly and often.

In addition, the power from your plant may not be required for a number of hours each day, but shutting down and starting up fossil-fired power plants can be costly—in both operating costs and in terms of cumulative stress and damage to the equipment. There is increasing value in extending your ability to operate at lower loads overnight or in the middle of each day to avoid shutdown costs, minimize fuel costs, and to quickly capitalize on the returning electrical demand and pricing when the sunlight and wind subside.

**Riley Power can help evaluate and prepare your plant for this new operating regime.**

## EXPERIENCE

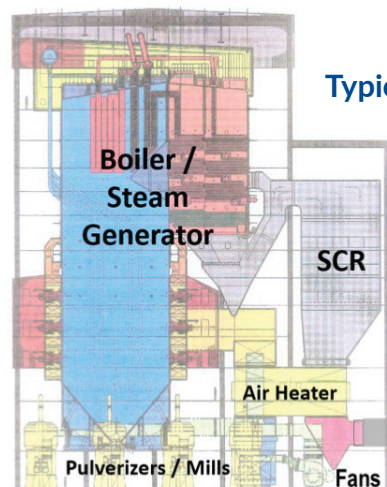
Since 1911, Riley Power Inc., a Babcock Power Inc.® company, has designed, manufactured, and provided after-market services for steam generators, fuel firing equipment, and emissions control systems for fossil- and other fuel-fired plants. For more than six decades, Riley Power Inc. has provided expert boiler metallurgical analyses and comprehensive condition assessments in conjunction with Riley Power's Boiler Evaluation, Engineering, and Field Services departments. Although managed under several business units, our Boiler, Emissions Controls, and Services divisions are co-located and work collaboratively on integrated solutions for the entire boiler island. Such a coordinated and holistic approach provides benefits in plant cycling and low load extension evaluations.

## BENEFITS

Support corporate and economic objectives for your plant, including

- Extend load range with reduced minimum load
- Identify and remove limiters to load ramp rate
- Safely achieve faster starts and stops
- Respond quickly to increasingly variable dispatch
- Maximize spinning reserve of current assets
- Improve system performance, load range, and reliability
- Gain knowledge of the condition, capacity, and maintenance requirements of key plant components, supporting condition-based maintenance plans, and reduce unplanned outages

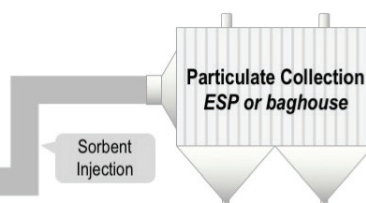
*Ligament cracking on inside of superheater header resulting from excessive load cycling*



## Typical Cycling Assessment Covers Complete Boiler & AQCS Island

**All variations / All makes –**

refer to [babcockpower.com](http://babcockpower.com)  
for additional company capabilities





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## GENERAL APPROACH TO PROBLEM DEFINITION & EVALUATION

Each plant's design, operating history, and future requirements are unique, and so all evaluations begin with discussions with plant management and operating staff. Riley Power's experts want to hear first-hand what the unit's history, current known issues, and future objectives are before formulating a plan with your staff. In this way, efforts may be focused on those most appropriate to your plant and provide results as soon as possible for the least cost.

We work collaboratively with all levels of owner staff to prioritize efforts for each unit considering its history and objectives. Typically, operators are already aware of several current limiters to achieving operating objectives, and of other issues that are growing maintenance costs. Additional value is provided by Riley Power's experience and ability to anticipate the next set of likely limiters which lie beyond the extent of current operations. Evaluations can focus on such components to determine their capacity and/or the most practical solutions, to ensure that the benefits available from each incremental investment are realized to their fullest potential.

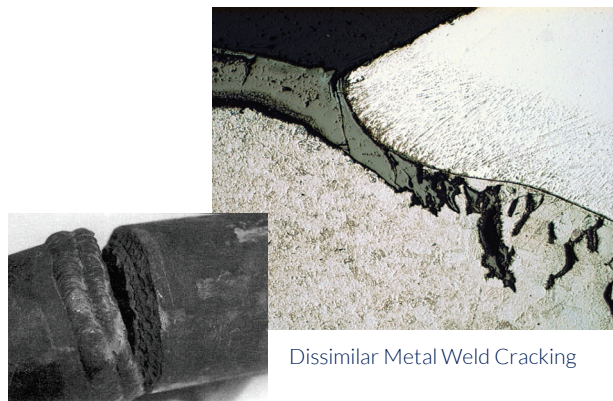
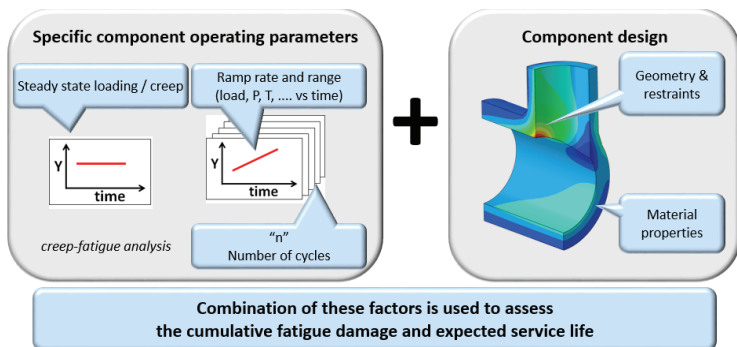
**Riley Power is a collaborative partner in plant optimization efforts, with practical experience to help guide several steps ahead of the plant's current limitations.**

## RANGE OF SERVICES AND EVALUATIONS

- Complete boiler inspection and metallurgical services
- Condition assessment & life evaluation
- Failure analysis/root cause determination
- Boiler/AQCS performance testing, tuning, and optimization
- Operating data review and analysis
- Control system review, tuning, and optimization
- Pulverizer and burner system tuning and upgrades
- Assess all boiler components for capacity extension
- Creep/fatigue analysis of pressure parts
- Coordinated boiler & AQCS evaluation and modeling
- Mechanical design analysis and upgrades
- Finite Element Analysis (FEA) for thermal/stress distribution in pressure parts and structural components
- Computational Fluid Dynamics (CFD) to optimize combustion, flow, thermal, and emissions performance
- Flow modeling and mixing for emissions control performance improvements
- AQCS testing, tuning, and load range extension
- SCR and FGD temperature control systems and upgrades
- Develop emissions control strategies at very low load
- Fuel switching analysis and equipment

### Pressure Parts Cycling Analysis:

The overall plant operating parameters are translated to conditions at each key boiler component for analysis...



Dissimilar Metal Weld Cracking

SAFETY<sup>3</sup> PEOPLE. POWER. PROJECTS.

We're giving safety the third degree.

Babcock Power Inc. and its subsidiaries place the safety, health and security of our people at the core of our company values. Our team is our most valuable resource, generating solutions everyday to deliver safe, clean, reliable energy globally. With a keen focus on safety, Babcock Power Inc. conducts business in a manner that protects our people, our customers and the environment. From innovation to generation, we are proud of our award-winning safety record and are committed to operating with integrity and excellence.

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