Air-Cooled Condenser Assessment

- Thorough review of the air-cooled condenser
- Identify potential performance improvement options and anticipated benefits
- Review undesirable influences of the air-cooled condenser on other plant equipment
- Identify best practices and equipment retrofits that could improve safety and component life, reduce maintenance, ease operations, and limit environmental risk exposure

Key Research Question

Air-cooled condensers (ACC) are increasingly being employed to cool turbine steam exhaust in thermal power plants, as access to water supplies and regulatory requirements for water discharge has become progressively more challenging. However, cooling by ambient air (dry bulb temperature) is generally less efficient than by water (wet bulb), particularly during hot weather conditions. With high ambient air temperatures, the vacuum created by steam condensation may be inadequate to permit operation at full load, and steam turbine with ACCs typically lose from 10 to over 20% of generating capacity during the hottest weather conditions.

Optimization of ACC performance requires consistent attention to details such as air in leakage, fin tube cleaning, and fan power consumption. In addition, maintaining equipment in a reliable condition is a major factor in cost minimization, including the effects of ACC component corrosion and product transport, maintaining fan blade and gearbox integrity, and preventing condensate freezing in tubes and headers.

An ACC assessment is aimed at addressing these and other issues relevant to optimizing performance and minimizing equipment problems, while improving operational and maintenance practices where needed. Ensuring an ACC is operated to ensure power generation in a cost-efficient manner is important in today's increasingly competitive electricity-generating market. The assessment includes consideration of low water use options to compensate for air cooling deficiencies during hot weather.

Objective

The assessment will use expert input to provide options for improving ACC operation. Plant management will be provided information about best or alternative practices at other ACC plants that can be evaluated for comparison with current practices. The assessment should improve ACC performance and lower operational costs, with specifics dependent on the existing status of equipment, policies and practices.

Participants will receive reviews of the following items which will include status, comparison with the industry, and recommendations where needed:

- Fin tube cleaning
- Steamside corrosion
- Air in-leakage
- Condensate freezing
- Efficiency performance
- Fans
- Wind effects
- Steamside chemistry
- Environmental and safety

Any unresolved current or historical issues identified by the participant will be given particular attention by the assessment team.

Approach

An ACC assessment involves three primary components:

- Pre-assessment information collection
- Plant visit, typically one to two days per ACC assessed, to conduct system walk-downs, equipment inspections, and discussions with plant staff and management
- Final Report that includes assessment discussion, primarily status of equipment, review of practices, and recommendations for considering changes

Research Value

Optimal ACC operation leads to improved reliability, lower environmental impact including carbon reduction, and lower total cost of operations and maintenance. Best practices and lessons learned will be documented and incorporated into the assessment program to develop more effective outcomes. More reliable and efficient generation will benefit the public in terms of lower power prices and enhanced grid stability.

Deliverables

ACC assessment report including assessment results, review of practices, opportunities for improvement, assistance with an action plan, and supporting reference information from EPRI guidance documents.

Price of Project

The cost of this supplemental project is dependent upon ACC location and complexity. This project qualifies for Tailored Collaboration (TC) and Self-Directed Funding (SDF).

Project Schedule

A unit-dependent scope and schedule will be developed with the participant and will be based on availability of plant personnel and equipment status.

Who Should Join

This project is valuable to organizations that want to improve their ACC performance and reduce O&M costs, and to increase power output under certain conditions.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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Product ID: 3002017422 Project ID: 1-112619 August 2022

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