Geothermal power
Damage mechanisms such as corrosion, erosion, deposition and scaling are challenging issues that affect reliability and availability in geothermal plant. Our geothermal energy plant materials and assessment experience provide valuable information to enable operators to confidently extend inspection periods and improve operational reliability and availability. Comprehensive risk-based assessment allows inspection and monitoring to be targeted on critical equipment and critical locations improving reliability and preventing failures.
Our expertise covers assets such as geothermal wells and steam-filled equipment, steam turbines, heat exchangers and cooling towers, binary plant/ geothermal/heat exchangers and high pressure steam piping.

Hydro power
We have extensive experience in assessing the hydro power industry in achieving reliability and availability targets and preventing unplanned outages. Comprehensive risk-based integrity experience and expertise allow us to deliver maximum life value from their operations through effective life management combined with optimized inspection planning. We specialize in integrity management of the following critical assets:
  - Francis, Kaplan and Pelton turbines and runners
  - Penstocks, draft tubes, spillway gates
  - Valves, nozzles and manways
  - Scroll casings, step valves and modular gates
  - Generators (rotors and stators)
  - Generator and turbine shafts
  - Support structures
  - Headcovers

Thermal power
Achieving reliability and availability is a key focus in thermal power plants. Our range of asset integrity management services combine expertise in creep life management, fatigue life management and corrosion. We have extensive experience in gas turbines, steam turbines and pressure equipment with tried and tested cost effective life management procedures for boilers, heat recovery steam generators (HRSGs), high temperature piping and balance of plant. This is combined with planning, supervision and execution of world-class condition assessment and inspection techniques to provide a holistic service.

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Effective asset integrity management in the thermal, hydro and geothermal power industries is critical to optimizing production performance, ensuring safety and compliance, reducing expenditure and obtaining maximum life value from critical assets.

Quest Integrity understands the significance and complexity of effective asset life management. Our complete asset integrity management services include inspection planning, condition assessment, material testing, fitness-for-service assessment, life management and life extension of assets. Our advanced technologies, industry expertise and extensive experience have been demonstrated to improve plant availability and reliability while maintaining safe operation.

Engineering Consulting

Quest Integrity’s engineering consultancy brings together a team of engineers, technical specialists and industry experts who possess the industry expertise and extensive experience have been demonstrated to improve plant availability and reliability while maintaining safe operation.

Outage Support Services

Quest Integrity provides a comprehensive service to determine the condition of power industry assets. These include condition assessment and inspection services and we have proven that in many cases we can inspect assets that were previously considered unacceptable. In addition to performing inspections we also provide inspection planning for both pressure and non-pressure equipment.

Services include:
- Barocast Digital Video Inspection (PDVITM)
- Foreign object retrieval
- End ring inspections
- In-line metal loss evaluation
- Spectral turbine inspection
- Phased array ultrasonic testing
- Time of flight diffraction
- Thermal inspection
- Ultrasonic UT III inspection of piping
- Inspection management and outage/ turnaround support

Risk-Based Assessment

Plant maintenance and inspection resources should be used preferentially on high-risk assets. Quest Integrity’s approach recognises that a relatively small percentage of plant equipment accounts for a very large percentage of disruption, shutdown and safety risk. Our plant assessment experience enables an operator to certify extend inspection periods and improve operations that extend plant life.

Risk-based assessment (RBA) begins with identification of high-risk assets followed by assessment of equipment condition, evaluation of maintenance and inspection programs, study of operating protocols and estimation of life consumption of these priority assets. This process takes into account the likelihood and consequences of failure. The information is then used to modify and optimize inspection and maintenance programs, audits, procedures, training and education.

Risk-based assessment management which effectively targets resources at the high risk items of plant to deliver best reliability outcomes.

Critical Spare Management for Thermal Power Plant

Recovering quickly from an unplanned outage is an essential part of business continuity planning. Quest Integrity assisted three gas fired power stations with their critical spare part inventory, determining the future needs for each critical component, special tooling needs and staff competency. Detailed monitoring, maintenance and inspection test plans specific to each component were produced and the reliability and availability of critical items of plant assessed. This not only resulted in improved availability but minimized their essential spare holding and maximized their ability to recover quickly in the event of failure.

Risk-Based Assessment and Geothermal Plant

Quest Integrity has performed Risk-Based Assessment (RBA) for inspection optimization at eight geothermal power stations. RBA has been used to control the risk of premature or unexpected failure and for targeting maintenance. The ability to predict the corrosion chemistry in key parts of the plant so that material-environment combinations can be modelled allows the prediction of damage mechanisms and identifies operative location for that damage to occur. Operations were provided to support the operators in the implementation of the RBA and increased the value of the resources in a more efficient way.

Case Studies

Engineering Critical Assessment for Hydro-Turbine Rotors

Six horizontal shaft hydro-turbine generators, each with two Pelton wheel runners installed, were discovered to contain cracks on the runners. Cracks were also observed on the circumferential machined grooves on the shafts. Quest Integrity performed a full finite element analysis (FEA) including the load of the identified grooves. The model included the loading due to the driven fit, centrifugal load applied by the spinning runner, the torque applied on the shaft due to the runners, and the total assembly self-weight. Finite element analysis showed critical crack size computation and fatigue life calculations were performed to provide guidance for the future safe operating of the units. The fracture mechanics assessment showed that the shaft assembly could withstand a significant crack depth around the shaft before failure would occur. A conservative estimate of six years remaining was obtained. The stress analysis also included a natural frequency evaluation to ensure that the rotation of the assembly would not interfere with the shafts the natural frequency. The 71.89Hz natural frequency of the structure, much higher than the 13.92Hz maximum rotational speed, implied that the assembly self-weight. Finite element stress analysis, critical crack size and damage to business reputation. Understanding the significance and complexity of effective asset life management. Our complete asset integrity management services include inspection planning, condition assessment, material testing, fitness-for-service assessment, life management and life extension of assets. Our advanced technologies, industry expertise and extensive experience have been demonstrated to improve plant availability and reliability while maintaining safe operation.

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