RCP Stator Replacement

Know-how and experience at the service of motor robustness and lifetime

The challenge
Reactor Coolant Pump (RCP) motors power the RCP for primary circuit circulation and core cooling. The stator is one of the most sensitive parts, as it has to withstand aggressive environment, start-up conditions, and power supply irregularities.

Expectations on RCP motors are greater than ever due to reliability requirements and economic impact of failure (plant shutdown). Utilities have thus to implement appropriate maintenance strategies to cope with RCP motor aging and ensure their robustness for the remaining life of the reactor.

The solution
Backed by a robust design, demanding qualifications and a specific manufacturing process, 250 AREVA RCP stators have operated worldwide with no failure, no repair and no power plant outage to date.

This proven experience and know-how enables AREVA motors to operate up to 40 years, i.e. on average 30% longer than other motors. Such a reliability represents an opportunity for plants reaching 30 or 40 years of operation to carry out only one single heavy maintenance activity for their RCP motors and consider long-term operation.

In addition, the replacement by stators of recent design increases the efficiency of the motor.

AREVA offers an integrated solution of motor disassembly, decontamination & refurbishment in hot shop with a stator replacement, and on-site re-assembly.

Key Features

A robust design of RCP motor stators
• Improved and qualified insulation system
• Nuclear qualifications: aging irradiation tests and accident irradiation tests performed in CEA Cadarache & Saclay (France) in collaboration with EDF
• Each First-Of-A-Kind motor has been submitted to 1,500 successive starts in uninterrupted sequence
• Strategic improvements to improve overall robustness and decrease electrical consumption (efficiency gains)

Associated maintenance services
• Assembly/Disassembly
• Decontamination of RCP motors and replacement with new stators
Your benefits at a glance

- A robust and proven design worldwide: no additional heavy maintenance required till end of plant life after having replaced the aged stator with a new one
- Self-funded new stator thanks to efficiency gains
- AREVA replacement stators mitigate the risk coming with repairing old stators (rewinding process) such as damage of the core, increase of losses, non-compliance with electrical test requirements, etc...
- Optimized plant availability during the Extended Period of Operation
- Integrated solutions combining on-site services, decontamination, repairs, upgrades and stator replacement

Insulation of the stator, a century of unique know-how

Our insulation system has been designed to be able to withstand extreme demands: overheating (due to the Joule effect), overvoltage (due to direct online startup and stops), intense electric fields, environment aggressions (humidity, dust, radiations, etc.) and mechanical constraints (due to direct online startup, operation vibrations, electromagnetic forces, etc.)

Strategic improvements over time to improve overall reliability & efficiency

Step 1: Improvement of end winding mechanical robustness
Step 2: Increasing of insulation thermal class B to F+ 20 °C
Step 3: Decreasing of electrical stresses
Step 4: Decreasing of operation temperature rise

Supporting capabilities

AREVA has hot shop facilities based in France and in the USA, to serve utilities worldwide. In addition, its skilled engineering workforce is able to perform reverse engineering activities to supply interchangeable replacement stators for RCP motors made by other OEMs without supplementary adaptations. Compared with origin stators, the supplied replacement stators have at least the same efficiency with improved insulation quality.