

Utility Increases Power Levels to Achieve Additional Electrical Output and 10 Year Regulatory Approval

Overview

Centrales Nucleares Almaraz-Trillo (CNAT) operates the Almaraz Nuclear Power Plant, located in the Province of Cáceres, Spain. The plant operates two Westinghouse Pressurized Water Reactors each with an electrical output of 980 MWe.

Both units had previously implemented a Measurement Uncertainty Reduction (MUR) uprate based on UFM technology and were in the process of implementing and Extended Power Uprate. In order to implement the uprate a safety screening and reasonable assurance evaluation had to be completed.

GSE TrueNorth was able to provide Almaraz with the confidence to increase their power output and receive ten-year regulatory approval.

Customer: CNAT
Plant Type: Nuclear
Solution: Power Output Analysis



Challenge

Almaraz sought to implement an Extended Power Uprate (EPU) of 8% at both units, but lacked a cost-effective manner to confirm its acceptability with the regulator.

Because the reactor thermal power calculation used a reduced instrument uncertainty, it was necessary to ensure that the assumptions used in the power calculation would still be valid at the conditions expected at the increased power.

Solution

GSE TrueNorth created a cost-effective plan of action and proceeded with the following:

- Reviewed the licensing documentation, plant documentation and procedures, and evaluated operational parameters at increased power.
- Established whether the reactor thermal power assumptions would still be valid at the increased power level.
- Simulated (using PEPSE) the expected measurement values at hold points during the power ascension.
- Provided assurance that the reactor power uncertainty would not be exceeded once the uprate power was reached.
- Monitored the power ascension to ensure that model predictions were not exceeded.
- Performed a new Uncertainty Calculation for the use of the UFM to support operation at the increased power.
- Produced documentation for Nuclear Safety Screening.

GSE TrueNorth provided close support for plant personnel during the power ascension, comparing actual instrument readings to predicted values while providing the plant with the operational basis to increase power to the next hold point.

A final analysis was performed which provided the basis to move to the final uprate power level using the reduced instrument measurement uncertainty.

Results

Approval was received from the Regulator. The plants at Almaraz now operate at the increased power levels while maintaining the reduced measurement uncertainty, giving the plant the benefit of additional electrical output.

The operating license for both units has now been extended for an additional ten years guaranteeing a significant return on the investment in the EPU.

Knowledge, experience and the right tools are critical to increasing electrical output in today's power industry.

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