NUCLEAR RESEARCH INSTITUTE

Operational Support of Power Facilities Department
Integrity and Technical Engineering Division

EVALUATION OF COOLING WATER COMPOSITION & SCALE TESTS

Cooling towers and ESW circuit of Temelín NPP

Value for customers

- The possibility to test raw water and circulating cooling water (CCW) from the viewpoint of carbonate system stability.
- The possibility of optimizing the chemical regime of cooling water.
- Identifying the need of additives in water treatment, their efficiency and optimization of the dosage.

Application

- Nuclear, fossil and industrial power sources (water cooling circuits).
- Technical support for the owner when dealing with treatment vendors.

What we offer

- Laboratory scale tests mimicking cooling water behaviour, taken from a power plant make-up water source/ cooling water circuit.
- Determination of minimum blowdown rate based on test results and determination of need for supplemental treatment (antiscalant, dispersants, inhibitors).

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- Optimization of the chemical treatment dose for the particular raw water/ CCW.
- Determination of a relation between maximum operating concentration of the chem. additives and changes of chemical parameters.
- Determination of the basic characteristics of water and their effect on maximum concentration factor (max. degree of thickening) or minimum blowdown respectively in the CCW circuit (pH, alkalinity, Ryznar index, Langelier index, conductivity, Cl^-, SO_4^{2-}, Fe, non-soluble substances, carbonates, and others according to customer requirements).
- Assessment of the effectiveness of the treatment, comparing the results of tests for thickening raw and treated water (e. g. clarification or decarbonisation of the water).
- Evaluation of the deposits composition a corrosion rates using LOM and SEM.
- Development of economic considerations, including an overview of the total cost depending on the operating requirements and circuit capabilities.

Our references

- Long term tests carried out by the thickening of the cooling water for the Dukovany NPP (from 1998)
- Concentration tests for Temelín NPP, Mochovce NPP and Bohunice NPP
- Concentration tests for power Počerady, Ledvice, Hodonin, Chvaletice and Tušimice
- Proposal chemical regime of cooling water for the power plant Chvaletice
- Assessment of circulating cooling circuits and cooling water treatment plant in Mochovce NPP and Bohunice NPP
- Thickening comparative tests of raw water from the dam Dalešice and Mohelno without using conditioning, in relation to the new nuclear unit – “EDU5”