

Apros[®] Nuclear - Success stories

Loviisa case 2: Modelling and Analysis of Loviisa main condensate pumps and condenser level controlling valve

Modelling and Analysis work to found optimal combination to reduce internal consumption of electricity.

During the renewal project of Loviisa nuclear power plant, new main condensate pumps and condenser lever controlling valves were planned to replace.

The purpose of the modelling and analysis work was to found optimal combination of pump and control valve where head curve of the new pump and Kv-value of the control valve were chosen to reduce internal consumption of electricity.

The existing analysis model was updated by the required parts of the plant model and six variants of the main condensate pumps and three variants of the level control valves were defined.

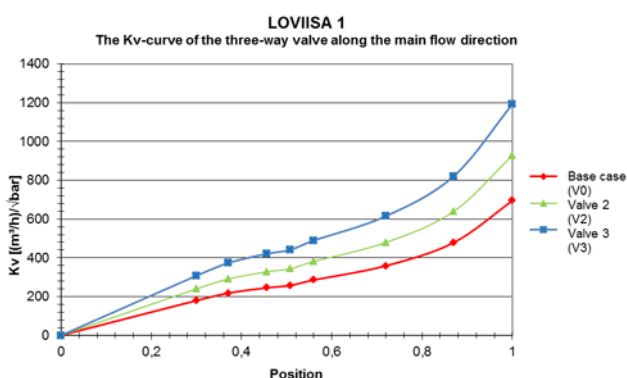
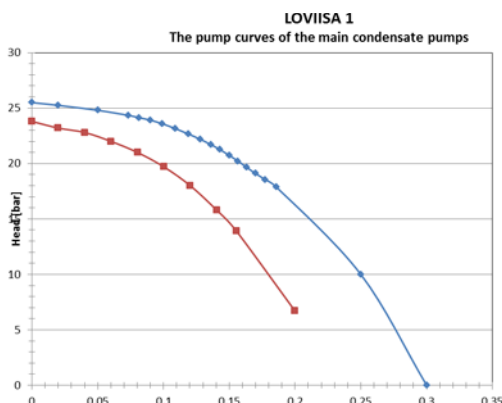
The analysis work consisted total of 7 transients cases where each case was calculated using all relevant combination of different pumps and control valves. As a result, an ideal combination was found that fulfilled all necessary requirements with lower consumption of the internal electricity.

The analysis work was effective way to find out realistic parameters for the new main condensate pumps. Calculation results confirmed the choice of the new head curve of the pump and also the reliable operation inside the existing NPSH range.

Loviisa nuclear power plant, Finland

Loviisa nuclear power plant has two VVER pressurised water reactors, Loviisa 1 and Loviisa 2, with capacities of 498 MW net and 500 MW net. Loviisa 1 was commissioned in 1977 and Loviisa 2 in 1980. The operating licence for Loviisa 1 is valid until 2027 and Loviisa 2 until 2030.

In 2015 the production of the power plant totalled 8.47 TWh, i.e. about 13% of Finland's electricity production. The power plant continuously employs about 500 employees and 100 subcontractors. The safety of the Loviisa nuclear power plant is based on the very high reliability of equipment and functions. Multiple parallel functions that back up each other and structural barriers are part of the safety systems designed to manage any situation.



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