

OSART Good Practices

TECHNICAL SUPPORT

Use of PSA

Loviisa, Finland

Mission Date; 5-21 Mar., 2007

Fortum Nuclear Services (FNS) has developed a high quality and comprehensive a Probabilistic Safety Analysis (PSA) with state-of-the-art methods and tools. The model is used by the plant in several areas.

The team noticed some outstanding features in different aspects of the PSA, including:

- Human reliability assessment: usage of an improved state-of-art Human Reliability Assessment (HRA) method which allows to include dependencies, procedures and recovery factors in more details; comprehensive collection of site-specific data during simulator training;
- Shutdown modes: very detailed division and modelling of the different outage phases including multiple time windows with state-specific models, initiating events and data;
- Severe weather and industrial hazard PSA: detailed assessment of oil spill impact frequencies from the tanker in the Baltic sea has been performed taking into account hydro-meteorological conditions, oil properties and leakage sizes as well as recent oil spill statistics.

The PSA is continuously and extensively developed and being used by the plant in different areas in order to improve operational safety and initial design. Examples of such improvements are:

- Fire PSA
 - Fire protection covers on critical cables,
 - Extension of sprinkler system
 - Covering of high pressure hydraulic oil pipelines
 - New cables routings
 - Support for definition of Fire training programme
- Dilution risks
 - Change in some outage procedures
- Drops of heavy loads
 - New lifting routes
 - Improved lifting procedures
- Improvements of EOPs and Severe Accident Management Guidelines
- Numerous improvements of initial plant design :
 - Frazil ice measures
 - Primary Coolant Pump sealing water modifications
 - Primary to secondary leakage measurements
- Optimisation of surveillance programme for emergency Diesel generators (EDG), based on comprehensive analyze of EDG fault history and diagnostic for Diesel damages.