

# OSART Good Practices

## OF PSA FOR PLANT OPERATIONAL SAFETY IMPROVEMENT

### Use of PSA in PSA applications

Olkiluoto, Finland

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The plant established a PSA group consisting of experienced PSA experts having full support of the plant management and providing services for the extensive use of PSA applications for continuous safety improvements.

The PSA application program of the plant consists of a large number of specific PSA applications. The related activities are well coordinated, and the results are effectively applied in the different areas of the production. The following activities can serve as examples of good practices:

- The regulatory PSA guideline YVL A.7 specifies those applications that are expected from the licensee, and the plant PSA application practice is in full compliance with those requirements. In addition to this, the PSA is also used for supporting such safety-related decision-making (mainly in relation with the selection of the most beneficial variant of the proposed changes) that is neither reported to, nor is it required by the regulator. The use of the PSA can also be initiated in four different forums that hold regular meetings on nuclear safety questions at the plant.
- The PSA updating process is an intensive "Living PSA" program consisting of two parts: the updating of the models and documentation due to plant changes and modifications as soon as they are implemented, and the regular PSA upgrading performed yearly, with consideration of new PSA areas, and new or more sophisticated PSA methodologies. This results in using at any time the most recent and most representative PSAs in the decision-making process both at the plant and at the regulatory body.
- The plant developed an internal plant procedure that clearly defines the responsibilities and procedures associated with the development and updating of the PSA and with the different PSA applications. This procedure also contains a set of internal probabilistic safety targets that are in full accordance with the regulatory safety goals for old nuclear facilities, and are developed based on the best international practices of applying probabilistic safety criteria in safety-related activities. There are separate targets for long term and permanent changes and for short term and once-in-a-lifetime changes. These are aimed to ensure that the plant changes and the related activities do not cause cumulative risk increase higher than the regulatory targets.
- The planning of the plant outages is supported by an hour-by-hour calculation of the shutdown PSA model taking into account the planned maintenance activities and system configurations. In this way, without a specific risk monitor or outage risk management tool, it is possible to derive the risk profile for the whole outage duration, and assess the high risk configurations to support the determination of the optimal distribution of the maintenance works. In addition, the work execution is also followed during the outage, and if a high risk situation is met, it is possible to immediately assess the risk to resolve the high risk configuration. This helps to keep the risk level under the targeted value, and also helps to turn the attitude of the outage planner personnel more "risk-informed" in relation with their planning work.
- The planning of the simulator training of the personnel is supported by the use of the PSA results to determine the safety-critical operator actions. If needed, these operator actions are then included in the training program, and the PSA is also updated based on the fact that the relevant operator actions are trained actions. Both the control room and the field actions are considered in this activity. This helps to focus the training program on the most

safety-significant human interactions.