

A reactor scram at Olkiluoto unit 1 and a power reduction at unit 2

Finnish Radiation and Nuclear Safety, STUK
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There was a reactor scram at Olkiluoto unit 1. The scram occurred on Friday, 30 May 2008 at 6:31 am. STUK was informed about it rapidly. The power of the unit 2 was also reduced later in the Friday evening for investigations.

The event did not cause any on-site or off-site radiation consequences.

The chain of events: Olkiluoto unit 1 was to be started after the annual outage. When the power was 60% the voltage regulator of the main generator had a failure which caused an overvoltage in the plant's electrical systems. The plant disconnected automatically from the normal offsite power source and reconnected to back-up offsite power. Reactor and turbine trip followed and safety systems stabilized the plant in hot stand-by mode. Overvoltage however caused the main circulation pumps to trip, and simultaneously disabled all six fly wheel systems which provide additional inertia to the main circulation pumps in order to ensure sufficient cooling during transients. Overvoltage protection of these safety classified systems was thus inadequate. Two main circulation pumps could not be started later on due to failures. Since the pumps were at minimum speed in the beginning of the transient, the fly wheel systems were not needed to slow down the pump ramps, and the transient had no consequences for fuel coolability.

The INES rating is INES 1, because it caused a common cause failure in a safety system. Overvoltage protection was inadequate for this system. Cooling of the fuel was adequate during the event.

The design of Olkiluoto units 1 and 2 has been modified during power upgrades in late 1990's. The fly wheel systems were installed at that time. The fly wheels are not mechanically connected to the main circulation pumps - rather, they are a separate set of generators which use their inertia to produce electricity for the main coolant pumps in case of loss of normal power feed.

This kind of event may challenge the overvoltage protection in similar systems or any other power electronics (eg. inverters, rectifiers, UPS systems).

STUK has published a press release and informed Finnish authorities about the event.