

Investigation of Causes for Failure of Pump of Water Treatment Instrument for Highly Radioactive Accumulated Water

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Tokyo Electric Power Company

As the water amount treated by the water treatment instrument gives significant impact on the control of the water level in turbine building and the rate of water injection to the reactor, to improve the reliability of the instrument is currently the urgent issue. In order to promptly improve the reliability, therefore, we established " Investigation Task Force for Causes of Failure of Water Treatment Instrument " .

Developed by the task force, the following is the investigation plan for causes of failure of cesium adsorption instrument and decontamination instrument.

1 . Cesium Adsorption Instrument

(1) Incident Overview

Currently a SMZ skid pump (removing oil and technetium) and 3 H skid pumps (removing cesium) are not workable.

July 24 H4 skid pump No.1 stopped. Restart was tried, but failed.

July 29 H3 skid pump No.2 stopped. Restart was tried, but failed.

Restart of H3 skid pump No.1 was tried, but failed.

August 7 A SMZ skid pump No.3 stopped. Restart was tried, but failed.

Since the pumps have redundancy, 3 systems other than H3 skid pump continue water treatment.

(2) Probable Causes

Based on the operation status and error messages generated by the control board, there is a possibility that the pumps or the inverter controlling pumps have some failure. As a result of the resistance measurement of inverters and motors of the 4 pumps, it has been confirmed that disconnection or bad electrical contact in H3 skid pump is probable.

The causes for these incidents is considered to include poor-quality installment resulted from rush construction within short period.

Since the causes for other pumps have not been identified yet, further

investigation is required.

(3) Future Plan

Develop necessary countermeasures based on the following investigation for causes and the investigation of the way of replacing motor when the water treatment instrument stops

- Operation test of a pump (confirm the behavior of the pump by having the inverter operated)
- Confirmation of the soundness of the inverter by using a spare motor

Investigate and have discussions with manufacture designers about the way to replace pumps installed inside the skid with high radioactivity. In replacing pumps/motors, measures to lower the exposure dose will be developed and implemented, and the soundness of the spare parts will be confirmed in advance.

Insulation resistance and wire wound resistance of inverters and motors of sound pumps are measured (In the case of any abnormal sign confirmed, the same measures as defective pumps are implemented.)

Have discussions with manufacturer designers about the way to improve maintainability and reliability to lower the exposure dose, and plan the reconstruction.

2 . Decontamination Instrument

(1) Incident Overview

Water treatment instrument automatically stopped due to the failure of automatic start of the backup pump which should have started when coagulant injection pump stopped and the operating pump stopped. (August 4: Ultra High Speed Coagulation Settling Facility August 7: High Speed Coagulation Settling Facility)

(2) Probable Causes

Based on the operation status and the error message generated by the control board, the cause is estimated to be overloaded trip of the inverter. Although the coagulant injection pump tripped during the transition period of the decontamination instrument, the backup pump did not automatically start due to the stopped state

of the decontamination instrument, resulting in the automatic stop of the water treatment instrument.

(3) Future Plan

Based on the probable causes above, the following measures will be implemented when the water treatment instrument stops along with the test operation of SARRY.

- Change the minimum frequency in order to avoid overload of inverter
- Change the timer setting which automatically stops water treatment instrument in order to enable the continuous operation of water treatment instrument by the manual start of the backup coagulant injection pump

END