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SUBJECT: PNO-V-89-007A:update on PNO-V-89-07 (unusual event due to grid disturbance).

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PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE--PNO-V-89-07A Date 3/6/89

This preliminary notification constitutes EARLY notice of events of POSSIBLE safety or public interest significance. The information presented is as initially received without verification or evaluation and is basically all that is known by Region V staff on this date.

FACILITY: ARIZONA NUCLEAR POWER PROJECT
PALO VERDE UNIT 3
DOCKET NO. 50-530
WINTERSBURG, AZ

Emergency Classification
__X_Notification of Unusual Event
____Alert
____Site Area Emergency
____General Emergency
____Not Applicable

SUBJECT: UPDATE ON PNO-V-89-07 (UNUSUAL EVENT DUE TO GRID DISTURBANCE)

Following the Palo Verde Nuclear Generating Station, Unit 3, plant trip on March 3, 1989, Region V formed an Augmented Inspection Team (AIT) which assembled on-site on March 4, 1989, to investigate the March 3, 1989, Unusual Event. The following sequence of events describe the team's understanding of the event as of 1:30 p.m. (MST), March 6, 1989.

Sequence of Events (March 3, 1989):
Mountain Standard Time (MST)

0102 An electrical fault on one of four 525 KV transmission lines (the Devers line) caused the opening of the 525 KV breakers feeding the faulted line. Approximately 13 cycles later the Unit 3 525 KV main generator output breakers also opened generating a Unit 3 full load rejection. The licensee does not yet understand why the Unit 3 generator output breakers opened.

The main generator load rejection initiated a Reactor Power Cutback, as designed, to reduce reactor power and bypass main steam to the main condenser in order to equalize reactor power, and steam load at approximately 45 % of full power. In this condition the generator would be left supplying power to in-house loads only, through the auxiliary transformer.

The bypassing of main steam to the condenser is controlled by the Steam Bypass Control System (SBCS). The SBCS failed to properly control steam loads to the condenser. Some of the valves cycled repeatedly through their full range. The cause of this failure is not yet fully understood by the licensee.

0103 The malfunctioning SBCS decreased steam generator pressure to the reactor trip setpoint of approximately 919 psia. In addition to the reactor trip, a Main Steam Isolation Signal (MSIS) was received, as designed. At the same time a turbine trip was initiated by the reactor trip, removing power from in-house non-class 13.8 KV busses (S01 and S02) which supply reactor coolant pumps (RCPs). The increased secondary heat removal also caused primary reactor coolant system (RCS) temperatures to decrease, causing decreasing pressurizer level and pressure.

IE-34

Due to decreasing RCS pressure, approximately six seconds following the reactor trip, a Safety Injection Actuation Signal (SIAS) and Containment Isolation Actuation Signal (CIAS) were received. When Main Steam Isolation Valves closed due to the MSIS, steam generator pressures and RCS temperatures and pressures began recovering to their normal post-trip values.

The SO1 and SO2 busses which lost power following the turbine trip are designed to fast transfer to other busses powered from off-site sources in order to maintain RCP operation. However, a fast transfer did not occur for either bus. The fast transfer was prevented from occurring, due to the SO1 and SO2 busses not being in sufficient synchronization with the off-site source due to the main generator coastdown. Thus, forced reactor coolant circulation was lost. With the MSIVs shut, the preferred method of establishing steam generator heat removal for natural circulation cool down is with the safe shutdown Atmospheric Dump Valves (ADVs).

0103 (Approximately) Operators noted that the following equipment indicated that it had received a safety signal (SIAS, CIAS, or MSIS) but could not verify that the equipment was in its actuated position:

Auxiliary building damper M06
Auxiliary building basement pump room isolation dampers - HAA-HS-114
Steam Trap Isolation Valves - SG-1134 and SG-1135
Steam Generator No. 1 Cold Leg Blowdown Sample Isolation Valve - SG-UV-228
No. 1 Steam Generator MSIV Bypass Valve - SGE-UV-169
H_2 Purge Containment Isolation Valve - HPA-UV-001

Several of these appear to be indication problems. This list is preliminary.

0105 (Approximately) Control room operators discovered they could not control the ADVs from the control room. These valves have no automatic control.

0111 Main Steam Safety Valve 579 lifted at least twice.

0125 (Approximately) Operators unsuccessfully attempted to operate at least one ADV from the Remote Shutdown Panel (RSP).

0126 ADV control was shifted back to the Control Room. A second attempt to operate ADVs from the Control Room was unsuccessful.

0139 Operators declared an Unusual Event based on the loss of 13.8 KV power to the SO1 and SO2 busses concurrent with SIAS on low RCS pressure.

0140 Auxiliary Operators attempted local manual hand wheel operation of the ADVs. ADV 178 and 185 were controlled in this manner to restore steam generator pressure control. ADV 179 hand wheel was operated in the shut direction using a "cheater" bar which broke a portion of the valve actuator, cracked the housing, and rendered the valve inoperable.

0207 Operators unsuccessfully attempted to open #1 steam generator MSIV bypass valve from the control room.

0222 Operators successfully opened #1 steam generator MSIV bypass valve manually at the valve.

0230 Operators opened #2 steam generator MSIV bypass valve from the control room. Operators then began controlling steam generator heat removal from two SBCS valves which dump to atmosphere. (Main condenser vacuum had been lost due to the loss of Circulating Water Pumps powered from SO1 and SO2)

0232 Bus SO1 was reenergized from its off-site source.

0238 MSIS was reset.

0239 Operators secured use of ADVs for steam generator heat removal.

0241 SIAS and CIAS were reset.

0243 Bus SO2 was reenergized from its off-site source.

0252 The Unusual Event was terminated.

0315 NRC resident arrived in Control Room.

0449 RCP 1A was restarted.

0455 RCP 2A was restarted.

In accordance with their incident investigation procedures, the licensee has formed an investigation team to identify and resolve the concerns arising from this event. In addition, they have implemented quarantine controls on all equipment which did not or which may not have functioned correctly. Region V has issued a Confirmatory Action Letter requiring review by the AIT prior to removing quarantine controls for troubleshooting or root cause of failure analysis.

This information is current as of 3:30 p.m. (PST), March 6, 1989.

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