ENCLOSURE I (CIR

Copies ~~list~~ ... ~~[illegible]~~

Cy [illegible]

PRELIMINARY NOTIFICATION

June 3, 1980

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE -- PNO-II-80-98

This preliminary notification constitutes EARLY notice of an event 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 IE staff as of this date

FACILITY: Virginia Electric and Power Company
Surry Unit 1
Docket No. 50-280
Surry, Virginia

SUBJECT: ELECTRICAL FIRE AND RESULTANT SAFETY INJECTION

At 12:04 a.m. on June 3, Surry Unit 1 tripped from 100% power when a fire in an instrument bus voltage transformer disabled one of four instrument buses. The fire was confined to the sola transformer for instrument channel IV in the emergency switchgear room and was extinguished using carbon dioxide within 2 minutes. The plant tripped following a turbine runback on steam flow/feed flow mismatch coincident with low steam generator level. Thirty seconds after the trip a safety injection actuation occurred when reactor coolant temperature cooled to less than 543 degrees F on coincident high steam flow (from the deenergized bus). Safety systems responded properly and the safety injection was terminated according to procedure after eight minutes. No radiological release occurred.

The plant is in a hot shutdown condition while the licensee replaces the transformer and dilutes the boron concentration to restart the unit. The licensee estimates the unit will be ready to start up this evening. The NRC resident inspector is onsite and has reviewed the plant data.

Media interest has occurred. The licensee has made a press release. The NRC does not plan any press release. The Commonwealth of Virginia has been informed.

The NRC Emergency Response Center received notification of this occurrence by telephone from the licensee at 12:23 a.m. on June 3. This information is current as of 8:00 a.m. on June 3.

Contact: E. H. Webster, RII 242-5549; P. J. Kellogg, RII 242-5649

Distribution: Transmitted H. St. 9:49

Chairman Ahearne	Commissioner Hendrie	S. J. Chilk, SECY
Commissioner Gilinsky	Commissioner Bradford	C. C. Kammerer, CA
Commissioner Kennedy	ACRS	(For Distribution)
Transmitted: MNBB 9:53	P. Bldg. 9:57	IE:XOOS 9:46 (IE:HQ Dist.)
W. J. Dircks, EDO	H. R. Denton, NRR	
C. Michelson, AEOD	R. H. Vollmer, NRR	Landow ______ (6 min/page)
J. J. Fouchard, PA	R. J. Mattson, NRR	J. J. Cummings, OIA
N. M. Haller, MPA	D. F. Ross, NRR	
R. G. Ryan, OSP	D. Eisenhut, NRR	MAIL
H. K. Shapar, ELD	S. H. Hanauer	R. Minogue, SD
		IE:XOOS
	Willste 10:01	Document Mgt. Br. (For PDR/LPDR)
Applicable Resident Site	J. G. Davis, NMSS	
Regional Offices 10:15	R. J. Budnitz, RES	

dupe
8007

PRELIMINARY NOTIFICATION

8007230362

Docket No. 50-280

ENCLOSURE 2

MEMORANDUM FOR: E. L. Jordan, Assistant Director for Technical Programs, Division of Reactor Operations Inspection, IE

FROM: H. W. Woods, Reactor Systems Specialist, Technical Programs, Division of Reactor Operations Inspection, IE

SUBJECT: SURRY-1 TRIP ON JUNE 3, 1980 DUE TO SOLA TRANSFORMER FIRE

I. Description of Event

(a) Chronology (from Don Burke, RI, June 5 conversation with Stu Rubin and Roy Woods).

The Sola transformer associated with Vital Bus IV (v.b.iv) malfunctional at 00:04 on June 3, 1980 due to a ruptured capacitor. The capacitor, which is inside the transformer cabinet and about the size of a 12 oz. beer can, ruptured apparently due to age and spilled its oil contents inside the transformer cabinet. This caused a minor fire which was confined inside the transformer casing.

The outside of the transformer showed only very minor damage ("light soot cover in places") and since the transformer is mounted 5 ft. up on a concrete block wall in the emergency switchgear room about 6 or 8 feet from the nearest other electrical equipment, there was no appreciable danger of the fire spreading to other equipment. The fire was manually extinguished in about 2 minutes using CO_2. The licensee is checking with the capacitor manufacturers regarding life of these capacitors, and will advise if there appears to be a generic problem.

Loss of the capacitor caused loss of the Sola transformer and loss of power to V.B.IV. This caused loss of control to the feedwater (fw) regulation valve, which failed closed. This caused a real steam-feedflow mismatch and an actual low S.G. level thus tripping the reactor from ~ 100% power.

Loss of Vital Bus IV also gave a false high steam flow signal from the one out of two steamflow monitors powered by V.B. IV in all three steamlines (those steamflow monitors fail to "high" on loss-of-power). Thus, half of a Safety Injection (S.I.) signal was present due to the failed V.B.IV (one out of two instruments in two out of three steamlines reading "high" provides half of an S.I. signal). The other half of the S.I. signal, low Taverage (Tav), was provided about 30 seconds after the trip because at Surry 1, most reactor trips result in low Tav since all auxiliary steam loads in the plant are provided by Unit 1 (Unit 2 is still down for S.G. replacement). Thus, if the operator is not quick enough after a scram in isolating those loads, the plant is cooled down sufficiently to get "low Tav." In this case, when "low Tav" occurred ~ 30 seconds after trip, Safety Injection was initiated. By procedure, the S.I. was secured in seven or 8 minutes.

The operators used a "maintenance" oriented procedure to load V.B.IV loads onto the V.B.II power supply, and improperly connected the V.B.II power supply to V.B.IV while the shorted Sola transformer was still connected to V.B.IV. This caused a momentary

loss of V.B.II and IV, and since this happened ∿ two minutes after the first S.I. had been cleared, a second S.I. was initiated which lasted about six minutes. The operators quickly realized their error, disconnected the V.B.II power supply from V.B.IV, cleared the V.B.IV fault, then re-energized V.B.IV from the V.B.II supply. As a result of this experience, there now exists a proper procedure for use when dealing with a faulted bus, and the "maintenance" oriented procedure will not again be used in these type circumstances.

A total of 4,000 to 5,000 gallons of water (Total for the two S.I.s) was injected. Also, it is confirmed by the fact that no primary system relief or safety valves lifted at any time. This was determined by RWST level change, boron concentration change in the primary system, and pressurizer level change which all confirmed the 4 to 5,000 gallon number.

V.B.IV also supplies power to the "steam dumps" (also called "bypass to condenser" valves), which were thus failed closed and unavailable during this event. Interestingly, this did not necessitate the opening of atmospheric dumps (secondary system relief valves) or secondary system safety valves at any time. Up until the first S.I., heat was removed to the auxiliary steam loads (in fact, too much heat was thus removed, as previously mentioned, causing the low Tav and the S.I.). Also, at Surry level collapse in the S.G.'s following reactor trip/turbine trip causes isolation of feedwater

and initiation of auxiliary feedwater. Heating the colder auxiliary feedwater provides an additional heat sink, which was important following the first S.I., since an S.I. involving high steam flow closes the MSIVs, which shuts off the "auxiliary steam load" heat removal path. The 1035 psig setpoint pressure of the "atmospheric dumps" (relief valves) on the secondary side of the S.G.'s was not reached. It would have eventually been reached, causing an atmospheric dump, but in the meantime the operators had successfully restored power to V.B.IV, and they had opened the bypass valves around the MSIVs, thus making the condenser available as a heat sink.

All safety equipment functioned properly during this event. The V.B.II inverter was not overloaded while supplying the normal 15 amps to V.B.II and an additional 15 amps to V.B.IV (the inverters and associated equipment are rated for 10 KVA each; at 120 volts, 30 amps represents 3.6 KVA). Primary coolant samples showed only increases normally associated with "spikes" after any shutdown.

Due to redundancy of instrumentation provided in the control room and powered by different V.B.'s, no significant amount of control room indication was lost. The pressurizer level strip recorder chart was the only instrument that was called to our attention that was lost. Other parameters have indications <u>not</u> powered by V.B.IV. The momentary loss of V.B.II was over too quickly to cause

significant additional losses; in any event, V.B.I and III also power redundant instruments for vital parameters.

To recover from the event, a Sola transformer was removed from the shutdown Unit 2 and physically installed in place of the burned unit 1 transformer, thus restoring a separate power supply to V.B.IV (independent channels are required for operation, even when shutdown, operation with a single power source to two Vital Busses is undesirable, for example, because containment spray requires three out of four logic on containment pressure and is the energize to initiate type; thus single failure of the power source of two busses would preclude auto initiation of containment spray).

(b) Actual Consequences

There were no releases outside containment, and no primary or secondary system safety or relief valve opened (i.e, no release inside containment, either).

The plant was always under control with indication of all vital parameters available in the control room.

(c) Potential Consequences

If the recovery of power to V.B.IV or the opening of the MSIV bypass valves had taken longer, an atmospheric dump of secondary

steam thru the RV's would have occurred (with no significant adverse consequences).

If the V.B.II power supply had remained connected to the faulted V.B.IV for a longer period, some degradation of control room instrumentation might have occurred, but adequate indication powered by V.B.III and V.B.I would have remained available.

II. Cause of Event

Fire in a capacitor in the Sola transformer supplying power to V.B.IV.

III. Corrective Action

(a) Short Term

The licensee physically and electrically replaced the damaged transformer with one from Unit 2.

The licensee wrote and implemented procedures to supply power to a faulted bus from another power supply.

(b) Long Term

None

IV. Evaluation

The corrective actions described above are acceptable to justify continued operation.

V. Recommendations

See Section VII

VI. Conclusion

See Section IV

VII. Preliminary Assessment of Generic Implications

Further discussion and review of this event will occur within the NRC Staff as the result of distribution of this memo. After a consensus is reached, further action may be taken in one or more of the following areas:

1. Capacitor fires. Depending upon the assessment of the probability of other capacitors of this type failing and causing a fire, it may be prudent to examine locations of these capacitor in relation to other vital equipment and/or consider moving or replacing the capacitor or protecting other equipment.

2. Procedures. If the NRC staff feels other licensees have inadequate (or no) procedures for powering a faulted bus, we would issue a Bulletin or otherwise require development and implementation of such procedures.

3. Effects During Shutdown Due to Non-Independent Vital Buses. If the NRC Staff feels the unique problems associated with non-independent Vital Buses (one power supply to two V.B.s) are not realized, an Information Notice or other appropriate discussion would be distributed to licensees.