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SUBJECT: Provides description of mod re switchyard degraded voltage issue, per 900426 conference call.

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DUKE POWER

May 8, 1990

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Switchyard Degraded Voltage

Dear Sir:

On April 26, 1990, a conference call between members of my staff and members of the NRC staff was held. The purpose of the call was to discuss the switchyard degraded voltage issue. During this phone call, the staff requested that information regarding the proposed modification to resolve the problems identified be submitted to them for their information. To this end, a description of the modification is provided. In addition, simplified one line drawings to aid in the understanding of the modification are also provided.

The initial concern was discovered as a result of the 230KV Design Basis Documentation (DBD) effort. It was discovered that during a LOCA event concurrent with a 230KV switchyard voltage less than 219KV, the unit could be vulnerable to a single failure event, due to the relative setpoint of the undervoltage relaying of the startup source breakers and the undervoltage relaying of the switchyard isolate circuitry. This situation is fully described in LER 269/90-04 submitted April 30, 1990. This LER provides detailed information regarding this event, the root cause, the corrective actions taken and to be taken, the basis for continued safe operation of the units, and an assessment of the safety consequences and implications of the event. In addition, the LER also stated that another concern was identified. This new concern had identified the possibility that the E breakers could close when the 230KV switchyard voltage is degraded (less than 219KV). This finding was also determined to be reportable. A separate LER on this problem will be submitted May 24, 1990. Please note that the operability evaluation provided by LER 269/90-04 is also applicable to the new concern identified.

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Document Control Desk


May 8, 1990

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As I stated earlier, to resolve the problems identified, a modification to the plant was proposed. This modification is to install three undervoltage relays to monitor the switchyard voltage on the line side of each of the three startup transformers. Each of the undervoltage relays will be connected to one of three existing single phase spare potential transformers. These relays will be connected in a two out three configuration and timed to provide a permissive in each of the two redundant switchyard isolate circuits through one of two redundant Cutler Hammer relays. This logic will provide inputs for alarms via the Operator Aid Computer, the Event Recorder, an annunciator in the unit 1 and 2 control room, an alarm in the Power System Control Area Operation Center, and would initiate switchyard isolate if an ES signal is present on any of the three units. This logic which is safety related, will be fed from the switchyard 125VDC system.

For your information, every effort is being made to implement this modification in a timely manner. I currently anticipate that the above modification will be installed on all three units by no later than July 1, 1990. An outage of the units is not required to implement the modification. If further discussion is desired regarding this issue or the modification, please don't hesitate to contact us through normal licensing channels.

Very truly yours,



Hal B. Tucker

SYDVOLT/PFG

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MODIFICATION DESCRIPTION

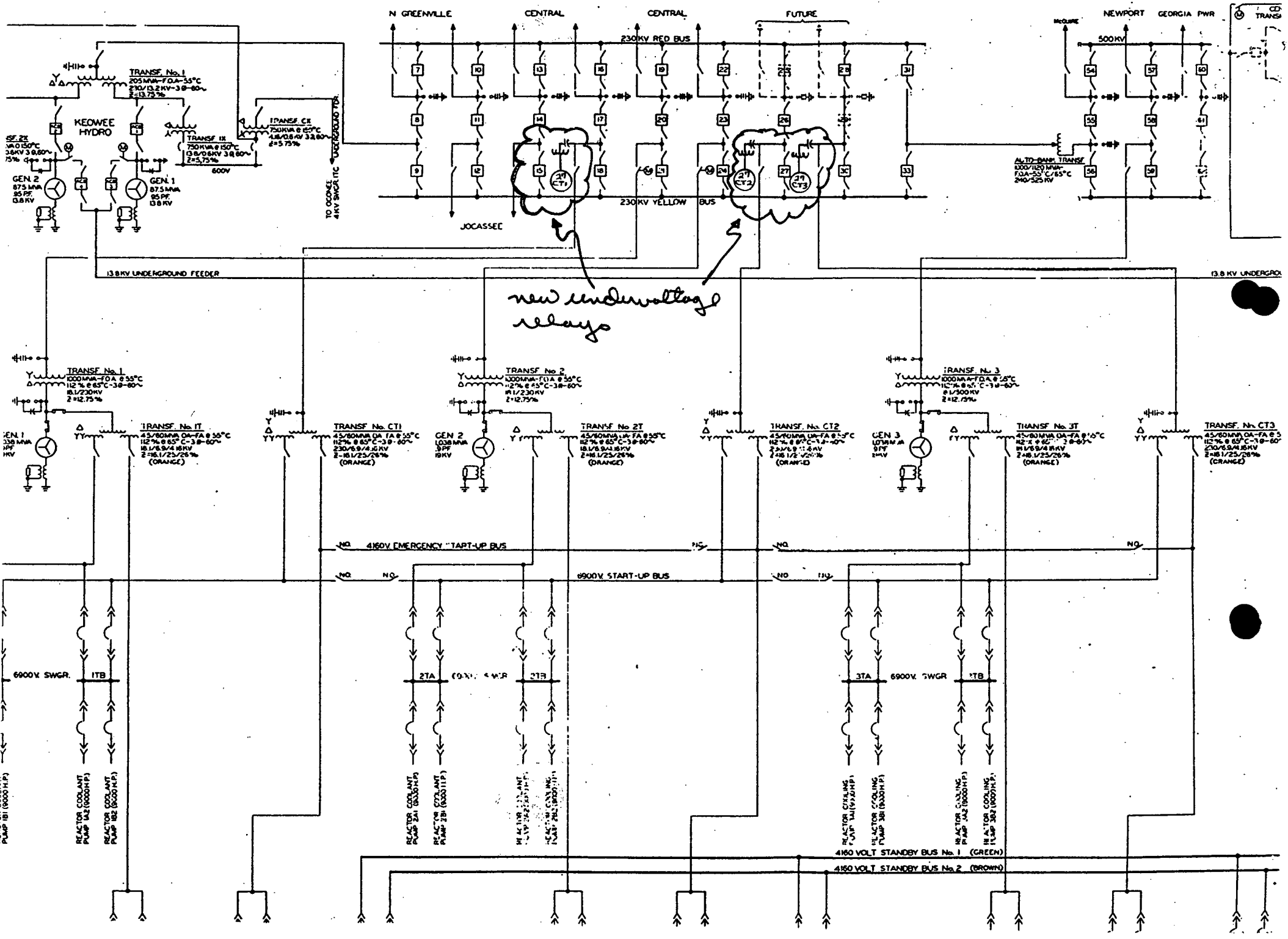
The modification will install equipment that will provide an annunciator alarm in the Unit 1 and 2 control room, an alarm via the unit Operator Aid Computer an alarm to the Power Systems Control Area Operation Center and an event recorder point and, if an ES signal occurs on any unit while the voltage is at or below the setpoint, will automatically isolate the switchyard by initiating the External Grid Trouble Protection (EGTPS) system. The new logic will ensure the overhead power path from Keowee is available during an ES event, even if the switchyard voltage is below 219KV. The modification will install several relays to accomplish this logic.

The EGTPS is designed to detect undervoltage or underfrequency conditions on both buses in the 230KV switchyard and to isolate the yellow bus, (and thus the Keowee overhead path), from the transmission system if these conditions occur. To address the difference between the minimum analyzed voltage for starting LOCA loads and the voltage at which the EGTPS is automatically initiated, the above modification was proposed.

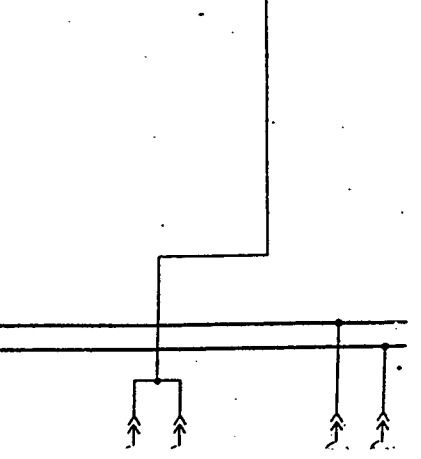
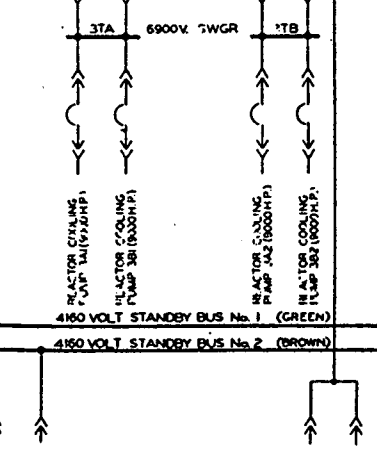
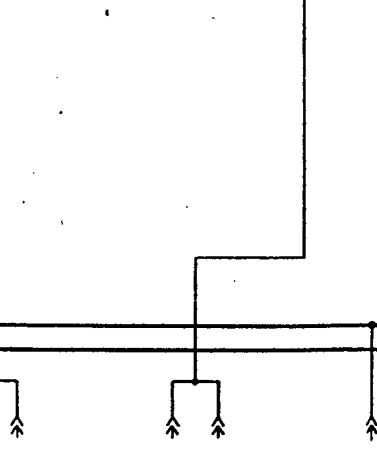
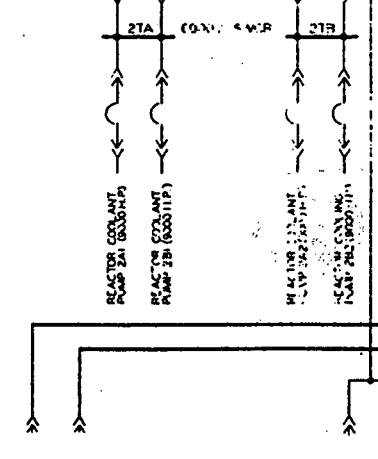
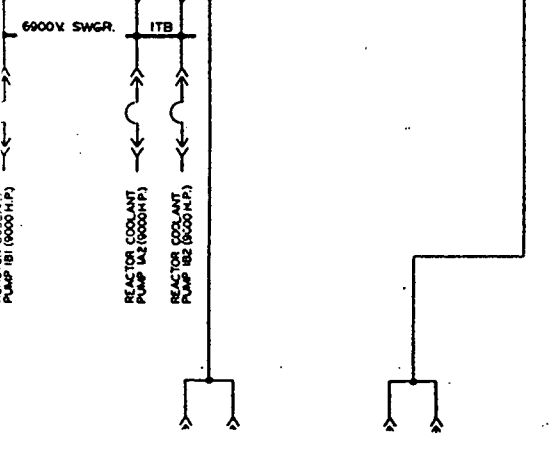
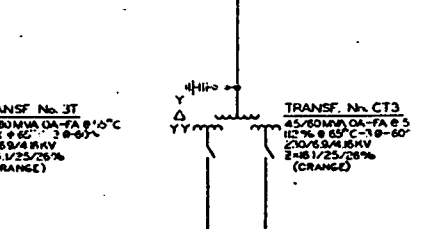
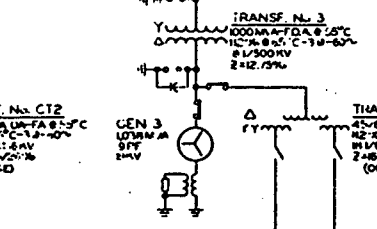
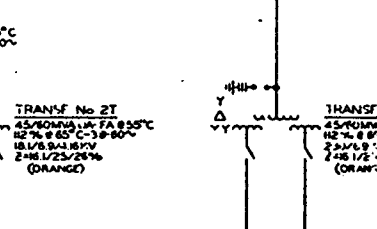
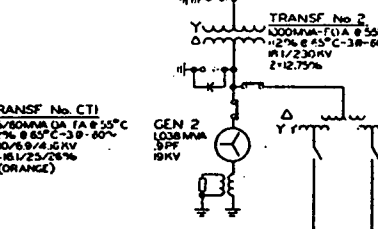
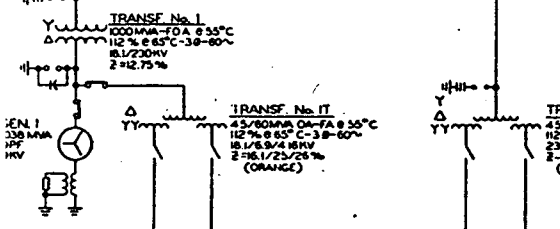
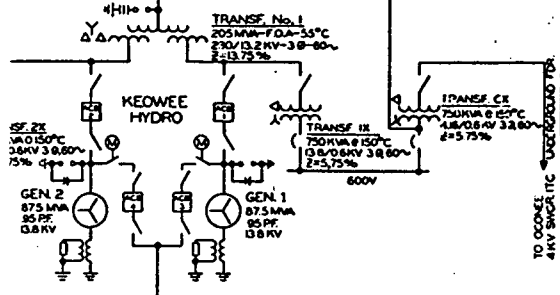
The voltage will be measured by existing potential transformers (PTs). The failure modes of these PTs are in the safe direction. The safety related voltage relay contacts used in the switchyard isolation logic will be arranged in a 2 out of 3 (2/3) logic. The output of the 2/3 logic will be connected to actuate two redundant safety related relays. If this 2/3 logic is satisfied and an ES signal occurs on any of the three units, both channels of the EGTPS will be activated. If the EGTPS is actuated by a failure of this new logic, unit generation would not be interrupted since the EGTPS does not operate the unit tie breakers.

The Engineered Safeguards Protective System (ESPS) is a three channel redundant system employing 2/3 coincidence between measured variables. The ESPS consists of eight 2/3 coincidence logic networks for actuating the equipment in four safeguards systems, thus each system is actuated by a pair of 2/3 logic. Therefore a failure within one channel of the ESPS will not result in an ES signal being provided to the 230KV Switchyard Degraded Voltage Protection Circuitry (230KV SDVP). Further details regarding the ESPS at Oconee is provided by section 7.3.2 of the Oconee FSAR. An inadvertent EGTPS actuation would allow the units to continue to operate safely, since the generator output breakers would remain aligned to the system grid through the 230KV Switchyard red bus (units 1 and 2) or 525KV Switchyard (unit 3). In this condition, the units' auxiliary electrical power would continue to be supplied from auxiliary transformer 1T, 2T, or 3T, respectively. An EGTPS actuation due to degraded grid voltage and a concurrent ESPS signal would allow the unaffected units to continue to operate in the manner just described, while power to the affected unit would be automatically available through:

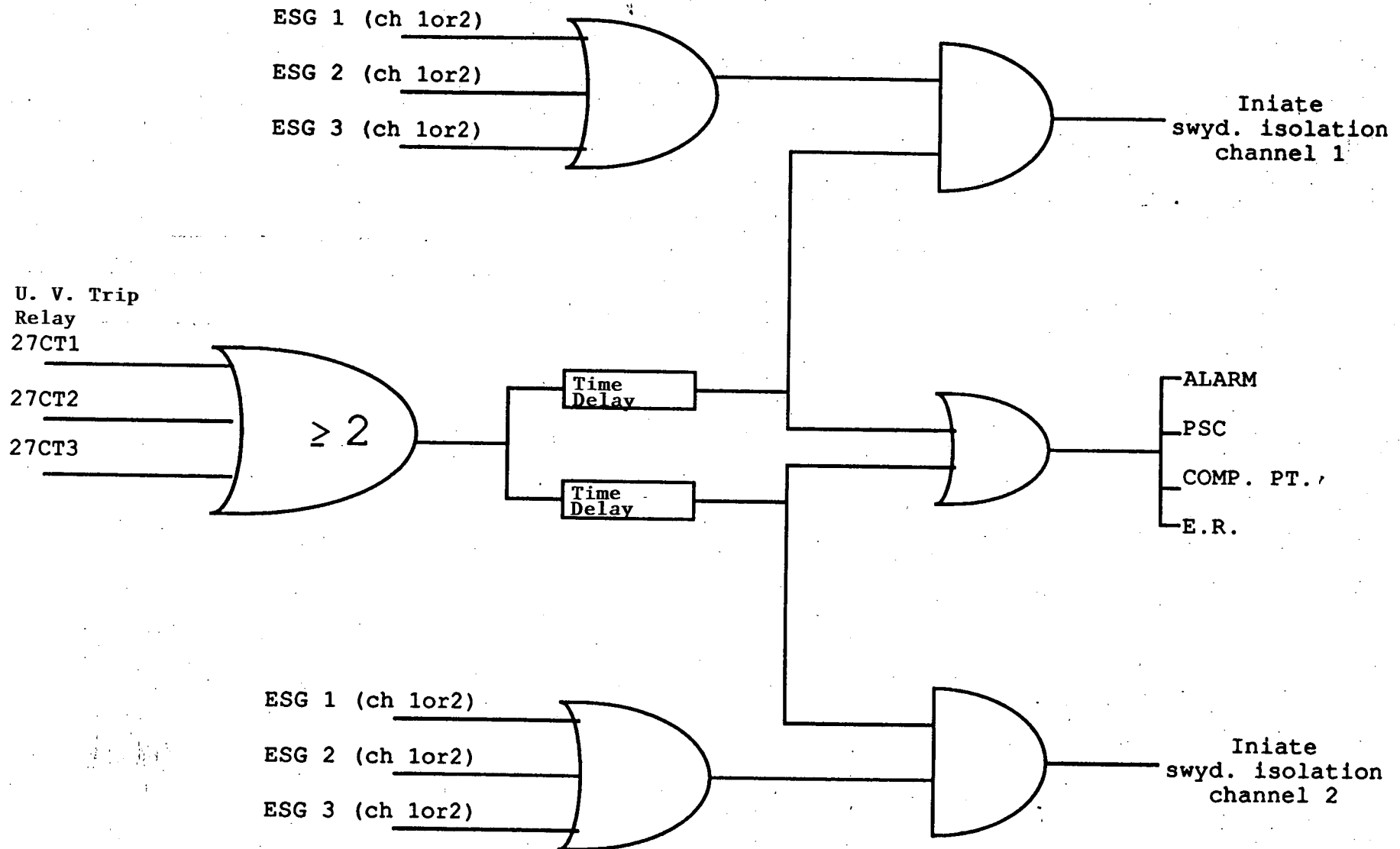
- a) The 4160V standby buses if previously powered from the dedicated line to the Lee Gas Turbines,
- b) The 4160V standby buses from the underground on-site emergency power path from Keowee, or
- c) The overhead on-site emergency power path from Keowee.



new undervoltage relays



PRELIMINARY



PRELIMINARY

Oconee Nuclear Station
Preliminary Logic Diagram
230KV Switchyard Degraded Voltage Protection
NSM ON-52850
May 4, 1990