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SUBJECT: Forwards preliminary description of Keowee Hydro Station
auxiliary load ctr transfer mod to restore automatic
transfer capability to Keowee auxiliary power sys, per 921019
loss of offsite power at Unit 2.

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DUKE POWER

May 17, 1993

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269,-270,-287
Alignment of Keowee Hydro Station Auxiliary Power

In response to the October 19, 1992 loss of offsite power at Oconee Unit 2, on October 23, 1992 I provided a detailed description of the revised alignment of the Keowee auxiliary power system. Briefly, one Keowee Unit is aligned to the overhead emergency power path. The auxiliaries of this Unit are dedicated to the overhead emergency power path. The other Keowee Unit is aligned to the underground emergency power path. The auxiliaries of this Unit are dedicated to the underground emergency power path. Automatic transfer circuitry for the Keowee auxiliary power system has been placed in "manual." The intent of the alignment was to meet the requirements of the Technical Specifications. By letter dated October 27, 1992 I committed to maintain the Keowee auxiliary power system in this alignment until further discussions with the NRC staff are held.

Attached for your information is a preliminary description of the Keowee Hydro Station auxiliary load center transfer modification. This modification restores automatic transfer capability to the Keowee auxiliary power system. This modification is currently scheduled to be implemented on July 8, 1993. A conference will be arranged through our NRR project manager prior to implementation.

Very Truly Yours,

Joe M Davis
for J. W. Hampton

xc: L. A. Wiens, Project Manager
ONRR

S. D. Ebnetter, Regional Administrator
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P. E. Harmon, Senior Resident Inspector
Oconee Nuclear Station

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OCONEE NUCLEAR STATION

Keowee Hydro Station Auxiliary Load Center Transfer Modification Functional Description

To correct design problems identified by the recently completed Keowee Single Failure analysis and the October 19, 1992 Oconee loss of power incident, the operation of the Keowee auxiliary load centers will be modified. For the following description refer to the attached Keowee One-line and logic diagram for Keowee Unit 1. Keowee Unit 2 controls will be identical.

The current design has each Keowee Unit's auxiliary transformer as the normal source of auxiliary power, with transformer CX serving as a standby. This modification will change the operating alignment of the load center incoming breakers such that the Keowee Unit aligned to the underground will be normally fed from transformer CX, with that Unit's auxiliary transformer (1X or 2X) serving as the standby. The alignment will be determined by logic derived from both Keowee Unit's underground breaker position (see attached).

The modification is designed to prevent load center transfers as a result of expected transients during normal and emergency operations, and only have a load center transfer to it's backup source if the normal source is lost for one minute. This new alignment will solve the problem described in LER 269/92-19 concerning a potential fault on the 1X or 2X incoming breaker (ACB-5 or ACB-6) for the underground unit.

In addition, this modification is designed so that the load center transfer signal will originate from normal incoming breaker position versus the current design transfer only on loss of normal voltage. This will permit transfers to the standby source if the normally closed breaker trips for any reason. This provides additional defense-in-depth over the current design where a transfer would occur only if there is an undervoltage condition on the normal source.

Consistent with current design, one relay per source will be utilized. The new design will replace the four MG-6 relays in the load center transfer logic with ITE type 27N undervoltage relays. Ten Cutler-Hammer type D26 auxiliary relays will be installed; Four will be used as auxiliary relays slaved to the 27N UV relays, four will be equipped with D87 time delay-ON timer modules for the load center transfer logic scheme, and two will be used in the incoming breaker lineup logic. All new equipment will be QA qualified equipment, and will be powered from a safety related DC source. Adequacy of this design will be documented in the design input calculation for the modification.

The operation of the new transfer scheme is as follows for Keowee Unit 1 (Unit 2 is similar). Start with Unit 1 aligned to the underground --> ACB's 3 & 7 are closed. If voltage is lost from CX for more than 2 seconds, ACB-7 will trip. The 2 second time delay is long enough to avoid transient induced trips, but short enough to prevent prolonged auxiliary equipment exposure to abnormal voltage. The undervoltage relay dropout will be set to ensure adequate voltage is available to the connected loads. If voltage from CX returns within one minute, ACB-7 will re-close.

If ACB-7 does not re-close within 1 minute for any reason, and voltage is available from LX, ACB-5 will close to provide power from transformer LX. The 1 minute time delay will ensure that, without a failure, the load center will remain powered from it's normal source, and also ensure power is restored to the auxiliaries in a timely manner if a failure removes the normal source (the Keowee Units can operate for approximately 1 hour without auxiliary power).

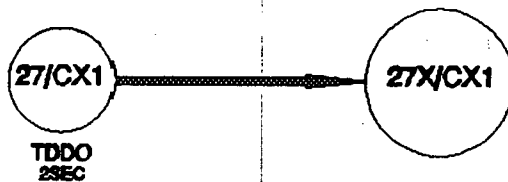
If the Unit is aligned to the overhead, the transfer scheme is identical, except that the CX transformer becomes the standby source, and LX becomes the normal source.

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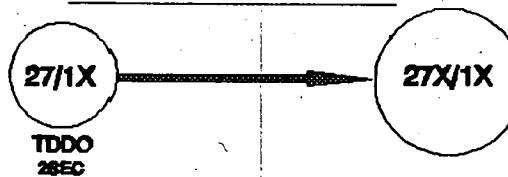
KEOWEE AUXILIARY LOAD CENTER LOGIC DIAGRAM

ALL CONTACTS SHOWN WITH UV RELAYS ENERGIZED (AUX RELAYS DE-ENERGIZED). LOCKOUT RELAYS (86) SHOWN RESET, AND BREAKER AUXILIARY CONTACTS SHOWN WITH BREAKER OPEN (82) OR IN TEST (83).

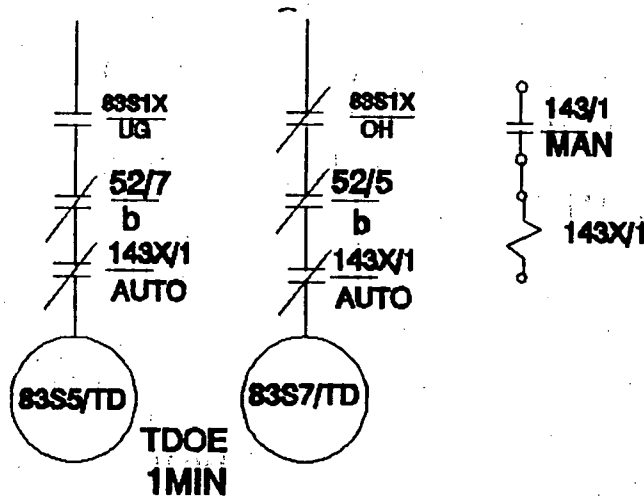
TRANSFORMER CX UNDERVOLTAGE



TRANSFORMER 1X UNDERVOLTAGE

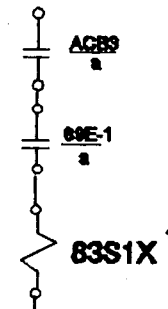


LOAD CENTER TRANSFER LOGIC



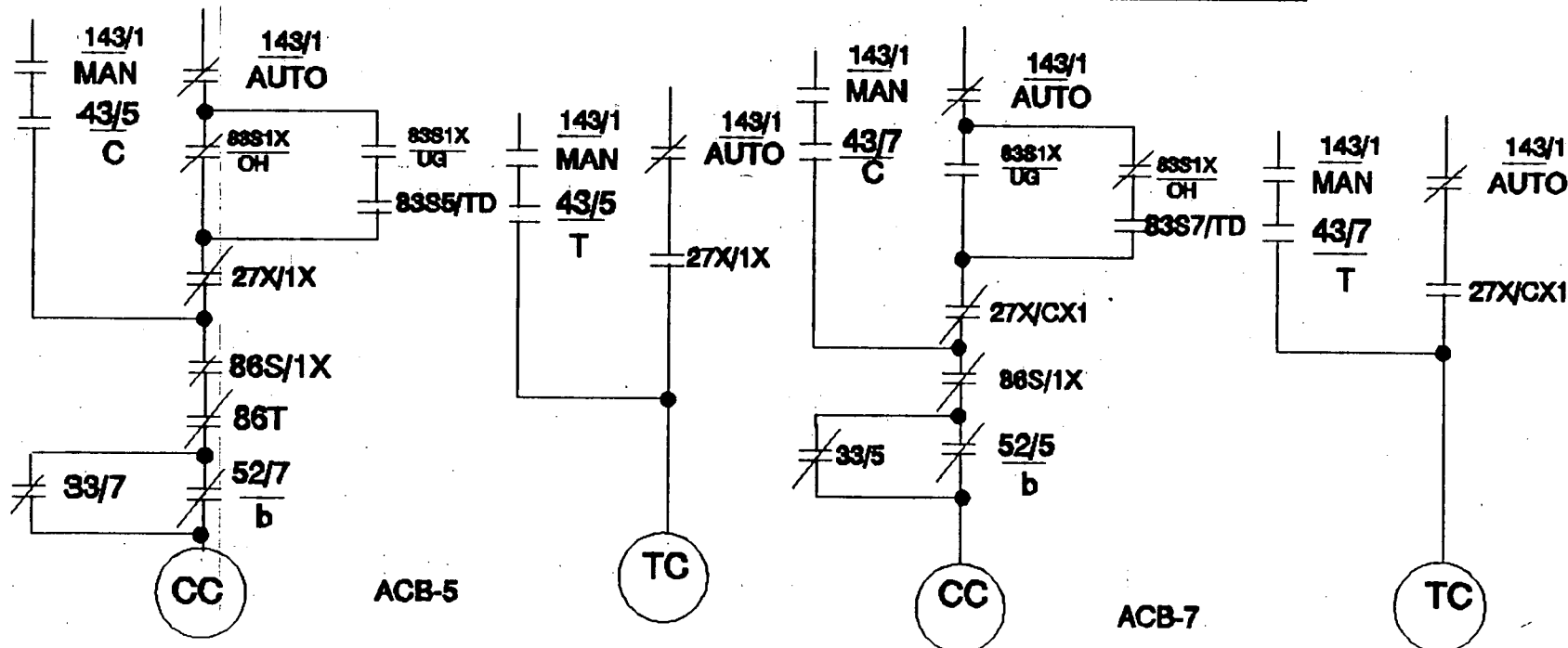
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LOAD CENTER INCOMING BREAKER LINEUP LOGIC

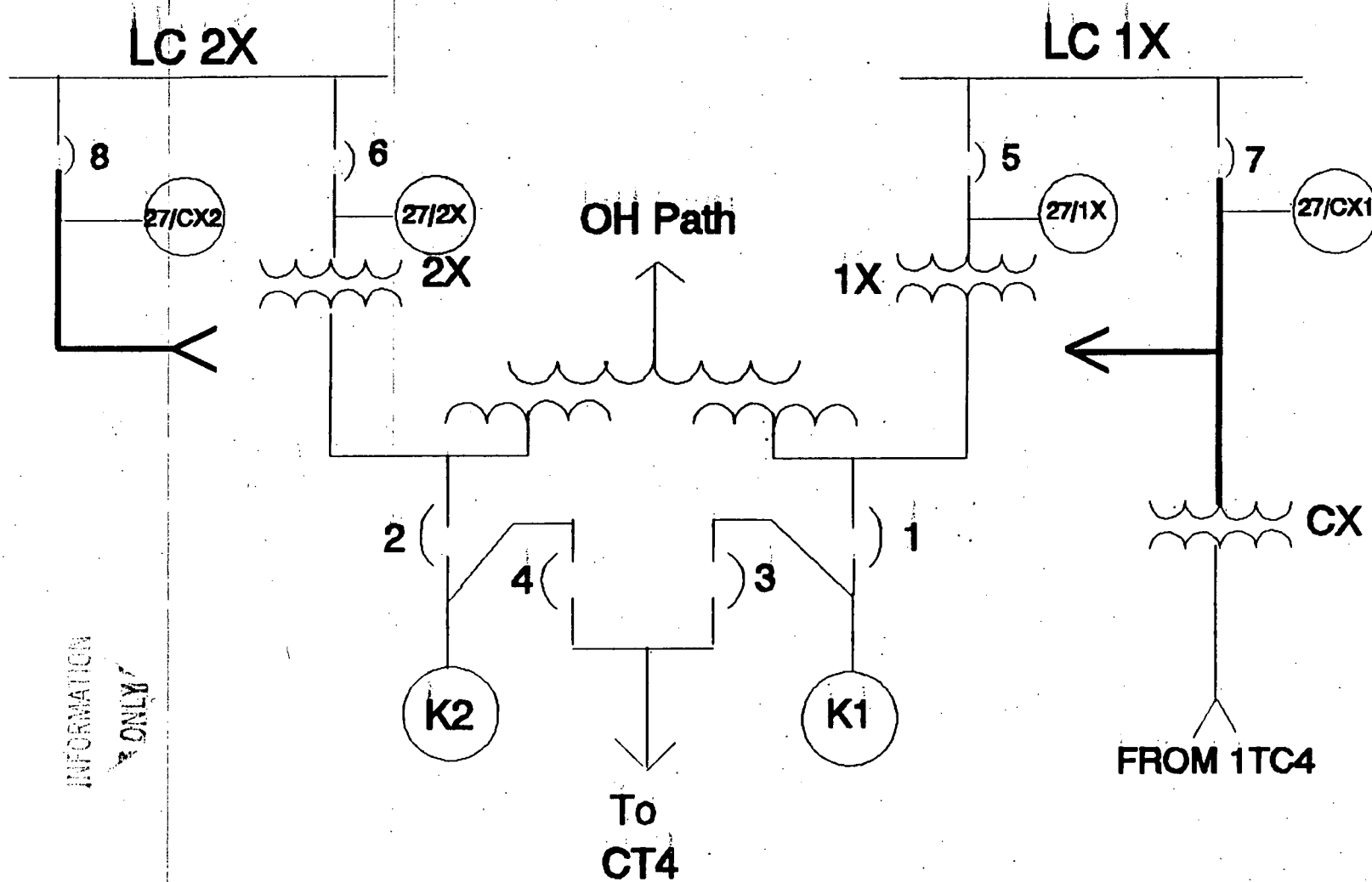


* Contacts labeled 83S1X/OH will be closed when relay is de-energized. This logic determines the normally closed load center incoming breaker.

LOAD CENTER BREAKER TRANSFER CONTROL LOGIC



KEOWEE ONE-LINE FOR ON-52930



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