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February 6, 1992

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attn: Document Control Desk

Subject: Dresden Nuclear Power Station Units 2 and 3
Supplement to Application for Amendment to
Facility Operating Licenses DPR-19 and DPR-25,
Appendix A, Technical Specifications
NRC Docket Nos. 50-237 and 50-249

Reference: M. Richter (CECo) letter to T.E. Murley (NRC),
dated October 14, 1991

Dear Dr. Murley:

The referenced letter submitted a proposed Technical Specification amendment to Operating Licenses DPR-19 (Dresden Unit 2) and DPR-25 (Dresden Unit 3). The proposed amendment incorporated the scram setpoint and calibration frequency requirement for the turbine control valve fast acting solenoid valve pressure switches which initiate the turbine generator load rejection (turbine control valve fast closure) scram. Upon review of that submittal, your Staff requested additional information regarding the response of the Electro-Hydraulic Control (EHC) trip system fluid pressure for the turbine control valves upon a load rejection event (actuation of the fast acting solenoid valves). This letter presents that information.

Attachment 'A' presents a brief description on the response of the EHC System for the turbine control valves during a turbine generator load rejection event (note, this description was previously submitted in the referenced letter). Upon a load rejection signal, the fast acting solenoid valve (FASV) on each turbine control valve will energize causing a rapid depressurization of the EHC trip system fluid (between the FASV and disk dump valve) which is monitored by the FASV pressure switch. General Electric testing experience has shown that the EHC trip system fluid pressure decreases from approximately 1600 psig to 0 psig in approximately 10 milliseconds or less. This decrease is followed by a slight repressurization (between the FASV and disc dump valve) which is caused by the draining of the EHC fluid from the hydraulic positioning cylinder after the disk dump valve has repositioned (see Attachment 'A' and Figure 1). The repressurization has been observed (through testing experience) to consist of random pressure spikes (maximum pressure of approximately 200 to 300 psig) which occur approximately 50 milliseconds after the initial rapid pressure decrease.

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It is CECo's understanding that the Technical Specification setpoint proposed for the FASV pressure switches is consistent with those setpoint values at other BWR stations with General Electric turbine generator units. The nominal trip setpoint of 590 psig has been established (utilizing General Electric methodology) in order to provide margin to the Technical Specification value (460 psig) while minimizing the probability of a trip signal during normal operation of the control valves (which can cause pressure fluctuations in the EHC trip system). As indicated in the referenced letter, pressure switch drift has been observed during recent FASV pressure switch calibrations; however, pressure switch response time testing (from the nominal trip setpoint of 590 psig to 120 psig) confirmed that setpoint drift had insignificant impact with respect to the pressure switch response time assumed in the turbine generator load rejection event analysis (pressure switch actuation occurred within 30 milliseconds of control valve movement). Additionally, the repressurization (following disc dump valve repositioning) was detected by the FASV pressure switches during the response time testing when performed with a pressure switch setpoint of 120 psig. The testing, however, also demonstrated that the scram function would not be impacted by the repressurization. Based on the nominal trip setpoint being utilized, coupled with the results of the response time testing, CECo believes the proposed Technical Specification amendment is appropriate to maintain the integrity of the turbine generator load rejection scram.

Please contact this office should further information be required.

Respectfully,

Milton H. Richter

Milton H. Richter
Nuclear Licensing Administrator

Attachment: A - Operation of the Electro-Hydraulic Control (EHC) System

cc: A. Bert Davis, Regional Administrator-RIII
B.L. Siegel, Project Manager-NRR
W.G. Rogers, Senior Resident Inspector-Dresden
Illinois Department of Nuclear Safety

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ATTACHMENT A

OPERATION OF THE ELECTRO-HYDRAULIC CONTROL (EHC) SYSTEM

The following provides a brief synopsis of the operation of the EHC System as it relates to the control valves and the load reject signal to assist in the review of the proposed amendment. The EHC pressure control and logic system, and the EHC hydraulic system, work in conjunction to control turbine operation.

I. EHC Pressure Control and Logic System

The purpose of the EHC pressure control and logic system is to position the turbine control valves, intercept valves, and bypass valves in order to achieve the turbine speed or load which is consistent with the ability of the reactor to supply adequate steam. The system also controls and maintains reactor pressure during plant startup, heatup and cooldown. The EHC pressure control and logic system is comprised of five (5) subsystems which includes the pressure control unit, bypass control unit, load control unit, speed and acceleration control unit and the valve flow control unit.

The purpose of the load control unit is to develop a steam flow signal which represents the desired load to be placed on the turbine. The load control unit of the EHC pressure control and logic system will develop a power/load unbalance (load reject) signal when the mismatch between turbine crossover pressure and generator load (stator amps) exceeds 40%. The load unbalance signal actuates relays which send a signal to the turbine fast acting solenoid valves. The fast acting solenoid valves energize which causes the fast closure of the turbine control valves by rapidly decreasing the EHC fluid pressure, as detailed in the following sections of this discussion.

II. EHC Hydraulic System

The purpose of the EHC hydraulic system is to supply cooled, filtered, high pressure fluid for the control of the turbine valves.

The turbine control valve hydraulic positioning unit contains two ports which are supplied by high pressure hydraulic fluid (as shown on Figure 1). The Fluid Jet Supply (FJS) enters one of the ports of the positioning unit (pressure rated at 1600 psig) and is directed to a servo-valve. The purpose of the servo-valve is to convert low level input signals from the EHC pressure control logic into high level hydraulic outputs which are used to position the control valves. The second hydraulic fluid supply is the Fluid Actuator Supply Trip Control (FASTC) fluid which is also rated at 1600 psig. The FASTC fluid enters the positioning unit and is directed to the servo-valve and the fast acting solenoid valve. The FASTC fluid is transmitted through the fast acting solenoid valve (in the de-energized state) to close the disk dump valve, sealing the end of the hydraulic positioning cylinder. With the disk dump valve sealing the end of the hydraulic positioning cylinder, the servo-valve (with the aid of the FJS fluid pressure) controls FASTC to the single acting actuator piston for positioning of the control valve. The FASTC pressure opens/positions the turbine control valve against the closing spring force and steam pressure. When the fast acting solenoid valves are energized, the disk dump valve will open to exhaust the positioning cylinder pressure and cause a rapid closure of the turbine control valve.

III. Operation during the Turbine/Generator Load Mismatch

When the load control unit of the EHC logic system senses the turbine/generator load mismatch, the logic system sends a signal to the fast acting solenoid valves to energize and reposition. When the fast acting solenoid valves reposition, the following occurs:

a. The FASTC fluid, which holds the disk dump valve seated, begins to drain as a result of the repositioned fast acting solenoid valve; causing a rapid pressure decrease.

b. The fast acting solenoid valve pressure switch senses decreasing FASTC fluid pressure and at a pressure equal to or greater than 460 psig initiates a scram signal to the Reactor Protection System.

Under the original design, a position switch on the fast acting solenoid valve sensed that the fast acting solenoid valve had repositioned and initiated the scram signal to the Reactor Protection System.

c. When the FASTC fluid pressure decreases to approximately 400 psig, the disk dump valve is forced away from its seat and the FASTC fluid in the hydraulic positioning cylinder is rapidly drained.*

d. The control valve closes rapidly.

* - The FASTC fluid pressure which holds the disk dump valve closed/seated (referred to as the 'trip system') must decrease to approximately one-fourth of the FASTC fluid pressure in the hydraulic positioning cylinder before the disk dump valve is opened (or forced away from its seat) to allow for control valve fast closure. This is due to the 4-to-1 area ratio between the top and bottom of the disk dump valve. When a control valve is full open (against its mechanical stop) the positioning cylinder fluid pressure would be approximately 1600 psig, necessitating the 'trip system' fluid pressure to decrease to approximately 400 psig before control valve fast closure can begin. However, during normal plant operating conditions at Dresden Station, the control valves are always in a controlling state or less than full open (all control valves are approximately 60% open at full load conditions). With the control valves less than full open, the positioning cylinder fluid pressure would be less than 1600 psig (approximately 800 to 1000 psig), necessitating the 'trip system' fluid pressure to decrease to a lower pressure (approximately 200 to 250 psig) before control valve fast closure can begin.

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FIGURE 1
Typical EHC Fluid Flow Diagram for Turbine Control Valves