

April 17, 1996

Mr. Michael W. Lyon
Director - Licensing
Clinton Power Station
P. O. Box 678
Mail Code V920
Clinton, IL 61727

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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING ELIMINATION OF ANALOG TRIP MODULE RESPONSE TIME TESTING REQUIRMENTS FOR CLINTON POWER STATION, UNIT 1 (TAC NO. M94310)

Dear Mr. Lyon:

By letter dated December 14, 1996 (U-602520), Illinois Power Company proposed the elimination of response time testing (RTT) for Analog Trip Units, GE series 147D8505, from the Technical Specifications (TS) for Clinton Power Station. The technical basis and methodology for the elimination of the RTT is contained in Attachment 2 of your letter. In order to facilitate NRR's review of this submittal, the attached information is requested.

If you have any questions, please contact me at (301) 415-1364.

Sincerely,

(original signed by)

Douglas V. Pickett, Senior Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-461

Enclosure: As stated.

cc: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D. C. 20555-0001

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A handwritten signature in cursive script that reads "Douglas V. Pickett".

Douglas V. Pickett, Senior Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-461

Enclosure: As stated.

cc: See next page

Mr. Michael W. Lyon
Illinois Power Company

Clinton Power Station
Unit No. 1

cc:

Mr. Wilfred Connell
Vice President
Clinton Power Station
Post Office Box 678
Clinton, Illinois 61727

Illinois Department
of Nuclear Safety
Office of Nuclear Facility Safety
1035 Outer Park Drive
Springfield, Illinois 62704

Mr. Daniel P. Thompson
Manager Nuclear Station
Engineering Department
Clinton Power Station
Post Office Box 678
Clinton, Illinois 61727

Resident Inspector
U.S. Nuclear Regulatory Commission
RR#3, Box 229 A
Clinton, Illinois 61727

Mr. R. T. Hill
Licensing Services Manager
General Electric Company
175 Curtner Avenue, M/C 481
San Jose, California 95125

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4351

Chairman of DeWitt County
c/o County Clerk's Office
DeWitt County Courthouse
Clinton, Illinois 61727

Mr. J. W. Blattner
Project Manager
Sargent & Lundy Engineers
55 East Monroe Street
Chicago, Illinois 60603

REQUEST FOR ADDITIONAL INFORMATION
RELATED TO THE
CLINTON POWER STATION, UNIT NO. 1
ELIMINATION OF ANALOG TRIP MODULE RESPONSE TIME TESTING REQUIREMENTS
DOCKET NO. 50-461

The Boiling Water Reactor Owners Group, in NEDO-32291, their topical report, asked for elimination of response time testing (RTT) either for devices for which a thorough failure modes and effects analyses (FMEA) had been done, or for devices used in relatively slow responding systems. Thus, in the RPS and ESF systems, where rapid response is required, only sensors were subject to the elimination. In other systems, the entire channel is subject to the elimination of RTT requirements. The RTT Topical, Section 2, Page 2-2, states:

Most of the instrumentation response time testing targeted for elimination involves tests where the instrumentation loop response time is a small fraction of the total allowable system response time requirement. This typically occurs when the total allowable system response time is equal to or greater than ten seconds. In addition, selected pressure and differential pressure sensor response time testing can be eliminated on the basis of work done by EPRI (References 1 and 9) and supplemented by the BWR Owners' Group.

The sensors were covered by a thorough FMEA as documented in Electric Power Research Institute Report NP-7243, "Investigation of Response Time Testing Requirements," Final Report May 1991. The 184C5988 Series GE Master Trip Units were covered in the RTT Topical, Appendix K, Page K-2, paragraph K.1.2, which states:

GE Master Trip Unit (184C5988 Series)

The GE master trip unit, which is similar to Rosemount, provides the signal processing necessary to monitor analog inputs and provide contact closure/open as trip outputs. Trip points, hysteresis, and gross failure limits are adjustable. There are no failure modes within the master trip unit circuitry which would delay the normal response time without also affecting calibration or causing misoperation. If calibration checks are normal, the trip unit response time will be within specifications.

The level of detail, and hence the confidence that every component and circumstance has been covered, is significantly different. For systems whose response time requirements are many times the response time of the trip unit and of the 5 seconds it was estimated a technician would notice, the level of detail is not as important. For systems whose response time requirements is quite short, a fraction of the 5 seconds, and approaching the manufacturer's specification of a component of that system, a much more detailed FMEA is required, and correspondingly, a greater level of detail is needed to justify the elimination of response time testing.

ENCLOSURE

In addition, the Clinton request states "The components within the scope of this request are within the scope of NEDO-32291 and the NRC's safety evaluation of NEDO-32291," while in fact the staff's SER covered GE 184C5988 Series Master Trip Units, and the Clinton request states "The only components affected by this request are GE trip units model 147D8505."

In a discussion concerning this apparent discrepancy, the staff was referred to a General Electric letter dated February 16, 1996 (T.A. Green to M.A. Lyon). This letter included the following discussion concerning the 184C5988 and 147D8505 Trip Unit Design:

Similarities in circuitry and components exist in the analog input section of both designs. Resistive/capacitive filters are used in both designs prior to the operational amplifier input. Thus, the failure modes analysis discussed in Section K.1.2 of Reference 1 for the 184D5988 Trip Unit design bounds this portion of the Clinton 147D8505 Trip Unit Design. Also, since the 147D8505 Trip units are utilized in the Clinton Nuclear Systems Protection System (NSPS), the units are self-tested such that any component failure in the downstream circuitry affecting response time will be detected and reported by the NSPS self-test system. Manual calibration checks and functional tests conducted periodically would identify any untested failure modes within the 147D8505 Trip Unit circuitry which could delay the normal response time.

It appears, from the GE letter, the units are not identical, but only similar in circuitry and components. The degree of that similarity is unspecified. In order to rely on similarity for a FMEA, a detailed description of the components and design should be provided, showing that the similarity is sufficient such that any differences are inconsequential.

The Clinton request is missing two critical items which are requested:

1. A detailed FMEA of the trip unit showing each component's failure modes, and the effect that failure mode will have on the performance of the trip unit. This should show that for each failure mode which has the possibility of affecting response time, the calibration of the unit is also affected, and the failure will thereby be detected. It will be important to note in this analysis that the failure is such that a mere adjustment of the calibration is insufficient, but that replacement or repair of the system will be required in the event of this failure. If mere adjustment will be sufficient to mask the problem, it is highly likely that a technician will not notice a small change in response time of under 5 seconds, and only adjust the instrument until it is within calibration, rather than replace the instrument as failing to meet its required response time.

2. Since the response time requirements for the systems in which the trip unit is being used is rapid compared to the 5 second technician awareness limit, an analysis of each accident where this unit is required, and a determination that an additional 5 seconds added to the response time will not introduce a safety problem, and that there is no added increase in the risk of release of radiation to the public.