

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D.C. 20055-0001

October 17, 1996

MEMORANDUM TO: Dale F. Thatcher, Section Chief Advanced Designs Section and Electrical Components Electrical Engineering Branch Division of Engineering

FROM: Frederick H. Burrows, Electrical Engineer Electrical Engineering Branch Division of Engineering

SUBJECT: DIFFERING PROFESSIONAL VIEW CONCERNING DYNAMIC TESTING OF INSTRUMENTATION CHANNELS AT BRAIDWOOD

Attached hereto is the subject Differing Professional View (DPV) which you should forward to our Office Director per the latest DPV policy guidelines.

Attachment: As stated

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DIFFERING PROFESSIONAL VIEW CONCERNING DYNAMIC TESTING OF INSTRUMENTATION CHANNELS AT BRAIDWOOD

During my seven years in the Instrumentation and Controls Branch (1981-1988), I reviewed mainly Westinghouse instrumentation and control systems. My major efforts were completing the licensing reviews for Byron/Braidwood, Catawba, Beaver Valley 2, and Vogtle. I also participated in the development and final approval of the instrumentation and controls sections of the technical specifications for McGuire and the aforementioned plants.

In order to complete those efforts and reach acceptable conclusions, many meetings were held with the applicants/licensees and personnel from Westinghouse to exchange detailed technical information. During the review of the last several plants, I became concerned about the adjustment of dynamic components (lead-lag networks) in Westinghouse instrument channels. I was told during discussions with Westinghouse personnel that exact, nominal values for these components were used in FSAR Chapter 15 analyses. Values for these adjustable components were not contained in Westinghouse Technical Specifications (except Overtemperature aT and Overpower aT reactor trips) and errors associated with these adjustments were not addressed by the Westinghouse setpoint methodology. Only Westinghouse plant-specific guidance (not reviewed by the staff and not agreed upon by all Westinghouse personnel) addressed lead-lag adjustment tolerances. Additionally, the periodic channel function testing of Westinghouse instrument channels, as reviewed and approved by myself and others in the Instrumentation and Controls Branch up to the development of my concerns, specifically required those dynamic components to be jumpered out.

In an effort to address my concerns, Westinghouse and the licensees for the last plants that I reviewed (e.g. Vogtle) agreed to place footnotes in the plants' Technical Specifications on the trip setpoirts for instrument channels that contained dynamic components (e.g. pressurizer pressure - low reactor trip). These footnotes required that the dynamic components be adjusted exactly to a specified value during channel calibration to ensure the plants' Chapter 15 analyses remained bounding since those analyses (per Westinghouse) did not provide for any tolerance. Admittedly, neither Westinghouse (to my knowledge) nor I addressed this issue generically following my Vogtle/Beaver Valley 2 reviews.

Towards the end of my time in the Instrumentation and Control Branch, I was requested to review a new automatic test system (MESAC) being using at Braidwood for periodic, functional testing of the safety-related instrumentation channels. This system deviated from the Westinghouse static testing (all dynamic components jumpered out with slow-varying input signal with the measured bistable trip point compared to setpoint contained in the Technical Specifications) by utilizing dynamic testing (dynamic components not jumpered out with a ramp signal input with measured time response compared to the licensee calculated time response). To complete my review, I visited the site during November 1987 and wrote a request for additional information (dated January 14,1988) upon my return to headquarters. That request (signed by my acting branch chief, sent to the project manager, but not sent to the licensee) was intended to have the licensee address the impact of dynamic component errors (part of the assumptions used to calculate acceptable dynamic testing results) upon the setpoint methodology, technical specification setpoints and allowable values, and FSAR Chapter 15 analyses.

Subsequently, I left the Instrumentation and Controls Branch and, to the best of my knowledge, the subject was forgotten until it surfaced during a personal grievance meeting with Bill Russell (then Director, NRR) in October 1992. Because my concerns were heightened by second-hand information which indicated that dynamic testing similar to that utilized at Braidwood may be marketed to other nuclear power plants, I started an informal process to have my concerns pertaining to dynamic testing of instrument channels addressed. To that end, I stated my concerns in an October 3, 1995, memo to Jared Wermiel, Branch Chief of the Instrumentation and Controls Branch.

The Instrumentation and Controls Branch response, dated October 11, 1995, failed to resolve my concerns. I then responded to the specific technical issues in an October 18, 1995, memo and stated that Braidwood may not be meeting its Technical Specifications and that plant operation may be outside its licensing basis. Also, I stated that I was perplexed that the Instrumentation and Controls Branch chose to address my concerns based on only informal discussions with the licensee and that I believed it was inappropriate for the staff to justify and analyze licensing basis deviations for licensees. These statements were based on my belief that dynamic testing of safety-related instrument channels can not substitute for the staff approved static testing without prior staff review since FSAR Chapter 15 analyses, Technical Specifications and setpoint methodology are directly impacted.

In a January 17, 1996, response to my October 18, 1995, memo, the Instrumentation and Controls Branch addressed each of my points and concluded that the concerns that I identified related to dynamic testing at Braidwood have been effectively resolved based on a staff member's visit to the site and the licensee's headquarters. In my January 31, 1996, memo back to the Instrumentation and Controls Branch, I once again stated that my concerns were not resolved, I provided detailed comments on the January 17 memo, and I included three fundamental questions to be sent to the licensee in an effort to formalized the process of reviewing what I considered to be a deviation from the plant's licensing basis. In a May 22, 1996, letter to the licensee, the staff formally requested the licensee to address my concerns in detail.

Because the licensee has not responded in what I consider to be a timely fashion, the Instrumentation and Controls Branch has repeatedly taken an informal approach, and the change from static testing to dynamic testing hits directly at the heart of the 10 CFR 50.59 process; I now wish to express my concerns as a Differing Professional View.

Specifically and in summary, I believe Braidwood's use of dynamic testing of safety-related instrument channels is outside of the plant's licensing basis (Technical Specifications, FSAR Chapter 15 analyses, and setpoint methodology) and represents an unreviewed safety question because:

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- Braidwood's Chapter 15 safety analyses are based on nominal values and do not account for any tolerances for dynamic components such as the lead-lag network used for pressurizer pressure - low reactor trip. (This was an assumption based on a discussion with Westinghouse personnel.)
- 2. An increase in the lag time constant or a decrease in the lead time constant (resulting from plant adjustment errors) from the nominal values used in Chapter 15 analyses can delay the plant's accident/transient response beyond the corresponding Chapter 15 analyses. (Again, this was an assumption, but was supported by the Instrumentation and Controls Branch screening analysis contained in the October 11, 1995, memo.)
- 3. Admittedly, individual lead-lag adjustment errors may produce small increases in accident/transient response times, but they are similar to other instrumentation errors which the staff formally reviews/ approves and expects/requires all licensees to account for and track.
- 4. The staff-approved Westinghouse setpoint methodology for Braidwood relates periodic testing, setpoints for safety-related instrument channels and Chapter 15 analyses to each other is a meaningful, structured way. Dynamic testing of instrument channels, with its own licensee-developed acceptance criteria, is completely foreign to this structured approach and has received only limited, informal staff review.