October 7, 2004

Mr. W. Brown
21734 Park Brook Drive
Katy, Texas 77450-4632

Dear Mr. Brown:

Thank you for taking the time to share with the U.S. Nuclear Regulatory Commission (NRC) staff your concerns regarding the means by which instrument channel uncertainty is accounted for in the establishment of limiting settings. Your letter dated June 26, 2004, identified two areas of concern: (1) the apparent dismissal of Instrumentation, Systems and Automation Society's (ISA) Standard 67.04, Part II, "Methodology for the Determination of Setpoints for Nuclear Safety-Related Instrumentation," Method 3 by the NRC staff as a viable means to establish instrumentation trip setpoints and allowable values (AVs), and (2) the NRC staff's use of certain standard statistical techniques.

Regarding the first issue, there are two basic schools of thought on this matter, one focused on traditional regulatory limits, and one focused upon channel performance. Both considerations are important.

- The traditional regulatory-based considerations result in AVs recorded in the Technical Specifications (TSs). An As-Found setting that does not fall within the corresponding limit is considered evidence that the plant might be operating outside the conditions assumed in the safety analyses.

- The performance-based considerations result in acceptance criteria to be incorporated into test procedures. An As-Found setting that does not fall within such a limit is taken as evidence that the channel is not functioning in accordance with the assumptions upon which the limiting setpoint was established, and appropriate maintenance or other corrective action is warranted. Please note that maintenance considerations are addressed broadly in Generic Letter 91-018[1] but there is no specific regulation on this matter. Licensees are required to maintain instrumentation channels – and all other equipment important to safety – in such a manner as to ensure that they will perform the required functions when needed. In some cases, it may be appropriate to reconsider the uncertainty allowance assumed in the channel uncertainty analysis and to adjust the limiting setpoint accordingly.

Method 3, as described in ISA Standard 67.04, Part II, calculates an AV based upon a limiting expected deviation from the calculated setpoint. The NRC staff's concern is that a trip setpoint found during periodic testing near but conservative to a Method 3-calculated AV will be considered operable from a TS's standpoint, but may not give adequate confidence that the process parameter being measured will not exceed the assumptions in the plant safety

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[1]GL 91-018: "Information to Licensees Regarding two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability," November 7, 1991.

analyses. This does not mean that Method 3 fails to compute a setpoint that protects the associated safety limit, rather, the NRC staff considers AVs computed using Method 3 are not appropriate for use in traditional TS applications as a determinant of channel operability.

The NRC staff's concerns over the use of Method 3 AVs were addressed in a presentation at public meetings at NRC headquarters in Rockville, Maryland, on June 23 and July 26, 2004. The presentation slides, which cover both the regulatory and the mathematical considerations pertinent to this issue, are included in the meeting handouts for each meeting, which have been published on the NRC website (www.nrc.gov: go to "Electronic Reading Room" and select "ADAMS Documents." Select "Web Based Access," and enter ADAMS Accession number ML042030355 for the June 23, 2004, meeting, or ML042370785 for the July 26, 2004, meeting, into the search box).

Proper control of the As-Left value of the setpoint may seem to allow AVs calculated using Method 3 to be used to identify unacceptable behavior (e.g., excessive drift) in the tested portion of an instrumentation channel. However, other concerns emerge when using AVs in this manner, such as the effect on instrument operability when setpoints are set more conservatively than the limits calculated using Method 3. The additional conservatism, which is desirable from a safety standpoint, would increase the amount by which a setpoint would need to change in order to exceed the AV, and would therefore compromise the usefulness of the AV as an indicator of excessive deviation (i.e., TS operability). In this example, the channel would be exhibiting unacceptable behavior due to excessive drift, but not be considered inoperable by TSs.

Regarding the second issue, as to whether uncertainties should be based upon double-sided distributions or single-sided distributions (i.e., whether the uncertainty should be taken as two standard deviations or less than two standard deviations), Regulatory Guide (RG) 1.105, Revision 3, "Instrument Setpoints for Safety System" (December 1999), does not address this issue directly. It simply indicates that there should be "a 95 percent probability that the constructed limits contain 95 percent of the population of interest for the surveillance interval selected." (Regulatory Position #1)

For a normal distribution, the 95/95 criterion is met if the population of interest is within about two standard deviations of the mean. So the actual trip setpoint will fall beyond about two standard deviations from the measured value 5 percent of the time. But half of that 5 percent will fall to the conservative side of the measured value. Therefore the actual trip setpoint will be nonconservative by more than two standard deviations only about 2½ percent of the time. This is certainly acceptable, but it is in excess of the recommendations in RG 1.105. It is acceptable to define the uncertainty as something less than two standard deviations such that the probability that the actual trip setpoint will be nonconservative by more than the uncertainty does not exceed 5 percent.

While the NRC staff has worked individually with some licensees in the short-term to address these and other concerns with their use of Method 3, the NRC staff will continue to work with the nuclear industry and other stakeholders to come to an acceptable long term resolution to this issue.

Thank you again for your concerns regarding this issue and if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

/RA/

Ledyard B. Marsh, Director
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Thank you again for your concerns regarding this issue and if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

/RA/

Ledyard B. Marsh, Director
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

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