

NUCLEAR REGULATORY COMMISSION

Notice of Availability of Draft Report for Comment: "Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process," NUREG-1829

AGENCY: Nuclear Regulatory Commission.

ACTION: Notice of availability and request for comments.

DATES: Written comments must be provided by November 30, 2005.

Background: In support of an effort to develop a risk-informed revision of the emergency core cooling system (ECCS) requirements for commercial nuclear power plants, estimates of loss-of-coolant accident (LOCA) frequencies have been developed which will enable redefinition of the design-basis break size for these requirements. These LOCA frequency estimates have been developed using an expert elicitation process by consolidating service history data and insights from probabilistic fracture mechanics (PFM) studies with knowledge of plant design, operation, and material performance. This expert elicitation to develop LOCA frequency estimates is described in draft NUREG-1829, "Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process" (June 2005).

The ECCS requirements in the United States are contained in 10 CFR 50.46, Appendix K to Part 50, and General Design Criterion (GDC) 35. Specifically, ECCS design, reliability, and operating requirements exist to ensure that the system can successfully mitigate postulated LOCAs. Consideration of an instantaneous break with a flow rate equivalent to a double-ended guillotine break (DEGB) of the largest primary piping system in the plant generally provides the limiting condition in the required 10 CFR Part 50, Appendix K analysis. However, the DEGB is widely recognized as an extremely unlikely event, so NRC staff is performing a risk-informed revision of the design-basis break size requirements.

A central consideration in selecting a risk-informed design basis break size is an evaluation of the LOCA frequency as a function of break size. The most recent NRC-sponsored study of pipe break failure frequencies is contained in NUREG/CR-5750 (Poloski, 1999). Unfortunately, these estimates are not sufficient for design basis break size selection because they do not address all current passive-system degradation concerns (e.g., primary water stress corrosion cracking) and they do not discriminate among breaks having effective diameters greater than 6 inches.

There have been two approaches traditionally used to estimate LOCA frequencies and their relationship to pipe size: (i) estimates based on statistical analysis of service experience data and (ii) PFM analysis of specific postulated failure mechanisms. Neither approach is fully suitable for evaluating LOCA event frequencies due to the rarity of these events and the modeling complexity. This study used an expert elicitation process, which is well-recognized for quantifying phenomenological knowledge when data or modeling approaches are insufficient. Elicitation responses from a panel of 12 experts determined individual LOCA frequency estimates for the 5th percentile, median, mean and 95th percentile of the frequency distribution for each of six LOCA categories. Group estimates were determined by aggregating the individual estimates using the geometric mean of the individual estimates for each frequency parameter (i.e., median, mean, 5th and 95th percentiles). Group variability was estimated by calculating 95% confidence bounds for each of the group frequency parameters. A number of sensitivity analyses were conducted to examine the effects on the quantitative results from variation of the assumptions, structure and techniques of the baseline analysis procedure.

Solicitation of Comments: The NRC seeks comments on the report and is especially interested in comments on the following questions:

1. Is the structure of the expert elicitation process appropriate for the stated problem and goals of the study?
2. Are the assumptions and methodology of the analysis framework used to process the panel responses appropriate and reasonable? Are they consistent with the type of information provided by the expert panel and the goals of the study?
3. Is the geometric mean aggregation methodology appropriate for the panel responses and the study goals? Should other aggregation methodologies be considered and what are their advantages and disadvantages?

Comment Period: The NRC will consider all written comments received before November 30, 2005. To facilitate the comment process the NRC will conduct a workshop on October 31, 2005, to be held in room O4B6 at NRC Headquarters, 11545 Rockville Pike, Rockville, Maryland. In the workshop, the staff will provide an overview of the report and address clarification of items identified by the public. A preliminary agenda is attached. A separate notice will be published in the *Federal Register* announcing the public workshop. Comments received after November 30, 2005, will be considered if time permits. Comments should be addressed to the contact listed below.

Availability: An electronic version of the report and the accompanying experts' raw data files, are available electronically at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1829/> and through the NRC's Electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html>. From the latter site, you can access the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents. The ADAMS accession numbers for the documents related to this notice are:

Document Title	ADAMS Accession No.	File Format
NUREG-1829	ML051520574	Adobe Acrobat Document
BWR Non-piping Raw Data for NUREG-1829	ML051580341	Microsoft Excel Worksheet
BWR Piping Raw Data for NUREG-1829	ML051580344	Microsoft Excel Worksheet
PWR Non-piping Raw Data for NUREG-1829	ML051580346	Microsoft Excel Worksheet
PWR Piping Raw Data for NUREG-1829	ML051580347	Microsoft Excel Worksheet

If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737, or by email to pdr@nrc.gov.

These documents may also be viewed electronically on the public computers located at the NRC's PDR, O1F21, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852.

The PDR reproduction contractor will copy documents for a fee.

FOR FURTHER INFORMATION CONTACT: Dr. Charles A. Greene, Mail Stop T10E10, U.S. Nuclear Regulatory Commission, 11545 Rockville Pike, Rockville, MD 20852, telephone (301) 415-6177, facsimile number: (301) 415-5074, e-mail cag2@nrc.gov.

Dated at Rockville, Maryland, this ____ day of September 2005.

For the Nuclear Regulatory Commission.

Andrea Lee, Acting Branch Chief
Materials Engineering Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research.

PUBLIC WORKSHOP ON DRAFT REPORT FOR COMMENT:
“ESTIMATING LOSS-OF-COOLANT ACCIDENT (LOCA)
FREQUENCIES THROUGH THE ELICITATION PROCESS,”
NUREG-1829

October 31, 2005 - 9:00am-12:00pm
Room O-4B6

Preliminary Agenda

9:00am-9:15am	Introduction
9:15am-9:45am	Overview of NUREG-1829
9:45am-10:15am	Discussion of clarification of items identified by the public
10:15am-10:30am	Break
10:30am-12:00 noon	Clarification of items identified by the audience
12:00 noon	Adjourn