

MEMORANDUM TO: Patricia G. Norry
Deputy Executive Director for Management Services
Office of the Executive Director for Operations

FROM: J. E. Dyer, Director
Office of Nuclear Reactor Regulation

SUBJECT: COMMUNICATION PLAN FOR BULLETIN 2004-xx, "USE OF
ULTRASONIC FLOW MEASUREMENT DEVICES FOR FEEDWATER
FLOW MEASUREMENT IN LIGHT WATER REACTORS"

The attached plan describes the methods and tools for communicating with internal and external stakeholders regarding Bulletin 2004-xx, "Use of Ultrasonic Flow Measurement Devices for Feedwater Flow Measurement in Light Water Reactors." This plan will guide our communication efforts and related activities as we proceed with the development and issuance of the bulletin.

This plan will facilitate communication within the agency to enable the staff to provide timely, consistent, and understandable information to our external stakeholders. In addition, this plan identifies opportunities for meaningful involvement to enhance the public's understanding of our safety and regulatory activities.

Attachment: As stated

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COMMUNICATION PLAN
BULLETIN 2004-xx, "USE OF ULTRASONIC FLOW
MEASUREMENT DEVICES FOR FEEDWATER
FLOW MEASUREMENT IN LIGHT WATER REACTORS"

OBJECTIVES

This document describes the methods and tools that the staff of the Nuclear Regulatory Commission (NRC) will use to communicate effectively with internal and external stakeholders about a proposed NRC Bulletin 2004-xx, "Use of Ultrasonic Flow Measurement Devices for Feedwater Flow Measurement in Light Water Reactors." This plan will guide our communication and related activities as we proceed with the development and issuance of the bulletin.

The plan will facilitate communication within the agency to enable the staff to provide timely, consistent, and understandable information to our external stakeholders. In addition, this plan identifies opportunities for meaningful involvement to enhance the public's understanding of our safety and regulatory activities.

BACKGROUND

Ultrasonic flow measurement devices (UFMs) are used in several applications in light water reactors. They are used to measure feedwater flow, steam generator blowdown flow, and reactor coolant flow. UFMs are often used because they can be more accurate and not subject to fouling compared with the commonly used flow nozzles. The purpose of this bulletin is to address the UFM application in the measurement of feedwater flow rates. Feedwater flow rate is a major parameter used in the calculation of reactor thermal power (RTP). Consequently, an increase in feedwater flow rate accuracy can result in an increase in the accuracy of the RTP calculations.

Over the past ten years, UFMs have been increasingly used to reduce feedwater flow measurement uncertainty in three applications: (1) a one-time check of venturi calibration; (2) a measurement uncertainty recapture (MUR) power uprate that credits the improved feedwater flow measurement uncertainty of a UFM; and (3) power recovery to correct for such effects as venturi fouling. Feedwater flow is typically measured by venturi meters. Fouling is a disadvantage of this meter because it causes the meter to indicate a higher differential pressure and thus a higher than actual flow rate. This leads to the calculation of higher than actual RTP and as a consequence, operators must reduce power in order to keep the calculated RTP within the licensed value. This is conservative with respect to safety, but results in an unnecessarily low electrical output.

Appendix K to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 used to require an allowance of two percent in RTP as an allowance for instrumentation uncertainty. In June 2000, Appendix K was changed to allow a smaller instrumentation uncertainty when justified. Feedwater flow measurement using UFMs with their improved uncertainty measurement has permitted licensees to justify MUR power uprates. MURs require NRC approval since they

involve a license amendment. Power recovery and one-time check of venturi calibration applications do not require NRC approval and licensees may address them under 10 CFR 50.59.

There have been several recent instances in which plants using UFM's for feedwater flow measurement have exceeded their licensed power. From August 2003 through March 2004, the licensee for Byron and Braidwood Stations, which were using UFM's for power recovery, reported that all four units operated above their licensed RTP for several years. The largest overpower occurred at Byron, Unit 1, which exceeded its licensed RTP by 2.6 percent. The licensee for River Bend reported in May 2003, that the plant apparently operated at more than 2 percent over its licensed RTP for one cycle and part of another. The licensee for Ft. Calhoun informed the NRC staff that as a result of the pre-implementation testing of its UFM prior to implementation of a 1.6 percent MUR, it could not meet its expected accuracy. As an interim step, the licensee requested that the NRC amend its license to restore the pre-MUR licensed RTP. The Palo Verde plants recently reduced thermal power because of concerns similar to those discovered at River Bend.

The NRC staff believes that a bulletin is necessary in order to determine that all plants using UFM's are operating in accordance with their licenses. For those licensees that are considering installing UFM's, the bulletin will inform them of the NRC staff concerns and suggest steps that they can take to assure that UFM implementation maintains RTP within its licensed limit.

AUDIENCE

The intended audience of this communication plan includes interested internal and external stakeholders as follows:

External Stakeholders

- Licensees
- General Public
- Congress
- Vendors (Westinghouse/Advanced Measurement and Analysis Group, Caldon)
- Owners and Users Groups (WOG, Caldon)
- States
- Media

Internal Stakeholders

- Chairman and Commission
- NRC Director of Communications
- OEDO
- Regions (Inspector's newsletter)
- NRR ET and LT
- DE (EEIB) and DSSA (SRXB)
- CRGR
- ACRS
- OCA

- OPA
- OGC
- DIPM (Regions)
- NSIR
- IP

KEY MESSAGES

- The mission of the NRC is to ensure public health and safety.
- The NRC encourages the use of improved components and procedures utilized in commercial nuclear power plants. However, they must be thoroughly tested to assure that the plants remain within their designed operating bases and do not negatively affect the public health and safety.
- Venturi meters are typically used by plants to measure feedwater flow. Over the past ten years, ultrasonic flow measurement devices have been increasingly used to reduce feedwater flow measurement uncertainty.
- The maximum thermal power that can be generated by a nuclear power plant is included in the licenses granted by the NRC to the plant owners and operators. Plants are required to operate within their licenses. The NRC recently discovered that some plants using ultrasonic flow measurement devices have exceeded their licensed thermal power.
- The NRC is issuing a Bulletin to ensure that all plants that use ultrasonic flow measurement devices are properly evaluated and that they will continue to operate within their licensed power.

COMMUNICATION TEAM

The primary responsibility of the communication team is to convey a consistent, accurate, and timely message to our stakeholders. The team consists of the following technical, project management, and communication staff:

George Dick (NRR/DLPM)	415-3019	Lead PM
Evangelos Marinos (NRR/DE)	415-2911	Technical Lead
Tanya Mensah (NRR/PMAS)	415-3610	Communications Analyst
Scott Burnell (OPA)	415-8200	Public Affairs Officer
Bob Jasinski (NRR)	415-1542	Technical Communications Assistant

COMMUNICATION TOOLS

- External Web Site
- Internal Briefings

The communication team will conduct internal briefings at various points in the process in order to keep internal stakeholders informed of our activities and messages. The schedule of activities (presented in the next section of this plan) includes known points of interaction with internal stakeholders.

- Public Meetings

A public meeting is scheduled for July 1, 2004, to inform the public of the basis and content of the proposed bulletin. Additional meetings will be scheduled as necessary.

- Press Releases and Media Interviews

The communication team will coordinate with the NRC's Office of Public Affairs to issue press releases and arrange media interviews. Press releases will be issued to announce the bulletin and as advised by the OPA.

SCHEDULE OF ACTIVITIES

ACTION	DATE	RESPONSIBLE ORGANIZATION
Brief ET	06/24/04	DE
Brief DEDO	06/25/04	DE
Commissioner's TA Briefing	06/29/04	DE
Public Meeting with stakeholders	07/01/04	DE, DLPM
ACRS Meeting	07/08/04	DE
Issue CRGR Package	07/15/04	DLPM/DE
Brief CRGR	07/27/04	DE
Finalize Bulletin	07/29/04	DE, DLPM
Send Commission Paper to EDO	08/18/04	DLPM, DE
Commission Paper sent to Commission	09/02/04	DLPM, DE
Receive comments from Commission	09/17/04	
Issue Bulletin	09/21/04	DIPM
Issue press release	09/21/04	OPA

QUESTIONS AND ANSWERS

- **Why is the NRC issuing the bulletin?**

The NRC is aware of instances where UFM's that were used for feedwater flow measurement gave erroneous readings. The erroneous readings were used in the calorimetric calculations conducted to determine reactor thermal power, with the result that the reactors were operating at power levels greater than permitted by their licenses. The NRC wants to: (1) inform the industry that there have been some problems with UFM's; (2) determine if there are other instances in which plants, using UFM's, operated at power levels (either higher or lower) other than the expected levels.

- **What is the safety significance of the potential overpower conditions?**

The overpower operations have not been safety significant in the instances reported to date. With the exception of Ft. Calhoun (which had not implemented the UFM), for the cases referenced in the bulletin, the UFM's were used to compensate for venturi fouling. While there were several reported power levels that were above the 102 percent that the affected licensees used in their licensing basis analysis, the overpower levels were small and considering the conservatism inherent in the NRC approved calculations, the NRC does not believe that those overpowers were safety significant.

Some utilities have requested and received MUR power uprates of up to 1.7 percent based on the improved accuracy of UFM's. The NRC is not aware of instances in which those MUR uprate plants have exceeded their licensed power. It is the intent of the bulletin, however, to have those MUR uprate licensees take a detailed look at that their plant performance to verify that they are operating within their license.

- **Why issue a bulletin if an immediate safety problem has not been identified?**

As part of their licenses, licensees are required to operate their plants at or under the RTP specified in the license and in the technical specifications. However, Appendix K to 10 CFR Part 50 requires licensees to perform their accident analyses at a RTP that is above the licensed level to allow for instrument uncertainties. Appendix K to 10 CFR Part 50 used to require a two percent allowance, but this has been changed to allow a smaller value when the smaller value is justified. Where plants have received MUR power uprates, assumed instrument uncertainty is less. If, because of a problem with its flowmeter, a plant is operating above its licensed power, then the plant is not being operated within the conditions authorized by its license.

- **If licensees have discontinued using UFM's, why do they need to respond to the bulletin?**

Even though a plant may not be using a UFM at this time, there is still a need for information to understand how the meters perform under various configurations and plant conditions. If a particular utility considered using a UFM, but decided not to, the reasons for that decision are of interest. For example, was the calculated power with the UFM too high or was it too low? In reaching their decision, did the licensee compare the UFM performance against the usual methods of feedwater flow measurement (e.g., clean, laboratory calibrated venturi meters)?

- **What will the NRC do with the information collected from the licensees' responses to the bulletin?**

The information obtained from the bulletin responses will provide the NRC with licensee's plans for comparing plant actual RTP with the licensed RTP or if they have already made the comparison, the results of the comparison and what actions, if any, were taken by the licensee after evaluating the results. The NRC will use the information to determine if the plant is in compliance with its license. It will also provide information regarding how licensee's monitor and evaluate UFM performance and provide the basis for the NRC to determine if additional steps or precautions must be taken in using the meters.

- **Why did it take a licensee report to generate NRC action?**

The first licensee reports of overpower were received in mid-2003. Questions were raised regarding use of UFM's in the late 1990s and the NRC has been following the progress associated with responding to these questions. For example, the licensee installed UFM's at Byron in 1999, but postponed their use for a year because of concerns expressed by the licensee's staff. Following installation, the NRC questioned the performance of the UFM's at Byron in 2002. However since the UFM's are supposed to be more accurate than conventional meters, it was difficult to know for sure that Byron was operating in an overpower condition. Certain secondary side instrument readings raised questions regarding power level, but again, it was difficult to get an absolute answer. It was not until the licensee undertook an extensive test program in 2003 and early 2004, that definitive information was developed to confirm that the unit was operating above its licensed power

- **How will the NRC modify its criteria for use of UFM's for MUR power uprates?**

In support of its request for a MUR power uprate, the licensee has to address four criteria related to installation and maintenance of the UFM. In addition, Westinghouse recently issued several documents to owners of the W/AMAG instrument setting additional criteria to be used in properly installing and operating the instrument. The NRC will evaluate the licensee responses to the bulletin to determine whether the current design and installation criteria, pre-implementation testing, and performance monitoring are sufficient to assure proper operation of the UFM meters used for MUR power uprates.

- **How will the NRC modify the allowed usage of UFM's?**

The NRC will evaluate the licensee performance verification results as reported in the responses to the bulletin and from those results, determine if additional NRC oversight is warranted.