



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 13, 2006

Dr. Monideep Dey

REDACT - PERSONAL PRIVACY INFORMATION

SUBJECT: DIFFERING PROFESSIONAL OPINION DECISION REGARDING ISSUANCE
FOR PUBLIC COMMENT OF A DRAFT NUREG ON FIRE MODEL
VERIFICATION AND VALIDATION (DPO-2005-006)

Dear Dr. Dey:

The purpose of this letter is to provide the management decision for the Differing Professional Opinion (DPO) that you submitted on June 21, 2005, regarding the issuance for public comment of draft NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications." In accordance with NRC Management Directive 10.159, "The Differing Professional Opinions Program," I appointed an Ad Hoc Review Panel on August 1, 2005, to conduct an independent review of your concerns.

Before addressing the panel's conclusions, it is important to note some of the background facts regarding the DPO, and leading up to your filing a DPO.

The core of your concerns relate to the publication of draft NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," without publishing and/or addressing the findings of the NRC Benchmark Exercise research reports that you claim highlight the issues and limitations of the CFAST and FDS fire models. You propose that these Benchmark Exercise research reports be published (as NUREGS) as drafted either by you, or under your project management.

The Benchmark Exercise research reports were not published as drafted because of concerns identified by NRC staff, and substantiated by fire modeling experts at another agency, regarding the technical soundness and validity of these reports. The Office of Nuclear Regulatory Research (RES) staff began the process of addressing and resolving the concerns regarding the technical and scientific soundness of these Benchmark Exercise research reports, and determined that in order to prevent further delay in the publishing of draft NUREG-1824, that the necessary technical information and data from the Benchmark Exercise research reports, as modified by RES staff, would be directly incorporated into draft NUREG-1824 without waiting to first publish the corrected Benchmark Exercise research reports. You propose that the uncorrected Benchmark Exercise research reports be published and/or incorporated into draft NUREG-1824.

Concerns regarding the technical and scientific soundness of Benchmark Exercise research reports first surfaced in the Fall of 2003. In November 2003, the Office of Nuclear Reactor Regulation (NRR) in a peer review, raised technical concerns with your draft NUREG/benchmark exercise, "Analysis of Pool Fires in Large Multi-Level Halls with the CFAST

and FDS Fire Codes." NRR staff (engineers and technical staff) provided comments to you raising scientific and technical concerns with your proposed draft.¹ NRR's comments were not resolved, nor did you explain why the comments could not be resolved. Subsequently, in the Fall of 2004, your new supervisor independently raised these same concerns and many other concerns regarding the technical and scientific soundness of the work you performed/managed on this and several other Benchmark Exercise research reports, which you proposed to immediately publish as is. Your supervisor was not made aware of NRR's peer review concerns, nor that NRR's concerns and comments were never resolved. Nor was management advised that you had already published this same pre-decisional draft NUREG/benchmark exercise outside the agency (as NISTIR 7081, a National Institute of Standards and Technology (NIST) publication) without resolving NRR's comments and concerns, and without management approval and peer review.

As time progressed in the Fall of 2004 into 2005, your supervisor's concerns regarding the technical and scientific soundness of the work you performed/managed on several of the benchmark exercise research reports was substantiated by other staff members, and by the leading fire modeling experts at the National Institute of Standards and Technology (NIST). In fact, after reviewing your supervisor's comments and technical concerns, NIST pulled from publication two benchmark exercise items you published at NIST.²

The primary focus of the panel's review was to evaluate the process issue of whether draft NUREG-1824 could be issued for public comment prior to the draft NUREGs on the benchmark exercises. The panel determined that this was acceptable. Since the DPO centered around the process, the panel's report did not examine in detail the technical adequacy and quality of the work underlying your position. Nor did the panel's report note that the issues in its attached "Fire Limitations Review Table" were being addressed by RES staff, prior to the filing of the DPO, as part of the staff effort to correct the technical concerns with the Benchmark Exercise research reports as drafted either by you or under your project management.

Regarding the panel's report, the panel's review noted that you had the following three concerns regarding issuance of draft NUREG-1824 for public comment:

1. The findings on the issues and limitations of the CFAST and FDS fire models from the nine benchmark research reports have not been addressed or incorporated in the preparation of draft NUREG-1824. Specifically, there are 11 identified limitations of CFAST and FDS modeling codes that should be evaluated with respect to draft NUREG-1824.
2. In publishing draft NUREG-1824, the NRC is at risk of being criticized for not addressing its own research in the development of regulatory products and it is not fair to NRC stakeholders who have paid for the research to learn that the

¹ See, Memorandum from Sunil Weerakkody, Section Chief, Fire Protection Engineering and Special Projects Section, Plant Systems Branch, Division of Systems Safety and Analysis, Office of Nuclear Reactor Regulation, "NRR Comments on Draft NUREG 'Analysis of Pool Fires in Large Multi-Level Halls with CFAST and FDS Fire Codes,' Developed by the NRC Office of Nuclear Regulatory Research," dated November 24, 2003.

² The items removed from NIST publication due to concerns over technical soundness were Benchmark Exercise No. 2 (which you propose be published as a NUREG) and a data CD for Benchmark Exercise No. 3.

research was not used in the draft documents they have been requested to review.

3. The lack of accounting for the limitations of the models in the V&V process will probably lead to the improper use of the models by licensees.

The panel provided the results of its review on November 15, 2005, and reached the following overall conclusions:

1. The panel partially substantiated two of the three concerns raised by the Submitter. [Note - Concerns 1 and 3 were partially substantiated. The panel did not substantiate concern 2.]
2. The panel concluded that it is acceptable to publish draft NUREG-1824 for public comments.

In reaching my decision on the panel's conclusion, I have reviewed its report, the additional comments you provided the panel on November 22, 2005, and information provided by my staff. Based on my review, I have decided to disagree with the panel's first conclusion, and agree with the panel's second conclusion. With regard to the panel's first conclusion (i.e., partial substantiation of Concerns 1 and 3), I provide the following:

Panel Discussion on Concern 1: Based on its understanding of the code limitations and the objectives of a draft document for comment, the panel partially substantiated the concern in that the limitations were not addressed in a manner similar to the benchmark reports in the working draft of NUREG-1824. However, the panel believed that, even without further changes to the working draft NUREG-1824 with respect to the limitations, NUREG-1824 seemed to be on a successful path for publications as a draft since it would contain sufficient information to permit an independent evaluation of the quality of the work.

Management Decision: The panel is correct in determining that the model limitations discussed in draft NUREG-1824 are not addressed in a manner similar to the draft benchmark reports. The draft benchmark reports were not issued because of a number of technical and quality concerns which your management discussed with you in various meetings beginning in October 2004 and continuing through 2005. One of the principle concerns was that the limitations discussed in the draft benchmark reports were often broad and sweeping without providing sufficient technical basis. As such, the draft benchmark reports did not provide a suitable technical basis to support issuance of draft NUREG-1824. Accordingly, in the Spring of 2005, the staff pursued a different approach to ensure that the limitations were appropriately addressed in draft NUREG-1824. You were informed of this different approach in the Summer of 2005. The staff was pursuing this different approach for addressing the model limitations in draft NUREG-1824 prior to the issuance of your differing professional opinion. Furthermore, with regard to the specific model limitations identified in "Fire Limitations Review Table" attached to the panel's report, the staff evaluated those issues and provided a complete accounting of the limitations in a response to the panel dated December 12, 2005 (enclosure). Where appropriate for a verification and validation report, these limitations

were addressed in Draft NUREG-1824. As such, I conclude that no further action is necessary.

Panel Discussion on Concern 3: The panel believed that there had not yet been an accurate accounting of the potential model limitations derived from the originally conceived benchmark exercises. However, the panel further believed that this accounting was not critical to the publication of the draft NUREG-1824 and that sufficient checks and balances remained in the regulatory process to minimize the potential of improper use of the models by licensees.

Management Decision: With regard to accounting for the potential model limitations from the benchmark exercises, the panel's report included an attachment (i.e., "Fire Limitations Review Table"), which was intended to reflect the limitations of concern. In a letter dated December 12, 2005, RES responded to the panel and stated that all limitations identified in the DPO report had been previously identified, and addressed in draft NUREG-1824 or other technical documents such as the user's manual and technical basis manuals. The decision to address the model limitations in draft NUREG-1824, as opposed to relying upon draft benchmark reports, was made prior to submittal of your differing professional opinion. With regard to the publication of draft NUREG-1824 for comment, I agree with the panel that sufficient checks and balances remained in the regulatory process to minimize the potential for improper use of the models. These checks and balances included the public comment resolution process, reviews by the NRC's Advisory Committee on Reactor Safeguards, and the NRC's licensing and inspection programs. Furthermore, NUREG-1824 is only one part of the NRC's fire modeling program (as opposed to it being the program unto itself) and is meant to support the verification and validation for selected fire models. Draft NUREG-1824 complements the fire model user's guide and other technical basis documents. A fundamental assumption of the verification and validation project is that the fire model analyses are performed by qualified model users who are familiar with the limitations of the models, as identified in the model's documentation, which includes the users manual and technical support documents. As such, I conclude that no further action is necessary.

The panel also provided two recommendations. My decisions regarding the recommendations, and the rationale for the decisions, are provided below.

Recommendation 1: The panel recommends that 8 of the 11 issues in the "Fire Limitations Review Table" be specifically considered for inclusion as limitations in the final NUREG-1824 or equivalent document such as a user's guide.

Management Decision: The issues identified in the "Fire Limitations Review Table" were evaluated by RES and the results of that evaluation are attached to this letter. As indicated in the evaluation, the limitations had already been addressed in draft NUREG-1824, prior to the filing of the DPO, when the limitation was appropriate for a verification and validation report, or, the limitations were already addressed in the model user's manual and technical basis documents. As such, I conclude that no further action is necessary.

M. Dey

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Recommendation 2: The panel recommends that the remaining limitations be specifically considered for inclusion in the benchmark NUREGs.

Management Decision: The remaining model limitations (3 of 11) in the "Fire Limitations Review Table" were evaluated by RES and the results of that evaluation are attached to this letter. As indicated in the evaluation, the limitations were either already addressed in draft NUREG-1824, prior to the filing of the DPO, when the limitation was appropriate for a verification and validation report, or, the limitations were more appropriately already addressed in the model user's manual and technical basis documents. As such, I conclude that no further action is necessary.

In accordance with Management Directive 10.159, a summary of the issue and its disposition will be included in the Weekly Information Report to advise interested employees of the outcome.

Sincerely,



Carl J. Paperiello, Director
Office of Nuclear Regulatory Research

Enclosure: RES Comments on the
Differing Professional Opinion Panel
Response to DPO-2005-006
dated December 12, 2005

cc w/enclosure:
R. Pedersen, DPOPM
D. Lew, Region I