



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064**

January 24, 2002

MEMORANDUM TO: Samuel J. Collins, Director, Office of Nuclear Reactor Regulation

FROM: Ellis W. Merschoff, Regional Administrator /RA/

SUBJECT: DIFFERING PROFESSIONAL VIEW CONCERNING THE CONTINUED
PERFORMANCE OF SIGNIFICANCE DETERMINATION PROCESS
(SDP) PHASE 2 ANALYSES

This memorandum forwards to you for your consideration and appropriate action the recommendations of the Ad Hoc Review Panel that considered the subject Differing Professional View (DPV). A copy of their January 10, 2002 report is attached. I have reviewed the panel's recommendations and discussed them with members of your staff.

Please note that the Ad Hoc Panel's first recommendation, to perform an overall review of the SDP program progress and direction, stipulated that the program office review be completed before the draft SDP Timeliness Improvement Strategies and Task Action Plan are finalized. If you should determine it appropriate to perform these tasks in parallel, then the Task Action Plan should recognize the issues raised in the DPV and provide an opportunity to reconcile formally the results of the program office review with the SDP Timeliness Strategies.

In accordance with Management Directive 10.159, Handbook, section B.(5) Followup Actions, completion dates for followup actions agreed to by the Office Director are to be established and communicated to the submitter of the DPV. Since the followup actions for this DPV lie with the program office rather than Region IV, I am requesting that you respond to this memorandum with a copy to Mr. Troy J. Pruett of my staff, identifying appropriate target completion dates. I understand that NRR will track those followup actions under DPV Tracking Number NRR-02-DPV-02.

Thank you for your assistance in both the Ad Hoc Review Panel and in addressing the panel's recommendations. Should you have any questions concerning this memorandum, please call me at (817) 860-8225. Questions concerning the recommendations of the Ad Hoc Panel should be directed to Mr. William D. Beckner at (301) 415-1161.

Attachment: As stated

cc w/o Attachment:

William D. Beckner, Chairman, Ad Hoc DPV Review Panel
Hubert J. Miller, Regional Administrator, Region I
Bruce S. Mallett, Acting Regional Administrator, Region II
James E. Dyer, Regional Administrator, Region III
Jon R. Johnson, Deputy Director, Office of Nuclear Reactor Regulation
R. William Borchardt, Associate Director for Inspection & Programs, NRR
Bruce A. Boger, Director, Division of Inspection Program Management, NRR
Frank Congel, Director, Office of Enforcement

Samuel J. Collins

-2-

bcc w/o Attachment:
EWMerschoff
TPGwynn
KSmith
AHowell

DOCUMENT NAME: S:\RAS\RADIR\DPV\DPV-MC0609 Nov 2001\NRR Referral.wpd

To receive copy of document, indicate in box: "C" = Copy without enclosures "E" = Copy with enclosures "N" = No copy

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TPGwynn:jc/RA/		KSmith/RA/		EWMerschoff/RA/	
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January 10, 2002

MEMORANDUM TO: Ellis W. Merschoff, Regional Administrator
Region IV

FROM: William D. Beckner, Chair /RA/
Ad Hoc Review Panel

SUBJECT: DIFFERING PROFESSIONAL VIEW ON SIGNIFICANCE
DETERMINATION PROCESS (SDP) AD HOC REVIEW PANEL

Per your memorandum of November 16, 2001, the Ad Hoc Review Panel has convened and made an assessment of the differing professional view (DPV). This panel consisted of myself as chair and members M. Chris Nolan, Wayne L. Schmidt, and Kriss M. Kennedy. The panel convened in Rockville on December 4 and 5, 2001 to interview the submitter of the DPV and a number of staff from NRR and RES responsible for the SDP program. In addition, the panel convened and conducted further interviews by telephone on several occasions.

A report prepared by the panel is attached and provides an evaluation of the concerns and makes the following recommendations:

1. The AD Hoc Review Panel recommends that the program office undertake a review of the overall SDP program progress to date and future program direction. This review should be timely and completed before the current proposed SDP Timeliness Improvement Strategies and Task Action Plan currently being draft by NRR are finalized. This review would include a number of areas that the panel agreed were valid concerns raised by the DPV and included in Enclosure 5. This review would rely heavily on stakeholder input focusing on analyst and inspector stakeholders making use of the tools and those decision makers using the results.
2. In addition to the general recommendation for an overall program assessment, the panel makes a specific recommendation relative to Mr. Pruett's concern that the *Phase 2 SDP Process Does not Ensure Safety*. This is related to the possible under prediction of the risk significance of findings by the Phase 2 notebooks. The panel believes that this would not be a significant concern once the notebooks have been benchmarked and updated. In addition, there is appropriate defense in depth to the overall Reactor Oversight Process that risk significant findings are not likely to go unnoticed. However, the Ad Hoc Panel recommends that NRR formalize guidance that any finding that is screened as potentially risk significance by the Phase 1 process be reviewed by an SRA at least until the Phase 2 notebooks have been benchmarked and updated as necessary.

3. To address Mr. Pruett's concern regarding the potential for unnecessary regulatory burden resulting from overly conservative Phase 2 notebooks, the panel recommends that the program office issue formal guidance that a Phase 3 analyses should be conducted if the accuracy of the Phase 2 analyses is in question such that the significance of the finding would likely be changed if a more detailed (Phase 3) analysis was conducted.

Attachment: Ad Hoc Panel Report

cc: K. M. Kennedy
M. C. Nolan
W. L. Schmidt
R. W. Borchardt
Karla Smith
T.P. Gwynn

- 3. To address Mr. Pruett’s concern regarding the potential for unnecessary regulatory burden resulting from overly conservative Phase 2 notebooks, the panel recommends that the program office issue formal guidance that a Phase 3 analyses should be conducted if the accuracy of the Phase 2 analyses is in question such that the significance of the finding would likely be changed if a more detailed (Phase 3) analysis was conducted.

Attachment: Ad Hoc Panel Report

cc: K. M. Kennedy
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 Karla Smith
 T.P. Gwynn

ADAMS ACCESSION NUMBER: ML020140037

*See previous concurrence

DOCUMENT NAME: G:\RTSB\BECKNER\DPV RECOMMENDATION LETTER.WPD

OFFICE	OE	RGN-IV:DRS:SRA	RGN-1:DRS	PD:RORP:DRIP
NAME	MCNolan*E-mail	KMKennedy*E-mail	WLSchmidt*E-mail	WDBeckner
DATE	01/08/2002	01/08/2002	01/08/2002	01/10/2002

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AD HOC REVIEW PANEL REPORT ON THE DIFFERING PROFESSIONAL VIEW OF MR. TROY PRUETT

William D. Beckner, Chair
Ad Hoc Review Panel

M. Chris Nolan, Member
Ad Hoc Review Panel

Wayne L. Schmidt, Member
Ad Hoc Review Panel

Kriss M. Kennedy, Member
Ad Hoc Review Panel

Introduction

In a memorandum dated November 8, 2001, the differing professional view (DPV) of Mr. Troy Pruett (see Enclosure 1), a Senior Reactor Analyst in Region IV, was forwarded to the Director of the Division of Reactor Safety in Region IV. This DPV involved concerns about the performance of the Significance Determination Process Phase 2 Analyses. An Ad Hoc Review Panel, appointed by the Regional Administrator by memorandum dated November 16, 2001, was formed to review the DPV and make appropriate recommendations. The members of the Panel were William D. Beckner as Chair, M. Chris Nolan, Wayne L. Schmidt, and Kriss M. Kennedy who was selected by the initiator of the DPV. The panel conducted an initial organizational telephone conference on November 20, 2001 and then met on December 4 and 5, 2001 in Rockville to interview Mr. Pruett and a number of individuals. The panel subsequently interviewed other staff by telephone on December 10, 2001. Enclosure 2 provides a list of those individuals interviewed by the Panel. The Panel concluded developing their recommendations and this report through the use of numerous telephone conversations and electronic mail and document exchanges.

Background

The Significance Determination Process (SDP) is used by NRC inspectors and staff in determining the safety significance of inspection findings, using risk insights where appropriate. The SDP determinations for inspection findings and the performance indicator information are combined for use in assessing the performance of licensees through the NRC Reactor Oversight Process (ROP) described in Manual Chapter 2515.

A finding is an issue that has been determined to be of sufficient significance to warrant more detailed analysis using the SDP or that has extenuating circumstances. The output of the SDP is a color designation for the finding. The color represents the safety significance of the finding: A Green finding is a finding of very low safety significance; a White finding has low to moderate safety significance; a Yellow finding has substantial safety significance; and a Red finding has high safety significance. Therefore, the significance determination is the characterization of an inspection finding using the SDP outcome color scheme to identify the level of significance (i.e., Green, White, Yellow, or Red).

The plant-specific reactor safety SDP uses a graduated three-phase process to differentiate inspection findings on the basis of their potential risk significance. Phase 1 of the SDP provides a precise characterization of the finding and an initial screening of very low-significance findings for disposition by the licensee's corrective action program. Phase 2 of the SDP is an initial approximation of the risk significance of the finding and development of the basis for this determination for those findings that pass through the Phase 1 screening. The Phase 2 SDP is performed using plant-specific risk-informed inspection notebooks which have been developed for each nuclear plant. These notebooks contain plant-specific worksheets used by the inspectors to determine the significance (color) of the inspection finding. Phases 1 and 2 of the SDP are intended to be accomplished primarily by field inspectors and their supervisors or managers. Phase 3 of the SDP is a review and, as-needed, refinement of the risk significance estimation results from Phase 2, performed by an NRC risk analyst. A Phase 3 evaluation is also performed for the development of a risk analysis for findings which cannot be evaluated using the plant-specific risk-informed Phase 2 notebooks.

All findings with an assessment other than Green are reviewed by the SDP and Enforcement Review Panel (SERP). The purpose of the SERP is to provide a management review of the potential findings and related apparent violations. SERP members attempt to reach a consensus on the statement of deficient licensee performance which the inspection finding is

based on, the significance of the finding(s), and the apparent violations and the requirements that should be cited.

If the SERP concludes that the preliminary significance assessment is other than Green, then the licensee will be given the choice of formally presenting any further information or perspectives, or to accept the staff's decision. The licensee may request a public regulatory conference with regional inspection staff and management to present facts and their evaluation of significance. If the licensee provides further information on the docket by mail or during a regulatory conference, then the regional staff with NRC headquarters staff participation will make its final significance determination after evaluating this information. If the staff, after consideration of the licensee's additional information, determines that the initial characterization of significance should not change, the final determination of significance will be issued. If the staff, after consideration of the licensee's additional information, determines that a change in the initial characterization of significance is warranted or should be considered, the SERP will schedule a review. When the SERP agrees on the final determination of significance, the licensee will be informed of the final color of the finding in a letter.

Discussion of Mr. Pruett's Concerns

Mr. Pruett supports the concept of risk-informing the ROP, but believes that the tools that have been made available to perform the significance determination are not meeting the needs of the inspectors. He would like tools to determine the risk significance of an issue that are both effective and more "inspector friendly". The focus of this concern is on the SDP Phase 2 notebooks. Mr. Pruett perceives NRC management to believe that Phase 2 provides an adequate assessment of inspection findings and effectively utilizes staff resources. He also perceives that his concerns about the process are viewed by NRC management as simply placing "... too much focus on obtaining a risk-based number..." and wanting a "... gold-plated, sophisticated risk-model ... as opposed to an effective inspector friendly tool that is appropriately risk informed." Mr. Pruett's concerns were provided in a letter included as Enclosure 1 and articulated in four major areas as summarized below.

Mr. Pruett believes that the *Phase 2 SDP Process Does Not Ensure Safety*. He questions the adequacy of the process from a number of perspectives including lack of updating and independent validation of the models and known inaccuracies that have been demonstrated by the limited benchmarks that have been performed. Mr. Pruett has participated in a number of benchmarking trips and provided his assessment of the quality of the Phase 2 notebooks based on the results of these trips. He indicates that the Phase 2 notebooks are difficult to use and there is inadequate training on their use. Mr. Pruett believes that these inadequacies can produce both overestimates and underestimates of the risk significance of a finding. The major thrust of the concern, as indicated by subsequent discussion, is on the lack of effectiveness and efficiency and unnecessary burden due to unnecessary overestimates of the risk significance which are most likely. However, the potential to underestimate the risk significance also exists and thus there is a possibility that an important issue might not be recognized and adequately addressed. Given the statement of this view, the panel asked Mr. Pruett why he didn't further articulate any specific safety concerns. He indicated that he felt the statement "spoke for itself" and provided no additional information.

Mr. Pruett believes that the *Phase 2 Process is Inefficient and Ineffective*. He questions the continued expenditure of resources to continue development of the Phase 2 notebooks as well as their continued use which he believes will not be efficient or effective even if completed. Mr. Pruett has concerns about the performance of the contractors developing the notebooks

and lack of a quality standard for the results. Even if the notebooks were to be improved, Mr. Pruett stated, in accordance with Manual Chapter 0609, that more complex assessments or those involving external events will always require a Phase 3 analyses and that performing a Phase 2 analysis is therefore an unnecessary duplication of effort. For less complex assessments that may be amenable to a Phase 2 analyses, a Phase 3 analyses would also be very simple and, therefore, it would be more efficient to go straight to a Phase 3 analysis.

Mr. Pruett believes that the *Phase 2 Process Places a Regulatory Burden on the Licensee*. He believes that holding a SERP based solely on Phase 2 analyses is an unnecessary burden on licensees since in most cases the results will be overly conservative. The licensee is required to expend resources to prepare for the regulatory conference which in most cases will result in lowering of the significance of the finding. He believes that any issue that is potentially risk significant based on a Phase 2 analysis should be further analyzed using a Phase 3 SDP analysis. Since potentially risk significant findings should be analyzed using a Phase 3 analysis, the conduct of a Phase 2 analysis is an unnecessary duplication of effort.

Mr. Pruett believes that the *NRC Does Not Need Two Separate Assessment Tools*. He believes that the SPAR models that are also under development duplicate the minimal features of the Phase 2 notebooks. He believes that with an improved interface, the SPAR models would serve as an independent assessment tool that could be used by inspectors, analyst and management. Mr. Pruett also believes that NRC management significantly over estimates the benefit of the insights that the Phase 2 notebooks provide to inspectors and that the SPAR models would provide insights that would substantially exceed the insights of the Phase 2 notebooks.

Mr. Pruett's Recommended Actions

Mr. Pruett specifically recommended the following actions:

1. *Discontinue the use and development of the at-power and shutdown Phase 2 notebooks.*
 2. *Development of the SPAR models should be suspended until the NRC has developed a integrated position on what the SPAR model should be able to accomplish. This step is necessary to prevent incremental and costly modifications of the model.*
 3. *Evaluate which assessment tool/method will result in the most accurate result with the best use of resources. The NRC needs to stop expending resources until a plan is developed which articulates what tools are needed, what the tools should be able to accomplish, what will be necessary to develop the tools, and when the tools should be available to the staff.*
 4. *Obtain current importance measure tables for each facility. The tables should be used to assess the significance of single condition inspection findings. These table already exist as a part of the licensees' PRA models.*
 5. *Develop a standard methodology for completing all types of Phase 3 analyses.*
 6. *Fully integrate the use of individuals which have completed advanced risk training.*
- Consistent with the discussion of the concerns about the Phase 2 analyses, Mr. Pruett specifically recommends discontinuation of use and further development of the Phase 2

notebooks. In addition, while supporting more detailed Phase 3 or SPAR analyses, he makes several specific recommendations for planning and standards directed toward ensuring that the analyses are both effective and efficient. Lastly, Mr. Pruett recommends that better use be made of individuals who have had advanced risk training. This recommendation is not directly related to the concerns over the SDP Phase 2 process, but a general concern that the NRC has invested in significant training of staff which are not making use of that training.

Evaluation of Concerns

The panel discussed the concerns with Mr. Pruett and with NRR management and staff responsible for the SDP program. In addition, technical staff in NRR and RES responsible developing and maintaining the SDP tools including the Phase 2 notebooks and the SPAR models were interviewed. A list of individuals interviewed by the panel is included as Enclosure 2. While there was general agreement on many of the facts surrounding Mr. Pruett's concerns, it was evident that there was widely diverse opinion on the implications of the facts. For example, Mr. Pruett believes that the possible over estimation of the risk significance using the Phase 2 notebooks results in an unnecessary burden on the licensee since, in many cases, the findings will subsequently be found to be less risk significant. Others believe that use of the Phase 2 SDP results enables the NRC to publicly engage the licensee earlier in the process to facilitate obtaining information. Even if the risk significance is later shown to be less significant, overall licensee burden is reduced by the many findings that are screened out by the Phase 2 process. Differences in opinion also exist over the perceived benefit to public confidence from an early public engagement of licensees versus a potential loss of public confidence if the significance of findings are consistently reduced following a regulatory conference. These differences in perspective have resulted in differing practices between the regions relative to going forward with a SERP or regulatory conference based solely on the results of the Phase 2 SDP analysis. There is also difference in opinion surrounding the additional benefit to the inspectors of risk insights that might be provided by the Phase 2 process. This diversity of opinion was emphasized by two staff members who separately brought unsolicited views to the panel, one supporting and one opposing the DPV concerns. Given the diversity of opinion, the panel considered interviewing a number of Senior Reactor analysts (SRA) and regional managers to see if a consensus view could be obtained. However, the usefulness of such an effort was questioned due to the anecdotal evidence that no clear consensus would be obtained.

It was also clear to the panel that the issues raised by the DPV are far reaching and involve a significant number of stakeholders in the regions, headquarters, the Commission, and external stakeholders. It was also determined that of some of these same issues were already being addressed by other efforts. For example, the NRR program office is currently attempting to address issues with SDP timeliness in response to Commission direction. A draft of SDP Timeliness Improvement Strategies and a Task Action Plan has been prepared by NRR (Enclosure 3) which has a number of objectives and tasks directly related to the DPV. These plans include improvements to the SDP processes including the Phase 2 notebooks. The draft plan attempts to address many of the concerns that led Mr. Pruett to recommend stopping the Phase 2 process. In addition, there are a number of tasks related to his other recommendations to better define standards for Phase 3 analyses and future program direction. RES also provided a plan for SPAR development and indicated that an interoffice group exists to guide the program direction (Enclosure 4).

Given the far reaching issues, large number of stakeholders, and significant ongoing activities related to the SDP, the Ad Hoc Review Panel felt that it was not appropriate or possible, in the

short time period available, to try and definitively address each of Mr. Pruett's concerns and recommendations. However, the panel did believe that he raised a number of valid concerns that should be addressed. As such, the panel's primary recommendation is that the program office undertake a comprehensive review of the overall progress of the SDP program to date and future program direction. Irrespective of the DPV, it would be prudent at this point in the program to pause and conduct a review of the program's progress to ensure that the significant success of the ROP continues. The panel made no recommendation with regard to the form of the review, but is making a number of specific recommendations for areas to consider. In addition, the panel recommends significant involvement in any review by the inspectors, analysts and decision makers who have implemented the program to date. The panel observed that Mr. Pruett had submitted a feedback form several months ago containing some of the concerns contained in the DPV and that several other staff members independently contacted the DPV panel to express opinions. Again, irrespective of the DPV, these stakeholders are the ones who have been most involved with the SDP program as it has evolved from development to implementation and the panel questioned the effectiveness of the current feedback process in addressing stakeholder concerns.

Disposition of Mr. Pruett's Recommendations

The panel's specific recommendations relative to Mr. Pruett's recommended actions are included below:

1. *Discontinue the use and development of the at-power and shutdown Phase 2 notebooks.*

The panel does not recommend abruptly discontinuing use of the Phase 2 notebooks due to the diversity in opinion by key stakeholders relative to their use and the far reaching implications of such a recommendation. However, the panel does view many of the concerns which led to this recommendation to be valid. As a result, the panel recommends that the NRC conduct a comprehensive review of the SDP, including the effectiveness of the Phase 2 notebooks and the future direction of the process.

2. *Development of the SPAR models should be suspended until the NRC has developed a integrated position on what the SPAR model should be able to accomplish. This step is necessary to prevent incremental and costly modifications of the model.*

The panel does not recommend stopping work on the SPAR models because the models support other efforts besides the SDP. In addition, there is evidence of an integrated plan for what these models should accomplish. However, the panel recognized the potential for an inefficient use of resources if clear expectations for the models were not determined. Thus a reevaluation of expectations of these models for the SDP program would be expected as part of any review of the SDP program.

3. *Evaluate which assessment tool/method will result in the most accurate result with the best use of resources. The NRC needs to stop expending resources until a plan is developed which articulates what tools are needed, what the tools should be able to accomplish, what will be necessary to develop the tools, and when the tools should be available to the staff.*

The panel supports this recommendation in principle and believes that the panel-recommended SDP program review of progress and future direction should be the means to accomplish this.

Specifically, the panel was concerned about the timing of the Phase 2 notebook benchmarks and improvements which, at the current level of funding, would not be completed for several years. The panel noted that this schedule was similar to that for completion of the “longer term” SPAR program and questioned parallel funding of two efforts that would be completed in the same time period.

4. *Obtain current importance measure tables for each facility. The tables should be used to assess the significance of single condition inspection findings. These table already exist as a part of the licensees’ PRA models.*

The panel agreed that importance measures can be useful tools in evaluating single condition inspection findings. However, the panel recognized that the accuracy of the importance measures is dependent on a number of factors, including the quality of the licensee’s PRA. Importance measures can be utilized by SRAs in evaluating the significance of the inspection findings subject to the quality of the PRA and the other factors that must be considered, such as external events. The panel recommends that the use of importance measures, in lieu of the Phase 2 notebooks, be considered as part of the comprehensive review of the SDP program.

5. *Develop a standard methodology for completing all types of Phase 3 analyses.*

The panel agrees with this recommendation that improved guidance be developed for Phase 3 analyses. This consistent with the draft Task Action plan being developed by NRR.

6. *Fully integrate the use of individuals which have completed advanced risk training.*

This is a general recommendation with no specific actions requested. However, the panel recommends that, as part of the SDP program reevaluation, a plan be developed to fully integrate those personnel who have completed the advanced risk training into the process for conducting risk evaluations.

Ad Hoc Panel Recommendations

1. The AD Hoc Review Panel recommends that the program office undertake a review of the overall SDP program progress to date and future program direction. This review should be timely and completed before the current proposed SDP Timeliness Improvement Strategies and Task Action Plan currently being draft by NRR are finalized. This review would include a number of areas that the panel agreed were valid concerns raised by the DPV and included in Enclosure 5. This review would rely heavily on stakeholder input focusing on analyst and inspector stakeholders making use of the tools and those decision makers using the results.
2. In addition to the general recommendation for an overall program assessment, the panel makes a specific recommendation relative to Mr. Pruet’s concern that the *Phase 2 SDP Process Does not Ensure Safety*. This is related to the possible under prediction of the risk significance of findings by the Phase 2 notebooks. The panel believes that this would not be a significant concern once the notebooks have been benchmarked and updated. In addition, there is appropriate defense in depth to the overall ROP that risk significant findings are not likely to go unnoticed. However, the Ad Hoc Panel

recommends that NRR formalize guidance that any finding that is screened as potentially risk significance by the Phase 1 process be reviewed by an SRA at least until the Phase 2 notebooks have been benchmarked and updated as necessary.

3. To address Mr. Pruett's concern regarding the potential for unnecessary regulatory burden resulting from overly conservative Phase 2 notebooks, the panel recommends that the program office issue formal guidance that a Phase 3 analyses should be conducted if the accuracy of the Phase 2 analyses is in question such that the significance of the finding would likely be Green if a more detailed (Phase 3) analysis was conducted.

Attachment

Enclosure 1

DPV Letter



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064**

MEMORANDUM FOR: Arthur T. Howell, III, Director
Division of Reactor Safety

FROM: Troy W. Pruett, Senior Reactor Analyst
Division of Reactor Safety

SUBJECT: DIFFERING PROFESSIONAL VIEW REGARDING THE
CONTINUED PERFORMANCE OF SIGNIFICANCE
DETERMINATION PROCESS (SDP) PHASE 2 ANALYSES

The continued use of the Manual Chapter 0609 Phase 2 analysis process should be discontinued. The process is cumbersome, difficult to utilize, time consuming, inflexible, and frequently provides inaccurate results. The continued development and use of the Phase 2 process will not necessarily ensure safety is maintained, is inefficient and ineffective, and will place an unnecessary regulatory burden on licensees.

Perspective on the Staff's View of the Phase 2 Process

The following comments were made verbally or provided in written correspondence:

- I am seeing my fears about introducing risk analysts into the process being realized. Sometimes too much of a focus on obtaining a risk-based number vice a legitimate risk-informed outcome for the observed deficiency gets in the way. The ROP will be revised to appropriately mitigate this.
- I have been hearing some items from the staff regarding the continued uncomfortableness of SRAs in using Phase 2 workbooks, despite the successful benchmarking efforts over past several months. I sense that the SRAs want a gold-plated, sophisticated risk-model equivalent tool, as opposed to an effective, inspector friendly tool that is appropriately risk-informed. I am concerned that we are undermining all the good that the ROP can provide in terms of risk-informing the process by which we assess licensee performance by tying ourselves up in lengthy, resource consuming risk analyses.

From my perspective, NRC management in NRR believes that the SDP Phase 2 process provides an adequate assessment of inspection findings and effectively utilizes staff resources.

Differing View - The Phase 2 SDP Process Does Not Ensure Safety:

The Phase 2 notebooks are not an independent assessment tool. The Phase 2 notebooks are derived from the initial submittals of Individual Plant Examinations (IPE). The validity of the models used to develop the IPEs received minimal scrutiny by the Agency. Benchmarking to support the adequacy of the Phase 2 notebooks determined whether or not alignment existed between the licensee's original IPE submittal and the current update of the licensee's PRA model. Again, the validity of the licensee's current PRA model has also received minimal scrutiny by the Agency. Consequently, the results of a Phase 2 analysis do not necessarily provide an accurate assessment of the significance of a particular issue. The Phase 2 analysis

result provides an oversimplification of the licensee's PRA model and does not provide an independent assessment of the significance of a particular finding.

The quality of the Phase 2 notebooks, as evidenced by the two rounds of benchmark trips, is unsatisfactory. Specifically:

- The first round of benchmark trips conducted in 2000 concluded that the Phase 2 notebooks needed significant revision. Consequently, significant resources were expended to add additional elements to the existing Revision 0 notebooks.
- 3 of 7 Revision 0 notebooks underestimated the significance in more than 10 percent of the conditions reviewed. Consequently, if acted on, 10 percent of the conditions analyzed by a Phase 2 notebook could result in a regulatory conclusion which underestimates the safety significance of the issue.
- 6 of 7 Revision 0 notebooks over estimated the significance for between 11 and 41 percent of the conditions reviewed. This has actually been incorrectly reported to NRC management. The benchmark results are based on a comparison of the risk significance for conditions lasting one 1 year (See attached data sheets). Shorter intervals result in significantly more over conservative results. While this may provide a safety benefit, it places a regulatory burden on the licensee and results in inefficient use of staff resources.
- 1 of 7 Revision 0 notebooks necessitated removal from the public website due to gross inaccuracies.

Essentially, if executed perfectly, the post benchmarked Phase 2 notebooks should provide an over conservative estimate approximately 90 percent of the time. These results were obtained with the use of a panel of highly informed and trained risk analysts from BNL, INEEL, NRR, RES, and Regional offices. Even these individuals had difficulty completing condition assessments using the Phase 2 notebooks. Individuals with less training and information should not be expected to produce the same results. Consequently, what may produce an above average result with highly skilled personnel is likely to produce a below average or unsatisfactory result with the lesser skilled inspection staff. Additionally, the web based training being developed by the TTD does not enable the inspection staff to complete the more complex Phase 2 determinations.

If the licensee revises their PRA model, the Phase 2 notebooks will produce an even greater number of inaccurate results. Currently, there are no plans to provide periodic and long term maintenance of the Phase 2 notebooks. Without resource intensive updates, the Phase 2 notebooks have the potential to produce a higher percentage of results which do not reflect the actual safety significance.

A review of Revised Oversight Process data for the first 5 quarters of implementation was performed. Per SECY 00-0009, the staff was to complete a Phase 3 analysis for any Phase 2 analysis. This action was to ensure an appropriate assessment of risk was completed while the Phase 2 notebooks were in development. 706 green findings, 22 white findings, and 1 red

finding were issued. During the same period, 97 Phase 3 evaluations were performed. No data was collected to ensure that all Phase 2 evaluations received a Phase 3 evaluation. In addition, recently completed assessments of inspection reports by NRR suggest that several issues were evaluated as green without the benefit of a Phase 3 analysis. Using the suspect Phase 2 notebooks to determine an issue is green has the potential to impact both safety and the regulatory process.

Based on discussions with the inspection staff, there is confusion regarding what constitutes a completed Phase 2 notebook. Does a Revision 0 Phase 2 notebook function as a stand alone risk tool or does a Revision 1 Phase 2 notebook need to be issued?

Differing View - The Phase 2 Process is Inefficient and Ineffective

The new assessment process began in April 2000. Well over a million dollars has been spent and additional large sums of money are being allocated to continue the development of the at-power Phase 2 notebooks. After a year and a half, the NRC still does not have a single approved notebook. A Revision 0 of the plant specific notebooks for most facilities has been completed; however, only a small percentage have undergone a quality check. None of the notebooks which were quality checked have been revised. Even when/if the first document is fully completed, it will be unuseable because it fails to account for external events, does not allow for the assessment of multiple failures, does not provide an adequate allowance for reasonable operator recovery actions, and requires numerous (currently undocumented) special rules to use.

NRC Manual Chapter 0609 specifies that issues which affect external events and containment findings must be evaluated by an SRA using a SDP Phase 3 process. Consequently, most conditions assessed by the Phase 2 process will require a Phase 3 evaluation. This results in a duplication of effort between inspection and risk analyst personnel. The duplication of effort is an inefficient use of resources.

The Phase 2 notebooks are a cumbersome and time consuming process. Phase 3 analyses for potentially significant issues have been performed since the inception of the revised oversight program without substantially increasing the burden on the risk analyst. Additionally, the increased use of advanced risk trained individuals should allow regional SRAs more time to focus on complex significance determinations. In any event, Phase 3 results for single conditions are less time consuming than a Phase 2 analysis. A single condition issue (auxiliary feedwater train unavailable) assessed via the Phase 3 process requires that the analyst know 3 numbers: The baseline CDF, the risk achievement worth, and the duration. Note that this process frequently occurs when issues are first identified. It is a common practice for inspectors to contact a risk analyst in order to screen issues before investing inspection resources. Estimated time to get a reliable first cut on the risk significance: 1-2 hours. This includes a discussion with the licensee's risk analyst to confirm the results. The process is essentially complete for licensee's which have included external events in the probabilistic risk assessment (PRA) model. For all other licensee's, a qualitative assessment of the impact of external events on the safety significance must be performed (THIS QUALITATIVE ASSESSMENT IS NO DIFFERENT THAN WHAT IS REQUIRED TO BE PERFORMED FOR ANY PHASE 2 OR 3 ANALYSIS).

From personnel experience, the estimated time consumed to complete a Phase 2 analysis for a single condition (auxiliary feedwater train out of service) is 1-2 days. The uniformed inspector must review MC 0609, refresh themselves on the rules associated with the analysis, and then complete the process. Note that because auxiliary feedwater affects external events, the inspector must then review the IPEEE and qualitatively re-assess the significance of the finding. If the finding is affected by external events, then a SRA must do a Phase 3 analysis.

Approximately 30 percent of the conditions evaluated by the SDP Phase 2 notebooks are not impacted by external events or large early release frequency. All other types of findings bypass the Phase 2 process. These include, but are not limited to; multiple conditions, external events, shutdown operations, initiating events, and containment findings. The level of effort on the part of the NRC staff to continue the development of a tool which can only be used to assess single condition at-power findings that do not involve external events or containment integrity is an inefficient and ineffective use of NRC resources.

No data was available to determine the number of times a Phase 2 evaluation screened an issue as significant and the Phase 3 evaluation screened the issue as non-significant. For example, Riverbend Station had two issues which were greater than green based on the Phase 2 analysis. A subsequent Phase 3 analysis demonstrated that the issues were of very low safety significance. The hours of resources to complete the Phase 2 analyses could have been better utilized if the issues were evaluated with a Phase 3 analysis following the Phase 1 screening process.

Brookhaven National Laboratory (BNL) quality has been, and continues to be very poor. Large quantities of money were allocated and in return the NRC had to expend additional resources to revise the BNL output. At one point the quality of the work product was so low that NRR began a process where a risk analyst was required to travel to BNL to review each notebook before completion. Even then, BNL failed to make required changes for item-by-item comments. Following the BNL site visits, the Agency completed several benchmarking trips at selected facilities. These trips identified significant weaknesses in the Phase 2 notebooks. Several additional deficiencies were also identified. These weaknesses and deficiencies will require the allocation of additional funds and resources to upgrade the Phase 2 notebooks. Instead of suspending future contracts/business with BNL until quality control standards were implemented, the NRC awarded the additional contracts to develop Phase 2 notebooks for shutdown operations. The lack of an up-front quality standard resulted in a significant reduction of effectiveness and efficiency.

The plans for the Phase 2 shutdown model are to be extrapolated from shutdown PRA models developed for Grand Gulf and Surry. The intention is to develop generic notebooks for shutdown conditions. These may or may not be reflective of actual shutdown conditions for every facility. In addition, the same deficiencies associated with the at-power notebooks will more than likely exist in the generic shutdown notebooks. Consequently, the same inefficiencies, burdens, and impacts on safety will also exist. A review of NUREG/CR 6143, "Evaluation of Potential Severe Accidents During Low Power and Shutdown Operations at Grand Gulf, Unit 1," was completed to determine if the Grand Gulf practices and assumptions were current. Based on the review, the results of the NUREG/CR 6143 study should not be

used until a detailed analysis of current operating practices is completed (See attached summary).

Differing View - The Phase 2 Process Places a Regulatory Burden on the Licensee

The result of the Phase 2 analysis is frequently over conservative. The over conservatism should not be viewed as a positive feature. Processing findings as greater than green solely on the output of a Phase 2 analysis will result in excessive regulatory and financial burdens on both the licensee and the NRC as they prepare for and respond to unnecessary regulatory information conferences and significance determination process and enforcement review panels (SERP).

A review of the post-benchmark results for 33 conditions evaluated at the Cooper facility and 22 conditions evaluated at the San Onofre facility was completed. The review determined that approximately 76 percent of the Cooper conditions and 50 percent of the San Onofre conditions would result in an over conservative result at least 50 percent of the time (See attached data sheets).

The current guidance from the NRR program office and the proposed draft of NRC Manual Chapter 0609 specify that a SERP should be conducted based on the outcome of the Phase 2 analysis. Given the high percentage of over-conservative results, licensee's would be required to expend financial and personnel resources to prepare for a SERP which will more than likely result in a lowering of the Phase 2 significance determination. This type of approach results in an unfair regulatory burden on the affected licensee.

Why have a SERP to discuss the result of a Phase 2 finding which will in most instances be incorrect? Any issue which screens as potentially significant during the Phase 2 process should require further analysis (Phase 3). Once again, why have a Phase 2 process if a Phase 3 analysis needs to be performed for any adverse Phase 2 result? The duplication of effort is an inefficient use of resources and unnecessarily prolongs the resolution of the finding.

There is a misperception between staff personnel as to what constitutes a Phase 3 analysis. These misperceptions are fueled by the failure to develop adequate training for risk analysts and the failure to develop a methodology by which to complete a Phase 3 analysis. The failure to have a standard approach to risk analysis was documented in OIG Audit Report 99A-03. This issue remains unresolved.

Given the current tools available to the analyst (Current tools include: the licensee's IPE, the licensee's IPEEE, the licensee's insights from PRA model updates, the licensee derived importance measures, the licensee derived sequence cutsets, and communications with licensee risk analysts), a Phase 3 analysis can be as simple as manipulation of three numbers (RAW, CDF, and duration). A comparison of this result can be made to the licensee's full model PRA quantification. Additionally, the analyst could compare the order of magnitude changes and dominant cutsets from the licensee's model to the output of the SPAR model. The total time to do all of this is less than the time to complete a Phase 2 analysis. With the exception of the SPAR model manipulation, every certified inspector should be able to perform this type of Phase 3 analysis.

The perception that Phase 3 analyses are resource intensive is due in large part to issues which are highly complex. These issues involve large degrees of uncertainty, affect multiple components, and require operator recovery actions (Fire protection issues and Cooper EQ). These types of Phase 3 analyses are infrequent and are not representative of the more routine types of analyses. Because of the lack of a standard methodology, there is often disagreement between analysts on the assumptions and results of the Phase 3 analysis. The lack of a standard methodology results in extended periods of time to resolve these issues and unnecessarily impacts staff efficiency and effectiveness.

NRC management frequently indicates that the Phase 2 notebooks provide invaluable risk insights to inspectors. The extra insights that reportedly exist include: system dependencies, accident sequences, and an appreciation of important equipment given the failure of another component. NRC management has significantly overstated the insights provided by the Phase 2 notebooks. Specifically, (1) All NRC inspectors are required to complete PRA training. This training provides inspection personnel with the ability to locate, interpret, and apply risk information specified in Individual Plant Examinations, Individual Plant Examinations of External Events, and updated probabilistic models. (2) All NRC inspectors must complete a qualification program before certification. This program requires that inspection personnel become familiar with the use of risk insights. (3) Inspectors are familiar with the significant contributions to core damage for their assigned facilities, including dominant accident sequences. (4) The qualification process requires that inspectors become familiar with system functions and dependencies. (5) Look closely at the system dependency table. Pumps are dependent on AC power. How useful is this information to an inspector?

A review of OE data from October 23, 2001, indicated that there had been 33 findings with an initial significance of greater than green. 18 of the 33 findings involved the initiating event, barrier, or mitigating system cornerstones. 8 of these 18 findings (44 percent) were downgraded in significance. 6 of the 8 were downgraded to green. Performing a SERP for issues which will be downgraded places an unfair regulatory burden on the licensee and wastes NRC resources.

The NRC Does Not Need Two Separate Assessment Tools!:

Parallel to the Phase 2 notebooks, the NRC has already invested and plans to allocate additional resources into the development of the software driven SPAR models. The SPAR models not only duplicate the minimal features of the Phase 2 notebook, but also provide additional features which the Phase 2 notebooks are incapable of performing (event assessment, multiple deficiencies, dominant sequence cutsets, quantification of results, and more). With an improved end user interface, the SPAR models have the potential to be an independent assessment tool which can easily be utilized by inspection staff, analysts, and management. Use of the SPAR model requires significantly less time than a Phase 2 or 3 analysis. The SPAR models have the potential to provide reliable insights into significant risk conditions and events. These insights would substantially exceed any insights which might be provided by the Phase 2 notebooks.

SPAR models, if properly developed, would be the most independent tool the Agency has to assess safety significance. Specifically, the SPAR models were derived from a review of generic industry data as well as plant IPEs. A quality check of the SPAR models which includes a comparison of basic event probabilities to the licensee's model could identify and resolve

discrepancies with both the SPAR models and the licensee's PRA models. It is conceivable, that the SPAR models could be used as an independent one stop resource for the assessment of findings. A resource the Agency could use to make confident and informed decisions without an over reliance on licensee input. Additionally, this type of decision making would significantly reduce the current dependency on senior reactor analysts.

Interim Actions:

1. Discontinue the use and development of the at-power and shutdown Phase 2 notebooks.
2. Development of the SPAR models should be suspended until the NRC has developed a integrated position on what the SPAR model should be able to accomplish. This step is necessary to prevent incremental and costly modifications of the model.
3. Evaluate which assessment tool/method will result in the most accurate result with the best use of resources. The NRC needs to stop expending resources until a plan is developed which articulates what tools are needed, what the tools should be able to accomplish, what will be necessary to develop the tools, and when the tools should be available to the staff.
4. Obtain current importance measure tables for each facility. The tables should be used to assess the significance of single condition inspection findings. These table already exist as a part of the licensees' PRA models.
5. Develop a standard methodology for completing all types of Phase 3 analyses.
6. Fully integrate the use of individuals which have completed advanced risk training.

REVIEW OF GRAND GULF SHUTDOWN PROBABILISTIC RISK MODEL

A comparison of current shutdown operating practices at Grand Gulf to NUREG/CR 6143, "Evaluation of Potential Severe Accidents During Low Power and Shutdown Operations at Grand Gulf, Unit 1," was completed. Per conversations with the licensee, the shutdown model was never maintained or revised.

The review determined that the current shutdown operating practices at Grand Gulf probably do not correspond to the assumptions used in the NUREG/CR 6143 study. An on-site visit would be needed to provide a complete perspective on the scope of the differences between current practices and NUREG/CR 6143. Additionally, the following assumptions should be validated before the results documented in NUREG/CR 6143 are used for any current assessments or projects.

Purpose:

The purposes of the review were to: (1) evaluate the validity of the assumptions utilized in the NUREG/CR 6143 study, (2) compare the assumptions to current plant operating practices, and (3) determine areas of concern for use of the NUREG/CR 6143 study prior to implementation of the Significance Determination Process (SDP) Phase 2 Notebooks for shutdown plant conditions.

Conclusions:

The current practices at Grand Gulf are probably not representative of the assumptions in the NUREG/CR 6143 study. Per conversations with the licensee, the shutdown model was never maintained or revised. The assumptions listed below should be validated before the results documented in the NUREG/CR 6143 are used for any current assessments.

Background:

In 1995, the NRC published a study on plant risk during lower power and shutdown operations. The study was performed by Sandia National Laboratory and is documented in NUREG/CR 6143. Phase 1 of the project was completed in 1991. Phase 1 consisted of a coarse screening of potential accidents that could occur at a boiling water reactor for other than full power conditions. Phase 2 of the project was completed in 1994. Phase 2 consisted of a detailed review of one of the seven shutdown plant operating states (POS).

The reviewers selected POS 5 for the analysis. POS 5 consisted of three time windows (TW). TW-1 was the period between initiation of cold shut down (less than 200 degrees Fahrenheit) to 24 hours after shutdown. TW-2 was the period between 24 hours post shutdown to POS 6 (Vessel head off and vessel level at the main steam line). The estimated period for TW-2 was 70 Hours. TW-3 was the period after completion of core alterations. TW-3 commenced 40 days after shutdown and lasted 10.5 days.

The reviewers determined that approximately 59.5 percent of the core damage frequency (CDF) occurred in POS 5. Approximately 37.8 percent of the CDF occurred in POS 6. POS 4 (Plant in hot shutdown with the residual heat removal system in the shutdown cooling mode of operation) and POS 7 (Reactor vessel head removed and reactor cavity filled) accounted for

the remaining 2.3 percent of the CDF. POS Groups 1, 2, and 3 were not evaluated in that were considered part of the at-power risk model.

Assumptions to be Validated:

1. Durations for the TWs are not realistic. Actual durations spent in each time window is of concern in that the decay heat rates could be substantially different. One of the major contributors in determining CDF and large early release frequency (LERF) is the time available to operators to implement mitigating and/or recovery actions. For shutdown plant conditions, the decay heat rate and time spent in the associated POS are the major inputs in determining the amount of time available to plant operators.
 1. TW-1 assumed that Mode 5 was entered within 24 hours. Need to determine the number of hours it takes Grand Gulf to reach Mode 5.
 2. TW-2 was assumed to last 70 hours. Need to determine the number of hours Grand Gulf spends in Mode 5 before detensioning of the reactor vessel head. TW-2 is expected to occur between post shutdown hours 24 and 96. Need to determine when Grand Gulf would be in TW-2.
 3. TW-3 was not expected to commence until post shutdown day 40. It was assumed to last 10.4 days. Need to determine the number of hours it takes Grand Gulf to reach TW-3 and the duration of the window.
2. NUREG/CR 6143 assumed that the alternate decay heat removal (ADHR) system did not isolate automatically on high pressure. Later in the text, (Volume 2, Part 1, Page 3-5) NUREG/CR 6143 stated that ADHR would automatically isolate on high pressure. Automatic protection of ADHR would reduce risk in that the over-pressurization sequences would be affected.
3. NUREG/CR 6143 required at least 2 safety relief valves (SRVs) for feed and bleed to prevent over-pressurization of ADHR. What are the plant requirements for availability of SRVs while shutdown?
4. NUREG/CR 6143 assumed that scenarios existed where the main steam isolation valves (MSIVs) were open because no licensee controls were identified. MSIVs would need to be re-closed during a loss of coolant accident (LOCA) event within 5 minutes. Consequently a human error probability of 1.0 was assigned to closure of the MSIVs. The MSIVs would need to be re-closed within 20 minutes to prevent flooding. Need to validate administrative controls for MSIVs.
5. NUREG/CR 6143 assumed the suppression pool was considered empty for 25 percent of the outage. Need to validate administrative controls for suppression pool.
6. NUREG/CR 6143 assumed that suppression pool automatic make-up from upper pool was not available. The unavailability of the upper pool was a significant contributor to CDF for the large LOCA and medium LOCA sequences. Need to validate existence of administrative controls for suppression pool make-up.

7. 37.8 percent of the CDF occurred in POS 6. No discussion on the importance of systems in POS 6 compared to POS 5 was provided. POS 6 was not evaluated in detail. The use of NUREG/CR 6143 could affect the outcome of shutdown SDP notebooks.
8. Containment flooding and failure to close lower containment access were assumed to result in a loss of plant systems. Need to validate administrative controls for lower containment access and the effect of not closing this access point.
9. No consideration was given for extended POS 4 or POS 5 operation. Need to assess the risk associated with forced outages. TW-2 was the most significant portion of POS 5; however, the duration was only evaluated for 70 hours.
10. The pressure rating of ADHR was assumed to be 80psig. The pressure rating of the residual heat removal (RHR) system was assumed to be 220 psig. Need to validate actual pressure ratings of the affected systems.
11. Volume 1, Section 3.1.1, Page 4, specified that the development of a detailed methodology for analyzing human actions during shutdown conditions was underway, and analysis of such events was deferred until the methodology was available. Need to determine if a methodology was ever developed and if the variations in operator actions could have a significant impact on CDF.
12. NUREG/CR 6143 assumed that core can be cooled with 250 gpm of makeup water. Credit is given for control rod drive (CRD), which has a capacity of 240 gpm, as a success criteria. Need to validate the actual success criteria.
13. The station blackout (SBO) scenario credited the ability to maintain SRVs available. Can Grand Gulf maintain an SRV available. Are there procedures and equipment pre-staged?
14. What is the availability of fire water systems while shutdown?
15. High pressure injection systems were credited as a means of reducing CDF. What is the status of the high pressure core spray (HPCS) system during outages?
16. LERF impacts were associated with a lack of containment heat removal and hydrogen control. These issues are probably not of concern for shutdown applications and in some at-power scenarios
17. NUREG/CR 6143 assumed that Train A was unavailable. What is the licensee's practice for maintaining the availability of two or more divisions of equipment?
18. Hydrostatic testing was assumed to occur at day 30. What is the licensee's current practice for hydrostatic testing?
19. NUREG/CR 6143 used a truncation level of 1E-8. This is a very high threshold for truncation using current standards. 1E-12 or 1E-13 would be more appropriate.

20. The reactor core isolation cooling (RCIC) system was not credited. There are certain scenarios in which RCIC may be available to mitigate an event. What are the licensee's practices for removal of the RCIC system during an outage?
21. NUREG/CR 6143 assumed that fire protection was available when the emergency diesel generator (EDG) was removed from service. Need to validate plant restrictions on diesel driven fire pumps during periods of EDG unavailability.
22. SECY 00-0007 specified that human error is a dominant contributor to shutdown risk. However; NUREG/CR 6143 did not use a detailed human reliability analysis for the study. Need to validate the assumptions used by Grand Gulf for human error probabilities. These probabilities should be compared to the generic shutdown SDP values.
23. SECY 00-0007 specified that shutdown risk was dependent on plant specific information. However, the shutdown SDP plans to use generic plant information. What activities are planned to assess the validity of the use of generic information for conducting plant specific SDP evaluations?
24. External events were not a major concern for Grand Gulf in the NUREG/CR 6143 study. How is the application of external events to be incorporated into the shutdown SDP process?
25. Need to compare the current Grand Gulf shutdown risk assessment tools to industry guidance. Need to evaluate the level of validation and verification of the risk tools.

References

- NUREG/CR 6143, "Evaluation of Potential Severe Accidents During Low Power and Shutdown Operations at Grand Gulf, Unit 1"
- SECY 00-0007, "Proposed Staff Plans for Low Power and Shutdown Risk Analysis Research to Support Risk Informed Regulatory Decision Making"
- NUMARC 96-01, "Guidelines for Industry Actions to Assess Shutdown Management"
- EPRI TR-113084, "Development of Shutdown Probabilistic Safety Analysis (PSA)/Shutdown Equipment Out of Service (EOOS) for River Bend Station"

Enclosure 2

Individuals Interviewed

December 4-5, 2001 in Rockville:

Troy Pruett
Senior Reactor Analyst, Region IV

Mr. Michael Johnson, Chief
Inspection Program Branch, NRR
(Also contacted by chair on November 21, 2001 and December 18, 2001)

Doug Coe, Chief
Reactor Inspection Section
Inspection Program Branch, NRR

Patrick O'Reilly
Operating Experience Risk Branch, RES

Jin Chung
Probabilistic Safety Assessment Branch, NRR

Peter Wilson
Probabilistic Safety Assessment Branch, NRR

December 10, 2001 by telephone:

Richard Barrett, Chief
Probabilistic Safety Assessment Branch, NRR

Provided Input to Panel:

James Trapp
Division of Reactor Safety, Region I

Enclosure 3

Draft SDP Timeliness Improvement Strategies and Task Action Plan

MEMORANDUM TO: William D. Travers
Executive Director for Operations

FROM: Samuel J. Collins, Director
Office of Nuclear Reactor Regulation

SUBJECT: Significant Determination Process Timeliness Improvement
Strategies

The strategies and corresponding task action plan attached to this memorandum are intended to improve Significance Determination Process (SDP) timeliness to meet the goal established in Staff Requirements memorandum M010720A for conducting and finalizing the significance determination process within 90 days. The strategies incorporate recommendations of two recent audits, "Audit of the Timeliness of Escalated Cases Handled Under the New Reactor Oversight Process" conducted by the Office of Enforcement; and "Case Study of the Significance Determination Process," prepared by the Inspection Program Branch.

The attached two documents, SDP Timeliness Proposed Improvement Strategies and the accompanying Task Action Plan, provide the objectives we believe must be met to reach our timeliness goal. We expect to improve the SDP timeliness while continuing to meet agency strategic goals and the objectives of the reactor oversight process. Regional participation is intrinsic to the successful resolution of the issue and regional support for this plan has been assured. Since this is an ongoing effort, the Plan will be reviewed and updated periodically. We will continue to monitor the timeliness of processing findings through the SDP to gage the effectiveness of these actions and modify the Plan as needed.

Attachments: As stated

cc:
A. Thadani, RES
H. Miller, RI
B. Mallett, RII
J. Dyer, RIII
E. Mershoff, RIV

SDP Timeliness Proposed Improvement Strategies

1. Increase Focus on Early Resolution of Specific Technical Questions or Disagreements

objective 1.1: establish weekly management status report on SDP issues in process

objective 1.2: identify issue characteristics that provide for early detection of SDP results that are likely to become untimely due to technical, policy, or process issues

objective 1.3: develop and track/trend SDP process time metrics within ROP Self Assessment process

objective 1.4: develop a root cause assessment review requirement for untimely SDP results

2. Improve SDP Process and Tools

SERP process needs more clearly defined roles/responsibilities

objective 2.1: revise IMC 0609 Attachment 1 to clarify SERP roles, responsibilities, escalation process, and timeliness goals

Low inspector confidence in SDP risk-informed notebooks

objective 2.2: continue/complete benchmarking effort, issuance of rev 1 notebooks, and provide routine updates on progress

objective 2.3: issue interim guidance on use of rev 0 SDP phase 2 notebooks, to reinforce expectations such as required use of the notebooks and reviews of phase 2 results by SRAs

objective 2.4: develop changes to IMC 0609 App A to clarify the phase 2 process and the treatment of concurrent issues and external initiating events

objective 2.5: develop and provide appropriate SDP refresher training

Limited or no SDP tools for certain types of inspection findings

objective 2.6: develop/improve SDPs for fire protection, maintenance rule, shutdown safety, containment integrity, external event treatment, steam generator tube integrity, and spent fuel safety. Consider improving guidance on the type of information that inspectors should collect in support of the SDP.

objective 2.7: develop/improve physical protection SDP, accounting for any necessary safeguards policy changes

Limited risk analyst resources in the shutdown risk analysis area

objective 2.8: increase staffing and/or staff development in shutdown risk area

Lack of detailed procedures for phase 3-type risk analyses

objective 2.9: (near term) develop database of all completed phase 3 analyses, (long term) work with other agency organizations, e.g., RES, to develop analysis criteria/standards

3. Improve Clarity of Clear Risk-Informed ROP Decision Guidance

Cost-benefit “cross-over” point (allowing the staff to cease analysis when the benefit is not justified) is allowed by IMC 0609 Appendix A, but not well defined and therefore not applied

objective 3.1: better define cost-benefit cross-over decision criteria

Tendency to require detailed risk analysis preliminary SDP results before issuing to licensee - need to better balance timely (but generally conservative) preliminary results while still being sensitive to achieving public confidence goals (if final results are reduced in significance more often)

objective 3.2: consider modifying SDP/SERP processes to provide for preliminary characterization of issues as “potentially greater than green”, rather than a specific color, to reduce pressure on the process to arrive at the most accurate determination as the preliminary determination

The defacto threshold for minimally acceptable risk-informed SDP bases has become a detailed quantitative risk analysis for which it is frequently difficult to obtain agreement on the technical/analytical details among NRC risk analysts and technical specialists

objective 3.3: define the attributes of a minimally acceptable risk-informed decision process for use by the ROP, including how uncertainty is accounted for within this process

objective 3.4: consider alternative processes specifically to respond to programmatic issues whose significance is difficult to estimate through through detailed quantitative risk analysis (e.g., widespread program deficiencies with EQ, GL 89-10, seismic qualification, etc)

4. Clarify Expectations for ASP and SDP Processes

objective 4.1: NRR/RES formalize in writing the recent discussions on SDP and ASP processes, to include active involvement/input by NRR, RES, and Regions prior to final determinations, in order to minimize the potential for unexpected or unreasonable differences

SDP Timeliness Improvement Task Action Plan

Background:

The Reactor Oversight Process (ROP) was implemented without incorporating a specific timeliness goal for completing and finalizing the SDP results for findings. During the initial period of implementation the existing timeliness criteria set forth in Section 5.5 of the Enforcement Manual was adopted as a general guide. The criteria states that the average overall timeliness goal for the agency's enforcement timeliness performance measure is 90 percent completed within 90 days following the inspection exit meeting. As discussed in SECY 0049-01, this timeliness goal was not met. Since the issuance of this SECY, the Commission informed the Staff that the expectation for SDP timeliness is 100% issued within 90 days. Two audits examined the process to identify weaknesses. Both audits provided recommendations for improvement which are incorporated into this Task Action Plan.

Objective:

Assign responsibilities and target dates for the tasks to achieve the stated objectives. Meet the timeliness goal established by the Commission for the Significance Determination Process.

Action Plan Coordinator: Peter Koltay, IIPB/DIPM/NRR

TASK ACTION PLAN		
Task	Target Completion Date	Lead
<u>objectives 1.1; 1.2; 1.3; 1.4;</u> Develop finding tracking methodology. Develop metrics that would help identify weaknesses in the process. Develop a root cause assessment process for untimely finalization of SDP results	01/01/02	IIPB, Sykes

TASK ACTION PLAN		
Task	Target Completion Date	Lead
<p><u>objective 2.1</u> Clearly define the accounting process of the 90 day time period including: Starting time. End time.</p> <p>Define exclusion periods such as time spent in addressing TIAs and licensee preparation for regulatory conference.</p> <p>Improve the SERP process: Clearly identify SERP participants and their respective roles in MC0609.01.</p> <p>Outline the escalation process for issues where the SERP fails to reach consensus in MC0609.01.</p>	<p>03/01/02</p> <p>12/31/01</p>	<p>IIPB, Koltay</p> <p>IIPB, Koltay</p>
<p><u>objective 2.2</u> Benchmark the Risk Informed Inspection Notebooks issue Revision 1.</p> <p>Evaluate the possibility for setting priority for benchmarking and identify the criteria.</p>	<p>10/31/03</p> <p>02/01/02</p>	<p>SPSB, Wilson</p>
<p><u>objectives 2.3; 2.4; 2.5;</u> Develop criteria and provide training and written guidance on the use of the Revision 0 Notebooks (pre-benchmarking)</p> <p>Provide SRA/inspector training on the implementation of Notebook usage rules:</p> <p>Incorporate Notebook usage rules into IMC 0609 Appendix A and reissue Appendix A:</p>	<p>02/01/02</p> <p>03/01/02</p> <p>02/01/02</p>	<p>IIPB, Cobey SPSB, Wilson</p>

TASK ACTION PLAN		
Task	Target Completion Date	Lead
<u>objectives 2.6 and 2.7</u> Develop new and improve existing SDP tools as applicable in the following areas:		
fire protection	12/31/02	SPSB, Rubin
maintenance rule	10/01/02	SPSB, Wong
containment	04/01/02	SPSB, Palla
steam generator	04/01/02	IIPB, Cobey
shutdown	04/01/02	SPSB, Pohida
external events	08/01/02	SPSB, TBD
physical protection/safeguards	08/01/02	IOLB, Madison
<u>objective 2.8</u> Increase staff specialists (various)		SPSB, Barrett
<u>objective 2.9</u> Provide written guidance to SRAs on the performance of reactor safety SDPs phase 3 analysis:	TBD	SPSB, Wilson
Initiate database to include and categorize for ease of retrieval all completed phase 3 analysis:	04/01/02	IIPB, Cobey
<u>objectives 3.1</u> better define cost-benefit cross-over decision criteria	04/01/02	IIPB, Cobey
<u>objective 3.2</u> consider modifying SDP/SERP processes to provide for preliminary characterization of issues as "potentially greater than green", rather than a specific color, to reduce pressure on the process to arrive at the most accurate determination as the preliminary determination	03/01/02	IIBP, Koltay

TASK ACTION PLAN		
Task	Target Completion Date	Lead
<u>objective 3.3</u> define the attributes of a minimally acceptable risk-informed decision process for use by the ROP, including how uncertainty is accounted for within this process	04/01/02	IIPB, Cobey
<u>objective 3.4</u> Consider alternative approaches to augment the SDP decision making process where significance of inspection findings could be affected by program deficiencies not addressable by the current SDP.	04/01/02	IIPB, TBD
<u>objective 4.1</u> NRR/RES formalize in writing the recent discussions on SDP and ASP processes, to include active involvement/input by NRR, RES, and Regions prior to final determinations, in order to minimize the potential for unexpected or unreasonable differences	04/01/02	IIPB/SPLB

Attachment

Enclosure 4

SPAR Model Development Plan

Enclosure 5

SDP Issues for Consideration

The Ad Hoc Review Panel agreed that the DPV raised many valid concerns and recommends that the following should be considered as part of the recommended SDP review to address these concerns:

1. Establish Long Range Plan for SDP including:
 - Determination of what will be the final Agency SDP tool and develop schedule and resource estimates to get to its implementation.
 - Establish a benchmarking completion plan for all sites including Phase 2 and SPAR information. Ensure regional interaction during the development of the plan.
 - Develop more detail on the types of insights that should be gained from the final SDP tool. Assess this relative to the insights available from the Phase 2 notebooks and SPAR.
 - Evaluate use of Phase 2 notebooks and/or SPAR until transition to the final SDP tool.
 - Verify that senior management understands the Phase 2 benchmark process and SPAR validations and the outcomes to date.
 - Evaluate the cost effectiveness of continued use and parallel development of both the Phase 2 notebooks and SPAR.
 - Given the Phase 2 limited applicability due to lack of containment, external event and treatment of multiple failures and recovery actions, could SPAR be made available earlier if Phase 2 development were curtailed?
 - Creation of the SPAR interface should be a priority. Ensure that inspectors are contacted and given a chance to provide input as to what information would be useful from the interface.
 - Ensure that plant changes are adequately reflected in the Phase 2 notebooks and SPAR.
 - Provide clear contractor quality and product format goals.
 - Determine expectations for inspector and analysts and evaluate and update training plans as required to fully integrate those personnel who have completed the advanced risk training into the process for conducting risk evaluations.

2. Improve the use of Phase 2 notebooks prior to benchmarking and updating.
 - Issue the special usage rules to the inspectors.
 - Improve training on use of the notebook sheets, including examples.
 - Formalize guidance that any finding that is screened as potentially risk significance by the Phase 1 process be reviewed by an SRA at least until the Phase 2 notebooks have been benchmarked and updated as necessary.
 - Evaluate the use of importance measures, in lieu of the Phase 2 notebooks.

3. Clarify program guidance on SDP use prior to SERP and regulatory conferences relative to:
 - Expectations for Phase 2 validation or completion of Phase 3 prior to SERP.
 - Use of Phase 2 notebooks as a simple screening tool for inspectors.
 - Timeliness versus accuracy; the need to initiate early engagement with the licensee, while ensuring public confidence in the SDP.
 - Potential for an over estimation or under estimation of risk significance using only the Phase 2 notebooks.
 - Completion of a Phase 3 analysis, prior to SERP, if there are staff concerns for potential downgrading of an issue, even if timeliness goal will not be met.
 - Timeliness driven by analysis method or lack of facts.
 - Use of unresolved items, to ensure timely public notification, when risk information needs additional time for development (NRC staff and/or contact with licensee's PRA staff).
 - Resource, timeliness and accuracy trade-offs between Phase 2 notebooks versus Phase 3 analyses.
 - a. Provide examples Phase 3 analyses (from easy to difficult along with some time expectation)
 - b. Provide written guidance to SRAs on the performance of reactor safety SDPs phase 3 analysis: