

### DIFFERING PROFESSIONAL OPINION

1. DPO CASE NUMBER

DPO-2008-001

**INSTRUCTIONS:** Prepare this form legibly and submit three copies to the address provided in Block 14 below.

2. DATE RECEIVED

10/1/2008

3. NAME OF SUBMITTER

Ralph Architzel

4. POSITION TITLE

Senior Reactor Engineer

5. GRADE

15

6. OFFICE/DIVISION/BRANCH/SECTION

NRR/DSS/SSIB

7. BUILDING

OWFN

8. MAIL STOP

O10A1

9. SUPERVISOR

Donnie Harrison

10. DESCRIBE THE PRESENT SITUATION, CONDITION, METHOD, ETC., WHICH YOU BELIEVE SHOULD BE CHANGED OR IMPROVED.  
(Continue on Page 2 or 3 as necessary.)

Described on attached continuation pages.

11. DESCRIBE YOUR DIFFERING OPINION IN ACCORDANCE WITH THE GUIDANCE PRESENTED IN NRC MANAGEMENT DIRECTIVE 10.159.  
(Continue on Page 2 or 3 as necessary.)

Described on attached continuation pages.

12. Check (a) or (b) as appropriate:

- a. Thorough discussions of the issue(s) raised in item 11 have taken place within my management chain; or
- b. The reasons why I cannot approach my immediate chain of command are:

SIGNATURE OF SUBMITTER

DATE

10/01/2008

SIGNATURE OF CO-SUBMITTER (if any)

DATE

13. PROPOSED PANEL MEMBERS ARE (in priority order):

1. John Lamb
2. Robert Tregoning
3. James Beall

14. Submit this form to:

Differing Professional Opinions Program Manager

Office of: NRR

Mail Stop: 4A15A

### 15. ACKNOWLEDGMENT

THANK YOU FOR YOUR DIFFERING PROFESSIONAL OPINION. It will be carefully considered by a panel of experts in accordance with the provisions of NRCMD 10.159, and you will be advised of any action taken. Your interest in improving NRC operations is appreciated.

SIGNATURE OF DIFFERING PROFESSIONAL OPINIONS PROGRAM MANAGER (DPOPM)

PRE-CONDITIONS MET

YES  NO

DATE OF ACKNOWLEDGMENT

10/6/2008

AK082310042

A-2

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10. Describe the Present Situation, Condition, Method etc, which you believe should be changed or improved.

This differing professional opinion concerns the NRC staff closure process for Generic Safety Issue (GSI)-191 [1], including associated activities such as review of Generic Letter (GL) 2004-02 [2]. The closure process for GL 2004-02 was established in an internal memorandum "NRC Staff Process For Review Of Licensee Supplemental Responses To Generic Letter 2004-02 (TAC MC9003), dated March 25, 2008 [3]. Documentation of the closure process is accomplished via a set of forms that are an integral part of the process. The closure process has two parts; a "Quick Look" for part one, with which I do not differ; and a subsequent detailed review, which is the subject of this differing professional opinion.

The GL 2004 02 Supplemental Response Detailed Area Review Form [4] is used by a set of technical reviewers that are tasked with evaluating 19 detailed areas as described in the procedure. The procedure directs designated subject-matter experts to use available guidance and references for judging the supplemental responses' comprehensiveness and completeness (e.g., Content Guide, NEI 04-07 [6], and the NRC safety evaluation of NEI 04-07 [7])<sup>1</sup>. Following completion of the individual detailed area reviews, the input forms are consolidated into a single file that in turn is the subject of review by an integration team (aka integration review team (IRT)).

The integration team conducts its review and documents the results using a form titled "GL Supplemental Response Integration Team Review Results" [5]. The form directs that the overall team result fit into one of the following categories:

Recommend NRR issue a finding that all applicable regulations are met.  
(with bases):

Recommend that requests for additional information (RAIs) be Sent to Licensee (with bases, attach proposed RAIs):

Defer Recommendation (provide rationale):

The process and the form provide for documentation of minority opinions. Of particular note in the procedure are several references to reaching determinations of whether each plant is in compliance with all applicable regulations (e.g., [3, page 3 end of third paragraph], and the above noted call to find that all applicable regulations are met, to preclude pursuit of additional information).

Considering the review criteria, most integration team reviews conducted to date resulted in the recommendation to pursue RAIs. Since these efforts included reviews by three senior staff and were resource intensive, for the most part resulting in the decision to pursue RAIs, a

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<sup>1</sup> Technical reviewers for the key areas of head loss, chemical effects, and coatings, are in actuality using staff review guidance published March 28, 2008 [9]; which was well after licensees were expected to have completed all actions to close GSI-191 and provided final responses (February 28, 2008 for final responses). Except for the head loss area, the industry had the major changes available in a September 2007 draft.

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management decision was made to have one of the IRT members (me) conduct screening reviews to check whether it was likely that a conclusion of compliance with applicable regulations could be reached for a particular package.

As of the date this differing professional opinion was prepared, approximately nine packages (the sixty-nine PWR responses were grouped into approximately 42 packages based on dual unit etc., considerations) had had an integration team review and decision, although IRT documentation was not completed in all cases. Several of those nine packages were screened to conduct an IRT. (The others were processed before the packages were being screened). Additionally, approximately twelve packages underwent a "screening" review with a decision not to conduct an IRT. In making screening determinations, I consider the quantity and significance of RAIs to check whether it is likely reach a holistic conclusion of compliance with applicable regulations or not. Many of the packages being screened do not contain final head loss testing and analyses results (including incorporation of chemical effects precipitants). Since there is no provision to defer a screening recommendation until such licensee information is available, such reviews cannot realistically be considered candidates for conclusions of compliance and invariably result in screening to the RAI phase, without an integration team review.

11. Describe your differing Opinion in accordance with the guidance in NRC Management Directive 10.159

My differing professional opinion essentially is that the staff procedure and process outlined above has resulted in a review that is unnecessarily focused on compliance versus a determination that the underlying safety issue has been satisfactorily addressed. The process uses very late-breaking staff review guidance as a yardstick to establish whether licensees have demonstrated compliance in key areas. Additionally, I consider that this approach does not comport with Commission guidance provided in two staff requirements memoranda:

The Commission requested the ACRS work with the staff to resolve outstanding issues with respect to PWR Sump Performance, and make a recommendation for a practical solution within a reasonable period of time. Both the ACRS and the staff should focus their attention, resources, and additional research, if needed, on evaluating realistic scenarios rather than all possible scenarios [11].

The staff and industry should make a concerted effort to look at resolution of this issue holistically. Such an approach should include understanding the interdependence of changes in water chemistry on debris accumulation and sump performance [12].

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When the GL Closure Process was being developed I objected to the use of a compliance test to determine whether or not GSI-191 had been adequately implemented at a particular plant. In this interaction I stated on February 27, 2008 [10]:

I realize that perhaps this form is final, at least for first pilot - but wanted to get in the last word commenting on Tim's \$.02, and Mike's compliance comment.

Although I didn't participate in the 2-hour "holistic" hunt - I still believe that is perhaps the appropriate task to assign an integration team; versus the simple "all applicable regulations are met" or coming up with a compliance finding.

These determinations are easy to make. If there is a design basis case and its not satisfied, they don't comply (with the applicable regulation(s) stating the fundamental requirement). But perhaps not what is really desired outcome of such an effort. I offer following words from a previous SRM\* (pre-dates holistic SRM) on this topic:

"The Commission requested the ACRS work with the staff to resolve outstanding issues with respect to PWR Sump Performance, and make a recommendation for a practical solution within a reasonable period of time. Both the ACRS and the staff should focus their attention, resources, and additional research, if needed, on evaluating realistic scenarios rather than all possible scenarios."

To me - the words of the form indeed lead to consideration of all scenarios within the design basis. I believe I can be a team player and make calls consistent with this form. However, I believe that a lot less of the forms would have a positive (viewed as whether more licensee and staff resources should be devoted to resolving this issue on particular PWRs) outcome versus the case if a more "holistic" (based on overall safety significance - whatever that means to an individual) metric was used.

I also don't really believe you need a team to make such determinations - compliance determinations and meeting the applicable regulations are fairly straight-forward [exercises] within the normal [expertise] of reviewers and their supervision.

My long winded 2c.

\* June 30, 2000

Management response:

In this case, beauty (er... compliance) will be very much in the eyes of the beholder. I value the diverse opinions that you and Leon bring to the table. I expect that your team will evaluate the picture for each plant holistically, will consider what is good enough, and will reach a conclusion regarding reasonable assurance of compliance. After you meet for the first time we can review lessons learned and change the form if appropriate.

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I initially identified my potential differing professional view to management on July 16, 2008 [16] as a result of staff and management actions taken after completion of the Diablo Canyon IRT. Subsequently, on September 4, 2008, following many additional IRT deliberations and discussions with management, I identified five additional plants (packages) that were included within my differing professional view on the resolution of GSI-191 [17]. During the preparation of this differing professional view form and during informal discussions prior to formally filing, I came to realize that my difference was principally with the NRC procedure/process, and not the specific decisions on a particular plant. The particular plants involved represented what in my view were some of the best cases for having adequately resolved GSI-191; wherein I was comfortable making a 'holistic' call that the plants had demonstrated with reasonable assurance that all regulations were met. For the balance of the packages to be reviewed, the great majority will likely result in an inability to reach a holistic decision of compliance with all the rules and regulations due to either moderate or greater amounts of fiber (thus questioning adequacy of thin bed testing) or licensees that have deferred submittal of the final supplemental responses (therefore, not providing a foundation to even attempt a holistic call at this time). The existing IRT process, as well as the input by staff detailed area reviewers; already provided for documenting differing views. Therefore, I consider the particulars of the specific six packages outside the scope of this differing professional view. However, for information I included Table 1 below that addresses the particular packages and provides some background on my differences. The details of my different views can be found in the material referenced in the table. This population of six packages represents the total of IRT packages that contained differing views as of the date this document was prepared. My position on all was to not ask RAIs; thus that the NRC holistically accept the licensees' arguments demonstrating that all the rules and regulations were met. In all cases, including the two where I was not in the minority, it is interesting (and disturbing to me) that management sided with the recommendation to pursue RAIs versus accept the response(s) as is.

My proposed alternate approach would assess whether the plants have adequately resolved the risks associated with GSI-191, without making clear-cut compliance determinations. All licensees have been asked to make such determinations in their supplemental responses and in general have been stating their compliance basis using analyses and testing methods that were considered acceptable at the time their modifications and analyses were developed. The current staff approach is resulting in determinations that consider all possible worst-case design basis scenarios; a situation that is extremely unlikely to ever happen in a "real" design basis event, which will be stochastic in nature and could not be reasonably expected to occur. In my opinion, the staff process should ask whether the issues involved have been adequately addressed, using a holistic viewpoint considering residual risk, with practical solutions, specifically not evaluating all possible scenarios, making a determination that the safety issue can be closed for the particular plant, while not challenging licensees arguments for compliance.

I also recommend that the detailed area reviewers be assigned to play a role in the "holistic" decision-making process. As the current process stands; this decision making is essentially the sole province of a set of senior reviewers that in general are not as familiar with the detailed issues involved in the decision for a particular plant, when there is an IRT. In addition, when a package is screened to RAIs (most plants fall in this category), the potential for a "holistic" pass is only assessed by a single individual.

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Issues associated with the staff agreeing with licensees' determinations of compliance should be deferred to a later time. I would recommend that such determinations be combined with the planned revisit by BWR licensees of head loss and testing issues. In slides presented at a public meeting held on September 10, 2008 [13], the BWROG stated plans to consider strainer head-loss/correlation issues, including whether there is a need to pursue new testing, during CY2010. During the meeting the BWROG Chairman was questioned by an NRC manager concerning whether he thought any of the particular issues were of safety significance. The verbal reply was that the in-vessel/core blockage issue possibly had significance. However he opined confidence that the other issues would not likely be determined to be significant. The NRC manager noted alignment with the statement. I may agree that the head-loss testing/correlation issues for the BWRs will not pan out to warrant additional measures to establish compliance (with newly revised staff positions) when they are examined in several years. However, it is difficult to accept the illogic of pursuing such compliance questions for PWRs, yet not BWRs. I believe that most individuals familiar with the specifics of debris generation, transport, strainer performance and testing, would consider the situation far more challenging for BWRs – with their immediate flow demand, much higher flow rates through much smaller strainers, and with demonstrated (not conservative postulated) major quantities of iron oxide particulate as a minimum for chemical effects; rather than PWRs with delayed initiation of recirculation, plant-specific tests, larger strainers, etc.

Such an approach (close GSI-191 based on safety significance being addressed holistically) would perhaps never result in compliance being established to the same level as the current approach of "test to success." It may be difficult to pursue additional changes for PWRs beyond what has already been done from a backfit/cost benefit viewpoint. As documented in the original RES technical assessment of GSI-191, forwarded to NRR in September 2001 [14], the costs (to the aggregate of plants) for pursuing resolution were in the range of \$24.5 to \$31.8M; with realistic benefits ranging from \$71 to \$92M; thus net beneficial. As a rough personal estimate, the industry costs to date of resolving GSI-191 likely exceed \$1B. Even if the benefits are assumed to have doubled (to \$200M) considering the evaluation of downstream effects mitigation and evaluation of chemical effects, which were not considered in the RES regulatory analyses, the benefits achieved to date fall far short of costs. It is hard to envision how additional retesting (at several hundred thousand \$ per plant), and additional modifications associated with the "test to success" approach (such as removal of major quantities of fibrous insulation which would cost several million \$), could be justified based on considerations of the present risk after the modifications that the licensees have performed in their efforts to date to resolve GSI-191. Clearly there is only a de minimis benefit to fairly large additional costs, and in my opinion such a course of action should be pursued in concert with the BWR plants<sup>2</sup> and "fixed" in compliance space based on careful consideration of the situation, the costs of further analyses and testing, the incremental safety benefit that could be achieved as well as safety risks such as radiation exposure for issues such as insulation removal and other potential risks such as exposure to asbestos-laden debris .

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<sup>2</sup> NRR has requested via user need memorandum [15] that RES examine the issues identified during resolution of GSI-191 for applicability to BWRs.

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**Table 1: Packages that Contain Differing Views**

Plant	IRT Form or Other Reference(s) Documenting Differing View	Key Aspects
Diablo Canyon	ML081300134	Low debris loading, clean screen area during test; backflush available for beyond design basis considerations. Successful test to original protocols.
Sequoyah	ML080570179 (IRT Form Not prepared yet- will be available in plant closure package above)	No fiber plant (10 latent fibers found in survey), clean screens, high NPSH margins. tested successfully to original protocols
Watts Bar	ML082740556 ML080570226	Very low fiber plant, Interam Fire Wrap not likely to contribute fibers, high NPSH margins, tested successfully to original protocols
Fort Calhoun	ML082690563 ML082620175	Only plant taking water management approach. No containment spray; very low flows (No low pressure pumping – only low flow high pressure safety injection). Extreme settling potential. Successful limiting test to latest methods [9]. RAIs may result in industrial hazard of asbestos laden debris removal plus unnecessary radiation exposure
Crystal River	ML082380852	No fibrous insulation for LBLOCA, clean screens, debris interceptors not credited but available, backflush available for beyond design basis considerations.
Prairie Island	ML080570257 (IRT Form Not prepared yet- will be available in plant closure package above) ML082620175	DPV on management decision to ask core tube pressure drop RAI versus go with IRT majority on no RAIs. No fibrous insulation. Low latent fibrous debris with committed program. High NPSH margins. Tested successfully to original protocols.

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## References

1. GSI-191, "Assessment of Debris Accumulation on PWR Sump Performance," prioritized September 1996.
2. NRC Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," dated September 13, 2004.
3. Memorandum from Michael Scott to William Ruland dated March 25, 2008, NRC Staff Process For Review Of Licensee Supplemental Responses To Generic Letter 2004-02 (TAC NO. MC9003), ML073380168.
4. GL 2004 02 Supplemental Response Detailed Area Review Form, Revision 5, ML082620300
5. GL Supplemental Response Integration Team Review Results, ML082701092
6. NEI PWR Sump Performance Task Force Report NEI 04-07, "Pressurized Water Reactor Sump Performance Evaluation Methodology," Revision 0, December 2004, ML050550138.
7. Safety Evaluation by the Office of Nuclear Reactor Regulation Related to NRC Generic Letter 2004-02, Nuclear Energy Institute Guidance Report, NEI 04-07, "Pressurized Water Reactor Sump Performance Evaluation Methodology," NRC/NRR Staff Report, Revision 0, 2004, ML043280007.
8. Revised Content Guide for Generic Letter 2004-02 Supplemental Responses, forwarded to NEI by W Ruland letter dated November 21, 2007, ML073110389.
9. Revised Guidance For Review Of Final Licensee Responses To Generic Letter 2004-02, "Potential Impact Of Debris Blockage On Emergency Recirculation During Design Basis Accidents At Pressurized-Water Reactors," March 28, 2008, ML080230234.
10. Chain E-mail, "Integration Team Form Revision 1 for Comment," February 27, 2008, ML082600360.
11. Staff Requirements Memorandum, Meeting with ACRS, June 30, 2004, ADAMS
12. Staff Requirements Memorandum, Briefing On Resolution Of GSI-191, Assessment Of Debris Accumulation On PWR Sump Performance, November 16, 2006, ADAMS ML063200471.
13. September 10, 2008 - Notice of Public Meeting with Boiling Water Reactor Owner's Group (BWROG) to Discuss the BWROG Program Plan for the Treatment of Emergency Core Cooling System (ECCS) Suction Strainer Technical Issues as Applied to Boiling Water Reactors, ML082240654.
14. Memorandum from A Thadani to S Collins dated September 28, 2001, RES Proposed Resolution of GSI-191, Assessment of Debris Accumulation on PWR Sump Performance, ML012750091.
15. User Need Request to Revise Regulatory Guide 1.82 and Address Identified Disparities in Treatment of Debris-Induced Clogging of Emergency Core Cooling Systems Strainers (NRR-2007-007), December 31, 2007, ML073120209.
16. Chain E-mail, "E-mail to Inform DH of Existing DPV copied to W Ruland," August 20, 2008, ML082540855.
17. E-mail with attachment, "Task Status Report RE Weekly IRT Tracking Table," September 4, 2008, ML082620173.



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18. Staff Observations of Fort Calhoun Station Strainer Testing for GSI191 During February 18-19, 2008, Trip to Continuum Dynamics, Incorporated, dated May 28, 2008, ML081420357.