

May 1, 2002

MEMORANDUM TO: Geoffrey E. Grant, Director
Division of Reactor Projects
Region III

FROM: Ledyard B. Marsh, Acting Deputy Director */RA/*
Division of Licensing and Project Management
Office of Nuclear Reactor Regulation

SUBJECT: TASK INTERFACE AGREEMENT (TIA) 2001-07 FROM REGION III
REGARDING QUAD CITIES MAINTENANCE RULE (MR) ISSUES
(TAC NOS. MB2287 and MB2288)

By your memorandum dated June 27, 2001, Region III requested a disposition of risk for failures of the licensee at Quad Cities Nuclear Power Station to comply with certain aspects of the MR (10 CFR 50.65) guidance. Inspections performed in accordance with Inspection Procedure (IP) 71111.12 (MR Implementation) at Quad Cities found the licensee was not consistent with MR guidance in Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and Nuclear Energy Institute guidance NUMARC 93-01, Revision 2, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." As a result, performance criteria for several systems were not consistent with assumptions in the Quad Cities Individual Plant Examination (IPE) submittal. In addition, the inspectors found that condition monitoring criteria were not established to ensure maintenance was effective. Also, the licensee had not updated some portions of the probabilistic safety assessment (PSA) related to equipment performance since 1996, and had not met station procedure guidance to update the PSA every two years. The combined effects of multiple system, structure, and component performance criteria not being consistent with the PSA, of not updating the PSA for equipment performance since 1996, and of not establishing condition monitoring criteria could not be determined by the significance determination process (SDP). This issue was discussed in a MR panel on April 19, 2001, and was recommended by the panel for further review to determine disposition by MR experts and significance by risk analysts.

Region III believes that the licensee should maintain an updated PSA in accordance with their own procedures, which indicate a 2-year update will be performed, and that this update is important, in light of the risk-informed decision-making for which this document is being used. The Region also believes that performance criteria should be consistent with the numbers published in the updated PSA, as recommended by Regulatory Guide 1.160 and by NUMARC 93-01. The Region believes that condition monitoring criteria should be established when performance monitoring criteria are set at a low level, as described in Regulatory Guide 1.160. The Region believes that failure to meet Regulatory Guide 1.160, while not a violation, should be considered for inclusion in the inspection program as a finding. The April 19, 2001, MR panel recommended further review of this issue to determine how to disposition the discrepancies found as a result of the inspection, which was conducted in accordance with

Inspection Procedure 71111.12. A determination of how to classify these issues in terms of risk or color was recommended by the panel, and the TIA was the tool recommended by the panel to accomplish the review.

Region III requested an interpretation from the Office of Nuclear Reactor Regulation (NRR) on the following specific Quad Cities MR issues.

1. Is it acceptable for the licensee to use the Electric Power Research Institute (EPRI) TR-105396, "PSA Applications Guide," methodology to set performance criteria, even when it causes the performance criteria to not be consistent with the equipment reliability and availability data published in the station's IPE and in apparent contradiction with Regulatory Guide (RG) 1.160?
2. What is the acceptable approach for determining risk significance of a finding when the licensee's unavailability and reliability criteria exceed that of the IPE?
3. Is it acceptable for inspectors to use the excess unavailability accrued on a system, structure, or component (SSC) (actual system unavailability minus IPE-published unavailability) in the SDP to determine the risk significance of maintaining an SSC outside IPE targets?
4. What risk significance should be placed on a finding that the licensee has not updated equipment performance data for their IPE in at least five years? How should this issue be treated in the revised reactor oversight program in which MR issues, risk assessment decisions, licensing decisions, and Notice-of-Enforcement-Discretion (NOED) decisions are based on some determination of risk using risk tools such as the IPE?
5. What risk should be assigned to the licensee's failure to use condition monitoring criteria to effectively monitor maintenance effectiveness?
6. Should any of these individual issues or a combination of these issues be considered a finding, and, if so, what risk or color should be assigned to the finding?

The staff has reviewed your memorandum, and provides the following responses to the specific questions. The responses to Questions 1 and 4 include suggestions based on additional information provided by M. Ring, et al. (Region III) in a telephone conversation with S. Alexander, et al. (NRR) on January 17, 2002.

Question 1

Is it acceptable for the licensee to use the EPRI TR-105396, "PSA Applications Guide," methodology to set performance criteria, even when it causes the performance criteria not to be consistent with the equipment reliability and availability data published in the station's IPE and in apparent contradiction with RG 1.160?

Discussion and Conclusion

Yes. With regard to the acceptability of the EPRI guidance, use of the EPRI methodology was found acceptable under certain circumstances during the MR baseline inspections in accordance with the MR Supplemental Inspection Guidance (compiled for the MR baseline inspections). As explained in the MR Supplemental Inspection Guidance, this approach is generally conservative, because it is not likely that all SSCs will be performing at their assumed worst-case limits at the same time. Also, note that the current probabilistic risk analysis (PRA) guidance in RG 1.174 is even less prescriptive.

Note that the answer presumes that the EPRI guidance was properly applied. If the inspector should find that it was not properly applied, then the question of acceptability is moot. Instead, the meeting minutes of the licensee's expert panel could be reviewed to discover the rationale for the change in performance criteria (PC) and to determine if that rationale was reasonable.

The question of acceptability of a basis for PC in the context of the reactor oversight process (ROP) is moot. The more relevant questions are: (1) does the issue constitute a violation of actual regulatory requirements, i.e., the MR, and (2) whether or not it is a violation, what is the risk/safety significance? The answer to the first question is clearly no. PC are not required by the MR, nor do Nuclear Regulatory Commission (NRC) regulations even require a PSA. Therefore, under the current enforcement guidance, having PC that are not consistent with the PSA by itself is not a violation. The answer to the second question is that the safety/risk impact may or may not be significant. Absent actual degraded performance or condition of SSCs within the scope of the MR, this becomes a programmatic issue which does not lend itself readily to SDP evaluation. Therefore, a sensitivity study would need to be performed using the station's PSA. However, since in this case the PSA has not been updated in the last five years (which may not be an unreasonable interval for updating), it may need to be updated before performing the sensitivity study in order to obtain the most accurate results.

Presumably, issues of this sort will have been revealed in the course of reviewing the licensee's MR treatment of actual SSC performance problems. However, there is no requirement for conformance to RG 1.160, NUMARC 93-01, or anything other than the MR itself. Nevertheless, realistically, the inspector may engage the licensee and obtain an explanation of the basis for the PC. If the licensee cannot justify the PC by any reasonable means (such as those in the industry guidance and in the supplemental inspection guidance), there may be at least a green finding, even without a MR violation.

Question 2

What is the acceptable approach for determining risk significance of a finding when the licensee's unavailability and reliability criteria exceed that of the IPE?

Discussion and Conclusion

There is no acceptable approach to determine an increase in risk associated only with the setting of criteria. Changes in risk are based only on deficiencies in performance or degraded SSCs. Per the ROP, an issue becomes a finding only if there is a licensee performance deficiency. Findings are judged to be more than minor by screening through Appendix B of Inspection Manual Chapter (IMC) 0612 (which will soon replace IMC 0610* for power reactor

inspection reports), or are treated under traditional enforcement. Then it can be determined if the performance deficiency constitutes a violation of the MR per the enforcement guidance (Section 8.1.11 of the Enforcement Manual). It should also be checked against the examples in Appendix E of IMC 0612 of minor MR violations and the conditions that would render them more than minor. The MR requires that the goals established by 10 CFR 50.65(a)(1) be commensurate with safety. If the "criteria" to which you referred are (a)(1) goals, then it might be possible to make the case that the (a)(1) goals are not justifiable or commensurate with safety on the basis, for example, of being inconsistent with PRA assumptions. If that case can be made, then the inadequacy of the goals would constitute a violation of (a)(1), assuming the SSCs in question are being monitored in an (a)(1) status. If the criteria in question are only (a)(2) PC, then there would be no violation, since the MR does not require PC. However, if there are actual SSC performance issues, and the case can be made that, without regard to the PC, the licensee is not able to demonstrate effective control of SSC performance or condition through appropriate preventive maintenance, and further, that the licensee has not put the affected SSCs in (a)(1) status within a reasonable amount of time and has no reasonable justification for not doing so, only then could an (a)(2) violation be identified. What determines a reasonable delay or reasonable justification would, of course, depend upon the circumstances.

With regard to determining risk significance, under the ROP, having goals or PC in excess of PRA assumptions has no real risk significance absent actual degraded performance or condition of the SSCs in question. Even if the licensee's performance criteria would allow unavailability and/or unreliability far in excess of PRA assumptions, unless SSC performance actually degrades, there is no change in risk significance. While it is theoretically possible to determine the potential risk significance if SSC performance hypothetically degrades, this is not provided for under the performance-based ROP.

Question 3

Is it acceptable for inspectors to use the excess unavailability accrued on an SSC (actual system unavailability minus IPE published unavailability) in the SDP to determine the risk significance of maintaining an SSC outside IPE targets?

Discussion and Conclusion

No. SSC actual unavailability greater than the licensee's PSA assumption is not, by itself, a performance deficiency and the SDP therefore does not apply. If there is, in fact, significant actual unavailability that exceeds a licensee goal or performance criteria, under the ROP, it must first be determined whether or not the unavailability is attributable to a licensee performance deficiency and if the performance deficiency is more than minor. Then, the risk significance of that actual degraded SSC performance could be determined using the SDP to estimate the increase in risk from the baseline (i.e., nominal) risk. In addition, of course, inspectors should determine that if the actual unavailability exceeds the licensee's goals for SSCs in (a)(1), adequate corrective action is being taken. For SSCs in (a)(2), see the discussion under the answer to your Question 2.

Another inspection area in which these issues may appropriately be considered is the IP 71111.12 biennial inspection (Periodic Evaluation), which heretofore focused on the licensee periodic evaluation(s) pursuant to 10 CFR 50.65(a)(3). NRR is considering adding a provision

to IP 71111.12 for NRC risk analysts to evaluate the risk impact of maintenance effectiveness issues on a biennial basis.

Question 4

What risk significance should be placed on a finding that the licensee has not updated equipment performance data for their IPE in at least five years? How should this issue be treated in the revised reactor oversight program in which MR issues, risk assessment decisions, licensing decisions, and NOED decisions are based on some determination of risk using tools such as the IPE?

Discussion and Conclusion

The risk significance of not updating the IPE or PSA could only be determined by updating the IPE/PSA and comparing the "before and after" baseline core damage frequency (CDF) (and large early release frequency (LERF), if applicable). Since there is no requirement for an IPE (or PSA/PRA) in the first place, this would not be enforceable. Nevertheless, should the licensee request a license amendment (for which an up-to-date PSA is specified in RG 1.174), NOED, or some other relief from regulatory requirements based on risk determinations using its existing PSA, then the NRC could reasonably expect the licensee to first update its PSA.

After a PRA has been updated, depending on the extent of changes to the plant in the intervening years, there may be a substantial change in baseline CDF and/or LERF. If the licensee's risk assessment (RA) tool is closely based on the plant's PSA, then it is conceivable that previous maintenance-related RAs performed pursuant to 10 CFR 50.65(a)(4) may have underestimated the risk associated with one or more maintenance activities. When the RA tool is updated as well, which we would expect the licensee to do, we would also expect the licensee to re-perform any currently effective RAs using the updated tool within a reasonable period of time. This situation should be treated similarly to emergent conditions that change plant risk. However, we would not expect the licensee necessarily to re-perform past RAs that are no longer effective solely because of a PRA update. Note that it is still appropriate to review past RAs for inadequacy (for all other reasons) in accordance with IP 71111.13.

Also, inspectors may review the industry peer evaluation performed on the licensee's PRA. Different PRA applications require different levels of quality. The peer review document should attest to the application(s) that a given PRA has sufficient quality, completeness, fidelity, etc., for it to be suitable. More specifically, the peer review may address how well the current PRA reflects (1) the plant as it is currently configured; (2) the routine maintenance actually being done, relative to PRA assumptions; (3) operating and maintenance procedures; and (4) actual plant availability and reliability data, or perhaps industry-wide generic data updated with plant-specific data.

Question 5

What risk should be assigned to the licensee's failure to use condition monitoring criteria to effectively monitor maintenance effectiveness?

Discussion and Conclusion

The risk impact of not using condition monitoring criteria could only be determined to the extent that it could be demonstrated that it led directly to risk-assessable unavailability and/or unreliability/demand failures.

Question 6

Should any of these issues or a combination of these issues be considered a finding, and if so, what risk or color should be assigned to the finding?

Discussion and Conclusion

In general the types of issues discussed above may be considered findings if they are first determined to be, or to be attributable to, licensee performance deficiencies. Then, if they screen through the questions in Appendix B (and/or Appendix E) of IMC 0612, and are thus determined to be more than minor, they may be documented findings under the ROP. Their significance may then be determined as the circumstances warrant as discussed above.

When SSCs and safety functions become degraded, if the proximate causes of such degradation are reasonably judged to be performance deficiencies, then inspection findings may be written and their significance assessed using the SDP. In such cases, the SDP estimates the added risk (delta CDF or delta LERF) to the public above the otherwise nominal or "baseline" risk.

If a licensee's maintenance monitoring program is in compliance with 10 CFR 50.65, then that program cannot reasonably be judged as deficient. This is true even when, for example, planned unavailability of an SSC is allowed to exceed that of a point-estimate unavailability value in the licensee's PRA model. Note that a point-estimate value in a PRA model generally represents the median of a probability function.

For regulatory assessment under the ROP, it is more appropriate to view the licensee's 10 CFR 50.65 maintenance monitoring program as one part of their overall problem identification and resolution program. Inspection guidance related to evaluating and documenting issues in this cross-cutting area is provided in IMC 0612, IMC 0305, and other related documents.

Also, as discussed above, inspecting licensee activities for conformance to regulatory guides or industry standards that are not binding documents, i.e., that are not invoked by a regulation, license condition, or technical specification, normally does not result in enforceable findings. Therefore, one of the major changes in the new revision to the procedure for ROP baseline inspection of licensee maintenance effectiveness activities (including MR implementation), IP 71111.12, reflects this fact. A portion of the revised procedure will focus inspection of MR implementation more on the requirements of rule itself with provisions of the industry guidance and the NRC regulatory guide used only as supporting information.

G. Grant

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If you have any questions regarding this issue, please contact Mr. F. Lyon of my staff at (301) 415-2296.

Docket Nos. 50-254 and 50-265

cc: B. Platchek, RGN-I
L. R. Plisco, RGN-II
K. E. Brockman, RGN-IV

G. Grant

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