

DPO Case File for DPO-2015-001

The following pdf represents a collection of documents associated with the submittal and disposition of a differing professional opinion (DPO) from an NRC employee involving concerns about the significance determination of a Yellow finding issued to Arkansas Nuclear One Unit 1 on June 23, 2014.

Management Directive (MD) 10.159, "The NRC Differing Professional Opinions Program," describes the DPO Program. <http://www.internal.nrc.gov/policy/directives/toc/md10.159.htm>

The DPO Program is a formal process that allows employees and NRC contractors to have their differing views on established, mission-related issues considered by the highest level managers in their organizations, i.e., Office Directors and Regional Administrators. The process also provides managers with an independent, multi-person review of the issue (one person chosen by the employee). After a decision is issued to an employee, he or she may appeal the decision to the Executive Director for Operations (EDO).

Because the disposition of a DPO represents a multi-step process, readers should view the records as a collection. In other words, reading a document in isolation will not provide the correct context for how this issue was considered by the NRC.

The records in this collection have been reviewed and approved for public dissemination.

- Document 1: DPO Submittal
- Document 2: Memo Establishing DPO Panel
- Document 3: DPO Panel Report
- Document 4: Comments from Submitter for RA to Consider
- Document 5: DPO Decision

Document 1: DPO Submittal

Document Markings...

NRC FORM 680 (08-2015) NRCMD 10.159		U.S. NUCLEAR REGULATORY COMMISSION DIFFERING PROFESSIONAL OPINION		DPO Case Number DPO-2015-001	
				Date Received 9/2/2015	
Name and Title of Submitter George Replogle, Senior Reactor Analyst, Region IV		Organization R4, DRS, EB1		Telephone Number (10 numeric digits) (817) 200-1249	
Name and Title of Supervisor Tom Farnholtz, Chief, EB1		Organization R4, DRS, EB1		Telephone Number (10 numeric digits) (817) 200-1243	
When was the prevailing staff view, existing decision or stated position established and where can it be found? Date June 23, 2014 Where (i.e., ADAMS ML#, if applicable): ML14174A832					
Summary of prevailing staff view, existing decision, or stated position. (Use continuation pages or attach Word document)					
Reason for DPO, potential impact on mission, and proposed alternatives. (Use continuation pages or attach Word document)					
Do you believe the issue represents an immediate public health and safety concern? <input checked="" type="checkbox"/> No		<input type="checkbox"/> Yes, (Explain on continuation page(s) or attach Word document).			
Is the issue directly relevant to a decision pending before the Commission? <input checked="" type="checkbox"/> No		<input type="checkbox"/> Yes, Reference Document (i.e., ADAMS ML#)			
<input checked="" type="checkbox"/> Informal discussions took place (Identify with whom and time frame of discussions) Sunil Weerakkody from May 2015 through August 2015 - affected office; Joseph Giitter discussion held on August 27, 2015 - director of affected office; Sent white paper to my chain and discusses with J. Clark and T. Farnholtz on July 8th.		<input type="checkbox"/> Extenuating circumstances prevented informal discussions			
Proposed panel members are (in priority order): 1. John Kramer 2. Russ Gibbs 3. Rick Deese <input type="checkbox"/> No names of potential panel members will be provided.					
When the process is complete, I would like the DPO case file:		<input type="checkbox"/> Non-Public <input checked="" type="checkbox"/> Public			
SIGNATURE OF SUBMITTER <i>George Replogle</i>				DATE 9/2/2015	
SIGNATURE OF CO-SUBMITTER (if any) <i>NA</i>				DATE NA	
SCAN THE SIGNED AND DATED FORM (INCLUDE ANY CONTINUATION PAGES OR WORD DOCUMENTS) AND E-MAIL TO: DPOPM.Resource@nrc.gov					
SIGNATURE OF DPO PROGRAM MANAGER <i>Renée Pedersen</i>				DATE 9/4/2015	
<input checked="" type="checkbox"/> DPO accepted <input type="checkbox"/> DPO returned					
Delete Continuation Page			Add Continuation Page		

NRC FORM 680
(08-2015)
NRCMD 10.159

U.S. NUCLEAR REGULATORY COMMISSION

DPO Case Number

DIFFERING PROFESSIONAL OPINION
(Continued)

Date Received

Please see WORD document for details.

I am requesting an expedited response to this DPO. If the DPO is successful, ANO-1 will transition from Column 4 to Column 3. The NRC inspection will change from the 95003 (which is being planned) to the 95002. The 95003 has over 1800 direct inspection hours scheduled whereas the 95002 would only have 200 inspection hours. The exact date of the 95003 is not known, but should start around the first of the year.

September 2, 2015

DPO

**Use of Mission Time in Excess of 24 hours
For Plant Operating State 3 Finding**

Acronyms:

ANO-1 – Arkansas Nuclear One – Unit 1
APHB – Probabilistic Risk Assessment Operations and Human Factors Branch
BWR – Boiling water reactor
CCDP – Conditional core damage probability
 Δ CDF – Change to the core damage frequency
 Δ LERF – Change to the large early release frequency
EA – Enforcement Action
DPO – Differing Professional Opinion
IMC – Inspection Manual Chapter
NRC – Nuclear Regulatory Commission
POS 3 – Plant Operating State 3
PWR – Pressurized Water Reactor
RASP – Risk Assessment of Operational Events
RCS – Reactor Coolant System
RUG – RASP Users Group
SPAR – Standardized Plant Analysis Risk

Procedures Referenced: A listing of the referenced procedures is included on the last pages of this differing professional opinion. ML numbers were provided when possible. Otherwise, internet links were made available.

Event Description: On March 31, 2013, ANO-Unit 1 was in a refueling outage. The reactor vessel was flooded to greater than 23 feet above the reactor vessel flange. This shutdown condition was Plant Operating State 3 (POS 3), as defined in Inspection Manual Chapter (IMC) 0609, Appendix G, and IMC 0308, Attachment 3, Appendix G. Two trains of decay heat removal were in service.

That same day a licensee contractor attempted to lift the main generator stator during maintenance activities. This component was exceptionally large and weighed many tons. The lifting rig had a flawed design and collapsed, dropping the stator onto the turbine building floor. The stator drop caused one fatality and several injuries (some serious). In addition, substantial damage occurred to the turbine building as well as several systems, including fire protection piping, instrument air, and the alternate alternating current diesel generators (station blackout diesels). Offsite power was lost and was not recovered for several days.

Note: The fatality and injuries were part of an industrial accident. The agency with regulatory authority concerning industrial accidents is the Occupational Safety and Health Administration. Accordingly, the NRC did not consider these unfortunate events in the risk evaluation. This was appropriate.

In response to the event, both emergency diesels started and decay heat removal (residual heat removal) was restored. The reactor and reactor coolant parameters (reactivity, level, temperature) were maintained within the desired ranges. [emphasis added]

Prevailing Staff View: On June 23, 2014, the NRC issued a final Yellow finding to Arkansas Nuclear One – Unit 1 concerning the dropped stator event – See NRC Inspection Report 05000313/2014008, Enforcement Action EA 14-008 (ML14174A832). The senior risk analyst (APHB) had extended the diesel generator mission time to 72 hours (the accident mission time was extended to six days). The normal mission time for equipment and accidents is 24 hours. The detailed risk evaluation was reviewed by another headquarters analyst as well as a Region 4 senior reactor analyst.

The document with the most detail concerning the detailed risk evaluation was NRC Inspection Report 05000313/2013012; 05000368/2013012, “Arkansas Nuclear One – NRC Augmented Inspection Team Follow-Up Inspection Report; Preliminary Red and Yellow Findings” (ML14091B128). This document includes all of the analyst’s assumptions. The assumption of interest is:

PRA mission time is normally assumed to be 24 hours. However, after the event was initiated it took approximately six days [emphasis added] to recover offsite power. If the emergency diesel generators failed after running successfully for three days the time to core uncover was over three days after loss of DHR [decay heat removal]. Thus the emergency diesel generator mission time was 72 hours.

My Differing Views: This finding should have screened to Green in accordance with IMC 0609, Appendix G, Attachment 2, and IMC 0308, Attachment 3, Appendix G.

As discussed earlier, POS 3 is the shutdown condition where the reactor cavity is flooded to at least 23 feet above the reactor vessel flange.

IMC 0609, Appendix G, Attachment 2 specified, in part:

Loss of Offsite Power - Includes losses of offsite power which cause a loss of RHR [residual heat removal]. LOOP [loss of offsite power] events are not assessed in POS 3. **[Emphasis added]**

IMC 0308, Appendix G stated, in part:

Loss of Offsite Power (LOOP) – This initiating event category covers losses of offsite power at shutdown which cause a loss of RHR [residual heat removal], and operator

action is needed to restore RHR [residual heat removal]. This initiator category is considered for only POS 1 and POS 2. This category is not considered applicable to POS 3, since the time to core uncover is assumed to be greater than 24 hours. **[Emphasis added]**

IMC 0308, Attachment 3, Appendix G established a clear tie between the 24 hour mission time and the POS 3 operating state.

Note: There is one exception to this rule. If a loss of offsite power occurs and a coincidental loss of inventory event also occurs, analysts are instructed to go to Phase 3. This is not just a loss of offsite power event, it's a double event including a loss of offsite power and a loss of inventory event. Under these conditions, there may not be a 24 hour supply of water above the core. There was no coincidental loss of inventory event at ANO-1 during the loss of offsite power.

POS 3 is one of the safest plant configurations. Compared to at-power conditions, decay heat is less and getting lower and there's an abundant supply of water for core cooling. In the worst case at-power models, core damage can occur in a matter of hours. In this plant configuration, it takes several days.

Revision 1 of the RASP Handbook had provided a basis for the standard 24 hour mission time. This was removed at a later date. Because there's no readily available paper trail for changes, the reasoning for the removal can't be easily found.

Typical mission times in Standardized Plant Analysis Risk (SPAR) Models: SPAR assumes a 24-hour mission time for most structures, systems, and components. The 24-hour assumption is made for SPAR models because for many structures, systems and components, the choice is arguably conservative, yet does not contribute significantly to the top event metric. In most events, 24 hours is sufficient time to bring numerous resources to bear on core cooling. In some events, the choice is conservative and the analysis results are overestimates.

Relationship of the RASP Handbook to the IMCs: The RASP Handbook is a sub-tier methods handbook that is required to be consistent with the IMCs. IMCs are not required to match the information in the RASP Handbook. The applicable requirements are provided below:

IMC Chapter 0308, Section 01, "Purpose" states, in part:

This document shall serve as the source information for all applicable program documents such as manual chapters, performance indicator guidance, and assessment guidance. **[Emphasis added]**

IMC 0308, Appendix G, states, in part:

Loss of Offsite Power (LOOP) - This initiating event category covers losses of offsite power at shutdown which cause a loss of RHR [residual heat removal],

and operator action is needed to restore RHR [residual heat removal]. This initiator category is considered for only POS 1 and POS 2. This category is not considered applicable to POS 3, since the time to core uncover is assumed to be greater than 24 hours.

Note: All loss of offsite power events include the simultaneous loss of RHR. RHR can be recovered when power returns to the safety buses.

Reason for NRC's Original Position: In lieu of the instruction contained in IMC 0609, Appendix G, and IMC 0308, Attachment 3, Appendix G, the analyst had followed other guidance contained in the RASP Handbook. As a review, the detailed risk evaluation had stated, in part:

PRA mission time is normally assumed to be 24 hours. However, after the event was initiated it took approximately six days to recover offsite power. **[Emphasis added]** If the emergency diesel generators failed after running successfully for three days the time to core uncover was over three days after loss of DHR [decay heat removal]. Thus the emergency diesel generator mission time was 72 hours.

Note: This justification is dependent on recovering offsite power.

This position came from The RASP Handbook, Volume 4, "Shutdown Events," dated April 2011, which stated in part:

8.4 Sequence Mission Time:

In some shutdown sequences, the time to core damage may be longer than 24 hours (for example in a loss of decay heat removal during refueling with reactor cavity filled and no loss of inventory event). **[Emphasis added]** The mission time for such sequences should be extended beyond the usual 24-hour period (see Volume 1, Section 4); until a sustainable safe state is reached. Such a longer time window may also allow crediting recovery/repair actions that may have not been feasible in a 24-hour period.

Note: The example above is a POS 3 event with a loss of offsite power. The instruction to extend the 24 hour mission time is in direct conflict with the requirements contained in IMCs 0609 and 0308, including Attachments and Appendixes. In addition, this section refers to the RASP Handbook, Volume 1 for additional guidance.

The RASP Handbook, Volume 1, "Internal Events," Revision 2.0, dated January 2013, Section 4 contained the information referenced in the Shutdown volume (Volume 4). Volume 1, however, contained three different sections that discussed extending the mission time beyond 24 hours. Section 4.5 was the most similar to the words in the Shutdown volume.

4.5 Increasing Mission Time (>24 Hours):

For longer duration LOOP [loss of offsite power] events caused by an external event, the mission time of the EDG [emergency diesel generator] and other components may need to be increased to account for the fact that offsite power is not likely to be recovered (condition analysis) or was not recovered (initiating event analysis) within the 24 hour mission time. **[Emphasis added]**

Notes:

1. The ANO-1 event was not caused by an external event.
2. It is likely that this guidance was used by the analyst. This is the only applicable Volume 1 mission time guidance that is tied directly to the recovery of offsite power. It does not originate from the ASME PRA standard and the source of the information is not currently known. I checked with APHB on August 28, 2015.
3. This guidance contradicts guidance in Sections 4.2 and 4.9 below:

4.2 Treatment of Mission Time in Events and Condition Assessments:

General Considerations. The SPAR models assume a 24-hour mission time for all sequences and most SSCs. Guidance for adjusting the mission time for a sequence and/or SSC in an ECA should follow the supporting requirements from the PRA [probabilistic risk assessment] Standard. **[emphasis added]** Supporting requirements for specifying an appropriate mission time for the modeled accident sequences, support systems, and intersystem and intrasystem dependencies are provided in the Section 4.9.

Note: The ASME PRA standard is not an approved source document for the RASP Handbook.

4.9 PRA Standard Supporting Requirements – Mission Times

Mission time > 24 hours. For sequences in which stable plant conditions would not be achieved by 24 hours using the modeled plant equipment and human actions, perform additional evaluation or modeling by using an appropriate technique (ASME Section SC-A5). **[Emphasis added]** Examples of appropriate techniques from Supporting Requirement SC-A5 include... Extending the mission time, and adjusting the affected analyses, to the point at which conditions can be shown to reach acceptable values.

Much of this information comes from the ASME PRA standard. However, this information is incomplete. The analyst would need to understand the meanings of stable plant conditions as well as reaching acceptable values. After all, do stable plant conditions require the recovery of offsite power OR could they simply rely on stable reactor coolant parameters (such as temperature, reactivity, and level)? The direct wording from the ASME PRA standard was, in part:

Definition:

Safe Stable State: a plant condition, following an initiating event, in which RCS [reactor coolant system] conditions are controllable at or near desired values. **[Emphasis added]**

SC-A5 – Categories II and III

For sequences in which stable plant conditions would not be achieved within 24 hours using the modeled plant equipment and human actions, PERFORM additional evaluation or modeling by using an appropriate technique. Examples of appropriate techniques include:

(b) Extending the mission time and adjusting the affected analyses to the point at which conditions can be shown to reach acceptable values.

Considering the definition of “safe and stable state,” the intent of the ASME standard is clear. The standard is relying on the establishment of controllable reactor coolant system conditions. RCS conditions can reach a safe and stable state without recovering offsite power. In fact, there is no tie to equipment functionality in this portion of the ASME standard. The requirements involve reactor coolant system conditions only. While some equipment would be needed to maintain acceptable reactor coolant system conditions, there is a myriad of different equipment options that would be effective. In this case, operators met the safe and stable state conditions shortly after the loss of offsite power had occurred.

Accuracy of the RASP Handbook: While the Handbook is a convenient source of information, the accuracy of the RASP Handbook has been a known problem. The RASP Handbook was never subjected to reasonable quality controls and has never had adequate management oversight (no one even concurs on it). As part of the ANO-1 significance determination, the analyst should have validated that the requirements in IMCs 0609 and 0308 were met. Additional contributors to the improper Yellow finding included:

- Most NRC Managers aren’t aware of the IMC 0308 Basis documents or that they must be followed. Most NRC Managers don’t bother to independently check the IMC 0609 procedures.
- Most licensee personnel are not aware that the IMC 0308 Basis documents exist. This makes their defense and/or appeal of an improper detailed risk evaluation much more difficult.
- Most NRC senior reactor analysts don’t check the IMC 0308 Basis documents when performing risk evaluations.
- Most NRC Managers and licensee personnel mistakenly believe that the RASP Handbook is NRC Policy. It is not. Policy resides in the IMC 0609 procedures and the IMC 0308 procedures. IMC 0308 is the lone approved source document for Significance Determination Process guidance documents. The RASP Handbook should consistently reflect policy, but it is not policy itself.

I had requested, as part of DPO 2014-002, that the RASP Handbook receive a full review using a rigorous approval process. This did not occur and APHB had only planned to submit the CCDP issue itself to a formal review. Further, the newly developed “rigorous approval process” was simply a one page table, attached to a memo. These instructions didn’t require

concurrences. Like most things attached to memos, this attempt to establish an adequate approval process will be forgotten in a few years.

Note: Since the resolution of DPO 2014-002, additional problems with the RASP Handbook were identified. A future review of three sections (CCDP, common cause failure, and mission time) will include a concurrence page. It's not clear if this is a one-time practice or it will endure. Nonetheless, based on the long history of inadequate quality assurance controls and the knowledge that at least one inappropriate Yellow finding was issued, a full review of the RASP handbook is warranted. The remainder of the handbook has never received concurrences.

Consequences: If the prevailing view is allowed to stand, the NRC may experience the following:

1. The NRC could be viewed as an agency that is unwilling to follow their own procedures (NRC IMCs).
2. If we do not take actions to review and correct the entire RASP Handbook in the near term, this outcome will eventually be repeated. The RASP Handbook is a sub-tier "methods" document and is required to be consistent with IMCs 0609 and 0308.
3. The arbitrary increase of mission times to greater than 24 hours will create substantial inconsistency with our detailed risk evaluations. For the exact same issues, some analysts will determine that a finding screens to Green (assuming a 24 hour mission time) while others would increase the mission time until core damage occurs, getting greater than Green results. We cannot run a credible Significance Determination Process unless we consistently implement NRC policy and procedures.
4. The NRC will issue a higher number of greater than Green findings without adequate justification. The number of plants that must be transitioned to higher levels of the NRC Action Matrix will increase.
5. If the finding is not revised, the licensee will unnecessarily expend substantial resources supporting a 95003 inspection, "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs or One Red Input," dated February 9, 2011. ANO Unit 1 is currently in Column 4 of the NRC Action Matrix. Region 4 has scheduled approximately 1850 direct inspection hours for Unit-1. Indirect efforts for preparation and documentation will increase the charges. ANO-1 should be in Column 3 of the action matrix. The estimated inspection hours for a Column 3 plant (95002 inspection, "Supplemental Inspection for One Degraded Cornerstone or any Three White Inputs in a Strategic Performance Area," dated February 9, 2011) is 200 direct inspection hours.

Remedies: Implementation of all of the following would satisfy my concerns. A commitment to perform all of the following would be justification for withdrawal of the DPO.

- Revoke the ANO-1 Yellow finding concerning the dropped stator event and reissue as a Green finding.
- Perform a full review of the RASP Handbook (completed by September 1, 2016) to verify that the handbook is in conformance with applicable NRC policies and procedures. In addition, remove any information from DRAFT/Unapproved documents (the RUG has inserted DRAFT information into the Handbook). Provide a detailed list of changes for management review. This revision is to have concurrences (at least one manager from each region). It is preferred that the RUG be recomposed of individuals who have not served on the RUG previously.
- Issue a Regulatory Issue Summary to educate the licensees on the contents and purpose of the IMC 0308 basis documents. Further, explain that the RASP Handbook is not policy, but should reflect policy.
- Issue a memo to all senior reactor analysts and headquarters risk analysts stating that, until the RASP Handbook can be validated, analysts must check the official procedures and source documents that are applicable to their risk evaluations. This would be an ongoing good practice anyway.
- Establish peer review expectations and enforce those expectations. Two peer reviews were performed on the subject significance determination. Neither review was adequate. Peer reviewers should be held equally accountable for deficient detailed risk evaluations.
- Ownership of the RASP Handbook should be taken from APHB and assigned to another branch in the Division of Risk Assessment.

Accession Numbers or Internet Links:

Document Title	Accession Number
ASME RA-S-2002 to 2009, Standard for Level1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications	Not Available on ADAMS Use IHS Search Engine
Differing Profession Opinion 2014-002, Use of Conditional Core Damage Probability (CCDP) to Evaluate Performance Deficiencies that Cause Initiating Events	ML14344A291

IMC 0040, Preparing Revising and Issuing Documents for the NRC Inspection Manual, November 11, 2014	ML13176A014
IMC 0308, Attachment 3, Technical Basis for Significance Determination Process, October 15, 2006	ML062890430
IMC 0308, Attachment 3, Appendix A, Technical Basis for At Power Significance Determination Process, June 9, 2012	ML11222A063
IMC 0308, Attachment 3, Appendix G, BWR and PWR Phase 2 Significance Determination Process for Shutdown, February 28, 2005.	Not in ADAMS. Available at the following link. http://www.nrc.gov/reading-rm/doc-collections/insp-manual/manual-chapter/mc0308g-att3.pdf
IMC 0308, Reactor Oversight Process (ROP) Basis Document, September 4, 2014	ML14164A209
IMC 0609, Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process, Phase 1 Initial Screening and Characterization of Findings," dated May 9, 2014 IMC 0609, Appendix G, Attachment 2, "Phase 2 Significance Determination Process Template for PWR during Shutdown," dated February 28, 2005	ML13050A934
IMC 0609, Appendix G, Shutdown Operations Significance Determination Process, May 9, 2014	ML0350A933
Inspection Procedure 95002, Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area, February 9, 2011	ML102020532
Inspection Procedure 95003, Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs or One Red Input, February 9, 2011	ML102020551
NRC Inspection Report 05000313/2013012; 05000368/2013012, Arkansas Nuclear One – NRC Augmented Inspection Team Follow-Up Inspection Report; Preliminary Red and Yellow Findings.	ML14091B128
NRC Inspection Report 05000313/2014008, Enforcement Action EA 14-008	ML14174A832
NRR Office Instruction OVRST-102, NRR Procedures for Processing Inspection Manual Documents	ML11059A012
Risk Assessment of Operational Events Handbook, Volume 1, Internal Events, Revision 2	ML13030A049
Risk Assessment of Operational Events Handbook, Volume 1, Internal Events, Revision 1.03	ML10085108
Risk Assessment of Operational Events Handbook, Volume 1, Internal Events, Revision 1.0	ML080100440

Risk Assessment of Operational Events Handbook, Volume 4, Shutdown Events, Revision 1	See this link http://www.internal.nrc.gov/RES/projects/RASP/documents/RASP%20Handbook/RASP%20Handbook%20Vol%20%204%20Rev%201%20Final.pdf
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SDP
from Rpt 2013012

The following equipment was available after the event initiation to mitigate the event:

- Both emergency diesel generators and their respective electrical distribution systems
- Both decay heat removal trains (two pumps)
- Both high pressure injection (HPI) trains (three pumps)
- Reactor building spray systems – note these were not credited in the analysis, however, the non-crediting had no effect on the quantitative results

5.0 Significance Determination Process (SDP) Phase 2 Summary

No Phase 2 was conducted.

6.0 Initiation of a Phase 3 SDP Risk Assessment

A Phase 3 SDP risk assessment was performed by the Office of Nuclear Reactor Regulation (NRR).

The analysts used the following generic references in preparing the risk assessment:

- NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management." December 1991
- NUREG/CR-6883, "The SPAR-H Human Analysis Method." August 2005
- NUREG-1842, "Good Practices for Implementing Human Reliability Analysis." April 2005
- NUREG/CR-6595 Revision 1, "An Approach for Estimating the Frequencies of Various Containment Failure Modes and Bypass Events." October 2004
- INL/EXT-10-18533 Revision 2, "SPAR-H Step-by-Step Guidance." May 2011
- "RASP Manual Volume 1 – Internal Events," Revision 2.0 date January 2013
- NUREG/CR-1278, "Handbook of HRA with Emphasis on Nuclear Power Plant Applications." August 1983

The analyst used the following plant specific references:

- EOP: 1202.007, Degraded Power
- AOPs:
 - 1203.024, Loss of Instrument Air
 - 1203.028, Loss of Decay Heat Removal
 - 1203.050, Unit 1 Spent Fuel Pool Emergencies
- Calculation: 89-E-0017-01, Time to Boiling and Time to Core Uncovery after Loss of Decay Heat Removal, Unit 1, Revision 7

Should
have
performed.

IN SDP
from Report 2013012

- Procedure: 1103.018, Maintenance of RCS Water Level

7.0 Development of the Model

No Low Power/Shutdown (LP/SD) SPAR model exists for ANO Unit 1. Therefore, the at-power ANO1 SPAR model was modified to allow analysis of the LOOP event. A new event tree (ET) was created to analyze the event.

This ET is shown in Figure A-1 of Appendix A. The ET was linked to a mix of existing at-power fault trees (FT) and new FTs, as applicable. The existing FTs were modified as necessary to appropriately describe system dependencies during shutdown conditions and the different success criterion. The ET and high level FTs are shown in Appendix A.

Modeling Assumptions



- PRA mission time is normally assumed to be 24 hours. However, after the event was initiated it took approximately six days to recovery offsite power. If the emergency diesel generators failed after running successfully for three days the time to core uncover was over three days after loss of DHR. Thus the emergency diesel generator mission time was modified to 72 hours.
- The Division 2 normal AC power is from 4Kv bus A2. However, bus A2 was unavailable for maintenance and bus A4 was receiving power from 4Kv bus A3 via breaker A-310 and A-410. A model change was made to reflect this alternative alignment and the associated interlocks and their failure probabilities.
- As identified above, the Green train battery D06 had been disconnected from D02 bus. D02 DC bus was being fed from a battery charger supplied from Div. 1 AC power. With this arrangement, the Div. 2 DC system would (and did) de-energize on a loss of Div. 1 AC power. If the Div. 1 AC power is restored with an EDG start then Div.2 DC power would be (and was) restored. However, if the Div. 1 EDG did not restore AC power to the battery charger, the Div. 2 DC power would remain de-energized. The consequence of this is that without DC power from a Div. 1 battery charger the Div. 2 EDG would not start normally. In fact, during the event, the Div.2 EDG start was delayed about 10 seconds until the Div. 1 EDG restored Div.2 DC power. The model was modified to allow for a manual realignment of Div. 2 DC power directly to the Div. 1 battery. This human action (HFE) was given a failure probability of $4E-3$ (DCP-XHE-XM-DD11D12). Notes: 1) An alternative means of re-energizing the Div. 2 DC system would be to restore the Div. 2 battery from its maintenance status. The licensee indicated that this could be accomplished in about 30 minutes once the problem and solution were identified and the decision made to proceed. This recovery method was not modeled as it is assumed that the failure probability of the primary method was adequately low to negate

Document 2: Memo Establishing DPO Panel

September 23, 2015

MEMORANDUM TO: Michael C. Cheok, Panel Chairperson
Office of New Reactors

Russell A. Gibbs, Panel Member
Office of Nuclear Reactor Regulation

George T. MacDonald, Panel Member
Region II

Laura L. Kozak, Panel Member
Region III

THRU: Patricia K. Holahan, Director **/RA/**
Office of Enforcement

FROM: Renée M. Pedersen **/RA/**
Sr. Differing Professional Views Program Manager
Office of Enforcement

SUBJECT: AD HOC REVIEW PANEL - DIFFERING PROFESSIONAL
OPINION ON SIGNIFICANCE OF YELLOW FINDING AT ANO-1
(DPO-2015-001)

In accordance with Management Directive (MD) 10.159, "The NRC Differing Professional Opinion Program;" and in my capacity as the Differing Professional Opinion (DPO) Program Manager; and in coordination with Patricia Holahan, Director, Office of Enforcement; Marc Dapas, Regional Administrator, Region IV; and the DPO submitter; you are being appointed as members of a DPO Ad Hoc Review Panel (DPO Panel) to review a DPO submitted by a U.S. Nuclear Regulatory Commission (NRC) employee. We have exercised discretion in accordance with the guidance in the MD and appointed four members to this panel due to the complexity of the issues.

The DPO (Enclosure 1) raises concerns about the significance determination of a Yellow finding issued to Arkansas Nuclear One Unit 1 on June 23, 2014. Because of the subject of the DPO, it has been forwarded to Mr. Dapas for consideration and issuance of a DPO Decision.

CONTACTS: Renée Pedersen, OE
(301) 415-2742

Marge Sewell, OE
(301) 415-8045

The DPO Panel has a critical role in the success of the DPO Program. Your responsibilities for conducting the independent review and documenting your conclusions in a report are addressed in the handbook for MD 10.159 in [Section II.F](#) and [Section II.G](#), respectively. The [DPO Web site](#) also includes helpful information, including interactive flow charts, frequently asked questions, and closed DPO cases, including previous DPO Panel reports. We will also be sending you additional information that should help you implement the DPO process. Because this process is not routine, we will be meeting and communicating with all parties during the process to ensure that everyone understands the process, goals, and responsibilities. Disposition of this DPO should be considered an important and time sensitive activity. The timeliness goal for issuing a DPO Decision is 120 calendar days from the day the DPO is accepted for review. The timeliness goal for issuing this DPO Decision is **January 4, 2016**.

Process Milestones and Timeliness Goals for this DPO are included as Enclosure 2. The timeframes for completing process milestones are identified strictly as goals—a way of working towards reaching the DPO timeliness goal of 120 calendar days. The timeliness goal identified for your DPO task is 75 calendar days.

Although timeliness is an important DPO Program objective, the DPO Program also sets out to ensure that issues receive a thorough and independent review. The overall timeliness goal should be based on the significance and complexity of the issues and the priority of other agency work. Therefore, if you determine that your activity will exceed your 75-day timeliness goal, please send an e-mail to Mr. Dapas with a copy to DPOPM.Resource@nrc.gov and include the reason for the extension request and a proposed completion date for your work. Mr. Dapas can then determine if he needs to submit an extension request for a new DPO timeliness goal to the Executive Director for Operations for approval.

An important aspect of our organizational culture includes maintaining an environment that encourages, supports, and respects differing views. As such, you should exercise discretion and treat this matter appropriately. Documents should be distributed on an as-needed basis. In an effort to preserve privacy, minimize the effect on the work unit, and keep the focus on the issues; you should simply refer to the employee as the DPO submitter. Avoid conversations that could be perceived as “hallway talk” on the issue and refrain from behaviors that could be perceived as retaliatory or chilling to the DPO submitter or that could potentially create a chilled environment for others. It is appropriate for employees to discuss the details of the DPO with their co-workers as part of the evaluation; however, as with other predecisional processes, employees should not discuss details of the DPO outside the agency. If you have observed inappropriate behaviors or receive outside inquiries or requests for information, please notify me.

On an administrative note, please ensure that all DPO-related activities are charged to Activity Code ZG0007.

We appreciate your willingness to serve and your dedication to completing an independent and objective review of this DPO. Successful resolution of the issues is important for NRC and its stakeholders. If you have any questions or concerns, please feel free to contact me or Marge.

We look forward to receiving your independent review results and recommendations.

Enclosures:

1. DPO-2010-001
2. Process Milestones and Timeliness Goals

cc: w/o Enclosures:

M. Dapas, RIV
K. Kennedy
G. Replogle, RIV
G. Holahan, NRO
N. Sanfilippo, NRR
A. Masters, RII
A. Stone, RIII
P. Holahan, OE
M. Sewell, OE

M. Cheek, et al.

3

We look forward to receiving your independent review results and recommendations.

Enclosures:

1. DPO-2010-001
2. Process Milestones and Timeliness Goals

cc: w/o Enclosures

M. Dapas, RIV

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P. Holahan, OE

M. Sewell, OE

ADAMS Package: ML15265A526

MEMO: ML15265A574

OE-011

OFFICE	OE: DPO/PM	OE: D
NAME	RPedersen	PHolahan
DATE	9/ 22/2015	9/23 /2015

OFFICIAL RECORD COPY

Document 3: DPO Panel Report

January 22, 2016

MEMORANDUM TO: Marc L. Dapas, Regional Administrator
Region IV

FROM: Michael C. Cheok, Panel Chair /RA/
Russell A. Gibbs, Panel Member /RA/
George T. MacDonald, Panel Member /RA/
Laura L. Kozak, Panel Member /RA/

SUBJECT: DIFFERING PROFESSIONAL OPINION PANEL REPORT ON THE
SIGNIFICANCE DETERMINATION OF A YELLOW FINDING AT
ANO UNIT 1 (DPO-2015-001)

In a memorandum dated September 23, 2015, we were appointed as members of a Differing Professional Opinion (DPO) Ad Hoc Review Panel (Panel) to review a DPO regarding the significance determination of a Yellow finding issued to Arkansas Nuclear One (ANO) Unit 1 on June 23, 2014. The Panel reviewed the DPO in accordance with Management Directive 10.159, "NRC Differing Professional Opinion Program." The Panel's report is enclosed for your consideration in issuing a DPO Decision.

The Panel concluded that the ANO Unit 1 event was a very complex event which required a detailed risk analysis to determine the best estimate results for the significance determination. The Panel therefore concluded that the staff's process used to determine the Yellow finding issued to ANO Unit 1 on June 23, 2014 was the appropriate process to use. The Panel concluded that the Risk Assessment Standardization Project (RASP) Handbook is a risk assessment guidance (or "methods") document for capturing best practices for performing risk evaluations, as such, the Panel considers that flexibility in the use of the RASP Handbook is essential as long as its application is not inconsistent with program requirements. Finally, the Panel concluded that the agency's proposed response to DPO-2014-002 (ADAMS Accession Number ML14344A291) for establishing a more rigorous process for review and approval for changes to the RASP Handbook to be adequate.

Although the Panel concluded that the correct processes were used for the ROP evaluation for the ANO Unit 1 stator drop event, the Panel identified several potential process improvements for your consideration. We appreciate that these recommendations involve areas that are outside of your responsibility. Therefore we are providing a copy of this memorandum to Bill Dean, the Director of the Office of Nuclear Reactor Regulation, who has responsibility for these activities.

- The Panel recommends that a comprehensive review of the RASP Handbook be performed to ensure its guidance is not inconsistent with program requirements.
- The DPO Panel recommends that the purpose and use of the RASP Handbook be clarified to ensure it remains a "living" methods document which takes into account the

use of available best practices which may or may not be specified in higher tier program documents.

- The Panel recommends that the comprehensive review of the RASP handbook include additional guidance on a “safe, stable, end state” and appropriate consideration of the need to increase the mission time of modeled components.
- The panel recommends that Inspection Manual Chapters 0609 and 0308 be revised to clarify the expected need for flexibility in performing Significance Determination Process (SDP) evaluations. While the panel determined the documents already allow flexibility, additional clarity would be helpful in order to ensure appropriate technical assumptions are developed consistent with the unique aspects of individual findings.
- The Panel recommends that the initiative to further develop the RASP handbook quality assurance process beyond that recommended by the response provided by DPO-2014-002 be carefully considered taking into account agency resources and long term value added.

Please do not hesitate to contact us if you have any questions regarding the enclosed report.

Enclosure: DPO Panel Report

cc: G. Replogle, RIV
P. Holahan, Director, OE
R. Pedersen, DPOPM
W. Dean, Director, NRR

use of available best practices which may or may not be specified in higher tier program documents.

- The Panel recommends that the comprehensive review of the RASP handbook include additional guidance on a “safe, stable, end state” and appropriate consideration of the need to increase the mission time of modeled components.
- The panel recommends that Inspection Manual Chapters 0609 and 0308 be revised to clarify the expected need for flexibility in performing Significance Determination Process (SDP) evaluations. While the panel determined the documents already allow flexibility, additional clarity would be helpful in order to ensure appropriate technical assumptions are developed consistent with the unique aspects of individual findings.
- The Panel recommends that the initiative to further develop the RASP handbook quality assurance process beyond that recommended by the response provided by DPO-2014-002 be carefully considered taking into account agency resources and long term value added.

Please do not hesitate to contact us if you have any questions regarding the enclosed report.

Enclosure: DPO Panel Report

cc: G. Replogle, RIV
P. Holahan, Director, OE
R. Pedersen, DPOPM
W. Dean, Director, NRR

Non-public

ADAMS Package Accession No.: ML16021A233

ADAMS Memo Accession No.: ML16021A185

OE-011

OFFICE	DPO/PC	DPO/PM	DPO/PM	DPO/PM
NAME	MCheok	RGibbs	GMacDonald	LKozak
DATE	1/ 19 /2016	1/ 19 /2016	1/ 13 /2016	1/ 14 /2016

OFFICIAL RECORD COPY

**Differing Professional Opinion (DPO) on the Significance
Determination of a Yellow Finding at ANO Unit 1
(DPO-2015-001)**

DPO Panel Report

/RA/

Michael C. Cheek, Panel Chair

/RA/

**Russell A. Gibbs, Panel
Member**

/RA/

**George T. MacDonald, Panel
Member**

/RA/

Laura L. Kozak, Panel Member

Date: January 22, 2016

ENCLOSURE

Introduction

Differing Professional Opinion (DPO-2015-001) was received on September 2, 2015. The concerns in the DPO involved the NRC's Significance Determination Process (SDP) evaluation of the March 2013 stator drop event at Arkansas Nuclear One Unit 1 (ANO Unit1). The NRC determined the finding for ANO Unit 1 to be Yellow, a finding of substantial safety significance. The final significance determination letter was issued on June 23, 2014.

The memorandum from the Senior Differing Professional Views Program Manager, Office of Enforcement, establishing the Differing Professional Opinion Panel (DPO Panel or Panel) was issued on September 23, 2015. The memorandum tasked the Panel with conducting an independent review of the issues in accordance with Management Directive (MD) 10.159, "NRC Differing Professional Opinion Program."

The Panel met with the submitter on October 6, 2015, and established a concise statement of the submitter's concerns (see below). The submitter approved the statement of concerns on October 15, 2015. During the course of the Panel's review, the Panel interviewed the DPO submitter on several occasions, conducted numerous NRC document reviews, and interviewed managers and members of the staff from the Office of Nuclear Reactor Regulation (NRR), Region IV, and the other regional offices.

Statement of Concerns

Based on a review of the DPO submittal and associated references, and an interview with the submitter, the following concerns were identified by the Panel:

1. The staff is not following certain procedures associated with determining the significance of inspection findings. Inspection Manual Chapters (IMCs) 0308 and IMC 0609 are the governing documents for Significance Determination Project (SDP) risk determinations and the Risk Assessment Standardization Project (RASP) Handbook is a sub-tier document. Program requirements in IMCs 0308 and 0609 must be followed when there is a conflict between these documents and the RASP Handbook. The Phase 2 process documented in IMC 0609 Appendix G should have been used for the ANO Unit 1 stator drop SDP evaluation. Instead, guidance from the RASP Handbook was used. The RASP Handbook is not consistent with the program requirements specified in IMCs 0308 and 0609 or with the ASME PRA Standards document. (The 24 hour vs. 72 hour diesel generator mission time (6 day total mission time) was the example used to highlight this issue.)
2. If the process identified in IMC 0609 Appendix G had been used, the SDP finding for the ANO Unit 1 stator drop should be Green. Instead, because of the above two issues, the SDP finding was finalized as Yellow. (If the finding is Green, the resulting NRC inspections at ANO Unit 1 should be based on Inspection Procedure (IP) 95002 instead of IP 95003.)
3. (a) The RASP Handbook contains several pieces of inaccurate information and the review and approval process for the handbook is not rigorous. (b) The current RASP Handbook change process is inadequate.

Evaluation of Concerns

Concern 1

Concern 1, as articulated in the Statement of Concerns, is as follows:

The staff is not following certain procedures associated with determining the significance of inspection findings. IMC 0308 and IMC 0609 are the governing documents for SDP risk determinations and the RASP Handbook is a sub-tier document. Program requirements in IMCs 0308 and 0609 must be followed when there is a conflict between these documents and the RASP Handbook.

The Phase 2 process documented in IMC 0609 Appendix G should have been used for the ANO Unit 1 stator drop SDP evaluation. Instead, guidance from the RASP handbook was used.

The RASP Handbook is not consistent with the program requirements specified in IMCs 0308 and 0609 or with the ASME PRA standards document. (The 24 hour vs. 72 hour diesel mission time (6 day total mission time) was the example used to highlight this issue.

Background - Summary of ANO Unit 1 stator drop SDP evaluation

During a refueling outage on March 31, 2013, a temporary overhead crane being used to move the generator stator from Unit 1 collapsed. Unit 1 lost electrical power from offsite sources due to damage caused by the dropped stator. Offsite power was not restored for 6 days.

On April 1, 2013, a risk evaluation of the event was performed in accordance with MD8.3, "NRC Incident Investigation Program" to evaluate the level of NRC response for the event. At the time, Unit 1 was in the refueling mode with the reactor cavity flooded. A Region IV SRA used IMC 0609 Appendix G, Attachment 2, "Phase 2 Significance Determination Process Template for PWR during shutdown", along with other risk evaluation tools and analyst judgment to estimate the conditional core damage probability (CCDP) of the event. The evaluation was reviewed by a risk analyst in NRR/DRA who specializes in shutdown risk assessment. The estimated CCDP for Unit 1 was $1.6E-4$, which along with the assessment of the deterministic criteria in MD8.3, met the threshold for performing a reactive inspection with an Augmented Inspection Team (AIT). The MD8.3 evaluation documented several unknown aspects of the event that could affect (increase) the risk estimate.

The AIT report was issued on June 7, 2013. The report discussed 10 unresolved items that were under NRC review. From July 15, 2013 through February 2, 2014, RIV conducted an AIT follow-up inspection to review the unresolved items and develop any inspection findings. During this period a potential finding and violation for Unit 1 was identified. The finding was evaluated using phase 1 of IMC 0609 Appendix G, "Shutdown Operations SDP". Specifically, the inspectors used IMC 0609 Appendix G Attachment 1 Checklist 4 and determined that the finding required a phase 2 or 3 analysis because it was a finding that degraded the licensee's ability to add reactor coolant system inventory when needed since a loss of offsite power occurred.

A phase 2 significance determination evaluation was not performed. A detailed risk evaluation, also known as a phase 3 evaluation, was performed by NRR/DRA. One of the assumptions in the detailed risk evaluation was a mission time of 72 hours for the emergency diesel generators and a mission time of 6 days for offsite power recovery. The inspection report stated the assumption as follows:

“PRA mission time is normally assumed to be 24 hours. However, after the event was initiated it took approximately six days to recover offsite power. If the emergency diesel generators failed after running successfully for three days the time to core uncover was over three days after the loss of DHR (Decay Heat Removal). Thus the emergency diesel generator mission time was modified to 72 hours.”

The detailed risk evaluation was peer reviewed by the RIV SRA who performed the initial MD8.3 risk evaluation and by another risk analyst in NRR/DRA. On January 30, 2014, a Significance and Enforcement Review Panel (SERP) was held to discuss the significance of the findings. The SERP agreed to issue a preliminary Red finding for Unit 1.

At a regulatory conference held on May 1, 2014 to discuss the significance of the findings, the licensee presented information to the NRC on potential recovery actions that could have been implemented to establish and maintain cooling if needed and requested that the NRC consider the recovery actions in the final SDP evaluation. NRC risk analysts considered the licensee's proposed recovery actions and revised the detailed risk evaluation. Additional SERP meetings were held on May 27, 2014 and May 29, 2014, to discuss the revised evaluation and the significance of the findings. The SERP concluded the finding for Unit 1 should be finalized as Yellow, a finding of substantial safety significance. The final significance determination letter was issued on June 23, 2014. The licensee did not appeal the final significance determination.

Evaluation:

The panel noted that the staff did not use the IMC 0308 and IMC 0609 Appendix G guidance that would have screened the finding to green as stated in the DPO. However as discussed below, the panel found that the staff appropriately deviated from this specific guidance when they determined that the finding would not be adequately assessed for significance given the inherent assumption of a 24 hour mission time in Appendix G.

Appendix G provides guidance for phase 1 and 2 significance determinations for shutdown findings in various shutdown modes of operation. For the refueling mode of operation with the reactor cavity flooded, commonly referred to as plant operating state (POS) 3, the safety significance of findings would typically be very low (Green) because the amount of water above the reactor core allows for significant time to recover the decay heat removal function if it was not available. Specifically, for such scenarios, the time to core damage would be greater than 24 hours. Since the Appendix G guidance uses an inherent assumption of a 24 hour mission time for successful mitigation of core damage (which is widely used in probabilistic risk assessment (PRA)), the guidance will lead to a Green outcome.

During interviews, the staff involved with the detailed risk evaluation informed panel members they recognized that guidance in Appendix G would screen the finding to Green but determined that this was not appropriate based on event-specific information and on the previous staff risk evaluation in support of the MD8.3 decision. When the finding was

identified during the AIT follow-up inspection and it was determined to be related to the cause of the initiating event, the RIV SRA determined that, similar to the MD8.3 evaluation, a deviation from the existing Appendix G guidance that used the 24 hour mission time assumption would be necessary. The licensee performance deficiency directly led to the stator drop hence the phase 2 risk estimate completed for the MD8.3 evaluation, had it been done again for SDP purposes, would have been essentially unchanged. As a result, no phase 2 was performed and NRR was requested to perform a detailed risk evaluation. The detailed risk analysis simply stated that no phase 2 evaluation was performed but did not specifically document the reasons why Appendix G phase 2 could not adequately address this finding. However, the detailed risk evaluation appropriately documented the assumptions that were used to evaluate the finding.

The need to deviate from IMC 0308 and IMC 0609 appendices to perform a detailed risk evaluation of a finding is recognized by the inspection manual. The panel noted the following relevant statements as a few examples that describe a general philosophy in the significance determination process that an analyst may deviate from phase 1 or phase 2 guidance, if necessary.

IMC 0308 Attachment 3, "Significance Determination Process Basis Document", section C.3.5 stated:

"Phase 2 for any risk-informed SDP should, as much as possible, provide a simplified risk-informed process that can be implemented by inspectors and be used as a risk communication tool. The public basis for an SDP results does not have to be more extensive or resource intensive than Phase 2 if this basis reflects the staff's basic understanding of the significance, which may be checked by professional risk-analysts using more detailed computer-based risk models. Even when the reactor safety SDP tool (phase 2) cannot be used for a particular reactor safety inspection finding because its pre-specified imbedded assumptions are not appropriate to the finding, the departure from the publically documented process (i.e., a phase 3 analysis) can often be understood in terms of appropriate adjustments that are made to the phase 2 model. Thus the published SDP model may continue to serve a valuable role as a communication tool, even for phase 3 analysis."

"Phase 3 was defined to address the expected need to depart from the Phase 2 guidance when the Phase 2 modeling assumptions are known to be inaccurate or incomplete, and requires professional risk analysts to be involved in all such cases."

IMC 0308 Attachment 3, Appendix A, section 3.1, "The Technical Basis for the At-Power Screening Questions" also provides guidance that the staff can deviate from the existing guidance if necessary. The following excerpt expresses this point:

"Therefore, as a conservative measure, if a finding screens to green in accordance with the applicable screening questions and the staff has reason to believe that there is still potential that the finding is risk significant, the staff reserves the opportunity to perform a more detailed risk evaluation."

IMC 0609 Appendix G guidance also recognizes that a quantitative evaluation can be a phase 2 or a phase 3, both are not required, and that certain complex findings need to go directly to a detailed risk evaluation performed by headquarters staff. Appendix G also states

that the SRA determines which findings require a detailed risk evaluation. Below are several relevant excerpts from the version of Appendix G in effect at the time this SDP was in progress on this point:

IMC 0609 Appendix G, section 3.2, "Objective", stated:

"When using this guidance to assess a finding, there are two possible outcomes: (1) the finding requires quantitative assessment (Phase 2 or Phase 3 analysis) to determine its risk significance, or (2) the finding can be screened as having very low risk significance (Green)."

Further it stated:

"Caution: To determine if a shutdown finding needs quantitative assessment, the inspector should review Appendix G, Attachment 1 to ensure that the licensee is maintaining an adequate mitigation capability and (2) Table 1 if an event occurred that could be characterized as a loss of control. If these conditions occur, the finding needs to be quantitatively assessed."

Further NRC IMC 0609 Appendix G, Section 3.5 stated:

"If a finding needs quantitative assessment, then the finding should be forwarded to the SRA. The SRA will then decide if the finding should be forwarded to NRR for Phase 3 analysis or the finding will be evaluated using the Phase 2 PWR and BWR templates located in Attachments 2 and 3 respectively. The SRA should be sent the completed checklists associated with the finding and a complete description of the finding."

After interviewing staff involved in the analysis of the finding and reviewing documents, the panel concluded that this was a very complex event which should not have screened to green as the NRC's best estimate for the significance determination. This event was an extended loss of offsite power (LOOP) with many complications that occurred during a time when the electrical distribution systems were not in the normal alignment. This level of complexity would necessitate a detailed risk evaluation. The panel found that the Inspection Manual guidance recognizes that these complex issues can occur and allows the NRC to perform a detailed risk evaluation as necessary.

The panel also determined that the Appendix G guidance for phase 1 and 2 that would screen most findings using a 24 hour mission time assumption is generally applicable. However, in this specific case, the fact that offsite power was not recovered for six days caused this event and related finding to be outside the inherent assumptions of the IMC 0609 Appendix G PWR template for findings in POS 3.

Given the determination that the existing guidance was not applicable for this specific finding, the NRR risk analyst developed an alternate input regarding mission time. All inputs and assumptions and a list of generic references were documented in the SERP worksheet and in the inspection report. The analyst used a 72 hour mission time for the emergency diesel generators rather than the typically used 24 hour mission time assumed in the IMC 0308 and IMC 0609 guidance. The panel discussed this particular assumption with the analyst and determined that it was appropriately developed based on the event that occurred.

The RASP manual provides methods and guidance to perform risk evaluations. It contains a section on mission time that provides guidance for risk analysts. It states that it is not within the scope of the manual to repeat program-specific requirements and if there is a conflict between RASP and the IMCs that the program specific requirements supersede the RASP manual guidance. The panel did not view the general use of a 24 hour mission time for phase 2 of Appendix G as a program requirement and instead considered the use of a 24 hour mission time as an assumption of the SDP that is generally appropriate but not required to be used in an SDP evaluation, if it is not appropriate to the finding. Therefore, the panel did not see a conflict between Appendix G and the RASP manual for the example provided.

The detailed risk evaluation, including the assumption to use a mission time greater than 24 hours, was peer reviewed by other risk analysts, reviewed by the SERP panel, and also provided to the licensee for their review. None of these reviews challenged the mission time assumption. The panel considered this fact as further evidence that deviating from Appendix G and using an increased mission time was reasonable for this inspection finding.

With respect to the RASP manual consistency with the ASME/ANS PRA Standard (PRA standard) document regarding mission time, the panel reviewed the manual and the standard. The RASP manual is an NRC document and was written primarily for evaluating the safety significance of events and findings for the Reactor Oversight Process and the Accident Sequence Precursor Program. In these cases, event-specific input is important. The PRA standard is used to guide the development of baseline probabilistic risk assessments to estimate the overall risk from typical (or best estimate) plant operations. Since the documents are references for different uses, it would not be unexpected that there would be some differences in the way analysis input or assumptions are applied. The panel did not see any substantive differences with respect to mission time guidance. The DPO submitter questioned the meaning of some terms used, notably the term "safe, stable, state". The panel agreed that this term, which is used in the PRA standard, could be further explained in the RASP manual to help risk analysts recognize situations where alternate assumptions regarding mission time or functional success criteria should be considered.

Conclusions:

- The panel noted that the staff did not use the IMC 0308 and IMC 0609 Appendix G guidance for the SDP evaluation for the ANO Unit 1 stator drop event. However, the Panel concluded that the staff appropriately deviated from this specific guidance when they determined that the finding would not be adequately assessed for significance given the inherent assumption of a 24 hour mission time in Appendix G.
- The panel concluded that the ANO Unit 1 stator drop event was a very complex event which would require a detailed risk evaluation for the SDP determination. This event was an extended LOOP with many complications that occurred during a time when the electrical distribution systems were not in the normal alignment. The panel found that the Inspection Manual guidance recognizes that these complex issues can occur and allows the NRC to perform a detailed risk evaluation as necessary.
- The panel also determined that the IMC 0609 Appendix G guidance for phase 1 and 2 that would screen most findings using a 24 hour mission time assumption is generally applicable. In this specific case, the fact that offsite power was not recovered for six days caused this event and related finding to be outside the inherent assumptions of the IMC 0609 Appendix G PWR template for findings in POS 3.

Recommendations:

- The panel recommends that the comprehensive review of the RASP handbook include additional guidance on a “safe, stable, end state” and appropriate consideration of the need to increase the mission time or other analysis assumptions or functional success criteria of modeled components.
- The panel recommends that the IMC 0609 and IMC 0308 documents be revised to clarify the expected need for flexibility in performing SDP evaluations. While the panel determined the documents already allow flexibility, in order to ensure appropriate technical assumptions are developed consistent with the unique aspects of individual findings, additional clarity would be helpful.

Concern 2: If the process identified in IMC 0609 Appendix G had been used, the SDP finding for the ANO Unit 1 stator drop should be Green.

The Panel reviewed the ANO Unit 1 stator drop event and determined that, if IMC 0609 Appendix G had been used, the SDP finding would be Green. However, as discussed in the write-up for Concern 1, the Panel is of the opinion that the ANO Unit 1 stator drop event was a complicated event with several unique circumstances. As such, the evaluation of safety significance for the event required input and assumptions that are more event-specific and thus warranted a more detailed risk analysis. The Panel finds that the more detailed risk analysis process used by NRC staff to arrive at a Yellow finding was the appropriate one to use. (Note that the Panel’s review focused on the processes used and on the inputs to these processes. The Panel did not focus on the details of the evaluations or their results.)

Conclusions:

- The evaluation of safety significance for the ANO Unit 1 stator drop event required a more detailed risk evaluation, and the staff’s process used to arrive at a Yellow finding for the ANO Unit 1 stator drop event was the appropriate one to use.

Recommendations:

None.

Concern 3(a) -The RASP Handbook contains several pieces of inaccurate information.

The Panel interviewed the DPO submitter and various agency staff and management to better understand the purpose and intent of the RASP Handbook. Consistent with the guidance in the handbook, its purpose and intent is to provide a means for risk analysts to use standard and consistent approaches and best practices in performing risk applications that are not inconsistent with implementing requirements. The RASP Handbook states the following:

Relationships to program requirements. This handbook is intended to provide guidance for implementing requirements contained in program-specific procedures, such as Inspection Manual Chapter (IMC) 0609, “Significance Determination Process,” MD 8.3, IMC 0308, “Reactor Oversight Process (ROP) Basis Document,” and IMC 0309, “Reactive Inspection Decision Basis for Reactors.” It is not the scope of this handbook to repeat program-specific requirements in the handbook, since these requirements may differ among applications and

may change as programs evolve. Program-specific requirements supersede guidance in this handbook.

The Panel notes that there may be possible misinterpretation on what the handbook represents in terms of guidance. Some are of the opinion that the handbook is meant as a “procedure” to be followed as written with the handbook to be fully consistent with program requirements. Others believe that the handbook (while remaining consistent with program requirements) should be considered a living document subject to change as experience is obtained in its use and that the handbook may offer guidance that is not necessarily contained in other documents. There is a general consensus among the staff and managers interviewed that when a particular approach is used, deviations may be allowed as long as these are approved and sufficiently justified and documented in the analysis.

All parties interviewed agreed that the RASP Handbook is a “methods” document that captures best practices for performing the various risk assessments and is expected to evolve with use. These best practices are oftentimes not specifically addressed in specific program requirements such as those mentioned above. As such, there may be situations where the analyst, using his or her experience and knowledge, uses the RASP Handbook to apply risk assessment approaches, with the possibility that the approach itself may not have been used before. However, in all circumstances the risk analyst is obligated to ensure that any given approach identified is not inconsistent with program requirements. The term “inconsistent” (versus consistent) is used because the program requirements may be silent on the appropriate risk evaluation method chosen for the assessment. The DPO Panel agrees that the RASP Handbook should retain its flexibility in this manner. The Panel agrees that it is not a requirements document. Rather, it is a collection of acceptable approaches to performing risk assessments.

In applying this flexibility, there may arise situations where approaches identified in the RASP Handbook do not clearly coincide with program requirements. In these situations, the analyst is obligated to consult with and to inform the technical and program experts, managers and other involved staff pertinent to the assessment outcome to ensure that the intent of program requirements are satisfied. It is also expected that these situations are identified for follow-up to provide the necessary clarity for subsequent assessments.

Conclusions:

- The DPO Panel did not identify that the RASP Handbook contained “several pieces of inaccurate information.” The panel, however, believes a more appropriate expression for concern would be on the “consistency” of handbook contents when compared with program requirements. The panel concluded that the handbook would benefit from a comprehensive review to ensure its guidance is not inconsistent with existing program requirements.
- The DPO Panel does not consider the RASP Handbook as a requirements document. Rather, it represents risk assessment guidance that is a “methods” document for capturing best practices for performing risk evaluations.
- The DPO Panel considers that flexibility in the use of the RASP Handbook is essential as long as its application is not inconsistent with program requirements. This approach is considered by the DPO Panel in the best interest of furthering the application of risk technology.

Recommendations:

- The DPO Panel recommends that a comprehensive review of the RASP Handbook be performed to ensure its guidance is not inconsistent with program requirements.
- The DPO Panel recommends that the purpose and use of the RASP Handbook be clarified to ensure it remains a “living” methods document which takes into account the use of available best practices which may or may not be specified in higher tier program documents.

Concern 3(b) - The review and approval process for the handbook is not rigorous. The current RASP Handbook change process is inadequate.

The DPO Panel interviewed the DPO Submitter and staff and management in NRR’s Division of Risk Assessment to gain a better understanding of the identified statement of issue. The panel also reviewed the Agency response to DPO-2014-002 (ML14344A291).

The DPO Panel independently assessed the agency actions relative to the review and approval process established as a result of DPO-2014-002 and concluded that the actions were adequate and represented a considerable improvement over the previous process. However, the panel noted that the review and approval process had not been incorporated into the RASP Handbook at the time of the panel’s review due to other competing priorities as expressed by the responsible Branch Chief.

The panel noted that an even more rigorous review and approval process for the RASP Handbook was under development. The project consisted of two phases. The first phase is to establish reasonable quality assurance requirements for the RASP Handbook. The second phase involves identifying discrepancies between the RASP Handbook and the program requirements.

For the first phase of the project, the DPO panel reviewed draft material being developed for that process and considered the material to be of very high quality but questioned the need for such an intensive process – a process that appears to go well beyond agency established practices for document development and revision as described in IMC 0040, “Preparing, Revising and Issuing Documents for the NRC Inspection Manual”. The panel viewed the draft process as potentially very resource intensive. The added value of such a review may not be commensurate with the resources required, particularly because the use of the RASP manual guidance is typically reviewed by staff and management during SDP, accident sequence precursor (ASP), Notice of Enforcement Discretion (NOED), and MD8.3 event response evaluations.

For the second phase of the project, the DPO Panel, after discussions with relevant staff and management, agree that a comprehensive review of the RASP Handbook against implementing requirements is warranted. The DPO Panel discussed the suggestion to perform the comprehensive review with DRA management who agreed that the review was needed.

Conclusions:

- The DPO Panel considers the agency's proposed response to DPO-2014-002 for establishing a more rigorous process for review and approval for changes to the RAS Handbook to be adequate.
- The DPO Panel agrees that a comprehensive review of the RASP Handbook against implementing requirements is warranted.

Recommendation:

- The DPO Panel recommends that the initiative to further develop the RASP handbook quality assurance process beyond that recommended by the response provided by DPO-2014-002 be carefully considered taking into account agency resources and long term value added.

Overall Conclusions Regarding DPO-2015-001

The Panel concludes that the ANO Unit 1 event was a very complex event which required a more detailed analysis to be used to determine the best estimate results for the significance determination. The panel found that the Inspection Manual guidance recognizes that these complex issues can occur and allows the NRC to perform a detailed risk evaluation as necessary.

The Panel determined that the IMC 0609 Appendix G guidance for phase 1 and 2 evaluations that would screen most findings using a 24 hour mission time assumption to be generally applicable. However, this guidance would not be appropriate for events where the mission time is appreciably greater or less than 24 hours (for example, in the ANO Unit 1 stator drop event, offsite power was not recovered for six days).

The Panel concludes that the process used to arrive at a Yellow SDP finding for the ANO Unit 1 stator drop event was the appropriate one to use.

The Panel concludes that the RASP Handbook represents risk assessment guidance that is meant to be a "methods" document for capturing best practices for performing risk evaluations. The Panel considers that flexibility in the use of the RASP Handbook is essential as long as its application is not inconsistent with program requirements. Although the Panel did not agree that the RASP Handbook necessarily contained "several pieces of inaccurate information," the Panel concluded that the handbook would benefit from a comprehensive review to ensure its guidance was not inconsistent with existing program requirements.

The Panel concludes that the agency's proposed response to DPO-2014-002 for establishing a more rigorous process for review and approval for changes to the RASP Handbook to be adequate.

Overall Recommendations Regarding DPO-2015-001

Based on the Panel's review, the following recommendations are provided for consideration by the Office of Nuclear Reactor Regulation:

- The Panel recommends that a comprehensive review of the RASP Handbook be performed to ensure its guidance is not inconsistent with program requirements.
- The DPO Panel recommends that the purpose and use of the RASP Handbook be clarified to ensure it remains a “living” methods document which takes into account the use of available best practices which may or may not be specified in higher tier program documents.
- The Panel recommends that the comprehensive review of the RASP handbook include additional guidance on a “safe, stable, end state” and appropriate consideration of the need to increase the mission time of modeled components.
- The panel recommends that IMC 0609 and IMC 0308 documents be revised to clarify the expected need for flexibility in performing SDP evaluations. While the panel determined the documents already allow flexibility, additional clarity would be helpful in order to ensure appropriate technical assumptions are developed consistent with the unique aspects of individual findings.
- The Panel recommends that the initiative to further develop the RASP handbook quality assurance process beyond that recommended by the response provided by DPO-2014-002 be carefully considered taking into account agency resources and long term value added.

**Document 4: Comments from Submitter for Regional
Administrator to Consider**

Document 5: DPO Decision

Hi Marc,

Thank you for forwarding the DPO Panel's report. I am very appreciative. I would like to provide just a few comments and then (because of my current situation) I'll be done. I don't believe that I'll be employed by the NRC much longer, so I'll have to forfeit my appeal rights.

One of the conclusions was that the NRC followed the required process. I could not disagree with this conclusion more. While the process does allow analysts to perform a Phase 3 at any time, it's also important to document the deviation from the process and justify the reason(s). This was not performed. It also does not permit unreasonable assumptions (like extending the accident mission time to six days just to obtain core damage).

The RASP Handbook is a methods book and does not represent program requirements. In fact, Volume 4, specifically states:

1.2 The scope of the handbook is provided below. ..

...**Relationships to Program Requirements.** This handbook is intended to provide guidance for **implementing requirements contained in program-specific procedures, such as Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," and IMC 0309, "Reactive Inspection Decision Basis for Reactors."** It is not the scope of this handbook to repeat program-specific requirements in the handbook, since these requirements may differ among applications and may change as programs evolve. **Program-specific requirements supersede guidance in this handbook.**

Again, thanks for the opportunity to review the report.

George



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

February 2, 2016

MEMORANDUM TO: George D. Replogle, Senior Reactor Analyst
Division of Reactor Safety, Region IV

FROM: Marc L. Dapas, Regional Administrator, Region IV */RA/*

SUBJECT: DIFFERING PROFESSIONAL OPINION REGARDING THE
SIGNIFICANCE DETERMINATION PROCESS EVALUATION
FOR A FINDING AT ARKANSAS NUCLEAR ONE INVOLVING
THE MARCH 2013, UNIT 1 STATOR DROP EVENT (DPO-2015-001)

On September 2, 2015, in accordance with Management Directive 10.159, "The Differing Professional Opinions Program", you submitted a differing professional opinion (DPO) concerning the significance determination process (SDP) evaluation result of "Yellow" for a finding at Arkansas Nuclear One (ANO) involving a Unit 1 stator drop event that occurred in March 2013. Upon coordination with Patricia Holahan, Director, Office of Enforcement (OE), myself (as the DPO decision authority), and you (as the DPO submitter), a DPO Ad Hoc Review Panel (the Panel) was established by memorandum from Renee Pedersen, Senior Differing Professional Views Program Manager, OE, dated September 23, 2015. The Panel was tasked with reviewing your DPO submittal and providing me with a report documenting the Panel's conclusions and any associated recommendations. The Panel met with you on October 6, 2015, and based collectively on the results of that interview and review of the DPO submittal, developed a concise statement of your concerns. You approved the statement of concerns on October 15, 2015. Upon completing its deliberations, which included interviews with you on several occasions, completion of a number of document reviews, and interviews with staff and managers from the Office of Nuclear Reactor Regulation (NRR) and the regional offices, the Panel provided me with its report, dated January 22, 2016, for my consideration in issuing a decision regarding the subject DPO. A copy of the report was provided to you and you sent me an email response on January 28, 2016.

In order to make a decision with regard to your DPO, I reviewed your DPO submittal, the Panel's report, and your January 28, 2016 email to me providing comments on the conclusions documented in the DPO Panel's report, as well as the decision with respect to DPO-2014-002, "Differing Professional Opinion Involving Use of Conditional Core Damage Probability to Evaluate Performance Deficiencies that Cause Initiating Events" (ADAMS Accession Number ML14344A291), since that DPO decision was referenced in both the Panel's report and your own submittal pertaining to this DPO (DPO-2015-001).

Statement of Concerns

- (1) The staff is not following certain procedures associated with determining the significance of inspection findings. Inspection Manual Chapter (IMC) 0308, "Reactor Oversight Process (ROP) Basis Document", and IMC 0609, "Significance Determination Process", are the governing documents for significance determination process (SDP) risk evaluations and the Risk Assessment Standardization Project (RASP) Handbook is a sub-tier document. Program requirements in IMCs 0308 and 0609 must be followed when there is a conflict between these documents and the RASP Handbook. The Phase 2 process documented in IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process", should have been used for the ANO Unit 1 stator drop SDP evaluation. Instead, guidance from the RASP Handbook was used. The RASP Handbook is not consistent with the program requirements specified in IMCs 0308 and 0609 or with the American Society of Mechanical Engineers (ASME) Probabilistic Risk Assessment (PRA) Standards document. (The 24-hour vs. 72-hour diesel generator mission time (6-day total mission time) was the example used to highlight this issue.)
- (2) If the process identified in IMC 0609 Appendix G had been used, the SDP finding for the ANO Unit 1 stator drop should be Green. Instead, because of the above two issues, the SDP finding was finalized as Yellow. (If the finding is Green, the resulting NRC inspections at ANO Unit 1 should be based on Inspection Procedure (IP) 95002, "Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area", instead of IP 95003, "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs, or One Red Input".)
- (3) The RASP Handbook contains several pieces of inaccurate information and the review and approval process for the handbook is not rigorous. In addition, the RASP Handbook change process is inadequate.

DPO Panel Conclusions

- (1) The ANO Unit 1 stator drop event was a very complex event which required a detailed risk analysis to determine the best estimate results for the significance determination.
- (2) The process used by the staff to determine the significance of the associated performance deficiency, which resulted in the issuance of a "Yellow" finding to Entergy (the licensee for ANO) on June 23, 2014, was the appropriate process to use.
- (3) The RASP Handbook is a risk assessment guidance (or "methods") document for capturing best practices for performing risk evaluations, and as such, the flexibility in the

use of the RASP Handbook is essential as long as its application is not inconsistent with program requirements.

- (4) The agency's response to DPO-2014-002, proposing the establishment of a more rigorous process for review and approval of proposed changes to the RASP Handbook, is adequate.

DPO Panel Recommendations

Based on its conclusions and several potential process improvements identified during its review, the Panel made the following recommendations:

- (1) A comprehensive review of the RASP Handbook be performed to ensure its guidance is not inconsistent with program requirements.
- (2) The purpose and use of the RASP Handbook be clarified to ensure it remains a "living" methods document which takes into account the use of available best practices which may or may not be specified in higher tier program documents.
- (3) The comprehensive review of the RASP handbook include additional guidance on a "safe, stable, end state" and appropriate consideration of the need to increase the mission time of modeled components.
- (4) IMCs 0308 and 0609 be revised to clarify the expected need for flexibility in performing SDP evaluations.¹
- (5) The initiative to further develop the RASP handbook quality assurance process beyond that recommended by the response provided to DPO-2014-002, be carefully considered taking into account agency resources and long term value added.

Decision and supporting rationale

After considering all of the information, I agree with the Panel's conclusions and endorse the recommendations provided by the Panel for NRR's consideration. The basis for my decision follows.

Your principal concern that the staff did not follow the governing procedures associated with determining the significance of inspection findings, and as a result, reached the wrong SDP outcome of "Yellow" instead of "Green" for the finding pertaining to the ANO Unit 1 stator drop event, derives from the staff's use of a 72-hour mission time for the emergency diesel generators (EDGs) versus a 24-hour mission time as specified in IMC 0609, Appendix G, and

¹ While the panel determined the documents already allow flexibility, additional clarity would be helpful in order to ensure appropriate technical assumptions are developed consistent with the unique aspects of individual findings.

its associated attachments, and IMC 0308, Attachment 3, Appendix G, "BWR [Boiling Water Reactor] and PWR [Pressurized Water Reactor] Phase 2 Significance Determination Process for Shutdown". As you stated in your DPO submittal, use of IMCs 0609 and 0308 would have resulted in the subject finding screening to "Green".

As noted in the Panel report, for the refueling mode of operation with the reactor cavity flooded, commonly referred to as plant operating state (POS) 3, the safety significance of findings would typically be very low (Green) because the amount of water above the reactor core allows for significant time to recover the decay heat removal (DHR) function if it was not available. Specifically, for such scenarios, the time to core damage would be greater than 24 hours. In performing Phase 1 and Phase 2 SDP evaluations for findings involving shutdown modes of operation, application of the IMC 0609 and IMC 0308 Appendix G guidance, which assumes a 24-hour mission time for successful mitigation of core damage, results in a Green finding.

The staff involved with the detailed risk evaluation, i.e., Phase 3 SDP analysis, recognized that use of the Appendix G guidance would have resulted in the subject finding screening to Green, but determined that this was not appropriate based on event-specific information. The Unit 1 stator drop event was very complex. It involved an extended loss of offsite power (LOOP) with many complications that occurred during a time when the electrical distribution systems were not in the normal alignment. This level of complexity necessitated a detailed risk evaluation using the Phase 3, quantitative SDP analysis tool. As described in the Panel's report, Inspection Manual Chapters 0609 and 0308 recognize that these complex events can occur, and consequently allow the NRC to perform a detailed risk evaluation, i.e., Phase 3 SDP analysis, as necessary. This includes the flexibility to modify various modeling assumptions when the pre-specified imbedded assumptions are not appropriate to the finding. As specifically noted in IMC 0308, "Phase 3 was defined to address the expected need to depart from the Phase 2 guidance when the Phase 2 modeling assumptions are known to be inaccurate or incomplete, and requires professional risk analysts to be involved in all such cases." While the 24-hour mission time prescribed in the Appendix G guidance for conducting Phase 1 and Phase 2 SDP analyses is generally applicable, the fact that offsite power was not recovered for six days caused this event and related finding to be outside the inherent assumptions of Appendix G for findings in POS 3. More specifically, given that it took approximately six days to recover offsite power and that upon a loss of DHR, it would have taken over three days for the core to become uncovered, modification of the mission time for the EDGs from the 24-hour time assumed in the IMC 0308 and IMC 0609 Appendix G guidance, to a 72-hour mission time, was appropriate.

You stated in your DPO submittal that "the RASP Handbook is a sub-tier methods handbook that is required to be consistent with the IMCs." You also stated that "in lieu of the instruction contained in IMC 0609, Appendix G, and IMC 0308, Attachment 3, Appendix G [specifically, that LOOP events are not assessed for POS 3 since the time to uncover the core is considered to be greater than 24 hours], the analyst had followed other guidance contained in the RASP Handbook." Volume 1, "Internal Events", and Volume 4, "Shutdown Events", of the RASP Handbook provide guidance on appropriate adjustments to component, e.g., EDG, mission time dependent upon the duration of LOOP events. As noted by the Panel, the RASP Handbook contains guidance for performing various risk evaluations, and it states that it is not within the scope of the Handbook to repeat program-specific requirements, noting that if there is a conflict between the RASP Handbook and the IMCs, the program-specific

requirements supersede the RASP Handbook guidance. As documented in its report, the Panel did not view the general use of a 24-hour mission time per Appendix G in conducting a Phase 2 SDP evaluation as a program requirement. Instead, the Panel considered the use of a 24-hour mission time as generally appropriate for the SDP, but not a required assumption if it is not appropriate to the finding. Therefore, the Panel did not see a conflict between Appendix G and the RASP Handbook for the example provided involving EDG mission time. In addition, as noted by the Panel, the detailed risk evaluation comprising the Phase 3 SDP analysis, including the greater than 24-hour mission time assumption, was peer reviewed by other risk analysts, reviewed by the Significance and Enforcement Review Panel, and also provided to the licensee for its review. Noting that none of these reviews challenged the mission time assumption, the Panel considered this fact as further evidence that deviating from the Appendix G guidance and increasing the mission time was reasonable for the subject inspection finding. It is my view that the Panel has applied sound logic as described above in arriving at its conclusion.

With respect to your concern that the RASP Handbook is not consistent with the ASME PRA standard regarding mission time, the Panel noted that the RASP Handbook is an NRC document intended for use in evaluating the safety significance of events and findings in connection with the Reactor Oversight Process and the Accident Sequence Precursor Program, whereas the ASME PRA standard is a document used to guide the development of baseline PRAs in estimating the overall risk from typical plant operations. I agree with the Panel's conclusion that since the documents are references intended for different uses, it is not unreasonable to expect some differences in the way analysis input or assumptions are applied. Notwithstanding, as noted by the Panel, the differences in the guidance with respect to mission time were not substantive. I also agree with the Panel's conclusion that the term "safe, stable, state", used in the ASME PRA standard in the context of component mission time to achieve stable plant conditions, could be further explained in the RASP Handbook, as it would help NRC risk analysts recognize those situations where alternate assumptions regarding mission time or functional success criteria should be considered.

I noted that the Panel, in evaluating your concern that the RASP Handbook contains several pieces of inaccurate information, interviewed various agency staff and management to obtain their respective views on the purpose and intended application of the RASP Handbook. The Panel indicated in its report that "all parties interviewed agreed that the RASP Handbook is a 'methods' document that captures best practices for performing various risk assessments and is expected to evolve with use." These "methodologies/best practices" are oftentimes not specifically described, referenced, or addressed as "program-specific requirements" in the governing program documents such as IMCs 0609, 0308, and 0309, "Reactive Inspection Decision Basis for Reactors." Lack of reference in the governing IMCs to a specific methodology/best practice contained in the RASP Handbook does not automatically mean that the subject methodology/best practice is inconsistent with program-specific requirements. However, I do think it would be a prudent measure, as the Panel recommends, for the staff to conduct a comprehensive review of the RASP Handbook to ensure its guidance is consistent with existing program requirements. Of particular note, one of the recommendations from the DPO Panel established to review DPO-2014-002 was that, "The staff should ensure that guidance in the RASP Handbook conforms with governing ROP documents. This could involve changes or clarifications to the RASP Handbook, to governing ROP documents, or to both the RASP Handbook and governing ROP documents." This DPO Panel recommendation was endorsed by the Director of NRR in his memorandum to the DPO

submitter dated November 21, 2014. As reflected in the decision for DPO-2014-002 and in the Panel's report for DPO-2015-001, relevant staff and management in NRR agree that a comprehensive review of the RASP Handbook against the implementing requirements is warranted. Of note, this action is still outstanding and it has been 14 months since the decision on DPO-2014-002. Regarding DPO-2015-001, I also agree with the Panel's view that risk analysts should continue to have the flexibility to apply risk assessment approaches/methodologies described in the RASP Handbook since it is in the best interest of furthering the application of risk technology. However, as the Panel noted, when applying this flexibility, if a situation arises where the approach identified in the RASP Handbook appears to be inconsistent with program-specific requirements, the risk analyst is obligated to follow up with appropriate staff/management to ensure that the intent of program requirements is satisfied.

With respect to your concerns that the review and approval process for the RASP Handbook is not rigorous and the associated change process is inadequate, I noted that you raised similar concerns in DPO-2014-002. Recommendation 6 from the DPO Panel established to review DPO-2014-002 was, "A rigorous change control process should be adopted for incorporating changes to the RASP Handbook." This recommendation was endorsed by the NRR Director in his memorandum to the DPO submitter dated November 21, 2014. The Panel's report for DPO-2015-001 indicates that the revised review and approval process for changes to the RASP Handbook that has been established by the NRR's Division of Risk Assessment in response to recommendation 6 from DPO-2014-002, represents a "considerable improvement over the previous process." However, as noted by the Panel, the subject revised review and approval process has not yet been incorporated into the RASP Handbook.

Thank you for your active participation in the DPO process. Your willingness to raise concerns with our regulatory processes and associated outcomes via a DPO when previous discussions with staff and management on the involved issues did not result in satisfactory resolution, is important to ensuring a healthy safety culture within the agency. When the case is closed, a summary of the DPO and associated decision will be included in the Weekly Information Report to advise interested employees of the outcome. In addition, you will be included on correspondence involving the development/listing of follow up actions and associated implementation schedules.

Enclosure:

DPO Panel Report dated January 22, 2016

cc: W. Dean, NRR
Patricia Holahan, OE
R. Pedersen, OEI
M. Sewell, OE
J. Giitter, NRR
K. Kennedy, Region IV
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